SWEET'S ARCHITECTURAL CATALOGUE

SEVENTEENTH
ANNUAL
EDITION

SWEETS CATALOGUE SERVICE, INC.
NEW YORK, N.Y.

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ARCHITECTURAL
CATALOGUE

A Completely Indexed Catalogue Filing System
of
Building Materials, Supplies and Equipment

Seventeenth Annual Edition

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PREFACE

This Seventeenth Annual Edition of Sweet's Architectural Catalogue contains not only a more complete representation of producers and manufacturers of building materials but also a greater amount of informative data relating to building construction and equipment than any previous issue.

This fact and the increasing co-operation and improvement in service which it implies will, undoubtedly, be as gratifying to the users as it is to the publishers.

With the last edition a new form of index was adopted for the Products Section (Part III) and Specifications were separately indexed (Part IV). A new section (Part V) was added, indexing special useful information not susceptible of being indexed under the head of products. This form of index, having been heartily endorsed, has been followed this year, as has also the grouping of products throughout the book in classified sections.

It is with particular gratification, however, that the publishers call attention to the fact that the "Trade Groups or Classified Sections" (Part II) in this new edition conforms (with some few additional listings, required by the contents) to the Standard Construction Classification of the American Institute of Architects.

This is the first result of the co-operation of the Structural Service Committee of the Institute, through further contact with which and through the more general adoption of the Standard Classification, Sweet's Architectural Catalogue extends and raises the standard of its usefulness.

In recognition of the valued co-operation of architects and producers throughout the country and in the furtherance of the purposes for which the two conferences on Better Advertising to Architects were recently called, there is recorded on the third page following, with the approval of the Structural Service Committee, extracts from its Report, together with the action of the American Institution of Architects growing out of these conferences, concluding with an expression of the disposition of the publishers of Sweet's Architectural Catalogue to do their part in the accomplishment of these purposes.

In further recognition of the co-operation of the Institute, and in the belief that the users of this catalogue will appreciate having readily available basic information concerning the National Organization of the architectural profession, the publishers have much satisfaction in including in this edition an outline description of the American Institute of Architects.

In this will be found, in addition to the purposes and publications of the Institute, information concerning membership, chapters, committees, and other data which, used in connection with the Journal of the Institute, will, it is hoped, be useful to members of the Institute as well as to the profession at large.

Constructive criticisms and suggestions as to how Sweet's Architectural Catalogue may be further improved will always be welcomed.

THE EDITORS.

Publishers' Notice

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Any user of Sweet's Architectural Catalogue whose address or firm name changes is requested to notify the publishers *immediately* in order that the distribution lists may be accurately kept and subsequent issues delivered promptly.

Architects, engineers, contractors, purchasing agents and others identified with building and construction programs are invited to address Sweet's Architectural Catalogue, 119 W. 40th Street, New York, N. Y., for information on any special class of building material, equipment and supplies not fully covered in the following pages.

The publishers' files contain detailed information pertaining to the many products of the principal manufacturers.

It is the publishers' aim to make Sweet's Architecture Catalogue as comprehensive as possible. Users of this catalogue will confer a favor upon the publishers by reporting any omissions of catalogues of firms in whose products they are interested or if the catalogues herein are lacking in the specific data they require. Such co-operation will aid in making subsequent editions increasingly comprehensive. THE PUBLISHERS.

AMERICAN INSTITUTE OF ARCHITECTS

The Octagon House, Washington, D. C.

Objects

The objects of the Institute, as expressed in its Constitution, are: To organize and unite in fellowship the architects of the United States of America; to combine their efforts so as to promote the aesthetic, scientific, and practical efficiency of the profession, and to make the profession of ever-increasing service to society.

Membership

Any resident of the United States, who is a practicing architect, or an architect engaged in professional education, or an architectural draughtsman over thirty years of age, is eligible as a Member if able to submit the required proofs of his or her professional capacity and honorable personal and professional standing. Foreign architects practicing within the territory of the Institute shall be eligible to membership.

Juniors—Graduates of recognized schools of architecture, and special students of such schools if recommended by the head of the school, are eligible as "Juniors." They must apply within two years of completion of their collegiate work, and junior affiliation expires automatically upon the Junior's election to Chapter Associateship or Institute Membership, on his reaching the age of thirty. The Junior's dues are $5.00 a year of which $2.50 covers subscription to "The Journal."

Membership Qualifications—The requirements for Institute membership are based on the Institute's desires that there be affiliated with it every architect who is qualified to practice the profession of architecture, and who deals honestly with his brother architect and with those whom he serves. The Institute pledges its members to maintain professional standards of behavior and to render the right kind of service. It has not tried to create a privileged class of the profession bound to maintain a uniform price standard for architectural service. The Schedule of Charges has never been mandatory.

Membership Procedure—Membership Procedure has been simplified and the routine to be observed is clearly shown on the "Application Form" mentioned under "Documents." Two essentials are the endorsement of three Institute members and the exhibits of two executed buildings. Such exhibits should consist of photographs and drawings from the architect's files. They need not be specially prepared, and are carefully returned later. Graduates in architecture of the leading Universities, also holders of various scholarships noted on the application form, are excused from sending exhibits.

Assignment—Upon election, the new member is assigned to the Institute Chapter covering the territory where he practices or has his residence, as he prefers. There he comes into closer association with his fellow architects, and there he will find broader opportunities for service and self-improvement.

Fellowship—Fellowship is conferred upon a Member of the Institute who is a citizen of the United States, and who, in the opinion of an authorized jury of Fellows, shall have notably contributed to the advancement of the profession in design, construction, literature, or education.

Honorary Membership—There is within the Institute an honorary class composed of persons not eligible to membership, who have rendered the profession signal and valuable service, and who have conspicuously upheld its aims. This class consists of two groups of equal standing and dignity, known respectively as Honorary Corresponding Members and Honorary Members.

The number of Members as of June 7th, 1922, is as follows:

Members, 2123; Fellows, 272; Honorary Corresponding Members, 27; Honorary Members, 68.

The Initiation Fee and Dues

The initiation fee was reduced by the Fifty-fourth Convention from $20.00 to $5.00. This fee of $5.00 serves to cover the cost of handling the application.

The dues are $20.00 a year, which includes the subscription price of "The Journal," the official organ of the Institute.

Chapters

The membership, other than Honorary and Honorary Corresponding members, is distributed throughout fifty-one Chapters, located in different parts of the United States, as listed in the Annuary.

The local Chapter of the Institute is the American Institute of Architects in its territory. The Institute as a national entity is nothing more nor less than the aggregate force of its Chapters, as expressed by their influence and efforts in public and professional matters.

Officers

The President and other officers, including three members to serve on the Board of Directors, are elected at each annual meeting. A list of these, and the officers of the various Chapters, who are elected at different periods of the year, will be found, always current, in the pages of "The Journal" of the Institute.

Documents

The Institute issues, for distribution to its members and to any others making written application to the Executive Secretary, The Octagon House, Washington, D. C., the following Institute Documents:

The Standard Form of Agreement between Owner and Architect (Percentage Basis)	$ .05
A Form of Agreement between Owner and Architect (Fee Plus Cost System)	.05
A Circular of Information on the Fee Plus Cost System of Charges (Explanatory of Owner-Architect Agreement on Fee Plus Cost Basis)	.03
A Form of Agreement between Owner and Contractor (Cost Plus Fee Basis)	.10
Circular of Information Relative to Cost Plus Fee System of Contracting (Explanatory of Contractor-Owner Agreement on Cost Plus Fee Basis)	.06
A Circular of Advice and Information Relative to the Conduct of Architectural Competitions	Free
Standard Form of Competition Program	.10
Ethical Documents of the Institute (in booklet form)	Free
Circular on Functions of the Institute	Free
Circular on Information Concerning Requirements for Institute Membership	Free
Circular of Information Concerning Requirements for Chapter Associateship	Free
Constitution and By-laws	Free
Standard Form of Chapter Constitution and By-laws	Free
A Circular of Advice Relative to Principles of Professional Practice, the Canon of Ethics	Free
Schedule of Proper Minimum Charges	.02
Decisions of the National Board for Jurisdictional Awards in the Building Industry	Free
Model Registration Law	Free
List of Institute Documents	Free
A Filing System for Architects' Offices	Free

Standard Contract Documents—These represent the careful study and joint agreement of national organizations interested in the building industry.

They are recommended by the Institute, without reserve, as equitable to the Architect, Owner, Contractor and Sub-contractor.

These documents, obtainable separately or as complete sets from the Executive Secretary or from dealers in office and drafting supplies in all of the large cities of the country, are as follows:

Agreement and General Conditions (in cover)	$ .20
General Conditions without Agreement	.14
Agreement without General Conditions	.05
Bond of Suretyship	.03
Form of Sub-contract	.04
Letter of Acceptance of Sub-contractor's Proposal	.03
Cover (heavy paper—with valuable notes)	.01
Complete Set (in cover)	.30

Publications

"The Annual Proceedings" of the Convention, issued for distribution to members only, contain reports of officers, board of directors and committees, papers read, addresses delivered, and discussions.

"The Annuary" is issued without charge to members and at a charge of $5.00 to others. It contains a list of all officers, committees and members, with their addresses.

"The Journal," published by the Press of the American Institute of Architects, Inc., is the official organ of the Institute and goes to every member. The subscription price is at present $2.50 to members only ($5.00 to non-Institute members). Its Editorial pages and its Special Departments are intended to acquaint its readers with the technical, scientific, and economic developments of the building industry and with such urgent questions as Community Planning, City Planning, Housing, Education; also to keep them informed of the more intimate matters concerning professional practice, compensation, competitions, and the many activities of the Institute and its Chapters.

"The Monograph on the Octagon," containing thirty drawings (12x18), photographs and text, may be purchased at a price of $12.50.

"The Handbook of Architectural Practice" may be purchased for the sum of $5.00.

Committees

In professional and public service activities of the Institute, many committees are earnestly engaged. Names of the members of the Institute composing committees may be found in the "Annuary," before mentioned.

Standing and Special Committees, with Names and Addresses of Chairmen

Standing Committees	Chairmen	Addresses
Practice	Henry H. Kendall	142 Berkeley Street, Boston, Mass.
Judiciary	N. Max Dunning	Kimball Building, Chicago, Ill.
Contracts	B. W. Morris	101 Park Avenue, New York, N. Y.
Allied Arts		
Public Works	Burt L. Fenner	101 Park Avenue, New York, N. Y.
Building	D. Everett Waid	1 Madison Avenue, New York, N. Y.
Education	C. C. Zantzinger	112 S. 16th Street, Philadelphia, Pa.
Competitions	Edwin H. Hewitt	1200 2nd Avenue, South, Minneapolis, Minn.
Publications and Public Information	John V. Van Pelt	126 E. 59th Street, New York, N. Y.
Structural Service	Sullivan W. Jones	19 W. 44th Street, New York, N. Y.
Finance	Wm. B. Ittner	Board of Education Building, St. Louis, Mo.
Special Committees		
Community Planning	Clarence S. Stein	56 W. 45th Street, New York, N. Y.
Registration Laws	Wm. P. Bannister	69 Wall Street, New York, N. Y.
School Building Standards	Wm. B. Ittner	Board of Education Building, St. Louis, Mo.
War Memorials	Horace Wells Sellers	Stephen Girard Building, Philadelphia, Pa.
Small House Committee	Edwin H. Brown	1200 2nd Avenue, South, Minneapolis, Minn.
Foreign Building Co-operation	Charles Butler	56 W. 45th Street, New York, N. Y.
Co-operation with Engineers	Burt L. Fenner	101 Park Avenue, New York, N. Y.
Co-operation with Commission of Fine Arts	Edward W. Donn, Jr.	808 17th Street, N. W., Washington, D. C.
Industrial Relations	Robert D. Kohn	56 W. 45th Street, New York, N. Y.
Preservation of Historic Monuments and Scenic Beauties	Fiske Kimball	55 West Range, Charlottesville, Pa.
Archives	Donn Barber	101 Park Avenue, New York, N. Y.

Extracts from Report of the Executive Committee

JOINT CONFERENCE ON BETTER ADVERTISING TO ARCHITECTS

and *Resolutions* of the

American Institute of Architects

55th Annual Convention
June 7-9, 1922

The Executive Committee in its Report to the Institute, which report was amended at the Second Joint Conference between the Institute and the Building Materials Producers of the United States on "Better Advertising to Architects" held on June 5-6 prior to the 55th Annual Convention, said:

"All advertising, regardless of its vehicle, falls into two categories. The first may be referred to as 'Informational' or that which conveys technical information and data establishing quality and the suitability of a product for a specific use. The second may be generally termed 'Promotional' or that which is designed merely to capture or stimulate the reader's interest in the thing advertised; to make him want to know more about it; or better yet, want to use it.

"Technical or informational advertising, to be of value to the architect, must convey to him the kind of information and data he needs to make an intelligent selection and to make proper provision for employment of the product selected. Such advertising must be accepted by the architect as accurate and trustworthy. By experience the architect has learned what kind of information he needs in order adequately to provide for the use of a product in the preparation of specifications and drawings, and to identify it when delivered. To define the character of informational advertising is a relatively simple undertaking when approached from the standpoint of the architect's needs.

"But to determine what is and what is not effective promotional advertising is far more difficult. The necessary knowledge has, we believe, still to be born of experience in testing out new postulates. Many of our present assumptions rest upon the insecure foundation of theory or the results of tests which signify little or nothing. For the present, all that can be done is to erect lighthouses on the shoals and rocks of past practice to warn the advertiser.

"In the past, architects and manufacturers have been separated by a gulf of mutual misunderstanding as to incentives and attitudes and a certain common blindness with respect to their singleness of interest in the product and its proper use. This isolation of the two groups we now see quite clearly has deprived the architect of that commanding knowledge of materials and processes which is essential to his full competency, and withheld from the manufacturer that marked recognition of merit in the product without which standards of quality cannot be maintained against the pressure of price competition."

The outcome of the consideration of this report by the Joint Conference was that the Resolution printed below was adopted and referred to the Board of Directors of the Institute. By them it was presented, with the Board's unanimous recommendation, to the Convention.

The Convention, in turn, unanimously adopted the following:

RESOLUTION

Whereas the Joint Conference on Better Advertising to Architects between the Board of Directors of the American Institute of Architects and the Building Materials Producers of the United States and reported in the Journal of the A. I. A. of April, 1922, and the Conference in Chicago, held June 5th and 6th, 1922, has demonstrated the great desirability of a better understanding among architects and producers as to their common interest in the characteristics, presentation and appropriate utilization of products entering into construction, be it

Resolved by the American Institute of Architects, in 55th Annual Convention assembled, that the Structural Service Committee of the American Institute of Architects be authorized to create a Producers Section of the Structural Service Committee as a sustaining body to collaborate in the following duties:

(A) To advise and counsel with manufacturers, who may so desire, on the character of their advertising as to size, form, and content.

(B) To assist in furthering the use, by Architects and Producers, of the Standard Construction Classification adopted by the American Institute of Architects.

(C) To promote sincerity and reliability of statement in advertising.

SWEETS CATALOGUE SERVICE

was represented at both joint Conferences and subsequently has been in consultation with the Structural Service Committee of the Institute. It pledges itself to the fullest co-operation with the American Institute of Architects, its Structural Service Committee in its new activities, and with the producers of building materials and devices, generally, in securing the results desired to be accomplished.

GENERAL INDEX

The General Index is divided into five parts:

PART I. List of Manufacturers Represented

PART II. Trade Groups or Classified Sections

PART III. Classified List of Products, Including Trade Names

PART IV. Classified List of Specifications of Products and Materials

PART V. Useful Information Not Covered by the Above

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Part II

TRADE GROUPS OR CLASSIFIED SECTIONS

Products described in this volume have been divided into trade groups which are arranged in the order usually followed in writing specifications. The subjoined index gives the general classification of products and the approximate order in which the various groups and sub-groups are arranged; it does not, however, include in detail all products described. **For complete list and index of products, see Part III.**

The sub-groups of each main classification are arranged in the order shown, except in a few instances where paging did not permit.

1. **Architects' Office Supplies** 1–3

2. **Engineers and Contractors** 4–21
   - Inspection.
   - Piling.
   - Building.
   - Structural Steel.
   - Roof Trusses.
   - Acoustics.

3. **Contractors' Construction Equipment** 22–25
   - Wire Rope, Derricks, Concrete Mixers, etc.

4. **Concrete Work** 26–65
   - Portland Cement (see 13).
   - Floor Systems.
   - Reinforcing Steel: Bars and Rods, Wire Fabric, Expanded Metal, Corrugated Plates.
   - Concrete Reinforcement Devices: Chairs, Spacers, Saddles, Separators, Supports, etc.
   - Concrete Inserts.
   - Forms.
   - Nailing Concrete.

5. **Waterproofing** 66–99
   - Membrane Method: Bituminous Paints and Compounds, Felts.
   - Integral Waterproofing: Mass Concrete or Cement.

6. **Hardeners and Densifiers, Cement** 100–107

7. **Brickwork** 108–144
   - Common Brick.
   - Face or Front Brick.
   - Fire Brick
   - Chimneys.
     - Lightning Rods.
   - Calking Compounds.
   - Bricklayers' Cement.
   - Mortar Colors.

8. **Hollow Blocks: Structural and Fireproofing** ... 145–168
   - Clay or Terra Cotta.
   - Gypsum.
   - Composition Slabs.

9. **Terra Cotta, Architectural** 169–179

10. **Stone** 180–224
    - Granite.
    - Limestone; Sandstone; Blue Stone.
    - Marble.
    - Imitation Marble.
    - Imitation Stone.
    - Concrete Blocks.

11. **Slate** 225–247
    - Roofing.
      - Snow Guards.
    - Structural.
    - Blackboard (see also 39).
      - Accessories (see 39).

12. **Furring and Lathing** 248–313
    - Furring.
    - Lathing: Metal, Wood, Wire, Wire and Felt, Wood and Felt, etc.
    - Corner Beads, Metal Plastering Grounds, Cove Base, etc.
    - Plaster Partition Systems.

13. **Plastering** 314–373
    - Portland Cement.
    - Gypsum Plaster.
    - Plaster Boards.
    - Lime Plaster.
    - Ornamental Plastering.
    - Magnesite Stucco and Plaster.
    - Special Stucco.

14. **Tile, Floor and Wall** 374–381

15. **Swimming Pools** 382–390

16. **Terrazzo** 391–397
    - Floor Dividers.

17. **Paving and Special Floors** 398–495
    - Cement.
    - Paving Tile.
    - Wood Blocks.
    - Brick.
    - Asphalt Mastic.
    - Asphalt Block.
    - Composition, Magnesite.
    - Rubber: Tile and Sheet
    - Cork Tile.
    - Linoleum.
      - Linoleum Cement and Glue.
    - Hardwood.
    - Floor Deadening Systems.
    - Vault and Sidewalk Lights.
    - Expansion Joints.

18. **Structural Steel and Miscellaneous Iron** 496–579
    - Rolled Steel Shapes.
    - Pressed Steel Lumber.
    - Miscellaneous Iron.
      - Post Caps and Bases, Beam Hangers and Straps.
      - Columns, Structural.
      - Roadway Drains, Cleanout Doors, Scuppers, Sidewalk Doors, etc.
      - Stairs.
      - Safety Treads and Sidewalk Gratings.
      - Fireplace Accessories.
      - Ash, Garbage and Package Receivers, Coal Chutes.
      - Automobile Turntables.
      - Jail Equipment.
    - Ash Hoists.
    - Carpenters' and Masons' Iron Work.
    - Portable Steel Buildings.
    - Flagpoles.
    - Ornamental Metal Columns (see 28).

19. **Ornamental Metal Work** 580–640

20. Fencing and Gates 641–666

21. Fire Resisting Doors, Frames and Appurtenances 667–787
- Hollow Metal.
- Metal Covered.
- Tin Clad.
- Counterbalanced and Telescoping Elevator.
- Rolling Steel.
- Combined Bucks and Trim.
- Mouldings.

22. Special Doors and Gates 788–790
- Elevator Gates.
- Revolving Doors.
- Cold Storage Doors (see 34).

23. Fire Resisting Windows and Fittings 791–857
- Hollow Metal.
- Metal Covered.
- Casement.
- Solid Steel Industrial.

24. Special Windows (see 29).

25. Vaults and Safes 858–865
- Door Engines.

26. Roofing 866–952
- Built-up.
- Prepared or Ready.
- Canvas.
- Tile.
  - Terra Cotta.
  - Concrete.
- Slate (see 11).
- Reinforced Cement Tile.
- Gypsum.
- Shingles.
  - Asbestos.
  - Asphalt.
  - Wood.
  - Copper.
  - Zinc.
- Sheet Metal.
- Roof Cement.
- Flashing Blocks and Special Flashings.
- Roof Sumps and Vent Connections, Roof Flanges, etc.

27. Sheet Metal Work 953–1036
- Gutters, Leaders, etc.
  - Hangers.
- Skylights.
- Ventilators.
- Store Front Construction.
- Metal Ceilings.
- Building Corners.

28. Carpentry 1037–1185
- Lumber Associations.
- Lumber Dealers.
- Millwork.
  - Waterproof Glue.
  - Veneers.
  - Windows.
  - Doors.
    - Ventilators.
  - Interior Wood Finish.
  - Exterior Wood Finish.
  - Blinds and Awnings.
  - Wood Mantels.
  - Partitions and Booths.
  - Flooring (see 17).
  - Columns.
- Wall Board.
- Building and Sheathing Papers, Felts, Quilts, Mineral Wool, etc.
- Door and Window Screens.
- Weatherstrips.
- Portable Houses.

29. Hardware 1186–1339
- Builders (Rough).
  - Nails, Screw Holes, etc.
  - Pulleys, Weights, Chains, Cords, Sash Balances.
  - Window Cleaners' Safety Devices.
  - Hangers, Door.
  - Garage Door.
- Finishing.
- Screen.
- Specialties.
  - Reversible Window.
  - Casement.
  - Door Exit Devices.
  - Sash Operators.
- Dairy Barn Equipment.

30. Paint, Preservatives, etc 1340–1405
- Paint.
- Varnish and Enamel.
- Stain.
- Wood Preservative.
- Floor Polish.

31. Glazing 1406–1426
- Sheet Window Glass.
- Plate Glass.
- Wire Glass.
- Rolled Figured Glass.
- Vault and Sidewalk Lights (see 17).
- Art Glass: Stained, Opalescent, etc.
- Putty.

32. Plumbing 1427–1650
- Drainage.
  - Sewage Ejectors and Sump Pumps.
  - Sewage Disposal Plants.
  - Chemical Toilets.
  - Septic Tank Systems.
- Water Supply.
  - Pipe and Fittings.
  - Valves and Fittings (see 37).
  - Meters.
  - Heaters, Range Boilers, etc.
  - Filters and Purifiers.
  - Softeners.
  - Well Drilling.
  - Private Water Supply Systems.
  - Pumps.
  - Storage Tanks and Steel Plate Work.
- Lawn Sprinklers.
- Fire Protection.
  - Automatic Sprinklers.
  - Fire Extinguishing Apparatus.
- Toilet Partitions and Urinal Stalls.
  - Steel.
  - Structural Slate (see 11).
  - Soapstone.
  - Structural Glass.
- Plumbing Fixtures.
  - Drains, Traps, etc.
  - Bathtubs, Lavatories, Closets.
  - Sinks and Laundry Trays.
  - Brass Goods.
  - Shower Baths.
  - Industrial.
  - Drinking Fountains.
  - Closet Seats.
  - Bathroom Accessories.

33. Heating and Ventilating 1651–1772
- Gas Air Heaters.
- Warm Air Furnaces.
- Steam and Hot Water.
  - Boilers.
  - Radiators.
  - Vacuum and Vapor Systems: Valves, Traps, etc. (for Standard Radiator Supply Valves, see 37).
  - Temperature Regulators.
  - Feed Water Regulators.
  - Floor and Ceiling Plates, Radiator Hangers, Covers, etc.
  - Insulation.
  - Piping.
- Underground Systems.
- Ventilation.
  - Blowers and Fans.
  - Heaters.
  - Air Conditioning Apparatus.
- Registers.

34. **Refrigeration** 1773–1808
- Refrigerators.
- Small Domestic Units.
- Ice Making Machines.
- Cold Storage Doors.
- Cold Storage Insulation.

35. **Electrical Work** 1809–1941
- Wire.
- Conduit and Fittings.
- Panelboards and Accessories.
- Wiring Devices: Switches, Plugs, Receptacles, etc.
- Fuses.
- Lighting Fixtures.
  - Interior Fixtures.
  - Reflectors.
  - Industrial Units.
  - Exterior Fixtures.
  - Stage Fixtures.
  - Signs.
  - Illuminating Glassware.
  - Chain.
- Lamps.
- Heating Devices.
  - Ranges.
  - Household Appliances.
- Power Equipment.
  - Complete Equipment.
  - Motors and Generators.
  - Switchboards.
  - Rheostats and Controllers.
  - Isolated Domestic Generating Units.
- Low Voltage Equipment.
  - Signal Systems: Bells, Annunciators, Alarms, etc.
  - Telephones.
  - Clocks.
  - Batteries.
  - Other Specialties.
- Curtain Operators.

36. **Elevators, Dumbwaiters, etc** 1942–2015
- Elevators.
  - Cars.
  - Elevator and Signal Safety Devices.
  - Gates (see 22).
- Dumbwaiters.
- Elevating and Conveying Machinery: Automatic Elevators, Conveyors, Spiral Chutes, Escalators, etc.
- Pneumatic Tubes.

37. **Power Plant** 2016–2031
- Boiler Room Equipment.
  - Boilers and Accessories.
  - Condensers.
  - Economizers.
  - Superheaters.
  - Grates.
  - Stokers.
  - Mechanical Draft.
  - Tube Cleaners.
  - Separators.
  - Fuel Oil Equipment.
  - Powdered Coal Equipment.
- Coal and Ash Handling Machinery.
  - Cranes.
  - Conveyors, Pivoted Bucket.
  - Steam Jet Conveyors.
  - Crushers and Pulverizers.

37. **Power Plant—Continued**
- Pumps (see 32).
- Valves.
- Regulators.
  - Pressure Reducing Valves.
  - Damper.
  - Feed Water (see 33).
  - Pressure, Water, Gas, Steam.
- Engine Room Equipment.
  - Steam Engines.
  - Turbines.
  - Compressors.
- Miscellaneous.
  - Gas Burners.
  - Gas Producers.
  - Oiling Systems.
  - Oil Storage.
  - Oil Filters.
  - Water Cooling Systems.
  - Combustion Recorders.

38. **Furnishings** 2032–2084
- Wood Furniture.
  - Wardrobes.
- Metal Equipment.
  - Lockers and Shelving.
  - Furniture.
  - Library Bookstacks.
- Interior Decorations.
- Wall Coverings.
- Linoleum and Cement (see 17).
- Beds, Concealed or Wall.
- Garment Hangers.
- Ventilating Window Shades.
- Pipe Organs.

39. **Equipment** 2085–2162
- Kitchen and Bakery.
  - Ranges, Coal.
  - Ranges, Gas.
  - Ranges, Electric (see 35).
  - Kettles and Cookers.
  - Dishwashers.
  - Incinerators (Garbage Destroyers).
  - Kitchenettes.
- Laundry.
  - Washing Machines.
  - Dryers.
  - Ironing Equipment.
  - Chutes.
- Barber Shop Chairs and Fittings.
- Commercial Buildings.
  - Mail Chutes
  - Directory Boards.
- Store.
- Vacuum Cleaners.
- Blackboards (see also 11).
  - Accessories.
- Bowling Alleys, Billiard Tables, etc.
- Bells and Chimes.

40. **Dairy Barn Equipment (see 29).**

41. **Landscape** 2163–2173
- Greenhouses.
- Garden Furniture.

Part III

PRODUCTS

A list of the products catalogued in this volume, arranged alphabetically. Only products described or illustrated are indexed under the firm name and page number. Products merely mentioned (not described or illustrated) are indexed under their proper headings by page number only.

Products are indexed under the main noun (Face Brick, for example, being indexed as Brick, Face) except where common usage makes it desirable to have the qualifying word precede the main noun (as, for instance, Cork Carpet, Metal Lath, etc.).

Trade names of products are listed in italics following the firm names. No trade names are so listed where they are the same as the firm name, as such duplicate listing would be simply unnecessary repetition without giving any additional information. Trade names are never used as products headings.

This index relates to the contents of the book only, and does not include items which might be inferred but are not actually mentioned.

Note—For information regarding special applications, methods of installation, detailed drawings and other data relative to products, see Part V of index.

A

ACCESSORIES
Bathroom, see Bathroom Accessories
Fireplace, see Fireplace Accessories

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Drain Pipes, see Pipe, Drain—Acid Resistant
Fittings, see Fittings, Pipe—Acid Resistant
Paint and Compounds, see Paint, Acid Resistant
Pumps, see Pumps, Acid Resistant
Traps, see Traps, Sink, etc.—Acid Resistant

ACID TOWER
Packing, see Packing, Acid Tower

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Controlling Heads, see Ventilators, Mushroom
Deflectors, see Ventilators, Mushroom; Register Shields
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Edwards and Co., Inc.....1916-1918
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Plasters, see Plasters, Gypsum—Hard Wall
Shingles, see Shingles, Asbestos
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Bins, see Bins or Bunkers, Coal
Cans, see Cans, Ash; Receivers, Ash
Dumps, see Dumps, Ash—Fireplace
Handling Machinery, see Elevating and Conveying Machinery
Hoists, see Hoists, Ash
Receivers—Rotary or Stationary, see Receivers, Ash
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Granite, see Granite
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BALUSTRADES

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Check Desks, see Ornamental Metal Work
Furniture, see Furniture and Furnishings, Bank and Library
Screens, Metal, see Ornamental Metal Work
Vault Door and Gate Operators, see Operators, Door, Sliding or Swinging
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Part V

USEFUL INFORMATION

An index of useful information not susceptible of being indexed under the head of products (Part III)—detailed drawings, designs, data, capacity tables, etc.

While not a part of our contract undertaking, it has been added in order to make all information contained in this volume readily available. As a new feature, it may possibly be found lacking in some respect. We shall appreciate suggestions as to how its usefulness can be increased.

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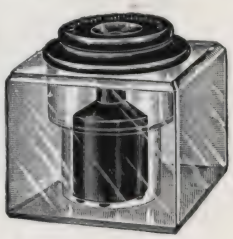

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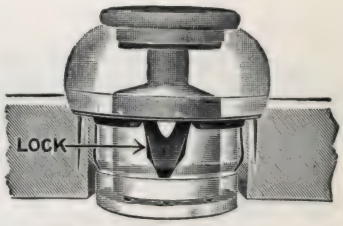

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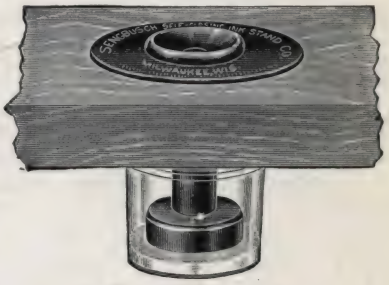

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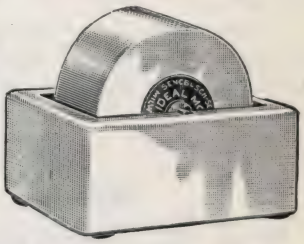

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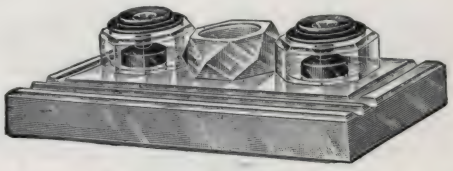

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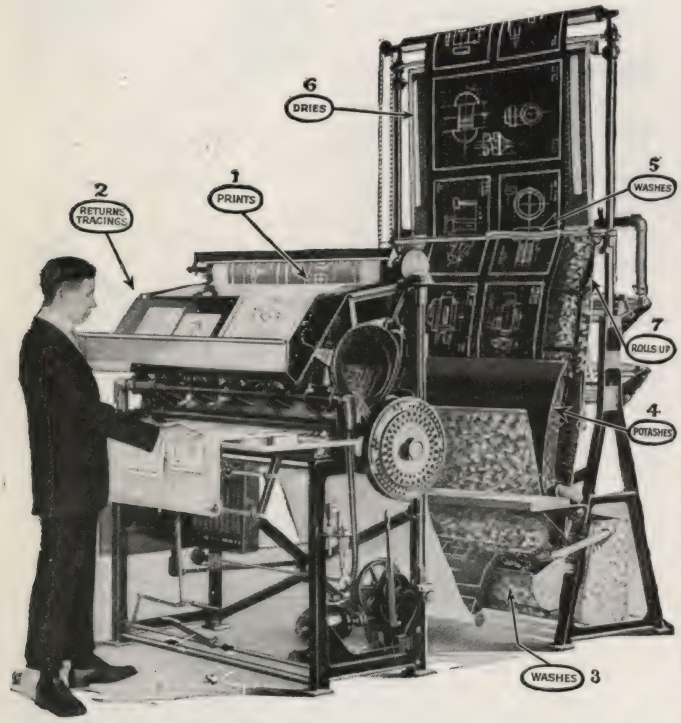

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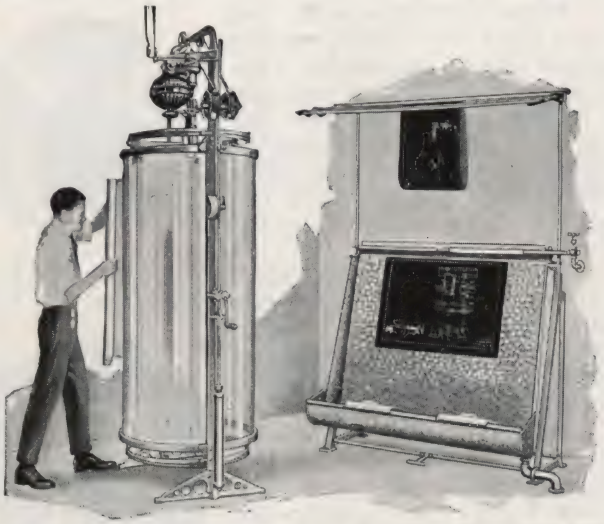

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Pease drawing, detail, and tracing papers and cloths are unsurpassed. Sample books or working sample will be cheerfully furnished on request. Every effort is made to meet detail requirements.

Printed sheets of tracing paper and cloth (cut to required sizes) with customer's titles and appropriate borders are furnished on order.

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A full line, both wood and celluloid. All sizes and qualities carried in stock. Also slide rules for every calculation required by the architect.

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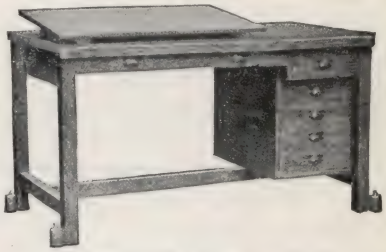
Particular attention is called to a vertical plan safe made of steel, which makes a dustproof container for blue prints, drawings, maps, plates, etc.



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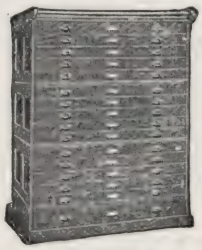

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Catalogue B-37 Complete

Pease catalogue B-37, a 272-page cloth bound book, contains every blue print and drafting room requirement and many articles used by architects, engineers, surveyors and builders in field work. If you have not a copy for ready reference, write for one now.

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The SUPERVISION and DETAIL INSPECTION of CONCRETE CONSTRUCTION, including EXAMINATIONS and REPORTS upon the SUITABILITY of AGGREGATES.

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Strength tests of materials and systems of construction—steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

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Duty and efficiency tests of entire plants—engines, boilers, pumps, compressors and other machinery.

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The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

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The testing of cement, including the sampling in car load or bin lots at the mills or warehouses, or when delivered on the work.

Complete cement and chemical laboratories in connection with cement testing at Chicago, New York, Pittsburgh, St. Louis, Kansas City, San Francisco, Montreal, Vancouver and London.

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The scientific method of determining areas of foundations, permissible loads per square foot and the probable ultimate settlement under load, based on an analysis of direct soil loading tests and borings, as compared with our records of the results of similar investigations.

Specification Forms

The following is a form for incorporation in specifications for buildings and other structures, covering the necessary arrangements for inspection and relationship between inspector and contractor:

Materials of Construction—Shall be inspected and tested by ROBERT W. HUNT & COMPANY, who will act under instructions of the architect and engineer, and report to him the results of inspection and progress of the work, and otherwise facilitate prompt and early delivery of satisfactory materials. The inspectors shall also place marks of identification on accepted materials. Such inspection shall not relieve contractor from responsibility to furnish satisfactory material, but is a measure of precaution against oversights and errors. The cost of this inspection is to be borne by the contractor unless otherwise stipulated.

Structural Steel—Shall be inspected and tested at the rolling mills and also inspected at the shops during fabrication, in proper manner, to determine whether the material conforms with the plans and specifications. Contractor shall furnish inspector necessary facilities for inspecting, testing and labor for handling material.

Reinforcing Steel—Shall be inspected and tested at the mill or warehouse, in proper manner, contractor furnishing, free of charge, testing apparatus and facilities for inspection.

Cement—Shall be sampled and tested before delivery to the work, in accordance with specifications.

Standard Specifications

Booklets containing standard specifications adopted by American Society for Testing Materials include Structural Materials for Buildings, Cement and Concrete, Paving Brick; and standard specifications for Creosoted Timber. Also booklet describing facilities of our Engineering Division may be obtained on request at our general office, Chicago.

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Inspecting Engineers and Chemists

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Chemical tests of all building materials, including steel, iron, cement, paints, oils, slags, limestones, marks and clays.

H. C. Nutting Testing Laboratory Service

This company offers its services to architects and engineers for special investigation of all engineering and chemical problems.

Cement Testing and Inspection

Chemists or samplers are permanently stationed at the cement mills, where samples are taken while cement is being run into bins or is being loaded into cars. This laboratory's private seals are placed on the bins or cars, and complete tests made.

Results of tests are in hands of clients, as a rule, before cement is needed on the job.

Testing of Aggregates

Investigations, tests, and analysis of gravel, stone, slag, sand, etc., to determine suitability for use in concrete.

Structural Steel Inspection

The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first-class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

Estimation of weights from detail drawings, and checking shipped weights of finished work.

The supervision and detail inspection of the structure during erection.

Erection Inspection

This consists in seeing that members are erected in their proper places and are not interchanged; that all columns are plumb and that joints meet without excessive use of drift pins. All field connections are examined to see that field rivets are tight. Painting is watched to see that paint is carefully applied.

Progress reports are issued weekly.

Testing—Physical, Chemical and Machinery

Strength tests of materials and systems of construction—steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

Inspection Clauses

These clauses cover the inspection of cement, reinforcement and structural materials and should be incorporated in general specifications where positive results are necessary.

Cement—All cement shall be tested and inspected by a reliable, disinterested Inspection Bureau, and the selection of such bureau must be approved by the architect, to whom a copy of all reports must be sent. The contractor shall include in his bid the cost of such cement testing. When possible, and where facilities are to be had, the cement shall be sampled at the cement mill by the Inspection Bureau while the cars are being loaded, so that the tests can be made and the results reported before the cars reach their destination; otherwise samples shall be selected from each shipment at destination at the expense of the contractor in a manner satisfactory to the architect.

Reinforcement Steel—All reinforcement steel shall be inspected by a reliable, disinterested Inspection Bureau, and the selection of such bureau must be approved by the architect, to whom a copy of all reports must be sent. The contractor shall include in his bid the cost of such inspection. The inspection shall be made at the rolling mill prior to shipment to the building site.

Structural Materials—All structural material shall be inspected by a reliable, disinterested Inspection Bureau, and the selection of such bureau to be approved by the architect, to whom a copy of all reports must be sent.

Mill Inspection—All structural steel shall be tested and inspected at the rolling mill prior to shipment to the fabricating shop.

Foundry Inspection—All castings shall be inspected at the foundry before being shipped to the machine shop or to the building site.

Shop Inspection—All fabricated material shall be inspected at the structural mills and machine shops prior to shipment to the building site.

The contractor shall include in his bid the cost of the inspection of structural materials.

Specifications

Specifications will be sent to architects and engineers on application.

MacARTHUR CONCRETE PILE & FOUNDATION CO.

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Products and Services

MacArthur Pedestal Concrete Piles.

The purpose of the company is the Construction, under Contract, of various Types of Foundations. The company specializes in the design and construction of foundations where the low bearing value of the surface soils requires the use of piling. It is equipped to install Pre-moulded Reinforced Concrete Piles; Steel Pipe Concrete Filled Piles, Moulded-in-place Straight Piles, or the patented MacArthur Pedestal Pile.

MacArthur Pedestal Concrete Piles

If you have a difficult foundation problem just remember:

That wooden piling must be cut off below permanent water level, which probably means excavation, sheeting and pumping. That even when installed the water table may change; the pile tops rot and the whole structure be ruined.

That the use of caissons is only commercially feasible when very large concentrated loads have to be carried direct to rock.

That pre-cast concrete piles are always liable to fracture during driving and that they cost more than cast-in-place piles.

That a tapered pile with a small point must depend chiefly on skin friction unless carried to rock, and that the friction between the pile and the sustaining soil depends largely on the roughness of the pile surface.

That in the pedestal pile both the enlarged foot and the shaft are formed under great pressure which is exerted through concrete in direct contact with the earth. This means:

First, that the soil in which the pile stands is compacted and its bearing value increased. Second, that the concrete is pressed into the earth and therefore forms an almost perfect friction surface with it. Third, that the pile and pedestal may be and are formed of a dry mixed, thoroughly tamped concrete of unusual density and 25% greater strength than an ordinary poured mix. Fourth, that owing to the density and stiffness of this concrete and the packed earth layer contiguous to it, infiltration of water or possible deformation of the pile is prevented. Fifth, that the subsoil to which the foot of a pile reaches is nearly always of much higher bearing value than the soil which surrounds the shaft of the pile, and that the Pedestal Pile alone gives a spread footing on that firmer subsoil.

Then if you have a difficult foundation problem why not let us look it over and give an opinion? The service will not cost you anything. It will probably point the way to a saving in first cost and a big added safety factor for future satisfaction.

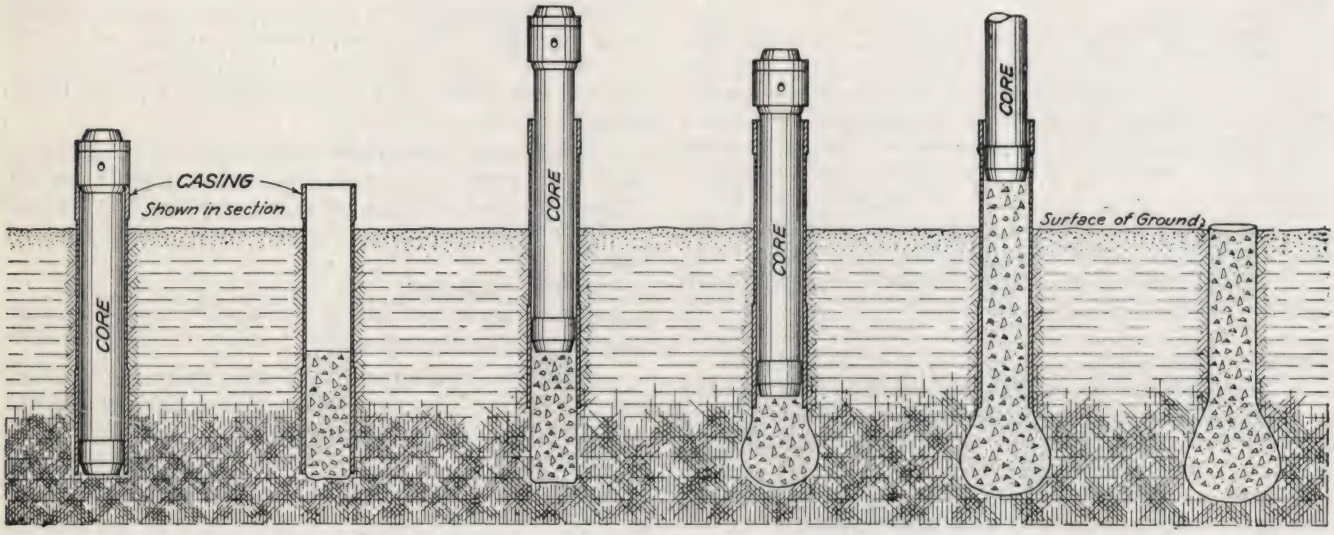


Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6

Method of Forming the Pedestal Concrete Pile

(As approved by The Better Building Committee of New York Architects. Full report will be sent on application)

Fig. 1. A core and cylindrical casing are first driven to the required depth.
Fig. 2. Core is now removed and a charge of concrete dumped to the bottom of the casing.
Fig. 3. Core is now placed on the charge of concrete and casing is raised to permit forming the pedestal.
Fig. 4. Core is now used as a rammer to compress this concrete into the surrounding soil. The process is repeated until the base is as large as can be formed under the compression caused by the action of a Vulcan steam hammer.
Fig. 5. The enlarged base being completed, casing is filled to the top with concrete and core and hammer (approximately 6 tons) are rested on the concrete.
Fig. 6. The final step is to withdraw the cylindrical casing from the ground, while weight of core and hammer remain on the concrete. The completed pedestal pile, consisting of a monolithic concrete column 16 in. in diameter surmounting a broad base or pedestal, is thus left in the ground

SIMPLEX CONCRETE PILING

New England Foundation Co. Inc.

120 TREMONT ST., BOSTON, MASS.
844 ELLICOTT SQ., BUFFALO, N. Y.

Simplex Pile Foundation Co.

KEYSTONE BUILDING, PITTSBURGH, PA.
REPRESENTATIVES: Morris & Reynolds, Marshall Building, CLEVELAND, OHIO

Products and Service

Simplex Concrete Piles: Cast-in-place, Pre-cast and Composite.

Engineers and General Contractors on Concrete Construction.

Also, Steel Incased Concrete Piles, Open Concrete Caissons, Difficult Foundations (Chimneys, Tanks, etc.).

We will submit recommendations, designs and estimates on receipt of necessary data, or will visit the site of prospective work at any time for purposes of investigation and consultation, without obligation on your part.

Specific Types of Piles for Specific Conditions

No one type of concrete pile has as yet been designed that will economically and successfully meet all conditions of soils and loadings. We have developed several methods of installing concrete piles enabling us to meet successfully every condition.

Simplex piles are of proved worth. They have been used extensively in the United States and Europe since 1903 for supporting buildings and other structures.

Advantages of Simplex Concrete Piles

Simplicity; easily and quickly installed

Constant sectional area of 201 sq. in.; equal bulk of concrete for each foot of length

Certainity of results

Durability equal to that of natural rock; renewals never required

Greatest frictional surface

Unsurpassed carrying power

Economy in time and cost over other types of foundations

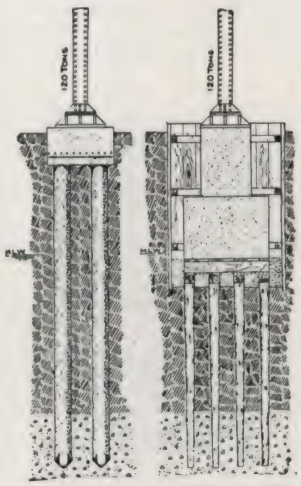
Load transferred to firm bearing strata without reference to or dependence on poor soil above, although taking full advantage of it in addition to the end bearing value

Standard Simplex Cast-in-place Concrete Piles

Are suitable for nearly all conditions met with in unreliable ground. A cylindrical steel form, fitted with a cast iron point (joint is watertight) is driven to proper depth and filled with wet concrete. Form is withdrawn and the concrete is molded against the rough, compacted walls of the hole, resulting in tremendous skin friction in addition to its end bearing. *The concrete is placed before removal of form.*

In no case of Simplex pile construction has it been found that the back pressure of the earth was as great as the weight of the column of concrete in the pile. Reinforcement may be used, if desirable.

Standard Simplex concrete piles are 16 in. in diameter their entire length; they have been driven to depths of 75 ft.



Comparison of Concrete Pile and Wood Pile Foundations

Working load is usually 30 tons per pile, fully justified by long experience and many tests. Load may be varied in special cases.

Under average soil conditions, a spacing of 3 ft. on centers produces the best results.

Specification—Concrete piles shall be made-in-place by driving to proper penetration a 16-in. diameter steel pipe fitted at its lower end with a detachable cast iron point. This pipe shall be filled with concrete to the proper height and then it shall be pulled out of the ground, leaving the cast iron point in the ground and a shaft of concrete completely filling the hole to its compacted walls.

How a Simplex Pile Compresses Surrounding Soil

Greatest compression of soil immediately about the pile. Disturbance ceases about one diameter from pile

Simplex Pre-cast Concrete Piles

Are used for foundations for docks, wharves, sea walls and other water work, and for foundations where the ground is unusually unsatisfactory. A form is driven to proper depth as in the standard system. Wet concrete is poured into the form. A pre-cast reinforced concrete pile is lowered through the form; the projecting ends of the reinforcement extend into the wet concrete. The form is then withdrawn, leaving the pre-cast pile in position. Thin grout poured into the form as it is withdrawn materially increases skin friction in some cases. This method admits of positive results as to penetration without striking a blow on the pre-cast pile and entirely avoids the questionable consequences of jetting.

Standard size is 13 in. in diameter and 40 ft. in length, but can be installed in larger diameters and to greater depths.

Simplex Composite Piles

Economically meet soil conditions requiring great depth of penetration, where the permanent water line is considerably below the surface. A wood pile of required length and diameter is driven to proper depth, upon which is constructed a standard Simplex concrete pile. This method lends itself to the modifications of the standard system and readily admits the use of a pre-cast concrete pile on top of the wood pile.

RAYMOND CONCRETE PILE COMPANY

Concrete Piles and Special Concrete Work

140 Cedar Street
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BRANCH OFFICES IN ALL PRINCIPAL CITIES
RAYMOND CONCRETE PILE CO. OF CANADA, LTD., MONTREAL, CANADA

Products

RAYMOND CAST-IN-PLACE CONCRETE PILES.
RAYMOND COMPOSITE (WOOD-CONCRETE) Piles.
RAYMOND PRE-CAST PILES: Bearing and Sheet.
CONCRETE WORK of a Special Nature.

Slogan

A form for every pile—
A pile for every purpose.

Services and Facilities

We have on our staff and at your service, experts in the design and installation of concrete piles for all purposes and to meet all conditions.

Engineering—Our engineering department is available to architects and engineers at all times for investigation work and consultation, and we will gladly submit recommendations, designs and estimates covering any problem within the scope of our business.

Equipment—Every Raymond driver is built of structural steel, scientifically designed for the most rapid and economical construction and the major portion of our equipment is built by ourselves at our machineshops.

Concrete Piles vs. Wood Piles

There are certain fundamental advantages that concrete piles have over the use of wood piles. Wood piles must be driven so that the cut-off is below permanent water line, whereas concrete piles may be cut off at any level, irrespective of the permanent water line. Wood piles are often broomed or broken while being driven, thus reducing, if not eliminating their supporting power, whereas the Raymond type of concrete pile is not subject to distortion in driving.

In marine work wood piles most frequently are creosoted for protection against marine borers, whereas concrete piles are not subject to such destruction. Wood piles very often require considerable shoring, underpinning, sheeting, pumping and deep excavation, whereas this can usually be eliminated partially, if not entirely, by the use of concrete piles. Furthermore, there is an important saving in time by the use of concrete piles, when the footings can be placed immediately the concrete pile has been driven.

Classification of Concrete Piles

Concrete Piles are of two distinct types:
(1) Concrete piles, which are made in place, commonly referred to as "cast-in-place" concrete piles.
(2) Concrete piles which are cast in moulds and then driven like wooden piles and are referred to as "pre-cast" concrete piles.

Cast-in-place piles are divided into two classes:
(a) Those in which a form is left in the ground to preserve the integrity of the finished pile.
(b) Those in which the concrete is placed by means of a temporary driving form which is removed before the concrete hardens and leaves the pile confined only by the loose earth. The green concrete is then, obviously, subject to the admixture of foreign materials, excess of water and distortion due to strains set up by soil pressures and the driving of adjacent piles.

Pre-cast concrete piles are those which are cast in a mould and then driven like a wooden pile and are referred to frequently as "pre-cast concrete piles."

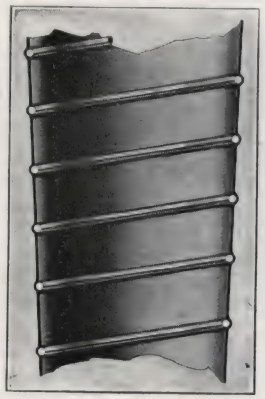
The Raymond Method

A collapsible steel core, usually 8 in. in diameter at the point and increasing in diameter at the rate of 0.4 in. per lin. ft. of length, is incased by the spirally reinforced steel metal shell. The core, thus incased, is driven to a proper penetration in accordance with the Engineering News formula. It is then collapsed and withdrawn from the shell, the shell remaining in the ground and maintaining the resistance encountered in the driving. The shell is then inspected, found perfect from tip to top and filled with concrete, thus making a perfect concrete pile.

Under certain conditions we use a core with a larger diameter at the point.

Loads and Spacing—Usually Raymond concrete piles are driven to carry a working load of 30 tons each, but in some cases, loads of from 35 to 40 tons are safely carried.

A working load of 30 tons per pile is accepted by all building departments. The usual spacing of Raymond concrete piles is 2 ft. 6-in. centers for piles less than 30 ft. in length, and for piles in excess of 30 ft.



SECTION OF SPIRAL SHELL

LOOKING DOWN INTO A DRIVEN SHELL—30-FT. LONG

Continued on next page

in length, a spacing of 3-ft. centers is more desirable. In view of the very wide variation in soil conditions and any difficulties surrounding a job, it is suggested that the nearest Raymond office be conferred with, so that the site can be investigated and recommendations made.

Sizes—The standard Raymond concrete pile is installed by the use of a pile core 8 in. in diameter at the point and increasing in diameter 0.4 in. per lin. ft. of length. For instance, a pile 20 ft. in length would be 16 in. in diameter at the top, while one 37 ft. long would have a top diameter of 22.8 in.

The present limit in length of a standard Raymond concrete pile is 37 ft. 6 in. Where conditions are such as to require piles of greater length, we call attention particularly to the Raymond composite pile, a description of which will be found on the next page.

Working Loads—In calculating the resistance to penetration, the Engineering News formula, based on using a steam hammer, has been found most satisfactory. This formula follows:

$$L = \frac{2\,W\,H}{S + 0.1}$$

L=Load in pounds
W=Weight of falling parts in pounds
H=Drop in feet of falling parts
S=Final penetration per blow in inches

A No. 1 steam hammer has a weight of 5000 lbs. falling 36 inches.

A No. 2 steam hammer has a weight of 3000 lbs. falling 30 inches

Thus the carrying capacity of the Raymond concrete pile is not a matter of guesswork or speculation, but is susceptible of computation and demonstration.

Advantages of Taper—The Raymond concrete pile possesses an extreme taper and offers a maximum resistance for a given length. This has been proved by a comprehensive record of resistance encountered in driving plus an extensive series of loading tests, during which the real carrying power of the pile has been checked with the driving resistance. Furthermore, the taper maintains the resistance accumulated in driving the pile.

Prices—The Raymond concrete pile is "made-in-place" and not sold by the foot, f.o.b. cars, consequently it is impossible to quote prices without knowing the conditions under which the work is to be done and for even approximate prices it is necessary to have some knowledge of the number of piles, probable length, the approximate spacing, soil conditions, accessibility of the site, etc.

Points of Superiority of Concrete Piles—
(1) Absolute permanency: immunity from decay or from the attacks of wood borers and destroyers.
(2) Economy, because of greater carrying capacity—meaning a less number of piles for a given load. The claim of greater carrying capacity rests upon several points—to wit:

(a) Greater size, therefore greater displacement and frictional area.

(b) Greater taper, therefore greater frictional value per square foot.

(c) Perfect shape, therefore perfect contact with the ground at every point.

(d) Possibility of inspection after driving, hence the ability to load to full capacity, instead of making a large allowance for inefficiency as in the case of wood piles subject to injury by overdriving, telescoping, departing from the vertical, and like defects, none of which are discernible at the moment when correction is possible.

(e) Decreased length of pile as a natural consequence of greater size and taper.

(3) Smaller and lighter footings, because of decreased number of piles.
(4) Decrease in total load to be carried, because of decreased weight of footings.
(5) Practical elimination of shoring, underpinning, sheeting, pumping and deep excavation and the reduction of masonry.
(6) Due to decreased number of piles and consequent reduction in width of wall footings, the center line of columns can be brought nearer to the building line.
(7) Important saving in time caused by:

(a) The smaller number of piles required.

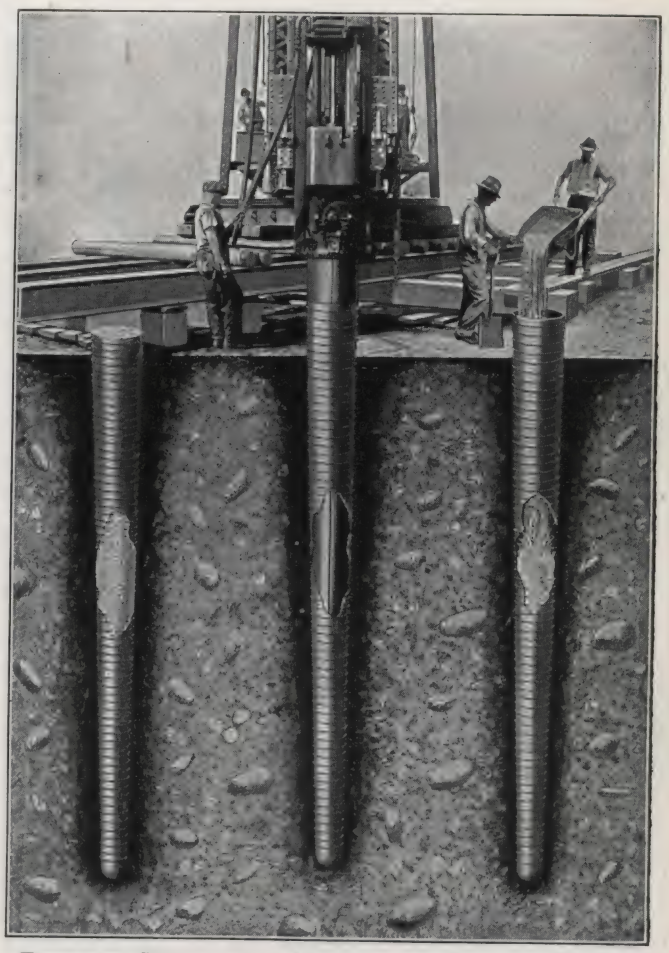
(b) The reduction in the amount of excavation, shoring, sheeting and pumping.

(c) The reduction in quantities of footing or masonry.

(d) The manufacture of the pile in place, from materials readily procurable in all localities, and the limit of manufacture to the actual number and *exact length* of piles required. There is no delay for cutting and trimming trees, hauling to shipping point, transporting for great distances by rail or water and delivery to the job, perhaps only to find that the piles are too long or too short.

Specification—If "Raymond Concrete Piles" are called for, this is of course sufficient. On the other hand, if it is, for any reason, inadvisable to name them specifically the following specifications will cover:

"Concrete piles shall be of a type specifically approved by the architect or engineer, and shall be placed in the following manner:



Essential Steps in the Making of a Raymond Concrete Pile

Continued on next page

"A collapsible steel mandrel or pile core 8 in. in diameter at the small end and 20 in. in diameter 30 ft. from that point shall be incased in a spirally reinforced steel shell and driven to a proper penetration. The pile core shall then be collapsed and withdrawn from the shell. Before placing the concrete, each shell shall be inspected and, being found perfect, shall thereupon be filled with concrete placed in accordance with the best practice,"

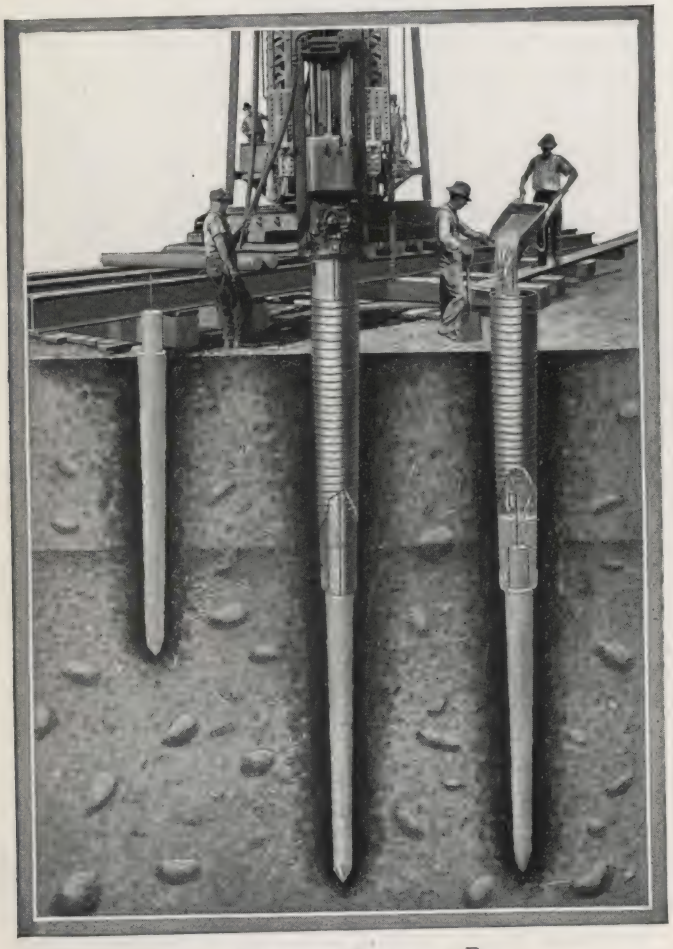
Or the following:

"Moulded-in-place piles shall be of a type suitable for the conditions and subject to the approval of the architect or engineer. They shall be formed in protective casings left in place, which shall be of sufficient strength to prevent distortion or bulging after mandrel has been withdrawn and while the cavity is being filled with concrete or during the driving of adjacent casings."

More About the Raymond "Cast-in-place" Pile

The Raymond pile is the only concrete pile having a permanent form which remains in the ground. This feature is essential for perfect dependable results. The province of the form or shell is manifold:

(1) To serve as a form for the piles.
(2) To prevent the admixture of foreign substances.
(3) To retain the original moisture in the mixture until the concrete is thoroughly hardened.
(4) To prevent distortion by external pressure, due to the driving of adjacent piles or accumulated pressures from displacement by the pile itself.
(5) To perfectly retain the displaced earth forming the walls of the cavity, so that there may be no relaxation of the ground and therefore no loss of resistance when the displacing force (the core) is removed.
(6) To act as reinforcement of the pile until the concrete shall have attained its maximum strength.



Raymond Composite Pile

Raymond Composite Piles

For use where depths greater than 37 ft. 6 in. are encountered, we have developed a composite pile made up by superimposing on a previously driven wooden pile, a concrete section, which latter section is nothing more nor less than a Raymond concrete pile made by the usual Raymond methods. The wood pile is ultimately driven so that the top of it is below the permanent water level and from that point to the bottom of the footing is the standard Raymond concrete pile, all of which is more fully illustrated herewith and in a special catalogue.

Pre-cast Piles

Pre-cast piles have a large and useful field, particularly in marine structures, such as docks, bulkheads, etc. The Raymond Concrete Pile Company is prepared, through its experience, to give good advice upon the use of "pre-cast piles," and also to design and construct work in which a pre-cast pile can be used economically and advantageously.

Special Concrete Construction

In addition to the placing of standard Raymond concrete piles for foundation of structures on land, we construct and design permanent docks, piers, bulkheads, trestles, storage bins, retaining walls, bridges, heavy foundations, shipways, drydocks, etc.

Each problem requires a special study for its solution and our experienced organization is yours to command.

References

Since 1901 when the first Raymond concrete pile was placed, we have placed up to 1922 more than 15,000,000 ft. of Raymond concrete piles throughout the United States, covered by over 1000 separate and individual contracts, and will be only too glad to have you refer to *any* of the many architects, owners, engineers and general contractors with whom we have been associated.

A partial list of installations follows:

Academic Group, U. S. Naval Academy, Annapolis, Md.
International Bureau of American Republics, Washington, D. C.
Post Office, East St. Louis, Ill.
Auditorium, Denver, Colo.
New Legislative Buildings, Regina, Saskatchewan, Canada
City Hall, Des Moines, Iowa
Soldiers' and Sailors' Memorial Building, Pittsburgh, Pa.
Public Bath No. 1, Brooklyn, N. Y.
Grandstand, National League Baseball Park, Pittsburgh, Pa.
Statler Hotel, Buffalo, N. Y.
Public School No. 17, New York, N. Y.
Trumbull School, Chicago, Ill.
Rowen High School, South Chicago, Ill.
Public Library, New Orleans, La.
Public Library, Council Bluffs, Iowa
Standard Oil Company Office Building, Baltimore, Md.
Lindeke-Warner Building, St. Paul, Minn.
Maxwell-Briscoe Building, Chicago, Ill.
General Electric Company Buildings, Schenectady, N. Y.
Troy Laundry Machinery Company Building, Chicago, Ill.
Brewster Building, Long Island City, N. Y.
Ward Bakery Company Building, New York, N. Y.
Lawler Flour Mill, New Orleans, La.
Gas Holder, New York & Richmond Gas Company, Clifton, S. I., N. Y.
Brooklyn Rapid Transit Car Barns, Brooklyn, N. Y.
Canadian Pacific Railway Viaduct, Lethbridge, Alberta, Canada.
L. C. Smith Building (49 stories), Seattle, Wash.
Water Works Department, City of Detroit, Mich.
Steel Mills, Youngstown Sheet & Tube Co., Youngstown, Ohio.

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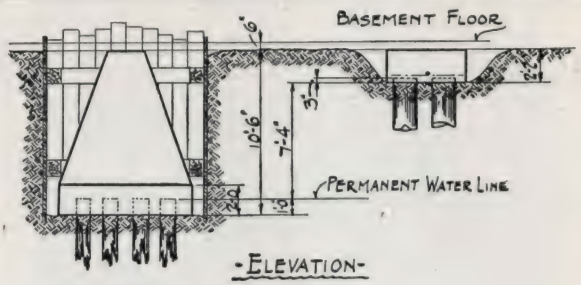
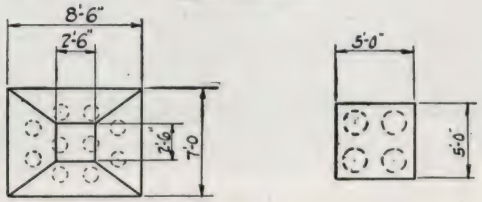


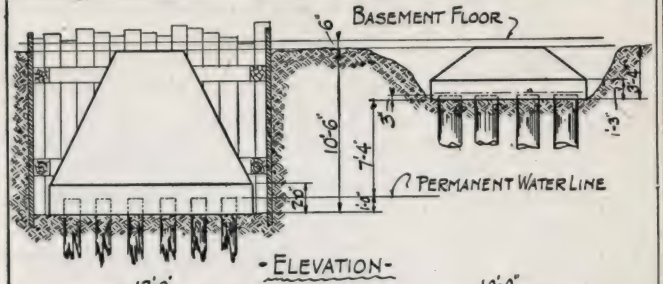
-ELEVATION-



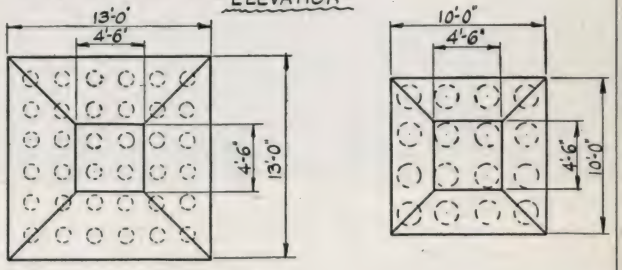
-PLAN-

-FOR COLUMN LOAD OF 116 TONS-

WOOD PILE LOAD = 15 TONS-	CONCRETE PILE LOAD = 30 TONS-	
-QUANTITIES-	WOOD	CONCRETE
NO OF PILES	10.	4.
CONCRETE	15. CU. YDS.	2.01 CU. YDS.
STEEL	0	121. LBS.
FORMS	237. SQ. FT.	44. SQ. FT.
EXCAVATION	36. CU. YDS.	3.94 CU. YDS
SHEETING	39 LIN. FT. 12 FT DEEP	0



-ELEVATION-

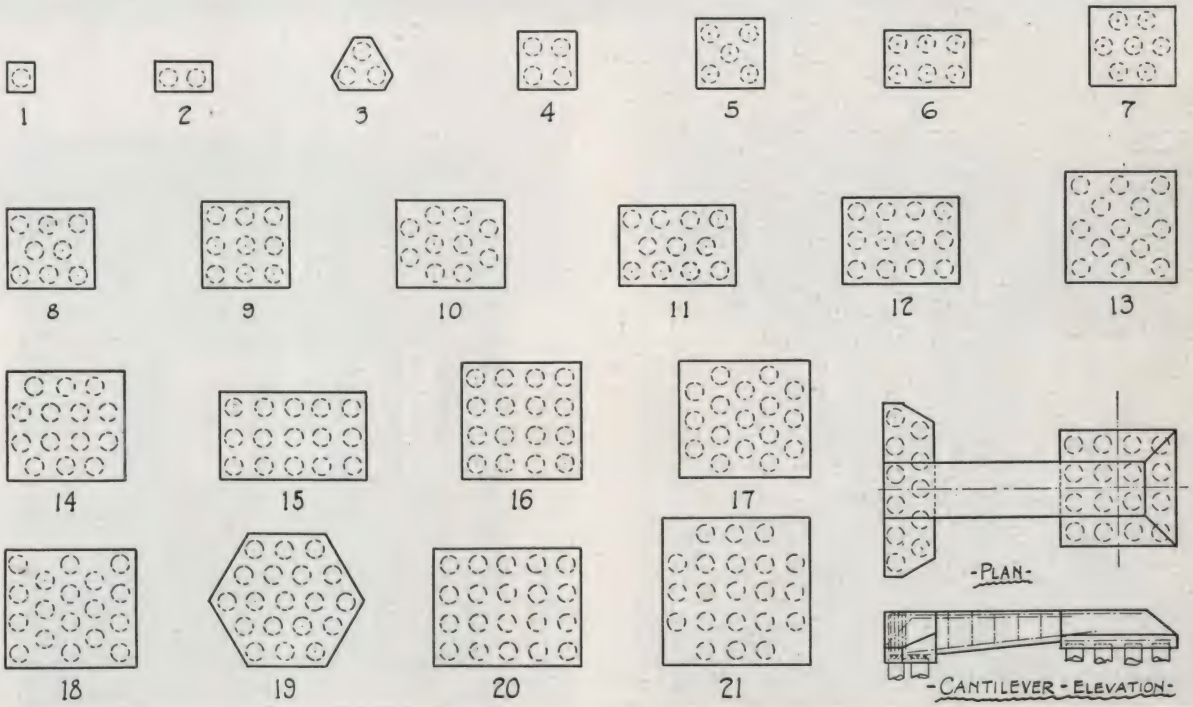


-PLAN-

-FOR COLUMN LOAD OF 461 TONS-

-WOOD PILE LOAD = 15 TONS.-	CONCRETE PILE LOAD = 30 TONS-	
QUANTITIES	WOOD	CONCRETE
NO OF PILES	36.	16
CONCRETE	38.5 CU. YDS	8.9 CU. YDS
STEEL	0	1230. LBS.
FORMS	419. SQ. FT.	150. SQ. FT.
EXCAVATION	87.5 CU. YDS	22. CU. YDS.
SHEETING	60 LIN. FT. 12 FT DEEP	0.

~WOOD PILES VS CONCRETE PILES~



~TYPICAL PILE FOOTINGS~

EASTERN BRIDGE & STRUCTURAL CO.

Engineers and Builders

WORCESTER, MASS.

OFFICE AND FABRICATING SHOPS, 88 Crescent Street, WORCESTER, MASS.

Products and Services

Engineers; designers, manufacturers and erectors of STEEL STRUCTURES of all classes, particularly BUILDINGS and BRIDGES; ORNAMENTAL IRON WORK.

This company maintains an excellent designing and engineering department which is at the service of architects and contractors.

It will execute all the designing and engineering in connection with structural and ornamental iron work on all classes of structures.

Facilities

A large and complete stock of structural shapes is carried on hand at all times for immediate delivery.

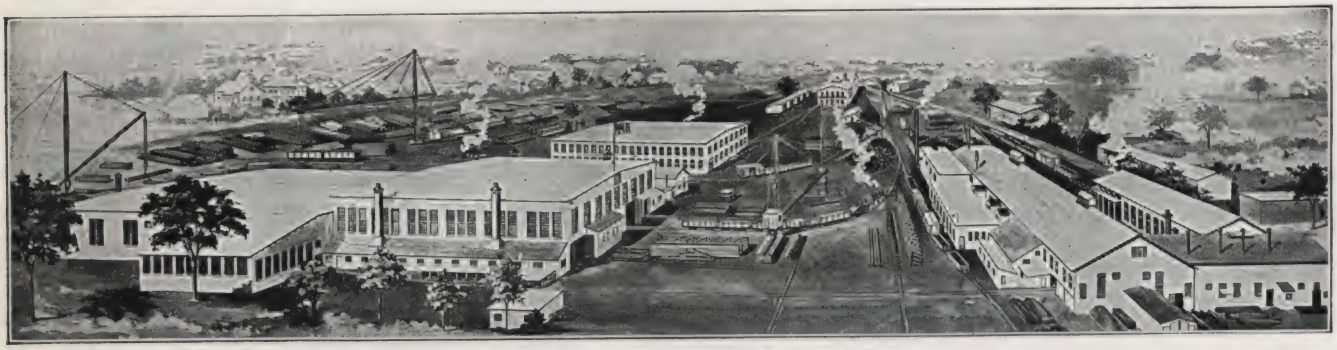
The accessibility of the plant to three leading New England railroad lines insures prompt deliveries.

Ornamental Iron and Structural Steel Work

This is the largest structural steel company in New England having an ornamental iron department; thus it is given considerable advantage in dealing with contractors, as it can execute not only the structural work, but also the ornamental iron work.

Structures Designed and Erected by This Company

Following are a number of illustrations showing work designed and erected by the EASTERN BRIDGE & STRUCTURAL CO.



PLANT OF EASTERN BRIDGE & STRUCTURAL CO., WORCESTER, MASS.

Stairway, Worcester Electric Light Co. Building, Worcester, Mass.

Elevator Fronts, Five Cents Savings Bank Building, Worcester, Mass.

ORNAMENTAL IRON WORK CONTRACTS EXECUTED BY THE EASTERN BRIDGE & STRUCTURAL CO.

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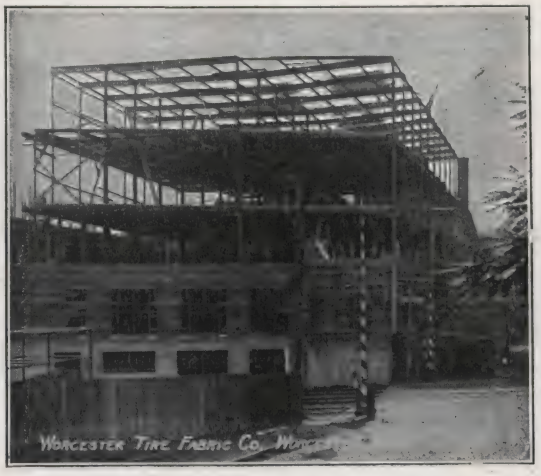
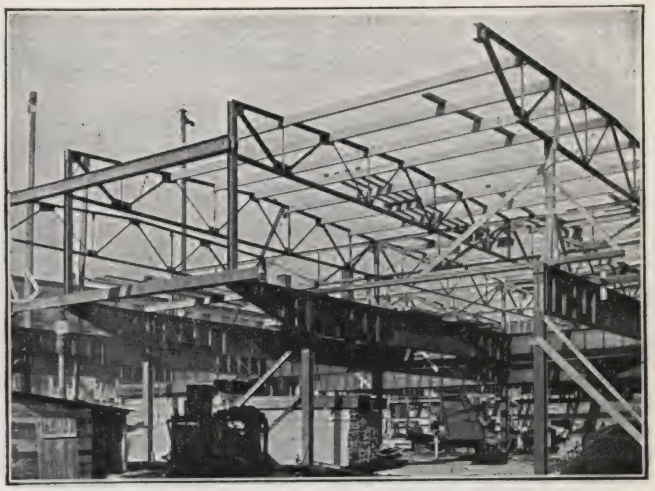


Worcester Tire Fabric Co., Worcester, Mass.



Handleman Garage, Worcester, Mass.

Highway Bridge, Berlin, N. H.

Runway, Jones & Sons, Pittsfield, Mass.

Bridgeport Projectile Co., Bridgeport, Conn.

Electric Railway Trestle, Gofftown, N. H.

Ford Building, Watertown, Mass.

Administration Building, Norton Co., Worcester, Mass.

Steel Structures Designed and Erected by the Eastern Bridge & Structural Co.

McKEOWN BROS. COMPANY, INC.

Contractors and Engineers

112 West Adams Street
CHICAGO, ILL.

21 East 40th Street
NEW YORK, N. Y.

Products

Manufacturers of and contractors for Wood "Lattis-Trusses;" Wood "Bowstring Trusses" and Wood Trusses of other types.

For Ventilating Skylights, see pages 974-975.

Uses

Roof supports for all buildings requiring clear floor space, such as commercial garages, machine shops, storage buildings, assembly halls, etc.

Spans

Built for spans from 30 to 130 ft.

Spacing of Trusses

Determined by size of building and building ordinance requirements. Usually spaced from 16 to 20 ft. on centers.

Material

Unless otherwise specified, trusses are constructed of material which will allow the greatest stress per square inch as specified in building codes. If desired, trusses can be made of acid resisting as well as non-decaying woods.

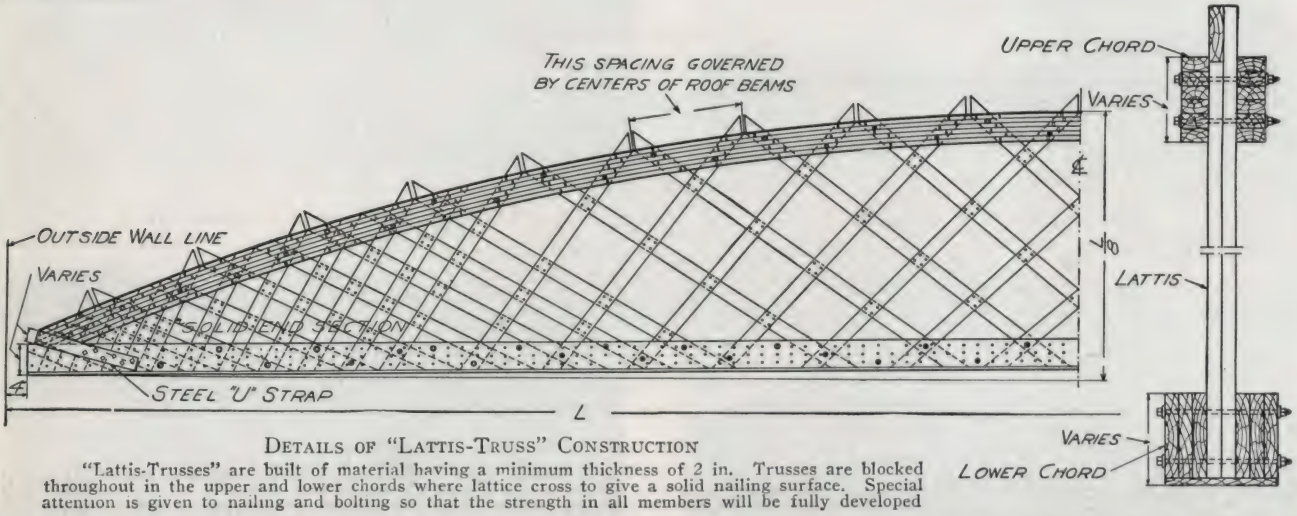
Designing Loads

Live load is governed by the building ordinance in the locality in which trusses are installed. Dead load is figured to meet the roof conditions of each structure.

Trusses may be designed to carry special loads, such as balconies or cranes.

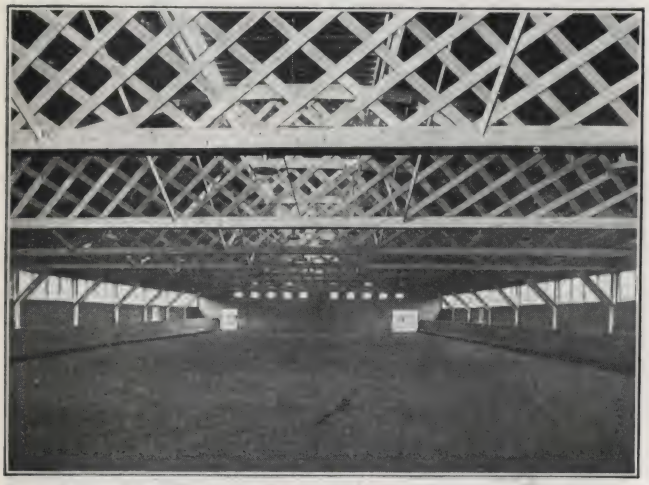
Drawings

Full detail drawings are furnished for each job.



Details of "Lattis-Truss" Construction

"Lattis-Trusses" are built of material having a minimum thickness of 2 in. Trusses are blocked throughout in the upper and lower chords where lattice cross to give a solid nailing surface. Special attention is given to nailing and bolting so that the strength in all members will be fully developed



Nine 122-ft. "Lattis-Trusses" in Riding Club at Cincinnati, Ohio
James Gilmore, Architect, Cincinnati, Ohio

Six 126-ft. "Lattis-Trusses" in Garage in New York City
L. A. Sheinart, Architect, New York, N. Y.

Construction and Delivery

Trusses are built on the site of the job under our supervision and erected by us when piers are ready. All material is purchased locally and local labor is used when possible.

Data Required for Estimates

As practically every installation is different we should receive the following information before submitting estimates:

(1) Outside width of building, thickness of walls and number of trusses required.

(2) Spacing of trusses.

(3) Loading required in pounds per square foot; give required live and dead roof load, ceiling load if any. If trusses carry any concentrated loads such as balconies or cranes, estimates can not be given unless plans are submitted.

(4) Location of job.

Specifications

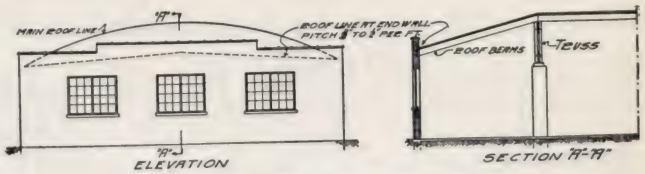
Roof trusses shall be "Lattis-Trusses" or "Bowstring" Trusses to be built and erected by McKeown Bros. Company, Inc., 112 West Adams Street, Chicago, or 21 East 40th Street, New York.

Co-operative Service

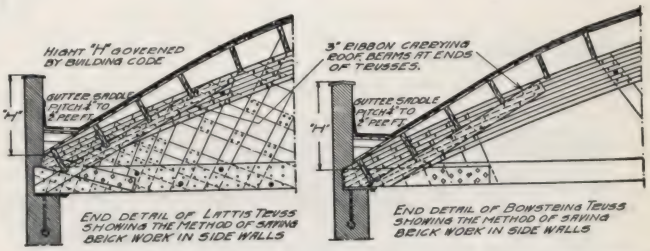
Our engineers will be pleased to work in conjunction with architects and engineers and suggestive working details will be gladly submitted on request.

Literature

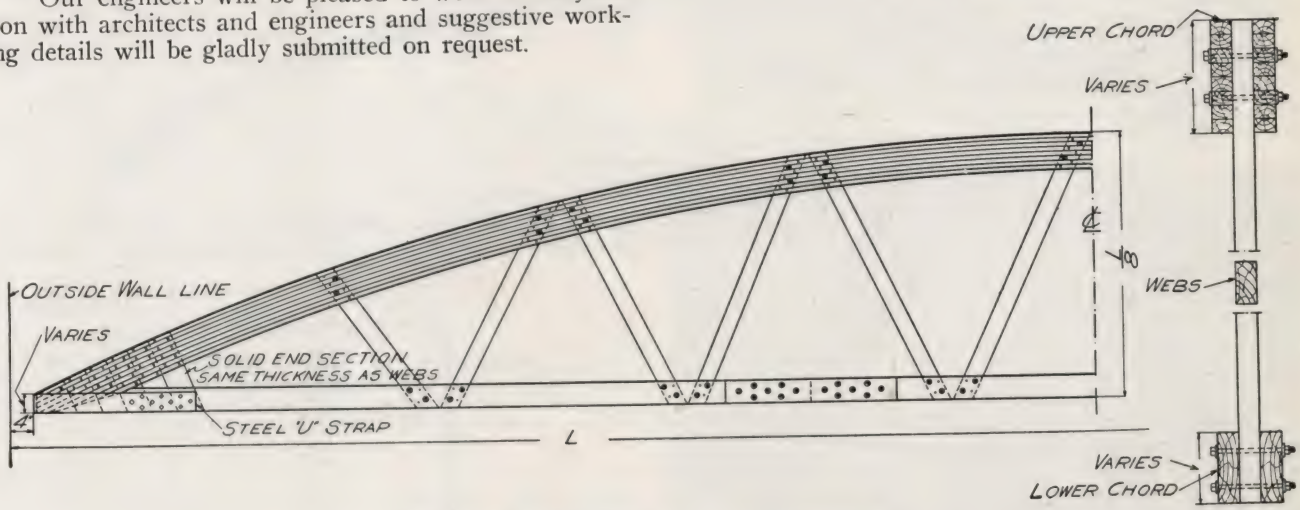
Interesting folder giving more information mailed on request.



Suggestive Roof Framing Details



Methods of Saving Brickwork in "Lattis" and "Bowstring" Truss Construction



Details of "Bowstring" Truss Construction

"Bowstring" trusses are built of material having a minimum thickness of 3 in. All stresses are transmitted through bolted connections. Web members have solid sections

Twelve 50-ft. "Bowstring" Trusses in Garage in Chicago
L. E. Russell, Architect, Chicago, Ill.

Twenty-six 60-ft. and Seven 25-ft. "Bowstring" Trusses in Jos. H. Collins & Son, Lumber Yard, Philadelphia, Pa.
Roydhouse-Arey Co., Contractors, Philadelphia, Pa.

SUMMERBELL TRUSS COMPANY

Wood Roof Trusses

30 North La Salle Street
CHICAGO, ILL.

1021 Mission Road
LOS ANGELES, CAL.

CHICAGO—TELEPHONE: Franklin 0590

Products

Manufacturers and erectors of WOOD ROOF TRUSSES.

Wood Roof Trusses

Spans designed from 30 to 125 ft. in accordance with best standard engineering practice and to comply with various local ordinances.

Trusses can be erected at the building site anywhere. No delays due to inability in obtaining materials; local lumber yards carry in stock all sizes of materials used in the construction of this truss.

Information Required for Estimates

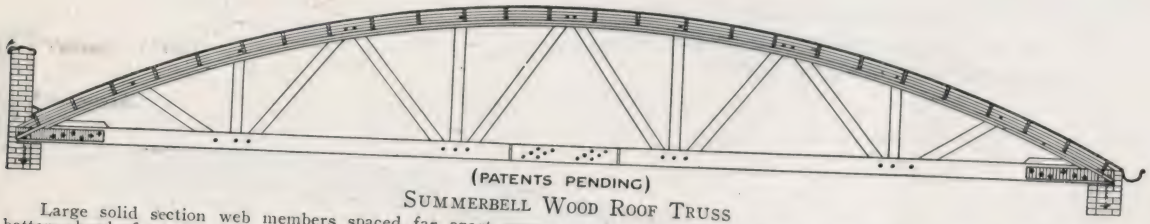
In requesting quotations the following information is necessary:

(1) Number of trusses required. (2) Span out-to-out of building walls. (3) Spacing of trusses. (4) Loads: roof, ceiling or special loadings. (5) Location of building, name of architect and owner's name.

Service

Estimates and details furnished on request.

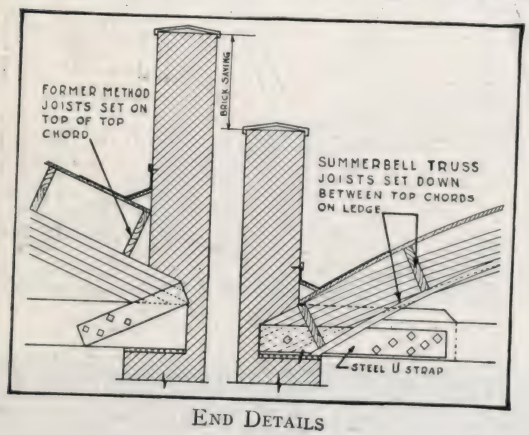
It is suggested that architects avail themselves of our engineering service in any design calling for special types of roof trusses.



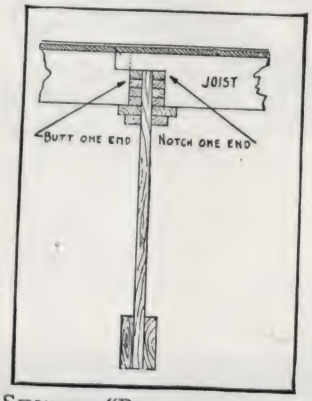
(PATENTS PENDING)

SUMMERBELL WOOD ROOF TRUSS

Large solid section web members spaced far apart assure maximum light distribution. Heavy laminated top chord and bottom chord of two large solid sections reduce fire hazard. Note that the arch of the top chord is uniform from end to end and that there are no sharp breaks which cause rain to carry gravel to the gutters, or allow tar melted by the sun to run down

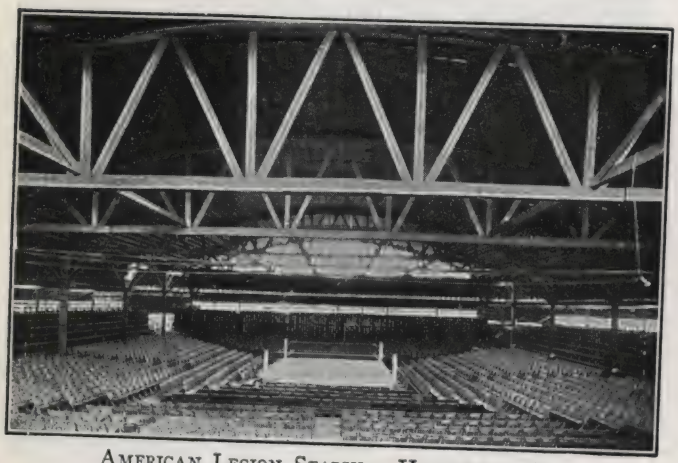


END DETAILS

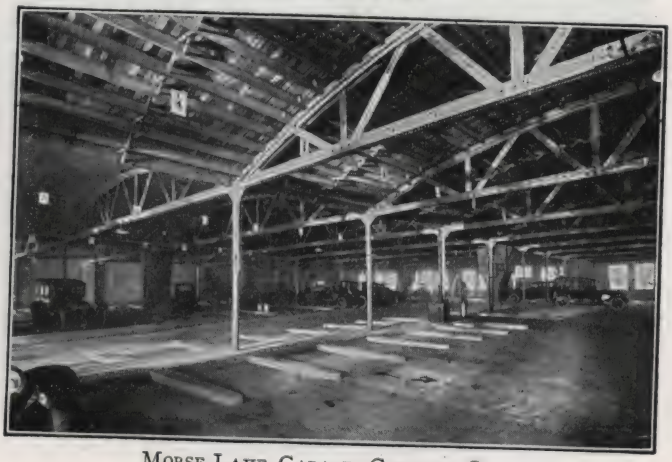


SECTION SHOWING "RIGID-ROOF" CONSTRUCTION

Summerbell trusses save several courses of brick wall on all sides of the building in addition to making a rigid roof



AMERICAN LEGION STADIUM, HOLLYWOOD, CAL.
Eight trusses, 108-ft. span



MORSE-LAKE GARAGE, CHICAGO, ILL.
Twenty-seven 50-ft. trusses

THE MECHANICALLY APPLIED PRODUCTS CO.

Manufacturers of Acoustical Plaster
323-24 Bulkley Building
CLEVELAND, OHIO

Products

"M. A. P. Macoustic Plaster."

For "M. A. P. Magnesite Composition Flooring" and "M. A. P. Mag-Stucco," see pages 434-435.

Theory of Our Treatment

"M. A. P. Macoustic Plaster" acoustical treatment is based upon *sound direction and control* and calls for a minimum amount of sound absorbing materials.

M·A·P PRODUCTS MACOUSTIC PLASTER

TRADE-MARK

Engineering Department

It will be remembered that the successful use of "M. A. P. Macoustic Plaster" lies not only in the use of this material, but in the correct construction of the building's interior. We have therefore established an Engineering Department which will render architectural service (without charge), and which will recommend proper construction and design.

Plans should be submitted giving us the general layout of the structural interior desired. We will then make the necessary recommendations to obtain the best acoustic results. When plans are returned, they are accompanied by our Engineers' sketches together with a typewritten report and instructions. Consequently the following specifications are brief.

Specifications

Specify as follows:

"M. A. P. Macoustic Plaster" as manufactured by The Mechanically Applied Products Co., Cleveland, Ohio, is to be applied on all surfaces specified and recommended by the manufacturer's Acoustical Engineering Department.

Economy

As compared to other acoustical treatments, "M. A. P. Macoustic Plaster" shows a great saving. The selection of this material by the city of Cleveland for its auditorium (as shown in the accompanying photograph) saved the city over $100,000.00.

Because of the great economy of "M. A. P. Macoustic Plaster," the question of acoustics can now be considered in places where it was formerly impractical to entertain acoustical construction. Schoolrooms and office buildings are the most important of these.

Application

"M. A. P. Macoustic Plaster" is a plastic material applied as plaster. It is troweled on 5/8 to 3/4 in. thick over the following surfaces: metal lath, wood lath, Bishopric board, tile, brick, gypsum block or gypsum scratch coat.

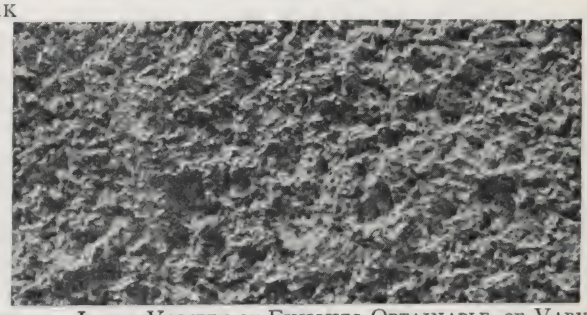
Painting

"M. A. P. Macoustic Plaster" is not to be painted. Should a color other than the natural light gray be desired, a stain made up of very finely ground color pigments is to be stippled over the surface.

Advantages

Unlike other acoustical treatments "M. A. P. Macoustic Plaster" is a building material. This means that when applied it becomes an integral part of the building proper, and is just as permanent as the masonry itself. There are no upkeep costs as against other materials, which occasionally need repairing.

When applied to the surfaces of a building, "M. A. P. Macoustic Plaster" enhances the architectural beauty, because of the decorative value of its rugged finish against the smooth plaster moulding.



One of a Large Variety of Finishes Obtainable, of Varying Degrees of Coarseness, with "M. A. P. Macoustic Plaster"
Actual size

Close-up of Ceiling Panels, Cleveland Auditorium
One of our recommended acoustic beams

Cleveland Auditorium
Seating capacity, 15,000. The largest building in the world ever treated acoustically, and the most successfully

R. GUASTAVINO, PRESIDENT WM. E. BLODGETT, TREASURER F. M. SUMMERVILLE

R. GUASTAVINO COMPANY

INCORPORATED UNDER THE LAWS OF THE STATE OF MASSACHUSETTS

Designing and Installing the System of Timbrel Arch Construction and Installation of Akoustolith Tile for Improving Acoustic Properties

BOSTON, MASS.
40 COURT STREET

Fuller Building
NEW YORK, N. Y.
TELEPHONE, ASHLAND 7948

FACTORY
WOBURN, MASS.

Products and Services

The business of this company is that of DESIGNING and INSTALLING the SYSTEM of TIMBREL ARCH CONSTRUCTION with which its name has been identified for many years.

Facilities

This company owns and operates for its sole use, as contractors, a factory for the manufacture of the better grades of glazed and unglazed tile and acoustic tile required in its exposed or finished work, thus having unexcelled facilities for prompt installation and the making of special pieces in connection with its contracting business.

Acoustic Tile

"Rumford" tile is a ceramic product. "Akoustolith" is an artificial stone made in tile, block, or in various ornamental forms. Both are used on the exposed surfaces of vaults, arches and facing of walls in churches and auditoriums to minimize the amount of reverberation.

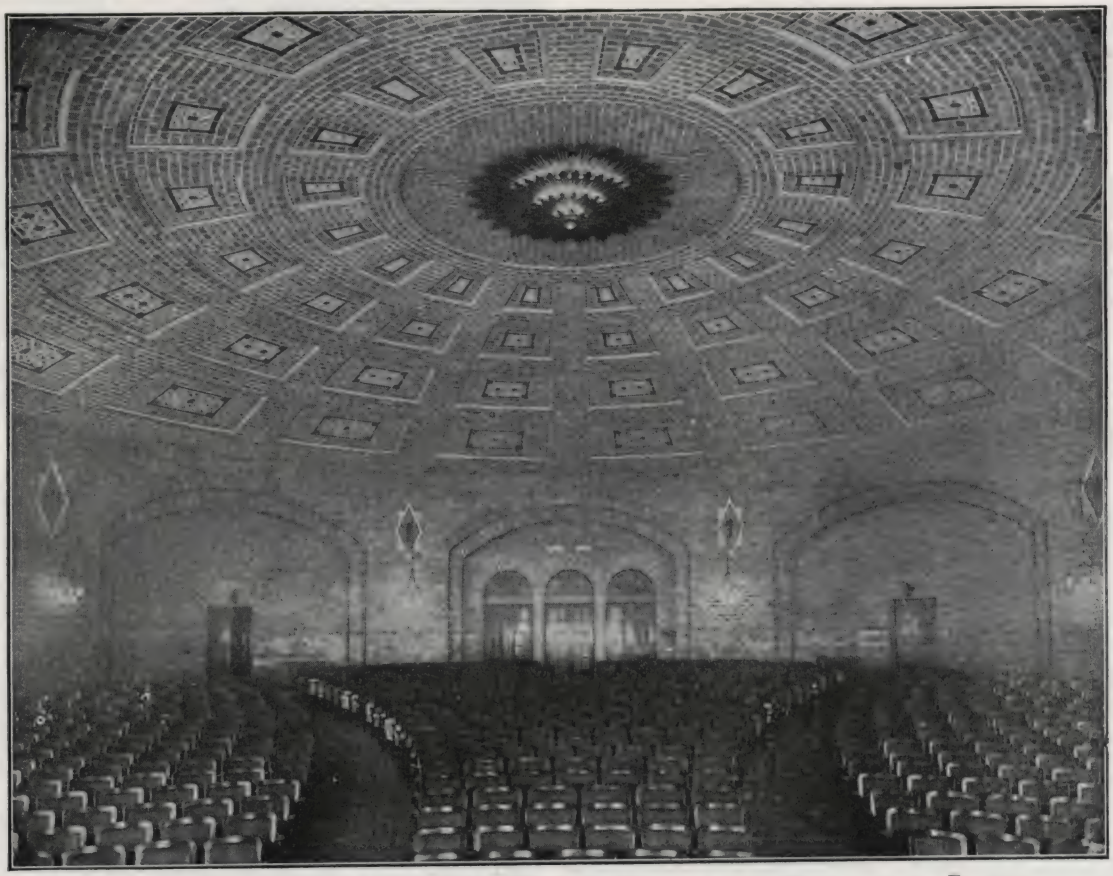
Their great acoustical value has been demonstrated by laboratory tests made by the late Prof. Wallace C. Sabine, of Harvard University, and by many important installations.

"Akoustolith" is made in a variety of textures, usually of a fine granular appearance, and can be made to closely resemble building stones. It is manufactured in a wide range of colors.

Ceilings, Roofs, Floor Construction

A large portion of our business is the construction of large vaulted ceilings and roofs in all forms, and floor construction for very heavy loads.

In nearly all cases the small amount of steel required is used in tension only, and thoroughly embedded in the masonry. This system of construction is approved by the New York Building Department.



AUDITORIUM IN THE MUSEUM, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.
WILSON, EYRE & MCILLVAINE, DAY BROTHERS & KLAUDER, STEWARTSON & PAGE, Associated Architects
Ceiling vault 90-ft. span, supporting floor above, with soffit course and side wall finish (except faience inserts) of "Rumford" acoustic tile, constructed by R. GUASTAVINO COMPANY

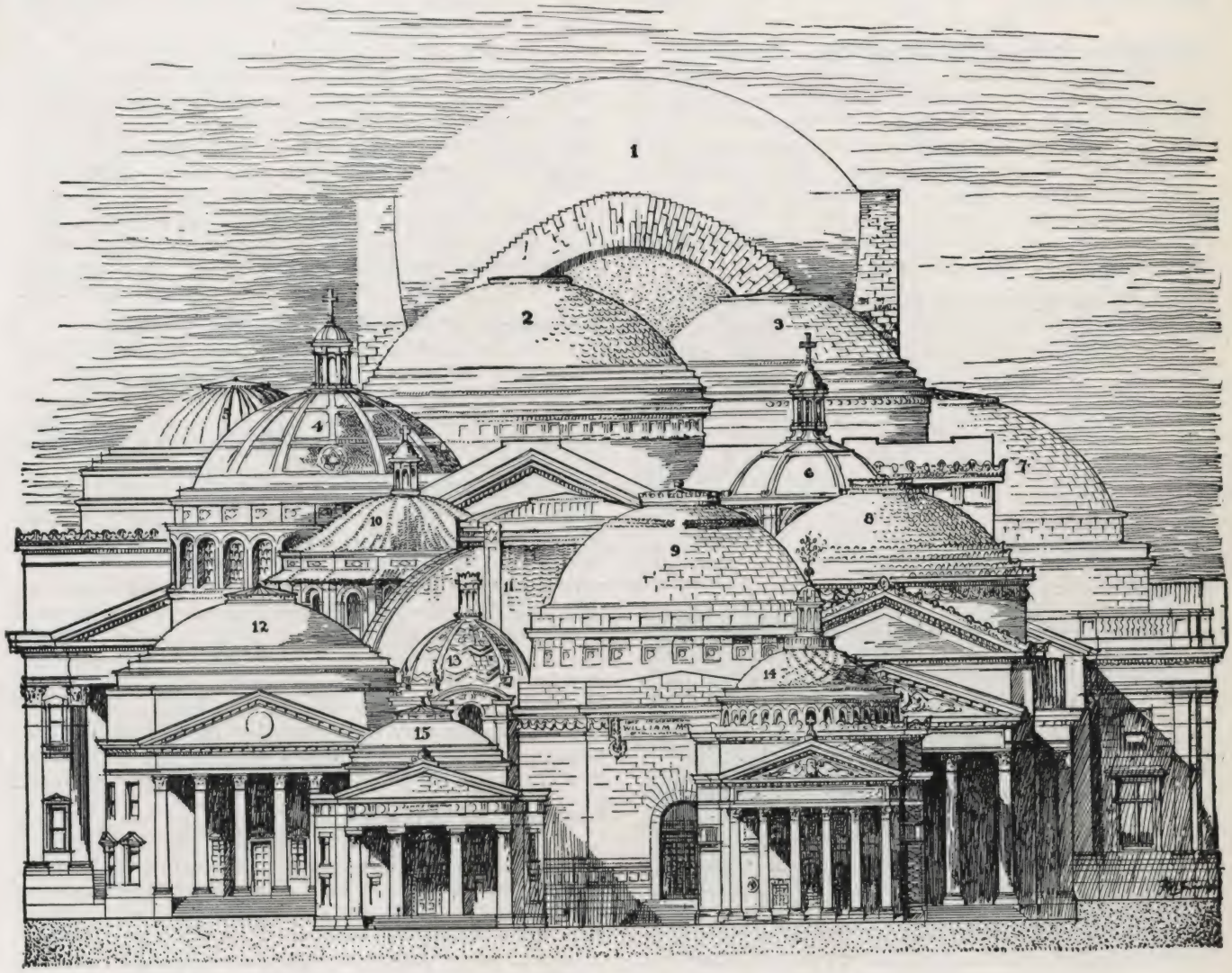
Continued on next page

Adaptability

The class of work for which this system is particularly adapted is that of buildings of a monumental type, State houses, court houses, churches, libraries, etc., in which the vaulted ceiling is notably acceptable, especially when laid in finished repressed tiles of designs as required, either unglazed or glazed, of any color desired.

Co-operative Service

Owing to the varied uses of our construction, involving engineering and architectural features, the more satisfactory method is to send us, before the plans are fully drawn, a sketch outline of the requirements, which will enable us to indicate the most approved method of treatment and the approximate cost.



SOME DOMES CONSTRUCTED BY R. GUASTAVINO COMPANY

	BUILDING AND LOCATION	SPAN	ARCHITECT
1.	Cathedral, St. John the Divine, New York, N. Y.	135 ft. at base	Heins & La Farge
2.	National Museum, Washington, D. C.	80 " " "	Hornblower & Marshall
3.	Institute of Arts and Sciences, Brooklyn, N. Y.	64 " " "	McKim, Mead & White
4.	St. Francis de Sales Church, Philadelphia, Pa.	61 " " "	Henry D. Dagit
5.	Bank of Montreal, Montreal, Can.	69 " " "	McKim, Mead & White and A. T. Taylor
6.	Church of St. Barbara, Brooklyn, N. Y.	43 " " "	Helmle & Huberty
7.	Girard Trust Co., Philadelphia, Pa.	101 " " "	McKim, Mead & White and Allen Evans
8.	University of New York, New York, N. Y.	70 " " "	McKim, Mead & White
9.	McKinley National Memorial, Canton, Ohio	56 " " "	H. Van Buren Magonigle
10.	St. Paul's Chapel, Columbia University, New York, N Y.	52 " " "	Howells & Stokes
11.	Rodef Sholem Synagogue, Pittsburgh, Pa.	90 " " "	Palmer & Hornbostel
12.	University of Virginia, Charlottesville, Va.	70 " " "	McKim, Mead & White
13.	Elephant House, Bronx Park, New York, N. Y.	34 " " "	Heins & La Farge
14.	Madison Square Presbyterian Church, New York, N. Y.	46 " " "	McKim, Mead & White
15.	J. J. Jermain Memorial Library, Sag Harbor, N. Y.	30 " " "	Augustus N. Allen

ESTABLISHED 1909

MAZER ACOUSTILE COMPANY

INCORPORATED 1916

Acoustical Engineers, Contractors and Manufacturers

9 South 21st Street

PHILADELPHIA, PA.

Products

Manufacturers of Sound Controlling Materials, the combination of which comprises the MAZER ACOUSTILE SOUND CONTROLLING SYSTEM.

Acoustile
THE PERFECTOR OF ACOUSTICS
TRADE-MARK

Calculations Involved in Determining Acoustics

Obviously only a very brief discussion of acoustics is here possible. The solution in most cases lies in the precise provision and distribution of sufficient absorbing materials to insure the complete decay of sound within the proper time after it originates. This involves accurate calculations, taking into consideration all the exposed materials in the room, each of which has a definite sound absorbing value. The use for which the room is designed must also be considered.

Approximate Method for Determining Treatment

Based upon the data we have accumulated in connection with hundreds of successful Acoustile installations, we have found the number of square feet of treatment (Acoustile in its completed form painted as desired) required in the average room can be roughly estimated at from 2% to 3% of the number of cubic feet in volume, depending on the sound absorbing value of other materials in the room. Architects may safely use this computation where desired for estimating purposes, pending a more accurate report from our engineers, which is always advisable before final plans and specifications are prepared.

Detail Drawings Furnished Architects Without Charge

Our Engineering Department is entirely at your service without charge. We shall make a careful study of preliminary sketches or plans, and submit full report of just what acoustical results may be expected, together with complete detail drawings and specifications for such treatment as may be necessary to regulate the hearing conditions of any room or building. Each case is individually studied and our recommendations as to location, quantity and arrangement of the various Acoustile units are made to accord with the architect's ideas of design and appearance. Blank data sheets will be furnished on request showing the information required for reports on the correction of acoustical defects in existing buildings. It is our policy to avoid, as much as possible, needless annoyance of architects by frequent visits to their offices. A representative of this company, fully competent to intelligently discuss acoustical problems, will call on request.

Objectionable Features of "Old Method" Entirely Eliminated

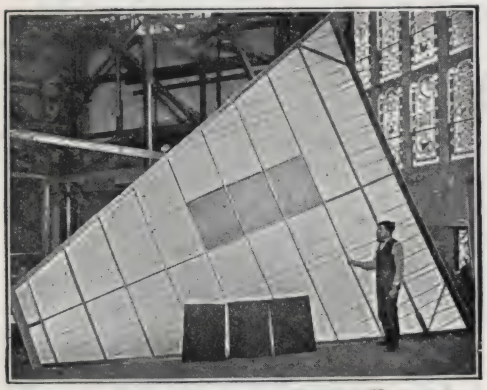
Acoustile should not be confused with the sound absorbing coverings applied to walls and ceilings by what is called the "old method," which consists of nailing wood furring strips to the surfaces and fastening between these strips, by means of chicken wire, ordinary rolled hair felt, such as used for pipe and boiler coverings, and an outer covering of thin muslin or rep tacked to the face of strips, the tack heads being then concealed with a guimpe or moulding. Our Improved Built-Before-Erection Acoustile System has entirely overcome the many serious objections to this "old method," chief of which is the necessity for using a porous or semi-porous surface membrane that can not be successfully painted with washable oil paints or cleaned and re-painted.

Advantages of Built-Before-Erection System

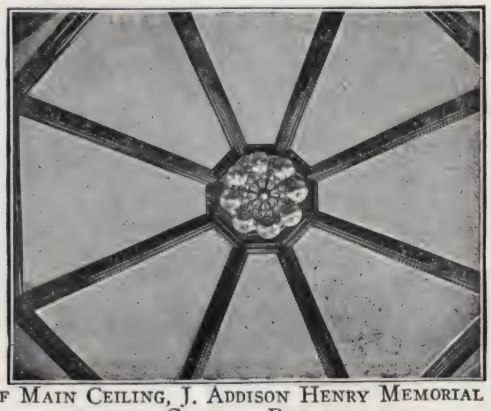
Acoustile panels are built complete before erection. They have the only acoustical surface that permits of successful painting in washable oil colors. The panels can be made any shape, in large or small dimensions, and with single or double curvatures, each panel showing a permanently smooth, finished surface, from edge to edge, without joints or lines of any kind. They may be in the form of raised or depressed panels, or flush with adjoining surfaces. They can be decorated in any manner desired, using either water colors or washable oil paints, and can be cleaned with soap and water and repainted. Plaster relief ornaments can be secured to these panels the same as to plaster walls or ceilings. Murals can be painted directly on the face of Acoustile acoustic membrane. Acoustile panels can be removed and replaced without damage. In new buildings, the metal lath and plaster may be omitted behind the panels, thus effecting a material saving in cost. Acoustile can also be secured directly to old plaster walls, or other surface.

Pioneers and Specialists

We were the pioneers in the field of acoustical engineering, and have specialized in this work exclusively for the past fourteen years. Our broad experience in all classes of buildings has enabled us to devise scientific materials and methods best suited for the correction and control of sound under varying conditions, and to develop a technique which has been incorporated in the Mazer Acoustile specification, insuring satisfactory results no matter what the style of architecture.



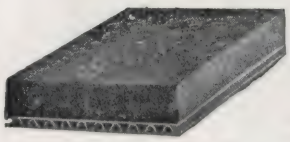
BACK OF TRIANGLE PANEL BEFORE ERECTION
Note three sheets of Acoustifelt already in position. Properly spaced wires kept it correct distance from the membrane



VIEW OF MAIN CEILING, J. ADDISON HENRY MEMORIAL PRESBYTERIAN CHURCH, PHILADELPHIA
Finished Acoustile panels in place—no seams or joints

Continued on next page

Acoustifelt The Main Sound Absorbing Element



SECTION OF ACOUSTI*FELT*
(Patented)
The main sound-absorbing element in Mazer Acoustile Specification

The main sound absorbing element in the Mazer Acoustile specification is our patented Acoustifelt, made of non-inflammable, chemically cleaned felt, reinforced with a fireproofed, air-cell fiber board backing which preserves uniform thickness and smooth surface, and prevents moisture, bits of dirt, plaster, etc., from penetrating the felt and reaching the inside of membrane. Acoustifelt is never rolled. Made in sheets, standard size 15x24 in., shipped in sanitary cartons, and delivered in a clean condition, perfectly smooth and flat, ready for insertion in Acoustile panels, without alteration of its predetermined acoustical value.

Appearance Same as Finished Plaster

The acoustic membrane or outer surface is a specially prepared canvas of definite weight, stretched over panels to a vibratory, drumhead tension, responsive to a wide range of sound frequencies. Required tautness is permanently maintained by tacking membrane to *sides* of frames. The exposed face of Acoustile panels presents the same appearance as finished plaster.

Competitive Bids Assured and Results Guaranteed

Attention is directed to the importance of preparing specifications for acoustical treatment as much in detail as possible, and clearly indicating the exact materials and methods of construction to be followed. Written permission to use our patented materials and construction, will be given to any responsible approved contractor, and the MAZER ACOUSTILE COMPANY'S guarantee issued to cover the workmanship and materials, as well as satisfactory acoustical results. It is thus possible for architects and owners to secure competitive bids with the assurance that the acoustical properties of the building will be adequately provided for, and that the necessary treatment will be installed in the most approved manner.

Abbreviated Specifications for Sound Controlling Wall and Ceiling Treatment

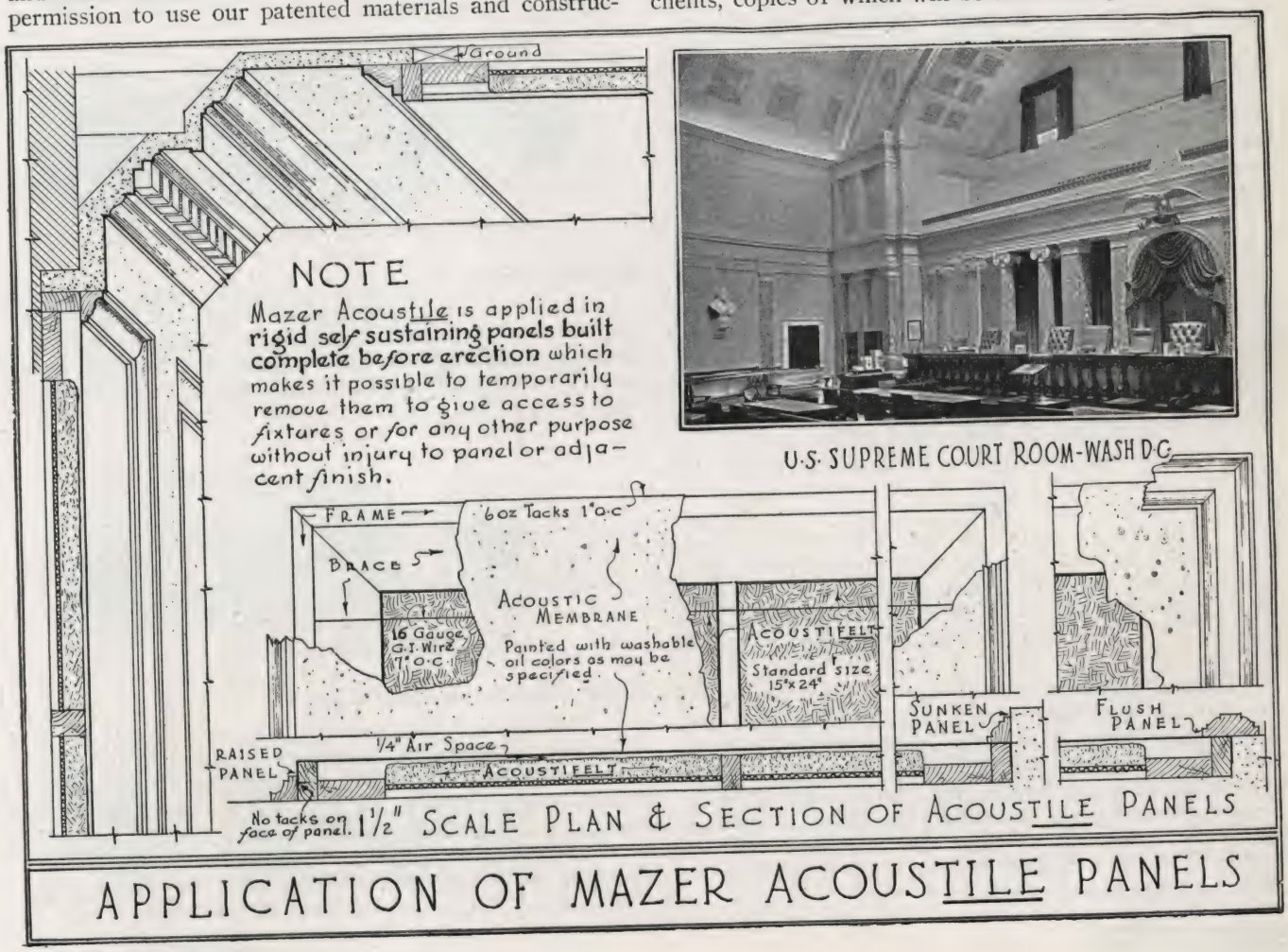
Cover all wall and ceiling surfaces, where indicated on drawings, with Acoustile Sound Controlling Panels, built complete before erection as directed by and under the supervision of the Engineering Department of the MAZER ACOUSTILE COMPANY, of Philadelphia, Pa., the total area of Acoustile treatment being approximately ..... square feet.

(Write for copy of the Standard Mazer Acoustile specifications which contains a complete description of all materials used and the various steps in their construction and erection.)

References

The Acoustile system of sound control has been successfully installed in numerous buildings of all kinds throughout the United States and Canada, prominent among which are the United States Supreme Court Chamber, Washington, D. C.; House of Commons, Ottawa, Canada; State Capitol Building, Cheyenne, Wyo.; City Auditoriums at Denver, Houston, Evansville, Dayton, etc.; churches, courtrooms, theaters, lodge rooms, schools, banks, offices, etc., and in no case have our products and services failed to give complete satisfaction.

We have hundreds of testimonial letters from clients, copies of which will be sent on request.



AMERICAN STEEL & WIRE COMPANY

Manufacturers of Wire Rope

SALES OFFICES

CHICAGO, 208 South La Salle Street
NEW YORK, 30 Church Street
WORCESTER, 94 Grove Street
BOSTON, 185 Franklin Street
PHILADELPHIA, Widener Building
PITTSBURGH, Frick Building
BUFFALO, 337 Washington Street
DETROIT, Foot of First Street
CINCINNATI, Union Trust Building
CLEVELAND, Western Reserve Building
BALTIMORE, 32 South Charles Street
WILKES-BARRE, PA., Miners Bank Building
ST. LOUIS, Liberty Central Trust Co. Building
ST. PAUL-MINNEAPOLIS, Pioneer Building, St. Paul
KANSAS CITY, MO., 417 Grand Avenue
OKLAHOMA CITY, First National Bank Building
BIRMINGHAM, ALA., Brown-Marx Building
DENVER, First National Bank Building
SALT LAKE CITY, Walker Bank Building

EXPORT REPRESENTATIVES, United States Steel Products Co., 30 Church Street, New York
PACIFIC COAST REPRESENTATIVES, United States Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

Products

All kinds of Wire Rope in the following qualities: Iron, Crucible Cast Steel, Extra Strong Crucible Cast Steel, Plow Steel and Monitor Steel or Tico Special.

Also a full line of Wire Rope Fittings: Slings, Thimbles, Clips, Clamps, Sockets, Hooks, Turnbuckles, Shackles, Blocks, Sheaves, etc.

For Concrete Reinforcement, see pages 27-31; for Triangle Mesh for Stucco Base, see pages 278-279; for Electric Wires and Cables, see pages 1820-1829.

Qualities of Wire Rope and Their Uses

Wire rope is made in the following 5 qualities:

Iron Rope—The wires are made from the best quality iron, being soft, tough and flexible. They are of low tensile strength. Iron hoisting rope is most generally used for elevator hoisting, where the strength is sufficient. It is almost universally employed for counterweight ropes, except on traction elevators. For traction elevators we recommend mild steel hoisting rope.

Crucible Cast Steel Rope—This is a medium strength material, tough and pliable, of moderate cost and general utility. Weighs only about half as much as iron for same strength; is harder, and better resists external wear. This rope is applicable to a great variety of uses, among which may be noted mine hoisting, logging, elevators, derricks, hay presses, dredges, cableways, inclined planes, coal hoists, conveyors, ballast un loaders, skip hoists and many other uses.

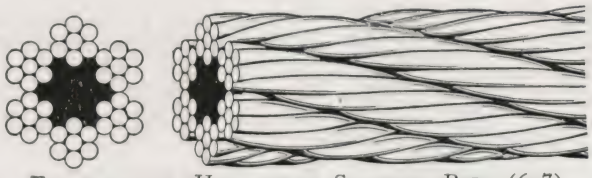
Extra Strong Crucible Cast Steel Rope—Of higher tensile strength than the crucible steel, and is tough, pliable, a little lighter for the same strength than crucible steel, and about two and one-half times the strength of iron. It has been found particularly useful for oil well drilling and tubing lines. Its other general uses are similar to those of the crucible steel, except that it may be used where loads are somewhat heavier.

Plow Steel Rope—Combines lightness and great strength; is somewhat stiffer than crucible steel and nearly three times as strong. Used particularly for heavy mine hoisting, derricks, inclined planes, dredges, cableways, for heavy logging and similar uses. It is the most economical rope to use where the weight of the rope has to be considered, or where the capacity of the machinery is to be increased without a corresponding increase in sheaves and drums.

Monitor Steel Rope—This is the highest strength rope made. It is somewhat stiffer in the same diameter than the plow and crucible steel grades, but, strength for strength, it is equally flexible. Very useful where great strength, lightness and abrasive resisting qualities are required.

Transmission, Haulage or Standing Rope

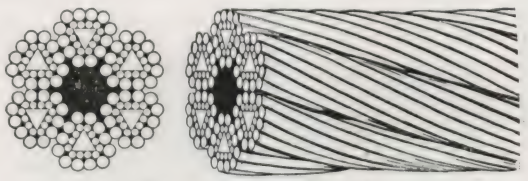
The coarsest rope, *i. e.*, 6 by 7 construction, a relatively stiff rope with large wires, capable of resisting external wear or abrasion; but it is the least flexible.



Transmission, Haulage or Standing Rope (6x7)

Hoisting Rope

Composed of 6 strands of 19 wires each, with hemp core. Used for elevators, mine hoisting, derricks, dredges, cableways, inclined planes, coal hoists, conveyors, ballast unloaders, skip hoist, oil well drilling and tubing lines.



Hoisting Rope (6x19)

Extra Flexible Hoisting Rope

This rope is composed of 8 strands of 19 wires each, laid around a hemp core. The addition of these 2 strands over the standard hoisting rope increases the flexibility and permits the rope being used over comparatively smaller sheaves and drums.

Adaptable for derricks, steam dredges, coal and ore handling machinery, pile drivers, and also for logging purposes, as well as tubing lines for oil wells.

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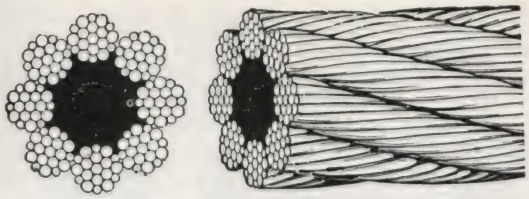
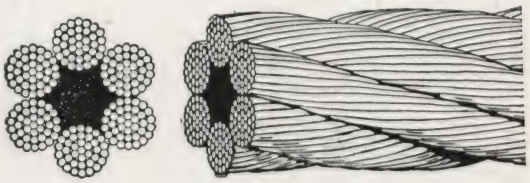


Extra Flexible Steel Hoisting Rope (8 x 19)

Special Flexible Hoisting Rope

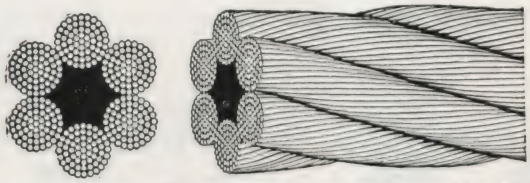
This rope is composed of 6 strands of 37 wires each, laid around a hemp core. This is a very flexible rope, and used largely on cranes and similar machinery where sheaves, of a necessity, are small.



Special Flexible Steel Hoisting Rope (6 x 37)

Extra Special Flexible Hoisting Rope

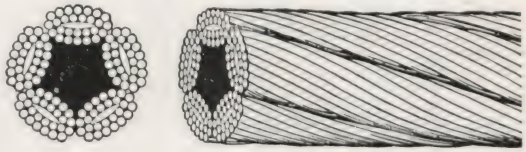
Composed of 6 strands of 61 wires each, with 1 hemp core, and recommended for dredging purposes, for which it is usually made with special wire center.



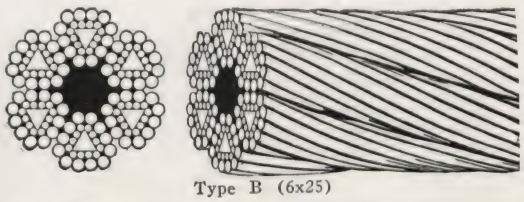
Extra Special Flexible Hoisting Rope (6 x 61)

Flexible Strand Hoisting Ropes

These ropes compare in flexibility with the standard hoisting rope, but possess about 150% greater wearing surface than the round strand ropes of same diameter, and have been used generally in the same places. (For data see following page.)



Type A (5x28)



Type B (6x25)

Flattened Strand Hoisting Ropes

VARIOUS CONSTRUCTIONS AND GRADES OF WIRE ROPE

Diameter in ins.	Weight per ft. in lbs.	IRON: Proper working load in tons of 2000 lbs.	IRON: Diameter of drum or sheave in ft. advised	IRON: List price per ft.	CRUCIBLE CAST STEEL: Proper working load in tons of 2000 lbs	CRUCIBLE CAST STEEL: Diameter of drum or sheaves in ft. advised	CRUCIBLE CAST STEEL: List price per ft.	EXTRA STRONG CRUCIBLE CAST STEEL: Proper working load in tons of 2000 lbs.	EXTRA STRONG CRUCIBLE CAST STEEL: List price per ft	PLOW STEEL: Proper working load in tons of 2000 lbs.	PLOW STEEL: List price per ft.	MONITOR STEEL: Proper working load in tons of 2000 lbs.	MONITOR STEEL: List price per ft.
Transmission, Haulage or Standing Rope—6 Strands, 7 Wires to Strand, 1 Hemp Core													
1½	3.55	6.4	16	$0.51	12.6	11	$0.60	14.6	$0.75	16.4	$0.90	18	$1.05
1⅜	3	5.6	15	.43	10.6	10	.51	12.6	.64	14.4	.76	16	.88
1¼	2.45	4.6	13	.36	9.2	9	.43	10 8	.53	12	.62	13	.72
1⅛	2	3.8	12	.30	7.4	8	.36	8.6	.44	9.4	.51	10	.58
1	1 58	3	10.5	.24	6.2	7	.29	7	.35	7.6	.41	8.4	.48
⅞	1.20	2.4	9	.18½	4.8	6	.22½	5.6	.27	6.2	.32	6.6	.37
¾	.89	1.7	7.5	.14	3.7	5	.17	4.2	.20	4.6	.24½	5	.28½
11/16	.75	1.5	7.25	.12	3.1	4¾	.14½	3.3	.17	3.6	.21	4	.24½
⅝	.62	1.2	7	.10	2.6	4½	.12	2 9	.14¼	3 2	.17½	3.5	.20½
9/16	.50	.96	6	.08¼	2	4	.10	2.2	.12	2 4	.14½	2.6	.17
½	.39	.74	5.5	.06½	1.5	3½	.08	1.8	.09½	2	.11½	2.2	.13½
7/16	.30	.52	4.5	.05½	1.1	3	.06½	1.25	.07½	1.4	.09	1.5	.11½
⅜	.22	.44	4	.04½	.92	2¾	.05½	1.05	.06	1.2	.06¾	1.3	.08¾
5/16	.15	.34	3.5	.03¾	.70	2¼	.04½	.79	.05½	.88	.06	.....	.....
9/32	.12½	.24	3	.03¼	.50	1¾	.04	.59	.05	.68	.05½	.....	.....
Hoisting Rope—6 Strands, 19 Wires to Strand, 1 Hemp Core													
2¾	11.95	22.2	17	$1.70	42.2	11	$2.10	48.6	$2.55	55	$3.00	63	$3.45
2½	9.85	18.4	15	1.40	34	10	1.75	40	2.10	46	2.50	53	2.80
2¼	8	14.4	14	1.17	26.6	9	1.44	32	1 70	37	2.00	42	2.50
2	6.30	11	12	.95	21.2	8	1.16	24.6	1.34	28	1.58	33	1.85
1⅞	5.55	10	12	.88	19	8	1.02	22.4	1.25	25	1.46	30	1.75
1¾	4.85	8.8	11	.80	17	7	.90	19.8	1.10	22	1 30	27	1.60
1⅝	4.15	7.6	10	.65	14.4	6.5	.77	16.6	.94	19	1.08	22	1.30
1½	3.55	6.6	9	.57	12.8	6	.66	14.6	.80	16	.93	20	1.10
1⅜	3	5.6	8.5	.49	11.2	5.5	.56	12.8	.68	14	.79	17	.90
1¼	2.45	4.56	7.5	.40	9.4	5	.46	10.6	.56	12	.65	14	.75
1⅛	2	3.72	7	.33	7 6	4.5	.38	8 6	.46	9.4	.54	11	.62
1	1.58	2.90	6	.26	6	4	.31	6.80	.37	7.6	.43	9	.50
⅞	1.20	2.36	5.5	.20	4.6	3.5	.24	5.20	.29	5.8	.34	7	.39
¾	.89	1.70	4.5	.16	3.5	3	.19	4.04	.22	4.6	.26	5.3	.31
⅝	.62	1.20	4	.12	2.5	2.5	.14	2.80	.16½	3.1	.19	3.8	.22½
9/16	.50	.94	3.5	.10	2	2.25	.12	2.24	.14	2.4	.16	2.9	.19
½	.39	.78	3	.08½	1.68	2	.11	1.84	.12½	2	.14	2.4	.17
7/16	.30	.58	2.75	.07½	1.30	1.75	.10	1.45	.11½	1.6	.13	1.9	.15½
⅜	.22	.48	2.25	.07	.96	1.50	.09½	1.06	.11	1.15	.12½	1.35	.14½
5/16	.15	.30	2	.06¾	.62	1.25	.09¼	.70	.10¾	.76	.12¼	.9	.13½
¼	.10	.22	1.50	.06½	.44	1.00	.09	.49	.10½	.53	.12	.63	.13
Extra Flexible Hoisting Rope—8 Strands, 19 Wires to Strand, 1 Hemp Core													
1½	3.19	.....	.....	.....	11.6	3.75	$0.73	13	$0.88	14.8	$1.03	16	$1.19
1⅜	2.70	.....	.....	.....	10.2	3.5	.62	11	.75	12.8	.87	13	.98
1¼	2.20	.....	.....	.....	8.4	3.2	.51	9.4	.62	10.4	.72	11	.82
1⅛	1.80	.....	.....	.....	6.8	2.83	.42	7.6	.51	8.6	.60	9.2	.68
1	1.42	3.1	6	$0.29	5.2	2.5	.34	5.9	.41	6.6	.48	7.2	.55
⅞	1.08	2.6	5.5	.22	4	2.16	.27	4.6	.32	5.2	.38	5.6	.43
¾	.80	1.9	4.5	.18	3.06	1.83	.21	3.5	.25	4	.29	4.4	.34
⅝	.56	1.4	4	.14	2.18	1.75	.16	2.5	.18½	2.8	.21	3	.25
9/16	.45	1.2	3.5	.11½	1.74	1.5	.14	2	.16	2.32	.18	2.4	.22
½	.35	1	3	.09½	1.46	1.33	.12	1.6	.14	1.74	.16	1.9	.19
7/16	.27	.....	.....	.....	1.14	1.16	.11	1.26	.13	1.38	.15	.....	.....
⅜	.20	.....	.....	.....	.84	1	.10½	.93	.12¼	1.02	.14	.....	.....
5/16	.13	.....	.....	.....	.55	.83	.10¼	.61	.12	.67	.13½	.....	.....
¼	.09	.....	.....	.....	.36	.75	.10	.40	.11¾	.45	.13¼	.....	.....
Special Flexible Hoisting Rope—6 Strands, 37 Wires to Strand, 1 Hemp Core													
2¾	11.95	.....	.....	.....	40	.....	$2.30	47	$2.80	53	$3 30	55	$3.75
2½	9.85	.....	.....	.....	32	.....	1.92	37	2.35	43	2.75	45	3 15
2¼	8	.....	.....	.....	25	.....	1.60	30	1.90	35	2.20	37	2 50
2	6.30	.....	.....	.....	21	.....	1.35	23	1.55	26	1.80	27	2.10
1⅞	5.55	.....	.....	.....	18.8	.....	1.20	21.2	1.41½	23.8	1.65	25	1.92½
1¾	4.85	.....	.....	.....	17	.....	1.05	19	1.28	22	1.50	23	1.75
1⅝	4.15	.....	.....	.....	14	.....	.89	16	1.07	18	1.25	19	1.45
1½	3.55	.....	.....	.....	12	3.75	.79	14	.95	16	1.10	17	1.25
1⅜	3	.....	.....	.....	11	3.5	.65	12	.78	14	.91	14	1 05
1¼	2.45	.....	.....	.....	9	3.2	.55	10	.65	11	.75	11	.86
1⅛	2	.....	.....	.....	7	2.83	.46	8	.55	9	.64	9.2	.75
1	1.58	.....	.....	.....	6	2.5	.37	6.4	.44	7	.51	7.4	.59
⅞	1.20	.....	.....	.....	5	2.16	.28	5	.34	5	.40	5.8	.46
¾	.89	.....	.....	.....	3.5	1.83	.23	3.8	.27	4	.31	4.6	.36
⅝	.62	.....	.....	.....	2.2	1.75	.18	2.5	.21	3	.24	3.2	.27
9/16	.50	.....	.....	.....	1.9	1.5	.15	2.1	.17½	2.3	.20	2.5	.23
½	.39	.....	.....	.....	1.45	1.33	.13	1.65	.15	1.85	.17	1.9	.20
7/16	.30	.....	.....	.....	1 1	1.16	.12½	1.27	.14	1.4	.16	1.5	.18½
⅜	.22	.....	.....	.....	.84	1	.12	.93	.13	1	.15	1.06	.17½

Diameter of drum advised for extra strong crucible cast steel, plow steel and monitor steel ropes is same as for crucible cast steel,

The tensile strength is 5 times the proper working load given above.

EXTRA SPECIAL FLEXIBLE HOISTING ROPE—6 STRANDS, 61 WIRES TO EACH, 1 HEMP CORE

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	CRUCIBLE CAST STEEL: Proper working load in tons of 2000 lbs.	CRUCIBLE CAST STEEL: List price per ft.	EXTRA STRONG CRUCIBLE CAST STEEL: Proper working load in tons of 2000 lbs.	EXTRA STRONG CRUCIBLE CAST STEEL: List price per ft.	PLOW STEEL: Proper working load in tons of 2000 lbs.	PLOW STEEL: List price per ft.	MONITOR STEEL: Proper working load in tons of 2000 lbs.	MONITOR STEEL: List price per ft.
3¼	16.60	11	56	.....	63	.....	70	.....	74	.....
3	14.20	10	48	.....	55	.....	62	.....	65	.....
2¾	11.95	9	40	$2.53	47	$3.08	63	$3.63	56	$4.12
2½	9.85	8	32	2.11	37	2.58	43	3.02	45	3.46
2¼	8.00	7	25	1.76	30	2.09	35	2.42	37	2.75
2	6.30	6	21	1 48	23	1.70	26	1.98	27	2.31

Continued on next page

FLATTENED STRAND HOISTING ROPES

Diameter in ins.	IRON Type A: Proper working load in tons of 2000 lbs.	IRON Type A: Weight per ft. in lbs.	IRON Type A: Diameter of drum or sheave in ft. advised	IRON Type A: List price per ft.	CRUCIBLE CAST STEEL Type A: Proper working load in tons of 2000 lbs.	CRUCIBLE CAST STEEL Type B: Proper working load in tons of 2000 lbs.	CRUCIBLE CAST STEEL Type B: Weight per ft. in lbs.	CRUCIBLE CAST STEEL Types A and B: Diameter of drum or sheave in ft. advised	CRUCIBLE CAST STEEL Types A and B: List price per ft.	EXTRA STRONG CRUCIBLE CAST STEEL* Type A: Proper working load in tons of 2000 lbs.	EXTRA STRONG CRUCIBLE CAST STEEL* Type B: Proper working load in tons of 2000 lbs.	EXTRA STRONG CRUCIBLE CAST STEEL* Types A and B: List price per ft.	MONITOR STEEL Type A: Proper working load in tons of 2000 lbs.	MONITOR STEEL Type B: Proper working load in tons of 2000 lbs.	MONITOR STEEL Types A and B: Diameter of drum or sheave in ft. advised	MONITOR STEEL Types A and B: List price per ft.
2¼	14.4	8.00	11¼	$1.52	26.6	29.2	9.20	8½	$1.82	32	35.2	$2.20	42	46.2	12	$2.85
2	11	6.30	10¾	1.20	21.2	23.4	7.25	8	1.44	24.6	27	1.77	33.2	36.6	11	2.25
1¾	8.8	4.85	9	1.04	17.0	18.8	5.60	7¼	1.21	19.8	21.8	1.55	26.6	29.2	9	2.08
1⅝	7.6	4.15	7½	.82	14.4	15.8	4.75	6¼	.96	16.6	18.2	1.30	22	24.2	8½	1.56
1½	6.6	3.55	6¾	.74	12.8	14.0	4.00	5¾	.86	14.6	16	1.05	19.6	21.6	8	1.37
1⅜	5.6	3.00	6¼	.625	11.2	12.4	3.45	5½	.73	12.8	14	.90	16.8	18.4	7½	1.12
1¼	4.56	2.45	5¾	.52	9.4	10.4	2.80	5	.595	10.6	11.6	.70	13.8	15.2	7	.89
1⅛	3.72	2.00	5¼	.43	7.6	8.4	2.30	4½	.50	8.6	9.4	.59	11.2	12.4	6	.71
1	2.90	1.58	4¾	.34	6.0	6 6	1.80	4	.395	6.8	7.4	.48	9	10.0	5	.60
⅞	2.36	1.20	4	.26	4.6	5.0	1.38	3½	.30	5.2	5.8	.38	7	7.8	4½	.49
¾	1.70	.89	3½	.21	3.5	3.86	1.00	3	.24	4.04	4.44	.30	5.26	5.8	4	.375
⅝	1.20	.62	3	.155	2.5	2.76	.72	2¼	.18¼	2.80	3.08	.225	3.8	4.2	3½	.28
9/16	.94	.50	2½	.13	2	2.2	.58	1¾	.165	2.24	2.46	.195	2.9	3.2	3	.25
½	.78	.39	2	.105	1.68	1.86	.45	1½	.145	1.84	2.02	.175	2.42	2.7	2¾	.20¾
⅜	.48	.22	1	.095												

Weights for Types A and B respectively are the same for all constructions.
Standard Plow Steel grade is also furnished if desired.
*Diameters of drums are the same as for Crucible Cast Steel.

Sash Cord

Made "dead soft" unless ordered to the contrary. Used principally for window weights, bell cords, automobile brakes and whistles. $\frac{3}{32}$-in. diameter galvanized sash cord is used on electric open car curtain fixtures; $\frac{1}{16}$-in. galvanized sash cord is used on car curtain fixtures.

SASH CORD (6x7)

6 Strands of 7 Wires Each, 1 Cotton Core

Trade No.	Diam., in.	Weight per ft. in. lbs.: Iron	Weight per ft. in. lbs.: Copper	Approximate breaking strength in lbs.: Bright Iron	Approximate breaking strength in lbs.: Annealed iron	Approximate breaking strength in lbs.: Bright copper	List price per ft.: Iron annealed or bright	List price per ft.: Tinned or galvanized iron	List price per ft.: Copper
26	¼	.101	.115	2200	1650	1320	$0.03	$0.04	$0.09
27	7/32	.077	.087	1800	1411	1080	.02¾	.03½	.07½
27½	9/64	.056	.064	1400	1100	840	.02¼	.03	.06
28	⅛	.025	.029	550	425	350	.01¾	.02¼	.04½
28½	5/32	.014	.016	320	250	200	.01½	.02	.03½
29	1/16	.006	.007	140	110	90	.01¼	.01¾	.03

Steel Wire Strand

Used chiefly for guying poles and smokestacks, supporting trolley wire, and operating railroad signals.

STEEL WIRE STRAND
7 Wires Twisted into a Single Strand, Galvanized or Extra Galvanized

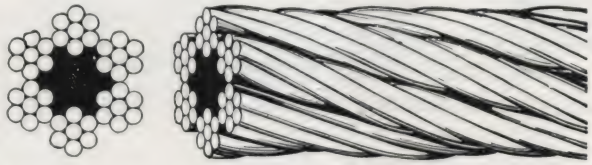
Diameter in ins.	Sizes of wire American Steel & Wire Co.'s steel wire gauge	Weight per 1000 ft. in lbs.	Strength in lbs.	List price per 100 ft.
¾	3	1200	16,700	$14.00
5/8	5	800	11,600	8.50
9/16	6	650	9,600	7 00
1/2	8	510	7.400	5.50
7/16	9	415	5.700	4.50
3/8	11	295	4.250	3.50
5/16	12	210	3,200	2.50
9/32	13	160	2,570	2.25
1/4	14	125	1,900	1.75
7/32	15	95	1,540	1 50
3/16	16	75	1,150	1.25
5/32	17	55	870	1.15
9/64	18	40	700	1.10
1/8	19	32	540	1.00
7/64	20	25	450	.90
3/32	21	20	400	.80
5/64	22	13	300	.70

STEEL WIRE STRAND
19 Wires Twisted into a Single Strand, Galvanized or Extra Galvanized

Diameter in ins.	Sizes of wire in ins.	Weight per 1,000 ft. in lbs.	Strength in lbs.	List price per 100 ft.
1	.200	2100	32000	$26.00
⅞	.175	1610	24000	20.70
¾	.150	1200	18000	16.80
⅝	.125	800	14000	11.00
½	.110	650	11000	9.25
	.100	510	8500	7.30

Galvanized Iron or Steel Guy Rope

For supporting derricks, and for general standing rope service; it is not designed to run over drums or sheaves.



GALVANIZED IRON OR STEEL GUY ROPE (6x7 or 6x12)

Iron: Diameter in ins.	Iron: Weight per ft. in lbs.	Iron: Strength in tons of 2000 lbs.	Crucible Cast Steel: Diameter in ins.	Crucible Cast Steel: Weight per ft. in lbs.	Crucible Cast Steel: Strength in tons of 2000 lbs.
6 Strands, 7 or 12 Wires Each, 1 Hemp Core			6 Strands, 7 Wires Each, 1 Hemp Core		
1¾	4.85	42	1¼	2.45	42
1 11/16	4.42	38	1 3/16	2.21	38
1⅝	4.15	35	1⅛	2	34
1½	3.55	30	1 1/16	1.77	31
1 7/16	3.24	28	1	1.58	28
1⅜	3	26	⅞	1.20	22
1¼	2.45	23	1 1/16	1.03	19
1 3/16	2.21	19	¾	.89	16.8
1⅛	2	18	5/8	.62	11.7
1 1/16	1.77	16.1	9/16	.50	9
1	1.58	14.1	½	.39	7
⅞	1.20	11.1	15/32	.34	6
13/16	1.03	9.4	7/16	.30	5
¾	.89	7.8	⅜	.22	4.2
5/8	.62	5.7	5/16	.15	3.2
9/16	.50	4.46			
½	.39	3.39			
7/16	.30	2.35			
⅜	.22	1.95			
5/16	.15	1.42			
5 Strands					
9/32	.125	1.20			
¼	.09	.99			
7/32	.063	.79			
3/16	.04	.61			

List prices furnished on application.

Continued on next page

Tiller or Hand Rope

Used for starting and stopping elevators, and also for steering lines on yachts and motor boats.

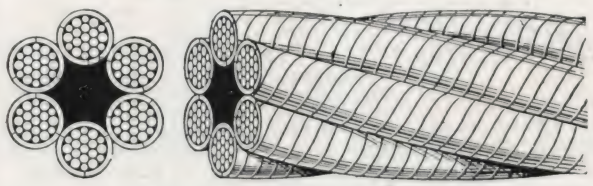
TILLER ROPE OR HAND ROPE (6x42)

TILLER OR HAND ROPE
6 STRANDS OF 42 WIRES EACH, 7 HEMP CORES

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	IRON		CRUCIBLE CAST STEEL	
			Breaking strength in lbs.	List price per ft.	Breaking strength in lbs.	List price per ft.
1	1.10	24	22000	$0.33	35000	$0.43
7/8	.84	21	15500	.27	26000	.36
3/4	.62	18	11000	.22	18000	.30
5/8	.43	15	7000	.17	13500	.24
9/16	.35	13½	6300	.14	11000	.20
1/2	.28	12	5800	.11½	9000	.17
7/16	.21	10½	4000	.10	6500	.15
3/8	.16	9	3000	.09	4800	.14
5/16	.11	7½	1900	.08	3600	.12½
1/4	.07	6	1300	.07½	2500	.11
3/16	.04	....	750	.07	1350	.10

Steel Clad Hoisting Rope

Each strand is spirally wound with flat steel strips, giving considerable wearing surface over the ordinary type. When the flat strips of a steel clad rope have worn through, there still remains the complete hoisting rope with unimpaired strength. Where ropes wear out quickly, this feature is a distinct advantage. Made in 3 constructions: 6 strands of 19 wires each; special flexible, 6 strands of 37 wires each; and extra special flexible, 6 strands of 61 wires each.

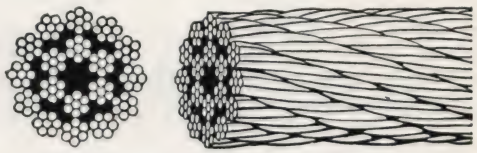


STEEL CLAD HOISTING ROPE (6x19)
6 STRANDS, 19 WIRES TO STRAND

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	CRUCIBLE CAST STEEL		EXTRA STRONG CRUCIBLE CAST STEEL		PLOW STEEL		MONITOR STEEL	
			Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.
2¼	8.45	8	21.2	$1.56	24.6	$1.74	28	$1.98	33	$2.25
2	6.70	7.5	19.2	1.29	22.4	1.52	25	1.73	30	2.02
1⅞	6 02	7	17.0	1.16	19.8	1.36	22	1.56	27	1.86
1¾	5.25	6.5	14.4	1.01	16 6	1.18	19	1.32	22	1.54
1⅝	4.62	6	12.8	.89	14.6	1.03	16	1.16	20	1.33
1½	3.95	5.5	11.2	.78	12.8	.90	14	1.01	17	1.12
1⅜	3.30	5	9.4	.67	10.6	.77	12	.86	14	.96
1¼	2.80	4.5	7.6	.57	8.6	.65	9.4	.73	11	.81
1⅛	2.12	4	6.0	.49	6.8	.55	7.6	.61	9	.68
1	1.72	3.5	4.6	.41	5.2	.46	5.8	.51	7	.56
⅞	1.30	3	3.5	.36	4.04	.39	4.6	.43	5.3	.48
¾	1.00	2.5	2.5	.30	2.80	.32	3.1	.35	3.8	.38
⅝	.70	2	1 68	.26	1.84	.27	2.0	.29	2.4	.32

Non-spinning Hoisting Rope

This type of rope is so constructed that it prevents the rotating of a free load suspended on the end of a single line. It is recommended for "back haul" or single line derricks.



NON-SPINNING HOISTING ROPE (18x7)

NON-SPINNING HOISTING ROPE
18 STRANDS, 7 WIRES EACH, 1 HEMP CORE

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	IRON		CRUCIBLE CAST STEEL		EXTRA STRONG CRUCIBLE CAST STEEL		PLOW STEEL		MONITOR STEEL	
			Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.
1¾	5.50	7.00	9.1	$0.80	17.1	$0.90	20.2	$1.10	22.2	$1.30	24.0	$1.60
1⅝	4.90	6.50	7.9	.65	14.8	.77	17.5	.94	19.2	1.08		
1½	4.32	6.00	6.8	.57	12.7	.66	15.0	.80	16.5	.93	18.1	1.10
1⅜	3.60	5.50	5.6	.49	10.4	.56	12.4	.68	13.7	.79	15.1	.90
1¼	2.80	5.00	4.6	.40	8.7	.46	10.3	.56	11.3	.65	12.5	.75
1⅛	2.34	4.50	3.9	.33	7.3	.38	8.6	.46	9.5	.54	10.4	.62
1	1.73	4.00	2.9	.26	5.6	.31	6.6	.37	7.2	.43	7.8	.50
⅞	1.44	3.50	2.3	.20	4.5	.24	5.3	.29	6.3	.34	7.0	.39
¾	1.02	3.00	1.7	.16	3.3	.19	3.9	.22	4.9	.26	5.4	.31
⅝	.70	2.50	1.1	.12	2.2	.14	2.6	.16½	3.1	.19	3.4	.22½
9/16	.87	2.25	.97	.10	1.8	.12	2.1	.14	2.5	.16		
½	.42	2.00	.73	.08½	1.3	.11	1.6	.12½	1.9	.14	2.1	.17
7/16	.31	1.75	.52	.07½	.98	.10	1.1	.11½	1.3	.13		
⅜	.25	1.50	.42	.07	.78	.09½	.92	.11	1.1	.12½	1.2	.14½

STEEL CLAD, SPECIAL FLEXIBLE HOISTING ROPE
6 STRANDS, 37 WIRES TO STRAND, 1 HEMP CORE

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	CRUCIBLE CAST STEEL		EXTRA STRONG CRUCIBLE CAST STEEL		PLOW STEEL		MONITOR STEEL	
			Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.
2¾	12.05	8	32	$2.52	37	$2.95	43	$3.35	45	$3.75
2½	9.90	7	25	2.10	30	2.40	35	2.70	37	3.00
2¼	8.00	6	21	1.75	23	1.95	26	2.20	27	2.50
2	6.60	5.25	18.8	1.47	21.2	1.68	23.8	1.92	25	2.19
1⅞	5.90	4.75	17	1.31	19	1.54	22	1.76	23	2.01
1¾	4.90	4.25	14	1.13	16	1.31	18	1 49	19	1.69
1⅝	4.30	3.75	12	1.02	14	1.18	16	1.33	17	1.48
1½	3.75	3.5	11	.87	12	1.00	14	1.13	14	1.27
1⅜	3.05	3.2	9	.76	10	.86	11	.96	11	1.07
1¼	2.40	2.83	7	.65	8	.74	9	.83	9.2	.94
1⅛	2.00	2.5	6	.55	6.4	.62	7	.69	7.4	.77
1	1.75	2.16	5	.45	5	.51	5	.57	5.8	.63

STEEL CLAD, EXTRA SPECIAL FLEXIBLE HOISTING ROPE
6 STRANDS, 61 WIRES TO STRAND, 1 HEMP CORE

Diameter in ins.	Weight per ft. in lbs.	Diameter of drum or sheave in ft. advised	CRUCIBLE CAST STEEL		EXTRA STRONG CRUCIBLE CAST STEEL		PLO W STEEL		MONITOR STEEL	
			Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.	Proper working load in tons of 2000 lbs.	List price per ft.
3¼	16.80	10	48	$3.90	55	$4.55	62	$5.10	65	$5.70
3	14.35	9	40	3.23	47	3.78	53	4.33	55	4.82
2¾	12.05	8	32	2.71	37	3.18	43	3.62	45	4.06
2½	9.90	7	25	2.26	30	2.59	35	2.92	37	3.25
2¼	8.45	6	21	1.88	23	2.10	26	2.38	27	2.71

Continued on next page

REPUBLIC FIREPROOFING COMPANY, INC.

Long Span Two-way Reinforced Fireproof Floor and Roof Construction
Reinforced Concrete Engineers

EXECUTIVE OFFICES

Cuyler Building, 116 West 32nd Street
NEW YORK, N. Y.

REPRESENTATIVES THROUGHOUT THE UNITED STATES

Product and Service

REPUBLIC DESIGN of FIREPROOF FLOOR, ROOF and FRAMING for all classes of buildings.

The various Republic Patented Two-way Block Reinforced Floor and Roof Constructions are sold under exclusive licenses and ownership.

Literature and engineers' service resulting from experience in design and sale of material for over 500 prominent buildings are at the disposal of architects and others.

Technical Advantages

A floor slab reinforced in two directions resting on four supports produces reactions at every point of its support, resulting in stresses set up in all directions.

By virtue of the support on four sides, a floor is restrained from deflecting as freely as a floor supported on only two sides.

Concrete, reinforced in two directions, produces double compression, resulting in greater stiffness, less deflection or greater resistance to bending and allowable higher bending moments.

Through distribution of the load in two directions, the supporting members may be reduced and column footings and foundations may be lighter than with other kinds of construction.

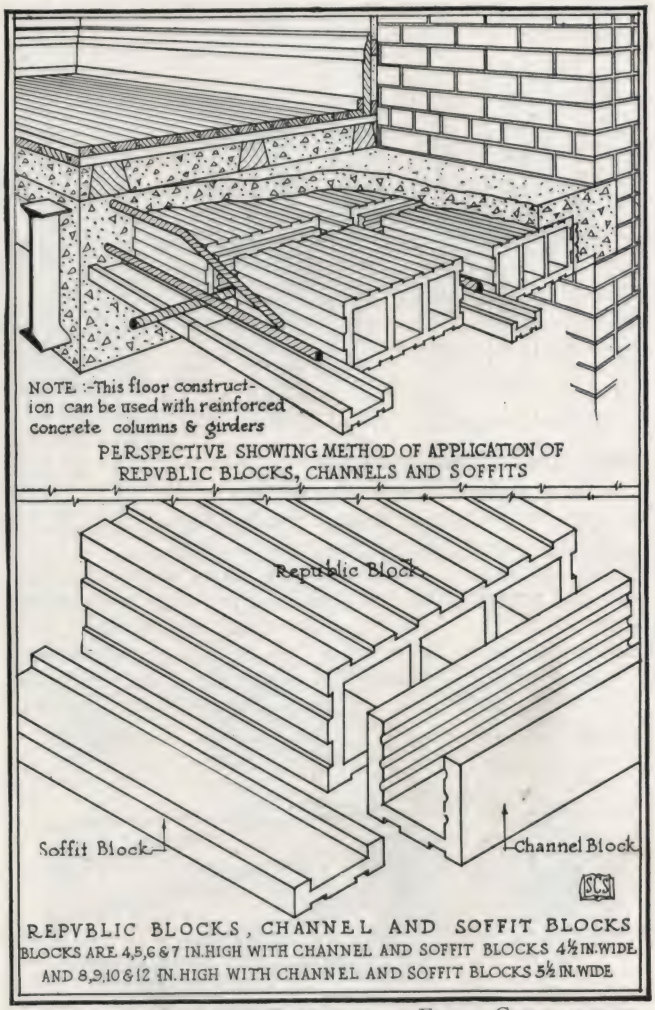
Description

The Republic long span fireproof floor and roof construction is based upon a unit composed of a block, a channel and a soffit, all made of light, strong, fireproof material. The channels are, for convenience in handling, generally shipped two together and the soffits six together. These three elements automatically space themselves when assembled, which is a guarantee against errors of installation.

The lower series of reinforcing bars rest upon the sides of the soffits, automatically fixing their correct position above the bottom of the construction. The upper bars are placed at right angles to, and on top of, the lower bars, which in turn are also fixed in proper position so that thorough embedment and fireproofing are made certain. The last step in completing the construction, after the blocks and bars are aligned, is to pour the concrete between the blocks, around the bars and over the blocks to the required depth.

Ceilings produced by Republic blocks, channels and soffits are solid and uniform, so that only two coats of plaster are required, instead of three, as is generally necessary; furthermore, discoloration, cracking and falling of plaster are prevented.

Fire would most seriously attack the underside of a roof or floor where it is reinforced. In the Republic construction, the underside of the channels and the soffits and the automatic embedment of the bars in the concrete insure a maximum of fire protection.



DETAILS OF REPUBLIC BLOCKS AND FLOOR CONSTRUCTION

Fox Department Store, Hartford, Conn.
CASS GILBERT, Architect, New York, N. Y.

Public Service Terminal Building, Newark, N. J.
GEO. B. POST & SONS, Architects, New York, N. Y.

BUILDINGS IN WHICH REPUBLIC PATENTED TWO-WAY REINFORCED CONCRETE SYSTEMS WERE INSTALLED

AMERICAN STEEL & WIRE COMPANY

Triangle Mesh and Electrically Welded Wire Fabric for Concrete Reinforcement

SALES OFFICES

CHICAGO, 208 South La Salle Street
WORCESTER, 94 Grove Street
BOSTON, 185 Franklin Street
PHILADELPHIA, Widener Building
PITTSBURGH, Frick Building
BUFFALO, 337 Washington Street
DETROIT, Foot of First Street
CINCINNATI, Union Trust Building
CLEVELAND, Western Reserve Building
NEW YORK, 30 Church Street
BALTIMORE, 32 South Charles Street
WILKES-BARRE, PA., Miners Bank Building
ST. LOUIS, Liberty Central Trust Co. Building
ST. PAUL-MINNEAPOLIS, Pioneer Building, St. Paul
KANSAS CITY, MO., 417 Grand Avenue
OKLAHOMA CITY, First National Bank Building
BIRMINGHAM, ALA., Brown-Marx Building
DENVER, First National Bank Building
SALT LAKE CITY, Walker Bank Building

EXPORT REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., 30 Church Street, New York
PACIFIC COAST REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., San Francisco, Los Angeles, Portland, Seattle

Products

TRIANGLE MESH and ELECTRICALLY WELDED WIRE FABRICS for CONCRETE REINFORCEMENT.

For Wire Rope, see pages 22-25; for Triangle Mesh for Stucco Base, see pages 278-279; for Electric Wires and Cables, see pages 1820-1829.

Uses

Triangle Mesh and Electrically Welded Wire Fabrics are used for reinforcing of concrete floor and roof slabs, arch construction, beams, columns, dams and retaining walls, water, sewer and culvert pipe, pavements and roadways, river revetment, silos, fireproofing steel framing, bridge floors, reservoirs, monolithic concrete sewers and stucco work.

Advantages of Wire Fabric Reinforcement

(1) Provides even distribution of steel.
(2) Reinforces in every direction.
(3) Tension or carrying members accurately spaced.
(4) Low cost of inspection.
(5) Properly distributes over a large area stresses due to concentrated load.
(6) Due to cold drawing, higher elastic limits and ultimate strengths with same quality of steel.
(7) Continuous action from one end of the structure to the other.
(8) Impossible to leave out or otherwise reduce the necessary steel if specific style number of fabric or area of steel is specified.
(9) Perfect mechanical bond.
(10) Easily handled and stored on the work.
(11) Minimum cost of installation.

Grade of Steel

A reduction of the required sectional area of steel is safely accomplished, within limits, by the use of a higher tensile strength steel. This high tensile strength may be secured by increasing the carbon content or by cold drawing of mild steel.

Cold drawing of mild steel produces a high ultimate strength and yield point, and the proportion of the yield point to the ultimate strength is increased to from 70 to 90%. Since the strength of a reinforced concrete structure, insofar as the reinforcement is concerned, depends on the yield point of the steel, the high yield point of cold drawn wire is of great importance.

Galvanizing

Triangle Mesh woven wire reinforcement can be furnished either plain or galvanized but is usually furnished plain.

Electrically Welded wire reinforcement fabric is usually furnished galvanized.

Galvanizing of reinforcement is necessary when used with cinder concrete.

Triangle Mesh Woven Wire Concrete Reinforcement

Triangle Mesh fabric is made from cold drawn mild steel having an ultimate strength of 70,000 to 85,000 lbs. per sq. in. The longitudinal members are spaced 4 in., the diagonal cross wires either 2, 4, or 8 in. It is the only design of wire fabric having cross wires that assist the longitudinals in carrying the load.

For the light styles of fabric, the longitudinals consist of 1 wire; for the medium styles, 2 wires laid parallel; and for the heavy styles, 3 wires stranded. The size of the wires is varied to obtain the desired cross sectional area of steel per foot of width. Stranded longitudinals are used to reduce the stiffness of the finished product without affecting the tensile strength.

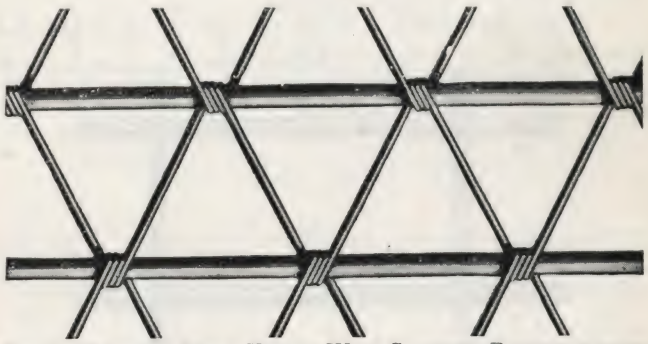


FIG. 1. TRIANGLE MESH WOVEN WIRE CONCRETE REINFORCEMENT
Solid longitudinals

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TRIANGLE MESH WOVEN WIRE CONCRETE REINFORCEMENT

Style No.	Number and gauge of wires each, longitudinal, A. S. & W. Co.'s steel wire gauge	Sectional area longitudinals, sq. in. per ft. width	Total effective longitudinal sectional area, sq. in. per ft. width	Approx weight, lbs. per 100 sq. ft.
LONGITUDINALS SPACED 4 IN. CROSS WIRES NO. 14-GAUGE, SPACED 4 IN.				
032	1—No. 12 gauge	.026	.032	22
040	1—No. 11 gauge	.034	.040	25
049	1—No. 10 gauge	.043	.049	28
058	1—No. 9 gauge	.052	.058	32
068	1—No. 8 gauge	.062	.068	35
080	1—No. 7 gauge	.074	.080	40
093	1—No. 6 gauge	.087	.093	45
107	1—No. 5 gauge	.101	.107	50
126	1—No. 4 gauge	.120	.126	57
146	1—No. 3 gauge	.140	.146	65
153	1—¼ in.	.147	.153	68
168	1—No. 2 gauge	.162	.168	74
180	2—No. 6 gauge	.174	.180	78
208	2—No. 5 gauge	.202	.208	89
245	2—No. 4 gauge	.239	.245	103
267	3—No. 6 gauge	.261	.267	111
287	3—No. 5½ gauge	.281	.287	119
309	3—No. 5 gauge	.303	.309	128
336	3—No. 4½ gauge	.330	.336	138
365	3—No. 4 gauge	.359	.365	149
395	3—No. 3½ gauge	.389	.395	160
LONGITUDINALS SPACED 4 IN. CROSS WIRES NO. 14-GAUGE, SPACED 8 IN.				
036P	1—No. 12 gauge		.036	17
044P	1—No. 11 gauge		.044	20
053P	1—No. 10 gauge		.053	24
062P	1—No. 9 gauge		.062	27
072P	1—No. 8 gauge		.072	31
084P	1—No. 7 gauge		.084	35
097P	1—No. 6 gauge		.097	40
LONGITUDINALS SPACED 4 IN. CROSS WIRES NO. 12½-GAUGE, SPACED 8 IN.				
041R	1—No. 12 gauge		.041	21
049R	1—No. 11 gauge		.049	24
058R	1—No. 10 gauge		.058	28
067R	1—No. 9 gauge		.067	31
077R	1—No. 8 gauge		.077	35
089R	1—No. 7 gauge		.089	40
102R	1—No. 6 gauge		.102	44

LONGITUDINALS SPACED 4 IN. CROSS WIRES NO. 14- AND 12½-GAUGE, SPACED 2 IN.
(This material is used principally for cement gun work)

Style No.	Number of wires each, long	Gauge of wires each, long	Gauge of cross wires	Approx. weight, lbs. per 100 sq. ft.
7A	1	12	14	31
6A	1	10	14	37
5A	1	8	14	44
4A	1	6	14	53
29A	1	12	12½	42
28A	1	10	12½	48
27A	1	8	12½	55
26A	1	6	12½	64

Length of rolls: 150 ft., 200 ft. and 300 ft.
Widths: approximately 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, and 56 in.
NOTE: Material may be furnished either plain or galvanized. Unless otherwise specified, shipment will be made of material not galvanized.

Electrically Welded Wire Fabric Reinforcement

A square or rectangular mesh made from cold drawn steel wire electrically welded at the intersections of the transverse and longitudinal wires. Various combinations of spacings and sizes of wires can be furnished.

This material combines the same high quality of material and service that has given Triangle Mesh reinforcement its enviable reputation.

When embedded in concrete, this mesh yields the maximum of its steel strength.

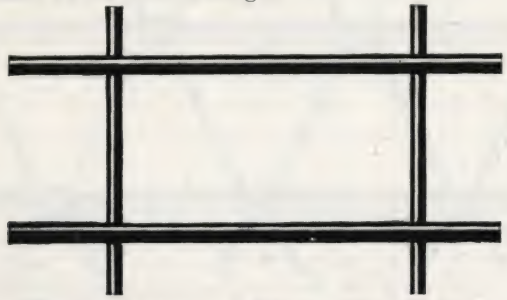

FIG. 2. ELECTRICALLY WELDED WIRE FABRIC

ELECTRICALLY WELDED WIRE FABRIC REINFORCEMENT

Spacing of wires, in.		A. S. & W. Co.'s steel wire gauge No.		Sectional area per lin. ft., sq. in.		Weight, lbs. per 100 sq. ft.
Longit	Trans.	Longit.	Trans.	Longit.	Trans.	
2	16	2	8	.325	.015	119.4
2	16	3	8	.280	.015	103.6
2	16	4	9	.239	.013	88.5
2	16	5	10	.202	.011	74.6
3	16	3	8	.187	.015	72.0
3	16	4	9	.159	.013	61.4
3	16	5	10	.135	.011	51.8
3	16	6	10	.116	.011	45.1
3	16	7	11	.098	.009	38.1
4	16	3	8	.140	.015	56.1
4	16	4	9	.120	.013	47.9
4	16	5	10	.101	.011	40.4
4	16	6	10	.087	.011	35.2
4	16	7	11	.074	.009	29.7
4	16	8	12	.062	.007	24.7
4	16	9	12	.052	.007	21.1
4	12	3	7	.140	.025	59.3
4	12	4	8	.120	.021	50.6
4	12	4	9	.120	.017	49.4
4	12	5	10	.101	.014	41.6
4	12	6	10	.087	.014	36.5
4	12	7	10	.074	.014	31.8
4	12	7	11	.074	.011	30.7
4	12	8	10	.062	.014	27.4
4	12	8	11	.062	.011	26.4
4	12	9	12	.052	.009	21.8
4	12	10	12	.043	.009	18.6
4	12	11	12	.034	.009	15.6
4	12	12	12	.026	.009	12.6
4	8	12	12	.026	.013	14.1
6	8	12	12	.017	.013	11.1
2	2	12	12	.052	.052	36.8
4	4	6	6	.087	.087	61.9
4	4	8	8	.062	.062	44.1
6	6	6	6	.058	.058	42.0
6	6	8	8	.041	.041	29.9
6	6	10	10	.029	.029	20.7

Other combinations can be promptly furnished.
Widths:—Any multiple of the spacing of longitudinal wires up to a maximum of 96 in. for 6-in. or 4-in. spacing, 84 in. for 3-in. spacing and 60 in. for 2-in. spacing. (56-in. for No. 0 gauge spaced 2 in.)
The transverse wires extend 1 in. beyond the outside longitudinal wires. Square footage or square yardage will be figured exclusive of these projections. Extra charge made for widths narrower than 48 in.
Lengths:—Styles having longitudinals No. 3 gauge or smaller, made regularly in standard rolls of 150 ft., 200 ft. and 300 ft. Styles having longitudinals larger than No. 3 gauge made regularly in straightened and cut sheets only.
Weights:—All above weights are based on a width of 60 in. measured from center to center of the outside or selvage longitudinal wires.

TABLES FOR ESTIMATING WEIGHT OF ELECTRICALLY WELDED WIRE FABRIC

Weights per 100 sq. ft. assuming net width of 60 in. center to center of outside wires

LONGITUDINALS

A. S. & W. Co.'s steel wire gauge No.	Spacing of longitudinals, in.			
	2	3	4	6
000	.....	.....	112.16	77.11
00	.....	.....	93.50	64.28
0	155.37	105.25	80.19	55.13
1	132.43	89.71	68.35	46.99
2	113.96	77.20	58.82	40.44
3	98.21	66.53	50.69	34.85
4	83.95	56.87	43.33	29 79
5	70.87	48.01	36.58	25.15
6	60.96	41.29	31.46	21.63
7	51.81	35.10	26.74	18.38
8	43.40	29.40	22.40	15.40
9	36.37	24.64	18.77	12.91
10	30.14	20.42	15.56	10.69
11	24.01	16.27	12.39	8.52
12	18.41	12.47	9.50	6.53
13	13.84	9.38	7.15	4.91

CROSS WIRES

A. S. & W. Co.'s steel wire gauge No.	Spacing of cross wires, in.						
	2	3	4	6	8	12	16
2	.....	.....	56.99	37.94	28.49	18.99	14.24
3	.....	.....	49.10	32.74	24.55	16.37	12.28
4	.....	.....	41.97	27.98	20.99	13.99	10.49
5	.....	.....	35.43	23.62	17.72	11.81	8.86
6	.....	.....	30.48	20.32	15.24	10.16	7.62
7	.....	.....	25.90	17.27	12.95	8.63	6.48
8	.....	.....	21.70	14.47	10.85	7.23	5.43
9	.....	.....	18.18	12.12	9.09	6.06	4.55
10	30.14	20.09	15.07	10.05	7.53	5.02	3.77
11	24.01	16.01	12.01	8.00	6.00	4.00	3.00
12	18.41	12.27	9.20	6.14	4.60	3.07	2.30
13	13.84	9.23	6.92	4.61	3.46	2.31	1.73

The above weights are based on width of 60 in. measured from center to center of the outside or selvage longitudinal wires.
The weight of the cross or transverse wires includes the 1-in. projection or overhang beyond the outside longitudinal wires.

Continued on next page

STEEL WIRE GAUGE AND DIFFERENT SIZES OF WIRE

Diameter, in.	A. S. & W. Co.'s steel wire gauge	Diameter, in.	Area, sq. in.	Lbs., per ft.	Lbs., per mile	Ft. per lb.
½		.5000	.19635	.6668	3521.	1.500
	7/0	.4900	.18857	.6404	3381.	1.562
15/32		.46875	.17257	.5861	3094.	1.706
	6/0	.4615	.16728	.5681	2999.	1.76
7/16		.4375	.15033	.5105	2696.	1.959
	5/0	.4305	.14556	.4943	2610.	2.023
13/32		.40625	.12962	.4402	2324.	2.272
	4/0	.3938	.12180	.4136	2184.	2.418
3/8		.3750	.11045	.3751	1980.	2.666
	3/0	.3625	.10321	.3505	1851.	2.853
11/32		.34375	.092806	.3152	1664.	3.173
	2/0	.3310	.086049	.2922	1543.	3.422
5/16		.3125	.076699	.2605	1375.	3.839
	0	.3065	.073782	.2506	1323.	3.991
	1	.2830	.062902	.2136	1128.	4.681
9/32		.28125	.062126	.2110	1114.	4.74
	2	.2625	.054119	.1838	970.4	5.441
¼		.2500	.049087	.1667	880.2	5.999
	3	.2437	.046645	.1584	836.4	6.313
	4	.2253	.039867	.1354	714.8	7.386
7/32		.21875	.037583	.1276	673.9	7.835
	5	.2070	.033654	.1143	603.4	8.750
	6	.1920	.028953	.09832	519.2	10.17
13/64		.1875	.027612	.09377	495.1	10.66
	7	.1770	.024606	.08356	441.2	11.97
	8	.1620	.020612	.07000	369.6	14.29
5/32		.15625	.019175	.06512	343.8	15.36
	9	.1483	.017273	.05866	309.7	17.05
	10	.1350	.014314	.04861	256.7	20.57
1/8		.125	.012272	.04168	220.0	24.00
	11	.1205	.011404	.03873	204.5	25.82
	12	.1055	.0087147	.02969	156.7	33.69
3/32		.09375	.0069029	.02344	123.8	42.66
	13	.0915	.0065755	.02233	117.9	44.78
	14	.0800	.0050266	.01707	90.13	58.58
	15	.0720	.0040715	.01383	73.01	72.32
	16	.0625	.0030680	.01042	55.01	95.98
	17	.0540	.0022902	.007778	41.07	128.60

Wire Fabric Reinforced Slabs Supported by Concrete Beams

Design Suggestion, Cost, Etc.—From an economical standpoint it is very desirable to have the same amount of reinforcement and the same thickness of slab in the end as in the intermediate slabs; the inspection requirements are less and in fact the entire installation costs are reduced. This is true whether bars or mesh constitute the slab reinforcement. The construction of the forms can seldom be made exactly uniform for the end and intermediate panels regardless of the relative lengths of spans "A" and "B"; therefore the cost of forms should not be considered.

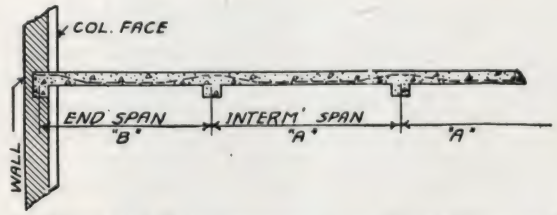

FIG. 3. UNIFORM REINFORCEMENT AND THICKNESS OF SLAB IN INTERMEDIATE AND END SLABS

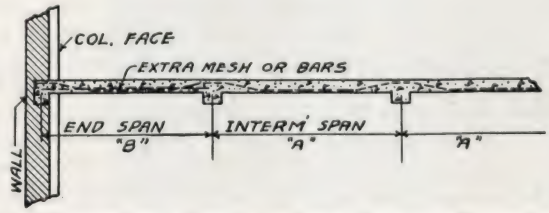

FIG. 4. SCHEME FOR INCREASING THE REINFORCEMENT IN THE END SPANS

In order for span "B" to have resisting moments equal to span "A," assuming the same reinforcement and same thickness of slab in both cases, the length of span "B" must be not more than nine-tenths time "A."

Under certain conditions it may be found advisable so to space the columns as to require a greater or less amount of reinforcement or a greater or less thickness of slab for the end spans than for the intermediate spans. If the reinforcement requirements are greater, add sufficient bars or another layer of mesh to make up the difference. It is recommended that the spacing of additional bars be not more than 24 in.

Supporting the Mesh Reinforcement—The correct location of the reinforcing mesh in the top portion of slabs over concrete beams can be easily and cheaply obtained by means of precast concrete blocks as shown in Fig. 5.

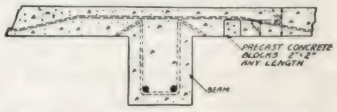

FIG. 5. SHOWING INEXPENSIVE METHOD OF SUPPORTING WIRE MESH REINFORCEMENT OVER CONCRETE BEAMS

The blocks should have a height about 1¼ or 1½ in. less than the full thickness of the slab. The length may be any convenient amount such as 1 or 2 ft. or such lengths as are readily formed by breaking long strips of the blocks. The mesh should be supported for at least one-third of its width. These blocks will stay in approximately correct position without any means of attachment to the reinforcing mesh or to the forms.

For short spans (about 8 ft. or less) these blocks will be required on one side only of the beams. For spans greater than 8 ft., use blocks on both sides.

Detailing Widths of Mesh—For estimating purposes where accuracy is unnecessary, provided the estimate is on the safe side, it is permissible to assume that the mesh required will equal in square feet the actual area of the floor slab. As a matter of fact, the amount of mesh needed will be less than that, and at the same time a more efficient and more economical layout is possible. In the first place, a 2-in. lap along the sides of the sheets of wire mesh reinforcement is sufficient to develop the full strength of the reinforcement; more than that is a waste of material. This 2-in. lap means a lap of the outside (or selvage) longitudinal wires and should not be assumed for those forms of mesh having a zigzag selvage edge.

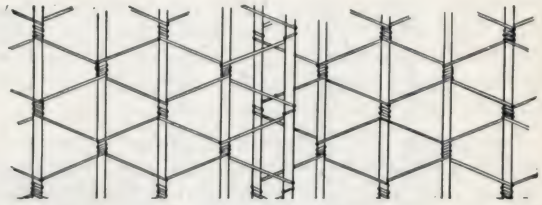

FIG. 6. SHOWING TRIANGLE MESH REINFORCEMENT AS IT ACTUALLY APPEARS WITH A SIDE LAP OF 2 IN.

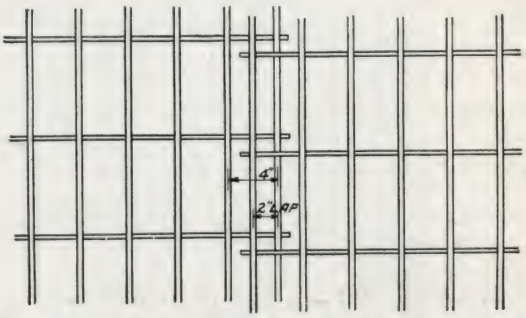

FIG. 7. SHOWING ELECTRICALLY WELDED FABRIC AS IT ACTUALLY APPEARS WITH A SIDE LAP OF 2 IN.

A suggested detail for the amount and location of Triangle Mesh reinforcement is shown in Fig. 8. Pro-

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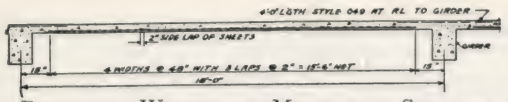

FIG. 8. DETAILING WIDTHS OF MESH AND SHOWING EXTRA STRIP OF MESH OVER THE GIRDERS

viding a short strip of light weight fabric (Style 049 or 053P) is placed near the top of the slab over the girders with the main longitudinal wires at right angles to the direction of the girders, it is not only unnecessary but a waste of material to require that the main reinforcement of the slabs entirely cover the space between and over the girders. The distance between the center line of the girder and the edge of the reinforcing fabric can be any amount up to about 20 in. without reducing the strength of the structure.

Other Uses of Wire Mesh Reinforcement

Concrete Joist Floors—For long spans and light loads, a floor construction consisting of closely spaced concrete ribs and connecting concrete slabs will very often prove to be economical. Fig. 9 shows a typical section of such a floor. Here is a 2-in. or 3-in. slab having a clear span between the supporting ribs of 23 in., that must not only act as part of the compression portion of the beams and resist temperature stresses, but in addition act as a support of the loads that may come upon the floor. The most efficient type of reinforcement to take care of these various stresses is a fabricated mesh made from cold drawn high elastic limit wire. At first these thin top slabs were built without any reinforcement. Such a construction invites disaster. The next step in the development of this type of floor consisted of adding small wire or rods placed at right angles to the ribs and spaced about 24 in. apart. Such a method possibly takes care of the temperature stresses but does not definitely insure the T-beam action assumed in the design. A wire mesh fabric with comparatively close spacing of members is the only logical reinforcement to use.

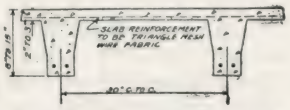

FIG. 9. TYPICAL SECTION OF CONCRETE JOIST FLOORS

Top Layer of Concrete Finished Floors—It is often desirable for construction reasons to leave the ¾- or 1-in. top dressing until after the main part of the slab is completely hardened. In this case the slab should be thoroughly cleaned before applying the final course, and this course should be reinforced with wire mesh reinforcement to prevent destructive cracks. Specify Style 032 Triangle Mesh or 4 in. x 4 in. mesh No. 12 by No. 12 gauge wires Electric Weld wire fabric.

Basement and Other Floors that Rest Upon the Ground—It is very seldom that such a concrete floor has better than filled ground for support, and it usually must carry heavy loads sometimes spread over a large area, sometimes concentrated on comparatively small space. Unless such a floor is reinforced, it is liable to crack and then concrete is criticised unjustly. As conditions vary with each job, it is impossible to make any definite suggestions regarding the proper weight of fabric to use, but it can be said that millions of square feet of Style 049 Triangle Mesh have been successfully used for this purpose. Where heavy loads and questionable fill-foundations occur, it will be economy to use heavier mesh, such, for instance, as Style 153 Triangle Mesh or an equivalent weight of Electrically Welded wire fabric having spacings of wires that do not exceed 6 in.

Flat Slab Beamless Floors, Special Triangle Fabric—A most successful style of construction for warehouse and other heavy load construction is the flat slab type, without any beams or girders.

For this type of floor, use extra heavy Triangle flat slab fabric, which is made of ⅜- to ½-in. cold drawn wire spaced 4 in. on centers in very long lengths, rolled up sideways and bundled. When applying to the building it is only necessary to lay it on the forms and unroll it sideways; it is then ready for the concrete to be poured. This guarantees absolute spacing of wires, an immense saving on account of the small number of laps, extremely low cost of placing as compared to loose rods, and higher values in continuous action. This material is most desirable and it is highly recommended.

Cement Gun Work—Gunite (trade-name) is concrete applied by the cement gun process, which produces probably the densest and therefore the most waterproof concrete available by present known methods.

Gunite reinforced with Triangle Mesh reinforcement has repaired successfully old crumbling bridge piers, tunnel linings and sea walls; old steel bridges, tanks and trusses; leaky reservoirs and irrigation ditches; even wooden structures that have been damaged by fire have been restored to usefulness by this method. And repair work is by no means the most important class of work produced. All kinds of new construction, especially those requiring waterproof qualities with light resulting weight, can be successfully executed.

Fireproofing of Steel Framing—Wrap all steel columns, girders and beams with Triangle Mesh, Style 032, or Electrically Welded fabric, 4 in. by 4-in. mesh, all No. 12 gauge wires.

Concrete Chimneys—Style 153 Triangle Mesh is standard for the circumferential reinforcement.

Stucco Reinforcement—See pages 278 and 279.

Concrete Sewers—The close spacing of members of Triangle Mesh is largely responsible for the successful results obtained with precast sewer pipe. The weight of fabric varies with the diameter of pipe thickness of shell and depth of fill.

Concrete Driveways, Streets and Highways—Wire fabric reinforcement is essential to prevent destructive cracks. The action of the reinforcement is to increase the structural strength of the concrete slab and also to bind it together as a unit. The high tensile strength and the close spacing of members of a wire fabric show decided advantages for these purposes. The weight of wire fabric used in pavement has varied on account of varying conditions, but the average practice calls for 35 or 40 lbs. per 100 cu. ft.

Suggested Specifications—Reinforcement shall consist of steel wire fabric manufactured from cold drawn wire, finished members of which shall develop an ultimate tensile strength of at least 70,000 lbs. per sq. in. and which shall bend cold 180° around a pin the diameter of which is equal to diameter of wire specimen without cracking on outside of bent portion.

All reinforcement shall be free from excessive rust, scale, paint or coating of any character which will tend to prevent proper bonding of the concrete.

The fabric reinforcement shall weigh not less than 40 lbs. per 100 sq. ft. For figuring weight per 100 sq. ft., the width considered shall be the distance center to center of outside or selvage longitudinal members.

The main or heavier wires of fabric shall be spaced not more than 6 in. apart. The secondary or lighter wires of fabric shall be spaced not more than 12 in. apart.

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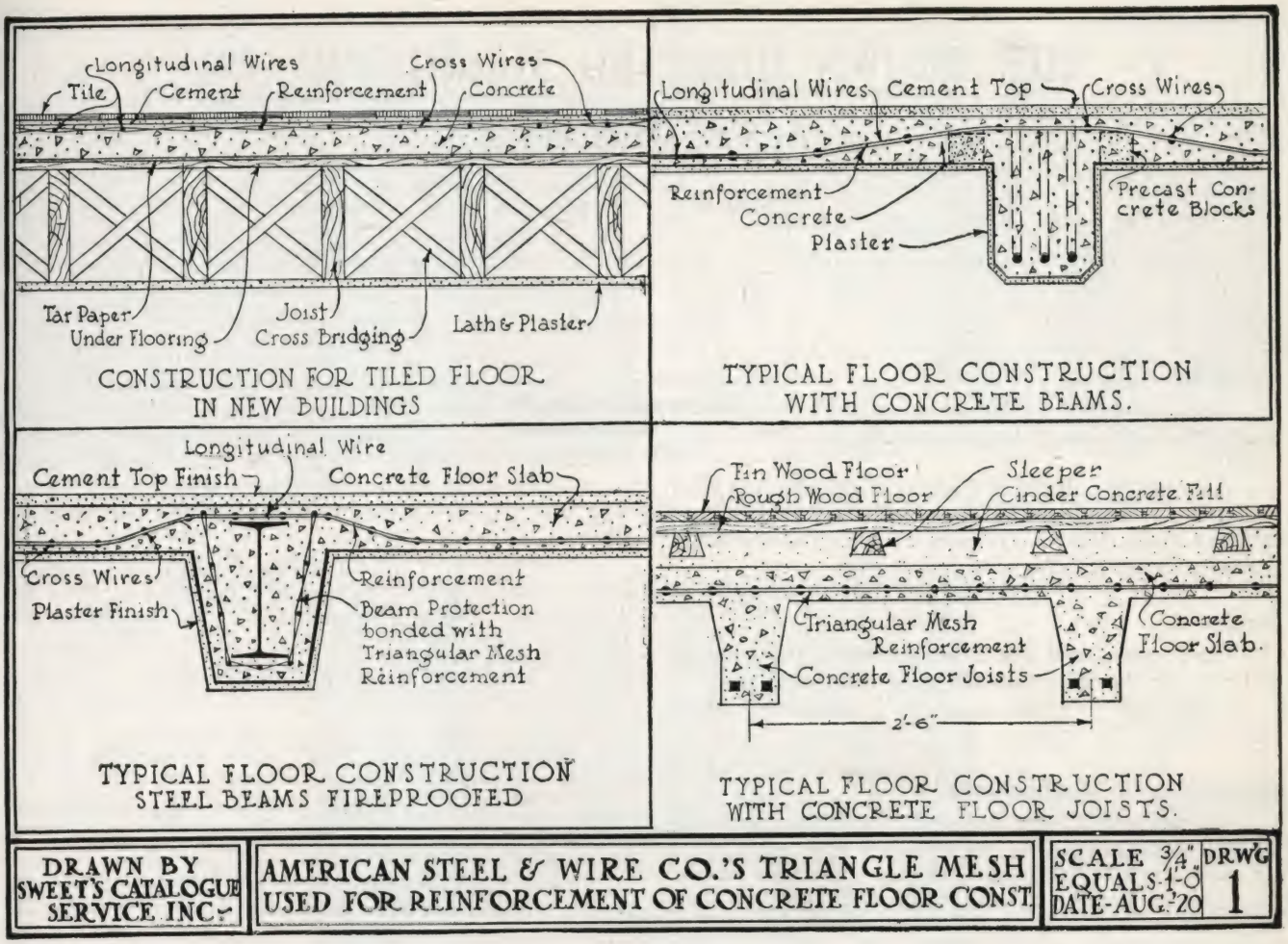
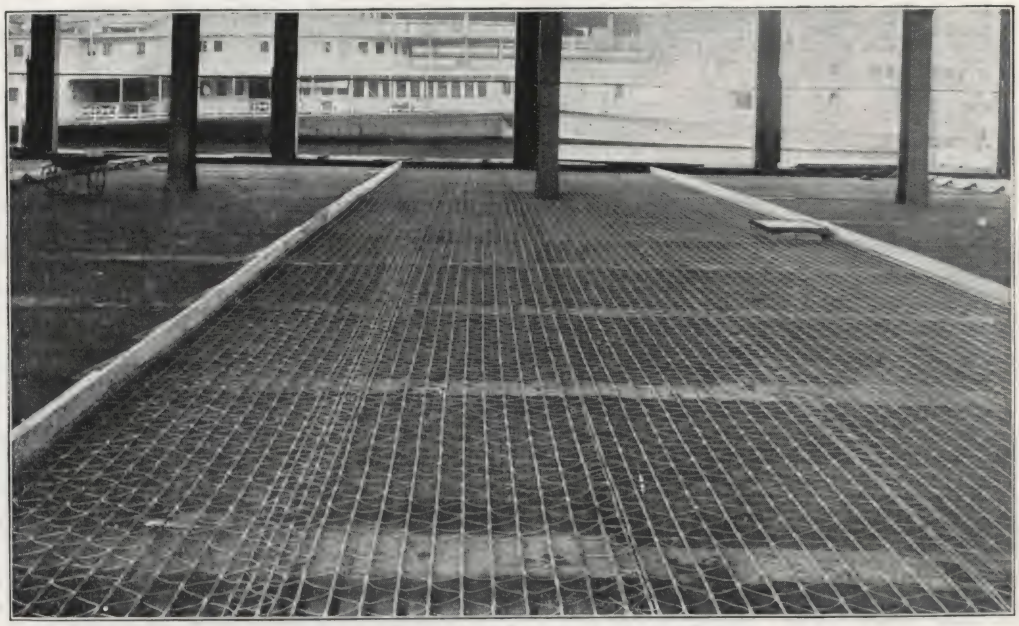




PIER 42, NORTH RIVER, 56,000 SQUARE FEET, STYLE 40, TRIANGLE MESH REINFORCEMENT USED

Note the large area of reinforcement with its heavy stranded longitudinals. Excellent results obtained with minimum installation cost

FOUNDED 1880

THE BROWN HOISTING MACHINERY CO.

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
PITTSBURGH, PA., Oliver Building
CHICAGO, ILL., 208 South La Salle Street
SAN FRANCISCO, CAL., Monadnock Building
NEW ORLEANS, LA., Whitney Central Building

Products

Manufacturers of "FERROINCLAVE," a Patent Sheet Steel Reinforcement for concrete.

Ferroinclave
TRADE-MARK

Also manufacturers of Concrete Coal and Ash Bins; all kinds of Hoisting Machinery, which includes Locomotive Cranes, I-beam Trolleys, Clamshell and Dragline Buckets, Bridge Cranes, conveyors, etc.

Service

On request, and for large contracts, the company will execute the work complete and guarantee same.

Catalogue H shows more fully how and where "Ferroinclave" is used.

Description of "Ferroinclave"

"Ferroinclave" is a box annealed steel sheet with dovetail corrugations, ½ in. in depth or height, which are inversely tapered, permitting the large ends of corrugations of one sheet to fit or "shingle" over and into the small ends of corrugations of another sheet. This forms a tight joint and practically makes one continuous sheet.

The dovetail corrugations form a key for concrete, making it possible to apply concrete to both sides without the use of centering or forms of any kind. This results in greater speed in erection and also greatly reduces the cost.

Sheets for ridges or valleys of roofs are made with non-tapering corrugations.

"Ferroinclave" Advantages

(1) Lightest reinforced concrete construction.
(2) Strongest for a given thickness and span.
(3) Erected without forms.
(4) Sheets are waterproof and building can be used before concrete is applied.
(5) Sheets are laid entirely from upper side.
(6) Sheets easily handled.
(7) Under side is smooth and white and serves as a ceiling.

Details for Roofing with Concrete

"Ferroinclave" is laid in the same manner as ordinary corrugated iron roofing. The purlins, I-beams, channels or Z-bars may be spaced any distance up to 9 ft. 9 in.

The standard size "Ferroinclave" sheets are 10 ft. long, and purlins must be so spaced that the lap (usually 3 in. or more) of the sheets comes on one of them. A spacing of 4 ft. 10½ in. is most economical, as it allows the use of sheets 10 ft. long and requires a minimum of concrete and erecting labor.

"Ferroinclave" sheets should be laid on hardwood strips, ⅜ in. square, placed along the tops of the purlins, thereby preventing corrosion. As the sheets are laid they should be secured to the purlin at intervals of 10 in. with clips furnished with the sheets. The side laps are fastened with our special cross-ties, spaced about 2 ft. apart.

Mortar Mixture—When the "Ferroinclave" is secured in place, the upper side should be coated with a mixture of 1 part portland cement to 2 to 3 parts of sand, or 1 part portland cement, 2 parts sand and 4 parts of stone or gravel.

The coating should be ½ in. in thickness above tops of corrugations when purlin spacing does not exceed 5 ft.

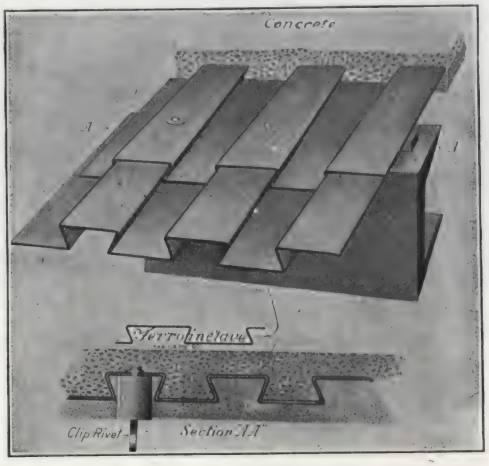
Tables of safe loads will be furnished on application.

After cement on upper side has set, under side should be coated with mortar composed of 1 part portland cement to 2 or 3 parts sand, with small amount of hair.

Mortar to be ⅜ in. thick, applied in 3 consecutive coats—second and third applied before preceding one dries or sets. Waterproof covering should be used on top of roof.

Weight—Weight of complete roof (without waterproof covering), 1⅜ in. thick, is about 16 lbs. per sq. ft.

This kind of roof (with purlins not more than 5 ft. apart) will support a minimum load of 300 lbs. per sq. ft. after 10 days.



"FERROINCLAVE" ROOF, FLAT FLOOR OR SIDING, ETC.

Details for Roofing with Cork

In some cases, a lightweight roof is necessary and for such installations "Ferroinclave" with a cork and waterproof covering makes an ideal roof.

The "Ferroinclave" is laid in the usual manner as described above, and the cork slabs are then put in place after being dipped in asphalt. This type of construction makes a strong and lasting roof, but one that is very light in weight.

By painting the under side of the "Ferroinclave" white, a light, attractive building is obtained.

Continued on next page

"Ferroinclave" Roof with Cork
Method of covering "Ferroinclave" roof with cork and waterproof covering

Under Side of "Ferroinclave" Roof
As concrete is applied to under side of "Ferroinclave" roof it is given a smooth finish which makes a white ceiling, increasing the light of the building

Details for Flooring and Highway Bridges

Same construction as roofing, or sheets may be curved between floor beams, making a segmental arch floor.

Mortar of 1 part portland cement to 2 or 3 parts sand should be spread over the sheets to about ½ in. above corrugations. Then portland cement concrete should be tamped on top to about 3 in. above the crown of the "Ferroinclave," thickness depending on span and load.

The under side, when coated as in roofing, presents a smooth white appearance and serves as a ceiling.

"Ferroinclave" Flat Flooring
"Ferroinclave" flat floor combines great strength with light weight. Can be erected easily and quickly, is attractive in appearance, fire-resistive and inexpensive. The concrete is applied without the use of any forms and without interfering with any work on the floor below

Details for Stairways

"Ferroinclave" stairs are made by bending the sheets with corrugations so that tread and riser are formed by one sheet. Mounted on structural or reinforced concrete stringers and then covered on both sides with concrete. A very strong, light weight, attractive, economical, efficient, and fireproof stairway. Easily and quickly erected without centering. No forms are necessary. Thickness of concrete on upper side is determined by the spacings of supports and maximum load to be carried.

"Ferroinclave" Stairway

Details of All Sizes

Sheets are made in any lengths up to 10 ft., and length is determined by spacing of the purlins.

Width, 20½ in.

Center to center of side laps, 20 in.

The following are kept in stock, for immediate shipments:

No. 26 gage sheets in 10-ft. lengths.

No. 24 U. S. gage sheets in even and ½-ft. lengths, from 5 to 10 ft.

Other sizes and weights are formed to order and shipped promptly.

WEIGHT AND CROSS-SECTIONAL AREAS OF "FERROINCLAVE" (NOT INCLUDING LAPS)

Gage No. U. S. G.	Weight, lbs. per sq. ft.	Cross-sectional area, sq. in. per ft. of width
28	.94	.274
26	1.13	.329
24	1.5	.439
22	1.88	.548

TABLE OF DEFLECTIONS
Sheets with Concentrated Loads at Middle and Without Cement or Plaster Covering—4-ft. Span

No. 26 U. S. gage		No. 24 U. S. gage		No. 22 U. S. gage	
Total load, lbs.	Total deflection, in.	Total load, lbs.	Total deflection, in.	Total load, lbs.	Total deflection, in.
30	1/8	125	1/4	170	1/32
80	3/8	150	1/4	270	9/32
130	1/2	175	7/16	370	13/32
180	5/8	200	1/2	518	21/32

BARKER STEEL COMPANY

Concrete Reinforcement and Fireproofing Materials

7 Water Street
BOSTON, MASS.

Products

DEFORMED CONCRETE REINFORCING BARS; PRESSED STEEL LUMBER; STEEL FLOOR FORMS; STANDARDIZED STEEL BUILDINGS.

Service

The BARKER STEEL COMPANY carries in its Boston warehouse a large stock of deformed concrete reinforcing bars and pressed steel lumber from which immediate shipment can be made. Quick shipments can be made on bars cut to special lengths from a large stock maintained at the mill warehouse.

Accuracy in fabricating reinforcing bars and steel lumber is obtained by special machines and expert supervision. Bent bars are furnished to exact details, all bars are carefully tagged either singly or in bundles convenient to handle. This accuracy, special care and system of marking bars, with clear details and placing plans, eliminates error, delay and extra cost at the job, which is a real and practical service to the contractor.

Engineering

The BARKER STEEL COMPANY'S engineers are always at the service of its customers for consultation on designs, estimates and technical features of reinforced concrete design and metal lumber construction.

Our service includes preliminary layouts and estimates on cost of all types of fireproof floor construction, also the preparation of complete setting plans, bar schedules and bending details.

Deformed Reinforcing Bars

Gabriel bars are rolled in all grades of steel from new billet stock to conform to the standard specifications of the Association of American Steel Manufacturers. Gabriel deformed reinforcing bars have a raised section number rolled on the surface at 3-ft. intervals, indicating the size of the bar. These section numbers will save the contractor two or three dollars per ton in the cost of sorting and placing reinforcing bars. Gabriel bars have the same shape in cross section for all sizes equivalent in area to round or square sections.

GABRIEL DEFORMED REINFORCING BAR

Section No.	Gabriel square in.	Weight per foot, lbs.	Section area, sq. in.	Gabriel round, in.
G- 1	...	.38	.11	⅜
G- 2	⅜	.49	.14	...
G- 3	...	.67	.196	½
G- 4	½	.86	.25	...
G- 5	...	1.05	.307	⅝
G- 6	⅝	1.35	.39	...
G- 7	...	1.52	.442	¾
G- 8	¾	1.94	.563	...
G- 9	...	2.06	.60	⅞
G-10	⅞	2.64	.766	1
G-11	1	3.41	1.00	1⅛
G-12	...	4.20	1.22	1¼
G-13	1⅛	4.34	1.265	...
G-14	1¼	5.35	1.562	...

Pressed Steel Lumber

Pressed steel lumber floor construction is a recognized type of economical fireproof floor. Its general use has created a demand for local shop fabrication, avoiding delays involved by mill shipments. Our Boston warehouse is equipped to fabricate pressed steel joists.

Immediate shipments can be made on sizes carried in stock listed in the following table:

Depth, in.	6	7	8	9	10
Weight per ft., lbs.	4.90	5.80	6.80	7.70	8.70
Area of section, sq. in.	1.42	1.69	1.98	2.24	2.54

Steel Floor Forms

Long span concrete joist construction is now standard and its economy is proved by its general use. The steel floor tile or forms which are used to form the concrete joists are of two general types—light gauge corrugated forms to remain in the floor construction and heavy gauge forms which are removed. In general, the permanent forms are used when an attached wire lath ceiling is required and the removal forms are used when the concrete joists are left exposed. We carry both types of steel forms in stock ready for immediate shipment.

Permanent steel forms are corrugated, made from No. 26 gauge steel. Width at bottom is 20 in.; furnished in lengths of 30 and 35 in.

Heavy removable steel forms are smooth on top and sides and are made from No. 14 gauge steel. Width at bottom is 20 in. and length varies from 4 to 6 ft.

The standard depths of both types are 6, 8, 10, 12 and 14 in.

Expert advice, estimates, designs and specifications furnished on either permanent or removable form types of long span concrete joist construction, without obligation. An opportunity to co-operate with architects, engineers and contractors will be greatly appreciated.

Standardized Steel Buildings

The BARKER STEEL COMPANY is sole New England representative of the Milliken Bros. Mfg. Company, Inc., manufacturers of Milliken standardized buildings of structural steel skeleton frame construction. These buildings are made in unit members on the standard truss unit system (patented).

Milliken buildings are suitable for industrial service of practically every kind, such as light manufacturing, warehouses, machine shops, garages, storage buildings, etc. Prompt shipment can be made from large stock maintained at the New York plant.

Our latest catalogue No. 10, containing complete information on Milliken buildings, will be mailed free on request.

MILLIKEN STANDARDIZED STEEL BUILDING

CONCRETE ENGINEERING COMPANY

Fireproofing and Reinforcing Materials

Omaha National Bank Building
OMAHA, NEBR.

DISTRICT OFFICES

CHICAGO, ILL., 140 South Dearborn Street
MILWAUKEE, WIS., Colby and Abbott Building
KANSAS CITY, MO., Railway Exchange Building
DETROIT, MICH., Vinton Building
DES MOINES, IOWA, Hubbell Building
DALLAS, TEX., Interurban Building

Products

CECO REINFORCING BARS; CECO COLUMN SPIRALS; MEYER REMOVABLE STEELFORMS; CECO ROUND COLUMN FORMS.

Also, Ceco Bar Chairs and Spacers, Triangle Mesh Concrete Reinforcement, Expanded Metal and Rib Reinforcing, Metal Lath, Self-furring Metal Lath, Cold Rolled Channels; Corner, Base and Rail Beads; Picture Moulding; Metal Weatherstrips.

TRADE-MARK

Ceco Service

The Engineering Department will prepare complete designs on all types of reinforced concrete construction at a nominal charge. Preliminary estimates of cost, layouts, etc., are a part of the service and incur no obligations.

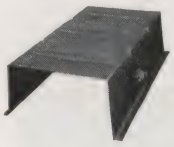
THE CONCRETE ENGINEERING COMPANY'S Contract Department will erect all materials when the quantity is large enough to warrant doing so.

Meyer Removable Steelforms

Economically adapted for all buildings with long spans. A series of concrete joists is formed, eliminating all concrete useless in resisting stresses, and effecting a great saving in formwork through the early removal and speedy re-use possible. No. 16 gage sheet steel. Shaped exactly by heavy presses, extremely rigid, so maximum re-use is secured.

MEYER STEELFORMS WITH REINFORCEMENT IN PLACE READY FOR CONCRETING

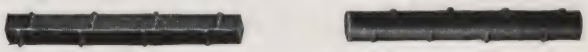
Rented to contractors, the labor of placing and removing being handled by Contract Department. Furnished in 6-, 8-, 10-, 12-, and 14-in. depths, in 20-in. widths; and 12- and 15-in. depths in 30-in. widths; as well as special widths; and with both single tapered and double tapered end forms—also an economy.



MEYER REMOVABLE STEELFORM

Ceco Reinforcing Bars

Rolled from new billet steel. In either plain or deformed rounds and squares. Conforming to the Manufacturers' Standard Specifications for reinforcing steel. Furnished cut to length, and bent to specifications, at mill or warehouse.



CECO REINFORCING BARS

SIZES, WEIGHTS, AREAS AND EXTRAS, CECO REINFORCING BARS

Size	Round Bars		Square Bars		Size Extras
	Area	Weight	Area	Weight	
¼"	.049	.167	.063	.212	50c per cwt.
⅜"	.110	.376	.141	.478	25c per cwt.
½"	.196	.668	.250	.850	10c per cwt.
⅝"	.307	1.043	.391	1.328	05c per cwt.
¾"	.442	1.502	.563	1.913	Base
⅞"	.601	2.044	.766	2.603	Base
1"	.785	2.670	1.000	3.400	Base
1⅛"	.994	3.380	1.265	4.303	Base
1¼"	1.227	4.172	1.563	5.313	Base

CECO COLUMN SPIRALS

Ceco Column Spirals

Accurately shaped to required diameter by machinery, and held in correct pitch by the channel spacer, accurately spacing each wire, preventing distortion, allowing spirals to be collapsed for shipment, and then readily expanded to required diameter. Unless otherwise specified, two spacers furnished with each spiral. Hooping given an extra turn at each end and securely wired in position, so no slipping is possible.

Ceco Round Column Forms

In standard adjustable sections, all snugly fitted together by tongue and groove joints, and held in place with both flat and tee iron clamps. All parts completely interchangeable; columns with diameters of 12 to 48 in., of any height, quickly formed. The natural rigidity of heavy gage sheet steel, with added reinforcement of tongue and groove joint between clamps, makes an absolutely stiff and rigid form. Column section always uniform throughout, and smooth surface a certainty. Used with any type floor construction, special column caps being furnished when necessary. Constant re-use effects great economy.

CECO ROUND COLUMN FORMS

Contract Department will erect Ceco round column forms in place ready for concrete, guaranteeing complete satisfaction. Or they will be rented to responsible parties without labor of installation.

Shipping Facilities

Adequate stocks are always maintained in warehouses at Omaha, Chicago and Kansas City. Prompt shipments of any size order made without delay.

Handbooks

Handbooks with detailed information and illustrations will be supplied on request.

THE CONSOLIDATED EXPANDED METAL COMPANIES

Concrete Reinforcement

GENERAL OFFICES AND WORKS

BRADDOCK, PA.

(In the Pittsburgh District)

SALES OFFICES

PHILADELPHIA, PA. CHICAGO, ILL. NEW YORK, N. Y. PITTSBURGH, PA.

EXCLUSIVE REPRESENTATIVES

BOSTON, MASS., Penn Metal Co. TORONTO, CAN., Baines & David, Ltd. DALLAS, TEX., R. J. De Wees Co.

Products

"Steelcrete" Expanded Metal for reinforcing concrete; "Steelcrete" Road Mesh for concrete roads; "Steelcrete Binder" for stucco; Beam Wrapper.

TRADE-MARK

For Plastering Lath, Corner Beads and Channels, see page 273.

"Steelcrete" Expanded Metal for Concrete Reinforcement

Sectional Area—A sheet of expanded metal 16 ft. in length can be obtained with a sectional area of .60 sq. in. and under. 12-ft. sheets may be had with a sectional area up to 1.00 sq. in. Reinforcing ranges from this sectional area of 1.00 sq. in. down to a light section used for temperature stresses. The sheets are stiff and rigid, readily handled and quickly placed.

Scope of Use—"Steelcrete" Mesh, the most widely used and the oldest of concrete reinforcement, for floor and roof slabs, sewers, conduits, tanks, roads, highway bridges, culverts, retaining walls, etc.

Description—Cold drawn from soft open hearth steel of low carbon content, "Steelcrete" possesses great unit strength and a high elastic limit of more than 60,000 lbs. per sq. in. It is uniform in size, and the flat sheets save time, give economy in weight and quicker construction.

Distinctive Features—In reinforcing with "Steelcrete" each pound of steel does 50% more work—does it easier, better and at less cost.

With "Steelcrete" a unit stress of 24,000 lbs. can be used in all designs. It provides tensile strength and bond resistance; it reinforces the concrete in all directions.

Specifications—The slabs shall be reinforced with "Steelcrete" Mesh, size .... [or, The Slabs shall be reinforced with "Steelcrete" Mesh, of such thickness of slab and size of metal as shall carry a superimposed load of .... lbs. per sq. ft. with a factor of safety of 4].

The expanded metal shall be laid on the forms with long way of diamond meshes extending transversely to supporting beams. Adjoining sheets shall be lapped 8 in. on the end and 3 in. on the side.

"Steelcrete" Road Mesh

The increasing weight of traffic of the present, and the unknown limits of burden that will be placed on roads in the future, present a problem that is best met by the properly reinforced concrete road.

Extremes of temperature, unequal settlement of the subsoil all cause stresses that must be distributed over the greatest possible area. A flat, stiff sheet, having all strands of steel rigidly connected, is essential, and expanded metal has given by far the nearest approach to this ideal.

In addition, "Steelcrete" Road Mesh provides a most secure bond between the expanded metal and the concrete. The Joint Committee reports:

"The bond stresses between concrete and plain reinforcing bars may be assumed at 4% of the compressive strength, or 2% in the case of drawn wire."

The rectangular strands, and the integral and rigid joints of "Steelcrete" give a bond stress that may be assumed at a much greater percentage than 4% of the compression strength of the concrete.

Authoritative tests indicate that "Steelcrete" reinforcing possesses a great effective area at right angles to its main line of strength. It reinforces longitudinally as well as transversely, and thoroughly distributes all strains. "Steelcrete" Road Mesh at 24,000 lbs. per sq. in. will allow less deflection than bars or wire at 16,000 lbs. per sq. in.

Thousands of tons of this material are installed in concrete roads throughout the country. The flat "Steelcrete" sheets are ready for use—no unrolling, no lost time. It gives a practical, actual saving in the construction of every yard of road.

Laying "Steelcrete" Expanded Metal Sheets

"Steelcrete" is readily handled, quickly placed; it retains its position securely in the form

Concrete Highway Reinforced with "Steelcrete" Road Mesh

Continued on next page

"Steelcrete" MESH SLAB TABLES FOR USE WITH GRAVEL OR STONE CONCRETE.

Giving thickness of slab in inches and area in sq. in. per ft. of width.

Concrete = 650 lbs. per sq. in. — Steel = 24000 lbs. per sq. in. — Bending Moment = $\frac{1}{12}wl^2$.

Safe live loads in lbs. per sq. ft.	Span 4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"
40	3" .075	3" .075	3" .075	3" .075	3" .075	3" .075	3" .075	3" .10	3" .10	3½" .125	4" .125	4" .15	4½" .175	5" .20	5" .25	5½" .25	6" .25	6½" .30	7" .35
50	3" .075	3" .075	3" .075	3" .075	3" .075	3" .075	3" .10	3" .10	3" .125	3½" .125	4" .15	4½" .15	5" .175	5" .20	5½" .25	6" .25	6½" .30	7" .30	7½" .35
60	3" .075	3" .075	3" .075	3" .075	3" .075	3" .10	3" .10	3" .125	3½" .125	4" .125	4" .15	4½" .175	5" .20	5" .25	6" .25	6½" .25	6½" .30	7½" .30	7½" .35
75	3" .075	3" .075	3" .075	3" .075	3" .10	3" .10	3" .125	3½" .125	3½" .125	4" .15	4½" .175	4½" .20	5½" .20	5½" .25	6½" .25	6½" .30	7" .30	7½" .35	8½" .35
90	3" .075	3" .075	3" .075	3" .075	3" .10	3" .125	3½" .125	3½" .125	4" .125	4½" .15	4½" .175	5" .20	5½" .25	6" .25	6½" .30	7" .30	7½" .35	8" .35	8½" .40
100	3" .075	3" .075	3" .075	3" .10	3" .10	3" .125	3½" .125	3½" .15	4" .15	4½" .15	5" .175	5½" .20	5½" .25	6½" .25	6½" .30	7½" .30	7½" .35	8" .40	9" .40
125	3" .075	3" .075	3" .10	3" .10	3½" .10	3½" .125	3½" .15	4" .15	4" .175	4½" .175	5" .20	5½" .25	6" .25	6½" .30	7" .35	7½" .35	8½" .35	9" .40	9½" .45
150	3" .075	3" .075	3" .10	3" .125	3½" .125	3½" .15	4" .15	4" .175	4½" .175	5" .20	5½" .25	6" .25	6½" .30	7" .30	7½" .35	8½" .35	8½" .40	9½" .45	9½" .50
175	3" .075	3" .10	3" .125	3½" .125	4" .125	4" .15	4" .175	4½" .175	4½" .20	5½" .20	5½" .25	6½" .25	6½" .30	7½" .30	8" .35	8½" .40	9½" .40	10" .45	10½" .50
200	3" .075	3" .10	3" .125	3½" .125	4" .125	4" .15	4½" .175	4½" .175	5" .20	5½" .20	6" .25	6½" .30	7" .30	7½" .35	8½" .35	9" .40	9½" .45	10" .50	11" .50
250	3" .10	3½" .10	3½" .125	4" .125	4" .15	4½" .175	5" .175	5" .20	5½" .20	6" .25	6½" .30	7" .30	7½" .35	8½" .35	9" .40	9½" .45	10½" .50	11" .50	12" .55
300	3" .125	3½" .125	4" .15	4" .15	4½" .175	4½" .20	5" .20	5½" .20	5½" .25	6½" .25	7" .30	7½" .35	8½" .35	9" .40	9½" .45	10" .50	11½" .50	12" .55	/

DECIMAL STANDARDS FOR "STEELCRETE" EXPANDED METAL

Designation of mesh	Size of mesh, in. Width of diamond	Size of mesh, in. Length of diamond	Area, sq. in. per ft. of width	Approximate weight per sq. ft., lbs.	Size of standard sheets, ft. in. x ft. in.
3-13-075	3	8	.075	.25	6-0x 8-0 6-0x12-0 6-0x16-0
3-13-10	3	8	.10	.34	6-9x 8-0 6-9x12-0 6-9x16-0
3-13-125	3	8	.125	.42	5-3x 8-0 5-3x12-0 5-3x16-0
3-9-15	3	8	.15	.51	7-0x 8-0 7-0x12-0 7-0x16-0
3-9-175	3	8	.175	.59	6-0x 8-0 6-0x12-0 6-0x16-0
3-9-20	3	8	.20	.68	5-3x 8-0 5-3x12-0 5-3x16-0
3-9-25	3	8	.25	.85	4-0x 8-0 4-0x12-0 4-0x16-0
3-9-30	3	8	.30	1.02	7-0x 8-0 7-0x12-0 7-0x16-0
3-9-35	3	8	.35	1.19	6-0x 8-0 6-0x12-0 6-0x16-0
3-6-40	3	8	.40	1.36	7-0x 8-0 7-0x12-0 7-0x16-0
3-6-45	3	8	.45	1.53	6-3x 8-0 6-3x12-0 6-3x16-0
3-6-50	3	8	.50	1.70	5-9x 8-0 5-9x12-0 5-9x16-0
3-6-55	3	8	.55	1.87	5-3x 8-0 5-3x12-0 5-3x16-0
3-6-60	3	8	.60	2.04	4-9x 8-0 4-9x12-0 4-9x16-0
3-1-75	3	8	.75	2.55	5-9x 8-0 5-9x12-0
3-1-100	3	8	1.00	3.40	4-3x 8-0 4-3x12-0

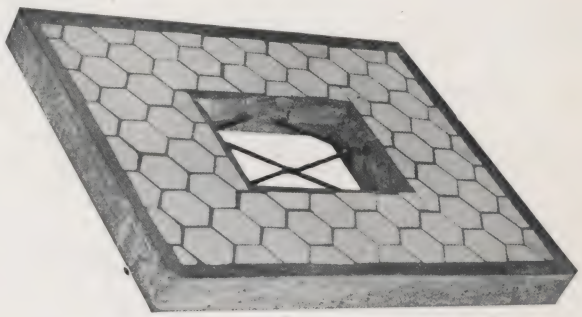
"STEELCRETE" SPECIAL MESHES

Designation of mesh	Size of mesh, in. Width of diamond	Size of mesh, in. Length of diamond	Approximate weight per sq. ft., lbs.	Size of standard sheets. ft. in. x ft. in.
½" No. 18	.43	1.2	.74	3-0x8-8 6-0x8-8
¾" No. 13	.95	2	.80	6-0x8-0
1½" No. 13	1.36	3	.60	4-0x8-0
2" No. 13	1.82	4	.50	5-0x8-0
¾" No. 9	.95	2	1.80	4-0x8-0
1½" No. 9	1.36	3	1.28	5-0x8-0
2" No. 9	1.82	4	.90	4-0x8-0
Binder	1.82	4	.18	2-6x8-8
Beam wrapping	3	8	.20	0-6x8-8

Note that in the decimal standard for "Steelcrete" the width is designated as the short way of the diamond and the length is designated as the long way of the diamond.

"Steelcrete" Binder

This material is a light sectional area of expanded metal designed to reinforce concrete against temperature stresses. It is especially fitted for use in mosaic work, terrazzo, tile and cement flooring or stucco. Such surfaces are so designed that, if cracks occur, their whole purpose would be ruined. They must be guaranteed *against* cracks, and it is necessary that they be reinforced against temperature stresses.



"STEELCRETE" BINDER

Note the mesh shape which rigidly binds the whole floor together. Details of floor binder are noted in table of "Steelcrete" Special Meshes

Literature

The Companies issue the "Steelcrete" Handbook, containing useful tables and designing data.

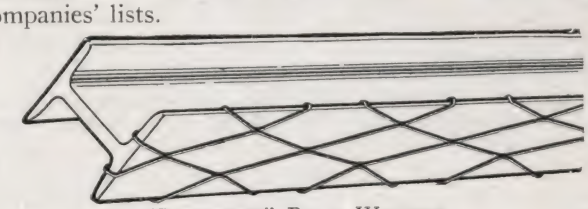
The booklet, "Companion Sets of Steelcrete Slab Tables," gives additional working data.

"Expanded Metal vs. Bars" gives conclusive tests of value to every architect.

The catalogue, "Steelcrete Products," lists and describes all products.

The Universal Slab Computer gives proper thickness of the slab and reinforcing necessary for any given bond and span; 50c postpaid.

Bulletins will be mailed as issued to names on the Companies' lists.



"STEELCRETE" BEAM WRAPPER

Serves as a concrete binder for the lower flange of I-beams of all sizes up to 24 in.

CORRUGATED BAR COMPANY, INC.

Concrete Reinforcement

Mutual Life Building
BUFFALO, N. Y.

DISTRICT OFFICES

NEW YORK, N. Y., Whitehall Building, 17 Battery Place
CHICAGO, ILL., 20 West Jackson Boulevard
PHILADELPHIA, PA., 1713 Sansom Street
BOSTON, MASS., 27 School Street
DETROIT, MICH., Penobscot Building
ST. LOUIS, MO., Boatmen's Bank Building
ST. PAUL, MINN., Pioneer Building
SYRACUSE, N. Y., Union Building
MILWAUKEE, WIS., 820 Wells Building
ATLANTA, GA., 404-405 Candler Building

Products

CORRUGATED BARS; CORR-BAR UNITS; COLUMN SPIRALS; CORR-PLATE FLOORS; CORR-MESH, a ribbed expanded metal.

Corrugated Bars

Perfect bond between Corrugated Bars and the concrete is assured by the carefully formed ribs—scientifically designed to bear squarely against the concrete without any splitting tendency.

This gives the Corrugated Bar a positive and definite bonding value that is independent of the character of the surface. It permits designers to build with a definite factor of safety. It saves steel. There is no need to provide a great excess of steel to take care of the uncertainty in bonding value that is always present when materials are needed whose bond is dependent upon the accidental conditions of their surface—whose bonding value varies in practice as much as 1000%.

STANDARD SIZES OF CORRUGATED BARS

Net area, sq. in.	Weight per ft., lbs.	Equivalent to
.11	.38	⅜-in. Round
.19	.66	½-in. Round
.25	.86	½-in. Square
.30	1.05	⅝-in. Round
.44	1.52	¾-in. Round
.60	2.06	⅞-in. Round
.78	2.69	1-in. Round
1.00	3.43	1-in. Square
1.26	4.34	1⅛-in. Square
1.55	5.35	1¼-in. Square

CORRUGATED ROUNDS (PATENTED)

CORRUGATED SQUARES (PATENTED)

Accessories

We offer a complete line of slab spacers and chairs, beam and joist spacers and chairs.

Corru-Bar Units

Insure correct reinforcement in accordance with the specifications and save much labor cost because only one piece has to be handled instead of fifteen to twenty.

They are shop fabricated and self-positioning reinforcement for concrete beams and girders. Each unit, representing the entire reinforcement for the beam, anchored rigidly together, is made collapsible for shipment, and is opened on the job and set in the form wherein it positions itself.

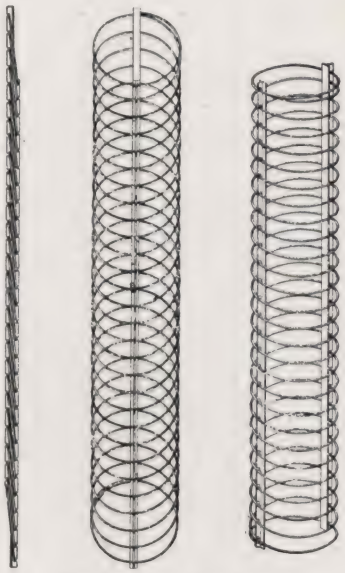
Ready for Shipment

Ready to Place

CORR-BAR UNITS (PATENTED)

Column Spirals

Spirals for columns are shop fabricated with T-section spacers and furnished in any length, in diameters of 10 to 36 in., pitch 1 to 4 in. A large stock is maintained at all times available for immediate shipment.



SPIRALS FOR COLUMNS

Corr-Plate Floors

Contrary to prevailing ideas, a system of rods radiating from columns as reinforcement for a flat slab concrete floor is not economical.

The Research Department of the CORRUGATED BAR COMPANY, INC., has determined by extensive laboratory and field tests that in over 90% of the area of the panel, the lines of principal stress in such floors are parallel to the sides of the panel. Therefore, a 2-way system of reinforcing is far more economical and is scientifically correct, provided the quantity of reinforcement per unit of width varies according to the gradual change in stress.

The Corr-Plate floor satisfies these requirements, and is, therefore, a technically correct and economical system of flat slab construction.

The stresses around the column are much greater than in the middle of the panel. In Corr-Plate floors, therefore, a cap is used, usually about 2 in. in thickness, which saves much concrete. This cap is usually placed underneath the floor, or if wood floor surface is used, it can be placed on top, giving a perfectly smooth ceiling. There is no waste of reinforcement, because it runs at practically all points in exactly the right direction to

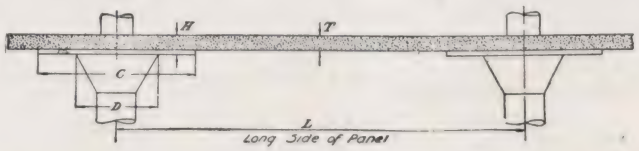
Continued on next page

coincide with the principal stresses, meeting in quantity and location the actual theoretical requirements. The fact that the reinforcement is in but 2 layers gives an increased effective depth, as compared with those forms of flat slab construction employing 4 layers of steel.

Corr-Plate floors save in total height of structure for given clear story heights.

Forms and ease of erection are simpler, lighting and ventilation are better. Large savings are effected in cost of sprinkler, shafting, piping, elevators and other installations.

Patents—The Corrugated Bar Company, Inc., is able to convey on its Corr-Plate construction the protection of Lindau Patent No. 1,050,477.



Corr-Plate Floor Dimension Diagram

DIMENSION TABLE OF CORR-PLATE FLOORS

L	C	40 lbs.				150 lbs.				200 lbs.				300 lbs.				400 lbs.				500 lbs.			
		T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.	T	H	D	Wgt.
15	6′-0″	5½	7½	36	73	6	8	36	79	6	8	36	79	7	9	39	92	7½	11½	42	102	8½	12½	42	114
16	6′-6″	5½	7½	36	73	6	8	36	79	6½	8½	42	86	7½	9½	42	98	8	12	45	108	9	13	45	121
17	6′-9″	5½	7½	39	73	6½	8½	42	86	7	9	45	92	8	11	45	106	8½	12½	48	114	9½	13½	48	127
18	7′-3″	6	8	39	79	6½	8½	45	86	7	9	48	92	8½	11½	48	112	9	13	51	121	10	14	51	133
19	7′-9″	6	8	42	79	7	9	48	92	7½	9½	51	98	8½	11½	51	112	9½	13½	51	127	10½	15½	51	142
20	8′-0″	6	8	42	79	7½	9½	48	98	8	10	54	104	9	13	54	120	10	14	54	133	11	16	57	148
21	8′-6″	6½	8½	45	86	8	10	51	104	8	10	54	104	9½	13½	54	127	10½	14½	57	139	11½	16½	60	154
22	8′-9″	6½	8½	48	86	8	10	54	104	8½	11½	57	112	10	14	57	133	11	16	60	147	12	18	60	162
23	9′-3″	7	9	51	92	8½	10½	57	111	9	12	60	119	10½	14½	60	140	11½	16½	60	154	12½	18½	63	168
24	9′-9″	7½	9½	54	98	9	11	60	117	9½	12½	60	125	10½	15½	63	142	12	18	63	162	13	19	66	175
25	10′-0″	8	10	57	104	9½	11½	63	123	10	13	63	131	11	16	66	148	12½	18½	66	165	14	20	69	187

Note—Dimensions T, H and D are given in inches. Weight given in pounds per square foot.

Designing Table—Table gives dimensions of Corr-Plate floors when reinforced with Corrugated Bars for various sizes of panels and live loads. Data are based on a maximum theoretical concrete stress of 750 lbs. per sq. in. Slab thicknesses are such that the deflections under a superimposed test load, equal to twice the safe live load plus dead load, will not exceed 1/500 of span for a theoretical working stress in steel of 18,000 lbs. per sq. in.

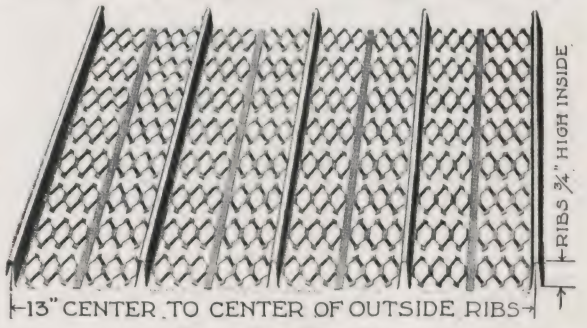
Flat slab designs, showing smaller column head diameters, or thinner slabs over the supports, should be carefully checked for shear at the edge of the column heads.

Corr-Mesh

Corr-Mesh is an expanded metal with integral stiffening ribs connected by a diamond mesh. It is so expanded that no internal stresses are produced in the metal. It is not necessary to handle it carefully in order to avoid splitting, a condition peculiar to the over-expanded products. It is given a protective coating of paint, applied after expansion.

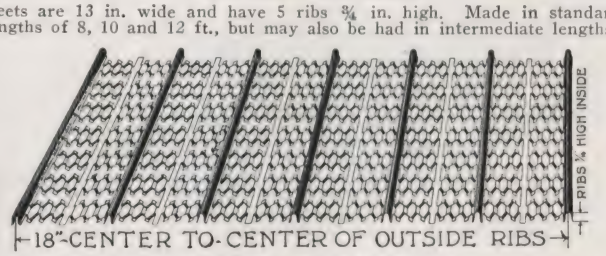
The ribs obviate the necessity of studs for the partitions, practically eliminate centering for the floor and roof construction, and materially reduce the amount of light steel framing required for suspended ceilings.

There are two kinds of Corr-Mesh: one with ¾-in. ribs and the other with $\frac{5}{16}$-in. ribs. The former is called "¾-in. Rib Corr-Mesh," the latter "$\frac{5}{16}$-in. Rib Corr-Mesh." The standard sheets of both kinds are made in Nos. 24, 26, and 28 U. S. gages, painted. Other gages can be furnished if required.



¾-in. Rib. Corr-Mesh

Sheets are 13 in. wide and have 5 ribs ¾ in. high. Made in standard lengths of 8, 10 and 12 ft., but may also be had in intermediate lengths



$\frac{5}{16}$-in. Rib Corr-Mesh

Sheets are 18 in. wide and have 7 ribs $\frac{5}{16}$ in. high. Made in standard lengths of 8 and 12 ft., but may also be had in intermediate lengths

Corr-Mesh Partitions

Corr-Mesh partitions greatly reduce the amount of labor and time in the field, effect a considerable saving in floor space, are light in weight, and are fireproof and verminproof.

When used in fireproof buildings, the difference in the weight of Corr-Mesh and hollow tile partitions is enough to cause considerable saving in the cost of steel framing.

When used for solid partitions, ¾-in Rib Corr-Mesh is steel studs and lath combined.

When used for double partitions, the stiffness and close spacing of the ribs of $\frac{5}{16}$-in. Rib Corr-Mesh permit supports to be placed from 26 to 40 in. center to center.

Corr-Mesh Ceilings

Corr-Mesh is an economical material for suspended ceilings. Being a combined unit of steel lath and furring, it eliminates three-quarters of the light steel framing and time consumed in wiring. The mesh affords a positive plaster key.

Solid Stucco (Steel Frame)—When applied to a skeleton steel frame, ¾-in. Rib Corr-Mesh gives a wall especially suited for factories and such other buildings of an industrial character as are not required to be heated to the same degree as stores and office buildings. Such walls cost about half as much as brick; are permanent, presentable, economical and fireproof.

Stucco Veneer (Wood Frame)—When a stucco residence of excellent quality and moderate first cost is desired, $\frac{5}{16}$-in. Rib Corr-Mesh is fastened direct to the timber sheathing and plastered with cement mortar. This type of wall gives a very handsome finish, is economical, and affords an excellent insulation against heat in summer and cold in winter.

Corr-Mesh Floors and Roofs

¾-in. Rib Corr-Mesh forms a very efficient reinforcement for short span floor and roof construction between either steel or concrete beams.

Handbook

For architects, engineers, contractors, and students of reinforced concrete construction, we offer a handbook "Useful Data on Reinforced Concrete Buildings" (price $2.50).

Catalogues and Information

Catalogues, detailed information, etc., sent in response to requests on business letterheads.

PAUL J. KALMAN COMPANY, INC.

Reinforcing Steel and Concrete Accessories

22 West Monroe Street

CHICAGO, ILL.

DISTRICT SALES OFFICES

KANSAS CITY, MO. MILWAUKEE, WIS. NEW YORK, N. Y. MINNEAPOLIS, MINN. ST. PAUL, MINN.

WAREHOUSES AND FABRICATING SHOPS

CHICAGO, ILL. MINNESOTA TRANSFER, MINN. YOUNGSTOWN, OHIO

Products

KALMAN GRIP BARS for concrete reinforcement; KALMAN COLUMNS SPIRALS.

KALMAN CONCRETE ACCESSORIES: SLAB SPACERS, BEAM CHAIRS, RIB CHAIRS, HIGH CHAIRS.

KALMAN CONCRETE INSERTS; KALMAN HANGER INSERTS; KALMAN SLEEPER ANCHORS.

Also Bar Clips, Metal Lath, Steel Tile, Steel Joists and Accessory Products.

Kalman Services and Facilities

Warehouses and fabricating shops at centers of distribution, where large stocks are maintained with full equipment for rapid handling, accurate cutting and bending, tagging and loading for prompt and positive shipment.

Kalman Grip Bars

Deformed bars meeting in all essentials the standards generally recognized and approved for reinforcing steel. These bars are rolled from new billet stock exclusively and are furnished in square and round sections, areas and weights being the same as are standard for plain squares and rounds.

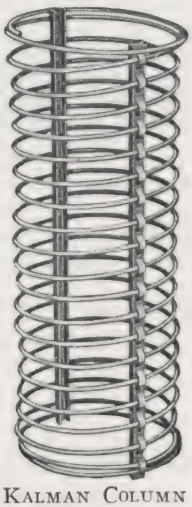
KALMAN ROUND GRIP BAR

KALMAN SQUARE GRIP BAR

The deformation of Kalman grip bars is distinctive. Lateral ribs are provided with correct frequency to insure effective mechanical bond. Longitudinal ribs add greatly to the bending properties of these bars, which do not twist or wind when bent. This is particularly of advantage in the use of square sections, and makes the Kalman grip bar specially desirable for work demanding extreme accuracy of detail.

Kalman Spirals

Kalman spirals are strongly and accurately made. They are coiled by machinery of special design, which prevents variation in diameter, and are assembled to specified pitch and length with stiff channel iron spacers which maintain alignment and allow collapsing of the spiral for convenient shipment and handling.



KALMAN COLUMN SPIRAL

Kalman Accessories

Practical devices to aid in accurate and economical setting of reinforcing steel. By their use bars are correctly supported from the forms, properly spaced apart, and firmly held in place prior to and during the concreting operation.

Kalman accessories are protected by patents.

Slab Spacers—Strongly built of steel rods, with wire legs welded at every bar location. Made for service. Exceptionally easy to handle. Will positively hold slab steel where it belongs.

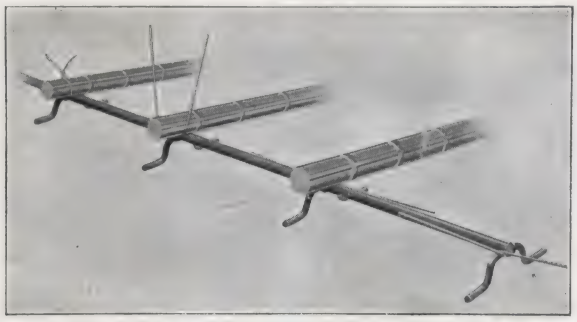
Kalman slab spacers do not tip over; do not dig into the forms; do not collapse when stepped on.

Kalman slab spacers *do* embed perfectly in concrete.

Are shipped straight and reach the job straight.

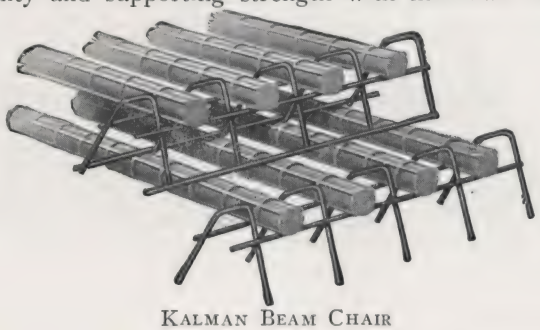
Furnished in lengths and spacings to conform with design details of each job. Bundling and tagging is carefully done to insure delivery in acceptable condition.

Made in standard heights: ½, ¾ and 1 in. Heights above 1 in. readily furnished. Made up promptly to order.



KALMAN SLAB SPACER

Beam Chairs—Strongly made of wire parts, electrically welded. Kalman beam chairs combine maximum stability and supporting strength with minimum inter-



KALMAN BEAM CHAIR

Continued on next page

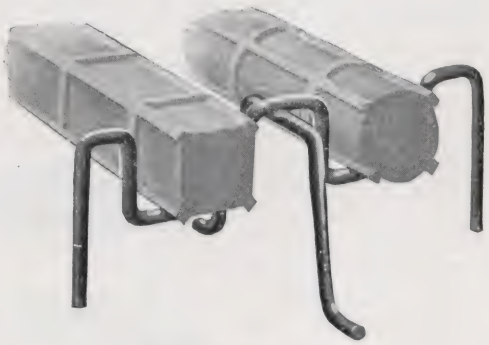
ference to flow of concrete. Trussed for lateral stiffness. Solidly footed to prevent overturning. Chair, or separator, to carry a second layer of rods, rests directly on the lower layer rods and is not in any way dependent on connection with the chair beneath the lower rods.

Made to order to fit exact requirements of detailed design. Special attention given to packing, strong fiber cartons being used.

Kalman Rib Chair

For use in any and all of the many types of ribbed floor construction. Kalman rib chairs provide rod seats of ample depth and separation, with supporting legs giving exceptional stability. No obstruction to flow of concrete. Standard type illustrated furnished in sizes for 4- or 5-in. width of rib.

Special chairs for 6-in. rib and special arrangements of reinforcement are provided on short notice. Standard sizes carried in stock.



KALMAN RIB CHAIR

Kalman Bar Chair

Very strong welded wire chairs for the support of single rods or two rods crossing each other, the chair being placed at the point of crossing. Kalman bar chairs made in any height from ¾ to 5 in., and are especially valuable on heavy work, such as bridges and railroad structures.

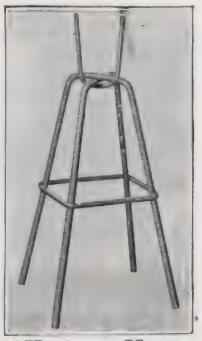
Kalman bar chairs carried in stock for prompt shipment.

KALMAN BAR CHAIR

Kalman High Chair

Very strong supports for reinforcement at heights above 5 in., collapsible for compact shipment, require no nailing to the forms. Made to any height from 5 to 16 in. Certain to hold steel at correct elevation with no obstruction to free flow of concrete.

Shipment made on short notice.



KALMAN HIGH CHAIR

Kalman Concrete Inserts

Mallaeble iron inserts of standard adjustable type. Improved fastening means for setting on the forms, also safety feature preventing loss of proper bearing for bolt head.

Staple points drive directly into forms and hold insert securely. No nails required. Saving of 75% of labor compared with other methods. When forms are removed staple is withdrawn from insert. No cutting off of nails at ceiling, which saves still more labor.

Washer inside of insert automatically prevents withdrawal of bolt and provides full range of adjustment with no loss of bearing.

Kalman inserts carried in stock for ¾-, ⅝- and ½-in. bolts.

KALMAN CONCRETE INSERT

Kalman Hanger Inserts

A light concrete insert capable of carrying loads up to 1000 lbs.; especially adapted for use in suspended ceiling construction and the hanging of pipe lines. A very simple insert to set, and a very economical insert to use.

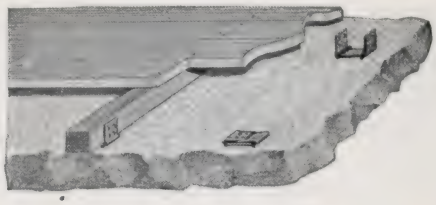
Special literature descriptive of the various detailed uses of this efficient insert supplied on request.

KALMAN HANGER INSERT

Kalman Sleeper Anchor

A strong and permanent anchor for embedment in the top surface of a concrete slab to provide secure fastening to the slab for wood sleepers where wood top flooring is required. These devices provide sleeper anchorage superior to the results obtained by the use of cinder concrete and are very economical in cost.

Made in two widths, for 2x2-in. dressed sleepers and 2x4-in. dressed sleepers. Carried in stock for immediate shipment.



KALMAN SLEEPER ANCHORS

Catalogues, etc.

Kalman catalogues and special information forwarded in response to inquiries made on business letter heads.

TRUSCON STEEL COMPANY

Manufacturers of Reinforcing Steel and Building Specialties

YOUNGSTOWN, OHIO

For Branch Offices, see page 848

Products

REINFORCING STEEL; KAHN TRUSSED BARS; RIB BARS; RIB METAL; COLUMN HOOPING; STEEL FLORETYLES and FLOREDOMES; WIRE MESH; CONCRETE INSERTS; CONTRACTION JOINTS; STEEL BUILDINGS.

For Hy-Rib Metal Lath, see pages 268-269; for Steel Joists, see page 496; For Steel Windows, see pages 848-851.

TRADE-MARK

Service

Owing to the wide range of detail of these products and the value of the technical experience of the company, it is suggested that engineers and architects avail themselves of the service offered by our corps of engineers that is at all times ready to furnish suggestions, estimates and details.

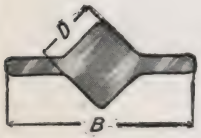
The following is necessarily only an outline of products and not an attempt to suggest their wide application and extensive use.

Kahn Trussed Bars

RIGID CONNECTION

Open hearth steel, concrete beam, girder, floor and arch reinforcement. Unit bars with 45° rigid diagonals formed from flanges on the main body producing 12% to 30% stronger beams than loose stirrups; save steel in design, labor in installation; safe; strong; fireproof and shockproof.

KAHN TRUSSED BAR



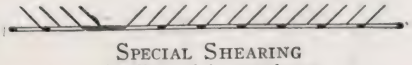
SECTION KAHN TRUSSED BAR

D & B in.	Wt. per lin. ft.	Area, sq. in.
½x1½	1.4 lbs.	0.41
¾x2 3/16	2.7 lbs.	0.79

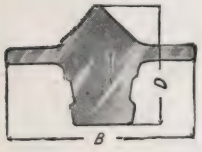
STANDARD SHEAR
Middle portion left unsheared

CENTER SHEAR
Entire bar sheared to center

ONE-WAY SHEAR
All diagonals sheared, inclining in one direction



SPECIAL SHEARING
As directed by purchaser



SECTION KAHN TRUSSED BAR

D & B in.	Wt. per lin. ft.	Area, sq. in.
1½x2¼	4.8 lbs.	1.41
1¾x2¾	6.8 lbs.	2.00
2 x3½	10.2 lbs.	3.00

LENGTH OF DIAGONALS

Size, in.	Standard lengths, in.	*Special lengths, in.
½x1½	12	(6) 8 (18)
¾x2 3/16	12, 24	8 (18) 30
1½x2¼	12, 24, 36	8 (18) 30
1¾x2¾	36	(24) 30 (48)
2 x3½	36	(24) 30 (48)

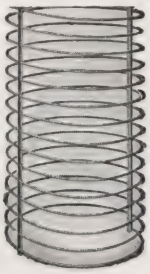
* NOTE—The special lengths enclosed in parentheses are ordinarily available only for items of 5 tons or more

Collapsible Column Hooping

Accurately constructed column reinforcement, shipped flat in coils of exact diameter attached to spacing bars, ready for field erection. Sizes as follows:

Diameter of wire, in.	¼	5/16	⅜	½
Area, sq. in.	.0491	.0767	.1105	.1963
Wt. per sq. ft., lbs.	.167	.261	.376	.668

Diameter of coils—9 in. to 36 in.
Pitch of coils—1¼ in. to 12 in.



COLUMN HOOPING

Rib Bars

Special rolled steel section with series of cross ribs to secure maximum grip. Carried in stock in warehouses in various cities, furnished straight or bent as ordered.

PROPERTIES OF RIB BARS

Area, in.	Equivalent to	Wt. per ft., lbs.
.110	⅜-in. Round	.379
.196	½-in. Round	.674
.250	½-in. Square	.86
.307	5/8-in. Round	1.054
.442	¾-in. Round	1.517
.601	⅞-in. Round	2.065
.785	1 -in. Round	2.697
1.000	1 -in. Square	3.46
1.266	1⅛-in. Square	4.38
1.563	1¼-in. Square	5.41

SQUARE RIB BAR

ROUND RIB BAR

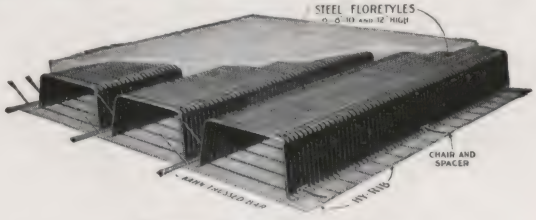
Floretyles

Rows of specially formed steel tiles, separated by reinforced concrete joists and covered with thin layer of concrete, produce strong, deep, light weight, long span floor construction with flat ceilings; require but inexpensive centering and are soundproof. Accuracy of spacing assured by special spacer-chairs. ⅜-in. Hy-Rib metal lath used for ceilings.

Furnished in two types: ribbed and corrugated.

(1) Ribbed Steel Floretyles—Ribbed with deep stiffening ribs across top, corrugated sides, rounded corners, corrugated flanges.

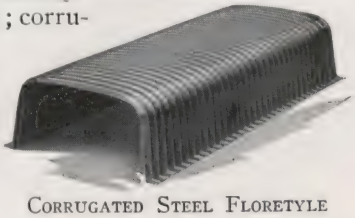
Approximate width at base, 20½ in.; standard lengths, 3 and 4 ft.; standard heights, 6, 8, 10 and 12 in.



RIBBED STEEL FLORETYLES

(2) Corrugated Steel Floretyles—Corrugated, with deep corrugations extending completely around tile; corrugated flanges.

Approximate width at base, 20½ in.; standard lengths, 2 ft. 4½ in. and 3 ft. 9 in.; standard heights, 6, 8, 10 and 12 in.



CORRUGATED STEEL FLORETYLE

Continued on next page

Cantilever Floretyle—In this construction, the end Floretyles are tapered so as to provide a maximum width of joists at the supports.

The joist is reinforced to act as a cantilever for a considerable distance from the support, assuring a longer span without increase of depth, as well as maximum economy of materials.

Cantilever Floretyles are used with either the ribbed or corrugated types of Floretyle.

Properties of Cantilever Floretyles—Standard heights, 6, 8, 10 and 12 in.; approximate width at end, 20½ in.; at narrow end, 13¾ in.; lengths (nominal) 2, 3 and 4 ft.

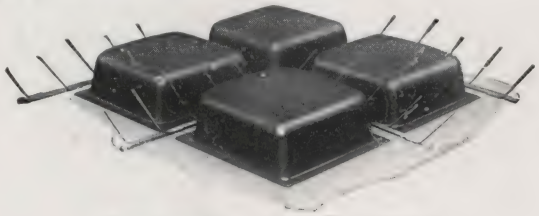
CANTILEVER FLORETYLES

Truscon Removable Floredomes

Truscon removable Floredomes have the advantages of Floretyle, but are adapted to two-way construction in which the loads are carried in two directions to the supports. As the Floredomes are removable they can be used repeatedly and thus reduce the cost of forms.

Truscon removable Floredomes are formed from No. 16 gauge sheets by powerful presses and are absolutely uniform and exact. Their smooth, true surfaces make them especially easy to remove after the concrete has set.

Properties of Cantilever Floredomes—Thickness of metal, No. 16 gauge; standard heights, 6 and 8 in.; size over all, 22 by 22 in.; size at base, exclusive of 1-in. flanges on all sides, 20 by 20 in.



TRUSCON REMOVABLE FLOREDOMES

Rib Metal

A unit reinforcement, equivalent to a large number of separate bars. Provides perfect cross reinforcement against temperature and shrinkage strains.

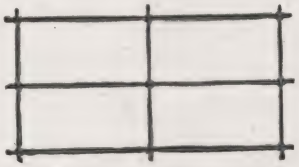
RIB METAL

PROPERTIES OF RIB METAL

Size No.....	2	3	4	5	6	7	8	12
Width of sheet, in	16	24	32	40	48	56	64	96
Area per foot of width, sq. in..	.450	.300	.225	.180	.150	128	.113	.075

Truscon Wire Mesh

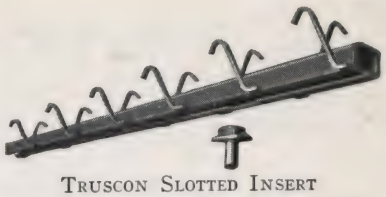
A superior reinforcement for concrete roads. Furnished either in rolls with 18-in. core or in flat sheets cut to length; various weights.



TRUSCON WIRE MESH

Truscon Inserts

Used in concrete slabs, beams or columns for attaching shaft hangers, fixtures, sprinkler systems, etc. Obviate expensive drilling into concrete in finished building. Built into concrete during process of construction by merely fastening them to wood centering. The concrete thoroughly embeds insert and holds it rigidly in place. Only narrow slot flush with concrete is seen in completed work.



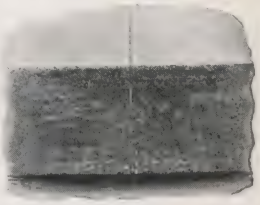
TRUSCON SLOTTED INSERT
Standard lengths, 12, 18, 24, 36, 48 and 60 in.

TRUSCON ADJUSTABLE INSERT
½, ⅝ and ¾ in.

TRUCSON TAPPED INSERT
½, ⅝ and ¾ in.

Truscon Dowel Contraction Joint

Used in concrete roads to form a plane of weakness for joint. Plates beveled to crown of road and doweled to provide stiffness.



TRUSCON DOWEL CONTRACTION JOINT

Truscon Standard Buildings

The ideal auxiliary building for industrial plants, built of interchangeable steel panels, permitting any arrangement of doors or windows. Wall heights up to 21 ft. 4 in. in multiples of 2 ft. 8 in. plus varying curb heights.

Widths of Standard Buildings—*Type 1*—Clear span, pitched roof 8, 12, 16, 20, 24, 28, 32, 40, 48, 50 and 60 ft.

Type 2—Two-bay, pitched roof 40, 48, 50, 56 and 60 ft.

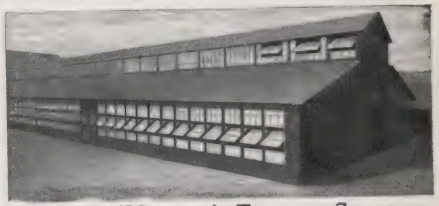
Type 3—Three-bay, pitched roof 56, 60, 64, 68, 72, 76, 80, 84, 88, 96, 98, 106, 108 and 116 ft.

Type 3M—Three-bay (monitor roof) 60, 64, 68, 72, 76, 80, 84, 88, 90, 96, 98, 100, 106, 108 and 116 ft.

Type 4—Four-bay, pitched roof 80 ft. (4 bays of 20 ft.); 100 ft. (4 bays of 25 ft.); 112 ft. (4 bays of 28 ft.).

A continuous lantern, 12 ft. wide, can be provided at the ridge of any building which is 40 ft. or more in width.

Lengths of Standard Buildings—Any multiple of 2 ft.



TYPE 3M (MONITOR) TRUSCON STANDARD BUILDING

Sawtooth Type of Truscon Standard Buildings

Widths of sawtooth buildings (direction at right angles to face of sawtooth), any multiple of 28 ft.

Lengths of sawtooth buildings (direction along face of sawtooth) multiples of 2 ft.

50x500-FT. SAWTOOTH TYPE TRUSCON STANDARD BUILDING

WICKWIRE SPENCER STEEL CORPORATION

SUCCESSOR TO CLINTON-WRIGHT WIRE COMPANY

Manufacturer of Electrically Welded Wire for Concrete Reinforcement

WORCESTER, MASS. BUFFALO, N. Y.

DISTRICT OFFICES

BOSTON MASS., 120 Franklin Street
PHILADELPHIA, PA., 237 North Sixth Street
DETROIT, MICH., 3044 West Grand Boulevard
NEW YORK, N. Y., 41 East 42nd Street
CHICAGO, ILL., 215 West Ontario Street
TULSA, OKLA., 861 Mayo Building
SAN FRANCISCO, CAL., 111 Townsend Street
LOS ANGELES, CAL., 316 Market Street

Product

CLINTON ELECTRICALLY WELDED WIRE FABRIC for Concrete Reinforcement.

For Wire Lath and Welded Sheathing, see pages 280-287; for Ornamental Metal Work and Wire Fencing, see page 638; for Perforated Metal Grilles, see page 1773.

Clinton Electrically Welded Wire Fabric

Scope of Use—Clinton electrically welded wire fabric, a mesh reinforcement, is especially suited for floors, roofs, walls, roads, sidewalks, sewers, reservoirs, levees and all kinds of slab construction. The material is also used to special advantage in all kinds of work involving the covering or protection of steel with concrete as in buildings, bridges, subways and tunnels.

Material—Clinton electrically welded wire fabric is a wire mesh made up of a series of parallel longitudinal wires, spaced at even distances apart and held in position by means of transverse wires arranged at right angles to the longitudinal ones, and securely welded to them at the points of intersection by a patented electrical process.

Wire—Clinton electrically welded wire fabric is manufactured from a special grade of high quality steel wire, possessing such strength, elasticity, and ductility as to render it especially suited to structural use.

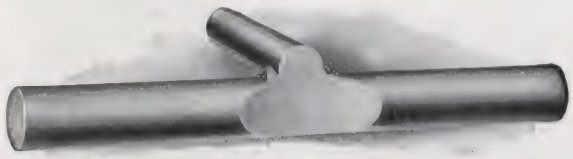
The wire will develop an average ultimate strength of 70,000 to 80,000 lbs., with a maximum, in some cases, of 85,000 lbs. per sq. in. or over.

Innumerable tests and investigations which have been made upon welded wire during the past 15 years have proved, beyond the shadow of a doubt, that the process of welding does not in any way lessen the tensile strength of the longitudinal wires. Specimens when tested, whether they break at or between the welds, will invariably show the full tensile strength of the longitudinal wire when compared with the strength of the plain wire before welding.

Electric Weld—In Clinton welded wire the transverse wires are welded to the longitudinal wires by means of an electric current. They are not in any way secured by winding, or by loops or clips, and for this reason the casual observer sometimes concludes that the wires are merely soldered together. This idea is wrong. The connection is made by an absolute and perfect weld, in which the two wires are actually fused into one homogeneous section.

A great number of tests have been made upon the welded connections, and it has been shown that the shearing strength of the weld in many cases actually exceeds the tensile strength of the longitudinal wire.

Rectangular Mesh—Clinton welded wire is rectangular or square mesh. There are no zigzag or diagonal members in the material.



THE CLINTON ELECTRIC WELD

In this view the two wires have been cut through at their point of union, revealing a perfectly smooth surface. It is a perfect weld; the two wires are actually fused together.

When used as reinforcement in floor slabs, the longitudinal members are thus located in the line of tension, while the transverse or secondary members, arranged at right angles to them, afford a most efficient means of distributing concentrated loads in a direction perpendicular to the main reinforcing members.

In floors slabs, designed and estimated on the basis of distributed loads, this is a most important factor in enabling a slab to receive a very heavy load on a small area. Clinton welded wire fabric, affording, as it does, an efficient transverse as well as longitudinal reinforcement, prevents cracking due to changes in temperature and provides a perfect network of steel which knits and binds the concrete together, reinforcing it securely in all directions.

ROLL OF CLINTON ELECTRICALLY WELDED WIRE

Shipped also in sheets if desired

Perfect Bond—There is perfect adhesion of concrete to this fabric, because it has no clips or wrapped wires to prevent free flow of the aggregate when it is being poured; therefore, no voids exist in the completed work. Transverse strands, which are of much heavier gauge than can be used in any other wire fabric, are securely welded to longitudinal strands at right angles to the latter, and provide absolute anchorage against movement of the fabric when subjected to strain.

Unbroken Continuity—By using Clinton welded wire in floor slabs it is possible to obtain a perfect continuity from span to span without any lapping or splicing of the members.

Fabric is delivered in rolls, and may be laid in continuous sheets up to 200 ft. in length. The result is no waste, no lapped ends, no weak points.

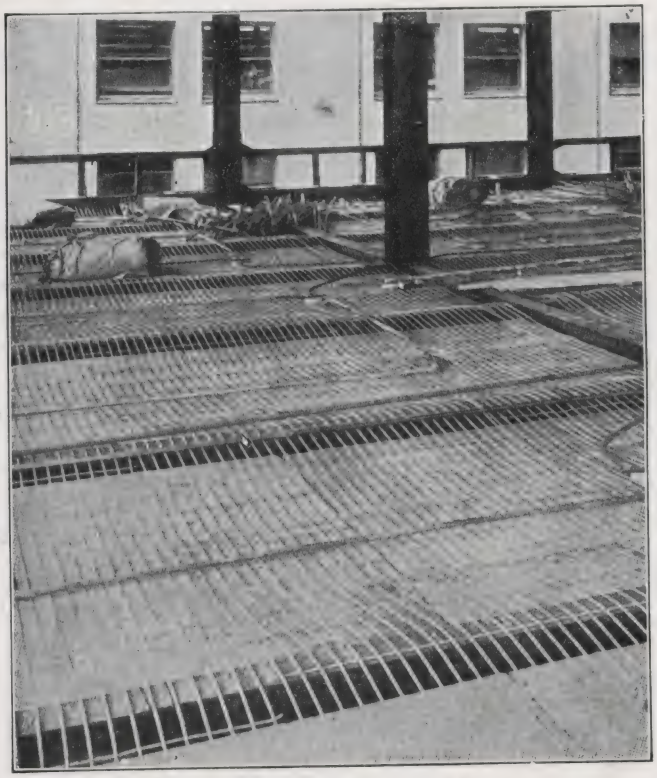
Continued on next page

Economy and Accuracy of Installation—The use of welded wire eliminates all cost and trouble involved in the spacing and wiring of loose members. Spacing is established by machinery, and it is impossible for the relative position of various members to become changed in the slightest degree.

The fact that great quantities of material can be laid accurately in a very short time by unskilled labor, with absolute assurances that every strand of wire is in its proper position, renders welded wire the safest, simplest and most economical reinforcing material for all kinds of slab construction.

Finish—Unless otherwise ordered, Clinton electrically welded fabrics are furnished made with plain steel longitudinal and galvanized steel transverse strands. The price is lower than for fabrics galvanized throughout, the difference being controlled by the market price of spelter used in the galvanizing process.

Galvanizing—Clinton electrically welded fabrics are also made from steel wire, which is thoroughly galvanized before being welded. Galvanizing affords protection against the development of rust if the material is exposed to the weather by reason of delays in its use in the work, or if the concrete is of inferior quality and contains elements injurious to steel, or is so porous as to permit the entrance of moisture or destructive gases.

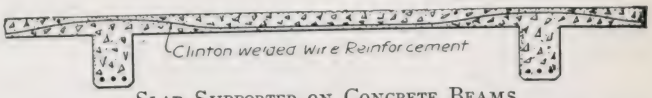


CITY HALL ANNEX, BOSTON, MASS.
EDWARD T. P. GRAHAM, Architect

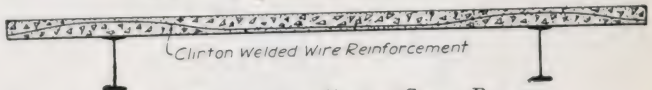
View during construction of floor, showing Clinton electrically welded wire in position, ready for pouring concrete; entire floor reinforced with drawn steel wire (the best known material for tensile reinforcement); every unit accurately spaced and securely held in its proper position—an unbroken continuity of reinforcement from one side of the building to the other

Reinforced Concrete Slab Tables

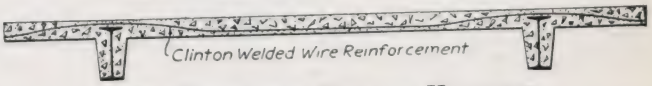
The tables following the reinforced concrete slab section are based on accepted formulæ. The loads given at heads of the varying tables cover customary roof and floor loads, and are the safe applied load in addition to the weight of the slab. No allowance, therefore, need be made for the weight of the slab. The tables have been compiled on a basis of a maximum compression in concrete of 650 lbs. per sq. in. with a maximum tension in the steel of 20,000 lbs. per sq. in.; spans being considered as continuous, i. e., $M = \frac{W1^2}{12}$



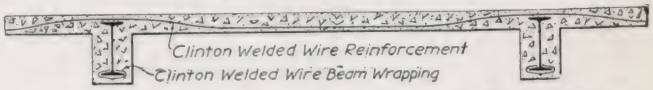
SLAB SUPPORTED ON CONCRETE BEAMS



SLAB SUPPORTED ON TOP OF STEEL BEAMS



STEEL BEAMS WITH CONCRETE HAUNCHES



STEEL BEAMS WITH COMPLETE CONCRETE FIREPROOFING

REINFORCED CONCRETE SLAB TABLES

Reissued April 1, 1922

TABLE I. APPLIED LOAD 50 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	....	....	....	.....
4½	¾	.....	.....	4 x 12 8&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	.....	.....	.....
5	1	.....	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	.....	.....
6	1	.....	.....	.....	4 x 16 7&11	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8
7	1	.....	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8
8	1¼	.....	.....	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9

TABLE II. APPLIED LOAD 75 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	....	.....	.....	.....	.....
4½	¾	.....	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....
5	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	.....	.....	.....
6	1	.....	.....	4 x 12 8&12	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	.....
7	1	.....	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 6&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8
8	1¼	.....	.....	.....	.....	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8

TABLE III. APPLIED LOAD 100 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
4½	¾	.....	4 x 12 8&12	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....
5	1	.....	.....	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....
6	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....
7	1	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 3&8	2 x 16 3&8	2 x 16 1&7
8	1¼	.....	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8

Continued on next page

REINFORCED CONCRETE SLAB TABLES (Continued)

TABLE IV. APPLIED LOAD 125 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 5&10	3 x 16 2&8	2 x 16 4&9	2 x 16 3&8	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	2 x 16 0&6
8	1¼	.....	.....	.....	.....	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7

TABLE V. APPLIED LOAD 150 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....
8	1¼	.....	.....	.....	.....	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6

TABLE VI. APPLIED LOAD 175 LBS. PER SQ. FT.

Thickness of slab, in	Concrete below steel, in.	Clinton fabric required — Span of slab, in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 7&11	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 5&10	2 x 16 5&10	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 6&10	4 x 16 4&9	2 x 16 6&10	2 x 16 4&9	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....	.....
6	1	.....	.....	4 x 16 5&10	3 x 16 5&10	2 x 16 6&10	2 x 16 4&9	2 x 16 3&8	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 6&10	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....
8	1¼	.....	.....	.....	.....	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....

TABLE VII. APPLIED LOAD 200 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....	.....
6	1	.....	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 0&6	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6	.....

TABLE VIII. APPLIED LOAD 225 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 6&10	4 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 7&11	4 x 16 4&9	3 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 4&9	2 x 16 1&7	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3 x 16 6&10	3 x 16 4&9	3 x 16 2&8	2 x 16 3&8	2 x 16 1&7	.....	.....	.....	.....
7	1	.....	.....	.....	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 4&9	3 x 16 2&8	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....	.....

REINFORCED CONCRETE SLAB TABLES (Continued)

TABLE IX. APPLIED LOAD 250 LBS. PER SQ. FT.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required — Span of slab in ft. 4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
5	1	.....	1 x 16 6&10	3 x 16 4&9	2 x 16 4&9	2 x 16 1&7	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....	.....

Note: Values in all these tables indicate size of mesh and gauge of wires in Clinton fabric. Thus, 4x16, 7&11 indicates a fabric having No. 7 gauge longitudinal wires on 4-in. centers welded to No. 11 gauge transverse wires on 16-in. centers.

Reinforcements below and to left of zigzag lines may also be safely used in cinder concrete without exceeding 300 lbs. per sq. in. compression in the concrete. In using cinder concrete, applied loads as given may be increased 3½ lbs. for each inch thickness of slab.

Wire

Size of Wire—The fabrics listed below are suggested as combinations which may be used to special advantage. While all of these fabrics are not actually carried in stock, the majority of them may usually be obtained upon short notice. When only a small quantity is desired it is sometimes less expensive to use a stock grade, even though it possesses greater strength than the work requires.

The longitudinal or transverse strands may be of Nos. 0 to 13 inclusive, Washburn & Moen gauge wire. When the same size of wire is not required in both members of the fabric, the heavier size can be placed longitudinally or transversely, as may be specified, but there should not be a difference exceeding 6 numbers on heavy grades, or 5 numbers in light grades, between the longitudinal and transverse strands.

PROPERTIES OF WIRE AND SECTIONAL AREA OF FABRICS

Size per W.&M. gauge	Diam. of 1 wire, in.	Sectional area of 1 wire, sq. in.	Weight per lin. ft. of 1 wire, lbs.	Sectional area (sq. in.) of longitudinal wires only in 1 ft. of fabric width when spaced as shown below — 2 in.	3 in.	4 in.	5 in.	6 in.
No. 0	.3065	.07378	.2506	.4426	.2951	.2213	.1770	.1475
No. 1	.2830	.06290	.2136	.3774	.2516	.1887	.1509	.1258
No. 2	.2625	.05411	.1838	.3246	.2164	.1623	.1298	.1082
No. 3	.2437	.04664	.1584	.2798	.1865	.1399	.1119	.0932
No. 4	.2253	.03986	.1354	.2391	.1594	.1195	.0956	.0797
No. 5	.2070	.03365	.1143	.2019	.1346	.1009	.0807	.0673
No. 6	.1920	.02895	.0983	.1737	.1158	.0868	.0694	.0579
No. 7	.1770	.02460	.0835	.1476	.0984	.0738	.0590	.0492
No. 8	.1620	.02061	.0700	.1236	.0824	.0618	.0494	.0412
No. 9	.1483	.01727	.0586	.1036	.0691	.0518	.0414	.0345
No. 10	.1350	.01431	.0486	.0858	.0572	.0429	.0343	.0286
No. 11	.1205	.01140	.0387	.0684	.0456	.0342	.0273	.0228
No. 12	.1055	.00874	.0296	.0524	.0349	.0262	.0209	.0174

Spacing of Longitudinal Wires—The longitudinal wires may be spaced on centers of 2 in., or more, in steps of ½ in. The distance between centers of outside longitudinal wires can not exceed 100 in.

Spacing of Transverse Wires—The transverse wires can be spaced on centers of 1 to 10 in. inclusive, in steps of 1 in., and on centers of 10 to 18 in. inclusive, in steps of 2 in. They must project at least ½ in. beyond the outside longitudinals and may, if required, be extended to a maximum length of 102 in.

Rolls and Sheets—Special lengths of rolls or sheets, as may be required, can be made to order. Rolls may be of any desired length not exceeding 400 ft. in the light grades, depending upon the weight and convenience in handling. Sheets should not exceed 20x7½ ft. if shipped in box cars, or 32x8 ft. if shipped on flat cars.

Continued on next page

Special Designs in New York, N. Y.

In the city of New York the allowable capacities of floor slabs are no longer based on tested approvals, but may now be determined by a newly devised method of computation which applies to flat slabs of either stone or cinder concrete when cast between steel beams, and only when the span of slab does not exceed 8 ft. For these conditions a minimum thickness of 4 in. is required. While 4 in. is thus fixed as the minimum thickness of slab, still, a 4-in. thickness may be used on any span up to 8 ft., and for any load which does not exceed the computed capacity of the slab; the actual capacity in any case being determined by the thickness of slab, the conditions of continuity, and the amount and kind of reinforcement used.

Because of the unaccountable strength of short span slabs as shown by actual tests, the city of New York has adopted an empirical formula to be used in designing slabs of 8-ft. span and less when confined between steel beams. The tables below have been computed by this formula for the conditions of continuous wire mesh reinforcement.

ALLOWABLE CAPACITIES OF FLOOR SLABS IN NEW YORK, N. Y.

CINDER CONCRETE SLABS

Span	Applied load, lbs. per sq. ft.	Total load, lbs. per sq. ft.	Thickness of slab, in.	Required steel, sq. in. per ft. width	Required Clinton Fabric: Mesh, in.	Required Clinton Fabric: Gauge No. of wire
4 ft. 0 in.	50	86	4	.0432	4 x 12	9 and 12
"	75	111	4	.0432	4 x 12	9 and 12
"	100	136	4	.0432	4 x 12	9 and 12
"	125	161	4	.0432	4 x 12	9 and 12
"	150	186	4	.0432	4 x 12	9 and 12
"	175	211	4	.0433	4 x 12	9 and 12
"	200	236	4	.0484	4 x 12	9 and 12
"	225	261	4	.0535	4 x 12	9 and 12
"	250	286	4	.0587	4 x 12	8 and 12
"	275	311	4	.0638	4 x 12	8 and 12
"	300	336	4	.0689	4 x 16	7 and 11
5 ft. 0 in.	50	86	4	.0432	4 x 12	9 and 12
"	75	111	4	.0432	4 x 12	9 and 12
"	100	136	4	.0436	4 x 12	9 and 12
"	125	161	4	.0516	4 x 12	9 and 12
"	150	186	4	.0597	4 x 12	8 and 12
"	175	211	4	.0677	4 x 16	7 and 11
"	200	236	4	.0757	3 x 12	8 and 12
"	225	261	4	.0837	3 x 12	8 and 12
"	250	286	4	.0917	3 x 16	7 and 11
"	275	311	4	.0998	3 x 16	7 and 11
"	300	336	4	.1078	3 x 16	6 and 10
6 ft. 0 in.	50	86	4	.0432	4 x 12	9 and 12
"	75	111	4	.0513	4 x 12	9 and 12
"	100	136	4	.0628	4 x 12	8 and 12
"	125	161	4	.0744	4 x 16	7 and 11
"	150	186	4	.0859	4 x 16	6 and 10
"	175	211	4	.0974	3 x 16	7 and 11
"	200	236	4	.1089	3 x 16	6 and 10
"	225	261	4	.1205	3 x 16	6 and 10
"	250	286	4	.1320	3 x 16	5 and 10
"	275	311	4	.1436	2 x 16	7 and 11
"	300	336	4	.1551	3 x 16	4 and 9
7 ft. 0 in.	50	86	4	.0540	4 x 12	8 and 12
"	75	111	4	.0697	4 x 16	7 and 11
"	100	136	4	.0855	4 x 16	6 and 10
"	125	161	4	.1011	3 x 16	7 and 11
"	150	186	4	.1168	3 x 16	6 and 10
"	175	211	4	.1325	3 x 16	5 and 10
"	200	236	4	.1481	2 x 16	7 and 11
"	225	261	4	.1639	2 x 16	6 and 10
"	250	286	4	.1796	3 x 16	3 and 8
"	275	311	4	.1953	2 x 16	5 and 10
"	300	336	4	.2110	2 x 16	4 and 9
8 ft. 0 in.	50	86	4	.0706	4 x 16	7 and 11
"	75	111	4	.0911	3 x 16	7 and 11
"	100	136	4	.1116	3 x 16	6 and 10
"	125	161	4	.1321	3 x 16	5 and 10
"	150	186	4	.1526	3 x 16	4 and 9
"	175	211	4	.1732	2 x 16	6 and 10
"	200	236	4	.1936	2 x 16	5 and 10
"	225	261	4	.2142	2 x 16	4 and 9
"	250	286	4	.2346	2 x 16	4 and 9
"	275	311	4	.2553	2 x 16	3 and 8
"	300	336	4	.2758	2 x 16	3 and 8

STONE CONCRETE SLABS

Span	Applied load, lbs. per sq. ft.	Total load, lbs. per sq. ft.	Thickness of slab, in.	Required steel, sq. in. per ft. width	Required Clinton Fabric: Mesh, in.	Required Clinton Fabric: Gauge No of wire
4 ft. 0 in.	50	100	4	.0432	4 x 12	9 and 12
"	75	125	4	.0432	4 x 12	9 and 12
"	100	150	4	.0432	4 x 12	9 and 12
"	125	175	4	.0432	4 x 12	9 and 12
"	150	200	4	.0432	4 x 12	9 and 12
"	175	225	4	.0432	4 x 12	9 and 12
"	200	250	4	.0445	4 x 12	9 and 12
"	225	275	4	.0489	4 x 12	9 and 12
"	250	300	4	.0534	4 x 12	8 and 12
"	275	325	4	.0578	4 x 12	8 and 12
"	300	350	4	.0622	4 x 12	8 and 12
5 ft. 0 in.	50	100	4	.0432	4 x 12	9 and 12
"	75	125	4	.0432	4 x 12	9 and 12
"	100	150	4	.0432	4 x 12	9 and 12
"	125	175	4	.0486	4 x 12	9 and 12
"	150	200	4	.0556	4 x 12	8 and 12
"	175	225	4	.0625	4 x 12	8 and 12
"	200	250	4	.0695	4 x 16	7 and 11
"	225	275	4	.0764	4 x 16	7 and 11
"	250	300	4	.0834	4 x 16	6 and 10
"	275	325	4	.0903	4 x 16	6 and 10
"	300	350	4	.0972	3 x 16	7 and 11
6 ft. 0 in.	50	100	4	.0432	4 x 12	9 and 12
"	75	125	4	.0500	4 x 12	9 and 12
"	100	150	4	.0600	4 x 12	8 and 12
"	125	175	4	.0700	4 x 16	7 and 11
"	150	200	4	.0800	4 x 16	6 and 10
"	175	225	4	.0900	4 x 16	6 and 10
"	200	250	4	.1000	3 x 16	7 and 11
"	225	275	4	.1100	3 x 16	6 and 10
"	250	300	4	.1200	3 x 16	6 and 10
"	275	325	4	.1300	3 x 16	5 and 10
"	300	350	4	.1400	4 x 16	3 and 8
7 ft. 0 in.	50	100	4	.0545	4 x 12	8 and 12
"	75	125	4	.0681	4 x 16	7 and 11
"	100	150	4	.0817	4 x 16	6 and 10
"	125	175	4	.0953	3 x 16	7 and 11
"	150	200	4	.1089	3 x 16	6 and 1-
"	175	225	4	.1225	3 x 16	6 and 1
"	200	250	4	.1361	3 x 16	5 and 1t
"	225	275	4	.1497	2 x 16	7 and 1
"	250	300	4	.1633	2 x 16	6 and 1
"	275	325	4	.1770	2 x 16	6 and 1
"	300	350	4	.1906	2 x 16	5 and 1
8 ft. 0 in.	50	100	4	.0711	4 x 16	7 and 11
"	75	125	4	.0889	4 x 16	6 and 10
"	100	150	4	.1067	3 x 16	7 and 11
"	125	175	4	.1244	3 x 16	6 and 10
"	150	200	4	.1422	4 x 16	3 and 8
"	175	225	4	.1600	3 x 16	4 and 9
"	200	250	4	.1778	2 x 16	6 and 10
"	225	275	4	.1956	2 x 16	5 and 10
"	250	300	4	.2133	2 x 16	4 and 9
"	275	325	4	.2311	2 x 16	4 and 9
"	300	350	4	.2489	2 x 16	3 and 8

DESCRIPTION OF STOCK GRADES OF CLINTON ELECTRICALLY WELDED WIRE FABRIC

Longitudinal wires: Spacing, in.	Longitudinal wires: Size No. W. & M. gauge	Transverse wires: Spacing, in.	Transverse wires: Size No. W. & M. gauge	Cross-sectional area of longitudinal wires per foot of width of fabric	Weight per sq. ft., lbs.	Description of rolls: Length, ft.	Description of rolls: Width, in.	Description of rolls: Weight, lbs.	Description of rolls: Approx. diam., ins.	Specifications for ordering: Mesh, in.	Specifications for ordering: Gauge No. of wire
2	3	16	8	.2798	1.002	150	60	776	25	2 x 16	3 and 8
2½	3	16	8	.2238	.816	150	75	785	20	2½ x 16	3 and 8
3	3	16	8	.1865	.693	150	84	744	21	3 x 16	3 and 8
3	4	16	9	.1594	.592	150	84	636	21	3 x 16	4 and 9
4	3	16	8	.1399	.539	150	84	579	21	4 x 16	3 and 8
3	5	16	10	.1346	.506	150	84	543	21	3 x 16	5 and 10
3	6	16	10	.1158	.434	200	84	621	20	3 x 16	6 and 10
3	7	16	11	.0984	.374	200	84	535	20	3 x 16	7 and 11
4	6	16	10	.0868	.338	200	84	484	18	4 x 16	6 and 10
3	8	12	12	.0824	.332	200	84	475	23	3 x 12	8 and 12
3	8	8	10	.0824	.356	200	84	510	20	3 x 8	8 and 12
4	7	16	10	.0738	.293	200	84	419	20	4 x 16	7 and 11
3	9	12	11	.0691	.276	200	84	395	21	3 x 12	9 and 12
4	8	12	12	.0618	.263	200	84	376	18	4 x 12	8 and 12
4	9	12	12	.0518	.219	200	84	313	24	4 x 12	9 and 12
6	10	6	10	.0286	.198	400	96	646	30	6 x 6	10 and 10
4	12	12	12	.0262	.120	400	100	408	24	4 x 12	12 and 12
5	12	9	12	.0209	.113	400	100	384	30	5 x 9	12 and 12

All of the foregoing items are made from steel wire galvanized before being welded, or with plain wire in the longitudinal and galvanized wire in the lateral strands. The latter fabrics are less expensive than when galvanized wire is used throughout. In ordering, specify whether plain or galvanized wire is required.

CONCRETE STEEL COMPANY

42 Broadway
NEW YORK, N. Y.

SALES OFFICES

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Products

CONCRETE REINFORCEMENT BARS; COLLAPSIBLE COLUMN REINFORCEMENT; CONCRETE REINFORCEMENT DEVICES, including SUPPORTING, SPACING and TYING DEVICES for holding bars in place in forms; WIRE SOFFIT CLIPS; WALL ANCHORS and TIES; CONCRETE INSERTS; CURB BARS; SAFETY STAIR TREADS; SHEET LATH; EXPANDED METAL LATH (Plain and Self-furring); EXPANDED METAL REINFORCEMENT; RIBLATH; HOT ROLLED and COLD FORMED CHANNELS; CORNER BEADS; WIRE DEVICES.

Engineering Departments

Experienced and efficient engineering departments are maintained in our district sales offices. This organization, which includes the highest grade of engineering talent in its line, will lend every assistance in connection with all concrete reinforcement problems.

Havemeyer Concrete Reinforcement Bars

These deformed bars (Figs. 1 and 2) are rolled square and round sections, with the deformations running longitudinally and entering directly into the tensile strength of the bar, no metal being used for mechanical bond only. At all points they have constant uniform area of cross section exactly equal the cross-sectional area of a plain bar of same size. As the purchaser secures all the advantages of a reinforced bar with the same weight as a plain bar. He does not have to pay extra for the weight of the lugs. As the projections and depressions are rolled longitudinally, there are no sharp angles to start a fracture when bar is bent. Tests prove the very superior bending qualities of Havemeyer bars.

Specifications for Steel—Havemeyer bars are rolled to any desired standard specification from new billet steel at mills which do not re-roll rails. This eliminates all possibility of substitution of inferior metal.

Shop Bending and Fabricating—Our warehouses are equipped for accurately bending and fabricating bars. This service eliminates a bending gang and bending machines on the job. Our warehouse charges for bending are less than it would cost the contractor if he did the work himself. Furthermore, shop bending assures the architect that every bar is bent accurately.

Fabricated units can be made up in our warehouses by using Havemeyer Beam-Saddles, Bar-Tys, etc. This assures proper spacing and placing of bars.

FIG. 1. Round

FIG. 2. Square

HAVEMEYER CONCRETE REINFORCEMENT BARS

HAVEMEYER CONCRETE REINFORCEMENT BARS
Ten Standardized Sizes Carried in Stock

Size, in.....	1¼ sq.	1⅛ sq.	1 sq.	1 rd.	⅞ r l.	¾ rd.	⅝ rd.	½ sq.	½ rd.	⅜ rd.
Area, sq. in.....	1.563	1.266	1.000	.785	.601	.442	.307	.250	.196	.110
Weight perft., lbs.	5.313	4.303	3.400	2.670	2.044	1.502	1.043	.850	.668	.376
Mill extra for size per 100 lbs....	Base	Base	Base	Base	Base	Base	5c	10c	10c	25c

Havemeyer deformed bars have a uniform area of cross section and the same weight per foot as plain bars.

Above standardized sizes recommended by the War Industry Board and adopted by the American Concrete Institute and by the Distributors of Reinforcing Bars.

Collapsible Column Reinforcement

Havemeyer Collapsible Column Spirals—Wire is accurately coiled to proper diameter and correctly spaced with a rigid spacer. Shipped collapsed, ready to be opened up and placed in the form.

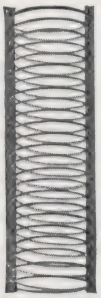


FIG. 3. COLLAPSIBLE SPIRAL

FIG. 4. COLLAPSIBLE COLUMN

Havemeyer Collapsible Columns—Havemeyer bars used for longitudinal members and for bands, the latter being attached to longitudinal members by Bar-Tys. Shipped collapsed for convenience in shipping and handling. Readily opened and set in place. These can be fabricated in our warehouses or by the contractor on the job. The use of Bar-Tys constitutes the cheapest method of assembling column steel.

Securo Bar-Spacers for Supporting, Spacing and Holding Slab Reinforcing Bars

Made from hoop steel. Locking prongs and legs self-contained. Facilitate inspection—a missing bar is detected by its absence from the chair seat. Standard height from underside of bar to form, ½, ¾ and 1 in. Minimum spacing between bars, 3 in. Booklet No. A8.

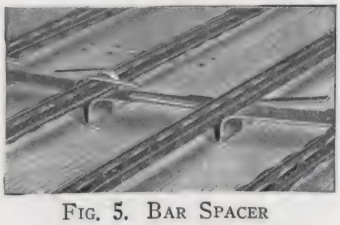


FIG. 5. BAR SPACER

Havemeyer Bar-Tys for Tying Together Reinforcing Bars at Intersections

Used for tying together bars in walls, bent-up bars to supporting rods in slab, tying stirrups to beam bars, for fabricating columns, etc. More quickly attached than soft wire and much more secure. Made from high grade spring steel wire in various sizes to accommodate any combination of bars. Carried in stock. Booklet No. A4.

FIG. 6. BAR-TY

Continued on next page

Havemeyer Ty-Chairs for Tying and Supporting Slab Reinforcing Bars

Quick, simple and economical. Made from high grade spring steel wire.

Standard distance from underside of bar to forms, 1 in.; special, ¾ to 2 in. Made in various sizes to accommodate any combination of bars used. Carried in stock. Booklet No. A4.

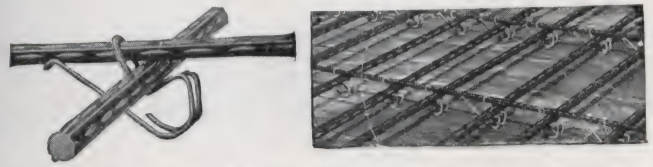


FIG. 7. TY-CHAIR
One Ty-Chair used at each intersection on large bars and at every third intersection on small bars

Havemeyer Hy-Chairs for Supporting Head Rods Over Columns and Bent-up Bars in Slabs

Cheaper and better than concrete blocks. Made from pressed steel, beaded for strength and punched with locking prong and nailing holes.

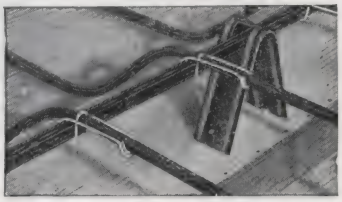


FIG. 8. HY-CHAIR

Shipped nested. Easily carried and quickly distributed. Maximum size bar, ¾ in. Range in height from 1½ to 8½ in. Provided with nailing holes to insure retaining position in forms when concrete is poured. Booklet No. A8.

Havemeyer Easel-Chairs for Supporting and Spacing Two Bars in a Joist

Used in terra cotta and steel tile construction. Made from high grade spring steel wire. Spring of locking arm securely holds bars in place. Single easel-chairs support one bar and both arms lock on the bar; double easel-chairs support two bars, one arm locking on one bar and the other arm on the opposite.

Standard distance from underside of bar to forms, 1 in.; special, ¾ to 2 in. Carried in stock. Booklet No. A4.

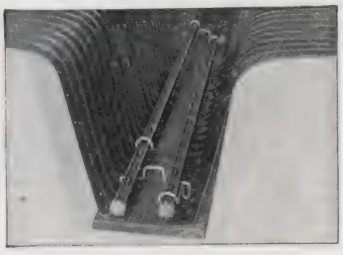


FIG. 9. EASEL-CHAIR

Havemeyer Beam-Saddles and Separators for Supporting, Spacing and Holding Reinforcing Bars in Beams, Girders, Lintels, etc.

Saddles space and support lower layer of bars; separators space and support the upper layer.

Standard height from underside of bar to forms, 1½ and 2 in. Made ½ in. short of beam widths. Standard clear distance between layers, 1 in. Made from hoop steel. Locking prongs hold bars in position. Booklet No. A8.

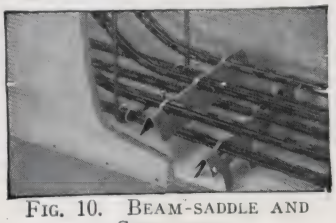


FIG. 10. BEAM-SADDLE AND SEPARATOR

X-Tension Clips (Soffit Clips) for Fireproofing Steel Beams, Girders, Columns, Etc.

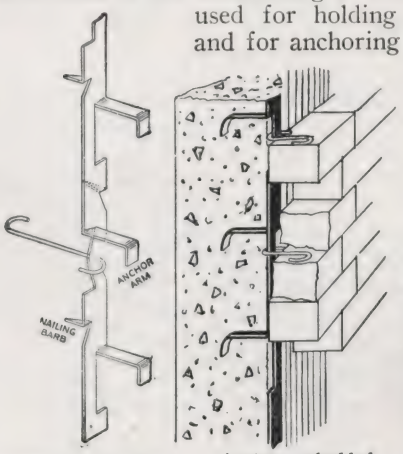
Quickly snapped on flange of beam and have a vise-like hold. Cost of applying is much less than with mesh. May be placed end to end or overlapped; may be applied on either end of beam and pushed along. Made of high grade spring steel wire. Size No. 1 for flanges 3 to 6 in.; No. 2 for flanges 7 to 10 in. Carried in stock. Booklet No. A4.

FIG. 11. X-TENSION CLIPS PLACED ON STEEL BEAM

Security Anchor and Wall-Tys

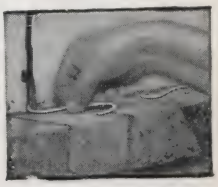
Used especially for bonding brick veneer, stone, terra-cotta or tile wainscoting to concrete surfaces. Also used for holding metal lath ceilings and for anchoring floor screeds.

Anchor is made from loop steel; Tys from steel spring wire. Standard length of anchors is 8 ft.



Anchor showing nailing barbs, anchor arms and S-hooks

Anchor embedded in concrete wall holding brick veneer



Inserting a wall-ty through loop in anchor

FIG. 12. APPLICATIONS OF SECURITY ANCHOR AND WALL-TYS

Concrete Inserts

No. 3 No. 5

FIG. 13. DAYTON ADJUSTABLE-INSERTS

Dayton Adjustable-Inserts—Made from highest grade malleable iron, cast in one piece with keyhole slot for adjustment.

No. 3 is for ¼- to ⅞-in. standard bolts; No. 5 for ⅜-in. to ¾-in. standard bolts, inclusive. Carried in stock. Booklet No. A7.

Havemeyer "Y" Socket-Inserts—Made from highest grade malleable iron. Broad nailing base with four *nailing* holes insures against displacement. Accommodate ⅜- to ¾-in. bolts with standard thread, both inclusive. Carried in stock. Booklet No. A7.

FIG. 14. "Y" SOCKET-INSERT

Havemeyer Slotted-Inserts—Made from high grade pressed steel. Standard lengths, 12, 18, 24 and 36 in. Accommodate ½-, ⅝- and ¾-in. bolts; ⅞-in. bolt special. Have 6 nailing holes. Closed slot and removable end caps prevent seepage of concrete to inside. Can be used singly, or, with end caps removed, can be placed end to end for a continuous run. Carried in stock. Booklet No. A7.

FIG. 15. SLOTTED-INSERT

Continued on next page

Havemeyer Round Nose Curb Bars

Staggered and flared anchors act as reinforcement. Absence of continuous web permits accurate and even bending without kinking. Stocked in 10- and 12-ft. lengths, galvanized. Booklet No. A6.

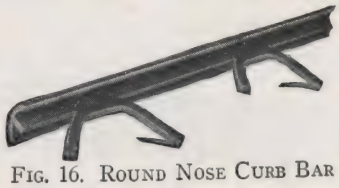


FIG. 16. ROUND NOSE CURB BAR

We also make angle nose curb bars for stair nosings and platform edges. Booklet No. A6.

Havemeyer Safety Stair Treads ("SaniTread")

"SaniTread," a combination of steel plate and lead slugs, can be applied to any type of concrete stairs. Cut to required lengths in multiples of 3-in. Carried in stock. Booklet No. A6.

Havemeyer Metal Lath

An ideal base for ceilings, walls, partitions and exterior stucco work.

A stiff heavy product made of steel, plain or galvanized, or of iron alloy, especially well adapted for overcoating or long spans. Corrugations on 2-in. centers give increased rigidity and enable lath to be used without furring. All sheets are 24 by 96 in.; 1.77 sq. yds. per sheet; 9 sheets per bundle; 16 sq. yds. per bundle.

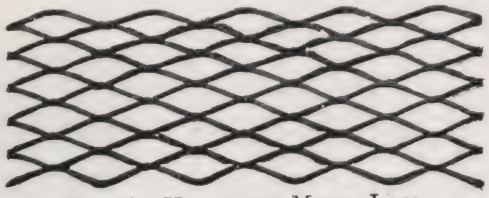


FIG. 17. HAVEMEYER METAL LATH

STANDARD WEIGHTS, HAVEMEYER METAL LATH

Gauge No.	Lbs. per sq. ft.	Gauge No.	Lbs. per sq. ft.
27	2.25	25	3.00
26	2.50	24	3.40
Havemeyer	Special	24	2.75

Havemeyer Expanded Metal

Sizes with large diamonds are used for reinforcing, especially for culverts, sewers, bridges, tanks, etc. Smaller diamonds for machinery guards, enclosures, railings, lockers, etc. Furnished in full range of sizes from 3x7 in. to ½x1¾ in.

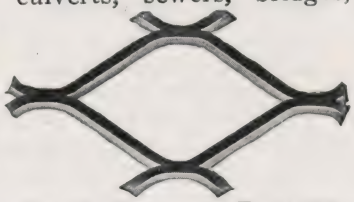


FIG. 18. HAVEMEYER EXPANDED METAL

Havemeyer Channels

Hot Rolled Channels—Furnished in any size on short notice.

FIG. 19. HAVEMEYER COLD FORMED CHANNEL

Cold Formed Channels—For suspended ceilings, furring, columns, false beams, cornice work, or for solid or hollow partitions. Stock lengths, 12, 14, 16, 18 and 20 ft.

STANDARD SIZES HAVEMEYER CHANNELS

Gauge No.	16	16	16	16	16	16	16	18	16
Width, in.	¾	⅞	1	1¼	1½	2	1½	1⅞	2
Flange, in.	⅜	⅜	⅜	⅜	⅜	⅜	½	½	½
Weight per 1000 ft., lbs.	276	304	332	387	456	580	525	458	635

Havemeyer Corner Beads

Wing Bead—No. 26 guage special analysis galvanized sheet. Stock lengths, 6, 7, 8, 9, 10 and 12 ft.; 10 pieces to bundle; weight, 175 lbs. per 1,000 ft.

FIG. 20. WING BEAD

Rail Bead—No. 22 gauge electro galvanized steel. Its great ease in bending gives it precedence over wing bead for arches and similar work. Erected with clips, one clip furnished for each foot of bead. Lengths same as wing bead.

FIG. 21. RAIL BEAD

Bull Nose Bead—No. 26 gauge galvanized steel, ¾-in. radius. Lengths, 6, 7, 8, 9 and 10 ft.; weight, 273 lbs. per 1000 ft.

Havemeyer Base Bead—For cement base, No. 26 gauge galvanized sheet. 12 pieces per bundle; weight, 135 lbs. per 1000 ft.

Havemeyer Diamond Rib Lath

An exceptionally stiff metal lath—A labor and material saver, therefore a money saver.

The V-shaped ribs are cold drawn, not folded, imparting a materially greater elastic limit to the steel. Sheets are 24x96 in.; 1.77 sq. yds. per sheet; ribs spaced 4.8 in. center to center. The wide strand diamond mesh between ribs takes plaster easily and rapidly without waste. Rapid erection results from using a smooth sheet, easily handled. Economy results from perfect fit of interlocking ribs along sides and ends, from reduced number of fastenings to supports, and from saving in material by spacing supports further apart without sacrificing stiffness of plaster.

FIG. 22. HAVEMEYER DIAMOND RIB LATH

MAXIMUM SPANS RIB LATH

Gauge	Weight lbs. per sq. yd.	Ceilings		Partitions	
		Steel furring in.	Wood joists in.	Steel studs in.	Wood studs in.
24	4.8	30	36	36	40
26	3.6	24	30	30	36
28	3.0	19	24	24	30
Special	2.4	16	19	19	24

Wire Devices

Our wire shops are prepared to manufacture, on short notice, any type of wire device required for the installation of suspended ceilings or for securing lath. Tie wire staples, etc., carried in stock.

THE BULL DOG FLOOR CLIP CO.

Floor Clips for Use in Concrete Construction

WINTERSET, IOWA

AGENTS THROUGHOUT THE UNITED STATES

Product

The BULL DOG FLOOR CLIP for concrete construction. (Patented June 14, 1921.)

Slogan

"Put the Bull Dog on your Payroll."

Description and Advantages

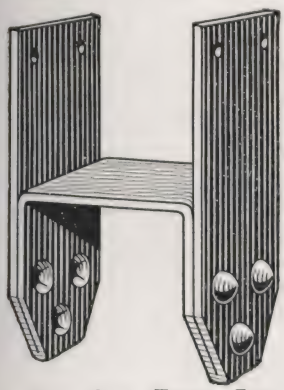
The Bull Dog floor clip, made of No. 20 gage galvanized iron, is a modern money saving simple device for laying wood floors over concrete.

Through the use of these clips, one-half of the lumber usually required for the old strip-fill method is saved. In addition, no concrete or cinder concrete fill is necessary which means a saving of 18,000 lbs. dead load to every 1000 sq. ft. Figuring this saving in dollars and cents: 1000 sq. ft. concrete fill at 8c would cost $80.00; 1000 sq. ft. of floor with Bull Dog clips spaced 16 in. center to center would require 576 clips at 5¼c a clip in place, making a total cost of $30.24, a saving of $49.74 per 1000 sq. ft. of floor.

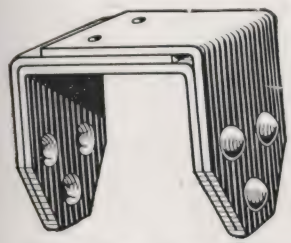
From careful tests, no hollow or drum head sound, can be detected where fill is eliminated. Clips are placed in green concrete with top members folded over (as shipped). In this method they can be forgotten until the floors are to be installed, and the delay and expense of strip fill is done away with. An occasional "fire wall" of concrete on a wood strip can be thrown between strips to avoid any draft under floor where an underwriter *might* consider it feasible.

In short, with Bull Dog clips there is absolute assurance of *holding the floor strips rigidly in place* with no buckle or dome in the finish floor due to strip-fill or slab moisture.

If a fill is required, sand, cinders, or a very weak concrete mix will do. Enough saving can be made in labor, time and lumber, to much more than pay for the clips.



BULL DOG FLOOR CLIP SHOWING TOP MEMBERS RAISED TO RECEIVE FLOOR STRIPS



BULL DOG FLOOR CLIP AS MANUFACTURED AND READY TO PLACE IN SOFT CONCRETE

Method of Installation

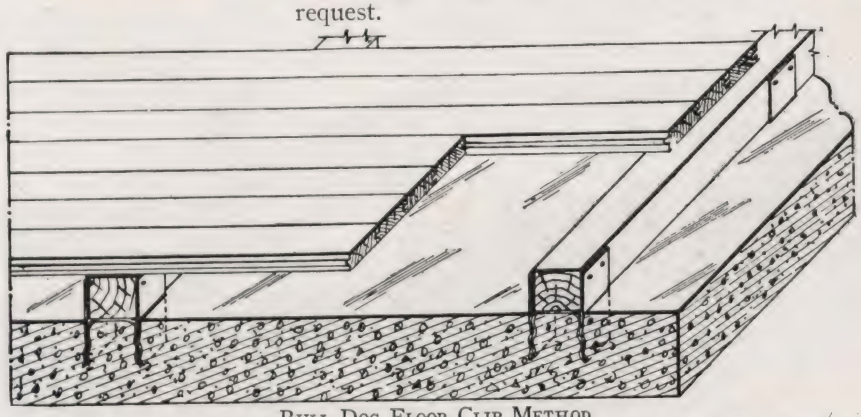
Good substantial screeds should be placed every 8 or 10 ft., so when the concrete is poured it can be levelled off with a straightedge. After the concrete has been poured about 30 minutes, or, as soon as it will support a man on a plank without sinking down, take a straight 2x12-in. plank, mark one edge off into 16-in. spaces (preferably with a saw). Place this plank about 4 in. from the inside wall line; then beginning at one end, place a clip with side against the plank and push it down into the concrete until the center cross bar of the clip is even with the surface of the concrete. By holding the side of the clip against the plank each time a clip is placed, a perfect alignment of clips will be assured. After one row of clips has been placed, move the plank over 16 in. and proceed as before. An easy method of keeping the rows of clips just 16 in. center to center without measuring with a rule each time, is to nail a strip at each end, and at right angles to the plank, with the ends projecting over just 16 in.

The Bull Dog floor clips are manufactured and shipped with the tops bent over, one on top of the other. They are placed in the concrete and the tops are not raised until the floor strips are to be put down. This allows the free use of the floor for wheeling or shoveling.

When the time arrives to put down the floor strips, take a chisel or any sharp edge tool and raise the top members perpendicular to the floor. Place the strip between the top members, level it up with a straightedge and nail to the clip on both sides. Two holes are punched in each side of each clip so that when a joint occurs between the strips, both ends may be nailed. This does away with having any loose ends. If it is found that the concrete slab or base has not been leveled off properly, and there are open holes under the floor strip, take a bricklayer's trowel and slush these places with cement mortar, or use shingle wedges. If the workmen are particular with this phase of the work, they will have every strip lying snugly on the slab, thus getting a better, more solid and cheaper floor than by the use of any other method. Use No. 7x1¼-in. nails.

Samples and Prices

Sample clips and descriptive folder mailed on request.



BULL DOG FLOOR CLIP METHOD

Each floor strip laying flat on concrete and held rigidly in place by the Bull Dog Clip. Dead air space prevents moisture from injuring finish floor. Clips, 16 in. c-c. Strips, 1⅝x1$\frac{13}{16}$ in.

MUNSON MANUFACTURING CO.

Manufacturers of Floor and Wall Anchors

WINTERSET, IOWA

Product

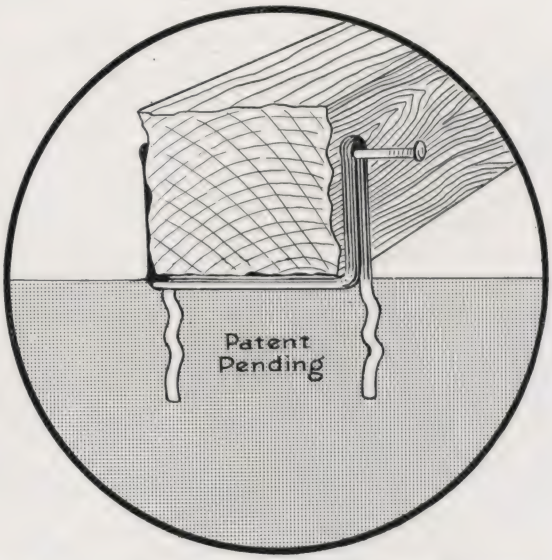
GRIP-TITE FLOOR AND WALL ANCHORS.

Grip-Tite Floor and Wall Anchors

Grip-Tite floor and wall anchors are made of No. 12, 10 or 9 gauge dead, soft, annealed, galvanized wire.

They bend easily but do not break or lose their shape. Save work, time and money.

No fill of any kind is necessary between the sleepers when Grip-Tite anchors are used to anchor them to the slab. These anchors are easily installed and will last as long as any building.



DETAIL OF GRIP-TITE FLOOR ANCHOR HOLDING NAILING STRIP
Note perfect anchorage in concrete slab; also method of fastening nailing strip to anchor

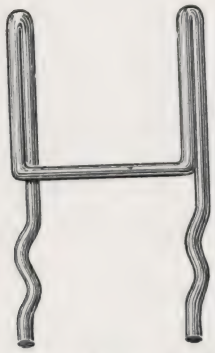
We can show a saving of at least $85.00 per 1000 sq. ft. of floor space over the old method of using the fill.

Prices

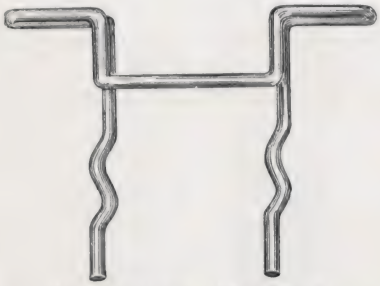
No. 12 gauge $15.00 per thousand; No. 10 gauge $17.50 per thousand; No. 9 gauge $20.00 per thousand; f. o. b. factory, Winterset, Iowa.

Samples

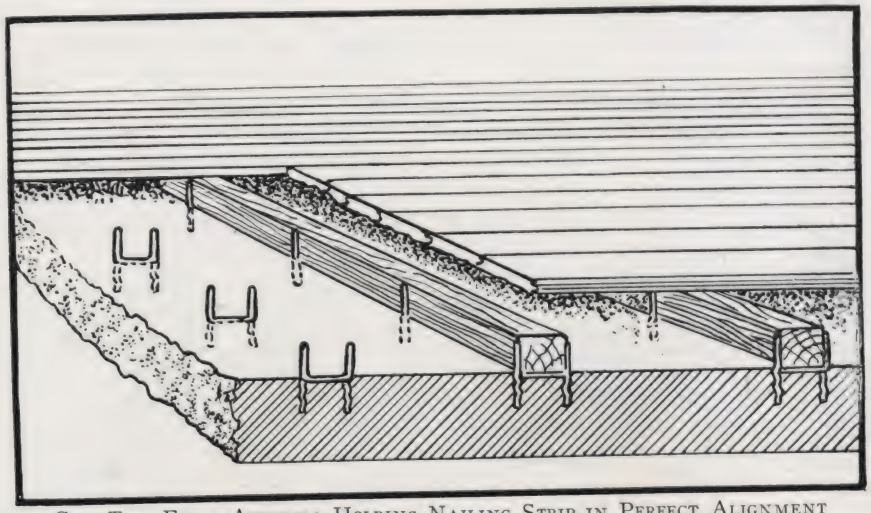
Sample anchors and circular will be gladly sent on request. We will also be glad to answer any questions or furnish further information.



FLOOR AND WALL ANCHOR (HALF SIZE)
For anchoring wood floors to concrete slab, or furring strip to brick or block walls



WALL ANCHOR (HALF SIZE)
For anchoring furring strip to concrete wall



GRIP-TITE FLOOR ANCHORS HOLDING NAILING STRIP IN PERFECT ALIGNMENT
Note absence of cinder fill between strips

J. B. PRESCOTT & SON

Manufacturers of Building and Construction Specialties

WEBSTER, MASS.

Products

The original all-steel line of Building Specialties, comprising RUTTY METAL WALL PLUGS, in two forms, MORSE STEEL WALL TIES in three styles, and PRESCOTT CORNER BEAD.

DELUXE UDDERGROUND and BUILT-IN WALL GARBAGE RECEIVERS, COAL CHUTES, RECEPTACLES for Ice, Packages, etc.

For Pyrofuse Garbage Incinerators, see page 2126.

TRADE-MARK

Rutty Steel Wall Plugs

Rutty Steel Wall Plugs are constructed of heavy sheet steel in such a way that an opening is created sufficiently large for a 10d or larger nail. Also made in the non-furring variety, the use of which eliminates the obsolete wooden furring strips.

Morse Wall Ties

Morse Wall Ties are made in several thicknesses of galvanized steel wire, not only in the straight form for solid walls, but also in the dripped style for hollow walls and the veneer style for veneer walls. Veneer ties come complete with galvanized staples.

Prescott Steel Corner Bead

Prescott Steel Corner Bead is correct in design and made of solid rolled bar steel, absolutely true and straight, and of sufficient weight to maintain a perfect corner. Held in place by heavy steel clips and allows sufficient thickness of plaster at the extreme corner to give permanency.

Uses

The Rutty Steel Wall Plug provides an absolutely perfect nailing base in all forms of brick, stone or concrete construction. The non-furring plug does away with the use of wood furring strips.

Morse Steel Wall Ties in their three forms are the universal ties for bonding all classes of brick and stone construction.

Prescott Corner Bead prevents plaster from chipping or breaking away.

Other Products

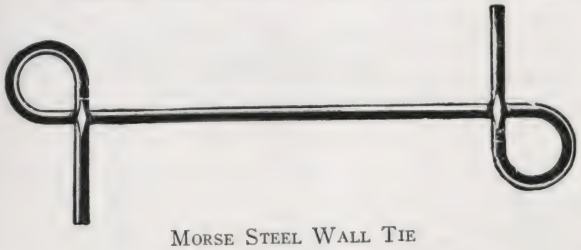
De Luxe Underground Garbage Receivers are made from the most approved forms, with bodies of heavy sheet steel and tops of cast iron. The design covers every convenience.

De Luxe Coal Chutes are built from original design, embracing convenience, safety and durability. They are of sheet steel bodies and semisteel fronts.

De Luxe Built-in Wall Garbage Receptacles prove of great convenience where our Pyrofuse can not be used, and receive waste directly from the kitchen, yet opening out of doors.

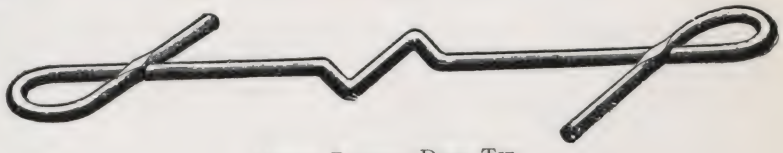
De Luxe Line of Receptacles for receiving ice, packages and meter reading are made from original designs and cover every essential feature of convenience and durability.

Write for special circulars and catalogues.

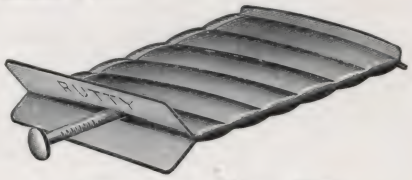


MORSE STEEL WALL TIE

VENEER TIE

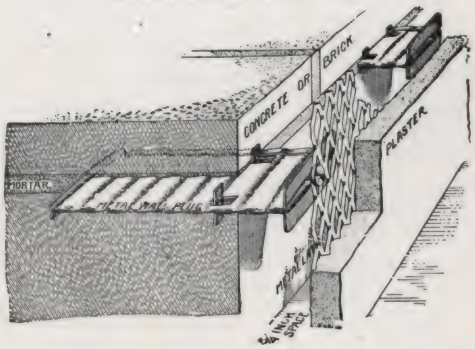


MORSE PATENT DRIP TIE



RUTTY STEEL WALL PLUG

PRESCOTT STEEL CORNER BEAD



NON-FURRING PLUG FOR ATTACHING METAL LATH

ACKERMAN-JOHNSON CO.

Expansion Screw Anchors, Expansion Bolts, Concrete Inserts

625 West Jackson Boulevard

CHICAGO, ILL.

Products

ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR: EXPANSION BOLTS; CONCRETE INSERTS. U. S. Patents; April 27, 1915, December 21, 1915, April 4, 1916, May 14, 1918; others pending. Patented in Canada, Great Britain, France, Belgium; others pending.

Ackerman-Johnson Expansive Screw Anchor

Adaptability—For attaching objects to hard materials, as concrete, brick, stone, tile, marble, etc.

Description and Operation—Consists of a doubly tapered internally threaded cone made of brass, iron or steel (Fig. 1), within a lead composition ductile sleeve (Fig. 2). These are assembled at the factory, the sleeve being forced on the cone to a normal position as at Fig. 3.

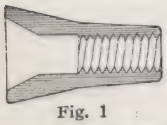


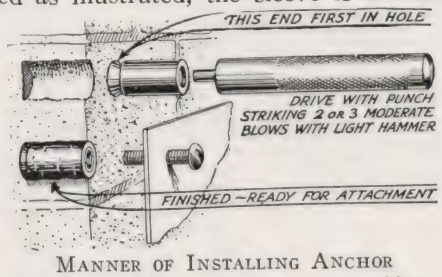
Fig. 1

Fig. 2

Fig. 3

ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR

When installed as illustrated, the sleeve is driven farther toward base of the cone and is expanded generally to any degree required to swedge tightly against the sides of hole, effecting perfect holding contact throughout the length and circumference of the anchor.



MANNER OF INSTALLING ANCHOR

The piloted setting punch supplied without charge with all anchors

Thus consolidated with the wall material, the anchor provides a machine threaded hole the same as an ordinary tapped hole in a machine part. Any object may then be attached with a standard screw or bolt of suitable diameter

The heavier the load attached, the more forcible becomes the expansion causing the anchor to resist effort to pull it out far beyond the tensile strength of any screw or bolt

Distinctive Advantages—Time saving through the use of Ackerman-Johnson anchors compared with any others much more than compensates their total cost.

They save 50% to 75% of drilling costs, requiring holes only a fraction of the depth needed for others.

They are installed instantly, without the aid of the screw, and before the fixture is lifted into position to be fastened.

They will support loads more than double what other types can support.

They necessitate the least displacement of wall material and consequently less injury to buildings.

They effect a neater and more finished job than any others.

Sizes—The size of anchor is designated as the size of the bolt or screw to be used. Example: For No. 10-24 screw, use No. 10-24 anchor; for ⅜-in. bolts use ⅜-in. anchor.

SIZES, EXPANSIVE SCREW ANCHORS

Anchor No.	Minimum Dimen. of holes required, in.		Shipping weight, lbs. per 1000	Anchor No.	Minimum Dimen. of holes required, in.		Shipping weight, lbs. per 1000
	Diam.	Depth			Diam.	Depth	
6 x 32	¼	⅜	7½	5/16" x 18	⅝	1	95
8 x 32	5/16	½	15	⅜" x 16	¾	1¼	162
10 x 24	⅜	⅝	22½	7/16" x 14	⅞	1½	231
12 x 24	7/16	¾	38	½" x 13	⅞	1½	221
¼" x 20	½	⅞	50½	5/8" x 11	1⅛	2	512

Packed 50 or 100 in box.

Stud Type Expansion Bolts

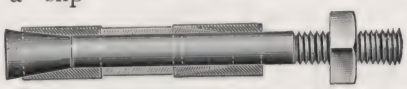
So great is the holding power of this anchorage, that when set in strong stone or concrete with only its one primary sleeve expanded, the bolt shank can be pulled in two, without the anchorage yielding.

Bolt with Primary Expansive Sleeve Only

Bolt with Primary and One Secondary Expansive Unit

Secondary Expansive Units—Made up of an expansive sleeve and a slip steel cone, giving additional anchorage equal to the primary unit.

Calculate the minimum depth of holes for setting at twice the diameter of hole drilled.



Sectional View Showing Bolt with Primary Expansion Sleeve, One Iron Spacing Sleeve, and One Secondary Expansive Unit

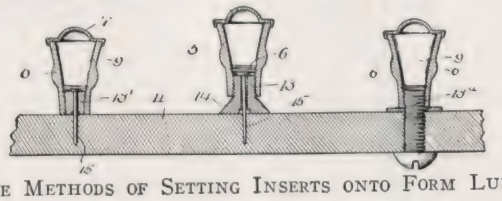
STUD TYPE EXPANSION BOLT SIZES

Diam. of bolt, in.	¼	⅜	½	⅝	¾
Diam. for hole, in.	⅜	9/16	¾	1	1⅛
Length, in.	1¼	1¾	2½	3½	6
	1½	2	3	4	8
	1¾	2½	3½	5	10
	2	3	4	6	12
	2½	3½	4½	7½	15
	3	4	5	9	18
	3½	4½	6	10½	....
	4	....	7	12	....
	....	....	8	15	....

Concrete Inserts

Ackerman-Johnson concrete inserts for moulding into the concrete when poured, afford minimum displacement of the concrete and maximum speed in setting. Can be furnished for all sizes of screws and bolts for which we make expansive screw anchors.

We invite requests for full information concerning inserts.



THREE METHODS OF SETTING INSERTS ONTO FORM LUMBER

Users of Ackerman-Johnson Products

Extensively adopted by leading contractors, manufacturers, railroads, shipyards, government departments and public utility companies.

KOHLER DIE & SPECIALTY CO.

Concrete Inserts and Metal Specialties

DEKALB, ILL.

Products

KOHLER THREADED CONCRETE INSERTS: Pressed Steel and Cast; COLLINGS SLOTTED or ADJUSTABLE CONCRETE INSERTS; FLATTENED END BOLTS.

Kohler Threaded Concrete Inserts

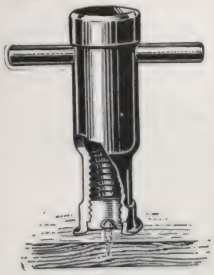
Advantages—The easiest and quickest inserts on the market to set in the forms. No nails or pins required for their use. Adapted for use with either wood or steel forms.

PRESSED STEEL INSERT
Construction of ⅜- and ½-in. sizes

INSERT WITHOUT SCREW
Construction of ⅝- and ¾-in. sizes

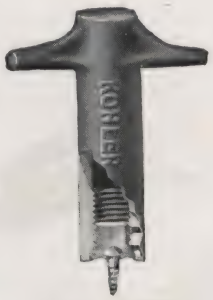
The screw point, shown clearly in the illustration below, does the work. A blow with the hammer and a couple of turns with the hand sets this screw down so that the insert is held securely in a vertical position ready for the concrete to be poured.

The bottoms of these inserts are squared accurately with the thread, as illustrated, so that the inserts must stand upright when the screw is firmly turned down. After work is finished, forms are easily pulled away from the screws, which are then quickly removed, leaving the insert free for the threaded bolt.



STEEL INSERT IN FORM, WITH SCREW POINT IN PLACE
Construction of ⅝- and ¾-in. sizes

EXACT SIZE OF SCREW POINT USED IN ⅝-IN. INSERT
(Patented Feb. 27, 1912)



CAST INSERT

Economy—These inserts, regularly spaced in the ceilings, floors or walls of reinforced concrete buildings mean a saving of time and heavy expense in attaching or rearranging shafting, piping or other interior equipment. A necessity in concrete construction.

Strength—Careful tests show that both the pressed steel and cast threaded inserts have an ample margin of safety over the working load of bolts to be used. At the University of Illinois the ½-in. steel inserts, constructed as shown in the small illustration in upper left-hand corner of page, supported an average load on five tests of 6070 lbs. Similar tests of ⅝-in. cast inserts showed a supporting strength of 9600 lbs.

How Shipped—With both the pressed steel and cast threaded inserts the screw points as illustrated are used. These are put in place at the factory so that insert as shipped is ready for use. Notice it is possible to set these inserts in the forms almost instantly and with the same accuracy as driving a nail.

SIZES, WEIGHTS AND PRICES, KOHLER INSERTS

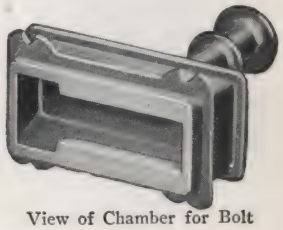
Size bolt	Height	Weight per 100	List price
PRESSED STEEL THREADED INSERTS			
⅜ in.	2½ in.	8 lbs.	10c each
½ in.	3 in.	13½ lbs.	13c each
⅝ in.	3¼ in.	42 lbs.	17c each
¾ in.	3½ in.	50 lbs.	20c each
CAST THREADED INSERTS			
½ in.	3¼ in.	45 lbs.	15c each
⅝ in.	3½ in.	75 lbs.	19c each
¾ in.	3⅝ in.	85 lbs.	22c each
⅞ in.	3¾ in.	110 lbs.	28c each

List prices are subject to discount which will be quoted on application.

Collings Adjustable or Slotted Insert

Made with a corrugated stem that extends up into the compression area of the concrete, the correct place to hang the load. The tapering, ribbed base is so shaped that it gives the greatest possible supporting strength to the concrete member. In this insert the fullest strength of the concrete is developed. The greater the load on the Collings insert the tighter the concrete grips and holds.

Note Corrugated Stem and Tapering Base with Flange at Top



View of Chamber for Bolt

COLLINGS INSERT
(Patented March 26, 1918)

The Collings insert, when placed in the form, is never in the way of the reinforcing bars, and is so designed that the concrete flows freely around it. There are no sharp corners and with the Collings insert less surface is exposed in the ceiling after the forms are removed than with any other—a very desirable feature.

The Collings insert may be used upside down in the floor for fastening chairs, machinery or permanent fixtures but its greater field is in the ceiling for supporting shaft hangers, sprinkler systems, electric lights, piping and overhead rails. Either the head of the bolt or the nut may be used in the socket. The Collings is the only insert in which the bonding value of the corrugated bar is secured.

SIZES, WEIGHTS AND PRICES, COLLINGS INSERTS

Size bolt	Height	Weight per 100	List price
½ in.	3½ in.	76 lbs.	16c each
⅝ in.	3¾ in.	81 lbs.	19c each
¾ in.	4 in.	100 lbs	23c each

Discounts will be quoted on application.

Flattened End Bolts

For use in suspending overhead piping and other work supported from concrete inserts.

FLATTENED END BOLT

Flattened, punched and threaded one end as illustrated.

SIZES AND PRICES, FLATTENED END BOLTS

No. 3—Machine thread, bolt ends, ⅜ x 2 in	8c each
No. 4—Machine thread, bolt ends, ½ x 2½ in	10c each
No. 5—Machine thread, bolt ends, ⅝ x 2½ in	12c each

List prices are subject to discount, which will be quoted on application.

SECURITY INSERT COMPANY

Ceiling Sockets for Concrete Work

PHILADELPHIA, PA.

Product

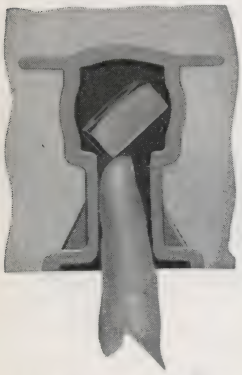
SECURITY INSERTS, or CEILING SOCKETS, for Concrete Work.

Security Inserts

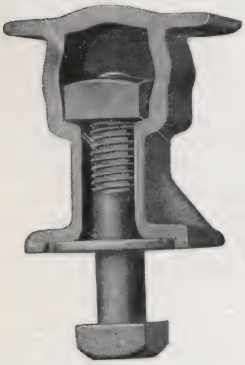
The Security insert solves in a practical way the problem of the hanging of machinery or fixtures from the ceilings or walls of factories, warehouses and other buildings of concrete construction.

Designed by engineers after most careful and exhaustive study, the Security insert has proved its practicability because it is being specified repeatedly.

The illustrations show the ease of installation and many other commendable features of this socket, such as the absence of any fixed thread, the flexibility of placement of bolt and nut, the strength of design, maximum grip in the concrete, etc.



INTRODUCING OR REMOVING NUT



BOLT AND NUT IN POSITION

Eleven Reasons for Specifying Security Inserts

The design, construction and application of Security inserts embody many superior features of which the following are the most important:

(1) The sturdy design of the Security insert enables it to carry a greater load than the bolt.

(2) The nut being placed up in the concrete the strain is not entirely dependent on the casting, but is reinforced by the concrete itself.

(3) It has no fixed thread to become rusty or damaged.

(4) In place of fixed thread a standard steel nut (the strongest thread possible) is placed in the insert when ready to use.

(5) This nut is renewable at any time.

(6) A stud or a bolt may be used, whichever is more convenient for the work.

(7) The Security insert is nailed to the form, thus avoiding waste of time and lumber, and the large flat base assures its remaining upright during pouring.

(8) A unique and convenient way to install Security inserts is by the use of a machine cut wood block as shown in the illustration. This block fits into the rectangular shank of the insert which is merely set down over it. This method avoids leaving nails protruding from the ceiling to be clipped off.

(9) It is desirable to place inserts in all parts of concrete buildings, even offices, storerooms, etc., for they provide easy means for fastening partitions, etc. A unique and exclusive feature of the security insert is that the holes may be concealed by means of a cardboard disk which fits the washer recess and can be painted.

(10) Once placed the Security insert is always ready for use. There is nothing in the socket to get out of order or deteriorate.

(11) The Security insert has been found to be the most practical means for providing safe, permanent anchorage for any loads from the lightest partition to the heaviest crane.

CROSS SECTION SHOWING MACHINED WOOD BLOCK FOR SETTING UP INSERT

Safety

Above all, Security inserts are safe. Even with vibrating loads the nut and bolt are secure. Besides, Security inserts will carry with a factor of safety the safe load of the bolt.

Indorsed by Builders Everywhere

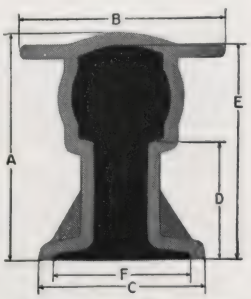
Many of the finest industrial buildings in the United States are equipped with Security inserts.

A list of prominent installations will be sent on request.

INSERT NAILED TO FORM

TABLE OF MEASUREMENTS

Size of bolt, in.	A in.	B in.	C in.	D in.	E in.	F in.
3/8	2 1/4	1 3/4	1 5/16	1 3/8	2 5/32	1 3/64
1/2	2 3/4	2	1 7/8	1 5/8	2 5/8	1 7/16
5/8	3	2 3/4	2 1/4	1 21/32	2 7/8	2 27/32
3/4	3	3	2 1/2	1 7/16	2 7/8	2 1/16
3/4	4	3	2 1/2	2 7/16	3 7/8	2 1/16
7/8	4	3	2 3/4	2 3/16	3 57/64	2 11/32



DIMENSION DIAGRAM SECURITY INSERT

STRENGTH OF BOLTS

Assumed Tensile Strength 60,000 lbs. per Sq. In.

Size of bolt, in.	3/8	1/2	5/8	3/4	7/8
Ultimate strength, lbs.	4,100	7,600	12,100	18,100	25,200
Safe load factor 5	820	1,520	2,420	3,620	5,040

WEIGHTS AND PRICES

Made for the following sizes of bolts, in.	3/8	1/2	5/8	3/4 x 3	3/4 x 4	7/8
Shipping weight, 100 inserts, lbs.	40	70	110	140	170	185
List price, each	11c	13c	17c	21c	25c	30c

Discounts and prices of wood blocks on application.

ALBERT N. WRIGHT & SON, INC.

Manufacturers of Concrete Inserts

ROCHESTER, N. Y.

Products

"Wrialco" Concrete Inserts.

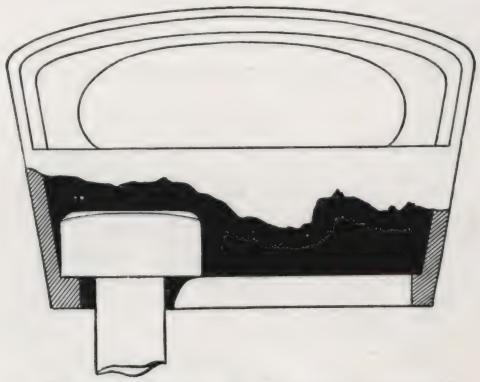
Description of the "Wrialco" Concrete Inserts

The "Wrialco" Insert is a one-piece casting made of an exceptionally high grade malleable iron for the following sizes of U. S. Standard Bolts: 3/8, 7/16, 1/2, 5/8 and 3/4 in.

"Wrialco" Inserts have a standard slotted bottom and will take either the bolt head or nut.

A shelf at the key end of the slot permits using the entire length of the adjustment chamber without danger of the bolt sagging.

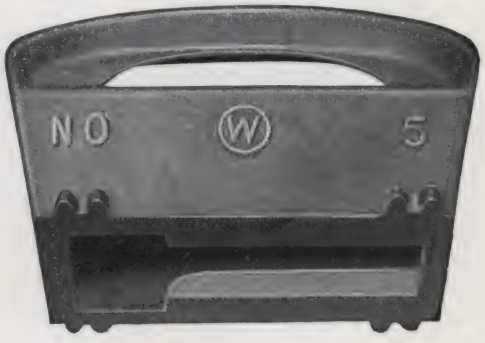
The wedge shape of the "Wrialco" Insert together with the heavy loop at the top, through which a reinforcing bar may be placed if desired, makes it an insert of unusual strength.



Sectional View of "Wrialco" Insert

Distinctive Features of the "Wrialco" Insert

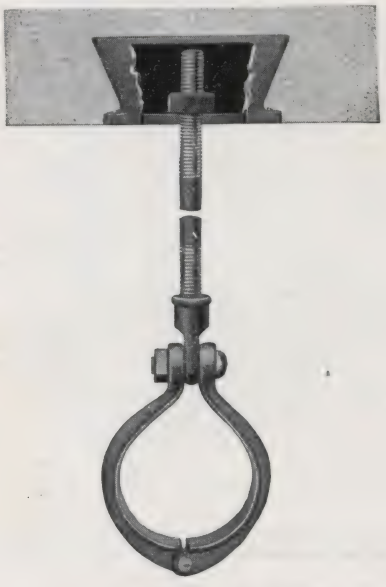
(1) Strength, due to design and construction.
(2) Compact, no special bolts or nuts to loosen.
(3) Adjustment the full length of the slot.
(4) Nailing feature, four lugs instead of the usual two.
(5) Inexpensive.



"Wrialco" Insert

Special "Wrialco" Insert

Special "Wrialco" Insert for the Plumbing and Heating Trades. Made in 1/2-in. and 5/8-in. sizes for nut only. Provides vertical and horizontal adjustment.



Special "Wrialco" Insert

List Prices of "Wrialco" Inserts

3/8-in., $0.10; 7/16-in., $0.11; 1/2-in., $0.12; 5/8-in., $0.15; 3/4-in., $0.19 f.o.b. foundry, Buffalo, N. Y.

"Wrialco" Inserts are sold by the best dealers throughout the country.

SYMONS CLAMP & MFG. CO.

Column Clamps

TELEPHONE
LAWNDALE 0652

2112-2116 South Sawyer Avenue
CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 243 Bush Street, BROOKLYN—Telephone, Henry 1809 KANSAS CITY, MO., Mutual Building—Telephone, Harrison 6167

REPRESENTATIVES IN LEADING CITIES

Products

SYMONS COLUMN CLAMPS.

Also Symons Bar-ties and Bar-tie Supports.

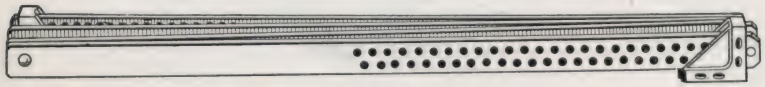
Description

Symons column clamps have been designed to save time in erecting forms for concrete columns, and have so effectively accomplished their purpose that they are now recognized by most of the leading contractors in this country to be one item of their standard equipment.

They are made of mild steel, are suitable for both square and rectangular columns and are very quickly applied and removed from a form. One size clamp usually suitable for all the columns in a construction. There are no loose parts to become lost, and the wear and tear are negligible.

The saving derived from their use is so pronounced that the company devised a means for putting them out on rental orders, making shipment from warehouse stock, located in principal cities.

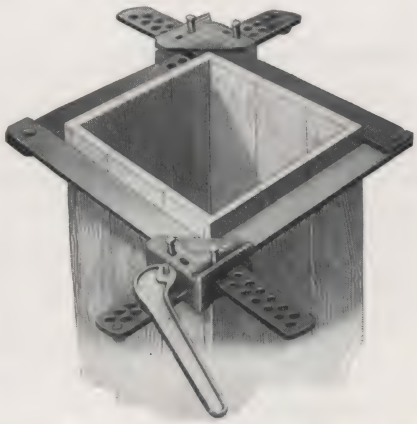
SETTING UP COLUMN FORM WITH SYMONS CLAMPS



SYMONS COLUMN CLAMP, COMPLETE

Rental Proposition

The clamps may be rented on terms that insure or guarantee a saving. All rental contracts contain a 90-day option of purchase, the paid rentals to apply. This rental proposition guarantees a saving even when figured on a rental basis, and has proved so attractive to contractors that within the last five years Symons clamps have come into almost universal use and seldom need an introduction in a contractor's office.



APPLICATION OF SYMONS COLUMN CLAMPS
Showing also tightening wrench

Symons clamps made good when form lumber was selling for $25.00 and $30.00 per thousand, and carpenters were being paid 50c and 60c per hour. Surely they ought to make good under present conditions.

SIZES AND SPECIFICATIONS OF SYMONS COLUMN CLAMPS

Size of clamp, in.*	Arms (mild steel), in.	Adjustment, in.	Size of columns (square or rectangular) for which clamps are suitable Size is net of concrete, in.
30 x 30	2 x 5/16 x 30	14	20 x 20 to 9 x 9
36 x 36	2 x 5/16 x 36	17	25 x 25 to 10 x 10
48 x 48	2½ x 3/8 x 48	22	36 x 36 to 14 x 14
60 x 60	3 x 3/8 x 60	24	48 x 48 to 24 x 24
48 x 72	2½ x 3/8 x 72	24	34 x 58 to 12 x 36
72 x 72	2½ x 3/8 x 72	30	58 x 58 to 36 x 36

Above specifications are for column forms made of 2-in. boards. With 1-in. boards, 30-in. size is suitable for columns 22x22 in. down to 11x11 in., etc.

*"Size of clamp" indicates length of clamp arm only. Does not mean size of column for which clamp is suitable.

Sample Clamp

The SYMONS CLAMP & MFG. Co. has never employed a road salesman, but on request, sends prepaid a sample clamp which speaks for itself in more convincing language than a salesman might command in telling about it. If not acquainted with this popular clamp, send a postcard at once. Procure a sample and a list of over 1000 contractors in this country who will testify as to its worth.

Immediate Shipment

Immediate shipment from stock at the following points: New York, Chicago, Minneapolis, Kansas City, San Francisco, Los Angeles, Seattle.

ANKYRA MANUFACTURING CO.

Manufacturers of Expansion Bolts

149 Berkley Street, Wayne Junction
PHILADELPHIA, PA.

Product

ANKYRA ANKOR (Expansion) BOLTS.

TRADE-MARK
(Reg. U. S. Pat. Off.)

Purpose

To provide a means of holding fixtures to *any* wall, whether hollow or solid, and so holding them that they shall never come loose.

Uses

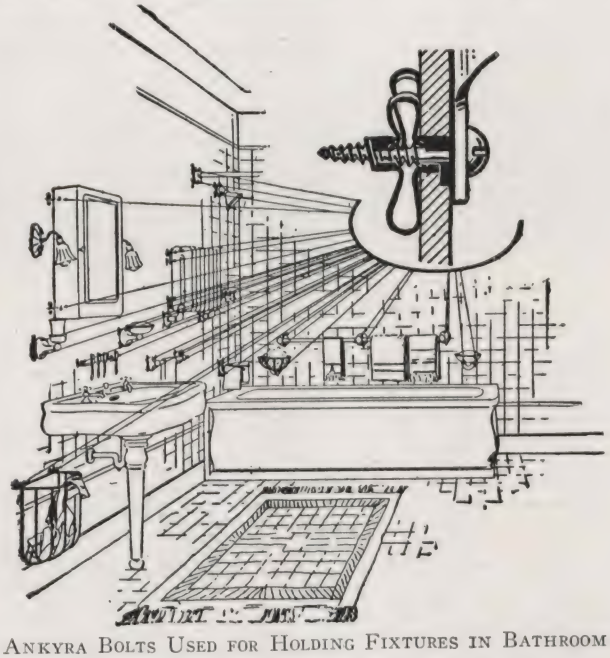
The uses for Ankyra Ankor Bolts are too many to permit of more than a description of typical cases.

Ankyra Ankor Bolts will fasten fixtures to lath and plaster, hollow tile, glazed tile, expanded metal lath, compoboard, sheet metal, brick or concrete walls—in fact they may be used in any sort of wall with assurance that the fixture will "stay put," and yet that it may be removed and replaced at will, if alterations or renewals are necessary.

The illustrations show some uses; but a booklet giving detailed information will be mailed on request.

Other Advantages

Unlike wooden or lead plugs which are prone to loosen quickly because they dry out or are so soft that the threads wear out rapidly, Ankyra Ankor Bolts remain in the wall—rivet themselves in it—and, being made of steel, last indefinitely.



ANKYRA BOLTS USED FOR HOLDING FIXTURES IN BATHROOM

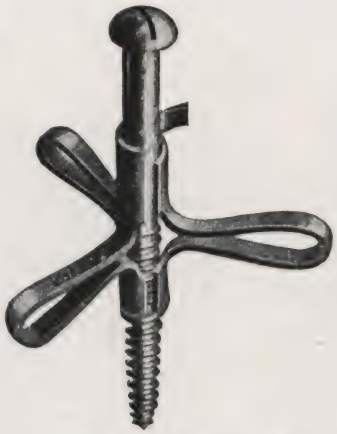
Tests show that Ankyra Ankor Bolts will support a greater load than can be carried on any hollow wall regularly used on standard construction.

(1) The Ankyra sleeve is a self-riveting wing nut.

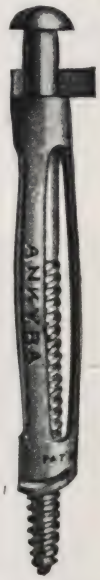
(2) Ankyras can be installed so quickly that the labor and time saved is an exceedingly important factor. Contractors and plumbers have reported that they saved as much as 90% over ordinary methods.

(3) Ankyras obviate the necessity of sounding for studding or making previous provision during construction for the location of fixtures.

(4) The fixture may be removed by taking out screw, but Ankyra nut will not drop down inside of wall as it is an integral part of sleeve or bolt.



ANKYRA BOLT EXPANDED
Note wood screw
Self-riveting; self-adjusting



ANKYRA BOLT WITH
WOOD SCREW
BEFORE EXPANSION

(5) Ordinary standard wood screws are used with Ankyra and may be selected to match other hardware.

(6) Ankyras will hold until the wall itself gives way.

(7) The alignment of grounds can be controlled regardless of irregularities in the face of the wall.

(8) Ankyras are easily and quickly installed.

(9) The solution to many especially vexing problems.

Fastening wall radiators to nearly any kind of wall, but more particularly to tile walls, is usually a ticklish proposition. Ankyras hold the radiator hooks firmly to any kind of wall and are easy to install, as well as permanent.

Bathroom fixtures—especially in public places—break loose with annoying and expensive frequency. The remedy lies in Ankyras which not only hold permanently, but can be used without fear of cracking or breaking the tile.

WALL RADIATOR
PLACED ON TILE
WALL

References

Hundreds of thousands Ankyra Ankor Bolts have been used in many of the largest and best known buildings in this country and Canada. Among them are:

The Woolworth, Metropolitan, Equitable and Widener Buildings; Massachusetts Institute of Technology; the Ritz-Carlton, Bellevue-Stratford and Marlborough-Blenheim Hotels; Detroit Free Library.

PAUL MENDE

INCORPORATED

132 East 44th Street

NEW YORK, N. Y.

"NALECODE"

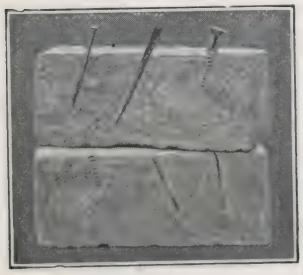
TRADE-MARK

Product

MENDE'S NALECODE, a Nailing Concrete made of indestructible minerals.

Description

Nalecode is a compound of powdered and fibrous minerals, which, when mixed with portland cement, sand and water, makes a plastic mortar that sets and forms a tough, elastic mass filled with air cells, into which nails or screws can be driven as readily as into wood. It is made entirely of minerals, and contains no cinders, which generate destructive sulphuric acid fumes. It contains no sawdust, wood chips, vegetable matter, gypsum, lime or other chemically active matter. It will not disintegrate nor lose its nailing properties, and is absolutely verminproof. It prevents condensation, because it is a poor conductor of heat.



SECTION THROUGH NALECODE

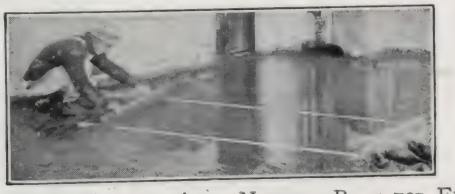
Nalecode weighs and costs less than concrete. It eliminates the short-lived wooden sleepers, fill and underflooring, affecting a considerable saving in cost.

Mixing and Applying

Nalecode compound is shipped in neat form, and on the job it is mixed with portland cement, sand and water in accordance with directions furnished by the manufacturers. The method for mixing and applying Nalecode is the same as ordinary cement mortar or concrete. Nalecode is slower setting than concrete, however in two or three days after it is laid, it can be walked upon and will not interfere with other operations in the course of construction.

Installation Data

For Floors—A 2-in. layer of Nalecode is laid on the structural slab or arch of floors to form a nailing base. Where a wood finish flooring is specified, Nalecode takes the place of underflooring, wood sleepers and cinder fill.



NALECODE BEING APPLIED AS A NAILING BASE FOR FINISH FLOORING

For Roofs—A 2-in. layer of Nalecode, on a reinforced concrete slab, book tile or other structural slab, makes a perfect and permanent base for nailing finish roofings, thus eliminating wood sleepers, fill and sheathing.

Nalecode Structural Roof Slab—A Nalecode structural slab for roofs offers great advantages. It weighs 75 lbs. per cu. ft.; provides a perfect nailing base for all kinds of finish roofings; is a good insulator, preventing condensation. Specifications, tables and tests furnished on request.

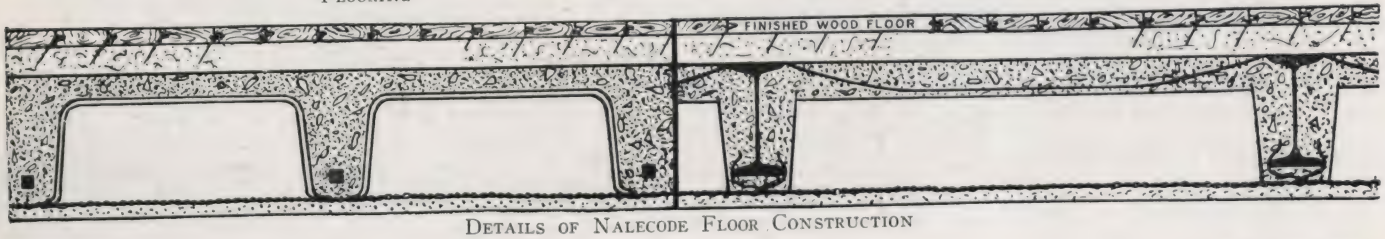
NALECODE STRUCTURAL ROOF SLAB
Rosary College, River Forest, Ill.
Installed by H. J. Baker Co., Chicago, Ill.

For Reinforced Solid Partitions—A 1-in. coat of Nalecode, applied to either side of reinforced metal, makes a 2-in. solid partition, to which all trim can be readily nailed without furring strips. A Nalecode partition deadens sound and is fireproof.

References

New York, N. Y.—Cass Gilbert; Donn Barber; Ernest Flagg; Ludowici-Celadon Co.; Board of Education; Westinghouse, Church, Kerr & Co.; Wm. Welles Bosworth; Electus D. Litchfield; Kenneth M. Murchison; McKim, Mead & White
Washington, D. C.—U. S. Government, Yards and Docks Department: various buildings throughout the United States.
Albany, N. Y.—Alexander Selkirk; Public Works Commissioner; L. F. Pilcher, State Architect
Philadelphia, Pa.—Horace Trumbauer; Arthur H. Brockie
Springfield, Mass.—McClintock & Craig
Trenton, N. J.—Board of Education
Pittsburgh, Pa.—S. Diescher & Sons Co.
Detroit, Mich.—Essylstyn, Murphy & Hanford
Boston, Mass.—Massachusetts State Architect
Kansas City, Mo.—Wight & Wight
Chicago, Ill.—New Immaculate High School
Indianapolis, Ind.—Westinghouse Lamp Co.
St. Louis, Mo.—Wrought Iron Range Co.
Cumberland, Md.—Kelly-Springfield Tire Co.
Pittsburgh, Pa.—Hunt Armory, W. G. Wilkins Co., Architects
Denver, Colo.—Byers Junior High School; Presbyterian Hospital
Fargo, N. D.—Roosevelt School
Missoula, Mont.—State Library
Olympia, Wash.—Capitol Building

Names of many others on request.



DETAILS OF NALECODE FLOOR CONSTRUCTION

Continued on next page

BUILDINGS IN WHICH NALECODE HAS BEEN INSTALLED

DETROIT PUBLIC LIBRARY, DETROIT, MICH.
CASS GILBERT, Architect
GEO. A. FULLER CO., General Contractors

UNIVERSITY OF TEXAS, AUSTIN, TEX.
CASS GILBERT, Architect
JAMES A. STEWART & CO., General Contractors

KIEFER BUILDING, DETROIT, MICH.
SMITH, HINCHMAN & GRYLLS, Architects
GEO. A. FULLER CO., General Contractors

CHRIST CHURCH CATHEDRAL, ST. LOUIS, MO.
JAS. P. JAMIESON, Architect
HINCHMAN-RENTON CONSTRUCTION CO., Contractors

APARTMENT HOUSE, 950 PARK AVENUE, NEW YORK, N. Y.
J. E. R. CARPENTER, Architect and Builder

CLUETT-PEABODY & CO., INC., TROY, N. Y.
WESTINGHOUSE CHURCH KERR CO., Engineers and Contractors

PUBLIC SCHOOL NO. 61, NEW YORK, N. Y.
C. B. J. SNYDER, Architect
THOS. DWYER, New York, N. Y., General Contractor

THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete

101 Park Avenue

NEW YORK, N. Y.

Products

NAILCRETE (A Nailing Concrete. Patented. Name registered).

"NAPPERS" (Little Sleepers made of NAILCRETE. Patents allowed. Name registered).

Nailcrete

PATENTED-NAME REG.

Nailcrete, a Nailing Base

Nailcrete is well known to architects and contractors as a patented cementitious mixture especially suitable as a nailing base for floors, roof coverings of various kinds, etc.

As Nailcrete is used without sleepers and without underflooring or sheathing, it is both cheaper and more durable than the ordinary construction with cinder fill.

Nailcrete is made after different formulæ giving varying degrees of strength, tenacity and fineness of texture, as may be required for its different uses. Complete instructions accompany each shipment. Manufactured under United States, Canadian and foreign patents. *In successful commercial use over ten years,* following four years of laboratory tests in connection with researches in economic construction conducted by Grosvenor Atterbury, Architect, for the Russell Sage Foundation. Always specify Nailcrete by name.

"Nappers" (Little Sleepers), a Fireproof Substitute for Wood Sleepers

Small precast reinforced sleepers of a Nailcrete mixture, 31 in. long, 3 in. wide on top, 4 in. wide on the bottom and 2 in. thick with sloping sides. A "Napper" weighs about 12 lbs., or, say, 5 lbs. to the running foot.

Comparative Advantages of Different Forms of Nailcrete

Nailcrete made with portland cement, sand and cinders is cheaper, lighter and slightly stronger than Nailcrete made with portland cement and sand. For floors not requiring cinder fill, "Nappers" will usually be the most economical form of Nailcrete. They bring practically no water into the building, and the wood floor may be laid 48 hours after the "Nappers" are in place. "Nappers" can not be used under parquet floor without a wood underfloor, but a parquet floor can be nailed directly on Nailcrete without a wood underfloor.

Nailcrete neat is regularly supplied in bags containing in each case the correct quantity for the mix used. The Nailcrete completely mixed, except for the cement, will be supplied, if desired.

NAILCRETE USED ON ROOF OF THE TOWER OF FOREST HILLS INN, L. I.

Nailing strips for tile rotted out in four years. Tile was removed and Nailcrete applied, making a permanent and practically indestructible nailing base for the tile. This roof has a pitch of 72°

Uses of Nailcrete

(1) **Subfloor**—As a subfloor 2 in. thick, weighing 13.4 lbs. per sq. ft., Nailcrete is laid directly on top of the structural slab or floor arch in place of short-lived wood sleepers, the cinder fill between sleepers and the wood underfloor. Nailcrete is also used under cork tile, linoleum, etc., giving to the floor in such cases greater resiliency, and making it more impervious to sound.

(2) **Reinforced Floor Slabs for Metal Lumber**—Nailcrete can be used 2 in. thick on top of metal lath placed on metal lumber floor beams. In this case the Nailcrete acts as the floor slab and as a nailing base for the finish wood floor.

(3) **Roof Coating**—This is usually 1½ in. thick on top of sloping roof slabs as a nailing base for tile, slate, shingles, etc., in place of wood nailing strips, the fill between strips and the sheathing.

(4) **Reinforced Sloping Roof Slab**—A poured-in-place construction on rafters of steel, metal-lumber, or wood.

(5) **Nailing Strips**—These are laid around rooms in hotels, etc., as a nailing base for carpets.

(6) **Mortar**—For laying up terra cotta partition and furring blocks, Nailcrete affords perfect nailing in every joint without wood plugs, etc.

(7) **Plaster**—For plastering the exterior of pent house walls, skylight curbs, etc., to receive the sheet metal covering.

(8) **"Nappers" Made of Nailcrete**—Used in place of wood sleepers. Quickly and easily set in cement mortar to a true level without clipping and bracing.

"Nappers" are especially recommended under wood floors in basements. Because of the mechanical key (a patented feature) on the under side, "Nappers" can never work loose from the mortar bed.

Cinder concrete is unnecessary with "Nappers," as fire drafts and vermin can be checked by means of two cross rows of "Nappers" laid at the ends of the bearing rows and, in large areas, intermediately every 20 ft. or so.

Qualities and Physical Properties

Nailcrete and Nailcrete "Nappers" are absolutely fireproof, and are unaffected by dampness; never rot, shrink, nor swell; hold nails better than white pine, retain their nailability, and do not affect any metal embedded in them.

Nailcrete deadens sound, and is a poor conductor of heat.

Nailcrete's Co-efficient of Expansion, Setting and Drying Periods—These are substantially the same as those of cinder concrete. It calls for the same precautions against freezing, quick drying, etc., as are necessary with ordinary concrete.

Weight of Nailcrete—

Per cu. ft. ..... 80 lbs.
(25% less than weight of 1:3:6 cinder concrete)

Per sq. ft.
1 in. thick (plaster) ..... 6.7 lbs.
1½ in. thick (roof covering) ..... 10 lbs.
2 in. thick (subfloor) ..... 13.4 lbs.
3 in. thick (roof slab) ..... 20 lbs.
3½ in. thick (roof slab) ..... 23.4 lbs.
4 in. thick (roof slab) ..... 26.8 lbs.

Weight of Nailcrete "Nappers"—

Each "Napper" (31 in. long), about ..... 12 lbs.
Per running foot, say ..... 5 lbs.
Per sq. ft. of floor area:
"Nappers" spaced 12 in. on centers ..... 5 lbs.
"Nappers" spaced 14 in. on centers ..... 4.2 lbs.
"Nappers" spaced 16 in. on centers ..... 3.6 lbs.
(One quarter of weight of sleepers and cinder fill)

Strength (See Tests)—Nailcrete has slightly greater compressive strength than 1:3:6 cinder concrete.

Nailcrete gives a greater nail-pull than white pine.

Cost

Of Nailcrete or of "Nappers" in place is less than cost of good wood-sleeper-and-cinder-concrete-fill construction.

Tests and Analysis

Made by Central Testing Laboratory for New York City before installation of Nailcrete in New York City Hall.

NO. 30522-A AND B—APRIL 3, 1918

	30522-A Nailcrete made with cinders	30522-B Nailcrete made with sand	White pine
Nail holding power (lbs. resistance to drawing):			
a—8d floor nails, depth 1 in.	165	163	106
b—8d floor nails, depth 1½ in.	320	260	210
Crushing strength (ultimate compressive strength in lbs. per sq. in.)	855	731	.....
Chemical Composition:			
Loss on ignition (moisture and volatile matter)	.....	8.25%	.....
Loss on ignition (moisture volatile and organic matter)	16.50%	.....	.....
Chlorides	Trace	Trace	.....
Sulphates as SO_3	0.30	0.28	.....
Iron and aluminum oxides	5.60	7.50	.....
Magnesium oxide	1.05	1.11	.....
Calcium oxide	11.26	10.26	.....
Insoluble matter (silica and silicates)	65.29	72.60	.....
Wood filler	None	None	.....
Water soluble material	1.65	2.10	.....

* * *

Judging from the chemical analysis, it would appear that the materials will not deteriorate copper, or any other metal embedded therein.

* * * *

Otto H. Klein,
Director of Laboratory.

Specifications for Nailcrete

Materials—Nailcrete shall be made with portland cement and sand, or with portland cement, sand and cinders, strictly in accordance with the specifications of the manufacturer for its various uses. All sand shall be sharp, clean and screened through ¼-in. mesh. All cinders shall be screened through ⅜-in. mesh.

Preparatory Work—Immediately before Nailcrete is laid, or Nailcrete "Nappers" are put in place, the surface to be covered shall be swept broom-clean and properly sprinkled.

Setting—All Nailcrete shall be allowed to set properly before being walked on.

Note: Ordinarily 2 days in summer, and 3 days in winter.

Nailcrete Subfloors—On structural floor construction Nailcrete shall be laid 2 in. thick, and screeded, and if necessary, troweled, to a level.

Note: For high class work, specify (under the heading of Carpentry) one layer of tarred paper (not less than 2-ply), additional deadening felt, if desired, and the finish wood flooring to be used.

The flooring is to be laid only after the Nailcrete has thoroughly dried out.

On Metal Lumber Beams—Cover the floors of rooms, etc. (specify which ones are to be covered), with metal lath secured directly to the beams (not over 2 ft. apart), and on top of the metal lath put a bed of Nailcrete not less than 2 in. thick at the thinnest point, screeded level to receive the finish flooring specified under Carpentry.

Note: In high class work specify paper as above.
Even in work of the highest class under-flooring is unnecessary.

Nailcrete Roof Coating—The structural roof construction shall be covered with 1½ in. of Nailcrete.

Note: If slate are thicker than ¾ in., consult THE NAILCRETE CORPORATION as to the thickness of the Nailcrete.

Reinforced Sloping Roof Slabs—Cover the steel rafters with self-centering or ribbed lath (as per specifications of the manufacturers), and on top of the lath apply Nailcrete .... in. thick. (See Table of Safe Loads.)

Nailing Strips for Carpets, Rugs, etc.—On top of the rough concrete fill, lay a strip of Nailcrete entirely around all edges of (specify all rooms, halls, etc., where desired), of such thickness as will bring Nailcrete to level of finished cement floor.

This strip is to be troweled smooth and level with the portland cement floor finish.

Mortar—Nailcrete mortar shall be used for laying up the terra cotta block walls and partitions in (state where it is to be used).

Plaster—Plaster the exterior of pent house walls, skylight curbs, etc., with Nailcrete plaster 1 in. thick in two coats, scratch and finish, troweled (or floated) true and even.

Note: If the Nailcrete plaster is to be applied to gypsum blocks, the blocks should be covered first with proper bonding material, and the Nailcrete is then to be applied while the bonding material is still tacky.

Specifications for Nailcrete "Nappers" (Little Sleepers)

Nailcrete "Nappers" laid in a bed of portland cement mortar, ... in. on centers, to a true level will be required in (state the rooms, etc., where required). Lay a cross row of "Nappers" at each end of the bearing rows, as fire stops; and also lay such intermediate rows as may be needed to make the spacing of these fire stops not more than 20 ft. at any point.

Patents

It is the belief of this company that its patents cover the only practical and feasible concrete material for nailing purposes; and that all other mixtures of the cementitious nature adapted to receive nails are infringements of these patents.

Safe Loads

ROOF SLABS—TOTAL SAFE LOAD PER SQUARE FOOT
(Exclusive of weight of slab)

Cross-sectional area of steel, sq. inches, per sq. ft. of slab	Thickness of Nailcrete above steel, in.	SPAN IN FEET								
		4	4½	5	5½	6	6½	7	7½	8
.174	3	280	216	171	138	113	93	77	65	54
	3½	362	281	223	180	148	122	102	85	72
	4	458	355	283	231	189	156	131	110	84
.239	3	310	241	192	155	127	105	88	74	61
	3½	403	314	250	202	166	138	116	98	83
	4	479	373	297	241	198	165	138	117	100
.281	3	325	252	201	162	133	111	93	78	64
	3½	428	332	265	214	177	147	124	105	89
	4	538	420	335	272	225	187	158	134	114

Supervision

Where practicable, THE NAILCRETE CORPORATION will send a representative to the job without expense to the owner, to instruct users in the proper installation of Nailcrete.

Continued on next page

References

35% of all orders have been re-orders.

Grosvenor Atterbury, New York—Executive offices, Sage Foundation Homes Co., Forest Hills, N. Y., floors. 40 dwellings built in last 10 years for Sage Foundation Homes Co., Forest Hills, floors and roofs. Forest Hills Inn roof. Fabbri residence, New York, floors. New York City Hall, roof and cupola. Gould residence, New York, "Nappers" for floors; Bloomingdale Hospital, Occupation Building floors.

Grosvenor Atterbury and Stowe Phelps, Associate Architects, New York—First Presbyterian Church, New York, roof coating under copper roof.

Bessell and Goodwillie, New York—School No. 1, Great Neck, N. Y., floors. School No. 2, Great Neck, floors.

Roger H. Bullard, New York—Oakland Golf Club, Bayside, N. Y., floors.

Henry Barret Crosby, New York—School No. 13, Clifton, N. J., "Nappers" for floors. School No. 6, Paterson, N. J., floors.

Cross & Cross, New York—Tryor residence, Greenwich, Conn., floors. Chas. Sabin Residence, Southampton, N. Y., floors.

Cass Gilbert, New York—Annex to U. S. Treasury Building, Washington, D. C., floors and roof.

Bertram Goodhue, New York—Aldred Residence, Glen Cove, N. Y., roof. St. Bartholomew's Church, New York, roof slabs.

Frank Goodwillie, New York—Globe Indemnity Building, Newark, N. J., floors.

Philip Goodwin, New York—Apartment house, New York, floors. Goodwin Residence, Syosset, N. Y., "Nappers" for floors.

Helmle & Corbett, Brooklyn, N. Y.—Nurses' Home, Kings County Hospital, Brooklyn, floors.

Howells and Stokes, New York—John Sherman Hoyt Residence, New York, floors.

Hunt & Hunt, New York—Sanderson Residence, Oyster Bay, N. Y., roof.

Frederick P. Kelley, New York—Day Nursery, Bethlehem, Pa., floors. Settlement House, Friendly Aid Society, New York, floors.

Robert D. Kohn, New York—Macy Warehouse, New York, floors.

E. A. Kunze—Central R. R. of New Jersey station at Newark, N. J., floors.

Lockwood, Greene Co., New York—Cotton mill, Reading, Pa., floors.

Mann & MacNeille, New York—Wells Residence, Vt., floors. Porter Residence, Scarsdale, N. Y., floors. Freeman Residence, New York, floors. Hendrix Residence, Larchmont, N. Y., floors. Community House, Tremont, Mich., floors.

E. S. Masqueray, St. Paul, Minn.—Sioux Falls Cathedral, Sioux Falls, S. D., roof.

Otto G. Simonson, Baltimore, Md.—Administration Building of Maryland Casualty Co., Baltimore, roof slabs of belfry towers.

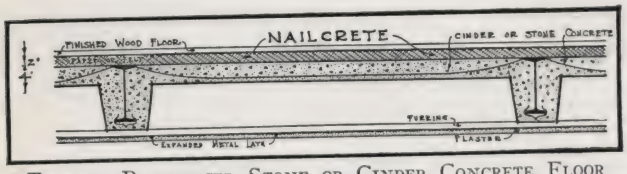
Louis Sonntag, Acting Architect, Board of Education, Newark, N. J.—Oliver Street School, floors. Madison Avenue School, floors.

C. B. J. Snyder, Architect, Board of Education, New York—Floors in Schools Nos. 26, 38, 60, 136 and in Bryant High School. School 130, roof slabs.

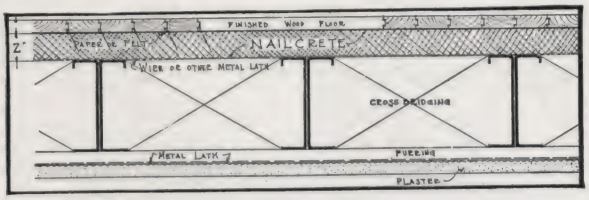
J. K. Turton, New York—Factory, Long Island City, N. Y., floors.

U. S. Government Architect—U. S. Treasury Building, Washington, D. C., roof coating.

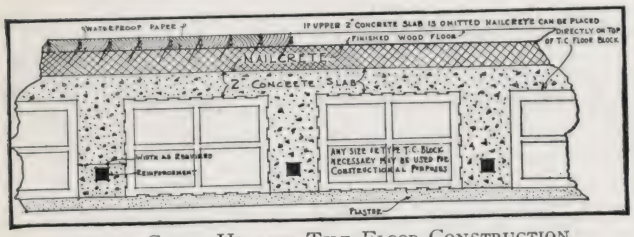
Nailcrete has been specified for use under cement finish and linoleum throughout in Federal Reserve Bank, Minneapolis, Cass Gilbert, Architect; and for floors and sloping roof of American wing of Metropolitan Museum, New York, N. Y., Grosvenor Atterbury, Architect.



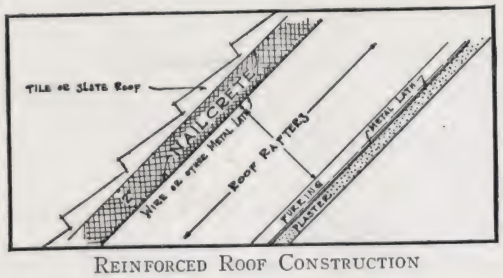
Typical Reinforced Stone or Cinder Concrete Floor Construction



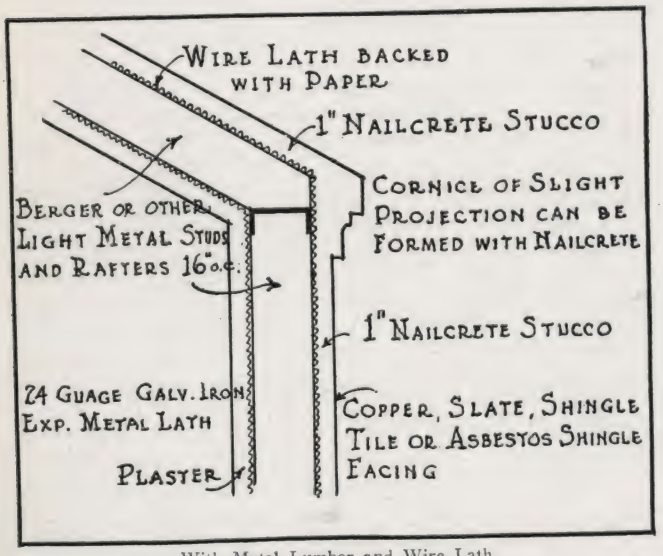
Metal Lumber Floor Construction



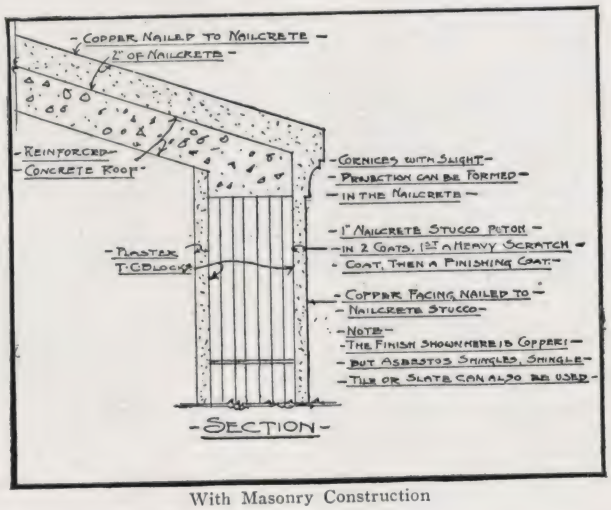
Terra Cotta Hollow Tile Floor Construction



Reinforced Roof Construction



With Metal Lumber and Wire Lath



With Masonry Construction

Typical Pent House Wall and Roof Construction

FLEX-OR-CRETE CORPORATION

Manufacturers of Fireproof Nailing Concrete

Earle Street, Somerville
BOSTON, (42), MASS.

TRADE MARK
FLEX-OR-CRETE
REGISTERED

Products

FLEX-OR-CRETE, a NAILING CONCRETE for Fireproof Sound Deadening Subfloors and Fireproof Subroofs.

Owners of United States and Foreign patents.

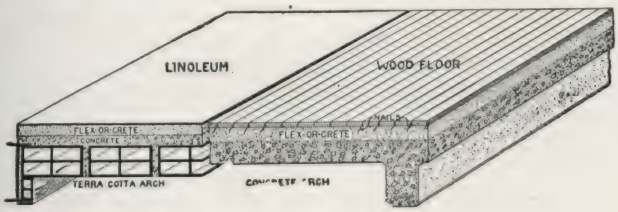
Material

FLEX-OR-CRETE is a high grade, patented, fireproof nailing concrete of light weight and great compressive strength; it is a non-conductor of sound and heat, is non-corrosive and permanently retains all of its qualities.

Uses

FLEX-OR-CRETE is particularly suited for use as a subfloor or subroof and receives directly—nailed, screwed, glued or cemented—any surfacing, including wood, tile, slate, linoleum, etc., and grips against removal with greater resistance than wood.

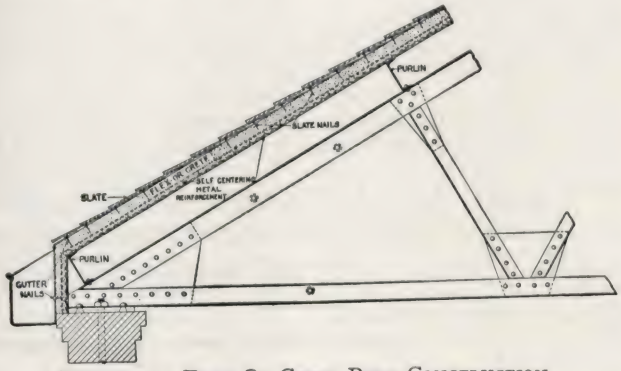
FLEX-OR-CRETE subfloors covered with linoleum produce a silent, resilient and non-fatiguing floor especially suited to hospitals, business offices and educational buildings.



DETAILS OF FLEX-OR-CRETE FLOOR CONSTRUCTION

Shipping and Applying

FLEX-OR-CRETE is supplied in bags completely prepared, ready for use with the addition of water only; it is mixed in the usual concrete mixer to the consistency of mortar of good body; the base to which it is applied should be properly roughened, wetted, and grouted to secure a perfect bond; when applied, it is simply screeded to a level surface and, except in special applications, requires no float or trowel finish. One ton (2000 lbs.) covers 320 sq. ft. 1 in. in thickness.



DETAILS OF FLEX-OR-CRETE ROOF CONSTRUCTION

A pamphlet describing FLEX-OR-CRETE, its uses and method of application, will be forwarded upon request.

Flex-Or-Crete Tests

The following are the results of tests, reported February 15, 1921, by the Underwriters' Laboratories of the National Board of Fire Underwriters:

Fire Test—"The results obtained during the tests indicate that when properly reinforced and proportioned, slabs of this material (FLEX-OR-CRETE) are capable of sustaining their full figured safe working loads for long periods under exposure to severe fire."

Bonding Test—"Efforts to detach the FLEX-OR-CRETE facing from the concrete block sample produced fractures extending well into the concrete."

Nailing Test—"The tests indicate that nails can be driven into FLEX-OR-CRETE regardless of its age, and show that this material will serve as a nailing base and will make the use of grounds and nailing strips unnecessary."

FLEX-OR-CRETE is the first, and at present the only, material for fire resistive subflooring listed by the Underwriters' Laboratories of the National Board of Fire Underwriters.

SAFE UNIFORMLY DISTRIBUTED LIVE LOADS IN POUNDS PER SQUARE FOOT ON FLEX-OR-CRETE SLABS
Weight, 84 lbs. per cu. ft.

Thickness of FLEX-OR-CRETE above mesh, in.	Span								
	4′0″	4′6″	5′0″	5′6″	6′0″	6′6″	7′0″	7′6″	8′0″
2	110	87	70	58	49	41	.....	.....	.....
2½	138	109	88	71	60	52	44	.....	.....
3	168	132	105	84	67	57	49	43	38
3½	178	141	112	91	73	63	55	48	42
4	194	155	130	111	96	83	76	71	67
5	222	186	162	137	119	104	95	88	83
3	210	with 0.164 sq. in. steel per foot width.							
4	330	with 0.219 sq. in. steel per foot width.							

Except where otherwise noted, this table is to be used with 0.137 sq. in. of steel per foot width.

Flex-Or-Crete Applications

Rockefeller Institute for Medical Research, New York, N. Y., Coolidge & Shattuck, Architects
Liberal Arts Building, Wellesley College, Wellesley, Mass., Day & Klauder, Architects
Massachusetts Institute of Technology, Boston, Mass., Wm. W. Bosworth, Architect
Canadian Hospital for Insane, Whitby, Ont., James Govan, Architect
Sandusky Hospital, Sandusky, Ohio, E. F. Stevens, Architect
Norfolk County Hospital, Braintree, Mass., H. Kellogg, Architect
Northeast School, Hartford, Conn., Whiton & McMahon, Architects
Oliver School, Lawrence, Mass., James E. Allen, Architect
Belmont High School, Belmont, Mass., Brainard & Leeds, Architects
Embankment Trust Apartments, Boston, Mass., Coolidge & Carlson, Architects
New Haven Music School, New Haven, Conn., Coolidge & Shattuck, Architects
Public Garden Apartments, Boston, Mass., H. Van B. Magonigle, Architect
Munsell Residence, Brookline, Mass., Putnam & Cox, Architects
Alexander Porter Residence, Magnolia, Mass., Charles B. Baker, Architect
Parliament Buildings, Ottawa, Can., John A. Pearson, Architect
United States Post Office, Boston, Mass., James McLaughlin, Architect
Forbes & Wallace Department Stores, Springfield, Mass., Kirkham & Partlett, Architects
Watertown Arsenal Buildings, Boston, Mass., U. S. Government

ESTABLISHED 1895

THE ANTIHYDRINE COMPANY

308 Washington Building

NEW HAVEN, CONN.

Products

Manufacturers of ANTIHYDRINE, a Coating for Dampproofing and Stainproofing.

Description

Antihydrine is a material made of a high grade of asphalt carefully prepared in combination with several chemicals, which combination gives it the peculiar property of *forming (without heating) a continuous glossy and impervious coating upon porous surfaces, without penetration.*

Antihydrine is the pioneer dampproof paint, having been first made in 1895. *There has been no subsequent change in formula.*

Advantageous Features

(1) Antihydrine eliminates the necessity of using lath and wood furring for interior plastering of outside walls, plastering being applied over the Antihydrine within 24 hours.

(2) Renders walls dampproof.

(3) Prevents staining of plastering on walls and on fireproof work; also, the following:

Applied to Inside of Outside Walls—(4) No furring needed—cost of, and space occupied by furring are saved.

(5) Dangerous places to harbor vermin and encourage fires (when wood furring is used) are eliminated.

(6) Outside walls are made absolutely dampproof.

(7) Building is made warmer and more easily heated.

(8) All staining of and efflorescences on plastering are avoided.

Applied to Fireproof Blocks in Ceilings and Partitions—(9) All staining and efflorescence prevented.

(10) Plastering on blocks dries quickly, saving much time.

(11) All plastered surfaces permit diversified decoration without danger of damages from dampness.

(12) Discoloration of plastering from smoky brick is prevented.

Applied to Built-in Surfaces of Iron, Limestone, Marble, Face Brick, etc.—(13) All ironwork built in wall is preserved.

(14) Staining and efflorescence on exterior of limestone, marble and brick are prevented.

(15) Use of *ordinary* cement mortar in the backing is allowed, thus saving time and money otherwise spent in preparation of expensive cement mortar.

Application

After being well stirred, the Antihydrine contents are poured into a pail and any laborer can apply same *cold* with a brush. Material is fully prepared, ready for use, and is applied as easily as whitewash; *the coating, however, must be kept absolutely continuous, covering every part.* A second coat can be applied, if desirable, within a few hours after the first application.

Covering Capacity

Extensive, by reason of its lack of penetration. 1 gal. covers about 100 sq. ft. of brickwork or fireproofing, 1 coat; or, 60 sq. ft., 2 coats; 1 coat, properly applied, is sufficient for the prevention of dampness and stains.

Shipment

Antihydrine is delivered in casks of 10 and 50 gals.

Cost

The cost of Antihydrine is $1.25 per gal.

Specification Data

The brush shall be the kind used for oiling brick fronts; contents of barrel to be thoroughly stirred before application; every part to be covered, leaving no small holes, etc.; coating to be thin where it is to be plastered over, with sufficient body to leave a glossy surface; and the Antihydrine to be soft or "tacky" when plastering is applied.

First coat of plastering, as thin as will allow of proper scratching, will dry quickly; second coat is applied immediately thereafter; after drying, third and last coat of plastering is applied when, after a few days, surface will be ready for painting and decorating.

References

A few buildings in which Antihydrine was used:

NEW YORK, N. Y.

American Museum of Natural History
Delmonico Building
St. James Building
Manhattan Hotel
Skin and Cancer Hospital
Home for Aged Men and Married Couples
Journeay Building
Public School Buildings
New York Hospital
New Hall of Board of Education
Commercial Academy of Marest Bros.
Clara Hirsch Home for Working Girls

OTHER CITIES

St. John's Home for Boys, Brooklyn, N. Y.
Brazer Building, Boston, Mass., Cass Gilbert, Architect
Masonic Temple, Boston, Mass., Loring & Phipps, Architects
Residence, Beacon St., Boston, Mass., R. Clipston Sturgis, Architect
Hotel Dartmouth, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
St. Joseph's Novitiate, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
Hotel Cambridge, Boston, Mass., W. T. Sears, Architect
Hall of Missions Church, Boston, Mass., T. J. Untersee, Architect

AQUABAR PRODUCTS COMPANY

Waterproofing Engineers and Contractors;
Manufacturers of Proofing Products

112 South 16th Street

PHILADELPHIA, PA.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

WATERPROOFING, ACIDPROOFING, ALKALIPROOFING, OILPROOFING and BRINEPROOFING COMPOUNDS.

Services

Research; designing; engineering and contracting as applied to all proofing problems.

AQUABAR

TRADE-MARK

Research Department

For sixteen years the Aquabar organization has been successfully solving proofing problems of every nature. Well equipped chemical and testing laboratories, directed by ranking men in their respective professions, enable us to offer our clients an unusually comprehensive research service.

The elimination of damaging water conditions is only one field covered by this Company. Many manufacturing concerns wish to protect their plants or products against certain chemical conditions. It is the business of this organization to advise and furnish the remedy in such cases.

Designing Department

There are many instances where apparently reputable products have failed to accomplish the results claimed for them. This is usually caused either by the selection of unsuitable products or by incorrect designing. This department may be consulted without charge at any time and will prepare suitable plans to guard against any unusual proofing conditions.

Contract Department

Many engineers or architects prefer that the actual proofing work be done by the manufacturer of the products used. For those who desire it, the Contract Department will apply Aquabar products or will erect those portions of structures where Aquabar products are used, either on a lump sum or cost-plus basis.

Construction work done by our Company is guaranteed to be satisfactory in every particular.

"Waterproof Specification Index and Guide"

To assist engineers and architects in selecting the proper methods and materials for waterproofing in building construction, this Company has edited a practical handbook, dealing with standard problems of this character. It will be sent on request.

Individual folders on each product are also available.

Aquabar Integral

An integral waterproofing for concrete, cement mortar and stucco. This product is composed of waterproofing elements which are in the cement itself.

Aquabar Plaster Bond and Dampproofing

A bituminous product of unusual elasticity and adhesiveness. It is applied with either a brush or spray and flows readily into the smallest cracks, forming an impervious dampproof film.

Aquabar Glascoat

A colorless liquid, applied with a brush or spray, for weatherproofing the exterior surfaces of masonry walls. This liquid does not change the texture nor discolor the surface.

Aquabar Lastic Paint

An elastic paint which will neither peel nor crack. It should be specified whether the paint is desired for use on concrete, wood, metal or asphalt coating.

Aquabar Floorlife

A colorless liquid for hardening and waterproofing the surfaces of concrete floors.

Aquabar Insulite

A black, plastic, waterproofing membrane which is extremely adhesive. It is applied with a trowel.

Aquabar Oilproofing

A coating for concrete tanks to protect them from crude oil or fuel oil.

Aquabar Weathershed Roofcoat

For renewing old, built-up, metal or composition roofs and as an overcoating for new roofs.

Aquabar Tankcoat

A heavy black coating for metal, concrete or wood tanks. It will neither crack nor peel and is impervious to both acids and alkalis.

Aquabar Canvascoat

A preparation in either white or khaki color for waterproofing canvas. It is fire resisting, will not crack nor rub off and does not stiffen the fabric. Applied with either brush or spray.

E. N. BIEGLER MFG. CO.

Waterproofing Compounds and Dampproof Paints, Plastic Cements and Floor Hardeners

GENERAL OFFICE AND FACTORY
2728-2740 North Rockwell Street and C. & N. W. R. R.
CHICAGO, ILL.

TELEPHONES
HUMBOLDT 0135, 0136

Products and Services

BIEGLER'S FOUNDATION WATERPROOF COATING No. 15.

EVERTITE PLASTIC CEMENT WATERPROOFING (No. 23 MASTIC).

BIEGLER'S PLASTER BOND DAMPPROOFING.

BIEGLER'S STONE BACKING PAINT.

CONTRACTS for WATERPROOFING and DAMPPROOFING executed anywhere in the United States.

Also manufacturers of Orinite Cement, Floor Hardener and E-N-B Cement Waterproof Compound.

For Biegler's Mas-Oleum Mastic and E-N-B Magnesite Composition Floors, see pages 416-417; for Biegler's Rubbertex Plastic Tile Flooring, see page 470.

TRADE-MARK

Biegler Service

As manufacturers and contractors in our line we can furnish estimates of cost of either material required or the work executed anywhere in the United States. We can remedy your troubles in this line and work entirely according to conditions existing on special waterproofing and floor problems. Materials furnished or contracts executed by us are fully guaranteed.

Specifications furnished gratis on any character of work in our line.

Approval and References

Biegler's products are recommended and specified by leading architects in the United States for the purposes intended. Our materials have been approved by the supervising architect at Washington, and by many other leading architects and engineers.

We can furnish unlimited references on some of the largest industrial plants on which our material has been successfully used. Among them are hundreds of government buildings throughout the United States, and the Armour abattoir at South St. Paul (Blome-Sinek Company, Chicago, contractors, and Robert Clark, Chicago, architect) on which we waterproofed, in 1917, floors and roof areas aggregating over 1,250,000 sq. ft.

Biegler's Foundation Waterproof Coating No. 15

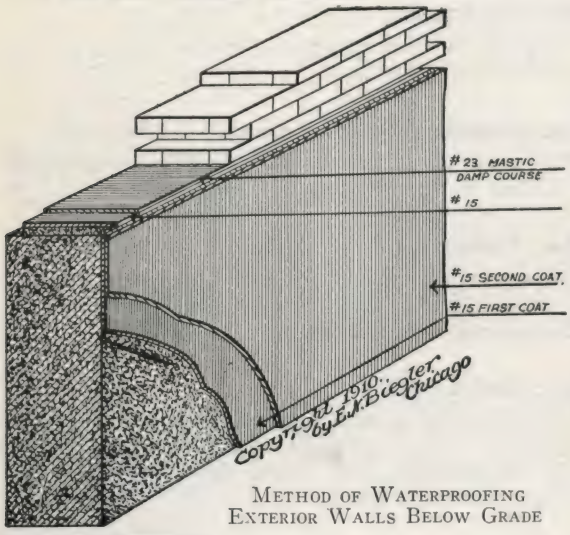
A bituminous compound of liquid consistency, ready for use, applied with a brush. Under ordinary conditions one or two coats will be sufficient. Covering capacity, 75 sq. ft. per gal. for each coat.

Where water pressure must be contended with and on top and sides of walls to prevent dampness entering building, apply extra coat of Biegler's Evertite Plastic Cement (No. 23 Mastic) over Liquid Coating No. 15.

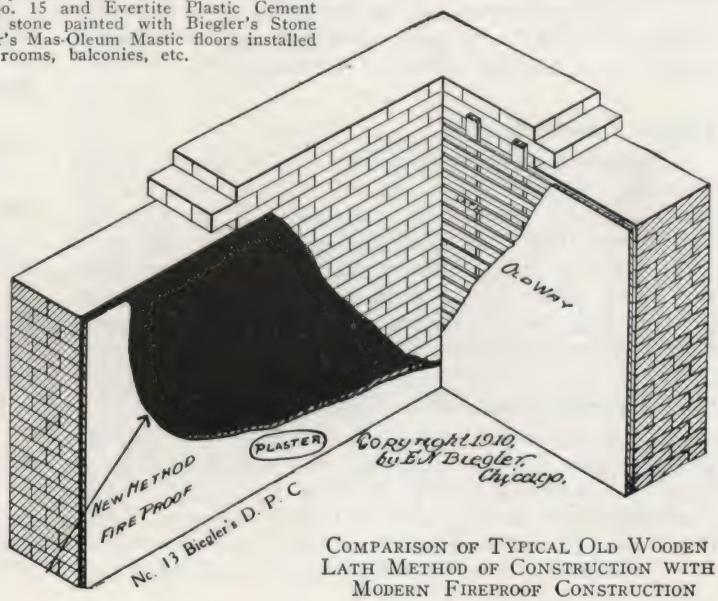
QUIGLEY PREPARATORY SEMINARY, CHICAGO, ILL.
ZACHARY DAVIS, Chicago, Architect
BLOME-SINEK CO., Chicago, General Contractors
All floors and walls below grade, including natatorium, in this edifice were waterproofed with Biegler's Foundation Waterproof Coating No. 15 and Evertite Plastic Cement (No. 23 Mastic). All stone painted with Biegler's Stone Backing Paint. Biegler's Mas-Oleum Mastic floors installed in gymnasium, locker rooms, balconies, etc.

Evertite Plastic Cement Waterproofing (No. 23 Mastic)

Manufactured ready for use, of plastic consistency. Applied with a plasterer's trowel. Will retain its elasticity under any earthy or climatic conditions. Covering capacity, approximately ½ lb. per sq. ft. for one-coat work. Can be applied over floors by using approximately ¾ lb. per sq. ft. Can also be used for many other purposes where a waterproof job is desired. Is practical for repairing leaks in foundations and basements, repairing skylights, chimneys,



METHOD OF WATERPROOFING EXTERIOR WALLS BELOW GRADE



COMPARISON OF TYPICAL OLD WOODEN LATH METHOD OF CONSTRUCTION WITH MODERN FIREPROOF CONSTRUCTION

Continued on next page

vent ducts, air shafts and composition roofing of any character. It expands and contracts with the surface to which it is applied. Can be used for lining vats, brine tanks, etc., and is absolutely acidproof and alkaliproof.

To get best results for plastic cement over common brick or tile foundations, it is preferable to use Liquid Coating No. 15 as a primer, then apply No. 23 Mastic, although mastic will itself apply readily to any surface.

CONWAY BUILDING, CHICAGO, ILL.
GRAHAM, ANDERSON, PROBST & WHITE, Chicago, Architects
Biegler's Plaster Bond Dampproofing applied on all exterior brick walls of this building

Biegler's Plaster Bond Dampproofing

A plaster key furnishing a perfect bond between plaster and brick, tile or concrete surface, resisting dampness, alkali and saltpeter. Furnished ready for use. Applied with a brush, one heavy coat and retouching. Covering capacity, approximately 75 sq. ft. per gal. A fireproof construction that saves space and is verminproof and much cheaper than wood lath and furring strips.

Biegler's Stone Backing Paint

When applied on unexposed surfaces of limestone, granite and all cut stone it will prevent stains or dampness from reaching face.

A heavy coat should be applied with a brush to all unexposed surfaces of stone at yard, and another coat at the job before stone is set, or apply paint to brick before stone is set. Material can be applied by any workman, as it comes ready for use. Covering capacity, 100 sq. ft. per gal. Positively acidproof, stainproof and alkaliproof.

METHOD OF APPLYING BIEGLER'S STONE BACKING PAINT

DRAKE HOTEL, CHICAGO, ILL.
MARSHALL & FOX, Chicago, Architects
All exterior walls in this building coated with Biegler's Stone Backing Paint

THE PHILIP CAREY COMPANY

Manufacturers of Waterproofing and Dampproofing Materials

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES
FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

CAREY PERCOPROOF DAMPPROOFING.
CAREY PREFORMED WATERPROOFING SYSTEM.
CAREY FABRICATED MEMBRANE.
CAREY NO. 66 SUBWAY ASPHALT.
CAREY FELTEX (Asphalt Saturated Felt).

Carey PRODUCTS
TRADE-MARK Registered

Also manufacturers of Carey Asphalt Primer, Carey Standard Membrane Waterproofing System, and Carey Anthracoil Wood Preservative.

For Expansion Joints, see page 495; for Built-up Roofing, see pages 876-879; for Asphalt Shingles, see page 907; for Pipe Coverings, see pages 1736-1737.

Experience and Facilities

For half a century this company has manufactured various waterproofing and dampproofing materials and has evolved improved methods for their successful application. The fact that these materials are today serving the purpose for which they were intended is definite and convincing proof of the reliability, permanence, economy, and satisfaction, which the users of Carey products know are their characteristics.

Carey Percoproof Dampproofing

Cost, covering capacity, efficiency, durability and safety attending the use of a dampproofing material are the vital factors governing its acceptance and use.

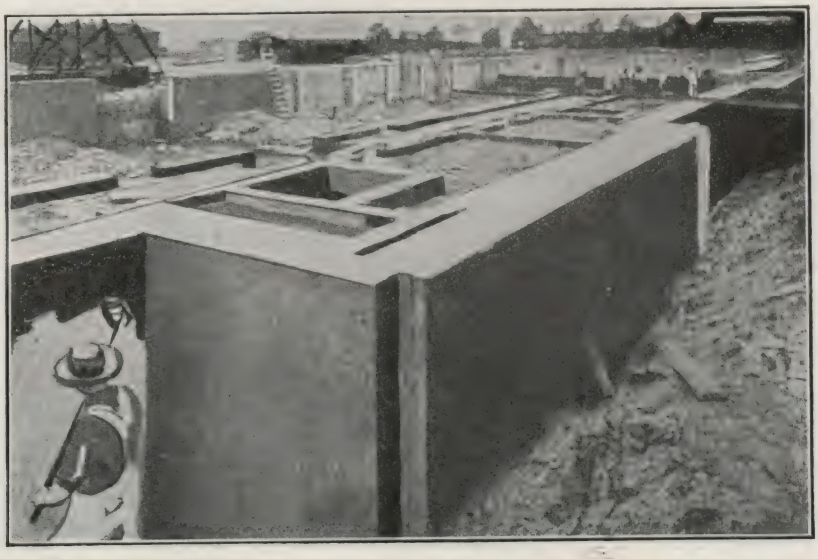
Percoproof, a liquid bituminous dampproofing compound, consists of a combination of high grade waterproofing materials, contains no animal or vegetable oils and is not saponified by alkalis or carbonized by acids. It comes ready for use and will cover approximately 100 sq. ft. per gal., depending largely on the condition of the surfaces treated.

Percoproof adheres to concrete, brick, stucco, plaster or tile, is designed for dampproofing only and should never be used on walls below grade line where hydrostatic pressures must be guarded against. It penetrates the pores of the materials providing an even, unbroken and elastic film which readily expands or contracts without cracking, flaking or peeling, perfectly insulating the interior of all walls from any evidence of dampness.

Specifications for Dampproofing Masonry Surfaces—All surfaces, particularly those below grade line, shall be absolutely dry, comparatively smooth and free of loose particles of foreign material.

Percoproof is applied with heavy brushes in an even uniform coating which is well rubbed into the pores of the surfaces treated. It is preferably applied to exterior surfaces, although satisfactory results are obtained when interior surfaces are coated. If the surfaces are very porous a second application is necessary to insure a heavy uniform layer of dampproofing.

Caution: No alteration, thinning or adulteration of Percoproof shall be made as the material is prepared in the correct consistency for use. In cold weather, Percoproof may be slightly heated, but never thinned with oil.



APPLYING PERCOPROOF TO FOUNDATION WALLS OF THE CINCINNATI GENERAL HOSPITAL

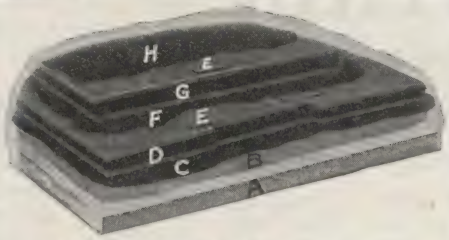
Continued on next page

Carey Preformed Membrane System of Waterproofing

The Carey preformed membrane system of waterproofing was developed from the well recognized need of providing an efficient volume of real waterproofing without the tremendously excessive labor cost incident to such construction by old methods of laboriously building up to the required thickness. Since asphalt, rather than felt is the real waterproofing material, a heavy body of asphaltic compound is interposed between two layers of asphalt saturated wool felt, combined to uniform thickness under tremendous mechanical pressure, providing a heavy barrier impenetrable to moisture and positively resistant to seepage.

It is made in standard sheets 3x5 ft., ¼ and ½ in. in thickness, furnished complete with all materials for installation.

Application—The concrete surface to be waterproofed should be finished hard and smooth, free from holes and loose particles of sand, cement or dirt. Coat the concrete with Carey Asphalt Primer applied cold and thoroughly brushed in. Mop the primed concrete with Carey No. 66 Subway Asphalt into which, while hot, embed 1 layer of Carey Preformed Membrane, butting joints tightly. The joints and surface of the preformed membrane should then be mopped with Carey No. 66 Subway Asphalt and a second layer of the preformed membrane embedded, so that the sheets break joint with the first course, after which all exposed joints are reinforced with a strip of Feltex and entire surface mopped with Carey No. 66 Subway Asphalt applied hot and evenly mopped to a uniform finish.



A-Concrete Surface to be waterproofed
B-Carey Asphalt Primer
C-Carey No. 66 Subway Asphalt
D-Carey Preformed Membrane
E-Feltex strips
F-Carey No. 66 Subway Asphalt
G-Carey Preformed Membrane
H-Carey No. 66 Subway Asphalt

CAREY PREFORMED MEMBRANE

Specifications — Detailed specifications suited to particular needs and conditions will be cheerfully and promply furnished on request.

Indorsement — Experienced engineers who have used this system on large and important work have pronounced it absolutely the most satisfactory and efficient ever installed.

Installations — The following installations are but a few representations of the type and characters which afford complete satisfaction to all users:

Cheswick Power Plant, Cheswick, Pa.
Harrison Water & Electric Co., Harrison, Ohio
Rapid Transit Subway Stations, Cincinnati, Ohio

WATERPROOFING UNDER TURBINE ROOM OF CHESWICK POWER COMPANY

Carey Fabricated Membrane

Carey Fabricated Membrane consists of a sheet of high grade asphalt saturated wool felt mechanically combined with asphalt to a layer of asphalt saturated and coated Calcutta burlap. Designed for use as a membranous layer in built-up waterproofing, its use affords a two-ply membrane with one less mopping of asphalt, thereby reducing the labor and expense of application. It embraces the desirable features of strength, flexibility and absolute water proofness. Furnished in rolls 36 in. wide and 36 ft. long weighing approximately 35 lbs. per roll.

Carey No. 66 Subway Asphalt

Carey No. 66 Subway Asphalt is a highly refined product, so tempered as to retain its flexibility and ductility under practically all temperature changes which the average waterproofing must withstand. Melting point is 175° Fahr. (over mercury) and especially designed to meet the requirements of waterproofing work.

Carey Feltex

Carey Feltex is a high grade wool felt, asphalt saturated, and is both odorless and waterproof. The method of saturation mats the fibers in the felt into one solid sheet, rendering it both tough and flexible. Used as a membranous layer in the built-up system of waterproofing by application in a hot asphaltic binder. Carey No. 66 Subway Asphalt or Carey Manco Asphalt are recommended for that purpose, as these materials are so manufactured as to be adaptable for use together.

Correspondence

Correspondence regardless of the size or character of any project or problem involving waterproofing or dampproofing is invited. The combined experience of our experts and engineers under varied conditions in all parts of the country affords a fund of information which is frequently of an invaluable character.

ESTABLISHED 1879

THE BILLINGS-CHAPIN CO.

Paints, Cement Coatings and Varnishes

438 Pearl Street
NEW YORK, N. Y.
TELEPHONE, WORTH 1354

1163 East 40th Street
CLEVELAND, OHIO
TELEPHONE, RANDOLPH 4675

146 High Street
BOSTON, MASS.
TELEPHONE, MAIN 4137

Products

Manufacturers of COATINGS, Transparent and Opaque; Waterproof, Decorative, and Protective, covering every department of EXTERIOR and INTERIOR treatment of surfaces—wood, stone, metal, cement, stucco, brick, plaster.

THE MARK OF QUALITY IN PAINTS AND VARNISHES
BILCHACO
TRADE-MARK

Clear Driwal for Cut Stone Application

Clear Driwal is a colorless liquid. It prevents the discoloration of stone by blocking the passage of staining elements, both from within and without. It does not change the natural appearance of the stone.

Driwal
TRADE-MARK

Specifications—*Preparation*—The stone shall be thoroughly clean and dry before Driwal is applied.

For Exterior Trim—All cut stone shall be given a saturating coat of Clear Driwal on all six sides.

For All-stone Structures—Before setting, a saturating coat of Clear Driwal shall be applied to both back and face of each unit of stone, allowing the brush to cover the edges of beds and builds to about 1 in. Cornice courses shall be treated on backs and faces, beds and builds, and on all areas extending out beyond the wall line. Copings shall be treated on all 6 sides.

Driwal for Cement, Stucco, Brick or Plaster

Driwal waterproofs and preserves, without impairing the texture of the surface. It is made in 12 colors which conceal stains already present and prevent further discoloration, as well as keep out dampness.

Driwal does not lay on the surface, hence it can not blister or peel if properly applied. It penetrates, tints and preserves.

Black Driwal for Underground Work

Unlike tar, Black Driwal will not become brittle and may be applied without heating. It is made in 3 consistencies: No. 1, Standard Body; No. 2, Extra Heavy, especially desirable on rough work; No. 3, Paste, for filling cracks and crevices.

Bilchaco Cement Floor Coating

An oilproof coating which prevents staining and dusting.

It is particularly suitable for floors liable to injury from the action of lubricating oils and greases. Acetic acid will not affect it. It is non-poisonous.

Bilchaco Cement Floor Coating is made in 6 colors. On large orders, special colors can be supplied.

It is recommended for garage floors, kitchens, lavatories, cement granaries, silos, and tanks for oil, etc.

BILCHACO
CEMENT·FLOOR
COATING
TRADE-MARK

U. S. N. Deck Paint, "The Universal Paint"

This is a quick drying, extremely durable, general purpose paint. It dries hard overnight with a smooth, pleasing luster which withstands washing, scrubbing and the most severe conditions of wear and weather.

U. S. N. Deck Paint is made in 30 colors, white and black. It gives splendid results on houses, porches, floors or walls.

U·S·N
DECK PAINT
The Universal Paint
TRADE-MARK

Artone Flat Finish for Walls, Ceilings, etc.

Artone produces the velvetlike finish so much desired for interior walls. It may be used on smooth or rough plaster, cement, brick, wall board, metal or wood.

Artone may be washed with soap and water without injury. It will not rub off as do calcimine and cold water paints, and is more sanitary than wall paper. It is made in 12 colors, black and white.

ARTONE
FLAT FINISH
TRADE-MARK

Rustnaught, The Anti-rust Paint of Greatest Durability

Rustnaught is a paint coating which prevents rust and electrolysis of metals. It is especially suitable for structural steel, metal roofs and siding, etc. Made in 8 colors and black.

This coating is made along the lines indicated by the Bureau of Industrial Research as best for the protection of structural steel, bridges, etc. It resists sulphuric acid fumes, brine and lubricating oils. It contains no asphaltum or tar.

RUSTNAUGHT
METAL COATING
TRADE-MARK

U. S. N. Deck Varnish, "The Universal Varnish"

A pale varnish of exceptional durability suitable for all exterior and interior work. Particularly adapted for floors or any other surfaces exposed to severe wear or weather.

U. S. N. Deck Varnish is suited also to use in combination with U. S. N. Deck Paint where high gloss enamel results of extreme durability are desired.

U·S·N
DECK VARNISH
The Universal Varnish
TRADE-MARK

CONTRACT WATERPROOFING CO.

INCORPORATED

Waterproofing Engineers and Contractors

2042 Railway Exchange Building

ST. LOUIS, MO.

BRANCH OFFICES

DETROIT, MICH. KANSAS CITY, MO. CHICAGO, ILL. PHILADELPHIA, PA. BOSTON, MASS.
DALLAS, TEX. NEW ORLEANS, LA. NEW YORK, N. Y. CLEVELAND, OHIO QUEBEC, CANADA

TRADE-MARK

Product

FERRO-TITE, the "Iron Method" of waterproofing.

Description

Ferro-Tite is composed of finely ground, clean, gray iron mixed with an accurately proportioned percentage of chemical constituents. It is mixed with water and then applied to the surface to be waterproofed. Clean, sharp, fine sand is also added in certain applications. Oxidization of the iron accomplishes the waterproofing, the chemicals hastening the process and completing the waterproof seal.

Ferro-Tite is used for waterproofing basements, subways, reservoirs, vaults, tunnels, swimming pools, and any structure of stone, brick or concrete. It is also used to oilproof concrete storage tanks.

Application

Wherever practical, the CONTRACT WATERPROOFING Co. applies Ferro-Tite to the inner surface, the number of coats depending on the condition of the surface and the amount of moisture present or leaking through. The surface must be carefully cleaned before applying the first coat which is thin and consists of Ferro-Tite and water. The following coats are thicker. Each coat is kept moist to assist oxidation and should be well oxidized before the next coat is applied.

Where hydrostatic pressure is present, the pressure is localized and relieved by the proper placing of "bleeders." The leakage being concentrated, the waterproofing is applied in the other portions and the "bleeders" gradually eliminated.

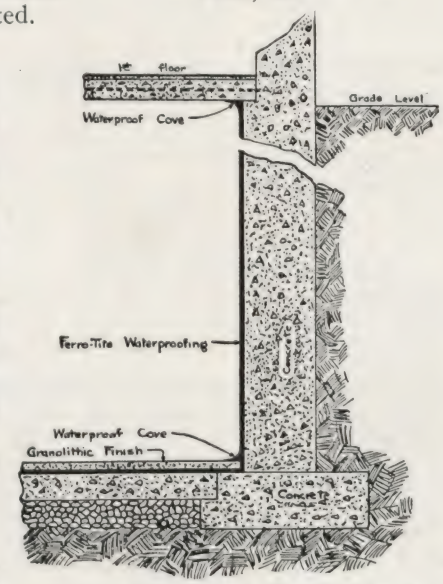
TYPICAL CALKING FOR PIPES, ETC.

Finishing of Walls

Ferro-Tite being an iron material naturally discolors the surface to which it is applied, but these surfaces are brought back to a light gray or natural cement color in the finishing. This is done by the application of slush coats of pure cement, or by gradually diminishing the iron contents in the coatings and adding cement and sand until coatings of practically nothing but sand and cement are being applied. The CONTRACT WATERPROOFING Co.'s method permits of walls being plastered or decorated after the waterproofing has been applied.

Floor Coatings

The coating is placed on the upper surface of the floor slab before the finish concrete (or granolithic) is applied. The number of coats required depends on the water present, three coatings usually being sufficient where no seepage has appeared. A slush cement coat should be applied over the waterproofing before the topping or finished surface is laid.



TYPICAL FERRO-TITE WALL AND FLOOR WATERPROOFING

Advantages of Ferro-Tite Waterproofing

Ferro-Tite when properly applied becomes an integral part of the structure. The water used carries the materials into the pores of the surface and the waterproofing is so strong that it can not be pushed from the walls and will withstand a very high hydrostatic pressure without showing the slightest evidence of percolation.

Ferro-Tite is fireproof and unaffected by intense heat.

No additional protective wall lining is required, the mortar cost ordinarily applied to protect waterproofing being eliminated.

The application of Ferro-Tite does not delay nor depend on other work.

When applied on the inside surface the extra excavation for outside walls and the incidental back filling is avoided, thus effecting a considerable saving in cost.

Cost of Ferro-Tite Includes Application

Successful waterproofing depends as much on the proper application of the materials as it does on the materials themselves. For this reason Ferro-Tite is not offered for sale commercially but is applied by this company under a contract for waterproofing.

Contracts and Guarantee

The CONTRACT WATERPROOFING Co. confines its efforts exclusively to waterproofing and has devoted many years to this specific type of work. This company contracts for service and results, not for a given number of coats or a specific amount of material and labor. No work is undertaken which can not be guaranteed and full responsibility is taken on all work undertaken.

Upon completion of our work we guarantee that all surfaces treated by us are and will remain absolutely watertight and waterproof, we to promptly make any repairs necessary within the time limits of the guarantee, at our expense.

Handbook

The CONTRACT WATERPROOFING Co.'s handbook containing valuable information on structural waterproofing will be sent without charge to architects, engineers and contractors on request.

CONCRETE WATERPROOF PAINT CO.

Manufacturers of Waterproofing and Dampproofing Materials and Cement Coatings

EXECUTIVE OFFICES
829-835 North 3rd Street
PHILADELPHIA, PA.
AGENCIES IN PRINCIPAL CITIES

Products

HYDROSEAL DAMPPROOFING COMPOUNDS: No. 330, a Plaster Bond; No. 640, a Foundation Waterproofing; No. 309, for Preventing Staining of Limestone, etc.; No. 304, for Protection of Woodwork and Tanks; No. 352, a Metal Preservative.

HYDROSEAL (KEEPS DRY) TRADE-MARK

PENETRITE INTEGRAL WATERPROOFING POWDER and PASTE; PENETRITE TRANSPARENT COMPOUND, a Colorless Waterproofing for Concrete, Cement, etc.; PENETRITE FLOOR FINISH, for Preventing Dusting of Cement Floors; KLING KOAT CEMENT COATING, a Decorative coating for exterior or interior masonry surfaces.

Advantages

Hydroseals are so prepared that they remain elastic indefinitely. No coal tar products are used. Such paints will be made to meet specific requirements, and any proposition offered will be submitted to our chemical laboratories.

Penetrite Transparent Compound enters into the pores of concrete or brick one-quarter inch. It seals the pores so the surface effectually sheds water.

Kling Koat Cement Coating withstands climatic changes, and beautifies any surface. It is made in white and in colors.

Catalogues and Samples

Catalogues containing information and samples may be obtained free on request by any architect or engineer.

References

Our various materials have been approved by the office of the Supervising Architect of the United States for Government work.

The character of our products may be judged by the type of buildings on which they have been used successfully for years.

We will gladly forward to you desirable references which are too numerous to list.

BRANDS, USES AND SPECIFICATIONS

PURPOSES	MATERIAL	SPECIFICATIONS
FOR DAMPPROOFING AND WATERPROOFING CONCRETE, BRICK AND CEMENT		
To dampproof exposed walls to be plastered—unfurred or furred with hollow brick or furring tile	Hydroseal No. 330	Coat the interior of all exposed walls one coat, and, if necessary, two
To prevent surface infiltration and dampness in basements and cellars	Hydroseal No. 640	Apply one heavy continuous coat
To prevent and resist severe conditions of dampness and water below sub-level	Hydroseal No. 640, in conjunction with canvas, felt or cheesecloth	Apply No. 640, and canvas, etc., alternately 3- to 5-ply until the hydrostatic pressure is equalized
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	Penetrite Transparent Compound	Apply one coat after having pointed all joints
To render waterproof by physical mixture with concrete and cement	Penetrite Integral Waterproofing Paste Penetrite Integral Waterproofing Powder	For ordinary work add 1 gal. to 16 gals. of water Use 2 lbs. to a bag of cement, under most severe conditions 3 lbs.
Used as an integral waterproofer, an integral hardener, as well as an anti-freeze	Conwatco Mix	When using Conwatco Mix as an anti-freeze and waterproofer use 1 gal. to 15 gal. of gauging water
FOR STAINPROOFING LIMESTONE AND MARBLE		
For the protection of limestone, marble, etc., against stain caused by the cement through surrounding masonry	Hydroseal No. 309	Apply to all unexposed sides of stone, one continuous coat
FOR THE PROTECTION OF WOOD		
For the insulation and protection of woodwork, tanks, etc.; i. e., to prevent the warping and deterioration of sleepers, wainscoting, etc.	Hydroseal No. 304	Apply to surface one heavy coat
FOR THE PROTECTION OF METAL		
For prevention against electrolysis and corrosion of exposed structural steel	Hydroseal No. 352	Apply one shop coat, to be followed by a field coat
For protection against brine drippings of salt water, gas, etc.	Hydroseal No. 352B	Remove all loose particles, then apply one heavy coat
FOR WATERPROOFING AND BEAUTIFYING CONCRETE AND PLASTER SURFACES		
To beautify and protect exterior walls of brick, stucco cement, and concrete	Kling Koat Cement Coating (flat and gloss)	Apply one or more coats
FOR TREATMENT OF FLOORS		
To prevent the dusting and abrasion of concrete floors	Penetrite Floor Finish	Apply two coats, and allow 24 hours between applications
For application after cement or concrete floor is laid. Makes the floor hard, dustproof and waterproof	Penetrite Liquid Floor Hardener	One application is all that is necessary if the condition is not severe
Mixed with the cement to harden and waterproof	Penetrite Metallic Floor Hardener	Approximately 100 lbs. to a sq. ft. in the top coat

THE ELATERITE PAINT & MANUFACTURING CO.

Waterproofing and Bonding Materials

DES MOINES, IOWA

EASTERN DISTRIBUTERS

ELATERITE PRODUCTS CORPORATION

NEW YORK, N. Y.: 171 Madison Avenue—Telephone, Murray Hill 5167 BOSTON, MASS.: Room 819, 6 Beacon Street—Telephone, Haymarket 3346

Products

No. 60 DES MOINES ELATERITE for CEMENT WATERPROOFING and BONDING; No. 65 DES MOINES ELATERITE for STONE BACKING.

Also manufacturers of Preservative Paints for all classes of surfaces.

DES MOINES ELATERITE

TRADE-MARK

No. 60 Cement Waterproofing and Bonding

No. 60 Des Moines Elaterite is both a waterproofing and a bonding material. Its base is an intensely adhesive, extremely elastic, non-porous, acid resisting, absolutely waterproof hydrocarbon known as "mineral rubber." It seals the pores of cement brick or stone, destroys capillary attraction and provides a continuous film which completely shuts out dampness. In addition its intensely adhesive quality makes it an ideal bonding material permitting the direct application to it of plaster or stucco coats.

APPLYING PLASTER COAT DIRECTLY TO DES MOINES "ELATERITE" WATERPROOFING AND BONDING COAT

Uses—For waterproofing all brick, stone and cement surfaces and as an integral waterproofing to be mixed in concrete or cement mixtures and for bonding plaster, stucco, tile, linoleums, etc.

Advantages — Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room and saving in labor and material costs; it meets every waterproofing requirement, thus there is no need to specify a different material for outside foundations, inside walls, basement floors or bonding.

Application—Applied cold, it spreads rapidly with broad flat brushes or may be applied with an air gun or spray. No hot swabbing or layers of felt required and any workman can apply it.

Covering Capacity —100 to 150 sq. ft., (one coat) per gal. or from 80 to 100 sq. ft. (two coats) on cement, brick or stone, depending on porosity; 250 to 300 sq. ft. on wood or metal.

APPLYING "DES MOINES ELATERITE" TO OUTSIDE OF FOUNDATION WALL

Specifications—*(a) For Waterproofing Substructures*—The waterproofing contractor shall apply waterproof membrane of No. 60 Cement Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING CO., Des Moines, Iowa, to the outside of all foundation walls to a point 6 in. above grade, including piers, and to be carried over all footings and properly joined to waterproofing course on outside walls. Membrane to consist of 2 coats properly applied so there shall be no pinholes or uncovered spaces. At least 24 hrs. must elapse after the application of first coat before applying a heavy second coat, allowing it to dry thoroughly before covering. Walls shall be cleaned thoroughly to remove all loose particles and must be dry and, if of concrete, thoroughly set before applying No. 60 Cement Waterproofing and Bonding, Des Moines Elaterite.

Where textile membrane is desired, first apply a coat of No. 60 Cement Waterproofing and Bonding, Des Moines Elaterite, over clean, dry surface; then a layer of open mesh cotton fabric to withstand 90 lbs. pressure per sq. in. Over this apply as many layers of No. 60 Des Moines Elaterite and open mesh cotton fabric as may be needed to insure perfect watertightness.

(b) For Dampproofing Interior Walls which are to be Plastered, or for Waterproofing Exterior Walls which are to be Stuccoed—The contractor is to apply 2 coats of No. 60 Cement Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING COMPANY, Des Moines, Iowa, over the inside surfaces of all exterior walls which are to be plastered, and outside surfaces of all walls which are to be stuccoed. Walls are to be clean and dry and the application to be so made that there shall be no pinholes or uncovered spaces. At least 24 hrs. must elapse between the application of the first and the heavy second coat. Plaster is to be applied directly over the coating of No. 60 Des Moines Elaterite, after the second coat is "set" but while it is still "tacky."

Stucco shall be applied directly over the coating of No. 60 Des Moines Elaterite, likewise in manner mentioned above.

The waterproofing and bonding coats may be applied with air gun or spray, if contractor prefers.

(c) *For Integral Waterproofing Use*—All concrete, stucco or cement mortar which is to be waterproofed shall have No. 60 Cement Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING COMPANY, Des Moines, Iowa, in the proportion of 1 part of No. 60 Des Moines Elaterite, to 4 parts of water. The No. 60 Des Moines Elaterite is to be added to the mixture in the foregoing proportion immediately after the water has been stirred in, and then the mixing is to be continued until there is a complete and thorough distribution throughout the mixture.

No. 65 Stone Backing

No. 65 Des Moines Elaterite is an absolutely stain-proof, acid resisting, waterproof material and will preserve the natural color of the stone or marble upon which it is applied.

Specification — All stone to be coated, before setting, on the 5 unexposed sides, also entire inner surface, including joints, to be coated after the stone is set with No. 65 Stone Backing, Des Moines Elaterite, as manufactured by THE ELATERITE PAINT & MANUFACTURING CO. of Des Moines, Iowa.

PROTECTING STONE FACING FROM DISCOLORATION WITH "DES MOINES ELATERITE"

Prices and References

These will be gladly sent on request.

A. C. HORN COMPANY

Chemical Products for the Conservation of Building Materials

TELEPHONE
HUNTERS POINT 3671

Room 505, Horn Building
LONG ISLAND CITY, N. Y.

CABLE ADDRESS
"HORNACO, NEW YORK"

CHICAGO OFFICE: Chamber of Commerce Building
AGENCIES LOCATED IN PRINCIPAL CITIES OF UNITED STATES, CANADA, SOUTH AMERICA AND AUSTRALIA
The Names of our Distributers and the nearest Points of Distribution will be given on request

Products

WATERPROOFINGS; DAMPPROOFINGS; TECHNICAL PAINTS; WOOD PRESERVATIVES; CONCRETE HARDENERS; CALKING COMPOUNDS; TECHNICAL and STRUCTURAL COMPOUNDS; MORTAR and CEMENT COLORS, which include:

Dehydratine Nos. 1, 2, 3, 4, 6, 7, 10, 22, 80; Hydratite (paste and powder); Symentrex; Hornstone (crystal form); Aquatite Cement; Vulcatex; Kopper Karbol; Rexide; Calktex.

Services

For twenty-six years the A. C. HORN COMPANY has been meeting unusual situations and solving difficult problems in its lines, and is always at the service of architects, engineers and contractors. When necessary, new methods are devised or new materials manufactured.

Specifications—The company will write specifications for any specific job, and in addition will furnish literature containing detailed specifications for each product. A short form of specification is often adequate for our more familiar products.

The following is suggested:

"For (name of operation) use (mention 1 or 2 coats if a coating) of (name of product) as manufactured by and in accordance with the directions of the A. C. HORN COMPANY, Long Island City, N. Y."

General Specifications

FOUNDATION WALLS

Membrane Method—

(1) Brush coating—Dehydratine No. 4.
One gal. double coat, 25 to 40 sq. ft.

(2) Trowel coating—Dehydratine No. 6
One gal. 1/16 in. thick, 26 sq. ft.

(3) Mop coating with fabric—Dehydratine No. 7 and Tripleflex Fabric.
One gal. melted, 33 sq. ft. per coat.
Fabric in rolls, 50 sq. yds. each.

Integral Method—

(1) Waterproofing powder—Hydratite No. 1.
2% by weight of cement used.

(2) Waterproofing paste—Hydratite No. 2
1½% to 2% by weight of cement used.

PITS, RESERVOIRS, SWIMMING POOLS, TUNNELS AND FLOORS BELOW GRADE

Same materials and quantities as for foundation walls.

SUPERSTRUCTURAL WALLS

Exterior Surfaces—

(1) Cement coating—Symentrex.
One gal. double coat, 100 to 135 sq. ft.

(2) Transparent waterproofing—Dehydratine No. 2 or 22.
One gal. single coat, 175 to 200 sq. ft.
One gal. double coat, 80 to 100 sq. ft.

(3) Stainproofing stone—Dehydratine No. 3.
One gal. single coat, 150 to 175 sq. ft.
One gal. double coat, 75 to 90 sq. ft.

(4) Cement mortar and exterior stucco—Hydratite Nos. 1 and 2.
2% by weight of cement used.

(5) Densifying and preserving limestone—Hornstone Preservative.
One gal. single coat, 150 sq. ft.

SUPERSTRUCTURAL WALLS (Continued)

Interior Surfaces of Exterior Walls, etc.—Dampproofing—

(1) Brush coating—Dehydratine No. 1.
One gal. single coat, 80 sq. ft.
One gal. double coat, 50 sq. ft.

(2) Trowel coating—Dehydratine No. 10.
One gal. 1/16 in. thick, 26 sq. ft.

(3) Wall coating for industrial buildings—decorative—Horntile Enamel.
One gal. double coat, 300 sq. ft.

(4) Mortar color—Fast to light and alkaline conditions; limeproof—Horn's Chromatex Colors.
Amount depends on color and shade.

STEEL WORK

(1) Priming or metal protective coat—Rexide.
One gal. single coat, 400 sq. ft.
One gal. double coat, 300 sq. ft.

(2) Final or saponification-proof coat—Dehydratine No. 5.
One gal. 500 sq. ft.

ROOFS

Concrete—

(1) Integral method—Hydratite Nos. 1 or 2.
2% by weight of cement used.

Of Every Character—

(1) Trowel coating—Aquatite Cement (Coal Tar) and Vulcatex (Asphalt).
One gal. 1/16 in. thick, 26 sq. ft.

CEMENT FLOORS

(1) Steel hardener—Ferro Fax. (Also in red and green).
15 to 33 lbs. per 100 sq. ft., depending on traffic.

(2) Chemical hardener—Hornstone Crystals.
Two lbs. per 100 sq ft.

(3) Cement filler and coating—Koncrex (with color or transparent).
One gal. single coat, 200 to 225 sq. ft.
One gal. double coat, 150 to 175 sq. ft.

BUILDING INTERIORS

Kitchens, Lavatories, Bathrooms—
High glaze waterproofing enamel to resist condensation and steam—Hornstone Enamel.
One gal. double coat, 300 sq. ft.

Flat Wall Finish—
China Flat.
One gal. single coat, 300 to 400 sq. ft.
One gal. double coat, 175 to 225 sq. ft.

MISCELLANEOUS

Calking—
For pointing up brick, stone, wood, cement—Vulcatex. To calk windows—Calktex.
One gal. will calk 9 windows.

Wood Preservative—
Kopper Karbol.
One gal. rough lumber, 200 sq. ft.
One gal. planed lumber, 250 sq. ft.

To Prevent Splintering of Wood Floors—
Woodcrex.
One gal. single coat, 400 sq. ft.

To Make Wood Fire Resistant—
A colorless coating—Firecrex.
One gal. will cover 300 sq. ft.

Bonding New to Old Concrete—
Bondsit.
Two lbs. dissolved in 1 gal. water covers 150 sq. ft.

References

Due to the long period of successful manufacturing in which this company has been engaged, it is able to refer to a large number of jobs on any of its products.

Should a desire be had to visit and inspect some of these jobs, reference lists will be promptly supplied.

THE HYDROLITHIC WATERPROOFING CO., INC.

Engineers and Contractors for Waterproofing

32 Pearl Street
NEW YORK, N. Y.

TELEPHONE
BOWLING GREEN 5055

HYDROLITHIC
TRADE-MARK

Services and Products

Engineers and Specialists for WINSLOW'S HYDROLITHIC SYSTEM OF WATERPROOFING.

This company takes and executes contracts for the WATERPROOFING of all kinds of SUBSTRUCTURES, such as Subways, Tunnels, Reservoirs, Vaults, Swimming Pools, Boiler Rooms, Cellars, etc., giving a guarantee against any percolation, whether structures are of concrete, brick or stone.

Winslow's Hydrolithic System

All work is executed in the well-known Winslow's hydrolithic system, using either hydrolithic cement or hydrolite as the conditions may require. Hydrolithic coatings contain all the good points of a first class true portland cement mortar, with the addition of their water repellent and waterproofing qualities.

Application—Hydrolithic waterproofing is applied on the interior of exterior walls and floor forming one monolithic shell. Its adhesive qualities are such that it will withstand any water pressure, and will last just as long as the structures waterproofed will last. Hydrolithic waterproof coatings, 5/8 in. thick on brick, have withstood tests of 1200 lbs. per sq. in.; and actual successful work has been done 162 ft. below grade, representing a hydrostatic pressure of over 70 lbs. per sq. in.

Advantages—The advantages of Winslow's hydrolithic system over the old membranous method are many: Repairs of any defects can be made easily, as the work is always in sight; it gains floor space, taken up in the membranous method of protecting brick walls, not necessary under the hydrolithic system; the waterproof coat constitutes the finish of the walls and floors and, being impervious, is absolutely sanitary. Hydrolithic coatings are perfectly bonded to waterproofed structures, forming a part of such and thereby add strength to walls, and especially to floors.

Record—Winslow's hydrolithic system has been used for more than 25 years; has stood the test of time, and the company can truly say there is nothing superior to it on the market to-day.

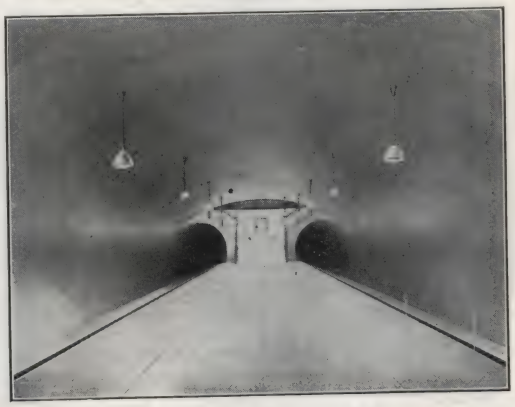
Estimates—If architects will write their requirements, specifications and estimates will be gladly furnished, no matter *how large* or small the job may be.

References

A few of the buildings where Hydrolithic Waterproofing was installed:

Graton & Knight Mfg. Co., Worcester, Mass.
Third National Bank, Springfield, Mass.
Scovill Mfg. Co., Waterbury, Conn.
Bridgeport Trust Co., Bridgeport, Conn.
Standard Oil Co., Baltimore, Md.
Public Service Building, Baltimore, Md.
Gambrill Mfg. Co., Ellicott City, Md.
Grace Dodge Hotel, Washington, D. C.
William Penn Hotel, Pittsburgh, Pa.
Mellon National Bank, Pittsburgh, Pa.
National Biscuit Co., Pittsburgh, Pa.
Jos. Horne Co., Pittsburgh, Pa.
Standard Underground Cable Co., Pittsburgh, Pa.
University of Pittsburgh, Pittsburgh, Pa.
Pressed Steel Co., Wilkes-Barre, Pa.
Pittsburgh Plate Glass Co., Ford City, Pa.
Royster Building, Norfolk, Va.
Interstate R. R. Co., Norton, Va.
Farmers Supply Co., Roanoke, Va.
B. F. Goodrich Co., Akron, Ohio
Peoples National Bank, Jackson, Mich.
Michigan City Trust & Savings Bank, Michigan City, Mich.
First Church of Christ, Scientist, Louisville, Ky.
Royal Bank of Canada, Liverpool, Nova Scotia
Standard Oil Building, New York, N. Y.
College of City of New York, New York, N. Y.
Glackner Building, New York, N. Y.
Nurses Club, New York, N. Y.
Fifth Avenue Building, New York, N. Y.
Manhattan Eye & Ear Hospital, New York, N. Y.
Remington Typewriter Co., New York, N. Y.
Residence, R. Fulton Cutting, New York, N. Y.
Residence, Jas. Gamble Rogers, New York, N. Y.
New York Harbor Dry Dock Co., Staten Island, N. Y.
Pittsburgh Plate Glass Co., Long Island City, N. Y.
Goodyear Tire & Rubber Co., Long Island City, N. Y.
Loft Candy Factory, Long Island City, N. Y.
Ardsley Club, Ardsley, N. Y.
Sunningdale Country Club, Scarsdale, N. Y.
Piping Rock Club, Locust Valley, N. Y.
New York Shipbuilding Corp., Camden, N. J.
Victor Talking Machine Co., Camden, N. J.
Westinghouse Lamp Co., Trenton, N. J.
U. S. Post Office, Asbury Park, N. J.
Singer Mfg. Co., Elizabethport, N. J.
Geo. J. Gould Estate, Lakewood, N. J.
Norwood Golf Club, Long Branch, N. J.

Before applying Waterproofing



After being Waterproofed

42ND STREET (NEW YORK) STATION, QUEENSBORO SUBWAY

MASONRY PRESERVERS OF NEW YORK, INC.

"Caffalls' Scientific Process"

Waterproofing and Dampproofing Engineers and Contractors

1 Madison Avenue

NEW YORK, N. Y.

Services

WATERPROOFING and DAMPPROOFING ENGINEERS and CONTRACTORS, specializing in the CAFFALLS' SCIENTIFIC PROCESS of PRESERVING and WATERPROOFING.

Caffalls' Scientific Process of Preservation

This is the only known process which preserves brick, stone, terra cotta and concrete by preventing it from chipping, flaking, crumbling, discoloring or disintegrating and which absolutely prevents the penetration of water or moisture.

In the Caffalls' scientific process, a preparation of paraffin and chemicals is applied to exterior walls of brick, stone, terra cotta and all kinds of concrete and masonry, either new or old.

Both preservatives and surfaces to be treated are heated. Preservative is then applied with a brush or spray by our specially trained experts under the personal supervision of Mr. Edward M. Caffall, son of the inventor of the Caffall process.

The preservative penetrates the material to which it is applied to a depth of about ¼ in. completely filling all pores or voids, forming an impenetrable barrier to water or moisture, and preventing disintegration otherwise caused by the action of the elements.

The preservative does not change the color or appearance of the surface treated.

Permanent Results

The Caffalls' scientific process is not an experiment —it has stood the test of time and has an enviable record for durability. Structures treated with it over 50 years ago are still waterproof and in good condition.

The preservative used is unaffected by acid and alkali solutions, gases and moisture, and is highly resistant to oxidation.

One treatment will last as long as the surface to which it is applied.

Guaranteed Results

We guarantee that the masonry (stone, brick, terra cotta, concrete, etc.) surfaces treated by us with the Caffalls' scientific process will not discolor, disintegrate, chip, break, crumble nor allow the penetration of water or moisture for a period of twenty years from date of treatment. Should any of the aforesaid defects occur during that period, we will re-treat same where necessary without charge.

Important Waterproofing Suggestions

There are certain vulnerable parts of the gable walls of buildings, which, if protected against the weather, will go far to insure a dry building. These are the parapet walls. If the average wall is examined, it will be found that the top of the parapet wall is the first part of the masonry to show signs of disintegration and wasting away of mortar joints. If the following specifications are used, the penetration of dampness will be eliminated.

North and east exposures are always subject to dampness, but the commencement of the trouble is generally at the top of the building.

Specification Suggestions

Suggestion No. 1—All exterior walls above grade shall be treated with Caffalls' scientific process for preserving and waterproofing, as applied by MASONRY PRESERVERS OF NEW YORK, INC., 1 Madison Avenue, New York, N. Y., or equal.

Suggestion No. 2—Brickwork of penthouses, bulkheads, side, rear and fire walls topped with stone, tile or terra cotta from roof flashline over and including the coping, down to the lintel level of the top-story windows shall be treated with Caffalls' scientific process for preserving and waterproofing, as applied by MASONRY PRESERVERS OF NEW YORK, INC., 1 Madison Avenue, New York, N. Y., or equal.

Suggestion No. 3—Brick or stone work of chimneys above roof flashing shall be treated with Caffalls' scientific process for preserving and waterproofing, as applied by MASONRY PRESERVERS OF NEW YORK, INC., 1 Madison Avenue, New York, N. Y., or equal.

THESE BUILDINGS ARE PRESERVED AND WATERPROOFED BY THE CAFFALL PROCESS

MINWAX COMPANY, INC.

Manufacturers of and Consulting Engineers on Waterproofing and Structural Protection

18 East 41st Street
NEW YORK, N. Y.

CHICAGO, ILL., 327 South La Salle Street PHILADELPHIA, PA., 609 Harrison Building
REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

MINWAX SATURATED COTTON FABRIC; WATERPROOFING ASPHALT; VAULT LIGHT and EXPANSION JOINT CEMENTS; HEAVY LIQUID WATERPROOFING and 300 DAMPPROOFING; CLEAR WATERPROOFING; BRICK and CEMENT COATING; CONCRETE FLOOR FINISH; FLAT FINISH.

Also Steel Coatings and Plaster Stains.

Minwax System of Sublevel Waterproofing

The Minwax System is an elastic membrane system, using 2 plies of Minwax Saturated Cotton Fabric, laid in with 3 layers of Minwax Waterproofing Asphalt.

This membranous system of waterproofing has become recognized as the highest standard of waterproofing engineering. It is the pioneer of all cotton cloth systems and has a record of over 15 years of satisfactory service.

Minwax Saturated Fabric—A woven cotton fabric thoroughly saturated with Minwax Waterproofing Asphalt, weighing 14 oz. to the sq. yd. No oils, petroleum residues, or other solvents used in obtaining the saturation. When tested by "Strip" Method, gage length 3 in., shows a tensile strength of 65 lbs. per in. of width and an elasticity factor at point of rupture of at least 10% in any direction. It is not coated with talc, wood pulp or other material which might prevent bond; is flexible at all temperatures.

RITZ-CARLTON HOTEL, ATLANTIC CITY, N. J.
WARREN & WETMORE, Architects
THOMPSON-STARRETT CO., Builders
Entire foundation, 14 ft. below mean tide level, waterproofed by the Minwax system of sublevel waterproofing

Minwax Waterproofing Asphalt—A tough rubbery asphaltic bitumen derived from an asphaltic petroleum by careful refining. Its melting point (B&R) 150° Fahr. to 175° Fahr. Penetration at 32° Fahr. not less than 10; penetration at 115° Fahr. not more than 100; Ductility at 77° Fahr. not less than 20 cm. It forms a permanent, tenacious mechanical bond to the membrane, to the material on which it is swabbed, or material which is cast against it. It is chemically inert and unaffected by water, the alkalis in cement or acids in cinders.

Specification—The sublevel waterproofing shall consist of 2 plies of Minwax Saturated Cotton Fabric laid in Minwax Waterproofing Asphalt. Materials shall be delivered on the job in original, unbroken packages. The entire substructure shall be enclosed in a 2-ply waterproof blanket, built up shingling method, carrying the waterproofing to grade. Application shall be done by responsible waterproofing contractor.

Note—A standard 2-ply blanket will require approximately 25 yds. of fabric and 12½ gals. of asphalt per 100 sq. ft. of surface to be waterproofed.

Minwax Vault Light and Expansion Joint Cement

An especially refined asphaltic cement for producing watertightness in vault light, expansion and construction joint work. The material heated only to the point where it will flow; joint dried, cleaned and poured flush. Not adapted to vertical or inclined surfaces; for such work use Minwax Fibrous Expansion Joint Cement. *Used exclusively in New York subway work since 1906.*

Minwax Heavy Liquid Waterproofing

A heavy-bodied, asphaltic coating for sublevel dampproofing, which forms a heavy, tough film of asphalt on curing, that bonds closely and firmly, and does not become brittle.

Minwax Clear Waterproofing

A colorless penetrative treatment, which, when cured, completely fills all voids with a chemically inert wax, forming a dense, waterproof surface. It does not change the texture, form a film on the surface, or materially change its color. Applied with a brush, like paint.

Minwax Brick and Cement Coating

This is a penetrative pigment coating, having as its vehicle Minwax Clear Waterproofing, and forms in and on the surface, a tough, flat pigment film, which does not flake, blister or peel, and which is absolutely waterproof. The coating is produced in 6 standard colors. Note that this material is in no way affected by the alkalis in cement or mortar surfaces.

Specification—All walls shall be thoroughly pointed, taking particular care at the windows. The material shall not be applied at temperatures below 40° Fahr. Two thorough brush coats of Minwax Brick and Cement Coating shall be applied, 12 hours to elapse between coats.

Minwax Concrete Floor Finish

For dustproofing concrete floor surfaces.

A light, oillike material, applied cold to the surface. It penetrates and carries into the floor a tough, chemically inert wax, thoroughly filling all pores, densifying the surface, rendering it dustproof, waterproof and resistant to stains.

Minwax Flat Finish

For the waxing, staining and finishing of wood floors and trim. Particularly on floors where a penetrative, waterproof, attractive and lasting finish is desired Minwax Flat Finish is of service. Manufactured in 7 colors.

Specification—The wood must be clean, free from dirt, grease, wax or other finish. Two coats should be applied, 12 hours between coats. Each coat should be rubbed off with a clean dry cloth in not less than 2 or more than 6 hours.

Note—For a high polish apply a coat of any floor wax.

Minwax Service

This company maintains a corps of engineers experienced in all phases of waterproofing and structural protection and is equipped to co-operate on details of design, specification, and application. A note to our nearest office places this service at your disposal.

MORENE PRODUCTS CO., INC.

Manufacturers of Portland Cement in Liquid Form and Waterproofing Specialties

245-247 West 28th Street
NEW YORK, N. Y.

AGENCIES

BROOKLYN, N. Y., and LONG ISLAND, BUILDING SPECIALTIES CO., 375 Fulton Street
PHILADELPHIA, PA., THE ARVON CO., 1814 Ludlow Street
WATERTOWN, N. Y., WAIT & DE LONG
BOSTON, MASS., E. R. BRISBIN, 80 Boylston Street

Products

MORENE LIKWID SEMENT, a Finishing and Protective Coating with which any texture and color can be produced. Adaptable for exteriors and interiors.

MORENE KEMISOL, a Preservative and Permanent Colorless Waterproofing for stone, brick and cement surfaces.

MORENE PETROFLUID, used integrally in cement plaster for Waterproofing basements, tunnels, tanks, etc., subjected to water pressure.

Also Morene Likwid Sement Thinners, a special preparation for thinning Likwid Sement to obtain the proper consistency for application; Morene Plastik Sement, a special waterproof portland cement putty for pointing crevices around windows, doors, etc. Will bond to any surface.

Morene Likwid Sement

Morene Likwid Sement is portland cement in liquid form, produced by a chemical process, carrying sand in suspension, retaining the natural set, hardening and curing features of the original portland cement base. Is free from injury in any temperature.

Morene Likwid Sement in the mass remains soft. When applied in a thin film to any surface, it takes its initial set in a few hours, and slowly hardens for months, similar to all cement mortars and concretes. Its slow setting quality prevents all surface and shrinkage cracks.

The base color is white portland cement. It is applied with a brush or trowel on stone, brick, concrete, plaster, metal or painted surfaces. Any smooth, stippled or stucco effect can be produced in any color.

Rough concrete or brick walls first given a surface application of Morene Kemisol (see directions, Kemisol) and a heavy brush coat of Morene Likwid Sement will be absolutely waterproof and have a reasonably smooth appearance as the small voids and imperfections will be filled.

It can be applied without injury when subjected to hot sun and wind. After being applied an hour, ordinary showers will not injure the surface.

Stone, brick and cement walls can be safely refinished. Morene Likwid Sement applied over brown coat cement plaster makes it unnecessary to apply the usual finish or dash coat of plaster and paint. Likwid Sement will produce both texture and color. Wooden or metal cornices can be finished to match the adjacent stucco or stone work.

Likwid Sement has the peculiar quality of preventing condensation. Cold water supply pipes, exposed walls and ceilings of laundries, factories, powerhouses, etc., where moisture caused by condensation is prevalent, should be coated with Likwid Sement.

Two or three heavy brush coats of Likwid Sement applied on structural metals will protect same against corrosion or smoke fumes.

Likwid Sement is absolutely fireproof, and will retain the bond and not crack or peel when applied on metals, even if subjected to 500° of continuous heat. Likwid Sement applied over combustible materials such as wood, fiber boards, etc., produces an unusually efficient fire retardant.

List of buildings where Morene Likwid Sement has been used as an exterior finish, will be supplied upon request.

Art Cementings—The first exhibit of art cementings was recently shown at the thirty-seventh annual exhibition of the Architectural League, New York City.

Special attention is directed to the possibilities of producing artistic wall decorations for interiors by the use of Morene Likwid Sement. The highest type of mural decorative art in bold relief work can be produced. The scope of artistic wall finishes combining both texture and color has no limitation.

One brush coat applied over troweled brown coat plaster replaces both the hard finish plaster coat and all decorative painting. Old painted walls can easily be made into newly plastered walls, plain or ornamental, combining any texture and color.

Remember it is *portland cement in liquid form.* Ask for full details.

Partial List of Buildings Where Morene Likwid Sement Has Been Used as an Interior Decorative Finish—

Mrs. J. W. Thompson Studio, 335 East 50th Street, New York, N. Y.
Clinton Peters Studio, 78 West 55th Street, New York, N. Y.
St. Marks Church, 10th Street and Second Avenue, New York, N. Y.
Stephen Clark Residence, 46 East 70th Street, New York, N. Y.
Clark Bros. Bank, 154 Nassau Street, New York, N. Y.
American Museum of Natural History, New York, N. Y.
H. F. Dabelstein Studio, 154 West 99th Street, New York, N. Y.
J. H. Kaufman Residence, 60 East 91st Street, New York, N. Y.
Julius Gregory, Architect, Residence, 323 West 112th Street, New York, N. Y.
Farmers Loan & Trust Co., 475 Fifth Avenue, New York, N. Y.
Ramsey Hoguet Residence, Woodmere, L. I., N. Y.
Mrs. Stewart Kerr Residence, Bronxville, N. Y.
Mary McMillan Studio, Syracuse, N. Y.
Dr. Miller's Sanitarium, Brewster, N. Y.
Robert Strange Residence, South Orange, N. J.
L. D. Compson Residence, Red Bank, N. J.
Mrs. Ellen S. Stan Residence, Stamford, Conn.
St. John's Episcopal Church, Newport, R. I.
National Tile & Mosaic Co., Philadelphia, Pa.
Rennas Hotel, Shamokin, Pa.
Dime Savings Bank, Shamokin, Pa.

Continued on next page

Morene Kemisol

The scientific, practical and economical perfection of a colorless waterproofing and preservative for stone, brick, concrete and cement surfaces above ground.

Morene Kemisol is a chemical solution, water base, ready for use and is efficient only on absorptive surfaces.

Kemisol is a surface application and permanently waterproofs by destroying the basic cause, absorption or capillarity (a force of nature) existing in the material itself, to depth of penetration. Leaves no coat, fills no pores, and is absolutely colorless.

Kemisol is a preservative for stone, brick and cement; prevents discolorations, stains, and damage from frost.

Kemisol applied to the surface prevents efflorescence or alkali from appearing on walls.

Kemisol applied on newly plastered sand or hard finished walls is a perfect sizing for paint and kalsomine.

Kemisol applied to the beds and builds of granite, stone and artificial stone before setting in wall will prevent any stains and discolorations appearing from the cement or lime mortar.

Because of condensation, water frequently accumulates on cement floors, laid directly on the ground and covered with linoleum. By thoroughly saturating the cement floor and treating the underside of the linoleum with Kemisol, this difficulty can be successfully overcome.

Estimate to use 1 gal. of Morene Kemisol for 10 to 15 sq. yds. Surface to be treated must be dry and absorptive to obtain proper results. If the structural material is covered with paint, grease or other foreign matter preventing direct contact, same must be thoroughly removed before applying the waterproofing.

Morene Kemisol should be applied with a compressed air spray or a large brush as required. Every square inch of exposed surface must be treated. Crevices, cracks, voids and all low places must be thoroughly saturated.

Apply freely, not less than two applications, second to follow immediately after first is absorbed, not over 10 minutes intervening. Once dry and set, no more can be absorbed. Any material remaining on the surface is useless. Smooth cut stone or pressed brick surfaces should be wiped off with cheese cloth before last application has thoroughly dried.

All dangerous crevices and voids on buildings must be pointed up with Morene Plastik Sement after being treated with Morene Kemisol to insure a watertight job.

Partial List of Representative Buildings in which Kemisol Has Been Used—

Hide & Leather Building, Madison Avenue, New York, N. Y.
Marlin-Rockwell Building, Madison Avenue, New York, N. Y.
Hardman, Peck & Co. Building, 433 Fifth Avenue, New York, N. Y.
Astor Estate Apartment House, West 45th Street, New York, N. Y.
Westchester County Hospital, East View, N. Y.
Irvin S. Cobb Residence, Ossining, N. Y.
Chamber of Commerce Building, Brooklyn, N. Y.
Prudential Insurance Co. Building, Newark, N. J.
Smaltz Building, Philadelphia, Pa.
Stern Residence, Atlantic City, N. J.
Brown University, Providence, R. I.
U. S. Naval Hospital, Boston, Mass.
Congressional Library, Washington, D. C.
U. S. Naval Academy, Annapolis, Md.

Morene Petrofluid

An underground waterproofing material for basements, tunnels, tanks and reservoirs, or any concrete or brick construction to resist water pressure; to be used as an integral mixture in cement plaster or floor topping.

Surface to be plastered must be properly prepared to secure a perfect bond.

If the surface is smooth or has been painted, roughen by chipping about 70% of the surface. Dry parts of the wall must be thoroughly wetted with water or given a brush coat of equal parts of Morene Petrofluid and water before plastering to avoid quick drying of plaster and assure a perfect bond.

For average conditions, mix 1 part cement and 2 parts fine sharp sand in the usual manner. Add 1 gal. of Morene Petrofluid to each bag of cement, then add sufficient water to make proper consistency. Apply and finish same as ordinary cement plaster.

For troweling or floating surface, use equal parts of Morene Petrofluid and water.

Estimate for this work: 1 bag of cement and 2 bags sand will plaster 6 to 7 sq. yds. ½ in. thick. Minimum thickness of plaster should be ½ in. Where severe water pressure exists, increase the quantity of Morene Petrofluid about 50% or 1½ gals. to each sack of cement. Also increase the thickness of plaster somewhat.

Partial List of Representative Buildings Where Petrofluid Has Been Used—

National Casket Co., Long Island City, N. Y.
Repetti Candy Factory, Long Island City, N. Y.
Bischoff Chocolate Factory, Balston Spa, N. Y.
Griselli Chemical Co., Elizabeth, N. J.
Brooklyn Rapid Transit Co., Brooklyn, N. Y.
Woolworth Building, Providence, R. I.
Turks Head Building, Providence, R. I.
Hotel Woodruff, Watertown, N. Y.
Watertown Garage, Watertown, N. Y.
F. D. Fleming Bungalows, Long Beach, N. Y.
Racquet Club Swimming Pool, Washington, D. C.
Municipal Building, Washington, D. C.

Technical Service Department

This company maintains a technical service department. Experts are available for the solution of any problems pertaining to the proper use of Morene Products.

Orders and Shipments

Likwid Sement—Quantity orders for Likwid Sement must have from 5 to 10 days advance notice as the material is not carried in stock in large quantities. This product must be used within about 4 months after being manufactured.

Weight per gallon, 14 lbs. Shipped in wooden barrels about 50 gals.

Half barrels, 25 to 30 gals. Smaller quantities in 5-gal. cans.

Petrofluid and Kemisol—Any reasonable amount can be shipped promptly as a supply is always carried in stock.

These products will keep an indefinite time after being shipped.

Weight per gallon, 8 lbs. Shipped in wooden barrels about 50 gals.

Half barrels, 25 to 30 gals. Smaller quantities in 5-gal. cans.

OBELISK WATERPROOFING COMPANY

Dampproofing Contractors and Engineers

TELEPHONE
GRAMERCY 2710-2711

1 Madison Avenue
NEW YORK, N. Y.

Services

Exterior Surfaces of Stone, Brick and Stucco Buildings, above grade, TREATED with the CAFFALL PROCESS.

Business, Residential and Monumental Buildings and Churches Restored, Dampproofed and Preserved; Exteriors of Delicate Marble Preserved from Weather Disintegration; Monuments Restored and Preserved.

Guarantee

All work done under contract, and with a 10-year guarantee, or on a cost-plus-percentage basis.

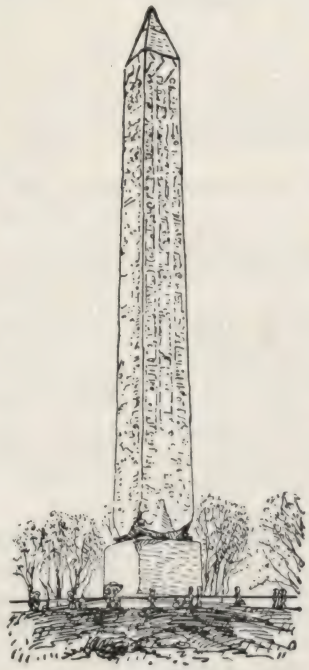
Process

New Structures—The surface is tested and structural defects, if any, are made good. The wall is then impregnated to considerable depth with a melted wax compound forced in by heat.

Old Structures—Where masonry walls leak but material disintegration has not occurred, all joints are tested and made sound where necessary, and the entire surface, including joints, treated as above.

Where the surface has disintegrated from weather attack, it is restored to sound condition, joints are repointed, and the entire surface treated as above. The treatment leaves the appearance unchanged, and one treatment will last for the life of the building.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat dries out the surface and forces penetration of preservative material. On cooling, the wax congeals and becomes an integral part of the material at and below the surface.



OBELISK OR CLEOPATRA'S NEEDLE
Restored and preserved by Caffall Process in 1885

Durability

The principal components can not be easily oxidized and are insoluble in water, acidulated or akaline solution, or gases. This is the only preservative process having a successful history covering any considerable period. Buildings treated more than fifty years ago are still dry.

Cost

Cost can be ascertained on application to the company. It is determined by the following elements:

Character of material to be treated.

Condition, whether newly erected, old, or requiring renovation.

Area requiring treatment.

Character of surface, whether plain or ornamental.

Location of building or monument.

PLYMOUTH ROCK
Treated 1921

CITY HALL, NEW YORK, N. Y.

F. W. WOOLWORTH RESIDENCE, GLEN COVE, L. I., N. Y.

PERMANENT WATERPROOFING COMPANY

Engineers and Contractors for Waterproofing

Interstate Building
KANSAS CITY, MO.

OFFICES

KANSAS CITY, MO., Interstate Building
CHICAGO, ILL., Conway Building
MILWAUKEE, WIS., 613 Caswell Block
OMAHA, NEBR., 503 Farnum Building
FORT WORTH, TEX., Jennings Avenue and Jarvis Street
PITTSBURGH, PA., 1207 Standard Life Building
INDIANAPOLIS, IND., 727 Lemicke Building
MINNEAPOLIS, MINN., 640 Builders' Exchange
OKLAHOMA CITY, OKLA., 1016 First National Bank Building
HOUSTON, TEX., 204 Beatty Building

Services

Real WATERPROOFING can not be accomplished by haphazard methods. It is a specialized engineering problem, requiring study and wide experience with all materials and methods, used under all sorts of conditions.

It is with this in mind that we offer our services and solicit consideration wherever WATERPROOFING or DAMPPROOFING is required. Information or suggestions, based on our past experience, will be cheerfully given at all times. This applies to Basement Walls and Floors, Pits, Tanks, Swimming Pools, Cisterns, Tunnels, Subways, Concrete Bridges, Retaining Walls, etc.

Material

The PERMANENT WATERPROOFING Co. adopts the material best adapted to the conditions which must be met. It has been found that for all subgrade work—basements, tunnels, pits, etc., as well as for concrete tanks—"Ironite" waterproofing is the most satisfactory. The material used under these conditions contains no grease, asphalt, oil or other substances subject to disintegration.

Application

The waterproofing can be applied to either the *Inside* or *Outside* surfaces of walls after all forms are removed, and to the top of rough floor slabs and footings, in the form of brush coats or in combination of brush and plaster coats.

Appearance

The finished surfaces are left with a finish and color similar to cement brush coat or cement plaster. The surface in either case may be plastered or painted or finished with any type of cement, marble, or terrazzo surfacing. Paint will not be discolored.

Resistance to Pressure

Applied either upon the inside or outside of walls, this waterproofing will resist any hydrostatic pressure which the wall is capable of withstanding.

Permanency

This material is not a simple coating, subject to injury by ordinary wear and abrasion or by changing atmospheric conditions. It will not "slump," crack or scale. Ironite possesses much chemical vitality and in combination with water becomes very active. It works its way into the pores of the concrete, expands and unites chemically as well as mechanically with the structural materials, forming a strong and impenetrable mass. The depth of the penetration varies in accordance with the porosity of the masonry—being greatest where the voids are most numerous and seepage most likely. The result is a metallic surface of varying thickness which is part of the wall or slab and can not be removed without actual cutting. Not only does the material form a *permanent waterproofing,* but it also serves as a preservative and strengthener of the masonry.

Bonding Qualities

This waterproofing forms an absolutely *permanent bond* between old and new surfaces. It is indispensable where a perfect bond between rough slabs or walls and finish coatings of cement, terrazzo, marble, tile, etc. is required.

Working Conditions

The efficiency of any material or methods depends in the last analysis upon workmanship.

The material is mixed with water, and the work can be done at a time when the working conditions are most favorable. This makes possible the highest class of workmanship when combined with the employment of intelligent experienced workmen, properly directed.

Outstanding Features

Waterproofing placed upon the *inside* or *outside* of wet walls, which penetrates and becomes part of the walls or floors.

Waterproofing which actually increases, rather than decreases, the strength and efficiency of the concrete, stone or brick.

Waterproofing which is continuous and assures (instead of breaks) the bond between footings and walls. This should be considered in case of lateral pressures.

Waterproofing which introduces no foreign or injurious materials into the concrete.

Waterproofing which assures bond between rough surfaces and finish and which is not injured by contact or vibration.

Waterproofing which eliminates the necessity for double or protective walls and slabs.

Waterproofing which offers peculiar resistive qualities to sulphurous fumes, gases, acids, fire and electrolysis.

Waterproofing which may readily be repaired in case of structural cracks.

Waterproofing which is *less expensive* than any other real waterproofing.

Waterproofing which is absolutely *guaranteed.*

Specifications

Walls—All outside walls and areas exposed to seepage shall be waterproofed with Ironite by the PERMANENT WATERPROOFING Co.'s method on the inside surfaces from floor level to outside finished grade level. This work to be done before partitions or other obstructions are installed.

Inside walls and columns extending through the basement slab shall be waterproofed or dampproofed as may be required—upon both sides from the top of the footings to the outside finished grade level.

Floors—After the rough slab has been poured and sufficiently set it shall be thoroughly cleaned and waterproofed with Ironite, according to PERMANENT WATERPROOFING Co.'s method, and finished with a slush containing good sharp torpedo sand to give a good bond surface for the topping. This work shall be done before partition walls, machinery bases, conduits, etc., are placed.

Immediately before the topping is applied wash this surface well and apply a bonding coat of cement and Ironite and thoroughly brush into the slab. Apply finish in the usual way.

THE VORTEX MANUFACTURING CO.

Par-Lock Processes of Plastering, Waterproofing, Dampproofing, and Cork Insulating

GENERAL OFFICES AND FACTORY
1978 West 77th Street
CLEVELAND, OHIO
LICENSED APPLIERS IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Product

PAR-LOCK, the method of mechanically applying waterproofing asphalt compounds; also the method of mechanically building out a coarse rock grit key when used for bonding purposes.

Par-Lock
TRADE-MARK

Par-Lock Process

By this process structural surfaces such as concrete, tile, brickwork, etc., are hermetically sealed with a pure asphalt compound applied at normal temperature, and when used for bonding purposes, the application is made in successive layers, sufficiently heavy to receive a coarse rock grit. This grit is driven into the asphalt while it is still wet, forming a rock asphalt mastic which quickly hardens, presenting an unexcelled, rough, rock faced key of minor but uniform suction. This forms a positive dampproof binder or key to receive plaster finish or cork insulation.

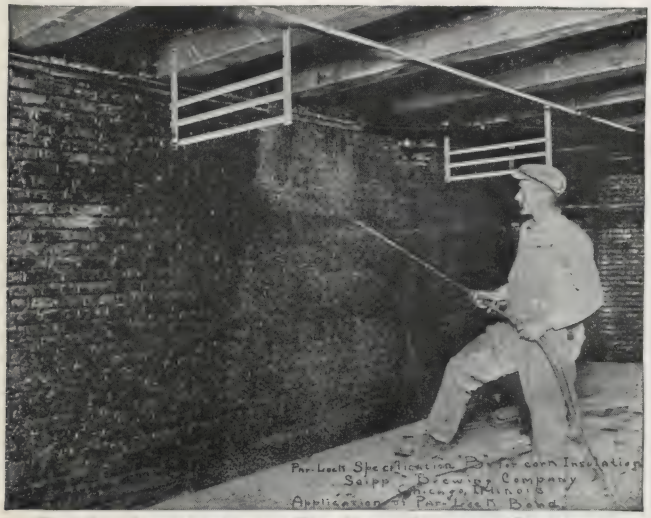


FIG. 1. APPLICATION OF PAR-LOCK ASPHALT COMPOUND

FIG. 2. APPLICATION OF PAR-LOCK GRIT KEY

Application of Par-Lock Bond and Key

Par-Lock bond is applied only through Par-Lock equipment. It is driven under 60 lbs. air pressure from the Par-Lock asphalt gun. The bond is expanded to a fine film and driven over and *into* the surface in repeated layers sufficiently heavy to receive and hold the rock grit in the form of a mastic (Fig. 1).

The crushed rock is driven into the wet bond until it is entirely charged with all the rock that it will contain, and until the surface shows only the dry rock uniformly imbedded over the entire area (Fig. 2).

After 3 days, the plaster may be applied.

Advantages of Par-Lock Plastering

Par-Lock plastering assures positive adhesion and freedom from all moisture and stain.

Solid brick or concrete side walls plastered direct with Par-Lock plastering develops the dryest, tightest, warmest and most economical type of side wall construction.

Cleavage Eliminated—Plastering directly over concrete or masonry has many disadvantages. Differing coefficients of expansion, filtration of lime and sulphur salts, and many other features develop cleavage planes and make plaster fall. The Par-Lock process overcomes these cleavage planes with its permanent, flexible, integral and mechanical bond.

Waterproof—Par-Lock bond forms a waterproof insulation. This prevents damage to equipment and furnishings on floors below by the flooding of sprinkler systems or broken plumbing. Stain transmission and discoloration of plaster is also prevented.

Speed in Construction—Par-Lock can be applied to monolithic concrete buildings in process of construction, permitting the finish work to proceed before the roof construction or roof covering is in place.

In the construction of building No. 40 of the B. F. Goodrich Plant, Akron, Ohio, the plaster was applied over the Par-Lock key on the first floor while the cement finish was being laid on the second floor. The Par-Lock key was being applied on the fourth floor ceiling while the sixth floor concrete was being run in place. Before the roof covering was placed the building was plastered and machinery installed.

Many buildings have been completed in this manner.

Economy in Construction—This process permits of the use of solid brick masonry or brick and tile walls with headers laid indiscriminately. Furring and lathing is eliminated. Substantial walls may be built at a minimum cost.

Condensation Eliminated—The positive, tight-wall construction developed by Par-Lock sufficiently insulated with hard plaster, prevents both the infiltration of moisture and the ingress and egress of air. This maintains an even temperature at the surface of the plaster and prevents condensation.

Continued on next page

Increased Efficiency of Heating Systems—Heating systems are developed to their highest efficiency as the tight side wall construction overcomes the rapid temperature changes at the surface of the plaster.

Advantages of Par-Lock Waterproofing

Par-Lock waterproofing assures positive, uniform adhesion of the waterproofing compounds of sufficient thickness and ductility.

Par-Lock Specifications

Below are listed the various forms of standardized Par-Lock specifications:

Par-Lock Plastering (No Scratch Coat Required)—*Form "A"*—Preparation for plastering horizontal concrete, concrete tile and tile surfaces, except roof slabs. On roof slabs, use specification "B."

Form "B"—Preparation of surfaces to be plastered. Brick and terra cotta walls, vertical concrete surfaces and gypsum surfaces, where thorough dampproofing or light water resisting is required and for all types of roof slab construction.

Floor Finish—*Form "C"*—Waterproofing and binding plastic floor finish except below grade line.

Waterproofing—*Form "D"*—For waterproofing surfaces to be finished with portland cement or tile to resist light bodies of standing water (interior of basement walls, floors, elevator pits, swimming pools, tunnels, etc.).

Form "E"—"Cotton membrane waterproofing" for heavy waterproofing on basement walls, floor footings, swimming pools, tanks, etc.

Form "F"—For light waterproofing of footings, outside walls below grade line, basement floors, tunnels etc.

Form "G"—"Membrane waterproofing" for heavy waterproofing to resist hydrostatic pressure (tunnels, swimming pools, reservoirs and deep basements).

Form "H"—For waterproofing bridge decks, basement floors, tunnels, etc.

Dampproofing—*Form "I"*—Dampproofing walls to be furred, and for coating cinder fill mixtures under matched flooring.

Form "J"—For dampproofing vertical tile wall surfaces to be plastered. Machine applied bond coat requires scratch coat same as bond paints which are less effectively applied by hand.

Note: If you do not have these specifications on file, they will be sent on request.

When specifying Par-Lock, indicate the surfaces to be coated and the form letter of the particular specification required for the work, selected from the above list. For example:

"All .... surfaces shall be coated by the Par-Lock Process according to Par-Lock specification form ...."

Specifications so written are positive assurance of a correct application by any of our Par-Lock licensees.

Guide for Specifying Plastering Over the Par-Lock Key

Ceilings, Except Roof Slabs (Over Par-Lock Specification Form "A")—*Material*—May be neat gypsum finish or hydrated lime gauged with not less than 40% gauging plaster. The usual proportion of sand may be added when sand finish is desired.

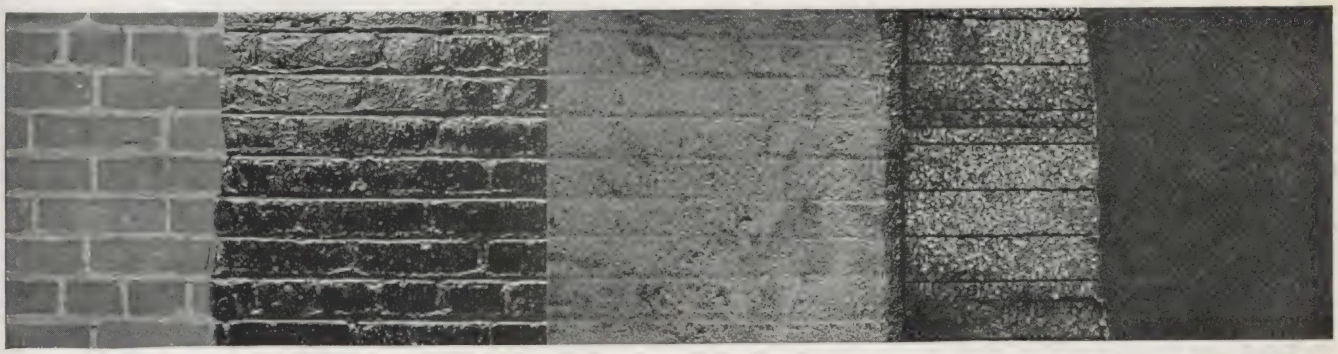
Application—Materials shall be laid over Par-Lock key and darbied or rodded true and even, and tight to key at all low places. As soon as plaster has sufficiently set, the plasterer shall double-back with a thin coat, troweling or floating it to finish required.

Side Walls and Roof Slabs (Over Par-Lock Specification Form "B")—*Material*—No scratch coat is required. Brown coat shall be gypsum prepared sand mortar, or gypsum hard plaster, mixed with sand on the job and prepared in the same proportions as the mill mixed materials (where lime mortar materials are specified for use over the Par-Lock key, they should be gauged slightly with a good gauging plaster to induce the set of the mortar sufficient for quick application of finish coat).

Finish coat shall be as specified above for ceiling surfaces (where Keene's cement is used for finish coat, it should be specified over gypsum brown coat applied over the Par-Lock key).

Application—Brown coat shall be applied direct to Par-Lock key and darbied or rodded out straight and true to the grounds, ready to receive the finish coat. As soon as brown coat has sufficiently set, the plasterer shall double-back and apply finish coat in the usual manner. Grounds of at least ¾ in. in thickness shall be used when Par-Lock plastering is applied on solid masonry or concrete side wall construction.

Caution—Plasters which are a mixture of portland cement mortar or putty gauged with portland cement or Keene's cement mortar must not be used over the Par-Lock key.



Wall Surface | Par-Lock Bond | Par-Lock Key | Cork Board | Waterproof Mastic Finish

TYPICAL INSTALLATION OF PAR-LOCK CORK INSULATION

Process

The Par-Lock Process waterproofs concrete and masonry surfaces, and provides the rock asphalt mastic key to receive the cork insulation.

Par-Lock Cork Insulation

Assures positive, permanent adhesion of cork insulation to structural surface. Prevents air infiltration, giving maximum efficiency of the cork insulation. Bonds the cork to the structural surface with a strength much greater than the cork itself.

Guide for Specifying Par-Lock Cork Insulation—All surfaces to be insulated shall be prepared with Par-Lock Specification Form "B." Cork shall be stuck to the key with asphalt cement having a remelting point of 180° to 200° Fahr. The asphalt cement shall be heated to the consistency of molasses, and the insulating board dipped 1 side and 2 edges, and firmly pressed against the Par-Lock until the asphalt chills.

Par-Lock licensees will make the Par-Lock application for all insulating companies.

Unit installation of Par-Lock and cork insulation installed by United Cork Companies, Lyndhurst, N. J. See page 1801.

Vorco Waterproofing Cork Mastic

Is a waterproofing, odorless, sanitary finish coating to be troweled in 2 layers over the surface of the cork. No joints and non-detachable.

WESTERN WATERPROOFING COMPANY

ST. LOUIS, MO.

OFFICES

ST. LOUIS, MO., 1064 Syndicate Trust Building
DETROIT, MICH., 400 Penobscot Building
CLEVELAND, OHIO, 1900 Euclid Building
HARTFORD, CONN., 902 Main Street
COLUMBUS, OHIO, Gugle Building
NEW YORK, N. Y., 103 Park Avenue
BOSTON, MASS., 27 School Street
PHILADELPHIA, PA., 317 Stephen Girard Building
TOLEDO, OHIO, 409 Smith & Baker Building
TORONTO, CAN., 22 Yonge Street

Services

Experts in waterproofing and sell no material. All work is done exclusively under contract and is guaranteed. Contracts are taken for TREATING STRUCTURES of CONCRETE, BRICK or other MASONRY, whether new or old. Consultation is solicited from architects and engineers when plans are being made, with a view to assisting them in the solution of problems involving WATERPROOFING, OILPROOFING, etc.

TRADE-MARK

Method Used

This system involves the use of Ironite Waterproofing, which is a finely pulverized gray iron containing chemicals. Upon brushing this on the walls with the addition of water, the particles are lodged in the surface pores. Due to the chemicals, rapid oxidation of the iron takes place with the resultant expansion of the iron particles. This swelling completely fills the surface pores and seals them against leakage. Sufficient coatings are applied to thoroughly fill all pores. The early coats make a filling or stuffing for the surface pores, and the succeeding coats form a highly oxidized iron filament. This iron oxide surface is extremely dense and impervious, not alone to the action of water, but also to oils, dilute acids, etc.

The treatment is applied on either the pressure side or the side opposite. In the latter case it is impossible to force the waterproofing away from the wall as the particles inside the surface pores have expanded therein and become an integral part of the structure.

Character of Work

Waterproofing—Tunnels, powerhouses, subways, pits, swimming pools, reservoirs, dams, retaining walls, viaducts, sewers, etc.

Treatment for—Fuel oil tanks, gasoline and lighter oils, molasses tanks, pickling vats, mineral or vegetable oil containers.

Acidproofing—To resist soaps, greases, fats, etc. Treating floors and walls of packing houses, soap factories, tanneries, dairies and other structures requiring protection of concrete and brick against dilute acids.

Specifications

It is our preference to write a separate specification for each specific job.

As a general specification the following may be used:

Basements—All enclosing walls and floors coming in contact with the earth are to be treated on the inside surfaces by the WESTERN WATERPROOFING COMPANY [give here street and town address of nearest office] according to their system of waterproofing, to be covered by their written guarantee.

Oil Tanks—All interior surfaces coming in contact with the oil are to be waterproofed and oilproofed; and the roof is to be waterproofed on the top surface, carrying the treatment down the outside walls a distance of 2 ft.; all waterproofing and oilproofing to be applied by the WESTERN WATERPROOFING COMPANY [give here street and town address of nearest office], and to be covered by their written guarantee.

Swimming Pools—All walls and floor to be waterproofed by the WESTERN WATERPROOFING COMPANY [give here street and town address of nearest office]; said work to be covered by their written guarantee. (If tile is used, we leave the walls with a rough finish to give proper bond to tile without further preparation of surface.)

Protection from Greases, Vegetable Oils, etc.—We have successfully used this system for the protection of concrete and brick walls and floors in packing houses, soap factories, sugar refineries, dairies, etc., but individual specifications are necessary for each job.

We solicit inquiries on this class of work.

Advantages of This Method

On practically all basements, tunnels, pits, etc., the inside surfaces are treated to withstand any hydrostatic pressure. Thus is eliminated the necessity of the following items which would be needed for an outside surface treatment, such as membrane; extra excavation, extra backfilling, brick or other backing wall for protecting membrane, subfloor on which to lay membrane under main floor, cost of waterproofing footings, as our system does not require this, delay to progress of building incidental to waterproofing of footings, rubble walls and floors on pits.

Continued on next page

Representative Contracts

Below are a few representative contracts executed:

MASSACHUSETTS

Fuel Oil Tanks Pacific Mills, Lawrence (also Dover, N. H.); Lockwood, Greene & Co., Architects, Boston; L. E. Locke & Son, Contractors, Lawrence

3,000,000 gal. Crude Oil Tank, Beacon Oil Co., Everett; Leonard Eng. Co., Architects and Contractors, Chicago

Memorial Building, Hamilton; Guy Lowell, Architect, Boston; J. R. Worcester Co., Engineers, Boston

CONNECTICUT

U. S. Post Office Bldg., New Haven; Davis-Carpenter Co., Contractors, New York

RHODE ISLAND

Providence-Biltmore Hotel, Providence; Warren & Wetmore, Architects, New York; Thompson-Starrett Co., Contractors

NEW YORK

Heckscher Bldg., New York; Warren & Wetmore, Architects, New York; Geo. Backer Const. Co., Contractors, New York

Klau Theatre, 45th St., New York; E. DeRosa, Architect, New York; Jardin Co., Contractors, New York

National Biscuit Co., Buffalo; A. G. Zimmermann, Architect; Thompson-Starrett Co., Contractors, New York

N. Y. Steam Corp. Station "J"; Stone & Webster, Contractors,

Swift & Co., New York; Bloome, Sinek Co., Contractors, New York

NEW JERSEY

Barber Asphalt Plant, Maurer; Lockwood, Greene & Co., Architects, New York; White Construction Co., Contractors

Duratex Co. Plant, Newark; Wood, Hulse & Yates, Architects and Contractors, Newark

Manufacturing Building for Mutual Potteries Co., Trenton; Stone & Webster, Inc., Contractors, Boston

Passenger Tunnel, Brooklawn, for Pennsylvania Railroad Company

School No. 2, Hoboken; C. F. Dieffenbach, Architect, Hoboken; Jas. Mitchell Co., Inc., Contractors, Jersey City

Seacoast Trust Co., Asbury Park; Thos. M. James Co., Architects, Boston; Fred T. Ley & Co., Inc., Contractors

PENNSYLVANIA

Chestnut Hill Hospital, Philadelphia; Willing & Sims, Architects, Philadelphia; Frank C. Stewart, General Contractor

Eastern Warehouse, Philadelphia; C. E. Wunder, Architect, Philadephia; Cramp & Company, General Contractors

Underground Tunnel, Philadelphia Plant of Sears Roebuck & Co.; Irwin & Leighton, General Contractors, Philadelphia

MARYLAND

Two 200,000 gal. Concrete Reservoirs, United States Navy Department, Navy Yard, Washington, D. C.

SOUTH CAROLINA

Francis Marion Hotel, Charleston; W. L. Stoddart, Architect, New York; Charleston Engineering Co., Contractors

OHIO

S. S. Kresge Co., Toledo; Owner, Architect and Builder

Commercial Bank, Toledo; H. W. Wachter, Architect; A. Bentley & Sons, Builders

Ford Plate Glass Company, Rossford, Toledo; Owners, Architects; A. Bentley & Sons, Builders

South High School, Toledo; Edward M. Gee, School Board Architect; H. J. Spieker Co., Contractors

Cleveland Discount Building, Cleveland; Walker & Weeks, Architects, Cleveland; Craig Curtiss Co., Contractors

Plain Dealer Building, Cleveland; Hubbell & Benes, Architects, Cleveland; Crowell Little Construction Co., Contractors

B. F. Keith's Theater and Office Building, Cleveland; C. W. & Geo. L. Rapp, Architects, Chicago; Lundoff-Bicknell Co., Contractors, Cleveland.

East High School, Columbus; Howell & Thomas, Architects, Cleveland; Walbridge & Aldinger, Contractors, Detroit

Oberlin High School, Oberlin; Franz C. Warner, Architect, Cleveland; Willing Bros. Construction Co., Contractors, Bellevue

Technical High School, Elyria; R. S. Silsbee, Architect, Elyria; L. A. Burgett Co., Contractors, Lorain

Akron University, Akron; M. M. Konarski, Architect, Akron; Lew Wallace & Son, Contractors, Akron

Capital University, Columbus; David Reibeld & Son, Architects, Columbus; Chas. Schneider & Son, Contractors

Walworth Run Diversion Sewer, Cleveland; Mr. Hoffman, City Engineer

MICHIGAN

American Can Co., Grand Rapids

Postum Cereal Company, Battle Creek

Cadillac Motor Car Co., Fire Lines, Reservoirs, Meter Pits; Du Pont Engineering Co.

Timken-Detroit Axle Co.; Owners, Architects and Builders

Bell Telephone Co.; Smith, Hinchman & Grylls, Engineers; Pontiac Construction Co.

S. S. Kresge Store; Owners, Architects; Bryant & Detwiler, General Contractors

Book Building; Louis Kamper, Architect; Walbridge-Aldinger Co., General Contractors

Stroh Building; Giaver, Dinkleberg & Ellington, Architects; Lanquist & Illsley, Builders

Woolworth Building, Geo. A Fuller Construction Co., Contractors

Hospital School Building, Framington; Albert Kahn, Architect; Bryant & Detwiler Co., Contractors

Burton School; Malcomson, Higginbotham & Palmer, Architects; Edw. D. Finn, Contractor

MICHIGAN (Detroit)

Dodge Bros. Plant; Smith, Hinchman & Grylls, Architects; Owners, Builders

Morgan & Wright Plant; Lockwood, Greene & Co., Engineers; Stone & Webster, General Contractors

Frank & Seder Co., Mercantile Store, 2 buildings; Smith, Hinchman & Grylis, Architects; Thompson-Starrett Co.

River Rouge High School; Van Leyen, Schilling, Keough & Reynolds, Architects; Bryant & Detwiler, Contractors

General Motors Co., Power House Tunnel; Albert Kahn, Architect; Thompson-Starrett Co., Contractors

Ford Motor Co., River Rouge Plant; Albert Kahn, Architect; H. G. Christman Co., Contractors

Detroit Packing Co., Brine Tanks, Grease Pits, etc.; F. R. Patterson Construction Co.

Wyandotte High School; B. C. Wetzel & Co., Architects; Patterson Construction Co.

MISSOURI

Rice-Stix Building, St. Louis; Mauran, Russell & Crowell, Architects, St. Louis; Jas. Stewart & Co., Contractors, St. Louis

Washington University Swimming Pool, St. Louis; Jamieson & Spearl, Architects, St. Louis

Post Dispatch Building, St. Louis; Barnett, Haynes & Barnett, Architects; Jas. Stewart & Co., Contractors

Grain Elevators, Valier-Spies Milling Co., St. Louis; Jas. Stewart & Co., Engineers and Contractors

Anheuser-Busch Co. Train Sheds, Viaduct, Tunnels, Settling Basins, etc., St. Louis; Klipstein & Rathman, Architects; Gilsonite Contracting Co.

S. S. Kresge Building, St. Louis; T. P. Barnett Co., Architect

Central States Life Ins. Co., St. Louis; T. P. Barnett Co., Architects, St. Louis; Dickie Construction Co., Contractors, St. Louis

VIRGINIA

Textile Plant for Riverside and Dan River Cotton Mills, Inc., Danville; Lockwood, Greene & Co., Engineers, Boston; Aberthaw Construction Co., General Contractors, Boston

ILLINOIS

Swift & Co., E. St. Louis; Owner, Architect and Contractor

KANSAS

Bell Telephone Co., Wichita; I. R. Timlin, Architect, St. Louis; W. M. Sutherland B. & C. Co., Contractors, St. Louis

LOUISIANA

Orpheum Theater, New Orleans; Murch Bros., Contractors, St. Louis

FLORIDA

35 School Buildings, Board of Public Instruction, Jacksonville; W. B. Ittner, Architect, St. Louis

CANADA

King Edward Hotel, Toronto; Essenwein & Johnson, Architects, Buffalo; P. Secord & Sons Co., General Contractors, Ont.

Grinnell Co., Ltd.; Anglin-Norcross, General Contractors, Toronto; H. M. Lane Engineering Co., Detroit

Prince Edward Hotel, Windsor; Essenwein & Johnson, Architects, Buffalo; P. Secord & Sons Co., General Contractors

Interprovincial Brick Co., Cheltenham; Wells & Gray, Ltd., Contractors and Engineers, Toronto

Mt. Royal Hotel, Montreal; Ross & McDonald, Architects; Thompson-Starrett Co., General Contractors

THE WATERPROOFING COMPANY

Engineers and Contractors for Waterproofing

345 East 33rd Street
NEW YORK, N. Y.

65 Albany Street
BOSTON, MASS.

Product and Services

Manufacturers of "Cow Bay" Waterproof Cement.

Engineers and Contractors for Waterproofing, making a specialty of Cement Waterproofing. This company contracts for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, etc., guaranteeing a positive and permanent waterproofing for all kinds of masonry construction.

Designs and builds Reinforced Concrete Construction, including Oil Storage Tanks.

Specializes in Oilproof Concrete Tanks.

TRADE-MARK
Reg. U. S.
Patent Office

Experience

The Waterproofing Company introduced and perfected cement waterproofing. During the past 18 years this company has waterproofed a majority of the important buildings in New York, Boston and Pittsburgh.

"Cow Bay" Waterproof Cement

Advantages of "Cow Bay" Cement Waterproofing—No extra supporting walls required. Walls are left with a neat finish; no furring and plastering being necessary. Floor coatings serve both as waterproof seal and floor finish. "Cow Bay" waterproof coating is as hard as the best portland cement finish; placed beneath grillages and column bases without danger of settlement.

Specifications—*Material*—All interior surfaces of all exterior walls and upper surface of concrete floor slab throughout basement (or subbasement), elevator pits, machinery foundations, trenches, etc., as shown on plans, shall be waterproofed with "Cow Bay" Waterproof Cement, applied by The Waterproofing Company.

Workmanship—All surfaces, before application of waterproof coating, shall be thoroughly chipped and cleaned, and coating applied not later than 24 hours after surface has been so prepared. A perfect bond must be secured with underlying masonry.

Wall waterproofing shall be 5/8-in. in thickness, applied in two coats. The floor work shall be 1 in. in thickness and is to serve as a wearing surface as well as a waterproof coating. All waterproofing shall be floated and troweled to a smooth and even finish free from imperfections.

Guarantee—The Waterproofing Company shall furnish written guarantee that all coating placed by them will be waterproof; that during a period of 3 years after completion of the work, they will promptly repair any leaks appearing through their waterproofing which are not due to causes beyond the waterproofer's control.

A Few Important Waterproofing Contracts—Building, location and architect:

New York District

Federal Reserve Bank, New York, N. Y., York & Sawyer
Woolworth Building, New York, N. Y., Cass Gilbert
Hudson Terminal Buildings, New York, N. Y., Clinton & Russell
Singer Building, New York, N. Y., Ernest Flagg
American Telephone & Telegraph Co., New York, N. Y., Wm. Welles Bosworth
Morgan & Co., New York, N. Y., Trowbridge & Livingston
Stock Exchange, New York, N. Y., Trowbridge & Livingston
Municipal Building of New York, N. Y., McKim, Mead & White
City Investing Building, New York, N. Y., Francis H. Kimball
Adams Express Co., New York, N. Y., Francis H. Kimball
Guaranty Trust Building, New York, N. Y., York & Sawyer
Liggett Building, New York, N. Y., Carrère & Hastings
State Education Building, Albany, N. Y., Palmer & Hornbostel

New England District

Federal Reserve Bank, Boston, Mass., R. Clipston Sturgis
Copley Plaza Hotel, Boston, Mass., Henry J. Hardenbergh
Wentworth Institute, Boston, Mass., Peabody & Stearns
R. H. Stearns Building, Boston, Mass., Parker, Thomas & Rice
Opera House, Boston, Mass., Wheelwright, Haven & Rice
New John Hancock Building, Boston, Mass., Parker, Thomas & Rice; (F. A. Waldron, New York, Engineer)
Shawmut National Bank, Boston, Mass., Parker, Thomas & Rice
Merchants National Bank, Boston, Mass., Coolidge & Shattuck
Old Colony Trust Company, Boston, Mass., Coolidge & Shattuck
Noyes-Buick Company, Boston, Mass., A. H. Bowditch

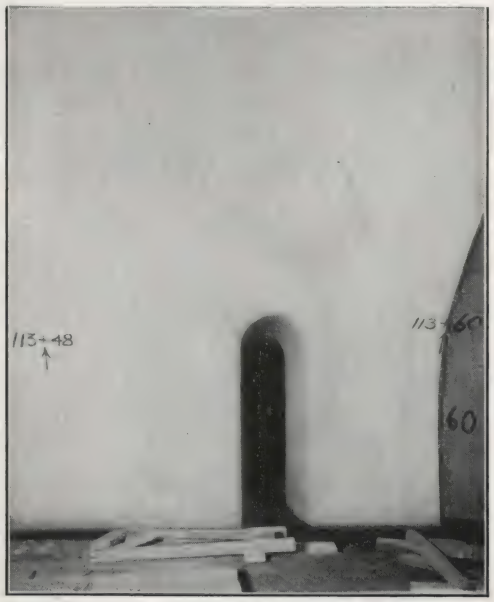
Pittsburgh District

Union Bank Building, Pittsburgh, Pa., MacClure & Spahr
Jones & Laughlin, Pittsburgh, Pa., MacClure & Spahr
Fort Pitt Hotel, Pittsburgh, Pa., Janssen & Abbott
Oliver Office Building, Pittsburgh, Pa., D. H. Burnham & Co.

Miscellaneous

Hydraulic Power Co., Niagara Falls, N. Y., John L. Harper
Detroit River Tunnels, Detroit, Mich., Butler Bros. Const. Co.
Shawinigan Falls Tunnels, Northern Aluminum Co.
47 Telephone Buildings in various cities, McKenzie, Voorhees & Gmelin

Before being Waterproofed



After being Waterproofed

Same Point in Pennsylvania Tunnels Before and After Being Waterproofed with "Cow Bay" Waterproof Cement

ANTI-HYDRO WATERPROOFING CO.

TELEPHONE
MARKET 5069

NEWARK, N. J.

Products and Services

"ANTI-HYDRO," a Liquid Integral Compound for waterproofing, dampproofing, accelerating, without weakening, and hardening all portland cement mixtures.

ARMORTOP, an applied Hardener and Dust Preventer for cement floor surfaces.

ACCELLO, a water solution of commercially pure calcium chloride for refrigeration, for preventing freezing and for accelerating the set of concrete in cold weather.

CONSULTING WATERPROOFING ENGINEERS, for consultation and design for all waterproof constructions. Correspondence invited.

Anti-Hydro

Description—"Anti-Hydro's" function may be expressed as waterproofing cement with cement; that is, filling the voids with a cement solution, which crystallizes at the same time as the cement, integrally forming a hard, insoluble silicate of greater tensile strength, density and activity. It enriches mortars so that cost of troweling, mixing and supervision is reduced to a minimum. In fact, it more than pays its cost in labor saving. It hardens wearing surfaces to a degree that makes them dustless and adamant. It lowers the freezing point of the gaging water permitting concreting when the temperature is as low as 15° Fahr.

ANTI-HYDRO
FOR PERMANENT CONCRETE
HARDENS WATERPROOFS
TRADE-MARK

"Anti-Hydro" is a liquid compound, neutral to litmus. When added, in certain percentage to the water used in gaging portland cement mixtures in the usual way, it has the effect, without retarding setting, of rendering cement in all kinds of masonry impervious to water, moisture, frost, gas, oils, odors, sugar solutions, alkalis and most acids. It excites and brings into service all the cohesive or colloidal possibilities of portland cements, which in themselves are most efficient waterproofing mediums. There are no alums, hydrate of lime, greases, oils, stearic acid, or decomposable ingredients used; neither are there any iron admixtures—all of which disintegrate concrete in time.

When mixed with portland cement, "Anti-Hydro" forms a plastic mass which sets up very quickly and is used for calking metal passing through concrete, and for stopping leaks under pressure. If water is added to the preparation as per the dampproofing specifications, dampproof cold water paint is formed, which can be applied to the inside of masonry walls or to the back of limestone to prevent discoloration.

Because of its remarkable properties "Anti-Hydro" is used for hardening cement floors, for waterproofing concrete in mass and in surface coating, for dampproofing and for waterproofing mortar in brickwork.

For coatings, 1 gal. "Anti-Hydro" for each 80 to 100 sq. ft. 1 in. thick; for mass concrete, 1½ to 2 gals. for each cu. yd.

Approval—The superiority of "Anti-Hydro" for waterproofing and concrete hardening is demonstrated by the permanency of work completed as long as eighteen years ago, and by the comparative tests of the United States Bureau of Standards. In these tests, reported in their Technologic Paper No. 3, they designate "Anti-Hydro" as Compound No. 40, and state "It is most impermeable of any of the Mortars."

Specifications—*Floor Hardener*—The 1-in. floor topping of 1:2 mix shall be gauged by addition of "Anti-Hydro" to all water used in tempering dry mixture, in proportion of 1 gal. of "Anti-Hydro" to each barrel (4 bags) of cement. The proper consistency will be obtained if, for each barrel of cement, 1 gal. of "Anti-Hydro" and 10 gals. of water be used.

Waterproofing in Mass—To the 1:2:4 mix, for gauging add 1½ gals. of "Anti-Hydro" for every cubic yard of concrete. Proper consistency will be obtained if, for each barrel of cement, 1 gal. "Anti-Hydro" and from 10 to 15 gals. of water be used. If forms are below water level, concrete should be poured extremely stiff.

Waterproofing in Coatings—Floor work shall be 1 in. in thickness, and shall serve the double purpose of a waterproofing agent and dustless wearing surface.

Wall coatings shall be ⅝ in. in thickness from floor level, where they shall be properly coved and bonded to floor, and carried up to at least 1 ft. above grade.

The 1:2 mortar shall be gauged by addition of "Anti-Hydro" to all water in proportion of 1 gal. "Anti-Hydro" to each barrel (4 bags) cement. To assure perfect bond to underlying masonry, all surfaces, before application of waterproofing, shall be thoroughly roughened, cleaned, dampened and grouted. A slush or grout of neat cement, using 1 part "Anti-Hydro" to 3 parts of water, is first applied. Coatings shall be applied not later than 24 hours after surfaces have been prepared.

Dampproofing—To a mixture of 1 gal. "Anti-Hydro" and 3 gals. water stir about ½ bag of portland cement to a creamy consistency. Apply 3 coats with a brush or spray, the surface first being cleaned and dampened.

Note: Specifications for waterproofing *Brickwork, Stucco on Solid Masonry* and *Stucco on Metal Lath* will be furnished on request.

Acid Resisting—Write for special specifications.

Armortop

Description—Armortop reacts chemically with cement, forming a surface so hard that it becomes dustproof and wearproof. When brushed into an ordinary concrete floor, it immediately combines chemically with the cement, forming a new compound which binds the loose, disintegrating particles of the concrete mix into a dense, hard mass. The results therefrom are permanent and should not be confused with temporary paint coatings.

So easily and quickly does Armortop transform soft floors into new ones, the whole job can be done in the evening after closing hours. By the following morning the floor is ready for use without loss of valuable time.

ARMORTOP
THE APPLIED HARDENER FOR CONCRETE
TRADE-MARK

Directions for Applying Armortop—Thoroughly clean the old floor, removing any loose particles and any oil or grease that may be on the surface. Upon the clean, dry floor apply a coat of 1 part Armortop and 1 part water. This should be flushed over the floor and swept into the surface with a long handled brush or stiff broom. The same process should be repeated with a second and a third coat, allowing at least 4 hours between each application.

Shipment

"Anti-Hydro" is shipped in standard containers of 5, 10, 20 and 30 gals., f.o.b. Newark, N. J.

Armortop is shipped in barrels of 55 gals. each.

Accello is shipped in barrels of 53 to 55 gals.

THE BITU-MORTAR WATERPROOFING COMPANY, INC.

Manufacturers of Cement Waterproofing; Waterproofing Engineers and Contractors

TELEPHONE
MURRAY HILL 3647, 3648

280 Madison Avenue
NEW YORK, N. Y.

NORTHWESTERN AGENTS
ST. PAUL, MINN., K. F. LOTT & Co., 101 East 8th Street
MINNEAPOLIS, MINN., K. F. LOTT & Co., Andrus Building

Products

"B-M No. 78" BITU-MORTAR LIQUID WATERPROOFING COMPOUND.

BITU-MORTAR WATERPROOFING
WATERPROOFS PERMANENTLY
TRADE-MARK

Services and Guarantee Bond

Contractors for the execution of waterproofing in all sections of the country, making a specialty of difficult operations where other materials have failed.

Will furnish bond from any bonding company, when required, guaranteeing work to remain absolutely watertight for a long term of years.

An engineering department is maintained, which is at the service of all seeking advice on any questions concerning waterproofing of tunnels, subways, foundation walls, sewers, reservoirs, etc.

"B-M No. 78" Bitu-Mortar Liquid Waterproofing Compound

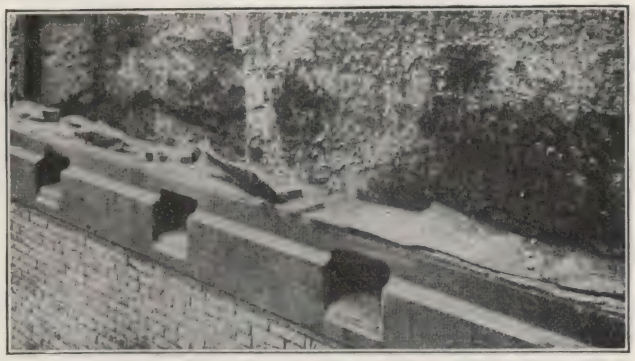
This is a bituminous emulsion which can be readily incorporated in ordinary portland cement mortar, rendering same absolutely and permanently impervious to water, even under severe pressure.

Mortar so prepared will bond perfectly to either old or new concrete, brick, stone or iron, and can be applied to surfaces even when water is coming through.

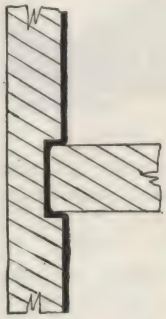
FISK BUILDING, 57TH STREET, BROADWAY AND EIGHTH AVENUE, NEW YORK, N. Y.
CARRÈRE & HASTINGS, Architects — FRED T. LEY, Contractor

Suggestions for Application

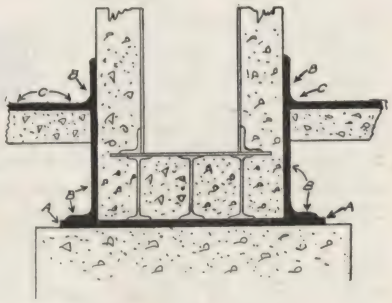
NATURE OF WORK	CONDITIONS	MATERIAL REQUIRED
Tunnels, subways, cellar walls.	Already constructed. Water coming through floors, ceilings or sidewalls.	Bitu-Mortar Liquid Waterproofing Compound, "B-M No. 78."



METHOD OF CARRYING WATERPROOFING BACK OF BEAMS



METHOD OF OBTAINING CONTINUOUS COATING WHERE INTERIOR WALL BUTTS AGAINST OUTSIDE WALL



METHOD OF WATERPROOFING UNDER GRILLAGES
A—First operation, "dampcourse"
B—Second operation
C—Third operation, finished floor

List of Prominent Installations

Munson S. S. Co. Building, Wall and Beaver Streets, New York, N. Y.; Kenneth Murchison, Architect; George A. Fuller Co., Contractors

Kerr S. S. Co. Building, 38 Beaver Street, New York, N. Y.; Warren & Wetmore, Architects; George A. Fuller Co., Contractors

Combustion Engineering Co. Building, 43-47 Broad Street, New York, N. Y.; Ludlow & Peabody, Architects; George A. Fuller Co., Contractors

Fisk Building, 57th Street, Broadway and Eighth Avenue, New York, N. Y.; Carrère & Hastings, Architects; Fred T. Ley, Contractor

7 Gold Street and 83 Maiden Lane Building, New York, N. Y.; Clinton & Russell, Architects; Cauldwell, Wingate Co., Contractors

Thomas W. Lamont, Residence, 109 E. 70th Street, New York, N. Y.; Walker & Gillette, Architects; Marc Eidlitz & Sons, Contractors

Business Building, 10-14 Pearl Street, New York, N. Y.; Clinton & Russell, Architects; H. H. Voight Co., Contractors

Jas. A. Hearn & Sons, 26-28 W. 13th Street, New York, N. Y.; Dunsmore & McClear, Engineers; R. H. Howes Construction Co., Contractors

Astoria Gas Plant, Astoria, L. I. (Underground Tunnel): W. Cullen Morris, Engineer; George A. Fuller Co., Contractors

181 Sixth Street, Long Island City, N. Y.; Stein & Davies Co., Owners; Turner Construction Co., Contractors

American Brake Shoe & Foundry Co., Newark, N. J.; Jas. A. Stewart & Co., Contractors

CRESCENT SALES & MFG. CO.

SUCCEEDING CERESIT WATERPROOFING CO.

Manufacturers of Waterproofing Products and Waterproofing Compounds

904 Westminster Building
CHICAGO, ILL.

Products

CRESCENT WATERPROOFING; CERESIT WATERPROOFING COMPOUND; INDURITE LIQUID HARDENER; CEM-BRIC COVERING COMPOUND; CRESCENT FOUNDATION COATING; CRESCENT PLASTER BOND; CRESOLAC TRANSPARENT WATERPROOFING.

Crescent Waterproofing

TRADE-MARK

The integral method of waterproofing has the prestige of years of successful use. The efficiency of this method of waterproofing concrete, cement mortar and cement stucco has been demonstrated in a practical way to the satisfaction of architects, engineers and builders for so long a time, that it is now conceded to be the economical and correct method of procuring permanently waterproof results.

Crescent Waterproofing (paste or powder) can be thrown in the mixer without any preliminary preparation. This is a distinct advantage over other types of waterproofing. It is efficient beyond the factor of safety, and its use means economy and effectiveness for all classes of waterproofing work.

Ceresit Waterproofing Compound

Ceresit has three general uses as follows:

(a) Waterproofing substructure work, such as foundations, basements, pits, tunnels, swimming pools, etc. Ceresit can be used either in mass concrete or cement mortar coating as indicated by specifications below.

(b) Waterproofing cement stucco.

(c) Waterproofing concrete bridges, pergolas, and ornamental cement work.

Specifications—In all work to be waterproofed Ceresit Waterproofing Compound shall be used as manufactured by CRESCENT SALES & MFG. CO., Chicago. Ceresit shall be used according to following directions:

Mass Concrete—Temper the concrete aggregates with the following solution: mix 1 part each of Ceresit and water, then add 15 to 19 parts of water, proportions in final solution to be 1 part Ceresit to 16 to 20 parts water. During waterproofing work, all water pressure must be relieved.

Amount required: 10 to 12 lbs. of Ceresit per cu. yd. of concrete.

Cement Mortar—Where a waterproof cement mortar or plaster coat is to be applied, dry mix cement and sand, and temper with the following solution: mix 1 part each Ceresit and water, then add 11 parts water, final solution to be 1 part Ceresit to 12 parts water. During waterproofing work, all water pressure must be relieved.

Amount required: 12 lbs. Ceresit per 100 sq. ft. cement mortar 1 in. thick. Proportionate amounts for fractions of an inch.

Cement Stucco—Follow the same specifications as for cement mortar.

Amount required: 3 lbs. per 100 sq. ft. for each ¼ in. thickness.

Indurite Liquid Hardener

A colorless chemical compound, which, when applied to cement surfaces, changes them to a flinty, granitelike hardness. Indurite gives concrete floors a permanent wearing surface, and insures them against dusting and the action of oils and moisture.

Indurite hardens by chemical reaction and is therefore permanent. A special folder gives detailed information as to its uses.

Covering Capacity—For 2-coat work approximately 100 sq. ft. per gal.

Directions—Thoroughly clean floor, removing all foreign matter such as oils, grease, etc. Workmen should wear rubbers or rubber boots. Apply material in 2 coats. Dilute first coat of Indurite with water, half and half. Flush the floor to full absorbent capacity and scrub in thoroughly with long-handled brushes with stiff bristles. Apply the second coat of Indurite without dilution, after a few hours. Scrub second coat thoroughly into the surface. Any material not absorbed can be removed with a rubber squegee, preferably with hot water.

Cem-Bric Covering Compound

A waterproof decorative paint for exterior surfaces of brick, cement stucco and concrete. Cem-Bric penetrates and seals the surface pores and is made in the following colors: white, cream, buff, cement gray, tile green, brown and brick red.

Directions—Give flowing coat over dry surface until pores are thoroughly saturated. If necessary, first coat can be thinned with turpentine. Apply second coat without dilution 24 hours after first coat.

Crescent Foundation Coating

A heavy black, asphaltic paint for dampproofing outside of foundation walls, under wood floors and work of similar character.

Covering Capacity—About 65 sq. ft. per gal. on brick; 75 sq. ft. per gal. on concrete. Double coat work 40 to 50 sq. ft. per gal.

Directions—Apply with large brush from outer edge of footings to 2 in. above grade level. After first coat dries, apply second coat.

Crescent Dampproof Plaster Bond

A dampproof protecting and bonding material to be applied to the inside surfaces of outer or exposed walls before application of plaster.

Covering Capacity—60 to 75 sq. ft. per gal. on brick; about 75 sq. ft. per gal. on concrete, for single coat work.

Directions—Apply with large brush and coat thoroughly, leaving no pinholes. Plaster can be applied after 24 hours.

Cresolac Transparent Waterproofing

A waterproofing liquid to be applied with a brush for protecting exteriors of cement, brick and porous stone against water penetration. It leaves no film on the surface, but enters and effectively seals the pores without changing the color of the treated surface.

Covering Capacity—150 to 200 sq. ft. per gal. for 2 coats.

Directions—Apply with wide brush in 2 coats several hours apart, over dry and dirt-free surface.

Literature

The Crescent catalogue and specification book describes all of these products in detail. Other Crescent products are included, such as, Crescent Metallic Hardener, Hydrolac Acidproofing and Hydrolac Protective Coatings.

THE GENERAL FIREPROOFING COMPANY

Waterproofing and Dampproofing Products and Technical Paints

YOUNGSTOWN, OHIO

BRANCH OFFICES

CHICAGO, 325 W. Madison Street
NEW YORK, 257-63 E. 133rd Street
BOSTON, 125 Federal Street
SYRACUSE, 707 Keith Theater Building
PHILADELPHIA, 614 Bulletin Building
ATLANTA, 257-63 Decatur Street
BALTIMORE, Builders' Exchange, 15 E. Fayette Street
CLEVELAND, Builders' Exchange, Rose Building
KANSAS CITY, 1009 Waldheim Building
OMAHA, 213 Kennedy Building
MILWAUKEE, 1018 First Wisconsin National Bank Building
SAN FRANCISCO, 20 Beale Street
LOS ANGELES, 618 Washington Building
BUFFALO, 824 Ellicott Square
MINNEAPOLIS, 754 Builders' Exchange
EXPORT DEPARTMENT, 438 Broadway, NEW YORK

Products

INTEGRAL WATERPROOFING, Paste and Powder; FOUNDATION BRUSH COATING; MOP COATING; WATERPROOFING FELT; SATURATED FABRIC; ACIDPROOFING; COLORLESS WATERPROOFING; CEMENT and MASONRY COATING (in colors); HARDENER and DENSIFIER for concrete floors; FLOOR PRIMER; FLOOR ENAMEL (in colors); WOOD PRESERVATIVES; DAMPPROOFING COATING; STAINPROOF STONE BACKING; MASTIC CEMENT; PROTECTIVE COATING (for steel); GALVANIZED STEEL PRIMER; BONDING COMPOUND.

For Metal Lath Reinforcement, see pages 260-263.

Service

Ordinary waterproofing and dampproofing problems are covered in standard literature, but there are many special problems which can not be thus adequately discussed. In order to meet these contingencies, a Waterproofing Service Department is maintained at Youngstown to assist in the solution of special problems. Aside from this service which is offered by the Home Office, our branch offices and representatives throughout the country are qualified to render the same assistance.

The Waterproofing Sales Department will be glad to suggest details for waterproofing or dampproofing any particular structure and will supply instructions and specifications for carrying on the work provided that data is supplied describing conditions to be met. Our engineers will study the problems and recommend the best methods and materials. This service is free and does not obligate you in any way.

Quality of GF Waterproofing Products

GF Waterproofings are manufactured from chemicals of the highest grade procurable and will accomplish as much as any similar product that can be found on the market.

THE GENERAL FIREPROOFING COMPANY is too proud of its reputation to place on the market products other than those of the highest quality which will fully meet with all the claims made for them.

Literature

THE GENERAL FIREPROOFING COMPANY publishes a wide variety of literature on waterproofing, from pieces describing the entire line to small folders discussing the use of an individual product for an individual purpose.

GF Integral Waterproofing Paste No. 10

A smooth, white paste to be mixed with the gauging water of concrete. The small quantity required and the ease of using it make it an effective and inexpensive waterproofing. Once dissolved in gauging water used for tempering the mass, it remains permanently in solution. GF Waterproofing Paste No. 10 is used in densifying and waterproofing mass concrete, either plain or reinforced. It lubricates the mixture, reduces amount of gauging water necessary to secure density, and thus decreases voids in finished concrete and distributes throughout the mass a medium which meets with the properties to be desired in an efficient waterproofing compound. Also used to waterproof stucco.

GF Integral Waterproofing Powder No. 11

This product is the same material which forms when GF integral Waterproofing Paste No. 10 combines with cement in finished concrete or mortar. It is mixed dry with the cement.

GF Cement Accelerator No. 12

A colorless liquid which is mixed with water and used to accelerate the set of cement. It also lowers the freezing point, thereby allowing work in much colder weather than usual; eliminates overtime work, and permits a much better finish to concrete floors.

GF Foundation Brush Coating No. 16

A bituminous, dampproofing compound which can be applied with a brush to the outside of any foundation wall.

GF Mop Coating No. 17

A high grade bitumen for use with either GF Waterproofing Felt No. 18 or GF Saturated Fabric No. 21 in building up a membrane waterproofing. GF Mop Coating No. 17 is free from all elements which have no permanent waterproofing value. It remains elastic at zero and will not run or slide at 110° Fahr. It repels water, ammonia solutions, sulphuric acid and saturated solutions of sodium chloride. Must be melted before using, and applied hot.

GF Waterproofing Felt No. 18

For membrane waterproofing in connection with GF Mop Coating No. 17. A strong water repellent felt made up from cotton stock with linen and fiber to give it tensile strength. GF No. 17 and GF No. 18 in combination are used for waterproofing swimming pools, steel and concrete bridge decks, substructures, etc.

GF Saturated Fabric No. 21

A high grade cotton duck fabric, thoroughly saturated during manufacture with strictly pure bitumen. For use especially on railroad bridges, etc., where structure is subject to excessive vibration.

Continued on next page

GF Acidproofing No. 99

This product is chemically neutral and will not combine with material over which it is applied. Especially adaptable for coating wood or concrete walls in hospitals and laboratories, and for coating tanks or vats (on the inside) to contain weak acids or alkali mixtures.

GF Colorless Waterproofing No. 100

A colorless, permanent, pore filling liquid which effectively dampproofs walls without changing appearance. For waterproofing exterior walls of brick, stone, or stucco; for copings, parapets, cornices, cisterns, water tanks, pools, etc.

GF Cement and Masonry Coating No. 101

For uses similar to GF No. 100 except that it imparts a lasting color to the surface. Supplied in colors—white, old ivory, buff, bedford gray, portland gray, concrete gray, tile red, and brownstone—making it possible to secure almost any desired decorative effect. GF Cement and Masonry Coating is in no way affected by the alkali in concrete or stucco surfaces, and will not peel or scale, as will ordinary paint. It effectively fills and seals surface pores, thus preventing absorption of moisture.

GF Thinner No. 101

A thinner to be mixed with GF Cement and Masonry Coating to form the priming coat. Use 1 part of thinner to every 5 parts of GF No. 101.

GF Metallic Floor Hardener No. 140

A ground metallic hardener which is mixed with cement and dusted over surface of a concrete floor prior to final troweling. Gives a smooth, hard, dense surface that will withstand exceptionally severe traffic.

GF Crystalrox Crystals No. 145

A chemical hardener which increases the hardness of a cement surface from 40% to 50%. Can be applied to old floors without interrupting their use. It protects floors from action of weak acids, alkali and oils. GF Crystalrox No. 145 is shipped in crystal form, this method being adopted for the customer's greater security. Eliminates freight charge on the water used to hold the compound in solution. Will keep indefinitely if kept dry. The application is simple. Dissolve crystals in water and apply solution in accordance with specifications.

GF Floor Enamel No. 155

A product containing high grade pigments combined with a tough, elastic vehicle which insures maximum wearing surface. The proper percentage of pigment and vehicle is combined in order to obtain greatest wear. This enamel gives an even, uniform coating, and is especially adapted for cement floors in hospitals, schools, hotels, libraries and all public buildings. GF Floor Enamel No. 155 is furnished in several pleasing colors. Neither pigment nor vehicle is affected by free lime in cement.

GF Floor Enamel No. 155 Transparent (Floor Primer)

When deep penetration of surface is required, it is found advisable to apply a floor primer previous to application of colored floor enamel. This is true of dusting floors or when the floor is laid directly on the ground.

GF Wood Floor Preservative No. 160

For application to either hard or soft wood floors. An exceptionally high grade wood preservative, giving a smooth appearance that is highly wear resistive. Seals the pores of surface to which it is applied, prevents absorption of moisture, prevents dry rot, and cements fibers of the wood together, thus preventing splintering and slivering.

GF Dampproofing Coating No. 200

A material to be applied to interior of brick or tile walls above grade before plastering. It forms a dampproof coating and at the same time furnishes a bond for plaster, inasmuch as the material retains a strong "tack." GF No. 200 is applied with a brush, and effectively protects interior plastered surface from absorption of dampness and moisture through wall. GF Dampproof Coating No. 200 is *not* to be applied to ceilings which are later to be plastered. This product is also used as a dampproofing on walls which are furred, lathed, and plastered.

GF Stainproof Stone Backing No. 220

A high grade coating applied to all unexposed sides of cut stone, marble, etc., to prevent staining and discoloration. Effectively seals pores of stone, preventing penetration of moisture and dampness from back-up walls, etc.

GF Black Mastic Cement No. 250

A heavy plastic trowel coating used for waterproofing concrete, tin or slate roofs, also for calking around windows and doors, pointing up flashings, chimneys, roof gutters, etc. Previous to application of GF Black Mastic Cement No. 250, GF Liquid Primer No. 250 shall be used.

GF Liquid Primer No. 250

A brush coating for use previous to the application of GF Black Mastic Cement No. 250.

GF Mastic Cement in Colors No. 250

A heavy decorative mastic trowel coating, pigmented, manufactured for use similar to GF Black Mastic Cement No. 250.

GF Steel Coating No. 300

A high grade paint for coating steel surfaces to protect them from corrosion. Also thoroughly insulates the surface and prevents electrolytic action. Furnished in black and several colors.

GF Galvanized Primer No. 350

For priming galvanized surfaces. Penetrates the film of grease left in the galvanizing process, forming a perfect bond with the metal itself without injuring the zinc coating. Furnished in several colors. To be used previous to the application of a decorative paint.

GF Bonding Compound No. 400

To be diluted with water and used as a wash to increase the bond between old and new concrete or plaster coat, by removing the laitance, etc.

GF Wood Preservative No. 550

To be used for making structural timbers, posts, etc., proof against the action of water, rotting due to dampness, etc. Applied by brush, spray, or immersion. Nut brown in color.

THE SANDUSKY CEMENT CO.

Manufacturers of Waterproofing

CLEVELAND, OHIO

FACTORIES

BAY BRIDGE (SANDUSKY), OHIO DIXON, ILL. YORK, PA.

Product

MEDUSA WATERPROOFING, in either Powder or Paste form—the original integral concrete waterproofing.

Also, Medusa Stone Backing.

For Medusa Portland Cements, see pages 316-318.

Output

1,000,000 lbs. of waterproofing.

TRADE-MARK

Medusa Waterproofing Paste

A white emulsion to be added to the gauging water. Especially recommended for machine mixed concrete.

Medusa Waterproofing Powder

To be mixed dry with dry cement before sand and water are added.

Description of Medusa Waterproofing

The Paste is identical with the Powder in resulting composition and waterproofing effect. The sole difference between the two is the greater ease and convenience of mixing which the paste form offers. If the powder is thoroughly and carefully mixed with the cement, however, equally good results can be obtained with either form.

Medusa Waterproofing forms in concrete a water repellent compound, thoroughly and effectually rendering the mass impermeable. It is not subject to deterioration and is as everlasting as the concrete itself.

Advantages

Concrete contains many microscopic pores or capillary tubes constituting from 20% to 40% of the cubic contents. Water enters concrete because of physical law of capillary attraction. To make it waterproof, the walls of the capillary tubes must be made impermeable.

Medusa Waterproofing, being mixed with the cement, becomes an inseparable part of the concrete itself. It is designed to be mixed with cement, to lubricate the particles and form an integral part of the mixture. It thus becomes an inseparable part of the mass, being tightly sealed within the concrete.

Medusa Waterproofing will positively and permanently render concrete dampproof and waterproof.

Uses

"Medusa" will give positive watertight and dampproof results in construction of concrete reservoirs, water towers and tanks, bathing pools, tunnels, disposal plants, pumping stations, elevator pits, stucco, basement walls and floors, cisterns, cement blocks, etc.

Quantity Required

Powder—From 1½% to 2% of weight of cement (6 to 8 lbs. Waterproofing to 1 bbl. cement).

Paste—1 gal. to 1 bbl. portland cement (dissolved in the water to be used for mortar or concrete).

Specifications for Waterproofing of Mass Concrete for Foundations, Walls, Floors, Footing, Piers, Swimming Pools, Reservoirs, Tanks, Wells, Pits, Tunnels and Concrete Blocks

Proportions—The concrete shall consist of 1 part cement, 2 parts sand and 4 parts aggregate.

Cement—The cement shall be Medusa Waterproofed Portland Cement or a brand of equal quality, which will pass all the requirements of the Standard Specifications of the American Society for Testing Materials.

Waterproofing—If Medusa Waterproofed Cement is not used, then the contractor shall use Medusa Waterproofing, either powder or paste, to waterproof the Portland cement which is used.

(A) Medusa Waterproofing Powder—To render concrete or cement work impervious to water, use Medusa Waterproofing Powder to the amount of 2% of the weight of cement (8 lbs. to the barrel of cement).

If Medusa Waterproofing Paste is to be used, consult Paragraph "B."

Method of Mixing by Hand—If a mechanical mixer is not used add the powder directly to the dry cement and mix by hand until the powder is uniformly distributed throughout the cement. To the dry mixture of cement and sand, add the crushed stone and mix until a uniform batch has been secured. The above procedure differs in no respect from the thorough mixing recommended for all concrete, except by the addition of the powder and its dissemination throughout the cement. Care should be taken to add the water a little at a time in order to avoid flotation and washing about of the fine particles of Waterproofing.

Mechanical Mixing—Where a concrete mixer is employed, the powder should be added directly to the cement at the hopper or on the loader. The time of mixing should be sufficient to insure uniformity throughout the mass and should not be lessened with a view to increasing speed. The water should be added slowly to prevent flotation and washing about of the fine particles of Waterproofing Powder. The amount of water should be kept as low as conditions permit, a quaking consistency being most desirable.

(B) Medusa Waterproofing Paste—If the paste is used instead of the powder, use the Paste to the amount of 2% by weight of the cement (8 lbs. to the barrel of cement).

Thoroughly mix the Medusa Paste with equal parts of water, and add this paste water to the gauging water used to mix the concrete.

If Medusa Waterproofing Powder is to be used, consult paragraph "A."

Gauging Water—The amount of water per cubic yard of concrete varies greatly with conditions. It theoretically requires only about 20 gals. of water to the barrel of cement to make 1:2 mortar or 1:2:4 concrete. This would be 30 gals. to the cubic yard. In actual practice, however, the quantity of water used may be 40 to 60 gals. or even more per cubic yard. The amount of Waterproofing added should therefore be in proportion to the cement or aggregates which go to make up the finished concrete.

Avoid Tricks in Specifications—The contractor who has blindly followed a specification for a given quantity of paste to a given quantity of water is apt to be grievously surprised when he receives a considerably larger bill for waterproofing than he had anticipated.

We therefore advise that the amount of water which a crew is using be determined, and the correct amount of Waterproofing Paste be added to the gauging water so that for each barrel used, 1 gal. of paste (8 lbs.) goes into the concrete.

No more water shall be used than is absolutely necessary to make a slightly plastic and workable mix.

Sand—The sand shall be clean, sharp and free from clay, loam, vegetable or other deleterious matter.

Aggregate—The aggregate shall be gravel, crushed trap rock or crushed limestone uniformly graded so that the largest pieces will pass a 1½-in. ring.

Placing—Concrete shall be placed immediately after mixing and shall be well spaded to expel entrapped air and insure maximum density. If possible, pouring of concrete for entire operation shall be continuous. If joints are unavoidable, however, extreme care shall be taken to remove all dirt and laitance from old concrete, saturating joint with water and giving it a good coat of cement grout.

Continued on next page

Specifications for Waterproofed Cement Plaster for Waterproofing Concrete Foundations, Pits, Wells, Reservoirs, Basements, Tunnels, etc.

Proportions—The cement plaster shall be composed of 1 part cement and 2 parts sand.

Cement—The cement shall be Medusa Waterproofed Portland Cement or a brand of equal quality which will pass all the requirements of the Standard Specifications of the American Society for Testing Materials.

Waterproofing—If Medusa Waterproofed Cement is not used, then the contractor shall use Medusa Waterproofing, either powder or paste, to waterproof the portland cement employed. (See "Waterproofing of Mass Concrete" specifications on preceding page.)

Sand—Sand shall be clean, sharp and free from clay, loam, vegetable or other deleterious matter.

Preparation of Surface—The old concrete surface shall be mechanically roughened or hacked by means of stone mason's hammers, drills or similar tools, exposing the matrix of the concrete and having ¼- to ⅜-in. deep holes every 2 to 3 in. apart, so as to provide a better bond for the cement plaster. Remove all loosened pieces and apply freely to the cleaned area a solution of 1 part muriatic acid and 10 parts water, using a fiber or acid brush. Allow acid solution to remain until the acid exhausts itself, approximately 10 minutes.

Wash the surface with water from a hose, being positive to remove all of the acid solution. Go over the walls with stiff wire brushes, or where available, compressed air or steam may be used, and remove any remaining loose pieces or particles.

Saturate the entire surface with water to prevent the concrete absorbing water from the cement plaster before the cement has had time to hydrate or set.

Masonry—Mortar joints shall be raked out to a depth of ½ to ¾ in. and all old and loose mortar removed.

All paint films are to be thoroughly removed by burning, scraping or by sand blast. All hard non-porous surfaces must be scored to provide key for plaster. All masonry surfaces shall be thoroughly saturated before grouting is applied. Prepare a grout of portland cement, 2% Medusa Waterproofing by weight of the cement, and water. Mix to a creamy consistency and apply with a fiber brush to the cleaned surface, brushing the grout thoroughly into the concrete.

Mixing—Using cement and sand as heretofore specified, mix waterproofed cement plaster to stiff, workable consistency, adding water slowly and using the smallest possible volume.

Application of Cement Plaster—Apply the first coat of plaster ⅜ in. thick, troweling the plaster well into the concrete surface so as to secure a proper bond.

Scratch the first coat with a "scratcher." Do not use nails, trowel, or scratch too deep.

As soon as the first coat has set hard enough, saturate with water and apply the second coat ⅜ in. thick, troweling the plaster with a sufficient pressure to obtain maximum density and to close all surface pores, leaving a tight, close-grained finish.

Where the waterproofed cement plaster is to be applied to the walls and floors, cut the second coat of plaster off 6 in. above the finished floor line.

After the walls have been plastered, prepare the surface of the floors, including the 6-in. base at walls, in the same manner as the walls (see "Preparation of Surface").

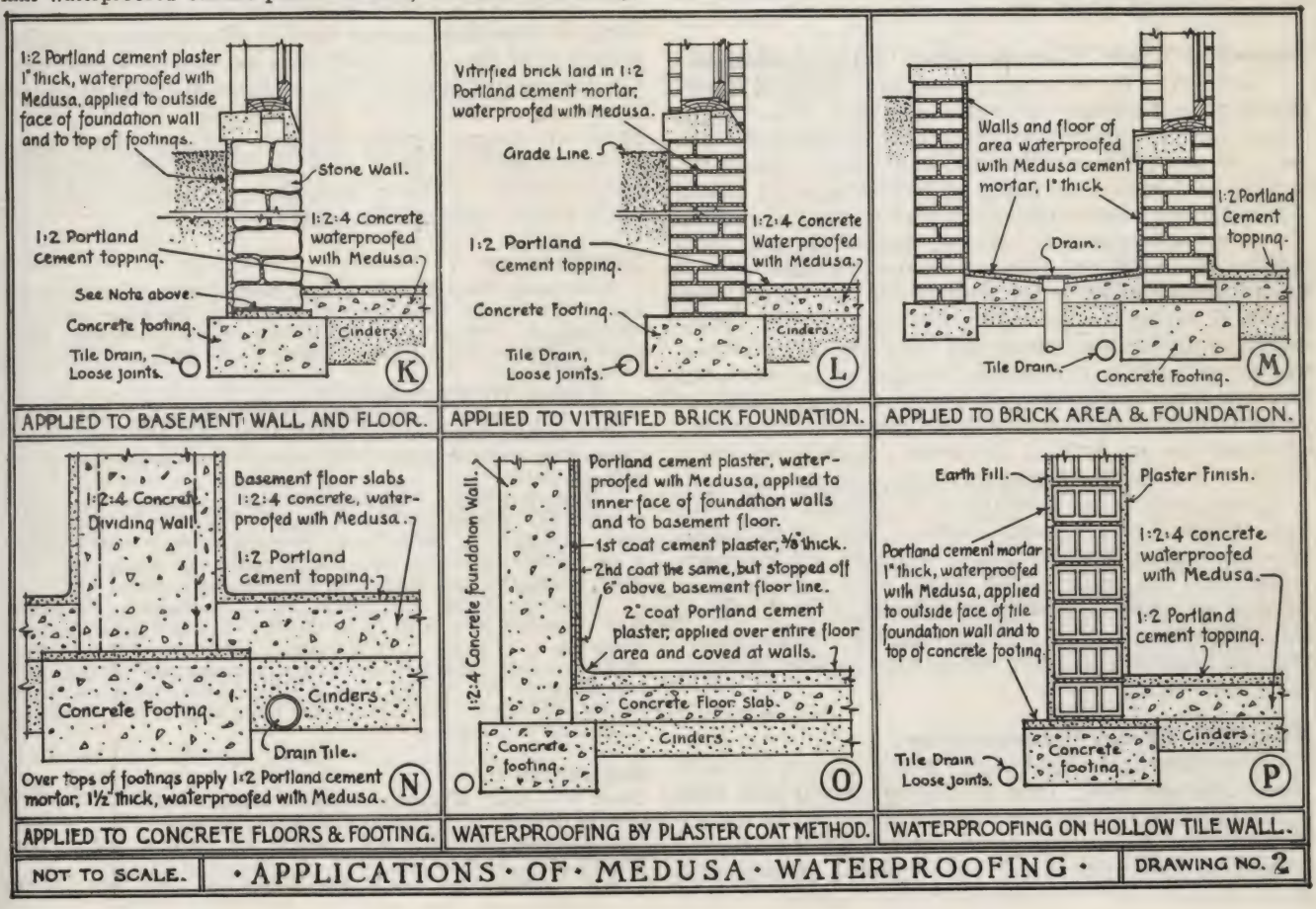
Have the floors cleaned, saturated with water and apply the coat of grout as described. Use extreme care to prevent mud or dirt being brought on or tracked over the grouted surface. Apply a 2-in. coat of waterproofed cement plaster over the floor, joining with the coved base with the finished wall cement plaster.

Where joints must be made in cement plaster work, run the cement work 1 or 2 in. beyond the contemplated joint. After plaster has set, cut this surplus off on as broad bevel as possible, giving this bevel a good coat of grout prior to applying subsequent plaster.

In Case Water Interferes With the Work—If there is a continual seepage through the walls, holes must be bored in the walls, and tubes or small gas pipes inserted to concentrate the flow of water and relieve the pressure while the plaster coat is being applied. Caulk around pipes with oakum dipped in hot asphalt. Drainage pipes should remain open until the waterproofed cement plaster coat has thoroughly set and is capable of resisting the pressure by its own adhesive strength, after which remove pipes and plug holes with cork or wood and cover them with waterproofed cement plaster.

If the water pressure is exceedingly great, it will be necessary to sink sumps on the exterior of the walls to a depth below the basement floor level, and keep pumps going until the plaster is thoroughly set.

Keep Finished Surface From Drying Out Too Fast—The finished surface must be protected from too rapid drying out, by keeping moist for at least a week to allow it to thoroughly harden and to prevent hair cracks. Sprinkle or soak with a hose, or cover with canvas or burlap kept continually wet.



NATIONAL WATERPROOFING CO.

Waterproofing Engineers and Contractors

1077-1081 Columbus Avenue

BOSTON, MASS.

Products and Services

ENGINEERS and CONTRACTORS for WATERPROOFING, DAMPPROOFING and OILPROOFING.

KENNELLY'S LIQUID (INTEGRAL) WATERPROOFING and OILPROOFING.

KENNELLY'S DAMPPROOFING PAINT and COMPOUND.

KENNELLY'S CONCRETE FLOOR HARDENER.

General

We will absolutely guarantee all waterproofing done by us to be watertight. We will dampproof without discoloring the outside of any concrete, brick or stone structure and will guarantee the work to be absolutely moistureproof. We will apply a floor hardener to any concrete surface and guarantee the work against dusting or softening of the surface. All work done by us will be carried on in such a manner that no delay will be caused the general contractor or any part of the work.

Engineering Department

Our engineers are always at the service of architects, engineers, contractors and owners for the solution of waterproofing problems, for preparing specifications and for estimating the cost of waterproofing all concrete structures, foundations, tunnels, dams, reservoirs, swimming pools, etc.

Kennelly's Liquid Waterproofing (Integral Method)

Kennelly's liquid waterproofing is an integral waterproofing liquid which crystallizes in the mass as the cement sets, sealing completely and permanently the voids or pores between the sand and cement against the passage of liquids, even under heavy pressure. It is used in concrete or cement mortar to prevent the penetration of water or dampness. Having practically the same specific gravity as water, it immediately becomes part of the tempering water when poured into the barrel, thus becoming evenly distributed throughout the mass. Kennelly's liquid waterproofing not only renders concrete, mortar and stucco permanently impervious to water, but prevents discoloration and efflorescence, gives additional protection to the reinforcement and increases rather than decreases the strength of the mass. It does not affect the color or setting of cement mortars or concrete.

Our method of installing is to have a competent man stationed at the water barrel or any other source of water supply for the mixer, who will put the compound into the water to be used. Thus no delay is caused; in short, whenever concreting is to be done, start the work at once and the concrete can be waterproofed as it is placed and we will guarantee the work to be watertight.

Kennelly's Plaster Waterproofing

If a watertight plaster finish is desired, put the compound into the water used in making mortar and then place the mortar on the surface to be covered and work it out to the desired finish. By this method, concrete, cement mortar and stucco are rendered permanently moistureproof and pressureproof, the finished surface is not discolored, and the strength of the concrete is increased rather than decreased.

Kennelly's Exterior Dampproofing (Colorless)

A colorless liquid for dampproofing exterior surfaces of stucco, brick, stone and concrete masonry. Also extensively used as a sizing for lime plaster on interior walls before paint is applied. It is applied with a brush. Efflorescence and blotches are caused by the absorption of atmospheric moisture and exudation of gypsum and lime. By the use of our dampproofing, we have overcome these disfiguring features without discoloring the original surface or joints.

We will guarantee to make any building dampproof by this method at a reasonable cost.

Kennelly's Interior Dampproofing (Dark)

A compound for coating interior surfaces of brick, stone or hollow tile walls. Forms a continuous waterproof film or coating on the surface, completely sealing walls and preventing penetration of moisture. This method eliminates furring and lathing and thus effects a great saving, as the plaster may be applied directly to this coating.

Kennelly's Concrete Floor Hardener

A liquid compound either *mixed with the concrete* finish in new floors *or applied to the surface* of old as well as new floors. In buildings subject to heavy wear, the dusting of a concrete floor induces disintegration and crumbling of the concrete and thus ruins the floor. Our hardener insures against dusting, and provides a non-absorbent surface, more impervious to wear than ordinary concrete, makes a durable top surface, and provides a sure non-slip foothold.

Specifications

Integral Waterproofing and Oilproofing—To each 50 gals. of water (1 bbl.) used in tempering the mass concrete, add 6 qts. of Kennelly's Liquid Waterproofing, thoroughly mixing the concrete and carefully spading it into place so as to avoid stone pockets.

Plaster Waterproofing—Material used in same proportion as for integral work, mixing the waterproofing with water used in making concrete mortar and then placing the mortar on the surface to be covered, using 6 qts. of waterproofing to 50 gals. of water.

Dampproofing—Thoroughly clean surfaces to be dampproofed by washing with warm water. Allow to dry, and then apply dampproofing with brush, covering surface well. Allow 4 or 5 hours to elapse before making second application, and when thoroughly absorbed, make a third application.

Concrete Floor Hardener—First thoroughly clean the floor surface to be treated by scrubbing with warm water, thereby removing all foreign particles, etc. Allow to dry, and then apply the floor hardener with brush, covering the surface well and allow to dry for at least 4 or 5 hours before making a second application. Should any dry spots appear, treat with another coat of hardener.

References

Stone & Webster Engineering Corp., Boston, Mass.
General Electric Co., Pittsfield, Mass.
New England Telegraph & Telephone Co., Boston, Mass.
Boston Post, Boston, Mass.
United Illuminating Co.'s Plants, Bridgeport, and New Haven, Conn.

ESTABLISHED 1848 INCORPORATED 1922

TOCH BROTHERS

Technical and Scientific Paint and Varnish Makers

320 Fifth Avenue
NEW YORK, N. Y.

DISTRIBUTING AGENCIES IN THE WORLD'S PRINCIPAL CITIES
WORKS AND LABORATORIES: LONG ISLAND CITY, N. Y.

Products

Inventors and manufacturers of Steel Protective Paints; Damp-proofing and Waterproofing Paints and Compounds; Concrete Floor Coatings; Insulating Paints; Smokestack Paint; Roofing Paint; Enamels; Mortar, Cement and Plaster Colors; Stone Backing.

Also manufacturers of Decorative Paints for all purposes; Machinery Enamel.

R.I.W. REMEMBER IT'S WATERPROOF! Reg. U. S. Pat. Off. TRADE-MARK

Integral Waterproofing—Concrete, Stucco and Cement Mortar

"R.I.W." Toxement (a dry powder), the patented integral waterproofing compound which lubricates concrete, increases its workability, plasticity and flowability, renders it non-porous, and eliminates the necessity for extreme tamping and vertical chuting.

"R.I.W." Toxement Mortar Paste, for the integral waterproofing of cement mortar and stucco.

Membrane Waterproofing—For *thin wall reinforced concrete foundations.*

"R.I.W." Self-Healing Bridge Cement, adhesive, waterproof, alkali-proof and elastic even under low temperature. Requires no skill to apply. Obviates the use of costly treated felts and fabrics.

Damp-proofing Walls Below Grade, Exterior

"R.I.W." Marine Cement, for damp-proofing footings, foundations, floor slabs, skylights and for expansion joints.

Damp-proofing Walls Above Grade, Interior

No. 232 "R.I.W." a black, waterproof, elastic, tacky material, for brush application to interior surfaces of exterior masonry walls. Forms a perfect bond with plaster applied directly to painted surface; prevents penetration of dampness; renders walls vermin-proof; saves cost of furring and lathing.

"R.I.W." Plastertox, dark olive gray, waterproof plastic compound; renders furring and lathing unnecessary.

Damp-proofing Exposed Walls Above Grade, Exterior

"R.I.W." Liquid Konkerit (patented), priming and finishing cement paints, ready for use, for damp-proofing, beautifying and overcoming the natural porosity of stucco, concrete and masonry walls.

"R.I.W." Toxloxpore (transparent), for brick, concrete, stucco, limestone, Bedford stone and wood. Prevents efflorescence and penetration of dampness.

Cement and Mortar Colors

"R.I.W." Cement Colors, for cement floors, stucco, bridges, swimming pools, buildings and other cement construction.

Edinburgh Mortar Color for mortar joints.

Stone Backing

No. 110 "R.I.W." (black), alkali-proof and waterproof. For backing limestone, Bedford stone, granite, marble or any cut stone. Protects against chemical action and discoloration from cement.

Concrete Floor Coatings

No. 2626 "R.I.W." Cement Filler, for hardening and preserving dry, crumbly floors where enamel finish is not to be applied.

"R.I.W." Cement Filler and Cement Floor Enamel, for hardening and painting dry, porous or crumbly floors.

"R.I.W." Pigmented Cement Filler, for priming well finished cement floors where an enamel finish is to be applied.

"R.I.W." Dustop, for dust prevention only of dry floors.

"R.I.W." Flintox, for chemically hardening and binding wet or dry floors.

"R.I.W." Acid-Proof Filler, for resistance to weak acids or alkalis.

"R.I.W." Exposed Porch and Deck Paint, for wood, canvas or concrete surfaces exposed to elements.

Interior Enamels

"R.I.W." Everlite Mill White, waterproof; easily cleaned; can be applied direct to any surface.

"R.I.W." Hospital and Laboratory Enamel, waterproof; resists fumes of acids, alkalis, sulphuretted hydrogen and chemicals.

"R.I.W." Pipe Enamel, in white, black, yellow, green, etc., for identification as well as protection.

Structural Steel Paints

"R.I.W." Tockolith, anti-corrosive patented cement paint for priming steel and other metal.

No. 49 "R.I.W." (black, dark olive green), for bridges, tanks, lined smokestacks, etc.

No. 137 "R.I.W." (red), for roofs, gutters, gas holders, tanks and interior of chemical works.

No. 1087-A "R.I.W." (black, red, brown and dark green), for railroad bridges, tanks, composition roofing, etc.

No. 110 "R.I.W." (black and maroon), for grillages, column footings, metal lath and steel subjected to the fumes of acids, alkalis or electrolysis.

No. 112 "R.I.W." (black and maroon), for structural steel building frames.

Acid- and Alkali-proof Coatings

No. 44 "R.I.W.," for tanks of wood or metal subjected to extreme heat and acid fumes.

No. 1375 "R.I.W." (cherry red), acid-proof and waterproof coating; resists gases, moisture, steam, etc.

No. 5 "R.I.W." Insulectric (black), for electrical insulating of armatures, junction boxes, transformers; non-conductor and acid-proof.

Catalogue, etc.

A chemical laboratory is maintained by us and the services of the chemists are at the disposal of clients who desire paints for special conditions. Correspondence and personal inquiries are invited on technical paint and waterproofing problems. Send for copy of Toch Specification Book, and the Blue Book describing complete line of steel preservative paints.

THE TRUSCON LABORATORIES

Waterproofings, Technical Paints and Factory Maintenance Products

DETROIT, MICHIGAN

BRANCH OFFICES

ATLANTA, GA., 605 Forsyth Building
BALTIMORE, MD., 406 Builders Exchange Building
BOSTON, MASS., 147 Summer Street
CHICAGO, ILL., 22 West Monroe Street
CLEVELAND, OHIO, 13434 Merl Avenue
COLUMBUS, OHIO, 261 Taylor Avenue
DALLAS, TEX., 738 Wilson Building
DENVER, COLO., 2941 Walnut Street
DETROIT, MICH., Caniff Street and G. T. R. R.
EL PASO, TEX., 1701 Olive Street
KANSAS CITY, MO., 611 Bryant Building
LOS ANGELES, CAL., 1480 E. 4th Street
MINNEAPOLIS, MINN., 601 Metropolitan Trust Building
NEW YORK, N. Y., 31 Union Square, W.
NORFOLK, VA., 607 Dickson Building
PHILADELPHIA, PA., 1432 So. Penn Square
PITTSBURGH, PA., 608 Maloney Building
PORTLAND, ORE., 194 N. 13th Street
ST. LOUIS, MO., 1307 Syndicate Trust Building
SALT LAKE CITY, UTAH, 423-24 McIntyre Building
SPOKANE, WASH., 527 Old National Bank Building
SAN FRANCISCO, CAL., 10th and Bryant Streets
SYRACUSE, N. Y., 440 Gurney Building
TORONTO, ONT., 311 King Street, East

Products

WATERPROOFINGS and FACTORY MAINTENANCE PRODUCTS: Dampproofings, Preservatives, Floor Hardeners, Technical Paints.

Truscon Waterproofing Paste, Concentrated

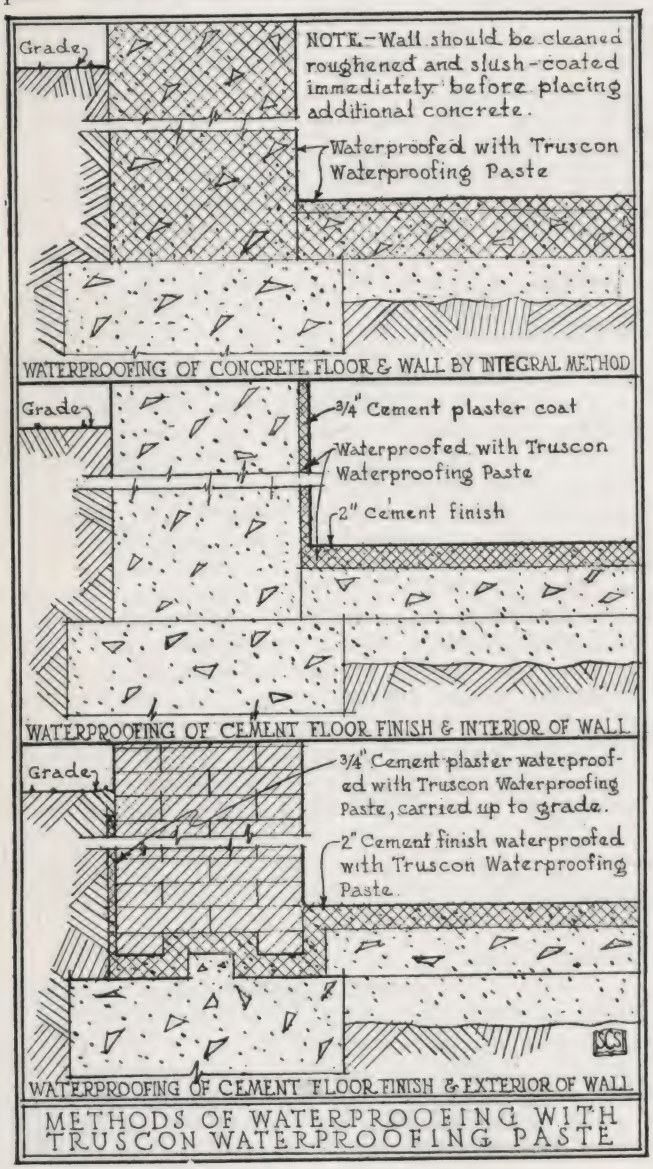
Integral waterproofing compound, in paste form for concrete and cement mortar; mixes perfectly with water and diffuses readily through the mix, giving uniformly dependable results.

TRADE-MARK

For foundations, dams, tunnels, reservoirs, tanks, and floors where absolute waterproofness is essential.

Specifications—*Mass Concrete*—The dry mix of cement, sand and stone (1:2:4) to be tempered with water to medium consistency and add 1 part Truscon Waterproofing Paste, Concentrated, to each 36 parts of water as per manufacturer's directions. All concrete to be placed in one continuous operation, each pouring to be thoroughly spaded to insure uniform density.

Waterproof Plaster Coat Applied to Concrete or General Masonry—To dry mix of sand and cement (2:1), tempered to required consistency, add 1 part Truscon Waterproofing Paste, Concentrated, to 18 parts of water as per manufacturer's directions. Before applying waterproofing coat, chip or otherwise roughen up the masonry and thoroughly clean to afford satisfactory bond. Further treatment of such surfaces as directed by manufacturer. Plaster to be applied in 2 coats, each ⅜ in.; the second applied just before the first has reached its final set.



Renovating and Protecting Exposed Masonry

A protective coating is as essential to exterior masonry surfaces as it is to wood. Masonry is porous and absorbs water, causing staining and cracking of concrete and stucco—and mildewing and chipping of brick. Stonetex, by preventing absorption of water, eliminates these troubles.

Stonetex—A specialized masonry coating, applied with a brush. It renovates and uniforms the surface, giving the texture and appearance of natural stone.

Send for color card of 10 beautiful masonry shades.

Dampproof Coatings

Truscon Plaster Bond—A bituminous dampproofing for the interior of exposed masonry walls. Plaster bond penetrates, being absorbed deeply into pores of masonry and insulates interior from dampness.

When using Truscon Plaster Bond, furring and lathing are eliminated, since material remains tacky, affording an excellent bond for coat of plaster.

Booklet containing specifications sent on request.

Truscon Foundation Coat—A liquid bituminous cement of heavy consistency for dampproofing substructural work under earth filling. Applied with a large brush, or mop. It is particularly penetrative and adhesive, which makes it especially valuable for undergrade dampproofing of masonry. More economical than coal tar pitch—requires no heating apparatus.

Truscon Stone Backing—A black dampproof coating for treating unexposed sides of cut stone to prevent staining and discoloration of stone, due to absorption of moisture from mortar.

For detailed specifications, see Truscon Specification Handbook. Ask for a copy.

Continued on next page

TRUSCON MAINTENANCE ENGINEERING SERVICE

MAINTENANCE DEPARTMENT TRADE-MARK

A Maintenance Product for Every Maintenance Purpose

For many years THE TRUSCON LABORATORIES have satisfied the maintenance requirements of manufacturing plants. It has been our special mission to invent and formulate various materials for increasing the value and serviceability of buildings and equipment.

This work has made it necessary for us to make a careful study of general maintenance requirements and to provide materials that would do these requirements justice. The result of this sound experience in maintenance work is offered *free* of *charge* in Truscon Maintenance Engineering Service.

Offices are located at convenient points throughout the United States—each office in charge of a man who has made maintenance a life study (list on opposite page). These are the Truscon Maintenance Engineers who are ready to cooperate with any engineer or plant superintendent regarding the requirements of his buildings. You are invited to call on them for assistance.

Concrete Floors Hardened Chemically with Agatex—Agatex hardens and densifies the cement, making it dustless, oilproof and long-wearing. Send for booklet "Agatex and Its Performances."

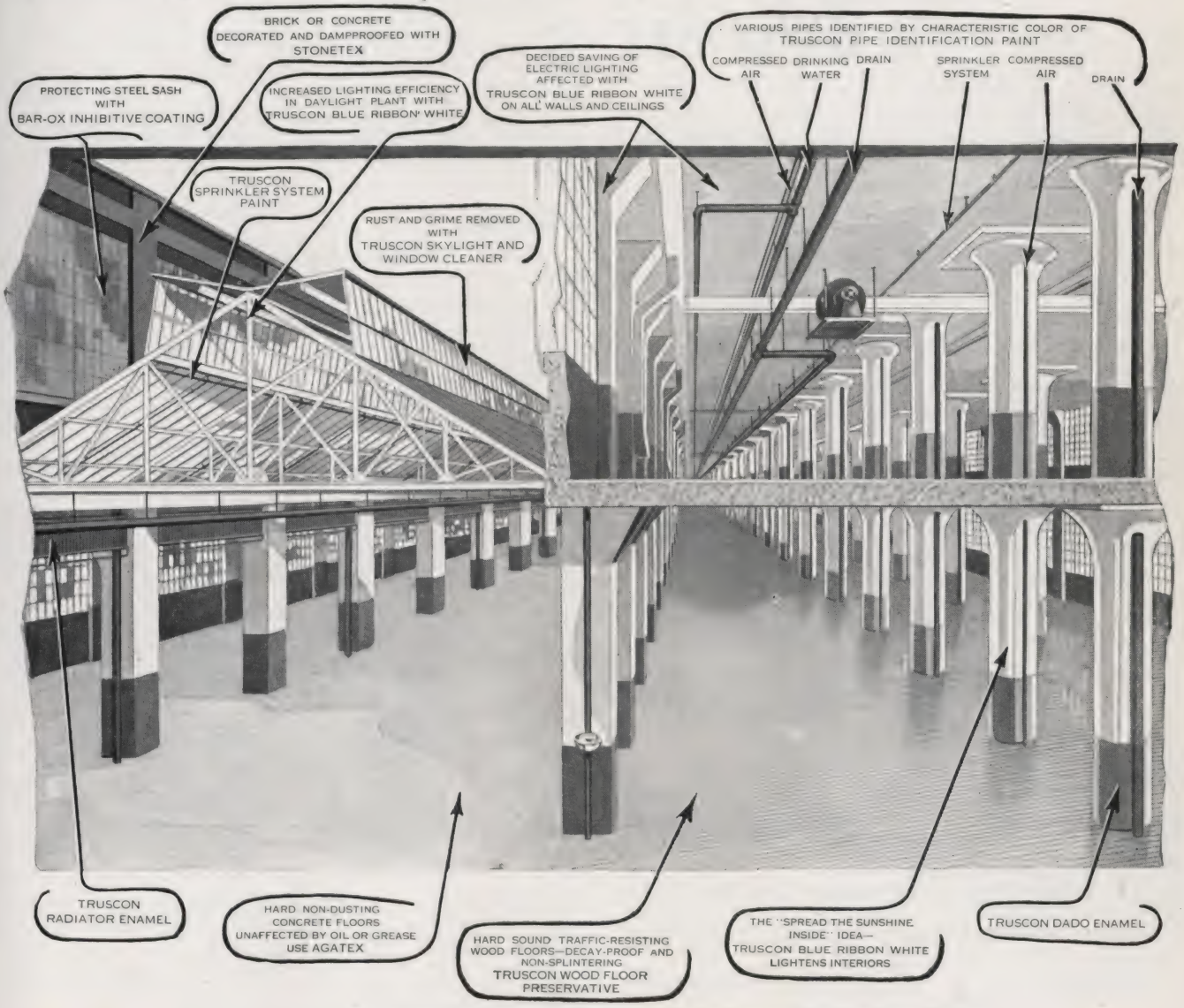
"Daylighting" Interiors—For increasing the lighting efficiency of a plant use Truscon Industrial White. Send for booklet, "Spread the Sunshine Inside."

Identification of Pipes—Truscon Pipe Identification Paint in various standard shades for the various pipes in industrial plants: compressed air, drinking water, steam, drain, sprinkler system, gas, etc.

Masonry Protected and Dampproofed—Stonetex, the specialized coating for dampproofing, protecting and beautifying concrete, stone, stucco, etc. Color card on request.

Structural Steel, Steel Sash Construction, Tanks and Other Exposed Steel Work Thoroughly Protected—Use Bar-Ox Inhibitive Coating—the coating that inhibits corrosion. Send for booklet, "Bar-Ox Protective Steel Coatings."

Wood Floors—Prevent drying-out and splintering of wood floors with Truscon Wood Floor Preservative. Penetrates into the wood. Does not make the surface slippery. Protects against decay where floors are subjected to wetting. Booklet on request.



ILLUSTRATING SCOPE OF TRUSCON MAINTENANCE ENGINEERING SERVICE

AMERICAN BUILDERS PRODUCTS CO.

Concrete Floor Hardeners and Waterproofings

TELEPHONE
HARRISON 2490

64 East Van Buren Street
CHICAGO, ILL.

BRANCHES IN PRINCIPAL CITIES

Products

KWIK-SET, a liquid Integral Hardener and Waterproofer for cement floors.

DURO, a liquid Chemical after-treatment for Hardening and Dustproofing new or old cement floors.

AQUATITE, a liquid Integral Waterproofer for walls, stucco, brick masonry, cement or concrete mixtures.

ECO, a Waterproofing Emulsion for brushing on surfaces of concrete or cement mixtures, brick, stone, stucco, etc.

METALLIC FLOOR HARDENER, a compound for dustproofing, wearproofing and waterproofing concrete floors.

Kwik-Set

KWIK-SET
TRADE-MARK

An integral liquid hardener and waterproofer for concrete floors, especially adapted for use in depots, loading platforms, industrial plants, hotels, service stations and garages. By its action the facing becomes dense, preventing penetration and making the floor impervious to water, oil or grease.

It quickens the final set without weakening the tensile strength, and produces a hard and flintlike wearing surface that will not dust nor disintegrate.

Kwik-Set gives an ideal fatty troweling condition, saving time and labor, and can be poured in low temperatures.

Specifications—Add to gauging water in proportion of 1 gal. Kwik-Set to every barrel of cement used. Pour, float and trowel in the usual manner. A second troweling when sufficiently set will give a hard, smooth finish. Keep surface wet and protected for 5 days, using a layer of soft wood sawdust; wet down as needed. Allow 1 gal. to 100 sq. ft. of surface.

Duro

DURO
TRADE-MARK

A chemical after-treatment for dustproofing and hardening cement floors, new or old.

Specification—Surface must be clean and dry.

First Coat—Mix Duro and water half and half. Thoroughly flush this mix over the floor very generously, letting soak in all possible to absorb. Use long handled, stiff bristle brush.

Second Coat or Finish—Apply Duro full strength, no dilution, in same manner as first coat; 5 to 10 hours advised between coats, depending on porosity of floor. 1 gal. covers 100 sq. ft., 2 coats, the complete treatment.

Aquatite

AQUATITE
TRADE-MARK

This liquid integral waterproofer for walls, stucco, brick masonry, cement or concrete mixtures, undergoes chemical action during the setting and becomes an integral part of the concrete or mortar. It produces an absolutely waterproof and dampproof condition, is simple in its use and gives uniform results.

Specification—Add 1 gal. Aquatite to gauging water for each barrel of cement.

Eco

ECO
TRADE-MARK

This waterproofing emulsion for brushing on concrete or cement mixtures, brick, stone and stucco surfaces, produces a non-porous condition absolutely impervious to moisture.

Specifications—Brush on 2 coats. The second coat can be applied immediately following first coat's absorption. 100 sq. ft. to gallon, 2 coats.

Metallic Floor Hardener, Regular or Red

For concrete floors, producing wearproof, waterproof and dustproof surface.

Specifications—Mixed equal parts hardener and dry cement dusted on. For ordinary foot wear, such as schools, public buildings, etc., the proportion is 15 lbs. to 100 sq. ft. For heavy duty, such as factories, garages, warehouses, etc., 25 lbs. to 100 sq. ft.

For decorative purposes, moving picture houses, garages, etc., supplied in red, producing a good imitation of tile by marking off in squares. 30 lbs. to 100 sq. ft. is necessary to produce a good red floor.

References

A partial representative list of architects and concerns for or by whom the above products have been applied or furnished.

International Harvester Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Cudahy, Wis.
Worden-Allen Co., Chicago, Ill.
Joliet Railway Supply Co., Chicago, Ill.
Pfister & Vogel Leather Co., Milwaukee, Wis., Walter W. Ahlschlager, Architect, Chicago, Ill.
Fire House, City of Milwaukee, Wis.
Johnson Soap Co., Milwaukee, Wis., Makers of Palmolive Soap
Armour Leather Co., Chicago, Ill.
Nash Motor Co., Milwaukee Plant
Eddy Paper Co., Three Rivers, Mich.
H. L. Vander Horst, Contractor, Kalamazoo, Mich.
Wisconsin Sugar Co., Menominee Falls, Wis.
Ferro Concrete Construction Co., Cincinnati, Ohio
Illinois State Penitentiary
U. S. A. Quartermaster's Department
J. I. Case Threshing Machine Co., Racine, Wis.
Chicago Wet Wash Laundry, Chicago, Ill.
Nelson & Co., Inc., General Contractors, Racine, Wis.
E. W. Sproul Co., General Contractors, Chicago, Ill.
Great Lakes Construction Co., Chicago, Ill.
Continental Seed Co., Hammond, Ind.
E. N. Crowell, General Contractor, Crown Point, Ind.
John Obenberger Forge Co., West Allis, Wis.
Concordia College, River Forest, Ill.
Laurence Construction Co., Minneapolis, Minn.
Mandel Bros., Chicago, Ill.
Green Bay Paper & Fiber Co., Green Bay, Wis.
Burgess Battery Co., Madison, Wis.
Whiting Hotel, Stevens Point, Wis.
John Hoberg Paper Co., Green Bay, Wis.
Walter W. Oeflein, Inc., General Contractor, Milwaukee, Wis.
Frank D. Chase, Architect, Chicago, Ill.
Badger State Tanning Co., Sheboygan, Wis.
Locomobile Co., Service Station, Chicago, Ill.
The Texas Co., Oils, Chicago, Ill.
Rainbo Gardens, Red Dance Floor, Chicago, Ill.

THE CAL CHEMICAL COMPANY

INCORPORATED

HAGERSTOWN, MD.

LABORATORY
STAUNTON, VA.

NEW ENGLAND OFFICE: 88 Broad Street, BOSTON, MASS.

Product

CONCRETE HARDENER and FROSTPROOFING.

Slogan

"CAL Cures Concrete."

"The Same Strength in Half the Trim."

CAL Concrete Hardener

CAL is an accelerator, integral hardener, frostproofing, and curing material for all portland cement mixtures. It is a definite aid to a proper cure under all conditions of temperature and climate, and is the best insurance against poor concrete and mortar.

It is a pure white powder, shipped in 100-lb. cloth sacks and added dry to the mix. A safe year around average use of CAL is 5 lbs. per bag of cement. This is increased or decreased on the job according to weather conditions and time of set required.

The Non-corrosive Accelerator—Careful architects, engineers and contractors have long felt the need for a material of this kind which could be used with equal safety in plain and *in reinforced concrete.* CAL is the first and only answer to this need—it *lessens* the danger of corrosion. A simple test can be made in any office to conclusively show that CAL is not corrosive.

The Test—Fill two cups with water from the faucet. To one cup add about a teaspoonful of CAL and stir for a few seconds. The CAL is partially dissolved. Then add to each a nail which has been cleaned with gasoline or ether, and after a few days note the results. *CAL actually prevents corrosion.*

For Summertime Curing—CAL holds the water of the mix until the cement needs it, insuring a good cure under the severest drying out conditions. Tests show that at 100° Fahr. a CAL mortar has more strength at 2 days than the same mortar, untreated, at 28 days. (*Prof. J. R. Lapnam.*) A similar comparison was found by the U. S. Bureau of Standards in test pieces stored in the laboratory air. (*Tech. Paper* 174). Too rapid drying out ruins more floors and finish than any other cause.

For Cold Weather Curing—Below 40° Fahr. the curing of ordinary concrete is very slow. The addition of CAL to the mix will bring winter work back to summertime speed. In freezing weather CAL is a double protection. It shortens the danger period and at the same time it generates a valuable heat of reaction in the mass, which prevents it from reaching the low temperatures which would otherwise be experienced.

For temperatures below 20° Fahr. CAL should be used to supplement rather than to replace the recognized cold weather precautions of heating water and aggregates. Be sure the aggregates are free from ice.

For Waterproofing—CAL is equivalent to an equal amount of hydrated lime in waterproofing. It fills the pores with an inert material, which makes a very much denser, less absorptive concrete.

For Stucco and Finish—For all stucco and finish work the water-holding power of CAL reduces the danger of checking and shrinkage cracks. Its early hardening is a protection against injury.

For Masonry—CAL cement mortar is fat and plastic without the addition of lime. The brick can not suck the life out of CAL mortar; it is the best mortar, summer and winter.

For Correcting "Flash Set"—CAL should not be used where an initial set in less than one hour is desired. The use of twice the recommended maximum of CAL will not give "flash set."

Cements which have become "flash set" will be corrected by the addition of a small amount of CAL.

For Correcting Unsound Cements—Cements which boil unsound will be made sound by the use of CAL.

Early Removal of Forms

In summer or winter, CAL will allow the forms to be removed in half the time. This will show an enormous saving in cost where expensive forms can be used again on the job. Where conditions are particularly severe the saving in time will be even greater.

As a Floor Hardener

CAL is an integral hardener, not an after-treatment. It hardens the topping all the way through, and at the same time it insures a good cure without checks and cracks, and without the need of wetting down. The great plasticity and workability of the CAL-mix makes it possible to finish the floor with a minimum of water and of troweling—another insurance against a soft, dusty floor. The early strength reduces scars and injuries to the new floor during construction.

Highest Authority

The architect who specifies CAL is backed by the highest technical authority of the United States Government. CAL is not a secret compound. It has been investigated and reported with full description and analysis by the U. S. Bureau of Standards in Technologic Paper 174. Literature will be sent by THE CAL CHEMICAL COMPANY on request.

Specifications

Under no conditions should any material be used in reinforced concrete which does not pass the simple corrosion test given above.

For best results in mortar or concrete use from 5 to 8 lbs. of CAL according to time of set desired by the contractor. Add CAL dry to the mix, and mix thoroughly not less than 1 minute. Resistance to wear is greatly increased if the actual mixing is increased to 2 minutes.

It is not necessary to specify wetting down, where CAL is used.

When the temperature is expected to fall below 20° Fahr. use recognized precautions of heating water and aggregates in addition to using CAL.

INSTALLATIONS AND RECENT USERS OF CAL

Hamilton Hotel, Washington, D. C., Fred Drew Co., Contractor
Harris Forbes Building, Boston, Mass., Lockwood Greene Co., Architects; George A. Fuller Co., Contractor
Storage Tanks of the Security Cement & Lime Co., Security, Md., M. A. Long Co., Contractor
Evening Star Building, Washington, D. C., George A. Fuller Co., Contractor
Concrete Highways, Wayne County, Mich., County Highway Dept., Contractor
Street Railways, Washington, D. C., Capitol Traction Co., Contractor
Cement Gun Construction, Fresh Pond Filter, Cambridge, Mass., H. Whittemore Brown

GARDNER-BARADA CHEMICAL CO.

Concrete Floor Hardeners and Waterproofing Products

3123 Bloomingdale Road
CHICAGO, ILL.

Products

CONCRETE FLOOR HARDENERS.
WATERPROOFING and DAMPPROOFING PRODUCTS.
OILPROOF ENAMEL for concrete tanks.

Oil Method of Concrete Floor Hardening

Gar Kem Concrete Dressing—A combination of oils treated under pressure with chemicals which partially "rubberize" or "gelatinize" them. These oils are then dissolved in a mixture of volatile hydrocarbon and turpentine distillates which prevent completion of the "rubberizing." It is applied with a brush, readily penetrating the voids or pores of the concrete. The volatile carrier of the "rubberized" oils evaporates, and the process of "rubberizing" is completed. Floors so treated are tough, watertight, dustproof, oiltight, resistant to the action of dilute organic acids and are sanitary.

How to Specify—Concrete floors shall be hardened by the use of Gar Kem Concrete Dressing as manufactured by GARDNER-BARADA CHEMICAL CO., Chicago, Ill., using 1 gal. to each 150 sq. ft. of floor surface. Floor shall be clean and dry. Gar Kem Concrete Dressing shall be poured or sprinkled upon the floor and brushed in thoroughly with an ordinary 18-in. sweeping brush, using about 1 gal. to 225 sq. ft. When absorbed repeat the process, brushing in well so that no excess is left on the floor. When second application has been absorbed, repeat the process, using just enough of the Dressing to push ahead of the brush. Brushing shall continue until all of the Dressing shall have been absorbed. Care shall be taken to prevent collection of Dressing in any hollows and to thoroughly cover high spots of floor.

Acid Method of Concrete Floor Hardening

Gar Kem Crystal Hardener—An acid fluo-silicate of magnesium and lead in concentrated form. It changes the aluminum and lime of the cement into a crystalline form which is hard, dense and resistant to wear, and renders the surface waterproof by filling the voids or pores of the surface with magnesium and lead salts.

How to Specify—Concrete floors shall be hardened by the use of Gar Kem Crystal Hardener as manufactured by GARDNER-BARADA CHEMICAL CO., Chicago, Ill., using 2 lbs. to each 100 sq. ft. of floor surface.

When concrete floor has attained its final set, or as soon thereafter as possible, it shall be flushed with a solution of Gar Kem Crystal Hardener and water in the proportion of 1 lb. of Hardener to 1 gal. of water, using 1 gal. of the solution to about 75 sq. ft. of floor surface, brushing it in with an ordinary floor brush or a soft broom. When first application has been absorbed (when floor begins to appear gray or dry) again flush floor and brush in thoroughly, using 1 gal. of the solution to about 125 sq. ft. of floor surface.

Note: For old floors, treatment is similar to that above and floor must be clean, dry and free from oil and paint. If floor is extremely porous, soft or affected by frost, a third application of the same strength may be needed. This need will be known by an extra rapid absorption of the solution.

Gar Kem Integral Waterproofing

A waterproofing in powder form, which, when mixed with cement before the water is added, will produce a permanently waterproof surface. It is a combination of chemicals and hydrated lime which increases the hardness and density of the concrete and makes it quick setting.

How to Specify—Floors and walls shall be waterproofed with Gar Kem Integral Waterproofing as manufactured by GARDNER-BARADA CHEMICAL CO., Chicago, Ill. To each bag of cement as it is added to the stone, gravel or sand, and before water is added, add 2 lbs. of Gar Kem Integral Waterproofing, thoroughly mixing waterproofing and cement.

Gar Kem Colorless Rainproofing

A solution of chemicals in a volatile solvent, which, when applied to any porous surface, penetrates into the body of the mass. The solvent evaporates, precipitating the chemicals into the pores.

It is colorless, does not deteriorate nor change, is neutral and inert, will not wash off and its effect is permanent. Suitable for applying with a brush to brick, cement, stucco, plaster or other porous substances. Positively prevents efflorescence and the scaling of walls due to the action of frost.

How to Specify—All exterior walls shall be rainproofed with Gar Kem Colorless Rainproofing as manufactured by GARDNER-BARADA CHEMICAL CO., Chicago, Ill. All surfaces shall be dry before application of Rainproofing. To all smooth surfaces, apply Gar Kem Colorless Rainproofing with a wall or calcimine brush, covering surfaces with successive coatings until no more of the Rainproofing shall have been absorbed. To all rough surfaces, apply the Rainproofing with an air brush or by stippling or splashing with a calcimine brush.

Note: One gallon of Gar Kem Colorless Rainproofing will cover about 150 sq. ft. of smooth surface; 140 sq. ft. of rough surface. Applications should follow each other immediately. Old or stained walls must be cleaned before applying the Rainproofing.

Gar Kem Oilproof Enamel

A solution of natural and synthetic gums and colloids in a mixture of alcohol and ether being readily absorbed by porous materials such as concrete, tile and the like.

It is applied with a brush to the interior surfaces of concrete tanks and positively renders them impervious to animal, vegetable and mineral oils and mineral oil distillates, also proofs them against the absorption of water, brine, tan liquors, etc.

Gar Kem is also useful for protecting metals and concrete from acid fumes. It is hard and wear resisting to a very great degree, yet is tough enough and sufficiently elastic to prevent cracking or scaling.

How to Specify—Inner surfaces of concrete tanks shall be made oilproof by the application of Gar Kem Oilproof Enamel as manufactured by GARDNER-BARADA CHEMICAL CO., Chicago, Ill., using not less than 1 gal. to each 100 sq. ft. of surface (for gasoline tanks not less than 1 gal. to each 75 sq. ft.) Surface to be treated shall be dry and carefully inspected to insure its freedom from sand or gravel pockets or cracks. All cracks or pockets must be sealed with a 1:1 mixture of portland cement and sand. The Gar Kem Oilproof Enamel shall be applied with a wall brush or calcimine brush. The first coat shall be well brushed. An interval of 24 to 48 hours shall elapse before applying subsequent coats. At least 48 hours shall have elapsed after application of last coat before tanks are allowed to be filled.

Note: If tanks have already been used for oil, new mortar should not be used to seal cracks or to cover sand or gravel pockets until the surface for 1 or 2 in. on either side of cracks has been thoroughly cleaned with kerosene or gasoline. If cracks or pockets are deep, they shall be roughened or chipped to a depth of ¾ to 1 in. from the surface and then filled with a 1:1 mixture of portland cement and sand. All cracks and pockets should then be given a heavy coat of Gar Kem Oilproof Enamel and strips or squares of unbleached muslin dipped in the Enamel and allowed to dry until they become sticky or tacky, should be laid over cracks or pockets and 3 or 4 coats of Gar Kem Oilproof Enamel applied until a heavy enameled surface is obtained.

GENERAL CHEMICAL COMPANY

Chemical Treatments for Concrete

40 Rector Street
NEW YORK, N. Y.

Product

HARD-N-TYTE: Chemical Surface Hardener and Priming Coat for concrete, portland cement mortar, plaster and stucco surfaces.

Hard-n-tyte

Hard-n-tyte is the trade-name for pure white crystals of zinc and magnesium fluosilicate. When applied to concrete surfaces according to the simple specification given below, Hard-n-tyte combines with the lime in the cement, producing a hard, insoluble substance similar to fluorspar which binds the particles of aggregate firmly together, giving

(1) A flint-hard, wear-resistant surface.
(2) Freedom from "dusting."
(3) High density.
(4) A non-soluble surface.
(5) A surface free from uncombined lime, making Hard-n-tyte an excellent priming coat before painting concrete.

Hard-n-tyte for CONCRETE and MORTARS
REG. U.S. PAT. OFF.
TRADE-MARK

Standard Packages

Hard-n-tyte is packed in barrels containing 325 lbs. net, and in 50- and 10-lb. containers.

Since it is shipped in a dry, crystalline condition and not as a solution, the use of Hard-n-tyte involves a considerable saving in transportation cost.

Five-year Guaranty Bond

The GENERAL CHEMICAL COMPANY will give a five-year Guaranty Bond issued by U. S. Fidelity & Guaranty Company on all jobs in the United States and Canada providing the floor is finished and treated by a contractor approved by the GENERAL CHEMICAL COMPANY in strict accordance with the following specifications.

Hard-n-tyte Specification for Concrete Floor Finish and Treatment

Top mortar shall be mixed in the proportion of 1 sack portland cement to not more than 2 parts of clean, silicious sand or equally durable material, uniformly graded from ¼ in. down to that passing a 100-mesh sieve.

Above mentioned materials shall be thoroughly mixed with a minimum of clean water to give a workable consistency. Measured by the *slump test, the slump shall not be greater than 5 in.

*A simple method of determining the proper consistency of concrete is known as the slump test. A tapered conical form of tin or sheet metal 6¼ in. in diameter at the bottom, 12 in. high and 5¾ in. in diameter at the top is required. After the mortar has been thoroughly mixed, it is placed in the form until flush with the top and compacted by working with a pointed round rod. The form is then lifted, allowing the concrete to settle or slump. After the pile has settled, its height should be measured and subtracted from the original height of 12 in. This figure is the "slump."

Wearing surface shall have a minimum thickness of 1 in. After being rodded off to grade, mortar shall be finished with a wooden float and steel trowel; then a final finish given with the steel trowel. Surface shall be left true to grade and free from depressions or excessive trowel marks.

After surface has hardened it shall be treated with two applications of GENERAL CHEMICAL COMPANY Hard-n-tyte as follows:

First Application: One part of Hard-n-tyte (by volume) dissolved in 13 parts of water.

Second Application: (After first application has dried, but not sooner than 30 minutes.) 3 parts of Hard-n-tyte (by volume) dissolved in 10 parts of water.

Concrete wearing surface shall be at least 48 hours old and broom-cleaned before first application. Solution shall be evenly distributed over area to be treated and all surfaces shall be kept wet with the solution for at least 3 minutes, each application.

Hard-n-tyte Specification Floors
TRADE-MARK

After second application has dried, floor shall be kept covered with building paper until all plastering has been completed.

All Hard-n-tyte used shall be delivered in the original packages.

Note: Incorporating the full wording of the specification in order to avoid any misunderstanding is advised.

If an abbreviated specification form is desired, the following is suggested.

Abbreviated Specification

Concrete floors shall be finished and treated in accordance with the Hard-n-tyte specification dated 1921, by a contractor approved by the GENERAL CHEMICAL COMPANY. The contractor shall furnish the GENERAL CHEMICAL COMPANY'S Surety Bond Guaranty for five years.

Hard-n-tyte Specification for Priming Coat

All portland cement plaster and concrete surfaces shall be treated before painting with a priming coat composed of 2 parts of GENERAL CHEMICAL COMPANY Hard-n-tyte, dissolved in 16 parts of water.

Application shall be made when the concrete or plaster is not less than 24 hours old.

Surfaces shall be kept drenched with the solution for at least 3 minutes.

Paint shall not be applied until the Hard-n-tyte treatment has thoroughly dried and in no case before 48 hours have elapsed.

General Directions for Hard-n-tyte

Hard-n-tyte is readily soluble in cold water, but care should be taken that it is thoroughly dissolved before applying.

When measuring Hard-n-tyte by volume for the first applications, use 1 level pail of crystals (measuring loosely) to 13 pails of water. It is a good plan to give a floor all it will take up readily, even going back over porous spots, where absorption is more rapid.

In this manner the surface is made to wear uniformly, irrespective of irregularities in placing the mortar or method of finishing.

THE MASTER BUILDERS COMPANY

Specialists in Masterbuilt Concrete Floors

CLEVELAND, OHIO

SALES OFFICES

NEW YORK CHICAGO PHILADELPHIA DETROIT ATLANTA DALLAS MINNEAPOLIS BOSTON
KANSAS CITY, MO. SALT LAKE CITY SAN FRANCISCO MONTREAL TORONTO AMSTERDAM

Products

MASTER BUILDERS CONCRETE HARDNER, used in accordance with MASTER BUILDERS METHOD for making concrete floors dustproof, wearproof and waterproof.

MASTER MIX (controls concrete), a colorless, odorless liquid chemical used integrally in cement mixtures, stucco, brick mortar, etc.

COLORMIX, a gauging water dye which hardens, dustproofs and waterproofs cement floors, at the same time producing uniform, permanent colored floors.

Master Builders Method

TRADE-MARK
Registered United States Patent Office

MASTER BUILDERS SANISEAL, a liquid chemical for hardening and dustproofing cement floors.

Also manufacturers of Master Builders Liquid Waterproofing; Waterproofing Paste and Powder; Master Builders Technical Paints.

Description and Advantages of Master Builders Method

Ordinary concrete floors dust and wear into ruts and holes. The reason for this is their porous structure and lack of proper wearing aggregate. Master Builders Method is a formula for building concrete floor surfaces according to definite, standardized principles which eliminate the defects of ordinary concrete floor surface construction and produce wearproof, dustproof and waterproof concrete floors.

To accomplish this result, Master Builders Method employs Master Builders Concrete Hardner, a perfectly graded, scientifically treated metallic aggregate, which, when added to the sand and cement when the topping of the floor is installed, eliminates all pores and supplies a hard wearing, permanent, non-abrasive element that withstands the wear and tear under which ordinary concrete floors break down and wear out.

Master Builders Method is the original and standard method for producing concrete floors that will not dust or absorb moisture and that will resist the hardest kind of wear. Over 30,000 users have more than 100,000,000 sq. ft. of surface in use to date.

Master Builders "Standard Specification"

Recommended for making wearproof, dustproof and waterproof concrete floors in every type of building.

Wherever practicable, topping to be laid before base has set.

Proportions of Topping—Topping (thickness at least full ¾ in.) shall consist of the following proportions: 1 part tested portland cement; 2 parts coarse, gritty, clean sand.

If rock or grit is used in addition to sand, specify as follows, instead of above: 1 part tested portland cement; 1 part crushed rock or grit (not over ⅜ in. in size), free of dust; 1 part clean, coarse, gritty sand.

Measuring Volumes—These proportions shall be accurately measured by volume, in suitable size boxes. No counting by shovels, or measuring by wheelbarrows or other approximation will be permitted. To determine proper proportions, 1 bag of cement shall equal 1 cu. ft. of sand or grit.

Addition of Water—Mix thoroughly dry until uniform in color, showing no streaks or patches of the constituents; if mixed by hand, topping aggregate shall be turned over dry three times. Add sufficient water to saturate mixture and mix thoroughly again. Topping shall at no time be made sloppy.

Application of Topping—Lay and straightedge the topping to a true and even surface; float the surface well with wooden floats to close all voids and hollows.

Wearproof Finish—A dry mixture of 1 part Master Builders Concrete Hardner to 1 part tested portland cement (by weight), mixed to an even color, shall be sprinkled evenly over surface. Not less than 30 lbs. of Master Builders Concrete Hardner and 30 lbs. of portland cement shall be distributed in this manner over each 100 sq. ft. This shall be floated in thoroughly and troweled. A second troweling shall be given surface when it has set sufficiently to finish hard and smooth. Under no circumstances shall wearproof finish be applied when there is any surplus water on the floated surface.

Safeguarding the Floor—After topping has set up, contractor shall cover it with a uniform layer of soft wood sawdust, shavings, or other suitable covering. This covering must not be applied until experiment shows surface hard enough to prevent covering from scratching or injuring the finish. Surface shall be kept wet for at least 5 days. Floors, if protected as above, will be ready for light traffic in 1 week, and for heavy traffic in 3 weeks, under favorable weather conditions.

Exceptions—The foregoing "Standard Specification" is the standard method of procedure for the average building. The 30 lbs. of Master Builders Concrete Hardner recommended per 100 sq. ft. will give a surface which will withstand any average service. However, there are some cases where the quantities should be varied. These exceptions follow:

For floors, piers and loading platforms, etc., which receive extremely heavy wear, specify 35 lbs. of Master Builders Concrete Hardner to every 100 sq. ft. for the wearproof finish. For railroad repair shops, forge shops, etc., specify 40 lbs. of Master Builders Concrete Hardner to every 100 sq. ft. for the wearproof finish.

Masterbuilt Tile Red Concrete Floors

Where the advantages of Master Builders Method are desired, combined with a color, Master Builders Red Hardner is recommended. It produces a hardened concrete surface with a pleasing tile red color finish. Widely used in office buildings, schools, institutions, etc. Specifications on request.

Colormix

This offers an inexpensive substitute for tile and similar materials, with the wearing advantages of hardened concrete, for floors for public buildings and private dwellings.

Colormix is unique in many respects. Instead of a dry color, mixed with dry sand and cement, it is a liquid which acts as a dye in the gauging water. This insures complete distribution of the color throughout the mass and a deep, uniform, permanent color.

In addition, Colormix automatically accelerates the set of cement, providing a rich, fatty troweling surface at just the right time for proper results, and saving time and labor. It also waterproofs all concrete with which it is properly incorporated.

Colormix is now made in the following true colors: Tile red, battleship gray, linoleum brown and Nile green.

Colormix Specifications

Pour a bucket of fresh clean water into the mixer. Then throw in a shovelful of clean, sharp sand while the mixer is revolving. Add to this the proper amount of Colormix for the batch, as follows:

Gray, 3 lbs. per bag of cement.
Red, 10 lbs. per bag of cement.
Brown, 11 lbs. per bag of cement.
Green, 16 lbs. per bag of cement.
Buff, 15 lbs. per bag of cement.

Continued on next page

In order to get a uniform color throughout, it will be necessary to mix the aggregates a little more thoroughly than you would with the plain sand and cement mix. Wherever possible, a ½-in. topping is recommended instead of 1 in.

Master Builders Saniseal

Saniseal is a corrective for concrete floors which have started to dust, crumble and disintegrate. Also a preventive of these conditions on new floors. It is a liquid chemical preparation which combines with the lime in the cement, forming a new crystal that is exceedingly hard and wear resisting. It changes the soft, porous surface to a flintlike hardness. Saniseal is easy to use. No complicated dilutions or applications are necessary. Except where a floor is particularly porous, 1 gal. of Saniseal will cover approximately 100 sq. ft. It does the work overnight in most cases, thus preventing delays.

In a comparative study of various concrete floor treatments, the Bureau of Standards, Washington, reported on a test panel treated with Saniseal: "This panel has been in service two years and two months. It is in good condition and uniform in appearance. No wear is apparent."

Master Mix

Master Mix gives the answer to five vital questions in concrete construction:

(1) How to accelerate the final set of the cement, and increase its initial tensile strength. (2) How to produce ideal troweling conditions. (3) How to create at low cost a dense, hard surface that will not dust. (4) How to secure waterproof concrete. (5) How to prevent concrete from freezing at ordinary low temperatures.

The scientific explanation of how Master Mix settles the "how" problems requires more space than is available here, but its accomplishments can be touched upon in sufficient detail to show the amazing possibilities and opportunities in this preparation.

Master Mix CONTROLS CONCRETE

TRADE-MARK

Master Mix accelerates the final set of the cement from 2 to 4 hours; increases the tensile strength 71% in the first 24 hours and from 5% to 10% permanently; produces a "fatty" condition of the cement that makes it 100% easier to trowel; hydrates from 40% to 50% more cement than water, thus producing a dense, hard surface that will not dust or crumble; prevents concrete and stucco from freezing at ordinary low temperatures; renders concrete waterproof, through giving it sufficient density to prevent water seeping through.

The latest development in the use of Master Mix is for brickwork. Mixed with the mortar it prevents it from freezing, making it possible to lay brick at the rate of a story a day, because the work can be tooled immediately, and scaffolding moved up without loss of time. It saves thousands of dollars in both time and labor. In addition, Master Mix renders mortar waterproof—a most important feature.

Master Mix Specifications

For Accelerating Set of Cement and Hardening Concrete Floors—1-in. topping is recommended, proportioned 2 parts clean, fairly coarse, sharp sand and 1 part fresh tested portland cement. Mix thoroughly dry. Add Master Mix to gauging water gradually in proportion of 1 gal. Master Mix for every barrel of cement used. Pour, float and trowel cement in usual manner. A second troweling when surface is sufficiently set will produce a hard smooth finish. Protect surface from injury and keep it wet until surface is hard. For this purpose use a layer of soft wood sawdust, properly wet down.

For Waterproofing Brick Masonry—Mortar in which bricks are laid should be 1 part cement and 2 parts sand. Mortar to be tempered with water to which has been added Master Mix in proportion of 1 gal. waterproofing to 10 gals. of water. Carefully grout each course of bricks, taking care that all joints are filled with mortar.

For Waterproofing Concrete and Cement Mixtures—To waterproof 1:2:4 mass concrete add ¾ gal. of Master Mix to gauging water to each barrel of cement. To waterproof 1:2:5 mass concrete add 1 gal. of Master Mix to gauging water to each barrel of cement.

Concrete walls, floors, etc., can be made waterproof by the application of a cement coat into which Master Mix has been introduced. A mixture of 1 part cement to 2 parts sand should be made and tempered with water and Master Mix in the proportion of 1 gal. of Master Mix to 18 gals. of water.

For Waterproofing Stucco—Stucco shall be applied in 2 coats. The straightening coat shall consist of 1 part portland cement and 3 parts sand. This shall be gauged with a solution of 1 part Master Mix to each 18 parts of water.

Wall shall first be thoroughly wetted and the straightening coat applied ¾ in. thick. Finish coat shall consist of 1 part portland cement and 2½ parts clean sand, which shall be gauged with the same strength solution of Master Mix and water as the straightening coat and applied ¼ in. thick.

To Make Masonry Impervious to Moisture—To a mixture of 1 gal. Master Mix and 3 gals. water gradually stir about ½ bag of portland cement to a creamy consistency. Apply in 3 coats, with a brush or spray.

First coat is a penetrating one, mixture for which should be as thick as the brush will carry, and well embedded, taking particular care to fill all joints and cracks. The second is a further filler. The third is the finish coat to which any color or effect can be given. Above coating also acts as a cold water paint.

To Prevent Concrete from Freezing—Use the following proportions to hydrate the mixture at indicated temperatures. Add Master Mix to gauging water.

Temperature 32°, 1 part Master Mix, 20 parts gauging water; temperature 25°, 1 part Master Mix, 15 parts gauging water; temperature 18°, 1 part Master Mix, 10 parts gauging water; temperature 13°, 2 parts Master Mix, 10 parts gauging water.

United States Naval Base, Brooklyn, N. Y.
Turner Construction Company, Contractors
Area 3,000,000 sq. ft. Master Mix used to accelerate set of concrete floor topping and harden floor surface

L. SONNEBORN SONS, INC.

Manufacturers of Concrete Floor Hardeners, Waterproofing Materials, Decorative and Technical Paints

114-116 Fifth Avenue
NEW YORK, N. Y.
FACTORY, BELLEVILLE, N. J.

Products

LAPIDOLITH, the Liquid Chemical Hardener and Dustproofer for concrete floors and Waterproofer for concrete and stucco walls.

CEMENT FILLER and DUSTPROOFER for cement floors (transparent and in colors).

FERMO, an Integral Liquid Chemical for the acceleration of the setting, and for prevention of freezing of concrete mixtures.

LIGNOPHOL, a Preservative for wooden floors.

CEMCOAT, a Wall and Floor Coating for concrete and other surfaces.

SONOTINT, a Flat, Washable Wall Coating.

MARVELWITE, a Laboratory Enamel.

PARIPAN, an Imported Long Oil Enamel.

HYDROCIDE WATERPROOFING PRODUCTS for interior and exterior surfaces.

Also manufacturers of Amalie Structural Steel Paints, Galvacote, a coating for galvanized iron; Amalie Pipe Enamel; Amalie Radiator Enamel; Amalie Stack and Boiler Paints; Amalie P & D House Paints; Enamelife.

Lapidolith

Lapidolith is a liquid chemical which renders concrete floors hard, dustproof, wearproof and watertight. When applied to old concrete floors, Lapidolith will prevent further dusting and disintegration.

LAPIDOLITH TRADE MARK
TRADE-MARK

Advantages—Prevents dusting and wear of floors, because Lapidolith unites with the free lime in the cement, and makes the mass as hard as granite.

Lapidolized floors take on a fine surface finish under service.

After Lapidolith is used, floors will not crumble or dust, thus saving cost of expensive repairs to machinery and injury to merchandise.

The labor cost of applying Lapidolith is negligible. Only unskilled labor is required, and an average man should be able to cover from 10,000 to 15,000 sq. ft. per day with 1 application.

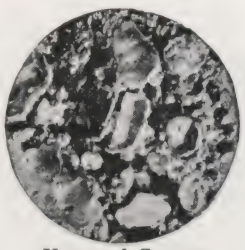
Covering Capacity—With 3 applications 1 gal. will cover 70 to 100 sq. ft. This will vary according to the porosity of the cement.

To harden an ordinary floor, 3 applications are sufficient.

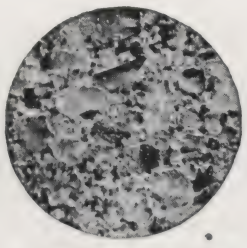
An Investigation of the Action of Lapidolith on Concrete—Following is an extract from the official report of Prof. R. J. Colony of Columbia University, New York, as the result of an examination by him, under the microscope, of treated and untreated concrete:

"The external application of Lapidolith to concrete surfaces results in (a) the formation of an optically isotropic but crystalline substance, derived by a reaction between components of the Lapidolith and the cement matrix of the concrete which (b) has a tendency to fill in voids and cavities and act as a binding agent, thus rendering the surface smoother and more uniform."

Lapidolith actually forms a new crystalline component, which reduces the pores of the concrete.



Untreated Concrete
Note large numerous voids (black spots) and roughness of surface



Lapidolized Concrete
Note roughness is reduced and voids filled with network of newly formed hard crystalline substance

MICROPHOTOGRAPHS OF SPECIMENS OF CONCRETE
Magnified 50 diameters

Guarantee of Lapidolith—The chemical change effected by Lapidolith is guaranteed to be permanent.

Lapidolith Specifications for Concrete Floors—Harden and dustproof with Lapidolith, manufactured by L. SONNEBORN SONS, INC., New York, N. Y., as per their directions.

What Two Prominent Users Think of Lapidolith

Fownes Bros. & Co., 119 W. 40th Street, New York, N. Y., wrote us on June 23rd, 1922:

"We beg to acknowledge receipt of your favor of the 7th instant in which you inquire as to the present condition of our concrete floors which were treated with Lapidolith in the Spring of 1913.

We are pleased to advise that these floors are in excellent condition today which we feel is the result of using your preparation, as we have not found it necessary to treat them in any further way since Lapidolith was first applied."

Chalmers Knitting Company, Amsterdam, New York, wrote us on July 20th, 1915:

"We have used one barrel of your Lapidolith hardener on our concrete floors, using it only in the runway where we do trucking and after three applications, finding it so satisfactory, we have placed an order for another barrel to use in other places in our concrete flooring, which is subject to wear and dusting.

We are pleased to learn by experience that Lapidolith is all you claim for it."

They wrote us again on June 12, 1922:

"Replying to yours of the 7th inst. we are pleased to advise you that our Lapidolized concrete floors are still rendering the same satisfactory service."

Cement Filler and Dustproofer

An inexpensive but thoroughly efficient preparation for dustproofing and waterproofing concrete floors, especially suitable for use in hospitals, school rooms, or office buildings where there is no excessive wear on the floor.

Made of treated oils and hard, durable, resilient gums properly compounded to furnish a material that penetrates into the pores of the concrete, acts as a filler and is a bond between the sand and cement aggregate. Can be furnished either transparent or in many attractive colors.

The material is easily applied, being brushed on the floor, the same way as painting, using a long handled brush. It is applied in 1 or 2 coats depending upon the condition of the floor.

Continued on next page

The first coat will dry in 6 to 12 hours and the second and third coats in 12 to 24 hours. The floor can be used 24 hours after the last coat has been applied.

Covering capacity per gal. (1 coat) is 350 sq. ft.; (2 coats) is 200 sq. ft.

Fermo

Fermo will:

(1) Accelerate the setting of concrete.

(2) Prevent concrete from freezing at low temperatures.

(3) Densify concrete and reduce its permeability.

(4) Produce a smooth, workable mix which is much more easily troweled than ordinary cement.

For conservation of time and labor, specify Fermo.

Lignophol, the Preservative of Wooden Floors

New floors will be protected from splintering and decay; old floors will be revived and their life prolonged.

LIGNOPHOL FOR WOODEN FLOORS TRADE-MARK

Lignopholed floors last longer, are dustless, smooth and sanitary.

Covering Capacity—1 gal. covers 350-400 sq. ft., depending upon dryness and texture of wood.

Cemcoat

The industrial enamel paint, is particularly durable on interior or exterior walls and on ceilings, washable and therefore sanitary.

Cemcoat TRADE-MARK

Laboratory tests show conclusively that it stays white longer than any other paint.

It goes farther because of its body and because it flows more freely under the brush. Thus it is cheaper, as 2 coats do the work of 3.

For Interior Walls—Can be used on concrete or any other type of building material. One coat of flat primer or undercoating followed by 1 coat of either gloss, eggshell or flat finish gives the best results. On porous or rough surfaces, 1 coat of Amalie wall size is recommended, before applying 2 coats of Cemcoat.

White Gloss Cemcoat—Reflects all the light and disseminates it equally throughout the room.

Covering Capacity—Approximate number of sq. ft. per gal., per coat:

	First Coat	Second Coat
Concrete	175	225
Brick	200	250
Plaster	250	300
Wood	300	350
Metal	350	400

Colors—Made in any desired shade. Standard colors always in stock: Gray, red, green, stone, brown, terra cotta, cream, white, concrete, moss green, maroon.

For Exterior Walls—Used effectively on concrete, brick, tile, slate, stone, wood shingles, canvas or felt and on plaster. It seals the pores and minute cracks on the surface; and on account of high degree of elasticity and intense adhesion to surface, is not affected by expansion or contraction of building material and will not peel off or crack. Lasts long and will remain waterproof under the most trying conditions.

Sonotint

A flat oil finish paint offered in 18 tints as well as white and black. Other variations are possible as the colors can be modified by the painter. Restful to the eye; provides light reflection without glare. Washing with soap and water preserves appearance.

Marvelwite

An enamel to meet the demand for an intensely white wall coating, which has the highest resistance against the conditions which turns the color of average enamels.

It is highly resistant to the influences of most of the chemical gases, fumes and vapors as they exist in:

Laboratories, tanneries, bleacheries, textile mills, laundries, bakeries, chemical plants, hospitals, operating rooms, and rubber and tire plants.

Covering Capacity—"Marvelwite" enamel, 500 sq. ft. to the gallon, 1 coat.

Covering Capacity—"Marvelwite" undercoating, 350 sq. ft. to the gal., 1 coat.

Paripan

Paripan is an *imported* English long oil enamel, as suitable and substantial for exterior use, as it is artistic for interior decoration.

Exceptional covering capacity in both density and area. Made in gloss, semigloss (eggshell) and flat.

Write for general specification book.

Hydrocide Waterproofing Products

Hydrocide No. 633—For waterproofing inner surfaces of exposed exterior walls; also plaster bond.

Ready for use, applied cold with a brush. Saves furring and lathing expense. Should not be applied to smooth concrete surfaces which are to be plastered unless walls are sufficiently roughened. Covering capacity per gal. (1 coat) is 65 to 100 sq. ft.

Hydrocide No. 648—For waterproofing outer surfaces of foundation walls and footings.

Ready for use, applied cold with a brush. Covering capacity per gal. (1 coat) is 65 to 100 sq. ft.

Hydrocide No. 611—For the protection of unexposed surfaces of limestone, caen stone, marble and other fine stones, from stain caused by absorption or communicated by surrounding masonry. Covering capacity from 250 to 350 sq. ft. per gal.

Hydrocide Colorless—For waterproofing exposed exterior walls.

Applied with a brush or spraying machine. Covering capacity per gal. (1 coat) approximately 100 sq. ft.

Hydrocide Integral Powder—For waterproofing mass concrete, concrete walls, floors, elevator, boiler and battery pits, swimming pools, water tanks, etc.

Mix 2 lbs. of Hydrocide integral powder with each bag of portland cement, then add to the sand and stone mixtures. In cases of high water pressure, mix 3 lbs. of Hydrocide integral powder with each bag of portland cement.

Hydrocide Integral Paste—For waterproofing cement, stucco and mortars.

Mix Hydrocide integral paste thoroughly with the gauging water, using 3 lbs. of the paste to each bag of portland cement.

Further Information

The following printed matter sent on request:

Individual specification sheets on Lapidolith, covering schools, hospitals, factories, warehouses, packing plants, bakeries, creameries, garages, power plants.

Specifications and color cards on Cemcoat and other paints.

"Index of Sonneborn Paint Products."

Circular: "A Scientific Investigation of the Value of Lignophol."

Specification Sheets on Hydrocide Waterproofing Products and Fermo.

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

CLEVELAND, OHIO

Product of the Industry

BRICK, which is properly defined as a solid building unit of burned clay.

TRADE-MARK

New Type of Brick Construction

The Ideal wall is a comparatively new type of brick construction for residences and other small structures and is now being extensively used throughout the entire country. This wall is less in first cost than frame, hollow unit, or any other type of construction. It is the lowest cost everlasting construction.

Character of Association Service to the Building Industry

The compiling of more exact information on the strength and other properties of brick and brickwork than is now available is one of the most important functions of the Association. Tests are being conducted jointly by the Association and thoroughly reliable, disinterested agencies such as the United States Bureau of Standards.

The Association, in 1920, adopted a standard size for common brick: 8x2¼x3¾ in.; and brick of this size are now made by almost all its members. This size is the same as standard face brick size, and is now required in A. S. T. M. specifications.

A list of members—from whom the best brick and the best service may be obtained—will gladly be sent by the Association.

What the Trade-mark Stands for

The product of members of this Association may be identified by the trade-mark, shown above. While many members place this mark on every brick, others, for mechanical reasons, find it impossible to do so, but place it upon their stationery and advertising matter.

The Association insists that this mark shall identify brick of good quality according to its grade; and it will investigate and remedy to the best of its power any complaints regarding the quality of common brick supplied by its members.

THE BEAUTY OF EXPOSED INTERIOR BRICKWORK
Harvard Lampoon Building, Cambridge, Mass.
WHEELWRIGHT & HAVEN, Architects

Publication

"Brick—How to Build and Estimate"—A comprehensive 72-page manual of brick construction; containing general information on the strength and other properties of brickwork and mortar; many pages of text and illustrated plates on solid and Ideal wall construction; proportioning mortar; bonds and joints; equipment for house construction; tables showing number of brick, weight, bricklayers' and laborers' time, and material for mortar for any area of solid and Ideal walls in several bonds and thickness of wall; table of heights of courses with brick flat and on edge; 30 tables, 9 full page detail plates and 57 illustrations. Sent for 25c prepaid.

Brick Is Worthiest Vehicle of Architect's Genius

Because of its small units, its infinite variety of color, shade, and texture, the many bonds and patterns in which it may be laid, the various sections, widths, colors and textures of its mortar joints, brick is one of the most interesting and flexible of all the materials at the disposal of the designer.

An architect's creations live after him according to the degree in which he builds of permanent material. Not only his larger works, but his humblest cottages will endure to express their designer's genius for generations, if built of the material which forms the everlasting wall surfaces of many of the greatest and the smallest buildings which have come down from medieval times in England, France, Belgium, Italy and every other section of the civilized world.

Integrity of Brick Construction

There is little chance in brickwork for hidden or exposed structural defects. Brickwork will always carry the load it is designed to bear. Inspection of brickwork is easy. Every portion is in plain sight as the wall goes up.

Brick Is Best for Fire and Party Walls

Brick is the most satisfactory material for fire and party walls. Rudolph P. Miller, formerly Superin-

Continued on next page

tendent of Buildings of the Borough of Manhattan, New York, says in "Kidder's Architects' and Builders' Pocket-Book": "In the Baltimore and San Francisco fires it was demonstrated that for outside walls brick is superior as a fireproof material to any other material used in wall construction." The solid wall takes the lowest or "base" fire insurance rate on building, equipment, and contents, a "penalty" being imposed on a wall of hollow unit construction.

For party walls brick has the further advantages of protecting the owner's rights. It may be necessary to cut new openings in such walls or make other changes. Without a wall which can be cut out at any desired height and at every required interval for the introduction of beams, joists, etc., or into which new chimneys or new walls may be bonded, one owner will be deprived of his right of using the party wall for his own requirements of construction. He may have to go to considerable expense and lose valuable space as a result of having to build another wall; and in such case the other owner will also lose his rebate of one-half the cost of the original party wall. In some states the recognition of these facts entrenched as a right is so firmly established that no material other than brick is permitted for party walls.

THREE YEARS OR THREE CENTURIES OLD
It is hard to tell the age of a brick house. This was built in 1666

Brick Has Many Other Practical Advantages

The brick wall is not easily damaged. Brickwork resists knocks and blows by the inertia of its bonded mass. This is most important in garages and industrial buildings. Brickwork is unexcelled as an anchorage for guards, shafting and fixtures. Its well bonded mass resists direct pull.

The Ideal Wall—The Lowest Cost Everlasting Construction

General Information and Record of Performance—The Ideal Wall is the name given to a new type of brickwork. Using standard brick, a substantial and well insulated wall of any thickness from 8 in. up is produced at less cost than frame, hollow unit or any other type of construction.

The Ideal wall has the great advantage of a considerable saving in material and labor. It is a thoroughly dry wall and does not require furring or lathing. It combines the advantages of the solid brick and hollow unit type of wall at a lower cost than either.

Ideal construction is adapted for:

(a) Foundation and superstructure walls of all residences.

(b) Load bearing walls wherever the hollow unit type of wall is now employed or allowed.

(c) Spandrel, curtain and partition walls.

For fire, division, and party walls solid brick only should be used.

Although this method of laying brick was developed by THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA, there have been found numerous examples of this construction in various parts of this country and Europe, but never before has it been worked out in all its details to fit varying conditions, nor has it been promoted until now. The Association has carefully investigated every example of this construction that has been brought to its attention. Although some of these buildings have been standing fifty years, they have, without exception, given satisfaction and proved substantial, durable, and in every instance the walls have been found to be dry and frostproof when plastered directly on the brick.

Moistureproof—The Structural Service Bureau, Philadelphia, reporting on a group of Ideal wall houses at Phillipsburgh, N. J., states: "Mr. Paul R. Smith (the architect) states that the 8-in. Ideal wall is a great success, and in a short time will come into general use. He states that although the walls are not furred, there had been no moisture show through on the inside of any of the houses, whose ages ran from several months to one year. In conversation with the people living in these houses, and in response to definite questions, there was no complaint of moisture or air leakage; in fact all appeared well satisfied with their occupancy of these houses. We conclude the 8-in. Ideal wall is very satisfactory throughout the development."

Similar favorable reports on the behavior of this wall during the rainy season come from California; and other sections of the country report the success of Ideal walls wherever erected.

Test of Imperviousness—A practical test to determine the degree of imperviousness of the Ideal wall was made at Williamson Trade School, Delaware County, Pa., under the direction of Prof. Joseph Shisler, instructor in charge of the Masonry Department, who is also the author of the following report:

Apparatus—One adjustable nozzle, length of hose, clamps and supports.

Wall—8 in. thick laid in Flemish bond, all bricks on edge (Ideal wall).

Mortar—1 part lime paste, 3 parts clean bar sand.

Joints—⅜ in. thick concaved with round steel jointer.

Bricks—Common straight hard, end wire cut.

Conditions—Wall built in shop on cement floor. Inside surface plastered ⅜ in. thick with 1:3 lime and sand mortar and finished with ⅛-in. hard white coat of calcined plaster and lime paste. This surface after four weeks drying was papered with common wall paper.

Method of Testing—The hose with nozzle attached was connected to faucet and water was turned on so as to produce a continuous running sheet of water on surface of brickwork. Measure showed 25 gals. per hour per sq. ft. of wall surface.

This proportion was reduced to a small area for closer observation involving only a few bricks under severest test conditions.

Result—After 3 days (72 hours) it was found that the bricks in the most saturated portion of the wall had not transmitted sufficient water through wall to even dampen wall paper on interior.

The stretchers on outside face of wall were wet on back surface but the headers which extend through the wall to the plaster had conducted the water only one-half this length.

The plaster on inside face of wall after being removed showed no evidence of moisture.

Conclusion—The purpose of the test was to determine whether the elimination of furring and lathing is practical when cheap bricks are used for hollow wall. Since the test was more severe than natural weather conditions and that the poorest grade of outside brick were used the evidence was convincingly favorable toward the hollow wall non-furring construction.

Also when compared with a hollow tile wall 8½ in. thick each foot of this wall had 34 sq. in. more bearing surface than hollow tile.

Continued on next page

Brick for the Ideal Wall

No special sizes or shapes of brick are required for the Ideal wall. Standard size brick only—2¼x3¾x8 in.—either face or common, are used.

Greater speed of construction is possible when a non-impervious brick is used for Ideal wall construction. The use of shale or similar hard impervious brick slows down the work considerably where the brick are laid on edge. The use of non-impervious brick is also advisable for the reason that such brick make the most weather resistive wall in Ideal construction. It will readily be seen that during a very heavy and long continued downpour of driving rain an absolutely impervious header might conduct a slight amount of moisture along its surface toward the inner face of the wall, whereas a header of non-impervious brick would absorb this moisture which would be dried out by the slight steady circulation of air within the hollow space.

Principles of Construction—In the Ideal All-Rolok wall all the brick are laid on edge.

In the Ideal Rolok-Bak wall the brick in the outer 4-in. course are laid on their flat bed, so that the wall has the usual brick appearance, the backing brick being on edge. Header courses may be run at every third or every sixth course and any bond may be used.

With the Ideal Rolok-Bak wall, each header which extends from the flat outer course to the backing of brick on edge, must have a small filling piece placed over it to make the brick on edge course line on top. It is not necessary for the bricklayer to cut a special piece for this filler. Brick chips lying on the scaffold can be used for this purpose, well slushed with mortar.

Examination of the plates will show that the Ideal wall has an absolute, positive break in the mortar joint in the direction of the thickness of the wall; thus accomplishing with ordinary brick what has long been striven for in vain through the use of odd shapes and units which lack many of the good qualities of brick.

In a wall above grade it is almost impossible, under conditions existing in actual practice, for a well burned header to carry moisture along its entire length by capillary attraction. Moisture can, under severe conditions, be conducted along a mortar joint either of cement or of lime mortar; hence the importance of interrupting the joint.

The 8-in. Ideal wall has one break in the mortar joint and the 12-in. wall has two, thus eliminating the penetration of moisture from this cause.

To further safeguard the inside surface, a slight steady circulation of air in the cavity dries out any small amount of moisture that might reach the portion of the header within the hollow space.

The 8-in. wall has one ventilated space; the 12-in. wall has two. The plates distinctly illustrate the fact that in the 12-in. wall there is no material in direct contact from front to back. No equal to this wall has as yet been devised for weather resistive qualities.

Because of the slight circulation of air in the cavities the Ideal wall of any thickness dries out very quickly, the mortar soon attaining its maximum hardness. The full load can be placed on it soon after it is built.

Omission of Furring—From many parts of the United States users report that plaster applied directly to the inside brick surface of properly built Ideal walls—without the use of furring—has proved satisfactory, and that with walls so constructed buildings are warm, dry and comfortable.

Ideal All-Rolok Wall
Note the sturdy construction of the 8-in. wall

With any kind of construction there are, of course, factors beyond the control of the material manufacturer and which affect the properties of the finished structure. Supplementing the brick, there must be also reasonably good mortar and workmanship, and where such are used furring may be safely omitted with the 8-in. Ideal wall and the plaster applied directly to the inside brick surface; excepting in those parts of the United States which have long continued periods of severely cold weather, such as northern Michigan, the Dakotas, and Montana, in which localities the 8-in. wall should be furred or the 12-in. unfurred Ideal wall used instead. The brick in all cases should be selected as recommended above.

Strength—Investigations made by The Common Brick Manufacturers' Association of America indicate that the strength of the Ideal All-Rolok wall may be fully equal to that of a solid wall of equal thickness. The strength of the Ideal Rolok-Bak wall, while less than the Ideal All-Rolok wall, closely approaches the strength of the solid wall also.

This is due to the fact that the transverse or bending strength of a brick on edge is greater than when laid flat; a brick in a wall having to resist stresses similar to those in a beam, in consequence of the slight irregularities in the supporting and superimposed beds of mortar.

The thickness of the webs (2¼ in.) and method of laying the units make it impossible to have webs out of vertical alignment.

Fire Resistiveness—Ideal walls undoubtedly retain much of the fire resistive properties of solid walls. The webs of Ideal walls, formed of solid units separated by mortar joints, can expand without rupturing the brick units of which the wall is built.

The United States Bureau of Standards is now making tests to determine the compressive and fire resisting values of all types of the Ideal wall. No statement can be made prior to the publication of the Bureau's own report.

Cost of Laying—Although, on the average, fewer brick may be laid per day with Ideal than with solid walls, a greater area of wall is laid per day. In some cases, however, bricklayers experienced with this construction approach closely the number of brick laid in solid work.

The Richards Brick Company, Edwardsville, Ill., makes the following report on the cost of laying Ideal walls in a 6-room brick bungalow, 32x30 ft. exclusive of front and rear porches—the first Ideal wall structure built in that district. House built in spring of 1921, bricklayers inexperienced with Ideal wall construction.

Exterior basement walls to grade—solid walls.

Interior basement partitions—8-in. Ideal All-Rolok walls. (These were badly cut up by openings and corners.)

Walls above grade—8-in. Ideal Rolok-Bak walls, faced with face brick.

Number of face brick used	15,200
Number of common brick used	26,000
Total Brick	41,200

Total bricklayers' time for entire job—260 hours.
Total laborers' time for entire job—240 hours.

Average number of brick laid by each mason per 8-hour day on entire job—1268. This includes chimneys, piers, porch walls and all brickwork.

With bricklayers' wages $1.25 per hour, laborers' $.85 per hour, total cost of masonry labor on entire house was $529.00 or $12.84 per thousand brick.

The following number of brick were laid in interior base-

Continued on next page

ment partitions (8-in. Ideal All-Rolok walls, with plain cut joints, requiring 3203 brick): Each mason per 8-hour day laid 1349 brick. This averages 81 more brick per day than average for entire job.

General Notes—The Ideal All-Rolok wall is laid in Flemish bond. With any brick it has a surprisingly distinctive and attractive appearance. When the rough or wire cut surface of the stretchers is exposed in combination with the smooth end of the headers this adds greatly to the interest and charm of the finished wall surface.

The Ideal Rolok-Bak wall may be laid in any bond, the header courses consisting of Flemish headers, and occurring every third or sixth course.

Where face brick are tied into backing of special material or special shapes and sizes, difficulty is often encountered in making the courses coincide where the headers occur, making it necessary to split courses or adopt the unsatisfactory device of tying with metal ties. All trouble of this kind is eliminated in the Ideal wall, particularly in the All-Rolok type.

Where face brick are used outside, Ideal backing has the further advantage of being thoroughly bonded to the face, thus adding the strength of the face brick to the strength of the wall.

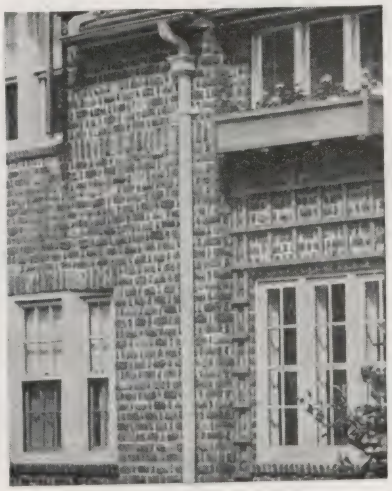
It is an advantage to use soft or salmon brick for backing, such brick not only costing less, but affording an unexcelled bonding surface on which to plaster. Walls with a salmon brick backing have more than ample strength for ordinary purposes.

In concrete floor systems it is sometimes necessary to place spandrel beams within the outside walls, concealed behind a 4-in. thickness of brickwork. By placing the outside brick on edge and securely anchoring every third course, it will be possible in many cases to leave enough room for the inverted beam so that it can be placed in an 8-in. wall.

Methods of supporting and anchoring joists are shown on the plates. More complete information is given in "Brick—How to Build and Estimate."

It is possible to keep the face of the window and door trim flush with the plaster with the Ideal All-Rolok wall if desired, and thus produce a charming and unusual effect. By making the brick opening a little wider and higher and setting out the frame, a stock double hung window used in the Ideal Rolok-Bak wall can be made to preserve the usual relation of the back of the frame being flush with the finish plaster. In this case a wind stop is nailed to the back of the frame. This detail has much historic precedent.

The Ideal wall is devised to take advantage of the enormous strength of burned clay brick. Ideal walls should never be built of unburned imitation brick, which are porous, weak and unsatisfactory in performance and appearance.



AN INTERESTING DETAIL
Note the attractive Flemish bond of ideal wall construction

Fire Resistiveness of Brick Column Coverings

The report on the fire resistiveness of various column coverings, issued within recent months jointly by the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters and the United States Bureau of Standards, states that a 4-in. thickness of brick, protecting a steel column 12 ft. 8 in. high, successfully resisted the action of fire for 7 hours 13¼ minutes and was, in consequence, given an official 5-hour rating.

European Construction

In European countries it is standard construction to use 4-in. brick walls for bearing and non-bearing partitions in residences and other buildings having only moderate floor loads and ordinary story heights. Such walls are frequently built 3 stories high and support the joists at each floor level. Non-bearing partitions of brick on edge are used extensively also.

STRENGTH OF THIN BRICK WALLS

Tests Made by British Government on Strength of Walls 2⅝* and 4½* in. thick

Thickness of wall, in.	Brick	Mortar	Crushing st'gth of 9x9-in. cubes, lbs. per sq. in.	Age of cubes when tested, days	Crushing strength of wall 14 in. wide 8 ft. 6 in. high, lbs. per sq. in.	Age of wall compression test, days	§Horizontal pull to break wall 3 ft. 6 in. wide, 8 ft. 6 in. high, lbs.	Vertical load applied, in tons per ft. run, while wall was tested under horizontal pull, tons	Age of wall tested under horizontal pull, days
4½	xStock	1:3 cement	770	26	638	24	895	2	34
4½	xStock	1:6 cement	720	26	562	23	791	1	41
4½	†Fletton	1:3 cement	1530	26	1040	24	781	1	39
4½	†Fletton	1:6 cement	1250	26	930	23	705	1	36
4½	†Fletton	1:3 lime	1050	22	330	24	375	1	27
4½	‡Fletton	1:3 cement	1470	29	1040	23	553	1	44
2⅝ cast in one piece	on edge								

xHard burned stock brick, compressive strength 1460 lbs. sq. in.; soft burned, 760 lbs. sq. in.

†Compressive strength 3300 lbs. sq. in.

‡Compressive strength 3500 lbs. sq. in.

§The horizontal load was applied at the center of the wall by means of a chain attached to a horizontal timber for spreading the load at the back of the wall.

*Dimensions of English Brick.

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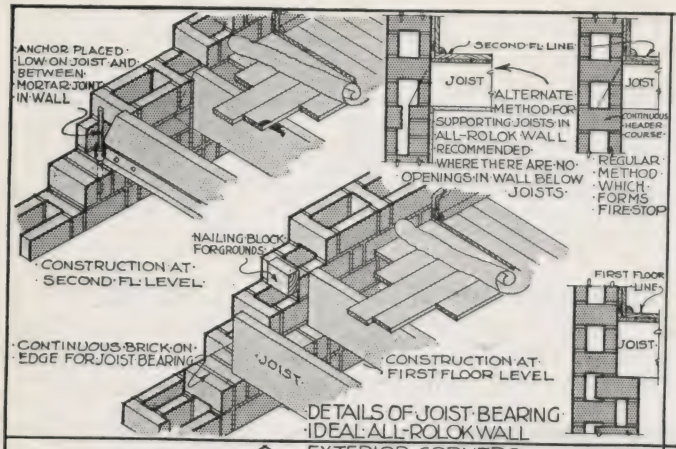
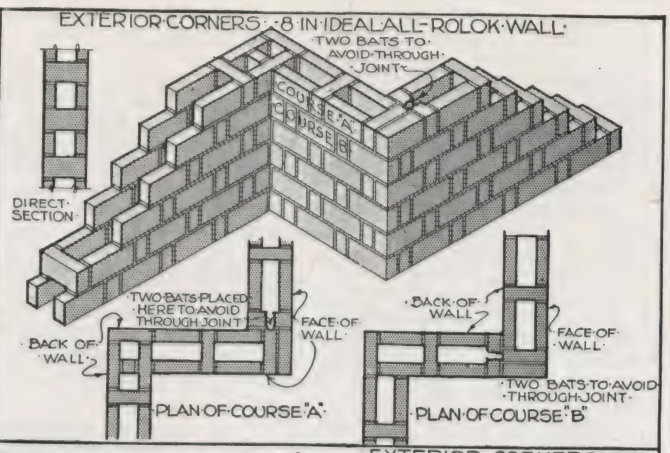
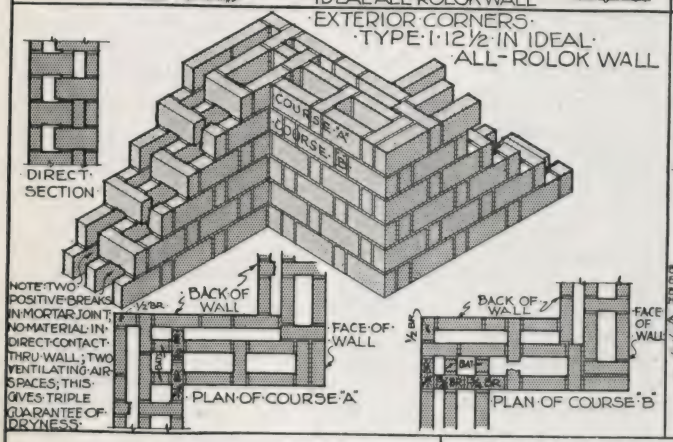
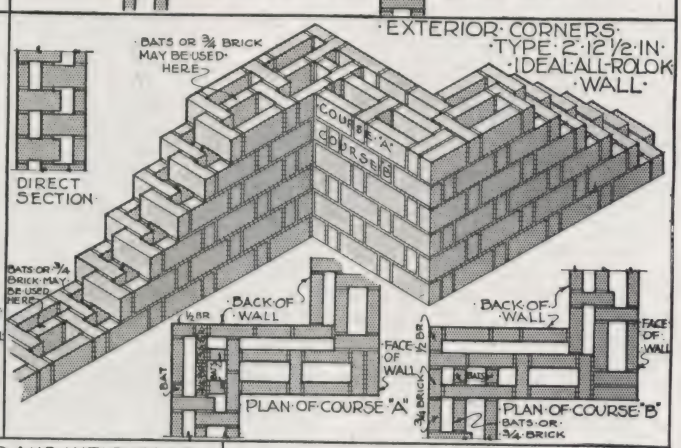
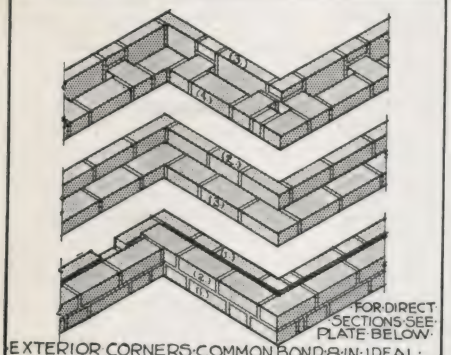








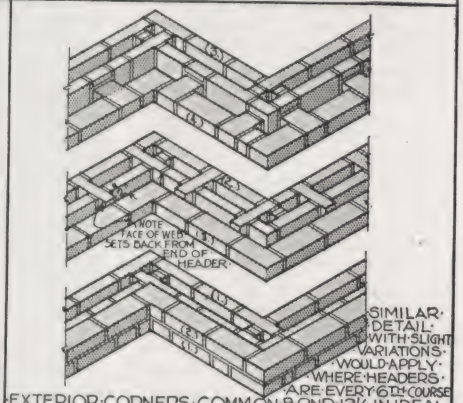


EXTERIOR CORNERS COMMON BOND 8 IN IDEAL ROLOK BAK WALL HEADERS EVERY 3RD COURSE
SIMILAR DETAIL WITH SLIGHT VARIATIONS WOULD APPLY WHERE HEADERS ARE USED EVERY 6TH COURSE

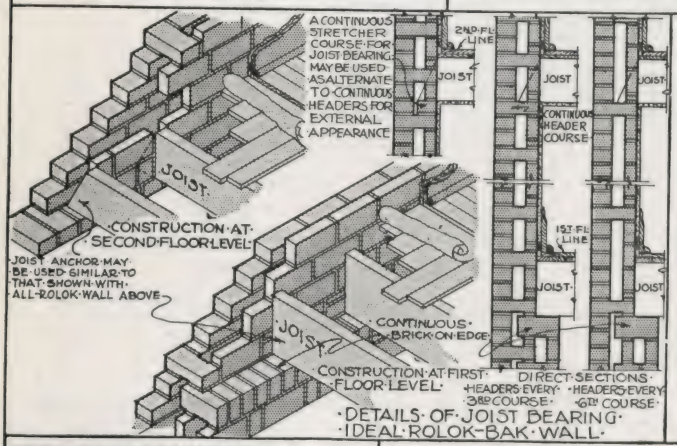
BRICK REQUIRED AND WEIGHTS OF IDEAL WALLS

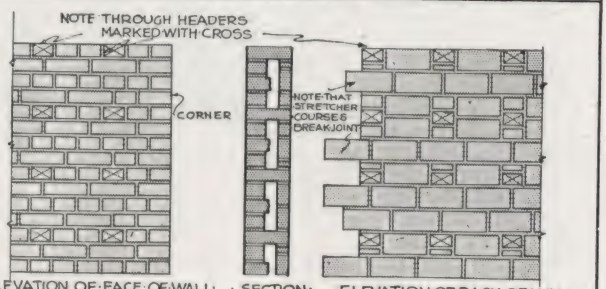
TYPE OF WALL	NO OF BRICK PER SQ FT OF WALL	AVERAGE WEIGHT PER SQ FT OF WALL. POUNDS
8" ALL-ROLOK	9.03	50.36
12½" ALL-ROLOK TYPE 1	13.28	74.02
12½" ALL-ROLOK TYPE 2	14.30	80.22
8" ROLOK-BAK HEADERS 3RD COURSE	10.78	62.45
8" ROLOK-BAK HEADERS 6TH COURSE	10.52	60.85
12½" ROLOK-BAK	15.44	87.63

FOR MORE COMPLETE TABLES SHOWING MORTAR QUANTITIES AND BRICK LAYERS AND LABORERS TIME FOR VARIOUS AREAS AND TYPES OF SOLID AND IDEAL WALLS, SEE "BRICK-HOW TO BUILD AND ESTIMATE", A 72 PAGE BOOK FOR 25¢.



EXTERIOR CORNERS COMMON BOND 12½ IN IDEAL ROLOK BAK WALL HEADERS EVERY 3RD COURSE





ENGLISH CROSS OR ENGLISH BOND
THROUGH HEADERS EVERY 4TH COURSE
8 IN IDEAL ROLOK-BAK WALL
WHERE THROUGH HEADERS ARE USED EVERY 6TH COURSE; DETAIL OF BACKING WILL BE SIMILAR TO THAT USED ON WALL OF COMMON BOND

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

IDEAL WALL DETAILS

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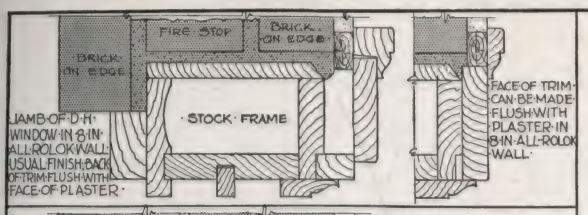
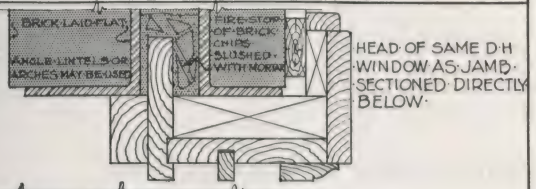
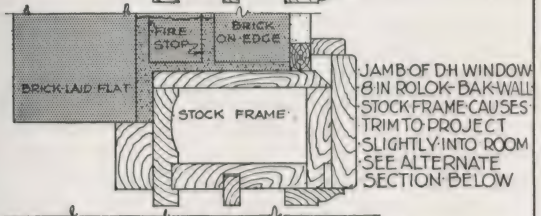
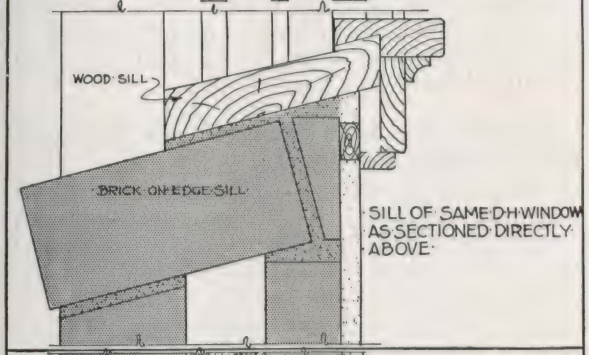




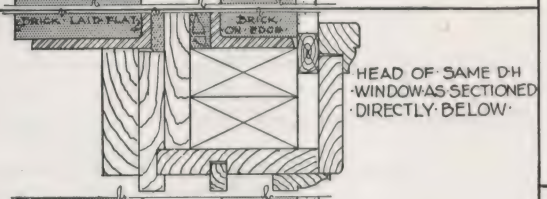
HEAD OF SAME D-H WINDOW AS JAMB SECTIONED DIRECTLY BELOW.



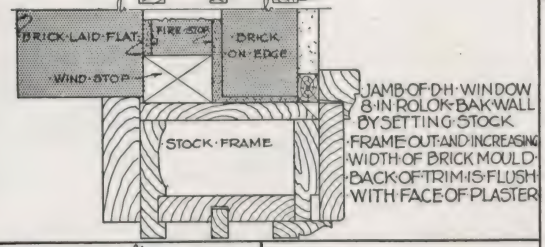
JAMB OF D-H WINDOW 8 IN ROLOK BAK WALL STOCK FRAME CAUSES TRIM TO PROJECT SLIGHTLY INTO ROOM SEE ALTERNATE SECTION BELOW



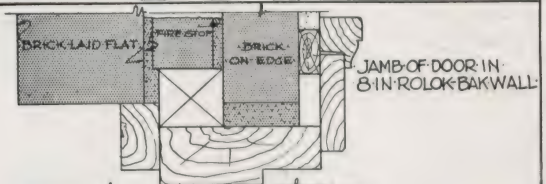
SILL OF SAME D-H WINDOW AS SECTIONED DIRECTLY ABOVE.



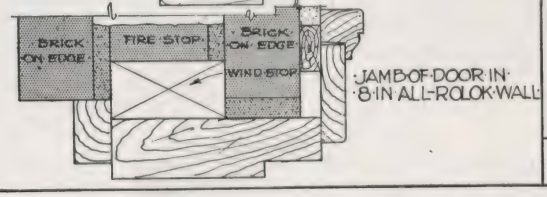
HEAD OF SAME D-H WINDOW AS SECTIONED DIRECTLY BELOW.



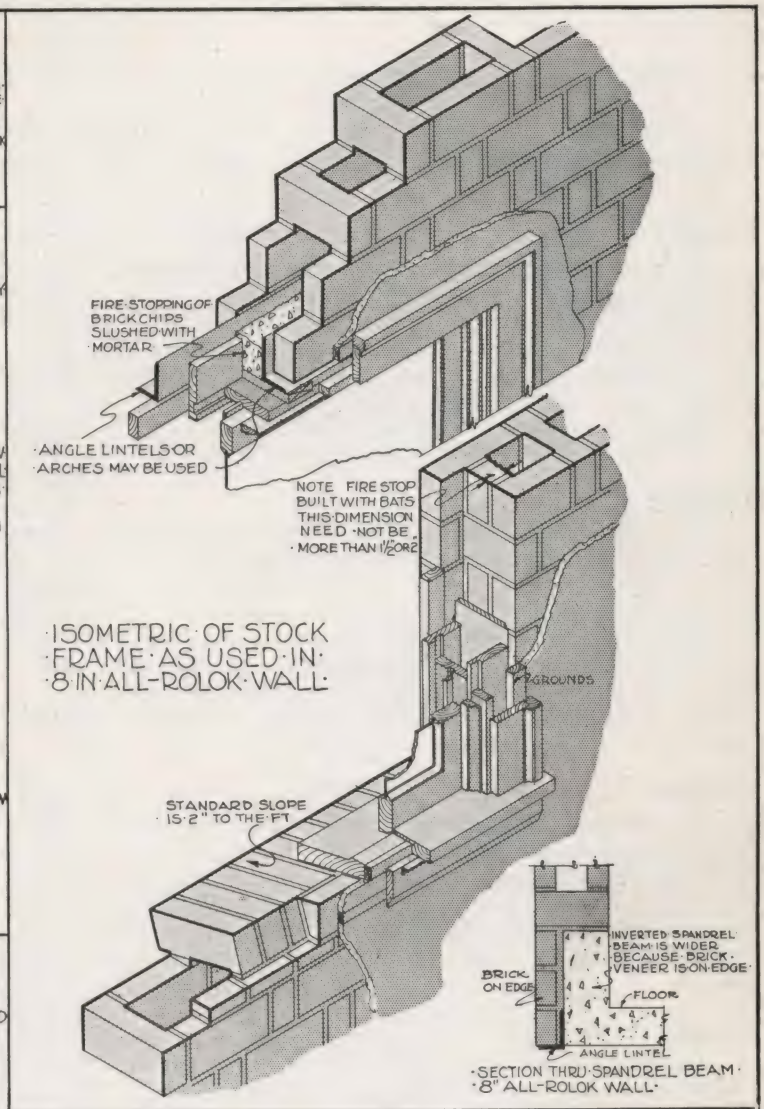
JAMB OF D-H WINDOW 8 IN ROLOK BAK WALL BY SETTING STOCK FRAME OUT AND INCREASING WIDTH OF BRICK MOULD BACK OF TRIM IS FLUSH WITH FACE OF PLASTER



JAMB OF DOOR IN 8 IN ROLOK BAK WALL



JAMB OF DOOR IN 8 IN ALL ROLOK WALL



ISOMETRIC OF STOCK FRAME AS USED IN 8 IN ALL-ROLOK WALL.

SECTION THRU SPANDREL BEAM 8" ALL-ROLOK WALL.

IDEAL ALL-ROLOK WALL UNDER CONSTRUCTION. NOTE THE PLEASING EFFECT OF THE ROUGH STRETCHERS AND SMOOTH HEADERS WHEN STRUCK BRICK ARE USED.

IDEAL WALL DETAILS

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

AMERICAN ENAMELED BRICK & TILE CO.

INCORPORATED 1893

Manufacturers of Fire and Enameled Brick; Dealers in Face Brick

TELEPHONES
MURRAY HILL 8787, 8788

52 Vanderbilt Avenue
NEW YORK, N. Y.

CABLE ADDRESS
"AMEREBRICK"

Products

ENAMELED BRICK, White, Mottled and Standard Colors, in standard sizes and ornamental shapes.

Also manufacturers of Fire Brick, Standard 9-in. and 9-in. Series Shapes (as adopted by the members of the Refractories Manufacturers' Association), and Special Shapes.

Fire Clay, packed in bags or in bulk.

Dealers in Face Brick, all shades and textures.

Territory

The business operations of this firm cover North and South America, Europe, Asia and Australia.

Personal Representatives

For the convenience of our customers in the United States and Canada, we have, in order to keep in closer touch with them, located representatives in all the principal cities to attend personally to inquiries, orders and deliveries.

Facilities

We are the largest manufacturers of enameled brick in North and South America.

Our works, located but an hour's travel from the New York office, are situated so as to enable shipping over two of the largest railroads, viz., the Pennsylvania and the Central of New Jersey, and their connecting lines.

Capacity

Our present capacity is 12,000,000 brick per annum, which will be increased as occasioned by the demand.

Stock

The average stock on hand at our factory is more than 2,000,000 brick, giving a large assortment for immediate delivery.

Illustrations of Stock Designs of Enameled Brick

Much delay is saved by use of stock designs of moulded brick.

In the following pages are shown designs that we recommend as being most satisfactory in manufacturing results.

We try to keep a stock of these on hand, in standard colors.

These designs are chosen to reduce manufacturing difficulties and delays to a minimum; to enable composite mouldings to be made up; and to enable prompt filling of orders.

Colors—Bright, Medium or Matt Finish

In addition to our regular white and standard colors, such as our sage green, red brown, etc., we have made a specialty of mottles in the following colors:

Gray, brown, black, blue and blue-brown in both enameled and porcelain finish, which give a very fine appearance for both interior and exterior work, having a finish more on the type of marble than enameled or porcelain brick.

If you have in mind, at any time, a particular color, shade or finish of enameled brick for interior or exterior purposes, advise us of your ideas and requirements and we will be pleased to submit samples.

Uniformity of Shade of Enameled Brick

We guarantee uniformity of shade in all first quality deliveries to the limit of practicability. Colors and effects giving most uniform results are, in order of degree of uniformity, white, mottled gray, mottled brown, mottled black, sage green and red brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders, if ample time be given, to match in shade the moulded and stretcher stock, but can not always guarantee to uniformly shade shipments of specials, particularly on rush shipments.

Special Features and Advantages of Our Enameled and Porcelain Brick

In making our product we follow the English and Scotch systems, working by the soft mud process. This is without question the only process which insures durability and the closest relation of bond obtainable between body and glaze.

Our brick are burnt in but one fire, thus making the chemical change in the body and the glaze simultaneous.

Where manufacturers use the dry pressed process, the brick have to be burnt first as front brick before the enamel can be applied, and fired again for the fluxing of the glaze.

Where the enamel is applied on an already burnt brick and fluxed in a second fire, the bond is weak and peeling is sure to follow.

We use hard and durable glazes; not soft lead glazes frequently seen on inferior grades of enameled brick and tile.

There has not been a single case during our twenty-nine years of business where any peeling or discoloring has been seen or reported.

This is better than any guarantee which we might be asked to give, as it covers a distributed output of over 125,000,000 brick, located all over the United States, Canada, South America and elsewhere, subject to all varieties of climatic conditions.

Cleaning

Enameled brick are best cleaned with some alkaline solution, such as caustic soda or sodium carbonate. This cleans the enamel and does not affect the cement or lime mortar.

Acids

Sulphuric, nitric or hydrochloric acids, even in concentrated form, will not affect our glazes; but if used as a wash, even when diluted, they will attack the cement or lime mortar.

The only commercial acids which will attack and destroy our enamel are hydrofluoric and hydrofluosilicic.

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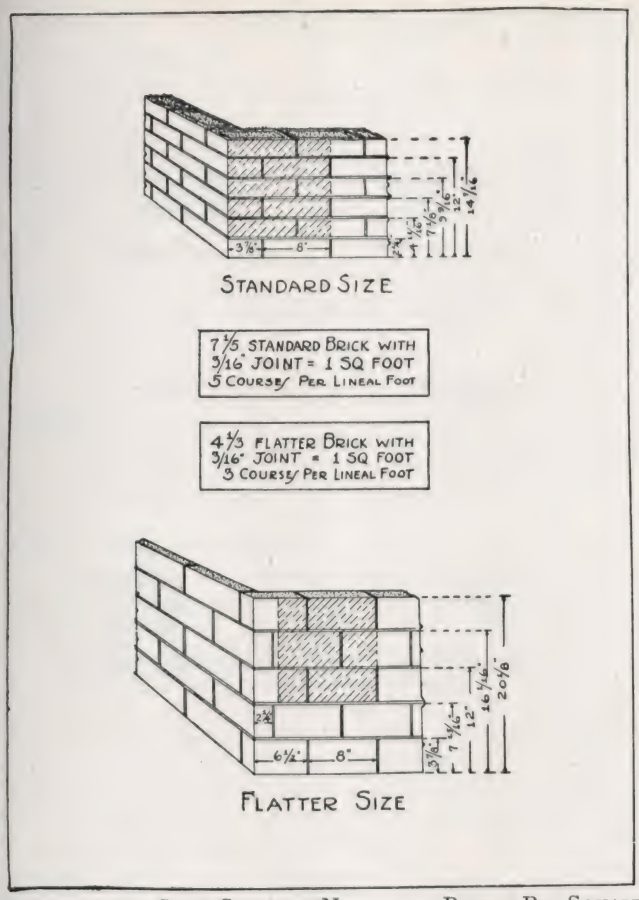
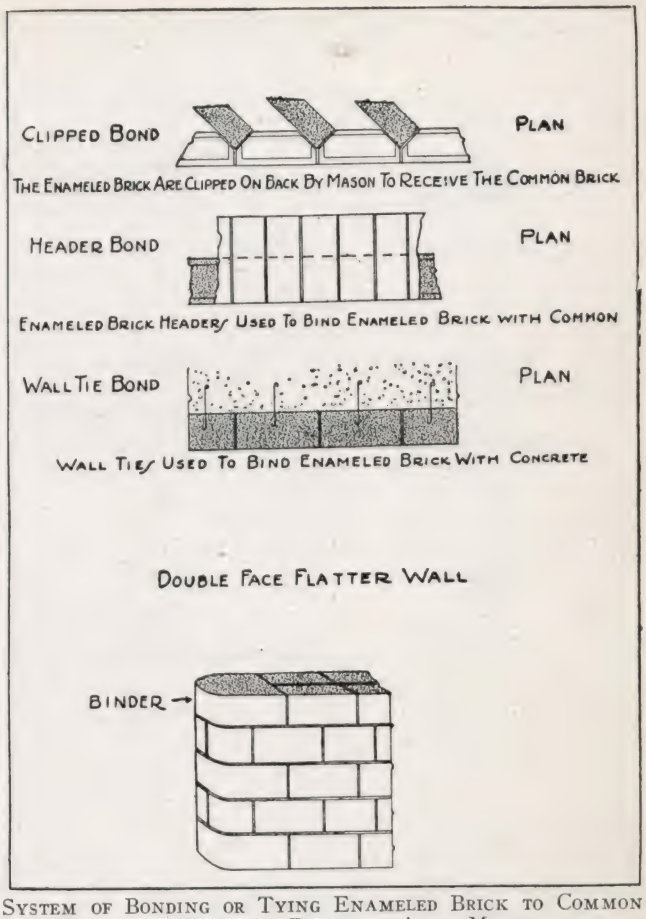
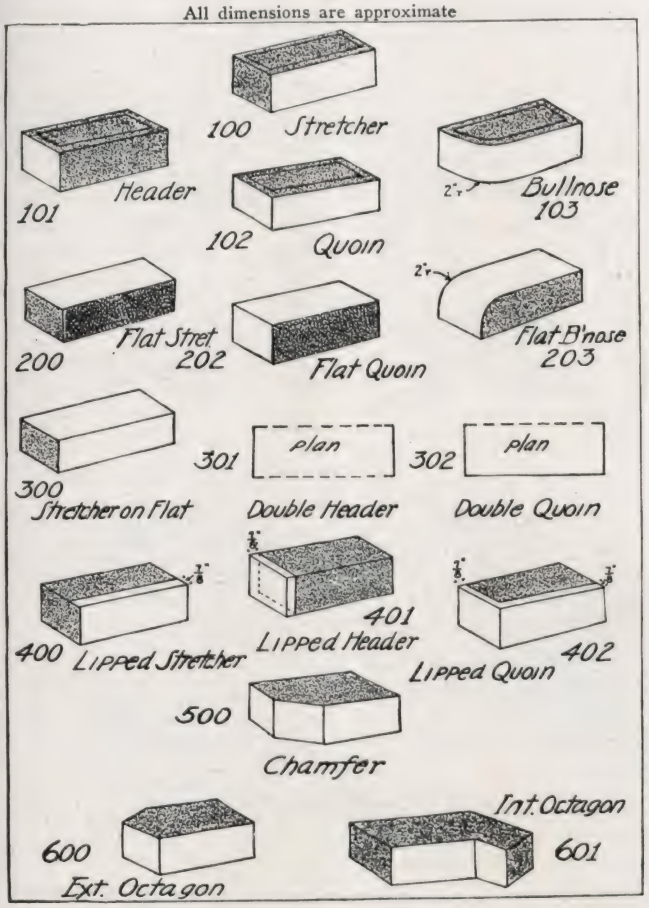


COMPARISON OF SIZES SHOWING NUMBER OF BRICKS PER SQUARE FOOT

All dimensions are approximate

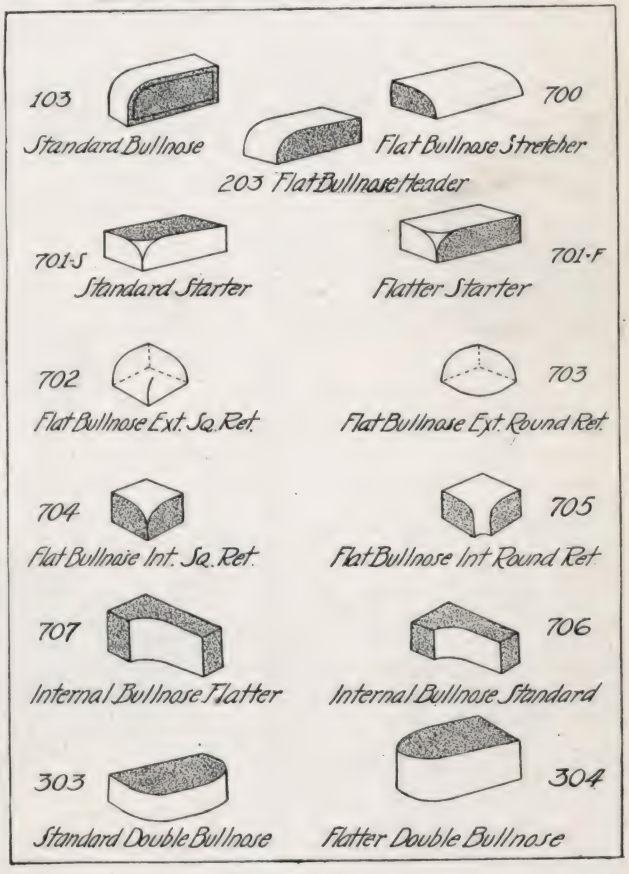


SYSTEM OF BONDING OR TYING ENAMELED BRICK TO COMMON BRICK OR CONCRETE BACKING, ALSO METHOD OF BONDING FLATTER BRICK FOR PARTITIONS



ILLUSTRATIONS OF TYPES

For projection and dimensions see next page



BULLNOSE SPECIALS

For projection and dimensions see next page. All brick shown have 2-in. radius

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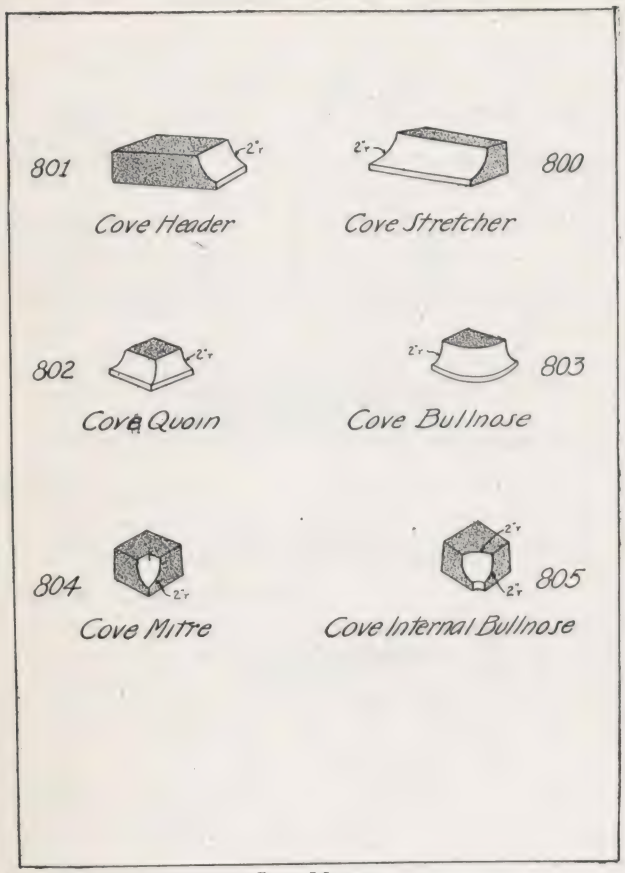
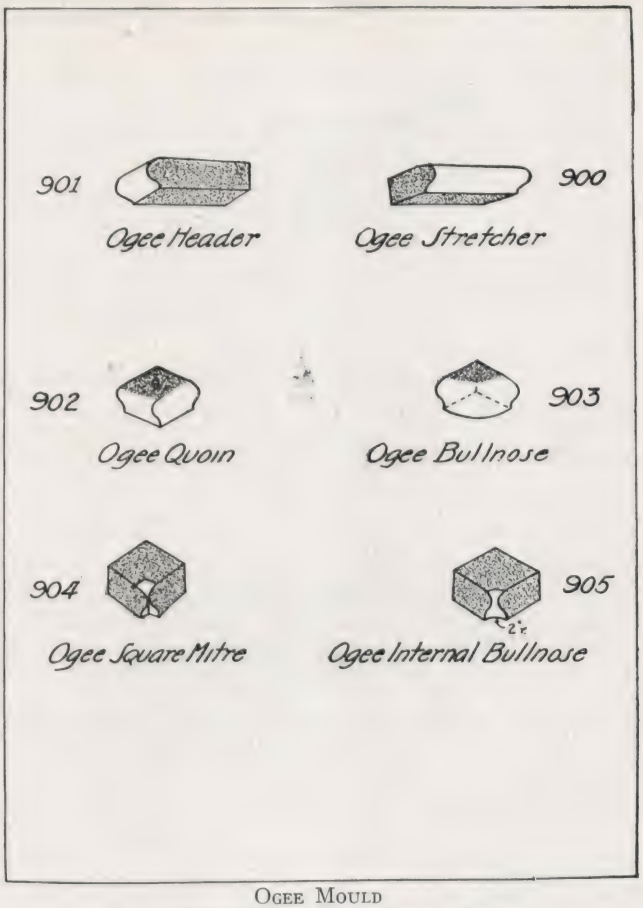
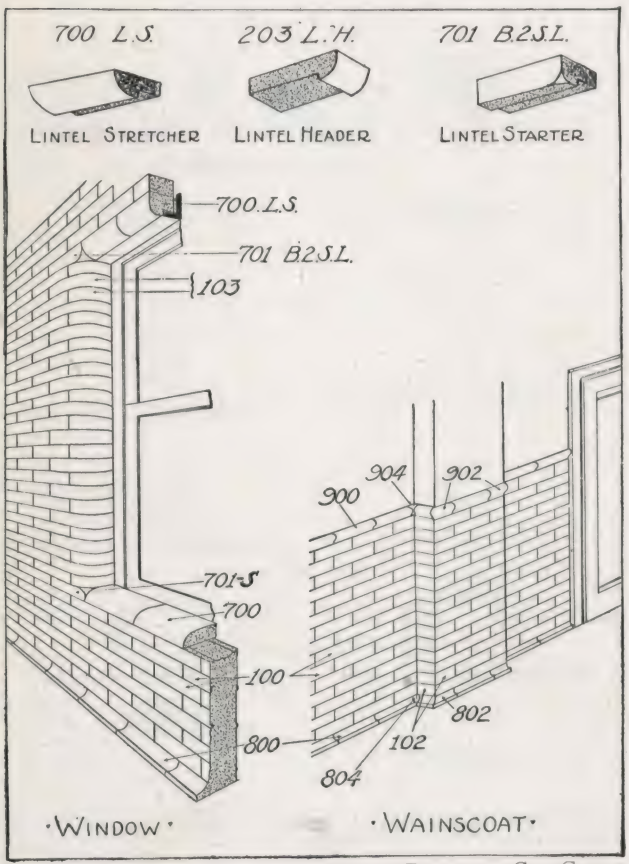


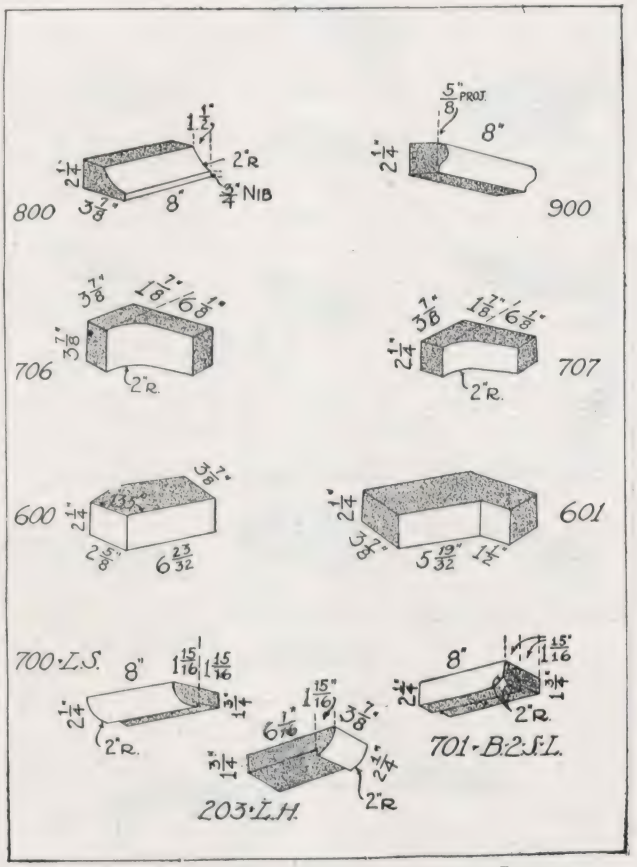
COVE MOULD
For projection and dimensions see cut below



OGEE MOULD
For projection and dimensions see cut below



STUDY OF A WINDOW OPENING AND OF A BASE AND CAP COURSE
For projection and dimensions see next cut



PROJECTION AND DIMENSIONS OF SPECIAL SHAPES

FISKE & COMPANY, INCORPORATED

Manufacturers of "Fisklock" and Face Brick

30 Franklin Street
BOSTON, MASS.

BRANCH OFFICES
NEW YORK, N. Y., 17 West 46th Street
WATSONTOWN, PA.

Products

"Fisklock" Brick (Hardoncourt-Fiske Patents).
Also, "Tapestry" Brick, "Caledonian" Brick, "Fiske" Brick, Garden Tile, "Tapestry" Tile.

Trade-names and Patents

"Fisklock" brick is fully covered by the Hardoncourt-Fiske patents which are the exclusive property of Fiske & Company, Incorporated.

The trade-names "Fisklock" and "Tapestry" are registered, United States Patent Office.

"Tapestry" is the trade-mark applied to our face brick, of vertical rough texture, burned to flashed shades. It is more fully described in our catalogue "Tapestry Brickwork" which will be sent on request to architects.

"Caledonian" is applied to our face brick of horizontal rough texture, burned either to flashed or clear shades.

"Fiske" is applied to our smooth face brick and certain rough texture brick.

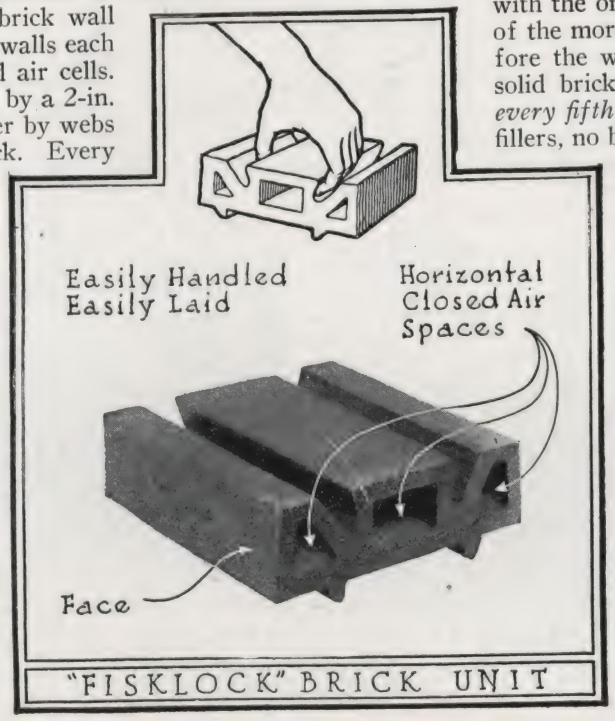
To protect our customers against substitution of inferior products, these trade-marks are branded on our brick.

"Fisklock" Brick Unit

"Fisklock" is an interlocking channel brick, 8x2¼x8 in. It has the face of a standard brick, 8x2¼ in. and is equivalent to a face brick and a common brick. It provides a double, hollow, brick wall which consists of two masonry walls each 3 in. thick and containing dead air cells. The double walls are separated by a 2-in. air space, yet are bound together by webs which are integral with the brick. Every "Fisklock" is both a header and a stretcher.

How a "Fisklock" Wall Is Constructed

The 8-in. wall is built up by laying one "Fisklock" on another in the usual way. It is equivalent to an 8-in. wall built up of face brick backed with common brick. A 12-in. wall requires a common brick backing of 4-in. thickness, with header courses. For corners, around doors and windows, solid brick is used in conjunction with "Fisklock." The same combination takes care of construction around beams, etc.



"FISKLOCK" BRICK UNIT

Insulating Qualities

Confined still air is the best heat and cold insulator and small air cells are more efficient than large ones. A "Fisklock" wall has a multitude of closed air cells, three in each brick. These air cells are horizontal, thereby eliminating internal air circulation caused by up-and-down drafts which are common in hollow walls having vertical air spaces.

Even hollow tile or solid brick construction saves 15% to 25% of the heating expense for a frame house. Tests by engineers of Columbia University indicate that the heat transmission through "Fisklock" walls is considerably less than that through walls of hollow tile or solid brick, and the saving in heating costs is therefore even greater.

Dryness

It is a well-known fact that moisture traverses a brick wall through the mortar joints, which are more porous than hard burned clay. The "Fisklock" wall has no continuous mortar joints, either horizontal or vertical. There is no possibility of moisture "striking through." This is an absolutely unique feature in brickwork.

Structural Strength

Every "Fisklock" brick is also a header interlocking with the one below throughout the length of the mortar joint on each side. Therefore the wall is stronger than a wall of solid brick *in which headers only occur every fifth or sixth course.* There are no fillers, no backing to be tied in.

Economy

Only about half as many brick are handled and laid. When a mason lays a "Fisklock" he lays the equivalent of two brick, but because of the balanced handhold he does it without additional effort. Although the equivalent of two ordinary brick, "Fisklock" weighs only about seven-tenths as much as the two brick. This effects a large saving in freight and truckage charges. Because of the 2-in. space (moisture check) left in the horizontal mortar joint, the amount of mortar is reduced to a minimum.

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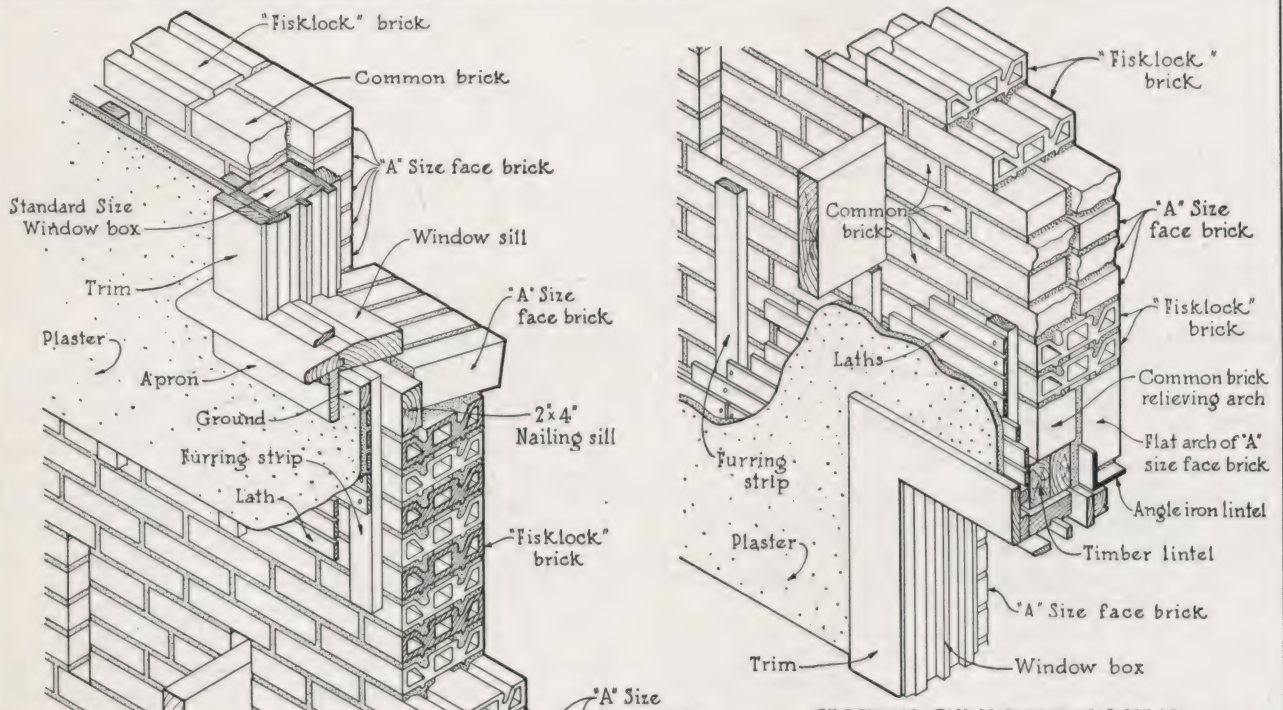
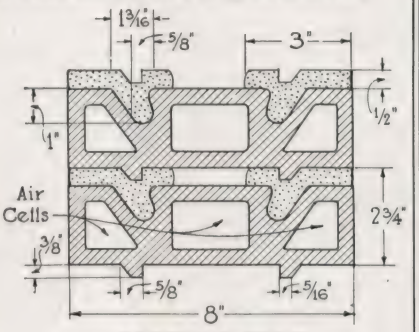
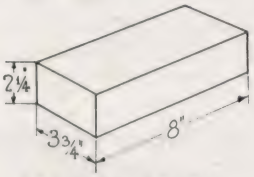


SECTION THRU WINDOW HEAD
SHOWING STANDARD LINTEL CONSTRUCTION

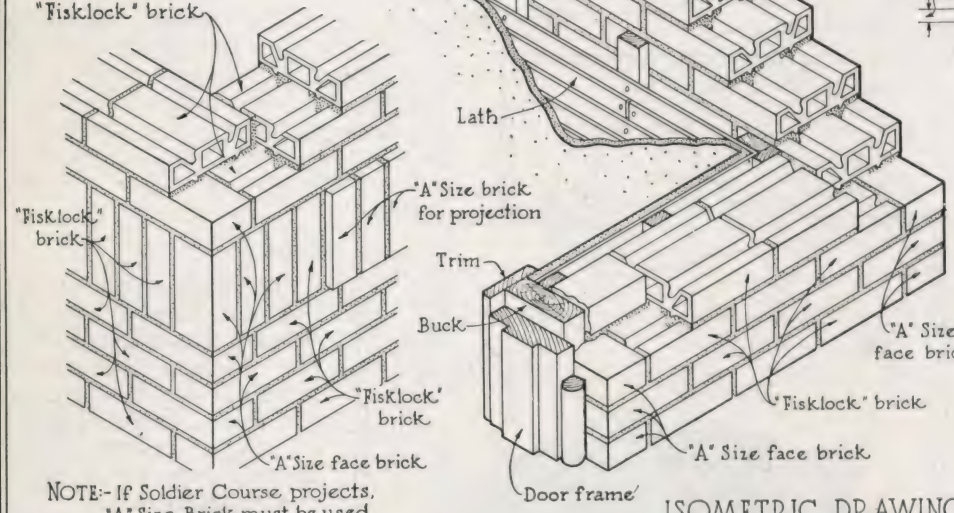


SECTION THRU
"FISKLOCK" BRICK
AS LAID UP



"A" SIZE BRICK

"A" Size brick is a solid brick made for use with Fisklock brick and has same texture and color as "Fisklock."



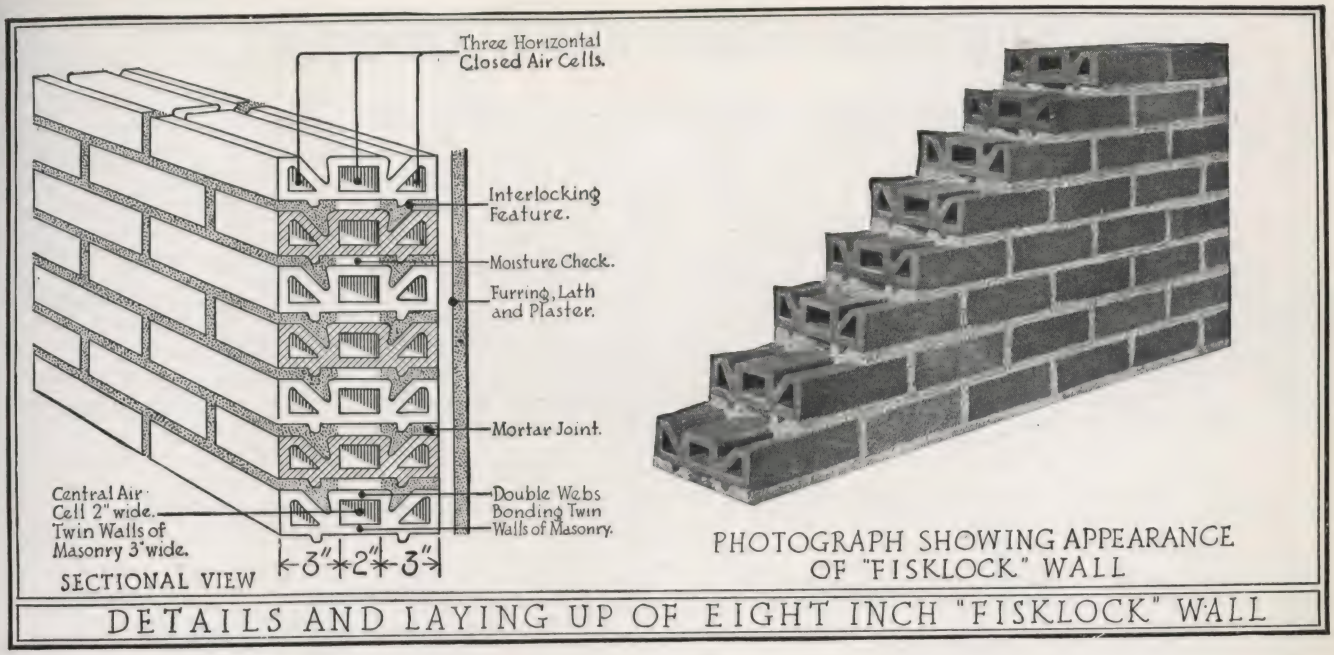
NOTE:- If Soldier Course projects, "A" Size Brick must be used

VIEW OF EXTERIOR CORNER
SHOWING FLUSH FISKLOCK BRICK
SOLDIER COURSE & TYPE "A" SIZE BRICK

ISOMETRIC DRAWINGS SHOWING
DETAILS OF CONSTRUCTION WITH "FISKLOCK" BRICK
IN CONNECTION WITH DOOR AND WINDOW FRAME,
BRICK SILL AND LINTEL, FLOOR JOISTS & CORNER OF WALL

DRAWN BY SWEET'S CATALOGUE SERVIC, INC.	CONSTRUCTION DETAILS FOR USE WITH EIGHT INCH "FISKLOCK" BRICK WALL	SCALE 3/4" EQUALS 1'-0" DATE: JUNE-21.	DRWG 1

Continued on next page



DETAILS AND LAYING UP OF EIGHT INCH "FISKLOCK" WALL

First Cost

A "Fisklock" wall costs less than any other face brick wall whether solid or brick veneer; costs about the same as hollow tile covered with *three-coat* stucco; costs but slightly more than frame construction.

There are types of buildings, three stories in height or less, in which 8-in. walls of "Fisklock" fulfill all structural requirements, even where 12-in. walls of solid brick would otherwise be required.

Ultimate Cost

Over a period of years a "Fisklock" house is less costly than other construction for it needs no paint, no repairs, no renewals. And it costs less to heat in winter.

Specifications of "Fisklock" Brick Walls

All face brick shall be "Fisklock" Brick, as manufactured by FISKE & COMPANY, INCORPORATED, or their licensees. The exterior surface of the brick shall be of rough texture, and either "Full Range Red" or "Clear Reds," as elected by the architect. All exposed door and window jambs, lintels, sills, corners, slopes and moulded courses, shall be built of solid brick, manufactured for use in connection with "Fisklock" brick, having same face size, color and texture, as the "Fisklock" brick. Mortar joints to be ½-in., both vertical and horizontal, and to be made full, to a depth of not less than 3 in. from the exterior and interior faces of the wall.

Mortar formula suggested as follows: 1 part cement, 3 parts sand and 10% hydrated lime. Mortar to be tinted to shade selected by the architect.

Where "Fisklock" has been Used

"Fisklock" has been used in more than 300 cities and towns from Maine to Alabama; in over 1000 residences—from humble cottages to fine country houses on Long Island and in Westchester County, N. Y.; for apartment buildings, hospitals, schools and garages; and by the United States Government.

Architects specify "Fisklock," and express their liking for it by repeated use.

House of J. Cozzens, Locust Valley, L. I., N. Y.
ROUSE & GOLDSTONE, Architects

Hospital of the American Institute for Deaf, West Hartford, Conn.
ISAAC A. ALLEN, JR., INC., Architect

RECENT BUILDINGS CONSTRUCTED OF "FISKLOCK"

HYDRAULIC-PRESS BRICK COMPANY

Manufacturers and Distributers of Hy-tex Brick

ST. LOUIS, MO.

BRANCH OFFICES

BALTIMORE, MD., Munsey Building
CHICAGO, ILL., Chamber of Commerce Building
CLEVELAND, OHIO, 5005 Euclid Avenue
DAVENPORT, IOWA, Putnam Building
DUBOIS, PA., Deposit National Bank Building
INDIANAPOLIS, IND., Board of Trade Building
KANSAS CITY, MO., Rialto Building
LITTLE ROCK, ARK., 710 Boyle Building
MINNEAPOLIS, MINN., Builders Exchange
NEW YORK, N. Y., Fredenburg & Lounsbury, Rep., 381 Fourth Avenue
NEWARK, N. J., Fredenburg & Lounsbury, Rep., 38 Park Place
OMAHA, NEBR., Woodmen of the World Building
PHILADELPHIA, PA., Otis Building
ROSEVILLE, OHIO
TOLEDO, OHIO, Ohio Building
WASHINGTON, D. C., Colorado Building

PRINCIPAL SELLING AGENCIES

ALLENTOWN, PA., George K. Halteman, Hunsicker Bldg.
ATLANTA, GA., Sciple Sons, Citizens and Southern Bank Bldg.
BINGHAMTON, N. Y., Pratt Lumber Co.
BOSTON, MASS., Waldo Bros. & Bond Co., 181 Congress St.
BUFFALO, N. Y., John H. Black Co., 123 W. Chippewa St.
CINCINNATI, OHIO, Builders' Material Co., 600 Lincoln Inn Court Bldg.
DALLAS, TEX., Fraser Brick Co., Sumpter Bldg.
DES MOINES, IOWA, Baker Brick Co., 410 Shops Bldg.
DETROIT, MICH., United Fuel & Supply Co., Free Press Bldg.
DULUTH, MINN., Standard Salt & Cement Co., 237 Lake Ave., South
ERIE, PA., Boyd & Shafer, 19th and Parade Streets
JACKSON, MICH., I. N. DeLamater
JACKSONVILLE, FLA., Baker & Holmes Co.
LOUISVILLE, KY., R. C. Tway Coal Co., 506 Inter-Southern Bldg.
MEMPHIS, TENN., Memphis Brick Supply Co., Goodwyn Institute Bldg.
MILWAUKEE, WIS., Ricketson & Schwarz, University Bldg.
MONTREAL, QUE., Alex. Bremner, Ltd., 100 Bleury St.
NIAGARA FALLS, N. Y., Empire Builders Supply Co., Inc., Gluck Bldg.
NORFOLK, VA., G. S. Friebus, Monticello Arcade Bldg.
OKLAHOMA CITY, OKLA., Lumbermen's Supply Co., American Bank Bldg.
OTTAWA, ONT., T. Sidney Kirby Co., Ltd., 213 Sussex St.
PEORIA, ILL., Dering & Oliver Co., Lehmann Bldg.
QUEBEC, QUE., Pruneau & Cie., 140 Rue St. Pierre
RICHMOND, VA., R. Massie Nolting, Mutual Bldg.
ROCHESTER, N. Y., American Clay & Cement Corporation, 1175 East Main St.
SPRINGFIELD, MO., Lumbermen's Supply Co., Holland Bldg.
ST. JOSEPH, MO., St. Joseph Pressed Brick Co.
ST. PAUL, MINN., Corning-Donohue Brick Co., 613 Ryan Bldg.
SYRACUSE, N. Y., Paragon Plaster Co., Water St.
TAMPA, FLA., I. W. Phillips & Co.
TOPEKA, KANS., Lumbermen's Supply Co., New England Bldg.
TORONTO, ONT., Drummond & Reeves, Ltd., Mail Bldg.
UTICA, N. Y., American Hard Wall Plaster Co., 728 Broad St.
WICHITA, KANS., Lumbermen's Supply Co., Caldwell-Murdock Bldg.
WINNIPEG, MAN., Winnipeg Supply & Fuel Co., 265 Portage Ave.

Hy-tex
TRADE-MARK

Products

SMOOTH TEXTURE BRICK

HY-TEX GRAY and BUFF RANGES, in wide variation of tone and shade; HY-TEX RED RANGE, running from light reds to dark browns and blacks; HY-TEX FLAT SET RANGE, bronze and mahogany; IRONSPOTS, in variation of shade; HY-TEX EQUITABLE RANGE, in various speckled effects; HY-NAMEL RANGE, in white, cream, green, brown, blue, and in transparent brown and speckled tones; HY-TEX COMMON RANGE, in wide variety of reds, a high grade common used for facing in the St. Louis market; WIRE-CUT-LUG, FIBER, and REPRESSED PAVERS of the best shales.

HY-NAMELS and HY-TEX EQUITABLES are made in standard sizes, and corresponding moulded forms.

ROUGH TEXTURE BRICK

HY-TEX MATT RANGE in reds, greens, browns, gunmetals, clear or flashed, served in varied mixtures, kiln run, or sorted to shades; HY-TEX CHALDEAN RANGE, in same color-tones as MATT RANGE. Special forms in MATT BRICK made on order.

HY-TEX HOLLOW BUILDING and PARTITION TILE in various sizes.

Color and Texture

Our widely distributed clay fields make it possible for our experts to turn out any color or texture in face brick the architect, builder, or owner may need.

Sizes and Special Forms

All Hy-tex Brick, except pavers, are made in standard size: wire cut, 2¼x8x3¾ in.; dry press, 2¼x8x3⅞ in.

Moulded or special forms in wire-cut brick, when not in stock, are made on specification of the architect. Arch brick are ground or moulded to any required radius.

Important

Please note the necessity of getting exact size of the particular brick to be used, as brick vary from $\frac{1}{16}$ to ⅜ in. in dimensions, dependent on the nature of clay or the kiln burn.

Service

With our 22 plants and 16 branch offices, besides numerous agencies throughout the country, we can assure the architect or builder of what he must have, *prompt, responsible,* and *efficient service.* The elaborate and artistic exhibit rooms, connected with all of our offices, are a mine of valuable information and suggestion.

If architects can not visit them, send to us or to our nearest branch office for color plates, or for samples, when considering face brick.

Chicago Branch Office

Products

SMOOTH TEXTURE BRICK

HY-TEX CALVERT COLONIAL RANGE, sanded face in red, brown, green, and black tones.

ROUGH TEXTURE BRICK

HY-TEX VELOUR RANGE, in maroon, antique, and bronze tones; HY-TEX CHALDEAN RANGE, in varied shades of red and brown. Both Velours and Chaldeans can be furnished in even shades if desired.

St. Louis, Davenport, Indianapolis, and Cleveland Ranges of Hy-tex and Hy-namel Brick distributed here.

Continued on next page

Products **Cleveland Branch Office**

SMOOTH TEXTURE BRICK

HY-TEX CHERRY RED RANGE, in light, medium, and dark shades; HY-TEX BLACKSTONES, or flashed CHERRY REDS; HY-TEX INDEPENDENCE RED SHALE RANGE, in rich dark reds, running to chocolate tones; HY-TEX ROUND-EDGE PAVER RANGE, a repress shale; HY-TEX OLD ENGLISH, a simulation of old English brick, the surface sanded and slightly pebbled, in a variation of shades.

ROUGH TEXTURE BRICK

HY-TEX BOKHARAS (rough horizontal scoring); HY-TEX ROYAL BOKHARAS (rough vertical scoring); HY-TEX NELA BOKHARAS (fine horizontal scoring); in a rich variety of red, brown, bluish, bronze, and polychrome effects, served in any desired percentages or in full range of color.

HY-TEX VERTICUTS are made from the famous Bokhara Shale with a mechanical but interesting vertical scoring.

Indianapolis and Dubois Ranges of Hy-tex; Philadelphia Hy-tex Equitable Range and St. Louis Hy-namel Brick distributed here.

Products **Davenport Branch Office**

HY-TEX OAK BARK, nature's own beauty in imperishable material, each brick varying in texture; HY-TEX RUSTICO, vertical texture of exceptional beauty; HY-TEX MATTS, semirough, and avoid the light reflection of most smooth brick.

Any of the above textures served in mixtures comprising the forest shades: greens, purples, browns and autumnal reds harmoniously blended. Can serve restricted shade variations on request.

St. Louis, Chicago, and Indianapolis Ranges of HY-TEX and HY-NAMEL BRICK distributed here.

Products **Dubois, Pa., Branch Office**

SEMISMOOTH AND ROUGH TEXTURE BRICK

Reds, Grays and Browns.

HY-TEX FALLS CREEK and REYNOLDSVILLE RED RANGE, in reds, browns and gunmetals, in both Semismooth and Rough Textures, Horizontal and Vertical Cut.

HY-TEX COWAN GRAY and BROWN RANGES, in both Semismooth and Vertical Texture, in wide variations of artistic color-tones. Special sizes and shapes made on architect's specification.

ROUGH TEXTURE and REPRESS FLOOR TILE, in various shades, suitable for porches, terraces, and hearths.

Philadelphia, Washington, and Cleveland Ranges of Hy-tex and St. Louis Hy-namel Ranges distributed here.

Products **Indianapolis Branch Office**

SMOOTH TEXTURE BRICK

HY-TEX GOLDEN SALT GLAZE RANGE, in varied light, medium, and dark shades; HY-TEX RED OXFORD STANDARD RANGE, in light, medium, and dark shades; HY-TEX BUFF and GRAY RANGES, in whites, creams, light and dark buffs, steel grays, and varied mottled grays.

ROUGH TEXTURE BRICK

HY-TEX MATT RANGE, in ivory, gray, and mosaic effects; HY-TEX CHINCHILLA RANGE, in maroon red, seal brown, gunmetal, and black mission tones; FULL RANGE SEAL BROWN, and SARABAND, in blended shades.

St. Louis, Davenport, Chicago, Cleveland, and Dubois Hy-tex and Hy-namel Ranges distributed here.

Products **Kansas City Branch Office**

SEMISMOOTH TEXTURE BRICK

HY-TEX OLD MISSIONS, in color variation from brown to maroons; HY-TEX OLD ENGLISH, in color variation from tans through copper browns and olive buffs.

ROUGH TEXTURE BRICK

HY-TEX MATT RANGE; HY-TEX CHALDEAN RANGE, both running in reds and browns, served in full variation of the reds or browns or in percentage mixture of both.

St. Louis, Davenport, and Indianapolis Hy-tex and Hy-namel Ranges distributed here.

Products **Minneapolis Branch Office**

SMOOTH TEXTURE BRICK

HY-TEX RED PRESS and SAND MOULD GEORGIAN RANGES, running from light to dark reds, in uniform or mixed shades; COLONIAL SAND MOULD RANGE, in a rich variety of red tones, fire flashed and gunmetal.

ROUGH TEXTURE BRICK

HY-TEX No. 39 CHENILLE, a Mixed Range, from rich maroon red to dark gunmetal, with flashed and polychrome effects, served also in uniform shades of red.

St. Louis, Indianapolis, Cleveland, Chicago, Dubois, Davenport, and Washington Hy-tex and Hy-namels distributed here.

Products **New York Branch Office**

SMOOTH TEXTURE BRICK

WASHINGTON and PHILADELPHIA HY-TEX RANGES; ST. LOUIS HY-NAMEL RANGE.

ROUGH TEXTURE BRICK

DUBOIS and PHILADELPHIA HY-TEX RANGES.

Products **Omaha Branch Office**

Distributing center for all HY-TEX and HY-NAMEL products manufactured at St. Louis, Kansas City, Davenport, Chicago, and Indianapolis.

Products **Philadelphia Branch Office**

SMOOTH TEXTURE BRICK

HY-TEX WINSLOW IRONSPOT RANGE, in rich variation of peachblow and orange tones; served in standard size or, on order, in Roman size; also in various moulded forms.

HY-TEX EQUITABLE RANGE, in whites and light grays with small or large speckle, served in standard size and in various moulded forms.

ROUGH TEXTURE BRICK

HY-TEX WINSLOW BELGIAN RANGE, in tan, copper, and bronze effects.

Dubois and Washington Hy-tex and St. Louis Hy-namel Ranges distributed here.

Products **Toledo Branch Office**

HY-TEX TOLEDO SAND MOULD RANGE, in uniform deep red tone or kiln run variation; on order, made in Radius, Octagon, and Bullnose forms.

Chicago, Cleveland, Dubois, Indianapolis, and St. Louis Hy-tex and Hy-namel Ranges distributed here.

Products **Washington, D. C.**

HY-TEX WASHINGTON RED RANGE, in reds and browns; HY-TEX WASHINGTON GRAY RANGE, in a variation of tones from plain white to dark mottled effects, served in standard and Roman sizes, in smooth face and rough texture face; and also, on order, in moulded and ornamental forms.

Dubois and Philadelphia Hy-tex and St. Louis Hy-namel Ranges distributed here.

KUSHEQUA BRICK COMPANY

Manufacturers of Face Brick and Paving Materials

OXBLOOD AND GARNET PLANTS

KUSHEQUA, PA.

Products

VITRIFIED SHALE FACE BRICK, FLOORING and PAVING MATERIALS; ACIDPROOF SPECIALTIES.

Kushequa Face Brick

The characteristics of Kushequa face bricks are their deep color (specially dark red), great strength and high vitrification. Kushequa face bricks include Kq Paver, Wire-cut, Oxblood and Garnet Devonshire, Velours, Saruk, Autumnoak and Veneer Brickette.

Kq Paver—2¼x8¼x3⅞ in.; weight, 6⅛ lbs. Repressed, with bevel edges resembles a small paving block. It is particularly pleasing in large buildings.

Wire-cut—2¼x8x3⅞ in., weight, 6 lbs. A standard red brick with smooth face and wire-cut sides, in 4 shades. Shade 1, exceptionally deep and strong; Shade 2, a dark red brick of moderate cost; Shade 3, a clear red brick for sidewalks and fronts not requiring dark red; and Shade 4, a light red brick, sufficiently vitrified to withstand wet and frost.

Oxblood Devonshire—2¼x8x3¾ in.; weight, 5¾ lbs. Very rough texture and a clear, uniform red color. Shade 1, the darkest clear red on the market; Shade 2, a fine deep red; Shade 3, a bright red.

Velours—Similar to Oxblood, but of finer texture, giving a velvety appearance.

Saruk—2¼x8x3⅞ in.; weight, 5¾ lbs. The rough texture and variegated color give this brick an Oriental rug effect. The hues harmoniously blend from deep red through old rose to greenish gray, and from bronze to tan. To get the best effect, it should be laid with dark mortar joints, not exceeding ½ in., raked.

Garnet Bricks—At our Garnet Plant we make the following kinds of face brick similar in size, texture and color to the Oxblood bricks, but having warm brown tint, viz: Rough Texture Autumnoak (full range), Devonshire Shades Maroon to Light Bronze, and Smooth-faced Wire-cut Shades 1 to 3.

Veneer Brickette—2¼x8x2 in.; weight, 3½ lbs. Made at Garnet Plant with rough texture face, and Autumnoak coloring. Corner ells to match show 2¼x3¾-in. heads. Used for siding on adobe, hollow tile or wooden structures gives appearance of solid brick wall. Reduces initial cost of freight, bricklayers' labor and fire risk; saves painting and lessens fuel bills.

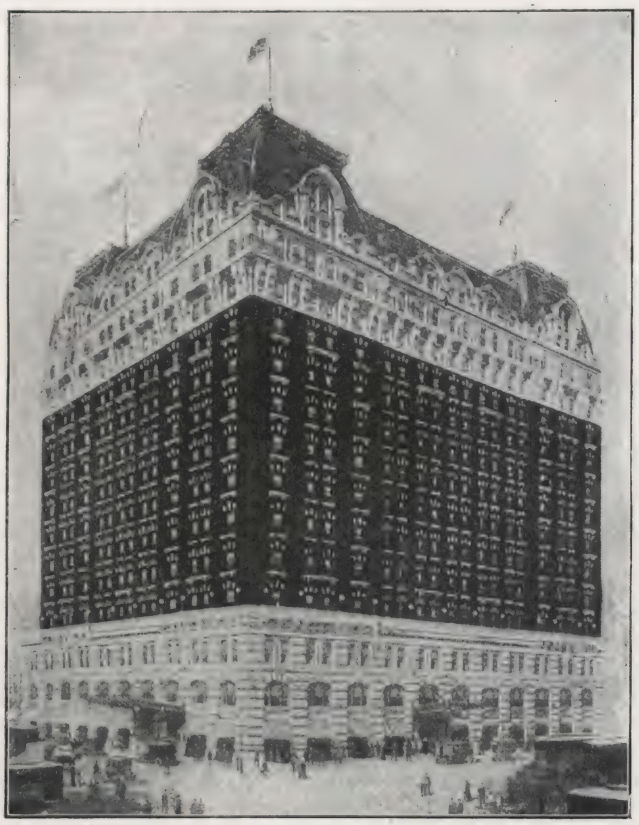
Paving and Acidproof Material

This company commenced business in 1904 with the manufacture of paving blocks out of a strongly ferruginous mountain shale highly vitrified by natural gas. The beauty of color and finish of the product created such demand for building purposes that, for several years, the capacity of the factory was principally taken for face bricks.

The high vitrification of our products makes them acidproof and electric insulating. Such products comprise:

Kushequa Repressed Paving Blocks—3½x8¾ x4 in.; weight, 10 lbs. Tough, durable, impervious and handsome in finish. Guaranteed to lay 40 per sq. yd., street measure.

WESTMINSTER PRESBYTERIAN CHURCH, ROCHESTER, N. Y.
Faced with 100,000 Saruk and Oxblood mixed



HOTEL SHERMAN, CHICAGO, ILL.
Faced with 500,000 Kq Pavers
HOLABIRD & ROCHE, Architects

Continued on next page

Brickette—2¼x8x2 in.; weight, 3½ lbs. A dark red, thoroughly vitrified brick, useful for floors where hard wear is desired but unnecessary depth is objectionable. The mall or concourse at Staten Island end of New York Municipal Ferry is paved with Kushequa Brickettes.

Also used for packing house floors.

Packing House Floor Brick—4x8x1¾ in.; weight, 4¾ lbs. Specially made for packing house floors to resist grease, hot water and heavy trucking. One side and two ends smooth; wire-cut back and edges. Durability and lightness are combined. Second quality, laid reverse side up, makes a superior sidewalk brick, edges showing no kiln marks.

Acid-tower Packing—Garnet Plant makes vitrified acidproof specialties, notably rings for packing condensery towers at acid works, oil refineries and fertilizer plants. These are hollow cylinders 3 or 6 in. diameter and same length divided by radial partitions. Other shapes made to order.

Shipping Facilities

Daily output, Oxblood Plant, 30,000, Garnet Plant, 20,000 bricks. Ample stocks carried. Both plants are located at Kushequa on the Mt. Jewett, Kinzua & Riterville R. R., a local railroad connecting direct with the Buffalo, Rochester & Pittsburgh Ry., Erie R. R., Pennsylvania R. R., Baltimore & Ohio R. R. and Pittsburgh, Shawmut & Northern R. R., consequently competition in freight rates, prompt car supply, and a minimum of embargo annoyances.

References

The following is a partial list of buildings in which Kushequa products were used, giving the location, architect, kind and quantity:

Face Brick

Thorp School, Lockwood and Berteau Streets, Chicago, Ill., A. F. Hussander; Brown Saruk, 60,000.

Sanitary District Pump Station, Mohawk and Menominee Streets, Chicago, Ill., F. L. Barrett; Oxblood Devonshire, 40,000.

Collins Apartments, 54th and Cornell Streets, Chicago, Ill., H. L. Newhouse; Kq Paver dark, 60,000.

G. S. Bridge, Residence, Evanston, Ill., Geo. W. Maher; Velours Shade 2, 30,000.

Hotel Sherman, Clark and Randolph Streets, Chicago, Ill., Holabird & Roche; Kq Paver dark, 700,000.

Stock Yards Inn, Chicago, Ill., R. L. Lindstrom; Oxblood Devonshire Shade 1, 450,000.

Highlands Co., 6811 Euclid Avenue, Chicago, Ill., J. R. Stone; Kq Paver dark, 25,000.

Callahan Apartments, 1622-24 Garfield Boulevard, Chicago, Ill. Worthmann & Steinbach; Kq Paver light, 35,000.

Y. W. C. A., Brooklyn, N. Y., Frank Freeman; Saruk and Oxblood (Gardens), 180,000.

Erie R. R. Station, Ridgewood, N. J., Graham King; Saruk, 40,000.

Electric Power Plant, South Framingham, Mass.; Kq Paver (2nds), 90,000.

Fire and Truck House No. 8, Germantown Avenue and Bringhurst Street, Philadelphia, Pa., W. B. Powell; 50,000 Wire-cut Shade 3; 52,000 Blackheaders.

8th District Police Station, 10th and Buttonwood Streets, Philadelphia, Pa., W. B. Powell; 47,000 Wire-cut Shade 3; 48,000 Blackheaders.

Church of Our Lady of Rosary, Yonkers, N. Y., John V. Van Pelt; Saruks.

Boys' High School, Louisville, Ky., J. E. Henry; Oxblood and Saruk mixed, 225,000.

Louis Seelbach, Residence, Louisville, Ky., McDonald & Dodd; Wire-cut Shade 2, 65,000.

Westminster Presbyterian Church, Rochester, N. Y.; Saruk and Oxblood Devonshire mixed, 100,000.

Colonial Theater, Dayton, Ohio; Oxblood Devonshire Shade 1, 27,000.

Eagles' Temple, Jamestown, N. Y., Freeburg & Fidler; Saruk.

United Evangelical Church, Oil City, Pa., J. C. Brenot; Saruk, 90,000.

Mayo Bros. Clinic Hospital, Rochester, Minn.; Kq Paver, 125,000.

Mayer Bros.' Block, Erie, Pa., Richard Irvin; Velours, 250,000.

Academy High School, Erie, Pa., Wm. B. Ittner, St. Louis, Mo.; Saruk, 250,000.

Methodist Episcopal Hospital, Philadelphia, Pa., Horace W. Castor; Autumnoak, 200,000.

Paving Materials

D. B. Martin Co., Packing House, Claremont, Baltimore, Md.; Brickette, 57,000.

J. J. Felin Packing House, Philadelphia, Pa., C. B. Comstock; Packing House Floor Brick, 140,000.

C. K. G. Billings, Driveways, Riverside Drive, New York, N. Y.; Kq Paver (Spl.).

Kingan & Co., Packing House, Indianapolis, Frank T. Lewis; Packing House Floor Brick, 100,000.

W. M. Rice Institute, Courts and Cloisters, Houston, Tex., Cram, Goodhue & Ferguson; Kq. Paver. 25,000.

Hammond Packing Co., Packing House, East Liberty, Pittsburgh, Pa., Packing House, Floor Brick.

Kingan & Co., Packing House Floor, Richmond, Va., Brickettes.

Louis Seelbach Residence, Louisville, Ky.
Faced with 65,000 Wire-cut Shade 2
McDonald & Dodd, Architects, Louisville, Ky.

Y. M. C. A. Building, Louisville, Ky.
Faced with Saruk and Oxblood Devonshire mixed
McDonald & Dodd, Architects, Louisville, Ky.

THE HOCKING VALLEY FIRE CLAY COMPANY

Manufacturers of Salt Glazed Brick

NELSONVILLE, OHIO

SALES AGENCIES IN ALL PRINCIPAL CITIES OF UNITED STATES AND CANADA

Products

ATHENA SALT GLAZED BRICK.
SANITARY FLOOR BRICK.
EVERWEAR PAVING TILE.

Athena Salt Glazed Brick

Size—8x2¼x3⅞ in.

Shade Numbers, etc.—Made in beautiful shades of mahogany (105), brown (106), golden (107), buff (108), thoroughly vitrified and salt glazed on both faces and ends, and rich in both color and glaze. All standard shapes carried in stock and special shapes made on order.

Interior Uses—For facing entire interior walls or wainscot work wherever sanitary conditions are desired. Principal places: schools, hospitals, gymnasiums, swimming pools, stables, garages, office, factory and warehouse buildings; prisons, power plants, city market houses, acid rooms and vats, fire engine houses, packing plants; subways, passenger and freight depots.

A Few Important Jobs (Interior)

World's Largest Electric Generating Station, United Electric Light & Power Co., 201st Street, New York City (see illustration)
Lincoln Park Lion House, Chicago, Ill.
Roseland & Mayfair Pumping Stations, Chicago, Ill.
Twin Market Houses, Pittsburgh, Pa.
Fire Engine Houses, Chicago, New York and Boston
General Chemical Co. Plants (many parts of United States)
Swift & Armour Packing Plants (various places)
Pennsylvania Railroad Stations and Tunnels
Ohio Penitentiary, Columbus, Ohio
Both High and Grade Schools in all principal cities of United States and Canada

Exterior Uses—For facing all exterior walls where a beautiful sanitary and permanent wall is desired, as it is not affected by acids or the elements.

A Few Important Jobs (Exterior)—

6-story Moose Building in Loop District, Chicago, Ill.
Apartment Buildings in all principal cities
3-story Business Block, Dr. J. E. Pickett, Minersville, Pa.
3-story Business Block, Marvin DeMaine, Pomeroy, Ohio

These brick have been furnished for exterior facing in almost every conceivable class of building.

Sanitary Floor Brick

Size—8¼x4x1⅜ in.

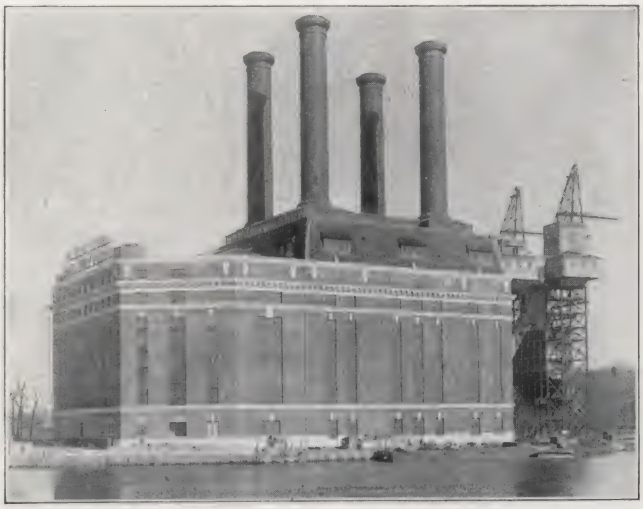
Uses—This product is usually embedded in cement. It is used for practically the same class of floors as those named for our Everwear paving tile, particularly where the desire is for lighter weight material. Especially desirable in packing house floors, and is being used extensively for such purposes. Only one side is glazed and either side can be turned up as desired.

A Few Special Jobs—

Cincinnati Abattoir Co., Cincinnati, Ohio
Detroit Edison Co., Detroit, Mich.
Wm. Davies, Ltd. (Packing Plant), Toronto, Ont.
Swift & Co., Chicago, Ill.
Armour & Co., Chicago, Ill.

Everwear Paving Tile

Size—Size 10x5x2¼ in.



201ST STREET GENERATING STATION, UNITED ELECTRIC LIGHT & POWER CO., NEW YORK, N. Y.
W. E. MCCOY, Engineer F. F. NESBIT & CO., Contractors
650,000 brick used, shades 103 and 102 (interior)

Uses—Extensively used for paving floors of engine and boiler rooms, power and industrial plants; basements of public buildings, schools, warehouses and battery rooms and for paving around electric and steam railway passenger and freight depots. Thoroughly vitrified and only one side glazed; it is unsurpassed for beauty and wearing qualities. They save 50% over cement floors on original cost, and have many times the life of a cement floor.

These tile have been upon the floors of boiler and engine rooms of the New York Life Insurance Building, New York, for 20 years and show scarcely any wear.

A Few of Many Concerns Using Same—

Chicago Edison Electric Co., Chicago, Ill.
Cleveland Electric Railway Co., Cleveland, Ohio
Cincinnati Gas & Electric Co., Cincinnati, Ohio
Ford Motor Co., Detroit, Mich.
Aluminum Castings Co., Detroit, Mich.
Hocking Valley Railway Co., Columbus, Ohio

General Qualities of Salt Glazed Material

All shades of the standard brick and two classes of floor brick are burned to about 2200° Fahr.; it is thoroughly vitrified and salt glazed; non-absorbent of moisture; absolutely acidproof; will not craze, crack or peel; withstands all the elements of the air besides heavy crushing strain, and always looks fresh and clean.

Samples

Communicate with this company and the nearest sales agency will be directed to submit samples and prices at once.

Facilities

With a daily capacity of 50,000 brick, or approximately 15,000,000 annually, and a large and well selected stock for quick shipment, all business is given prompt attention.

SAYRE & FISHER COMPANY

Manufacturers of All Kinds of Brick

261 Broadway (cor. Warren Street)
NEW YORK, N. Y.

Products

FINE PRESSED FRONT BRICK; ENAMELED BRICK.

In the Red Brick Department: HARD BUILDING BRICK; SELECTED COLONIAL BRICK; "S. & F." CLINKER STRETCHERS; "RAIN-WASHED," "OLD ENGLISH" RED, REPRESSED DOWN-DRAFT RED, and REPRESSED UP-DRAFT RED STRETCHERS, and BLACK HEADERS for Facing; HOLLOW BRICK and FIRE BRICK.

Front Brick in Various Colors

Manufactured by this company in a great variety of colors: white, light and dark buff, red, gray, old gold, rough face Persian and mottled—other shades to order—enabling architects to select a material that, while fire resisting and easily handled, shall permit them to lighten and beautify and add strength and variety to a street façade.

Superior Enameled Brick

Superior enameled brick is manufactured in white and various colors. They are coming into more general use for a great variety of purposes, and are especially adapted for lining of waiting rooms of railroad stations, tunnels, markets, hospitals, engine and boiler rooms, kitchens, etc.

Porcelain (Dull Finish) Enameled Brick for Outside Work

Several million used in prominent city buildings.

Red Brick Department

Hard Building Brick—Hard burned, dark red color. Shipments in cargo lots, via our fleet of barges or schooners, or via rail to all points. A very economical building brick for heavy construction work.

Selected Colonial Brick—For facing. Of general dark red color and sufficiently varied in color and shape for "Harvard" work. These are very desirable for Colonial work.

"S. & F." Clinker Stretchers—These are also for facing. Sometimes called "Clinker Brick," because they are nearest the fire in the kilns and are burned black and twisted.

"Rain-washed" Red Stretchers—A pitted face brick and laid either with or without Black Headers. A "chance" product caused by rain on the brick when in a green state in open yards.

"Old English" Red Stretchers—This product is something new and is about the size of the Old English Brick, made in dark red tone and measuring about 8⅞ x 2⅞ x 4 in.

Over 600,000 in the new Curtis Publishing Company's Building in Philadelphia. Selected by the architects after searching the Old World for ideas that were unique and artistic.

Repressed Up-draft Red Stretchers—Same as the Down-draft, except that these show light and dark kiln marks on the stretcher side, which gives a diversified effect.

Repressed Down-draft Red Stretchers—These are of a dark cherry red color and very popular for face work.

Sears, Roebuck Company, Philadelphia, Pa., used 3,000,000.

Black Headers—Made to be used with the Selected Colonial Brick or Repressed Stretchers for the "Harvard" effect if desired.

Hollow Brick—Both stretchers and headers (Haverstraw size) of a very superior quality. They can be furnished in cargo lots.

Fire Brick

Three grades: "Sayre & Fisher Extra," No. 1 "Phoenix" and No. 1 "Flue." Very desirable for boiler settings, furnace linings, etc., in all standard sizes.

Shipping Facilities

The favorable location of the SAYRE & FISHER COMPANY works at deep water on the Raritan River, in New Jersey, permits the loading of vessels of large draught.

Shipments can also be made direct to all points connecting with any line of railroad.

Export Trade

With such adequate and satisfactory facilities for shipment, as well as such large and complete stock always on hand, our export trade has grown to great proportions and is still increasing.

BRICK WORKS OF THE SAYRE & FISHER COMPANY, SAYREVILLE (ON RARITAN RIVER), N. J.

WESTERN BRICK COMPANY

Manufacturers of All Kinds of Brick; Building and Partition Tile

GENERAL SALES OFFICE AND FACTORIES

DANVILLE, ILL.

BRANCH SALES OFFICES

PEORIA, ILL., 720-22 Jefferson Building

INDIANAPOLIS, IND., 804 Hume-Mansur Building

FT. WAYNE, IND., 305-08 Shoaff Building

REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE MIDDLE WEST AND THE NORTHWEST

Products

FACING BRICK: "CLOISTER," SIDE-CUT, IMPERVIOUS; "EMPIRE," MATTE or ROUGH TEXTURE; "DORIC" and "GOTHIC," STIPPLED TEXTURE.

Various grades of VITRIFIED, IMPERVIOUS and SEMIPOROUS COMMON BRICK.

BUILDING and PARTITION TILE and STANDARD HOLLOW BRICK.

All products are manufactured strictly from shale and fire clay.

Facilities

The WESTERN BRICK COMPANY manufactures annually 100,000,000 brick and tile at the three plants.

The shale and clay supply for these factories is practically inexhaustible; fuel supply is owned by the company in sufficient quantities to last at least twenty-five years.

Shipping facilities are unequalled, as the product can be distributed from Danville over 7 railroads. Plants have side track room for about 75 cars, and ordinary daily shipments, during the building season, exceed 500,000.

Over 1,300,000,000 of brick have been manufactured and marketed.

Facing Brick

"Cloister" or 400 Series—A medium priced, impervious, side-cut facing brick manufactured from shale. Colors range from bright red through the intermediates to dark brown. Treated in the early stages of manufacture, in order to eliminate all harsh glaze.

This face brick is absolutely the best value for the money that can be produced, and we are able to sell it at prevailing prices only on account of our exceptionally large production.

About 200,000,000 have been marketed in the middle West. The absorption is well below 4%, and the crushing strength exceeds 10,000 lbs. to the sq. in. None of the "Cloister" or 400 series are of rough texture on face.

A brief description of various shades follow:

"Cloister" No. 420—Ranging from dark to light brown. This shade produces a brown effect in the wall, and has been a favorite for years for use in church and school construction, and all kinds of group buildings.

"Cloister" No. 430—Brownish edge, with deep red center are the prevailing characteristics of this brick. Headers are darker than the stretchers and the wall effect is full of life and character.

"Cloister" No. 440—Dark wine red, fairly uniform in color.

"Cloister" No. 424—Light and dark brown, to black.

"Cloister" No. 450—A brilliant red brick, quite uniform, one of the most attractive of the "Cloister" shades.

Dark "Cloister" Mixture—This mixture has been especially popular for a number of years and consists of approximately 40% No. 420 and 60% No. 430, thereby producing a somewhat dark effect, giving to the wall, however, considerable life and an effect that is most beautiful.

Red "Cloister" Mixture—This mixture consists of 10% No. 424, 40% No. 440, and 50% No. 450, and produces a lively and interesting wall, prevailing tones being the rich and lively red. The No. 424's will produce some dark spots.

"Cloister" No. 160—Light red facing brick, suitable for factories, inside facing, chimney tops and foundations.

"Empire" 501 Mixture—This grade of brick is of the vertical scored, rough texture type, being a strong mixture, with the red predominating. The colors will range from a small percentage of dark brown brick to a brilliant red. The effect produced in the wall is a beautiful one, and this mixture has proved to be one of our most popular shades in the last few years.

"Western Empire" No. 551—A bright red; almost carmine in color.

"Doric" and "Gothic" Stippled Brick—This is of a new refined texture, developed by this company and placed on market January, 1916. The principal feature is the elimination of all grain or lines by use of stippling process, making a myriad of small indentations. Colors in this texture are refined, deep and soft.

Continued on next page

"Empire" Shades—For every shade of "Doric" or "Gothic" face brick described in the following paragraphs, this company is in a position to furnish a horizontal texture matte brick of the same color.

"Doric" No. 871—Very dark purplish brown and black, quite uniform in color (same shade in matte texture is "Empire" No. 810).

"Doric" No. 872—Deep brown, with slight purplish cast; not absolutely uniform (same shade in matte texture is "Empire" No. 820).

"Doric" No. 875—A variant from No. 872 in that its prevailing color is lighter, the tans are more prominent, and shading not quite so uniform (same shade in matte texture is "Empire" No. 825).

"Doric" No. 876—A golden tan brick, distinctly different in shading from anything else produced; not absolutely uniform, but with sufficient life to make the wall interesting (same shade in matte texture is "Empire" No. 830).

"Doric" No. 878—Lively golden buff, comparatively even in color (same shade in matte texture is "Empire" No. 833).

"Gothic" No. 20—Ranges from dark to light brown, one of the most popular of the stippled texture brick, and a shade especially suitable for all types of construction.

"Gothic" No. 30—Brownish edges with deep red centers, producing in the wall plenty of life and character.

"Gothic" No. 35—Similar in general character to "Gothic" No. 30, however, in this shade the red blush covers almost the entire face of the brick, with a brown edge or rim forming the background. The effect is most pleasing.

"Gothic" No. 24—May be described as a "Gothic" stippled brick, brown in color, ranging from the light to the dark, not produced in great quantities, but is used extensively in the "red gothic stippled mixture."

"Gothic" No. 40—Probably no shade of stippled brick has more pleasing possibilities than No. 40. It is described in a general way as a dark wine red, fairly uniform in color, especially satisfactory for creating the best in brick work. To best appreciate, ask for samples.

"Gothic" No. 50—This shade is fairly uniform red.

Dark "Gothic" Stippled Mixture—Consists of a mixture of No. 20's, No. 30's, and No. 35's.

Red "Gothic" Stippled Mixture—Consists of No. 24's, No. 40's and No. 50's. This shade produces a very lively and interesting wall effect, the prevailing tones being a rich and lively red, the variation being produced by the use of No. 24's.

Shapes—Octagons, or 45° angles and round corners (2-in. radius) or bullnoses, are kept in stock at all times to match any of the foregoing shades.

Arches or specials, other than the above, can be made to order, cut green and burned, as all the facing brick are burned too hard to be successfully ground.

This work requires from 3 to 5 weeks, dating from the time the full sized details are received.

Western Common Brick

These bricks are all manufactured from shale, and in the hard burned varieties are impervious and vitrified. The company does not ship any brick "kiln run" as all are carefully sorted for hardness (not for color) into three grades described below:

Vitrified Hard Commons—Very low absorption and thoroughly vitrified. Not selected for color.

Medium Hard Commons—Very durable and can be used for all classes of work, either foundation or superstructure. Not selected for color.

Light Commons—Suitable only for inside work and are not recommended or suggested for use in work exposed directly to the weather.

Literature

A postal card will bring literature describing our many interesting shades of face brick or furnish complete hollow tile information.

STARK BRICK COMPANY

Manufacturers of Face Building Brick

CANTON, OHIO

FACTORY
EAST CANTON, OHIO

REPRESENTATIVES

FORT WORTH, TEX., Acme Brick Co.
ERIE, PA., Boyd & Schafer
LONDON, ONT., Wm. Buchanan
CEDAR RAPIDS, IOWA, Builders Material Co.
GARY, IND., Calumet Supply Co.
HARTFORD, CONN., The City Coal Co.
CLEVELAND, OHIO, Cleveland Builders Supply & Brick Co.
WHEELING, W. VA., Central Building & Supply Co.
AKRON, OHIO, Derr Sales Co.
FLINT, MICH., Flint Coal Co.
CINCINNATI, OHIO, E. F. Grand Brick Co.
GREEN BAY, WIS., Jos. A. Gagnon
WASHINGTON, D. C., Hydraulic-Press Brick Co.
NEW YORK, N. Y., Hay Walker Brick Co.
COLUMBUS, OHIO, Ironclay Brick Co.
CHICAGO, ILL., S. S. Kimball Brick Co.
MILWAUKEE, WIS., Kraatz Brick Co.
HAMILTON, ONT., Norman D. McPhie
BENTON HARBOR, MICH., Mamer Co.
INDIANAPOLIS, IND., A. B. Meyer Brick Co.
GRAND RAPIDS, MICH., Michigan Face Brick Co.
PROVIDENCE, R. I., P. L. Monroe & Son
FORT WAYNE, IND., Wm. Moellering's Sons
LINCOLN, NEBR., Nebraska Material Co.
BOSTON, MASS., Parry Brick Co.
RACINE, WIS., Racine Builders Supply Co.
PHILADELPHIA, PA., A. S. Reid & Co.
NEWARK, N. J., A. S. Reid & Co.
SAGINAW, MICH., Saginaw Brick Co.
MONTREAL, QUE., Stinson Reeb Builders Supply Co.
DETROIT, MICH., Frederic B. Stevens
DULUTH, MINN., Standard Salt & Cement Co.
SPRINGFIELD, MO., Southwest Builders Supply Co.
OMAHA, NEBR., Sunderland Bros. Co.
TOLEDO, OHIO, Toledo Plaster & Supply Co.
LOUISVILLE, KY., R. B. Tyler Co.
ST. PAUL, MINN., Twin City Brick Co.
PEORIA, ILL., Western Brick Co.
MADISON, WIS., Wisconsin Brick Co.
CHARLESTON, W. VA., West Virginia Brick Co.

Products

Facing Brick (Salt Glazed Brick a specialty.)

Salt Glazed Brick

The brick are made from the best fire clay, taking a heavy glaze, free from iron.

The shades are buff, orange and mahogany.

Adaptability—We suggest the use of salt glazed brick for interior decoration of walls in the following places: Schools, garages, market houses, dairies, hospitals, domestic science rooms, lavatories, club houses; and for other purposes where cleanliness and sanitary conditions are of prime importance.

Size of Brick—Standards are 8x3⅞x2⅜ in. All shapes are made to member with this size.

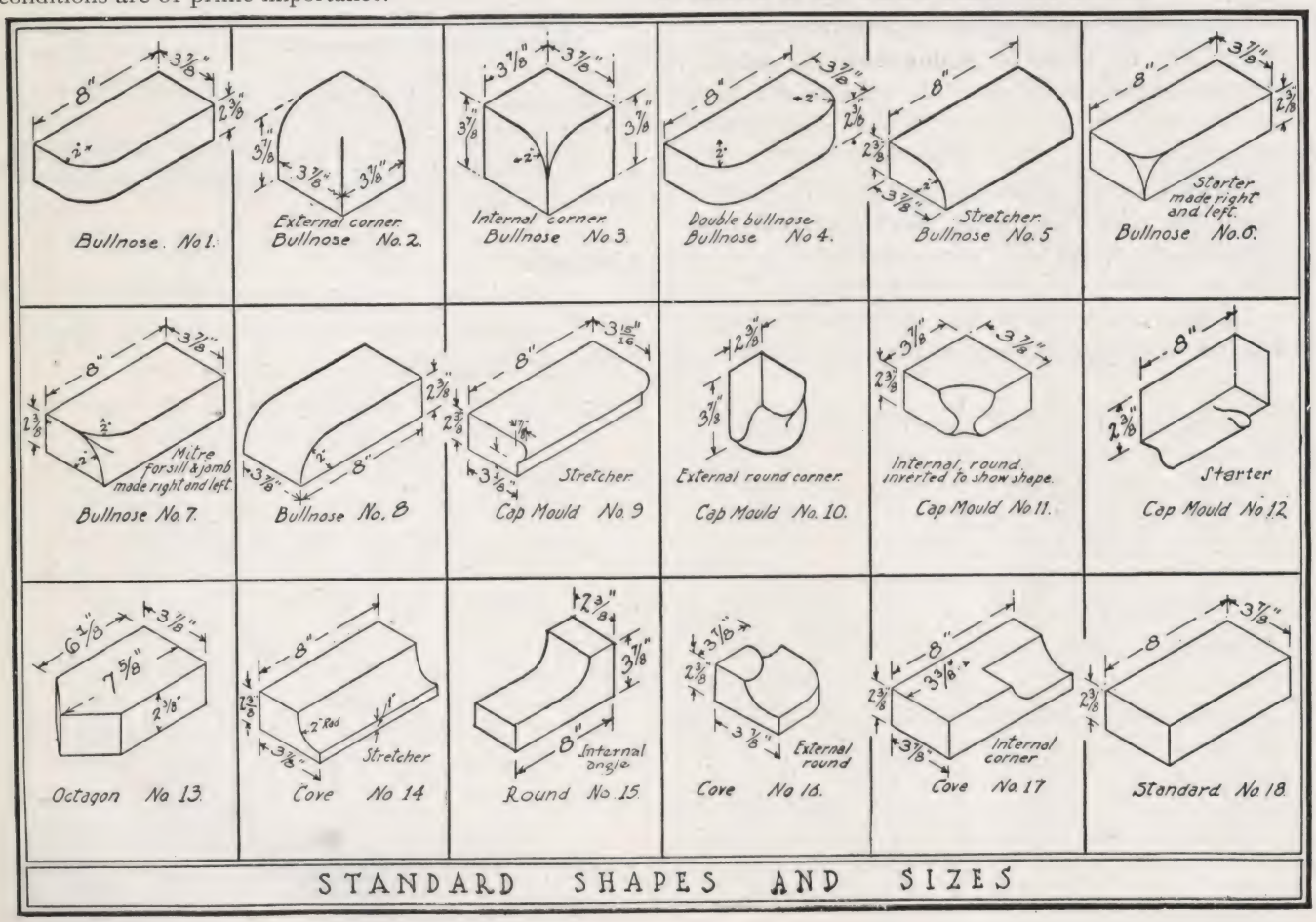
References

Our products have been used in:

Canton High School, Canton, Ohio
West Technical High School, Akron, Ohio
City Hospital, Cleveland, Ohio
Hell Gate Power House, New York, N. Y.

The last named is the largest job of salt glazed brick in the United States.

We have furnished glazed brick for a large number of schools in the United States and Canada.



AMERICAN CHIMNEY CORPORATION

Designers and Builders of Chimneys

TELEPHONE
STUYVESANT 3735, 5741

147 Fourth Avenue
NEW YORK, N. Y.

BRANCHES

PHILADELPHIA, PA., Stephen Girard Building
CHICAGO, ILL., 1101 Security Building
CLEVELAND, OHIO, 919 Ulmer Building
BOSTON, MASS., 141 Milk Street

Products

PERFORATED RADIAL BRICK CHIMNEYS.
COMMON BRICK CHIMNEYS.
CHIMNEY REPAIRS.
LININGS FOR STEEL STACKS.
BOILER SETTINGS.
FURNACES.

Services

The AMERICAN CHIMNEY CORPORATION designs and builds perforated radial brick and common brick chimneys of all sizes and for any purpose, such as boiler operation, smelter plants, chemical plants (acid gases), crematories and incinerators (high temperatures).

We also make a specialty of the repair and extension of old chimneys; design and construction of ornamental chimneys; inspection and repair of lightning-rods on chimneys; refractory linings for steel stacks; boiler settings and furnaces.

Perforated Radial Brick Chimneys

The AMERICAN CHIMNEY CORPORATION constructs its chimneys of special bricks which are perforated and are shaped to the circular and radial lines of the chimney, producing, when in place, smooth and true inner and outer surfaces.

The perforations in the brick permit a thorough burning. In the wall they form insulating dead air spaces which reduce radiation, resulting in fuel economy.

The mortar extends into the perforations, thoroughly bonding the bricks together and adding greatly to the stability of the chimney.

Steel bands are provided for in the wall as safeguards against cracking.

Joints are broken in every course, horizontally and vertically.

The chimneys are built from inside without scaffolding, greatly reducing the cost and time of erection.

Radial bricks are made of tested clays of a highly refractory nature and are acidproof and weatherproof.

Common Brick Chimneys

The AMERICAN CHIMNEY CORPORATION is prepared to erect chimneys of common brick, round, square or octagonal, to suit special architectural requirements.

Estimates

When asking for information or estimates, kindly advise on the following points:

(1) Intended use of chimney (boiler furnace, smelter, chemical plant, incinerator).

(2) Height above foundation and diameter or boiler horsepower or number and dimensions of boilers.

(3) If a bid is desired on foundation, give character of soil.

(4) Does chimney stand independent of building? If it is a part of the building, state for what height.

(5) Give hauling distance from purchaser's railroad siding or nearest railroad freight yard.

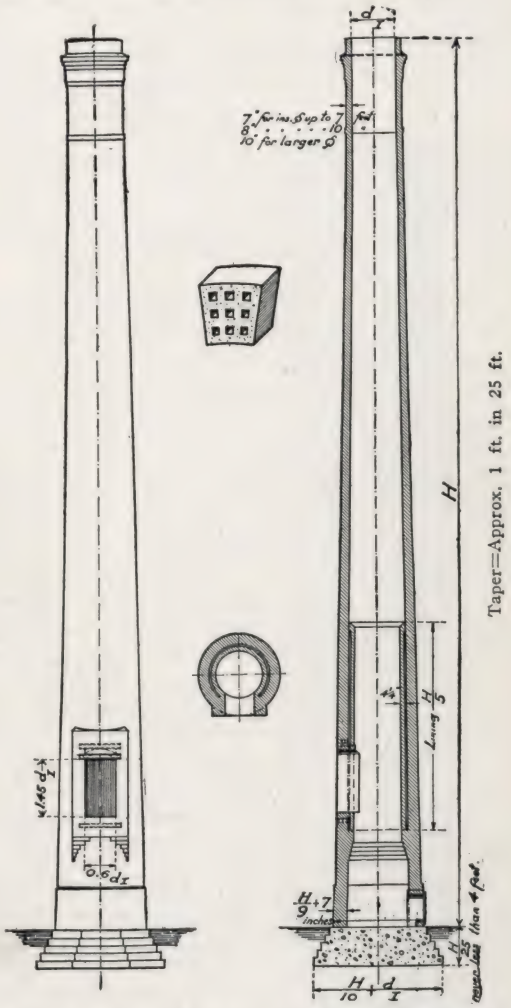
(6) If possible, give approximate prices of building materials and wage scale of local common labor.

(7) Color of bricks desired.

Construction Data

For general layouts it is often desirable to have some preliminary information available and for this purpose we submit the following data for designs.

For additional construction data, send for our cata-



DESIGN DATA—CHIMNEY FOR BOILER OPERATION
In chimneys for other purposes, the extent of the fire brick lining is varied to suit the stack temperature

Some Recent Installations

	Height, ft.	Diam., ft. in.
Pennsylvania R. R. Co., Altoona, Pa.	175	8-6
New Jersey Zinc Co., Palmerton, Pa.	200	14-0
Owens Bottle Machine Co., Glassboro, N. J.	150	6-0
Dwight P. Robinson & Co., Inc., New York, N. Y.	271	21-0
Viscose Co., Marcus Hook, Pa. (2 chimneys)	208	10-6
Viscose Co., Marcus Hook, Pa. (2 chimneys)	60	3-6
Viscose Co., Lewiston, Pa.	300	22-0
Whitall-Tatum Co., Millville, N. J.	150	6-6
New Departure Mfg. Co., Meriden, Conn.	150	7-6
Hartford Fire Insurance Co., Hartford, Conn.	150	7-0
Hoover Suction Sweeper Co., Canton, Ohio	175	8-0
Victor Talking Machine Co., Camden, N. J.	176	9-0
Sanford Mills, Sanford, Me.	170	8-0
Boston & Albany R. R. Co., West Springfield, Mass.	150	6-6
Jessus & Moore Paper Co., Wilmington, Del.	175	9-6
Norfolk & Western Ry. Co., Roanoke, Va.	200	10-0
Frankford Arsenal, Philadelphia, Pa. (2 chimneys)	200	12-0

CONTINENTAL CHIMNEY CO., INC.

SUCCESSORS TO AMERICAN CHIMNEY CONSTRUCTION CO.

Radial and Common Brick Chimneys

TELEPHONES
FRANKLIN 2594, 2595

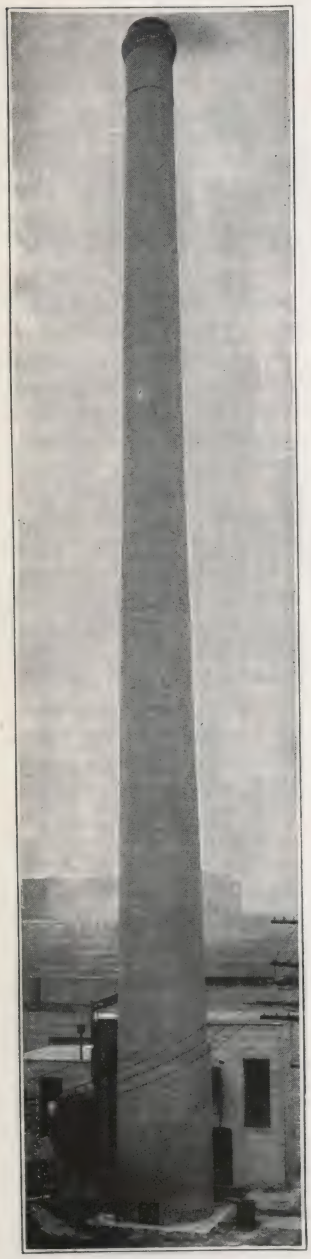
118 North La Salle Street
CHICAGO, ILL.

BRANCHES IN ALL PRINCIPAL CITIES

Products and Services

PERFORATED RADIAL and COMMON BRICK CHIMNEYS, Designed and Constructed for all purposes, and of all sizes.

OLD CHIMNEYS EXTENDED, REPAIRED, STRAIGHTENED, and POINTED while in operation; REPORTS and RECOMMENDATIONS on condition of old chimneys; STEEL STACKS LINED.



CHIMNEY 140 FT. HIGH FOR CHICAGO JUNCTION R. R. CO.

Engineering Service and Facilities

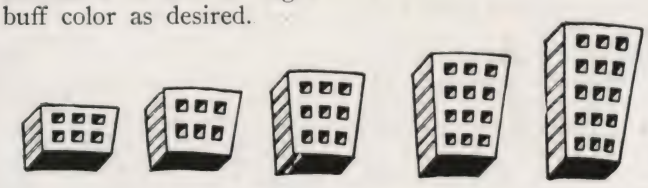
Reliable information and recommendations will be given by our engineers regarding the proper dimensions of chimneys with full consideration of the purpose for which they are designed. Advice will be given as to boiler arrangements and other conditions.

Twenty-six years' experience in building chimneys in all parts of the world enables us to render the most efficient and economical service in all the details involved.

Perforated Radial Chimneys

The purest materials only are used in making the radial blocks and are chosen for their great refractory qualities and high crushing strength. These materials are so combined in the proper proportions as to insure a chimney with the maximum resistance to strains of every nature to which it may be subjected.

Radial bricks can be furnished in red or light buff color as desired.



PERFORATED RADIAL BLOCKS

Common Brick Chimneys

The CONTINENTAL CHIMNEY CO., INC., also builds round common brick chimneys of inside top diameter from 3 ft. 6 in. and larger.

These chimneys are just as good looking and durable as the radial brick chimneys; they have been in use for many years and have given universally good results and satisfaction.

Data Required for Chimney Designs and Estimates

Give all possible information regarding place, transportation, dimensions of chimney required, boiler horsepower, probable temperatures, etc.

State nature of soil where chimney will be erected.

Give local prices for necessary building material.

In accordance with the above information, designs and lowest estimates of the chimney needed will be submitted.

Chimney Repairing

Chimneys extended with no interference to operation of plant.

Dimensions of chimney are desired or a plan of it.

Old chimneys repaired, straightened, pointed and banded while in operation.

Inspections made on the condition of old chimneys and reports furnished.

CHIMNEY 150 FT. HIGH FOR B. KUPPENHEIMER & CO., CHICAGO, ILL.

ALPHONS CUSTODIS CHIMNEY CONSTRUCTION CO.

TELEPHONE
CORTLANDT 8428

Bennett Building—95 Nassau Street
NEW YORK, N. Y.

CABLE ADDRESS
"CUSTOS, NEW YORK"

AMERICAN BRANCH OFFICES

ATLANTA, GA., Healey Building
BALTIMORE, MD., Equitable Building
BOSTON, MASS., 51 Ellery Street
CHICAGO, ILL., Marquette Building
CLEVELAND, OHIO, Guardian Building
DETROIT, MICH., Moffat Building
MILWAUKEE, WIS., 548 Milwaukee Street
PHILADELPHIA, PA., 315 South 15th Street
PITTSBURGH, PA., Empire Building
PORTLAND, ORE., 222 Pine Street
RICHMOND, VA., American National Bank Building
SEATTLE, WASH., Colman Building

CANADIAN BRANCH OFFICES

MONTREAL, QUE., 10 Cathcart Street
TORONTO, ONT., Kent Building

Products and Services

Designers and Builders of PERFORATED RADIAL BRICK CHIMNEYS, with FOUNDATIONS and FLUES, of all sizes, for boilers, furnaces, crematories and ovens; CHIMNEYS for smelters, hotels and office buildings; ACIDPROOF CHIMNEYS for paint works and chemical plants; HIGH TEMPERATURE CHIMNEYS for garbage destructors and incinerators; KILNS, BOILER SETTINGS, ETC.; REPAIRING and HEIGHTENING OLD CHIMNEYS; LIGHTNING RODS Installed and Repaired.

Specifications, plans, designs and data furnished free on request.

The ALPHONS CUSTODIS CHIMNEY CONSTRUCTION Co., through its fifty years of experience, is equipped to give expert advice as to the size and shape of any kind of a chimney, for any purpose, as well as make recommendations through its engineers regarding boiler layouts and size, shape and design of flues.

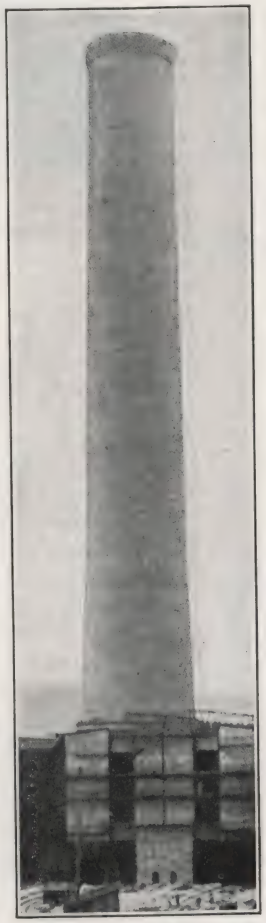
The boilers, the design of flues, the coal used, temperatures, gases generated, geographical location and many other conditions affect the determination of the most economical and efficient size of a chimney. State conditions and the results desired, and our engineers will promptly furnish the correct, efficient and economical size and design of chimney. They will make recommendations, not from theoretical tables, but from over fifty years' experience and unpublished data collected from actual working conditions of our chimneys all over the world.

The fact that over 10,000 Custodis radial brick chimneys are now in successful operation is conclusive proof of their efficiency, permanency and economy.

Perforated Radial Brick Chimneys

The perforated radial blocks are made only from the purest clays, selected for high refractory powers and high crushing strength. Special attention is given in the brickyards to making the proper mix of clays in the right proportion to produce a radial brick chimney which will resist heat strains, as well as strains from weight and wind. All the radial blocks are formed to suit the circular and radial lines of each part of the chimney, so that they can be laid with thin, even joints and produce a regular smooth surface.

The blocks are larger than common bricks, making the number of mortar joints in a radial brick chimney one-third of those in a common brick chimney of the same size. Moulded with vertical perforations, the radial blocks are most thoroughly and uniformly burned, materially increasing their density and strength. The perforations form a dead air space around the chimney, insulating the hot column of rising gases on the inside from sudden changes of temperature of the outer air. This results in a maximum draft under all conditions.



TALLEST AND LARGEST CHIMNEY IN THE WORLD BUILT FOR ANACONDA COPPER MINING COMPANY, ANACONDA, MONT.

Height above grade, 585 ft.
Inside diameter at top, 60 ft.
Built in 1918

Repairing and Heightening

We make repairs to radial, common brick and concrete chimneys. Work done while chimney is in operation, if necessary.

Old chimneys can be heightened without any interruption to the plant.

Send the height, inside diameter at the top, width at base and wall thickness, or a plan of the old chimney. The engineering department will furnish design and figure on heightening it. Old brick chimneys can be removed without danger.

We inspect old chimneys and make reports and recommendations on their condition.

Lightning Rods

Lightning rods installed and repaired. Special lightning rods for acid chimneys.

Flues and Kilns

This company designs and constructs flues and furnaces. It makes a specialty of building kilns of all kinds. Steel stacks, etc., lined.

Information Required for Estimates

Name of place where chimney is to be erected.
On what railroad siding is same located.
Distance from siding delivery to chimney site.
Is chimney to be used for boiler drafts or other purposes.
Give probable temperatures of the flue gases.
If for boiler draft, what is total horsepower.
Kind of fuel or coal to be used.
Amount consumed per horsepower or total per hour.
Dimensions of chimney required—diameter; height.
Is arrangement for overhead or underground flue.
Give dimensions and shape of flue opening desired in chimney.
Give height of same above or below foundation top.
What is nature of soil where chimney will stand.
What is estimated safe load per square foot.
What depth of excavation is necessary to reach good soil.
What is latest date allowed for erection of chimney.
Sketch showing arrangement of building, boiler and chimney.
Local prices—red brick, lime, cement and sand.

THE M. W. KELLOGG COMPANY

Manufacturers of Perforated Radial Brick Chimneys

140 Cedar Street
NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS. PHILADELPHIA, PA. CHICAGO, ILL. PITTSBURGH, PA.
LOS ANGELES, CAL. SAN FRANCISCO, CAL.
MONTREAL, TORONTO, WINNIPEG, CAN., Canadian Kellogg Co., Ltd.

Products

Perforated Radial Brick Chimneys.

Service

The M. W. Kellogg Company has erected some of the finest chimneys in the United States during the last eighteen years, and is ready to share the results of that experience with engineers and architects who are engaged in problems where chimney construction is required.

This company's engineers will be glad to advise on types, sizes, shapes, etc., of chimneys for any condition that may arise.

Kellogg Perforated Radial Brick Chimneys

No artificially produced material for the construction of the modern factory chimney compares with refractory clay. This raw material is put through a variety of scientific treatments by skilled hands and especially designed machines before it comes from the kilns in the form of perforated radial brick ready for shipment, and for use in chimney construction.

Each brick is formed to occupy a certain position in the circular and radial lines of the chimney, as shown by the drawing on this page, and is sound ringing, hard, well burned and free from checks.

Bricks are made to conform closely with the circular and radial lines of the shaft and are weatherproof and acidproof.

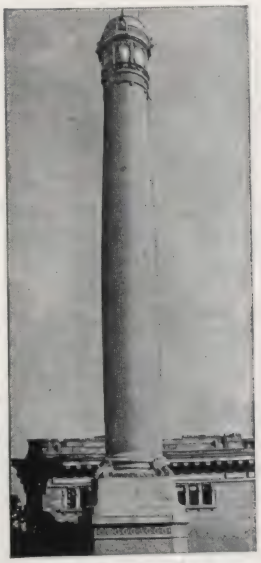
The total amount of perforations does not exceed one-fourth of the cross area of the brick, which are tested to a crushing strength of not less than 6000 lbs. per sq. in.

The perforations in the radial bricks form a dead air space about the core of the chimney. This has a marked effect in reducing amount of fuel used, in preventing sudden changes of temperature within the chimney, and in reducing radiation. Thus a uniformly maximum draft is maintained in any kind of weather.

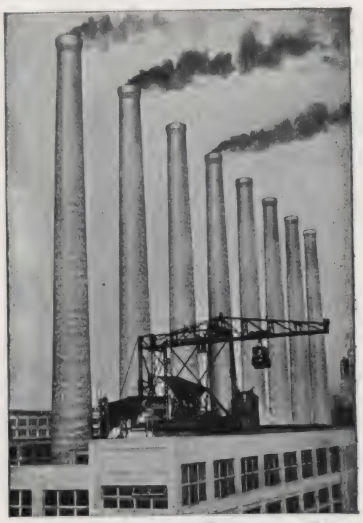
A trained superintendent of construction, familiar with all the details of the plans and specifications of the chimney, accompanies each shipment of radial brick, to supervise unloading and stacking in the order of their use. Throughout the entire construction the bricks of each tier reach their final place under his direction.

An expert mortar man supervises the preparation and use of all of the mortar. The tensile strength of the chimney, its ability to withstand heat and cold and to defy all sorts of weather from without and all sorts of gases from within, depend largely upon this mortar. Each brick is laid in so full a bed of mortar that the latter enters the perforations of the brick from 1 to 1½ in. The joints are struck both inside and out.

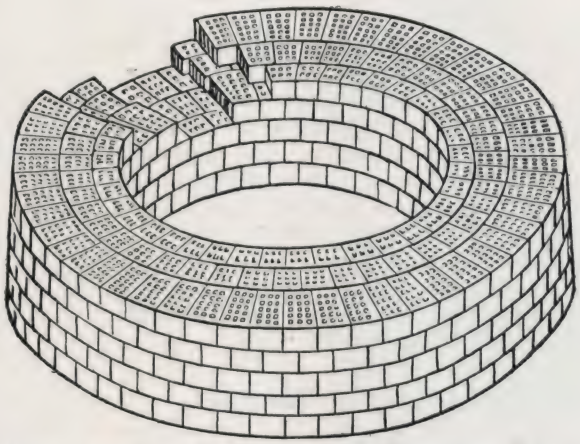
A crew of trained men in scientific chimney construction carry forward the erection of the chimney from start to finish, insuring careful construction and the proper grading and matching of brick throughout.



Queen Lane Filter Plant
Philadelphia, Pa.



Corn Products Refining Co.,
Argo, Ill.



Method of Using M. W. Kellogg's Perforated Radial Brick in Chimney Construction

Standard Specifications for Perforated Radial Brick Chimneys

Scope—The work included under this contract is to consist of all labor and material necessary for the erection complete of one radial brick chimney in accordance with this specification, which shall become a part of the contract. The proposal shall include all scaffolding, cartage, unloading of material and removal of rubbish necessary to leave the chimney in a first class condition ready for operation.

Continued on next page

Delivery—The chimney will be built at.....
.....located on the.....
.....railroad.

Material may be unloaded on owner's siding, which is within.....of the chimney site.

Space—Sufficient storage room for chimney contractor's materials will be provided adjacent to chimney as well as unobstructed access from transportation delivery to the site of chimney for delivery and removal of materials and tools. At least one side of chimney will be left free and open by the owners for hoisting and working space until the chimney is completed.

Water—The owners will provide the chimney contractor with necessary water within 50 ft. of the site of the chimney free of expense to the chimney contractor. From this point the chimney contractor will make his own hose connections, if required.

Workmanship and Materials—All workmanship and materials shall be first class.

The chimney contractor shall furnish a competent foreman under whose supervision the chimney will be built. Chimney must be built in a thorough, complete and workmanlike manner.

Time of Completion—The chimney contractor shall state in bid the guaranteed number of working days in which he will finish the chimney after receipt of signed contract and approved drawings.

Foundation—Proper foundation will be built by the owner from plans and specifications to be furnished by the chimney contractor, who will, on completion, give in writing his approval of the foundation as being sufficient to sustain the chimney and fulfil the guarantee.

Note: In case, however, it is desired to have chimney contractor build the foundation, the following may be used:

The chimney contractor shall furnish a concrete foundation of proper depth and spread to safely sustain the chimney. The foundation shall not be loaded to more than.....tons per sq. ft., which is the safe bearing value as determined for this work.

Excavating shall be done by contractor for foundation.

The concrete shall be composed of cement, sand, stone or gravel in the proportion of 1 part cement to 2½ parts sand and 5 parts of stone or gravel. It shall be deposited in the forms in layers not to exceed 6 in. in thickness and thoroughly rammed into place. Concrete shall be a wet mixture.

Design—The design of the chimney shall conform to the following dimensions as shown on drawing attached:

Height above top of foundation.....ft. .....in.
Minimum internal diameter.....ft. .....in.

The wall of the column shall have one straight and true batter from top to bottom. The wall thickness and section lengths to be as shown on drawing. In case the contractor's standard wall thickness should not be exactly as shown, a variation of 3% will be allowed in either direction.

Base—If chimney is to be built with base and column construction, use the following:

The base of the chimney shall be built [here fill in shape of base] in shape.....ft. high, of the dimensions shown on drawing, of straight, hard, well burned, well shaped common building brick laid in full bed of cement lime mortar as herein specified.

Note: If round for the entire height, specify as follows:

The chimney shall be built of perforated radial brick for the entire height, as hereinafter specified.

Radial Brick—All radial brick shall be best quality, moulded from refractory clay, sound ringing, hard, well burned, well shaped, of reasonably even color and free from checks; made to closely conform with the circular and radial lines of the shaft, and shall be weatherproof and acidproof. They shall have a water absorption of not less than 5% nor more than 12% of their dry weight after immersion for a period of 24 hours; and shall have a crushing strength of not less than 6000 lbs. per sq. in. The total amount of perforations shall not exceed one-fourth of the cross area of the brick. One cu. ft. of radial brickwork shall weigh not less than 120 lbs. The outside faces of the brick shall be of regular size, so that the general appearance of the brickwork will be neat and uniform.

Lining—The chimney shall have an expansion lining built of perforated radial fire brick 4¼ in. thick, ...ft. high from a point 2 ft. below the bottom of the flue opening. The lining prevents flue gases from coming in contact with the solid masonry of which the shell is built, and shall be separated from same by an air space of not less than 2 in.

The lining shall be built after the chimney is finished, and exceptional care must be taken to keep the air space clear and free of loose mortar and other dirt.

Rack out the shell of the chimney approximately 2 in. above lining, to form a ledge for the purpose of diverting the falling soot when the chimney is in operation.

Mortar—All brickwork shall be laid in cement lime mortar, as hereinafter specified, with courses level and with full joints throughout. Face brickwork and backing to be laid up at the same time with joints of reasonably even thickness, not exceeding ½ in. The mortar to be used in the chimney shall consist of 1 part portland cement, 2 parts fresh burnt lump lime mortar and 5 parts clean, sharp sand. The cement to be added to the sand and lime mortar as the mortar is required, and no mortar having taken an initial set is to be used. The cement must not be added until the lime is cool. The sand shall be clean and sharp, free from loam, vegetable matter and large pebbles. If necessary, it must be both screened and washed.

Bond—All common brickwork shall have every fourth course a header course.

Radial brickwork shall be bonded every three courses.

Breeching Opening—One opening shall be provided in chimney. The opening to be lined on the reveals with refractory material. The masonry above the opening to be supported by heavy I-beams set on steel plates, with air spaces at each end for expansion. Under these I-beams a flat masonry arch shall be built to properly protect the beams from the effect of the gases. The flue opening shall be reinforced laterally by heavy tie rods and plates over the top and at the bottom.

Steel bands, ⅜ by 3 in., to be placed in the masonry above and below opening .

The opening shall be.....wide by.....high, the bottom of which shall be approximately.....above foundation.

Reinforcing Rings—The chimney contractor shall place in the brickwork at every change in wall thickness steel bands ⅜ in. thick by 3 in. wide.

If the contractor should furnish perforated radial brick having corrugated sides, these bands may be omitted.

Head—The head of the chimney shall be neatly corbeled out and fitted with a heavy annular retaining ring set in full bed of cement mortar.

Clean-out Door—Provide and place in base of chimney where directed by owner a cast iron clean-out door and frame properly hinged and fitted with latch. Said door to be approximately 24 in. wide by 36 in. high.

Ladder—Build on the interior of the chimney a ladder to consist of ¾-in. galvanized iron rungs, spaced approximately 15 in. center to center and securely anchored to the masonry from top to bottom. These ladder irons to be in the shape of a "U" with hooked ends.

Lightning Conductor—The lightning conductor is to consist of.....copper points, ¾ in. in diameter by 8 ft. long, with 1½-in. platinum tips. The points to be anchored to the top of the column and extend from the bottom of the corbeling upward. The lower ends of the points to be connected by a loop of copper cable encircling the chimney. From this loop there is to be 1½-in. 7-strand No. 10 Stubbs' wire gauge copper cable, carried down the side of the chimney and connected to copper ground plate of the 3-winged type as best for the proper distribution of charge. The points to be securely fastened to the top of the chimney and the cable to be anchored every 7 ft. in height with brass anchors, so designed that they will support the weight of the cable. The ground plate shall be buried by the contractor for the foundation when it is built.

Lettering (When Desired)—Work into the column on [one or two] sides as directed the letters [here insert the desired legend] to be made in permanently colored kiln burnt brick. Letters to be true to size and shape and to be in a true vertical line.

Trimmings (If Any)—All necessary stone or terra cotta shown on drawing will be furnished without charge by the building contractor to the chimney contractor, who will set same. No one piece should weigh over 200 lbs.

Insurance—The chimney contractor shall carry at his own expense, during the entire period of construction, liability insurance, insuring the men in his employ and the public in general, in case of damage due to accidents.

Guarantee—The chimney contractor shall guarantee the chimney for a period of 5 years from date of completion. The guarantee shall cover any defects that may arise within this period due to faulty design, construction, material, weather, and the products of combustion up to 800° Fahr.; and shall further guarantee to make good at his own expense all defects that may arise from any of the above conditions within the specified period.

The chimney shall be designed for a wind velocity of not less than 100 miles per hour.

Note: The chimney shall be built according to THE M. W. KELLOGG COMPANY [or equal] system of construction.

THE HEINE CHIMNEY CO.

Engineers and Builders of Radial Brick and Concrete Chimneys

30 Church Street
NEW YORK, N. Y.

123 West Madison Street
CHICAGO, ILL.

Products and Services

Engineers and builders of RADIAL BRICK and CONCRETE CHIMNEYS.

Chimney Repairing and Remodeling.

Also Concrete Tanks and Towers for all industrial purposes, Boiler Settings, Furnaces and Kilns.

Services

THE HEINE CHIMNEY CO. have a skilled and experienced organization for the designing and construction of chimneys, tanks and towers. As a result of close application for many years in radial brick and concrete construction, our engineers are in a position to render a most valuable consulting service to engineers and others who are intending to build either chimneys, tanks or towers. A vast accumulation of data in our possession, and which is not ordinarily available, is at the disposal of our engineers for their use in determining the most efficient type and size of chimney required to meet any existing conditions. We are prepared to undertake contracts for the construction of either brick or concrete chimneys in any part of the world.

Heine Radial Brick Chimneys

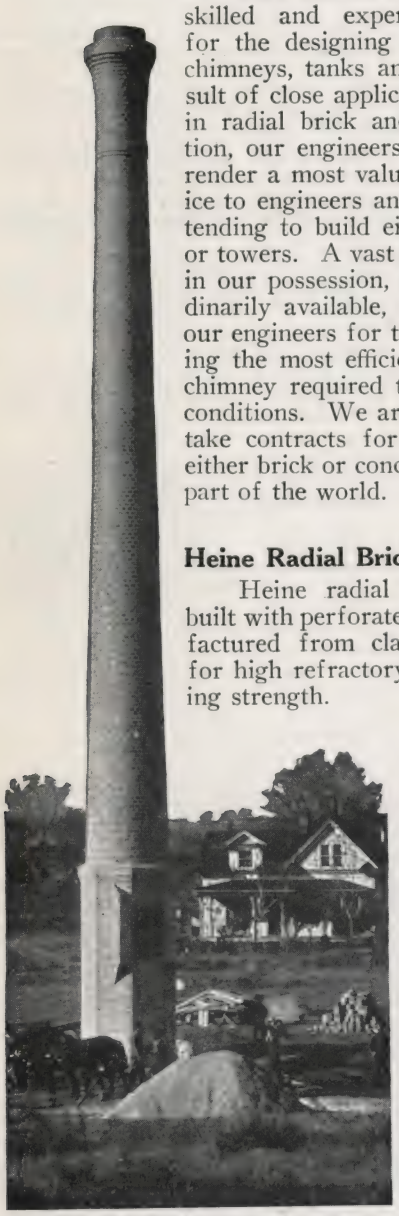
Heine radial brick chimneys are built with perforated radial brick, manufactured from clays specially selected for high refractory qualities and crushing strength.

Heine Concrete Chimneys

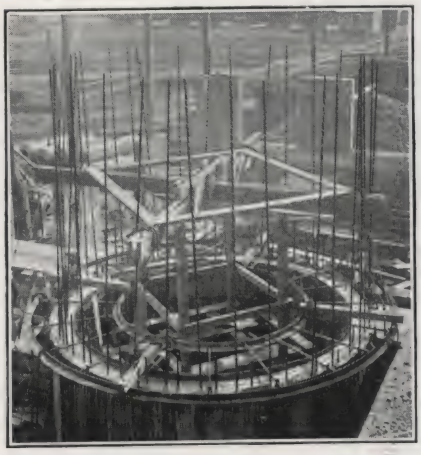
Heine concrete chimneys are constructed with all steel outer and inner forms, covered by patents, assuring a true and concentric chimney with uniform taper. They are built with a wet mixture, and reinforced with steel bars and triangular wire mesh as manufactured by American Steel & Wire Company.

Some Representative Clients

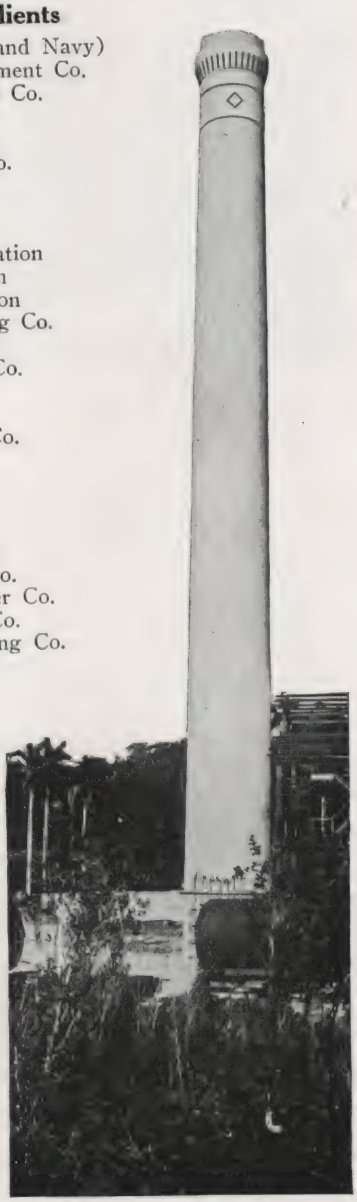
U. S. Government (Army and Navy)
Knickerbocker Portland Cement Co.
National Malleable Castings Co.
Standard Oil Co.
Morton Salt Co.
New York Central R. R. Co.
Pennsylvania R. R. Co.
Barrett Co.
H. J. Heinz Co.
United States Steel Corporation
General Motors Corporation
Stone & Webster Corporation
Harry M. Hope Engineering Co.
Jas. Stewart & Co.
American Car & Foundry Co.
General Electric Co.
Pressed Steel Car Co.
United Gas Improvement Co.
Henry L. Doherty & Co.
Vacuum Oil Co.
Godchaux Sugars, Inc.
American Hominy Co.
Electric Bond & Share Co.
American Sugar Refining Co.
Washington Pulp and Paper Co.
Pacific Power and Light Co.
Peet Brothers Manufacturing Co.
Sinclair Oil Refining Co.
Erie R. R. Co.



HEINE RADIAL BRICK CHIMNEY CONSTRUCTED FOR THE DENVER UNION WATER WORKS



VIEW LOOKING DOWN ON STEEL FORM IN PLACE FILLED WITH CONCRETE



HEINE CONCRETE CHIMNEY CONSTRUCTED FOR THE KNICKERBOCKER PORTLAND CEMENT CO.

H. R. HEINICKE, INC.

Builders of Radial Brick Chimneys

540 North Meridian Street
INDIANAPOLIS, IND.

147 Fourth Avenue
NEW YORK, N. Y.

FACTORY: NEWCOMERSTOWN, OHIO

SALES OFFICES

BOSTON, MASS. CHICAGO, ILL. DETROIT, MICH. LOUISVILLE, KY. MONTREAL, QUE. PITTSBURGH, PA.
BUFFALO, N. Y. CINCINNATI, OHIO KANSAS CITY, MO. MEMPHIS, TENN. NEW ORLEANS, LA. ST. LOUIS, MO.
CHARLOTTE, N. C. CLEVELAND, OHIO LOS ANGELES, CAL. MILWAUKEE, WIS. PHILADELPHIA, PA. TORONTO, CAN.

Products and Services

Specialists for 20 years in the design and construction of PERFORATED RADIAL BRICK CHIMNEYS and accessory structural members, including Foundations, Boiler Setting and Brick Furnaces.

Manufacturers of PERFORATED RADIAL BRICK.

Also, Grain Elevators, Tanks and Silos.

Rush work a specialty. Material always ready for immediate shipment from the factory.

Heinicke Radial Bricks and Chimneys

Heinicke chimneys are constructed of specially formed perforated bricks manufactured by Heinicke themselves. These bricks are shaped to the circular and radial lines of the chimney, producing, when in place, smooth and true inner and outer surfaces.

They are hard burned, regular in shape, sound ringing, weatherproof and acidproof. Produced from selected, chemically tested and carefully proportioned refractory fire clay and shale.

The perforations permit of thorough burning of the bricks, assuring a product which is highly resistant to acids, heat, weather and other deteriorating influences.

Our brick plant is run as a part of this business and not as a separate enterprise. It is the only brick plant in the United States which makes a specialty of radial bricks. Radial bricks are produced by other brick makers simply as a side line in connection with their regular business and, of course, the same care and attention can not be given. The Heinicke bricks are superior to the brick ordinarily used and are made by this company to maintain a high standard of excellence.

Since we manufacture the brick and erect the chimneys by our own organization, full responsibility is assumed for results without question or argument.

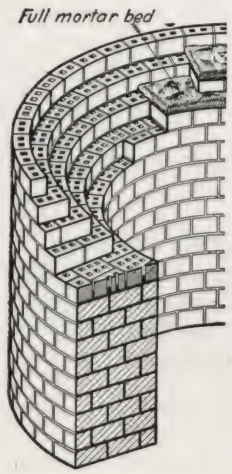
Heinicke chimneys are bonded in every direction at all courses. This, with the concealed reinforcement employed, enables us to absolutely guarantee chimneys against cracking, except from unusual cause or abuse.

Heinicke designed chimneys have been erected in Europe and America and thousands are in operation today as examples of their success. As specialists in the engineering and designing of chimneys, this company's experience is available to engineers, architects, contractors and owners.

Features of Design and Workmanship

(A) Perforations in radial bricks form insulating dead air spaces in wall of chimney, which reduce radiation and prevent sudden temperature changes within chimney, resulting in a considerable saving in fuel. Mortar slightly extends into perforations, forming an anchorage that adds greatly to stability of chimney.

(B) Concealed steel bands are used in reinforcing chimney; these add materially to strength in resisting stresses due to expansion, and insure safety against cracking.



SECTIONAL DETAIL OF CHIMNEY SHOWING HEINICKE BOND

HEINICKE CHIMNEY SERVING A SMELTER
Height, 460 ft.; clear diameter at top, 8 ft.

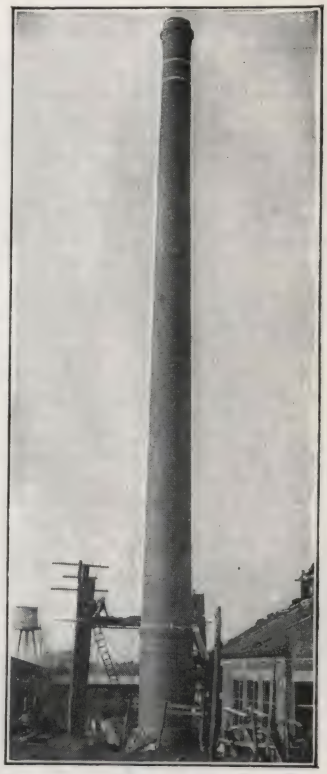
(C) The Heinicke system of bonding provides for breaking of joints between courses, so that no vertical joint is higher than one brick. Every course is thoroughly bonded through use of bricks varying in length from 4 to 10 in. (See sectional detail.) This method of bonding gives greater compressive strength and resistance to lateral stresses than other systems; the increase in strength over the common bond amounts to about 300%.

(D) Erection of chimney is done from inside, doing away with outside scaffolding and eliminating accompanying dangers to workmen as well as unnecessary cost.

Estimates

Please advise us on the following points:

(1) Distance from nearest railroad siding or team track. (2) Intended use of chimney (boilers, furnaces, incinerators, smelters). (3) Height and diameter, or boiler horsepower, or type, number and dimensions of boilers. (4) Kind of fuel to be used. (5) Character of soil for foundation. (6) Approximate price of cement, lime, sand, gravel, crushed stone and common hard brick, delivered at chimney site.



PASSAIC METAL WARE CO., PASSAIC, N. J.
Height, 125 ft.; clear diameter at top, 3 ft.

WM. SUMMERHAYS & SONS

Designers and Builders of Radial Brick Chimneys

1 Exchange Street

ROCHESTER, N. Y.

MONTREAL, QUE., 109 Place D'Youville

REPRESENTATIVES

PHILADELPHIA, PA., HAROLD H. HAPPOLD, 1025 Widener Building MONTREAL, QUE., JOHN C. RUSSELL, 109 Place D'Youville

Products

CHIMNEYS: Perforated Radial Brick and Common Brick.

BRICK BOILER SETTINGS, SPECIAL FURNACES and OVENS.

Sixty-six Years of Successful Chimney Building

Summerhays brick chimneys embody the results of 66 years of successful chimney building and have gained for WM. SUMMERHAYS & SONS an enviable reputation. Their present day practice is the cumulative experience of three generations.

Stability of design and quality of workmanship and materials explain the long life of their chimneys and the large number of successful installations in the United States and Canada.

This organization employs only workmen skilled in the chimney building trade—men who have specialized in this line of construction.

Summerhays chimney experts will, without charge, submit recommendations, plans, estimates, etc., for proposed radial and common brick chimneys and foundations, based on the knowledge gained through their long experience in chimney building.

Perforated Radial Brick—These brick are made from a selected shale material moulded from dies of this company's own design in varying sizes and radii, to make a perfectly bonded wall and to conform to the circumference of the chimney for any diameter. They are hard burned to the point of vitrification. The perforations insure an even and thorough burning of the entire brick, giving a material of maximum strength. The air pockets formed by these perforations, which are sealed with mortar, serve to insulate the hot flue gases from cooling by the atmosphere.

Typical Summerhays Chimneys—

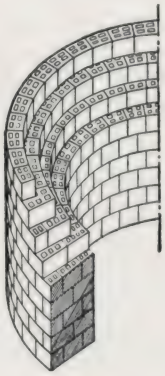
Bausch & Lomb Optical Co.
Berliner Gramophone Co., Ltd.
Buffalo, Rochester & Pittsburgh Ry.—2
Canadian Connecticut Cotton Co.
Curtice Bros. Co.—3
Curtiss Engineering Corp.
Douglas Packing Co.—2
Great Atlantic & Pacific Tea Co.
Hamburg Canning Co.—3
International Milk Products Co.—2
International Salt Co.—2
Isco Chemical Co.
Merrill Silk Co.
Mohawk Condensed Milk Co.—3
National Carbon Co.—2
New England Box Co.
New York Canners—6
Oldsbury Electro Chemical Co.
J. Hungerford Smith Co.—2
Standard Oil Co.—3
Taylor Instrument Cos.
United Gas Improvement Co.—3
Vacuum Oil Co.—5
Worcester Salt Co.—4
Yawman & Erbe Mfg. Co.

Brick Boiler Settings and Furnaces

The fire masonry experts of WM. SUMMERHAYS & SONS are in a position to design and build brick boiler settings, also ovens and special furnaces for any purpose.

From the standpoint of economy and efficiency, it is suggested that estimates for the construction of the chimney include construction of the boiler settings.

BERLINER GRAMOPHONE CO., LTD., MONTREAL, QUE.



HOW SUMMERHAYS RADIAL BRICK ARE BONDED

Wall bonding of Summerhays radial brickwork is accomplished by the use of brick of such varying lengths as to assure a thorough breaking of vertical and horizontal joints. This bonding is made every three courses

ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, N. Y.

ESTABLISHED 1889

H. B. FRED KUHLS

Manufacturer of Elastic Glazing Composition and Joint Paint

OFFICE AND FACTORY
6411-6423 Third Avenue
BROOKLYN, N. Y.

Products

ELASTIC GLAZING COMPOUND; ELASTIC SEAM PAINT; ELASTIC EXPANSION JOINT COMPOSITION.

Elastic Glazing Composition

General Glazing—For bedding and glazing in general; skylights, conservatories, etc.

For new work, after sash has been primed, apply Elastic Glazing Composition in same manner as ordinary putty.

For old work, clean sash thoroughly and putty as above.

For bedding and glazing on a ½ in. margin, 1 lb. will spread 10 ft.

Architects' specifications should read, "All sash to be glazed with Elastic Glazing Composition, manufactured by H. B. FRED KUHLS, Brooklyn, N. Y."

Calking—For calking of window frames.

For new work, before putting on staff bead, fill joint thoroughly with Elastic Glazing Composition so that it becomes flush with frame.

For old work, remove staff bead. If joints are wide, calk with oakum to within ½ in. from surface, then fill with Elastic Glazing Composition.

Between 2 and 3 lbs. required for a window 7 by 3 ft., according to size of opening.

Architects' specifications should read "Calk all window frames with Elastic Glazing Composition manufactured by H. B. FRED KUHLS, Brooklyn, N. Y."

Pointing Up—For pointing up of stonework, flashings, joining of tin roofs to walls, etc.

After joints have been cleaned out thoroughly, paint with Special Elastic Joint Paint, then fill with Elastic Glazing Composition with a pointing tool or knife. Special colors to match the stone.

Architects' specifications should read, "Paint all joints with Special Elastic Joint Paint and fill with Elastic Glazing Composition manufactured by H. B. FRED KUHLS, Brooklyn, N. Y."

Features

Elastic Glazing Composition adheres readily to galvanized and raw iron, steel, wood, glass, stone, concrete, etc.

Never becomes very hard, always remaining elastic and flexible, and prevents glass from cracking.

Withstands heat, cold and moisture.

Vibration has no effect upon it, thus it is ideal for setting wire glass, which has no tendency to crack when embedded in this composition.

More economical than white lead putty, it is double the bulk, and wears ten times as long; therefore is cheapest glazing material obtainable, service considered.

Color

Stock color is light gray; can be made in any shade.

How Shipped

Put up in kegs of 12½, 25 and 50 lbs., and in barrels of about 800 lbs.; also in cans of 1, 2 and 5 lbs.

Expansion Joint Compound

This material has been used on the Army Base, Brooklyn, N. Y., and several other large buildings. It has been adopted by prominent architects and meets all requirements. A small sample will be sent on request.

Directions for Use—Expansion joints must be thoroughly cleaned out. Apply 1 or 2 coats of Elastic Seam Paint, or until the surface shows a gloss, and then apply Elastic Seam Composition No. 2. Fill the joints so they are crowning; this will allow for heavy expansion and make a tight joint.

Testimonials

NEW YORK, Feb. 7, 1918.

DEAR SIR:

Your letter of December 13 has just been referred to the writer and in reply will say that I have used your glazing Compound for a number of years for special conditions and frequently to replace putty for glazing which had become defective through use.

Your Compound has always given good results and as far as the writer knows it is the best material on the market for glazing purposes.

Yours very truly,
CHARLES A. PLATT,
(Signed) per Dixon,
101 Park Avenue.

DEAR SIR: WORCESTER, MASS., May 10, 1918.

In your communication of December 12, 1917, you inquired as to result of my use of your Elastic Glazing Composition and at that time was unable to make any statement owing to the fact that same had not been exposed sufficiently long to make a test.

At present writing will say that your Composition is the best material for glazing that I have ever used. Owning (36) thirty-six tenements, have a large number of windows and sash to keep in repair and your composition meets with my hearty endorsement.

My painter said to me this morning "It is the best material for glazing I have ever seen."

Yours truly,
(Signed) CHARLES S. WEBSTER,
Slater Bldg.

References

A few buildings on which Elastic Glazing Composition has been used:

Pennsylvania Terminal, New York, N. Y., 20 tons for glazing
Woolworth Building, New York, N. Y., 5 tons for glazing and pointing up
Plaza Hotel, New York, N. Y., 1 ton for pointing up
Racquet & Tennis Club, New York, N. Y., 2¼ tons for glazing
Newcastle Leather Co., Wilmington, Del., 1½ tons for glazing
New York Central R. R., 10 tons for reglazing
Singer Sewing Machine Co., Elizabethport, N. J., 3 tons for glazing
Massachusetts Institute of Technology, Cambridge, Mass., 2 tons for glazing
U. S. Government Warehouses, 100,000 lbs.

Further references and information on request. Over 70 agents in United States and Canada. Send for booklet. Prices on application.

PECORA PAINT COMPANY

Calking and Glazing Compounds

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products

PECORA CALKING and GLAZING COMPOUND.

For Mortar Stains and Roofing Cements, see page 144; for Enamel Paints and Metal Sash Putty, see page 1383.

TRADE-MARK

Pecora Calking and Glazing Compound

A plastic material, impervious to heat, cold and moisture, or acid fumes. When set it forms a tough skin on the surface but remains permanently pliable and elastic underneath, never cracking or drying out. It adheres tenaciously to wood, stone, concrete, iron, glass, or any other building material, while its permanent elasticity adjusts itself, under all ordinary conditions, to contraction, expansion, or warping of the surfaces it joins.

Its consistency is about that of putty and it is as easily applied. Stock color is light gray. Other shades furnished if ordered in not less than ½ barrel lots (400 to 500 lbs).

Air Leakage Prevention

The prevention of air leakage is a vital prerequisite to fuel saving and satisfactory heating, and to the subsequent comfort of the occupants of a building. Approximately 90% of the air leakage in all buildings occurs between the window and door frames and the surrounding masonry. Unless these spaces are calked with a permanently flexible material in place of the usual mortar joint and cement pointing, this air leakage is bound to continue.

Method of Calking Around Window and Door Frames

This necessarily varies with the conditions to be found in old buildings. In some cases it is advisable to remove staff beads and calk space between the frame proper and the wall, while in other cases the calking can be done satisfactorily without removing staff beads. For this class of work a reliable calking contractor should be consulted; a list of these will be furnished on request.

For calking frames in new buildings the following set of specifications, if rigidly enforced, will insure thoroughly weatherproof, windproof, and dustproof joints between frames and the surrounding masonry.

Specifications—In the last paragraph of the general conditions to the specifications insert under the following heading:

Substitution of Materials, etc.—For material, apparatus, and appliances specified, other articles of equal capacity, material, designs, workmanship, and space occupied may be substituted providing that the written approval of the architect shall be given before the general contract is signed. After contract is signed, no substitutions will be allowed. Samples of such substitutions shall be submitted before signing the general contract.

In specifications for stone, hollow tile, or brick masonry, insert this paragraph:

This contractor shall rake out the mortar before it is set ½ in. deep from outside face of door and window frames, on jambs top and under wood sills.

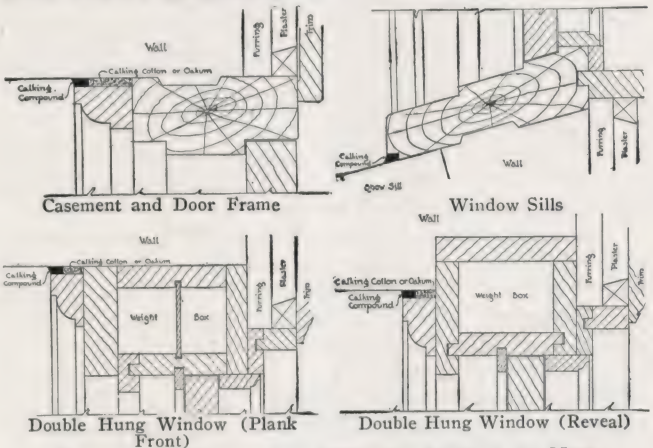
In specifications for carpenter and millwork insert this paragraph:

All staff beads on door frames and reveal window frames and back band moulding on plank front frames shall be loose and shall be put in place by the carpenter immediately after the calking is done.

In carpenter specifications after exterior door and window frames are specified add these paragraphs:

Calking—All exterior window and door frames shall be sealed with Pecora Calking Compound manufactured by the PECORA PAINT COMPANY of Philadelphia, Pa. This shall be executed so that the joint between masonry and frames (heads, jambs, and sills) will be rendered weatherproof, windproof, and dustproof, and guaranteed so to remain under all ordinary conditions for a period of 5 years from date of installation. When spaces between the frames and the surrounding masonry are wider or deeper than ½ in., these spaces shall be packed within ½ in. of frame surface with oakum and the remaining space filled solid with the calking compound.

The above work shall be done when all frames are set in place and primed and masonry joints raked out, as called for under masonry specifications.



SUGGESTIVE DETAILS FOR APPLYING MOULDS TO NEW FRAMES TO ACCOMMODATE CALKING AND UNDERCUT SILLS FOR SAME PURPOSE

Other Uses

Glazing—For any construction subject to severe conditions, such as excessive vibration, gas, acid fumes, extreme variations in temperature, etc., Pecora Calking and Glazing Compound should be used for bedding and glazing the skylights. Its permanent elasticity prevents the glass from cracking. It will go twice as far as white lead putty.

Pointing Stonework—It is difficult if not impossible, to get a cement mortar that will stand up in exposed joints in stone, terra cotta, or tile cornices. The cement cracks and becomes loose, causing leaks. To overcome this, set the masonry in portland cement in the usual way, but rake the joints back ½ in. before the cement hardens and fill in with Pecora Calking Compound.

In old work, clean the joints of all loose dirt or cement and grout with Pecora Calking Compound. This makes a positive seal against the action of the weather on the cement, insuring permanently tight waterproof joints.

Packages

Pecora Calking Compound is packed in 12½-, 25-, 50-, and 100-lb. kegs; also in ½ barrels (400 to 500 lbs.) and barrels (800 to 900 lbs.).

CARNEY CEMENT COMPANY

QUARRIES AND GENERAL OFFICES

MANKATO, MINN.

DISTRICT SALES OFFICES

CLEVELAND, OHIO, Leader-News Building
MINNEAPOLIS, MINN., Builders' Exchange
ST. LOUIS, MO., Syndicate Trust Building
OMAHA, NEBR., Omaha National Bank Building
CHICAGO, ILL., Chamber of Commerce Building
DETROIT, MICH., Book Building

Product

CARNEY CEMENT.

Description

The CARNEY CEMENT COMPANY has been manufacturing cement since 1883.

Carney is a cement unlike any other used in brick and tile construction. It is made from a peculiar deposit of stone found only at Mankato, Minn. This stone contains the correct proportion of lime combined chemically, so that, when the stone is burned and ground, it needs nothing but sand and water to form a smooth working, slower setting mortar. In the wall it becomes harder than the brick it binds.

Advantages

Carney is lighter in weight, and is easier handled. A barrel, 4 cu. ft., weighs 240 lbs. A sack of 1 cu. ft. weighs 60 lbs. Users of Carney are not required to buy lime, hence labor of slaking and mixing is eliminated. Carney requires nothing but sand and water in mixing.

One barrel of neat cement will swell, when properly soaked, so as to make a barrel and a half of putty. This 50% increase in volume does not injure the strength and durability of the mortar. It allows the user to lay approximately 1000 brick to the barrel. The soaking bleaches the cement, resulting in white mortar joints.

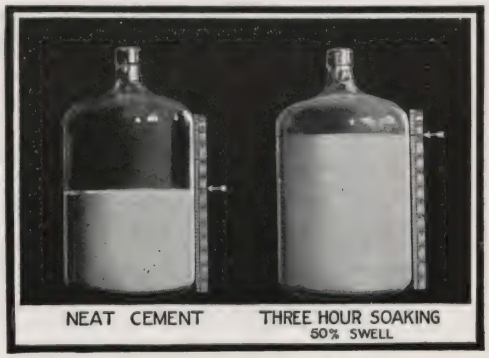
The simple mixing formula saves time and labor and eliminates carelessness. The addition of too much sand or adulteration at the mortar box interferes with the plastic, smooth working properties of the cement and is immediately noticed by the masons.

Because of the plastic and smoother working properties masons can lay more brick per man per day.

Carney mortar has no waste. Mortar left over at the end of the day or when a job is delayed can be used the next day by retempering with water.

Because of its slower set there is no tamping of brick or retempering on the mortar board.

Carney can be used winter and summer. Frost does not affect the strength of Carney mortar in the wall. Printed directions on tags attached to the cement bags provide for its proper use in cold weather.



SOAKING TEST OF CARNEY
50% increase in volume—the result of soaking the neat cement before adding sand

In the wall, Carney mortar returns to its native hardness, becoming harder than the brick it joins and, as the mortar is absorbed into the brick because of its slower setting properties, it exerts a tremendous gripping power. It makes one solid wall of masonry.

Directions for Using Carney in Brick, Tile and Terra Cotta Walls Above Grade

The following mixing directions are printed on tags attached to the cement bags:

Machine Mix—Box to be used for soaking Carney in water, or so called "putty box," should be about 5 ft. wide, 10 or 12 ft. long and 3 ft. deep, divided in the middle with a partition, making two equal sections for soaking. Thus cement can be soaked in one section while being used from the other. Put the neat cement in putty box, adding water in proportion of 1 part cement to 2 parts of water by volume. (Some prefer to fill putty box two-thirds full of water and then throw in cement as it comes from the bags.) Stir cement and water thoroughly and allow same to stand until surplus water is absorbed. This will require about 3 hours, though this time can be considerably shortened by an additional stirring. Putty is now ready to be mixed with sand for use. Throw into mixer 1 shovel of Carney putty to 3 shovels of sand, adding enough water to produce a mortar of the proper consistency for laying brick. Run mortar from mixer into a box and it is ready for use.

Note: There is considerable economy in using clean, sharp sand as the cement will go much further in the work.

Hand Mix—Have two boxes approximately 5 ft. wide. 10 or 12 ft. long and 18 in. deep partitioned off through the middle, thus making 4 sections for mixing. Pour the cement from bags into the boxes and add water, using 2 parts of water to one part of cement by volume. Hoe over to insure a thorough mixture of the water and cement which should be of the consistency of cream. This should stand for a couple of hours or so before addition of sand, or may stand overnight without affecting its quality. Sand is now added to the putty, chopping it over a couple of times, adding sufficient water to make a workable mortar for bricklayers. As each section of box is emptied of mortar it is refilled with water and Carney again, and the same procedure carried out as explained above.

Cold Weather Directions—Heat the sand and water. Hot water will cut in half the time required for soaking, thus obtaining the full swell of the putty in the least time. In cold weather use equal parts by volume of cement and water, and do not soak longer than an hour or an hour and a half before adding sand. Use directly after adding sand.

For Non-porous and Hard Shale Brick in Cold Weather—For every barrel of Carney use 1 bag of portland cement when adding sand. This small addition of portland cement quickens the set of the mortar, which is necessary when laying impervious brick in cold weather.

Specifications for Brick, Tile and Terra Cotta Mortar

Plain Mortar—For all brick, tile and terra cotta mortar above grade, use 1 part Carney, 3 parts clean, sharp sand (no lime), in accordance with the manufacturers' directions attached to the cement bags. When used in connection with Bedford Stone, the stone should be made stainproof.

Colored Mortar—Use a good, double strength mortar color. Mix Carney, the color and sand dry together and soak in water as long as possible before using.

Catalogue and Descriptive Literature

A catalogue and descriptive literature covering every point on Carney will be sent on request. A list of buildings near you that have been laid up in Carney, together with the names and addresses of the architects and contractors, will also be sent, if requested.

HY-TEST CEMENT CO.

FORMERLY A. T. MALMED & CO.

Manufacturers of Bricklayers' Cement

MAIN OFFICE
Presser Building
PHILADELPHIA, PA.

MILL: SIEGFRIED, PA

BRANCH OFFICES
NEW YORK, N. Y., 507 Fifth Avenue
BALTIMORE, MD., Hillen and Front Streets
BOSTON, MASS., 101 Tremont Street
PITTSBURGH, PA., 803 Union Bank Building

Product

HY-TEST MASONS' CEMENT, a finely pulverized, plastic, smooth working cement made especially for brick and tile mortar, and general masonry.

Advantages

Hy-Test mortar takes the place of portland cement-lime mortar.

Hy-Test masons' cement requires no addition of lime to make it work smooth, but contains within itself, when mixed with sand, properties which produce a creamy mortar that will work long and buttery under the trowel.

Architects will be quick to appreciate the fact that a mill finished cement that requires no adulteration with lime will produce a more uniform quality of mortar than the uncertain mixtures of portland cement adulterated with varying additions of lime to suit the individual ideas of each bricklayer.

An excess of lime undoubtedly decreases the strength of mortars.

Strength of Hy-Test Mortar

Hy-Test mortar will produce a compressive strength 4 to 6 times greater than the maximum load permitted on brickwork by the building codes of the larger cities. 1:3 Hy-Test mortar will withstand over 80 tons compression at 28 days and will eventually approximate portland cement in strength.

Lower Bids

Hy-Test masons' cement makes for lower bids because it costs less than portland cement, lime, or any combination of the two.

Composition and Manufacture

Hy-Test masons' cement is similar in chemical composition to portland cement and differs merely in the degree of burning. Portland cement is burnt to approximately 1800° Cent. and the lime is therefore so combined with the silicates and aluminates that it does not function to promote maximum plasticity, whereas Hy-Test cement is burnt to 900° Cent. and the lime is so combined as to impart that smoothness so desirable for bricklaying.

Hy-Test is made from the splendid cement rock of the famous Lehigh Valley. The necessary quantities of limestone and gypsum are added at the kilns, and the entire aggregate is burnt, granulated, pulverized and finished under strict laboratory control, in the latest design of cement making equipment.

Color

The natural color of Hy-Test is a pleasing light buff which makes it very desirable for face brick joints.

It can be colored more satisfactorily than portland cement-lime mortar, as lime has a tendency to bleach the color. Hy-Test mortar takes and retains the full richness of coloring.

Hydraulic Properties

Hy-Test cement is hydraulic and may be used both above and below ground. It has a definite set so that work can progress without waiting for the mortar to harden. Due to this early set, the walls will not slip.

Laboratory Tests and Approvals

Compression and tensile tests made by the Massachusetts Institute of Technology and by eight prominent testing laboratories are in evidence as to the uniformity and strength of Hy-Test. Copies of test reports gladly sent on request.

Hy-Test has been approved by the New York Building Department after thorough tests under the supervision of five city engineers.

Cold Weather Qualities

As Hy-Test is of the same composition as portland cement it is not affected by alternate freezing and thawing.

Estimating Data

One barrel of Hy-Test used in the proportion of 1 part Hy-Test to 3 parts sand, will lay 1000 bricks, average 3/8-in. joint.

How Packed

Hy-Test is packed in cloth sacks each containing 1 1/8 cu. ft. of cement, 4 sacks to the barrel, totaling 4 1/2 cu. ft.

Specifications

"The mortar for all masonry below grade, and for laying brick and tile, shall be made of one (1) part Hy-Test masons' cement (HY-TEST CEMENT CO., Presser Building, Philadelphia, Pa.) or approved equal, mixed with three (3) parts clean sand, no lime to be added.

"To each bag of Hy-Test there shall be added three (3) cu. ft. of sand. The sand shall be measured in cubic foot boxes. No counting by wheelbarrows or shovels will be permitted.

"When mixed by hand the Hy-Test and sand shall be first mixed dry and turned over at least three times before the water is added.

"In warm weather wet all bricks before laying. In freezing weather heat sand and water."

LOUISVILLE CEMENT COMPANY

INCORPORATED
315 Guthrie Street
LOUISVILLE, KY.
PORTLAND CEMENT MILLS: SPEEDS, IND. NATURAL CEMENT MILLS: NEAR SPEEDS, IND.
LIME WORKS: MILLTOWN, IND.

Products

BRIXMENT, a Special Cement for Brick Masonry, patented under U. S. Patents Nos. 1323952 and 1323953; British Patents Nos. 155431 and 158390; French Patents Nos. 506378 and 506379 and Belgian Patents Nos. 283418 and 283419.

TRADE-MARK

Also, Speed Portland Cement, Louisville Natural Cement, Blue River Lump Lime, White Star Hydrated Lime.

Brixment, for Perfect Mortar

Brixment, which is the outgrowth of fifty years of experience in cement manufacture, is a cement for brick mortar—of great strength, endurance, economy and architectural advantages. It is made, by an exclusive patented process, of argillaceous limestone and unsaponifiable oil, or waxy material, and oily shale.

Brixment is slow setting, plastic, strong and does not deteriorate in storage. It is similar to portland cement in its chemical composition and approximates it in strength. Being hydraulic it may be used above or below ground.

Method of Manufacture

The limestone, which is high in alumina and combined lime and silica, is first crushed to uniform size. It is then burned in upright kilns, passed through suitable mills and finally through a ring-roll reducer where such a fineness is obtained that 85% will pass through a 200-mesh screen. It is then placed with the oily materials in a specially constructed hydrater and sufficient water is added for complete hydration of the lime. When reaction has taken place it is conveyed to steel hoppers where, after about two weeks, the hydrating reaction is completed. From there it goes through the tube mills for final pulverization and thence to storage bins for bagging and shipping.

Advantages of Brixment

The three most essential elements in the making of brick mortar—enduring strength, economy and architectural adaptability—have been attained in Brixment to an exclusively high degree, the natural result of the combination of the following Brixment features:

Greater Strength and Endurance—Practical tests show that Brixment's early strength approaches that of portland cement mortar, while after the lapse of a few months they are of equal strength. This unusual strength and endurance is due to the high content of calcium silicates, the hydration of which is the cause of the final strength in hardened concrete.

Unimpaired by Retempering—The quick setting substances in Brixment have been retarded, while the slow setting, strength giving silicates retain their ability to set and cause the mortar to become hard, even though re-tempered. This permits mixing larger batches and tempering more slowly than with other cements.

Greater Economy—Being composed of definite elements in chemical equilibrium, according to an unvarying formula, Brixment, when gauged with good sand and properly tempered, produces uniformly good results with economy in time, labor and money.

Needs No Slaking—Needing no slaking before use, Brixment is constant in volume and will not swell, pop, crumble nor scale from rain after becoming hard in the work. Finished joints will always remain smooth.

Will Not Become Air-set—Samples of Brixment taken from a dealer's stock after two years' storage, showed no impairment of strength or condition, and test briquettes of same doubled in strength between the 28- and 90-day periods.

Greater Architectural Advantages—Being invariably uniform in quality and composition, the proportion of binding material required by the specifications need not be left to the discretion of the mortar mixer, as is the practice when using lime mortar tempered with cement.

Repels Moisture and Has Greater Plasticity—The oily content not only imparts greater plasticity to Brixment making it easier to work and assuring smooth joints, but also makes it impervious to moisture. Joints when set, repel rather than absorb moisture.

Inert to Mortar Colors—Less color is therefore required to obtain the desired shade than when using mortars made with lime or other cements.

Directions for Using Brixment

With 1 part Brixment, mix thoroughly 3 parts dry sand. Add sufficient water to make mortar of proper consistency. The addition of color does not affect the strength of Brixment mortar and Brixment does not affect mortar color; less color is required than with other mortar. Mortar may be mixed either by machine mixer or by hand.

Estimating Data

Brixment is put up in sacks of 1 1/9 cu. ft. each. Each sack weighs 75 lbs. Four sacks make 1 bbl., which is of greater volume than 1 bbl. of portland cement.

One barrel Brixment used in the proportion of 1 part Brixment to 3 parts sand should lay 1000 brick.

Average cost, $1.45 per bbl., f. o. b. Speeds, Ind.

Tests

A report of the American Bureau of Inspection and Tests is as follows:

"The Brixment produced about the same water-repellent qualities as the waterproofed white cement, and the absorption-resisting qualities of the mortars made with the two cements in the same proportion, appeared to be about equal."

CRUSHING STRENGTH OF BRIXMENT
Test by Robt. W. Hunt Co., Chicago, Ill.

Specimen	No. 1	No. 2	No. 3
Mortar started to crush at about, lbs....	20,000	23,000	19,000
Brick started to crush at about, lbs.....	25,000	25,000	24,000

Note: 3 specimens of Brixment used with one-third sand in a ½-in. joint between 2 common bricks. All tested at age of 28 days.

SHEARING STRENGTH OF BRIXMENT VERSUS PORTLAND CEMENT MORTAR
Test by American Bureau of Inspection and Tests

Test No.	Cement Used	Bricks used	Shearing Load lbs. per sq. in.
1	Brixment	Common	150
2	Brixment	Common	73 average 112
3	Cement-lime	Common	63
4	Cement-lime	Common	68 average 65

PHYSICAL TEST

Fineness 100	96.8%	Steam pat	O. K.
Fineness 200	87.0%	7-day 3-1 tensile	76 lbs.
Initial Setting	3 hrs. 30 min.	28-day 3-1 tensile	147 lbs.

THE CLINTON METALLIC PAINT COMPANY

Mortar Colors, Protective Paints and Roofing Cement

100 Clinton Road, CLINTON, N. Y.

Products

Manufacturers of CLINTON MORTAR COLORS.

Also manufacturers of CLINTON IRON OXIDE PROTECTIVE PAINTS and SILK FIBRE ELASTIC ROOF CEMENT.

Clinton Mortar Colors

Made from ores, carefully selected for their richness and purity, passed through special processes of drying, grinding and air separation. The resulting products are extremely fine and have tremendous coloring power and permanence.

PULP OR DRY COLORS—Clinton Colors are sold either in pulp or dry form. Colors in pulp form are more convenient to use and mix more readily with mortar, but they are somewhat more expensive and have not as much coloring power per unit of weight.

Mortar of color shown is produced by adding amount of dry Clinton Mortar Color mentioned to mortar consisting of 1 bucket or 16 quarts Portland Cement, 1 bucket or 16 quarts Hydrated Lime and 6 buckets or 96 quarts sand.

21 Quarts Clinton Double Strength Olive Green No. 1303

24 Quarts Clinton Pompeiian Buff No. 600

11 Quarts Clinton Double Strength Chocolate No. 402

Importance of the Mortar Joint

The mortar joint frequently represents nearly one-fourth the wall area. It is generally recognized that the treatment of the mortar joint, with respect both to color and texture, greatly influences the appearance of the brick wall. In Clinton Mortar Colors the architect has at his command a wide variety of shades from a rich mellow buff and the deepest red through warm browns, olive green and chocolates to the blackest black. These colors used alone in various quantities or mixed with one another, permit of almost any effect from pearl gray tones (produced by using a very little black) or warm, aged tones (obtained by using a small amount of buff) to the most decided tones which may be secured by using these colors in the quantities herein suggested.

Permanency of Clinton Colors

The color treatment chosen by the architect must be permanently preserved or the result in a few years will be disappointing.

Clinton Mortar Colors have been used by foremost architects and contractors throughout the country since 1887 and they have given complete satisfaction in regard to their non-fading properties. These colors are mineral colors and absolutely free from anything which could possibly weaken the mortar. No chemicals or chemical by-products are used in their manufacture.

Importance of using Clinton Mortar Color Experimenter and Preparing Sample Panels in Selecting Mortar Colors

In order to help the architect select the proper mortar color this company has had made the Clinton Mortar Color Experimenter. This consists of a number of strips of wall board ½-in. thick, tinted along the edges to reproduce colored mortars. By using these strips, brick panels can be built up and studied with the various colored strips without the use of actual mortar.

The Color Experimenter will be sent without charge to architects requesting it.

TEST PANELS—After using the Color Experimenter to determine what color harmonizes best with the brick selected, two or three panels of brick should be set up with colored mortar to determine the actual proportions of the aggregates of the mortar of the tint selected.

Such panels should be allowed to stand for a few days before arriving at a final decision, to give the mortar an opportunity to dry out and attain its permanent color. The mortar when wet, is deeper in shade.

24 Quarts Clinton Double Strength Black No. 800

Warning—Test Panels should be of the same thickness as the finished wall. More rapid drying of thin panels results in a lighter color tone.

Quantity Required for Mortar Joint of Deep Color

Amount of Clinton Mortar Color given under the panels, with the exception of panel laid in pearl gray mortar, involves the use of approximately 100 lbs. of coloring material per 1000 brick laid in running or common bond with mortar joints ½-in. wide. For other bonds and widths of mortar joints color estimates must of course be adjusted proportionately to the amount of mortar required.

Panel laid in pearl gray mortar involves the use of approximately 25 lbs. of Clinton Double Strength Black No. 800 per 1000 brick laid with ½-in. joint in running or common bond.

Formulae given are for dry colors. When pulp colors are used increase quantity of color 20%.

NOTE—Clinton Mortar Black No. 900 will not give a jet black. For best work, use Double Strength Black No. 800.

Cost of mortar color for intensely colored mortar varies from $2.50 to $8.00 per 1000 brick based on a ½-in. joint. If light tints are sought, cost will of course decrease proportionately with the amount of color used.

Specifications

After convincing himself that he has selected the right brand and shade of color, the architect wishes to write his specification so as to permit of no substitution. The following is suggested:

"All mortar for face brick work to be colored with genuine Clinton Mortar Color (insert shade and state whether dry or pulp), manufactured by THE CLINTON METALLIC PAINT COMPANY, Clinton, N. Y. All lime must be thoroughly slaked and cooled for at least 24 hours before the color is added. (State here how color and mortar are to be proportioned. See formulae suggested under color plates). This proportion must be strictly adhered to. Mix thoroughly and uniformly.

All mortar colors must be delivered at the job in their original packages."

Identification Labels

Colors of inferior grade are frequently offered as Clinton Colors. All barrels, kegs and bags bear the Clinton yellow label as illustrated.

Clinton No. 700 Colonial Buff Color for Stucco

This is a rich non-fading color which is mixed with the aggregates of the finish coat of stucco. The tone may be varied from a light cream to a deep buff.

21 Quarts Clinton Double Strength Olive Green No. 1503

Formula for Cream Colored Stucco:

White Cement	8 parts	16 quarts
Sharp Sand	8 parts	16 quarts
Lime Putty	1 part	2 quarts
No. 700 Clinton Colonial Buff	1 part	2 quarts (2.6 lbs.)

NOTE: Quantities above are for 100 sq. ft. finishing coat.

To obtain a deep buff color double the amount of mortar color above. To produce a surface of clear attractive color it is necessary to use White Portland Cement.

Coloring of Rough Cast Stucco is highly recommended and offers no difficulties if specifications are followed. In Smooth Finish Stucco the color follows the trowel or float, giving a surface of somewhat irregular or mottled appearance.

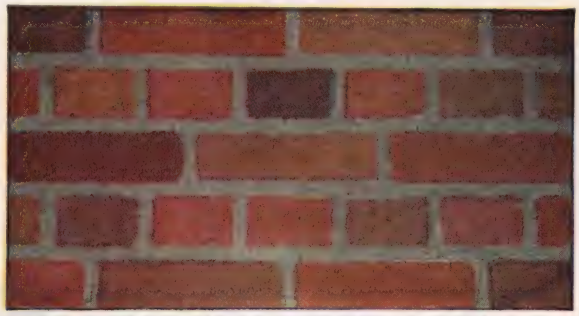
Service

Dealers all over the United States and Canada carry ample stocks of Clinton Mortar Colors. If local dealer in building materials does not carry Clinton Mortar Colors, write or wire for the name and address of nearest distributor.

Further Information

Booklets, Mortar Color Experimenter, etc., sent upon request. Special inquiries gladly answered.

21 Quarts Clinton Double Strength Olive Green No. 1503



Pearl Gray Mortar—6 Quarts Clinton Double Strength Black No. 800

24 Quarts Clinton Colonial Buff No. 700

PECORA PAINT COMPANY

Mortar Stains and Roofing Cements

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products

PECORA MORTAR STAINS; PECORA ROOFING CEMENT.

For Calking and Glazing Compounds, see page 138; for Enamel Paints and Metal Sash Putty, see page 1383.

Pecora Mortar Stains

Uses—A paste, or pulp, not a powder, made in 12 standard colors for moxing with lime or cement mortar, or the two combined, in laying brickwork for the facing of exterior or interior walls in any type of structure. Equally applicable for coloring the mortar of mantel facings, fireplaces, hearths and the jointings of floors, whether of brick, tile, marble, slate or other material.

They are also used for the pointing and jointing mortar of stonework where any color effect is desired, also for producing color tones in exterior "white-wash."

Advantages—Pecora Mortar Stains are offered as heavy paste or pulp, for in that form only, after much experiment, this company has found it is possible to produce *chemical* (not acid) mortar stains which, made from finely ground ores dissolved in chemicals, have the advantage of being absolutely fadeproof, exceptionally strong and thoroughly economical, and which give that deep, rich tone so often sought and so seldom found.

They have the added advantage of being most easily and thoroughly assimilated by the mortar with which they are mixed. Unlike powder, the quality of permeability is obtained by mechanical precision in making the paste, instead of uncertainly securing this result by hoeing a dry power into a wet mass of mortar.

This company's many years of successful research and constantly growing business have *proved this superiority of pulp stain;* and while a small detail in the construction of a building, it is, nevertheless, an important one, the correct use of which helps to build a lasting quality reputation for both architect and contractor.

Properties—Being a pulp or paste, constituting a fast *stain or dye,* and differing in that respect from ordinary coloring mediums or powders, they form a chemical union with the mortar and strengthen, rather than weaken, the mortar joint.

Economically they are unapproached as, *being 50% to 100% stronger than any mere mineral coloring material,* they are much less costly in the long run. Being manufactured from carefully selected, finely ground, and richest ores in combination with extenders and fixatives, the colors become permanent after the mortar is set, making rich, clean, clear shades, free from streaks or spots. Pecora Mortar Stains do not cause or increase unsightly efflorescence on the face of brick walls.

Colors—Shades below are always in stock. Special shades made to order.

Black	Red	Colonial drab
Brown	Buff	Amber
Dark brown	Purple	Terra Cotta
Windsor	Fern green	French gray

Specifications—Many architects have found that specification by description only has resulted in the substitution of inferior goods, the spotting or fading of which necessitates expensive tuck pointing. Therefore the following outline form is suggested:

All mortar to be colored or stained with Pecora Mortar Stain, manufactured by PECORA PAINT COMPANY, Philadelphia, Pa., using by measure 1 bucket of paste or pulp to 7 buckets of face wall mortar.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly. Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze before being mixed with mortar.

Note—Depending upon depth of shade desired, the following proportions per 1000 brick, ordinary stretches, will be found to approximate quantity desired:

Red, buff, terra cotta and amber—For ⅛-in. joint use 45 to 55 lbs.; for each additional ⅛ in., add 20 to 25 lbs. per 1000 brick.

Brown, windsor, Colonial drab, fern green, purple, French gray and dark brown—For ⅛-in. joint use 35 to 45 lbs.; for each additional ⅛ in. add 15 to 20 lbs. per 1000 brick.

Black—For ⅛-in. joint use 20 to 30 lbs.; for each additional ⅛ in. add 10 to 15 lbs. per 1000 brick.

Mortar varies and takes more or less stain according to richness of lime and quality of sand. Before laying brick it is suggested that a small portion of the stained mortar should be taken from the mortar bed and dried out thoroughly to determine whether the proper quantity of stain is being used to produce the shade desired.

TRADE-MARK
Registered

Literature—Booklet showing actual colors and giving full details and photographs of important buildings, with testimonials from architects and owners, sent on request.

Pecora Roofing Cement

Uses—An elastic cement used for bedding or laying slate or tile in roofs; for pointing around dormer windows, skylights, and chimneys; for sealing joints of tile, stone or terra cotta copings; for repairing breaks, cracks or holes in roofs of all kinds.

It is used also for pointing up cap flashings, hip and ridge rolls, and for sealing nailholes and joints in roofs of slate or tile.

Advantages—It is easily and rapidly spread with an ordinary trowel, and once in place, clings tightly without washing out. It expands and contracts with extremes of temperature, remaining in a rubberlike consistency for years. On account of this durability, it can be used in any climate. Pecora Roofing Cement has been used in the cold Northwest and in large quantities on the buildings at the Panama Canal with equal success.

It meets the need recognized in the Standard Specifications of the Building Materials Division, War Industries Board and other modern specifications for slate, tile, and composition roofing, and so, in spite of rigid conservation in the use of other materials, it was and is retained in specifications for the purpose of insuring tightness at places susceptible to leakage.

Properties—Pecora Elastic Roofing Cement possesses every feature which makes an elastic cement perfect for general repair or for new work. It will adhere to metal, glass, wood, slate, tile, asbestos or composition roofing.

Colors—It is made in 3 standard shades—red, brown, and slate. Other shades to order.

Specifications—After enumerating the places where tightness is required and mentioning the manner of laying or pointing with elastic cement, the inclusion of the clause "All elastic cement to be Pecora Elastic Roofing Cement as manufactured by PECORA PAINT COMPANY of Philadelphia" will insure against complaint from contractor or owner, will guarantee them freedom from the annoyance of leaks, and elicit their appreciation of the architect's attention to apparently small, but very important, details.

THE HOLLOW BUILDING TILE ASSOCIATION

Conway Building

CHICAGO, ILL.

Products of the Industry

HOLLOW BUILDING TILE FOR EXTERIOR WALLS:
- Load Bearing Tile
- Backing-up Tile, for walls faced with brick, cut stone or architectural terra cotta
- Smooth and Texture Faced Wall Tile

HOLLOW TILE FOR INTERIOR PARTITIONS AND DIVISION WALLS:
- Load Bearing Tile
- Partition:
  - Fire Wall Enclosures
  - Subdividing Partitions
- Wall Furring Tile

HOLLOW TILE FOR FLOOR CONSTRUCTION AND FIREPROOFING:
- Standard Column Covering Tile
- Standard Beam and Girder Covering Tile
- Flat Arch Floor Construction Tile
- Long Span Floor Construction Tile used with reinforced concrete
- Segmental Arch Floor Construction Tile
- Roof and Ceiling Construction Tile

HOLLOW TILE FOR SPECIAL PURPOSES:
- Hollow Brick Size Tile
- Hollow Tile Silo Blocks

Certain manufacturers also produce Special Hollow Tile for corn cribs, grain bins and dry kilns; for supporting column construction; and for chimneys and other circular masonry structures.

Announcement

THE HOLLOW BUILDING TILE ASSOCIATION is a national organization representing the interests of the hollow building tile manufacturers throughout the United States.

Information will be sent promptly regarding the industry, its products, and the best methods for their use.

Any complaints regarding the products or service, as well as suggestions for changes or improvements in the products, will receive the most careful attention.

A complete list of member manufacturers will be furnished on request.

Definition of Hollow Tile

Hollow burned clay building units with parallel cells.

Specifications for Hollow Building Tile

Hollow tile shall be uniform, straight, free from objectionable cracks and be manufactured in such a manner and burned to such a degree of hardness that it will have an average absorption of not over 12%; develop an average crushing strength of not less than 700 lbs. per sq. in. of gross area when designed to be laid with the cells horizontal and when tested in that position; and 1200 lbs. per sq. in. of gross area when designed to be laid with the cells vertical and when tested in that position.

Smooth face tile or other tile for use in exterior walls without stucco finish should be specified to have an absorption of not over 10%.

Tile for use in foundation walls in saturated soil, or where constantly subjected to subsurface water and the action of frost, should be specified to have an absorption of not over 8%.

STANDARD WEIGHTS
(Revised June 16, 1922)

Dimension, in.	No. of cells	Standard weight, lbs. (See footnote)
LOAD BEARING WALL TILE		
X 3 x 12 x 12	3	18
4 x 12 x 12	3	20
6 x 12 x 12	6	30
8 x 12 x 12	6	36
10 x 12 x 12	6	45
12 x 12 x 12	9	54
PARTITION TILE		
X 2 x 12 x 12	3	14
3 x 12 x 12	3	16
4 x 12 x 12	3	18
X 5 x 12 x 12	3	20
6 x 12 x 12	3	22
X 7 x 12 x 12	3	25
8 x 12 x 12	4	30
X 9 x 12 x 12	4	33
10 x 12 x 12	4	36
12 x 12 x 12	4	40
BACKING-UP TILE		
4 x 5 x 12	1	9
8 x 5 x 12	2	16
8 x 5 x 12	3	18

Note: "X" These shapes are not stock shapes.
Note: The standard weights permit a tolerance of 5%. In other words, they may vary 5% over or under the weights given in this schedule.

Publications

The following publications have been issued and will be sent free on request:

"Hand Book of Hollow Tile Construction"—This publication was designed as a reference book for the architect and engineer.

It covers both structural tile work and fireproofing, giving details and specifications.

"Standard Building Code"—A standard hollow tile section for use in building codes.

This section has already been adopted by a number of the larger cities and is offered as a reference or guide to those interested in writing a new city code or in revising the present code.

"Hollow Tile for the Home"—A non-technical publication illustrating and describing a number of residences and garages that have been constructed of hollow tile.

"Hollow Tile Farm Buildings"—A non-technical publication illustrating the various uses of hollow tile in the construction of farm buildings.

DENISON LOAD-BEARING TILE

AND

DENISON "H" WALLTILE

PATENTS OWNED BY

AMERICAN TILE ENGINEERING CO.

GENERAL OFFICE, Denison Building, MASON CITY, IOWA

PITTSBURGH, PA., OFFICE, 1215 Farmers Bank Building; LOS ANGELES, CAL., OFFICE, 611 and 612 Pacific Mutual Building

LICENSED MANUFACTURERS

MASON CITY BRICK & TILE CO., Mason City, Iowa
GOODWIN TILE & BRICK CO., Des Moines, Iowa
REDFIELD BRICK & TILE CO., Redfield, Iowa
AUGUSTA CLAY PRODUCTS CO., Augusta, Ga.
ARKANSAS BRICK & TILE CO., Little Rock, Ark.
ONTARIO DENISON TILE LTD., Windsor, Ont.
HAY WALKER BRICK CO., Pittsburgh, Pa.
BLOOMINGTON BRICK & TILE CO., Bloomington, Ind.

GENERAL SALES AGENTS

MASON CITY, IOWA, Denison Fireproofing Co.
MINNEAPOLIS, MINN., Hydraulic Press Brick Co.
ST. PAUL, MINN., Corning-Donohue Brick Co.
OMAHA, NEBR., Sunderland Bros. Co.
MILWAUKEE, WIS., Wisconsin Face & Fire Brick Co.
PITTSBURGH, PA., Hay Walker Brick Co.
AUGUSTA, GA., Georgia-Carolina Brick Co.
NEW YORK, N. Y., Hay Walker Brick Co., of Pittsburgh
DULUTH, MINN., Duluth Builders Supply Co.
ATLANTA, GA., B. Miflin Hood Brick Co.

Sold Through the Best Building Material Dealers in Every Town

Products

Denison Load-Bearing Tile.
Denison "H" Walltile.

Patents and License

The manufacture, sale and use of Denison Load-Bearing Tile and of Denison "H" Walltile is licensed under the "Wilson System Bearing Wall Construction" Patented; patents as follows: United States Patents No. 760,774; No. 784,476; No. 1,234,990; No. 1,171,913. Reissue No. 14,414; No. 1,350,399. Canadian Patents No. 151,165 and No. 178,744. Other domestic and foreign patents pending.

Advantages

(1) All vertical bearing webs are in perfect alignment to carry all load pressures. This gives a wall with the greatest load bearing capacity. (2) Two separate mortar beds at top and bottom, lying in same horizontal plane. (3) Dead air insulates space between these two horizontal mortar beds in same manner as body of tile is insulated, thus preventing formation of frost or moisture lines on inside of wall. (4) Closed trough in top of tile insures against conduction of moisture through wall.

(5) Works out to the same heights and thicknesses as common brick, hence is adapted to any height of cornice, window ledge, etc. (6) Because of discontinuous or insulated mortar joint, plaster may be applied direct to the wall without the use of furring tile.

(7) Tile is completely symmetrical, thereby facilitating laying. (8) It is a complete unit, which will stand on its own base in a stable condition when stood on either face or end, thus facilitating piling and handling. (9) Dimension tile of fractional lengths furnished to facilitate the laying of any length wall.

(10) Corner tile permit turning inside or outside corners without destroying the insulating efficiency of the wall at the corner. (11) Jamb and half jamb tile are furnished for either casement or box frame openings, which provide for a weatherproof joint with the frames, and which maintain the insulating efficiency of the wall. (12) Furnished either scored or smooth faced as ordered.

Costs

Construction costs will vary somewhat, due to such local problems as freight rates, yet, in general, practice indicates that it is safe to say that a given wall can be built of these tile at a cost that is 20% to 30% less than the cost to build the same wall of common brick, and the same price as to build it with common tile.

Strength

These tile are guaranteed by the various manufacturers to have a minimum crushing strength of not less than 700 lbs. to the sq. in. of gross bearing area, or not less than 2500 lbs. to the sq. in. net area of web section. Representative tests, made for the various manufacturers by such recognized testing laboratories as the following, show an ultimate crushing strength per tile ranging from 120,000 to 189,000 lbs.: Civil Engineering Laboratory, Engineering Experiment Station, Iowa State College; College of Applied Science, State University of Iowa; Testing Laboratory, Department of Buildings, Minneapolis; Carnegie Institute of Technology.

Specifications and Details

The following may be used as standard specifications for the use of these tile in "Wilson System Bearing Wall Construction":

Denison Load-Bearing Tile and Denison "H" Walltile shall be laid with the voids horizontal except for corners, jambs, piers or pilasters; all vertical joints shall be staggered and the tile above should overlap the tile below by at least 3 in. When the wall thickness is greater than that of the tile, it shall be constructed of a combination of whole and half thickness units, spaced apart from each other the distance of the void between the two lobes of the whole tile, and the next whole tile above shall bond two subadjacent tile below together by overlapping two bearing webs of each, retaining all bearing webs in alignment. Where joists rest on the wall they shall extend into same so that they will overlap at least two bearing members of the tile. Where wall heights do not work out to even courses of the tile being used, a smaller unit shall be used to complete the height. Dimension lengths, which are furnished in sufficient quantities, shall be used to complete lengths of walls and between openings, etc.

A portfolio, containing a full set of detail and working drawings, furnished free on request made to any licensed manufacturer.

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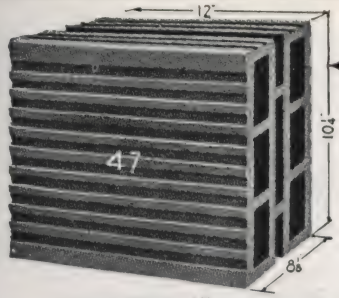
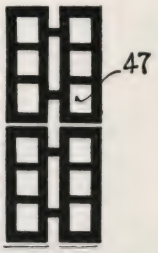
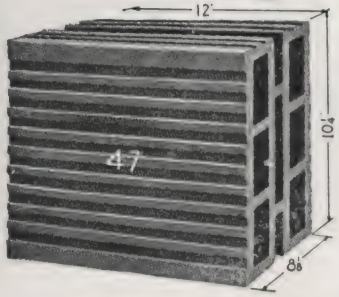
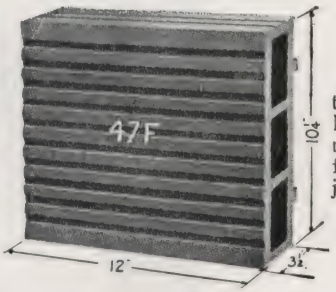
← THESE —— BUILD —— THESE →



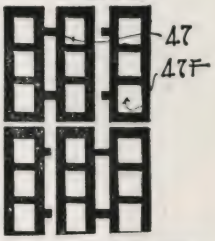
The No. 35 or the No. 23 and their allied units may be used in the place of, or in connection with, the No. 47 and its related units in this or in any of the other constructions shown here. In this way any desired height of wall can be reached that may be reached by using common brick.

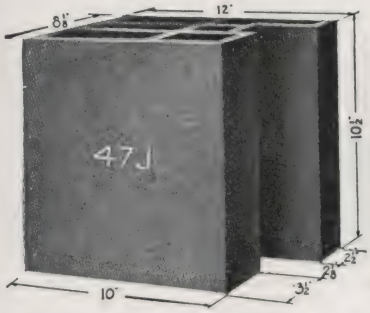


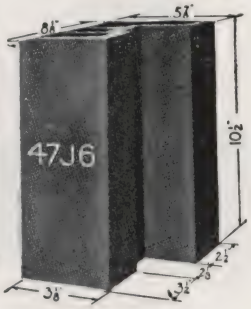




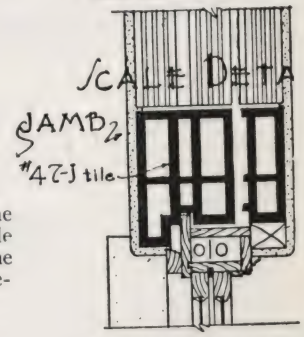
An "F" tile is, in reality, one of the two lobes of either a No. 47, a No. 35 or a No. 23. It may be furnished ready split, or it can be split from the full standard unit on the job.

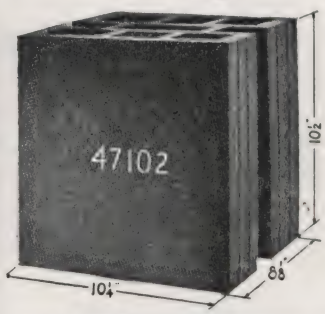


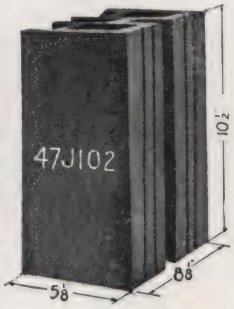




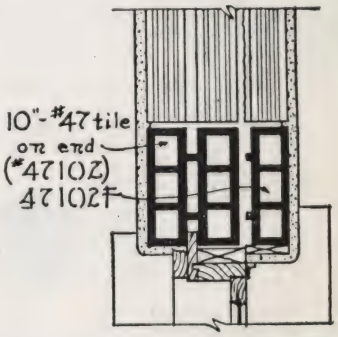
The "J" and "J6" units in the different sizes make possible weatherproof joints between the wall and a box frame without destroying the wall insulation.

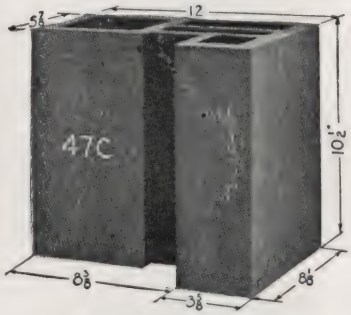




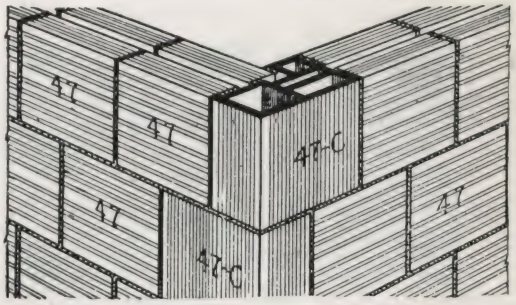


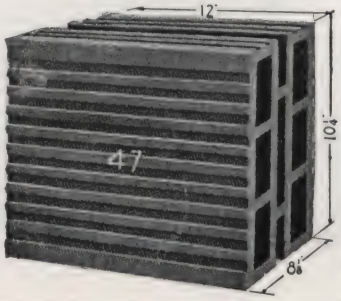
These units in the different sizes make weatherproof joints between the wall and casement frames without destroying the wall insulation.



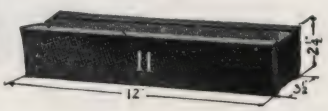


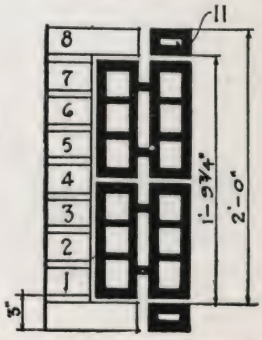
This corner unit enables either an inside or an outside corner to be turned without destroying the wall insulation. It bonds the two walls together into a strong and rigid corner.





The No. 11 is a hollow unit for backing up header courses of brick and maintains both the insulating and the load bearing efficiency of the wall.

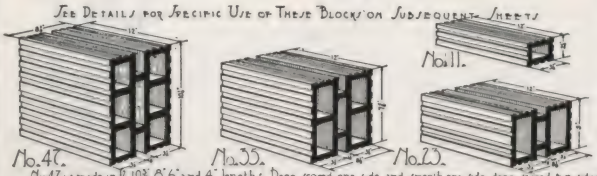




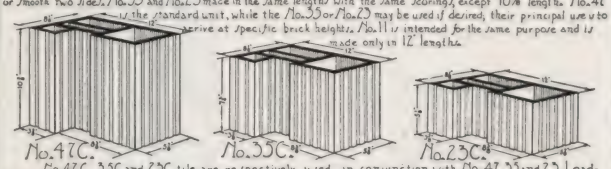
Continued on next page

LOAD-BEARING TILE

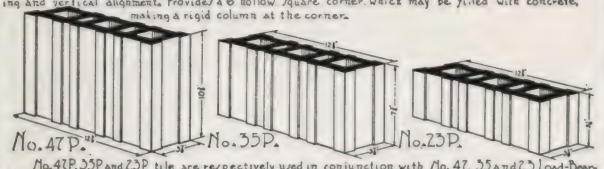
SEE DETAILS FOR SPECIFIC USE OF THESE BLOCKS ON SUBSEQUENT SHEETS



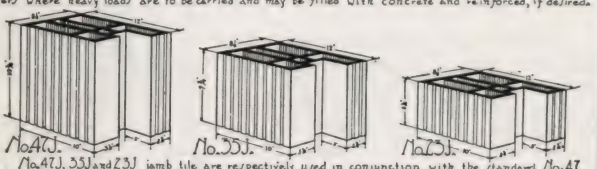
No.47 is made in 8", 10", 8'-6" and 4' lengths. Deep scored one side and smooth one side, deep scored two sides or smooth two sides. No.35 and No.23 made in the same lengths with the same scorings, except 10" length. No.47 is the standard unit, while the No.35 or No.23 may be used if desired, their principal use is to arrive at specific brick heights. No.11 is intended for the same purpose and is made only in 12" lengths.



No.47C, 35C and 23C tile are respectively used in conjunction with No.47, 35 and 23 Load-Bearing Tile. They close and turn corners forming perfect bond and retaining all vertical webs in bearing and vertical alignment. Provides a 6" hollow square corner which may be filled with concrete, making a rigid column at the corner.



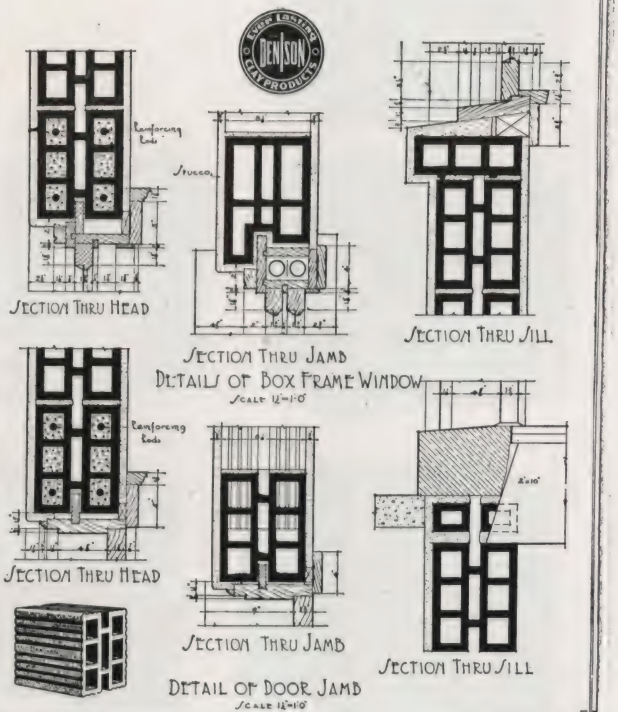
No.47P, 35P and 23P tile are respectively used in conjunction with No.47, 35 and 23 Load-Bearing Tile. They are used for forming casement frame jambs and half jambs, also columns and pilasters where heavy loads are to be carried and may be filled with concrete and reinforced, if desired.



No.47J, 35J and 23J jamb tile are respectively used in conjunction with the standard No.47, 35 and 23 tile and are made in a 6' length in addition to the 12' length shown.

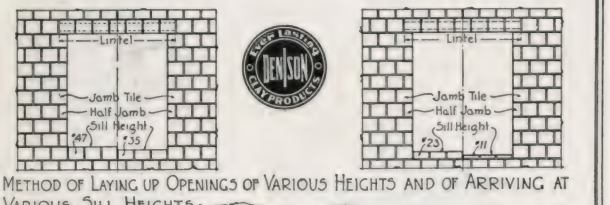
SET No. 1. 1921 SHEET No. 1.

LOAD-BEARING TILE

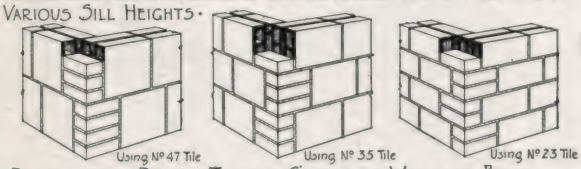


SET No. 2. 1921 SHEET No. 3.

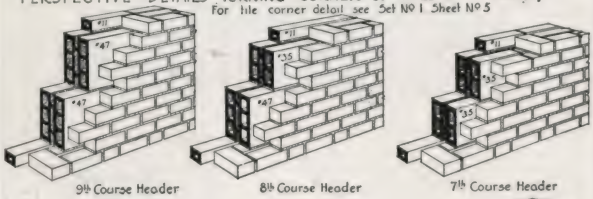
LOAD-BEARING TILE



METHOD OF LAYING UP OPENINGS OF VARIOUS HEIGHTS AND OF ARRIVING AT VARIOUS SILL HEIGHTS.



PERSPECTIVE DETAILS TURNING CORNER OF WALL WITH BRICK
For tile corner detail see Set No 1. Sheet No 5

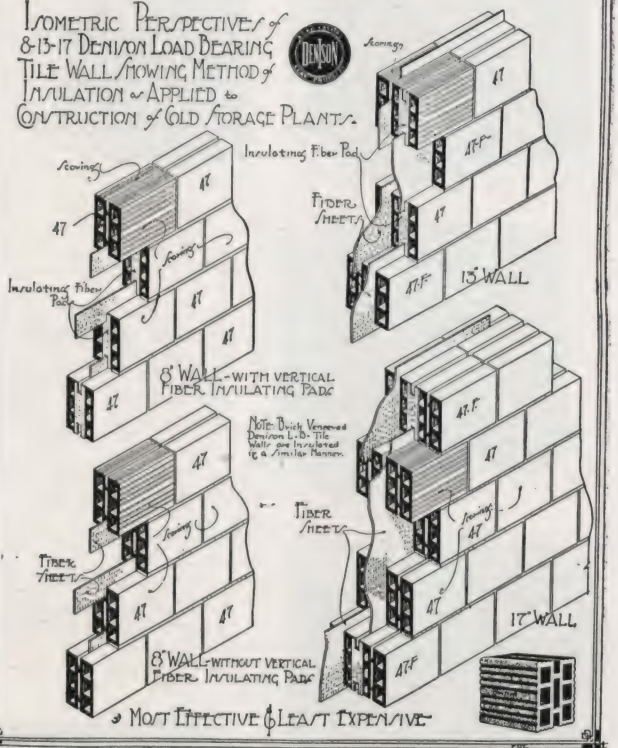


PERSPECTIVE DETAILS OF BRICK BONDS.

SET No. 5. 1921 SHEET No. 7.

LOAD BEARING TILE

ISOMETRIC PERSPECTIVES of 8-13-17 DENISON LOAD BEARING TILE WALL SHOWING METHOD of INSULATION as APPLIED to CONSTRUCTION of COLD STORAGE PLANTS.



MOST EFFECTIVE & LEAST EXPENSIVE

SET No 8 1916 SHEET No 1

SAMPLE CONSTRUCTION DETAIL PLATES REDUCED

P. BANNON PIPE CO.

Hollow Tile Fireproofing and Patent Lidded Pipe

LOUISVILLE, KY.

Products

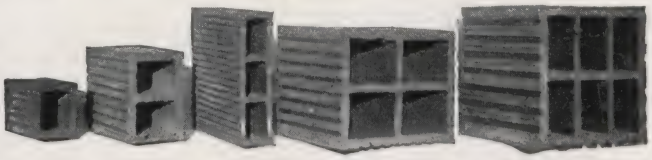
HOLLOW TILE FIREPROOFING; SHALE BRICK; FIRE BRICK; WALL COPING; FLUE LININGS; CHIMNEY TOPS; SEWER PIPES; PATENT LIDDED PIPE and EXPANSION PIPE SUPPORTS.

Also, Vitrified Culvert Pipe; Drain Tile; Glazed Conduit Pipe (for underground work); Vitrified Paving Brick and Blocks; Boiler and Grate Tile.

Hollow Tile and Shale Brick

Hollow Tile—For fireproofing of every description. Made of shale. For partitions and furring tile, 1½ to 16 in.; building tile, 6-cell and 9-cell, 6 to 12 in.; book tile, back up blocks; column covering; standard arch floor tile, 6 to 16 in.

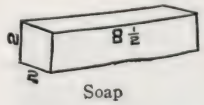
Shale Brick—Are manufactured hollow; with rough texture face, and common.



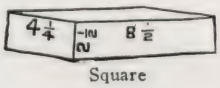
HOLLOW TILE SIZES

Fire Brick

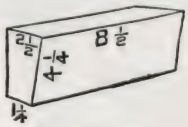
All shapes and sizes.



Soap



Square



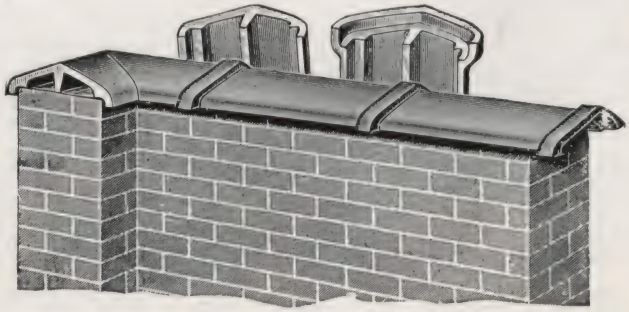
Side Wedge

Circle, 36, 40 and 44

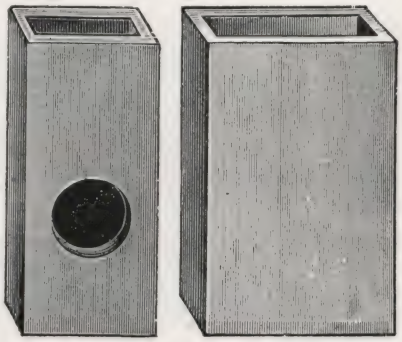
FIRE BRICK SIZES

Wall Coping

Made of best fire clay and shale, thoroughly vitrified, glazed to render surface as smooth as glass. Tile is shaped to fully cover wall, protecting same from action of the elements; also secures the top course of brick.



WALL COPING, HIP SHAPE
With or without rib



8½ x 13 in., pipe hole

13 x 13 in.

FLUE LININGS

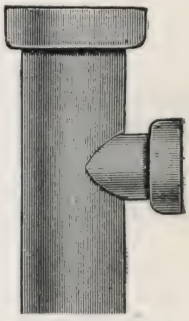
No. 14
CHIMNEY TOP

Sewer Pipe and Fittings

Made of vitrified salt glazed fire clay and shale.

The salt glazed surface, being smooth, clean and impervious, protects pipe and fittings from dampness, frost, all acids and sediments.

It is durable, low in cost, convenient for construction, and because of its smooth glazed surface has greater carrying capacity than any other material. It can be laid by unskilled labor.



SEWER PIPE
T-Branch

LIDDED PIPE
For conducting steam and water pipe

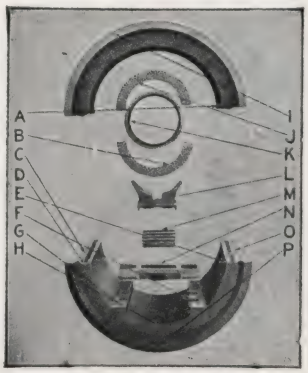


Plate E, Single Line

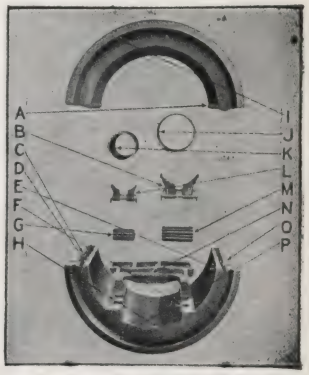


Plate F, Double Line

DETAIL OF CONDUIT

Reference letters point as follows:

Plates E and F—A, reinforcement inside along score cut on both sides of lid half; C, outer open scores; D, trenchlike fracture; E, inner open scores; F, support anchoring pocket; H, drainage space; I, hub of lid half; O, cement shelf and outer reinforcement at each side of lower half; P, hub of lower half.

Plate E, only—B and J, standard covering; K, 6-in. iron pipe; L, saddle receiving K, direct; M, 4⅛x2-in. toothed roller (meshes in rack of saddle and cradle); N, No. 15-F-15 cradle (the finger supported style).

Plate F, only—B, saddle for main line J; L, saddle for return line K; G, roller for return saddle; M, roller for main line saddle; N, No. 16-P-15-D cradle (the rib supported, boss-anchored style)

DENISON INTERLOCKING TILE CORPORATION

EXECUTIVE OFFICES
Guardian Building
CLEVELAND, OHIO

35 FACTORIES AND 120 SALES OFFICES THROUGHOUT THE UNITED STATES AND CANADA

INTERLOCKING TILE
TRADE-MARK

Product

INTERLOCKING TILE for Bearing Walls, Curtain Walls, Partitions, and Foundations.

Particularly adapted for use with Face Brick and with Stucco Exterior; also made with Rough Texture Face for exposed work.

Design

Owing to the special design of this tile, walls built with it have several distinct advantages found in no other type of wall construction.

Vertical Webs Always Align

The design of the tile is such that when laid in the wall every vertical web must stand directly over a corresponding web in the tile below. This feature of positive alignment of webs is protected by letters patent and is peculiar to this form of tile.

The 4-in. width of the mortar bed insures thorough bedding between webs; thus every square inch of vertical web section in the wall is available in computing bearing loads.

No Through Mortar Joints

A common fault of other forms of masonry walls is the through mortar joint, which readily conducts moisture, heat and cold through the wall.

In the wall of Interlocking Tile, the mortar beds are on different levels. An air pocket is thus provided in the mortar joint which prevents passage of moisture through the wall by capillary attraction, and insures ideal insulation.

Triangular Reinforcement

The lateral strength of the wall is materially increased by the triangular reinforcement due to this offsetting of the mortar beds. In addition to this, all the mortar beds are dovetail-grooved, holding the tile together in the firmest possible manner.

Many Dead Air Spaces

The air spaces are horizontal, and afford the perfect insulation which dead air gives. No convection currents can occur in such a wall.

In the 8-in. wall there are 3 air chambers, in the 12-in. wall 5, and in the 16-in. wall there are 7, etc.

No Continuous Cross Webs

None of the cross webs extend continuously through the wall, each being insulated by an air chamber.

Strong Walls

The interlocking feature gives the wall greater strength for bearing the weight of walls and floors in the buildings, and makes the wall stronger against side thrusts, such as the roof and wall loads.

Non-conductive Walls

Walls of this tile are, for practical purposes, perfect non-conductors of heat and cold. Buildings are therefore warmer in winter and cooler in summer.

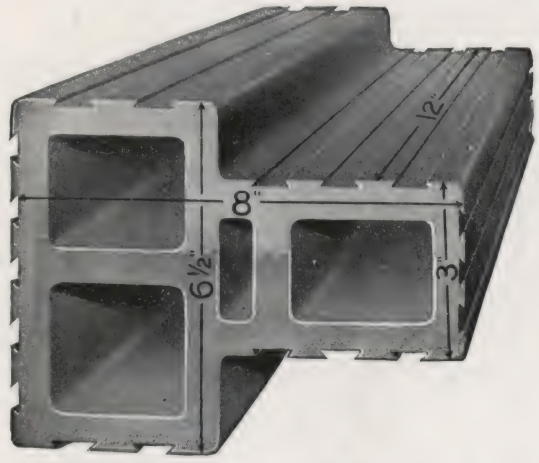
This feature makes the tile especially advantageous for walls in cold storage buildings, lumber dry kilns, warehouses and other places where non-conductive walls are necessary.

Dry Walls

Moisture and dampness quickly penetrate the ordinary masonry wall at the joint. This liability to injury is entirely overcome in the Interlocking Tile wall, because no mortar joint extends entirely through the wall.

Bearing Strength

The bearing strength of an Interlocking Tile wall is greatly enhanced by the fact that all bearing webs are continuous one above another from footing to sill. Thus every particle of strength of the individual tile is transferred to the wall. The web over web feature in this tile is not dependent on the skill or care of the mason; the tile can be laid no other way.



INTERLOCKING TILE

Strength Tests

The following tests on Interlocking Tile conducted by well-known engineering authorities show the bearing strength of the individual tile and of the completed wall.

AUTHORITY	LOCATION	MATERIAL	RESULT
United States Government Arsenal	Watertown, Mass.	Individual tile	5042 lbs. per sq. in. of vertical web section.
Building Department	Tacoma, Wash.	12-in. wall	70.8 tons per sq. ft. of gross wall area.
United States Bureau of Standards	Pittsburgh, Pa.	12-in. brick faced wall	64.8 tons per sq. ft. of gross wall area.

Continued on next page

Fireproofing Qualities

The design of Interlocking Tile makes them even more valuable than ordinary tile for fireproofing.

There are no vertical air spaces in the wall, and no furring is required, the plaster being applied directly to the tile, thus eliminating all vertical passages which might carry flames from floor to floor.

There are no through mortar joints to weaken under high temperatures. In case of injury to the outer shell of the wall, rendering it useless, there would still remain sufficient supporting webs to provide a safe wall for salvage.

No Furring Required

Owing to the non-conductive feature of the wall, no furring is required, plaster or stucco being applied directly to the tile itself.

Building Walls Any Thickness

One shape and size of Interlocking Tile builds walls of any thickness. Regardless of thickness, the wall retains all the advantages outlined on the previous page.

Three or four different thicknesses of walls are required on practically every operation, and one size of Interlocking Tile takes care of them all.

There are no left over sizes, and the mason does not require three or four miscellaneous widths of block on his scaffold.

Bonds Perfectly With Brick

The illustration shows the ideal bonding of Interlocking Tile with face brick.

All other forms of hollow tile backing require a brick stretcher course back of the header, thereby destroying the insulating effect at each header course, and adding materially to the cost.

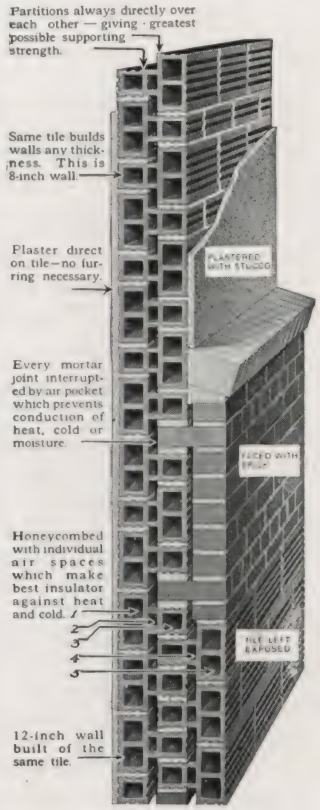
The brick facing on Interlocking Tile becomes an integral part of the wall, and will not shrink away, bulge or crack. It bears its share of the vertical load.

An Ideal Base for Stucco

The wall is always dry, and the hard burned body prevents absorption of water from the plaster coat.

The tile has practically the same expansion as the cement plaster, thus preventing cracking, and enabling it to withstand severe weather conditions.

The horizontal dovetailed grooves make a perfect mechanical key to hold the plaster or stucco.



SECTION OF 8- AND 12-IN. WALL

Lays Up Rapidly

There is only one size and shape of Interlocking Tile. The shape is such that the mason easily handles the tile with one hand, without laying down the trowel. All other tile of equal displacement require use of both hands.

Each tile is equivalent to 6 bricks. The bricklayer thus lays the equivalent of 6 bricks in one operation. In addition to this advantage, only one-third as much mortar is required as in the solid brick wall.

How to Order Interlocking Tile

If the number of square feet in the face of the wall and in the thickness of the wall are known, the number of Interlocking Tile required to lay it can be easily computed from the following table:

2.2 tile lay 1 sq. ft. of 8-in. wall.
3.4 tile lay 1 sq. ft. of 12-in. wall.

In ordering jamb or corner tile, the total linear feet (vertical) of jambs and corners should be given.

Weight of Wall

Including mortar, 60 lbs. per cu. ft.

Details, Catalogues and Data

Each of the offices is in position to submit details and other data, and to give valuable assistance to the architect or engineer.

Correspondence should be addressed to the main offi

Some Typical Buildings

The following buildings, each of which is well known in its own territory, give some idea of the wide approval with which Interlocking Tile has met for every class of building work throughout the United States and Canada:

Building and Location	Architect
Hotel Statler, Cleveland, Ohio, and Detroit, Mich.	Geo. B. Post & Sons
Mt. St. Mary's Hospital, Niagara Falls, N. Y.	W. P. Ginther
Sacred Heart Academy, Vancouver, B. C.	Chas. G. Badgley
M. K. & T. Station, San Antonio, Tex.	Henry John Schlesk
Chamber of Commerce Building, New Haven, Conn.	Brown & Von Beren
Santa Fe Depot, San Diego, Cal.	Bakewell & Brown
Residence, Geo. McKesson Brown, Huntington, L. I., N. Y.	Clarence Luce
May Co. Department Store, Cleveland, Ohio	D. H. Burnham & Co.
Cleveland General Hospital Buildings, Cleveland, Ohio	Myron B. Vorce
Pacific Coast Condensed Milk Co. Factory, Stanwood, Wash.	
St. Louis Country Club, St. Louis, Mo.	Mauran, Russell & Crowell
Elks Club, Seattle, Wash.	John Carrigan
Royal Connaught Hotel, Hamilton, Can.	Esenwein & Johnson
Fourth Presbyterian Church, Chicago, Ill.	Cram, Goodhue & Ferguson
Fleischmann Yeast Co., Sumner, Wash.	John Graham
Municipal Building, Dallas, Tex.	C. D. Hill & Co.
Christian Science Church, Toronto, Can.	S. S. Beeman
Ranier Brewery, San Francisco, Cal.	Carl Siebrand
Y. M. C. A. Building, Providence, R. I.	Hussey & Shattuck
Fruit Storage, Murphy Oil Co.	Rea & Garstang
Port of Astoria Docks	R. R. Bartlett and F. J. Walsh
Residence, John Hanan, Miami, Fla.	August Geiger
Rockefeller Institute, Plainsboro, N. J.	Coolidge & Shattuck

W. S. DICKEY CLAY MFG. CO.

ESTABLISHED 1885

KANSAS CITY, MO.

ASSOCIATED COMPANIES

CHATTANOOGA SEWER PIPE WORKS, Chattanooga, Tenn.
Established 1871

CALIFORNIA BRICK CO., 604 Mission Street, San Francisco, Cal.

CIA MEXICANA DE TUBOS DE ALBANAL, Mexico City, D. F., Mexico
(The Mexican Sewer Pipe Co.)
Established 1899

COLUMBUS SEWER PIPE WORKS, Columbus, Ga.

LIVERMORE FIRE BRICK WORKS, Livermore, Cal.

MACOMB SEWER PIPE WORKS, Macomb, Ill.
Established 1883

MACON SEWER PIPE WORKS, Macon, Ga.
Established 1887

OGDEN SEWER PIPE AND CLAY CO., Ogden, Utah
Established 1899

SAN ANTONIO SEWER PIPE WORKS, San Antonio, Tex.
Established 1895

SOUTHERN SEWER PIPE WORKS, Birmingham, Ala.

STANDARD SEWER PIPE WORKS, Rome, Ga.
Established 1888

TEXARKANA PIPE WORKS, Texarkana, Tex.

(Each of these companies owns and operates manufacturing plants)

Products

Manufacturers of TERRA COTTA and CLAY PRODUCTS, which include:

Architectural Terra Cotta: Enamel, Glazed, Polychrome, Slip
Blocks: Cupola, Hollow Building, Paving, Flashing, Rotary Kiln, Silo, Grain Tank, Corn Crib, Segment (for large sewers and culverts), Sewer Invert
Boxes: Meter
Brick: Acid Resisting, Dry Pressed, Building, Common, Dust, Special Mix for fire cement, Enameled, Face, Fire, Glazed, Kiln Floor, Mantel, Ornamental, Paving, Ruffled, Sewer, Step, Vitrified, Walk
Clay: Crude, Fire, Dry Milled, Fire Modeling, Special Mix for fire clay, Fire Brick Dust for fire cement
Conduits: Vitrified Clay Underground
Coping: Wall
Culverts: Pipe, Segment Block
Dams: Soil (Dickey Soil Saving Dams)
Fire Brick: Flints, Standards, 9-in. series shapes
Fire Cement: Dry Milled Fire Clay, Special Mix Fire Clay and Fire Brick Dust
Fireproofing: Hollow Tile
Flue Lining: Fire Clay
Grain Tanks: Hollow Glazed Blocks
Lot Markers: Glazed Clay
Pipe: Vitrified Salt Glazed Clay Sewer, Culvert, Stove, Well, Irrigation Work (farm drain tile)
Roofing Material: Crushed Brick
Roofing Tile: Mission-Spanish, "S" Shingles
Saggers: Fire Clay
Sewage Disposal Plants: Septic Tanks, Self-flushing Latrines
Silos: Dickey Glazed Hollow Tile
Tanks: Grain, Fuel Oil, Septic
Terra Cotta: Flue Lining, Mantel, Ornamental, Partition Tile, Pipe
Thimbles: Chimney, Stove Pipe
Tile: Bake Oven, Boiler, Building, Drain, Enameled, Fireproofing, Floor (enameled and vitrified), Furnace, Glazed, Hearth, Hollow Building, Mantel, Partition, Promenade, Quarry, Roofing, Sewer, Wall
Tops: Chimney, Fancy Windguard, Plain

Services

Due to the locations of the plants, and their capacities, it is possible for the buyer of these clay products to receive the very highest grade of service.

The service by mail includes illustrated booklets on all the products listed.

In addition to the co-operation of this broad-gaged and experienced organization, the user of clay products can have confidence that the materials are selected, blended and mixed and burned under the supervision of experts.

Materials and Manufacture

Vitrified, salt-glazed clay products are all made by the same processes of mixing and burning. These materials are moulded under high pressure and dried by regulated steam heat and burned to complete vitrification in a properly constructed kiln. They finally receive an indestructible salt glaze which closes the pores of the clay and makes a hard, smooth surface that is impervious to rain, snow, frost, gases, acids, grease, etc. This adds to the strength, aids in cleaning; in sewer and drain pipe it helps the flow of liquids, because the glaze is practically perfect, giving a low co-efficient of friction.

In the building block this hard and impervious finish eliminates the need of painting, because neither its attractive appearance nor its smooth resisting or wearing qualities are ever affected by the elements.

Flue linings are made from special process fire clay, which also is used in fire brick.

Versailles fire brick is made of the celebrated Versailles flint clay, which has a very low co-efficient of expansion and will stand a working temperature of 3250° Fahr.

Continued on next page

Dickey Vitrified, Salt-glazed Septic Tanks

Consists of three or more sections of specially made salt-glazed clay pipe laid horizontally. Sections are separated by vitrified salt-glazed baffle walls, and each section, 2 ft. in diameter by 2½ ft. long, is equipped with vitrified, salt-glazed covers for clean-out purposes. Three sections care for an average residence with 5 persons.

If for any reason it should be desirable to increase the capacity, more sections can be added as needed. Equally well adapted to public buildings, clubhouses, hotels, etc.

In addition to providing for improved sanitation, this septic tank gives the country home the conveniences of a modern city home—the lavatory, closet, bathtub and sink. It lessens danger of contaminating water supply by seepage from old fashioned cesspool to spring or well.

These septic tanks require no attention except cleaning at intervals of several years and will last indefinitely.

Bacterial Consumption of Organic Matter—When sewage reaches first section of tank, its flow is retarded. Solid or organic matter settles to bottom and forms a sludge bed, in which bacterial action is immediately begun by millions of germs (anaerobes) that work in the dark and without oxygen. As solid matter breaks up and floats on top of tank, some bacteria go with it and continue their destroying action.

Liquefaction of Sewage—When, through bacterial action, sewage has been reduced to a liquid, it flows through round openings in salt-glazed clay baffle plate used for partition. What little solid matter does pass into second or third chambers will be accompanied by its army of germs, and septic or destroying action will continue until no solid matter remains.

Disposal of Liquid—With all solid or organic matter eliminated, sewage is a liquid and is ready for disposal through lines of vitrified tile laid in a disposal field.

In dense, non-absorbent soils, tile lines are laid on two levels with intermediate filter bed of broken stone and cinders; in open absorbent soils, lines of tile laid with open joints carry the liquid sewage through the field and into the soil, where it is absorbed.

Automatic Siphon—In extremely tight soil, or in a large system, an automatic siphon is used in an additional chamber. The siphon discharges the entire contents of the siphon chamber into the distributing system when the liquid in the siphon chamber reaches a certain height. This intermittent discharge allows time for the purifying action in the drain tile system to occur between discharges, and prevents the soil from becoming clogged and foul.

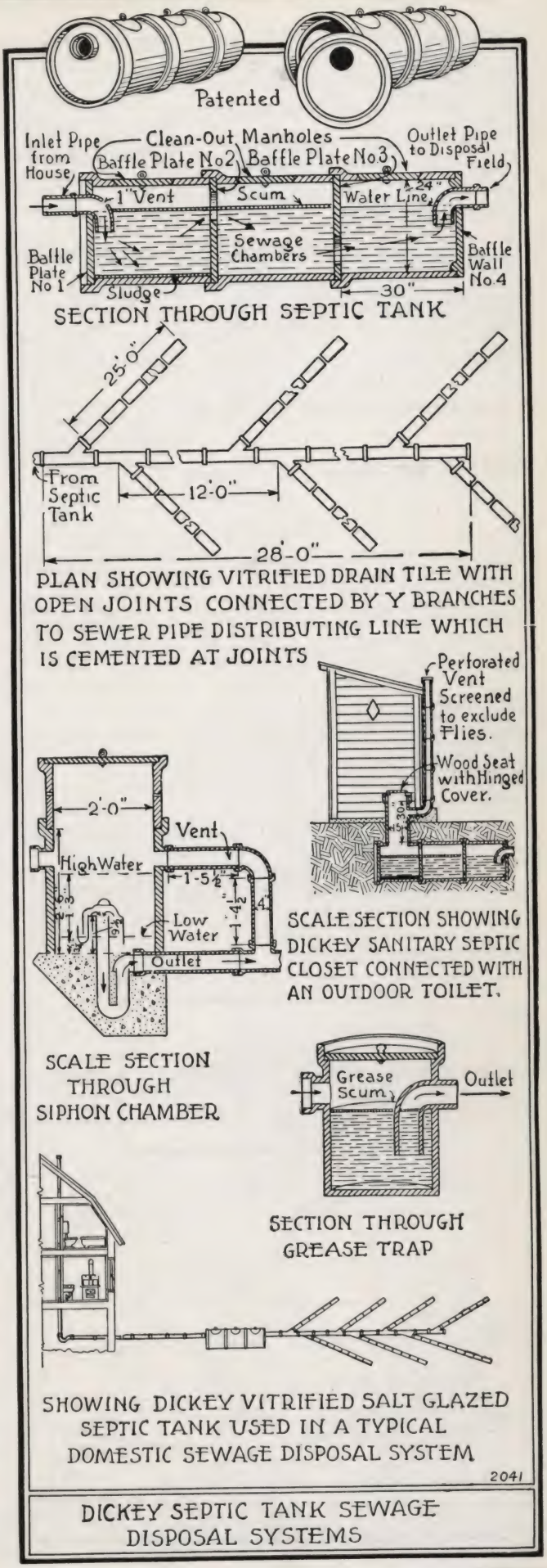
Vitrified, Salt-glazed Grease Trap

Trap and cover made of vitrified salt-glazed clay, all in one piece, except lid. Will not rust, decay, corrode, or disintegrate. Serves to separate the grease and soap from waste water which flows from kitchen sink, bathtub, laundry tubs, or milk house.

Especially recommended for use in connection with septic tanks, since grease is not readily liquefied by bacteria in the tank and tends to fill up pores of the disposal field.

Inside Measurements—Diameter, 18 in., length, 30 in. Inlet and outlet connections, 4 in. in diameter.

Larger sizes furnished when necessary.



DICKEY SEPTIC TANK SEWAGE DISPOSAL SYSTEMS

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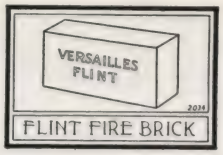
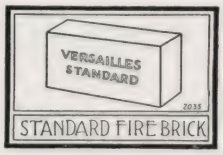
Versailles Flint Fire Brick



They have a very low coefficient of expansion and will stand a working temperature of 3250° Fahr.

Particularly adapted for tempering furnaces, smelting furnaces, welding furnaces, copper furnaces and rotary cement kiln housings.

Versailles Standard Fire Brick



They will stand a working temperature of 3000° Fahr. Suitable for stack lining, incinerators, bake ovens, coke ovens, zinc kiln settings, brick, tile and sewer pipe kilns, house grates and fireplaces, and for outside walls of all kinds of furnaces.

Vitrified, Salt-glazed Wall Coping

This coping is as important and necessary to a wall as ridgeboard is to a shingle roof. It is needed protection for all brick, stone and concrete walls. It is made impervious to moisture, frost, acids, gases, etc., by the salt-glazing process.

Made in sizes to fit 9-in., 13-in., and 18-in. walls. Straight coping made in 2-ft. lengths. Fittings furnished for various structural requirements include: right and left corners, right and left tees, starters and closed ends.

Specifications—All parapet walls shall be coped with vitrified, salt-glazed wall coping. Provide starters, closed ends, corners and tees as required. All coping to be neatly fitted. It shall be embedded in portland cement mortar composed of 1 part portland cement and 3 parts sand. All voids and joints shall be completely filled with the mortar. All joints shall be neatly pointed. On sloping walls, the sockets should be laid down the slope in order to prevent water from running into the socket joint.

Dickey Flashing Blocks

Being made of vitrified clay, they are impervious to moisture and frost, and proof against decay. Outside dimensions conform to structural requirements and practice, resulting in easy construction. The grooves in block furnish permanent anchorage for the base and cap flashings. Half length and mitered corner flashing blocks are furnished to meet special requirements.

Specifications for Flashing Blocks—*When Blocks are Laid Horizontally*—Blocks shall be laid in wall as brick is built up, starting with bottom of blocks 2 courses above high point of roof and extending on a level line until bottom of block is 4 courses above roof, then drop the line of blocks down 2 courses of brick (height of block) making the upper course of block overlap the lower course 12 in. Continue to drop the courses as above, throughout the length of the wall. In all head and cross walls the blocks shall be laid across on a level line.

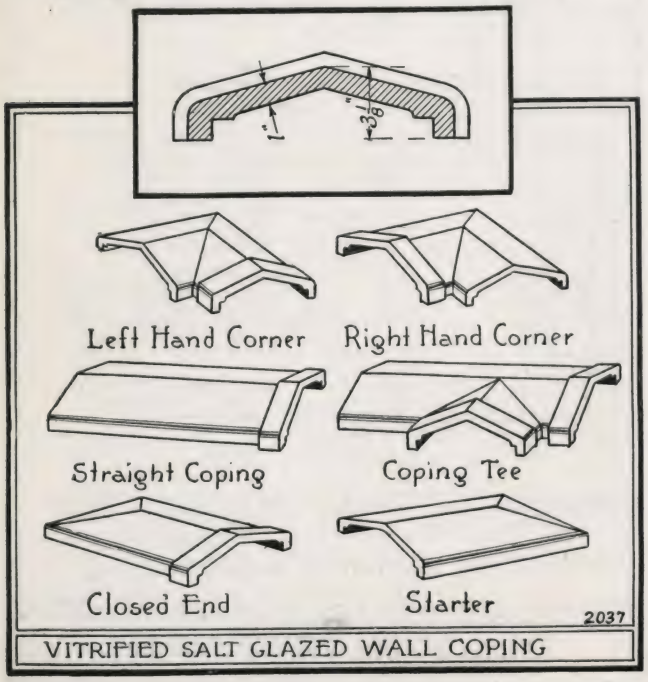
Special mitered blocks, in pairs, shall be used for all outer angles, such as offsets and chimney breasts. Inner angles shall be constructed by butting the end of one block against the face of another so that grooves match, the end of one block extending 4 in. into the abutting wall.

When Blocks are Laid Parallel to Slope of Roof—The brick shall be cut to conform to angulation, and clipping of blocks shall be done at intersections of inner and outer corners. Installation of blocks must always begin at high point of roof, and grooves in blocks be made to match at all joints.

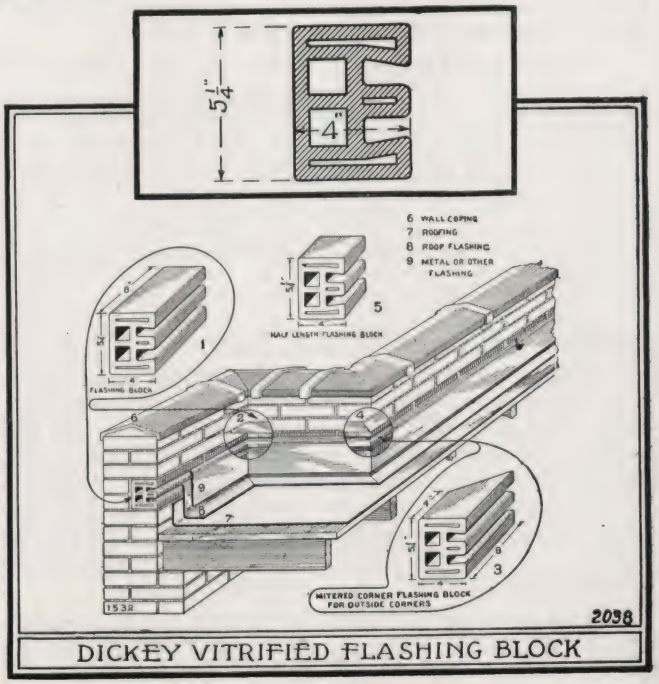
Flashing, Method No. 1—As shown by detailed drawing, the roofing material shall be extended up along the wall, but not fastened. Base flashing shall be tucked into the lower groove with oakum to allow for play or expansion and contraction.

Flashing, Method No. 2—When base flashing is not used, the roofing material shall be extended up along the wall and into the lower groove, where it shall be tucked in with oakum, allowing for play of expansion and contraction.

In both methods No. 1 and No. 2, the metal or other cap flashing shall be permanently cemented into the upper groove with the best portland cement mortar or high grade asphaltic cement.



VITRIFIED SALT GLAZED WALL COPING



DICKEY VITRIFIED FLASHING BLOCK

Continued on next page

Fire Clay Flue Lining

Flue lining serves as a fire preventive, and gives a straight flue of uniform dimensions. The ordinary brick chimney will not do this. With flue lining the flue has a smooth inner surface, which leaves no lodging place for soot, thus eliminating the possibility of chimney fires. The cost of flue lining is only nominal. It is a cheap method of preventing fire and strengthening the chimney.

Fire Clay Stove Pipe Thimbles

Thimbles are made and burned in the same manner as flue lining. They are used to make the opening which connects stovepipe, furnace pipe or clean-out hole to flue through the chimney. They are superior to metal thimbles, which rust or disintegrate, or to a round opening shaped in the brick chimney.

Fire clay thimbles are made in 6-, 8-, 10- and 12-in. sizes; 4½-, 6-, 9- and 12-in. lengths in all sizes.

Chimney Tops

Chimney tops have a practical as well as an ornamental value. By adding height to chimneys, they cause better draft. The unsightliness of loose brick on the top of the chimney is prevented.

Our chimney tops are made from a mixture of fire clay which is not affected by heat and will not crack from changes in temperature. They are much superior to metal, both in appearance and durability.

Old chimneys which provide a poor draft, because they are either too short or defective will be much improved by the addition of a chimney top.

If desired, they can be painted a dark color, such as green, red, brown or black, to conform to the color scheme adopted.

Data on Chimney Construction

Every smoke flue for a stove or range shall have an inside area of not less than 49 sq. in. Inside cross section of 8½x8½-in. flue lining is 49 sq. in.

The minimum area inside of flue lining used for furnace or fireplace shall be 75 sq. in. Inside cross section area of 8½x13-in. flue lining is 75 sq. in.

Each flue shall be lined starting at the bottom of the flue or from the throat of the fireplace. The flue lining shall be carried up through the entire height of the chimney as it is built. Care must be taken to make the joints of the flue lining tight and smooth. Sufficient mortar to fill the space between brick and flue lining must be slushed in as the chimney is built up. This will shut off all air currents which weaken the draft. The flue lining shall extend 4 in. above the top capping of the chimney to prevent brick falling into the chimney, and protect the mortar from gases and acids.

Neither chimney nor flue lining shall be contracted or drawn in at top. In no case shall abrupt angles be made. The angle of offset shall never be more than 30° from plumb.

The chimney shall extend at least 2 ft. above the ridge of a peak roof and 3 ft. above a sloping or flat roof. Conditions may require that the chimney be even higher than this.

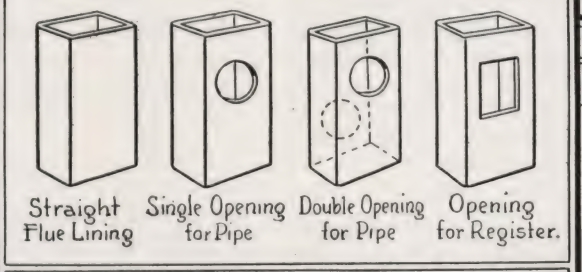
Chimneys for soft coal or wood fires require 25% more area than for hard coal.

The cheapest way to increase draft is to add a chimney top to the height of chimney.

A fire clay stovepipe thimble of proper length shall extend through the brick chimney wall into the flue opening or cleanout opening in the flue lining. Brick and mortar shall be carefully laid around thimble to make airtight joints.

DIMENSIONS OF FLUE LINING

Size	Weight Per Foot	Length Feet	Outside Dimen In.
4½x8½	14 lbs.	2	5 x 9
8½x8½	18 lbs	2	8½x8½
4½x13	20 lbs	2	5 x 13¼
8½x13	30 lbs	2	8½x13
13 x 13	38 lbs	2	13 x 13
8½x17½	36 lbs	2	9 x 18
13 x 17½	45 lbs	2	13½x18½
17½x17½	62 lbs	2	17½x17½



FIRECLAY FLUE LINING

DIMENSIONS OF CHIMNEY TOPS

Top No.	Approx Wt Ea.	Height over all	Base Dimen Outside	Fits over Flue Lining
1	75 lbs	30 in.	13½ x13½	8½ x 8½
2	115 lbs	30 in	13½ x16½	8½ x 13
3	155 lbs.	36 in	16½ x 16½	13 x 13
4	80 lbs	30 in	13½ x13½	8½ x 8½
5	120 lbs	30 in	13½ x16½	8½ x 13
6	160 lbs	36 in	16½ x16½	13 x 13
7	100 lbs	40 in	13½ x13½	8½ x 8½
8	130 lbs	40 in	13½ x16½	8½ x 13
9	170 lbs	40 in	16½ x16½	13 x 13
10	100 lbs	40 in	13½ x13½	8½ x 8½
11	130 lbs	40 in	13½ x16½	8½ x 13
12	170 lbs	40 in	16½ x16½	13 x 13
13	200 lbs	38½ in	16½ x 24	13 x 17½
14	60 lbs	24 in	13½ x13½	8½ x 8½
15	90 lbs	24 in	13½ x16½	8½ x 13

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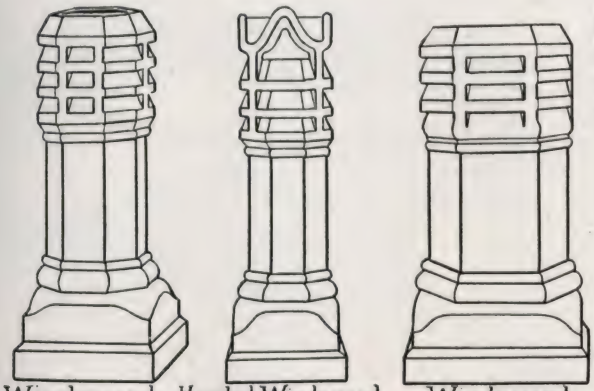
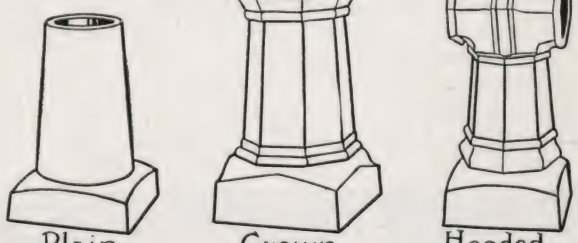


NOTE · Chimney Tops · made in various sizes to fit the sizes of Flue Lining in most general use. See Table at right



FIRECLAY CHIMNEY TOPS

ORGANIZED 1889

NATIONAL FIRE PROOFING COMPANY

Manufacturers of Hollow Tile

MAIN OFFICE

Fulton Building

PITTSBURGH, PA.

BRANCH OFFICES IN PRINCIPAL CITIES — TWENTY-ONE FACTORIES IN THE UNITED STATES

Products and Services

TRADE NATCO MARK

Manufacturers of STANDARD DENSE HOLLOW TILE for fireproof floors, roofs, ceilings, partitions, wall furring, column and girder coverings; and for exterior walls of all kinds, including barns, silos, and other farm buildings.

Also manufacturers of Natco Lock Joint Sewer Tile, Kiln Bottom Brick and Fire Clay.

Contractors for FIREPROOF CONSTRUCTION in HOLLOW TILE.

Facilities

The NATIONAL FIREPROOFING COMPANY is the largest concern in the world devoted solely to the business of hollow tile fireproof construction. It has an output from 21 factories in the United States and 1 in Canada. These factories, conveniently located, insure economical transportation and prompt delivery.

Branding

Attention is directed to the present policy, originated by this company, of branding all its hollow tile with the trade-mark name, Natco. The tile of special design bear special marks of identification, as Natco, Natco XXX, Natco Header-Backer, Natco Double Shell, Natco Lock Joint, to show the particular types of construction for which they are adapted.

Natco Floor Construction

Fireproof floors of hollow tile arches can be set more safely in winter, as the construction dries out in a few days.

They are absolutely soundproof and fireproof.

Following are typical illustrations and descriptions of the Natco floors in everyday use.

Natco Segmental Arch (without Tie Rod)

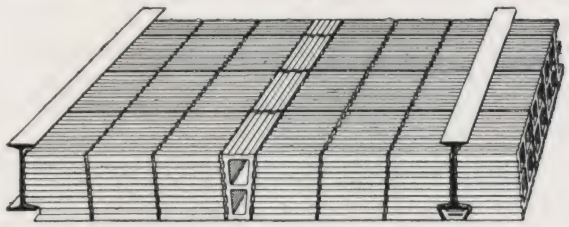
This form of arch combines great strength with economy and lightness.

It is suitable for warehouses, lofts, factories, sidewalks, or wherever a flat ceiling is not essential. Metal lath and plaster ceiling may be used in combination with it, as installed in the New York public schools, and in private houses, stores, etc. The 6-in. arch is used for all ordinary purposes; it weighs 35 lbs. per sq. ft.

TYPICAL SPAN OF NATCO SEGMENTAL ARCH

Natco Flat Arches

The flat arch is the accepted type of standard fireproof floor construction, meeting every requirement as to strength, fire protection, architectural appearance and minimum weight. The Natco hollow tile flat arch construction, as illustrated below, has been developed as the company's standard for this type.



PERSPECTIVE OF STANDARD NATCO FLAT ARCH

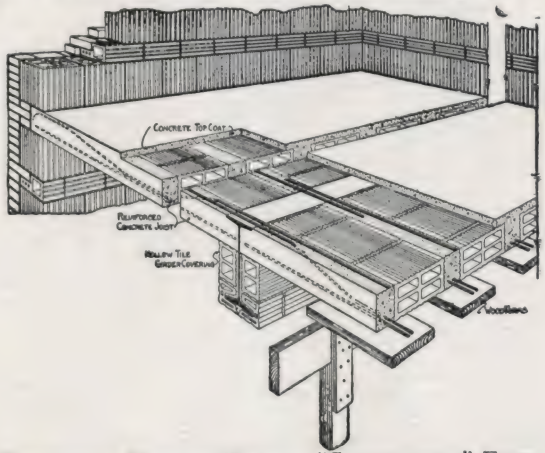
To find total dead load of any floor use the following weights: Tile, rock asphalt or cement finish weighs about 140 lbs. per cu. ft.; wood flooring, 3½ lbs. per sq. ft.; wood sleepers, 30 lbs. per cu. ft.; cinder concrete fill, 60 lbs. per cu. ft.; hollow tile arch, see table below; plastering, 5 lbs. per sq. ft.; steel I-beam, divide weight of beam by span in feet

TABLE OF WEIGHTS AND SPANS

Depth of arch, in.	Approximate weight, lbs. per sq. ft.	Maximum safe spans	
		ft.	in.
6	28	4	0
7	31	4	6
8	33	5	0
9	37	6	0
10	41	6	6
12	44	8	0
14	51	9	0
15	53	9	6
16	55	10	0

The strength of any arch depends as largely on workmanship as on materials; therefore the maximum spans given can be used only where experienced workmen are employed and the work is guaranteed by a responsible contractor

Natco "Combination" Floors (see next page)



PERSPECTIVE VIEW OF TYPICAL "COMBINATION" FLOOR

Note economical wood centering used; 2x8 in. or 2x10 in. under each joist is sufficient

Continued on next page

"Combination" Natco Hollow Tile and Reinforced Concrete Long Span Floor Construction (Continued)

Used without girders for clear spans up to 25 ft. Rows of tile 12 in. wide between reinforced concrete joists 4 to 6 in. wide, monolithic with a concrete top coat 2 in. thick, mixed 1 part cement, 2 parts sand, and 4 parts gravel. Eliminates beam forms and requires one-third to one-half less flat centering, effecting great economy in erection; 2 by 8-in. or 2 by 10-in. planks under each joist are sufficient.

For semicontinuous and continuous spans proper reinforcement must be provided in top of slab over supports to take care of negative bending moment.

Where heavy loads and long spans are encountered, the vertical and longitudinal shear must be investigated.

LOAD TABLE FOR "COMBINATION" FLOOR SLAB WITH 2-IN. CONCRETE TOP

TOTAL SAFE LOADS (DEAD AND LIVE) POUNDS PER SQUARE FOOT

The figures on left in tables denote the depth of tile in inches, the figures on right the area of reinforcing steel in each concrete joist in square inches.

fc. 650 lbs. per sq. in.
fs. 16,000 lbs. per sq. in.

$\frac{Ec}{Es} = \frac{1}{15}$

¾-in. of concrete below reinforcement
4-in concrete joists 16 in. o. c.

Total Load		W L	150	165	180	195	210	225	240	260	300	335	375	450
	Continuous span	12												
	Continuous span	10	125	135	150	160	175	185	200	220	250	280	310	375
	Semi-continuous span	9	110	120	135	145	155	170	180	195	225	250	280	335
	Simple span	8	100	110	120	130	140	150	160	175	200	225	250	300
Span, ft.		6	.....	.....	.....	.....	.....	3/.19	3/.20	3/.22	3/.26	3/.29	3/.32	3/.39
Span, ft.		7	.....	3/.19	3/.21	3/.23	3/.24	3/.26	3/.28	3/.32	3/.35	3/.38	3/.44	4/.42
Span, ft.		8	3/.23	3/.25	3/.27	3/.30	3/.32	3/.34	3/.37	3/.40	3/.46	4/.41	4/.46	4/.55
Span, ft.		9	3/.29	3/.32	3/.35	3/.37	3/.39	3/.41	3/.43	4/.40	4/.46	4/.52	4/.58	5/.57
Span, ft.		10	3/.36	3/.39	3/.43	3/.46	4/.40	4/.43	4/.46	4/.50	4/.57	5/.53	5/.59	5/.71
Span, ft.		11	3/.43	3/.47	4/.42	4/.45	4/.48	4/.52	4/.55	4/.61	5/.57	5/.64	5/.72	6/.73
Span, ft.		12	4/.41	4/.45	4/.49	4/.53	4/.58	5/.51	5/.55	5/.60	5/.68	6/.65	6/.72	7/.78
Span, ft.		13	4/.48	4/.53	4/.58	5/.52	5/.56	5/.60	5/.64	5/.70	6/.68	6/.77	7/.76	8/.80
Span, ft.		14	4/.56	5/.51	5/.56	5/.60	5/.65	5/.69	6/.63	6/.69	6/.79	7/.79	8/.78	9/.85
Span, ft.		15	5/.53	5/.58	5/.64	5/.69	6/.63	6/.68	6/.72	6/.79	7/.81	8/.81	8/.89	10/.88
Span, ft.		16	5/.60	5/.68	5/.72	6/.67	6/.72	6/.77	7/.74	7/.81	8/.81	9/.84	9/.93	12/.83
Span, ft.		17	5/.68	6/.64	6/.70	6/.75	6/.81	7/.78	7/.83	8/.80	9/.84	10/.84	10/.94	12/.93
Span, ft.		18	6/.65	6/.72	6/.78	7/.76	7/.82	8/.77	8/.82	8/.90	9/.94	10/.95	12/.87	15/.83
Span, ft.		19	6/.73	6/.80	7/.78	7/.84	8/.80	8/.86	9/.84	9/.92	10/.95	12/.87	12/.97	15/.93
Span, ft.		20	6/.81	7/.79	8/.76	8/.82	8/.89	9/.87	9/.93	10/.91	12/.86	12/.97	15/.86	15/1.03
Span, ft.		21	7/.79	8/.77	8/.85	8/.91	9/.89	10/.86	10/.92	12/.83	12/.95	15/.85	15/.94	.....
Span, ft.		22	8/.77	8/.84	9/.84	9/.91	10/.88	10/.94	12/.83	12/.91	15/.83	15/.93	15/1.04	.....
Span, ft.		23	8/.84	9/.84	9/.91	10/.89	10/.96	12/.85	12/.91	12/.99	15/.90	15/1.02	.....	.....
Span, ft.		24	9/.84	9/.92	10/.90	12/.80	12/.87	12/.93	12/.99	15/.87	15/.99	.....	.....	.....
Span, ft.		25	9/.91	10/.89	12/.81	12/.87	12/.94	12/1.00	15/.86	15/.94	15/1.07	.....	.....	.....

WEIGHT OF COMBINATION SLABS PER SQUARE FOOT

Tile	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
Weight	45 lbs.	50 lbs.	55 lbs.	60 lbs.	65 lbs.	70 lbs.	75 lbs.	80 lbs.	90 lbs.	105 lbs.

The load tables are for general information only, as each particular operation should be designed in accordance with actual conditions. Other "Load Tables" and other types of floor systems shown in our literature on "Long Span" Floors.

The engineering department is at the entire disposal of anyone desiring further information.

Natco "Two-way" Floor System (Patented)

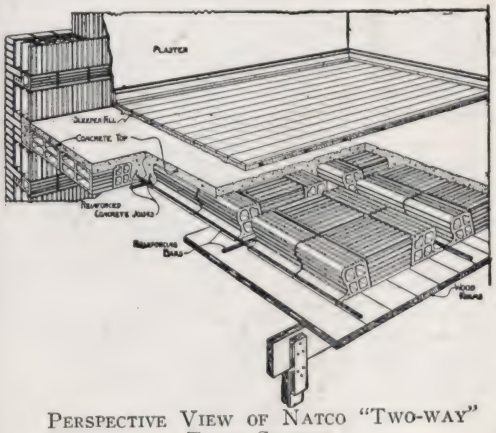
A later development of the "Combination" floor, designed to carry loads to four sides in place of two, thus enabling designer to cut down thickness of slab and reduce depth of supporting girders. Most economical for bays, the ratio of whose sides does not exceed 1:1½; for long narrow spans, "One-way" system is cheaper.

Tile is substituted for concrete, and approximately 54% of heavier and more expensive material is eliminated in an average slab built of a "Two-way" combination of 6-in. Natco hollow tile and reinforced concrete with a 2-in. top coat cast monolithic with joists.

Tile is so designed that spacing of same on flat centering is almost automatic. Bond between heavily scored hollow tile used in this floor system is increased by dovetailed slots in tops of the several tile forming sides of the long span of bay, and small amount of concrete forcing its way into small end openings of flanged tile.

When covered with concrete, the architect can feel satisfied that tile of the "Two-way" system are exactly where they were placed when he inspected them. Table of safe loads (live and dead) is given for general estimating purposes only, and every problem should be given special consideration. Consultation with our engineering department is solicited.

Write for handbook of "Natco Combination Long Span 'One-way' and 'Two-way' Fireproof Floors," containing full details, photographs and other useful information.



PERSPECTIVE VIEW OF NATCO "TWO-WAY" FLOOR SYSTEM

TABLE SHOWING THICKNESS OF TILE FOR VARIOUS SPANS AND SAFE LOADS (LIVE AND DEAD)

fc = 700 lbs. per sq. in.
fs = 18,000 lbs. per sq. in.
$M = \frac{WL}{12}$
W = Part of load taken in each direction.

¾-in. of concrete below reinforcement
4-in. concrete joists, 28 in. o. c.
2-in. concrete top

Total load per sq. ft. rectangular panel whose sides have ratio of		TOTAL SAFE LOAD (LIVE AND DEAD)																				
	1:1.50						104	110	117	124	130	136	143	150	156	162	169	175	182	188	195
	1:1.40					103	110	117	123	130	137	144	151	158	165	171	178	185	192	199	205
	1:1.35					106	113	120	127	134	141	148	155	162	169	176	183	190	197	204	211
	1:1.30				102	109	116	123	131	138	145	152	160	167	174	181	189	196	203	210	218
	1:1.25				106	114	121	129	136	144	152	159	167	174	182	190	197	205	212	220	227
	1:1.20			103	111	119	127	135	143	151	159	167	175	183	191	198	206	214	222	230	238
	1:1.15		104	108	117	125	134	142	150	158	167	175	183	192	200	208	217	225	233	242	250
	1:1.10		110	114	123	132	141	149	158	167	176	184	193	202	211	219	228	237	245	255	263
	1:1.00		125	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Short Span	16'0"	Thickness of Tile	3	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5
	17'0"		4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6
	18'0"		4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6
	19'0"		4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7
	20'0"		4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	7
	21'0"		4	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	7
	22'0"		5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	7	7	7	8
	23'0"		5	5	5	5	6	6	6	6	6	7	7	7	7	7	7	7	8	8	8
	24'0"		5	5	5	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	8
	25'0"		5	5	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9
	26'0"		6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	8	9	9	9
	27'0"		6	6	6	6	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9
	28'0"		6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10
	29'0"		6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10
	30'0"		6	7	7	7	7	7	8	8	8	8	9	9	9	9	9	9	10	10	10

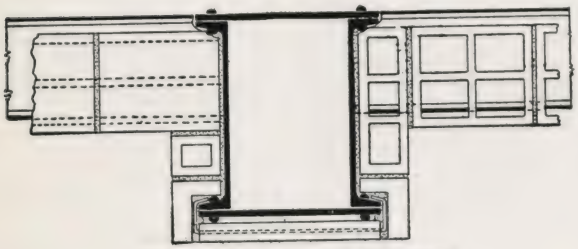
Example: To find thickness required for bay 20x25 ft., with a total load (live and dead), of 190 lbs. per sq. ft. Ratio of sides, $\frac{20}{25} = 1:1\frac{1}{25}$. Run across the horizontal space marked 1:1.25 until vertical column marked 190 lbs. is reached. Run down this vertical column to the horizontal space marked 20'0" (short span). This gives thickness of tile as 6 in., which, with 2 in. for concrete top, makes total thickness of floor 8 in.

Continued on next page

Natco Girder Covering

Hollow tile beam and girder covering is made in various forms to fit the flanges of all standard steel beams and girders. It is self-supporting except where the width to be covered is more than 12 in.; then the soffit is supported by metal clips.

STANDARD NATCO BEAM COVERING



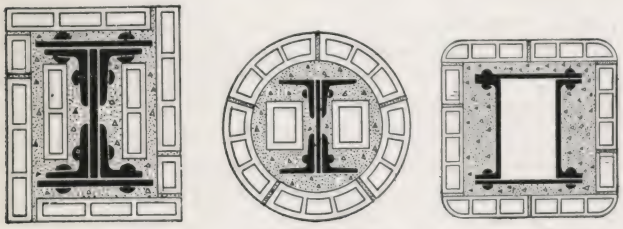
TYPICAL BOX GIRDER COVERING
Hung on metal clips

Natco Column Covering

Steel and cast iron columns must be covered by at least 2 in. of semiporous hollow tile.

For square columns Natco hollow tile can be furnished in 3-in. and 4-in. thicknesses, and with rounded corners if necessary.

For circular columns segmental column covering can be furnished in 2-in., 3-in. and 4-in. thicknesses.



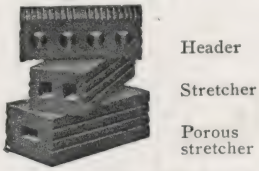
Square Column Covering
Circular Column Covering
Square Column Covering Round Corners

STANDARD NATCO COLUMN COVERING

Natco Book Tile (for both Roofs and Ceilings)

Natco book tile is used between and supported on T-irons to form flat mansard and hip roofs.

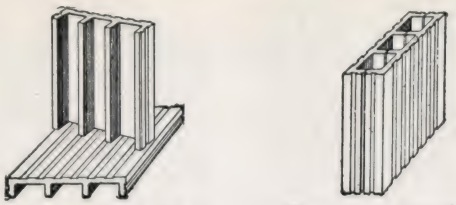
It is also used for flat or hung ceilings, for which purpose the ends can be rabbeted so that book tile are flush with bottom of steel T-irons.



"HAVERSTRAW" BRICK
STOCK SIZES
Stretcher, 2½x3½x8 in.
Header, 2½x3½x7¼ in.

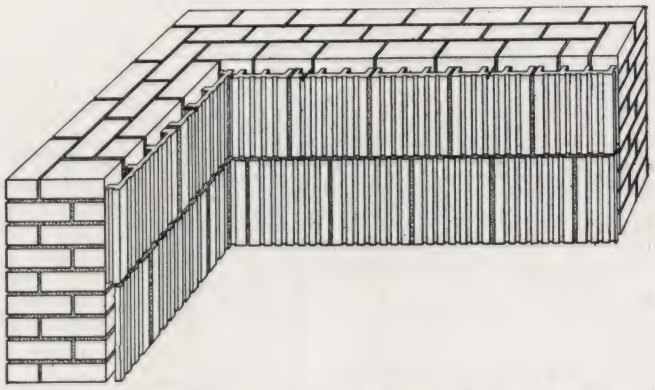
Natco Wall Furring

Walls are furred to prevent the admission of moisture, either by lining the inside with Natco furring tile, or by building the inside face of the wall with hollow brick, "Haverstraw" size, which, however, is manufactured at Eastern factories only. The former method is more effective.



Furring Split Ready to Lay Against Brick Wall
Furring as Manufactured and Shipped to Job

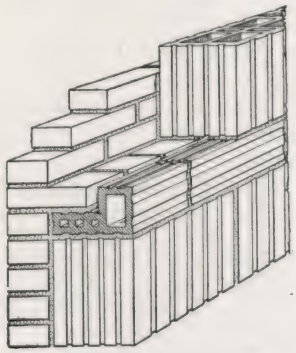
NATCO WALL FURRING



NATCO SPLIT FURRING TILE APPLIED TO INSIDE OF BRICK WALL
Stock Sizes
1½x12x12 in., approximate weight per sq. ft., 8 lbs.
2 x12x12 in., approximate weight per sq. ft., 9 lbs.

Natco Header-Backer Construction (Patented)

A Natco XXX load bearing tile veneered with face brick efficiently bonded as required by all building codes. Its use assures a saving of tons of dead weight on structural frame and foundations and approximately one-third of labor and mortar expense over solid masonry construction. Greatly superior to any other form of masonry for curtain-walls of office or loft buildings, hotels, warehouses, and for bearing walls of schools, banks, hospitals, garages, residences, etc.

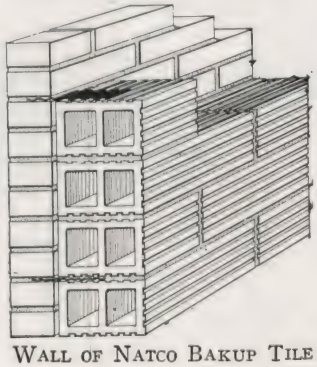


13-IN. WALL OF NATCO HEADER-BACKER TILE

Face brick are well bonded to a load bearing tile of great strength. The header tile displaces 4½ brick, an 8 by 12 by 10½ in. backer tile (most commonly used) displaces 12 brick, and a 12 by 12 by 10½ in. backer tile, 18 brick. Backer tile also manufactured in 4 in., 6 in., and 10 in. thickness, and just enough heights to work up with most commonly used joints and bonds. Readily adapted to a veneer of Indiana limestone or any other stone facing.

Natco Bakup Tile

For backing up face brick. Sizes 8 by 5 by 12 in., and 4 by 5 by 12 in., displacing 6 and 3 bricks respectively in 13-in. and 9-in. walls; smooth on a 5-in. by 12-in. face and scored for mortar or plaster on other three sides, assuring decreased weight, an insulated wall and economy in material setting.



WALL OF NATCO BAKUP TILE

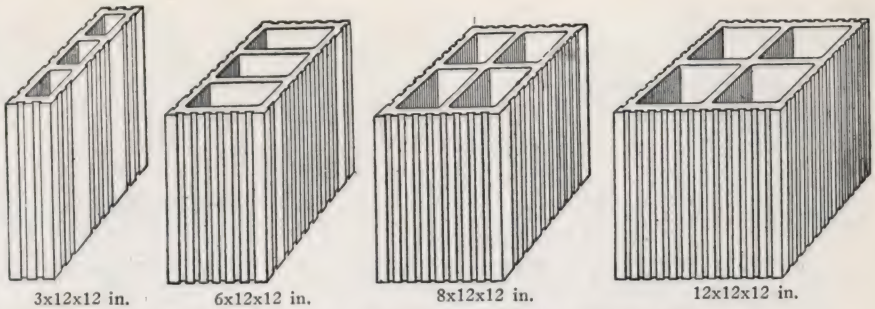
Continued on next page

Natco Hollow Tile Partitions

Fireproof, soundproof, easily erected, and the standard for stability, especially where called on to support plumbing fixtures, heavy picture frames, shelving, etc.

Stock sizes 2 to 12 in. thick, laying up 1 sq. ft. of wall surface. Short lengths also furnished.

Hollow tile partitions are commonly built of dense material: 3-in. tile can be used safely to a height of 12 ft.; 4-in. to 16 ft.; 5-in. to 20 ft.; and 6-in. to 24 ft.



TYPICAL SHAPES OF NATCO HOLLOW PARTITION TILE

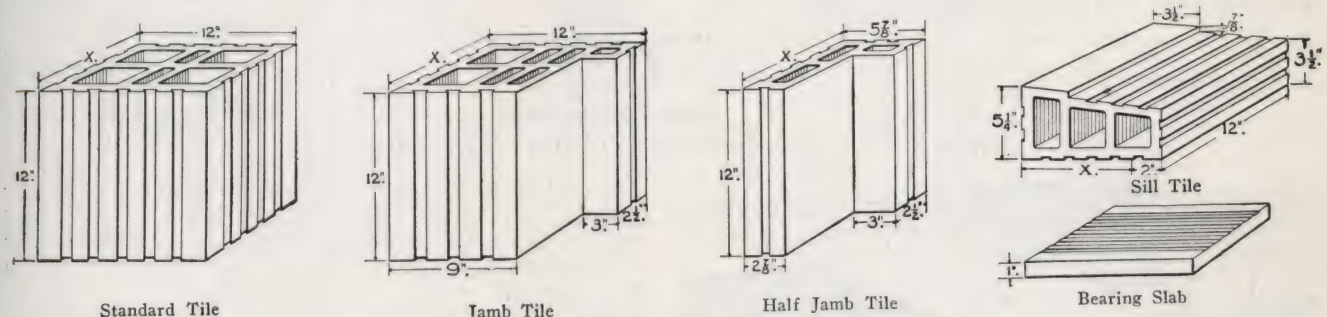
TABLE OF APPROXIMATE SIZES, WEIGHTS, ETC., OF NATCO PARTITION TILE

Size, in.	Minimum number of cells	Weight, lbs.	Size, in.	Minimum number of cells	Weight, lbs.
2 x 12 x 12	3	14	7 x 12 x 12	3	25
3 x 12 x 12	3	15	8 x 12 x 12	4	30
4 x 12 x 12	3	16	9 x 12 x 12	4	32
5 x 12 x 12	3	19	10 x 12 x 12	4	35
6 x 12 x 12	3	22	12 x 12 x 12	4	40

NOTE—Half lengths are also carried in stock and a reasonable percentage shipped on all orders.

Natco XXX Hollow Tile

Natco XXX as compared with regular Natco merely represents added strength in one of the strongest and most stable of all building materials. It realizes the very *last* degree of complete structural efficiency, its design being such that, when set up, *every square inch of webs and shells is under direct compression.*



DETAILS OF TYPICAL SHAPES OF NATCO XXX HOLLOW TILE

TABLE OF APPROXIMATE SIZES, WEIGHTS, ETC., OF NATCO XXX HOLLOW TILE

Standard Sizes			No. of cells	Weight, lbs. per sq. ft.	Jamb Tile			Half Jamb Tile			Corners		
Thickness	Height	Length			Thickness	Height	Length	Thickness	Height	Length	Thickness	Height	Length
(In.—in wall)					(In.—in wall)			(In.—in wall)			(In.—in wall)		
3	12	12	3	18	..	..	..	..	..	..	..	..	..
4	12	12	3	20	..	..	..	..	..	..	6	12	12
6	12	12	6	29	6	12	12	6	12	5⅞	8	12	2
8	12	12	6	34	8	12	12	8	12	5⅞	10	12	4
10	12	12	6	40	10	12	12	10	12	5⅞	12	12	6
12	12	12	9	52	12	12	12	12	12	5⅞			
Slabs													
6	1	12	..	6									
8	1	10	..	8									
10	1	8	..	8									
12	1	12	..	12									
Sill tile													
10	5¼	12	3	20									
12	5¼	12	4	22									
14	5¼	12	4	25									

NOTE—Manufactured and shipped with all orders a reasonable percentage of half lengths to use with 1-in. slabs listed here in working up to story height; when specifically called for on the customer's written order.

Comparative Cost— Natco XXX, with its superior qualities of extra heavy shells and webs, all in direct alignment when laid, and with its deep dovetail scoring which affords the best possible mechanical bond for the stucco, costs no more than the old style of tile, and for walls alone compares favorably in first cost with the best type of frame construction.

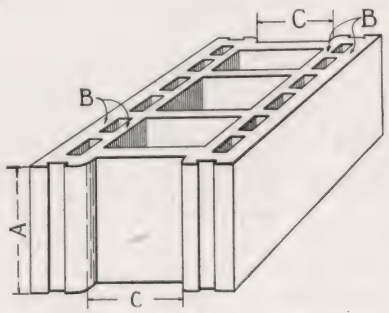
Natco Building Tile (Smooth Face; Glazed and Unglazed, from Eastern Factories Only)

These particular tile are appropriate for bearing or curtain walls of all types of city or farm buildings. Samples sent on request.

Natco Double Shell Building Tile (Glazed and Unglazed, from Western Factories Only)

These Natco products are hollow tile units with combed and "Tex" face affording a finished exterior surface when laid up in a wall. They have all the structural and artistic advantages of a good face brick with the added advantages of air spaces to check the passage of moisture, heat and cold, and a 30% decrease in cost of laying and mortar, without limitations as to size; manufactured in 8- and 6-in. thicknesses, with all necessary corners, jambs, sills, closures, joist tile, etc.

Superior Features—End construction (A) for greatest strength. Double shell (B) for ideal horizontal mortar joint. Moisture stop (C) for perfect insulation.



REGULAR WALL TILE 8x12x5 IN.

General Features — Burned clay tile—fire safety and permanence. Hollow (enclosed air spaces)—lightness and insulation. Large unit—rapid and economical handling.

Sizes and Types—6x12x5 in. for wall 6 in. thick. 8x12x5 in. for wall 8 in. thick.

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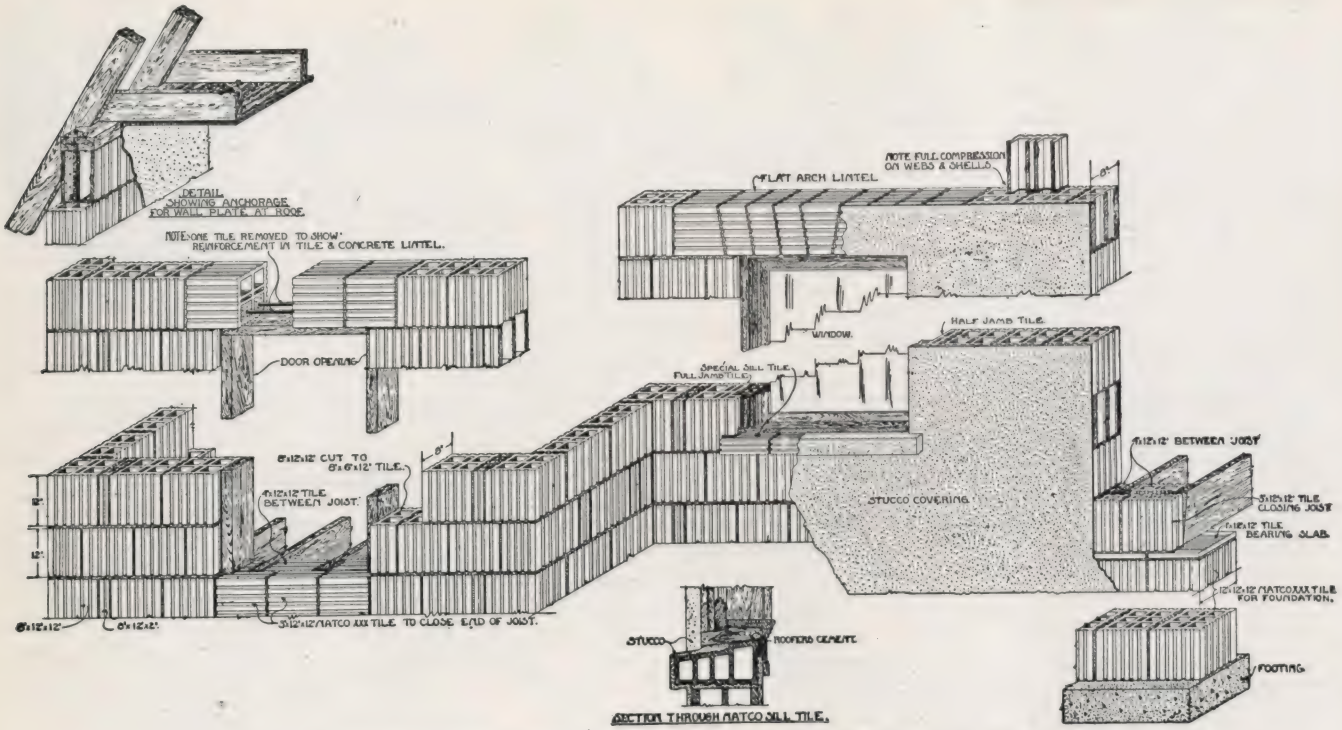
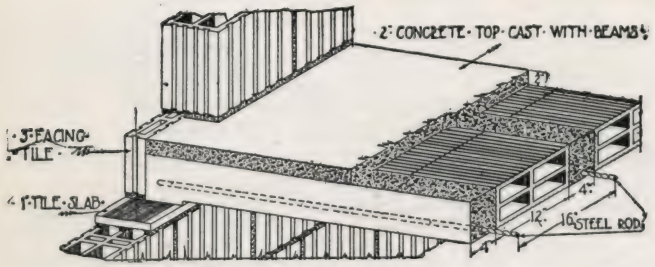


Typical Exterior Wall Construction of Natco XXX Hollow Tile



Typical Detail of Natco XXX Exterior Wall and Combination Floor of Hollow Tile and Reinforced Concrete

By erecting interior partitions of Natco hollow tile in conjunction with this type of construction, it is possible to completely fireproof private residences, stores, apartments, school buildings, libraries, etc., at a cost of approximately from 15% to 20% over the ordinary frame construction

Materials and Methods

The materials and methods illustrated and described herein have been determined by wide practical experience in Natco hollow tile construction, and have been approved by fireproofing engineers and architects generally.

Full details, not easily furnished in limited available space, will be supplied on application.

Specification Notes

For the assistance of all those desiring to take full advantage of hollow tile construction, with its low initial cost and minimum expense of upkeep, this company offers the following specifications for wall construction, floor construction, and stucco finish, which have been carefully developed through years of use and may be regarded as the manufacturers' standard specifications. The adoption of these will insure equable conditions in estimating, and produce results in accordance with best practice.

It is suggested that the first clauses of wall or floor specifications entitled "General" might be quoted in full, followed by clauses stipulating: (1) Which contractor applies cement coat to exterior of foundation walls of tile; (2) whether dampproofing shall be integral or applied and by whom furnished and done; (3) whether door or window openings are to be calked by hollow tile layer, as specified, or by plasterer; (4) how and by whom fireplaces and chimneys shall be constructed; (5) by whom centering for any arched or clear openings shall be provided; (6) by whom centering and sleepers for floors shall be provided and set; (7) which system of floor construction is to be used, or whether alternate estimates are to be given, etc.

Specification for Hollow Tile Walls

General—The contractor for this part of the work shall furnish, deliver and erect all materials required for exterior and interior bearing walls and any interior subdividing partitions, as indicated on plans, of hard burned hollow tile, together with all necessary special shapes required at corners, at joist level, in working around openings or to complete buildings as called for in this specification to approval of architect. All hollow tile shall be true and regular in size, manufactured of such design that all webs and shells are in direct compression when laid in the wall. Tile shall have all faces scored with special dovetail scoring to offer a good surface for the stucco and plaster finish. Tile cracked or broken on the outside shells will not be acceptable under this specification.

In general all exterior walls and interior bearing walls shall be of Natco XXX load bearing hollow tile; non-bearing, subdividing walls shall be Natco partition tile as manufactured by the National Fire Proofing Company.

Laying—All tile used in the exterior walls and any interior bearing partitions must be laid with the holes or voids vertical in the wall, in order to develop their full strength. Interior subdividing, non-bearing partition tile may be laid on side if desired, but must be started on the structural floor and wedged against the floor above. Care must be taken that the tops of all unfinished walls are thoroughly covered or protected against stormy weather.

The contractor for laying hollow tile is also to furnish and set all iron or steel or concrete incidental to the completion of the building as covered by these specifications—the materials in each case to be the best of their respective kinds subject to approval of architect.

Mortar—All mortar used for laying up the hollow tile shall consist of a standard portland cement and clean sharp sand in the proportion of 1 part cement to 3 parts sand, well mixed to a smooth, moderately stiff mortar. Lime, not to exceed 10% of the cement by volume, will be allowed in the mortar.

Continued on next page

Foundation Walls—Any foundation walls so indicated on plans from top of footings to the underside of first floor beams shall be constructed of proper combination of Natco XXX load bearing hollow tile to produce thickness shown. Care should be taken to use special Natco XXX hollow tile at the corners. Outside of walls from footing to a point above the ground shall be given a heavy coat of waterproofed cement or other approved dampproofing.

Where columns or piers supporting heavy loads rest on the foundation wall, the same shall be filled with concrete from footing to top of wall to prevent the possibility of failure due to compression.

Jamb Tile—Provide for all double hung windows Natco XXX jamb tile with rabbeted openings to receive the window frame box. Fill well with mortar the space between the tile and the frame box to within 1 in. of stop bead. The contractor for the setting of the tile is to calk to stop bead of all doors and windows with roofers' cement or oakum, furnished and set by him, to prevent the passage of air or moisture.

Lintels—Openings not exceeding 5 ft. in clear span may be spanned with Natco XXX arch lintel tile or with Natco XXX load bearing tile reinforced with proper steel rods in lower cells and filled solidly with stone or gravel concrete.

Openings over 5 ft. in clear span to be spanned with reinforced concrete girder faced with tile, or with steel angles—size of structural or reinforcing steel variable with load and span; all to be furnished and set by the contractor for tile laying to approval of architect.

Sills—Form all sills of Natco XXX special hollow sill tile. Special care must be taken to fill all joints so as to prevent moisture working through the same; wood sill of frame to be set in a heavy bed of roofers' cement.

Arch Openings—Build all arch openings shown on plans of 2-course rowlock hollow brick header arches, carefully laid on substantial centers. Arches will spring from the hollow tile and must be well bedded on them.

Porch Columns and Piers—Construct any porch columns and piers, so indicated of hollow tile to sizes as shown. Where column finish is round, build the same of 3-in. circular hollow tile column covering, filling the column with concrete when the second story walls are supported by them. If steel reinforcement is used, care should be taken to band the steel against lateral deflection. Square columns shall be built of the proper size Natco XXX load bearing tile.

Floor Beam Bearings—Provide and set load bearing tile slabs 1-in. thick under all floor beams as bearing plates for the same. These slabs shall also be used for working up to levels and story heights when the full or fractional tile do not work out correctly.

Beam Courses—Wood floor beams are to be framed into exterior walls as shown on detail, using Natco XXX load bearing hollow tile in accordance with the following: In 8-in. walls 3x12x12 in. for facing ends of beams, and 4x12x12 in. for filling between beams. In 10-in. walls 5x12x12 in. for facing ends of beams, and 4x12x12 in. for filling between beams. In 12-in. walls 6x12x12 in. for facing ends of beams, and 5x12x12 in. for filling between beams.

Roof Plates—Embed in cement grout in 2 upper courses of wall at intervals of 5 ft. ¾-in. bolts 24 in. long. Bolt to project 6 in. above the top of the wall, to allow of plate being fastened down with nuts.

Specifications for Floor Construction

General—Floor construction shall be the type known as the combination hollow tile and concrete floor construction, consisting generally of 4-in. reinforced concrete beams spaced 16 in. on centers with Natco hollow tile between, and covered with concrete top as shown, all to have at least 4-in. bearing on walls.

Concrete—All concrete used in floor construction shall consist of 1 part portland cement, 2 parts clean sharp sand, and 4 parts broken stone or gravel of such size as will pass through a ¾-in. ring. Concrete will be of wet mixture, and must be well tamped and worked around reinforcing steel after pouring.

Reinforcing Steel—Steel rods for floor construction must be of such type as will have a mechanical bond with the concrete. Corrugated, twisted or similar type will be accepted. Steel must have an elastic limit of not less than one-half the tensile strength. Rods must be clean and free from rust scales before placing in position, and must be placed not over 1 in. above bottom of floor.

Tile—Depth of Natco tile and size of steel reinforcement will be regulated by span and load to be carried, in accordance with standard tables of the manufacturers, and will be of size indicated on the plans. All tile must be wet before concrete is placed, so as to insure a proper bond with the concrete.

Centers—Centers must be of such size as to insure of their not deflecting under the weight of the wet concrete, and must be provided in such quantity as to insure speedy work. Centers must not be removed before the concrete has properly set, and under long spans a center line of supports must be maintained for at least 3 weeks after the concrete has been poured. In cold weather the centers must be left in place until directed by the architect to remove them.

Specifications for Stucco on Hollow Tile

The stucco shall consist of the following materials and be mixed in the following proportions:

(1) Portland cement which has met the requirements of the American Society for Testing Materials.

(2) Sand free from organic matter or loam, and uniformly graded in size from coarse to fine.

(3) Hydrated lime—any good brand of prepared hydrated lime or well burned slaked lime putty will be accepted.

First coat: 1 cement, ⅛ lime, 2 sand.

Second coat: 1 cement, ⅛ lime, 2½ sand.

Third coat: 1 cement, ⅛ lime, 3 sand.

All stucco should be applied immediately after being mixed; no re-tempered stucco shall be used. No stucco is to be applied when it is liable to freeze before it sets. All stucco work shall be kept thoroughly wetted down until cement has set, in hot or dry weather, as too rapid drying will cause cracking.

The tile surface shall be free from all foreign material, and shall be thoroughly wetted down before the first or scratch coat is applied. The first coat shall be applied with force so as to key behind the dovetail scoring, also to prevent air bubbles or holes, and shall be thoroughly scratched to insure proper bond with the next coat. The second coat should be applied as soon as the prior coat has sufficiently set to allow working upon the same, and should be straightened with darby and straightedge, then floated with cork or wooden float to prevent waves showing on the finished wall.

Should it be impossible to apply the second and last coats as soon as the former coat has become thoroughly set, wet down the coat already applied before applying others, to give a better bond between successive layers.

The finish coat should, as far as possible, be applied to the entire area of one side of structure to the corners at one operation.

Thickness of each coat should average from ¼ to ½ in. If only 2-coat work, the material must have a total thickness of not less than ¾ in., exclusive of the dovetail scoring.

Finish coat of stucco is to be waterproofed with an approved brand of integral waterproofing compound or other approved compound in accordance with directions of manufacturers.

Co-operative Services

The branch engineering departments maintained in many of the larger offices of this company are fully equipped to make complete plans and details of the fireproofing of buildings, estimate the cost, and give all possible help and information to patrons who wish to avail themselves of the advantages offered.

ESTABLISHED SIXTY-SIX YEARS

HENRY MAURER & SON

Manufacturers of Hollow Tile for All Classes of Buildings

PHILADELPHIA OFFICE
1919-1921 Brandywine Street

420 East Twenty-third Street
NEW YORK, N. Y.

FACTORIES
MAURER, NEW JERSEY

TELEPHONE, GRAMERCY 5050

Products

HOLLOW TILE BLOCKS for interior partitions, wall furring, exterior walls, backing tile and roof blocks (book tile).

Also Flat and Segmental Floor Arches, Round and Square Column Covering, Girder Covering, "Phoenix" Wall Construction, "Herculean" Long Span Floor Arches, Fire Brick for Boilers, etc.

Facilities

Factories located on tidewater and on Central R. R. of New Jersey and Lehigh Valley R. R. This insures prompt shipment by boat or rail. Direct delivery to buildings in New York and other cities.

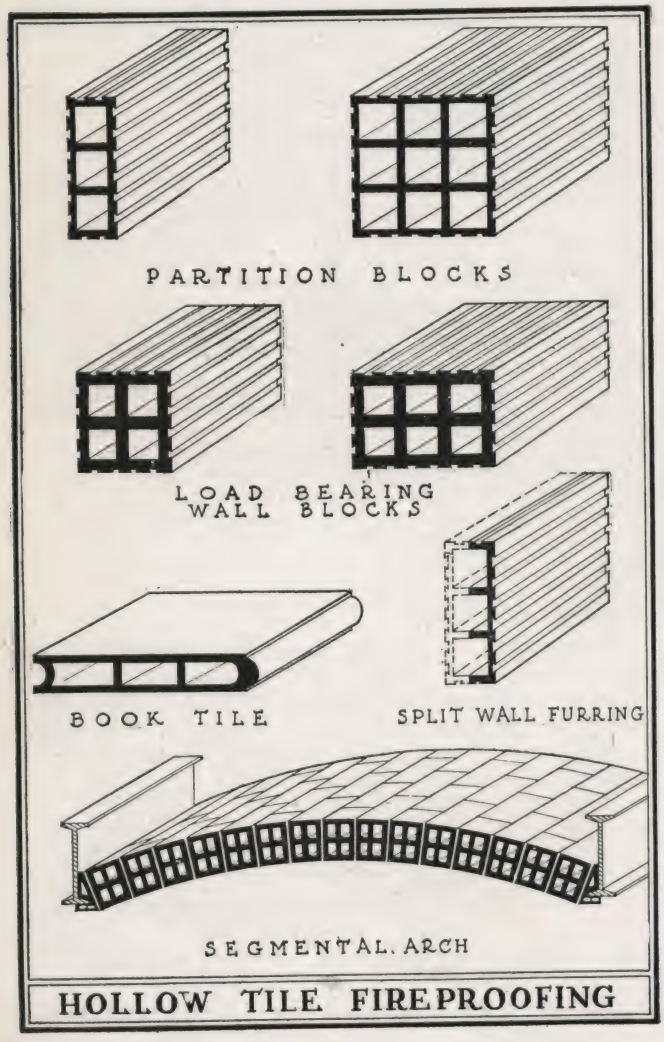
Quality

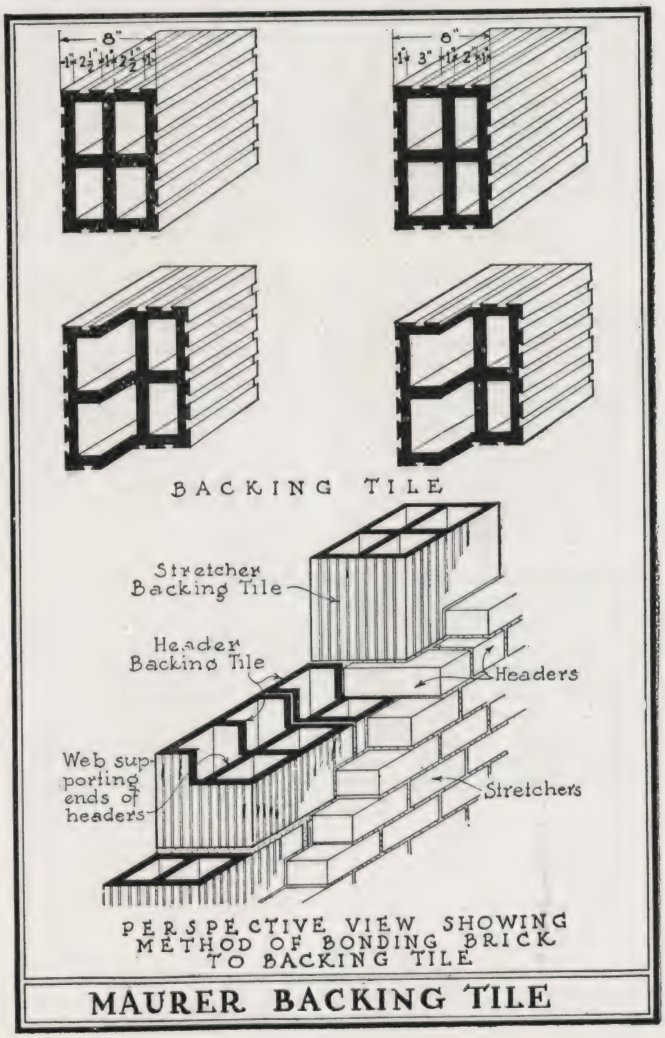
Our material is of the best quality and workmanship, and economical to erect because of its uniformity of size and shape.

Maurer Backing Tile

A backing system which makes the strongest and most dampproof wall, and, as only one size of block is used, is the cheapest to build.

These backing blocks, with webs running vertically back up the stretcher face brick as well as the header face brick, give maximum strength and a true and complete furring within the wall. The cubical content of the continuous air cells (running the entire height from floor to floor) is the greatest obtainable, reducing to a minimum the danger of moisture penetrating the wall through capillary attraction. The stretcher and header face brick are backed by tile with vertical webs, creating a wall which resists the greatest amount of compression. The header face brick have absolute support and are held securely so they can not rock out of place.





PENNSYLVANIA FIREPROOFING CO.

GENERAL OFFICES
ERIE, PA.

FACTORY
ST. MARY'S, PA.

Products

"Penco" Hollow Tile for exterior walls.

"Pentex Splits" Hollow Tile (Hardencourt-Fiske Patent).

Also Fire Clay Hollow Tile, hard burned, dense, and semiporous, for fireproofing steel buildings and for partition walls; "Pentex" Hollow Tile; Hollow Brick for backing up solid brick walls.

Manufacturers of the well-known Denison Interlocking Hollow Tile, being exclusive licensees for New England, Pennsylvania, Delaware and Maryland. Denison Interlocking Tile are described elsewhere in this catalogue under the Denison Interlocking Tile Corporation.

"Penco" Hollow Tile

An extra heavy, hard burned block for exterior walls, that will not discolor or stain the plaster.

"Penco" Hollow Tile

"Pentex Splits" Hollow Tile (Hardencourt-Fiske Patent)

These products (made for 8-in. and 12-in. walls) give a hollow tile wall with rough texture exterior face, at low cost, combining the beauty and soft exterior color scheme of high grade face brick. Face of tile is not wire cut, but is produced by a process that insures a more pleasing effect. The horizontal air space, the best insulator against cold or heat, absolutely prevents passage of moisture through wall, via horizontal or vertical mortar joints.

The colors, varying shades of red, with shadows and lights of the rough surface, make an artistic wall exterior.

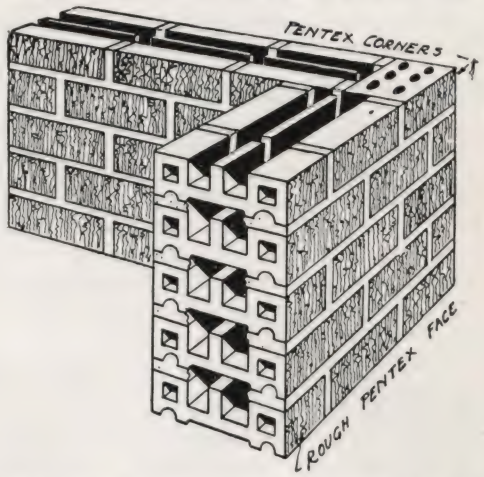
Each 2¼x8x8-in. block represents 2 standard solid brick; 7 of these splits equaling 1 sq. ft. of 8-in. wall.

The cost of a square foot (exterior surface) of 8-in. wall is from 25% to 40% *cheaper* (by using "Pentex Splits") than a face brick wall of solid brick. Large savings accrue in freight, cartage and human energy in handling; also, in cost of steel framing where "Pentex Splits" are employed, as curtain walls in large office, apartment or factory buildings.

Dead load on steel reduced 25%.

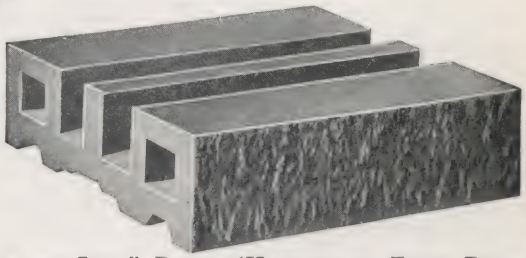
Guarantee as to Compression Load Tests—This company *guarantees* that "Pentex Splits" will, when laid up in the wall in accordance with the standard specifications, meet the following compression load tests:

Maximum load in pounds per lineal foot of 8-in. wall or 96 sq. in. gross, 75,000 lbs. Maximum load in pounds per square inch net section under compression (48 in.), 1800 lbs. Maximum load in pounds per square inch, gross area 96 sq. in., 780 lbs.



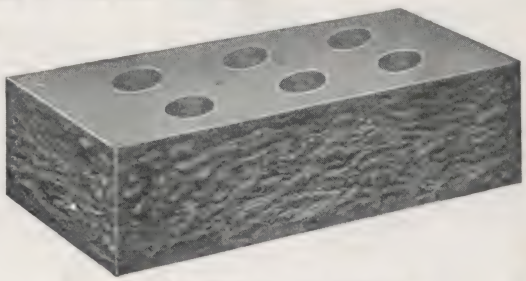
"Pentex Splits" Installed in a Hollow Tile Wall
Note double horizontal air cells, which have twice the insulating value of a single tile

"Pentex Split" Block (Hardencourt-Fiske Patent)—A hollow tile with the exterior faces rough texture and of the same size as a solid face brick. Red shades.



"Pentex Split" Block (Hardencourt-Fiske Patent)
2¼x8x8 in.

Corner Block and Header—Very useful as a closure in turning corners or in jambs for doors and windows where plank frames are used. Can also be used in soldier courses over windows, water tables, belt courses or rowlock courses.



Corner Block and Header
2¼x3¾x8 in.

UNIVERSAL UNIT TILE COMPANY

EXECUTIVE OFFICES
Scripps Building
SAN DIEGO, CAL.

Product

HOLLOW BUILDING TILE for structural purposes of novel and improved design, suitable for all types and varieties of buildings in which burned clay products can be used.

Design

The Universal Unit was designed to overcome the disadvantages of the present commercial forms of structural hollow tile and to facilitate and reduce the cost of manufacturing, shipping, handling, estimating and laying.

TRADE-MARK

Advantages of Universal Unit Tile

(1) One size and shape for all standard thicknesses of walls and details of construction. Starter, corner, jamb, sill, filler and all special shapes readily cut with trowel from standard unit leaving sections of usable size.

(2) Units are two bricks wide, three high and one long, with mortar joints, thus displacing six bricks in wall. Building construction can be designed with the Universal Unit same as for brick as they cut into any necessary combination of brick sizes.

(3) This construction offers maximum resistance to frost and dampness penetration. All mortar bed joints are offset, lead upward from exterior to interior face of wall and are interrupted by vertical rising voids. Stucco and plaster may be applied direct to tile without furring.

(4) Latticed interior construction and direct line continuation of webs through entire Unit insures maximum load bearing and lateral strength.

(5) No ties or reinforcing required except for arch and lintel construction; jamb tile make masonry bond with wall.

(6) Brick veneer work can be figured in supporting strength of walls as Unit bonds perfectly with it.

(7) Perfect balance, easy and quick to lay.

(8) Units nest perfectly, hence minimum breakage.

(9) Units simply yet positively interlock.

(10) Size, shape and cut-up features simplify quantity calculations.

(11) Facilitates placing grounds and plugs for interior finish without danger of moisture penetration.

Scoring

Units scored to facilitate cutting into special shapes, a proportion cross-scored for cutting into vertical half-sections. The scored tile can also be cut into rebated sections for forming joist pockets, providing pipe chases, etc.

Estimating and Construction Data

Face sizee of units 8x8x8 in. Two units lay exactly one face foot of 8-in. wall; three units for 13-in. walls; four units for 17-in. walls, etc. Units weigh between 17 and 18 lbs. Lintels formed of standard units or cut sections reinforced and filled with concrete, as required.

Tests by recognized testing engineers show each unit to have crushing strength of 50,000 to 100,000 lbs.

Use of Brick

As units are worked out to brick sizes in every dimension, walls can be built entirely without brick or brick can be used anywhere in construction and they line and bond with the tile.

Quality and Marking

All load bearing Universal Units are composed of properly prepared grades of hard burning clay, shale, fire clay or mixtures thereof to provide maximum strength and fire resistance. Each unit has trade-mark "UU" impressed thereon.

Non-bearing Construction

Universal Unit tile offers superior advantages for curtain and filler walls in pier and girder construction. The convenient size and shape, ease and rapidity of handling and laying, made it compare favorably in cost with plain tile. Its lightness, in addition to its fireproof, frostproof and dampproof feature, renders its use most desirable in construction of this class.

In cities and localities where the Universal Unit is now available, it is rapidly being given preference over other forms of hollow filler wall construction.

Farm Buildings

The advantages of fireproof construction on the farm is rapidly being realized. Universal Unit is a superior material for all types of farm buildings, houses, barns, silos, corn cribs, etc. The one size and shape builds all.

The simplicity and economy of this construction especially recommends it for use where skilled labor is difficult to obtain and construction costs must be minimized.

Availability

Universal Unit tile is available for immediate shipment in many sections of the south, middle west and west, and additional territory will soon be covered. The nearest sales office or agency can be obtained from the Executive Offices, Scripps Building, San Diego, California.

Specifications

Specifications covering the use of Universal Unit tile for any type of building furnished on request.

Patents

Universal Unit tile is manufactured and sold under the Richard S. Requa patent issued May 25th, 1920. Other United States patents allowed and pending. Canadian patent issued October 12th, 1920. Patents pending, or issued, in all principal foreign countries.

Engineering Service

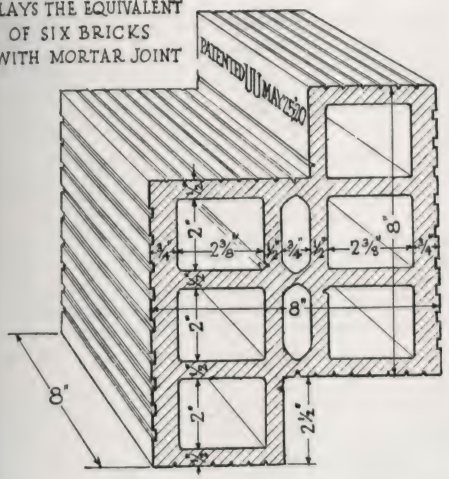
Free engineering service for advice or data concerning construction problems in connection with the use of Universal Unit tile is available at the Executive Offices. Architects, engineers and contractors are invited to freely avail themselves of this service.

Catalogues and Construction Details

Catalogues, detail sheets, miniature samples and general construction data will be supplied from the Executive office or any of the branch offices.

Continued on next page

LAYS THE EQUIVALENT OF SIX BRICKS WITH MORTAR JOINT



UNIVERSAL UNIT TILE

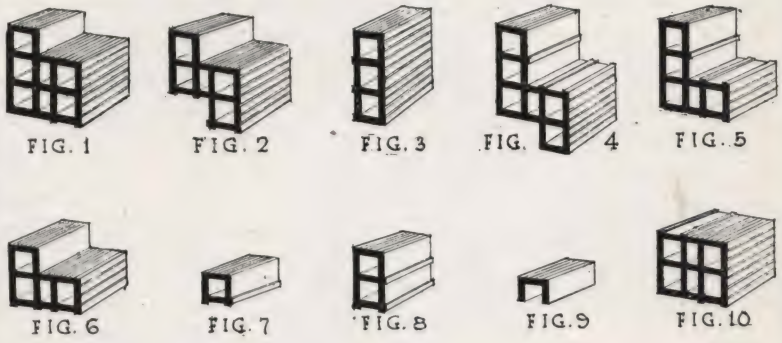
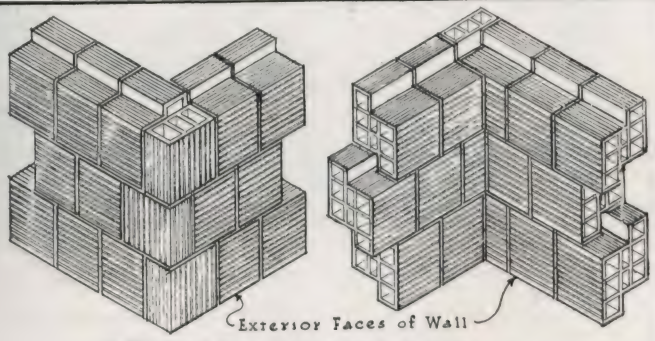
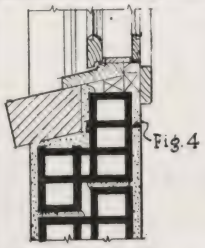


Fig. 1 - Section used for window & door heads, and flush jambs.
Fig. 2 - ⅔ Section used where full unit works too high, etc.
Fig. 3 - Longitudinal half section, used for corners and for constructing walls more than 8" thick.
Fig. 4 - For bonding courses in brick veneer work, under brick window sills, special floor construction, etc.
Figs. 5, 6, 7, 8, 9 & 10 - For special construction, fillers, etc. Fig. 9 is a brick-sized section formed in cutting other special sections, and can be used as starter under std. units, or wherever a brick size piece is needed.

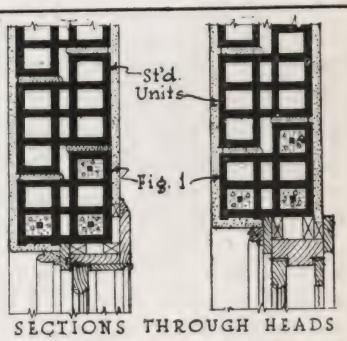
SPECIAL SHAPES CUT FROM STANDARD BLOCKS



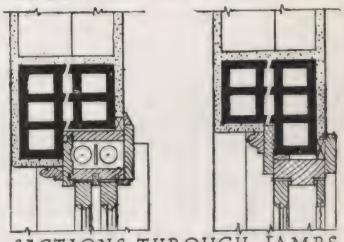
CORNER DETAILS
Note simplicity, strength, and perfect bond.



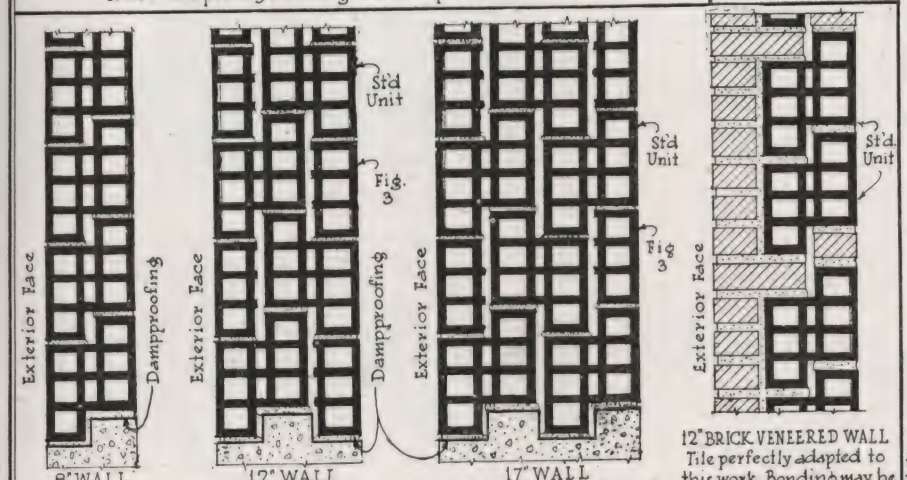
DETAILS OF BRICK SILL
Shown with 8" wall



SECTIONS THROUGH HEADS



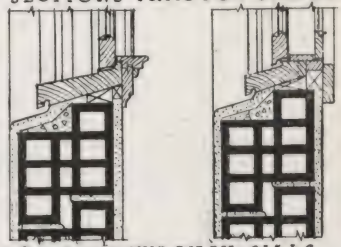
SECTIONS THROUGH JAMBS



Note simplicity of construction, and the waterproof, fireproof, interlocking and load bearing features of these walls.

¾" SCALE DETAILS OF TYPICAL WALL CONSTRUCTIONS

12" BRICK VENEERED WALL
Tile perfectly adapted to this work. Bonding may be every 4th & 7th. course



SECTIONS THROUGH SILLS
¾" SCALE DETAIL OF DOUBLE HUNG WINDOW
¾" SCALE DETAIL OF CASEMENT WINDOW
Note the interlocking bond around openings

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	UNIVERSAL UNIT TILE, SHOWING VARIOUS SHAPES CUT FROM STANDARD BLOCKS & DETAILS OF CONSTRUCTION	SCALE ¾" EQUALS 1'-0" DATE: AUG. '22	DRWG 1

UNITED STATES GYPSUM COMPANY

Floor Tile; Partition and Furring Tile, and Column Covering

205 West Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
BUFFALO, N. Y., Ellicott Square
BOSTON, MASS., 77 Summer Street
WASHINGTON, D. C., 410 Bond Building
BALTIMORE, MD., 910 American Building
PHILADELPHIA, PA., 107 Empire Building
PITTSBURGH, PA., 1723 Oliver Building
CLEVELAND, OHIO, 646 Hanna Building
ATLANTA, GA., 358 Williams Mill Road
CINCINNATI, OHIO, 52 Blymyer Building
DETROIT, MICH., 1360 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 650 Builders' Exchange
ST. LOUIS, MO., 1339 Syndicate Trust Building
KANSAS CITY, MO., 523 Bryant Building
OMAHA, NEBR., 301 Peters Trust Building
DENVER, COLO., 401 Boston Building
LOS ANGELES, CAL., 902 Citizens National Bank Building

Products

PYROBAR FLOOR TILE; PYROBAR PARTITION and FURRING TILE; PYROBAR BEAM and COLUMN COVERING.

For Plaster Board Partition Systems, see pages 307-309; for Gypsum Wall Plasters and Finishes, see pages 368-371; for Reinforced Roof Tile and Monolithic Roof, see pages 899-901; for Sheetrock Wallboard, see page 1128.

Engineering Service

Our Fireproofing Department is organized to cooperate with architects and engineers in the designing of floor systems.

Send in floor plans and the engineers will submit designs for a Pyrobar floor system together with specific information showing the advantages and economies obtained by the use of Pyrobar floor tile.

Pyrobar Floor Tile

Description—Pyrobar floor tile is made of "Structolite," a dense, specially prepared gypsum. The tile is cast with one end-piece integral, thus providing a seal for each row at the girders. Joist facers are made in standard widths of 5 in.; are 1 in. thick and 12 in. long. Special width facers can be furnished.

Advantages—Pyrobar floor tile is easily handled, and is rapidly and economically installed. No nailing is required to hold the tile in place on the forms.

A saving in reinforcing steel and concrete is assured when this tile is used, because its light weight reduces materially the dead load carried by joists and girders.

Form work is reduced to a minimum, as the large units are placed 24 in. on centers.

Spans up to 30 ft. are permissible with this system where light floor loads are involved.

Tests show that concrete poured against this tile is greatly increased in strength.

Pyrobar floor tile acts as a very efficient sound deadener, making it especially desirable for use in hospitals and schools. Used in roof construction, its high insulating value prevents condensation.

By using joist facers between the voids a uniform plastering base is obtained, thus obviating the use of metal lath.

Specification for Pyrobar Floor Tile—The floors and roof shall consist of the Pyrobar Floor Tile System of reinforced concrete construction, as shown on the accompanying plans, and all material and workmanship shall be in strict accordance with these plans and specifications.

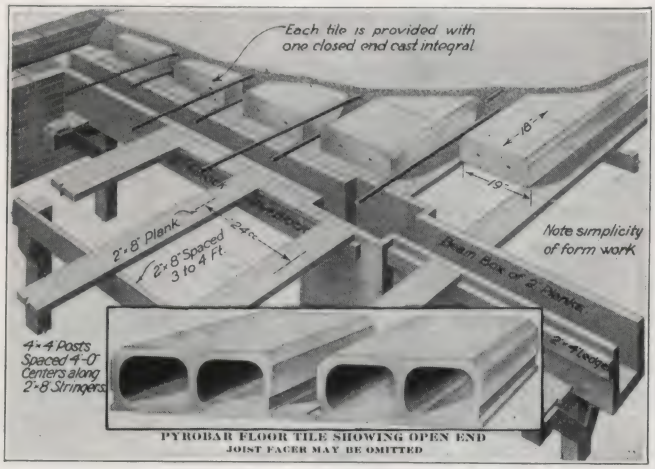
The tile for the floor and roof construction shall be Pyrobar Floor Tile, manufactured by the UNITED STATES GYPSUM COMPANY.

The tile shall be of the sizes indicated on the drawings.

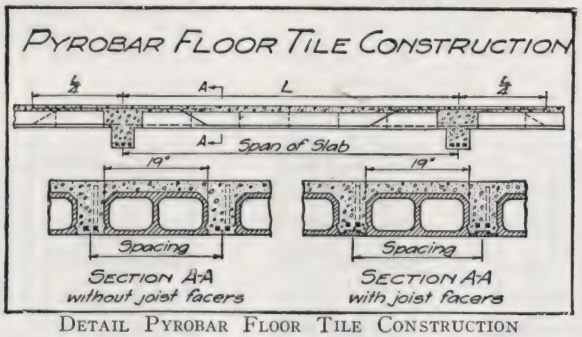
The floor tile shall be accurately spaced to secure the exact joist widths shown. Pyrobar joist facers, if required, shall be laid directly on the forms between the rows of tile. Care must be taken to see that the exact length of joists, as determined by the width of beam tee, is maintained.

In case this length is in odd feet and inches, the floor tile shall be sawed to fit. After all floor tile have been placed, wet tile and forms thoroughly before the concrete is poured.

Specifications for Plastering—See page 370.



PYROBAR FLOOR TILE SHOWING OPEN END
JOIST FACER MAY BE OMITTED



DETAIL PYROBAR FLOOR TILE CONSTRUCTION

Concrete Top	Joists						
		JOISTS WITHOUT FACERS					
		Depth of Tile	6"	8"	10"	12"	12"
		Width	5"	5"	5"	5"	6"
		Spacing Center to Center	24"	24"	24"	24"	25"
2"		Wt. of Conc. & Tile per Sq. Ft. of Floor Area	54#	60#	68#	76#	80#
2"		Cu. Ft. of Conc. per Sq. Ft. of Floor Area	0.28	0.32	0.35	0.39	0.42
2"		Sq. Ft. of Floor Area for One Yd. of Conc.	96	86	77	70	65
2"		Core Area in per cent of Section	58	62	65	67	64
3"		Wt. of Conc. & Tile per Sq. Ft. of Floor Area	66#	72#	80#	88#	92#
3"		Cu. Ft. of Conc. per Sq. Ft. of Floor Area	0.36	0.40	0.43	0.47	0.51
3"		Sq. Ft. of Floor Area for One Yd. of Conc.	74	68	62	58	53
3"		Core Area in per cent of Section	51	56	60	62	60
		JOISTS WITH FACERS					
2"		Wt. of Conc. & Tile per Sq. Ft. of Floor Area	52#	59#	67#	75#	78#
2"		Cu. Ft. of Conc. per Sq. Ft. of Floor Area	0.26	0.30	0.33	0.37	0.40
2"		Sq. Ft. of Floor Area for One Yd. of Conc.	102	91	81	74	68
2"		Core Area in per cent of Section	60	64	67	68	66
3"		Wt. of Conc. & Tile per Sq. Ft. of Floor Area	64#	71#	79#	87#	90#
3"		Cu. Ft. of Conc. per Sq. Ft. of Floor Area	0.35	0.38	0.42	0.45	0.49
3"		Sq. Ft. of Floor Area for One Yd. of Conc.	78	71	65	60	55
3"		Core Area in per cent of Section	54	58	61	64	62

Weights of tile per lin. ft.: 6 in. deep, 26 lbs.; 8 in., 29 lbs.; 10 in., 35 lbs.; 12 in., 41 lbs.

Continued on next page

Pyrobar Partition and Furring Tile

This very light, tough, underwriter-approved, fireproof tile is made of the highest grade calcined gypsum. Used for fireproof partitions, steel column protection, wall furring, stair and elevator enclosures, warehouse partitions, pipe chases, heating and vent ducts, etc.

Stainproof—Pyrobar is made from pure gypsum that can not produce stains nor mar decorations.

Sound Resisting—Tests prove that a plastered Pyrobar partition is more effective in preventing the transmission of sound than any other similar partition of same thickness.

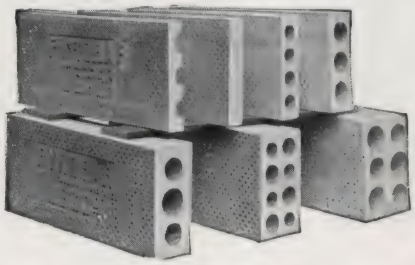
Distinctive Economy—Pyrobar tile are large units—two and one-half times the size of clay tile. Every Pyrobar tile is straight and true. It requires less plaster than clay tile. Partitions require not over ½ in. of plaster on a side to finish.

Cost—Its extreme lightness and large, true units secure economy in freight, labor, handling, erecting and plastering, and of material in laying up and plastering.

SIZES AND WEIGHTS OF PYROBAR PARTITION TILE

Thickness (Alltile 12"x30")	Ceiling height, ft.	Weight tile per sq. ft., lbs.	Weight plaster, 1 side, per sq. ft., lbs. (½ in. grounds)	Total weight, plastered 1 side, per sq. ft., lbs.	Weight plaster, 2 sides, per sq. ft., lbs. (½ in. grounds)	Total weight plastered 2 sides, per sq. ft., lbs.
1½-in. split	Furring	4.9	3	7.9	....	....
2-in. split	Furring	6.4	3	9.4	....	....
2-in. solid	10	9.4	3	12.4	6	15.4
3-in. hollow	13	9.9	3	12.9	6	15.9
3-in. solid	15	13.0	3	16.0	6	19.0
4-in. hollow	17	13.0	3	16.0	6	19.0
5-in. hollow	25	15.6	3	18.6	6	21.6
6-in. hollow	28	16.6	3	19.6	6	22.6

This company will erect Pyrobar partitions.



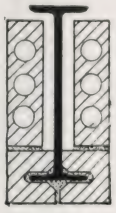
PYROBAR GYPSUM PARTITION AND FURRING TILE

Pyrobar Beam, Girder and Column Covering

Pyrobar tile, used for fireproofing steel beams, is a combination of special gypsum shoe tile and standard Pyrobar partition tile. Columns are usually covered with standard solid or hollow Pyrobar partition tile. The shoe tile is moulded to conform with the steel shapes.

Pyrobar beam and column covering is light in weight, which decreases the dead load of structural steel; can be easily cut and fitted; is uniform in size and shape; and affords a straight and true base for plastering.

Gives maximum fire protection and insulation of steel framing.



PYROBAR BEAM COVERING

Specifications for Pyrobar Partition and Furring Tile

Partitions—Unless otherwise specified or shown, all partitions shall be built of UNITED STATES GYPSUM COMPANY'S Pyrobar Tile, of thickness indicated on plans. All partitions shall be started on the fireproof floor, and the tile shall be set plumb, straight and true, and shall be wedged at ceiling and slushed with mortar. The corners of all partitions shall be built log cabin fashion, the tile alternating back and forth.

Furring—All outside walls, where shown on plans, shall be furred with Pyrobar Tile of thickness and type indicated on plans, laid up against the wall. Where solid or hollow furring tile are used, these shall be securely spiked to the wall every square yard with 10d steel cut nails. Metal ties or other approved methods for securing furring to the masonry may be used.

Shafts, Openings and Ducts—All pipe chases, dumbwaiter shafts, heating and vent ducts, etc., where shown on plans, shall be constructed with 2-in. solid Pyrobar Tile, unless otherwise specified.

Mortar and Laying—All Pyrobar Tile shall be laid up in mortar composed of any brand of the UNITED STATES GYPSUM COMPANY'S unfibered gypsum cement plaster (retarded for 4-hour set) 1 part plaster to 3 parts, by weight, of clean, sharp, dry sand, thoroughly mixed. (Important: Do not use Portland cement or lime mortar.) No mortar shall be re-tempered. All tile shall be laid with full, flush joints to a line, with horizontal beds uniformly level on each course. All joints, chinks, and crevices between the tile and other work shall be filled with mortar well slushed in. All partitions coming in contact with existing walls shall be anchored by driving spikes into the walls in the joints of each course. The wood door bucks shall be anchored to Pyrobar Tile by driving 10d cut nails into every course of tile.

Lintels—Openings in partitions of tile not greater than 22 in. may be spanned with a single tile, which shall have a bearing at each end of not less than 4 in. When such openings are more than 22 in. but not more than 4 ft., the Pyrobar tile over these openings shall be laid in the form of a jack-arch. Openings over 4-ft but not over 6-ft. shall be spanned with reinforced gypsum lintels. Openings over 6-ft. shall be spanned by metal lintels of approved design.

Wood Frames—The carpenter contractor shall set and secure the rough bucks for openings ahead of the contractor for this work so as to cause no delay. These bucks shall be left plumb and true by the carpenter and shall be made of 2-in. lumber of the same width as the thickness of the partitions, and there shall be ½x2¾-in. grounds nailed to the bucks, forming a rabbet to receive the Pyrobar Tile.

Trim—All wood or metal trim shall be of such design as to completely cover any junction between metal bucks or furring and the plaster coats.

Baseboards and similar trim shall be secured to grounds or to nailing blocks set in the tile construction for this purpose. Nailing blocks shall be not less than ⅞ in. thick, shall be nailed directly to the end of the gypsum tile and shall be of such other dimensions as to completely cover the end of the tile. When nailing blocks are used they shall be spaced not to exceed 30 in.

Chair rail, picture moulding and plaster grounds shall be secured as is herein specified for baseboards.

Blackboards, toilet and heavy fixtures shall be secured by bolting through the tile construction, or shall be nailed to nailing blocks not less than 1½ in. thick of the character required for other trim, and spaced not to exceed 15 in.

Plastering—See specifications for plastering Pyrobar Gypsum Tile, Nos. 15, 26, or No. 30, on page 370.

Specifications for Pyrobar Beam and Column Covering

Column Covering—All exposed interior columns shall be covered with Pyrobar Tile, of thickness indicated on plans. These tile shall be laid in log cabin fashion and the vertical joints shall be broken.

Girder and Truss Covering—All girders, beams and trusses, unless otherwise specified, shall be covered with Pyrobar Beam Covering Tile in accordance with the standards of the UNITED STATES GYPSUM COMPANY.

Mortar and Laying—See above specification for mortar and laying Pyrobar Tile.

Plastering—See specifications for plastering Gypsum Tile, Nos. 15, 26 or No. 30, on page 370.

ZENITHERM COMPANY, INC.

Manufacturers of Sound, Heat and Fire Resistive Materials

TELEPHONE
STUYVESANT 5565

OFFICE AND SALESROOM
22 East 17th Street
NEW YORK, N. Y.

FACTORY
RUNYON, N. J.

Products

The Universal Building Material known and specified as ZENITHERM, for Floors, Interior and Exterior Wall Facing, Roofing Tile and Shingles, Stair Treads and Risers, Wainscoting, Sanitary Base Trim, Store Fronts, Show Window Floors, Showroom Decorations, etc.

Where Used

For sun porches, libraries, terraces, decorative floors and walls, apartments, lobbies, entrance halls and stairways, hotels, dining rooms, office buildings, public buildings for all wall and floor surfaces, churches—interior and exterior with broken ashlar, theaters—for wall and floor areas.

What Is Zenitherm?

Zenitherm is a fire resistive material, made under heavy hydraulic pressure. It will not warp, shrink or expand. It is made in slabs ½ in., 1 in. and 2 in. in thicknesses 18 in. x 48 in. It can be sawed, nailed and carved, and set by either capenters or masons. The material comes in variegated shades of mottled ivory. Stock cutting sizes for tile—5½ in., 8⅜ in., 11½ in. and 17½ in. For ashlar heights, 17½ in., 11½ in., 8⅜ in. and 5½ in.—lengths, 47½ in. ½-in. material weighs 3 lbs. a sq. ft. 1-in. material weighs 6 lbs. a sq. ft.

Zenitherm is a material that should be used as an ashlar; a highly decorative effect is obtained in any plain, unbroken surface on account of its harmonizing tones and textures.

Joints

Tight joints are recommended. Where joints are required as a feature, the edges of slab are slightly beveled forming a V-joint.

Application

Zenitherm can be applied to masonry or wood backing and can be either nailed or anchored and plastered, meeting any condition found on construction work. Zenitherm is shipped in tile sizes and in ashlar sizes cut to the coursing heights and in full length slabs which are cut and jointed in the field.

Facilities

We can furnish Zenitherm for floors or ashlar for walls in large quantities at short notice.

A Few Installations

These installations represent Zenitherm used as a flooring, insulation, acoustic, and for decorative purposes for both inside and exterior:

Office of Pease & Elliman, New York, N. Y.
Mosse Store, Fifth Ave., New York, N. Y.
Board Room, Anaconda Copper Co., New York, N. Y.
Park Hotel, Plainfield, N. J.
Fashion Park Clothing Co., Rochester, N. Y.
Cadillac Motor Car Co., Detroit, Mich.
American Can Co., New York, N. Y.
Safe-Cabinet Company, Marietta, Ohio
National City Bank, New York, N. Y.
South Congregational Church, Springfield, Mass.
New Jersey Law School, Newark, N. J.
Eastman School of Music, Rochester, N. Y.
Stroheim & Romain, Hecksher Building, New York, N. Y.

THREE APPLICATIONS OF ZENITHERM

CONKLING-ARMSTRONG TERRA COTTA CO.

Wissahickon Avenue and Juniata Street
PHILADELPHIA, PA.

AGENCIES IN PRINCIPAL CITIES

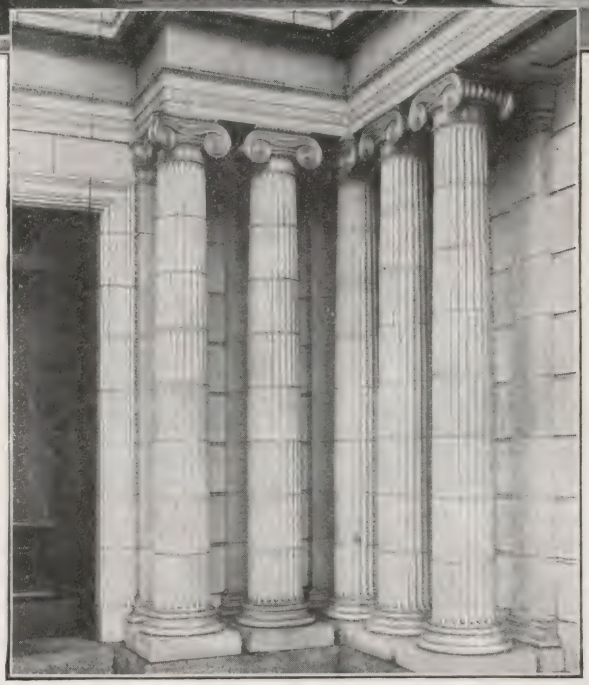
Products

ARCHITECTURAL TERRA COTTA of highest quality.

Services

As one of the largest terra cotta concerns in the country, the Conkling-Armstrong organization is in an exceptional position to execute, from sketch drawings if necessary, work of any description, however artistic, complex or technically difficult, and of any magnitude whatever.

Information, specific or general, covering any matter relative to terra cotta and its use gladly supplied on request and without obligation.



Quality

Conkling-Armstrong material has long represented the best in terra cotta both as to satisfactory appearance and permanence. This has been the result of studied investigation, not only of the material, but allied facts such as support, mortar, setting, pointing, etc.

Delivery

Large centrally located plant assures convenient delivery to any part of the United States.

Representative Work

PHILADELPHIA, PA.

Baptist Publication Building, Frank Miles Day (now Day & Klauder), Architect
Broad Street Station, Furness, Evans & Co., Architects
Bulletin Building, E. V. Seeler and F. C. Roberts, Architects
Stanley Theater, Hoffman, Hennon Co., Architects

NEW YORK, N. Y.

Waldorf Hotel, H. J. Hardenberg, Architect
Wanamaker Store, D. H. Burnham & Co., Architects

BOSTON, MASS.

Filene Building, D. H. Burnham & Co., Architects

And over 5000 others.

THE ATLANTIC REFINING COMPANY DISPLAY BUILDING, 40TH AND WALNUT STREETS, PHILADELPHIA, PA.
W. G. WILKINS CO., Architects, Pittsburgh, Pa.

The above building, from top of granite steps, is built entirely of terra cotta. The general tone effect is ivory white, with but a touch of color in the green letters of the name panel

ATLANTIC TERRA COTTA CO.

350 Madison Avenue
NEW YORK, N. Y.

SOUTHERN FACTORY
ATLANTA, GA., Atlanta Terra Cotta Co., Citizens & Southern Bank Building

DISTRICT OFFICES
ATLANTA, GA. DALLAS, TEX.

PLANTS
PLANT 1: TOTTENVILLE, S. I., N. Y.
PLANT 2: PERTH AMBOY, N. J.
PLANT 3: ROCKY HILL, N. J.
SOUTHERN PLANT: EAST POINT, GA.
Eight miles from Atlanta

REPRESENTATIVES

AKRON, OHIO
ATLANTA, GA.
BIRMINGHAM, ALA.
BOSTON, MASS.
BUFFALO, N. Y.
CHARLESTON, W. VA.
CHARLOTTE, N. C.
CHATTANOOGA, TENN.
CINCINNATI, OHIO
CLEVELAND, OHIO
COLUMBUS, OHIO
DALLAS, TEX.
DETROIT, MICH.
FAIRMONT, W. VA.
GRAND RAPIDS, MICH.
HALIFAX, N. S., CAN.
HAMILTON, ONT., CAN.
KNOXVILLE, TENN.
LOUISVILLE, KY.
MONTREAL, QUE., CAN.
NASHVILLE, TENN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
NORFOLK, VA.
PITTSBURGH, PA.
QUEBEC, QUE., CAN.
ROCHESTER, N. Y.
ST. JOHNS, N. B., CAN.
ST. LOUIS, MO.
SCRANTON, PA.
TAMPA, FLA.
TOLEDO, OHIO
TORONTO, ONT., CAN.
WASHINGTON, D. C.
WILKES-BARRE, PA.
YOUNGSTOWN, OHIO

Products and Services

Atlantic Terra Cotta.
Garden Pottery.
Chimney Pots.
Buildings cleaned (Masonry of any kind).

Printed Information

"Questions Answered," a booklet of general information.
Garden Pottery catalogue.
"Atlantic Terra Cotta"—issued monthly.
"Store Fronts and Stock Material," issued by Atlanta Company.

©

Uses of Terra Cotta

For facades, as illustrated in skyline photograph by the Woolworth Building (entirely of Atlantic Terra Cotta for 52 stories on all elevations); for entrances, window trim, mouldings, cornices and panels; for interior sidewalls and ceilings; for important rooms in hotels, banks, and rotundas of public buildings.

For exterior or interior construction and decoration with masonry, steel or reinforced concrete frame.

Modeled Detail

Atlantic Terra Cotta is plastic before being burned. In modeled detail the only limits are the limitations of the modeler. The Atlantic Terra Cotta Co. employs modelers of recognized skill.

Surface Finishes

For unglazed colors, smooth or tooled surface. For glazed colors, matt or lustrous. For conglomerate colors, rough-cut, picked, stippled, crandalled, bushhammered, smooth-, light- and rough-drag and special surfaces made in the mould or applied by hand while the terra cotta is in a plastic state.

Colors

Many shades of gray, buff, brown and red in unglazed, vitreous colors. White, creams and ivories in matt or lustrous glaze. A practically unrestricted range of blue, green, sienna, purple, yellow, lavender, etc., in matt glaze. Scarlet and gold either matt or lustrous.

Conglomerate colors are combinations of colors that occur in natural geological formations and a wide variety is possible.

Polychrome

Two or more colors on one piece or pieces of different color set in juxtaposition. Generally five or six colors are used. The Woolworth Building used nine colors in the modeled ornament for their color value and to accentuate the shadows of the modeling.

Fire Resistance

Atlantic Terra Cotta is made by fire and can not burn. There are many instances of buildings completely gutted by fire while the outside walls of Atlantic Terra Cotta were unimpaired.

Cost of Atlantic Terra Cotta

Atlantic Terra Cotta, in its widest application, is made especially for the building in which it is to be used, and is intended to occupy a certain place in that building. The designer is not restricted by standard dimensions.

Catalogue material, however, is coming into increasing use for small, conventional store fronts, banks, garages, filling stations, and small buildings in general. Our catalogue, in addition to a few complete designs, contains string courses, cornices, capitals, door and window trim and numerous details which the architect can incorporate at will in his design.

To determine the cost of Atlantic Terra Cotta for the great majority of buildings on which catalogue material can not be applied, the architect should submit the following drawings: floor plans and elevations drawn to scale, sections showing projections, and sketch details. When specifications have been prepared, they should be sent with the drawings. Details such as the amount and character of the modeling, and the color or colors should be indicated.

Continued on next page

The architect may either inspect the models at the Atlantic Plants or approve them from photographs the Atlantic Company will submit.

On all contracts, complete construction drawings, subject to the architect's approval, are prepared for the builder. The construction drawings show the location of every piece and its attachment to the frame. Accompanying the drawings, if necessary, is a schedule of iron rods and anchors for the iron contractor's bid.

Notification of plans to be estimated should be sent to the main office of the Atlantic Company, or to the nearest representative.

Southern Factory

The Atlantic Company operates a Southern Branch at Atlanta, Ga., under the name of Atlanta Terra Cotta Company, and separately managed. The Atlanta product equals the standard established by the northern Atlantic factories, and the architects of the South will find the Atlanta Company convenient in location and prepared to meet their requirements in every way.

Atlantic Service at the Building

It is a very simple matter to erect Atlantic Terra Cotta. The setting drawings prepared by the Atlantic Company on every contract are complete in detail and any builder can follow them. These drawings are prepared under the supervision of our chief draftsmen and engineer of standards; men who by training and experience are authorities on terra cotta construction.

Where the contract is of sufficient size to warrant it, the Atlantic Company will, if desired, erect the terra cotta. The advantages are many. Naturally, we know how to handle Atlantic Terra Cotta to the best advantage and we take an interest in the work. The responsibility is entirely ours from the time we receive the order until the Atlantic Terra Cotta is manufactured, shipped and set in the building. The following specifications should be used:

All terra cotta shall be set by the terra cotta manufacturer. Hoisting services, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse shall be furnished to the terra cotta manufacturer free of charge by the mason contractor. The mason contractor shall do the necessary backing up of the terra cotta as the work progresses.

Where the terra cotta is not to be set by the terra cotta manufacturer, we shall, if requested, furnish a competent man to assist in sorting and handling the terra cotta, and in general to facilitate the work. The customary method is to place this expert terra cotta mason on the contractor's payroll at the current New York wage rate. This is not an extra expense to the contractor as the terra cotta mason takes the place of one of the masons who would be employed, and is able by his experience and knowledge of terra cotta setting to reduce erection costs. The contractor is required to pay traveling expenses to and from New York or Atlanta, and a weekly allowance for board. If the work is of such scope or character that the proper handling and setting of the terra cotta can be advanced by the use of an Atlantic terra cotta mason, the following specifications should be used:

The terra cotta manufacturer shall furnish, at the expense of the setting contractor, a competent terra cotta mason to assist in sorting, selecting, handling and setting the terra cotta.

Service at the building is under the direction of our service department.

Cleaning Buildings

After a building has stood for years in a large city, dust and soot sometimes mar its freshness and cleaning may be advisable.

Atlantic Terra Cotta does not absorb dirt and can be easily restored to its original cleanliness. While this is not true of other materials to the same extent, cleaning will always improve the appearance.

While frequently buildings take on a soft patina that adds to their beauty, there are many cases where an accumulation of dust is unsightly.

We are prepared to execute cleaning contracts for every type of masonry, and our experience insures thorough satisfaction.

Cleaning operations are also under the direction of our service department.

Times Building, New York
Eidlitz & McKenzie, Architects
During process of cleaning by Atlantic Terra

Filling Station for Atlantic Refining Co.
East Liberty, Pittsburgh, Pa.
Joseph Kuntz, W. G. Wilkins Co., Architect
Entirely of matt glazed ivory
Atlantic Terra Cotta

New York City's Terra Cotta Line
More than half the visible building material is Atlantic Terra Cotta. The Woolworth Building, Cass Gilbert, Architect, represents a building entirely of Atlantic Terra Cotta for 52 complete stories on all elevations

FEDERAL TERRA COTTA CO.

Manufacturers of a Superior Grade of Architectural Terra Cotta

FACTORY
WOODBRIDGE, N. J.

MAIN OFFICE
101 Park Avenue
NEW YORK, N. Y.

WESTERN OFFICE
Book Building
DETROIT, MICH.

SALES REPRESENTATIVES IN PRINCIPAL CITIES

Product

ARCHITECTURAL TERRA COTTA for exterior and interior use.

Colors and Finishes

Complete lines of unglazed standard colors, such as gray, buff, red, etc., with hard burned vitreous surface; matt and full glazed white, cream, and polychrome finish.

All surface finishes are hard burned, impervious to weather conditions, and permanently durable.

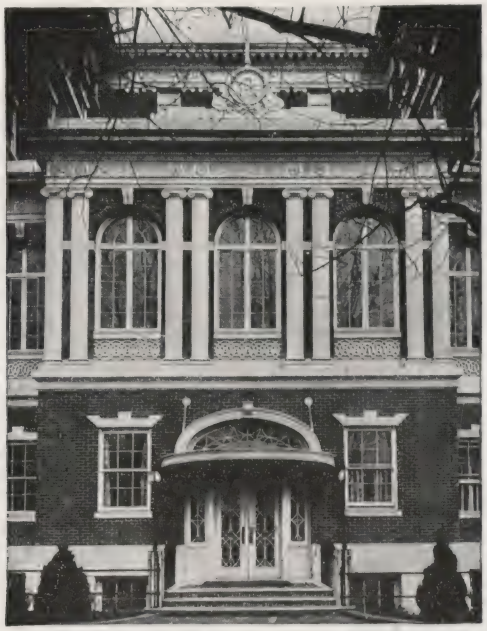
Specialties

Terra Cotta Granite and Terra Cotta Marble—Reproduce exactly the color, texture and general appearance of the natural material. Samples furnished on request.

Unusually Large Pieces—With careful study of jointing to conform to architect's scale and design.

Service

Development of preliminary drawings to show adaptability and construction of terra cotta.



RACQUET CLUB, WASHINGTON, D. C.
J. HENRI DE SIBOUR, Architect
A notable example of a building trimmed with Federal terra cotta marble. Note size of pieces in lower work

Representative Work

BUILDING	LOCATION	ARCHITECT	BUILDER
Equitable Building	New York, N. Y.	Graham, Burnham & Co.	Thompson-Starrett Co.
Wolverine Hotel	Detroit, Mich.	L. P. Rowe	Fridstein & Co.
Public Service	Baltimore, Md.	Parker, Thomas & Rice	J. Henry Miller, Inc.
Munson Building	New York, N. Y.	Kenneth M. Murchison	Geo. A. Fuller Co.
Guaranty Trust Co.	Butler, Pa.	Weary & Alford Co.	Weary & Alford Co.
Waggoner Building	Fort Worth, Tex.	Sanguinett & Staats	C. S. Lambie Co.
Rosenthal Building	Boston, Mass.	Monks & Johnson	Gascoigne & Linenthal, Inc.
United Fruit	New Orleans, La.	Diboll & Owen, Ltd.	Geo. A. Fuller Co.
Racquet Club	Washington, D. C.	J. Henri de Sibour	Harry Wardman

ESTABLISHED 1810

GALLOWAY TERRA COTTA COMPANY

Manufacturers of Galloway Pottery
3200 Walnut Street
PHILADELPHIA, PA.

Products

GALLOWAY GARDEN and DECORATIVE POTTERY and TERRA COTTA, including Flower Pots, Boxes, Vases, Bird Baths, Sundials, Tables, Benches, Hermes and Statuary; CHIMNEY CAPS.

Also Architectural Terra Cotta.

Finish

Standard finish, light stony gray. Red, cream, and special finishes made on order.

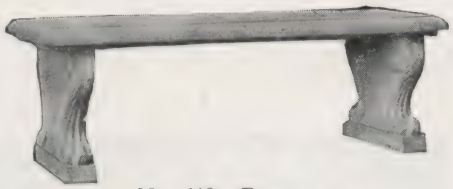
Chimney Caps

Can be supplied in a number of stock patterns for standard flues. Special caps will be made on order. State requirements in writing for information.

Catalogue

A catalogue of Galloway Pottery will be sent on request. Illustrations of chimney caps can also be sent.

No. 603. FLOWER POT
28 in. wide. Made in other sizes



No. 642. BENCH
Top of Indiana limestone; supports of light stony gray terra cotta

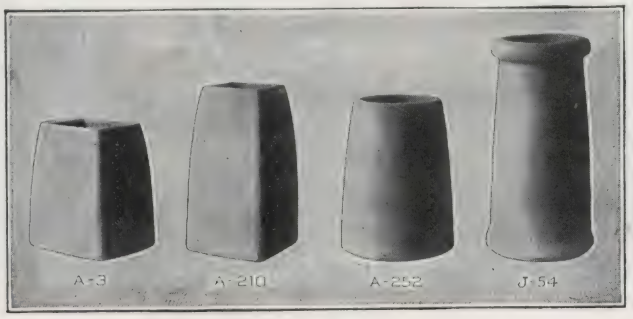
No. 713. FLOWER POT OR WELL CURB
32 in. wide. Executed for Chas. M. Schwab
CHARLES E. LEAVITT, Landscape Architect

No. 541. VASE
32 in. high, 24 in. wide

LARGE JARS
In the garden of Joseph C. Baldwin, at Mt. Kisco, N. Y.
BENJAMIN MORRIS, Architect

No. 183. ANTIQUE VASE
35 in. high

No. 275. CRETAN JAR
44 in. high. Cast from the antique



CHIMNEY CAPS

No. 595. BIRD FONT
48 in. high, 29 in. wide

O. W. KETCHAM

Ornamental and Structural Burnt Clay Products

121-125 North 18th Street, South of Parkway
PHILADELPHIA, PA.

FACTORY
CRUM LYNNE, PA.

BRANCH OFFICES
NEW YORK, N. Y., 1170 Broadway
BALTIMORE, MD., American Building
WASHINGTON, D. C., Home Life Building

Products

Manufacturers of ARCHITECTURAL TERRA COTTA.

Also special Moulded Brick, and Hand Made "Ageart Terra Tile" for Roofing, which is made in any size, shape, color or texture.

Dealers in Hollow Tile Fireproofing; Clay Roofing Tile, Decorative Inlaid and Faience Tile; Enameled, Salt-glazed. Paving and Face Brick.

Services

Architects desiring expert advice on architectural terra cotta construction, brick or fireproofing may feel free to call upon us for such service.

Extensive exhibits of our products may be seen in all our offices, and descriptive booklets or samples may be had on request.

We also erect our own hollow tile fireproofing: exterior walls, partitions, floors, column and girder coverings, etc. Our work in this line includes many of the largest factories, office buildings, warehouses and residences.

A FEW EXAMPLES OF TERRA COTTA WORK EXECUTED BY O. W. KETCHAM

ECKARDT V. ESKESEN, President and Treasurer — KARL MATHIASEN, Jr., Secretary

THE NEW JERSEY TERRA COTTA COMPANY

ESTABLISHED 1888

Manufacturers of Architectural Terra Cotta

TELEPHONE
Cortlandt 3903, 2767

Singer Building, 149 Broadway
NEW YORK, N. Y.

WORKS
PERTH AMBOY, N. J.

BRANCH OFFICE: 43 Tremont Street, BOSTON, MASS.

AGENCIES

CINCINNATI, OHIO, E. F. Grand Brick Co. — LANSING, MICH., Briggs Co. — DETROIT, MICH., F. B. Holmes & Co.
COLUMBUS, OHIO, Allan Ross Raff — NEW ORLEANS, LA., Erskine W. Fisher — NORFOLK, VA., Grover L. White
MONTREAL, CAN., Webster & Sons — BUFFALO, N. Y., Seneca Clay Co.

Products

Architectural Terra Cotta for exterior and interior of buildings.

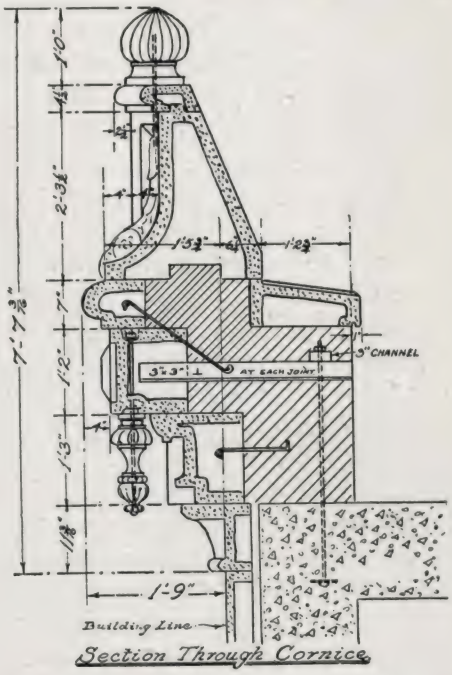
Character and Scope of Work

Ornamented and plain terra cotta in all colors and finishes glazed and unglazed. Highest development of Mottled and "Granite" Finishes.

New Jersey terra cotta is being used in the largest, as well as the smallest, buildings in all parts of the United States and Canada.

Our illustrated booklet on store fronts will be sent on request.

Keith Theater and Office Building, Cincinnati, Ohio
C. W. & Geo. L. Rapp, Architects
The entire street facades and returns from the curb line to top of building furnished in a special glaze of a pinkish shade with splash finish



Section Through Cornice

Detail of Cornice, Keith Theater and Office Building

Detail of Cheneau, Keith Theater and Office Building

THE NORTHWESTERN TERRA COTTA COMPANY

WORKS AND MAIN OFFICE

2525 Clybourn Avenue

CHICAGO, ILL.

AGENCIES IN ALL PRINCIPAL CITIES

Products

ARCHITECTURAL TERRA COTTA in glazed, unglazed, pulsichrome, polychrome (two-color, three-color, four-color, etc.), and fire gilded (gold) ceramic finishes.

Also "Northwestern" Multi-unit Sill for steel sash windows; Faience.

Northwestern Terra Cotta

Glazed Northwestern Terra Cotta is impervious to moisture, and is made in any one of three degrees of gloss, viz: bright, satin and matt.

Unglazed Northwestern Terra Cotta is covered with a slip coating of varying degrees of hardness and sheen.

Either glazed or unglazed material may have a plain, pulsichrome, polychrome, speckled, mottled, granite, old ivory, fire flashed, shaded, blended, or special color treatment.

All ceramic finishes are applied over a mechanical surface finish as selected; either smooth, tooled, drove, irregular drag or combing, bush hammered, rugged, pitted or special.

Quality

Northwestern Terra Cotta is made from carefully selected fire clays, chosen for those qualities which enable them to receive in the plastic condition, and maintain through the drying and burning processes, the form of design desired, with a minimum of warping, twisting or other variation, and with a resultant strength sufficient to fill any reasonable structural requirement.

All surface coatings are scientifically adjusted to the body underneath, to eliminate crazing, parting and other surface defects, and are prepared from formulæ so compounded as to give maximum assurance against undesirable variation in color, when passed through the fire.

As a decorative material adapted to fulfil all the requirements of present day architectural construction, Northwestern Terra Cotta is unsurpassed.

The nature of the raw material and the processes of manufacture permit of a variety in design, color and texture, which renders architectural terra cotta a medium unequalled for the expression of the individuality of the designer and the architect.

Service

To take full advantage of these possibilities requires close co-operation between the designer and an organization experienced in the most highly developed methods of manufacture.

THE NORTHWESTERN TERRA COTTA COMPANY through long experience has built up such an organization, and is in a position to render every assistance to designer and builder, relating to the proper uses and application of its product.

To the *designer* and *architect,* consultation at the initial stage of building promotion is recommended, in order that every advantage may be taken of the possibilities of the material.

To the *builder,* a service is offered which insures prompt deliveries, consistent with promises, and a minimum of time and labor necessary for erection.

To the *owner,* a result is obtained which is certain to yield a big return on his investment and a large measure of satisfaction in having used a material which retains its beauty and usefulness for all time.

Production Facilities

THE NORTHWESTERN TERRA COTTA COMPANY operates the largest plant in the world devoted to the manufacture of architectural terra cotta.

More than forty years' experience has equipped this company with a plant and organization capable of furnishing a quality and service unsurpassed in the entire industry.

Specifications

"Northwestern" has been a short form of specification covering architectural terra cotta quality and service of the highest degree obtainable, for nearly half a century. It needs qualification only with respect to the particular color treatment, mechanical and ceramic finishes desired.

Continued on next page

THE CHICAGO THEATER AT STATE AND LAKE STREETS, CHICAGO

C. W. and GEORGE L. RAPP, Architects

All architectural terra cotta facing on exterior of building, in the lobby, the interior work in rest room and at other points, was manufactured and set by THE NORTHWESTERN TERRA COTTA COMPANY.

NEW YORK ARCHITECTURAL TERRA-COTTA COMPANY

TELEPHONE
ASTORIA 0700

401 Vernon Avenue
LONG ISLAND CITY, N. Y.

Product

ARCHITECTURAL TERRA-COTTA.

Terra-Cotta

Ceramic finishes of proved merit cover such a wide range that the variety of selection presented to architect and owner is almost limitless. The New York Company presents the results of thirty-six years' constant research in this department.

The New York Company applies these ceramic finishes to terra-cotta which has been fabricated to outlast the building of which it will form a part.

Only the highest grade of selected clays, scientifically mixed and thoroughly pugged, tempered and aged enter into the construction of the New York Company terra-cotta.

With solidly pressed faces, sides and ends, all of honest thickness, and with heavy struts adequately placed, each piece of New York Company terra-cotta carries with it the New York Company guarantee.

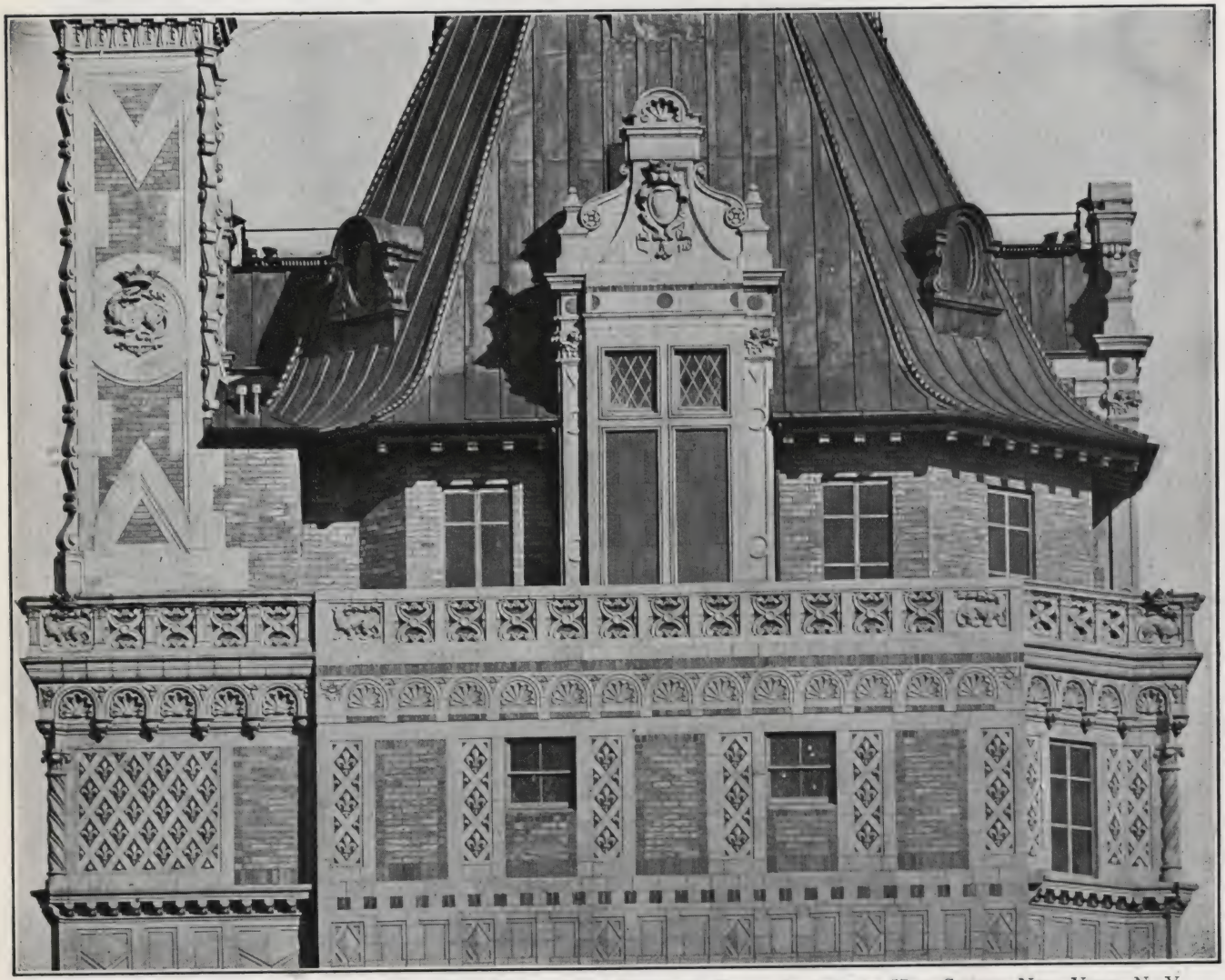
Quality

For thirty-six years the New York Company has manufactured terra-cotta of the highest quality only. Its product meets the most exacting requirements of architect and owner.

Service

The unique location of the New York Company—its plant covers five acres on the East River opposite East 59th Street—enables it to give tail-of-truck deliveries story by story as needed throughout the greater city and the Metropolitan District.

Rail or water shipments are made direct from the plant to out-of-town buildings.



DETAIL OF UPPER STORY OF TERRA-COTTA—THE HECKSCHER BUILDING, FIFTH AVENUE AT 57TH STREET, NEW YORK, N. Y.
WARREN & WETMORE, Architects

TROPICO POTTERIES, INC.

MAIN OFFICE AND WORKS
GLENDALE, CAL.

Products

ARCHITECTURAL TERRA COTTA in all ceramic finishes and colors and with any special surface treatment desired.

GLAZED FAIENCE TILE in all colors.

VITRIFIED and SEMIVITRIFIED BUFF and RED QUARRY TILE.

SALT GLAZED VITRIFIED SEWER PIPE.

Also manufacturers of Fire Clay Flue Lining, Chimney Pipe, Water Pipe, Drain Tile, and kindred products.

TRADE-MARK

for facings of a different character. It may be used with equal success in either exterior or interior work.

The plastic nature of the raw material and the possibilities of variety in the color and texture make architectural terra cotta a medium unsurpassed for the consummation of the architect's ideal in design.

Its fire resisting and sanitary qualities and durability recommend it for use where these considerations are of prime importance.

Production Facilities

TROPICO POTTERIES, INC. operate an up-to-date plant sufficiently large to meet all demands, and maintain an organization well equipped to render a complete and dependable service. Estimates, either preliminary or final, samples, color studies, and suggestions regarding design or construction will be cheerfully furnished at any time on request.

Architectural Terra Cotta

Tropico terra cotta is made from carefully selected fire clays, which receive the desired form of design while in the plastic condition by being hand pressed in plaster moulds. The pieces are then carefully dried by scientific methods which prevent warping or cracking. After drying, the surface coating (called the ceramic finish) is applied by spraying and the material is then burned at a temperature of 2000° Fahr. This burning operation firmly fixes the ceramic finish to the body and, at the same time, develops a strength in the body itself sufficient to fill all structural requirements.

Tropico terra cotta is unexcelled as the material for the entire facade of a building, or as decoration

Faience Tile

A very complete line of matte glazed faience tile in many attractive color and texture effects. These tile are made in 6x6-in., 6x2⅞-in., 2⅞x2⅞-in. and 4¼x4¼-in. sizes. Other sizes can be furnished to meet special requirements. Catalogue sent upon request.

Floor Tile

Our quarry tile is a dry-pressed product, very straight and true and of a pleasing shade of buff and red. Buff quarry tile is made in 6x6-in. and 4¼x4¼-in. sizes; red quarry tile is made in 6x6-in. and 9x9-in. sizes.

Vitrified Salt Glazed Sewer Pipe

Tropico vitrified salt glazed sewer pipe is manufactured by the most modern and approved methods of pressroom and kiln. By the process of vitrification and subsequent salt glazing, a glass surface is formed on both the inside and the outside of the pipe.

There is no other material known, suitable for the manufacture of sewer pipe, that will resist all physical and chemical attacks as will vitrified clay. When once laid, Tropico vitrified clay sewer pipe will last forever.

ORNAMENTAL PANEL FOR J. C. BRICKELL BUILDING, SAN FRANCISCO, CAL.
J. R. MILLER, Architect

NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION

INCORPORATED

HARRIE H. SHERMAN, SECRETARY

31 State Street

BOSTON, MASS.

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GRANITE—Rough, Dressed, and Polished—for Commercial, Public, Monumental, and Residential Building; for Memorials, Ornamental Public Improvements, Landscape Work, Mausoleums, and Monuments.

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GRANITE—Flagging, Riprap, Rubble, etc.

ROCK FACED and SEAM FACED GRANITE.

The Association and Its Functions

The chief aim of this Association is to further the use and sale of granite for building purposes and to advance the general welfare of the building granite industry by co-operative effort.

Co-operative Service—Close co-operation between the architect and the craftsman will produce the best results. This Association has been formed for that very purpose, to offer the knowledge gained by its craftsmen through long experience in this material, in an impartial manner, unbiased by thought of personal profit.

The membership of the Association includes the largest and most important producers of the standard building granites. Approximately 75% of the building granite used east of the Mississippi River is quarried by Association members. Many producers, not members of this Association, have indorsed the policies and indirectly received the benefits of co-operative effort, which is not confined to the membership solely, but is intended to benefit the industry as a whole.

Estimates and Samples—The Association does not quote prices, but requests for preliminary or final estimates will be transmitted to members and estimates promptly obtained.

Requests for samples will be transmitted to members producing the kind and quality of granite desired and information will be furnished as to where certain colors and qualities of granite may be obtained.

Uniform Proposal and Contract—The Association has adopted a uniform Proposal Blank which is used by all members in submitting estimates. This proposal form standardizes all the estimates as to terms and conditions.

Uniform Contract Forms have been adopted by the Association and are recommended for general use on contracts for granite work. One form has been provided for granite work delivered, and another form for granite work set in place complete. These contract forms embody the terms and conditions upon which the proposals are based, and have been carefully studied with a view of equity to both parties.

The Association has adopted a Code of Practice bearing particularly on bidding with a view of placing competition on a fairer basis and eliminating the old cut-throat methods which have been detrimental to the best interests of all parties concerned.

Competition—The Association, by its impersonal publicity, and through its reports to members, insures a wider and more intelligent range of competitive granite bids, backed up by the best organized and equipped plants in the building industry.

Continued on next page

Architects may easily secure for the owner a larger number of responsible competitive granite bids by referring their requests for bids through the Association.

Architects and general contractors are invited to advise the Association concerning prospective work, calling for granite, giving the date where possible when bids will close. This information will be transmitted to the members and will result in bids which might not otherwise be secured.

Architectural Uses of Granite

Granite has many and varied qualifications adapting it for architectural uses. Its natural qualifications are unsurpassed by any other material for exterior building purposes. The durability, hardness, and toughness of granite is so well established that it scarcely needs any comment. Granite occurs, and is produced, in a wide range of colors and textures.

Granite is often considered as adapted only to plain or massive work. That granite may be carved with as much fineness and delicacy of detail as marble, for instance, has not been generally known, but is nevertheless a well established fact. There are many fine examples where granite carving and detail can not be surpassed in any material—with the added feature that this detail will retain its sharpness and delicacy indefinitely, unaffected by action of weather or time.

Granite has a well recognized value as a commercial building material, due to its strength and durability. It is also preeminently adapted for perpetuating architectural masterpieces, where ultimate results outweigh mere cost consideration. Modern tools and appliances have made it possible to execute fine architectural details and carving in granite within reasonable time and cost, having in mind the worth-while result.

Design of Detail to Reduce Cost—When cost is an important factor the application of certain fundamental principles in design, which take into account the methods of cutting granite and the elimination of minor details, which tend to increase expense out of proportion to their architectural merit, will enable very substantial savings to be made.

The best results will be secured at the minimum of cost when details are worked out for granite rather than just for stone as is generally the case. It has frequently happened that application of these principles has reduced the total cost very materially. The Association will appreciate every opportunity to make suggestions in this connection.

Description of Granite

Granite is a holocrystalline, granular rock of igneous origin. The essential constituents are quartz and a potash feldspar. The principal accessory mineral is usually either mica or hornblende. Other minerals occur in small quantities, but are generally secondary to those mentioned.

The accessory mineral mica, occurs in two forms—black mica or biotite, and white mica or muscovite. The hornblende in building granite is usually black or a very dark green.

Granites are usually classified by the predominating accessory mineral. The most common varieties of building granites are known as biotite, muscovite, biotite-muscovite, muscovite-biotite, hornblende, biotite-hornblende, and quartz-monzonite.

As a general rule the color of granite is determined by that of its feldspars, and the hardness by the quartz and feldspars, varying according to the proportion and hardness of the feldspars.

Colors and Textures—The granites produced by Association members include many shades of gray, lavender, pink, red, green, brown, buff and white.

Natural texture varies according to the distribution and size of crystals of the constituent minerals. Granite is graded as to grain by the size of its feldspar crystals, from very fine to very coarse. The size of crystals or coarseness of grain has practically no bearing on the structural qualities, but gives to granite the variety of texture which adds greatly to its architectural possibilities.

Physical and Chemical Tests

The standard building granites so far exceed all ordinary architectural requirements as to chemical and physical properties, that specific data on tests has little or no bearing upon the relative architectural merits of the different granites.

In confirmation of this, the following statement, prepared by Mr. G. F. Loughlin of the U. S. Geological Survey is quoted in full:

"Physical tests have supplemented actual experience in the use of granite by showing that it exceeds the requirements for the tallest and most exposed buildings to a great degree. With this fact demonstrated, the actual results of strength and porosity tests are of little significance; far less than an accurate knowledge of the component minerals and their state of preservation as revealed by the microscope.

"Recorded crushing strengths of granite may serve as relative measures of soundness provided the tests were all made on machines that are calibrated alike and provided enough samples of each granite are tested to show its range in strength, also provided all samples are prepared with equal care; but as even the lowest recorded results obtained under unfavorable circumstances are far above the maximum required for the tallest buildings, the fact that the crushing strength of one granite is somewhat more than that of another should be of no concern to the architect or builder. Only when monuments of solid masonry and of unusual height are to be erected or when paving stone for extremely heavy traffic is to be laid, do crushing tests of granite need any consideration.

"Transverse breaking strengths of granites are also quite adequate to support any load that they are expected to support in buildings. There is much more danger of cracking from uneven settling of foundations than from overloading, and examples can be shown where granites with the highest recorded transverse strength have cracked when the load upon them was relatively low.

"Issues have been raised at times regarding the porosity of granite. Unweathered granites such as are supplied to the high class building trade are for all practical purposes absolutely impervious except close to the surfaces of blocks where minute cracks have been developed during splitting or tooling. 'Porosity' varies with the number and depth of these cracks. Differences in 'porosity' may indicate which granites are most likely to 'blister' from frost action if tooled too severely. If 'blistering' takes place it extends only to the depth of the minute surface cracks and thereafter weathering effects are imperceptible. That granite weathers in nature is undisputed, but conditions of weathering in the walls of a building are much less severe and not strictly comparable, and the time necessary for unweathered and properly fabricated granite to show appreciable effects of weathering in buildings is too long to cause concern except for monumental structures intended to last for thousands of years.

"Chemical analyses of granite, as usually recorded, are of little or no value from the builder's standpoint. For proper interpretation they require microscopic study. Such study supplemented by examination of the granite in the quarry and in the building, will disclose the essential facts regarding weathering qualities and other important questions. Such study may result in a call for special chemical tests, for example, to determine permanency of color, and then specific directions should be given to render the test thorough. For most granites, however, competent examination in the quarry and in structures supplemented by microscopic study will give all the information needed without resort to any physical or chemical tests."

Continued on next page

Quarrying

In selecting granite for building purposes, the quarry is the first essential and most vital consideration. The principal requirement of a building granite is ability to produce, in quantity, granite of the particular color, texture and sizes required and the quarry must be so equipped that the output may be handled and shipped promptly and at a rate to meet cutting requirements.

The Association quarries without exception meet the above requirements. They are all quarries of established reputation and have been developed to meet the requirements of quantity production. The only practical limit to sizes of individual blocks for specific purposes is that of transportation.

Most of the quarries are operated in conjunction with their own cutting and finishing plants, which handle the bulk of the quarry output, although several of the quarries ship part of their output in the rough to outside cutting plants and one Association quarry ships practically all of its output in the rough.

Cutting and Finishing

Modern time requirements demand that building granite plants be well equipped with machinery and appliances for handling and manufacturing. Association plants include the largest and best equipped plants of their kind in the country.

Granite is delivered from the quarry in rough blocks—some already split to approximate dimension sizes and others in random sizes to be drilled and split to dimension or sawed into slabs for ashlar or polished work. Pneumatic drills are universally used for drilling up rough stock or slabs, and pneumatic hand tools for cutting the edges, mouldings, and for carving.

Pneumatic surfacing machines rough down large surfaces, and point or cut them to the form and finish required. Surfacing machines also bush saw slabs to the various cut finishes, core and rough out heavy checks or mouldings, recess for panels, rough and finish the surface of columns, rough out the flutes and similar work.

Polishing machines are used for producing rubbed, honed, or polished work, from surfaces prepared either by surfacing machines or saws. Steel shot, carborundum and emery are used as abrasives for grinding down the surfaces, and heavy felt faced wheels gloss the surface thus ground, using oxide of tin and water. Small surfaces, mouldings, etc., are rubbed and polished by hand.

Round work, such as balusters and columns, are usually turned to required finish in specially built lathes using disc cutters. Lathes are also used for polishing round work. Several Association plants are equipped to do turned work for plants not so equipped.

Carborundum machines are coming into more general use in granite plants for special work such as cutting checks, rabbets, arrises, and for freeing flutes and mouldings.

Saws are used for cutting up blocks into slabs of various thicknesses, leaving smoothly finished surfaces, ready for bushing or polishing.

Handwork is required in finishing practically every piece of architectural granite, and a good journeyman granite cutter is one of the most skillful craftsmen in industry today. No tool or machine can displace this craftsman—his skill of hand and eye is as indispensable today as when the Egyptians cut their granite temples.

The handling, machining, sawing, and polishing of granite consumes power in relatively large quantities, and the power plant is one of the most important accessories to the direct cutting and finishing operations. Blacksmith shops, carpenter shops, and repair shops are also necessary accessories.

Carving and Models

Granite can be carved with the same delicacy of treatment and detail as much softer and less durable stones. The development of the pneumatic carving tool, and the skill which granite craftsmen have acquired in its manifold uses, have made it possible and practical to carve granite to almost any extent desired.

In the preparation of details and models for granite carving three points should be considered: the color and texture of the granite; location in the building as to distance from the eye; and location as to sunlight.

Color and texture regulate to a material extent the decorative value of the detail produced. Delicate detail would generally be wasted on a granite composed of coarse granite, strongly contrasting mineral constituents. In a fine grained light colored granite or a coarser grained granite, in which the component minerals produce a more nearly uniform tone, delicate details would appear more nearly in their true relative values.

Distance from the eye should regulate the character of detail and treatment. For work near the eye, the finer details would be more effective, and for work distant from the eye bolder detail, having greater light and shade values, would be more appropriate and at the same time more economical.

Location as to sunlight is generally the least considered point of all. A southerly exposure would obviously have greater light and shade value than a northerly exposure, and the detail and mass should be considered according to the exposure.

With the assurance that the craftsman has the ability to produce almost any result required in granite carving, under modern conditions, it lies chiefly with the architect and the modeler to get the best results with the greatest economy. Consideration of the three points above mentioned will be of very material aid.

Standards of Quality

It will be noted under "Physical and Chemical Tests" that these standard building granites come well within all possible requirements of architectural use, so that standards of material are unnecessary. The cutting properties of the granites from different quarries vary quite materially and it would be very difficult to define standards of workmanship.

Quality of workmanship has been graded by usage into three classifications, which, while somewhat elastic and difficult to define exactly, are pretty well established and recognized by the manufacturers.

Monumental Building Grade—For permanent buildings designed to perpetuate public pride or civic spirit, where utility and economy are subordinate to architectural merit, such as state house, courthouse, library or public memorial.

Good Commercial Grade—For high class buildings designed both for utility and to express something of the character, dignity and stability of the occupancy, such as banks or insurance buildings, high class office buildings, churches, schools, etc.

Ordinary Commercial Grade—For buildings where architectural appearance is subordinate to utility and governed by economic considerations. Workmanship will meet requirements of structural safety, but not carried beyond the point of a good appearance to the casual observer.

Continued on next page

CLASSIFICATION OF BUILDING GRANITES
Quarried and cut by Association Members
White, Gray, Lavender, Pink, Red, Green, Buff, Brown

Name of granite	Producer and manufacturer	Location of quarry	Grain	Color	Technical classification
Bethel White	Woodbury Granite Co., Hardwick, Vt.	Bethel, Vt.	Coarse inclined to medium	White-faintly mottled with gray	Quartz-monzonite
Mount Airy	North Carolina Granite Corp., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	Lemmerman & Hoffman Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	Mt. Airy Granite Cutting Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
Mount Airy	J. D. Sargent Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray	Biotite
North Jay	Maine & New Hampshire Granite Corp., North Jay, Me.	North Jay, Me.	Fine	Very light gray	Biotite-muscovite
Chelmsford Gray	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Fine and medium.	Light gray	Muscovite-biotite
Milford, N. H.	Lovejoy Granite Co., Milford, N. H.	Milford, N. H.	Fine inclined to medium	Light gray	Quartz-monzonite
Stone Mountain	Stone Mountain Granite Corp., Stone Mountain, Ga.	Stone Mountain, Ga.	Moderately fine	Light gray	Biotite-bearing muscovite
Concord	John Swenson Granite Co., Concord, N. H.	Concord, N. H.	Fine to medium.	Light to medium gray	Muscovite-biotite
Concord	New England Granite Works, Westerly, R. I.	Concord, N. H.	Fine to medium.	Light to medium gray	Muscovite-biotite
Connecticut White	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Waterford, Conn.	Fine	Medium buff gray, hammers light	Quartz-monzonite
Westerly Blue-White	New England Granite Works, Westerly, R. I.	Westerly, R. I.	Fine	Bluish gray	Quartz-monzonite
Woodbury Gray	Woodbury Granite Co., Hardwick, Vt.	Woodbury, Vt.	Medium	Medium gray	Biotite
Rockport Gray	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Medium gray, slight bluish-green tinge	Hornblende
Stonington Pink-Gray	Rodgers Granite Corp., 271 W. 125th St., New York, N. Y.	Deer Isle, Stonington, Me.	Coarse	Pinkish-lavender tinted, medium gray	Biotite
Goss Pink	John L. Goss Corp., Stonington, Me.	Crotch Island, Stonington, Me.	Coarse	Pinkish-lavender tinted, medium gray	Biotite
Conway Pink	Maine & New Hampshire Granite Corp., North Jay, Me.	Redstone, N. H.	Coarse.	Light pink mottled with large gray and small black spots	Biotite
Jonesboro	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Jonesboro, Me.	Coarse inclined to medium	Pinkish gray	Biotite
Red Westerly	New England Granite Works, Westerly, R. I.	Westerly, R. I.	Medium inclined to coarse.	Reddish-gray speckled with black	Biotite
Moose-a-bec Red	Rockport Granite Co., Rockport, Mass.	Jonesport, Me.	Coarse	Dark reddish-gray with white and pinkish feldspar	Biotite
Rockport Sea-Green	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Dark olive-green-gray with black spottings	Hornblende
Conway-Green	Maine & New Hampshire Granite Co., North Jay, Me.	Redstone, N. H.	Coarse	Dark yellowish-greenish-gray with black spottings	Biotite-hornblende
Somes Sound	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Mt. Desert, Me.	Coarse inclined to medium	Light grayish-buff	Biotite
Rockport Seam-Face	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium	Dark yellow-brown, bright rust-brown, light yellow-brown	Hornblende

Color Plates

Color reproductions of nineteen standard American granites were published in the Association catalogue in SWEET'S ARCHITECTURAL CATALOGUE, Fifteenth Edition, pages 177 to 192. Reference is made to these color plates as valuable in making preliminary selections for color and texture.

The above catalogue and color plates have been reprinted by the Association in the form of a booklet entitled "Architectural Granite." A copy of this booklet will be sent to any architect or prospective user of granite on application to the Association Secretary.

Plates Showing Surface Finishes

The half-tone reproductions on the second and third pages following illustrate the standard grades of finishes most commonly used on exterior building granite work. The reproductions are full size and have been prepared from a standard gray granite of fine to medium grain and of a light to medium gray color.

The relative cost of the different finishes illustrated, for any particular kind of granite, runs in the same order as the plates are numbered, with rock-face as the less expensive and polished as the most expensive.

The color and texture of a granite should be considered in selecting the grade of finish, as well as the type, and design of building, its location, atmospheric conditions, and relative cost considerations.

Continued on next page

Surface Finishes

The surface finishes most frequently used for granite on building work, arranged in the order of their relative cost are:

Rock-faced, pointed, pean-hammered, four-cut, six-cut, eight-cut rubbed, and polished. These terms are frequently misunderstood and sometimes misapplied.

The following brief description of finishes most generally used are therefore given:

Rock Face—Generally the least expensive finish, but with decorative as well as utilitarian value.

The relative cost varies according to the grade of work required.

The grades vary from ordinary split or quarry face ashlar with split or roughly squared beds and joints, to carefully quarried faces having practically uniform projection, beds, joints and arrises as carefully and accurately cut as for hammered work, and sometimes with rusticated or tooled margins.

Pointed Work—Coarse, medium, and fine pointed are the three general distinctions for grade of pointing, with many special grades for certain texture effects.

Hand pointing and machine pointing differ slightly in general appearance, machine pointing being generally more uniform. Special pointing will usually necessitate handwork. In general the point depressions in fine pointing will be approximately 3/8 in. apart, medium pointing 5/8 to 3/4 in., and coarse pointing 1 to 1 1/4 in.

Where special pointing is required, a sample should first be prepared under the architect's personal supervision. Beds, joints and arrises will conform to the method of use and grade of pointing.

Pean-hammered—Finish is adapted to rougher work such as steps, curbings, house or mill sills and thresholds, or on portions of high class work which require level finished surfaces, but which are not exposed to the eye.

In general this finish is somewhat coarser and less regular than four-cut and the point marks are not entirely eradicated by the axing.

Four-, Six-, and Eight-cut—These surfaces are finished by bushing with the patent bush hammer. This is a hand hammer with patent head having two opposite jawlike openings approximately 7/8 in. wide, in which are firmly bolted sets of 4, 6 or 8 cutting blades as the case may be.

Four-cut work is frequently and erroneously described as 4 cuts to the inch. Actually the four-cut hammer leaves nearer 5 cut marks to the inch, as 4 cutting blades are clamped into the 7/8-in. opening of the jaw; 6 and 8 cuts to the inch are likewise improperly so termed.

To produce four-cut work the rough split face is taken out-of-wind and reduced to an approximately level surface by pointing. This pointed surface is then further leveled and smoothed by cross-bushing with either a pean-hammer or four-cut, removing all trace of the pointing. This surface is then bushed with a sharp four-cut hammer, the bushing being kept parallel and in the required direction, until the entire surface is uniformly bushed to a true and level surface. The finished bush marks are not necessarily continuous or mechanically precise, but the resultant surface has the appearance of being uniformly corrugated to the fineness determined by the hammer used.

Six- and eight-cut finishes are simply continuations of the four-cut process, each coarser hammer being used consecutively, until the required finish is reached.

Pneumatic surfacing machines are also used for bushing, especially on larger surfaces, following practically the same routine as above described for hand bushing. Sawed surfaces are bushed under the surfacing machines, in which case the pointing process is unnecessary.

Ten-cut and Twelve-cut—These surfaces are also produced, but the finer finishes are less frequently used on regular building work, being more applicable to monumental or special work.

Texture and character are emphasized by the coarser cuts.

Rubbed and Honed Work—Produced by grinding a pointed or sawed surface under the polishing mill. The grade of rubbing is determined by the extent to which this grinding process is carried from coarse rubbed, with small surface scratches, adapted to work requiring fine finish but not close to the eye, to honed finish which is the last stage just before glossing, with dead smooth surface, practically free from scratches.

Small surfaces and mouldings are generally rubbed or honed by hand and the relative expense of this finish is materially affected by the amount of handwork necessary.

Polished Work—Produced by glossing, under a heavy felt coated wheel, a surface previously rubbed and honed. A durable and mirrorlike polish can only be obtained by carrying the grinding and glossing processes to their extreme stages, leaving the surface free from scratches, dull spots, or indications of stun marks from tooling.

Under modern methods, practically every standard granite may be polished to a satisfactory gloss suitable and durable for most ordinary requirements. Generally the harder granites and those containing the least mica content take a higher and more durable polish than the softer granites and those with abundant mica particles.

The preparation of the surface for polishing is almost as important as the polishing processes. Sawed surfaces are well adapted for polishing, and when surfaces are prepared by hand or machine pointing, sufficient excess material should be left for grinding to avoid stun marks in the finished surface.

Selecting the Finish

The following general suggestions will indicate methods of selection, which depend on the type and design of building, color and texture of the granite, location and atmospheric conditions.

Large scale work: rock-face, pointed and the coarser cuts. Small scale work: the finer cuts.

Rock-face, pointed, pean-hammered, and four-cut for economy, and rock-face and pointed for decorative effect in conjunction with hammered work and other materials.

Six-cut for average work, combining economy with good architectural effect.

Polished for base courses, portions subject to traffic stain, lower stories where exposed to smoky atmosphere, and for decorative effect.

Rubbed or honed where fine finish is required and for softened tone and texture effects.

Polished finish is practically impervious to stain or weather. Fine finishes will keep clean longer than coarser finishes, particularly where subject to atmospheric dirt and dust.

The possibilities of combining different grades of finish are almost unlimited, and combinations of different granites are used extensively with splendid architectural results.

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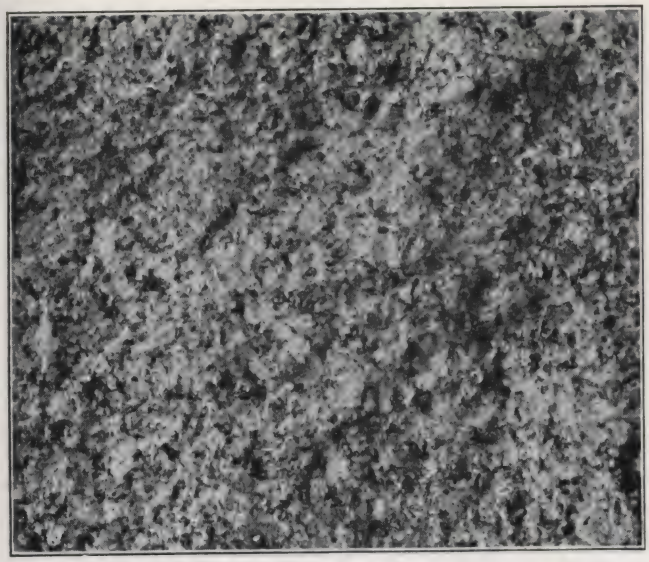

Plate No. 1. Rock-Face

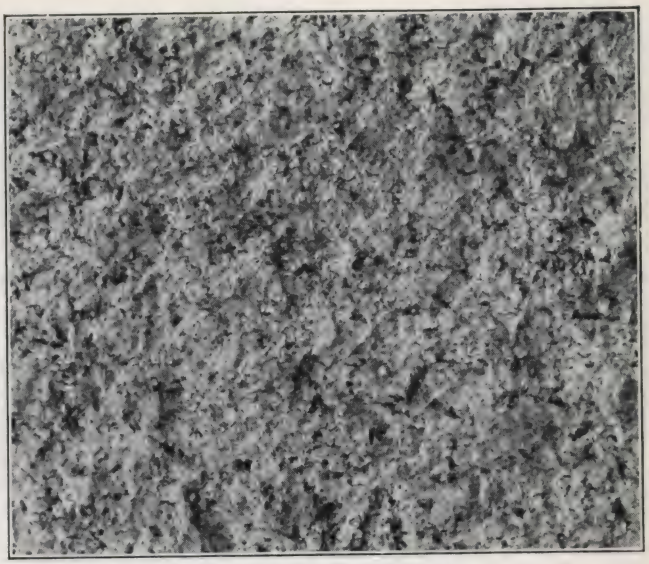

Plate No. 4. Medium Pointed

Plate No. 2. Pean Hammered

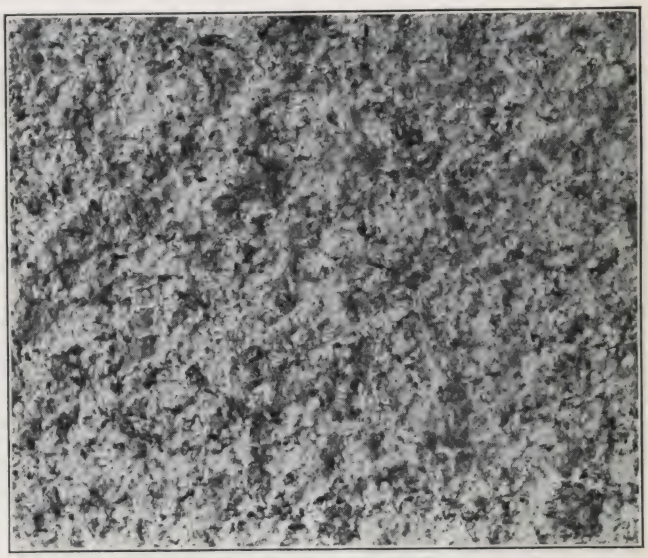

Plate No. 5. Fine Pointed

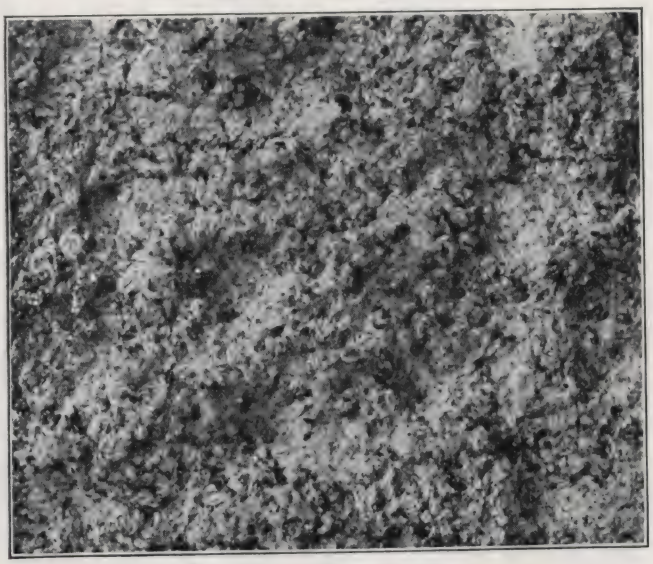

Plate No. 3. Coarse Pointed

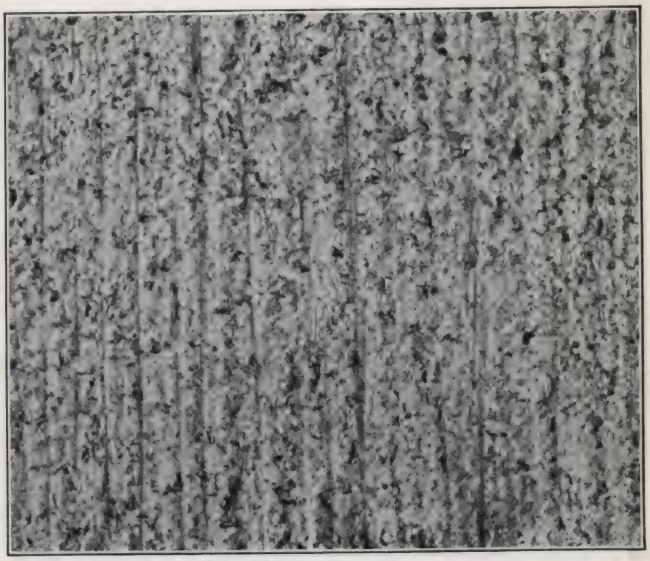

Plate No. 6. Four-Cut

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK

Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

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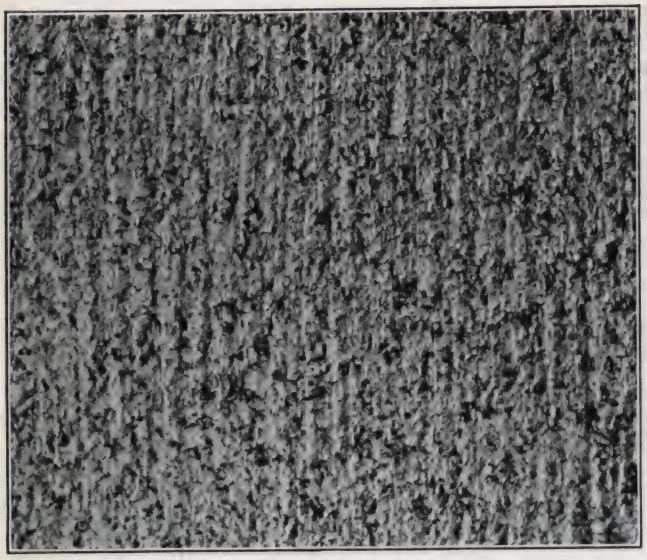


Plate No. 7. Six-Cut

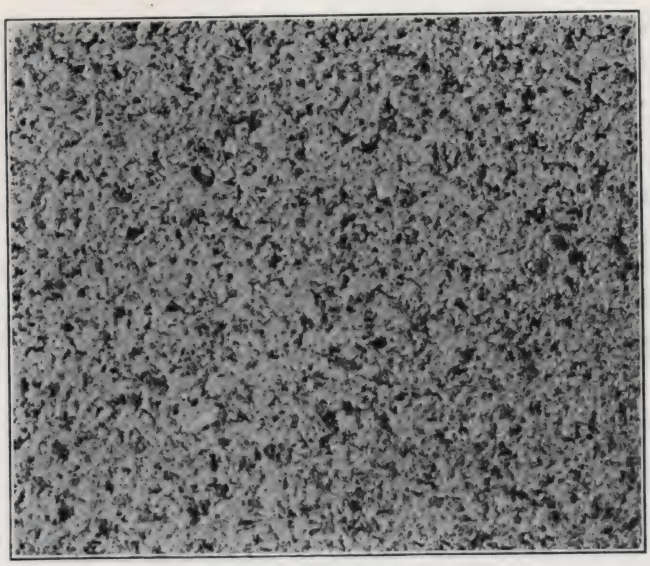
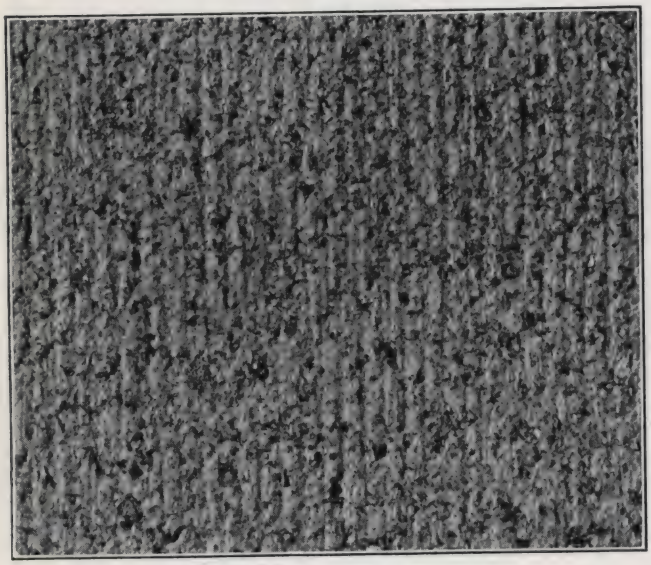


Plate No. 10. Rubbed



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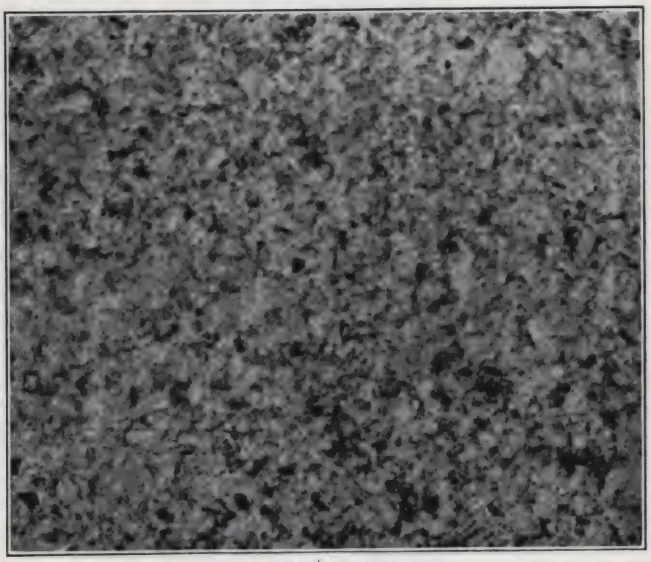


Plate No. 11. Honed

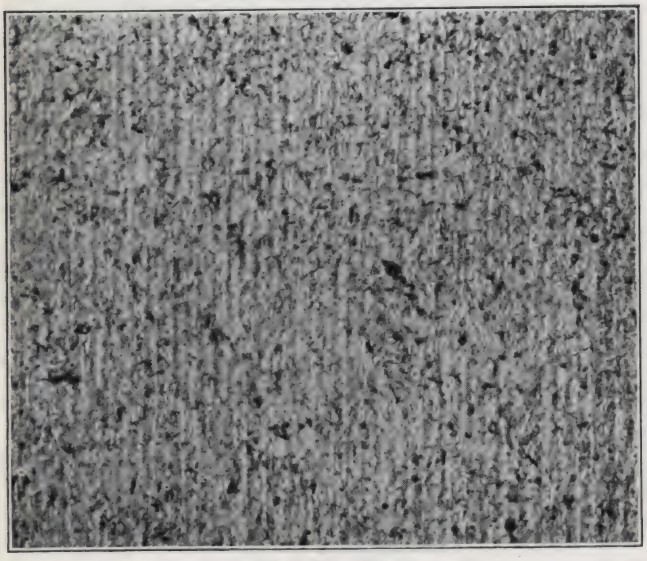


Plate No. 9. Ten-Cut

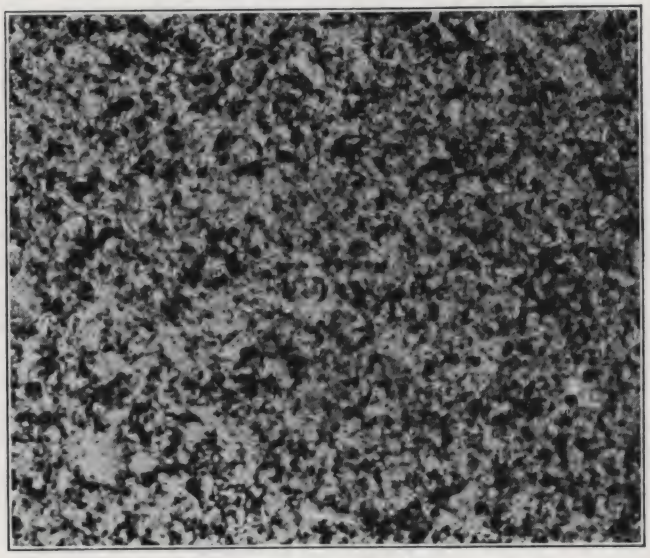
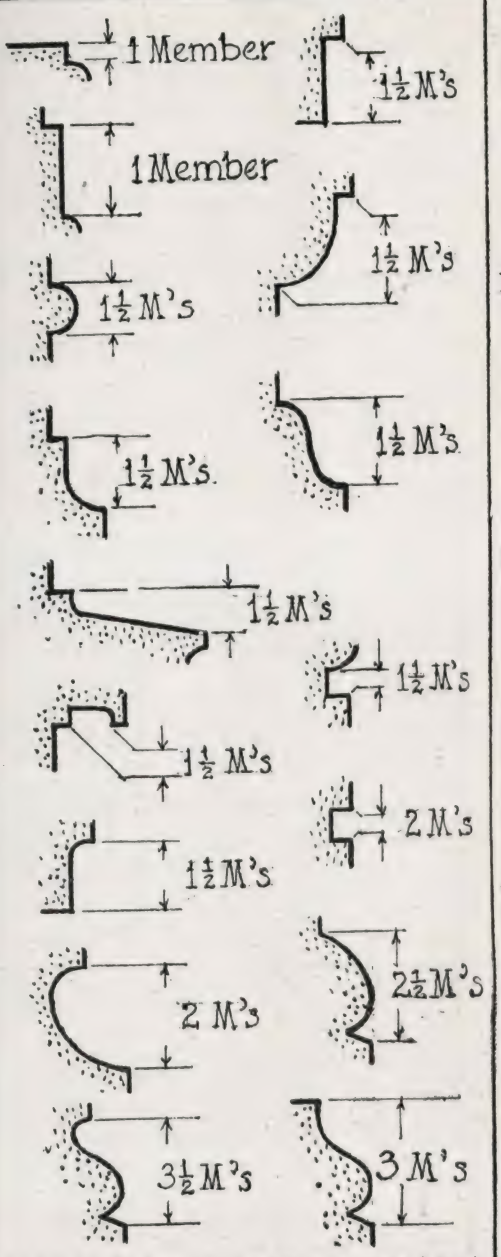


Plate No. 12. Polished

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK

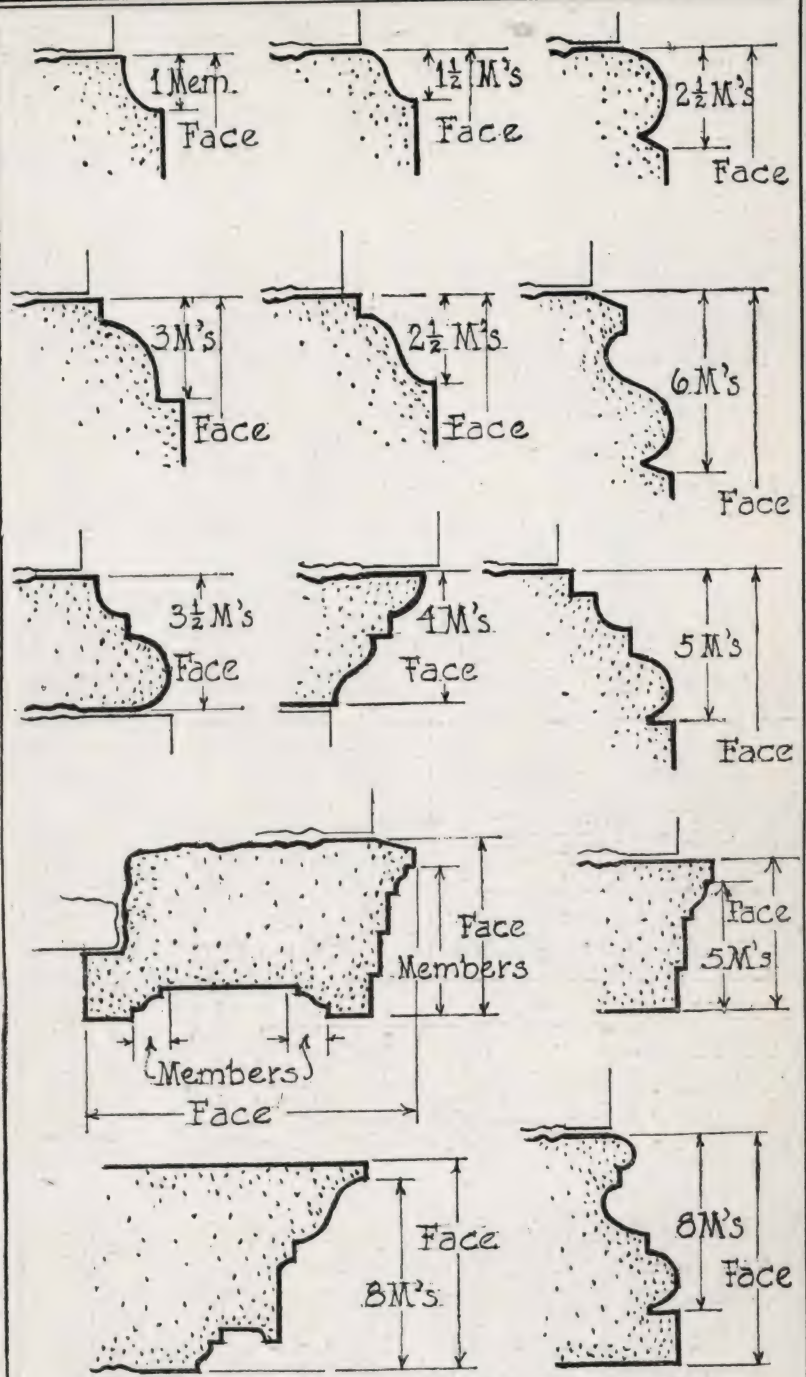
Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

Continued on next page

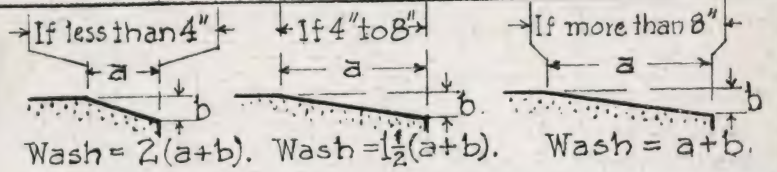


GENERAL MEMBER CHART

In general every 4 inches or fraction thereof is counted as one MEMBER. One lineal foot of member is approximately equal to the cost of one square foot of plain work.



EXAMPLES OF APPLICATION

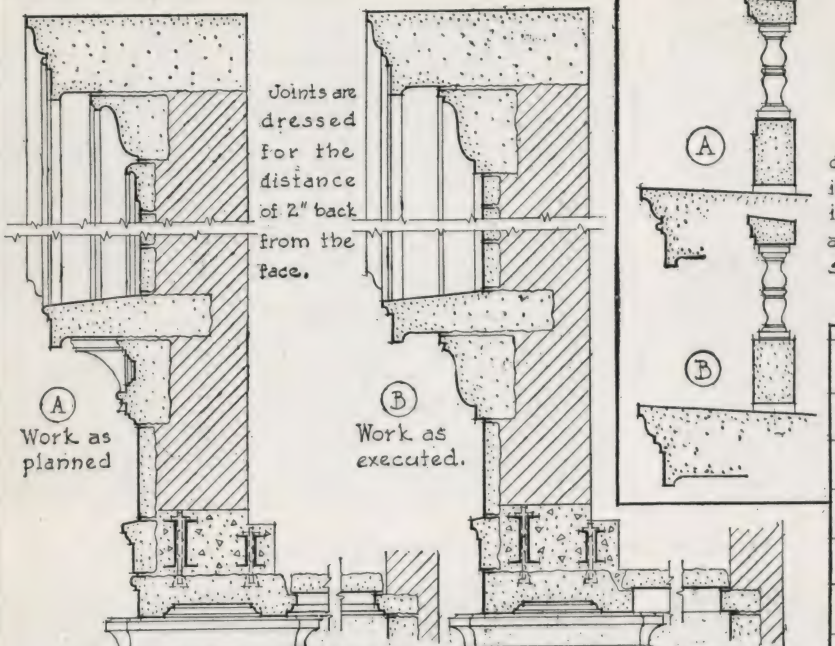


Wash = 2(a+b). Wash = 1½(a+b). Wash = a+b.

RELATIVE VALUE OF WASH OR CHAMFER IN TERMS OF PLANE SURFACE

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	UNITS USED AS BASIS FOR ESTIMATING COST OF GRANITE MOULDINGS	NOT DRAWN TO SCALE DATE-JUNE-20	DRWG. 1

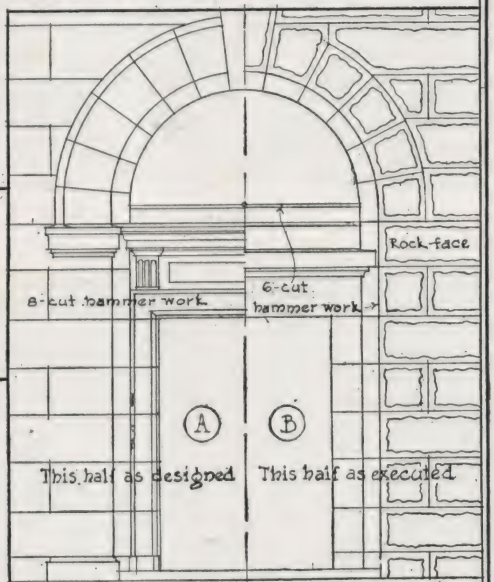
Continued on next page



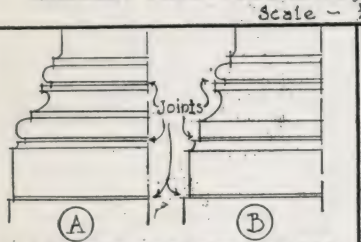
SECTION THRU PEDIMENT, CORNICE, & SOFFIT OF COLONNADE
Scale - ¼" = 1'-0"

Diagram "A" shows stone (or brass) dowels, an expensive method of anchoring balusters. Diagram "B" shows an inexpensive but practical method of anchoring with cement, with just as satisfactory results.

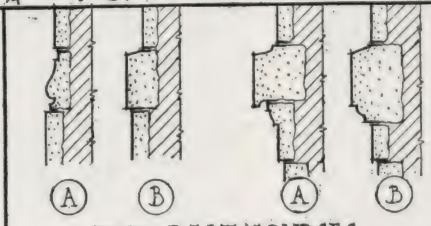
BALUSTRADES



ELEVATION OF ENTRANCE.
Scale - ⅛" = 1'-0".



COLUMN & PILASTER BASES
Scale - ¼" = 1'-0"



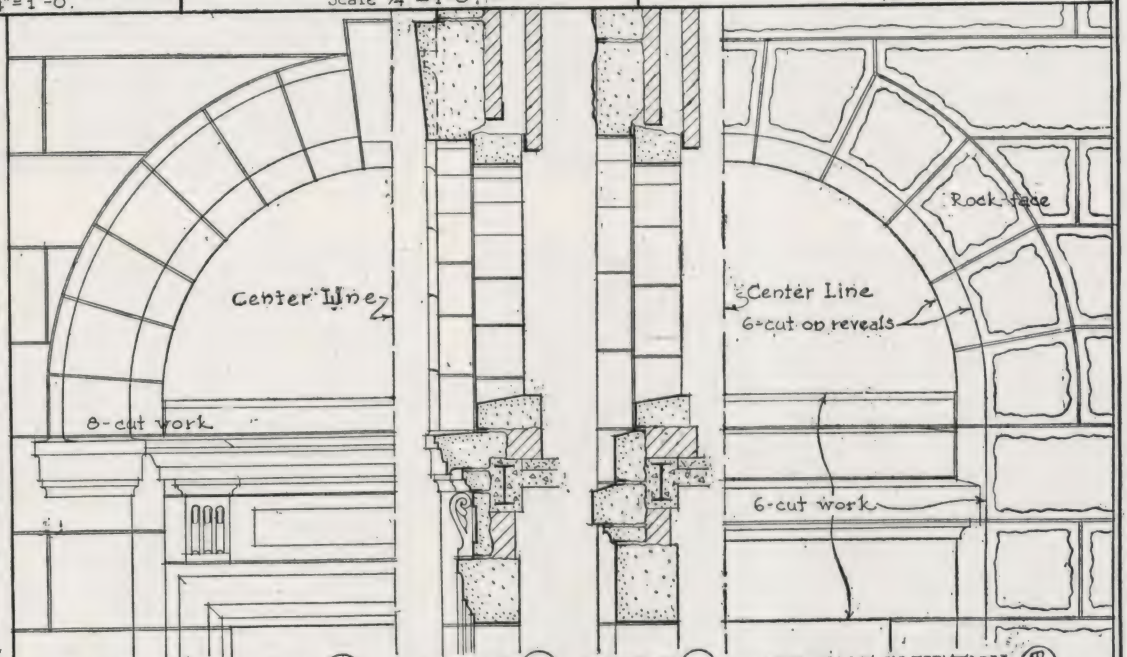
TWO BELT COURSES
Scale ¼" = 1'-0"

NOTES

This sheet shows changes made in the details of an actual building in which the mouldings were simplified, & the surfaces below the 1st fl. level were changed to rock-face & hammered trim, with a saving of $75,000 on the granite work.

Details "A" show mouldings as originally designed.

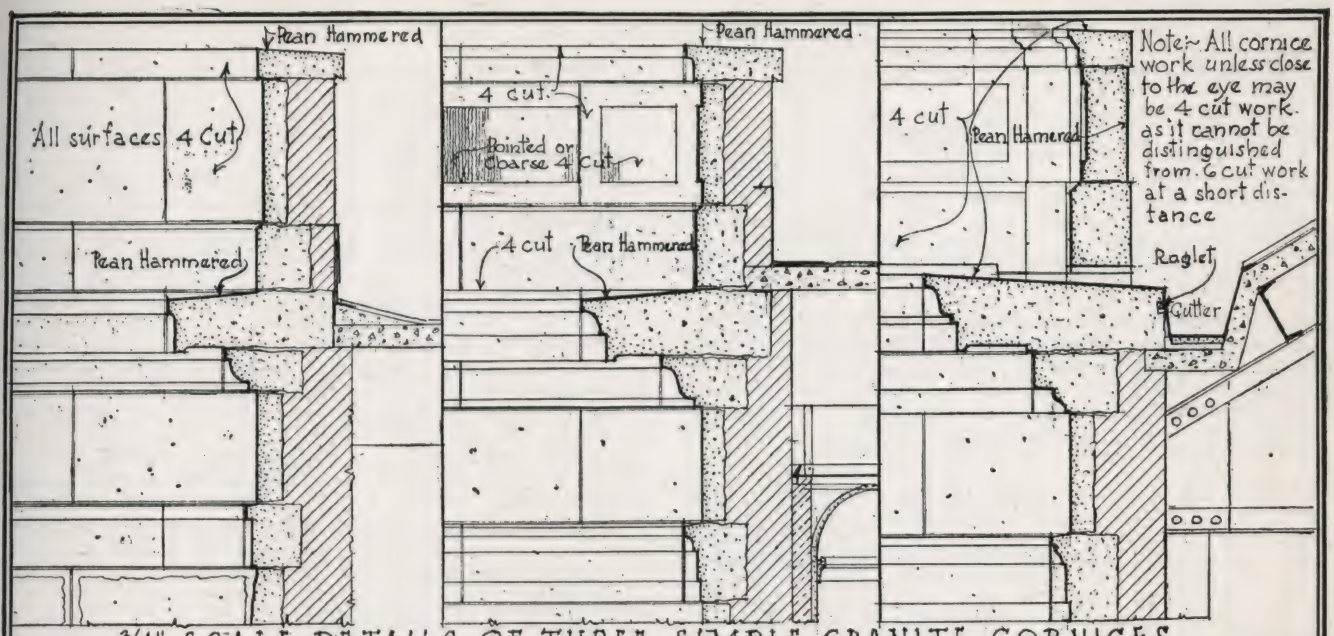
Details "B" show the executed work.



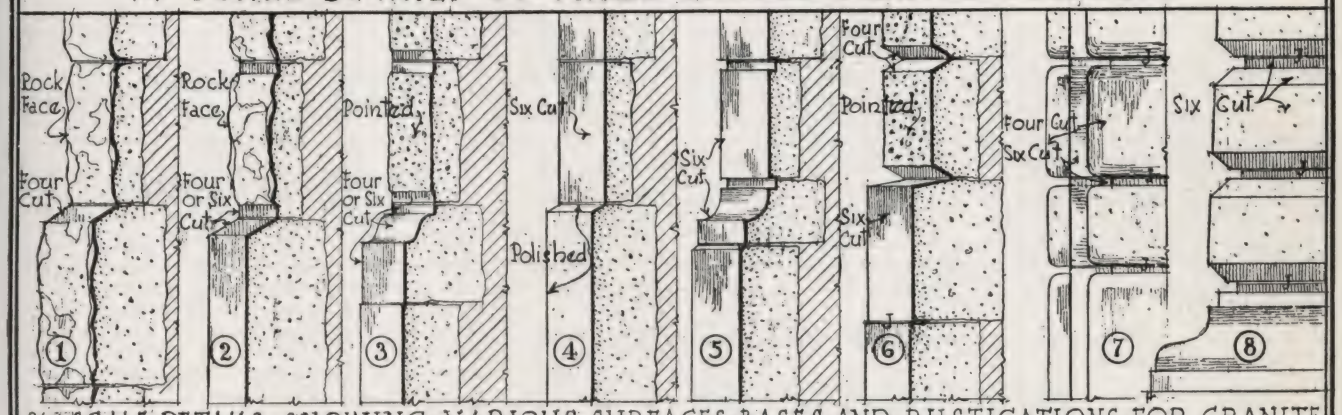
ONE-HALF ELEVATION (A) SECTION (A) SECTION (B) ONE-HALF ELEVATION (B)
¼" SCALE DRAWINGS OF ARCH AT ENTRANCE.

DRAWN BY SWEET'S CATALOGUE SERVICE INC.	COMPARATIVE DETAILS SHOWING ECONOMICAL DESIGN FOR GRANITE WORK.	SCALE ⅛" & ¼" EQUAL 1'-0" DATE JUNE '20 DRWG 2

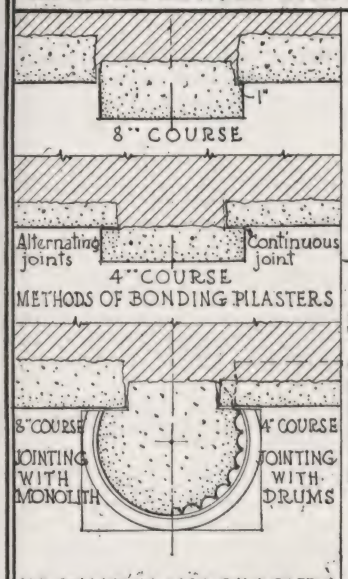
Continued on next page



3/4" SCALE DETAILS OF THREE SIMPLE GRANITE CORNICES

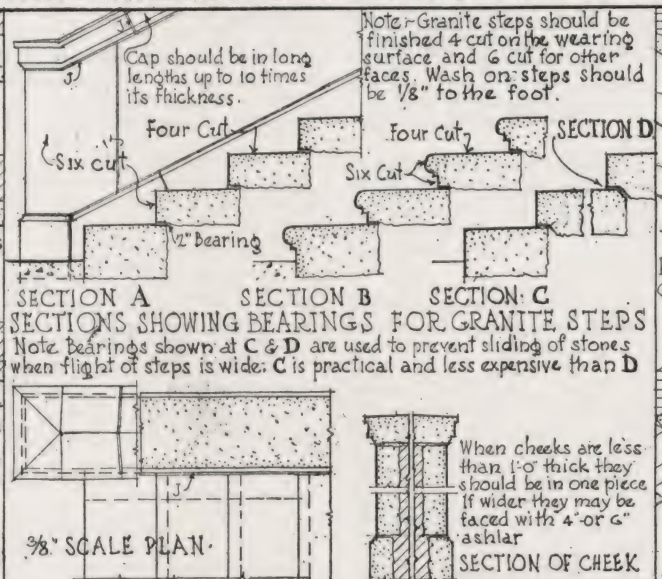


3/4" SCALE DETAILS SHOWING VARIOUS SURFACES, BASES AND RUSTICATIONS FOR GRANITE



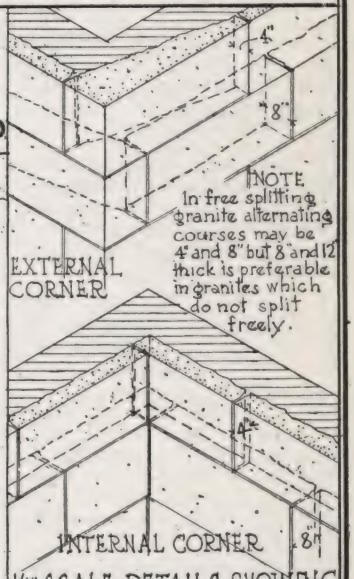
METHODS OF BONDING PILASTERS

3/8" SCALE PLANS OF BONDS OF PILASTERS & COLUMNS



SECTIONS SHOWING BEARINGS FOR GRANITE STEPS
Note bearings shown at C & D are used to prevent sliding of stones when flight of steps is wide: C is practical and less expensive than D

3/8" SCALE DETAILS OF TYPICAL STAIR CONSTRUCTION



1/4" SCALE DETAILS SHOWING BONDING OF CORNERS

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	TYPICAL GRANITE DETAILS SHOWING PRACTICAL METHODS OF CONSTRUCTION	SCALE- 3/8 & 3/4 EQUAL 1-0 DATE-JUNE-20	DRWG 3

Continued on next page

Granite Specifications

Section 1. General Conditions—All work included under the specifications for granite is to be subject to the general conditions hereinbefore written for the entire work.

Section 2. Material—All granite shall be of compact structure, hard and practically non-absorbent, and equal in durability and strength to the best granite of the kind required. Granite shall be (mention color, tone and grain) and of the kind designed as (mention name) granite from quarries at (mention location). Granites designated as (mention names and quarries), will also be considered. In submitting estimates, the contractor shall state the name of granite, and quarry, upon which his proposal is based.

Section 3. Quarry and Plant—Granite must be obtained from approved, well-known quarries having capacity and facilities for furnishing the quantity, sizes, and quality of granite required, and the cutting and finishing must be done by firms properly equipped to produce the finished material without causing delay in the progress of the work. Evidence to this effect must be submitted if required by the architect.

Section 4. Quality—All the granite shall be selected to meet the requirements of these specifications and shall be absolutely sound and free from seams or other defects which would impair its strength. Exposed surfaces shall be free from spots, stain, discoloration, knot formations, spalls, chips or other defects, which would impair the appearance of the work, except that in inconspicuous places a reasonable number of knot spots or texture variations inherent to the particular granite proposed may be permissible if samples showing the maximum of such characteristics be submitted to, and approved by, the architect.

In quarrying the granite the blocks shall be so selected that any variations in color permitted by the architect will be uniformly distributed throughout the exposed surfaces of the walls and other portions of the work. If granites from different quarries are used such granites shall be similar in texture and shall satisfactorily match in color and tone throughout the work.

Section 5. Work Included—The work to be done by the contractor under the heading of Granite shall include the furnishing, delivery and setting in place and completion of all granite work as required by the drawings and herein specified.

The work generally shall include (state portions of work to be of granite).

Note: State any portions or special features which are not to be of granite or not to be included in this contract.

Section 6. Shop Drawings—The granite contractor shall prepare all necessary shop drawings, showing the bedding, bonding, and jointing of all the granite work and typical and special anchoring of same. The dimensions and setting number of each granite stone shall be indicated upon the drawing which shall be submitted and approved by the architect as required under general conditions. No cutting shall be done or work completed except from shop drawings which have been approved by the architect.

Section 7. Corner Stone*—The granite contractor shall furnish and set where indicated on the drawing (or as directed) a corner stone of the required dimensions, having an inscription cut thereon in accordance with the drawings and recessed to receive the copper box to be furnished by the (general contractor).

Section 8. Samples—After the award of the contract 2 samples of each kind of granite required 8 by 8 by 2 in., showing the extreme variation in quality, color and texture that will occur in any granite which will be used, shall be submitted to the architect. Upon approval of these samples, one of each shall be returned to the granite contractor for use at the quarry or plant and the other retained by the architect for comparison with work at the building. Samples shall be dressed on the face and one edge to show finish required by the specification; opposite face may be split or dressed to the approximate size called for or may be dressed to another of the specified finishes called for.

Section 9. Finishes—The exposed surfaces of the granite shall be dressed as indicated on the drawings or specified herein. In general, surface finishes shall be as follows: From 2 in. below grade to level (state level or course) shall be dressed with best (state finish—as polished, six cut, eight-cut) work; from level (state level) to level (state level) shall be dressed with best (state finish) work; and from level (state level) to top of parapet shall be dressed with best (state finish) work.

Note: State here any exceptions to the above such as "treads of steps or platforms shall be ..... finish"; "back of parapet and coping courses shall be ..... finish," etc.

The cut marks of all bush hammer work shall be vertical except as noted.

Soffits shall be bushed at right angles to the face.

Faces of key blocks and voussoirs shall be bushed (state whether vertical or radial).

Top surfaces of window and door sills, steps, copings, washes and projecting courses shall be bushed at right angles to the nosing.

Moulded surfaces shall be bushed parallel to the direction of the mouldings.

Note: Mention other specific instructions on direction of bushing.

Section 10. Cutting—All exposed surfaces must be out-of-wind, free from waves, projections or depressions and faces of granite in the same plane must be absolutely flush at joints. Arrises must be cut sharp and true to square or pattern and continuous with adjoining arrises.

Slight inequalities which may occur in setting shall be trimmed to the proper surfaces and refinished equal to the original finish.

Section 11. Beds and Joints—Beds shall be horizontal and shall be cut full and square for a distance of at least 2 in. back from the face, from which point they may fall off not to exceed 1 in. in 12 in.; and shall be reasonably free from large depression and cuppings, which might impair the stability of the work.

Joints shall be dressed at right angles to the face for at least 1½ in. back from which point they may fall away, not to exceed 1½ in. in 12 in.

Backs of granite stones shall be scabbled or split to approximate vertical surfaces which shall not vary more than 1 in. in 12 in. from the true vertical, nor vary more than 1 in. either way from the thickness called for on the drawing.

Section 12. Jointing—The jointing of the granite work shall be as shown on the drawings and no additional joints will be permitted except upon written consent of the architect. The joints shall be uniformly $\frac{3}{16}$ in. (or ¼ in.) in thickness.

Section 13. Bonding—The bonding of various portions of the work shall be as shown on drawings. Alternate courses of granite shall bond at least 4 in. with the backing except where otherwise shown. No granite stone shall have less than 4 in. bed; projecting courses shall have beds equal to the projections unless otherwise shown. Where brick backing is required the granite shall not go closer than 4½ in. to the inside of the brick wall. Where granite facing occurs at grades it shall extend nowhere less than 4 in. below grade unless otherwise shown.

Section 14. Reveals and Returns—Reveals of all openings, unless otherwise shown shall be cut solid without vertical joints. Returns shall be not less than indicated on the drawings. Mitering of granite stones at corners will not be permitted.

Section 15. Mouldings—Granite stones forming continuous moulded courses shall be of uniform profile on the face with continuous unbroken lines absolutely flush at the joints and with the surfaces free from projections or depressions and out-of-wind.

Section 16. Washes and drips—All exterior projecting granite stones and all exterior sills, steps, platforms, coping and other stones with exposed top surfaces, shall be cut with a wash on top. Where other work is built upon such granite stones, they shall be cut with raised seats and lugs to form level beds for work built upon them.

All projecting granite stone, such as sills, cornices, copings, etc., shall have a groove drip cut on the underside unless otherwise detailed.

All exterior door sills shall be cut with raised thresholds unless otherwise shown.

Section 17. Miscellaneous—Mouldings and projections must not be subjected to pressure; and granite stones having projecting members which have weight of any kind bearing upon the upper surface shall have seats cut to bear such weights; and in all cases the edges of mouldings or projections must be kept free from pressure.

Reglets shall be cut for flashing and counter flashing as required.

Section 18. Models—Full size plaster models of all ornamental and carved work, shall be furnished to the granite contractor as hereinbefore specified.

*If required.

Continued on next page

Specifications (Continued)

Where necessary for the proper execution of the work, models will be delivered at the plant of the granite contractor free of expense to him, to be used by him for the purpose of roughing and such carving as may be done at the plant, the granite contractor to carefully preserve these models for re-shipment to the building if required. The expense of handling and re-crating for shipment at the plant to be borne by the granite contractor.

Section 19. Roughing for Carving—No roughing for carved work is to be done from drawings but from approved models only. Sufficient stock in all cases shall be left for the carving and the granite shall be roughed to suitable form and condition for the carver. The cutter and carver shall co-operate in the method of securing the proper roughing for ornamental work.

Section 20. Carving*—Carving may be done at the site either before or after the granite is set or the work may be delivered at the site already carved. In case the carving is done at the plant or at the site before being set in place, this contractor shall do all necessary refinishing or retouching to make the carving conform to the models and to the satisfaction of the architect. All carved ornament shall be executed by hand by skilled carvers in a spirited and artistic manner and in strict accordance with the approved models.

Where carving is done after the work is set all necessary staging and protection shall be furnished by the general contractor, and if required the models shall be hoisted into position and properly secured to the scaffolding for the convenient use of the carvers by the general contractor.

Inscriptions, lettering or numerals if required shall be clean cut and in accordance with the models, if provided, or otherwise with the full sized details of same. The incised surfaces of lettering shall be cut smooth and accurately to the full depth and section shown on the models or drawings.

Section 21. Crating and Shipping—This contractor shall properly crate the finished granite for shipment, the crating being so constructed as to properly protect the edges and surfaces of the exposed portions of the work during shipment and handling prior to setting same. Due precaution shall be taken to use crating material which will not stain or discolor the exposed surfaces of granite; and especial care shall be used to protect and suitably note any delicate portion where extra care should be observed in handling.

The finished granite properly crated shall be carefully loaded for shipment by this contractor who shall exercise all necessary precautions in loading to withstand the usual hazards in transit.

Section 22. Precaution Against Stain—Special precautions shall be taken in the setting to guard against possible seepage through the joints of moisture from the mortar or material used in backing up the granite work, which will cause discoloration around the face joints or surface of the granite.

At least 12 hours before the granite is set, all surfaces not exposed shall be thoroughly coated with an approved dampproof compound to within 1 in. of the exposed face. After the granite is set, and before backing up, another coat of the same dampproofing compound shall be applied to the back for the special purpose of covering the backs of the mortar joints.

The painting of the granite may be omitted with the approval of the architect when it is definitely known that the setting mortar will not stain the granite, but the backs of the mortar joints should be dampproofed in any event to guard against seepage.

If the first coat of dampproofing is applied at the mill, the setting numbers must be painted conspicuously over the dampproofing.

The granite shall at all times be protected from stain and upon delivery at the site shall be kept stacked on timber or platforms at least 4 in. above the ground, until set in place in the wall.

Under no circumstances shall salt be used for thawing out Lewis holes or otherwise in connection with the granite work.

Section 23. Setting—Each granite stone shall be brushed clean and drenched immediately before being set. Each piece shall be carefully bedded in a full bed of non-staining mortar and tapped home with a wooden mallet to a full and solid bearing.

The face of the granite work shall be kept free from mortar at all times.

Granite facing shall not in any case be built up more than two courses ahead of the backing and no stone having a greater width of bed than the one below it shall be set until the lower course is backed up.

All surplus mortar shall be immediately raked out to a depth of at least 1 in. and every precaution taken to prevent stones bearing upon the edges.

Sills, etc., subject to pressure, shall be bedded only at the ends.

The cement in the mortar used for setting all granite work where the joint is exposed to the weather shall be made waterproof with a satisfactory waterproofing compound, mixed with the mortar.

The sand used in all setting mortar shall be such as to cause no stain or chemical action with the cement.

Section 24. Anchors, Dowels, etc.—All bolts, expansion bolts, anchors, ties, etc., required in the setting of the granite work, will be furnished to the granite contractor. All ashlar shall be anchored to the backing with heavily galvanized wrought iron anchors ¼ by 1¼ in. turned down into the granite 1¼ in. and extending into the backing 8 in. if the thickness of wall permits; the end to be turned up 1½ in. into the backing. There shall be at least two anchors to every stone whose length exceeds its height and in general there shall be not less than two anchors to each superficial square yard of ashlar.

Note: Special anchoring for heavy cornices and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, and columns, etc., should be suitably described or shown according to the requirements of the work.

Section 25. Boxing and Protection—All granite work must be protected from damage during the progress of the work and until the completion of the building.

The general contractor shall provide the necessary protection, covering all projections, top surfaces, angles, etc., protective boxing to be securely fastened in position and securely nailed throughout with galvanized iron nails. No lumber or material to be used which would in any way stain or deface the granite work.

All necessary forms, centers, scaffolding, etc., required by the setter or carver to be furnished by the general contractor.

Section 26. Pointing and Cleaning—After the completion of the granite work or at such time thereafter as all liability from stain of other operations on the building is passed, and when there is no danger therefrom, the whole of the granite work shall be carefully cleaned down, removing all dirt, mortar, stains, and other defacements.

The use of wire brushes, acids or solutions which might cause discoloration will not be permitted.

All face joints shall be raked out to a depth of not less than 1 in., brushed clean, thoroughly wetted, and filled with pointing mortar and then carefully jointed. The pointing mortar must be packed solidly into all joints, completely filling the same; and the form of joint shall be as directed by the architect.

Vertical joints in the top courses of uncovered cornices having a projection of 8 in. or more shall be filled with mortar by grouting to within 3 in. of the top of the granite, then calked with picked oakum and filled with molten lead, calked against the edges and slightly convex at the top—taking care that the oakum is kept at least 2 in. away from the face and top of granite.

Joints in the upper surfaces of projecting stones which are not so protected and in all platforms, steps and coping, shall be raked out at least 2 in. deep and thoroughly grouted flush with the surface of the granite.

Pointing and cleaning shall start at the top and be continued until such work is completed.

Section 27. Defective Work—No patching or hiding of defects will be permitted. Defective granite stones shall be replaced with perfect ones, except in extreme cases where a stone has been damaged through no fault of the granite contractor, and where it is possible and practicable to remedy the defect without in any way impairing the appearance, strength or durability of the work—and then only with the approval and under the supervision of the architect—and where a satisfactory allowance has been agreed upon which shall be deducted from the contract price.

**Note:* If carving is to be done by others than the granite contractor same should be noted here—and this specification modified to suit conditions.

GRANITE MANUFACTURERS ASSOCIATION OF MOUNT AIRY

MOUNT AIRY, N. C.

MEMBERS

J. D. SARGENT GRANITE CO., New York Office, 30 East 42nd Street

LEMMERMAN & HOFFMAN GRANITE CO., INC.

MOUNT AIRY GRANITE CUTTING CO.

Products

CUT GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

POLISHED and TURNED GRANITE WORK.

The Association and Its Object

The aim of this Association is to jointly promote the use of Mount Airy granite for all purposes where granite is adapted.

The individual members will co-operate with architects, engineers, contractors or owners in matters relating to the use of granite, samples, specifications, estimates, etc.

Facilities

Cutting plants and offices are located at the base of the Mount Airy quarries and are equipped with the latest improved machinery for the manufacture of granite, including electric traveling cranes, polishing machinery and turning lathes with individual motors, also compressed air for the pneumatic surfacing machines and hand cutting tools.

These plants, taken together with the unlimited supply of rough granite available, enable large contracts to be executed in quick time.

Moulding and Carving

Owing to the composition of Mount Airy granite, it is especially adapted for fine moulding, carving and sculpture work, as is attested by reference to the following:

Pennsylvania State Monument, Gettysburg, Pa.
Column Capitals of the North Western Life Insurance Building, Milwaukee, Wis.
Column Capitals and Panels of the Municipal Building, New York, N. Y.

Colors and Textures

Mount Airy granite is a light gray granite of medium texture, the feldspar is nearly white, while the quartz is a blue gray and the mica black and very evenly distributed, giving an appearance of decided strong character when hammer dressed.

Estimates and Samples

A complete organization is maintained by each member of this Association for furnishing estimates, setting plans, details, etc., on short time.

Preliminary estimates cheerfully furnished on request of architect or contractor. Samples of Mount Airy granite will be furnished on request, also advice as to grade or style of finish desired.

References

BUILDINGS

Guilford Courthouse, Greensboro, N. C.
Lincoln Deposit & Trust Company, Altoona, Pa.
Citizens & Southern Bank, Augusta, Ga.
Merchants National Bank, Allentown, Pa.
Winona Savings Bank, Winona, Minn.
Isherwood Hall, U. S. Naval Academy, Annapolis, Md.

PUBLIC MAUSOLEUMS

Rose Hill Mausoleum, Chicago, Ill.
Valhalla Mausoleum, St. Louis, Mo.
The Memorial Mausoleum, Reading, Pa.
Rose Hill Mausoleum, Hagerstown, Md.

PRIVATE MAUSOLEUMS

Sharer Mausoleum, Alliance, Ohio
Stadelman-Grant Mausoleum, Akron, Ohio
Cone Mausoleum, Greensboro, N. C.
Hoerner Mausoleum, New Orleans, La.
Ward Mausoleum, Brooklyn, N. Y.
Myer Cohen Mausoleum, Nashville, Tenn.
Dodge Mausoleum, Detroit, Mich.
Packard Mausoleum, Columbus, Ohio

MONUMENTS

McConnell Shaft, Carthage, N. C.
General Julian S. Carr, Durham, N. C.
General Nathaniel Greene, Guilford Battle Ground, N. C.

Additional references furnished on request.

LOVE MAUSOLEUM, INDIANAPOLIS, IND

NORTH CAROLINA GRANITE CORPORATION

MAIN OFFICE AND QUARRIES

MOUNT AIRY, N. C.

NEW YORK OFFICE, 10 East 43rd Street — PHILADELPHIA OFFICE, Witherspoon Building

WESTERN SALES OFFICE, 127 North Dearborn Street, CHICAGO, ILL.

Products

DIMENSION GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

Also manufacturers of Granite Paving Blocks, Street Curbing, Crosswalk, Rubble, Crushed Granite and Rip Rap.

Quarry Production

The quarries were first opened in 1889, the first shipment being made in July, 1890; the output for that year being 135 carloads and has increased rapidly to a maximum output of 3500 carloads in one year.

Owing to the natural advantages peculiar to the Mount Airy quarries, Dimension Stone of unusual size is easily obtained, the only limit being that of railway transportation.

Facilities

The Mount Airy quarries are located one mile east of the Town of Mount Airy, N. C., and have 40 acres in exposed granite area.

They are equipped with cableways for handling the stone to the railroad; piped throughout with compressed air for the pneumatic drilling tools.

The crushing plants have a capacity of 500 tons per day and can furnish any size desired.

Geographical Location

The Mount Airy quarries are well situated in reference to shipping, being about an equal distance from New York City, New Orleans and Chicago; which fact guarantees a reasonable transportation cost on their material to points throughout the East, South and Middle West.

These quarries are served by the Southern Railway and have a nearby connection with the Norfolk & Western Railway.

Government Tests

Mount Airy granite, *"The Granite of Individuality,"* is a very light gray, almost white, biotite granite of medium texture. Feldspar, quartz and mica characterize the granite megascopically, and, being uniformly distributed, present a most pleasing appearance to the eye.

The composition of Mount Airy granite is indicated by the following Chemical Analysis:

SiO_2	70.70
Al_2O_3	16.50
Fe_2O_3	2.34
MgO	0.29
CaO	2.96
Na_2O	4.56
K_2O	2.45
FeS_2	0.09
Total	99.89

Weight per cu. ft. ..... 165 lbs.
Water absorbed per cu. ft. ..... 0.33 lb.
Crushing strength ..... 23,068 lbs. per sq. in.

From Bulletin No. 2, page 155; North Carolina Geological Survey, "The building and ornamental stones of North Carolina."

JOSEPH HYDE PRATT, State Geologist.

GUILFORD COURTHOUSE, GREENSBORO, N. C.
HARRY BARTON, Architect

PLYMOUTH QUARRIES INCORPORATED

Specialists in Ashlar

142 Berkeley Street
BOSTON, MASS.

Products

ASHLAR, in Seam Face and Split Face Granite.

Also Flagging and Stepping Stones, in Seam Face Granite.

Description

Color—We call particular attention to the large variety of color we can furnish, ranging from warm gray to deep russet brown; including, among others, buff, tan, red, and dusty purple, making it possible for the architect to produce almost any effect desired.

Color Scheme—As we operate several different quarries, we can produce almost any desired effect as to colors, design, or texture.

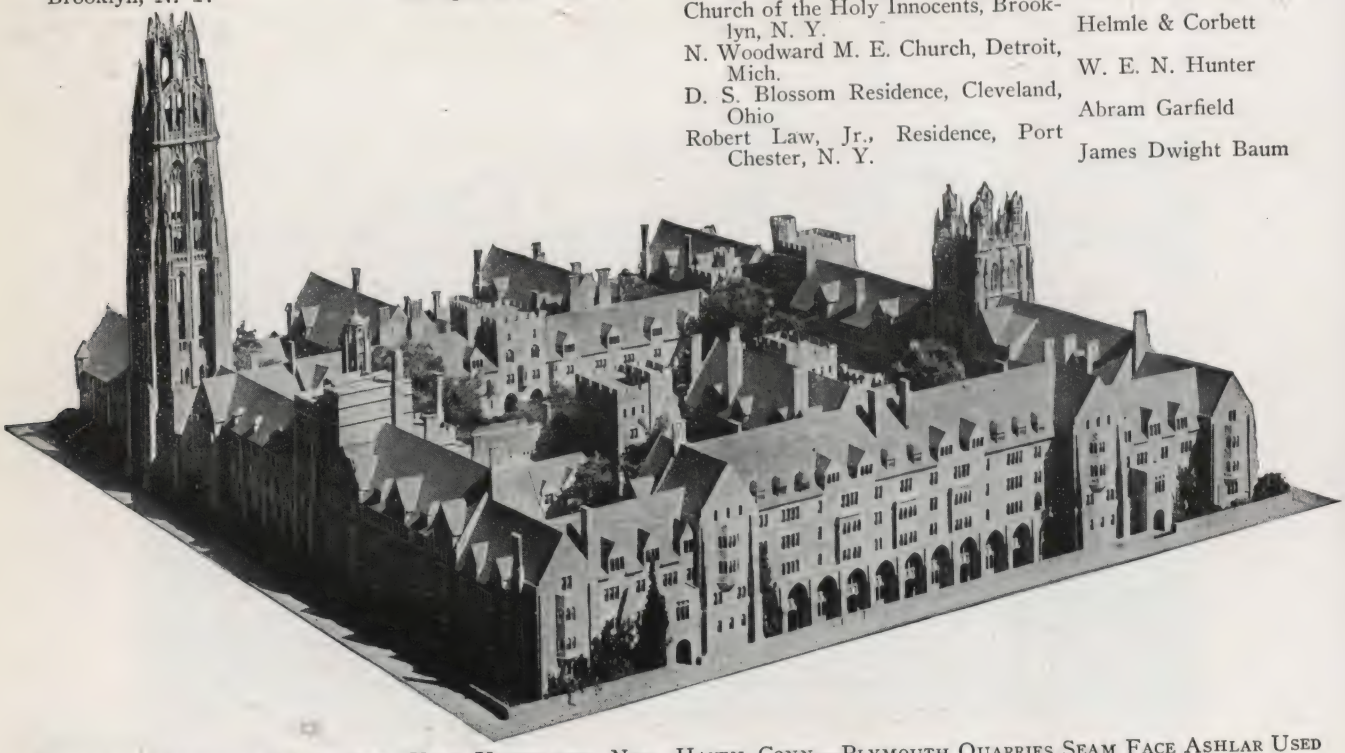
Tests—Extracts from the report of Prof. W. O. Crosby and Dr. G. F. Loughlin, of the Department of Geology of the Massachusetts Institute of Technology:

Absorption—The absorption is remarkably low for the Seam Face Granite. The low absorption ratio makes freezing tests wholly unnecessary.

Fire Resistance—Flame tests demonstrate that this granite is to a good degree proof against the scaling and cracking to which granites in general are so subject on exposure to fire.

Buildings Under Construction, or Recently Constructed

BUILDING AND LOCATION	ARCHITECT
J. F. Dodge Residence, Detroit, Mich.	Smith, Hinchman & Grylls
W. B. Lasher Residence, Bridgeport, Conn.	Walter John Skinner
M. T. MacLaren Residence, Milwaukee, Wis.	Scott & Mayer
Temple Beth-El of Boro Park, Brooklyn, N. Y.	Shampan & Shampan
Swedenborgian Church, Bryn Athyn, Pa.	Bryn Athyn Studio
Delaware & Hudson R. R. Office Building, Albany, N. Y.	Marcus T. Reynolds
Albany Evening Journal Office Building, Albany, N. Y.	Marcus T. Reynolds
Geo. D. Pratt Residence, Glen Cove, N. Y.	Trowbridge & Ackerman
Church of the Covenant, Wilmington, N. C.	Kenneth M. Murchison
B'Nai Jeshurum Synagogue, New York, N. Y.	Herts & Schneider
E. L. Woodward Residence, Le Roy, N. Y.	Arnold & Stern
Trinity Church, Syracuse, N. Y.	Brazer & Robb
Calvary Episcopal Church, Providence, R. I.	Clarke & Howe
Central Baptist Church, Providence, R. I.	Jackson, Robertson & Adams
P. R. Allen Residence, Duxbury, Mass. (Flagging)	R. Clipston Sturgis
F. L. Young Residence, Duxbury, Mass. (Flagging)	R. Clipston Sturgis
W. H. Clark Residence, Stockbridge, Mass. (Flagging)	Ferruccio Vitale
Bates College Chapel, Lewiston, Me.	Coolidge & Carlson
Albany Rural Cemetery (Gateway), Albany, N. Y.	Marcus T. Reynolds
Taylor Art Building, Vassar College, Poughkeepsie, N. Y.	Allen & Collens
A. R. Jeffords Residence, Gradyville, Pa. (Flagging)	Wilson, Eyre & McIlvaine
Massachusetts State Armory, North Adams, Mass.	McFarland & Colby
Third Presbyterian Church, Newark, N. J.	McMurray & Pulis
W. O. Briggs Residence, Detroit, Mich.	Chittenden & Kotting
Albert Strauss Residence, New York, N. Y.	York & Sawyer
Church of the Holy Innocents, Brooklyn, N. Y.	Helmle & Corbett
N. Woodward M. E. Church, Detroit, Mich.	W. E. N. Hunter
D. S. Blossom Residence, Cleveland, Ohio	Abram Garfield
Robert Law, Jr., Residence, Port Chester, N. Y.	James Dwight Baum



HARKNESS MEMORIAL QUADRANGLE, YALE UNIVERSITY, NEW HAVEN, CONN.—PLYMOUTH QUARRIES SEAM FACE ASHLAR USED
JAMES GAMBLE ROGERS, Architect
MARC EIDLITZ & SON, Contractors

ROCKPORT GRANITE COMPANY

ORGANIZED 1864

Dealers in Rough and Finished Granite

ROCKPORT, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 21 Park Row
CHICAGO, ILL., Chamber of Commerce Building
BOSTON, MASS., 31 State Street
PHILADELPHIA, PA., 614 Penfield Building

QUARRIES: ROCKPORT, BAY VIEW AND PIGEON COVE, MASS.; JONESPORT, ME.

Products

Quarriers and producers of ROCKPORT SEA GREEN, RED and GRAY GRANITES for the better class of Buildings, and for Memorials.

Also manufacturers of Granite Paving Blocks.

Co-operation and Estimates

Samples furnished to architects. Opportunity is solicited to submit prompt and reliable estimates from plans and specifications.

Facilities

The plant of ROCKPORT GRANITE COMPANY consists of more than 800 acres of quarry land, finishing, cutting and polishing sheds, wharves, and a fleet of sloops, schooners, barges, towboats, and lighters. The company also charters the best class of coasting schooners, barges and steamers up to 2500 and 3000 tons. This enables them to handle contracts of any size promptly and at moderate cost, particularly to the seacoast cities; also, having railroad connections, allows them to render *service* equaled by no other manufacturer.

At the quarries and sheds every modern appliance is utilized that will facilitate the quarrying, building-granite cutting, and carving work. These appliances include air compressors with an aggregate capacity of 6500 cu. ft. of free air per minute, 40 large modern steam derricks, many of which are capable of hoisting over 75 tons, hoisting engines of the latest type. Newly equipped electric drive polishing mill, with large polishing wheels, lathes, surface cutters, etc. From 800 to 1000 men are employed.

Rockport Granite

Rockport Granite —"the Granite of Character"—is a true hornblende granite, and resembling in composition the Egyptian granite from which ancient obelisks and sarcophagi were built. It is of decided toughness, firm and uniform in texture, of high crushing test, free from impurities, enduring in color, and susceptible to a beautiful and lasting polish.

Carving Qualities

Particularly significant of the toughness and carving quality of Rockport Granite is the fact that Prof. John H. Sears, Peabody Academy of Science, was able, in his microscopic studies of this stone, to make sections of it 1/700 in. thick.

References

Following are a few buildings recently erected of Rockport granite:

Winters National Bank, Dayton, Ohio, Rockport Sea Green, Frank Hill Smith, Inc., Architects

Seaboard National Bank, New York, N. Y., Rockport Sea Green columns, Rockport Gray base, Alfred C. Bossom, Architect

Gloucester Safe Deposit & Trust Company, Gloucester, Mass., "Rockport Moose-a-bec Red," Ezra L. Phillips, Architect

Plain Dealer Building, Cleveland, Ohio, Rockport Gray, Hubbell & Benes, Architects

WINTERS NATIONAL BANK, DAYTON, OHIO
FRANK HILL SMITH, INC., Engineers
Rockport Sea-Green Granite, eight-cut finish, was used exclusively in the construction of this building

HARRISON GRANITE COMPANY, INC.

200 Fifth Avenue
NEW YORK, N. Y.

QUARRIES AND WORKS, BARRE, VT.

BRANCH OFFICES

PHILADELPHIA DETROIT CHICAGO MINNEAPOLIS

Products

MEMORIALS of all kinds in GRANITE, MARBLE and BRONZE, ranging from monumental pieces of public interest to the simplest of private tributes.

Service Department

The HARRISON GRANITE COMPANY, INC. maintains a service department of an exceptionally high standard and broad experience. It is prepared to give expert advice on fitness of material, kind of finish and practical and economical construction; to place at your disposal the assistance of men trained to handle granite or marble and to set it with accuracy and skill. The interest of the client is always the first consideration, and upon the completion of the work he is presented with a written guarantee of its durability.

Harrison Quarries

The Harrison quarries contain rich veins of smooth, fine grained, even textured granite that has become renowned the world over for its peculiar fitness for memorial sculpture. Equipped with the most modern and extensive cutting facilities, and manned by experienced and well trained quarriers, the Harrison quarries are well able to supply all the ordinary needs of monument buyers.

Construction and Erection Facilities

Personal supervision has been the secret of Harrison achievement since the company commenced business 73 years ago. No work is permitted to leave the Harrison shops unless it meets every requirement of the Harrison standard. The Harrison plant is electrically equipped, and contains all the modern tools and appliances for turning out neat, artistic monuments. Its erection facilities are of the best, and this work is entrusted only to those who have demonstrated their capability to grasp and execute the lofty concept of the architect who designed the memorial they are to build.

References

Below are listed a few of the architects for whom we have done work:

Ernest Flagg, New York, N. Y.
A. W. Brunner, New York, N. Y.
H. Van Buren Magonigle, New York, N. Y.
Dodge & Morrison, New York, N. Y.
H. Allen Jacobs, New York, N. Y.
Barrister & Schell, New York, N. Y.
Denby & Nute, New York, N. Y.
John Russell Pope, New York, N. Y.
Carrere & Hastings, New York, N. Y.
C. P. H. Gilbert, New York, N. Y.
Eugene Schoen, New York, N. Y.
John V. Van Pelt, New York, N. Y.
Pennington & Lewis, New York, N. Y.
David M. Ach, New York, N. Y.
Donaldson & Meier, Detroit, Mich.
Albert Kahn, Detroit, Mich.
Geo. S. Orth & Brother, Pittsburgh, Pa.
Edward I. Lee, Pittsburgh, Pa.
L. S. Buffington, Minneapolis, Minn.
Murphy & Olmstead, Washington, D. C.
Sanquinet & Staats, Fort Worth, Tex.
Tallmadge & Watson, Chicago, Ill.
Howard Van Doren Shaw, Chicago, Ill.

McKINLEY MEMORIAL, CANTON, OHIO
H. VAN BUREN MAGONIGLE, Architect

THE PRESBREY-LELAND COMPANY

Designers and Workers in Stone

WORKS:
BARRE, VT.

681 Fifth Avenue
NEW YORK, N. Y.

SHOPS:
NASHVILLE, TENN.
VALHALLA, N. Y.
WOODLAWN, N. Y.

BRANCHES

HARTFORD, CONN. NASHVILLE, TENN.

REPRESENTED IN VARIOUS CITIES

Products

MAUSOLEUMS, PUBLIC and PRIVATE MONUMENTS, FOUNTAINS, GARDEN ADORNMENTS, etc., executed and erected complete in all parts of the country.

Special Service for Architects

This company maintains an exhaustive collection of photographs illustrating mausoleums, monuments, etc., throughout the world. These photographs are mailed for reference on request. Detailed information is offered concerning laws and regulations governing mausoleums in all states. Expert co-operation in the economical design and construction of stonework. Typical plans and specifications mailed. The company offers the experience of a quarter century in the production of more than 500 mausoleums and approximately 15,000 public and private memorials.

Quarries and Shops

The Presbrey-Leland Quarries at West Dummerston produce the fine grained white Vermont granite known as "Dummerston." It is indorsed for mausoleums, monuments, fine carvings and buildings. The Presbrey-Leland Works at Barre, Vt., are the largest retail granite working shops in America. Thoroughly equipped with all modern facilities; personally directed by an official of the company; provided with efficiency and cost record systems, these shops produce work of superior craftsmanship with unequalled expedition. All employees share in the annual earnings of the company through the extra-compensation system. Supplementary shops are located at Valhalla, N. Y., Nashville, Tenn., and Woodlawn, N. Y. C.

Construction Equipment

The company contracts to manufacture and erect work complete, thus insuring economy and constant supervision. Replete equipment for construction work is maintained at convenient points in the East, South and West. Expert granite and marble setting crews are retained in the exclusive employ of the company. Experienced in the conduct of work in cemeteries, these construction crews command the respect of cemetery officials throughout the country, who indorse their efficiency.

WORKS AND QUARRY OF THE PRESBREY-LELAND COMPANY
One of the largest granite cutting plants in the United States

Ideals in Craftsmanship

The conscientious and intelligent interpretation of architects' plans and details is a feature of the company's record. There is a unique spirit of good craftsmanship prevailing in the Presbrey-Leland Shops. The art and ideals of the company are best appreciated by careful inspection of the work erected. The "Directory of Presbrey-Leland Patrons in America" is mailed on request.

References

A partial list of architects for whom the company has done work:

NEW YORK—McKim, Mead & White, Carrére & Hastings, Wm. Welles Bosworth, H. VanBuren Magonigle, Warren & Wetmore, Henry Bacon, Charles A. Platt, J. H. Phillips, Kenneth B. Murchison, Albro & Lindenberg, Wm. Lawrence Bottomley, Walker & Gillette, Clarence N. Brazer, Charles Welford Leavitt, Howard Greenley, Thomas Nash, Hiss and Weeks, Edward I. Shire, D. Everett Waid, Jas. Layng Mills, Howard Major, Joseph Freedlander, Crow, Lewis & Wickenhoefer, Harry A. Jacobs, Alfred Freeman, Fred L. Smith, E. K. Rossiter, B. E. Stern, Frank A. Rooke, L. C. Holden, Carlos Contreras.

CHICAGO—Graham, Burnham & Son, Zachary T. Davis, Wm. E. Parsons, Childs & Smith.

PHILADELPHIA—John T. Windrim, J. C. M. Shirk, Edgar V. Seeler.

NEWARK—Henry Baechlin, Wm. Neuman, Nathan Myers, Guilbert & Batelle, J. O'Rourke & Son.

PITTSBURGH—Louis Stevens.

OMAHA—Thos. R. Kimball.

COLUMBUS — Frank L. Packard.

CLEVELAND — Walker & Weeks.

ST. LOUIS — James Jamison.

BRIDGEPORT — J. W. Northrop.

STAMFORD — George A. Freeman.

ELKHART — E. Hill Turnock & Son.

PITTSFIELD—Harding & Seaver.

WEST NEW YORK—Alex E. Schoen.

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

BEDFORD, IND. BLOOMINGTON, IND.

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, P. O. BOX 800, BEDFORD, IND.

MEMBERS OF THE INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

BLOOMINGTON-BEDFORD STONE CO., Bloomington, Ind.
CHICAGO & BLOOMINGTON STONE CO., Bloomington, Ind.
CONSOLIDATED STONE CO., Bedford, Ind.
CRESCENT STONE CO., Bloomington, Ind.
EMPIRE STONE CO., Bloomington, Ind.
FURST-KERBER CUT STONE CO., Bedford, Ind.
HUNTER BROS. STONE CO., Bloomington, Ind.
IMPERIAL STONE CO., Bedford, Ind.
INDIANA QUARRIES CO., Bedford, Ind.
J. HOADLEY & SONS CO., Bloomington, Ind.
MATHERS STONE COMPANY, Bloomington, Ind.
MONROE COUNTY OOLITIC STONE CO., Bloomington, Ind.
NATIONAL STONE CO., Bloomington, Ind.
PERRY STONE CO., Ellettsville, Ind.
SHEA & DONNELLY CO., Bedford, Ind.
STAR STONE CO., Bloomington, Ind.
W. McMILLAN & SON, Bedford, Ind.

Product

INDIANA LIMESTONE (formerly called "Bedford Stone").

GRAY (or Blue), BUFF, VARIEGATED (or Mixed) and certain other special varieties.

RANDOM INDIANA LIMESTONE ASHLAR: Rough sawed-four-side Quarry-run Indiana Limestone of short length stock is one of the specialties furnished for Random Ashlar wall construction and facing.

Colors and Textures

Gray is a silvery gray stone, with a slightly bluish cast, and is often called "blue" by the trade. The gray stone is available in both light and medium dark shades.

Buff varies from a very light creamy buff or buff gray to a distinctly gray-buff.

Both buff and gray vary somewhat in shade, but in general are fairly represented by these color designations which have been long in use and are now universally recognized.

Variegated (often called "mixed") is a mixture of gray and buff, some of it on the same stone, and occurs in the quarries at the irregular junction of the buff and the gray stone but is without cleavage plane. It is in great demand for "textured" walls and for producing an informal homelike atmosphere in dwellings, or the effect of maturity in new buildings.

The gray is specially suitable for both the more important monumental work and the average run of commercial work. The buff on account of its tone is generally preferred for interior work, but has always been extensively used for all purposes.

In addition to the classification by color the stone is further classified by texture as follows:

Select—Uniform fine grain; most suitable for carving, interior and special work, and is of a finer texture than generally required for average exterior work.

Standard—The grade most frequently used for exterior work, both plain and monumental; and for all general purposes, including trim, has a somewhat wider range of texture and color tone than "Select." This grade is always furnished unless another grade is clearly specified.

Rustic—(Buff only). Distinctly variable in texture and less uniform in color than the "Standard" variety. Specially suitable for use where antique or rustic effects are wanted and for residences and other buildings where the effect is more dependent on texture and tone than on carving and tooled work. Also used very extensively for heavy cornices and other work placed at some elevation above the eye.

Services

The INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION is the result of the consistent effort on the part of the quarry operators to establish a means of placing before architects and the building public a source of dependable and unbiased information regarding the product of the industry; to promote its proper and economical use; to render assistance on any problems pertaining to the use of Indiana Limestone and its employment in modern building construction, and render such other services to the users of Indiana Limestone as may be of general benefit to all concerned.

The activities of this Association are both promotional and educational comprising general publicity, investigation and research work, technical service and assistance to the architectural profession, to the trade or others directly interested in the use of this product. For this purpose the Technical Division, Service Department and Bureaus are maintained.

Practically all of the long established and proved quarries from which this dependable stone has been produced for generations are controlled by the *seventeen* separate and distinct companies who are members of this Association.

Cost

The present cost of this material compared with substitute products is such as to make it economically available for use in all classes of buildings, especially schools and institutional work, but also including moderate cost residences and many ordinary commercial structures, as well as for the more monumental work for which a natural stone is always used.

Continued on next page

Physical Characteristics

Indiana Limestone is *not crystalline;* the aggregate, filler and matrix are all pure carbonate of lime.

CHEMICAL ANALYSIS (AVERAGE)

Carbonate of Lime	97.26%
Silica	1.69%
Oxide of Iron	.49%
Magnesia	.37%
Water and Loss	.19%
	100.00%

While not a hard or brittle stone it can be split with equal ease in any direction and for all practical purposes is considered a free stone, having no evidence of grain. It possesses far greater strength than required for any ordinary building purposes, having an average crushing strength close to 9,000 lbs. per sq. in., and a remarkably uniform modulus of rupture whether tested parallel to or at an angle with the grain, making it safe for long lintels, etc., and also making it unnecessary to set this stone on its natural quarry bed.

Indiana Limestone is to all intents and purposes fireproof. It calcines above 1500° Fahr. and will not spall, crumble, split or check at temperatures up to 1000° Fahr. when drenched with cold water.

It possesses a wonderful internal elasticity, adapting itself without damage to extreme temperature changes and other conditions of permanence that exist in modern building structures, and for this reason alone is particularly well adapted to use in masonry and as a facing material in the colder northern sections of the United States and in Canada.

Permanence

Its durability and resistance to atmospheric action is proved by the exposed quarry ledges that are centuries old and by many fine existing structures of considerable age. Its soft light color tones are permanent, and no other building material remains clean so long or better resists the accumulation of grime from the smoke laden atmosphere of manufacturing cities. Many fine monumental and commercial buildings in the South and in Canada may be referred to as attesting the beauty, adaptability, permanence and genuine value of this fine natural building stone under varied climatic conditions.

Ease of Working

In spite of its great strength no other commercial stone is so easily worked. It can be freely carved, sawed, planed and turned and otherwise worked by machinery, as well as by hand.

Finishes

Any hand tooled or machine finish, including rubbing and honing, may be applied; but bush hammering and other so called "hard stone" finishes are rarely used, except for special purposes.

Additional information on finishes will be found in the service publications of the Association.

Organization of Industry

Indiana Limestone is found only in two counties of the state of Indiana and is produced by a number of independent quarrying concerns which are operated along thoroughly modern lines. Millions of dollars are invested in machinery, equipment, buildings, and a network of railway tracks.

The entire production operation is handled with precision and efficiency more like large scale manufacturing than quarrying, as quarrying is frequently carried on. This enables the industry to give rapid delivery and most satisfactory service, regardless of the size of any operation and the quantity of material required.

FEDERAL RESERVE BANK BUILDING, CHICAGO, ILL.

Uses

Indiana Limestone, to the extent of many millions of cubic feet, is used each year for all classes of buildings. A great proportion of United States Government buildings, including post offices, have been built of this stone.

Many of the finest office buildings, banks, stores, and other commercial structures, churches, residences, apartments, as well as monumental buildings of all sorts have been built of this material. It is unsurpassed as a material for trim, porches, etc., and for the trim of factory and other industrial buildings where it is used in walls of brick or other materials.

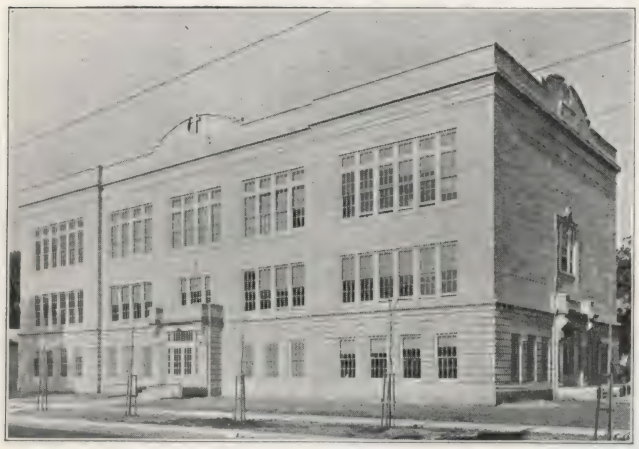
The finer grades of Indiana Limestone are much used for interior work in churches, public buildings, fine residences, etc. The fine grained buff stone, when in place, can scarcely be distinguished from the Caen stone of France; and having greater strength is often selected as its superior. The finest and most elaborate carved work, both interior and exterior, is easily, beautifully and permanently expressed in this material.

It is widely used for architectural sculpture and statuary, gateways, copings, pergolas and garden ornaments with most gratifying results. For such uses, the practically unlimited size of the perfect units which may be had is a great advantage. Monolithic columns, up to any size which can be transported, are always obtainable.

In engineering, Indiana Limestone is extensively used for retaining walls, piers, bridge abutments, etc.,

Continued on next page

and especially for the balustrades and trim of bridges built of other masonry or reinforced concrete.



CATHEDRAL SCHOOL, WICHITA, KANS.
LORENTZ SCHMIDT & CO., Architects

Preface to Standard Form of Cut Stone Specifications for Indiana Oolitic Limestone

For the convenience of architects and others using this specification it has been prepared and published both in loose leaf typewritten form and in booklet form and *will be mailed to architects on receipt of postal request.*

In reference to booklet edition the specification proper, complete for all ordinary requirements, is arranged in the most approved manner under subheadings as it appears in this publication, but is made more complete by alternate and supplementary clauses, marginal notes, and supplementary data in the form of appendices; also references to the specification clauses that should be inserted in the specifications for other trades.

The explanatory notes and descriptive data included in the appendices are intended to explain the requirements of the specification and the reasons therefor more fully than is possible in the marginal notes, and every one using the specification should have the booklet copy and read carefully all of these references.

It is particularly important that the notes in reference to setting mortar, sand for setting and pointing mortar, flashing and calking of projecting members, detailing of stone in connection with reinforced concrete and the protection of cut stone at time of delivery, during and after erection, be carefully studied.

In addition to the standard form of specification there has been included in the booklet a short form of specification for use in connection with small jobs or whenever it is not desired to incorporate the entire specification for cut work in the general specification.

Note: It being more or less usual for the cut stone to be furnished to the contractor either f.o.b. cars at destination or delivered alongside curb at the building site by trucks or teams, the specification is so arranged that either the setting only, or the delivery and setting, may be readily separated under a separate "Setting Contract."

Specification for Cut Indiana Limestone

(1) Work Included—The work under this contract shall include all labor and material for the furnishing of cut stone work in accordance with the drawings and as hereinafter specified.

(2) Description of Stone—All limestone specified or shown on drawings shall be Standard ..... (Color) (Gray, Buff, and Variegated) Indiana Oolitic Limestone building stock, free from all defects that would materially impair its strength, durability or appearance, and within the range of variation of color and texture represented by two samples approved by the architect.

Specially graded stone acceptable as to hardness and color as per samples to be submitted shall be employed where indicated on drawings for ..... and all other positions exposed to direct wear.

Wherever the terms "Indiana Limestone" or "Limestone" occur in this specification, they specifically refer to and shall imply "Indiana Oolitic Limestone" quarried in Lawrence or Monroe County, Indiana, by a member of INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION.

(3) Samples—The contractor shall submit to the architect, two samples which shall be typical of the extremes which the contractor proposes to furnish. Samples to be about 4 in. wide by 7 in. long by about 1 in. thick, produced so that the large faces shall show across the grain of the stone, the finish specified to be indicated on the large faces and at least two of the edges to be rock face.

Similar samples shall be provided when Select stock or specially graded hard stone is specified for certain positions in the building.

All samples shall be labeled or otherwise clearly marked with the name of the contractor submitting same, and the grade of the limestone, with the statement: "Samples of Indiana Limestone to be furnished for the ( ) Building."

(4) Standard Practice—In so far as these specifications pertain to the practice set out for the proper use of Indiana Oolitic Limestone, the standards established by the INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION of Bedford, Ind., are to govern. Bidders not familiar with these standards are cautioned to inform themselves regarding them.

The architect reserves the right to approve the sub-contractor for cut stone before this portion of the work is awarded.

(5) Cutting and Setting Drawings—The cut stone contractor shall prepare and submit to the architect for approval complete cutting and setting drawings in triplicate for all of the Limestone work under this contract. Such drawings shall show in detail sizes, sections and dimensions of stone, the arrangement of joints and bonding, anchoring, and other necessary details.

These drawings shall be based on and follow the drawings and full size details prepared by the architect, except where it is agreed in writing that changes be made. Each stone indicated on these drawings shall bear the corresponding number marked on the back or bed with a non-staining paint.

Moulded or projecting courses, unless otherwise shown, shall have not less than four-sevenths (4/7) of their cubic contents inside the face of wall and all projecting stones; except where otherwise shown or specially anchored to the structure, and so provided for by details on setting drawings; shall have beds in the wall at least 1 in. greater in depth than their maximum projection. There shall be "through" or bond stones wherever indicated on approved stone details.

Provisions for the proper anchoring and dowelling or clamping of work in keeping with standard practices, also for the support of same by shelf angles and loose steel, etc., when required, shall be clearly indicated on the setting drawings.

(6) Details for Lintels, etc.—Lintels and architraves or other members spanning openings, whether supporting a superimposed load or only their own weight, shall be of the proportions and sectional area that will provide an ample factor of safety based on the average ultimate breaking strength of the stone.

(7) Carving and Models—All carving shall be done under this contract by skilled carvers, in a correct and artistic manner, in strict accordance with the spirit and intent of the architect's sketches, or from plaster models prepared or approved by the architect.

(8) Cutting—All stone shall be cut accurately to shape and dimensions and full to the square, with jointing as shown on approved drawings. All exposed faces shall be cut true and out of wind. Beds and all joints shall be dressed straight and at right angles to the face unless otherwise shown, and, except where otherwise shown or noted on drawings, joints shall have a uniform thickness of ¼ in.

Patching or hiding of defects will not be permitted and Lewis holes shall not be made on exposed surfaces.

Washes shall be as deep as practical and drips of sufficient width and depth to shed water shall be provided on all projecting stones and courses.

Reglets for flashing, etc. shall be cut in the stone where so indicated on the drawings.

Continued on next page

Moulded work shall be carefully executed from full size details, supplied by the architect and must match perfectly at joints. All arrises to be sharp and true.

All columns shall be accurately cut with the entasis as shown on drawings. All pilasters *unless otherwise indicated* to be cut straight without entasis or taper.

(9) Checking Out of Backs and Fitting to Structural Frame—Stone coming in contact with structural work shall be back checked as indicated on the general drawings. Stones resting on structural work shall have beds shaped to fit the supports.

Where stone facing adjoins steel columns and spandrel girders, the depth of stone shall be such that will allow not less than 3 in. between extreme edge of metal and the back of the stone.

(10) Finish—The finish on exposed surfaces generally shall be smooth, machine dressed, showing no tool marks.

(11) Lewis Holes and Cutting for Dowels, Anchors, Clamps, etc.—Lewis holes shall be cut in all stones weighing more than 100 lbs. No lewis or other holes shall come closer than 2 in. to the exposed face of the stone.

Holes and sinkages shall be cut in stones for all anchors, clamps, dowels, etc., called for under this specification and indicated on the cutting and setting drawings.

(12) Loading and Shipment—The cut Indiana Limestone shall be carefully packed for rail or wagon transportation with exercise of all customary practical and reasonable precautions against damage in transit.

All cut stone under this contract shall be delivered promptly as ordered and in the sequence in which it is to be set.

(13) Field Cutting—*Specify in detail any field cutting that will be required.*

Specifications for Setting Indiana Limestone

(14) Work Included—Contractor shall refer to the preceding specification for cut Indiana Limestone for more detailed information regarding the cut stone that is to be set under this contract; also refer to "General Masonry," "Sheet Metal Work," "Roofing" and "Carpentry" specifications for reference to work that must be executed in conjunction with this work.

(15) Delivery and Storage—All Indiana Limestone delivered f.o.b. cars at destination under *another* contract shall be carefully unloaded and delivered to the building site.

Wagon or truck haul shall be handled throughout by competent workmen and by such methods as will guard against soiling, mutilation or snipping in transit to and upon delivery at the building site.

The stone shall be stored at the building site, for whatever period, on planking set so that stone will rest entirely clear of the ground, and be protected by proper means from damage to arrises and from contact with anything which would result in the accumulation of dirt, dust, soot, mud, grease or other staining or disfiguring elements. During extended periods of storage at the building site, the stone to be covered with tarpaulin, stout non-staining paper or boards.

(16) Setting Mortar—All Indiana Limestone shall be set in carefully prepared lime mortar tempered with stainless cement of an approved brand. The mixture to consist of 1 part dry hydrated lime or lump lime paste, to not over 3 parts sharp, *washed clean* sand, with the addition of stainless cement in an amount equal to 15% by volume of the lime used.

Lump lime paste shall be of best quality freshly burned lump lime slaked with cold water and screened through a $\frac{3}{16}$-in. mesh screen into a settling box following the practice employed in preparing lime for plastering. The lime putty so prepared to stand in the settling box not less than one week and then be mixed with the sand and be properly stacked to age; the cement to be added and thoroughly worked into the mixture in small batches just prior to its use for the setting of the stone.

The sand must be *washed clean,* entirely free from silt, vegetable matter, salts and all other injurious substances, and must be screened if containing pebbles or very coarse grains that would interfere with the proper bedding and jointing of the work. The water must be clear and devoid of salts and all injurious elements.

(17) Scaffolding—All scaffolding required for the proper execution of this work will be furnished and erected by the masonry contractor for the use of all trades.

(18) Centering—All wood centering required for the proper setting of cut stone work will be furnished and erected by the carpentry contractor.

(19) Anchors and Dowels—All anchors, dowels, clamps, lewis anchors, etc., required by setting drawings or necessary for the proper erection of the work shall be of thoroughly galvanized iron. Anchors, etc., to be galvanized after they have been bent to shape.

(20) Setting Cut Stone—The Indiana Limestone shall be set in accordance with the requirements of the drawings. When ready for setting, all stone shall be washed on *all* sides by scrubbing with soap powder and water applied with fiber brushes only and be thoroughly rinsed with clean water. Immediately prior to setting, all stone shall be sponged or drenched on all sides with clean water.

The stone shall be set accurately by competent stone setters true to line and level, with full flushed joints, filling all anchor holes. The face to set on thoroughly soaked wooden wedges, which shall not be removed until the building is cleaned and pointed.

Heavy projecting courses shall be securely propped until mortar has set and wall above same built.

All beds and vertical joints shall be of a maximum width of ¼ in. except where otherwise indicated. Mortar shall be raked out ¾ in. from the face of the stone to allow for pointing and the stone be sponged off along all joints.

Splashing exposed faces of cut stone with mortar shall be avoided and any splashing shall be immediately removed with a sponge and clean water.

The entire backs of all stone, while wet, shall be plastered with not less than ½-in. coat of setting mortar before backing up same; and where the stone occurs as a facing applied direct to previously erected structural members, both back of stone and face of structural work shall be plastered with setting mortar to insure a thoroughly filled back joint.

The ends only of all sills shall be set in a full bed of mortar, balance of sills to be left free until pointed.

Steps shall be set with a slight pitch to the front.

All cornices, copings and projecting belt courses and all stones forming gutters, etc., shall be set with the vertical joints dry. These joints shall be calked on exposed surfaces with picked oakum and shall then be filled from above with a mortar grout. Grout shall be composed of 1 part non-staining cement and 1 part fine white sand, mixed in small quantities, stirred vigorously until used, and of as thick consistency as can be poured into joints.

Where the Limestone extends down to the grade line of building the first course above grade shall be placed on a layer of approved non-staining impervious material.

(21) Backing up Cut Stone—The *first course of brick* next to stone facing, shall be laid in the same kind of mortar as used by masons for setting of stone.

(22) Protection of Finished Work—Contractor setting cut stone shall co-operate with the carpentry contractor who will furnish and erect the necessary protection for sills and projecting stonework.

(23) Cleaning—The face of all stone work under this contract shall be thoroughly cleaned upon completion, this cleaning to be done with soap powder boiled in clean water and applied vigorously with stiff fiber brushes. If necessary, clean sharp fine white sand to be added to the soap and water mixture. After cleaning, all exposed surfaces of stone to be drenched with clear water.

The use of wire brushes or acids of any kind will not be permitted under any circumstances for cleaning the stone work.

(24)—Pointing—All face joints shall be brushed out clean ¾ in. in depth, carefully removing all wedges so that pointing will be continuous, and after a thorough wetting of the stone be pointed flush with mortar, consisting of 1 part stainless cement, 2 parts clean white sand and sufficient cold lime putty to make as stiff a mixture as can be worked.

Transportation

Owing to the fortunate central location of quarries and unsurpassed railroad facilities, Indiana Limestone can be transported to all points with exceptional promptness and at minimum cost.

Distribution

Good sized stocks of Indiana Limestone are carried by cut stone contractors in nearly all the principal cities of United States and Canada. It is, therefore, available in quantity for prompt deliveries at all times.

Continued on next page

Horner Sales Garage, Washington, D. C.
Waddy B. Wood, Architect

B. A. Eckhart Residence, Lake Shore Drive, Chicago, Ill.
Marshall & Fox, Architects

Arlington, Mass., Town Hall
R. Clipston Sturgis, Architect

Literature and Samples

Literature useful to architects in the form of service publications, including technical information, construction details and service plates, etc., is constantly being prepared and as published will be furnished free to those requesting same.

Samples of the stone will also be furnished to architects and others interested.

Data on setting mortars and cleaning, and other information will be furnished gratis on request.

Architects should also obtain copy of the Association (masonry) specifications for random ashlar.

Association Service

Architects and builders are cordially requested to make free use of the Service Department and Bureaus of the Association as a source of reliable and impartial information regarding the products of the industry and their proper and economical use, and for assistance on any of their problems pertaining to Indiana Limestone and its employment in building construction.

THE CENTRAL OOLITIC STONE CO.

Indiana Limestone

TELEPHONES:
LAWNDALE 8940, 5490

CHICAGO OFFICE
2120-2140 South Kedzie Avenue
CHICAGO, ILL.

QUARRIES AND MILLS: BLOOMINGTON, IND., CLEAR CREEK, IND.

Products

Selected, Standard and Rustic Grades of Buff, Gray and Variegated INDIANA LIMESTONE in the Rough Block, Sawed, Planed, Turned or Cut ready to set in the wall, supplied from any of the well-known quarries in the district.

INDIANA LIMESTONE
The ARISTOCRAT of BUILDING MATERIALS
TRADE-MARK

Facilities

Our mill, located in the heart of the Indiana Limestone district, modernly equipped with electrically operated machinery of the latest approved type, offers excellent facilities for the prompt and efficient execution of contracts of any size.

FIRST NATIONAL BANK, DETROIT, MICH.
ALBERT KAHN, Architect. THE FOUNDATION CO., General Contractors

Description

For complete description of the colors and grades of Indiana Limestone, refer to pages of the Indiana Limestone Quarrymen's Association.

Quality

The policy of this company is to see that no work leaves its mill not thoroughly executed in a workmanlike manner, and that the grade of stone is in accordance with the specifications and equal to approved sample submitted.

Samples

To interested parties and prospective buyers will be sent, express prepaid, on request, samples of ordinary size to any part of the United States or Canada.

Estimates

Requests for quotations on stone work are solicited and will be given prompt attention.

Co-operative Service

This company has an organization composed of men thoroughly experienced in their respective lines, and will gladly give information or render service to the architect, owner, and general contractor when called on. Prompt and satisfactory attention will be given to all inquiries and attractive quotations made at all times.

References

This company has executed the stone work for some of the prominent buildings of the country, and points with satisfaction and pride to its references. Some recently completed contracts follow:

Courthouse, Rockford, Ill., J. W. Royer, Urbana, Ill., Architect
Register & Tribune Building, Des Moines, Iowa, Proudfoot, Bird & Rawson, Des Moines, Iowa, Architects
Men's College Dormitory, Grinnell, Iowa, Proudfoot, Bird & Rawson, Des Moines, Iowa, Architects
Court Avenue Bridge, Des Moines, Iowa, Marsh Engineering Co., Des Moines, Iowa, Engineers
Ohio River Pumping Station, Louisville, Ky., J. B. Wilson, Louisville, Ky., Engineer
Washington Hotel, Washington, D. C., Carrère & Hastings, New York, N. Y., Architects
American Exchange National Bank, Dallas, Tex., Lang & Witchell, Dallas, Tex., Architects
Municipal Courthouse, Des Moines, Iowa, Keffer & Jones, Sawyer & Watrous, Kraetsch & Kraetsch, Norman T. Vorse, Associated Architects of Des Moines, Iowa
Durant Building, Detroit, Mich., 15-story Colonnade and Court Walls, General Motors Co., Owners, Albert Kahn, Detroit, Mich., Architect
First Church of Christ, Scientist, Oklahoma City, Okla., Courtland L. Butler, Tulsa, Okla., Architect
University of Michigan Hospital, Ann Arbor, Mich., Albert Kahn, Detroit, Mich., Architect
First National Bank, Detroit, Mich., Albert Kahn, Detroit, Mich., Architect

Other references gladly supplied on request.

THE FURST-KERBER CUT STONE CO.

INCORPORATED

Cut Stone Contractors

CHICAGO OFFICE
2301 South La Salle Street

GENERAL OFFICE
BEDFORD, IND.

QUARRIES AND MILLS
BEDFORD, IND.

Product

BUFF BEDFORD INDIANA LIMESTONE.

Also all other grades found in this district; specialty—Furst-Kerber Indiana Travertine.

Qualifications

The comparatively simple problem of designing a building for the use of a generous quantity of stone and specifying a first class material, such as Buff Bedford Indiana Limestone, does not take care of the entire situation. It is of even greater importance that when a contract for the required cut stone is under consideration, only such firms be allowed to compete as are known to be properly qualified to render performance of the correct standards.

Need of Proper Facilities

This involves a number of important factors. At the base of them all lies the existence of complete and balanced facilities, and 100% maintenance of equipment. Then there is the question of ability to finance operations in keeping with their magnitude, as well as permanency and efficiency of factory and organization. Last, but not least, comes the condition of the quarries. Unless these are shipshape, no matter how they are equipped and managed, no stone company can operate successfully.

Experience and Capacity for Production

THE FURST-KERBER CUT STONE CO. has quarried the stone for many of the most important public and private buildings in the United States. This Company has been in successful operation more than a generation, and its organization and experience in handling the cut stone business is of the highest type developed in the industry. It is an institution ranking second to none in point of capacity and record for first class cut stone work of all types and sizes. Its mill facilities include Number One Mill, 625 ft. long by 150 ft. wide with 6 traveling cranes, and Number Two Mill, 320 ft. long by 120 ft. wide with 3 traveling cranes. Both mills are enclosed and operate the year around.

Magnitude of Operations

The quarries are amply able to furnish all requirements, interestingly illustrated by reference to the Bureau of Engraving and Printing at Washington, D. C.—500 car loads of Buff Bedford Indiana Limestone were quarried and milled for this structure by THE FURST-KERBER CUT STONE CO. in less than 6 months' time.

General Office

MILL NUMBER 1

QUARRY NUMBER 2

ESTABLISHED 1884

J. HOADLEY & SONS CO., INC.

Cut Stone Contractors and Quarrymen of Cream Buff Indiana Limestone

BLOOMINGTON, IND.

Products

Quarrymen and manufacturers of cut, carved, planed, turned, sawed and block CREAM BUFF INDIANA LIMESTONE.

Facilities

Our modern steam heated daylight plant contains 50,000 sq. ft. of operating floor space, with facilities for loading and unloading ten cars at all times, and an annual capacity of 200,000 cu. ft. of cut stone. Our sawing mill has an annual production of 150,000 cu. ft.

We own and operate quarries that produce 300,000 cu. ft. annually of "Cream Buff" Indiana Limestone.

Mills and quarries are located on the Monon Railroad and are easily accessible to all parts of the country.

Variety of Production

We produce the following grades of Indiana limestone:

Select Cream Buff, Standard Cream Buff, Hard Cream Buff and Rustic Buff. Cream Buff stone which is the most widely used of any shade, has a light creamy color and a fine even uniform texture.

TRADE-MARKS

Hard Cream Buff Indiana Limestone

Produced only in the quarries of J. HOADLEY & SONS CO., INC. Is fine grain and, as the name indicates, very hard.

It is particularly desirable for steps, buttresses, base courses, basement sills, mausoleums, interior work, etc.

Its wonderful wearing qualities, uniform color, low percentage of water absorption and crushing strength of 11,805 lbs. per sq. in. against 5,128 lbs. per sq. in. for the ordinary Buff Indiana Limestone, show conclusively that it will give satisfaction where a close grain non-absorbent stone is required. Data sheet showing the test conducted at Purdue University will be sent to interested parties with samples, on request.

Indorsement

One of the most important recent contracts is the Scottish Rite Cathedral, Guthrie, Oklahoma, illustrated below.

About 100,000 cu. ft. of "Select Cream Buff" Indiana Limestone was required, and contract was completed in 8 months.

The largest building in the world used exclusively for Masonic Purposes.

SCOTTISH RITE CATHEDRAL, GUTHRIE, OKLAHOMA
HAWK & PARR, Architects, Oklahoma City, Okla.
JAS. STEWART & CO., INC., General Contractors, Houston, Tex.
J. HOADLEY & SONS COMPANY, INC., Cut Stone Contractors

AMERICAN BLUE STONE COMPANY

CONSULTING AND SALES OFFICES
1 Madison Avenue
NEW YORK, N. Y.

QUARRIES AND MILLS
PORTAGEVILLE, (AMBLUCO), N. Y.

Products

GENESEE VALLEY BLUE STONE (sometimes called Portageville), a New York State Blue Stone for exterior and interior building construction.

AMBLUCO STAIR TREADS and LANDINGS for interior steel and concrete stairways.

Also Ambluco Wall Base and Blue Stone Flooring.

Facilities

This company was organized and opened its first quarry in 1899. It now has well developed quarries on its own property of about 200 acres located at Ambluco, N. Y., near the village of Rossburg, in Allegheny County, which forms part of the Pennsylvania border line of New York State.

The blue stone is taken out to a depth of 100 ft. from the top of the ground.

The mills and yards are equipped with the most modern machinery so that large volumes of business can be shipped without delay.

This blue stone is handled by dealers in principal cities east of the Mississippi River.

Genesee Valley Blue Stone

Color and Texture—A distinctive uniform shade of light blue, blending well with adjacent light colored surfaces, or giving a sharp clean contrast with dark materials. It is of a fine grain and even texture, being made up mostly of pure hard quartz as shown below.

MINERALOGICALLY CONSIDERED

Fine hard sand, mostly quartz	70%
Clay, as binding material	28%
Water	2%

Strength, Weight and Fire Resistance—Few, if any, stones have a greater crushing and transverse strength than this blue stone as shown in table below, compiled by the U. S. Ordnance Department. Likewise the stone has high tensile and shearing strengths.

CRUSHING STRENGTH

Quincy granite	9,793 lbs. per sq. in.
Rockport granite	15,296 lbs. per sq. in.
Genesee Valley blue stone	19,970 lbs. per sq. in.

Although of great density it weighs only approximately 150 lbs. per cu. ft. when cut ready to set.

It offers great resistance to extreme heat.

Durability—Specimens of this blue stone have been critically and carefully analyzed by eminent mineralogists and pronounced one of the most durable of all stones. In abrasive tests it excels most other stones. Like all stones this blue stone should be cut to set on its natural bed.

Ambluco Non-slip Stair Treads and Landings

This trade-name has been adopted because it is a contraction of the company's name and because the Pennsylvania Railroad has so named the passenger and freight station at our plant.

Ambluco treads and landings have established themselves wholly on their own merits, without any introduction on our part. By those who have studied their qualifications or used them, they are declared to be superior to and more economical than any other type.

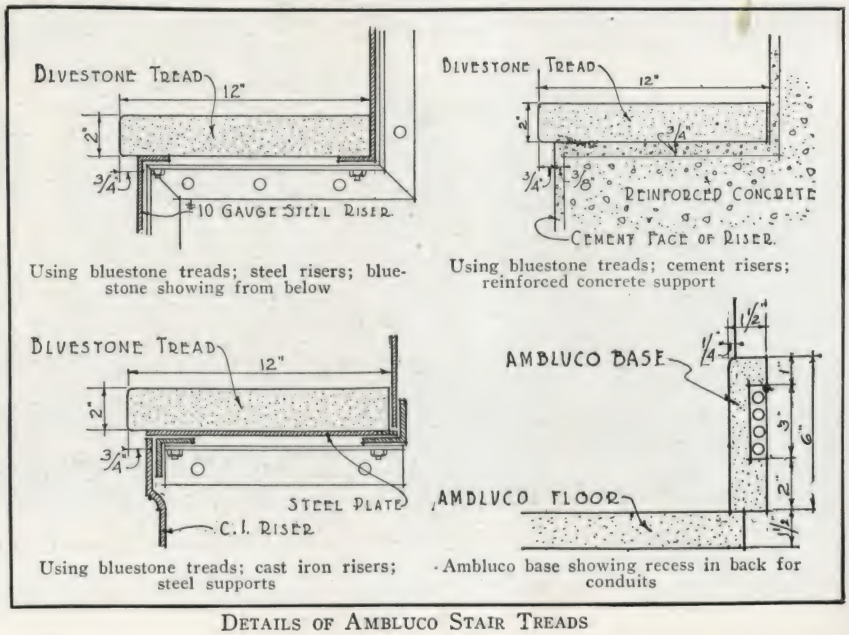
The uniformity in color, even grained texture and sand sawed finish (free from saw marks and imperfections) combine to give a splendid appearance.

The non-slip property, due to the fine grained quartz, does not grip the foot to cause tripping, but gives ample security at all times against slipping without requiring resurfacing or replacing.

The extreme durability of the Ambluco treads comes from the character of the material and the steadily increasing hardness of the stone brought on by the heat of the building, causing the treads to resist wear as they age. This great hardness prevents generation of dust and permits clean sweeping and mopping.

Best results are obtained by ordering the treads sawed on top, bottom and the two long edges 1½ to 2 in. thick. Just before installation, treads should be fitted, the slight ⅛-in. radius round put on the two front arrises and any dirt which may have accumulated washed off with sand and water.

AMBLUCO STAIR TREADS INSTALLED IN HARTFORD FIRE INSURANCE CO.'S BUILDING, HARTFORD, CONN.
PARKER, THOMAS & RICE, Architects
AUSTIN FORD & SON, E. Cambridge, Mass., Contractors



Using bluestone treads; steel risers; bluestone showing from below

Using bluestone treads; cement risers; reinforced concrete support

Using bluestone treads; cast iron risers; steel supports

Ambluco base showing recess in back for conduits

DETAILS OF AMBLUCO STAIR TREADS

THE LONGMEADOW CO., INC.

Producers of Longmeadow Red and Brown Sandstone

293 Bridge Street

SPRINGFIELD, MASS.

QUARRIES AND MILL, EAST LONGMEADOW, MASS.

Products

LONGMEADOW SANDSTONE, Red and Brown, suitable for all classes of buildings.

Facilities

Our quarries are equipped with hoisting machinery of the latest and most efficient types, which are capable of handling blocks of any size required by contractors or which may be specified by architects.

Our mill is located near the quarries, in the same town (East Longmeadow), and has its own railroad siding. Planes, lathes, compressor and gang saws are electrically driven.

We are in a position to furnish finished stone, sawed to size, or quarried blocks.

Estimates, etc.

We are glad at all times to furnish estimates for architects or contractors, and to give any information or suggestions which might be helpful in the preparation of designs or plans.

Samples of the stone, in either color, forwarded upon request.

References

Longmeadow sandstone appears in numerous important buildings throughout the country.

A notable example is the impressive and tasteful Romanesque entrance to Trinity church, Boston (of which the late Phillips Brooks was rector for many years), well known as the Galilee porch.

A few more representative buildings are listed below, and we shall be glad to name others which may be nearer to the address of any architect inquiring.

Correspondence is invited.

Second Congregational Church, Holyoke, Mass.

Sterling Chemical Laboratory, Yale University, New Haven, Conn.

Mary Lyon Hall, Mt. Holyoke College, South Hadley, Mass.

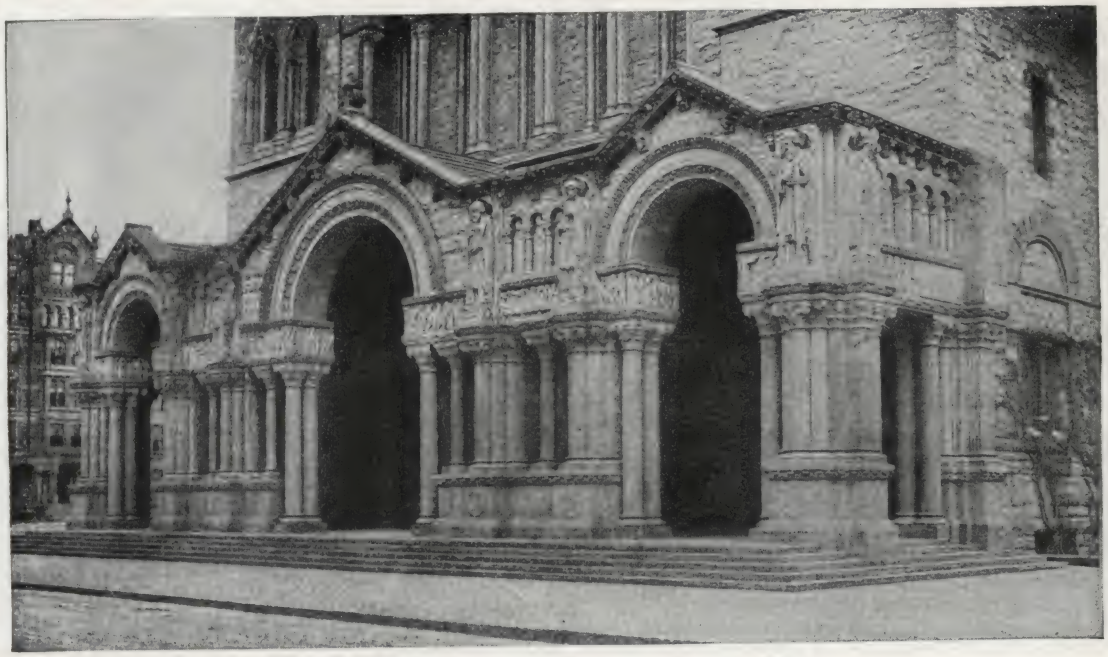
Skinner Chapel, Holyoke, Mass.

Marshall Field Building, Chicago, Ill.

New York Life Insurance Building, Omaha, Neb.

New England Building, Cleveland, Ohio.

Library and Stack Building, Princeton University, Princeton, N. J.



GALILEE PORCH, TRINITY CHURCH, BOSTON, MASS.
SHEPLEY, RUTAN & COOLIDGE, Architects
Built of Longmeadow brownstone

THE OHIO QUARRIES COMPANY

Producers of "Buckeye Gray" Sandstone

Citizens Building
CLEVELAND, OHIO

Product

"Buckeye Gray" Sandstone (sometimes called Amherst Sandstone) for exterior and interior building construction.

Trade-name

"Buckeye Gray" is the trade-name of the finest stone taken from the quarry and is furnished in *one grade only*. The stone specially selected for building purposes comes from below the 100-ft. level in the quarry, which has a total depth of 212 ft. The stone above this point is utilized for curbing, sidewalks, grindstones, bridges and other purposes where appearance is not of prime importance.

Supply and Facilities

In connection with an ample quarrying capacity, to satisfy the requirements of any undertaking regardless of the quantity of stone involved, we operate a modern mill, which consists of 24 gangs of saws, a steel tramway one-third mile in length equipped with 5 electric traveling cranes and a railroad embracing 4 miles of standard gage track, which furnishes a connection with the main line of the New York Central Railroad.

A separate organization has 3 cut stone plants in operation adjacent to our quarries, devoted exclusively to supplying the trade with stone cut ready to set. These plants are each completely equipped with modern machinery such as planers, lathes, air compressors, rubbing beds, circular saws, etc., and are in a position to make attractive figures on "Buckeye Gray" sandstone cut ready to set.

Color and Texture

"Buckeye Gray" sandstone is of a distinctive shade of rich light gray, with natural variations in tone. If desired, stone can be selected of an almost uniform shade. It is of a fine and even texture, and does not contain flint streaks, holes, glass seams or other such imperfections.

Structure

"Buckeye Gray" sandstone is what is geologically known as a silicious sandstone, analyzing approxi-

Partial View of Buckeye Quarry Located at Amherst, Lorain County, Ohio

A point about 35 miles southwest of Cleveland, Ohio. This is one of the largest quarries in the world; over 1600 ft. in length, 400 ft. in width, 212 ft. in depth

Continued on next page

mately 95% pure silica, and should not be confused with other classifications of sandstone, the cementing qualities of which are carbonate of lime, iron oxide or clayey matter. It is the presence of a large percentage of silica in the rock which gives it wonderful enduring qualities.

Strength

"Buckeye Gray" sandstone has withstood a crushing strength of 10,000 lbs. per sq. in.

If this stone was piled as high as the Washington Monument (555 ft. 5 in.) there would only be a pressure at the bottom of 579 lbs. per sq. in.

Fire Resistance

"Buckeye Gray" sandstone is the most perfect stone on the market in this respect. The mere statement of fact that thousands of tons of it are used annually by steel companies for lining their furnaces to protect them from the intense heat, amply verifies this assertion.

Durability

The excellent appearance of the stonework in many old buildings in Cleveland and vicinity, having been subjected for a period of over 65 years to adverse climatic conditions and severe atmospheric tests without a sign of disintegration appearing, illustrates the fact that nature has endowed "Buckeye Gray" sandstone with wonderful element resisting qualities. The original tool marks of the stonecutters' tools are as clean cut and sound today as when the stone was first set in the wall.

Many old buildings, having outlived their usefulness, have been torn down, the stone removed to a new location, re-cut and used a second time, which is another proof that the stone is durable beyond question.

The severest test that can be applied to stone to determine its durability is where it is used for street curbing, as it is constantly subjected to the moisture and acids from the soil and pavement refuse and during the winter months to a continuous freezing and thawing process.

Curbing made of this material has been in place over 45 years on certain heavy traffic streets in the city of Cleveland, during which time the road surface has been renewed three times, but the original curbing is still in place and unaffected by the elements working against it.

"Buckeye Gray" sandstone has never been known to scale or disintegrate.

Weight

"Buckeye Gray" sandstone weighs approximately 150 lbs. per cu. ft. when cut ready to set.

How to Use "Buckeye Gray" Sandstone

Many a fine stone job has been ruined due to various causes before and after the stone arrives at the site. There are a few set rules which, if strictly adhered to, will insure an attractive stone job, to wit:

(1) Design the stonework, as far as practicable, so that the rain water will drain off and not run over the face of the stone. This is exceedingly important at porticos, porte-cochères, porches and other such features. Provide *drips* on all projecting stones.

(2) Keep the stone clean until it is set. (This is very important.)

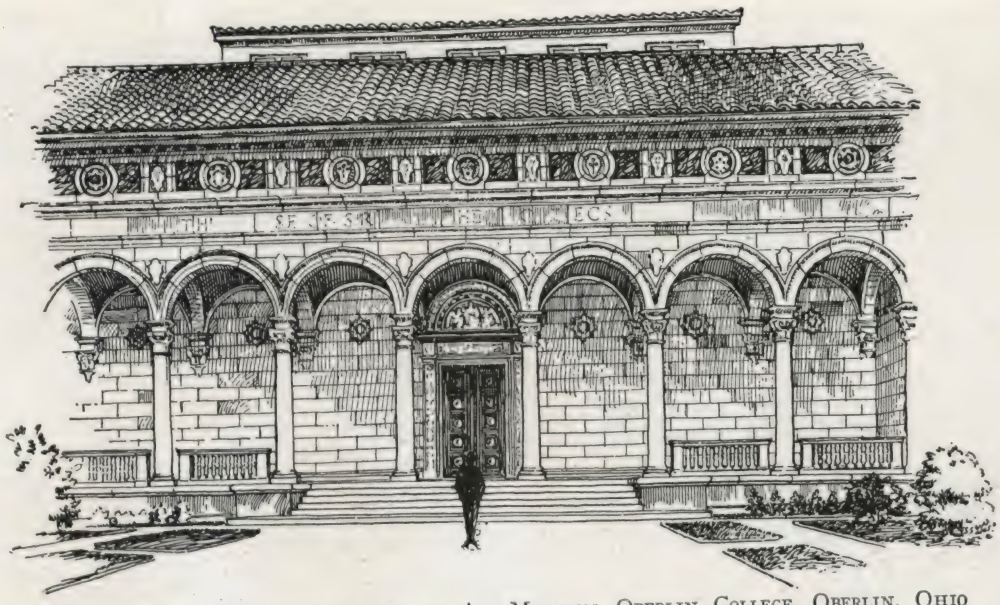
(3) Waterproof the first course at grade, both top and bottom beds, also waterproof the back of parapet walls.

(4) *Good setting.* Employ experienced stonesetters only.

Service Bureau

Expert information and data relating to the use, cost, handling, setting, etc., of "Buckeye Gray" sandstone; samples; suggested specifications and general information gladly furnished gratis.

Send plans for cut stone figures and we will secure them from reliable cut stone contractors who make a specialty of cutting "Buckeye Gray" sandstone.



"Buckeye Gray" Sandstone Used for Art Museum, Oberlin College, Oberlin, Ohio
Cass Gilbert, Architect

CARTHAGE MARBLE & WHITE LIME COMPANY

Producers of Imperial Gray Marble

QUARRIES AND MILLS
CARTHAGE, MO.

Product

IMPERIAL GRAY MARBLE:
Sawed, Planed, Turned and Cut Stone for interior and exterior work.

TRADE-MARK

Experience and Facilities

The CARTHAGE MARBLE & WHITE LIME CO. (incorporated 1884) are the pioneer quarriers of the Carthage District and have been operating quarries continuously during 39 years, furnishing stone for exterior and interior work for banks, schools, churches, public buildings and residences. Throughout the widest scope of application Imperial Gray marble has been uniformly found to give the highest degree of satisfaction.

A fully equipped quarry, sawmill and finishing plant is maintained at Carthage, Mo., for finishing of exterior and interior work.

Blocks and slabs of any reasonable size can be furnished without delay, and estimates given on finished exterior work.

Imperial Gray Marble

Of a beautiful, soft gray color that is always pleasing to the eye. When sawed with the grain as recommended, the result is often a very fine clouded effect which shows no veining, and is extremely handsome. The fossil ingredients of this stone when polished give it a surface not obtainable in any other marble. The color is such that almost any color scheme used in decorating will harmonize with the marble.

When sand rubbed, it has a pleasing white appearance, and when polished, a uniform gray color.

Analysis—Chemical analysis shows that Imperial Gray marble contains nothing which can in any way discolor it. It is 99% calcium carbonate and is free from iron.

Non-Absorbent—The ratio of absorption of this stone is 45/100 of 1%. Such a quality is of great importance in both exterior and interior work, for stains that can not penetrate the marble can be easily removed from the face, a feature of great value in sanitary work.

Strength—The strength of Imperial Gray marble is such that it stands all tests subjected through various kinds of work. Its crushing strength is about 20,000 lbs. per sq. in., which is considerably more than is required in any building work.

Wearing Qualities—Exposed to every weather condition found in the extreme climates, Imperial Gray marble has demonstrated its excellent qualities admirably.

Short Specifications for Ordinary Work

Write for more detailed specifications on large work.

Exterior Specifications—All cut stone to be of properly selected Carthage building stock, as furnished by the CARTHAGE MARBLE & WHITE LIME CO., Carthage, Mo. Veining averaging ¼ in. or less, if tight and sound, is permissible anywhere in face of stone.

All steps, door and window sills, coping and projecting courses, shall be cut to lay on the natural bed. Base, belt courses, ashlar, lintels, etc., to be set on edge. On stone set on edge, veining shall not intercept the face but clouded faces are permissible.

Setting—All exterior cut stone to be set in lime mortar. No acid to be used in cleaning stonework.

Finish—On exterior work, sand rubbed finish shows up to best advantage on ordinary work, but where a special finish is wanted, rock face, bushhammer or tooled may be used.

Interior Specifications—Marble to be Imperial Gray as furnished by the CARTHAGE MARBLE & WHITE LIME CO., Carthage, Mo., sawed with the grain to show clear faces.

Finish—Susceptible to all finishes of any natural stone or marble, but polished finish is recommended for interior finish only.

Veining

Attention is called to the fact that this company can not agree to furnish Carthage marble free from veins which are characteristic of all marbles.

References

EXTERIOR

Iowa National Bank, Des Moines, Iowa, Boyd & Moore, Architects
First National Bank, Las Vegas, N. M., I. H. & W. M. Rapp and A. C. Hendrickson, Architects
Medical Building, Missouri State University, Columbia, Mo., Jamieson & Spearl, Architects
Courthouse and Jail, Union, Mo., N. B. Howard and Bonsack & Pearce, Associated Architects
Insurance Exchange Building, Des Moines, Iowa, Boyd & Moore, Architects
Columns and Bases, Clements Library, Ann Arbor, Mich., Albert Kahn, Architect
High School, Winnsboro, La., Neild & Olschner, Architects
First State Bank, Rochester, Minn., F. H. Ellerbe, Architect
Butler County State Bank, Eldorado, Kans., W. H. Simon, Architect
W. K. Jewett Residence, Pasadena, Cal., Marston & Van Pelt, Architects
R. M. Bennett Residence, Lake Minnetonka, Minn., Pike & Cooke, Architects
Community Mausoleum, Wellington, Kans., R. W. Shaw, Architect

INTERIOR

Y. W. C. A., Tulsa, Okla., C. K. Birdsall, Architect
High School, Butler, Pa., W. G. Eckles, Architect
Y. M. C. A., Joplin, Mo., Smith, Rea & Lovitt, Architects
Dormitory Building, Gary, Ind., A. F. Wickes, Architect
U. S. Post Office, Raton, N. M., J. A. Wetmore, Architect
Kennedy Building, Tulsa, Okla., W. Black, Architect
Missouri Athletic Association, St. Louis, Mo., G. F. A. Brueggeman, Architect
Buder School, St. Louis, Mo., W. B. Ittner, Architect
Carved Entrance, Geo. D. Harter Bank, Canton, Ohio, Walker & Weeks, Architects

APPALACHIAN MARBLE CO., Inc.

Quarriers and Manufacturers of Appalachian Tennessee Marbles

KNOXVILLE, TENN.

APPALACHIAN TENNESSEE MARBLE, especially for interior use, including:

Appalachian Gray. (Page A. Illustration No. 1).

Appalachian Golden Vein. (Page A. Illustration No. 2).

Appalachian Champion Pink. (Page B. Illustration No. 3).

Appalachian Roseal. (Page C. Illustration No. 4).

Appalachian Silver Gray. (Page D. Illustration No. 5).

Appalachian Dark Chocolate. (Page D. Illustration No. 6).

Floor Tile, Crushed Marble, Rubble Marble, Tennessee Granito.

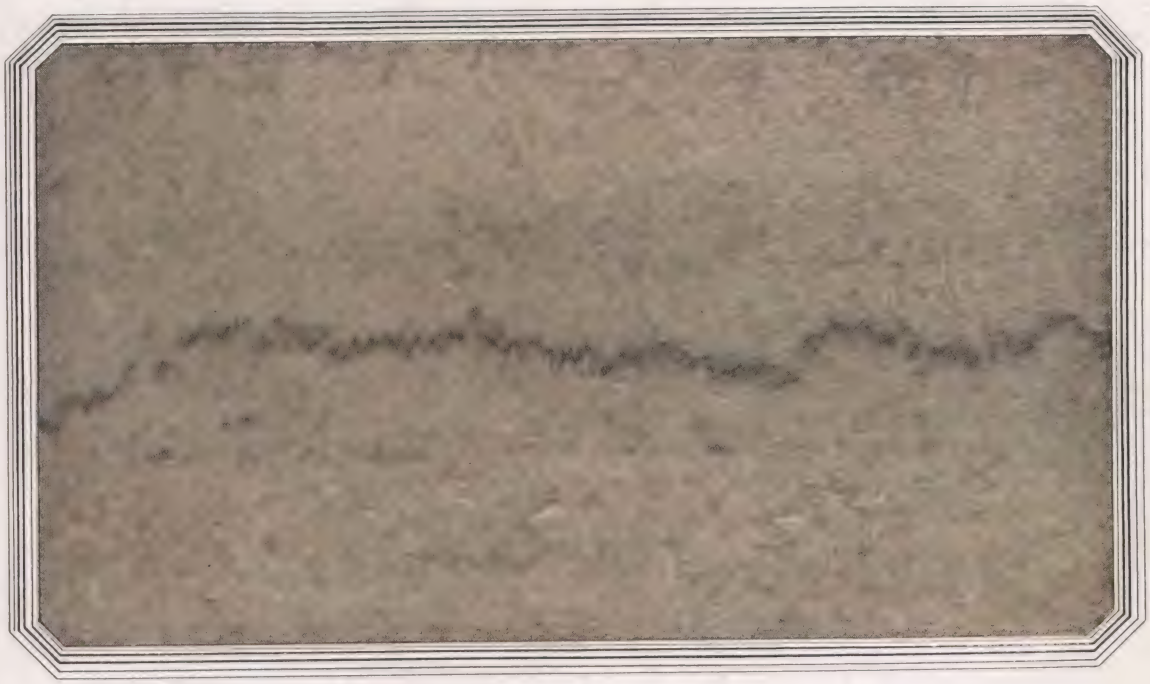


Illustration No. 1 APPALACHIAN GRAY

Illustration No. 2 APPALACHIAN GOLDEN VEIN

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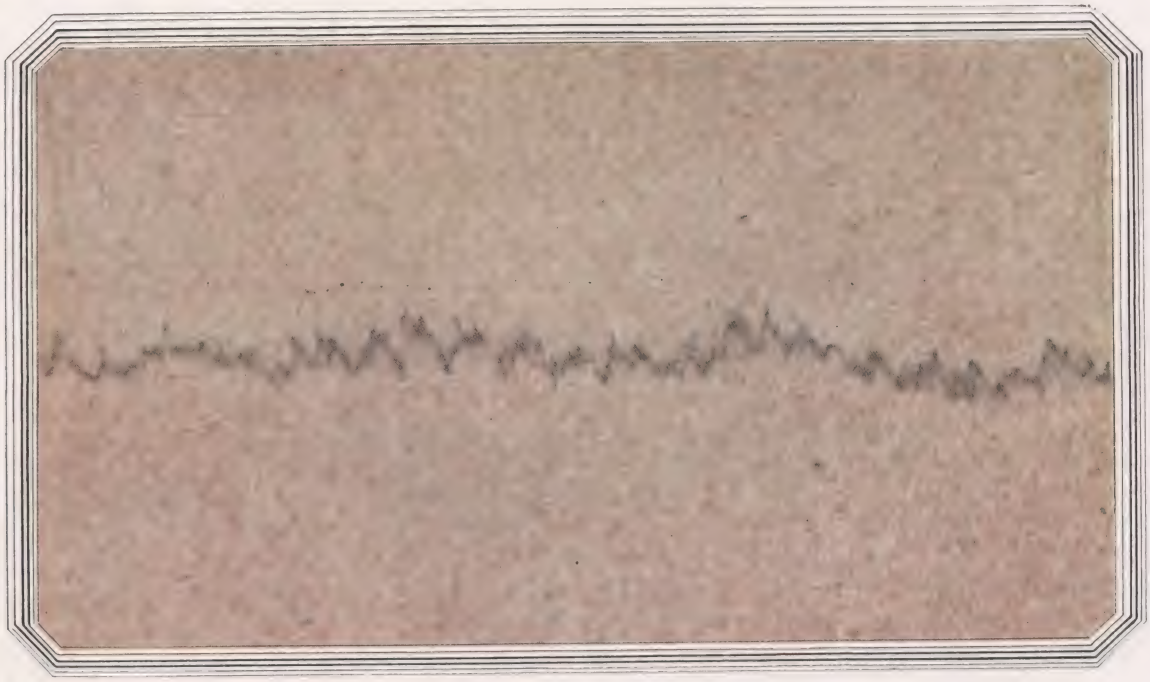


Illustration No. 3 APPALACHIAN CHAMPION PINK

Availability

All of the various Appalachian Marbles are available in practically unlimited quantities. The quarry holdings of the Appalachian Marble Company are the largest in Tennessee.

Quality

Appalachian Marbles are non-absorbing, long wearing, strong and easily workable.

	Average
Co-efficient of absorption	.047
Tensile strength (transverse to bed)	1,554 lbs. per sq. in.
Tensile strength (with bed)	1,551 lbs. per sq. in.
Transverse strength (modulus of rupture)	2,686 lbs. per sq. in.
Compressive strength	18,274 lbs. per sq. in.

These tests made by U. S. Bureau of Standards and reported by T. Nelson Dale, Retired Geologist, U. S. Geological Survey.

Standard Thicknesses

Appalachian Marble is cut in standard thicknesses. They are (after honing and polishing): 7/8 in., 1¼ in., 1½ and 2 in. Other thicknesses on order.

Price

Because of quantity production Appalachian Marbles although as beautiful as most fine foreign marble and superior in quality to the best of them are a great deal cheaper in price than imported marbles, as well as like quality domestic marbles.

Floor Tile

Orders for floor tile can be executed immediately. Standard sizes are always kept on hand. These are 8x16 in. and 10x20 in.

Crushed Tennessee Marble

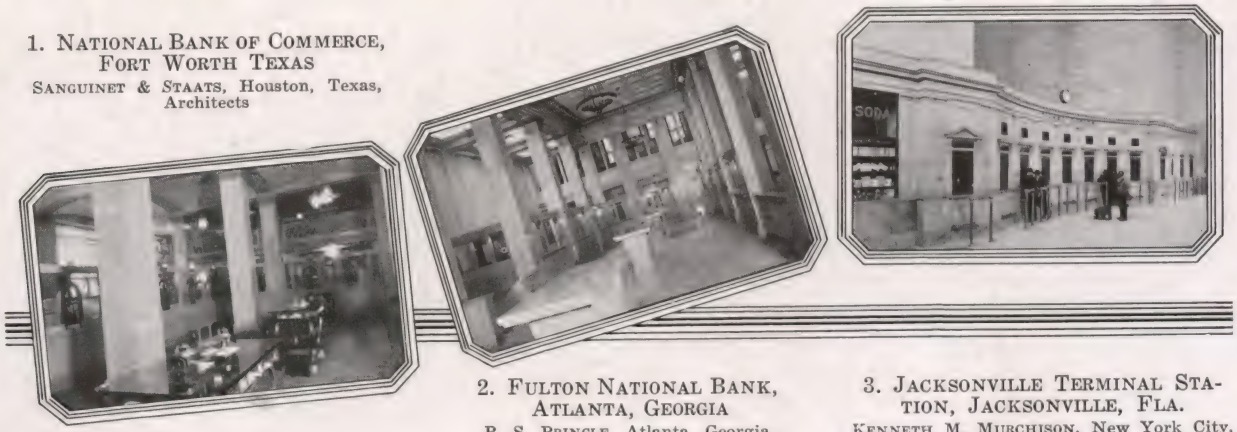
Beautiful, bright light colored Tennessee Marble suitable for stucco work. Marble dust.

Tennessee Granito

Sizes No. 1, 2 and 3 for terrazzo floors.

Tennessee Rubble Marble

This company is in a position to ship large quantities of one man's size stone for prompt delivery.



1. NATIONAL BANK OF COMMERCE, FORT WORTH TEXAS
SANGUINET & STAATS, Houston, Texas, Architects

2. FULTON NATIONAL BANK, ATLANTA, GEORGIA
R. S. PRINGLE, Atlanta, Georgia, Architect

3. JACKSONVILLE TERMINAL STATION, JACKSONVILLE, FLA.
KENNETH M. MURCHISON, New York City, Architect

Continued on next page

Illustration No. 4 APPALACHIAN ROSEAL

Samples

Polished samples showing the beauty of the Appalachian Marbles, of which the cuts shown herewith only hint, will be sent to any interested architect on request.

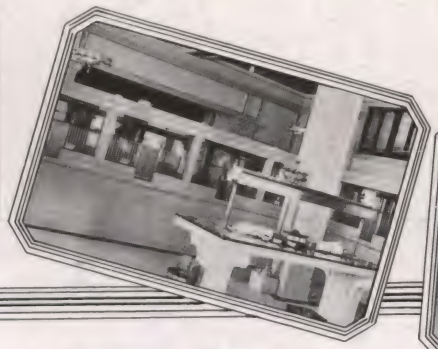
Installation

A few of the buildings in which Appalachian marble has been used are:

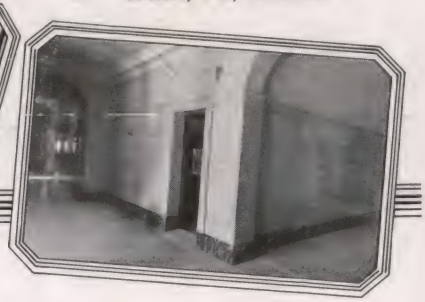
NAME OF JOB, ARCHITECT AND ADDRESS

Durant Hotel, Flint, Mich.—Esenwein & Johnson, Buffalo, N. Y.
First State Bank, Royal Oak, Mich.—Fred'k D. Madison, Royal Oak, Mich.
People's Savings Bank, Barberton, Ohio—Nachtegall Manufacturing Co., Grand Rapids, Mich.
Buffalo City Hospital Group, Buffalo, New York—Green & Wicks, Buffalo, N. Y.
East Side School, Cincinnati, Ohio—Garber & Woodward, Cincinnati, Ohio.
Erie Academy, Erie, Pa.—Wm. B. Ittner, St. Louis, Mo.
Chas. Vernon Gridley School, Erie, Pa.—Wm. B. Ittner, St. Louis, Mo.
Christopher Columbus School, Erie, Pa.—Wm. B. Ittner, St. Louis, Mo.
City Hall, Galveston, Texas—C. D. Hill & Co., Dallas, Texas.
First National Building, El Paso, Texas—Barglebaugh & Whitson, El Paso, Texas.
Bienville Apartments, New Orleans, La.—Toledano, Wogan & Bernard, New Orleans, La.
Albany City Hall, Albany, N. Y.—Ogden & Gander, Albany, N. Y.
Signal Mountain Inn, Chattanooga, Tenn.—Alsop & Phillips, Chattanooga, Tenn.
Exchange Bank, Olean, N. Y.—Mowbray & Uffinger, New York City, N. Y.
Green County Court House, Jefferson, Iowa—Proudfoot, Bird & Rawson, Des Moines, Iowa.
Hubbell Building, Des Moines, Iowa—Proudfoot, Bird & Rawson, Des Moines, Iowa.
Valley National Bank Building, Des Moines, Iowa—Proudfoot, Bird & Rawson, Des Moines, Iowa.
General Motors Building, Detroit, Mich.—Albert Kahn, Detroit, Mich.
Fidelity Trust Company, Knoxville, Tenn.—Manley & Young, Knoxville, Tenn.
First National Bank, Birmingham, Ala.—Warren, Knight & Davis, Birmingham, Ala.
Jacksonville Terminal Station—Kenneth M. Murchison, New York City, N. Y.
Metacomet National Bank, Fall River, Mass.—Nachtegall Mfg. Co., Grand Rapids, Mich.
Fulton National Bank, Atlanta, Ga.—R. S. Pringle, Atlanta, Ga.
National Bank of Commerce, Fort Worth, Texas—Sanguinet & Staats, Houston, Texas.
Huntington National Bank, Columbus, Ohio—Frank L. Packard, Columbus, Ohio.
Federal Reserve Bank Annex, Richmond, Va.—Carneal & Johnson, Richmond, Va.
Federal Reserve Bank, Houston, Texas—Sanguinet & Staats, Houston, Texas.
Union Arcade Building, Pittsburgh, Pa.—F. E. Osterling, Pittsburgh, Pa.
Volunteer State Life Insurance Bldg., Chattanooga, Tenn.—Barnwell & Barnwell, Chattanooga, Tenn.

4. FIDELITY TRUST COMPANY, KNOXVILLE, TENN.
MANLEY & YOUNG, Knoxville, Tenn., Architects



5. METACOMET NATIONAL BANK, FALL RIVER, MASS.
NACHTEGALL MANUFACTURING COMPANY, Grand Rapids, Mich.



6. MEDIA COUNTY COURT HOUSE, MEDIA, PA.
CLARENCE W. BRAZER, Crozer Bldg., Chester, Pa., Architect

Continued on next page

Illustration No. 5 APPALACHIAN SILVER GRAY

Co-operative Service

The Service Department of the Appalachian Marble Company welcome the opportunity to co-operate with the architect. This co-operation reaches its highest state of efficiency when architects furnish the Appalachian Service Department with blue-prints of the projects upon which they are working. The Service Department is then in a position to carefully estimate on work and offer all possible co-operation.

Facilities

The Appalachian Marble Company plant is the largest in Tennessee. Twenty-eight marble gang saws are operated. Two car loads of finished marble are shipped a day.

The quarries are only seven miles away from the mills. Any marble desired can be delivered at the mill, ready for manufacture, on twenty-four hours notice.

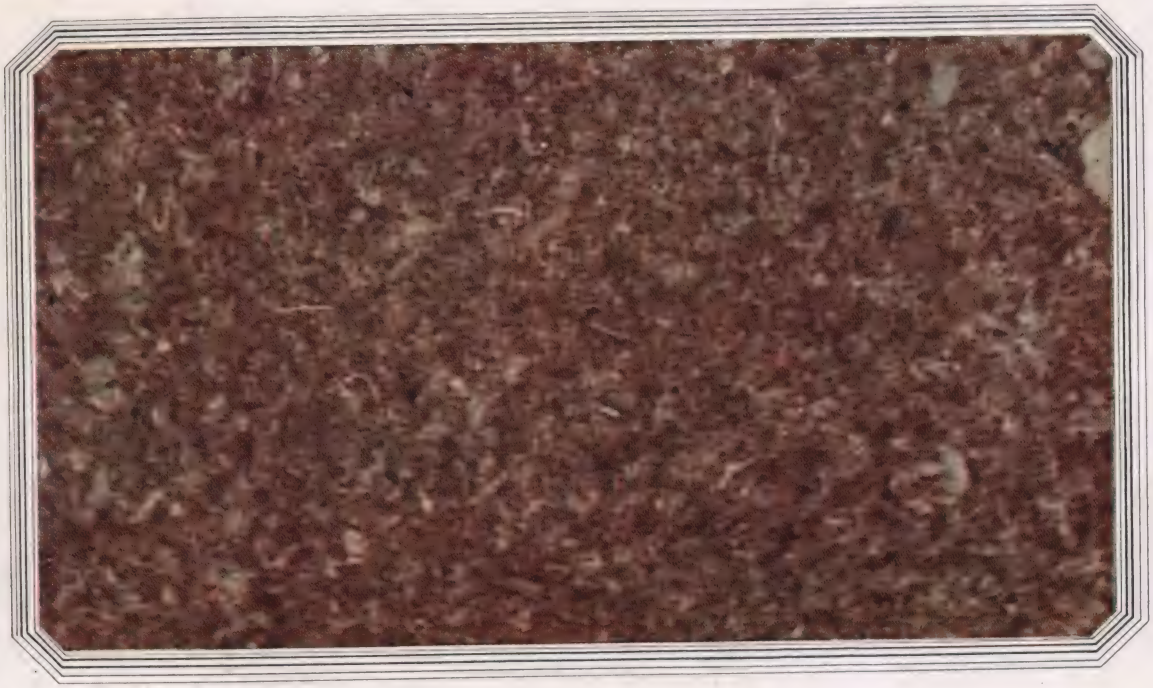


Illustration No. 6 APPALACHIAN DARK CHOCOLATE

THE GEORGIA MARBLE COMPANY

TATE, GA.

BRANCH OFFICES

NEW YORK, N. Y., 1328 Broadway—Telephone, Fitzroy 2193

CHICAGO, ILL., 456 Monadnock Block

Products

GEORGIA MARBLE for exterior and interior building and monumental work.

Rough quarry blocks, sawed stock or finished work in the following marbles produced by us: "WHITE," "LIGHT CHEROKEE," "SILVER GRAY," "MEZZOTINT," "CREOLE," and "PINK."

Durability

Georgia marble, owing to its dense, flawless, crystalline formation and non-absorbing qualities, does not disintegrate. It will stand the test of time, as proved by use in many fine buildings and memorials.

Colors

"White"—This company operates four quarries of white marble ranging from almost pure white to white with more or less dark marking, known as "White Georgia" and "Kennesaw."

"Light Cherokee"—A very light gray with clouding and veins running in waves well distributed.

"Silver Gray"—A uniform pearl gray, practically free from marking.

"Mezzotint"—Gray background with rather heavy dark marking occurring in waves, between "Silver Gray" and "Creole."

"Creole"—Heavily veined and having white background with black and bluish black veining and figures.

"Pink"—Ranges from a very light salmon to a deep old rose with very warm tints.

Physical Properties of Georgia Marble

Crushing Strength—Tests by the Ordnance Department, United States Army, show crushing strength to be from 11,000 to 16,000 lbs. per sq. in.

Analysis—Made at Worcester Polytechnic Institute:

Carbonate of Calcium	98.96%
Carbonate of Magnesium	0.13%
Alumina	0.22%
Silica	0.61%
Loss	.08%

Weight—The specific gravity at 60° Fahr. is 2.7178, equaling a weight of 169.5 lbs. per cu. ft.

Absorption—A 2-in. cube was dried at 220° Fahr. till its weight was constant; it was then placed in water at 60° Fahr. for 24 hours, and reweighed. It was found to have absorbed only 0.028% of moisture.

Statuary

The "White" and "Silver Gray" Georgia marble are unexcelled for sculpture work exposed to the weather. The marble is unaffected by the most severe weather. Large sizes can readily be obtained.

Columns and Monoliths

Special attention is given to the production of long columns in one piece. The company has furnished monoliths 30 ft. long by 4 ft. diameter.

Facilities

Facilities for production and finishing are unexcelled, eight quarries are operated, which will easily produce 1,000,000 cu. ft. per annum. The equipment of the four plants consists of upwards of 100 gang saws, 22 rubbing beds, planers, lathes, diamond saws, carborundum machines, etc., and with an unlimited supply of marble, any size order can be accurately and promptly filled.

References

A few representative buildings in which Georgia marble has been used, location, and architect or sculptor:

EXTERIOR OF BUILDINGS

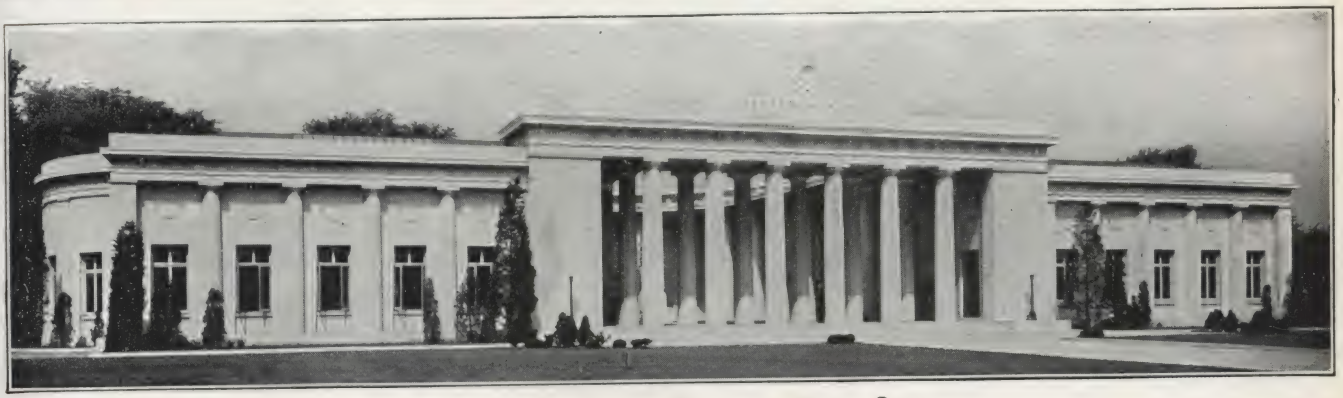
Cleveland Museum of Art, Cleveland, Ohio, Hubbell & Benes
New York Stock Exchange, New York, N. Y., Trowbridge & Livingston
Girard Trust Company, Philadelphia, Pa., McKim, Mead & White and Furness, Evans & Co.
U. S. Post Office, Birmingham, Ala., Supervising Architect, Treasury Department
Pan American Building, Washington, D. C., Paul P. Cret
Federal Reserve Bank, Atlanta, Ga., A. Ten Eyck Brown
Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks

INTERIOR OF BUILDINGS

Guardian Savings & Trust Co., Cleveland, Ohio, Walker & Weeks
State Capitol, Salt Lake City, Utah, Richard Kletting
House of Representatives Office Building, Washington, D. C., Thomas Hastings and Elliott Woods
Manufacturers & Traders National Bank, Buffalo, N. Y., Furness, Evans & Co.

MONUMENTAL AND SCULPTURE

Lincoln's Statute, Lincoln Memorial Building, Washington, D. C., Daniel Chester French
"Civic Virtue" Municipal Fountain, City Hall Park, New York, N. Y., Frederick W. MacMonnies
Pediment, National Capitol, Washington, D. C., Paul Bartlett
Columbus Memorial Fountain, Washington, D. C., Lorado Taft
Du Pont Memorial Fountain, Washington, D. C., Daniel Chester French



MCKINLEY BIRTHPLACE MEMORIAL, NILES, OHIO
MCKIM, MEAD & WHITE, Architects
Constructed entirely of Georgia marble, including the statue of McKinley in center of peristyle. 28 columns, 25 ft. high, 3 ft. 4 in. in diameter; furnished in monoliths

ESTABLISHED 1880

STANDARD MARBLE WORKS

JOHN M. MUELLER, JR., PROPRIETOR

OFFICE AND FACTORY

CINCINNATI, OHIO

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Cable Address
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ABC Code 5th Edition

Products

MARBLE, ONYX, SLATE, ALBERENE and kindred PRODUCTS from all parts of the world, for all Architectural and Decorative Requirements, in a great diversity of natural colors and figures.

Contractor for the installation of walls and floors in Tile, Mosaic and Terrazzo. Special attention given to the installation of Swimming Pools.

Facilities

We saw, cut, turn, carve and completely finish the various kinds of marble used for the interior and exterior of buildings. Our mill facilities for turning out finished materials are most ample and we are prepared to ship all orders on very short notice, and to *erect same,* if required.

Service

The stock of various blocks and sawn slabs in our capacious storage building assures a very good assortment to select from at all times.

Samples showing the variety of colorings and the different textures, will be furnished on application.

Estimates to architects, contractors and owners will be given promptly on receipt of plans and specifications.

Some Work Completed

City Hall, St. Louis, Mo.
Post Office, Pittsburg, Kans.
Railway Exchange Building, St. Louis, Mo.
Stahlman Building, Nashville, Tenn.
Mercantile Library Building, Cincinnati, Ohio
Empire Building, Birmingham, Ala.
Mack Building, Denver, Colo.
Keith Theater, Cincinnati, Ohio
Cox Theater, Cincinnati, Ohio
Union Trust & Savings Bank, Cincinnati, Ohio
Lincoln National Bank, Cincinnati, Ohio
Planters National Bank, Richmond, Va.
Empire National Bank, Clarksburg, W. Va.
Citizens American Bank, Tampa, Fla.
American National Bank, Pensacola, Fla.
Winters National Bank, Dayton, Ohio
Jefferson Hotel, St. Louis, Mo.
Bancroft Hotel, Worcester, Mass.
Penn Harris Hotel, Harrisburg, Pa.
South Park High School, Buffalo, N. Y.
Hughes High School, Cincinnati, Ohio

Further information on request.

FACTORY AND OFFICES OF STANDARD MARBLE WORKS

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NEW YORK, N. Y.

CHICAGO OFFICE, 414 Wrigley Building
SAN FRANCISCO OFFICE, 845 Monadnock Building
YARD AND WHARF, 3 Mill Street, ASTORIA, L. I., N. Y.

Products

We dispose of the entire output of quarries in all parts of the country. We also act as wholesale distributers of varied and complete stocks of DOMESTIC and FOREIGN MARBLES and STONE.

Shipment

These stocks are located in various strategic shipping centers where we also have an office or a representative. This enables us not only to make prompt and economical shipments, but to co-operate with you in the selection of marble at the very beginning of the work.

Our marbles and stones have been used for both exterior and interior of the largest and most important work executed in the country for a great number of years. If it is marble, we have it, or will get it, or it is not in the country.

Color Scheme

In arranging your color scheme we offer the following suggestions in marble and stone:

WHITE
Madre Cream Alabama
Madre Veined Alabama
Eastman's Cream Statuary
Eastman's White Paovnazzo
Eastman's Cream Paovnazzo
Eastman's American Sienna
Eastman's Blanc Clair

PINK
Pink Kasota Fleuri
Pink Kasota Veine
Kettle River Sandstone

GRAY
Napoleon Gray
Alamora
Batesville

BUFF
Onondago
Cenere
Juraville
Wellington Cream

BROWN
Nebo Golden Travis

GREEN
Westfield Green
Eastman's Cipolin (Light)
Eastman's Cipolin (Dark)
Imported Verde Antique
Emerald Curley Green

CREAM AND BUFF STONES
American Cream White Lens
Silverdale
Dunville
Littleton
Champville

BLACK
York Fossil
Antwerp Black

YELLOW
Yellow Kasota Fleuri
Yellow Kasota Veine

BLUE
Eastman's Oxford Fleuri

Descriptions

Alabama Marble—In coloring, soft cream white, beautifully marked. It has wonderful carving qualities, producing a smooth and regular finish.

Eastman Marble — Comes from Vermont in colorings of cream white, green, beautiful blue; eleven attractive shades.

Napoleon Gray—A real gray marble; high grade, taking a high polish. Equally effective in a hone finish. Suitable for interior or exterior work, and absolutely frost resisting. Non-slip when used as floor, tile or treads.

Alamora—A rich gray marble with just enough veining to make it particularly attractive for interior use.

York Fossil—A black marble dotted with small white spots, suitable for interior and exterior purposes.

Emerald Curley Green—Rich, dark green background with plenty of character and curley markings.

Westfield Green—Color, rich deep moss green with light green markings, giving splendid effect. The only spangled marble. Hard and durable, taking high polish. Exceptionally suitable for exterior use.

Imported Verde Antique—In color, rich dark green background with light green and white veinings.

Pink and Yellow Kasota Stones—Stones of exceptional beauty, sawed either with or across the bed. Especially pleasing when used in a hone finish in ashlar.

Nebo Golden Travis—Utah's rich product, having a rich golden background, shaded with rose and golden tints.

Onondago — America's Tavernelle marble. Ground of cream white with scattered crystals of buff gray.

Cenere—A deep buff ground with characteristic markings of yellow and red. Takes a high finish.

Kettle River Sandstone—Beautiful pink stone of uniform color and texture. Used for exterior and interior purposes.

Cream and Buff Stones (Listed)—America's cream white and buff stones are particularly suited for interior finish in churches, theaters and banks.

Juraville—Cream buff background, variegated, similar to Tavernelle and Hauteville.

Wellington Cream — Rich cream buff, interesting marking and taking a good polish. Has no crowfeet and absolutely sound and uniform. Suitable for exterior and interior construction.

REREDOS OF ST. THOMAS'S CHURCH,
NEW YORK CITY
G. BERTRAM GOODHUE, Architect
LEE O. LAWRIE, Sculptor

Carved entirely of Dunville Stone supplied by us and quarried at Dunville, Wis. This imposing piece of work is in many ways the handsomest thing of its kind in this country. It is 80 ft. high and 40 ft. wide

Samples

We will be glad at any time to furnish samples of marble, or our sample book which shows 37 different marbles in their natural colors and finish. You will find the book of great assistance in working out color schemes and much easier to file than pieces of marble. A copy will be sent on request.

DAPRATO STATUARY COMPANY

Designers, Sculptors and Makers of Statuary, Reliefs, Altars and Stained Glass Windows

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PIETRASANTA, ITALY

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BRANCH OFFICES
NEW YORK, N. Y., 51 Barclay Street
MONTREAL, CAN., 966 St. Denis Street

Products and Services

Designers, Sculptors and Makers of HIGH GRADE ECCLESIASTICAL WORK, such as: Altars, Altar Railings and Pulpits of Marble, Scagliola and Rigalico; Statues; Stations of the Cross; Cemetery Groups; Stained Glass Windows; Sounding Boards; Baptismal Fonts; Sanctuary Lamps; Electroliers; Monuments; Oil Paintings.

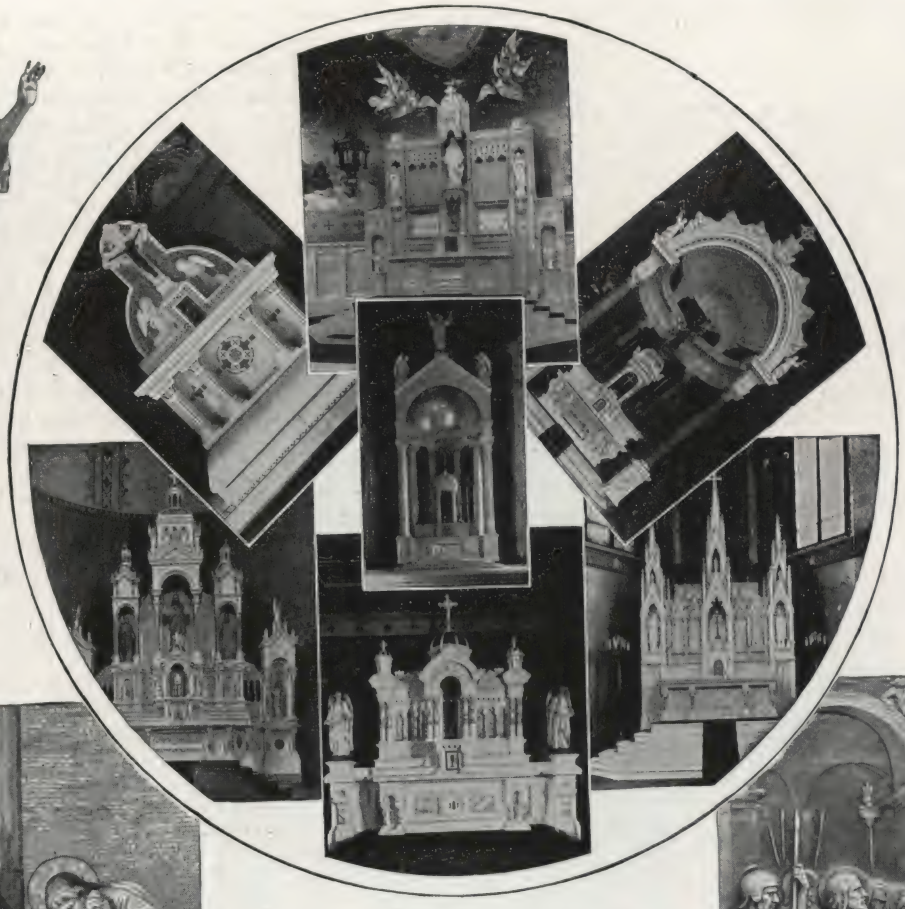
Special Sculpturing and Modeling of all kinds.

Facilities

The studios of DAPRATO STATUARY COMPANY have been established for 60 years, and are today the largest of their kind in the world. Here is available the work of artists, sculptors and modellers of exceptional skill and ability. Architects, whose plans include the creation of new ideas in architectural embellishment, either in the form of special statuary, relief work or ornamental effects, can utilize our facilities to advantage.

Correspondence invited.

GUARDIAN ANGEL
Executed in Orbronze for outdoor exposure

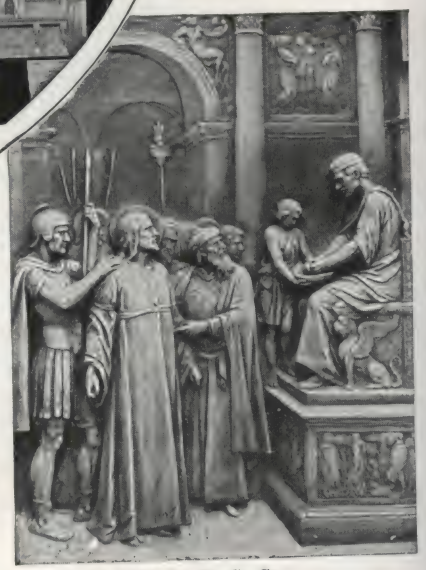


GROUP OF ALTARS FURNISHED BY DAPRATO STATUARY COMPANY

Made in Marble, Scagliola and Rigalico
Each of these productions is a work of art due to the excellent proportions of design and the admirable execution of details.
Our "Special Altar Book" free on request.

"THE IMMACULATE CONCEPTION"
Executed in Carrara marble

STATION OF THE CROSS
Executed in Venetian Mosaic



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Marble, Scagliola and Travertin

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NEW YORK, N. Y.

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SYNTHETIC REPRODUCTIONS of IMPORTED and DOMESTIC MARBLES and STONES indistinguishable from the natural, for architectural and decorative purposes.

Quality

The products of this firm are acknowledged to be the most perfect in form, color and finish, and are universally quoted as the "Standard of Quality."

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S. W. Straus & Co., New York, N. Y.
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Rhode Island Hospital Trust Building, Providence, R. I.
Fifth Christian Science Church, New York, N. Y.
National City Bank, New York, N. Y.
National Commerce Bank, Albany, N. Y.
Brooklyn Trust Company, Brooklyn, N. Y.
Coal & Iron National Bank, New York, N. Y.
Pennsylvania Hotel, New York, N. Y.
Equitable Trust Building, New York, N. Y.
Commercial National Bank, Washington, D. C.
Guaranty Trust, New York, N. Y.

RECEPTION ROOM AND LOBBY OF THE S. W. STRAUS BANK BUILDING, 46TH STREET AND FIFTH AVENUE, NEW YORK, N. Y.
WARREN & WETMORE, Architects

JOHN J. WISE & COMPANY—INCORPORATED

Artificial Marble, Scagliola and Travertine

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NEW YORK, N. Y.

Products and Services

Manufacturers of and contractors for:

ARTIFICIAL MARBLE, SCAGLIOLA, TRAVERTINE, etc.

Synthetic Reproductions of all kinds of Imported and Domestic Stones and Marbles for Architectural and Decorative purposes.

Quality

Products of this firm are of the best character, both in æsthetic values in reproductions of natural marbles and in quality of workmanship and materials.

Co-operation

We welcome any opportunity to be of service to architects and contractors in any capacity. Samples, estimates and suggestions will be submitted on request.

Prompt and attractive proposals will be sent to the inquirer on receipt of plans and specifications.

Recent Installations

Biltmore Hotel, Providence, R. I., Warren & Wetmore, Architects

Statler Hotel, Buffalo, N. Y., Geo. B. Post & Son, Architects

New York University, New York, N. Y., Wm. S. Gregory, Architect

National Bank of Commerce, Providence, R. I., Stone, Carpenter & Sheldon, Architects

Lafayette Theater, Buffalo, N. Y., Leon H. Lempert & Son, Architects

Loew's State Theater, Buffalo, N. Y., Thos. W. Lamb, Architect

Church of Our Lady of Guadaloupe, New York, N. Y., Gustave Steinback, Architect

Church of Our Lady of Victory, Jersey City, N. J., Joseph Jackson, Architect

St. Louis de Gonzague, Nashua, N. H., Walter F. Fountaine, Architect

Excelsior Savings Bank, New York, N. Y., Randolph H. Almiroty, Architect

MAIN LOBBY OF LIGGETT BUILDING, NEW YORK
CARRÈRE & HASTINGS, Architects
Ornamental pilastercaps, frieze, cornice and beams; reproduction in Botticino marble

ECONOMY CONCRETE COMPANY

Manufacturers of Decorative Concrete Stone

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NEW HAVEN, CONN.

Products

CONCRETE STONE of different colored aggregates. Also Laundry Tubs of the same material.

Samples

Samples of our concrete stone sent on request.

Uses

Few architects realize the rapid growth of the best makes of concrete stone in the past few years. Saving, as compared with limestone, is considerable, and its superiority to the natural article is generally admitted.

TRACERY WINDOW, FIRST PRESBYTERIAN CHURCH, FAR ROCKAWAY, N. Y.—MEMORIAL TO RUSSELL SAGE. BUILT IN 1908
CRAM, GOODHUE & FERGUSON, Architects

ESTABLISHED 1870

THE GEO. RACKLE & SONS CO.

Originators of Artstone

CLEVELAND, OHIO

Products

ARTSTONE GOTHIC WINDOWS, BUILDING TRIM, ARTSTONE INTERIOR WORK, BALUSTRADES; FLAT SLAB CONCRETE ROOFING TILE.

TRADE-MARK

Experience and Facilities

This firm has manufactured Artstone for fifty years, being the originator of this material and the leading producer of it today. During these years of progress a strong organization has been developed qualified to handle the best class of work, and the constantly expanding factory space makes it possible to execute contracts of any size. Ornamental work is a specialty, being in the hands of competent artists, and unusual attention is given to carrying out with precision the architect's ideas in design.

Artstone

Rackle Artstone is formed from a special concrete which has been developed through the many years that this firm has been in business, and stands on its own merits, distinct from any other product. Accurate layout, artistic modeling, expert mould making, careful selection of materials and a thorough knowledge of casting processes all enter into the manufacture of Rackle Artstone, for it is the Rackle idea that quality must not be sacrificed to cheapness, and that it pays to make the best article that can be produced.

Rackle Artstone is made in a variety of colors and textures. It is strongly reinforced, and it is everlasting.

Economy—An important point is that while Rackle quality is high, the cost of Artstone is low. Cer-

RACKLE ARTSTONE STAIRWAY IN RESIDENCE OF S. B. NEWBERRY, CLEVELAND HEIGHTS, OHIO

F. B. MEADE and J. M. HAMILTON, Architects

Continued on next page

tain reasons for this are apparent, such as the fact that any product cast in moulds is less expensive than when made by hand. But there are other things which enter into the matter, chief among them being the Rackle processes of manufacture, which have been perfected during a half century and which have economy as their aim, as well as high quality.

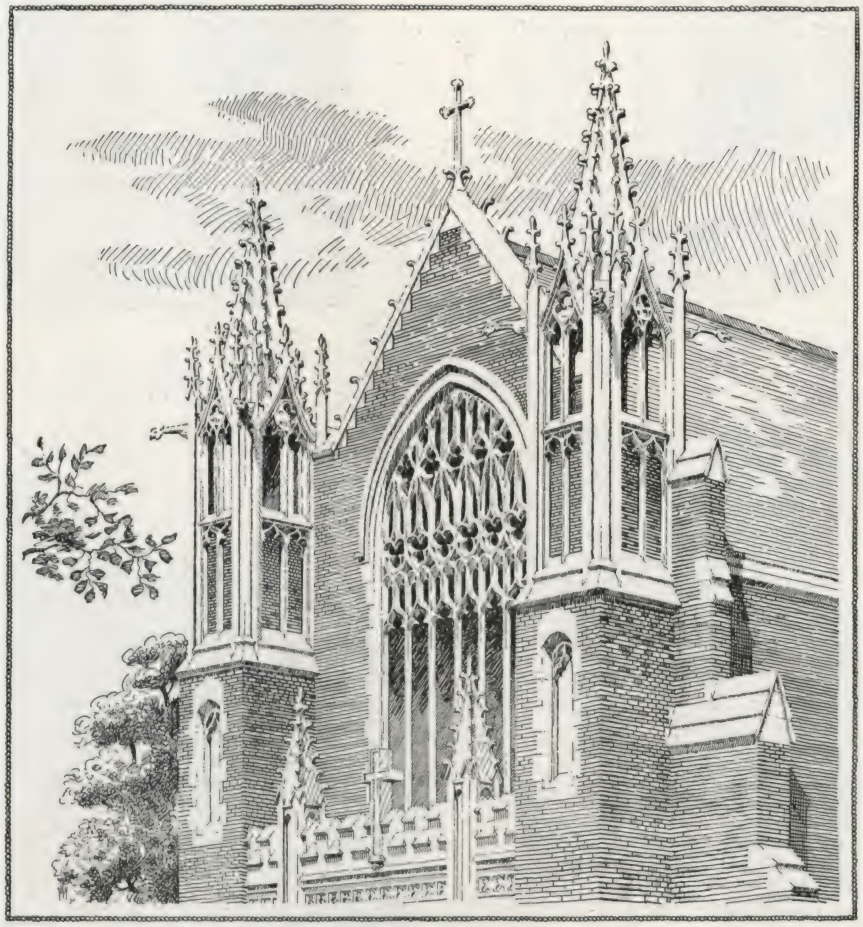
Gothic Windows—For Gothic windows Artstone is peculiarly adapted, being superior to any other material for this purpose. This is because Artstone, while it may be made into any shape, still has no grain or strata to cause splitting of curves and angles; and being thoroughly reinforced with steel rods, it is strong and durable. And then Artstone is always straight and true, never being warped nor twisted by any burning or firing process, and so is an ideal material for holding glass.

Building Trim and Balustrades—Scattered over the country are hundreds of buildings trimmed with Rackle Artstone, as well as scores of balustrades. Little argument is necessary to prove the case for Artstone when this work is seen, as the results speak for themselves. The list includes store and apartment buildings, the better grade of residences, office structures, hotels, schools, churches, banks, theaters, municipal and other public buildings. The firm's well-known success in producing exterior work means that Rackle Artstone has been found practical, attractive and permanent.

Interior Work—During the last few years there has been a growing demand for Rackle Artstone for interiors which require something better than ordinary finish, and yet in which the question of economics needs attention. This interior work comprises columns, arches, wainscots, stairways, door and window finish, and the like, in churches, schools, banks, and residences of the better class. Nothing is superior to Rackle Artstone for these purposes, as its beautiful, soft color tones can be made so as to harmonize with any surroundings.

References—

Church of the Ascension, Lakewood, Ohio
Grace Lutheran Church, Wadsworth, Ohio
Trinity Lutheran Church, Akron, Ohio
Boulevard Presbyterian Church, Cleveland, Ohio
Trinity Lutheran Church, Lakewood, Ohio
St. Mary's Church and School, St. Paul, Minn.
Tabernacle Presbyterian Church, Indianapolis, Ind.
Mt. Olive English Lutheran Church, Milwaukee, Wis.
Schauffler Hall, Richmond, Va.
Church of Our Redeemer, Chicago, Ill., (windows)
Wade Park M. E. Church, Cleveland, Ohio, (windows)
St. Paul's Evangelical Lutheran Church, Youngstown, Ohio
St. Andrew's Episcopal Church, Akron, Ohio, (windows and interior)
St. Paul's Lutheran Church, Elyria, Ohio
St. Paul's Lutheran Church, Warren, Ohio
St. Vincent de Paul Church, Mt. Vernon, Ohio
Grace Covenant Presbyterian Church, Richmond, Va.
First Church of Christ, Scientist, Warren, Ohio



TRIM OF ARTSTONE, CHURCH OF THE ASCENSION, LAKEWOOD, OHIO
J. W. C. CORBUSIER, Architect

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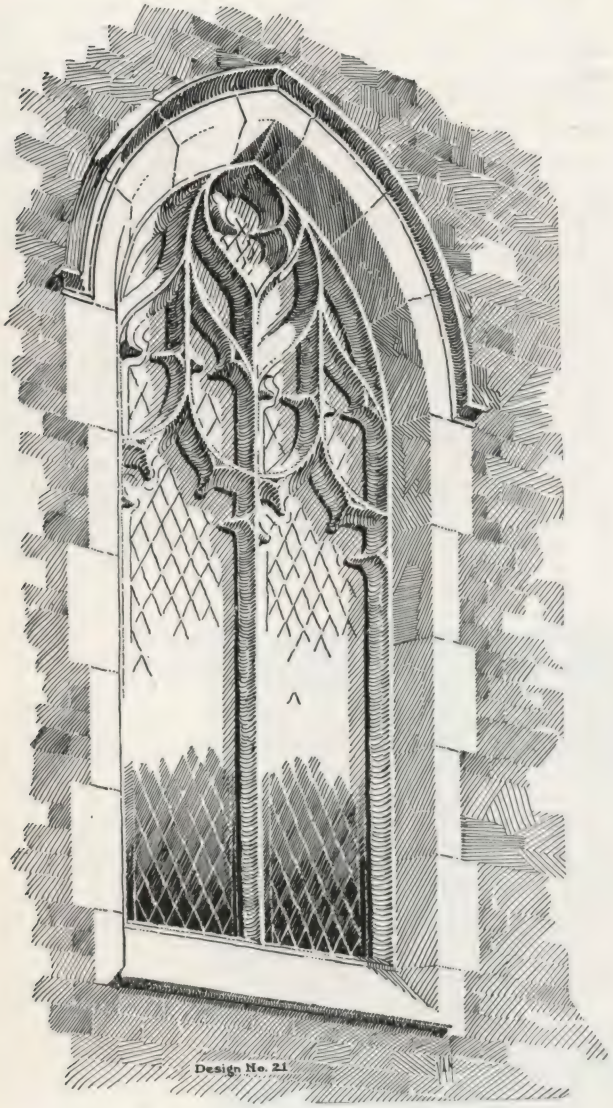


GOTHIC WINDOW

CUDELL MEMORIAL TOWER, CLEVELAND, OHIO
BUILT OF RACKLE ARTSTONE
DERCUM & BEER, Architects

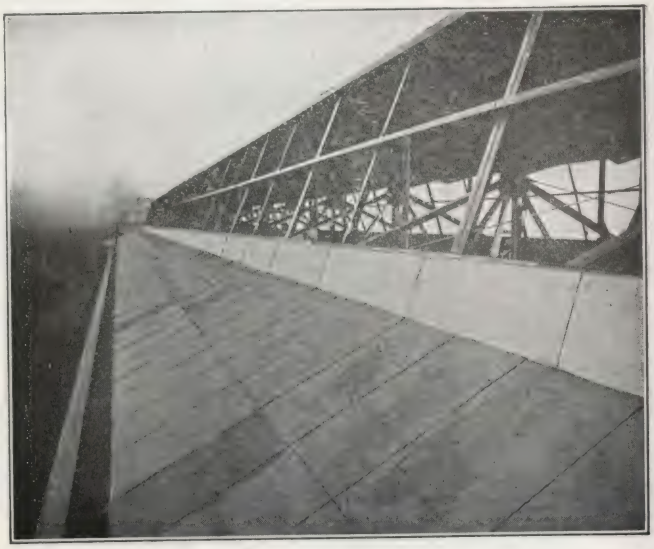
Flat Slab Roofing Tile

Rackle reinforced concrete flat roofing tile have proved successful in furnishing a light, strong, economical and fireproof roof which answers every requirement of first class building construction.

For foundries, shops, warehouses, garages, schools and theaters they are unexcelled. Flexible, yet firm, these tile are laid rapidly in place without building forms or centering such as is required for the old style of cast concrete roof. Rackle tile are used for either flat or pitched roofs wherever steel purlins can be used.

References—

U. S. Copper Products Co., Cleveland, Ohio
Ohio Body and Blower Co., Cleveland, Ohio
Lima Locomotive Co., Lima, Ohio
Harshaw, Fuller & Goodwin Co., Cleveland, Ohio
Canton Sheet Steel Co., Canton, Ohio
Wellman-Seaver-Morgan Co., Akron, Ohio
Superior Foundry Co., Cleveland, Ohio
Van Dorn Iron Works Co., Cleveland, Ohio
McMyler Interstate Co., Bedford, Ohio
East and West Junior High Schools, Warren, Ohio
White Motor Co., Shipping Building, Cleveland, Ohio
J. M. & L. A. Osborn, Warehouse, Cleveland, Ohio



FORGE SHOP ROOF, THE VLCHEK TOOL CO., CLEVELAND, OHIO

THE AULD & CONGER COMPANY

Producers of Roofing Slate, Slate for Terraces and Garden Walks, Blackboards and Structural Slate

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CLEVELAND, OHIO

QUARRIES
POULTNEY, VT.
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Products

ROOFING SLATE.

Also Blackboards; Structural Slate; Slate for Terraces and Garden Walks.

Slate Effects

Early European slate effects are easily obtained by using our natural slate resources, which do not imitate but actually reproduce. Artistic slate effects are a matter of the proper assembling of the slate at the quarries.

Service Department

Our Architectural Service Department will gladly furnish samples of slate and co-operate with architects, with suggestions if desired as to the color, texture, and method of application best suited to the type of building. For the architect's protection and also to enable the contractor to fairly estimate his work—as no set specification can cover each individual character of roof—on receipt of plans we will make a roof layout, actually detailing thereon just what the architect requires.

Our Products—(Roofing Slate)

Our Mammoth Vein Poultney Weathering Sea Green—A most durable, economical slate.

Our Purple Vein—A purple slate with green mottlings.

Our Agecraft Rustic Slates—These are an unusual material and are from a distinctive bed, or vein, in our quarries, and should not be confused with the (weathering) sea green slate. These rustic slates have an almost endless variety of shades—soft grays, several different colored browns, gray-greens, blacks, brown-greens and a few brown-purples. A very pleasing feature of this kind of roof is its improvement with age. The colors grow mellow with time and take on some very beautiful tints, making a decidedly artistic roof. Furnished in any size or thickness. Color cut on request.

Our Agecraft Mottled Purple and Rustic Slates—These are our purple vein slates mottled with green, and are mixed, by us, together with our rustic slates; soft grays, several different colored browns, some blacks and brown-purples, making a roof which at almost any distance shows its colors and individuality. Furnished in any size or thickness. Color cut on request.

Our Celebrated Genuine Bangor Slate—Pennsylvania unfading black slate furnished with labels and certificate of "The Genuine Bangor Slate Manufacturer's Association."

Catalogue

Write us for our book "Above All" which gives interesting facts about all slates and their uses.

LYFORD M. MOORE RESIDENCE, DETROIT, MICH.

ESTABLISHED 1873

THE JOHN D. EMACK CO.

Olde Stonesfield Roofs

110 South 16th Street

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QUARRIES AND ASSEMBLING YARDS, VERMONT AND NEW YORK STATES

NEW YORK OFFICE, 17 East 49th Street

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Products

Olde Stonesfield Roofs are, in design, materials and Greens and Grays; GARDEN FLAGGING.

Also Black Slates.

Olde Stonesfield Roof Treatment

Olde Stonesfield Roofs are, in design, materials and construction, based on the century-old roofs of England's famous Cotswold District.

Individual Treatment—England's roofer craftsmen designed each roof by laying the stones out on the ground, just as they were to be placed on the roof.

Pieces of various sizes, thicknesses, shapes and colorings, were literally woven into a tapestry thatch of stone, having rounded valleys and wonderful effects.

Service to Architects—In similar manner THE JOHN D. EMACK CO.'s designers will gladly consider with architects each Olde Stonesfield Roof in connection with each structure—a service that directly cooperates with the architect in skillfully translating his roofing desires.

Costs—Estimates, for supplying sufficient material, will be furnished on receipt of plans, based on the most appropriate graduation for the subject to be treated (unless special specifications are required).

Individual Effects—Olde Stonesfield Roofs are assured by the fact that we quarry the material and assemble orders at our yard before shipping, in accordance with carefully detailed working drawings which are furnished with each order.

Stonesfield Special

A moderate priced slate, full of texture, varying from $\frac{3}{8}$ to $\frac{3}{16}$ in. in thickness and wide range of colors. Especially quarried for the smaller type of house.

Colonial Greens and Grays

Quarried in soft, neutral shades for buildings where quiet or old shingled effects are desired.

Olde Stonesfield Garden Flagging

Large quantities of garden flagging in a wide range of colors, for porches, terraces, walks, etc., are produced and carried in stock.

Special Display

Special displays in both offices for visiting architects.

RESIDENCE OF R. W. CRABBE, CINCINNATI, OHIO
G. C. BURROUGHS, Architect
Where "Stonesfield Special" graduation has been applied to a moderate size house

J. A. FARRELL TERRACE, NORWALK, CONN.
LEROY P. WARD, Architect
Note interesting effect produced by using irregular and random rectangular flagging

Continued on next page

RESIDENCE OF EUGENE DU PONT, WILMINGTON, DEL.
H. T. LINDBERG, Architect
Note the graceful effect of round valleys

FARM BUILDING OF JAMES A. FARRELL, NORWALK, CONN.
LEROY P. WARD, Architect
A touch of the Old World brought out by Stonesfield roof treatment

OLDE STONESFIELD ROOF OF THE ALLAN LEHMAN RESIDENCE, TARRYTOWN, N. Y.
J. RUSSELL POPE, Architect
Note the variation of the ridge line and the undulated effect of parts of the roof, reminiscent of the century-old Cotswold stone thatched houses

KNICKERBOCKER SLATE CORPORATION

E. J. JOHNSON, PRESIDENT

153 East 38th Street

NEW YORK, N. Y.

Products

ROOF SLATES; GARDEN FLAGGING; SLATE BLACKBOARDS; STRUCTURAL SLATE; SNOW GUARDS; SLATING NAILS.

Also Slaters' Tools.

Consulting Service

Recent slate developments are such as to require the highest technical knowledge of slate possibilities in order to secure the best results. This concern offers an experience which covers 35 years in quarrying slate and working out the most advanced problems in installing. Especially does this apply to the Old European roof slate features which have been made a special study by us since its introduction in this country.

Our consulting service includes supplying the architect with technical facts covering slate possibilities in color combinations, specification suggestions and plans of layouts.

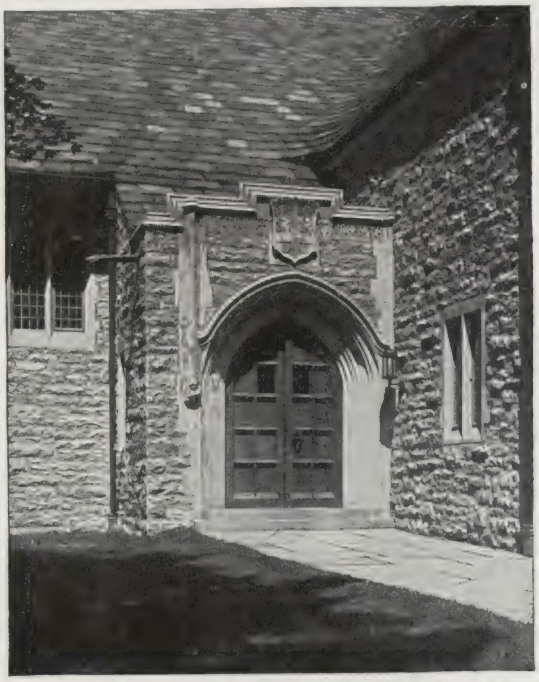
The full benefit of our long practical experience is gladly extended to aid the architect, roofing contractor, or owner in securing the results best suited to any particular building project.

Old European Slate Roof

A true reproduction of the ancient roof of Europe, wherein are slates of marked texture, graduated in thickness from as high as 2 in. down, and also in exposures from 13 in. down, other additional features lending themselves to make this character of roof an outstanding charm of any building. A feature in which we excel even the roofs of Europe is our color scheme wherein we vie with the autumnal tints of the hillside, having various shades of green, gray, purple, red and black, with the additional yellows produced by exposure. With the selection of guaranteed hard slates, such roofs will last hundreds of years—age adds beauty.

At a small advance in cost over that of an ordinary slate roof, we can give many of the desirable features of these roofs.

We invite correspondence as to detail features and advice.



OLD EUROPEAN SLATE ROOF AND FLAGGING, ST. PETER'S CHURCH, MORRISTON, N. J.

Specifications for Old European Slate Roof, Knickerbocker Method

Cover all sloping roofs (and other surfaces where indicated on drawings or herein specified) with one thickness of heavy tarred roofing felt to be approved by architect, over which lay the Knickerbocker Slate Color Scheme K (or other color arrangement as may be desired), with nailholes drilled and countersunk and in random widths and graduated lengths as follows:

Under eave course, 17½ in. long by ½ in. thick; eave course 30 in. long by ½ in. thick, 13½ in. to weather; the next course 30 in. long by 1 in. thick, 13½ in. to weather; the next two courses 28 in. long by ¾ in. thick, 12½ in. to weather; the next three courses 26 in. long by ½ in. thick, 11½ in. to weather; the next three courses 24 in. long by ⅜ in. thick, 10½ in. to weather; the next three courses 22 in. long by ¼ in. thick, 9½ in. to weather; the next three courses 20 in. long by ¼ in. thick, 8½ in. to weather; the next three courses 18 in. long by $\frac{3}{16}$ in. thick, 7½ in. to weather; the next four courses 16 in. long by $\frac{3}{16}$ in. thick, 6½ in. to weather; the next four courses 14 in. long by $\frac{3}{16}$ in. thick, 5½ in. to weather; the next five courses 12 in. long by $\frac{3}{16}$ in. thick, 4½ in. to weather. All slate to be fastened with yellow metal nails of suitable lengths for the various thicknesses.

Slates at valleys, hips, rakes and ridges to be laid in elastic cement of same color as slate. Small pieces of slate at valleys and hips will not be allowed.

Notes: We supply blue prints of roof plan showing exposures and thickness of each course.

The foregoing specification is for a roof with a 22-ft. rafter. The arrangement may be varied to suit any length rafter, the thickness increased or decreased, the exposures varied, or the cost reduced by using thinner slates, as the random and graduated effect would be obtained even though full $\frac{3}{16}$-in. slates were used entirely. A uniform length of slate and exposure throughout the roof with random widths is another scheme specially adapted to $\frac{3}{16}$-in. thickness.

Old European Garden Flagging

We furnish slate slabs in uniform or irregular shapes and in any of the various colors (including mottled purple and green) for loggia floors, garden walks, church floors, courtyards, etc. The color scheme of the roof may be reproduced in these walks or floors. Full description and interesting suggestions will be furnished on request.

Standard No. 1 Roof Slate Full 3/16 In. Thick

"Standard No. 1 Slate" is the trade-name applied to the ordinary thickness of roof slate, which approximates $\frac{3}{16}$-in. in any of the colors, and implies the best material as to quality. Thickness is not sufficiently or properly established in the trade to make that important point clear and definitely fixed as it should be, but leaves the question open to the use of thin or substantially split slate as may be the policy of those who supply it. We are earnest advocates of substantially split slates and supply in all our roof slates a Standard No. 1 full $\frac{3}{16}$-in. thick; and if architects will specify the "Knickerbocker Standard No. 1 Slates *full $\frac{3}{16}$-in. thick,*" it will insure this point of maximum strength and thickness which is so properly expected in a slate roof.

Continued on next page

Specifications for Ordinary or Standard No. 1 Slate of Full 3/16 In. Thickness

Cover all sloping roofs (and other surfaces where indicated on drawings or herein specified) with one thickness of single-ply tarred roofing felt properly lapped and of quality as may be approved by the architect, over which lay the Knickerbocker Unfading Green Roof Slate (or otherwise as may be desired) Standard No. 1 full $\frac{3}{16}$ in. thick, nailholes drilled and countersunk, size 20x10 in. (or size as desired), each slate fastened with 2 yellow metal slating nails 1¼ in. long. All slates to be laid with 3-in. lap and exposure of 8½ in. (or other dimensions suitable to size of slate used), with butts laying tight. Under eaves and top courses to be of same width and with grain of slate vertical; no "stretchers" or slate with grain running horizontal will be permitted. Slates at valleys, hips, rakes and ridges to be laid in elastic cement of same color as slate. Small pieces of slate at valleys and hips will not be allowed.

Metal at gutters must run well up under slate. Ridging and hips of 16-oz. cold rolled copper (or other metal), 3-in. flange coming down over slate, covering all nailholes; 14-oz. copper flashings and 16-oz. cap flashings wherever necessary.

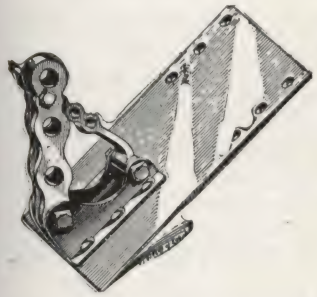
Note: Boston hips and ridges of slate are not only effective but are exceedingly practical. Detailed information respecting specification requirements will be furnished architects on request.

Snow Guards

The patent snow guard standard, in connection with ¾-in. (outside measurement, 1 in.) galvanized gas pipe, composes the "pipe" or "rail" guard. This standard is adjustable to any pitch of roof. The plate is made the thickness of standard No. 1 slate and of the same dimensions as the slate upon the roof where used, the plate taking the place of a slate and being well secured to the roof with wood screws or otherwise as may be desired.

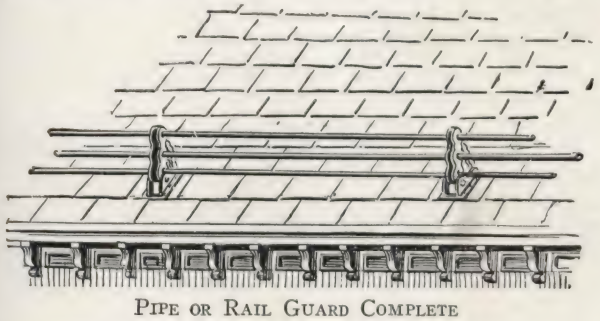
Standards with plates of greater thickness than standard No. 1 slate will be made to suit heavier slate at an additional charge. Plates will also be made of suitable form for use on tile roofs of any pattern.

Standards are placed along the eaves of all roofs from 5 to 6 ft. apart and are made for 2, 3 or 4 pipes.



Snow Guard Standard

When ordering, specify the size of slate to be used on the roof (standard No. 1 thickness is understood unless otherwise ordered) and the number of pipes that will be used. We quote on and ship 3 pipe standards unless otherwise specified.



Pipe or Rail Guard Complete

Slating Nails

The nails used for fastening slate should be of the most durable material, since most slate roof troubles are due to slates falling out because the nails have corroded. Cut yellow metal or copper wire nails are recommended for slate roofs. We also make plain wire, galvanized wire, tinned wire and copperclad nails.

Nails are made up and shaped distinctly for slating purposes—the result of many years' experience.

Structural Slate

Furnished in various shapes and sizes for use for steps, platforms, risers, wainscoting, base, toilet slabs of all kinds, floors, electrical slabs, etc.

Can be supplied in regular ribbon black, clear black, light green and mottled purple and green.

The light green and mottled purple and green slates present a very fine appearance and are especially suitable for use in entrances, lobbies, stairways, etc., where architectural beauty is desired. They compare favorably with marble in appearance and are considerably cheaper.

Slate Blackboards

Made of the best black slate with the highest grade of machine rubbed finish. Spaces made up of stated dimensions.

References

Slate roofs and interior structural slate supplied by us have been used throughout the country for buildings planned by leading architects.

A list of a few of these buildings, with the architects' names, follows:

Nicholas Brady Residence, Roslyn, L. I., N. Y., John T. Windrim
Mrs. Francis Carolan Residence, Burlingame, Cal., Willis Polk & Co.
Cornell University, Residential Halls "A" and "D," Ithaca, N. Y., Day & Klauder
Bryan Mullanphy School, St. Louis, Mo., William Ittner
First Presbyterian Church, San Francisco, Cal., Wm. C. Hays
Sage Memorial Church, Far Rockaway, N. Y., Cram, Goodhue & Ferguson
South Methodist University, Dallas, Tex., Shepley, Rutan & Coolidge
G. E. Gregory Residence, South Orange, N. J., Hollingsworth & Bragdon
Wm. Percy Bartram Residence, Stamford, Conn., Hollingsworth & Bragdon
St. Johns Church and Rectory, Locust Valley, N. Y., H. W. Rowe
Cathedral of Sacred Heart, Newark, N. J., I. E. Ditmars
H. S. Snyder Residence, Bethlehem, Pa., Duncan Fraser
Robert Eidlitz Residence, Ardsley-on-Hudson, N. Y., Francis Y. Joannes
M. P. Worthington Residence, Birmingham, Ala., Warren & Knight
St. Michaels Church, Litchfield, Conn., Rossiter & Muller
Highlands School, Highlands (Just north of Seattle), Wash., David Meyers
Cheyenne School Building, Cheyenne, Wyo.
Philosophy Hall, University of Washington, Seattle, Wash., Bebb & Gould
C. V. Steinhart Residence, Westfield, N. J., Hollingsworth & Bragdon
Morril Gates Residence, Park Avenue and 75th Street, New York, N. Y., John Mead Howells
Administration Building, Lindenwood College, St. Charles, Mo., Labeaume & Klein
Quadrangle Memorial Buildings, Yale University, New Haven, Conn., James Gamble Rogers
Hugh A. Murray Residence, Wheatley Hills, L. I., N. Y., Peabody, Wilson & Brown
Truly Warner Store, New Orleans, La., Starrett & Van Vleck
Truly Warner Store, Boston, Mass., Starrett & Van Vleck
Williams Hall, Vassar College, Poughkeepsie, N. Y., Hunt & Hunt
Mrs. Leighton Lobdell Residence, Rumsen, N. J., Alfred Busselle
Bernhardt E. Miller Residence, Milburn, N. J., Bernhardt E. Miller
V. Everitt Macy Residence, Ossinning, N. Y., W. Welles Bosworth
Sarah Choate Residence, Pleasantville, N. Y., McKim, Meade & White
Convent for Holy Trinity Church, Mamaroneck, N. Y., Robt. J. Reilly
Lincoln School, New York, N. Y., Starrett & Van Vleck
Milton Point School, Rye, N. Y., Tooker & Marsh
Convent Divine Compassion, White Plains, N. Y., Anthony F. A. Schmitt
New Bronx P. H. S. Hospital, New York, N. Y., United States Government
Culver Apartment, New York, N. Y., Walker & Gillette
Allerton Apartment, New York, N. Y., A. Loomis Harmon

THE CHAPMAN SLATE COMPANY

BETHLEHEM, PA.

Products

Makers and shippers of "WILLIAM CHAPMAN" BLACK ROOFING SLATE in all regular stock sizes, also in graduated lengths and thicknesses and random widths.

Quarries

The quarries of THE CHAPMAN SLATE COMPANY were opened in 1850, and today, with a capacity of over 3000 squares per month, produce more roofing slate than any other single hard vein quarry operating in the country.

The Chapman product today is quarried from a depth of over 200 ft.; is made by highly skilled mechanics, many of whom have long been in the service of the company, and the entire output is most carefully inspected to insure the proper grading.

Heavy "Old English Cleft" Special Rough Slate

Owing to the numerous and constantly increasing demands from architects, the company has, for the past years, been making a heavy rough "Old English Cleft" slate ranging from ¼ to 1 in. in thickness, and in graduated lengths and random widths.

The artistic effect of a roof laid with the genuine "William Chapman" "Old English Cleft" special rough slate gives tone and character to a building which can not be produced by the use of any other roofing material.

For manufacturing plants or other places where particularly hard wear is required, the company recommends the use of "William Chapman" special rough slate, ¼ in. thick.

Standard Roofing Slate

The excellence of the "William Chapman" roofing slate lies in the toughness of the fiber, which is very hard and close grained, thus insuring a durability beyond any known limit of time. "William Chapman" roofing slate absorbs no moisture and will not decompose. Largely owing to these characteristics there is practically no breakage in transportation.

The stock of regular sizes is large and complete.

These slate are about $\frac{3}{16}$ in. thick, weighing approximately 680 lbs. to the square, allowing for the standard 3-in. lap. There are 14 different sizes—ranging from 6 x12 in., to 14x24 in. Special sizes will be made to order when required.

Labels

To prevent substitution of inferior quality slate, the company has instituted the practice of labeling about 2% of each shipment of genuine "William Chapman" roofing slate with a label, facsimile of which is reproduced herewith, on which is indicated the grade, whether No. 1 or No. 2.

"WILLIAM CHAPMAN" SLATE LABEL

Shipping Facilities

The company ships direct from the Chapman quarries to every state in the Union, to Canada and Mexico, or to seaboard for export to Europe or South America.

With the present capacity, any size order for "regular" stock can be supplied promptly.

References

Herewith is given a partial list of buildings covered with "William Chapman" slate roofs:

Brooklyn Bridge Buildings, New York, N. Y.
Holy Trinity Church, New York, N. Y.
Central Park Buildings, New York, N. Y.
Isabella Heimath Residence, New York, N. Y.
Long Island Historical Society, New York, N. Y.
Metropolitan Opera House, New York, N. Y.
Philadelphia & Reading Railway Freight Station, Subway, Philadelphia, Pa.
Roman Catholic Cathedral, New York, N. Y.
Roman Catholic Church of the Epiphany, Philadelphia, Pa.
St. George's Church, New York, N. Y.
St. Vincent's Hospital, New York, N. Y.
U. S. Military Academy, West Point, N. Y.
First Presbyterian Church, Newark, N. J.
Mt. St. Mary's Convent, Plainfield, N. J.
St. Barnaby's P. E. Church, Philadelphia, Pa.
The Orphanage, Paterson, N. J.
Hackensack Water Co., New Durham, N. J.
Hackensack Water Co., New Milford, N. J.
Essex County (N. J.) Insane Asylum, Overbrook, N. J.
Morris Plains Asylum, Morris Plains, N. J.
U. S. Fort Terry, Plum Island, N. Y.
U. S. Fort H. G. Wright, Fishers Island, N. Y.
Convent Buildings, Lodi, N. J.
State Capitol, Albany, N. Y.
St. Ladislaus Polish Catholic Church, Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Consolidated Gas Co. of New York, New York, N. Y.
Midvale Steel Co., Philadelphia, Pa.
Bethlehem Fabricators, Inc., Bethlehem, Pa.

N. Y. CONSOLIDATED SLATE CORPORATION

Manufacturers of Roofing Slate and Garden Walk Slabs

MAIN OFFICE

POULTNEY, VT.

QUARRIES:
POULTNEY, VT.

BOSTON OFFICE: 61 West Seldon Street, BOSTON 26, MASS.
REPRESENTATIVES FOR CHICAGO AND THE WESTERN STATES: Slate & Flagstone Company, 1825 Central St., EVANSTON, ILL.
REPRESENTATIVES FOR PENNSYLVANIA AND NEW YORK: William Moore Co., 1516 Sansom St., PHILADELPHIA, PA.

Products

Roofing Slate and Garden Walk Slabs.

Roofing Slate

We are prepared to furnish roofing slate in all the standard sizes, colors and thicknesses.

Graduated Roofs

Artistic roofs of the style requiring random widths and lengths constitute our specialty.

Slate of graduated thicknesses in any size desired may be had in various attractive shades.

The present popularity of graduated roofs allows many charming combinations in the present day slate roof. Leading architects have not been slow to take advantage of this opportunity afforded to combine durability with color. The finished roof produces an artistic effect that easily harmonizes with the surrounding landscape.

Sizes of Roofing Slate

Where standard sizes are desired, roofing slate may be had in the following thicknesses:

$\frac{3}{16}$ in.	$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.
$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.

Selling Quantity of Roofing Slate

All of our roofing slate is sold by the square.

A square is equal to the amount of slate necessary to cover 100 sq. ft., the slate being laid out so as to allow a 3-in. lap over the head of the second course below.

Colors

Roofing slate or garden walk slabs may be had in the following shades and combinations:

Unfading Green—Dark green in color, the greenest of all roofing slates and non-fading, the color never changing.

Unfading Mottled Purple and Green—These slates afford many pleasing combinations.

If desired we can supply a larger proportion of either the mottled purple or the green, thus causing a predominance of the shade desired in the finished roof.

Sea Green—A tough, durable, and moderate priced slate capable of withstanding hard usage.

Clear Purple—In standard sizes and thicknesses.

Variegated Purple and Green—In standard sizes and thicknesses.

Grey and Black—May also be had in any standard size and thickness.

Roofing Slate Specifications

All pitched roofs to be covered with slate manufactured and sold by the N. Y. Consolidated Slate Corporation, Poultney, Vt. Size, quality and color as per samples on view at —— (or specify as desired).

Garden Walks

The use of slate slabs in irregular sizes and shapes for garden walks lends itself readily to the Old World atmosphere of period houses. These slabs may be obtained in various random sizes and attractive shades.

Detailed Information

Further information regarding our extensive line of roofing slate and garden walk slabs will be gladly furnished on request.

ESTABLISHED 1869

RISING & NELSON SLATE CO.

Miners, Makers and Shippers of High Grade Roofing Slate

QUARRIES AND MAIN OFFICE
WEST PAWLET, VT.

NEW YORK OFFICE, 101 Park Avenue
PHILADELPHIA OFFICE, 112 South 16th Street
CHICAGO OFFICE, 2554 West Harrison Street
BOSTON OFFICE, 46 Cornhill
LONDON OFFICE, 26 Martin Lane, Cannon Street
ARCHITECTS' SERVICE DEPARTMENT, 101 Park Avenue, NEW YORK, N. Y.

Products

"TUDOR STONE" and "TUDOR STONE JR." ROOFING SLATE.
COMMERCIAL ROOFING SLATE.
FLOORING SLATE and GARDEN FLAGGING.

Tudor Stone Roofs

TRADE-MARK

Production

The fact that this company owns and operates numerous quarries in addition to controlling the production of a number of others insures quality and uniformity of result in all slate. This is especially true of architectural slate, which is quarried to order under trained architectural supervision.

Architectural Specialties

"Tudor Stone" Roofing Slate; also the following, which are variations of the *"Tudor Stone"* group: Golden Pheasant, Valenheli, Verde Unique, Yorkshire Gray, Cotswold, *"Tudor Stone Jr.,"* etc. These are distinct types, not ordinary slate parading under new names, as can readily be seen by comparison.

Commercial Roofing Slate

Sea Green, Unfading Green, Weathering Green, Mottled Green and Purple, Clear Purple, Purple Vein, Rustics, Red, etc., quarried in Vermont.

Genuine Bangor, Albion or Jackson Bangor, Washington, Bangor, Franklin, Chapman, Peach Bottom, etc., quarried in Pennsylvania and elsewhere. Monson and Brownville, quarried in Maine.

VAN ANTWERP RESIDENCE, BURLINGAME, CAL.
BAKEWELL & BROWN, Architects

Flooring Slate and Garden Flagging

Split surface or rubbed surface, trimmed or sawn edges. Irregular shapes, random sizes, rectangular shapes and regular size pieces. In full range of weathering and unfading colors in all thicknesses.

Samples and Booklet

Samples of any slate desired will be forwarded on request.

We have a new booklet and architectural leaflet showing examples of our products. We would be pleased to forward copies of these on request.

Architects' Service Department

The Service Department established in the Architects Building, 101 Park Avenue, New York City, is under trained architectural direction, and is equipped and maintained by this company for the convenience of architects and others who may require information in reference to roof design and construction.

Architects are requested to make use of the facilities offered, either for preliminary work or for the preparation of complete roof layouts and estimates of costs. This service is without any obligation.

Specifications for Tudor Stone Roofing Slate

Preparation—Slating contractor shall examine roof boarding and report to carpenter all defects which would be detrimental to the durability of the finished roof, and shall see that defects are remedied before applying felt.

Carpenter contractor shall furnish and apply a cant strip nailed about 2 in. above the eave line of the slate and shall put water shedding cant strips back of chimneys and up the sides of dormers and where else required.

The carpenter contractor shall also build up forming where curved slate valleys are shown and furnish and place all blocking required by roofer.

Roofing contractor shall furnish and apply elastic cement where in his judgment the same is necessary.

Felt—Cover surface to be slated, including cheeks of dormers, with slater's asphalt impregnated roofing felt weighing 40 lbs. to 100 sq. ft., lapped 6 in. at joinings. (See Note 1.)

Where curved slate valleys are shown felt shall be double thickness.

Slate—All surfaces prepared for slate as above described shall be covered with Tudor Stone Roofing Slate, as made by the RISING & NELSON SLATE CO., West Pawlet, Vermont.

Thickness, exposure to the weather and character of laying shall be as indicated on roof layout prepared by the Architects' Service Department of the RISING & NELSON SLATE CO., under the direction of the architect. The contractor shall include in his estimate a sum sufficient to pay the expense of an expert

Continued on next page

ISAAC T. STARR RESIDENCE, LAVEROCK, PA.
CHARLES A. PLATT, Architect

from said Service Department to visit the work and assist the roofer in obtaining the architectural effect desired.

Nails—Nails shall be yellow metal (see Note 4) slater's nails of sufficient length to adequately penetrate the roof boards using not less than 2 to each slate.

Flashing—The sheet metal contractor shall furnish and the slate contractor shall install 16-oz. soft rolled copper built-in flashings as required at closed valleys, chimneys, dormers and other necessary places. Flashing shall extend not less than 4 in. under slate and have not less than 4 in. exposed above the slate on a line at right angle to the roof and shall not be nailed to the vertical surface. Roofing contractor shall insert all aprons required, which will be furnished by sheet metal contractor. Sheet metal contractor shall apply counter flashing and make same secure against leaks.

Open Valleys—All open valleys shall be 16-oz. soft rolled copper (see Note 5), 20 in. wide, nailed at top only. In applying slate, care shall be used that no nails penetrate the sheet metal valleys.

Closed Valleys—All closed valleys to be flashed with 16-oz. copper flashing over each course. Flashing to lap at least 2 in. and to extend 10 in. either side of valley.

Round Valleys—To be carefully fitted and laid with special long slate. No metal used unless specially directed, but care must be taken to preserve continuity of roof color and texture.

Ridge Rolls—Form 16-oz. copper hip and ridge rolls (see Note 6) as shown or required.

Guarantee—Contractor shall guarantee to maintain all slate roof surfaces in a watertight condition for a period of 2 years from completion.

Specification for Plain Hipped Roof with Valleys and Dormers Using Commercial Grade Slate

Preparation, Cement, Felt and *Guarantee* to be specified as described under heading Tudor Stone Roofing Slate with such modifications as may be necessary to meet the individual problem.

Slate—All surfaces prepared with felt as above described shall be covered with No. 1 Weathering Green (see Note 2) Roofing Slate, as furnished by the RISING & NELSON SLATE CO., West Pawlet, Vermont.

Slate shall be of random widths and 16 in. long (see Note 3); laid with 3-in. head lap so that distance to the weather shall be 6½ in.

Nails (see Note 4), *Valleys Flashing* and *Ridge Rolls* to be specified as described under heading Tudor Stone Roofing Slate.

Specification Notes

Note 1—For best commercial work 30-lb. felt is recommended. For slate not over ¼ in. thick 16-lb. felt may be used.

Note 2—Substitute, if desired, Tudor Stone Junior, Weathering Green, Unfading Green, Mottled Green and Purple, Clear Purple, Red or Pennsylvania Slate.

Note 3—Substitute other lengths or uniform widths if desired, but note that commercial slate are made in lengths from 10 to 24 in., always in even inches, and that slate should have 3-in. head lap on second slate.

Note 4—Substitute for less expensive work away from seashore, galvanized iron or copper clad steel nails.

Note 5—Substitute zinc, galvanized iron or tin if desired. Copper is recommended. Curved slate valleys require special attention and when required should be specified to be watertight and of uniform appearance to adjoining slate.

Note 6—Substitute 4-lb. sheet lead or galvanized iron if desired, or specify slated "Boston" hips and ridges or mitered slated hips and ridges. Plumbing specifications should call for 4-lb. sheet lead flashings, 18-in. square, turned up 4 in. around all plumbing pipes, with separate lead cap flashing extended down to the slate and calked into first joint of pipe above the roof.

References

A partial list of prominent architects who use our products:

Chas. I. Berg, New York, N. Y.
Alfred Hopkins, New York, N. Y.
Carrère & Hastings, New York, N. Y.
John Russell Pope, New York, N. Y.
Delano & Aldrich, New York, N. Y.
H. T. Lindeberg, New York, N. Y.
Chas. A. Platt, New York, N. Y.
Bertram G. Goodhue, New York, N. Y.
Walker & Gillette, New York, N. Y.
Murphy & Dana, New York, N. Y.
McKim, Mead & White, New York, N. Y.
Trowbridge & Ackerman, New York, N. Y.
Goodwin, Bullard & Woolsey, New York, N. Y.
Ewing & Allen, New York, N. Y.
James W. O'Connor, New York, N. Y.
Aymar Embury, 2nd, New York, N. Y.
Theodate Pope, New York, N. Y.
Smith & Bassette, Hartford, Conn.
Howard VanDoren Shaw, Chicago, Ill.
Perkins, Fellows & Hamilton, Chicago, Ill.
Cram & Ferguson, Boston, Mass.
R. Clipston Sturgis, Boston, Mass.
Parker, Thomas & Rice, Boston, Mass. and Baltimore, Md.
Bakewell & Brown, San Francisco, Cal.
John T. Windrim, Philadelphia, Pa.
Wm. B. Itner, St. Louis, Mo.
Archer & Gloyd, Kansas City, Mo.
Chas. S. Cobb, Toronto, Can.
Kenneth Rea, Montreal, Can.
Schenck & Williams, Dayton, Ohio.
Brust & Phillipp, Milwaukee, Wis.
Favrot & Livaudais, Ltd., New Orleans, La.
Albert Kahn, Detroit, Mich.
Ludlow & Peabody, New York, N. Y.
Allen & Collins, Boston, Mass.
Zanzinger, Borie & Medary, Philadelphia, Pa.
Horace Trumbauer, Philadelphia, Pa.
Day and Klauder, Philadelphia, Pa.
Mellor, Meigs & Howe, Philadelphia, Pa.

PARK AVENUE BAPTIST CHURCH, NEW YORK, N. Y.
HENRY G. PELTON and ALLEN & COLLINS, Architects

ESTABLISHED 1901

O'BRIEN BROTHERS SLATE COMPANY, INC.

Producers of Roofing Slate

QUARRIES AND OFFICES

GRANVILLE, N. Y.

Products

Miners, makers and shippers of:

O'Brien Brothers Emerald Unfading Green and Unfading Mottled Green and Purple Roofing Slate.

Garden Flagging.

Production

This firm owns and operates its own quarries, producing a roofing slate that is unapproached in quality, workmanship and color. The large production enables the company to offer for immediate shipment slate in quantities to take care of any reasonable size order in the Standard No. 1 grade, in sizes of from 10x6 to 24x12 in. inclusive.

Special thick slate $\frac{3}{16}$ to 2 in. thick in lengths from 12 to 36 in. Also can be furnished in random lengths and widths, made to order.

O'Brien Brothers Roofing Slate

Unfading Green—Emerald Unfading Green is admitted to be the greenest colored slate produced. It is of a dark green color and never changing. This slate is furnished with an absolute guarantee not to change color.

Unfading Mottled Green and Purple—Unfading Mottled Green and Purple slate produces a roof full of warmth and life. An effect of either green or purple predominating can be produced if so desired. This slate should be given consideration by architects who desire to obtain the best in a slate roof.

Combination of Colors—By a combination of Unfading Green and Unfading Mottled Green and Purple slate the very best in color blend can be produced.

This combination has been used extensively by the leading architects with wonderful success.

In order to obtain this combination of color the slate is laid haphazard on the roof.

Specifications—All pitched roofs as indicated on plan shall be covered with (state the color, quality and size here) slate as mined, made and sold by O'Brien Brothers Slate Company, Inc. of Granville, N. Y.

Samples—On application this firm will forward, without obligation, small or large samples of any slate in any thickness desired.

Garden Flagging

This firm furnishes flags in the natural cleft irregular shapes and thicknesses. Any desired pattern can be worked out by using trimmed edge flags cut to sizes.

Colors—Light and dark mottled green and purple, black, rustic gray, red, light and dark unfading green, fading green.

Service—On request, samples will be furnished, and on receipt of plans the service department will lay out a sketch of a garden using the different colors desired.

Combination of O'Brien Unfading Green and Unfading Mottled Green and Purple Roofing Slate, Residence of Frederick Osborn, Garrison-on-Hudson, N. Y.
Pleasants Pennington, Architect

F. C. SHELDON SLATE COMPANY

GRANVILLE, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Marquette Building
CINCINNATI, OHIO, 534 Main Street
COLUMBIA, S. C., 312 L. & E. Building
DALLAS, TEX., Scollard Building
MONTREAL, QUE., 137 McGill Street
DETROIT MICH., 901 Kresge Building
GREENSBORO, N. C.
NEW YORK, N. Y., 30 East 42nd Street
RICHMOND, VA.
TORONTO, ONT.

Products

ROOFING SLATE of every known size, color and thickness, comprising the BLACK SLATES of Maine, Pennsylvania and Virginia; the RED SLATE of New York; and the varying shades of GREENS, GRAYS and PURPLES, permanent or weathering, from the Sheldon mines in Vermont.

SHELDON'S RED GREEN PURPLE BLACK SLATES
TRADE-MARK

Also, Structural and Electrical Slate; Blackboards; Flagging for Gardens and Floors.

Production

We are generally recognized as the largest individual producers of colored roofing slate from quarries owned and operated under our personal supervision, resulting in the execution of all orders for architectural or commercial slate with unexcelled promptness and satisfaction.

Special Types

The wide range of natural colors, sizes and textures, in which Sheldon's slates can be furnished affords a selection that from any standpoint will most satisfactorily meet every individual requirement, thus providing a special type of slate to "fit" the building. If furnished with plan and elevations and informed as to the general color scheme that is to be carried out, suggestions will be submitted with full particulars covering just the kind of slate which an extensive experience, based on an exhaustive study of individual conditions, has demonstrated will be most apt to give the best results or prove the most satisfactory investment. This company has specialized with marked success in the development of distinctive and unique roof effects.

To insure faithful reproduction in texture and appearance, Sheldon's Old English graduated slate are hand wrought by skilled Old World artisans, and for exactness and accuracy of detail can not be surpassed.

A special brochure containing complete information and typical layouts for roofs of this description will be sent gratis to any architect on request. It will prove a valuable reference.

Exclusive Specialties

Weathering Greens and Grays—Rich, gray green in color when first quarried, but, upon exposure, gradually "weather" into wonderful deep shades of brown and buff. Time only serves to beautify and bring out in full the rich mellow colors of this product. These slate possess the greatest intrinsic value in proportion to the investment of any known type of roofing material and splendidly harmonize with natural surroundings.

Clear Purple—A handsome royal purple, particularly adapted for high class residences, especially those presenting a white exterior or constructed of stucco or cream face brick.

Unfading Green—Produced in two shades of color, light and dark. Both permanent. Can be used separately or in combination depending upon individual choice.

Unfading Rustic Greens and Grays—Slightly varying shades of green and gray, all of strictly fast color—some clear, some with dark spots and streaks that impart a "rustic" tone. This type of slate is constantly increasing in popularity on the part of discriminating architects and owners who prefer to avoid the flat color effect that results from the use of but one uniform shade.

Hard Vein Variegated Green and Purple—A combination of light and dark shades of green and purple, some of which retain their original color—the majority changing on exposure to a harmony of contrasts. Two-thirds purple and one-third green are the proportion of colors frequently called for, but these percentages may be changed to suit individual taste. Practically the same combination of colors can be supplied in strictly *unfading* slate throughout. Unusually fine effects are secured by applying both the weathering and unfading combination promiscuously on the same roof.

National Black—A strictly high grade Sheldon product guaranteed absolutely unfading. By reason of more favorable freight rates, it can be delivered to many localities at a considerable saving in cost over Maine, Peachbottom or Buckingham.

Sheldon's Superior Bangor with Certificate—We unhesitatingly recommend this product as representing the best value for the money of any blue or black slate on the market. Exclusively a Sheldon specialty. The certificate with every shipment protects the buyer against possibility of substitution. Strong and well made. Every slate "rings true." Extensively used by discriminating trade who have proved their value and found these slate their best buy.

Arabian Red—Distinctively a New York State product—Washington County, of this state, being the only place in the world where roofing slate of this color and quality has been found. Production limited. Immensely popular and exclusive.

Semiunfading Green—A happy medium between a Weathering Green and strictly Unfading Green, both as regards price and color permanency.

Unfading Mottled Purple—Slightly varying shades of permanently beautiful purple. Some quite clear; others more or less "mottled" or "tinted" with spots or clouds of green. No two slates alike in this respect.

Co-operative Service

An architect's service department is maintained at the main office, thoroughly equipped for supplying detailed roof layouts, also general and technical information pertaining to every phase of the roof question. A well informed representative will confer with members of the profession at any time and render any desired assistance toward the furtherance of architect's roof requirements. Our experts will supervise the application of any roof when required.

Samples

Miniature or full sized samples promptly furnished on request free of charge.

VENDOR SLATE COMPANY

MAIN EXECUTIVE OFFICES
EASTON, PA.

DEPARTMENT OF ARCHITECTURAL SLATE, EASTON, PA.

BRANCH OFFICES

PITTSBURGH, PA. WASHINGTON, D. C. COLUMBUS, OHIO DETROIT, MICH. NEW YORK, N. Y.
ST. LOUIS, MO. PHILADELPHIA, PA. CINCINNATI, OHIO LOS ANGELES, CAL. LONDON, ENG.
HARTFORD, CONN. MINNEAPOLIS, MINN.

INSPECTION AND SHIPPING OFFICES

BANGOR, PA. SLATINGTON, PA. POULTNEY, VT.

SHIPPING POINTS FOR ROOFING SLATE

BANGOR, PA. BERLINSVILLE, PA. PEN ARGYL, PA. POULTNEY, VT. FAIR HAVEN, VT.
SLATINGTON, PA. WIND GAP, PA. SLATEDALE, PA. WEST PAWLET, VT. GRANVILLE, N. Y.

REPRESENTATIVES IN OTHER PRINCIPAL CITIES

Products

ARCHITECTURAL ROOFING SLATE; STANDARD or COMMERCIAL ROOFING SLATE; FLAT ROOF SLATE.

VENDOR SLATE CO. INCORPORATED EASTON, PENNSYLVANIA
TRADE-MARK

Also Garden Walk, Terrace and Stepping Stone Slate; Tools, Accessories and Instructions for Applying Roofing Slate in regions unfamiliar with the material and its method of laying.

Size and Capacity

The VENDOR SLATE COMPANY carries at all times a larger stock and ships more slate; architectural and commercial, than the combined output of all other American producers. Facilities for quick shipment are thus unsurpassed.

Roof Designing Department

A fully equipped architectural department promptly gives advice of professional value on any subject connected with slate roofing, its design, selection, application, or cost. Blue prints greatly assist giving of specific information and are promptly returned.

Slate for the Flat Roof

Forming a smooth clean usable surface slate is in increasing use for surfacing the tar-and-gravel type roof where it displaces the unclean, troublesome and non-permanent slag or gravel. See specifications below.

Pennsylvania Slate

Controlling the bulk of Pennsylvania production, the VENDOR SLATE COMPANY is the logical headquarters for all inquiries on these high grade varieties, both standard and the newer architectural effects.

Catalogue, Service Sheets, Samples, etc.

Our complete architectural catalogue, service sheets of roof construction details, samples of any desired slate or slating effect, will be sent any architect on request.

Certificate

The Vendor Certificate accompanying all shipments is an absolute guarantee as to material and grade.

ARCHITECTURAL ROOFING SLATE

Specifications for Architectural Slate

Note: Architectural slate comes from the same beds as Standard slate—the difference being in the greater texture and interest of surface and color selection over commercial gradings which run uniform to trade standards.

(1) **Preparation of Roof**—Before starting work, the roofer shall examine all roof surfaces and report for correction all defects likely to interfere with his work or guarantee.

(2) Provide in place at all eaves a beveled cant strip of proper thickness for the slate.

(3) **Paper**—Cover all roof surfaces intended for receiving slate with 40-lb. (steep pitches 30-lb.) asphalt impregnated roofing felt of approved brand. The felt shall be well lapped, laid to shed water and in undamaged condition when the slate is applied.

(4) **Nails**—Each slate shall be secured with at least 2 yellow metal slaters' nails of length in every instance to penetrate the roof boarding 1 in.

Note: Away from the influence of manufacturing fumes or salt water, or for cheap work, galvanized metal can be specified; however, it is never to be recommended.

(5) Nails securing slate must in no instance be driven through flashings.

(6) **Cement**—Within 1 ft. of dormers, vertical walls, valleys, ridges, hips and similar places, slate shall be laid in an approved brand of elastic cement approximating the general color value of the slate.

(7) **Slate**—Cover all properly felted roof surfaces so intended with roofing slate supplied by the VENDOR SLATE COMPANY, Easton, Pa., with their certificates as to kind and quality.

(8) The slate used shall be (here insert the name of desired material as given in the Vendor Classification following this specification).

(9) Kind, thickness, graduation, and character of laying shall be as per layout prepared by the VENDOR SLATE COMPANY under the architect's direction.

(10) **Laying of Slate**—All slate shall be laid in a proper weathertight manner, with joints well broken and preserving a head lap of at least 3 in. under second course above in all instances.

(11) **Open Valleys**—(For closed valleys use paragraphs 12 and 13 below.) All open valleys shall be of 16-oz. soft rolled copper (see note following paragraph 4) of sufficient width to extend 8 in. under the slate each side (for steep pitches 6 in. is sufficient).

(12) **Closed Valleys**—All closed valleys shall be properly slip slashed under each course of slate.

(13) Each flashing shall be of sufficient size to lap 2 in. under the flashing next above and extend 8 in. under slate each side.

(14) **Hips**—All hips shall be made tight with cement and where necessary with slip flashings as well.

(15) **Ridges**—Make all ridges

Continued on next page

tight, using cement. Ridges shall be plain type as directed (or Boston ridges and hips, or metal as below).

(16) **Ridge Rolls**—(Metal)—Form 16-oz. copper (4-lb. sheet lead or see note following paragraph 4) to detail and secure to all ridges (and hips).

(17) **Cleaning Up and Guarantee**—The contractor shall guarantee his work for a period of one year from acceptance of his work, replacing or repairing at completion, and promptly as notified until the end of the guarantee period, any broken slates or any leaks.

Specification for Commercial Grades

Note: Accessories such as felt, nails and flashing metal should be specified very much as under architectural slate above, although on inexpensive work a cheaper grade may have to be used respectively, as galvanized nails, 15-lb. asphalt felt, tin, or galvanized iron flashings.

(18) **Slate**—Over the properly felt-covered roof lay VENDOR SLATE COMPANY'S (No. 1 Genuine Bangor, Red Slate, Unfading Green, or any other desired slate) roofing slate 24 in. by random (or desired size).

(19) All slate shall be quarry punched, 2 holes to each slate, and shall be laid with 3-in. head lap under second course above, with joints well broken.

(20) Adjacent to ridges, hips, valleys or vertical surfaces slate shall be laid in elastic cement for a distance of 1 ft.

(21) Hips or ridges shall be laid Boston style (or plain or covered with metal roll), valleys shall be open (or closed), using 16-oz. soft rolled copper (or see note preceding paragraph 18).

(22) On completion, replace any broken slates and repair any leaks that may develop during a period of one year from acceptance of the work.

Specification for the Flat Slate Roof

Note: Because of its absolute permanence in having nothing to wash off, evaporate, or require replacement, it is recommended to be used only over a high grade standard "specification" roof, the manufacturer's directions for which would be followed implicitly up to and including the last coat of felt. Copper or lead flashings are invariably recommended as this roof construction is absolutely permanent.

(23) **Slate**—All slate shall be VENDOR SLATE COMPANY'S No. 1 Genuine Bangor (or Genuine Washington or other desired slate) with edges true and square (preferably sawed).

(24) **Embedding Compound**—The compound used for embedding slates shall be Vendor Embedding Compound or other approved embedding compound fulfilling standard texts for temperature and flow.

(25) **Embedding of Slates**—All slates, thoroughly dry when placed, shall be neatly embedded bevel side up in full surface contact with the embedding compound.

(26) All lines shall be kept true, straight, and parallel with not over ⅛-in. clearance between slates and with all surfaces even, slate to slate.

(27) After laying point all joints nearly flush with hot embedding compound poured from a can.

(28) **Completion**—On completion all slate shall be sound, whole and clean and the roof shall be left in every respect tight, smooth and a neat example of workmanship.

SLATE SURFACE FOR FLAT BUILT-UP ROOF

Slate List and Descriptions to Accompany Above Specifications

The Vendor Classification is now recognized as the chief, if not the only, standardized listing of roofing slate ever prepared or maintained. In the following, practically every slate of American origin is given under its basic name with a brief and accurate description of its physical characteristics especially *weathering* or *fading*.

Vermont Colored Slate, Unfading Varieties—

Unfading Green—Color, green running uniform, strictly unfading. (Verdelite Unfading Green is quarried exclusively in the well-known as "Penryhn" and "Eureka" quarries, now Vendor operated and whose products are not elsewhere obtainable. It is positively unfading, of the uniform light shade for which these two quarries have so long been famous and wholly devoid of that dullness or gray common to practically all other so-called unfading greens.)

Variegated Green and Purple—Color, green and purple on each piece blended in a beautiful cloudy or irregular fashion. While the green usually predominates (called "light") some beds run somewhat purple ("dark") but always variable. Averages distinctly lighter than the *weathering* Mottled Purple from which it should be carefully distinguished if an *unfading roof* is desired.

Red—Color a garnet red, strictly unfading. Florentine Red, the only red now in production, has a bright, pleasing color, uniform as to shade and texture, highest quality and strength.

Variegated Red—Vendor Variegated Red is similar to clear red, but selected from beds showing various dark markings.

Vendor Old Red—A slate of varied deep shades of red and containing also blotches still darker, even black. Has rough fracture giving it exceptional value for architectural effect. Sold for special work only, not supplied in bulk to the trade.

Vermont Colored Slate, Weathering and Fading Varieties—

Weathering Green—Color, when fresh, green turning to various shades of buff, brown or yellow within a few weeks. While the color change is not predeterminable, this very quality when intelligently handled in mixture makes the slate very desirable where a variegated roof of decidedly warm color is desired. The Vendor production of this slate is of best quality and a particularly pleasing weathering index.

Mottled Purple—Color, predominately purple with occasional clear green markings on practically every piece. Certain beds weather visibly but as the material can not be selected for or against this tendency it is here classified as a weathering or fading slate.

Clear Purple—From some beds as Mottled Purple but sorted to contain as little green as possible.

Note: Owing to a prevalent discrepancy, inaccuracy and even unprincipled use of the several terms "mottled," "variegated," "green and purple," "purple and green" and the like, the Vendor lists the following, a mixture:

Mottled Purple and Sea Green—An artificial mixture of two different slates—Mottled Purple and Sea Green (usual proportions about one-half each). Often substituted under non-explicit specifications calling for "mottled green and purple," or "variegated purple and green" and other near expressions.

Sea Green—Color gray or green, fading quickly to brown, yellow or buff. Commercial term purely, formerly indiscriminately applied to fading and weathering slates quarried near the southern end of the Vermont slate region. On account of the extreme variability of the product, the misleading name (very little of it remains green) and resulting disappointment to the uninitiated, the VENDOR COMPANY endeavors to confine its sales of Sea Green slate to the trade where the color change, quite harmless in itself, can occasion no artistic disaster.

Browns, Buffs and Yellows—Certain beds of Weathering Green slate turn to various shades of the above colors after a more or less lengthy exposure to the weather. In orders for mixed effects a proportion of these colors can be selected from the stock on hand so as to hasten the effect desired.

Pennsylvania Slates, Grays and Blue Grays—

Genuine Bangor—The highest quality slate produced in the Blue Gray slates of Pennsylvania—no appreciable weathering—Genuine Bangor Slate, though all produced from the same beds, is divided into three classifications as follows.

No. 1 Clear—Tolerably uniform as to surface; thickness about $\frac{3}{16}$ in, straight with clean corners and entirely clear stock.

Semiclear—Produced from the same beds as the No. 1 and mostly clear stock. Whatever portion of the slate contains ribbons (dark streaks) is entirely above the nailholes and therefore is not only a first quality slate, but has the same appearance on the roof as the No. 1 Clear.

No. 1 Ribbon—Similar in quality and in appearance on the roof to the "Clear" and "Semi-Clear" grades; the only difference being that some of the ribbons come below the nailholes.

Continued on next page

Guarantee—All the above grades of Genuine Bangor Slate are identical in quality and appearance on the roof—they are all Certificate Slate and fully guaranteed.

Note: "Genuine Bangor" slate needs no further recommendation than its name. To protect architects and users against the substitution of inferior grades, the producers have formed the "Bangor Slate Association," and with all shipments of "Genuine Bangor" slate is furnished a certificate of the Association. It is safe to assume that any slate offered under any name hyphenated with Bangor, such as West Bangor, Albion-Bangor, or any other prefix to the word Bangor except "Genuine Bangor" is a substitution of much inferior material.

Genuine Washington Big Bed Provident Big Bed—Very high quality slate of a darker blue shade than "Genuine Bangor"—very uniform in color and unfading. Specified and accepted by the United States Government for its excellent quality and uniformity of color.

Genuine Franklin Big Bed—Of the same general excellence as the other Big Beds but somewhat below Genuine Bangor in tensile strength.

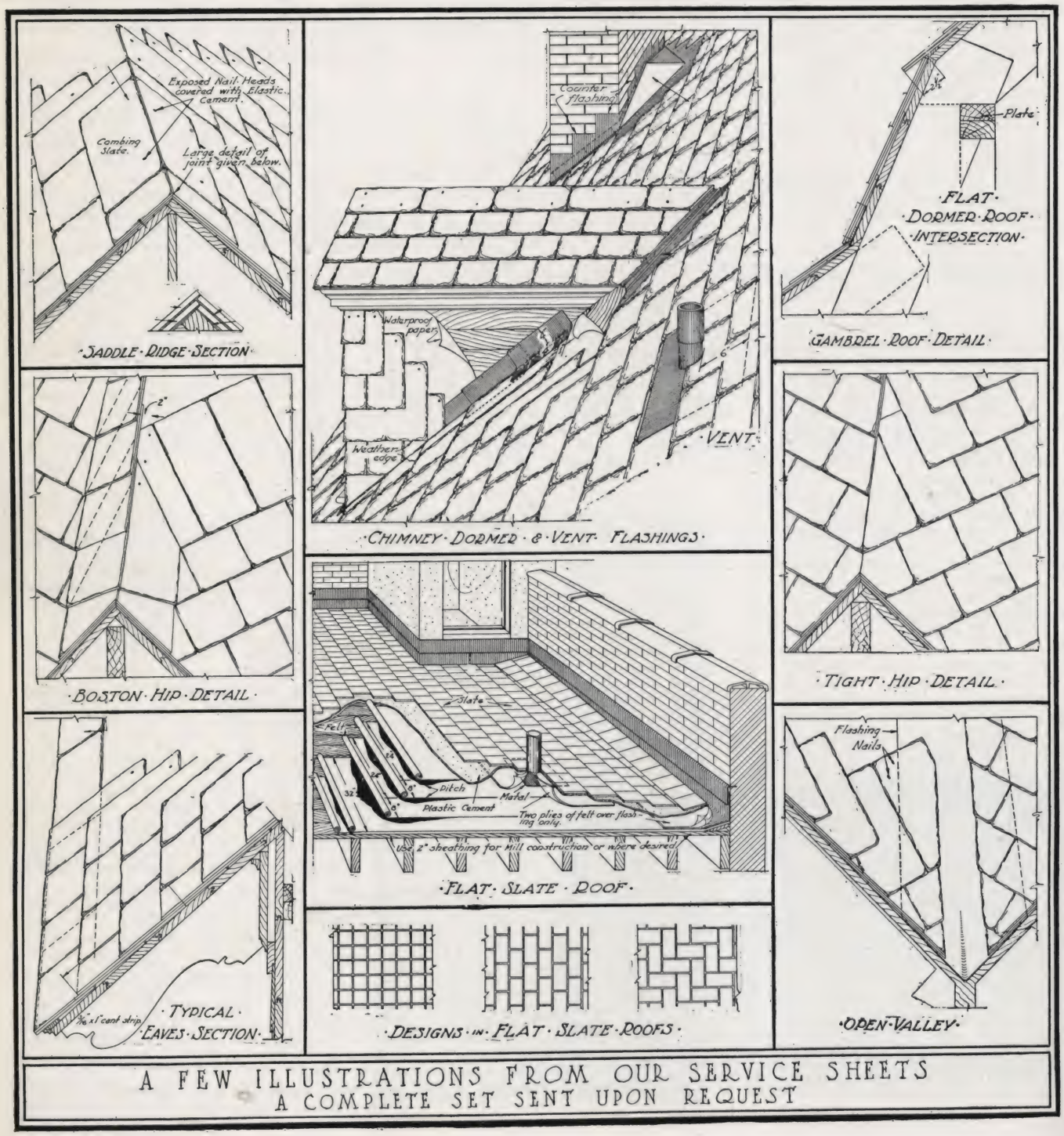
Genuine Albion—Ranks next to Big Beds in quality and has an excellent reputation for strength and color. Where a difference in cost without undue difference in quality is desired, it fills the bill admirably.

Vendor Small Beds (Weathering)—Of good quality, it is an admirable slate to use where a quickly developed weather appearance is desired.

Rough Textured Slate—Produced from Selected Beds that have a rough textured cleave. Neither surface nor thickness is uniform (purposely so). Thickness varies from $\frac{3}{16}$ to full ¼-in. and thus combined with the rough surface provides an architectural effect that is impossible with the smoother surfaced slates.

Other Pennsylvania Slate—The VENDOR SLATE COMPANY does not handle other grades of Pennsylvania slate except at the purchaser's risk.

Peach Bottom, Monson, etc.—Production limited or stopped altogether.



THE CLASON ARCHITECTURAL METAL WORKS

Wire Snow Guards for Roofs

PROVIDENCE, R. I.

Product

WIRE SNOW GUARDS for roofs.

Their Purpose

To lessen chances of damage suits against owners of property by increasing both personal and property safety.

There are many buildings so situated that the use of snow guards is essential to personal safety; there are more cases where the use of snow guards could protect the surrounding roofing and sheet metal work against costly damages.

Sliding snow and ice often injure roofings, and puncture or tear away gutters, etc. The use of our snow guards forestalls these dangers, as they hold the ice and snow where they form. They are a cheap and unobtrusive preventive against damage.

Manufacture

We make our guards in our own plant, and are not dependent upon the facilities or services of others. These guards are manufactured either from pure copper wire or galvanized steel wire, both selected for ductility and stiffness. No copper-covered steel wire is used.

Practicality

Our wire snow guards combine strength, long service, economy and unobtrusive design.

Types

Three general designs are offered:
For new roofs, the "Clason" and the "H-B."
For old roofs, the "H-B" Special.

The "Clason"

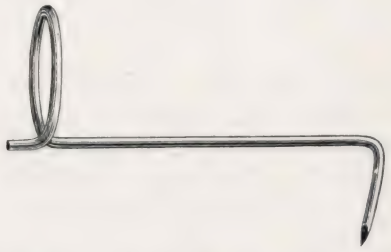
The "Clason" has been for years this company's standard guard, and is the strongest guard made.

"CLASON" SNOW GUARD FOR NEW ROOFS

Note from the illustration that the "butterfly" loops brace and strengthen each other, while the extension brace lends additional strength.

The "H-B"

The "H-B" snow guard is made with a single loop and extension brace, and is a strong, service giving guard. It is sold at a lower price than the "Clason" due to lower manufacturing costs.



"H-B" SNOW GUARD FOR NEW ROOFS

Number Per Square

The following table gives the approximate number of snow guards which may be safely specified for use in each 100 sq. ft. of roof surface:

ROOF PITCH	NUMBER OF GUARDS
One-quarter	50
One-third	75
One-half	150

Towers, and steeper roofs than above indicated, may require special consideration.

How to Specify

Apply to all pitched roofs "Clason" ["H-B"] Snow Guards, as made by THE CLASON ARCHITECTURAL METAL WORKS, Providence, R. I. The guards to be made from pure copper [galvanized steel] wire. (Here specify the number of guards required per square, dependent upon the pitch of the roof and other special conditions.)

In applying the snow guards, the eaves course of the roofing material shall be laid as usual, but the next course shall be laid with the joints slightly open to receive the shank of the snow guard. After striking the line for the third course of the roofing material, place the guards in the joints, with the loop just below the lap of the course, and drive the prong into the roof decking; then lay the course, leaving only the loop exposed. Care must be used to insure having the shank well sunk into the joints, so that the following course of roofing material will lie flat and not bear upon the guard.

(*Note*: The architect or engineer may omit at his discretion the method of application of the guards.)

A Correction

We note a tendency in the use of snow guards to install four or five courses just above the eaves line. From a practical standpoint, this is erroneous. In order to attain the desired results, the guards should be installed according to our recommendations.

THE STRUCTURAL SLATE COMPANY

PEN ARGYL, PA.

BRANCH OFFICES

BOSTON, MASS., 622 Old South Building
BUFFALO, N. Y., 823 White Building
CHICAGO, ILL., 1451 Marquette Building
LOS ANGELES, CAL., 600 Metropolitan Building
MINNEAPOLIS, MINN., Builders Exchange
NEW YORK, N. Y., Room 1128, 200 Fifth Avenue
PHILADELPHIA, PA., 313 Perry Building
PITTSBURGH, PA., 255 Frick Building Annex
WACO, TEX., P. O. Box 461
WASHINGTON, D. C., Mather Building

Products

Quarries of "PYRAMID" BRAND DARK BLUE-GRAY STRUCTURAL SLATE for Architectural, Electrical, Sanitary and other uses.

Manufacturers of "PYRAMID" BRAND SLATE for Stairs, Toilet Enclosures, Urinal Stalls, Shower Stalls, Laundry Tubs, Sinks, Wainscots, Bases, Thresholds, Plinths, Floors, Hearths, Vats and Tanks, Electric Switchboards and Panelboards, Lithograph Stones, Garden Steps, Window Sills and Heads, Wall Copings, Mortuary Slabs, Grave Vaults, Mausoleum Crypts, etc.

"CENTURIES OF SERVICE"
PYRAMID NATURAL SLATE BLACKBOARDS
Proof against Time - Wear - Water - Fire!
TRADE-MARK

Quarries and Organization

The deposits of slate in the counties of Northampton and Lehigh, State of Pennsylvania, possess characteristics which, with the abundant supply and ease of working, make this material particularly adaptable to a wide variety of uses in building construction and for commercial and scientific purposes.

In order to develop the most efficient standards of extraction, workmanship, assembling, distribution and methods of installation, as well as to encourage the maximum production and use of slate, the majority of the quarries throughout this far-famed slate district cooperate through one organization—THE STRUCTURAL SLATE COMPANY.

Equipment and Production

The different member companies have thus been enabled to enlarge and modernize mills and machinery, to co-ordinate in producing slate for all types of installations either of the standards adopted or to suit any special requirements and to co-operate with architects, engineers and constructors in obtaining fullest conservation of materials at a minimum outlay.

This has also made it possible to so produce large quantities of slate, as to maintain a stock of all sizes constantly on hand ready for prompt shipment.

Inspection and Trade-mark

All slate produced by this group of operators is thoroughly inspected before and after working and given the name "Pyramid." This trade-mark is registered and can be relied upon as indicative of the best that can be produced through careful methods of quarrying and experienced workmanship. Specifications need only call for "Pyramid" brand structural slate to insure that excellence of product and service which is obtainable through THE STRUCTURAL SLATE COMPANY organization alone.

Research and Service

In addition to the work of the company's own service department, containing specialists in the quarrying and utilization of slate, the Structural Service Bureau of Philadelphia, as architectural advisor and structural standardist, has conducted a series of researches into the production, uses and methods of installation within buildings as best adapted to their occupancy. As a result The Structural Service Bureau has advocated the adoption as standards of certain sizes, parts and details and has prepared data as to number, arrangement, accessories and preparatory work for the various slate installations.

This data, prepared in co-operation with THE STRUCTURAL SLATE COMPANY, has been issued by it in the form of separate chapters, the numbers, titles and subjects of which are as follows:

Chapter 1. Origin and Geologic Data. Commercial Grading and Standard Finishes.
Chapter 2. Basic Specifications. Essential Information and Preparatory Work.
Chapter 3. Stairways. Specifications, details and data concerning stairways.
Chapter 4. Fittings. Illustrating and describing those used with structural slate.
Chapter 5. Toilet Enclosures. Standardized sizes and parts, drawings and specifications.
Chapter 6. Urinal Stalls. Standardized sizes and parts, drawings and specifications.
Chapter 7. Shower Stalls. Standardized sizes and parts, drawings and specifications.
Chapter 8. Laundry Tubs, Sinks and Sink Tops. Standardized sizes and parts, drawings and specifications.
Chapter 9. Caps, Bases, Wainscots and Floors. Standardized sizes and parts, drawings and specifications.
Chapter 10. Architectural Uses of Slate. Drawings, details and data.
Chapter 11. Miscellaneous Uses of Slate. Drawings, details and data.
Chapter 12. Electrical Uses of Slate. Standardized sizes and parts, drawings and specifications.
Chapter 13. Grave Covers and Vaults, Mausoleum Crypts. Drawings, details and specifications.

The subject matter contained within each publication is set forth herewith in consecutive order.

Origin and Characteristics

Among the chief characteristics of structural slate are its fine even grain, uniform color and its cleavage or fissility, which permits it to be split into slabs of practically any thickness. The results of tests which are given in Chapter 1 show that slate is one of the least absorptive of any of Nature's products used for structural purposes. Moreover, it is not affected by atmospheric changes such as heat or cold and therefore does not contract or expand.

Further data in connection with the natural formation and quarrying of slate may be secured from Bulletin No. 586 of the United States Geological Survey.

Chapter 1 also describes and illustrates the methods of producing and finishing slate for structural purposes.

Continued on next page

Finishes

Slate is furnished with standard commercial finishes depending on use, cost and effect desired. The "split face" finish is the result of the natural cleavage or splitting of the slate and is therefore the least expensive. It forms an interesting and irregular surface, particularly suitable outdoors for copings, steps, fence posts, flooring, etc.

The next surface given slate is that resulting from the planing, which is the next step in milling after the slabs are split to thickness. In this finish, which is known as "planed" surface, the marks of the plane are faintly indicated and yet the effect is suitable in many locations such as the underside of stair treads, etc., as a means of economy and conservation of labor.

The standard "sand rubbed" finish is produced by the action of sand and water upon the slate after it has been planed and placed on large revolving disks. This is the finish illustrated by Fig. 1 and which is used in the great majority of cases for sanitary installations, stair treads, copings, tanks, vats, etc.

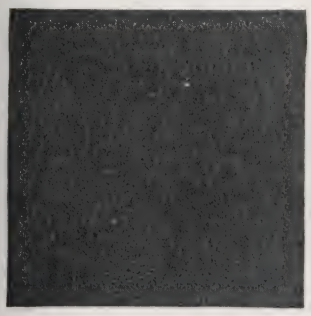


FIG. 1. STANDARD SAND RUBBED FINISH

FIG. 2. HONED FINISH

The fourth step in the proceis gives the smooth, sand finished slate a slight polish or "honed" finish which is naturally the highest in cost. It is particularly adaptable for such purposes as electrical installations, or when a very fine, velvet-smooth surface is required. Fig. 2 illustrates this finish.

Grading

Slate is produced in one "quality" only, but the stock is divided into two natural gradings known as "clear stock" and "ribbon stock." The former is a special selection, adding to the cost, for particular purposes, and must be free of any of the ribbons or natural veinings which are peculiarly the characteristics of the material and which in no way affect its usefulness or strength for structural purposes. The clear stock is naturally scarce and ribbon consequently is used in the vast majority of cases for installations of structural slate.

When in use as in stairs, floors, etc., or when for other purposes given the customary oiled finish, the ribbons become practically invisible.

Basic Specification

A basic specification is offered for the furnishing, installing and finishing of structural slate. This is given in Chapter 2.

The general conditions contain specific requirements governing grades, workmanship, construction, erection and finish of the slate.

For those who do not wish to repeat these in full, they may be made a part of any specification by the use of an abbreviated form referring to the original as follows:

"The General Conditions, Paragraphs 1 to 14 inclusive, as printed in Chapter 2 on Structural Slate, copyrighted by and registered with the Structural Service Bureau of Philadelphia, bearing the date of April 15th, 1920, are hereby made to constitute the general conditions of this specification."

Following the general conditions are descriptive paragraphs under separate headings indicating the manner in which slate may be specified for various types of installations.

Included also are reminder paragraphs for use in connection with other parts of an architect's specification for construction work preparatory to receiving slate installations.

Stairways

A detailed specification is also given in Chapter 3 suggesting paragraphs for inclusion in the architect's specification to secure a slate stairway installation in any of the 4 types of construction covered, namely:

(1) Slate treads, cast iron risers, steel supports.
(2) Slate treads and risers, steel supports.
(3) Slate treads, cement risers, reinforced concrete.
(4) Slate treads and risers, reinforced concrete.

This specification is accompanied by complete detailed drawings showing methods of installation. Fig. 3 illustrates the second type.

Each detail is accompanied by a photograph of a completed stairway of that type.

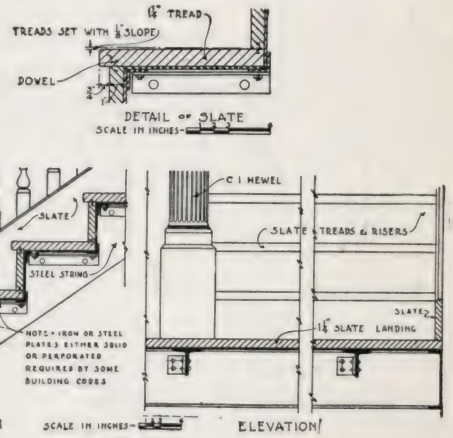


FIG. 3. DETAIL OF STAIRWAY

Comprehensive data concerning the proportion of tread or run to rise, the arrangement of platforms, the strength, capacity and width of stairs, is also published in the chapter. There is also a table giving the height of risers in inches and fractions of inches when the distance from floor to floor is between 8 ft. and 13 ft. 11 in., as well as actual measurements of risers and treads taken from various types of buildings constructed and in use.

Fittings, Trimmings and Accessories

"Pyramid" structural slate is furnished complete with all required metal work for the construction of each installation and for essential equipment as definitely described in the drawings for each type. This feature of the Company's service will be appreciated by all specifiers. Reference by number to the type desired carries with it all required metal parts without further selection. Stocks of quality fittings are maintained throughout the country to suit all requirements. All are illustrated in Chapter 4 including "trimmings," which may be purchased with the slate if not included as a part of the installation.

Continued on next page

Toilet Enclosures

The specific sizes and types adopted as standard are as follows:

Size	Width ft.-in.	Length ft.-in.	Type
1	2 10	4 6	AB
2	2 10	4 0	ABC
3	2 8	4 6	AB
4	2 8	4 0	ABC
5	2 10	3 6	C
6	2 8	3 6	C

Type A is known as the "all-slate" type with front stiles and rails of slate; finished height, 6 ft. 11 in.

Type B is held together and stiffened by nickelplated brass rails above the stiles. In this type the stiles are of slate, but only the end stiles are continued to the floor, all others and all partitions being 11 in. above the floor supported on metal standards.

Type C is the same as Type B, except that the front stiles are omitted and the rails, standards, etc., are fastened directly to the ends and partitions.

Each of these types may be obtained with vent spaces or work spaces by adding the letters V or W, as the case may be, to the type letter. Chapter 5 contains complete line drawings and perspectives of each of the types of enclosures, together with descriptions and full dimensions of the various sizes.

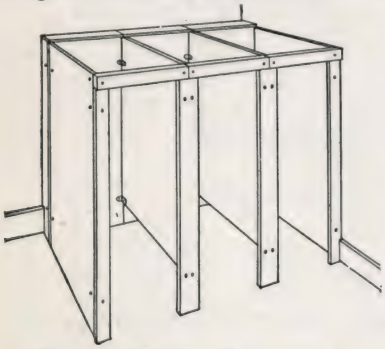
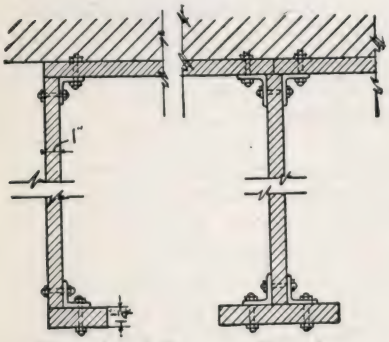


FIG. 4. TOILET ENCLOSURE, TYPE AV

Suggested paragraphs for specifying these enclosures in accordance with the standards adopted are also included. The perspective drawings are similar to those in Fig. 4, accompanying each of which is a page of plans, elevations and sections. A typical shop drawing of an enclosure is illustrated. Details of jointing are shown as in Fig. 5.



Types A and B Type A

FIG. 5. DETAILS OF JOINTING FOR TOILET ENCLOSURES

Urinal Stalls

Four types of urinal stalls have been adopted as standard and are shown by complete drawings and descriptions in Chapter 6, of which Fig. 6 is typical. Only one width, 24 in., and one height, 4 ft. 6 in. has been used in all types, the distinction between types being as follows:

Type A, 21 in. deep, alternate 24 in. deep, for use with separate urinal bowls.

Type B, 19 in. deep, with slate gutter and flushing pipe.

Type C, 22 in. deep same as type B but without individual partitions.

Type D, 19 in. deep, with slate gutter and flushing trough at top and vent space.

Each of these types may be obtained with a vent space by adding the letter V to the type letter. Fig. 6A shows standardized details, the backs of all urinals being sloped to insure being covered with water.

Working data as to proportioning the number of urinals in various types of buildings and specifications applicable to any type installations are included.

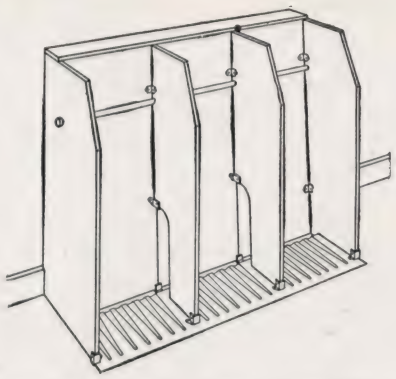


FIG. 6. URINAL STALL, TYPE BV

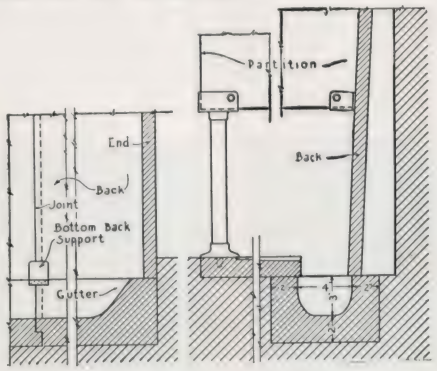


FIG. 6A. DETAIL OF URINAL STALL

Shower Stalls

Five types of shower stalls have been adopted as standard, the perspectives, plans and elevations of which are given in Chapter 7. The perspectives are similar to that shown by Fig. 7.

These types are furnished in 3 sizes varying as indicated in the following table:

Size	Width ft.-in.	Depth ft.-in.	Type
1	3	3	A
2	3	3 6	ABCDE
3	3 6	3 6	BCDE

Type A consists of slate slabs forming backs, ends and partitions, with slate floors.

Type B is similar to Type A with a curb added at the bottom.

Type C is a development of Type B with stiles placed on either side of the front.

Types D and E comprise combination dressing rooms and showers, Type D having a shower for each room, and Type E a shower between 2 dressing rooms. A slate seat is provided and a stile and curb occur between each dressing room and shower.

Details are given in Chapter 7 for metal pan equipment and specificational paragraphs are suggested.

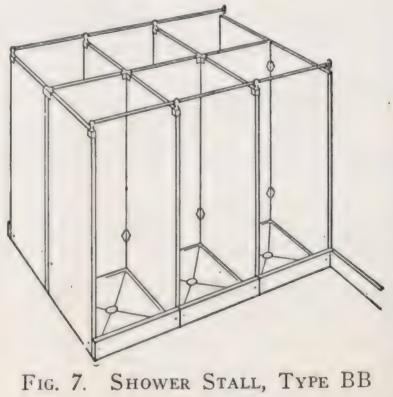


FIG. 7. SHOWER STALL, TYPE BB

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Laundry Tubs, Sinks and Sink Tops

The following types of laundry tubs, sinks and sink tops have been adopted as standard:

Laundry Tubs—Type A is plain with slate ends, partitions, front and back.

Type B has back slab extended 12 in. above top of tub.

Type C is like type B but provides a work space behind tubs and back with slate cover and ends for concealed plumbing.

Type D is a combination sink and laundry tub.

Each of these 4 types is furnished 24x24, 30x24 and 36x24 in. for each compartment.

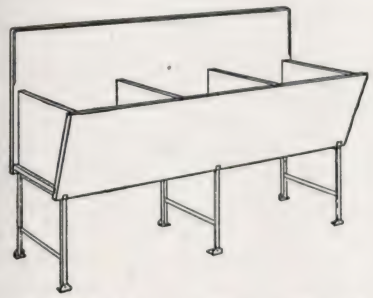


Fig. 8. Laundry Tub, Type B

Fig. 8 shows one type of laundry tub.

Sinks and Sink Tops—Type A is a slate sink supported on brackets; no drainboard.

Type B is a slate drainboard without apron, for any kind of sink and is supported on brackets.

Type C is similar to type B but has an apron, supported on standards.

Type D is a slate sink with slate back and slate drainboards supported on standards.

The types are illustrated and described in Chapter 8, together with slate lavatory tops and suggested specifications are offered.

Wainscots, Bases, Caps and Floors

Drawings showing how slate may be advantageously used for the purposes indicated by the heading, together with suggested forms of specifications, are included in Chapter 9. Thresholds, coves, plinths and various types of floors are illustrated and detailed. Fig. 9 is an example of one of the types of wainscots suggested.

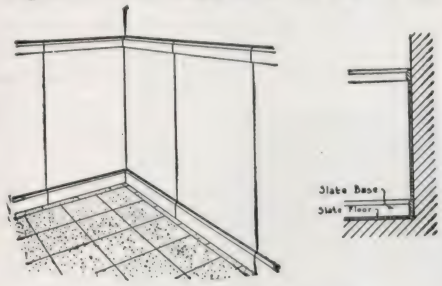


Fig. 9. Drawings of Wainscot

Architectural Uses of Slate

Slate has been utilized in many positions in all types of buildings for sanitary, protective and architectural purposes.

In order to indicate some of these various uses under the latter heading and to illustrate methods of installation, drawings are included in Chapter 10 showing cornices, chimney caps, door and window sills and heads, column bases, areaways, dampproof courses, shelving, fireplaces and hearths, protections for ranges, radiator recesses, register faces, copings, steps, walks, fence posts, etc.

Miscellaneous Uses of Slate

In addition to the other wide uses of slate, it plays an important part in many industries. For vats in chemical work and for tables in candy and other manufacturing establishments, tanneries, laboratories, etc., slate is becoming extensively utilized. It is in demand for refrigerating purposes and is standard construction for billiard table tops, greenhouse benches and many other uses.

Chapter 11 gives drawings, details and descriptions relating to some of these uses.

Electrical Uses of Slate

Slate is rapidly becoming one of the most important essentials for switchboards, panelboards and various other features of electrical installations. Properly selected slate is free from magnetic veins and is resistive to wear and tear and to the constant impact of safety circuit breakers.

Drawings illustrating electrical uses of slate are shown in Chapter 12. Valuable technical data, the results of stringent tests of Pennsylvania slate to determine its hardness, absorption, crushing strength, abrasion and its other properties for electrical purposes are tabulated. For the assistance of engineers and manufacturers, as well as of architects and constructors, there is included a complete developed specification setting forth the requirements which must be fulfilled by slate to make it suitable for electrical uses.

Grave Covers, Mausoleum Crypts

Through its resistance to dampness and action of the earth, slate has been used for the protection of the dead for many hundreds of years. Not only in underground vaults and as grave covers, but also to form grave vaults and crypts in mausolea either above or below ground, slate is standard with many cemeteries.

Drawings and detailed data of such installations including requirements are given in Chapter 13. One of these showing a crypt is illustrated in Fig. 10.

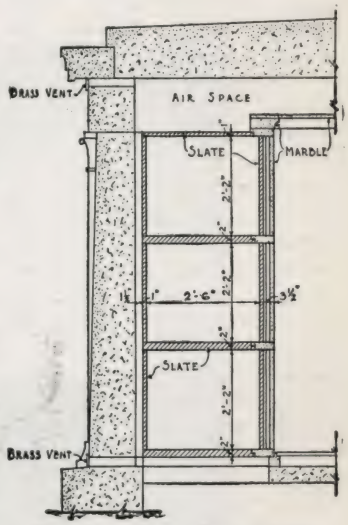


Fig. 10. Detail of Crypt

Structural Slate in Schools

This is the title of a special publication issued for the use of architects, school officials and others giving condensed data and cross reference to the various chapters before referred to. It is suggestive of many of the purposes in school buildings to which slate may be put, including blackboards, as mentioned in connection with the pages of the Natural Slate Blackboard Company in this edition of Sweet's Architectural Catalogue.

Plumbing Trade Catalogue

A new publication is now on the press, and is for express distribution to plumbing supply houses and plumbing contractors. It illustrates all sanitary uses of slate with data as to size, cost, weight, etc., within the one volume of convenient size.

The Company's Publications

These will be furnished without cost to interested inquirers, who will, on stationery containing their printed letterhead, address The Structural Slate Company, Pen Argyl, Pa.

VERMONT STRUCTURAL SLATE CO.

FAIR HAVEN, VT.

BOSTON REPRESENTATIVE, E. A. Bullard, 746 Tremont Building
PHILADELPHIA REPRESENTATIVE, William Moore Co., 1516 Sansom Street
NEW YORK REPRESENTATIVE, Knickerbocker Slate Corporation, 153 East 38th Street
CHICAGO REPRESENTATIVE, Slate & Flagstone Co., 1825 Central Street, Evanston, Ill.

Products

Vermont Unfading Green Structural Slate.
Vermont Unfading Mottled Green and Purple Structural Slate.
Vermont Unfading Purple Structural Slate.
Garden Flagging or Stepping Stones.
Roofing Slates.

Structural Slate

Description—Vermont structural slate is the name applied to structural slates quarried in or near Fair Haven, Vermont.

It is quarried in blocks ranging from 4x2 ft. to 8x6 ft. in various thicknesses.

The process of manufacture is to horizontally split the quarried blocks to a suitable thickness and to vertically cut to the approximate sizes required. The slabs are then passed through planers; after which operation they are ready to be reduced to exact dimensions on rubbing beds or through the use of air tools and other special machinery.

Vermont structural slate is a hard, dense rock formed by metamorphic action from clayey shale. It is exceedingly strong, hard and perfectly non-absorbent and does not chip or spall easily. It stands foremost among natural stones used in architectural and engineering work on account of its strength and durability. Few possess so fine and firm a texture or so remarkable a transverse resistance. Vermont structural slate is not affected by dilute mineral acids, and the permanency of color in combination with the lasting qualities of the rock make it desirable in many cases where for esthetic reasons black slate should not be used.

Vermont structural slate possesses all the superior qualities of the highest grades of slate, and in addition to them the charm and permanency of attractive color.

Color — The colors are distinct and permanent, ranging from a light green to a dark purplish brown. The most popular colors are the different shades of unfading green, unfading mottled green and purple, and unfading purple.

Vermont Unfading Green Slate in Combination with Gray Tennessee Marble
7 carloads of Vermont unfading green slate treads and platforms used in this building

Finishes—The standard finish for Vermont structural slate is the regular sand rubbed finish. This method of finishing reduces the surfaces finished to perfectly true, smooth surfaces. The arrises, where desired, are remarkable for their perfectly sharp and true lines. A handhoned finish furnished when required.

Sizes—The approximate maximum limit of surface size in which Vermont structural slate can be produced is 6 ft. wide by 8 ft. long. Greater lengths, however, can be furnished in lesser widths. The treads shown in illustrations are approximately 12 ft. long. The limit in width, for stair platforms, partitions, etc., is 6 ft. 3 in.

Uses—Great quantities of Vermont structural slate are furnished for water closet enclosures, shower bath enclosures, urinal stalls, etc.; for floors, either in large slabs, random rectangular, or other shapes; for wall base, wainscoting, plinths, thresholds, floor borders, etc.; for stair treads, strings and platforms; for door and window sills; for roofing and other structural purposes. Also used extensively for electrical apparatus.

Prices—Prices, samples, etc., will be furnished on request.

Garden Flagging

Recently, considerable quantities of floor and terrace work have been furnished with rough sawed edges and with top surfaces showing the natural cleave of the rock. A further variation of this finish is obtained by having the top surfaces slightly rubbed, thus showing in each stone a partly rough and partly smooth surface. This finish is especially adaptable to floors, church aisles, terraces, etc., and when laid in random, rectangular sizes presents a very artistic appearance.

Garden flagging is generally furnished in quarry run, small and medium sizes and irregular shapes. The thickness most generally used is approximately 1 in., but greater or lesser thicknesses can readily be furnished. A large stock of the regular flagging is carried at all times, insuring prompt deliveries.

Stepping stones can be furnished in irregular shapes and sizes or in rectangular shapes with rough trimmed edges.

Continued on next page

Floor Tile and Border

While we are prepared to furnish tile in any size or thickness, the nature of slate rock is such that tile of small or medium sizes, ½ or ⅝ in. in thickness, affords sufficient strength and wearing qualities, at the same time giving the buyer the advantage of a lower price and lesser freight cost than if tile 1 in. or more thick is used.

Sanitary base in any of the popular colors and of any desired design can be furnished for use with Vermont slate tile floors.

Tests

Abrasion Test of Vermont Unfading Green Slate:

With Best Black slate, made by J. Horace Cook, Architect and Supervisor, Board of Public Education, Philadelphia, Pa.

All samples were 12 in. x 12 in. x 1 in.; were subjected to the same weight (56 lbs.), and ground under the same conditions for the same length of time (3 minutes).

Best Black wore to $\frac{13}{16}$ in. on one edge and $\frac{9}{16}$ in. on opposite edge. Vermont Unfading Green wore to ¾ in. on one edge and $\frac{11}{16}$ in. on opposite edge.

Vermont Unfading Green thus showed not only 11% less but more uniform wear.

EXTRACT FROM U. S. ARSENAL TEST OF VERMONT STRUCTURAL SLATE

Test No.	Classification	Color	Size	Ultimate strength	
				Total, lbs.	Per sq. in., lbs.
12,011-13 12,014-16	Compressive test of slabs) Pressure applied at ends)	Green Purple	30 in. long 12 in. wide 2 in. thick	409,000 291,800	17,035 12,166
12,020	Compressive test of cubes				
	On bed	Green	4 in. each way	374,500	23,400
	On edge	"		378,800	23,650
	On bed	Purple		433,000	27,560
	On edge	"		476,600	30,300

Kitchen Alcove of Vermont Structural Slate

View of Plant of The Slate & Flagstone Co., Evanston, Ill.
G. Dudley Wagstaff, Landscape Architect

Specifications for Structural Slate

The usual specifications covering the installation of slate for structural purposes apply to Vermont structural slate. Further than that, Vermont colored slates may be used to advantage in different color combinations and special finishes to produce desired artistic effects.

Roofing Slates Furnished

The popular Vermont colored slates for roofing purposes furnished in any color combination desired. A specialty is made of heavy roofing slate in the different shades of Vermont unfading slates, Vermont unfading mottled green and purple; also weathering slates.

References

Park Avenue Baptist Church, Park Avenue and 64th Street, New York, N. Y.—Allen & Collins, Henry C. Pelton, Associate Architects.

Treads, platforms, base and floors all of Vermont unfading green slate. The floors are of natural cleft slabs with rough sawed edges, in random, rectangular shapes, the balance of the work in the regular sand rubbed finish.

School of Architecture, Princeton University, Princeton, N. J.—Cram & Ferguson, Architects.

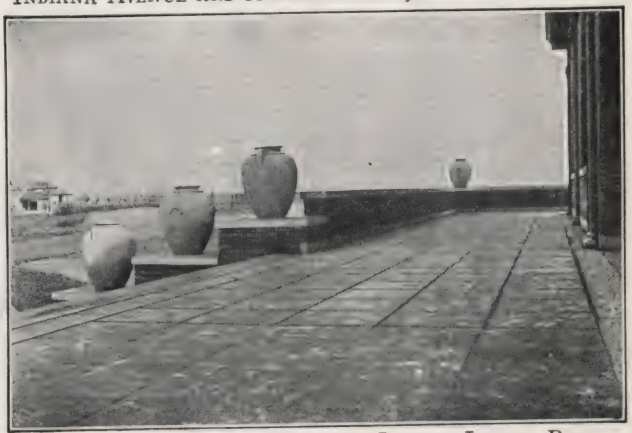
Treads, platforms, base, border, tile, window sills, saddles, etc., all of Vermont unfading green stock in the regular sand rubbed finish.

Junior High School, Springfield, Mass.—H. L. Sprague, Architect.

W. C. enclosures, urinals and shower stalls of unfading green slate.

Also many other projects where Vermont colored slates were used to splendid advantage.

Slate Flagging Used in Aisles of St. George's Church, Indiana Avenue and Almond Street, Philadelphia, Pa.



Mottled Field, Green Borders—League Island Park, Philadelphia, Pa.

NATURAL SLATE BLACKBOARD COMPANY

PEN ARGYL, PA.

MILLS AT SLATINGTON, WIND GAP, PEN ARGYL AND BANGOR

BRANCH OFFICES

BUFFALO, N. Y., 823 White Building
CHICAGO, ILL., 1451 Marquette Building
NEW YORK, N. Y., 200 Fifth Avenue
PHILADELPHIA, PA., 313 Perry Building
PITTSBURGH, PA., 255 Frick Building Annex
WACO, TEX., P. O. Box 461
WASHINGTON, D. C., Mather Building

REPRESENTATIVES

BOSTON, MASS., NEW ENGLAND SLATE BLACKBOARD CO., 224 Congress Street
MINNEAPOLIS, MINN., MINNEAPOLIS NATURAL SLATE CO., Builders Exchange Building

AGENCIES IN ALL PRINCIPAL CITIES

Product

NATURAL SLATE BLACKBOARDS.

TRADE-MARK

Service and Organization

Foremost in the minds of the various producers of slate who form the NATURAL SLATE BLACKBOARD COMPANY, is the necessity of giving the consumer all of the information which will enable him to advantageously use the material.

In order to assure to architects, constructors and owners the best available data, the NATURAL SLATE BLACKBOARD COMPANY has had the Structural Service Bureau of Philadelphia conduct extensive investigations into the production and utilization of natural slate for blackboards. The information thus obtained has been put into available form for use in laying out the blackboards and also for specifying the same in varying forms of construction.

Certain of this informative data is published in these pages, which also contain the specifications finally adopted. Detailed drawings on the following page show typical standardized methods of application.

In the pages of the Structural Slate Company within this issue of SWEET'S ARCHITECTURAL CATALOGUE will be found reference to a series of publications which contain much information of value concerning the characteristics and production of structural slate.

Advantages of Slate for Blackboards

The structure and characteristics of natural slate are such that the surface may be brought to a finish which is unexcelled for blackboard purposes. It results in a smooth, even, dark writing surface upon which chalk marks are clearly legible and which may be easily erased or cleaned.

As slate is not affected by atmospheric changes in the classroom, its true, velvetlike surface remains constant under all conditions and does not wear out or require replacement. The first and only cost in natural slate blackboards is in furnishing and installing them at the time the building is constructed. In order that they may be properly erected it has been the endeavor of the NATURAL SLATE BLACKBOARD COMPANY to place at the service of all users of natural slate blackboards their years of experience in this installation.

The "Pyramid" brand, which is stamped on all slate furnished by the NATURAL SLATE BLACKBOARD COMPANY, was adopted in order to distinguish the material distributed by this company as a guarantee of the enforcement of the most rigid rules of workmanship and inspection in order to assure the best possible selection for the purpose.

Heights, Widths, and Areas Required

The ages of the pupils in the various grades should determine the height at which blackboards are to be placed above the floor. In a district school where children of all grades may be in a single room, the board is usually placed at an average height of 2 ft. 4 in. from the floor to the chalk rail. In some cases the board behind the teacher's desk is set higher than the others as it may be used entirely for illustration work.

Nearly all states and the larger cities have adopted requirements governing the height of chalk rails and the area, height and width of blackboards. The tables and data here presented represent standard requirements compiled from the sources noted.

STANDARD HEIGHTS OF CHALK RAILS AND BLACKBOARDS

Grade	Height of chalk trough				Height of blackboard				Top of board above floor			
	New York		Boston		New York		Boston		New York		Boston	
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Kindergarten	2	0	2	2	4	0	4	0	6	0	6	2
1st, 2d, 3d	2	0	2	2	4	0	4	0	6	0	6	2
4th	2	6	2′4″	2′6″	3	6	4	0	6	0	6′4″	6′6″
5th, 6th	2	6	2	8	3	6	4	0	6	0	6	8
7th	3	0	2	8	3	6	4	0	6	0	6	8
8th	3	0	2	8	3	6	4	0	6	6	6	8
High schools	3	0	2	8	3	6	4	0	6	6	6	8

For colleges it is usual to set the board 3 ft. above the floor and use a 4-ft. width.

BLACKBOARD AREAS

HIGH SCHOOLS

Lecture rooms.....Not less than 50 sq. ft.
Manual training room.....15x4 ft.
Drafting rooms.....15x4 ft.
Cooking rooms.....10x4 ft.
Chemical laboratory.....Board parallel to desk section and back of demonstration table.
Physical laboratory.....As much board as possible.
Botanical and zoological laboratory.....50 sq. ft. of board.

COLLEGES

Small lecture rooms.....Blackboard back of instructor's desk and full on one side.
Laboratories generally.....15 to 20 lin. ft.
Lecture room for mathematics.All board space possible.
Drafting rooms.....About 15 lin. ft.

"Not less than 80 ft." of blackboard are required for the walls of each classroom by the Pennsylvania State Board of Education, which also requires the following heights and widths as best suited to the uses indicated:

Primary rooms.....21 in. above floor
Elementary rooms.....25 in. above floor
High school rooms.....30 in. above floor

Boards should be not less than 3 ft. 6 in. wide, but 4-ft. widths are more suitable for accommodating all grades.

Continued on next page

Architect's Specification

The following note and specification are identical with those in "Natural Slate for Blackboards" issued by the NATURAL SLATE BLACKBOARD COMPANY and copyrighted by the Structural Service Bureau, Philadelphia, Pa. They may be copied in full or referred to by name in the architect's specifications as governing the installation of blackboards.

Note: A complete specification for the furnishing and setting of blackboards affects the work of several different trades. In connection with this specification the specification for carpentry and millwork should call attention to requirements in regard to the grounds, trim, etc., to be furnished and set, and the kind of wood should be specified. It should be noted whether or not switches, thermostats, etc., are to be placed in trims of openings; and these trims designed accordingly. The location of switches, thermostats, etc., should be also specified under electrical work, heating work, etc.

Under masonry the setting of blocks or plugs to be built into the walls should be provided for. Under plastering it should be noted whether or not the walls back of the boards are to be plastered and under painting the finishing of the exposed frame and trim should be provided for.

(1) The general contractor shall furnish and arrange for the complete installation of Natural Slate Blackboards in every classroom (in the Manual Training room, the Domestic Science room, in all Laboratories and in the Assembly Hall) and in all other portions of the building where so shown or noted on the drawings.

(2) On all walls where blackboards occur they shall run full to corners and trim of openings. The heights of the slate to be as follows (state heights and whether single height or "double-tier").

(3) Where wardrobes occur in classrooms, place slate blackboards in each door, as follows (describe recessed panels, etc.).

(4) The slate shall be the finest quality selected blackboard stock, even in color, free from veinings or imperfections, not less than ¼ in., nor more than ⅜ in. thick. Each piece shall be surfaced in accordance with the NATURAL SLATE BLACKBOARD COMPANY'S standards, and shall be branded with the "Pyramid" trade-mark.

(5) Spaces 4 ft. 6 in. or less in length shall be in one piece: from 4 ft. 6 in. to 9 ft. in two pieces; longer spaces to be divided into pieces as nearly approximating 4 ft. 6 in. as space and standard lengths permit. Slate shall be furnished with joints ground straight, true and neatly fitted.

(6) The carpenter-contractor will furnish and set all grounds and will set all blackboards complete, with trim. All trim will be furnished by the millman. The complete installation shall be in accordance with the details and with the printed directions of the NATURAL SLATE BLACKBOARD COMPANY, consistent herewith.

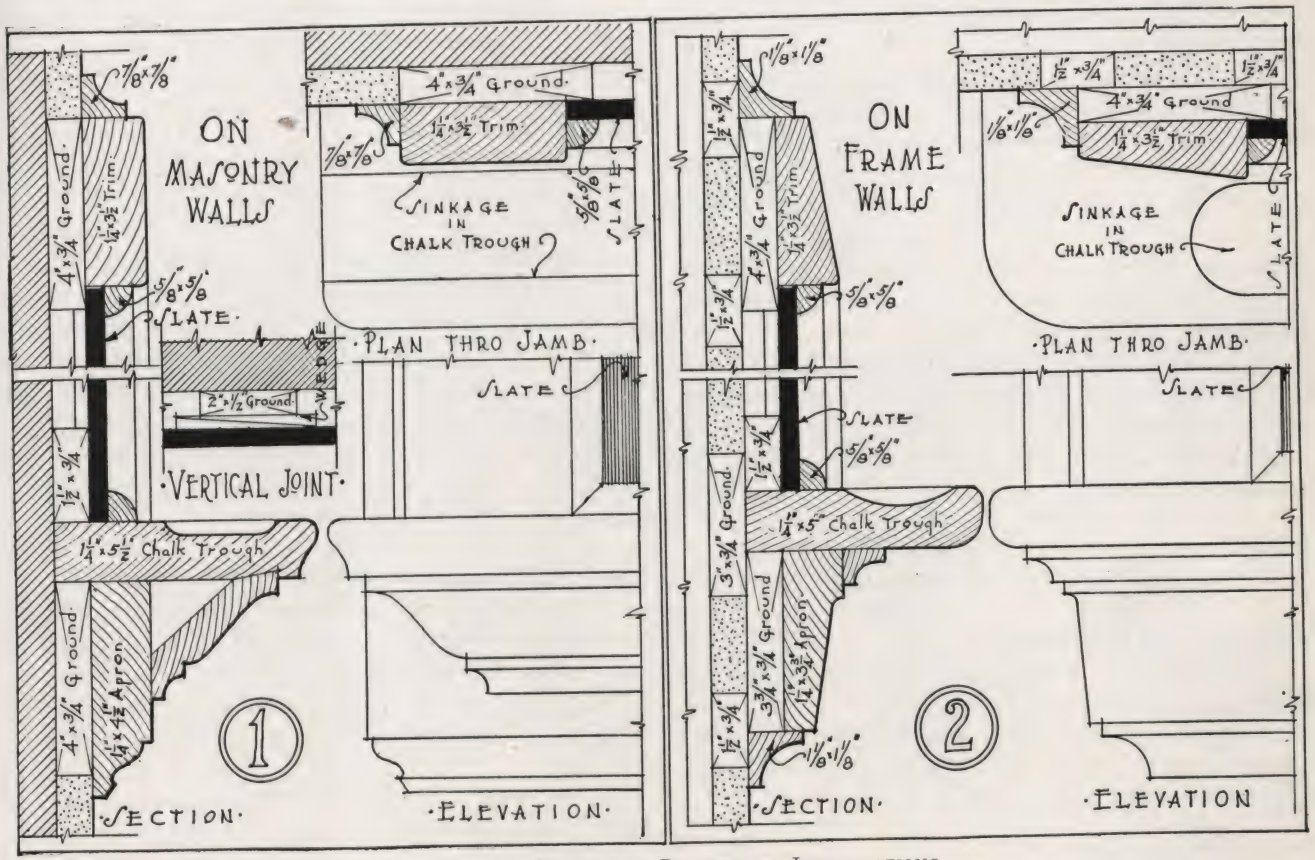
(7) Fasten securely to the walls, kiln-dried white pine "ground" strips 4x¾ in. at top, bottom and ends of all spaces to be occupied by blackboards (and intermediate strip near top if double-tiered). Back of all joints in slate securely place 2 x½-in. white pine strips and, when blackboards are being set, tap wood wedges behind slate and glue and sprig the wedges to these uprights.

(8) To the "ground" strips, above mentioned, securely set 1¼x3½-in. trim, slightly rounded at edges.

(9) At bottoms of blackboards place 5½x1¼-in. countersunk chalk troughs carefully leveled extending under blackboards to face of wall (or studs) and securely nailed to "ground" strips and to 4½-in. moulded aprons. Chalk trough shall be (moulded or rounded) on all exposed edges and returned at ends (or left open for cleaning), as detailed.

(10) As the blackboards are set, a ⅝x⅝-in. quarter-round shall be well secured to surrounding trims and chalk trough, firmly holding slate in place. Any free standing end trims and all tops shall be back-banded with ⅞-in. coved scotia mould (1¼ in. if on frame walls).

(11) The joints between slate shall, after being wedged as before specified, be made tight with special glue or jointing compound, which shall be furnished with the slate, and after completion of setting, joints shall be shaved and scraped to have the appearance of a smooth plane with adjoining surfaces. All slate blackboards shall be left sound, clean-black, ready for use and in every way a complete and satisfactory installation.



TWO TYPICAL DETAILS OF BLACKBOARD INSTALLATIONS

(1) Detail of installation on masonry walls, (2) detail of installation on frame walls. Scale as printed 3 in. equals 1 ft

ASSOCIATED METAL LATH MANUFACTURERS, INC.

TELEPHONE
RANDOLPH 1748

123 West Madison Street
CHICAGO, ILL.

MEMBER COMPANIES

BERGER MANUFACTURING CO., (pages 256-257), Canton, Ohio
BOSTWICK STEEL LATH CO., (pages 258-259), Niles, Ohio
GENERAL FIREPROOFING CO., (pages 260-263), Youngstown, Ohio
MILWAUKEE CORRUGATING CO. (page 264), Milwaukee, Wis.
NORTH WESTERN EXPANDED METAL CO., (pages 266-267), Chicago, Ill.
PENN METAL CO., (page 265), Boston, Mass.
SYKES METAL LATH & ROOFING CO., Niles, Ohio
TRUSCON STEEL CO., (pages 268-269), Youngstown, Ohio
YOUNGSTOWN PRESSED STEEL CO., (pages 270-272), Warren, Ohio

Services

(a) DEVELOPMENT OF CRACK PREVENTION DATA.

(b) DEVELOPMENT OF METAL LATH as a fire resistive building material of high efficiency.

(c) ENGINEERING DEPARTMENT giving full information on all subjects relating to Metal Lath, also to Fireproofing, Stuccoing and general Construction Work, without charge.

(d) RESEARCH WORK, TO DEVELOP METAL LATH for every desirable purpose and to determine the type best suited for different classes of construction.

(e) RESEARCH WORK, TO DETERMINE PERFECT METHODS OF METAL LATH APPLICATION AND THEIR FORMULATION INTO PRACTICAL SPECIFICATIONS for the use of architects and others in the building trades.

(f) PUBLICATION of METAL LATH LITERATURE, furnished on application.

(g) REPORTS on ACOUSTICS, DISTORTION, CRACK PREVENTION, FIRE, THERMAL CONDUCTIVITY and other tests on application.

(h) PREPARATION OF SAFETY REGULATIONS for BUILDING CODES.

Slogan

"Metal Lath Stops Fire and Prevents Cracks."

Purpose of this Catalogue

The purpose of the following data is to remind the architect, his draftsmen and specification writers, where metal lath should properly be specified or shown on the drawings, and to clarify some of the conditions under which metal lath should be employed.

Kinds of Metal Lath

Individual types and forms of metal lath and the particular qualifications of each will be found in the catalogues of the various companies listed above. Each has its distinctive qualities and uses which are described in their own catalogues.

In general, metal lath is furnished either painted, or galvanized before or after forming. No unprotected lath is manufactured for plastering use. Painted lath is suitable for all practical purposes.

Expanded metal is also used for reinforcing concrete, etc., and is illustrated by the members listed above.

Uses of Metal Lath

In fireproof construction, metal lath is a most convenient form of fire protection and its economy should be utilized to the fullest extent. It is the most economical form of structural steel protection.

Ordinary construction can be made practically crackproof and measurably firesafe by its more general use. Plastering on metal lath has decreased relatively in cost—it is frequently only about 25c per yard more than plastering on the commonest lath. Architects are quickly adopting a policy of using metal lath in a few of the *points most vulnerable* to fire or in *prominent rooms* only, when strict economy is essential.

Checking List for Metal Lath

Vulnerable Points (Ordinary Construction)—In ordinary construction, metal lath should be used on as many of the following points as possible:

(1) All bearing partitions and stud exterior walls, including a basket to hold incombustible material as a fire stop.

(2) Ceilings under inhabited floors, especially over heating plants and coal bins, and prominent ceilings.

(3) At chimney breasts, around flues and back of kitchen ranges.

(4) Stair-wells and under stairs.

(5) Base and reinforcement for exterior stucco.

Continued on next page

For Fireproofing—

(1) Steel column covering.
(2) Soffits of beams.
(3) Concrete column reinforcement.
(4) Elevator enclosures.
(5) Other steel beams and shafts.
(6) Furring for automatic self-closing fire-doors.
(7) Sawtooth and monitor walls.
(8) Suspended Ceiling.

For Economy in Floor Space—

(1) Solid Partitions (hotels, apartments, institutions).
(2) Stair and elevator enclosures.

For Insulation—

(1) Furring for walls.
(2) Refrigerating room walls.

For Appearance and to Prevent Cracking—

(1) Reinforcement for composition floors.
(2) Wood stud partitions.
(3) Ceilings, especially in prominent rooms.
(4) Bathroom and kitchen wainscots.
(5) Corners over wood lath.
(6) On porches instead of wood ceiling.

For Minimum Weight and Economy—

(1) Solid partitions.
(2) Moulded and ornamental work, coves, cornices, girders, beams and ceilings.
(3) Fireproofing trusses.

For Superior Plastering Surface—

(1) Around windows and doors in thick masonry walls.
(2) Over chases in masonry and wood lath walls.
(3) Lunettes, etc.
(4) Bay windows soffits.

For Sound Insulation—

(1) Solid partitions in hotel, apartment, hospital and public buildings, music rooms, etc.

For Stucco—

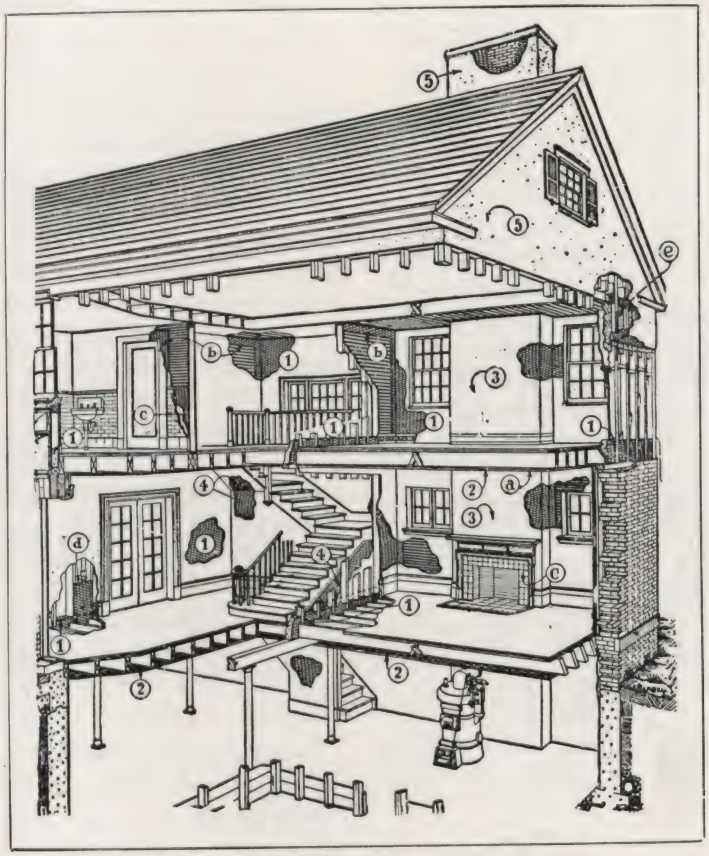
(1) Backplastered.
(2) Sheathed construction.
(3) Soffits of cornices, eaves, etc.

General—

(1) Overcoating old frame buildings.
(2) Walls and fences.
(3) Pent house construction.
(4) Half timber and stucco construction.
(5) Toilet and shower stalls.

For Fire Stops—

(1) On all stud bearing partitions and walls and fire stops between studs. (Fire stops to be metal lath basket-shaped to fit between studs, coated with plaster or cement and filled with incombustible materials.)
(2) On ceilings under inhabited floors, especially over heating plants and coal bins.
(3) At chimney breasts, around flues and back of kitchen ranges.
(4) For stair-wells and under stairs.
(5) As a base and reinforcement for exterior stucco.



For Crack Prevention—

(a) On ceilings of prominent rooms.
(b) Lap 6 in. on either side of wall and partition angles, and around door bucks.
(c) Back of wainscots and tile mantels.
(d) Across plumbing pipes and heat ducts.
(e) Proper construction of exterior stud walls for successful stucco.

FOR FIRE STOPS AND CRACK PREVENTION
Most advantageous positions for metal lath

Continued on next page

Economical Metal Lathing Specifications

To gain the maximum advantages of crack and fireproofing, the plastering specifications for every residence in which wood lath predominates should call for metal lath over the heating plant and fuel storage and on the bathroom wainscot.

In addition to this, the following two alternates are suggested.

Alternate I—(1) Use metal lath on the ceilings of the living room, dining room, entry hall, and around and under the stairs and stairwell where exposed to view from the main floor.

(2) Use a 12-in. strip bent into the corners of the living room, dining room and entry hall (to prevent corner cracks).

Alternate II—(In addition to the above)

(1) Use metal lath for the walls of the living room, dining room and entry hall.

(2) Use metal lath for the balance of the basement ceiling.

Have your contractor figure these alternates and show your clients how inexpensive it is to gain the advantages of metal lath.

Specifications for Erecting Metal Lath

General—*For Walls, Partitions, etc.*—Metal lath for inside walls and partitions and for fireproofing columns, brackets, ducts and vertical furring where tied to steel shall weigh not less than 2.5 lbs. per sq. yd.; where attached to wood shall weigh not less than 2.3 lbs.

For Ceilings—Metal lath shall weigh not less than 3 lbs. per sq. yd. tied to steel or 2¾ lbs. if attached to wood, with supports spaced not greater than 16 in. center to center.

For Exterior Stucco Work—Metal lath shall weigh not less than 3.4 lbs. per sq. yd.

Ribbed Metal Lath—Shall weigh not less than the minimum above, but the spacing of supports shall be in accordance with the published recommended practice of the manufacturers thereof.

Sheet Metal Lath—Shall weigh not less than 4½ lbs. per sq. yd. with supports for non-bearing partitions and ceilings not more than 24 in. on centers, or for bearing partitions not greater than 16 in. on centers.

Staples—Shall be 1¼ in. by No. 14 gauge smooth wire, driven to a penetration of at least ⅞ in.

Nails—Shall be not less than 4d for flat metal lath, but where ribbed lath or furring is used, 6d nails shall be used. They shall be driven to at least ⅞-in. penetration and shall be bent up to engage at least one strand without breaking.

Tie Wire—Shall be not less than No. 18 gauge black annealed lathers' wire. For suspended ceilings tie wires shall be galvanized.

Furring—For wood frame buildings, shall be at least ½-in. by No. 22 gauge crimped steel or $\frac{3}{16}$-in. pencil rods or self-furring lath.

Furring Channels—For suspended ceilings, shall be not less than .276-lb. ¾-in. channels.

Runner Channels—For suspended ceilings shall be not less than .442-lb. 1½-in. channels, 4 ft. center to center.

Hangers—For suspended ceilings, shall be $\frac{7}{32}$-in. round mild steel rods or No. 8 gauge galvanized steel wire fastened by twisting or 1x$\frac{3}{16}$-in. flats.

Lapping—Lower sheet laps ½ in. over sheet above.

Wood Frame Buildings—Where furring is used, it is to be fastened to studs and joists by nailing or stapling every 12 in.

The metal lath is placed with the long dimension (8 ft.) across supports and fastened by nailing or stapling every 6 in. Staples are placed astride the furring, nails are bent over the furring. The sheets are lapped not less than ½ in. on the sides and tied once with wire between supports. Ends lapped not less than 1 in. over supports.

The lath is first applied to ceilings and carried down 6 in. on all walls and partitions. All lath shall be started at least one stud away from a corner and be bent into the corner on to the abutting wall to avoid a lap-joint in the corner. On walls and partitions the lathing is started at top and carried down, the lower sheets lapping over upper sheets (lap being not less than ½ in.).

Diamond lath, sheet lath or ribbed lath on exterior work should be fully embedded in cement by back-plastering where wood sheathing is eliminated, furring with ½-in crimped furring or $\frac{3}{16}$-in. pencil bars (or self-furring lath). For overcoating or where sheathing is required, at least ⅜-in. space shall be provided behind the lath and must be filled by cement plaster.

Suspended Ceilings—Hangers are placed 4 ft. center to center in both directions. Where suspended below concrete construction, hangers are placed before pouring concrete; below flat arch hollow tile, hangers are fastened to toggle bolts inserted after tile are placed or by hangers extending completely through the block. Where steel beams or purlins are not more than 4 ft. center to center, hangers may be attached directly to them.

Runner bars placed 4 ft. on centers are bolted to hangers or suspended by securely twisted loops formed in the lower ends of the hangers.

Channels are placed across the runner bars and clipped securely to them. They are set on various centers depending upon the lath used. A maximum of 11¾ in. is used for 3-lb. flat lath; 15¾ in. for 3.4-lb. flat lath; and 19-in. centers for 3-lb. rib lath.

The metal lath is then wired to the channels, the long dimension (8 ft.) of the sheet being across the channels. The ties are placed not more than 6 in. apart, sheets are lapped not less than ½ in. on sides and not less than 1 in. on ends and tied once between supports.

Solid Plaster Partitions—Studding used for solid partitions shall be ¾-in. cold or hot channels 15¾ in. center to center for partitions not to exceed 16 ft. in height and 1-in. channels for greater height properly braced during plastering. Where ribbed lath is used,

Continued on next page

the partition shall be erected in accordance with the published recommended practice of the manufacturers.

The channels are held in place by springing into holes drilled in floor and ceiling. On wood floors, channels are bent to an angle and spiked or set in shoes. The metal lath is fastened to the channels, with the long dimension of the sheet across the channels by wiring every 6 in. Sheets are lapped not less than ½ in. on sides and wired once between supports and lapped not less than 1 in. at ends over supports.

All lath shall be started at least one stud away from a corner and be bent into the corner and carried on to abutting wall to avoid a lap-joint in the corner.

The work is started at the top of the partition and carried down so that the lower sheets lap over those above.

Specifications for stucco and plaster work sent on application.

Sound Insulation

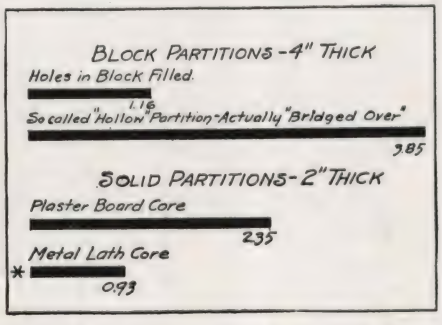
Through the recent completion of exhaustive, original tests, the superior acoustic properties of the 2-in. solid metal lath partition has been definitely determined by Professor F. R. Watson of the University of Illinois.

To learn the relative sound insulation of solid partitions and so-called "hollow" block units which are actually "bridged over," the following experiment was conducted under the most scientific conditions:

Partitions were tested with the holes filled, making the blocks solid; and the additional material increased the sound insulating quality over that shown when the holes were unfilled. Solid partitions on various plaster bases and varying thicknesses were then tested. The test showed conclusively that 2-in. solid metal lath partition is even more soundproof than commercial partitions of 4 in. total thickness, using 3-in. block.

Full details of test and discussion of reasons for results sent on application.

The relative measurements of transmitted sound are shown in illustration below.



* 2-in. solid plaster partition as specified above

RELATIVE AMOUNT OF SOUND THROUGH PARTITIONS

Fire Stops

Through its committee on Treatment of Concrete Surfaces, The American Concrete Institute has the following to say concerning fire stopping, "Probably the best method of fire stopping is to form a basket of metal lath (filled with concrete) to occupy spaces between the studs at juncture of floor joists and wall." See also revised edition "Dwelling House Code" of National Board of Fire Underwriters. (See drawing on second preceding page.)

Partitions

For the convenience of architects and builders, reduced details of various types of metal lath partitions are shown on following pages.

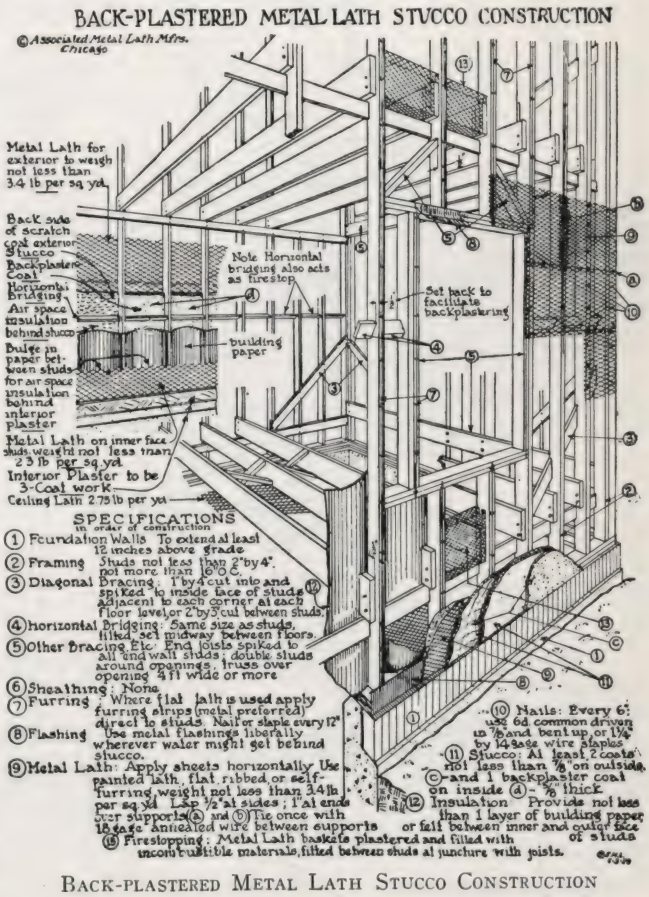
The methods outlined are all results of the manner of application which has proved most efficient in actual service.

These partitions are necessary in present-day space economy. In a typical 500-room hotel, 10 additional rooms can be secured by using 2-in. instead of 4-in. partitions.

Column Incasement

Results from Bureau of Standards Fire Tests indicate the necessity for surrounding concrete columns with metal lath. Investigation of 20-in. columns disclosed that, without use of expanded metal, the columns after 4 hours fire test, failed at an average of 1145 lbs. per sq. in. With the mesh incasement, they failed at 5615 lbs. per sq. in.

Incasement of concrete columns by expanded metal is the only safe way to handle silicious gravel concrete. *Required in 1921 report of Joint Committee on Reinforced Concrete.* It is also most economical for steel columns and should be provided for, at least as an alternate, in every specification. *See Underwriters' column tests.*



BACK-PLASTERED METAL LATH STUCCO CONSTRUCTION

Continued on next page

Stucco Exteriors

Cardinal Points of Good Stucco Design—

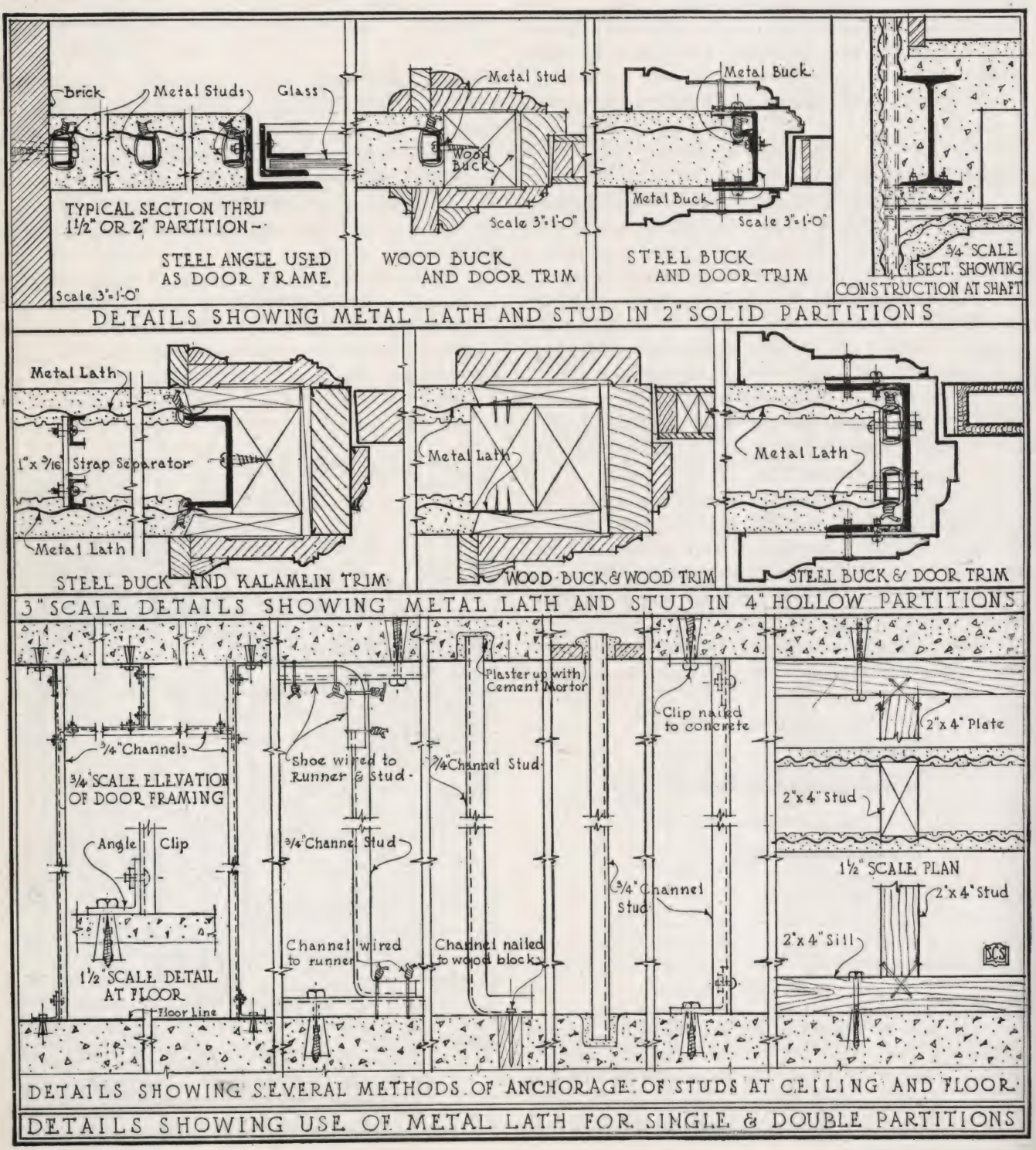
(1) Stucco should not be run down to the ground except when applied over a solid impervious base course. Wood frame should rest on a masonry foundation at least 12 in. above the finished grade.

(2) Window sills and other horizontal woodwork should be given the proper overhang and drip beyond the face of the stucco. To avoid concentration and scouring action of water at ends of sills they should be provided with stops.

(3) The design should be chosen to permit of a generous overhang of eaves and cornices.

(4) There should be no horizontal surfaces of stucco on which water can collect. Liberal and discriminating use of flashings should be made wherever water might get behind stucco—such as at roof and wall intersections, under joints of masonry trim, etc.

(5) Chimneys should be topped with projecting impervious caps having drip cut into underside to shed water beyond face of stucco. Chimneys should be wrapped with metal lath before stuccoing. Sheating should be eliminated and metal lath backplastered for economy and permanence of stucco. *See reports of the U. S. Bureau of Standards.*



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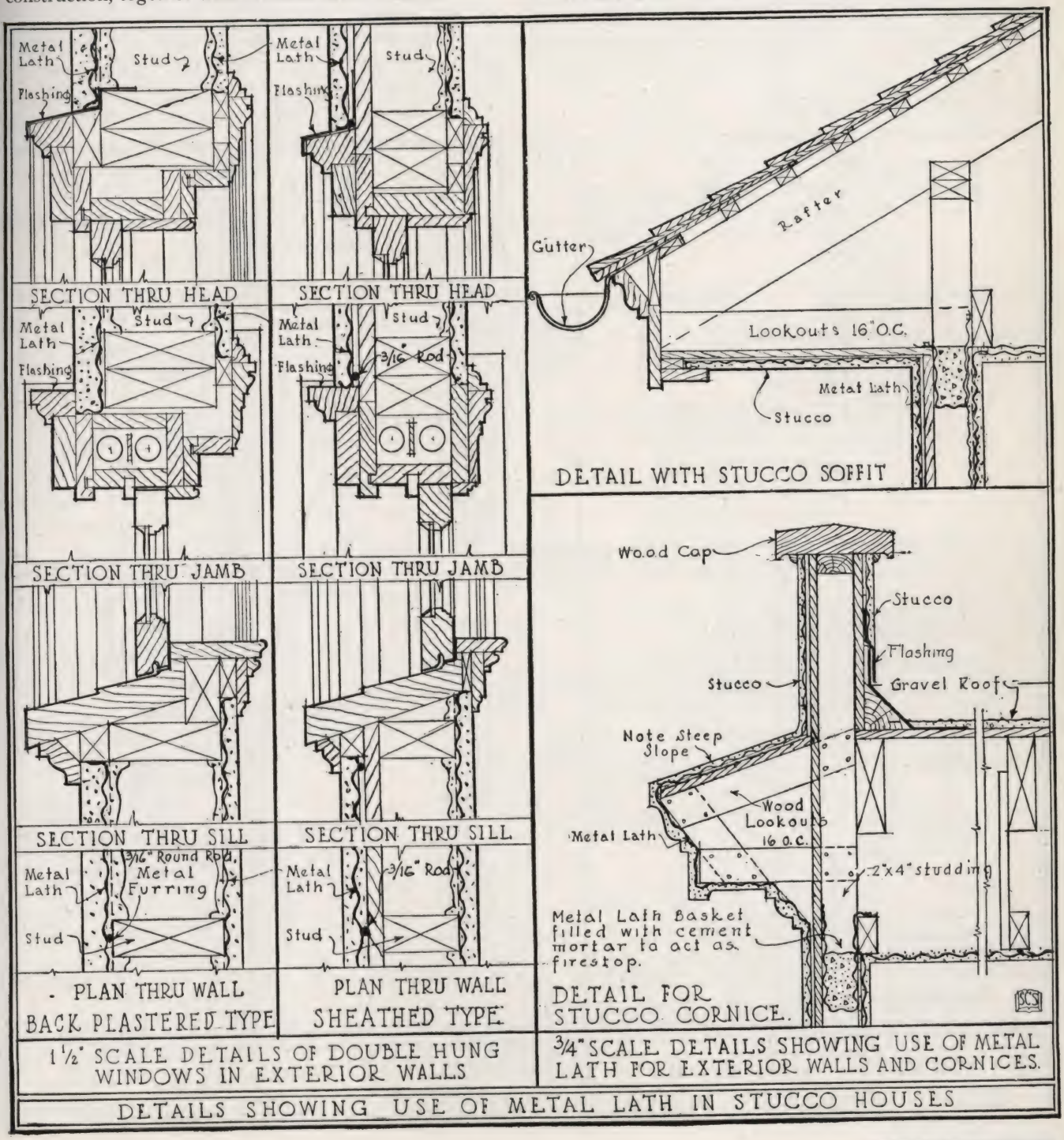
Types of Construction—Two types of construction with stucco on metal lath are in general use—*sheathed* and *backplastered*. Either is satisfactory and economical.

Backplastered construction, see second preceding page for details, is recommended. U. S. Bureau of Standards, after a severe weather test on 56 panels, using all stucco bases, gave the backplastered metal lath sample the only perfect rating where wood studs were used for supports. Investigation on ability to withstand distortion held at the Armour Institute of Technology further testifies to the strength of backplastered construction, as well as tests recently made in Omaha, that indicate a resistance to distortion that is six times that of ordinary lath construction, together with freedom from cracks.

In backplastered construction, pencil rods $\frac{3}{16}$ in. in diameter or ½-in. crimped furring are attached vertically to each stud and the lath nailed or stapled directly thereon, or self-furring lath is used. After the scratch coat, the keys are backplastered, the entire body of the lath being embedded in plaster, giving when complete, a reinforced concrete slab 1½ in. thick (see "e" on fourth preceding page, *also National Board of Fire Underwriters' Housing Code*).

Heat Insulation

The heat insulation of backplastered walls is better than many other common masonry walls. Common building paper so installed on inside face of studs as to

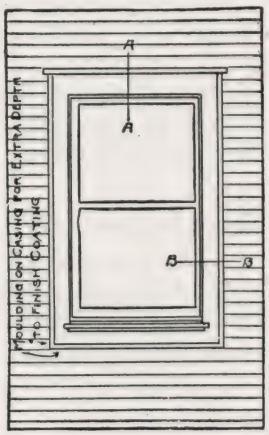


Continued on next page

allow 1 in. or less air space from back of interior plaster, provides least expensive efficient extra insulation. *Full report of tests made at Armour Institute of Technology may be had on application.*

Overcoating

Extensively used in remodeling old frame houses, each of which must be treated according to its physical condition. Effects a saving of 13.3% on the coal bill. Where furring is used the space back of lath must be entirely filled with plaster and provision must be made for extending old window and door frames for increased thickness of wall. If applied to clapboards or shingles in good condition, the method shown on the preceding page is satisfactory; if applied to flush siding, waterproof paper should be first applied, the surface furred with metal furrings, and proceed as for new work. If weatherboarding is in poor condition, it should be removed.

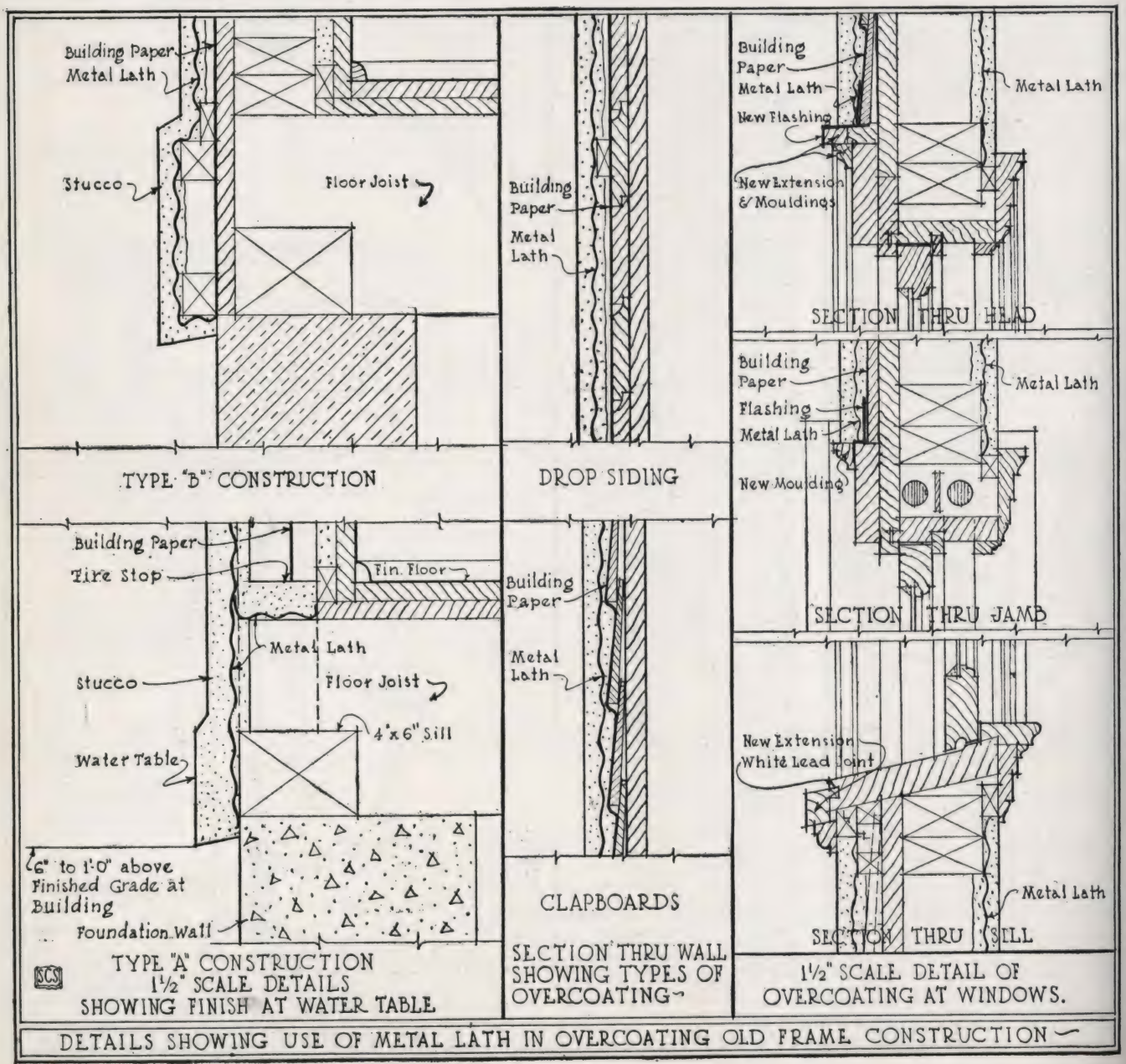


PREPARATION FOR OVERCOATING

Fire Tests

Metal lath and plaster constitute a most economical fire-resistive protection to any material over which they are applied. Both materials are of themselves incombustible, but the remarkable grip or key which the many small openings in the metal lath mesh afford the plaster or stucco is an essential part of the secret of their fire-resistive qualities. Exposed to a fire the metal lath holds the plaster covering in place long after it would have fallen off of other plaster bases and exposed them, and in turn the whole structure to the mercy of the flames.

In order to rate the fire-resistance afforded by metal



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lath and plaster protection for wood joisted floors and wood stud bearing partitions and exterior walls, severe fire tests have just recently been completed at the Underwriters' Laboratories of Chicago. While the final reports are not issued the results show that such construction *has passed the one-hour test.* This is greater protection than afforded by any other combination of interior finish for frame construction, and now gives to architects the positive assurance of the actual value of metal lath and plaster protection, and should overcome the slight handicap of extra expense.

Paint Weather Tests

Paint weather tests recently completed demonstrate the perfect coating that has been attained through operative study of the member companies. Out of hundreds of samples placed in the weather at Jacksonville, Pittsburgh, Boston and Chicago, readings after 3 months' exposure showed the recommended coating of the Association to be 98% perfect. Galvanized lath is not necessary for practical purposes.

Suspended Ceilings

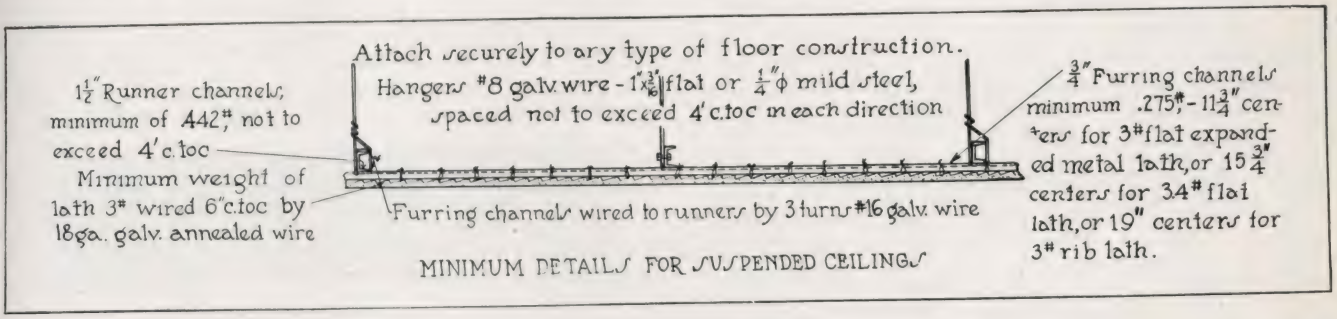
The report of the Committee of Members of the American Society of Civil Engineers upon the San Francisco Fire reads:

"It may be stated that one of the most obvious lessons taught by this fire is the protection to concrete floors and floor beams by the suspended ceiling of lath and plaster. In all cases where used it afforded complete protection. Where not used concrete was destroyed and beams distorted."

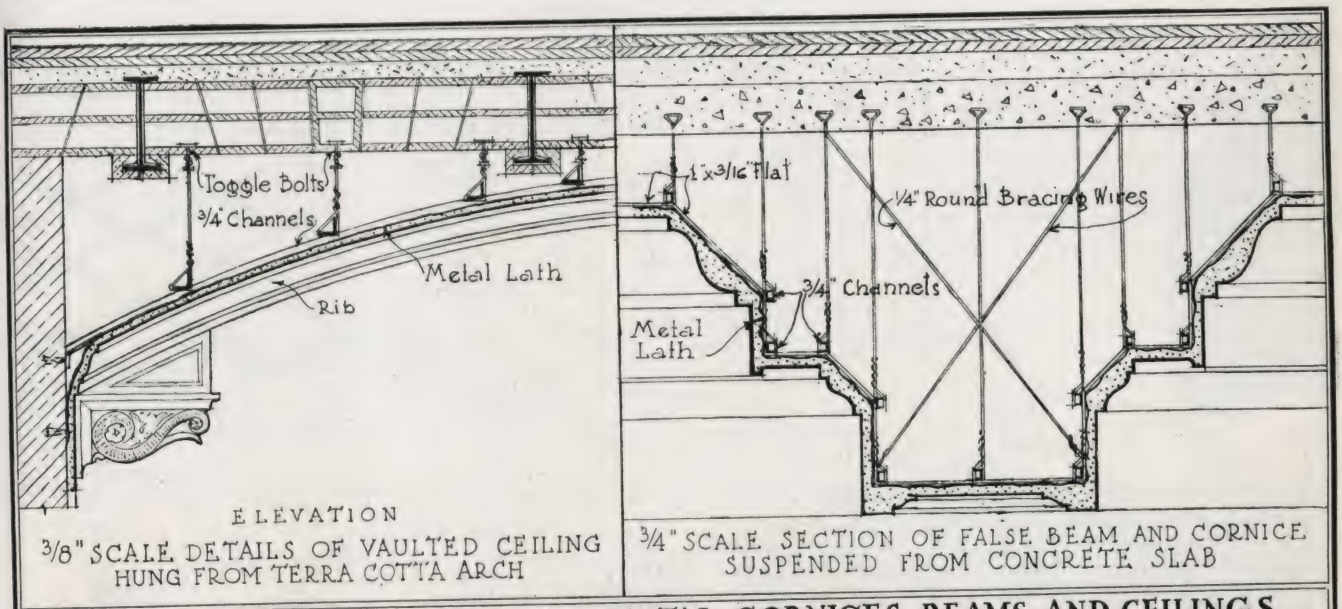
Many interiors of residences, theaters, schools and office buildings may be greatly improved architecturally by the use of plain or curved metal lath ceilings. A few dollars thus spent will add hundreds to appearance.

The minimum size of supporting members for suspended ceilings appears elsewhere on this page. At another place will be found construction details showing how ornamental cornices, beams and ceilings are built up and supported.

Many interiors of residences, theaters, schools and public buildings can be greatly improved architecturally by the use of plain or curved metal lath and plaster suspended ceilings. They add a richness and luxuriance not obtainable otherwise excepting at much greater expense. A few dollars thus spent will add hundreds in permanent value.



MINIMUM DETAILS FOR SUSPENDED CEILINGS



ELEVATION
3/8" SCALE. DETAILS OF VAULTED CEILING HUNG FROM TERRA COTTA ARCH

¾" SCALE. SECTION OF FALSE BEAM AND CORNICE SUSPENDED FROM CONCRETE SLAB

DETAILS OF FURRING FOR ORNAMENTAL CORNICES BEAMS AND CEILINGS

THE BERGER MANUFACTURING CO.

Metal Building Materials

CANTON, OHIO

BRANCHES

SOUTH BOSTON, MASS., 307-315 Dorchester Avenue
NEW YORK, N. Y., 514-524 West 25th Street
PHILADELPHIA, PA., 16th Street and Washington Avenue
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., Third and Russell Avenues
NORTH KANSAS CITY, MO., 14th and Charlotte Streets
MINNEAPOLIS, MINN., 1701-1729 Broadway N. E.
SAN FRANCISCO, CAL., 1120 Mission Street
LOS ANGELES, CAL., 405 East Second Street
DALLAS, TEX., Corinth and Pearl Streets
ROANOKE, VA., DOMINION METAL PRODUCTS CORP.
JACKSONVILLE, FLA., FLORIDA METAL PRODUCTS CO.

EXPORT DEPARTMENT: 514-524 West 25th Street, NEW YORK, N. Y.

Products

RIBPLEX METAL LATH; DIAMOND MESH EXPANDED METAL LATH; LATTICE SHEET LATH; CORNER BEADS; COLD ROLLED CHANNELS; METAL LUMBER JOISTS and STUDS.

Also, Floor Cores (pressed steel forms for concrete floor construction); Multiplex and Ferro-Lithic Reinforcing Plates.

For Metal Ceilings, see page 1036; for Steel Lockers, see page 2044.

BERLOY
TRADE-MARK

Berloy ⅜-in. Ribplex Metal Lath

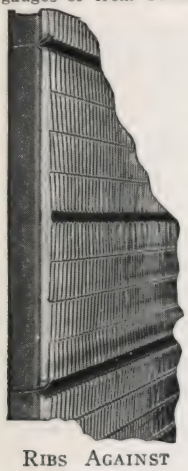
This is a ribbed expanded metal lath used principally for partition and ceiling plaster work, for exterior stucco and for overcoating old buildings.

The ⅜-in. ribs take the place of separate furring and permit wider spacing of supports (see table below). Ribs nest together at sides and ends to make a rigid splice and a uniform plastering surface. Effective covering width, 24 in. No waste of material in side laps. Finished work is strong, firm, uniform, permanent and satisfactory in every way.

BERLOY ⅜-IN. RIBPLEX METAL LATH

Gauge No.	Weight per sq. yd., lbs.	Size of sheets, in.	Sq. yds. per sheet	Sheets per bundle	Sq. yds. per bundle
28	2.55	24x96	1.78	9	16
26	3.06	24x96	1.78	9	16
24	4.08	24x96	1.78	9	16

Can be supplied in painted steel or cut from galvanized sheets in all gauges or from Toncan Metal in No. 26 or 24 gauges.

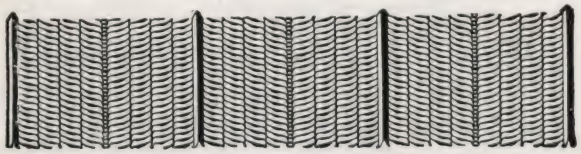


RIBS AGAINST SUPPORT

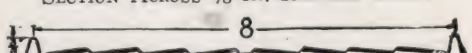
Erection Specifications—In all cases place ribs against, and the mesh away from, supports. Place ribs at right angles to supports. All adjoining sheets are to be interlocked at sides and ends.

Sheets shall be securely wired together with No. 18 gauge wire once between supports and not over 24 in. apart along ribs at sides and every 4 in. at ends. ⅜-in. Ribplex lath shall be securely wired to channels with No. 18 gauge wire or stapled to studs with 1¼-in. No. 14 gauge wire staples at least every 8 in.

When splices are necessary between supports, they shall be at least 2 ft. apart in adjacent rows. Allow 2-in. end lap when splices are at supports. If splices are between supports, allow 8 in. Spacing of supports for ⅜-in. Ribplex shall be according to following table, unless other conditions make closer spacing advisable:



SECTION ACROSS ⅜-IN. RIBPLEX SHEET



CROSS SECTION TO SHOW RELATION BETWEEN RIBS AND MESH

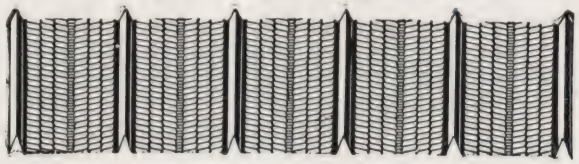
SPACING OF SUPPORT FOR RIBPLEX METAL LATH

Gauge No. of Ribplex	Stud spacing for walls and partitions, in.	Spacing of supports for ceilings, in.
28	23½ maximum	20 maximum
26	29½ maximum	23½ maximum
24	35½ maximum	29½ maximum

Berloy ¾-in. Ribplex

A combined reinforcement and centering for use in construction of concrete floors, roofs, walls, tanks, etc. Also a heavy weight self-furring expanded metal lath for use on extremely wide spacing of ceiling or siding supports and with ribs vertical for solid partitions without studs.

Covering width of ¾-in. Ribplex sheets, 24 in. Supplied in standard lengths, 4, 5, 6, 7, 8, 9, 10, 11 and 12 ft. (odd lengths without charge except waste). Made of open hearth steel in Nos. 28, 26 and 24 gauges, or of Toncan Metal in Nos. 26 and 24 gauges. Weights per 100 sq. ft. are as follows: No. 28 gauge, 50 lbs.; No. 26 gauge, 60 lbs.; No. 24 gauge, 75 lbs. Tables and complete construction details supplied on request.



SECTION ACROSS ¾-IN. RIBPLEX PLATE

CROSS SECTION TO SHOW RELATION BETWEEN RIBS AND MESH

Berloy Diamond Mesh Metal Lath

This is the ideal metal lath for all bent or formed work, also extensively used for all lath purposes. Made in two mesh sizes, "B. B." (Berloy Best) and "standard," the latter having a slightly larger mesh and lower weight per square yard than the former. Both are shipped in bundles of 9 sheets.

BERLOY DIAMOND MESH METAL LATH

Gauge No.	Weight per sq. yd., lbs.	Size of sheets, in.	Sq. yds. per sheet
	B. B. LATH		
27	2.33	24x96	1.78
26	2.50	24x96	1.78
25	3.00	24x96	1.78
24	3.40	24x96	1.78
	STANDARD MESH		
26	2.20	21x96	1.56
24	2.80	22x96	1.63

Both laths can be supplied in Painted Steel in all gauges and made of Toncan Metal in No. 26 gauge and heavier, or cut from galvanized sheets in Nos. 26 and 24 gauges.

Continued on next page

Berloy Sheet Lath

This lath is a perforated sheet; not expanded. Because of its great stiffness and plaster-clinching qualities, Berloy sheet lath is preferred by many architects for tile back-up and similar work. Weight per sq. yd., 4.50 lbs. Size of sheets, 18x36 in. Number of square yards per sheet, 1.33. Sheets per bundle, 9. Square yards per bundle, 12. Made only in painted steel.

BERLOY SHEET LATH

Berloy Corner Bead

Rail Bead—For extra hard service made of No. 22 gauge galvanized steel with one clip supplied for each foot. Stock lengths, 6, 8, 9, 10 and 12 ft., shipped in bundles of 25 pieces. Weight per thousand feet, 167 lbs., including clips.

Wing Bead—Easy to erect, gives perfect angle. Clips not necessary but can be supplied if desired. Stock lengths, 6, 8, 9, 10 and 12 ft. Made of No. 26 gauge galvanized steel. Shipped in bundles of 10 pieces. Weight per thousand feet, 165 lbs.

Berloy Cold Rolled Channels

For partitions, ceilings, furring and formed work. Made of No. 16 gauge steel in sizes ¾ to 2 in. with length of leg ⅜ and ½ in. Stock lengths, 12, 14, 16, 18 and 20 ft.

NEW STANDARD BERLOY METAL LUMBER JOISTS
(June 1, 1922)

Standard Joists				Depth in in.	Special Joists			
Wt. per ft. in lbs.	Flange width, in.	Web thickness, in.	Section modulus		Wt. per ft. in lbs.	Flange width, in.	Web thickness, in.	Section modulus
3.7	3	.144	1.3	4	6.1	3	.240	2.14
4.2	3	.144	1.75	5	6.9	3	.240	2.92
4.7	3	.144	2.3	6	7.8	3	.240	3.77
5.5	3½	.144	3.2	7	9.2	3½	.240	5.26
6.1	4	.144	4.2	8	10.5	4	.240	6.92
7.0	4	.150	5.3	9	11.4	4	.240	8.28
8.0	4½	.156	6.65	10	12.6	4½	.240	10.23
9.5	4½	.172	8.4	11	13.5	4½	.240	11.72
10.5	4½	.180	10.0	12	14.3	4½	.240	13.30

Bearings on brick walls, one-half the depth of the joists, but not less than 4 in.; on steel beams or shelf angles, not less than 2½ in.

STANDARD BERLOY METAL LUMBER PRESSED STEEL I JOISTS
Safe total loads in pounds per square foot of floor

Joists Spaced 24 In. Center to Center

Depth...		4	5	6	7	8	9	10	11	12
Weight..		3.7	4.2	4.7	5.5	6.1	7.0	8.0	9.5	10.5
Span in Feet	6	193	.....	.....	.....	.....	.....	.....	.....	.....
	8	108	146	192	.....	.....	.....	.....	.....	.....
	10	56	94	123	171	.....	.....	.....	.....	.....
	12	32	54	85	119	156	.....	.....	.....	.....
	14	.....	34	54	87	115	144	.....	.....	.....
	16	.....	.....	37	59	88	111	139	175	209
	18	.....	.....	.....	41	62	88	110	139	165
	20	.....	.....	.....	.....	45	64	89	112	134
	22	.....	.....	.....	.....	.....	48	67	93	110
	24	.....	.....	.....	.....	.....	.....	52	72	93
	26	.....	.....	.....	.....	.....	.....	41	57	74

Joists Spaced 16 In. Center to Center

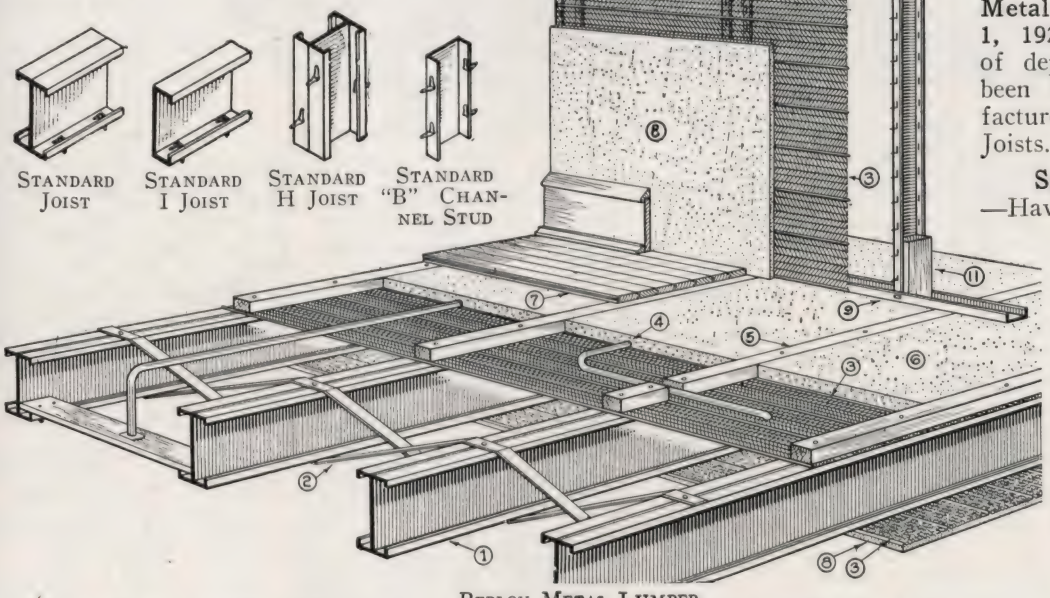
Span in Feet	6	289	.....	.....	.....	.....	.....	.....	.....	.....
	8	163	219	287	.....	.....	.....	.....	.....	.....
	10	84	140	184	256	.....	.....	.....	.....	.....
	12	48	82	128	178	234	.....	.....	.....	.....
	14	.....	51	81	130	172	216	.....	.....	.....
	16	.....	.....	54	88	131	166	208	262	313
	18	.....	.....	.....	62	93	131	164	208	247
	20	.....	.....	.....	.....	68	96	133	168	200
	22	.....	.....	.....	.....	.....	72	101	139	165
	24	.....	.....	.....	.....	.....	.....	77	108	139
	26	.....	.....	.....	.....	.....	.....	61	85	110

Note: Joist weights given above are per lineal foot.
Total dead weight of construction based on wood finished floors and plastered ceiling under, 40 lbs. per sq. ft.

Berloy Metal Lumber

Has a 15-year successful service record. Berloy joists combine simplicity and low cost of unit joist type of construction with solidity and fireproof qualities of heavier and more expensive fireproof systems.

Berloy pressed steel joists and studs are factory made and can be easily inspected. The best and most economical fireproof floor system for light occupancy buildings. Berloy Metal Lumber is easy to design and erect, and the architect is assured of safe construction with minimum inspection.



BERLOY METAL LUMBER

(1) Berloy metal lumber-I-joists
(2) Metal cross bridging
(3) ⅜-in. Berloy ribplex metal lath
(4) Electric conduits
(5) Wood nailing strips
(6) Concrete fill
(7) Finished wood floor
(8) Plaster
(9) Berloy-"B"-channel socket strip
(10) Berloy-"B"-channel studs
(11) Wood nailing block

New Standard Berloy Metal Lumber Joists (June 1, 1922)—These Standards of depth and strength have been adopted by all manufacturers of Pressed Steel Joists.

Special Berloy I-Joists—Have greater strength and are used principally for headers, trimmers, etc., and can be made in special shapes for these purposes.

Details as simple as for wood.

Berloy Building Materials Handbook

A 400-page book, full of good special and general information, gladly sent free to any architect requesting one on his business letterhead.

ESTABLISHED 1890

THE BOSTWICK STEEL LATH CO.

TELEPHONE
BELL 836, 837

NILES, OHIO

DISTRIBUTERS IN ALL CENTERS

EASTERN WAREHOUSE: PHILADELPHIA, PA., 2324-28 Callowhill Street—Telephones: Bell, Locust 0956; Keystone, R5566

Manufacturers of Lath According to the Standards of the Associated Metal Lath Manufacturers

Products

Manufacturers of BOSTWICK PRODUCTS under the "BOSTWICK" Trade-name: "Truss-Loop" Metal Lath; "Truss-V-Rib," light reenforcement; Expanded Metal Lath; "Diamond-A," "Lock," "Niles," "Trumbull"; Metal Ground Bead; Metal Corner Bead; Corrugated Metal Wall Tie; "Y" 3-Stress, 3-Way Metal Wall Tie; Metal Wall Plug; Channel Iron.

Bostwick
TRADE-MARK

Advantages of Metal Lath

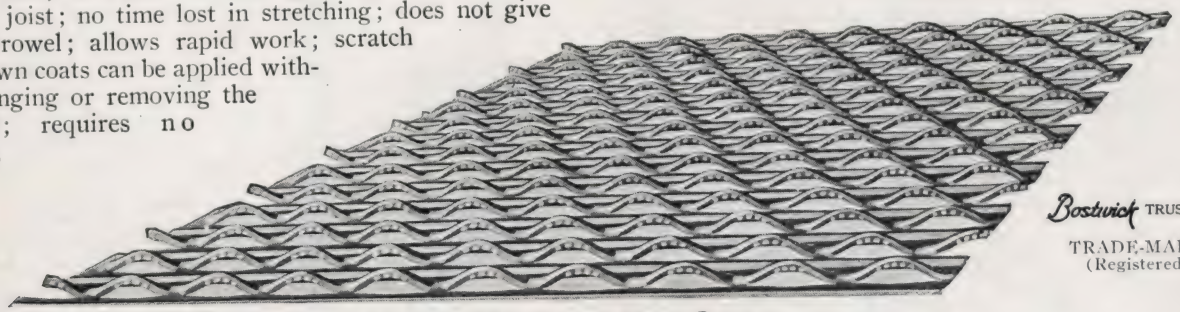
For general description of the advantages of metal lath construction, such as fire resistance, crack prevention, etc., see pages of Associated Metal Lath Manufacturers.

Bostwick "Truss-Loop" Metal Lath

A distinctive type.

Parallel corrugated ribs each side of a series of trussed arches (recognized as strongest form of support); metal expanded and contracted to forms of scientific structure and arrangement; each outside rib makes a nest for lapping, and gives double strength at every joint; openings spaced to give largest and most perfect plaster key. Weight 4½ lbs. per sq. yd.

Strength and rigidity and low cost of finished plaster surface; safely used on centers up to 24 in.; saves 11% in lath; no waste overlapping; nails direct to studding or joist; no time lost in stretching; does not give under trowel; allows rapid work; scratch and brown coats can be applied without changing or removing the scaffold; requires no furring.



Bostwick TRUSS-LOOP
TRADE-MARKS
(Registered)

BOSTWICK "TRUSS-LOOP" METAL LATH

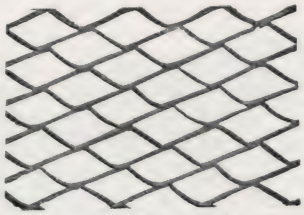
Note the metal trusses—652 in a square yard. They hold the plaster in a permanent grip

"TRUSS-LOOP" METAL LATH

Sizes, in.		For centers, in.	Sheets per bundle	Yards per bundle	Weight per sq. yd., lbs.
Width	Length				
13½	96	16 and 24	10	10	4½
24	96	16 and 12	9	16	4½
27	96	12, 16 and 24	10	20	4½

Bostwick "Lock" Lath

In places where a lighter weight material is desirable Bostwick "Lock" lath will meet requirements. Made from equally as good material as Bostwick's other types, and furnishing an excellent plaster key.



BOSTWICK "LOCK" LATH

"LOCK" LATH

Sizes, in.		Sheets per bundle	Yards per bundle	Weight per sq. yd., lbs.
Width	Length			
22	96	9	14⅔	2.80
21	96	9	14	2.20

Bostwick "Diamond-A" Expanded Metal Lath

Note the real diamond mesh. "Diagonal strands forming diamond shaped mesh provide ideal stress distribution."

The unusual angles of the strands make for increased strength; the result is a rigid plaster clinching fabric of greater weight and strength, the superiority of which has been fully demonstrated.

BOSTWICK "DIAMOND-A" EXPANDED METAL LATH

"DIAMOND-A" EXPANDED METAL LATH

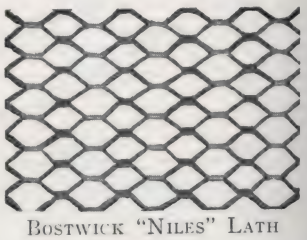
Sizes, in.		Sheets per bundle	Yards per bundle	Weight per sq. yd., lbs.
Width	Length			
14	96	10	10	4
14	96	10	10	2¾

Bostwick "Trumbull" Lath

A self-furring expanded lath, cut with wide strand. In galvanized, a popular base for stucco or exterior cement work.

Bostwick "Niles" Lath

A standard lath, conforming to weights shown in Metal Lath Hand Book. Of good plaster holding capacity, made in wide sheets favored by contractors. An eminently satisfactory material.



BOSTWICK "NILES" LATH

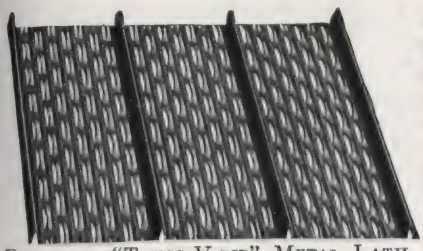
"NILES" LATH

Sizes, in.		Sheets per bundle	Yards per bundle	Weight per sq. yd., lbs.
Width	Length			
24	96	9	16	4.00
24	96	9	16	3.40
24	96	9	16	3.00
24	96	9	16	2.50
24	96	9	16	2.30

Bostwick "Truss-V-Rib" Metal Lath

Ideal material for light concrete work without forms or stiffening channels. Made from best open hearth

Continued on next page



BOSTWICK "TRUSS-V-RIB" METAL LATH

Rib, ¾ in. high; width between ribs, 7 in. Size of stock sheets, 21 in. wide by 4, 5, 6, 7, 8, 9 and 12 ft. long.

Area of sheet, 21x96 in.: 14 sq. ft. Weight of sheet, 21x96 in.: No. 24, 17.333 lbs.; No. 26, 13 lbs.; No. 28, 10.85 lbs. Packed 5 sheets to the bundle.

sheet. A ribbed material with every ounce of metal retained, shaped into "truss" formations for weight carrying capacity, forming openings for strongest and most efficient plaster bond; no narrow strands of metal to break from rib and weaken the fabric.

TABLE OF LIVE LOADS, FLOOR & ROOF SLABS

SECTION OF SLAB	DEPTH OF SLAB	WT. OF SLAB PER SQ. FT.	GAUGE OF METAL	SPAN IN FEET — SAFETY FACTOR 4								SPAN IN FEET — SAFETY FACTOR 2							
				2	3	4	5	6	7	8	9	10	2	3	4	5	6	7	8	9	10
	1½"	19	28	124	68	40							245	136	80	42					
			26	190	95	65	36						380	190	130	72	38				
			24	260	124	90	65						520	248	180	130	85				
	2"	25	28	270	142	98	67	38					540	282	196	144	76	40			
			26	296	160	110	72	48	22				580	320	220	134	96	44			
			24	398	190	135	90	64	37				790	380	270	180	125	70			
	2½"	31	28	291	235	178	102	72	45				580	470	355	200	140	90			
			26	350	272	205	134	91	61	30			700	540	410	265	180	120	60		
			24	462	310	261	167	122	82	51			920	620	520	330	240	160	100		
	3"	37	28	511	372	214	136	108	68	38			520	740	425	270	215	135	75		
			26		448	292	185	126	94	70	56			895	580	370	252	185	140	112	
			24		602	394	245	168	124	95	75			1200	785	490	335	245	190	150	
	3½"	43	28		426	260	166	115	84	63	48	26		850	520	332	230	165	125	95	50
			26		548	308	198	140	100	76	58	32		1095	635	395	280	200	150	115	60
			24			404	265	184	134	100	77	38			805	530	365	265	200	144	76

GAUGE	D=1"	D=1½"	D=2"	D=2½"	D=3"	D=3½"	D=4"	D=4½"	D=5"
28	3'-6"	3'-0"	2'-8"	2'-4"	2'-1"	1'-10"			
26	4'-1"	3'-6"	3'-1"	2'-9"	2'-5"	2'-2"	1'-11"	1'-8"	
24	4'-8"	4'-1"	3'-7"	3'-4"	2'-11"	2'-7"	2'-0"	1'-10"	1'-8"

Bostwick Corrugated Metal Wall Tie

Made from heavy galvanized sheets, with deep corrugations, giving maximum bonding power. Regular size, 7 in. long by ⅞ in. wide. Any reasonable size made to order. Packed 1000 to box. Weight: No. 1, 40 lbs.; No. 2, 30 lbs. All ties punched for veneer work.

BOSTWICK CORRUGATED WALL TIE

Bostwick "Y" 3-Stress, 3-Way Wall Tie

A new departure. Stress and strain of wall led three ways. Change of position in wet mortar will not affect holding power. Ties every brick with usual number of ties, or usual number of brick with half the number of ties.

BOSTWICK "Y" 3-STRESS, 3-WAY WALL TIE

Packed 1000 per box; weight 65 lbs.

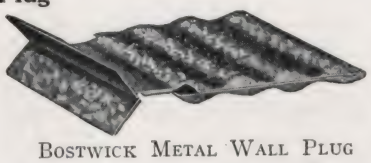
Heavy galvanized stock with deep corrugations at various angles. All ties punched for veneer work.

"Y" 3-STRESS, 3-WAY WALL TIE

For	Length, in.	Width, in.	Spread, in.	Shipping weight per 1000 lbs.
Regular wall	7	1	2 ¾	65
Concrete wall	10	1	2 ¾	105

Bostwick Metal Wall Plug

Made from heavy galvanized stock. For fastening interior trim instead of nailing into mortar joints (which gives a temporary and unsatisfactory hold),



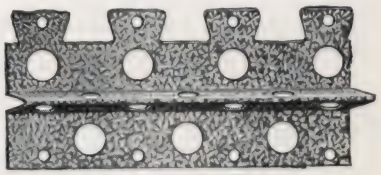
BOSTWICK METAL WALL PLUG

Length, 2⅞ in.; width, 2¼ in. Packed 500 per carton. Shipping weight, 50 lbs.

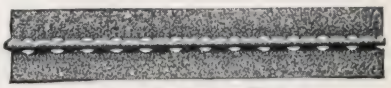
or wooden blocks which shrink and loosen from wall.

Bostwick Metal Ground Bead or Base Section

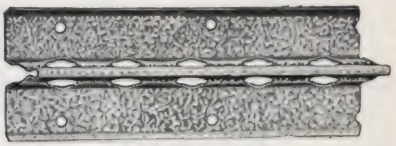
Where composition floors are used, Bostwick metal ground bead prevents plaster running to a thin edge easily chipped and broken, insures a uniform thickness both of plaster and flooring compound to dividing line and protects from damage at the vulnerable point. Openings for plaster and compound bond alternate on upper and under sides of bead, preventing the mixing of composition flooring with plaster and consequent discoloration, thus insuring a rigid clinch for both. Made from heavy galvanized stock.



Type A, ½ In. High



Type B, ¾ In. High



Type C, 1 In. High

BOSTWICK METAL GROUND BEAD OR BASE SECTION

Standard lengths, 5, 6, 7, 8, 9 and 10 ft. Shipping weight, 250 lbs. per 1000 ft. Inside and outside corners supplied according to requirements

Type A is especially efficient for heavy service on uneven grounds — the extra plaster keys in the flange increase the holding power and the gymped edge gives a solid nail hold in any surface depressions without changing the line of the bead.

Type C gives the same semiflat surface to the face of the bead as is found in corner beads and the slightly turned edge of the flange checks the downward trend of the plaster while wet and adds to the holding power.

Bostwick Metal Corner Beads

"Standard"—Supporting leaves are adjustable and of extra length, and bead can consequently be satisfactorily applied to any depth of ground; they fit every angle of the bead; reinforcing to double strength every 12 in. they are used, and distributing the shock over the largest possible area, preventing chipped and bruised corners. Plaster so covers and keys into bead that it becomes an integral part of wall or partition.

Standard lengths, 5 ft., 6 ft., 7 ft., 8 ft., 9 ft., 10 ft. Length of clip, 3 in. Standard package, 1000 lin. ft. Shipping weight, 250 lbs.

BOSTWICK STANDARD METAL CORNER BEAD

"Truss-Wing" — A lighter weight bead with a trussed shoulder giving an unusual depth of grounds for plaster key.

"Rail"—A miniature railroad rail, making a solid plaster corner with a steel reinforcement. No. 22 gauge; galvanized.

Handbooks

The Bostwick Catalogue, containing complete information of the full line, conforms to size for advertising matter as adopted by A. I. A. Following booklets also furnished: "After the Fire," "Beautiful Permanent Walls," "Princeton," "Wall and Ceiling Handbook"; and Handbook of the Associated Metal Lath Manufacturers.

THE GENERAL FIREPROOFING COMPANY

Expanded Metal Lath, Expanded Metal Reinforcement, Steel Tile for Floor Construction, and Steel Lumber

YOUNGSTOWN, OHIO

BRANCH OFFICES

CHICAGO, 325 W. Madison Street
NEW YORK, 257-63 E. 133rd Street
BOSTON, 125 Federal Street
BUFFALO, Ellicott Square Building
BALTIMORE, 15 E. Fayette Street
ATLANTA, 257-63 Decatur Street
PHILADELPHIA, 614 Bulletin Building
CLEVELAND, Builders' Exchange
KANSAS CITY, 1009 Waldheim Building
OMAHA, 213 Kennedy Building
SYRACUSE, 707 Keith Theater Building
MINNEAPOLIS, 754 Builders' Exchange
MILWAUKEE, 1018 First Wisconsin National Bank Building
SAN FRANCISCO, 20 Beale Street
LOS ANGELES, 618 Washington Building

EXPORT DEPARTMENT: 438 Broadway, NEW YORK

Products

"Herringbone" Rigid Metal Lath, Painted, Galvanized or Armco Ingot Iron.

"Key" Expanded Metal Lath.

Cold Rolled Channels, used as Studding for Metal Lath Partitions and as Furring for Suspended Ceilings, Cornices, False Beams and Ornamental Plaster Work.

Corner Bead, for supporting and protecting exposed plaster corners.

"Self-Sentering," an Expanded Metal Reinforcement for Concrete, acting as both Form and Reinforcement or as Lath and Stud.

Diamond Rib Lath, a rib reinforced lath used for Plastering, Suspended Ceilings, etc.

Expanded Metal Angles.

"Trussit," a patented Reinforcement for Curtain Walls and Partitions without studding.

Expanded Metal, the general purpose Reinforcement for Concrete Work.

Steel Lumber, used similarly to wood joists and studs in Fire Resistive Floor and Partition Construction.

"Peds," patented Spot Grounds for attaching wood and metal trim to walls, and screeds to concrete floors.

Steel-Tile and End-Tile—Steel Forms for joisted Concrete Floor Slabs.

For Waterproofings, Dampproofings and Technical Paints, see pages 92-93.

GF YOUNGSTOWN, OHIO.

TRADE-MARK
Reg. U. S. Pat. Office

Handbooks

GF publications cover construction data concerning our products completely and include standard specifications.

The "Herringbone" Catalogue contains full information on "Herringbone" metal lath with construction details and specifications.

The "Fireproofing" Handbook treats fully the uses of "Self-Sentering," "Trussit" and expanded metal.

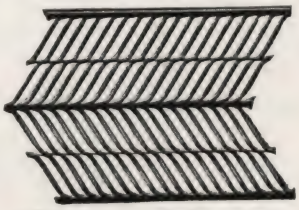
The "Steel-Tile" Handbook includes drawings, formulas, tables and computations for the concrete designer.

The "Steel Lumber" Handbook gives data on fire resistive floor and partition construction using GF Steel Lumber.

Specific information on any of these products, together with advice and estimates on particular applications, can be obtained from our Engineering Service Department.

"Herringbone" Expanded Metal Lath

"Herringbone" metal lath, universally used because of its stiffness, is, on account of its heavy, longitudinal ribs, the most rigid metal lath made. Its use permits the widest stud or joist spacing.

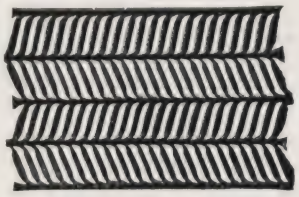


"Herringbone" Expanded Metal Lath, Style BB

"Herringbone" offers a firm surface, over which it is easy to lay a level coating of plaster. It will not buckle or sag between supports, which means a saving of plaster and labor. The interlocking edges eliminate waste from lapping and materially reduce the cost of lacing the sheets together.

The mortar curls around the flattened cross strands and the main ribs, forming a perfect key and embedding the metal lath therein.

"Herringbone" metal lath is carefully painted to protect it until the plaster is applied. It is always furnished painted, unless ordered galvanized. Suitable for all interior plastering and exterior stucco work.

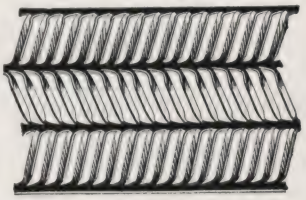


"Herringbone" Expanded Metal Lath, Style A

Where unusually severe conditions prevail, "Herringbone" can be furnished galvanized or made from "Armco" ingot iron.

The "Herringbone" Catalogue, containing standard lathing, plastering and cement stucco specifications, mailed on request.

For complete specifications for the use of "Herringbone" metal lath, send for the "Herringbone" Handbook.



"Herringbone" Expanded Metal Lath, Style AAA

HERRINGBONE EXPANDED METAL LATH, APPROXIMATE WEIGHT PER SQUARE YARD

Gage No., U. S. Standard	Weight, painted, lbs.	Weight, galvanized, lbs.
Style BB, Standard Lath for Cement Siding Construction and Fireproof Partition		
27	2.25	2.82
26	2.50	Not made
24	3.37	3.91
22	4.21	Not made
Sheets 20¼x96 in., 1½ sq. yds. Size of mesh, ⅞x1¼ in. Packed 15 sheets (22½ sq. yds.) to the bundle.		
Style A, Standard Lath		
28	3.00	3.75
Sheets 13½x96 in., 1 sq. yd. Size of mesh, ⅞x1 in. Packed 20 sheets (20 sq. yds.) to the bundle.		
Style AAA, the "General Purpose" Lath		
27	2.53	3.17
26	2.81	Not made
24	3.79	4.39
*22	4.74	Not made

Sheets 18x96 in., 1⅓ sq. yds. Size of mesh, ⅞x1¼ in.
Packed 15 sheets (20 sq. yds.) to the bundle.
*Furnished from mill shipment only.
Note—All styles furnished painted, galvanized or made from rust resisting "Armco" iron.

Continued on next page

GF Cold Rolled Channel Studding and Furring

Rolled from No. 16 gage steel, with square corners and true right angle sides. GF channels are light, stiff and straight; therefore, easily erected.

GF cold rolled channels are used for studding in solid or hollow partitions, for furring on flat or suspended ceilings, false beams and columns, cornice work, and on masonry.

Plain channels furnished in widths of ¾, 1, 1½ and 2 in., and lengths of 12, 14, 16, 18 and 20 ft.

Perforated channels (punched for wiring metal lath) furnished in widths 1½ and 2 in., same lengths as plain channels.

Both styles stocked in large quantities.

GF Corner Bead

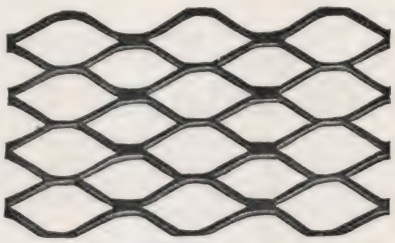
A heavy galvanized bead, rigid enough to make erection easy and so designed that the plaster coat is carried tight up to the nose and held firmly in place. GF corner bead insures a straight, solid corner.

Made with or without clip. No. 26 gage. Stock lengths of 6, 7, 8, 9 and 10 ft.

"Key" Expanded Metal Lath

"Key" Expanded Metal Lath is extensively used in all locations and is especially suitable for curved surfaces because of its uniform pliability.

"Key" lath is easy to handle and erect. The small mesh insures its complete envelopment in plaster, with the use of a minimum amount of material. The large sheets reduce the number of laps and save both labor and material.



"Key" Expanded Metal Lath

Approximate Weight Per Square Yard

Gage No., U.S. Standard	Weight, painted, lbs.	Weight, galv., lbs.
27	2.30	2.73
26	2.50	2.94
25	3.05	3.32
24	3.40	3.74
*22	4.00	Not made

Sheets 24x96 in., packed 15 sheets to a bundle, 26⅔ sq. yds.

Can also be furnished of rust resisting "Armco" iron.

*Furnished from mill shipment only.

"Self-Sentering"

"Self-Sentering" is a combined reinforcement and centering used extensively for concrete floor and roof construction. It is also used for solid and hollow walls, light partitions, etc., making possible a light weight, thin slab, built without expensive formwork, and equal to cast reinforced concrete in fire protection.

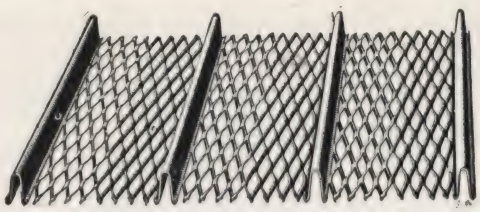
Roofs of any design and pitch can be built with "Self-Sentering" without solid forms.

"Self-Sentering" is an expanded metal sheet, stiffened by heavy ribs $\frac{11}{16}$ in. high, and spaced 3⅝ in. apart. The ribs carry the weight of the concrete until set; the diamond mesh forms a perfect bond for the concrete.

Sheets are 29 in. wide and are furnished in lengths from 4 to 12 ft., in variation of 1 ft. Long sheets permit rapid erection and minimum laps. The side ribs nest snugly.

"Self-Sentering" Floor Designs

"Self-Sentering" Floor, Type No. 1—"Self-Sentering" is attached direct to steel beams by clips; concrete is applied to the desired thickness and the underside plastered with cement mortar. Sides of beam boxes are wired together, to save bracing across the span. To permit pouring the beam covering at the same time, punch out the mesh between the "Self-Sentering" ribs where they come over the beam.

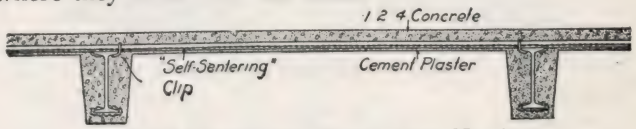


"Self-Sentering"
Patented March 3, 1914

Stock Gages and Weights Per Square Foot

Gage No., U.S. Standard	Weight, painted, lbs.	Weight, galvanized, lbs.	Section area per foot width, sq. in.
28	.58	.73	.173
26	.70	.83	.208
24	.93	Not made	.277

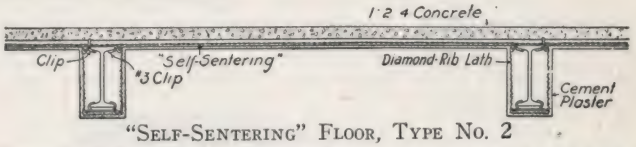
Other gages furnished on special order.
Galvanized "Self-Sentering" furnished on special orders only.



"Self-Sentering" Floor, Type No. 1

"Self-Sentering" Floor, Type No. 2—This type is the same as No. 1, except that beams are fireproofed with metal lath and plastered.

This can be done at the same time the underside of the slab is plastered.



"Self-Sentering" Floor, Type No. 2

SAFE UNIFORMLY DISTRIBUTED LIVE LOADS, LBS. PER SQUARE FOOT ON "SELF-SENTERING" SLABS

Assumptions:
Stress in steel, 16,000 lbs. per sq. in.
Ratio between the moduli of elasticity, 15.
Center of gravity, .19 in. above bottom of slab.
R. M. = resisting moments per foot width in inch-pounds; f c = maximum extreme fiber stress in concrete.

Bending moment $= \frac{W L}{10}$

Gage "Self-Sentering"	Thickness of slab above mesh, in.	R. M.	f c	Safe uniformly distributed live loads per sq. ft. for spans indicated					
				3 ft.	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.
28	2	4,360	660	310	164	98	61	...	...
26	2	5,190	760	359	192	128	92	49	...
24	2	6,210	800	476	258	166	110	64	30
28	2½	5,625	560	419	233	150	93	57	...
26	2½	6,710	650	484	279	186	118	76	50
24	2½	8,720	680	...	377	254	165	111	76
28	3	6,920	500	561	311	184	114	73	45
26	3	8,240	560	...	386	231	147	97	64
24	3	10,820	660	...	512	322	210	143	100
28	3½	8,250	460	...	368	218	135	80	50
26	3½	9,800	500	....	455	274	174	115	76
24	3½	12,750	610	...	...	375	245	166	116
28	4	9,500	425	...	439	261	164	105	68
26	4	11,300	460	...	533	320	206	136	91
24	4	14,800	560	...	...	436	286	196	137

Tables for other spans, also tables and complete data for all types of "Self-Sentering" floors and roofs, are given in the "Fireproofing Handbook." A copy of the latest edition available on request.

Diamond Rib Lath

A rib reinforced lath stiffened by U-shaped ribs approximately ⅜ in. high, 4.8 in. on centers, with diamond mesh between the ribs.

Diamond Rib Lath is primarily a plaster base for walls or suspended ceilings, permitting, through its exceptional rigidity, a wider spacing of supports.

Manufactured in Nos. 24, 26 and 28 gage. All sheets 24 in. wide, and 8 ft. long. (Special lengths involving 5 tons or more furnished on mill order.)

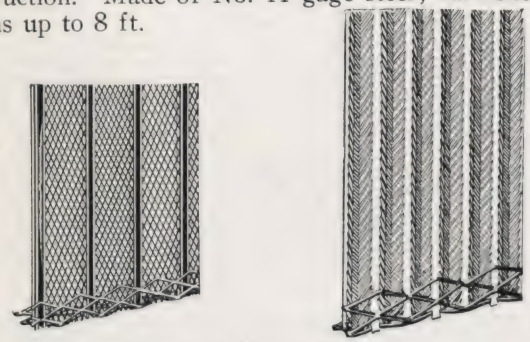
Continued on next page

Weights of Diamond Rib Lath are as follows:

No. 28 gage.....3.0 lbs. per sq. yd.
No. 26 gage.....3.6 lbs. per sq. yd.
No. 24 gage.....4.8 lbs. per sq. yd.

Expanded Metal Angles

For attaching "Trussit" or "Self-Sentering" to floor and ceiling in studless partition and curtain wall construction. Made of No. 11 gage steel; furnished in lengths up to 8 ft.



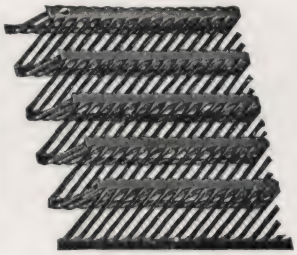
EXPANDED METAL ANGLES

"Trussit"

"Trussit" is an expanded steel reinforcement specially designed for solid plastered fireproof walls and partitions; also, for hollow walls, curtain walls, elevator enclosures, small individual structures, or office partitions in large buildings where fireproof, soundproof partitions are required.

"Trussit" eliminates the usual studding, a few temporary braces being required only till the first plaster coat has set. Sheets are attached to floor and ceiling with expanded metal angles or by other methods that insure a firm support.

"Trussit" is uniformly expanded in both directions. This makes it possible to plaster both sides exactly alike and, when the wall is finished, steel and concrete are so uniformly distributed that cracking from expansion or contraction is prevented.



"TRUSSIT" (Patented)

Stocked in gages Nos. 27, 26 and 24 and sheets 8, 10 and 12 ft. long; sheets uniformly 19 in. wide. Furnished painted, galvanized or "Armco" ingot iron.

Expanded Metal Reinforcement

Expanded metal, made by expanding sheets of steel into a diamond shape mesh, has greater reinforcing strength, pound for pound, than any other material. It is cut and expanded to the sizes required for particular classes or sizes of work.

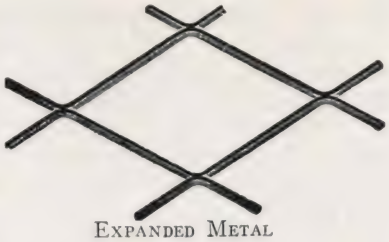
DATA, EXPANDED METAL

Style	Size mesh, short way of diamond, in.	Nominal gage of metal	Net section area per foot width, sq. in.	Approx. weight per sq. ft., lbs.	Standard size sheets	
					Lengths long way of diamond	Widths short way of diamond
1½–12–194	1½	12	.194	.66	6′, 8′	3′, 4′, 6′
½–18–220	½	18	.220	.75	6′, 8′	4′
3 –10–353	3	10	.353	1.20	6′, 8′, 9′ and 10′8″	3′, 4′, 6′
3 –10–265	3	10	.265	.90	6′, 8′, 9′ and 10′8″	4′, 5′4″
3 –10–176	3	10	.176	.60	6′, 8′, 9 and 10′8″	3′, 4′, 5′, 6′
3 –12–150	3	12	.150	.51	6′, 8′, 9′ and 10′8″	4′, 5′
3 –16–082	3	16	.082	.278	6′, 8′ and 10′8″	3′, 4′, 5′ 6′
¾–12–246	¾	12	.246	.84	6′, 8′	4′ 4″, 6′ 6′

A full line of expanded metal carried in stock at all times.

The larger meshes are used for reinforcing concrete in the construction of floors, roofs, sidewalks over basements, bridge decks, retaining walls, sewers, conduits, tanks, reservoirs, etc.

Smaller meshes are used in lighter cement work and for railings, window guards, elevator and tool room enclosures.



EXPANDED METAL

"Peds"

"Peds" are patented spot grounds for attaching wood or metal trim to walls, and screeds to concrete floors. They avoid the dangerous practice of embedding wood strips in masonry.

Wall "Peds" adhere permanently to metal lath, brick, concrete, gypsum block or hollow tile surfaces. They are set with ordinary gypsum wall plaster, which keys through the holes in the metal rim, and are firmly held in place by the finished plaster. "Peds" are easily and economically applied and give a better nailing base for wall trim at a much lower grounding cost.

Floor "Peds" are set in cement mortar beds in rows 16 in. on centers and 18 to 24 in. apart. Screeds are then nailed to the "Peds," providing a firm base for the floor.

"Peds" will not shrink, come loose, or split when nails are driven in.

Steel-Tile and End-Tile

GF Steel-Tile are light weight steel forms for joisted concrete floor slabs, designed on the well-known T-beam principle—deep reinforced joists and thin connecting slabs of concrete.

GF STEEL-TILE

Steel-Tile secures the substantial reduction in dead weight. Useless concrete is eliminated, reducing the dead load on girders, columns, foundations and footings, and permitting a lighter construction throughout, without sacrificing strength.

PROPERTIES OF STEEL-TILE FLOORS

Width of joists, in.	Center to center of joists, in.	2 in. of Concrete Above					
		Size Steel-Tile.....	6 in.	8 in.	10 in.	12 in.	14 in.
4	24	Average weight per sq. ft., lbs...	40.1	46.0	53.5	61.0	72.6
		Cu. ft. of concrete per sq. ft. of floor	.278	.319	.371	.423	.505
		Core area, per cent of section.....	58.3	61.7	63.0	63.8	62.2
5	25	Average weight per sq. ft., lbs...	42.3	49.4	57.1	65.3	78.4
		Cu. ft. of concrete per sq. ft. of floor	.293	.342	.396	.452	.537
		Core area, per cent of section.....	55.9	59.2	60.3	61.2	59.7

Send for GF Steel-Tile Handbook.

GF Steel-Tile make the old, expensive solid form work unnecessary. Centering along the line of joists, which are 25 in. apart, is sufficient. Flanges are flat and fit snugly against forms, preventing any leakage of concrete.

Steel-Tile are adapted to schools, hotels, office buildings, department stores, apartments, warehouses, lofts, etc. Wherever long spans are required GF Steel-Tile construction will be found most economical.

Flat ceilings are easily constructed under Steel-Tile

Continued on next page

floors. Suspended ceilings are supported from hangers which are placed in joists before pouring concrete.

GF Steel-Tile with End-Tile to match are made of corrugated steel in sizes of 4, 6, 8, 10, 12 and 14 in., also 10, 12 and 14 in. in tapered tile and tapered ends. Steel-Tile are furnished in lengths of 30 and 35 in. Width at bottom, 20 in., exclusive of flange. Shipped nested.

GF End-tile

GF Steel Lumber

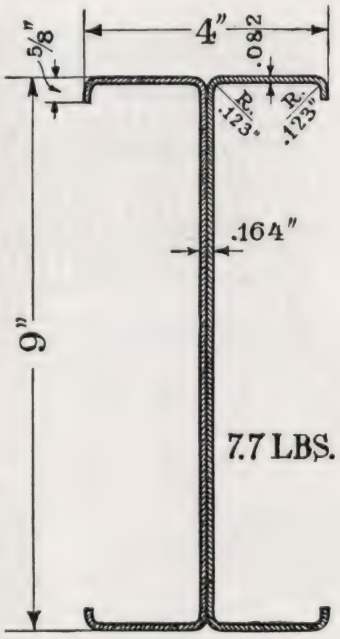
Description—GF Steel Lumber gives economical light weight construction that is permanent, durable, fireproof and soundproof. It provides a construction which eliminates combustible material entirely, with the minimum dead weight on beams and columns, and is a safe, dependable type of construction for erection in all seasons.

Steel Lumber is cut and fabricated ready for use when it arrives on the job and is handled and placed similar to wood joists or studs.

GF Steel Lumber joist sections are made of two absolutely uniform strips, of special steel, formed cold into channel sections and spot-welded together, a process insuring absolute uniformity of size and strength of the finished member. All lengths continuous, no splices.

All GF Steel Lumber is given one coat of oil before fabrication, and after fabrication all sections are dipped in a special graphite paint before shipping to destination.

GF Steel Lumber floor construction consists of pressed steel joists parallel to each other on supporting beams or walls, and secured in position by 1-in. strips of No. 20 gage steel cross bracing, approximately 6 ft. on centers.

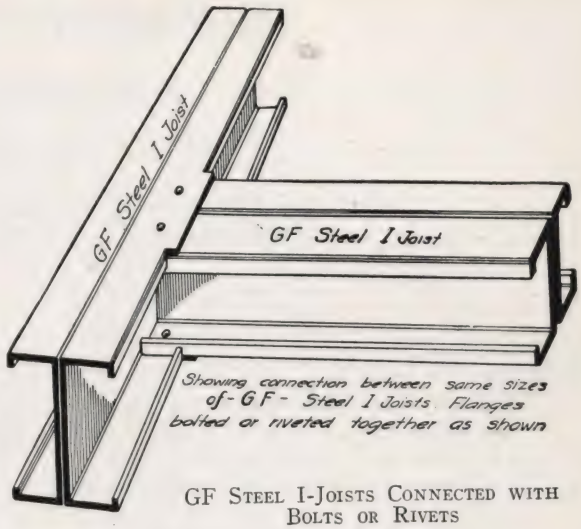


9-in., 7.7 Lb. GF I-Joist

GF Steel Lumber is furnished in 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11- and 12-in. floor joist and 4-in. channels and I's for studding.

Specifications—*Metal Lath*—Over joists a layer of Herringbone metal lath or Diamond Rib lath is to be placed to support and reinforce the concrete slab, in which wooden floor screeds are embedded. (If cement finish or tile floor is desired, screeds to be omitted; in which case a richer mix of concrete shall be used for top slab.) Herringbone lath or Diamond Rib Lath on top of joist to be attached by driving large head 6d roofing nails through lath directly into joint between the sections of joist or by special clips.

For wood floor finish, screeds or nailing strips, approximately 1¾ by 1¾ in., to be set directly on top of metal lath and along the center line of the joist and attached to joist with 12d nails at frequent intervals. Floor filling to be placed between screeds, lightly tamped or pressed in place and neatly



GF Steel I-Joists Connected with Bolts or Rivets

levelled off flush with their surface. Wood finish floor is then nailed directly to screeds.

Metal lath under joists to be Herringbone rigid metal lath or Diamond Rib lath of sufficient weight to support ¾ to 1 in. of plaster ceiling and retain its true position when the ground coat is applied. All metal lath to be given a dip coat of good paint by the manufacturer.

Metal lath for floor and ceiling to be lapped at ends and interlocked at sides. All laps at ends of sheets to come at steel joists. Ceiling lath under joists to be secured by special clips.

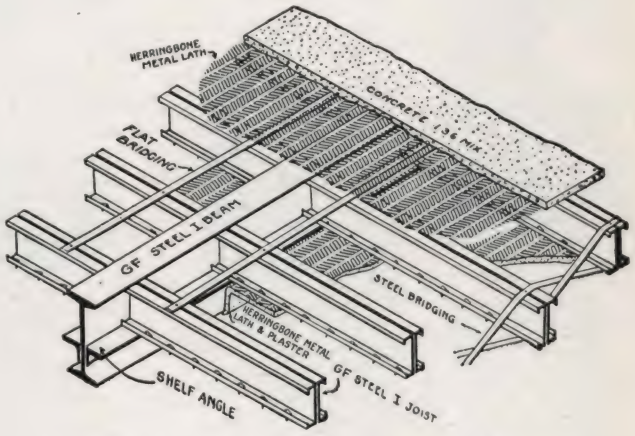
Floor Filling—Floor lath to be covered with floor filling as specified, if a wood top floor is used. If cement finished floor is desired, use 1-2-4 concrete for top slab with cement finish.

Spacing—In no case shall joists in floor construction, or any studs in bearing partition construction, be spaced more than 23½ in. center to center. In roof construction, where metal lath and a concrete slab are used above the steel joists, joists shall not be spaced more than 30 in. center to center. Where steel joists are used to support cement tile on flat roofs, spacing of joists may be increased to meet tile requirements, provided joists are tied together at intervals not exceeding 6 ft. on centers by ½-in. round steel tie rods securely fastened through joists at each end of rods. Punching of holes for rod connections to be along center of web.

APPROXIMATE WEIGHT OF GF STEEL LUMBER FLOORS

	Weight per sq. ft., lbs.
Wood flooring	3
1¾-in. concrete	21
GF steel joists (average)	3
Plaster ceiling	7
Total	34

Above is based on a wood floor finish. For other types of finish make proper correction. Total dead weight will not exceed 40 lbs. per sq. ft. for any standard design of steel joist construction.



GF Steel Lumber and Metal Lath in Practical Application

MILWAUKEE CORRUGATING CO.

Metal Building Specialties

MILWAUKEE, WIS.

BRANCH OFFICE AND FACTORY AT KANSAS CITY, MO.
SALES OFFICE, 929-30 Lumber Exchange, MINNEAPOLIS, MINN.

Products

NETMESH EXPANDED DIAMOND METAL LATH.
STAY-RIB METAL LATH.
EXPANSION CORNER BEADS.
EXPANSION DOOR and WINDOW CASINGS.
PATENT CASING LOCK or CLIP.
EXPANSION PLASTERING SCREED.
EXPANSION FLASHING.

Also, Superior, Neverbreak, Milcor and Bullnose Corner Beads; Milcor Pressed Steel Channels; Milcor Base Screeds; Milcor Picture Moulds.

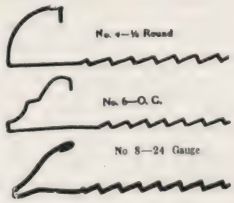
NETMESH EXPANDED DIAMOND METAL LATH

Furnished in Nos. 27, 26, 25, and 24-gauge metal, painted or galvanized after cutting. Also furnished with ⅝-in. corrugation, if desired

EXPANSION DOOR AND WINDOW CASINGS

An entirely new feature is embodied in Expansion Casings, namely, the expanded metal wings or webs.

Made of Tight-coat galvanized open hearth steel in 6-ft., 7 ft. 6-in., 8-, 9-, 10- and 12-ft. lengths. Also furnished in 16-oz. cold rolled copper, if desired



PROFILES OF EXPANSION DOOR AND WINDOW CASINGS

ONE-PIECE MITRE

For No. 6 O.G. Casing only

Designed to slip inside of casing, and is therefore hidden from view. Holds casing in place in event of shrinkage of wood, or settlement

STAY-RIB METAL LATH

Has reinforced ribs ½ in. wide and ¾ in. apart, center to center, making a rigid, flat, strong lath

Showing Under Side of Clip

PATENT CASING LOCK OR CLIP

Applicable to our expansion door and window casings.

Casings are punched with 7/16-in. round holes, 3 in. center to center. ¾-in. No. 10 round head screws are set in permanent jamb and driven to about ⅛ in. of home, and casings slipped over heads of screws. After being lined up, they are nailed to buck. Patent clips are slipped under heads of screws and driven home, thus locking casing immovably down on jamb. Casing will never open up

No. 1 Bead

For outside angle of wall. Made of Tight-coat galvanized open hearth steel in 8-, 9-, 10-, and 12-ft. lengths. Furnished in 16-oz. cold rolled copper for exterior use

No. 2 Bead

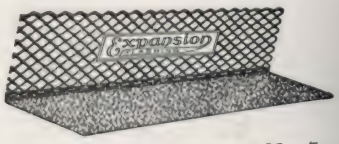
For inner angle of wall. Same construction as No. 1, with reversed wings. Made of Tight-coat galvanized open hearth steel in 8-, 9-, 10- and 12-ft. lengths

EXPANSION CORNER BEADS

Eliminate necessity of clips and otherwise effect saving of time in erecting. Afford a perfect bond for plaster, and true lines, as Expansion Beads are drawn like a wire

EXPANSION PLASTERING SCREED No. 3

Made for ⅞-in. grounds only, furnishes a perfect bond between portland cement and lime gypsum plaster. Made in 10- and 12-ft. lengths of Tight-coat galvanized open hearth steel



EXPANSION FLASHING No. 7

For use with exterior stucco, prevents cracks where stucco joins window or door frames. Made in Tight-coat galvanized open hearth steel in 6-ft., 7 ft. 6-in., 8-, 9-, 10- and 12-ft. lengths. Also furnished in 16-oz. cold rolled copper, when desired

PENN METAL COMPANY

Manufacturers of Metal Lath, Metal Studding and Lathing Accessories

65 Franklin Street
BOSTON, MASS.

SALES OFFICES

PHILADELPHIA, PA., 25th and Wharton Streets
PORTLAND, ME., 95 Exchange Street
EXPORT OFFICE, Corner of First and Washington Streets, JERSEY CITY, N. J.

Products

PENCO EXPANDED METAL LATH, METAL CORNER BEADS, METAL GROUNDS or BASE SCREEDS.

Also, Penco Metal Studs and Furring; Beam Clips.

For Fire Resistive Doors and Windows, see page 709; for Steel Shelving and Lockers, see page 2056.

TRADE-MARK

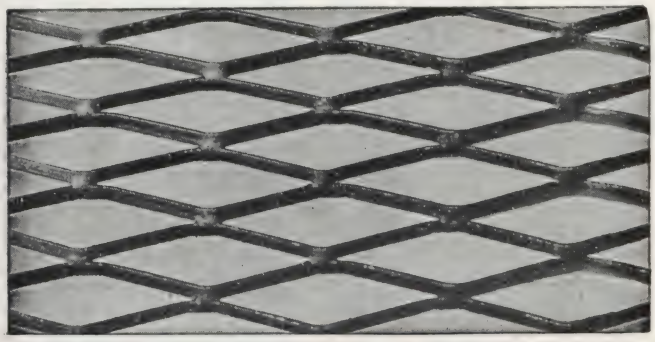
Penco Expanded Metal Lath

A perfect lath should (1) be rigid; (2) have gauge consistent with span of supports or condition of work required; (3) be sufficiently expanded to allow thorough embedding in plaster; (4) have wide strand to hold plaster with a proper slant to avoid cutting key; (5) be of a width conveniently handled without extra labor; (6) be in sheets uniform and squared.

All of these essentials are embodied in Penco expanded metal lath, backed by over 25 years' actual service in outside and inside construction.

Penco lath is a reinforcement and not a background for plaster.

Specifications—For specifications and details of applications, see Associated Metal Lath Manufacturers' pages 248-255.



PENCO EXPANDED METAL LATH, FULL SIZE

Gauge	Weight per sq. yd., painted, lbs.	Weight per sq. yd., galv., lbs.
No. 27 U.S.S.	2.25	2.75
No. 26 U.S.S.	2.50	3.0
No. 25 U.S.S.	2.75	3.25
No. 24 U.S.S.	3.0 (or 3.4)	3.50 (or 3.90)
No. 22 U.S.S.	4.0	4.50

Note: Size of sheets 24 x 96 in. Packed 9 sheets to a bundle, 16 sq. yds. Made in steel, painted or galvanized; also Hampton rust resisting metal.

Penco Metal Corner Beads

Made to tie in and protect the softer plaster. When papered or painted, the wall does not break at the corner. Offer a perfect key for plaster. The staggered holes, placed near the outer edge form a splendid clinch, thus bonding the plaster where most needed. Formed over micrometered dies that make a positive straight edge. Lengths: 6, 7, 8, 8½, 10 and 12 ft. Penco is the only metal corner bead made in 12-ft. lengths.

No. 1 Metal Corner Bead—No. 24 gauge, galvanized. For plaster grounds ⅜, ⅝ and ¾ in.

No. 2 Metal Corner Bead—No. 26 gauge, galvanized. For buildings where there is unusual wear and tear, such as schoolhouses and public buildings. For ⅜-in. grounds only.

No. 1 No. 2

PENCO METAL CORNER BEADS

No. 4 Metal Corner Bead—Bullnose corner bead, used in hospitals and public buildings. Make a large rounded corner and at a cost much less than an all-plaster corner. For ⅜- and ⅝-in. grounds.

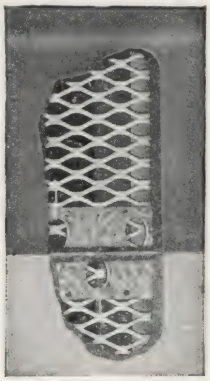
No. 6 Metal Corner Bead—Rail type, adjustable for any depth of grounds. One clip furnished with each foot of rail. Made in foot lengths only; 6, 7, 8, 9, and 10 ft.

No. 4 No. 6

PENCO METAL CORNER BEADS

No. 3 Metal Ground or Base Screed

The joint between the plaster above and the cement or tile below is formed with a Penco Metal Ground between, providing a non-shrinking and solid construction. Made in 10-ft. lengths to suit ⅜ and ⅝ in. grounds.



PENCO NO. 3. BASE SCREED

NORTH WESTERN EXPANDED METAL CO.

Manufacturers of Metal Lath, Expanded Metal Reinforcing and Lath Accessories

407 South Dearborn Street
CHICAGO, ILL.

SALES OFFICES

CAMBRIDGE, MASS., 300 Sidney Street
NEW YORK, N. Y., 350 Madison Avenue
ATLANTA, GA., 33 Poplar Street
DETROIT, MICH., 46 Davenport Avenue
PITTSBURGH, PA., 419 Fulton Building
ST. LOUIS, MO., 1006 Fullerton Building
MINNEAPOLIS, MINN., 319 Lumber Exchange Building
DALLAS, TEX., 1311 Great Southern Life Building
LOS ANGELES, CAL., 501 Stimson Building
CINCINNATI, OHIO, 307 Masonic Temple

Products

EXPANDED METAL LATH: Kno-Burn, XXth Century, Eureka, Corrugated (Self-furring), Kno-Fur (Self-furring), Post Office Special, Diamond Mesh, Econo Sheathing, Chanelath (⅞-in. T-Rib), Longspan (⅜-in. U-Rib).

ECONO EXPANDED METAL REINFORCING.

Also Nemco Presteel Lumber and Nemco Metal Lath Accessories: Corner Beads, Base Screeds, Base Grounds, Picture Moulds, Cold Formed Channels.

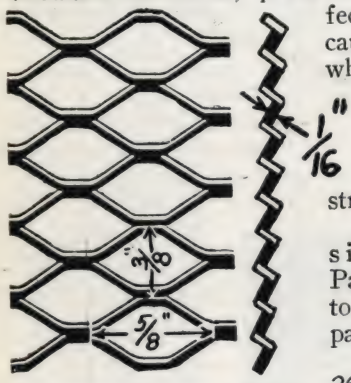
Specifications, Catalogues and Samples

Specifications, catalogues, results of tests and samples of Nemco expanded metal products will be promptly sent on request. For information on plastering, stuccoing and fireproofing, etc., styles of plastering laths, stock sizes and weights, etc., ask for handbook "Fireproof Construction." For data on reinforced concrete, using Econo expanded metal, request "Designing Data". "Formless Concrete Construction" describes the use of T-Rib Chanelath.

Our engineers invite consultation on any problem involving the use of Nemco expanded metal products.

Kno-Burn Expanded Metal Lath

A flat, stiff, small diamond meshed, steel lath and reinforcement for all types of plastering work, fireproofing, fire stopping, etc. Assures equal distribution of stress, *preventing plaster cracks*. Perfect keying. Economical because of the small mesh which prevents waste of plaster, and ease and rapidity with which it can be cut, shaped, erected and plastered. Uniform strands.



KNO-BURN EXPANDED METAL LATH

Furnished in convenient sized sheets, 24x96 in. Packed 9 sheets (16 yards) to a bundle. Furnished painted.

Gauges Nos. 24, 25 and 26 can also be furnished cut from pure iron, and gauges Nos. 24 and 26 cut from galvanized sheets or galvanized after cutting.

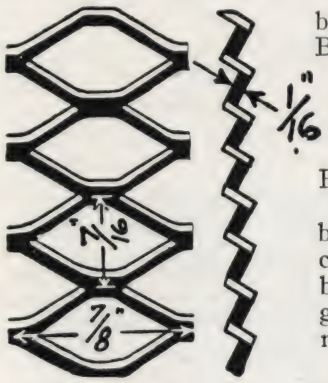
WEIGHTS OF KNO-BURN LATH

Gauge No.	Weight per sq. yd., lbs.	Weight per bundle, lbs.
24	3.4	54.4
25	3.0	48.0
26	2.5	40.0
27	2.33	37.3

XXth Century Expanded Metal Lath

Cut from copper bearing, acid resisting sheet. For all types of plastering, ratproofing, etc. Especially desirable for use in damp or warm climates, and with patent plasters, etc. Same mesh, sizes and weights as Kno-Burn (see illustration and table).

Eureka Expanded Metal Lath



EUREKA EXPANDED METAL LATH

Mesh similar in shape but slightly larger than Kno-Burn. Very economical for 2-in. solid partitions ornamental plastering or wherever a lath with as small a mesh as Kno-Burn is not required.

Packed 9 sheets to a bundle. Furnished painted, cut from pure iron or copper bearing steel; also cut from galvanized sheets or galvanized after cutting.

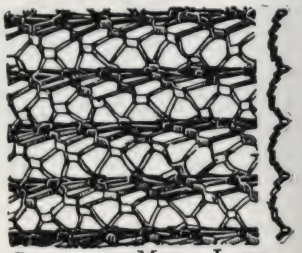
STOCK SIZES AND WEIGHTS OF EUREKA LATH

Gauge No.	Size of sheets, in.	Yards per bundle	Weight per sq. yd., lbs.	Weight per bundle, lbs.
24	22 x 96	14⅔	2.8	41.1
26	21 x 96	14	2.2	30.8

Corrugated (Self-furring) Expanded Metal Lath

A rigid, self-furring lath which eliminates the need of separate furring strips and can be used on wide spacing of supports for overcoating, stucco work, etc.

Furnished in same gauges and types of mesh as Kno-Burn, XXth Century or Eureka lath but with corrugations ¼-in. high, 1-in. apart, lengthwise of sheet, which act as furring strips and add to stiffness of lath.


CORRUGATED METAL LATH

Kno-Fur (Self-furring) Expanded Metal Lath

An unusually stiff, self-furring lath for stuccoing (new or overcoating) and which permits of wide spacing of supports. Cut from copper bearing or open hearth

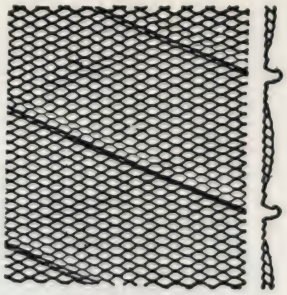
STOCK SIZES AND WEIGHTS OF KNO-FUR LATH

Gauge No.	Size of sheets, in.	Yards per bundle	Weight per sq. yd., lbs.	Weight per bundle, lbs.
*24 regular	22 x 96	14⅔	3.7	54.3
**24 special	20½ x 96	13⅔	3.0	41.0
**26 special	19½ x 96	13	2.4	31.2
*27 regular	22 x 96	14⅔	2.5	36.7

*Cut from copper bearing steel and has Kno-Burn style mesh.
**Cut from open hearth steel and has Eureka style mesh. Can also be furnished galvanized.

Continued on next page

steel sheets. Has ¼-in. open meshed ribs running diagonally across sheet in both directions, which act as furring strips. Packed 9 sheets to a bundle.



KNO-FUR METAL LATH

Post Office Special Lath

An extra heavy plastering lath for United States Government work, etc. Strands, 3/32-in. wide. Sheets, 24x96 in. Weight per sq. yd., 4.3 lbs. Weight per bundle, 68.8 lbs.

Furnished painted, cut from pure iron or copper bearing sheet, also cut from galvanized sheets or galvanized after cutting.

Diamond Mesh Lath

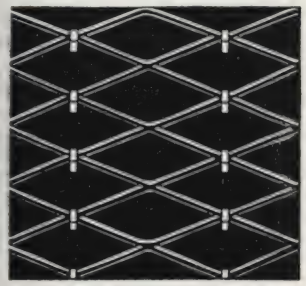
For reinforcing and plastering purposes, etc. Furnished painted or cut from galvanized sheet. Packed 9 sheets to a bundle.

STOCK SIZES AND WEIGHTS OF DIAMOND MESH LATH

Gauge No.	Size of sheets, in.	Yards per bundle	Weight per sq. yds., lbs.	Weight per bundle, lbs.
22	21 x 96	14	3.75	52.5
24	21 x 96	14	3.30	46.2
26	24 x 96	16	2.30	36.8

Econo Sheathing Lath

A combined lath and sheathing for stucco or interior plastering. Consists of No. 16 gauge, 3x8-in. mesh Econo expanded metal riveted to heavy waterproof building paper. Large sheets, 36x96 in. Quickly erected. Economical to plaster. Moisture-proof and weatherproof.



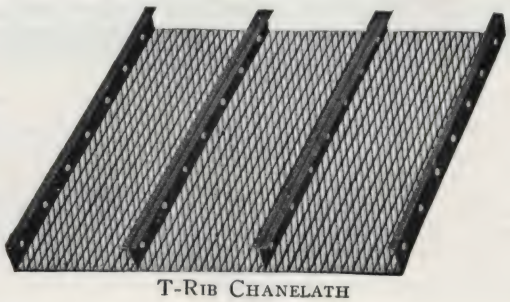
ECONO SHEATHING LATH

Furnished 24 sheets (64 sq. yds.) to a crate. Weight per sq. yd., 3.4 lbs.

T-Rib Chanelath

A rib stiffened lath, used as a combined form and reinforcing for concrete roofs or any slabs of moderate span and load, also as a self-furring plastering lath or suspended ceilings, solid partitions, etc., where the labor economy of large areas of combined lath and furring ribs is of advantage.

The ⅞-in. high T-Ribs are connected by 4-in. sections of Kno-Burn mesh. Furnished painted, in sheets 4 to 48 in. wide and 3 to 12 ft. long. Shipped crated. Weights per square foot of gauges Nos. 24, 26 and 28 are net, .89, .67, and .56 lbs. respectively; crated, 1.07, .82, and .70 lbs. respectively.



T-RIB CHANELATH

Longspan

A U-Rib or self-furring lath for partition work, ornamental plastering, etc. Very stiff. Splices easily. Has fine, smooth plastering surface.

The U-Ribs, ⅜-in. high, are connected by 4-in. sections of Kno-Burn mesh. Ribs and lath are expanded from one piece of metal. Painted. Shipped uncrated. Sheets 24x96 in., 16 sheets to bundle.

LONGSPAN

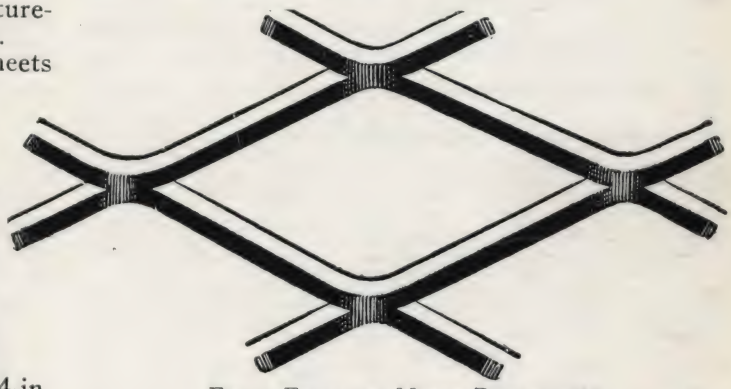
GAUGES AND WEIGHTS OF LONGSPAN

Gauge No.	Weight per sq. yd., lbs.	Weight per bundle, lbs.
24	4.8	76.8
26	3.7	59 2
28	3.0	48.0

Econo Expanded Metal Reinforcing

A cold drawn, fabricated or mesh reinforcing for concrete. Saves time and labor. Permits large areas of reinforcing to be quickly placed by unskilled workmen without possibility of error. Assures a perfect bond between steel and concrete, and perfect embedment of steel. Equalizes stresses. Made in large, flat sheets, requiring no stretching. Furnished in a variety of sizes and meshes, ranging from ½x1¼ in. to 5¼x12 in. (3-in. mesh Econo is generally used for reinforcing purposes, etc.)

Each style has a definite steel cross section area, which is used as part of the number designating the style. Thus, 15-3 Econo has 15/100 sq. in. of steel for every 12 in. in width of material, measured across short dimension of diamond.



ECONO EXPANDED METAL REINFORCING

PARTIAL LIST OF STOCK SIZES AND WEIGHTS OF ECONO EXPANDED METAL

Style	Mesh, in.	Gauge No.	Sectional area per ft. of width, sq. in.	Weight per sq. ft., lbs.	Width, ft.-in.	Lengths, ft.
06–3	3	16	.06	0.20	6–0	8, 12
08–3	3	16	.08	0.27	6–0	8, 12
10–3	3	13	.10	0.34	4–0	8, 12
125–3	3	13	.125	0.42	5–6	8, 12
135–3	3	13	.135	0.46	5–0	8, 12
15–3	3	10	.15	0.51	7–0	8, 10, 12
16–3	3	10	.16	0.55	6–6	8, 10, 12
176–3	3	10	.176	0.60	6–0	8, 10, 12
20–3	3	10	.20	0.68	5–6	8, 10, 12
25–3	3	10	.25	0.85	4–3	8, 10, 12
30–3	3	10	.30	1.02	7–0	8, 10, 12
35–3	3	10	.35	1.19	6–0	8, 10, 12
40–3	3	7	.40	1.36	7–0	8, 10, 12
45–3	3	7	.45	1.53	6–3	8, 10, 12
50–3	3	7	.50	1.70	5–9	8, 10, 12
54–3	3	7	.54	1.83	5–6	8, 10, 12
60–3	3	7	.60	2.04	4–9	8, 10, 12
65–3	3	7	.65	2.19	4–3	8, 10, 12
10–2¼	2¼	16	.10	0.34	5–0	8, 12
15–2¼	2¼	13	.15	0.51	4–9	8, 12
265–2¼	2¼	9	.265	0.90	4–6	8, 12

TRUSCON STEEL COMPANY

Manufacturers of Metal Lath

YOUNGSTOWN, OHIO

For List of Offices, see page 848

Products

HY-RIB; METAL LATH; STEEL STUDS; CORNER BEADS; BASE SCREEDS.

For Reinforcing Steel and Steel Buildings, see pages 42-43; for Steel Joists, see page 496; for Steel Windows, see pages 848-851.

TRADE-MARK

Truscon Hy-Rib and Metal Lath

Hy-Rib—A steel sheathing, stiffened by rigid ribs, eliminating forms and saving studs—an ideal reinforcement for concrete and a perfect base for plaster.

Floors and Roofs—Hy-Rib provides both the centering and reinforcement for the concrete, reducing costs and simplifying construction.

Walls and Sidings—Apply the Hy-Rib, plaster both sides, and the wall is complete. Hy-Rib provides a solid, monolithic wall, 2 in. thick, at half the cost of brick. No forms are required.

Partitions—There are two types of Hy-Rib partitions: (1) the ribs of the 7/8-in. Hy-Rib extend vertically from floor to ceiling and eliminate all stiffening channels; (2) the Hy-Rib lath with ribs extending horizontally is supported by widely spaced channels. Both types save channels and the expense of attaching lath to them. Solid Hy-Rib partitions, only 2 in. thick, save valuable floor space, stop fire, prevent cracks and are sound resisting, rigid and economical.

Ceilings—Hy-Rib is attached to the lines of support and plaster applied directly to the underside. Hy-Rib permits wide spacing of supports, saving channels and labor of attaching lath to them.

Furring—Attach the Hy-Rib to wall with lath side outward and apply the plaster. Hy-Rib does away with furring strips.

PROPERTIES OF HY-RIB

Type of Hy-Rib	Number of ribs	Height of ribs	Spacing of ribs	Width of sheets	Wt. per sq. ft., lbs.		
					Gauge 24	Gauge 26	Gauge 28
7/8"	8	7/8"	4"	28"	.93	.70	.58
3/8"	7	3/8"	4"	24"	.53	.40	.33

AREA OF HY-RIB PER BUNDLE

Type of Hy-rib	Sheets per bundle	Area per bundle		
		8' 0" length	10' 0" length	12' 0" length
7/8"	8	149 1/3 sq. ft. 32 sq. yds.	186 2/3 sq. ft. 40 sq. yds.	224 sq. ft. 48 sq. yds.
3/8"	18			

Furnished in open hearth or copper bearing steel—all painted. Standard lengths, 6, 8, 10 and 12 ft. Other lengths cut from standard lengths without charge except for waste. 7/8-in. Hy-Rib is shipped in bundles of 8 sheets, and 3/8-in. Hy-Rib Lath in bundles of 18 sheets.

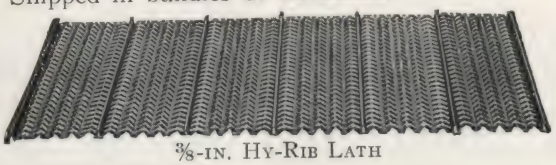
3/8-in. Hy-Rib Lath—A self-furring lath, permits wide spacing of studs and saves channels and wiring.

Width of sheets, 24 in. Standard lengths, 8, 10 and 12 ft.

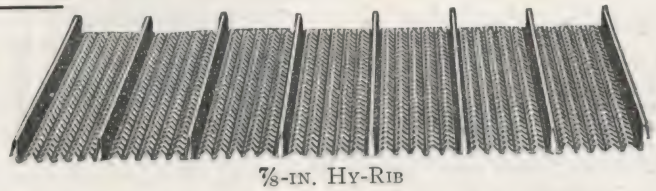
Shipped in bundles of 18 sheets.

3/8-IN. HY-RIB LATH

Gauge No.	Wt. per sq. yd., lbs.	Stud spac. for walls and partitions, in.	Spac. of supports for ceilings, in.
28	3.0	19 to 24	16 to 24
26	3.6	24 to 32	19 to 24
24	4.8	32 to 36	24 to 32



3/8-IN. HY-RIB LATH



7/8-IN. HY-RIB

MAXIMUM SPANS FOR 7/8-IN. HY-RIB AS CENTERING TO SUPPORT WET CONCRETE

Maximum spans for centering	Gauge 7/8" Hy-Rib	Thickness of slabs above base of Hy-Rib	Maximum spans for centering	Gauge 7/8" Hy-Rib	Thickness of slabs above base of Hy-Rib
3'-3"	28	2" thick slab, weight 24 lbs. per sq. ft.	2'-6"	28	3 1/2" thick slab, weight 42 lbs. per sq. ft.
3'-6"	26		2'-9"	26	
4'-0"	24		3'-0"	24	
3'-0"	28	2 1/2" thick slab, weight 30 lbs. per sq. ft.	2'-4"	28	4" thick slab, weight 48 lbs. per sq. ft.
3'-3"	26		2'-6"	26	
3'-8"	24		2'-10"	24	
2'-9"	28	3" thick slab, weight 36 lbs. per sq. ft.			
3'-0"	26				
3'-4"	24				

For greater spans use temporary supports.

SAFE LOADS IN LBS. PER SQUARE FOOT FOR SLABS REINFORCED WITH 7/8-IN. HY-RIB

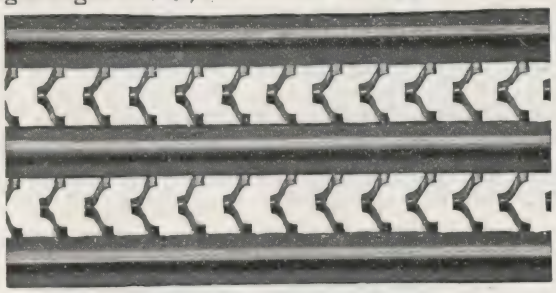
(Safe loads include weight of slab. For safe live loads, deduct weight of slab)

Thickness of slabs above base of Hy-Rib	Gauge 7/8" Hy-Rib	Moment of resistance per ft. of width	Span in feet								
			3	4	5	6	7	8	9	10	11
2" thick slab, weight 24 lbs. per sq. ft.	28	3533	327	185	117	82					
	26	4241	392	221	141	97					
	24	5647	522	294	188	132					
2 1/2" thick slab, weight 30 lbs. per sq. ft.	28	4590	424	239	153	106	78	59			
	26	5513	510	287	183	127	93	71			
	24	7346	681	383	245	171	125	95			
3" thick slab, weight 36 lbs. per sq. ft.	28	5648	522	294	187	131	96	73			
	26	6773	627	353	225	158	115	87	69		
	24	9023	835	469	300	209	153	117	91		
3 1/2" thick slab, weight 42 lbs. per sq. ft.	28	6705	620	349	220	155	113	87			
	26	8044	742	417	268	186	137	104	82		
	24	10721	992	558	356	249	182	140	110	89	
4" thick slab, weight 48 lbs. per sq. ft.	28	7763	718	403	259	180	132	101	80		
	26	9304	864	485	310	216	158	121	97	77	
	24	12409		644	413	288	212	162	128	103	86

B. M.$=\frac{1}{10}wl^2$ For B. M.$=\frac{1}{12}wl^2$, add 20% to above loads.

For B. M.$=\frac{1}{8}wl^2$, deduct 20% from above loads.

No. 1-A Hy-Rib Lath—The most popular lath on the market for plaster and stucco. Permits wide stud spacing and saves plaster. The most rigid surface to work against, and a perfect key for the plaster. The straight edges save 4% of lath in the laps.



No. 1-A HY-RIB LATH

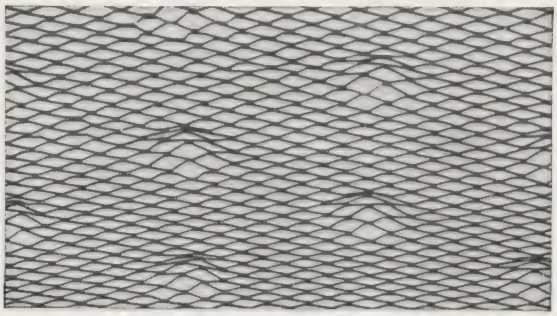
Grade	Wt. per sq. yd., lbs.	Stud spac. for walls, c. to c.	Joist spac. for ceilings, c. to c.
No. 1-A.....	3.20	16" to 24"	16" to 19"

Size of sheets, 18x96 in.
Shipped in bundles containing 15 sheets or 20 yards.
Furnished in open hearth or copper bearing steel.
Painted or galvanized before expansion.

Continued on next page

Truscon Diamond Laths

DIAMOND LATH



SELF-FURRING DIAMOND LATH

This type is furnished in any gauge of diamond lath. For dimensions, weights, etc., use tables for regular Diamond and Universal Diamond Lath

TRUSCON DIAMOND LATH

Gauge No.	Sheets per bundle	Yards per bundle	Weight per square yard, painted, lbs.	Weight per square yard, galvanized, lbs.
27	10	20	2.33	2.50
26	10	20	2.55	....
25	10	20	3.00	....
24	10	20	3.40	3.60
22	15	26⅔	4.20	....

2 yds. per sheet. Size of sheet, 27x96 in., except 22 gauge, which is 24x96 in.

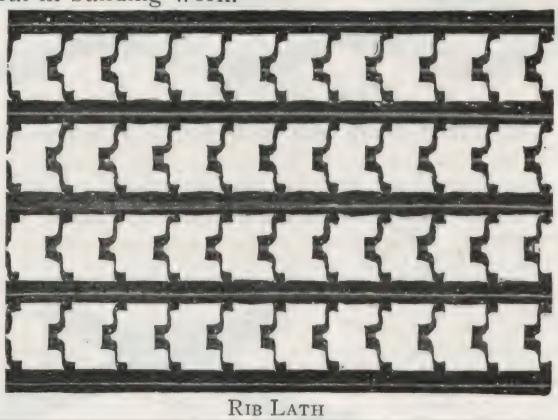
UNIVERSAL DIAMOND LATH

Gauge No.	Sheets per bundle	Yards per bundle	Weight per square yard painted, lbs.	Weight per square yard galvanized, lbs.
26	10	20	2.20	2.50
24	10	20	2.80	....

Size of sheet, 27x96 in. 2 yds. per sheet.
Furnished in open hearth or copper bearing steel.
vanized before expansion.

Standard Rib Lath

A ribbed steel lath of medium weight, generally useful in building work.



RIB LATH

Grade	Weight sq. yd., lbs.	Stud spacing for walls (c. to c.), in.	Joist spacing for ceilings, (c. to c.), in.
No. 2 Standard Rib Lath..	2.64	14 to 16	12 to 14
No. 4 Standard Rib Lath..	3.17	16 to 20	14 to 16
No. 6 Standard Rib Lath..	4.23	18 to 22	16 to 18

Furnished in open hearth or copper bearing steel—all painted.
In Standard Rib Lath, the amount of metal surface compared to open areas = 78%.
Size of sheets, 27x96 in. Shipped in bundles containing 10 sheets, or 20 yds.

SOLID PARTITIONS WITH HY-RIB LATH

With Channels			Without Channels	
Height of partitions, ft.	Thickness, in.	Reinforcement	Spacing of channels, in.	Metal Lath
10	1¾	No. 28 ⅞" Hy-Rib	12 to 14	Diamond lath, 2.2 to 3.0 lbs. or 1-A Hy-Rib lath
12	2	No. 28 ⅞" Hy-Rib	14 to 16	Diamond lath, 3.00 to 3.4 lbs. or Std. lath No. 2
14	2¼	No. 28 ⅞" Hy-Rib	16 to 28	1-A Hy-Rib lath
16	2½	No. 28 ⅞" Hy-Rib	16 to 20	Std. lath No. 4
18	2¾	No. 26 ⅞" Hy-Rib	24 to 30	3.0 lb. ⅜" Hy-Rib lath
20	3	No. 26 ⅞" Hy-Rib	32 to 36	3.6 lb. ⅜" Hy-Rib lath
			36 to 42	4.8 lb. ⅜" Hy-Rib lath

HY-RIB CEILINGS

Spac. supports ft.	in.	to ft.	in.	Reinforcement
1	0	1	2	Diamond lath, 2.20 to 3.00 lbs. or Standard Lath No. 2
1	2	1	4	Diamond lath, 3.0 to 3.40 lbs. or Standard Lath No. 4
1	4	1	11	1-A Hy-Rib lath or Standard Lath No. 4
1	11	2	4	3.0 lb. ⅜" Hy-Rib lath
2	6	2	9	3.6 lb. ⅜" Hy-Rib lath
2	9	2	11	4.8 lb. ⅜" Hy-Rib lath
3	0	3	11	No. 28 ⅞" Hy-Rib
4	0	4	11	No. 26 ⅞" Hy-Rib
5	0	5	11	No. 24 ⅞" Hy-Rib

HY-RIB SIDE WALLS

Spac. supports, ft.	in.	Thickness of wall, in.	Reinforcement
1	2	1¾	Diamond lath, 2.2 to 3.0 lbs.
1	6	1¾	Diamond lath, 3.00 to 3.4 lbs. or Std. Lath No. 4
2	0	1¾	1-A Hy-Rib lath, or 3.0 lb. ⅜" Hy-Rib lath
2	8	1¾	3.6 lb. ⅜" Hy-Rib lath
3	6	1¾	4.8 lb. ⅜" Hy-Rib lath
6	0	1¾	No. 28 ⅞" Hy-Rib
8	0	2	No. 26 ⅞" Hy-Rib
10	0	2	No. 26 ⅞" Hy-Rib
12	0	2½	No. 24 ⅞" Hy-Rib

Ribs run horizontally

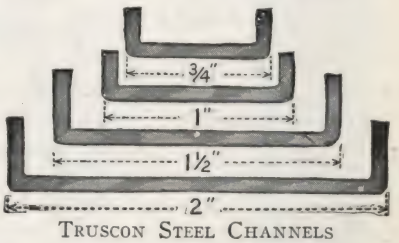
Steel Channels and Hollow Studs

Truscon channels are used in ceilings, solid partitions and furring. Carried in stock in lengths of 12, 14, 16, 18 and 20 ft.; shipped in bundles of 25 channels.

Hollow studs as used in hollow partitions are made of two ¾-in. channel studs united by spacing bars. Furnished usually with channels and spacing clips separate, for assembling on the job.

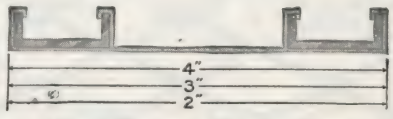
Standard widths (outside) 2 in., 3 or 4 in.; other widths can be furnished on special order.

Spacing of clips, 36 in. center to center of studs.



TRUSCON STEEL CHANNELS

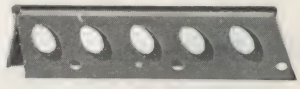
Size	¾ in.	1 in.	1½ in.	2 in.
Weight, lbs. per lin. ft.....	.276	.332	.442	.553



CROSS SECTION HOLLOW STUD

Corner Beads

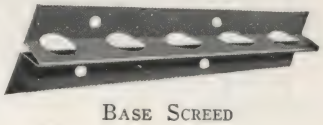
Furnished in two styles for the protection of plastered corners: (1) Detroit T-rail with adjustable clips and (2) rib steel as illustrated.



CORNER BEAD

Metal Base Screeds

Use between cement bases and plastered walls as ground for plaster and cement.



BASE SCREED

THE YOUNGSTOWN PRESSED STEEL COMPANY

Metal Lath, Channels, Corner and Base Bead, Furring and Expanded Metal

WARREN, OHIO

Products

MAHONING METAL LATH; IDEAL METAL LATH; ZEE METAL LATH; SHARON CHANNELS; YOUNGSTOWN BOX CHANNEL; CRIMPED FURRING; YOUNGSTOWN EXPANDED METAL; YOUNGSTOWN CORNER BEAD; WARREN CORNER BEAD; PARKER CORNER BEAD; SHARON BASE BEAD.

Slogan

"Metal Lath Makes Good Frame Construction Better."

Mahoning Metal Lath

Mahoning metal lath has a small diamond-shaped mesh that requires a minimum of plaster. This lath is manufactured by a process that gives straight, parallel edges on the long sides so that the lath laps evenly with minimum waste. The diamond construction is such that every strand becomes thoroughly embedded in the plaster, assuring a splendid key for the mortar.

Mahoning metal lath is adapted for all types of interior plastering and is especially easy to erect as a base for ornamental plaster cornices, arches, column capitals, mouldings and other intricate work.

Mahoning metal lath is manufactured from the best grade open hearth steel and is furnished painted black or in copper iron alloy painted red, also galvanized in Nos. 22, 24 and 26 gages. Sizes and weights are as follows:

Style No.	Size of sheet, in.	Weight per sq. yd., lbs.	Sheets per bundle	Yards per bundle
*22	24 x 96	3.4	9	16
23	24 x 96	3.0	9	16
*24	24 x 96	2.75	9	16
25	24 x 96	2.5	9	16
*26	24 x 96	2.2	9	16

Style Nos. 23 and 25 in iron alloy are manufactured only to order. *Galvanized lath in these gages weighs slightly more than painted steel lath of the same gage.

MAHONING METAL LATH

Ideal Metal Lath

Ideal metal lath has a diamond mesh but a wider strand than other diamond mesh laths. This lath is exceedingly rigid and affords a firm, solid base for both interior plastering and exterior stucco work.

There is an essential difference in Ideal metal lath that makes it superior to other brands. This superiority lies in the twist of the strands.

This twist is obtained by an unusual method of manufacture. In all other processes of manufacturing expanded metal lath, the first step is to slit the whole sheet of material, then stretch or draw it, thereby opening up the diamonds. In the manufacture of Ideal lath, however, the sheet is slit and expanded one row of diamonds at a time, giving absolute uniformity and shape with one operation.

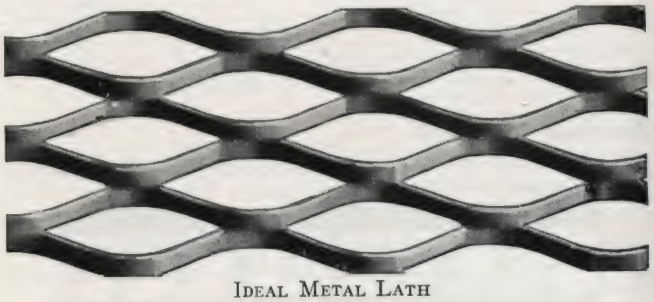
Metal lath has a strand measuring .096 in., which in No. 24 gage weighs 4 lbs. per sq. yd. and meets with specifications as prepared by the U. S. Government's supervising architect.

The diagonal diamond mesh of Ideal lath provides an excellent distribution of stress. Because of the peculiar twist of the strands, the rigidity of the lath is increased at least 50%. Ideal is known as the "flat lath." It saves plaster and gives the plasterer a surface much easier to work on. Sheets of Ideal lath are cut square with ends parallel. This saves waste due to lapping, the necessary lappage on Ideal lath being only about one-half of that required on other types of lath where the sides and ends are not at right angles.

Ideal metal lath is manufactured from the best grade open hearth steel, and is furnished painted black and in copper iron alloy painted red in the following weights and sizes:

Style No.	Size of sheet, in.	Weight per sq. yd., lbs.	Sheets per bundle	Yards per bundle
24	21 x 97	4.00	9	14
*25	21 x 97	3.50	9	14
26	21 x 97	3.00	9	14

*Style No. 25 in iron alloy is manufactured to order only.



IDEAL METAL LATH

The Twist That Makes It Stiff—The process of cutting and expanding Ideal metal lath in a direction perpendicular to the plane of the raw sheet, both at one operation, gives a twist to the lath at the intersection of the strands. This twist, a feature found in no other lath, adds 50% to the tensile strength, but even more important, makes the lath itself stiff and rigid. The rigidity of Ideal lath tends to reduce amount of plaster required and eliminate plaster cracks.

SECTION OF IDEAL AND MAHONING METAL LATH

Continued on next page

Zee Metal Lath

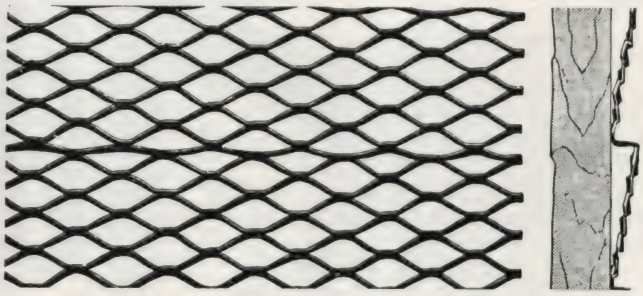
The most rigid self-furring metal lath for stucco work. On account of its self-furring feature, this lath may be applied directly to the sheathing boards, thereby saving furring and labor and insuring a wall of uniform thickness, which is easily plastered.

Zee metal lath is a product in which a lateral ledge is incorporated at regular intervals throughout the course of the sheet, as indicated by the illustrations. This gives the lath added strength and practically prevents expansion and contraction; at the same time it reduces the amount of stucco required to a safe minimum.

Zee metal lath is furnished in steel, painted black, and in copper iron alloy, painted red, in the gages shown in the following table:

Style No.	Size of sheet, in.	Weight per sq. yd., lbs.	Sheets per bundle	Yards per bundle
22	24 x 96	3.40	9	16
*23	24 x 96	3.0	9	16
24	24 x 96	2.75	9	16
*25	24 x 96	2.50	9	16
26	24 x 96	2.20	9	16

*Style Nos. 23 and 25 in iron alloy are manufactured only to order.



FRONT AND SIDE VIEWS OF ZEE METAL LATH

Sharon Channels

For wall and column furrings, solid partitions, carrying bars and furring strips for suspended ceilings.

Formed cold, of best quality open hearth steel, producing exceptionally straight and very rigid channels. Can be bent into the most difficult shapes for furring without the steel fracturing.

Sharon channels provide the best possible method for speedy erection of metal lath, and are lighter because of the uniform thickness produced only by the cold form process.

An important feature of Sharon channels is the fact that the legs are exactly perpendicular to the web. The corners are rounded, but with a small curve that produces a strong corner but keeps the web and legs perfectly straight without any belly or curvatures.

With the greater tensile strength of special steel cold formed with the lighter weight and the perpendicular legs, a builder can not afford to use other than Sharon straight, rigid channels.

Copy will be furnished of Robert W. Hunt & Company's test on ¾-in. channel for furring and 1-in. channel for carrying bars in suspended ceiling construction.

Plain, in stock lengths 12 to 20 ft., in standard No. 16 gage, or if required, in Nos. 14 to 18 gage, leg lengths either ⅜ or ½ in. Also furnished perforated.

Plain channels manufactured in the sizes shown in the following table:

SHARON PLAIN CHANNELS

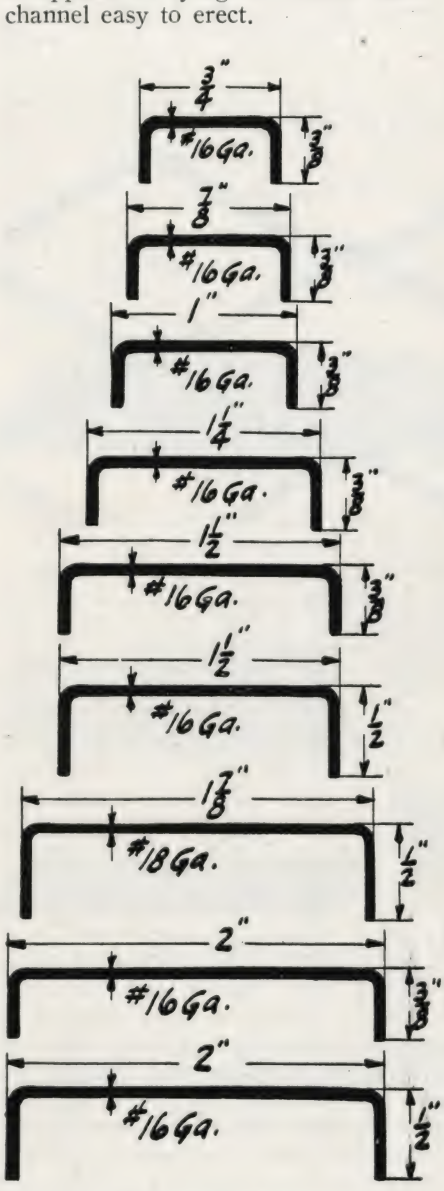
Gage	Size of web or back, in.	Size of flange or leg, in.	Weight per 1000 lin. ft., lbs.
16	¾	⅜	276
16	⅞	⅜	304
16	1	⅜	332
16	1¼	⅜	387
16	1½	⅜	456
16	1½	½	525
18	1⅞	½	458
16	2	⅜	580
16	2	½	635

Stock lengths, 12, 14, 16, 18 and 20 ft.; longer or special lengths can be furnished on special orders.

We are also prepared to furnish special sizes of channels with webs up to 6 in. wide, legs up to 2½ in. in any length. The thickness of steel may be from No. 8 gage or .050 to .156 in.

Youngstown Box Channel

New channel recently developed for suspended ceilings, furred walls and ceilings and solid plaster partitions. This box channel weighs the same as the usual ¾-in. No. 16 gage cold formed channel, but is very much stiffer and stronger, due to the fact that more metal is concentrated in the flange (see illustration and note long flanges). The long flanges eliminate the tendency of furring channel to turn over when pressure is applied in tying to runner bars. This makes the channel easy to erect.



SHARON CHANNELS

YOUNGSTOWN BOX CHANNEL

Continued on next page

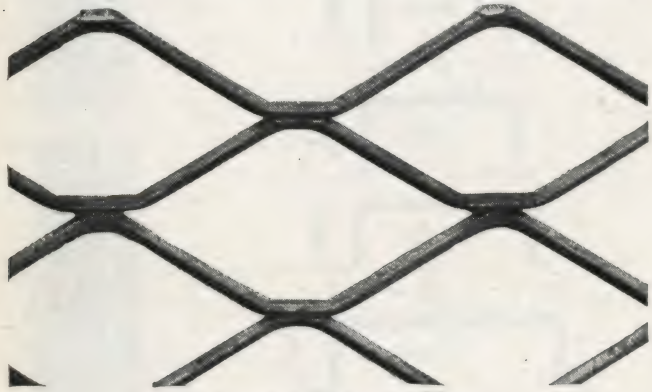
Crimped Furring

These metal strips are used over sheathing paper, over studs or against any solid surface to allow room back of flat steel lath for plaster to key solidly. Highly important in stucco work. The use of wood furring should never be permitted, for it detracts from the fireproof quality of the construction and will cause cracks in the plaster. This cracking is due to absorption of moisture from plaster before it has had time to set properly. Furnished in ½-, ¾- or 1-in. width in bundles of 50 pieces of 10-ft. lengths.

CRIMPED FURRING

Youngstown Expanded Metal

A sheet metal product formed cold at a single operation without waste. Youngstown expanded metal provides the sturdiest and strongest type of reinforcement due to the fact that stresses are absorbed in practically all directions. The larger diamond meets the need of architects, contractors and engineers for reinforcing foundations, floors, roofs, sidewalks, bridges, silos, reservoirs and retaining walls. It gives a higher factor of safety. Furnished in sheets up to 10 ft. in length (meaning the long axis of the diamond) and as large as 15 ft. wide. Youngstown expanded metal covers large areas quickly as sheets are laid in forms without wiring.



YOUNGSTOWN EXPANDED METAL

Style	Diamond, in.	Sectional area, sq. in.	Weight per sq. ft., lbs.	Comparative gage No.	Standard sizes	
					Width	Lengths
3–059– 20	3	.059	.20	16	5′ 4″	6′, 8′, 10′
3–082– 28	3	.082	.28	12	5′ 4″	6′, 8′, 10′
3–115– 39	3	.115	.39	12	5′ 4″	6′, 8′, 10′
3–130– 44	3	.130	.44	12	5′ 4″	6′, 8′, 10′
3–147– 50	3	.147	.50	10	4′, 5′3″, 8′	6′, 8′, 10′
3–162– 55	3	.162	.55	10	5′	6′, 8′, 10′
3–179– 61	3	.179	.61	10	5′	6′, 8′, 10′
3–251– 85	3	.251	.85	10	5′	6′, 8′, 10′
3–274– 93	3	.274	.93	10	5′	6′, 8′, 10′
3–324–110	3	.324	1.10	10	5′	6′, 8′, 10′
3–377–128	3	.377	1.28	10	5′	6′, 8′, 10′
2¼–089– 30	2¼	.089	.30	16	5′ 3″	6′, 8′, 10′
2¼–155– 52	2¼	.155	.52	12	5′ 3″	6′, 8′, 10′
1½–108– 36	1½	.108	.36	16	5′ 3″	6′, 8′, 10′
1½–179– 61	1½	.179	.61	12	5′ 3″	6′, 8′, 10′
1–084– 29	1	.084	.29	18	6′	6′, 8′, 10′
1–162– 55	1	.162	.55	16	6′ 6″	6′, 8′, 10′
1–206– 70	1	.206	.70	12	6′ 6″	6′, 8′, 10′
¾–084– 29	¾	.084	.29	18	6′	6′, 8′, 10′
¾–162– 55	¾	.162	.55	16	6′ 6″	6′, 8′, 10′
¾–206– 70	¾	.206	.70	12	6′ 6″	6′, 8′, 10′
½–226– 76	½	.226	.76	18	3′ 6″	8′

Sizes of diamonds, and thickness and width of strands can be varied to suit the purpose. The smaller diamond meshes just fit the need for window, elevator, or machinery guards, and hundreds of similar uses.

Youngstown expanded metal is manufactured for concrete reinforcing purposes, in gages from No. 18 gage to ¼ in. thickness, and the sizes of diamonds are as follows: 3x7 in., 2½x5 in., 1½x3 in., 1x2⅛ in., ¾x2 in., ½x1$\frac{3}{16}$ in.

The 1x2⅛ in. is made in gages from Nos. 13 to 18. Nos. 13 to 15 are used largely for locker purposes and for machinery guards; while the lighter, Nos. 16 and 18 gages, are used largely for reinforcing slabs for tile roofing purposes. The other gages and styles mentioned above are used almost exclusively for concrete reinforcement.

Corner Bead

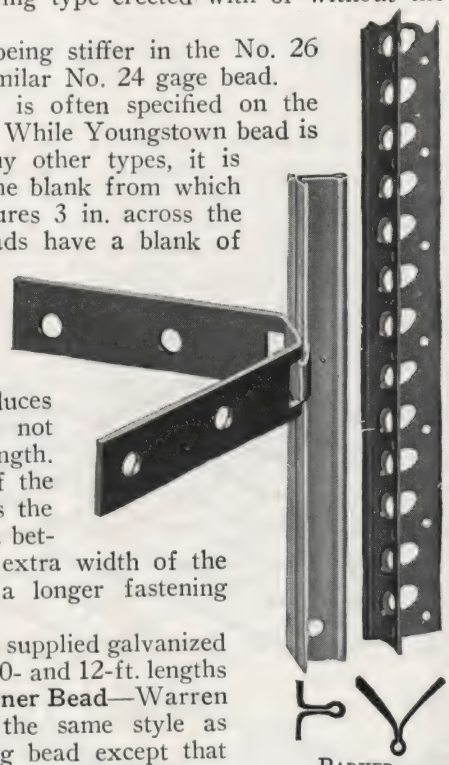
Youngstown Corner Bead—Youngstown corner bead is of the wing type erected with or without the use of clips.

It is rigid, being stiffer in the No. 26 gage than any similar No. 24 gage bead.

Corner bead is often specified on the basis of weight. While Youngstown bead is lighter than many other types, it is much stiffer. The blank from which it is made measures 3 in. across the face. Other beads have a blank of only 2½ to 2$\frac{5}{16}$ in. But the holes in Youngstown bead are cut oval. This reduces weight but does not reduce its strength. The large size of the oval hole permits the plaster to form a better key and the extra width of the wings provides a longer fastening surface.

This bead is supplied galvanized in 6-, 7-, 8-, 9-, 10- and 12-ft. lengths

Warren Corner Bead—Warren corner bead is the same style as Youngstown wing bead except that the wings are slightly shorter. Warren bead has the same narrow throat beneath the head to give it unusual stiffness.



PARKER YOUNGSTOWN CORNER BEAD

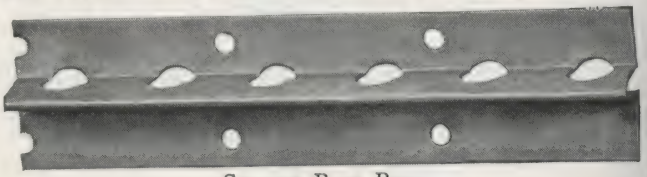
Parker Corner Bead—Parker corner bead is a miniature rail bead and is the only No. 22 gage corner bead made. This bead is especially recommended for use on arched corners where the bead must be curved.

The long clips supplied with Parker bead make it especially suitable for use on corners where good grounds for fastening are difficult to secure.

Parker bead is extremely heavily galvanized before forming. Stock lengths are 6, 7, 8, 9, 10, 11 and 12 ft.

Sharon Base Bead

Used on walls to divide the cement base from the plaster, to form a ground for both the plastered wall and cement or granolithic base. Its use keeps cement from staining the plaster. Costs less than temporary wood grounds. Made from special galvanized sheets and furnished in stock lengths of 6, 8 and 10 ft.



SHARON BASE BEAD

THE CONSOLIDATED EXPANDED METAL COMPANIES

Plastering Lath and Corner Bead

BRADDOCK, PA.

For Sales Offices and Representatives see page 36

Products

EXPANDED METAL PLASTERING LATH; CORNER BEAD; CHANNEL FURRING.

For Expanded Metal for Reinforcing Concrete, for building construction and roads, see pages 36-37.

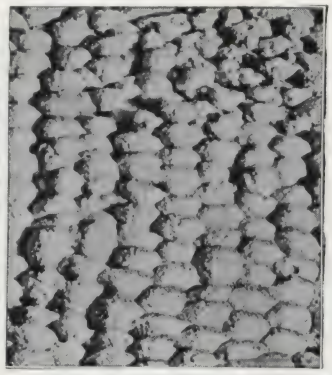
Steelcrete
TRADE-MARK

Expanded Metal Plastering Lath

"Steelcrete" lath is manufactured into stiff sheets 24 or 28 in. wide by 97 in. long, and in different gauges and designs to meet all possible conditions.

The diamond type is the lath which is recommended for general construction. The sheets are stiff and the openings are of the proper size to allow just the right amount of mortar to be forced through. The mortar clinches on the back and thoroughly embeds the lath.

"STEELCRETE" DIAMOND LATH



EXPANDED METAL LATH
Showing thorough bond with plaster

The illustration above shows plaster torn from a building which had been erected a number of years. It shows how effectively the plaster is keyed on "Steelcrete" Diamond Lath.

Other laths manufactured by us include the 22-P type which is acceptable to the United States Government for post office work. It is made from No. 22 gauge, U. S. standard steel and has a $\frac{3}{32}$-in. strand.

For exterior stucco work, "Steelcrete Binder," a stucco reinforcement, is recommended. It has No. 16 gauge square strands and 2-in. diamonds.

"Steelcrete Binder" has every feature essential to strength and rigidity. It provides for temperature variations, vibration, shrinkage, and all stresses to which stucco is subjected.

Orders and Specifications—When ordering or specifying lath, always give the full designation by name, gauge, weight per square yard, and whether painted, galvanized, or made from copper bearing steel. Specify as follows:

"The metal lath shall be 'Steelcrete' 'F' or 'H' No. 24 gauge, painted [galvanized or 'Cop-al' painted red], weighing .... lbs. per sq. yd."

The accompanying table gives all necessary particulars. Lath should be wired to metal furring with No. 18 gauge annealed steel wire. For fastening to wood studs or sheathing, use staples long enough to enter at least ¾ in.

"STEELCRETE" EXPANDED METAL LATH

Designation and gauge	Painted weight per sq. yd., lbs.	Size of sheets, in.	Number of sheets in bundle	Number of sq. yds. in bundle	Weight per bundle, lbs.
*22-P	4.37	24x96	10	17.77	77.65
24-F	3.40	24x96	15	26.66	90.67
25-F	3.00	24x96	15	26.66	80.00
26-F	2.55	24x96	15	26.66	68.00
27-F	2.33	24x96	15	26.66	62.22
24-H	2.90	28x96	14	29.00	84.10
26-H	2.20	28x96	14	29.00	63.80

*Special post office lath 3-32 in. strand.
Unless otherwise specified, the above laths will be furnished painted black; same can be furnished made from a copper, steel or galvanized sheet.

Rid-Gid Metal Lath

For wider spacing of studs, and its resultant economy in construction. Rid-Gid Metal Lath provides unusual advantages. The ribs give it strength—30% greater strength than any standard type of lath, with no greater weight.

This rigidity adapts it to use on suspended ceilings, and for other similar purposes where ordinary metal lath would not serve. In fact, Rid-Gid has proved itself an all-purpose lath.

RID-GID METAL LATH

"Steelcrete" Corner Beads and Channels

The standard wing type, rail type and bullnose corner beads in the standard gauges, hot galvanized after forming. The same may be obtained cut from galvanized sheet. Beads are strong and straight, and prevent cracking of the plaster after erection.

Write for catalogue.

WING TYPE BEAD WITH ROUNDING NOSE
Strong and rigid and well suited for general use

FURRING AND STUDDING
A full line of standard channel sections for furring and studding
Sizes, ¾, 1, 1½, and 2 in.

T-RAIL BEAD
Adjustable to any depth grounds. Clips may be fastened with every foot of bead

Literature

The Companies publish and furnish free:

"Sound Insulation," containing the report of the investigation by Professor F. R. Watson on sound insulation of 2-in. solid metal lath, plaster board and hollow block partitions; also "Cop-al" Metal Lath, which contains a report on the highest achievement in corrosion resisting steel.

THE GOLDSMITH METAL LATH CO.

Manufacturers of Metal Lath, Metal Tile System for Reinforced Concrete Slabs and Specialties

GENERAL OFFICE AND FACTORY

CINCINNATI, OHIO

Products

SHUREBOND, FOUR-RIB SHUREBOND and PHOENIX METAL LATH; SHUREBOND UNIT SYSTEM OF METAL TILE; COLD ROLLED CHANNELS; HANGER INSERTS.

Services

THE GOLDSMITH METAL LATH CO. is always glad to have special problems brought to its attention as the range of application is so great as to make it impossible to cover herein all phases as to the use of Shurebond products.

Catalogue containing complete details, specifications, table of safe loads for short concrete spans, and full information, mailed on request.

Shurebond—Its Wide Range of Adaptability

Shurebond is a patented metal reinforcement and lath used in fireproof, composite or wood constructed buildings, and is particularly adapted to solid plaster partitions, suspended and furred ceilings, fireproofing beams and columns, short span concrete floor and roof construction, outside walls, etc.

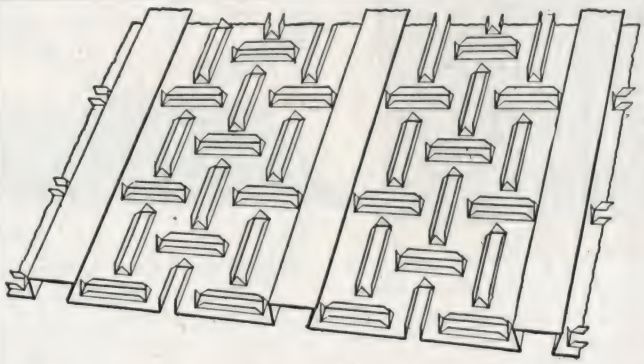
Shurebond is furnished in multiples of ½-ft. lengths to 6 ft. and even foot lengths to 12 ft. Made only in three gages (Nos. 28, 26, 24) and in widths of 2-ft. covering surfaces—allowance for laps unnecessary. Shurebond can be furnished arched to any radius down to cylinders 6 in. in diameter. Shurebond Metal Lath is furnished either painted or black.

Shurebond Advantages

Shurebond is designed to give the maximum bond, and stiffness, and greatest strength when combined with plastic materials which harden or set. Ribs are 4 in. on centers and dovetail, bonding mechanically with concrete and plaster. The webs of perforations are in the form of a truss, overlapping each other in both directions (no metal sheared away) which stiffens the plate vertically and laterally. No straight lines between perforations—plaster can not slip or shear upon application. Positive bond. Rib is ⅜ in. high. Cracks at rib are prevented because sufficient plaster covers top of rib when ¾ to 1 in. mortar is applied. Rib does not act in compression in thin concrete slabs.

The process of manufacturing Shurebond does not, as in expanded metals, require mutilating the fiber by first slitting the raw material, then expanding and stretching it. This destructive process opens up the slits, thereby making the entire plastering surface an open network of fractured metal fibers, which expose the open pores of the metal to corrosion and rapid disintegration. Shurebond is indestructible and should be used in buildings that are to last for all time, the life being many times that of expanded metals with or without ribs.

Partitions—Shurebond solid plaster partitions are absolutely fireproof, soundproof, sanitary, light in weight and space savers. They are economical in cost and rapidly erected. Can be built any height using No. 28 gage Shurebond. The names of many hotels, office buildings, hos-

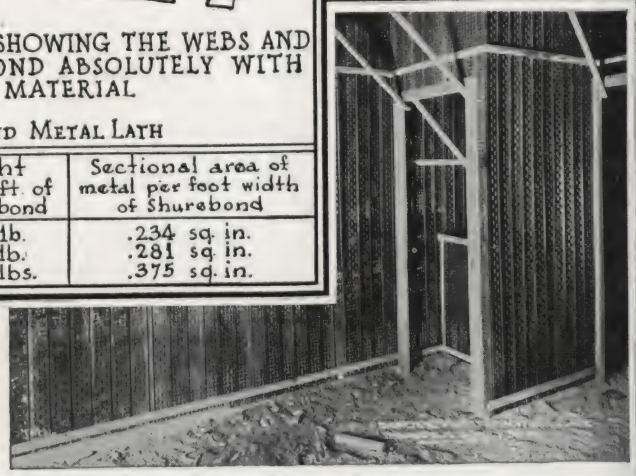


SHUREBOND METAL LATH, SHOWING THE WEBS AND PERFORATIONS WHICH BOND ABSOLUTELY WITH THE PLASTIC MATERIAL

DATA, SHUREBOND METAL LATH

No. gage	Weight per sq. ft. of Shurebond	Sectional area of metal per foot width of Shurebond
28 U.S. Standard gage	.80 lb.	.234 sq. in.
26 " "	.95 lb.	.281 sq. in.
24 " "	1.25 lbs.	.375 sq. in.

Shurebond Suspended Ceiling in Course of Construction



Shurebond Partition in Course of Construction

APPLICATIONS OF SHUREBOND METAL LATH

Continued on next page

pitals, schools and institutions constructed with Shurebond Reinforcement will be supplied as reference to bear out the above statements.

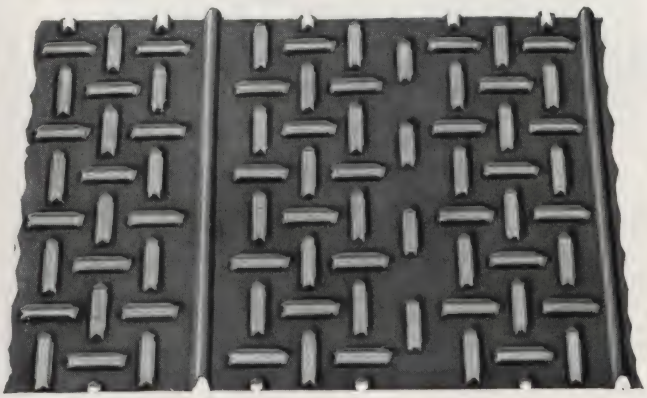
Ceilings—Shurebond for suspended ceilings can be used on 4-ft. spans without additional cross furring and of No. 28 gage. Bagging and sagging an unknown quantity. Shurebond can be plastered as easily as wood lath on account of its great stiffness and the fact that there are no sharp edges to cut the mortar. This naturally eliminates wastage. Shurebond Metal Lath should always be plastered on the smooth side first. When used as reinforcement it should be concreted on the rough side.

4-rib Shurebond Metal Lath

Identical to regular Shurebond except that ribs are channel shaped and are 8 in. on centers. Manufactured only in No. 28 gage weighing 7/10 lb. per sq. ft. or 6.3 lbs. per yard, in sheets 8 ft. long by 2 ft. wide covering surface, and painted. Used mainly for suspended ceilings up to 2 ft. 8-in. spans and in the manufacture of lath bottom units in the Shurebond Unit System of Metal Tile.

Phoenix Metal Lath

Used for nailing on wood studs or joists and for stucco work. Long life assured. Plastered as easily as wood lath. Bagging and sagging impossible. Good for 18-in. to 2-ft. span.



PHOENIX METAL LATH—WEB OR ROUGH SIDE

Made only in sheets 24½ in. wide by 8 ft. long and painted, weighing 4.85 lbs. per sq. yd.; 9 sheets (16.34 yds.) per bundle. Ribs 8 in. on centers.

Shurebond Unit System of Metal Tile (Patented)

This is a system of reinforced concrete slab construction which can be used with either reinforced concrete or structural steel frame. The Shurebond Unit System of Metal Tile consists of a series of rows of Shurebond Metal Tile Units separated so as to form concrete ribs or joists, which are reinforced and then covered with a thin slab of concrete. These reinforced concrete joists with the top slab carry the load to the supporting members; the Shurebond Metal Tile acting as a filler to form the ribs and support the dead load of the concrete slab as it is being poured.

Where ceilings are plastered directly on the underside of the slab Shurebond Lath Bottom Units are used in connection with the tile units.

Where ceilings are unplastered or suspended ceilings occur on the underside of the slab, the tile units are flanged and nailed to the forms directly with an 8d nail eliminating the lath bottom units.

Shurebond Lath Bottom Units are manufactured

SHUREBOND UNIT SYSTEM OF METAL TILE
New 12-story Keith Office Building, Cincinnati, Ohio

with a flange turned upward and a groove formed inside the flanges, so that when the Shurebond Tile are placed in this groove without nailing, they are held rigidly in position and a movement of the tile legs either inward or outward is impossible. When the concrete is poured to form the joists, it ties into the perforated flanges of the bottom unit, fills up the dovetail concave pockets in the flanges, forming lugs therein, thereby rigidly binding the Shurebond Lath Bottom Unit to the concrete and making it an integral part thereof, independent of the metal tile. It is only necessary to tack the lath bottom unit to the form with a No. 8 billposter's tack and a magnetic hammer. When the centering is removed these tacks do not project through far enough to interfere with the plastering and a perfectly flat and level ceiling is obtained without the use of wiring, hangers or furring of any kind whatever.

To prevent the concrete from running into the Shurebond Metal Tile at the supporting members, such as a girder or wall, Shurebond End Units are used to close the tile units at this point.

Shurebond Tile Units are furnished in standard widths of 20 in. and lengths of 2 and 1 ft., varying in depths from 4 to 16 in. inclusive. Shurebond End Units are furnished in standard widths of 20 in. and in depths of from 4 to 16 in. inclusive. Shurebond Lath Bottom Units are furnished in standard widths of 20 in. and in lengths of 2 and 1 ft.

The Company also manufactures a "fill in" tile, lath bottom and end unit which is standard 12 in. wide, designed for use at a wall or girder line where the spacing of the joists does not work out uniformly, thereby making it unnecessary to pour a large mass of concrete at these points.

Any depth or width of tile, end or lath bottom unit desired can be furnished on special order.

Economy of Construction—The Shurebond Unit System of Metal Tile is the most economical and serviceable slab system of reinforced concrete construction.

The dead load of floor slab, as compared with any other type of construction, is so materially reduced that it results in a considerable saving in reinforcing steel and concrete, not alone in the slab itself, but in girders, columns and foundations of concrete structures and structural steel in steel frame construction.

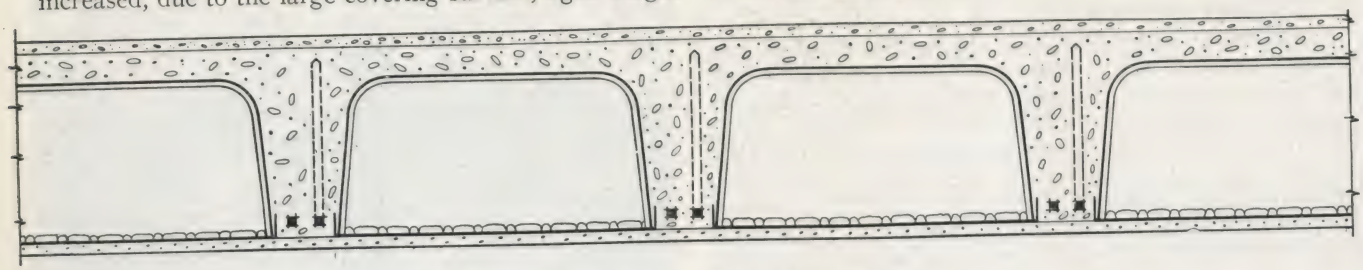
The simplest kind of temporary form work is employed. Only a skeleton centering is necessary, thereby reducing the amount of lumber and labor for forming for reinforced concrete work to a minimum.

The concrete after setting is very much harder than with clay tile, there being no loss by absorption or leakage through joints.

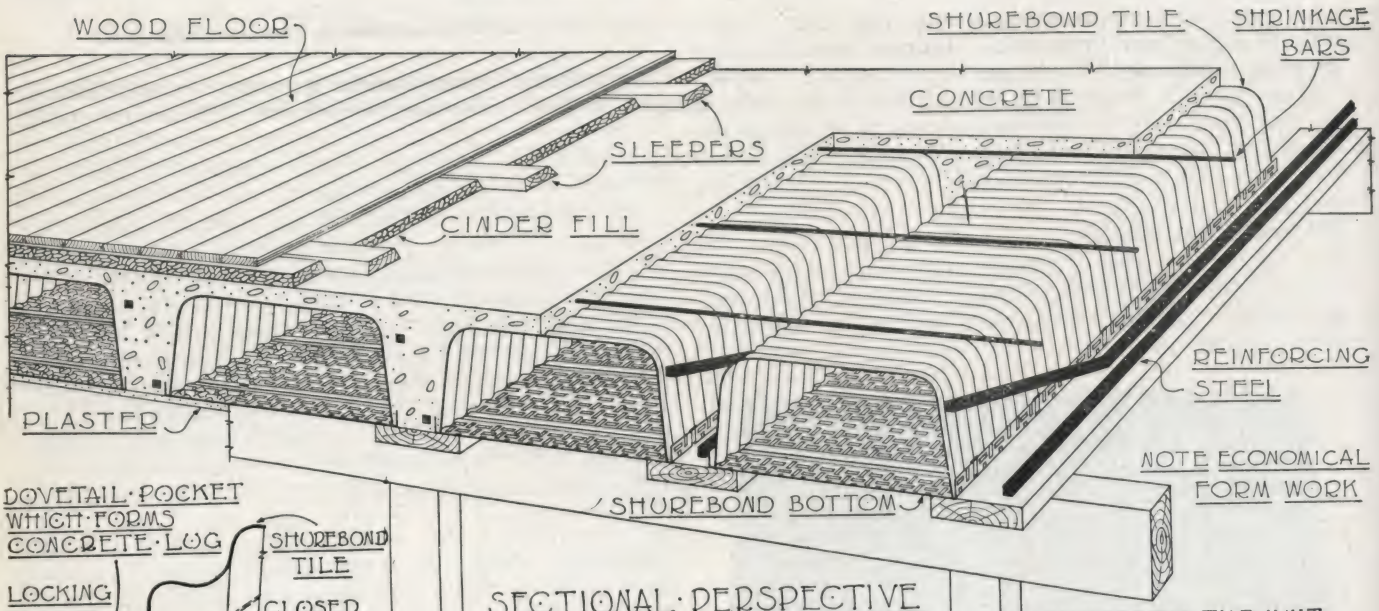
With the Shurebond Unit System of Metal Tile

Continued on next page

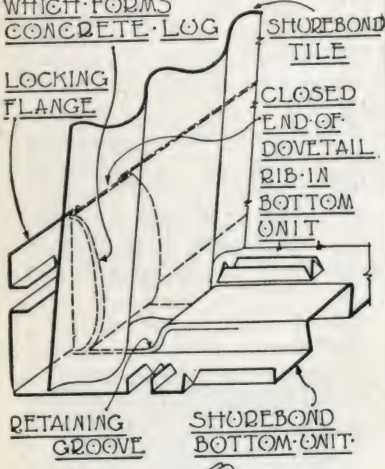
the speed in erecting fireproof buildings is greatly increased, due to the large covering surface, light weight of each tile, placement of less reinforcing steel and concrete, and simplicity of form work.

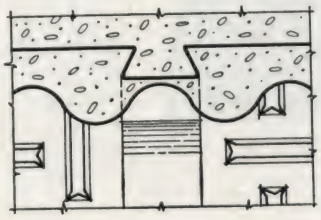


TYPICAL SECTION

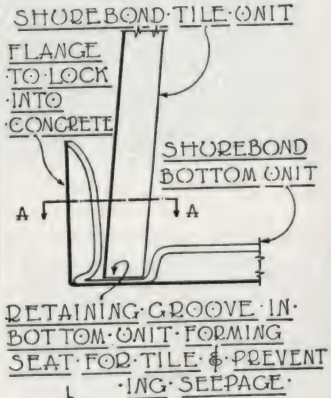


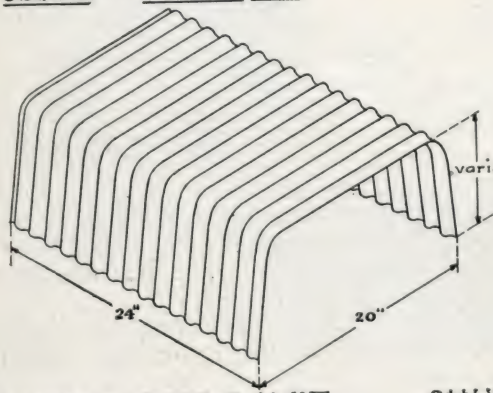
SECTIONAL PERSPECTIVE



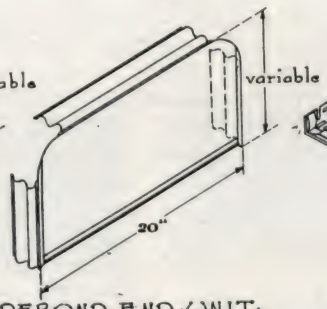


SECTION A-A

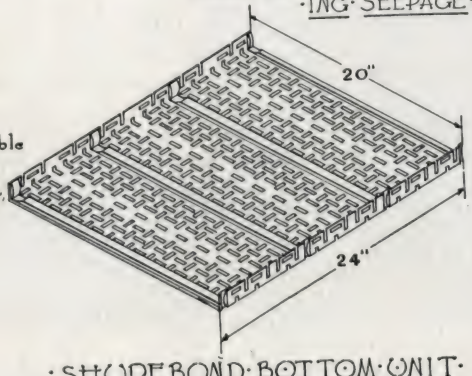




SHUREBOND TILE UNIT



SHUREBOND END UNIT



SHUREBOND BOTTOM UNIT

DETAILS OF SHUREBOND METAL TILE SYSTEM

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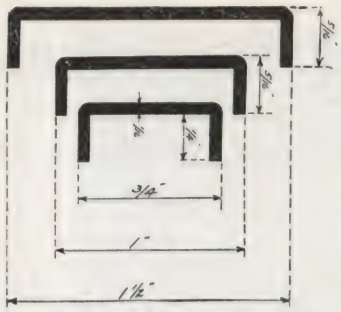
Cold Rolled Channels

THE GOLDSMITH METAL LATH CO. manufactures cold rolled and formed channels standardizing on ¾- 1- and 1½-in. face with ¼-in. flanges out of No. 16 B.W.G. and in 16-ft. lengths. Any size, length and gage desired can be made on special order.



ACTUAL SIZE SECTION OF COLD ROLLED CHANNELS

Shurebond Hanger Inserts (Patented)

This insert is just what its name implies—*Shurebond* because it is an integral part of the concrete structure when the concrete is poured and set, the same as reinforcing steel; *hanger insert* because the primary reason for its development was the lack of any economical or easily workable device to provide for suspending or furring from concrete slabs.

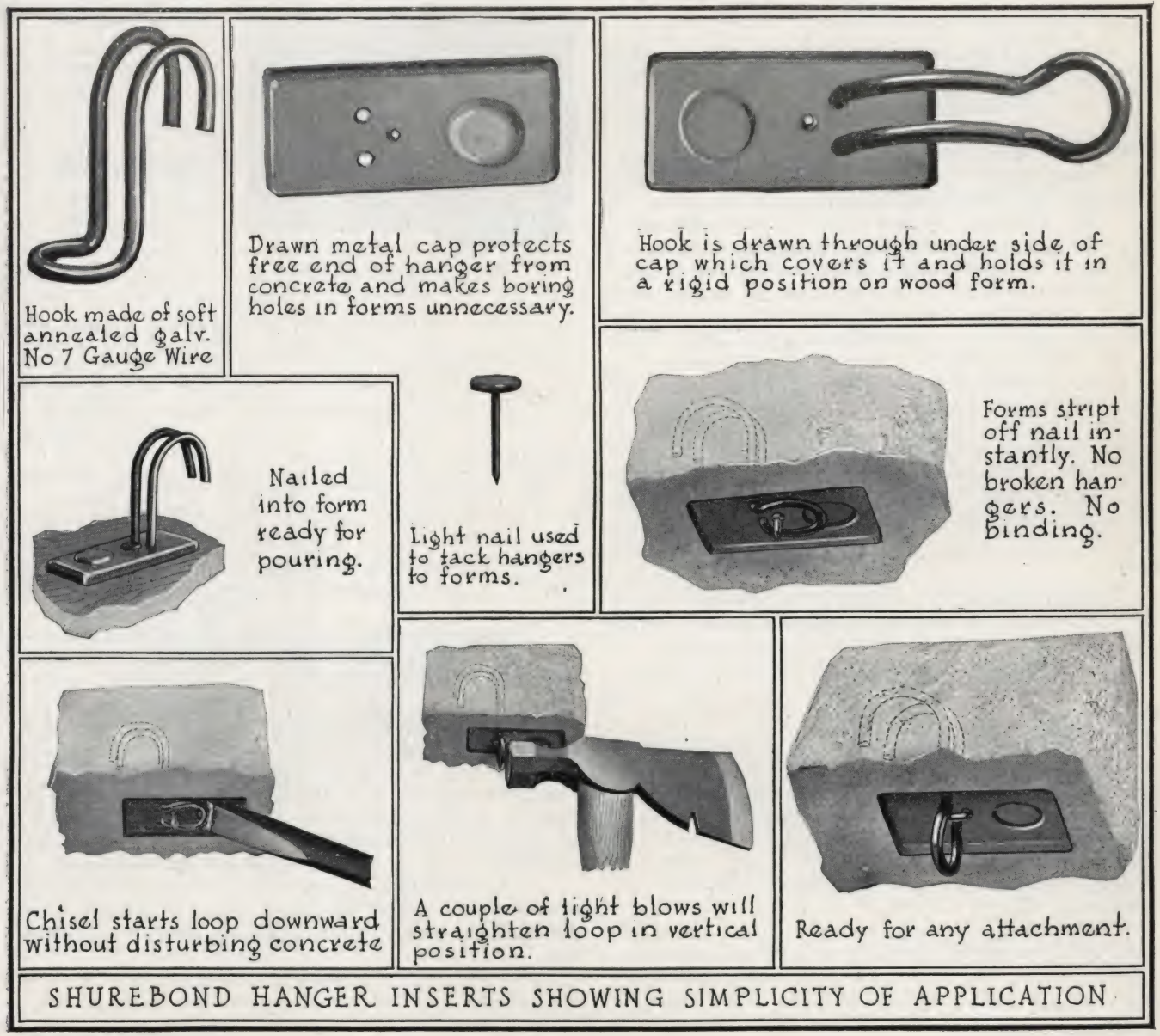
Unlimited Utility and Economy—The Shurebond Hanger Insert is ideal for suspending or furring ceilings; it can be used for suspending pipes or anything else that has to be hung from the underside of a concrete slab. It is an insert for which a thousand uses can be found and which some time may be just the thing you are looking for, to overcome in a simple manner, some tantalizing little problem.

Anticipate these problems before the buildings are up. The cost of Shurebond Hanger Inserts is a very small item. They are hardly noticeable in an unplastered ceiling. They will stand the pull that inserts many times their cost will. No holes to drill in wood forms. A man will lay 25 inserts while placing 1 wire in the old way, resulting in a tremendous saving in labor.

Application—All that is necessary is to nail the Shurebond Hanger Insert to the form through the nail-hole provided and when the form is stripped wedge the heavy wire loop downward with a chisel and one or two light blows with a hammer will give a perfect loop projecting downward to which to make attachment or suspension.

Specification—Be sure to specify Shurebond Hanger Inserts as manufactured by THE GOLDSMITH METAL LATH CO. of Cincinnati, Ohio, in future specifications and give the client the most important little device in the building line.

Try it and test it. We will gladly send one or two for experimental purposes.



SHUREBOND HANGER INSERTS SHOWING SIMPLICITY OF APPLICATION

AMERICAN STEEL & WIRE COMPANY

Triangle Mesh Woven Wire Fabric for Stucco Houses

SALES OFFICES

CHICAGO, 208 South La Salle Street
WORCESTER, 94 Grove Street
BOSTON, 185 Franklin Street
PHILADELPHIA, Widener Building
PITTSBURGH, Frick Building
BUFFALO, 337 Washington Street
DETROIT, Foot of First Street
CINCINNATI, Union Trust Building
CLEVELAND, Western Reserve Building
NEW YORK, 30 Church Street
BALTIMORE, 32 South Charles Street
WILKES-BARRE, PA., Miners Bank Building
ST. LOUIS, Liberty Central Trust Co. Building
ST. PAUL-MINNEAPOLIS, Pioneer Building, St. Paul
KANSAS CITY, 417 Grand Avenue
OKLAHOMA CITY, First National Bank Building
BIRMINGHAM, ALA., Brown-Marx Building
DENVER, First National Bank Building
SALT LAKE CITY, Walker Bank Building

EXPORT REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., 30 Church Street, New York

PACIFIC COAST REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., San Francisco, Los Angeles, Portland, Seattle

Product

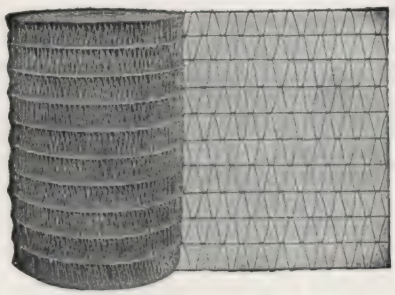
TRIANGLE MESH GALVANIZED WOVEN WIRE FABRIC for Stucco Work.

For Wire Rope, see pages 22-25; for Concrete Reinforcement, see pages 27-31; for Electrical Wires and Cables, see pages 1820-1829.

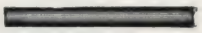
Description

Triangle Mesh is a woven fabric made of galvanized steel wire, each member of which is cold drawn from a hot rolled steel rod. When a rod is drawn through a die or hole in a cast steel plate, its various particles are rearranged and compressed, thus forming the finished wire which is smaller in diameter than the original rod. This mechanical working produces a steel that is automatically tested for imperfections and is very much stronger than the original rod from which it was drawn.

The accompanying cuts show the exact sizes of the wires used in the fabric and the general appearance of the mesh itself. The main or longitudinal wires are spaced 4 in. apart and the diagonal cross wires are spaced 2 in. apart. This fabric can also be furnished with the cross wires spaced 4 in. instead of 2 in. apart although the closer spacing is recommended.



STYLE 2L, 2-IN. MESH



EXACT SIZE OF MAIN OR LONGITUDINAL WIRE

EXACT SIZE OF DIAGONAL CROSS WIRES

GALVANIZED TRIANGLE MESH WOVEN WIRE REINFORCEMENT FOR STUCCO

Style No.	Longitudinal wires		Cross wires		Approx. weight, lbs., per sq. yd.
	Gauge	Spacing, in.	Gauge	Spacing, in.	
2L	No. 12	4	No. 14	2	2.84
2M	No. 12	4	No. 14	4	1.94

Made regularly in rolls 150 ft. long and 36 or 48 in. wide.
Rolls 150 ft. long, 36 in. wide contain 50 sq. yds. Rolls 150 ft. long, 48 in. wide contain 66⅔ sq. yds.

Uses

Triangle Mesh fabric is adapted to new buildings or overcoating old structures and works equally well for the overcoating of old wood, brick or stone structures. It is equally efficient with cement and magnesite stuccos.

Advantages

A study of the illustrations shows conclusively the decided advantage gained by having the wires placed as they are in this material. No matter where a crack may try to form, there is always a wire there to prevent it. The diagonal wires also act as a brace to prevent collapse of the building in exactly the same manner as the diagonal members in a bridge prevent collapse of that structure.

The openings are large enough to insure that the stucco will be pushed through and around the wires, thereby forming a perfect key or bond between the mesh and the stucco and at the same time making a complete coating over the wires. This coating, in addition to the zinc galvanizing, insures a lasting construction.

The wires used in Triangle Mesh reinforcement are 6 or 8 times as heavy as the members in the small meshed metal laths. This fact in itself demonstrates its superiority.

It is common knowledge that a thin, plain piece of steel will be quickly destroyed by rust. It is also known that a coating of paint is only a temporary protection. Therefore, specify a reinforcement for stucco that is made up of good substantial steel members, thoroughly galvanized. Galvanized Triangle Mesh steel wire costs less than a plain or painted small meshed metal lath.

It is furnished in long rolls, thereby eliminating extra material due to laps, and insures a stronger construction due to the longer continuous bands of building steel.

Because of the galvanized coating, it can be successfully used with magnesite as well as cement stucco.

Continued on next page

Economy

The economy of galvanized Triangle Mesh fabric lies in its efficiency, low first cost and low installation cost.

The size of the wires, the strength of the wires and the quality of the galvanized coating insure efficiency. The cost is less than for painted metal lath and compares favorably with wood lath. The cost to the contractor in small lots will average about 20c per sq. yd. For the ordinary house construction, 2 men will apply 300 sq. yds. per day.

Applying Scratch Coat Over Galvanized Triangle Mesh
Style 2-L

Application

This material is not a lath in the true sense of the word; a suitable backing must be used to prevent the stucco from pushing through and falling to the ground at the time of application.

This backing is always found in a well constructed house and may consist of the usual board sheathing with or without a covering of light weight tarred building paper, a manufactured felt, paper, or gypsum board, or any of the other so-called sheathing or plaster boards. Triangle Mesh fabric is used over this backing and its most important duty is to prevent the formation of destructive cracks in the stucco, eliminate the possibility of the stucco falling entirely away, and bind the house with bands of steel, thereby insuring the greatest stability possible.

When wood lath or small mesh metal lath is used, furring strips must be applied to hold the lath out away from the sheathing, otherwise the stucco will not flow through the openings far enough so that the lath will be gripped by the stucco. No furring strips are needed with Triangle Mesh reinforcement because its general construction is such as to insure that the wires are held away from the sheathing and that the stucco will completely cover them.

For fastening the reinforcement to wood sheathing, use 1-in. or larger galvanized wire poultry netting or metal lath staples, using at least one staple in every square foot of fabric. Special care should be taken to staple the mesh securely at all corners and all openings. Galvanized staples or nails are preferred for all types of stucco and are absolutely necessary when used with any of the magnesite stuccos, for the reason that the chemicals used in their manufacture will attack the plain or painted steel and cause early destruction.

Extend the Fabric Around the Corners

The wire fabric should extend around the corners, no laps being closer than 8 in. from the corner. The laps along the sides of the sheets should be at least 2 in. The cutting of the fabric can be easily done by means of heavy snips.

Stucco should not extend down to the ground, otherwise unsightly stains will form due to dirt, rain, etc. There is also the possibility that frost will work in behind the stucco and cause damage to the surface.

Sometimes it is necessary to run the stucco to grade and in that case the backing should be concrete, brick, stone or tile, and the steel wire reinforcement should be suitably fastened over this backing to insure that the stucco will not eventually crack and flake off.

Overcoating of Old Structures

Triangle Mesh is easily and quickly applied to old buildings at a small cost, and buildings remodeled in this way are made warmer, more durable and present a greatly improved appearance.

It is well adapted to the overcoating of old wood, brick or stone structures.

If the weather boarding on the old wood building is in bad condition, it is advisable to have it removed before applying the building paper and the fabric; otherwise staple directly to the old weather boarding.

For fastening to old siding, use 8d or 10d wire nails driven well into the sheathing or studding and bent over the reinforcement. For fastening to old brick walls, 10d wire nails should be driven well into the mortar joints and bent over the reinforcement.

WICKWIRE SPENCER STEEL CORPORATION

SUCCESSOR TO CLINTON-WRIGHT WIRE COMPANY

Manufacturer of Woven Wire Lath and Welded Sheathing

WORCESTER, MASS. BUFFALO, N. Y.

DISTRICT OFFICES

NEW YORK, N. Y., 41 East 42nd Street
BOSTON, MASS., 120 Franklin Street
PHILADELPHIA, PA., 237 North Sixth Street
CHICAGO, ILL., 215 W. Ontario Street
DETROIT, MICH., 3044 West Grand Boulevard
TULSA, OKLA., 861 Mayo Building
SAN FRANCISCO, CAL., 111 Townsend Street
LOS ANGELES, CAL., 316 Market Street

Products

CLINTON WIRE LATH and WELDED SHEATHING.

For Electrically Welded Wire Fabric for Concrete Reinforcement, see pages 44-47; for Ornamental Metal Work and Wire Fencing, see page 638; for Perforated Metal Grilles, see page 1773.

Clinton Wire Lath

Clinton Wire Lath has been the recognized standard of quality for over half a century and is the most efficient and trustworthy lathing material in use at the present time.

The Clinton Wire Cloth Company (WICKWIRE SPENCER STEEL CORPORATION, successor), the originator of wire cloth weaving, was the first concern to engage in the manufacture of fireproof lath.

Soon after the invention of power looms for the weaving of woolens and cotton, the Clinton Wire Cloth Company perfected a form of loom for weaving wire and entered into the manufacture of their wire lath. This woven wire mesh was the first efficient form of metal fireproofing ever used. It was used for fireproofing purposes as early as 1856, and many buildings are now standing which were fireproofed with this material at that time.

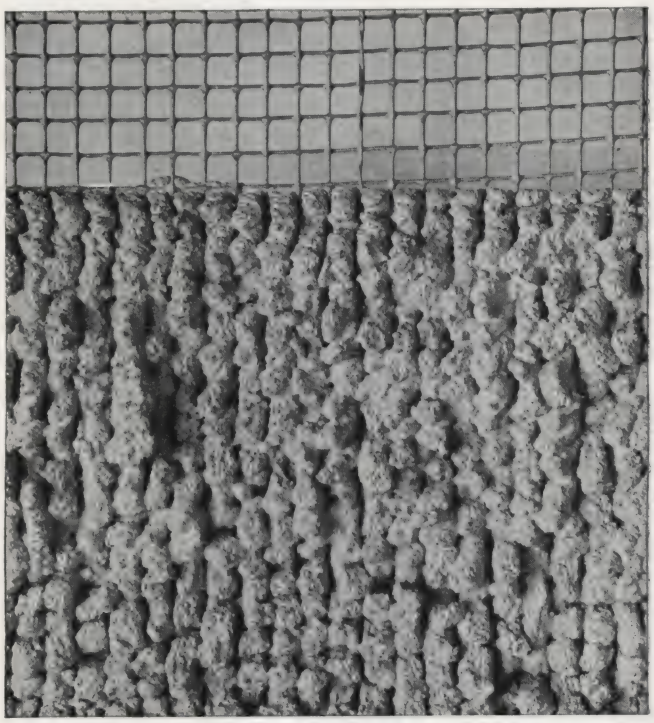
Wire versus Sheet Metal—A drawn steel wire when compared with a sheet metal is, in the matter of strength and general quality of material, a superior product. The wire, which is made by being drawn through a die, is, during its manufacture, subjected to a high tensile stress. This drawing and working of the material renders the wire a fibrous material of uniform quality and for this reason it is stronger and more reliable that sheet metal, which is necessarily of an inferior grade and which suffers more or less injury through the process of cold cutting and expansion.

Perfect Key—The primary function of any lathing material is to serve as a foundation to grip and hold mortar. It is the key or the clinch of the backplaster which actually determines the efficiency of the plastered surface.

To obtain the best results it is not sufficient to have isolated portions of mortar here and there pushed through and turned on the reverse side of the lath, as is obtained with a great many types of metal lath. In order to insure substantial and permanent construction, it is absolutely essential that the lath be actually embedded in the body of the plaster. Without a thorough covering of backplaster, air and moisture will in time attack the metal and slow but sure disintegration will result.

In view of the ease with which mortar will pass over and around the small circular strands of a wire mesh with no flat or inclined surfaces to deflect or obstruct its passages, Clinton lath enables plaster to form a more perfect key than can be obtained with any other type of lath.

Quantity of Plaster—This perfect key does not by any means indicate that wire lath will waste plaster. All metal which enters into the structural elements of a building must be protected against rust and corrosion. In the case of a metal lath it is this backplaster, this key, this rear side covering, which must be relied upon to offer the necessary protection to the lath. The claim made by some manufacturers that their lath saves mortar is in itself an admission of the fact that a thorough and satisfactory key is not obtained. Naturally any type of lath which permits plaster to pass through and be turned here and there at isolated spots on the reverse side of the lath will use less plaster than one which permits the plaster to thoroughly cover the metal.



THE KEY OF CLINTON WIRE LATH

It must be remembered that this rear side of the plastered surface is inaccessible; it can not be reached after the front side has been plastered, and it is consequently necessary to rely upon the plaster that works through and forms the key to offer the necessary protection to the metal on the rear side of the wall.

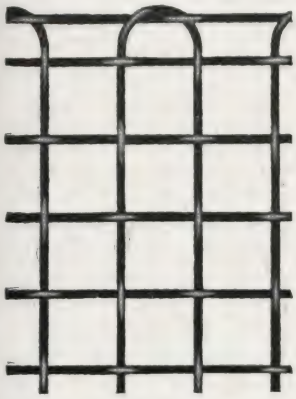
If good work is desired, plaster must be used and Clinton wire lath will require absolutely no more

Continued on next page

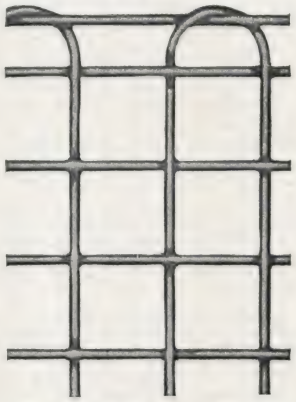
plaster than will be necessary on any other type of metal lath used in such a way as to insure good first class and reliable construction.

Stock Grades and Sizes of Clinton Wire Lath

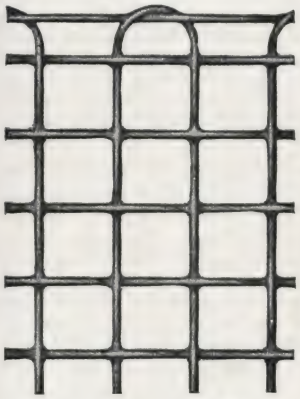
Mesh and Gauge—All stock grades of Clinton wire lath are woven from No. 18 to No. 21 Washburn & Moen gauge wire with 2 and 2½ meshes per lineal inch in each direction. In Clinton lath the gauge of wire is always correctly tagged, thus showing the actual size of wire used.



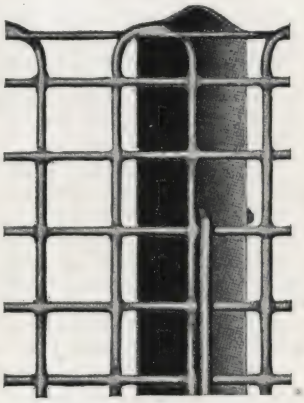
PLAIN JAPANNED WIRE LATH
2½x2½ mesh



PLAIN GALVANIZED WIRE LATH
2x2 mesh



PLAIN GALVANIZED WIRE LATH
2½x2½ mesh



STIFFENED GALVANIZED WIRE LATH
2½x2½ mesh

V-stiffeners—In cases where special rigidity is desired or where furring strips are widely separated, Clinton lath may be provided with V-stiffeners. These are rigid V-shaped ribs of No. 24 gauge steel securely fastened to the wires and extending across the fabric at intervals of 8 in.

In addition to giving additional stiffness, these V-stiffeners also afford an offset of ⅜ in. from the supports to which the lath is attached. The V-stiffeners are attached to the wire by flat steel clips which hold them rigidly in position. The V-stiffeners may be utilized as furring strips, thus enabling stiffened lath to be applied directly to flat surfaces with sufficient clearance behind the wire to establish a satisfactory key for the plaster.

Japanned Lath—All sizes of Clinton lath, either plain or stiffened, may be obtained either japanned or galvanized. Japanning, while cheaper than galvanizing, affords for average interior construction a thoroughly satisfactory and efficient protective covering. If, however, it is desired to use the best that the market affords, the galvanized grade should be used.

Galvanized-after-woven Lath—Clinton lath, either plain or stiffened, may be obtained in the grade known as "galvanized-after-woven."

This process of galvanizing after the mesh is formed increases the rigidity of the fabric as a result of the soldering action of the galvanizing metal at the points where the wires cross each other. This grade of material should always be used for exterior construction where the work is subjected to severe climatic conditions.

Size of Rolls—Clinton V-stiffened lath, either japanned or galvanized-after-woven, is furnished in rolls 100 ft. long.

Clinton plain lath, (i.e., lath without stiffeners) either japanned or galvanized-after-woven, is furnished in rolls 150 ft. long.

The stock width of Clinton lath, either plain or stiffened, is actually 36⅝ in. This width is called 36 in. and sold as such. Thus a 150-ft. roll of Clinton lath, which is sold as 50 sq. yds., actually contains about 51 sq. yds.

Special Grades and Sizes—Clinton wire lath may, upon special order, be obtained with various combinations of mesh and gauge other than those mentioned under "Stock Grades and Sizes."

SHIPPING WEIGHTS OF CLINTON WIRE LATH

Wire gauge No.	Weight of 1 roll, 36 in. wide, lbs.			
	Plain Lath containing 150 lin. ft.		V-stiffened Lath containing 100 lin. ft.	
	Japanned	Galvanized	Japanned	Galvanized
18	160	205	135	175
19	125	160	110	145
20	90	125	90	125
21	75	105	80	110

WIRE LACING AND WIRE STAPLES REQUIRED TO APPLY 100 SQ. YDS. OF CLINTON WIRE LATH

Spacing of furring, in. c. to c.	Plain Lath		V-stiffened Lath	
	No. 18 galvanized wire lacing, lbs.	¾-in. No. 14 galvanized wire staples, lbs.	No. 18 galvanized wire lacing, lbs.	1¼-in. No. 13 galvanized wire staples, lbs.
12	6	4	5½	9½
14	5	3½	4½	8
16	4½	2	4	7
18	.....	.....	3½	6

Proper Grade of Clinton Wire Lath to Use

As to the proper grade of lath to be used in any given case, that is, whether plain or stiffened, it may be said that this usually depends upon the spacing of the furring or the supports to which the lath is attached. In general, plain lath can be used with perfect satisfaction when the furring members are spaced 12 in., and in some cases even 16 in., whereas the stiffened type should always be used when the supports are more than 16 in. apart.

As to the proper size of wire to be used, the company would in general recommend, for ordinary average construction with 12-in. spacing of furring, the use of a No. 19 gauge wire when the lath is plain, while a No. 18 gauge may be used in special ceilings or cornices which are slightly heavier than usual or in other cases where it is desired to increase the spacing of furring to 14 or 16 in. If, however, the lath is provided with V-stiffeners, which are in reality small, secondary furring strips on 8-in. centers, a No. 20 gauge wire is sufficient. In the case of the galvanized-after-woven grade slightly smaller sizes may be used with perfect satisfaction; as, for instance, a No. 20 gauge when plain and a No. 21 gauge when V-stiffened.

Continued on next page

Specifications for Interior Furring and Lathing

Wire Lath—The lath throughout shall consist of No. 20 gauge Clinton Wire Lath woven with 2½ meshes per inch. All lath shall be thoroughly galvanized-after-woven. (If galvanizing is not desired, substitute word "japanned" for words "galvanized-after-woven.") The lath shall be provided with V-stiffening ribs, the depth of which shall be not less than ⅜ in. beyond the face of the lath. These ribs shall be securely clamped to the transverse wires, and shall extend across the full width of the fabric at intervals not exceeding 8 in. (These last two sentences may be omitted if the stiffened type is not desired.)

Laps—All lath shall be lapped at least 1 in. where end joints are made, and at the sides of the sheet shall be lapped and tied in such a manner as to provide secure and unbroken continuity to the lathed surface.

Wire Lacing—Lath shall be securely tied or laced to furring, as hereinafter specified, with No. 18 gauge annealed galvanized wire, and the ends of all ties shall be secured by a double turn and bent back flush with the face of the lath.

How to Apply—In applying wire lath to wooden supports either against sheathing or to bare studs in walls and partitions, or against joists as in ceilings, the lath shall be securely stapled in place with galvanized wire staples, driven down so as to bring the lath to a secure bearing against the supporting background.

In applying plain lath to wooden furring, it shall be stapled along each stud or joist.

In case stiffened lath is applied directly to sheathing, each stiffener shall be stapled both at the sides and at the center of the sheet.

Workmanship—All lath shall be tightly drawn with proper tools and shall finish smooth and true to the required lines without bag, bulge or sag.

All nuts shall be tightly drawn and all lath securely wired before plastering is begun.

All furring, cross-furring, studs, frames, brackets and lath shall be true, exact and rigid, and all necessary supports, connections and attachments shall be supplied and erected as required, leaving all surfaces in proper condition to receive the plaster.

Ceilings—*Size of Furring*—Furring for ceilings shall be done with suitable channels, angles, tees, or flats of such size and strength as will adequately support the depending loads. All furring and supports for same shall be of sufficient strength to sustain a load of at least 10 lbs. per sq. ft. of plastered surface, and all furring members shall have such stiffness that they will not deflect more than 1/360 of the span under the final load which they are required to sustain.

Furring bars shall in no case be less than ¾-in. channels, or their equivalent, for spans up to 5 ft.; nor less than 1x⅜x⅛-in. channels, or other approved sections of equivalent strength, for spans up to 7 ft.

For spans exceeding 7 ft., the sectional area and strength of furring bars shall either be increased in proper proportion or they shall be provided with intermediate supports consisting of clips or hangers securely fastened to or anchored in the floor construction above.

In all cases where heavy ornamentation or other special attachments are called for, special provision shall be made to sustain the loads imposed.

Suspended Ceilings—When ceilings extend more than 6 in. below the floor beams, they shall be considered as suspended ceilings and shall be properly cross-furred by means of running bars which shall receive and support the furring bars.

Running Bars—Suspended ceilings shall be provided with continuous running bars properly suspended by hangers from the beams or floor construction as may be required.

These running bars, which shall be spaced not more than 5 ft. apart, shall be of such size and strength as to adequately support the loads imposed, but shall in no case be less than 1½x¼-in. flat steel or other approved shapes of equivalent size and strength.

Connection of Furring Bars to Running Bars—In suspended ceilings the furring bars shall be securely bolted or clipped to or passed through the running bars. If running bars and furring bars are bolt-connected, the bolts for such connections shall be ¼ in. in diameter, or if hairpin clips are used they shall be of No. 9 annealed galvanized wire and shall pass up on both sides of the furring bars and be securely hooked over the running bars.

If furring bars are passed through running bars, they shall fit snug in the openings provided to receive them in order to prevent undue play or movement of the bars.

Spacing of Furring Bars—The spacing of furring bars in clipped and suspended ceilings shall depend upon the type of lath used, but shall not be more than 12 in. when the lath is plain nor more than 18 in. when the lath is provided with V-stiffeners.

Clips—Clips used for the purpose of receiving and supporting furring bars for ceilings shall be made from not less than 1x⅛-in. flat steel, but must in all cases be of sufficient strength to sustain the loads imposed, and of such fabrication and design as will meet the approval of the architect. All clips attached to steel beams shall be of the forked or clamped type and must be securely fastened over both sides of the bottom flange of the beam.

Unless other secure and approved means be provided for receiving and supporting furring bars, the lower ends of clips shall be punched for and provided with ¼-in. diameter bolts for attaching furring to same.

Hangers—In suspended ceilings the main running bars shall be suspended from the floor construction above by means of hangers which shall be not less than 1x⅜-in. flat steel, but which in all cases shall be of such strength, fabrication and design as to adequately support the loads imposed. All hangers attaching to steel beams shall be of such a type that they will securely clamp on both sides of the bottom flange. At their lower ends, hangers shall be punched for and provided with ⅜-in. diameter bolts for securing the furring to same and shall be of varying lengths so that any variation may be taken up and the wire lath ceiling made firm and secure to the proper lines.

Auxiliary hangers shall be provided for furring bars in clipped ceilings and for running bars in suspended ceilings at points where the strength and rigidity of the construction requires intermediate supports between floor beams. These hangers shall be not less than 1x⅛-in. flat steel when supporting furring bars as in clipped ceilings, nor less than 1x⅜-in. flat steel when supporting running bars as in suspended ceilings, but must in all cases be of such size and strength as is required to sustain the depending loads. Such hangers shall be provided at their upper ends with suitable means for attaching to or anchoring in the floor construction, and at their lower ends shall be punched for and provided with suitable bolts for connecting furring to same. These bolts shall be of ¼-in. diameter for hangers supporting furring bars as in clipped ceilings and of ⅜-in. diameter for hangers supporting running bars as in suspended ceilings.

Connection to Concrete or Wooden Beams—All hangers and clips which do not attach to steel beams must in the case of concrete beams be securely anchored therein or in the case of wooden beams be securely spiked thereto.

Partitions—*Size of Studs*—All studding for partitions shall consist of suitable channels, angles, tees or flats of such size and strength as will produce and maintain a stiff and rigid partition wall, but shall in no case be less than ¾-in. channels or other approved shapes of equivalent size and strength.

Arrangement of Studs—In solid partitions the furring shall consist of a single line of vertical studs set plumb and true to the proper lines and of such size as will give the required thickness to the finished partition wall.

In hollow partitions the furring may consist either of a single or a double line of vertical studs set plumb and true to the proper lines.

If a single line of studs be used, they shall be of such strength as will provide the required stiffness and rigidity of construction and of such width or depth as will give the required thickness to the finished partition wall.

If a double line of studs be used, the two lines shall at all times be maintained the proper distance apart, in order to obtain the required air space within the partition, and also give the proper thickness to the finished partition.

Supports for Studs—All studs shall be securely fastened to the floor and ceiling construction by bent knees, slotted clips or runner plates of approved type.

Runner Plates—Where runner plates are used, they shall be not less than 1x⅛-in. flat steel or 1x1x⅛-in. angles, but must, in any case, be of sufficient size, strength and width to receive and hold the studs in such a manner as to obtain rigid and secure supports for same.

Runner plates must be securely clamped or fastened to the floor beams by suitable attachments or must be securely connected to floor and ceiling construction by means of expansion bolts or anchor nails of approved type.

If a double line of studs be used, and if these are connected top and bottom to runner plates, two lines of such plates shall be provided both top and bottom—that is, one for each line of studs; and these plates shall be absolutely parallel and shall be maintained the proper distance apart.

Continued on next page

Separators—When two lines of studs are used, all studs, in addition to being bolted or otherwise securely connected to the ceiling and floor construction, must be braced and stiffened also by means of separators connecting the studs of one line with the corresponding studs of the other.

These separators which shall not be less than 1x⅛-in. flat steel shall be spaced at intervals of not more than 5 ft. vertically, and shall be securely bolted to the studs with ¼-in. diameter bolts.

Frames for Openings—Frames for doors, windows and other openings shall consist of suitable channels, angles, tees or other approved shapes assembled in a rigid manner and securely bolted in place.

All frames for openings must be true in size and shape, must have correct location and position as indicated on the plans or as may be directed by the architect and shall be provided with ⅜-in. round holes punched 18 in. apart to receive bolts for attaching to the wooden bucks. (See "Carpenter Work.")

Spacing of Studs—The spacing of the studs in a direction longitudinal with the length of the partition wall shall depend upon the type of lath used, but in no case shall such spacing be more than 16 in. when plain lath is used, nor more than 18 in. when the lath is provided with V-stiffeners.

False Columns—*Size and Arrangement of Studs*—Furring for false columns shall consist of suitable channels, angles, tees, flats or built-up sections of such strength and arrangement as will provide a firm and secure foundation for the plaster or ornamental covering.

In all false columns each column shall enclose at least four vertical studs which shall in no case be smaller than 1x1x⅛-in. angles or other approved shapes of equivalent size and strength. These longitudinal studs shall be set true and plumb and shall be accurately spaced and arranged in such a way as to conform to the general outline of the finished column.

False Beams and Cornices—Furring for false beams and cornices shall consist of steel brackets accurately bent and shaped so as to conform to the general outline of the finished beam or cornice. These brackets shall be formed with channels, angles, tees or flats of proper size and strength to adequately support the depending load, but shall in no case be formed with less than ¾-in. channels or other approved shapes of equivalent size and strength.

All brackets must be formed so as to constitute rigid and secure frames for supporting the plaster covering, and shall be securely bolted top and bottom to the longitudinal supporting rails with ¼-in. diameter bolts.

Longitudinal Rails—Extending at right angles to the brackets and in a direction longitudinal with the beams or cornice which is being furred, there shall be provided a top and bottom rail which shall be of proper size and strength to receive and support the bars of which the brackets are formed. These rails shall in no case be less than 1x⅛-in. flat steel, or other approved shapes of equivalent size and strength, and shall be securely connected to or supported from the beams, walls or ceilings by means of clips, bolts or hangers.

Chases, Air Ducts, etc.—All pipe chases, air ducts and other spaces as may be required, and all surfaces of iron or steel coming within spaces to be plastered, shall be properly furred and lathed.

Without Furring—All such openings or spaces as do not exceed 2 ft. in width may be lathed by the direct application of Clinton V-Stiffened Wire Lath without the use of any furring.

In such cases the lath shall be applied in such a way that the V-stiffening ribs span across the space or opening with sufficient lap on either side and with each stiffener secured on each side with staples or anchor nails of approved type.

With Furring—Openings not less than 2 ft. nor more than 4 ft. in width shall have a 1x1x⅛-in. angle, set along each side with the outstanding leg flush with the wall surface and the other leg secured to the wall with expansion bolts or anchor nails of approved type.

Extending across the opening and bolted with ¼-in. diameter bolts to the outstanding leg of each angle stud there shall be provided furring strips which shall be not less than 1x⅛-in. flat steel, but must, in any case, have such stiffness and rigidity as to offer adequate support to the lath and plaster.

The vertical spacing of these furring strips shall depend upon the type of lath used, but shall not in any case be more than 16-in. if plain lath is used, nor more than 18 in. if the lath is provided with V-stiffeners.

Lath Adjoining Masonry—All lath shall be lapped at least 4 in. over all adjoining masonry and shall be properly secured thereto by galvanized staples or anchor nails of approved type.

Joints—Where materials of different kind come together such as the joining of brick to gypsum, or gypsum to terra cotta, etc., such joints shall be covered with a strip of Clinton Wire Lath which shall extend 6 in. on each side of the joint and which shall be properly secured in place by galvanized staples or anchor nails of approved type.

Miscellaneous—It is to be understood that all miscellaneous furring and lathing as indicated on the plans, but which may not herein be specifically described, shall be done in a workmanlike manner conforming in all respects with the general scope and intent of these specifications, and in such degree of detail and exactness as will meet the approval of the architect.

Specifications for Exterior Furring and Lathing

General Requirements—*Intent*—It is the intent of this specification to include the furnishing of all labor, materials, apparatus, ladders, scaffolding, hoisting and cartage necessary to supply, erect and complete all waterproofing, furring and lathing required to construct a substantial and proper foundation for exterior plastering.

Wire Lath—The lath throughout shall consist of Clinton Wire Lath woven with 2½ meshes per lineal inch and of size and type as hereinafter specified.

Galvanizing—All lath used for supporting exterior plaster shall be thoroughly galvanized-after-woven, and no type of painted or dipped lath other than that which is galvanized will be accepted when used to support exterior plaster.

Laps—All lath shall be lapped at least 1 in. where end joints are made and these joints shall be properly alternated or broken.

Side joints shall be properly lapped and stapled in such a manner as to provide secure and unbroken continuity to the lathed surface.

Staples—All lath applied to wooden supports shall be properly secured thereto with Clinton Galvanized Wire Staples as hereinafter specified.

Walls with Wooden Sheathing—Where the wall framing is constructed with wooden sheathing, the exterior surface of the sheathing shall be waterproofed with an approved quality of 3-ply waterproof building paper of such thickness that 8 sq. ft. will weigh 1 lb.

Strips of the same paper as herewith specified shall extend around all openings and shall lap the flashings and be securely cemented thereto with approved liquid tar or asphalt.

Furring Strips—After the sheathing is thoroughly waterproofed as hereinbefore specified, ¾-in. wooden furring strips shall be set vertically at 12-in. intervals. These furring strips shall be securely nailed in place and leveled and plumbed in such a way as to provide a proper and secure foundation to receive the lath.

Wire Lath—Over the furring there shall then be applied No. 19 gauge Clinton Galvanized Wire Lath.

Application of Lath—The lath shall be tightly drawn and lapped as hereinbefore specified and shall be securely stapled at 6-in. intervals along each furring strip with ¾-in. No. 14 round top Clinton Galvanized Wire Staples.

Special Stiffened Lath without Wooden Furring—Wooden furring strips as hereinbefore specified may be omitted by using Clinton Wire Lath provided with special ⅜-in. V-stiffeners. The lath for this purpose shall be No. 20 gauge Clinton Galvanized Wire Lath provided with special V-stiffening ribs, the depth of which shall be not less than ⅜-in. beyond the face of the lath.

Walls without Sheathing—*Waterproofing*—Where the wall framing consists of wooden studs without sheathing, the exterior face of each stud and the sides of each stud to a depth of not less than 1 in., or to such depth as may come in contact with the plaster, shall be waterproofed by thoroughly painting with approved liquid tar or asphalt compound.

Wire Lath—After the studs have been properly waterproofed they shall be covered with No. 20 gauge Clinton Galvanized Wire Lath, provided with standard V-stiffening ribs, the depth of which shall be not less than ⅜ in. beyond the face of the lath.

These ribs shall be securely clamped to the transverse wires and shall extend across the full width of the fabric at intervals not exceeding 8 in.

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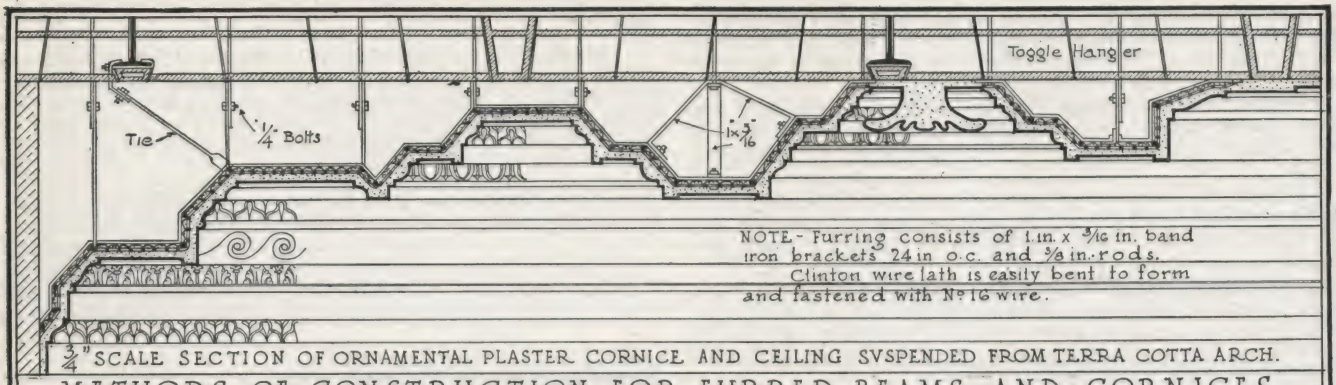
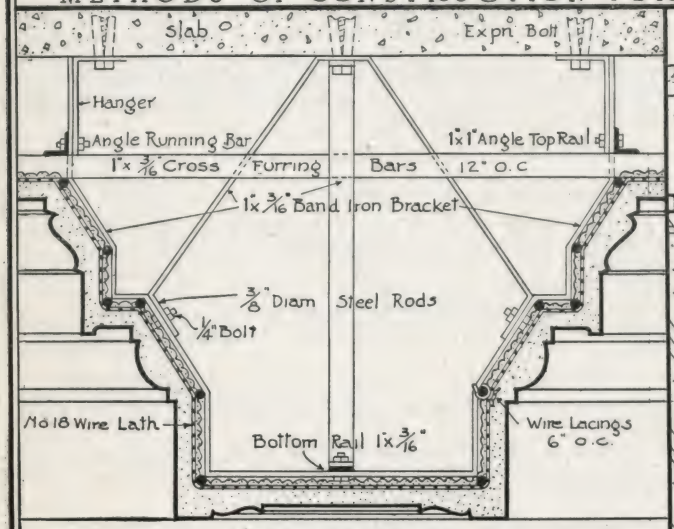


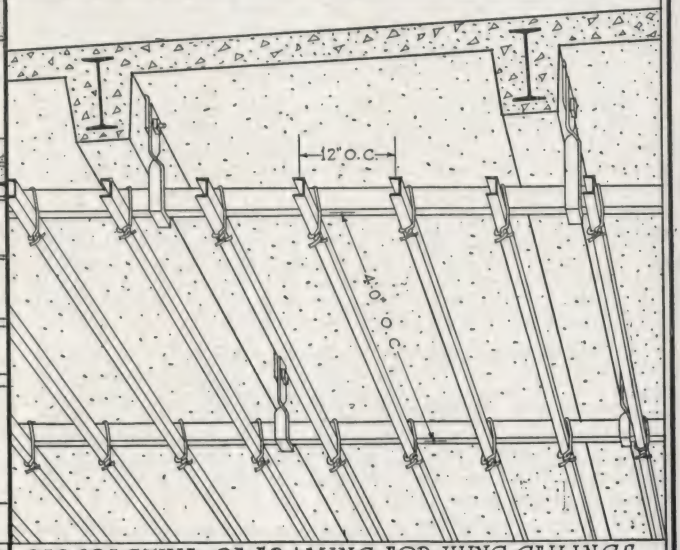
¾" SCALE SECTION OF ORNAMENTAL PLASTER CORNICE AND CEILING SUSPENDED FROM TERRA COTTA ARCH.

METHODS OF CONSTRUCTION FOR FURRED BEAMS AND CORNICES

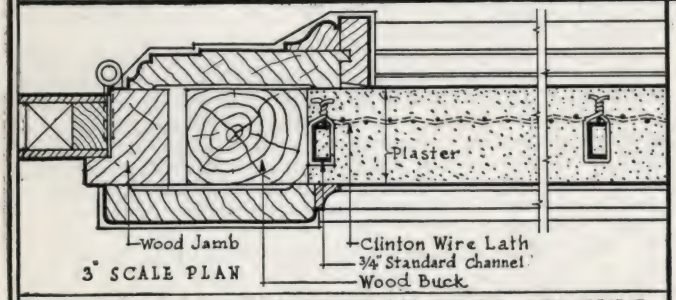


1½ SCALE SECTION

FALSE BEAM WORK SUSPENDED FROM REINFORCED CONCRETE SLAB

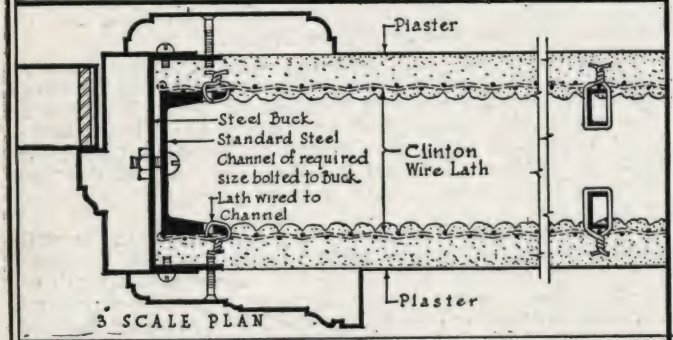


PERSPECTIVE OF FRAMING FOR HUNG CEILINGS



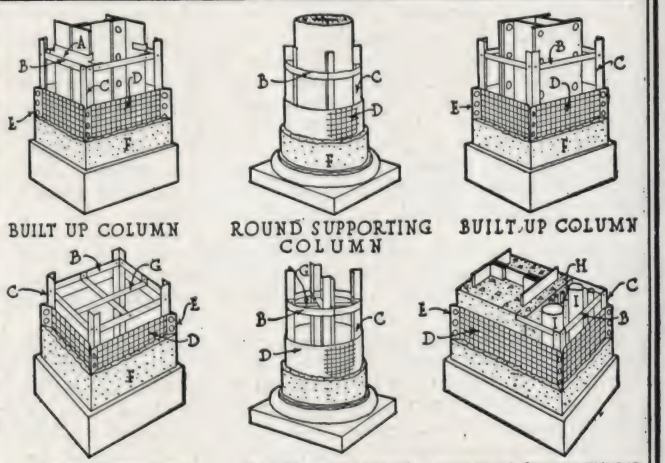
3" SCALE PLAN

TWO INCH SOLID PARTITION AT DOOR OPENING



3" SCALE PLAN

HOLLOW PARTITION WITH HOLLOW METAL TRIM



BUILT UP COLUMN — ROUND SUPPORTING COLUMN — BUILT UP COLUMN

FALSE COLUMN — FALSE COLUMN — COLUMN PROTECTION AND PIPE ENCLOSURE

A - Clips.
B - 3/16 x 1" Furrings 2'-0" o.c.
C - 1½" x 1½" Standard steel angles.
D - Clinton wire lath.
E - Metal corner beads.
F - Plaster
G - 3/16 x 1" Strap stiffeners
H - Electric conduits
I - Pipes

Clinton wire lath serves as a protection to the fireproofing of steel columns, preventing the cinder concrete from being washed away by streams of water in case of fire.

Pipes and conduits should be run in a furred space entirely outside of the necessary column protection.

TYPICAL METHODS OF COLUMN PROTECTION

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DETAILS SHOWING USE OF METAL LATH IN FIREPROOF CONSTRUCTION	SCALE ¾, 1½ & 3" EQUALS 1'-0" DATE-AUG:20	DRWG B1

Continued on next page

Clinton Welded Sheathing

This material is manufactured in two grades, viz.: "Plain" and "Interposed." Both grades consist of an electrically welded wire mesh the same in every respect as our regular reinforcing fabrics. Both the longitudinal and the transverse wires are of No. 13 Washburn & Moen gauge, and are galvanized. The longitudinal wires are spaced 3 in. on centers and the transverse or lateral wires are on 8-in. centers. The fabric would thus be designated as 3x8-in. mesh, 13 and 13 wires. The asphaltic felt occupies a position between the planes of the longitudinal and lateral wires, the welds being made through small holes previously punched in the felt at each point where a longitudinal crosses a lateral wire.

The Interposed sheathing differs from the Plain only in that a light poultry netting is interposed with the asphaltic felt between the longitudinal and the transverse wires.

The longitudinal or so-called "carrying" wires are on the side of the felt to which the plaster is applied and are entirely unobstructed and become thoroughly embedded in the body of the plaster or concrete, as the felt bulges slightly away from the wires under the pressure of the plasterer's trowel. The poultry netting in the Interposed type of sheathing is arranged also on the side of the felt to which the plaster is applied and gives a substantial bonding and fiber effect to the plaster.

Uses of Clinton Welded Sheathing

Clinton welded sheathing is especially adapted as an inexpensive lathing material for stucco and all kinds of interior plastering; also as a reinforcement for short span concrete slabs, as in roofs, or in floors carrying comparatively light loads.

Advantages of Clinton Welded Sheathing

As applied to exterior wall construction, Clinton welded sheathing may be used without wood sheathing, as the wire fabric with its asphaltic felt backing may be stapled directly to the studs.

The lath is placed so that the longitudinal or "carrying" wires, which are 3 in. apart, extend horizontally across the studs; the transverse or "stay" wires, which are 8 in. apart, run vertically with the studs. As the cement mortar is applied, it is pushed back, and keys thoroughly around all the carrying wires; while the asphaltic felt serves as a backing to prevent waste, and as a stop to retain the mortar while in its plastic state.

Exterior walls constructed in this manner are continuous slabs of cement, spanning from stud to stud, reinforced with galvanized steel wire, and covered with an impervious moistureproof backing.

The strength of this construction is apparent, as the reinforcing wires are of much heavier gauge than can be conveniently used in any type of woven or expanded metal lath; while its great economy is shown by the fact that the cost of any acceptable type of metal lath is more than double that of Clinton welded sheathing.

Here is the ideal material for stucco work—*galvanized wire lathing and moistureproof felt* combined in one material at a *fraction of the cost* of ordinary metal lath.

Clinton welded sheathing, as applied to cement roof and floor construction, requires no forms, as the material may be stapled directly to the joists and merely screeded over with 1 to 1½ in. of concrete or cement mortar.

For light loads and short spans, Clinton welded sheathing provides both *forms* and *galvanized wire reinforcement* combined in one material, at about *half the cost* of wood forms in place.

Stock Sizes of Clinton Welded Sheathing

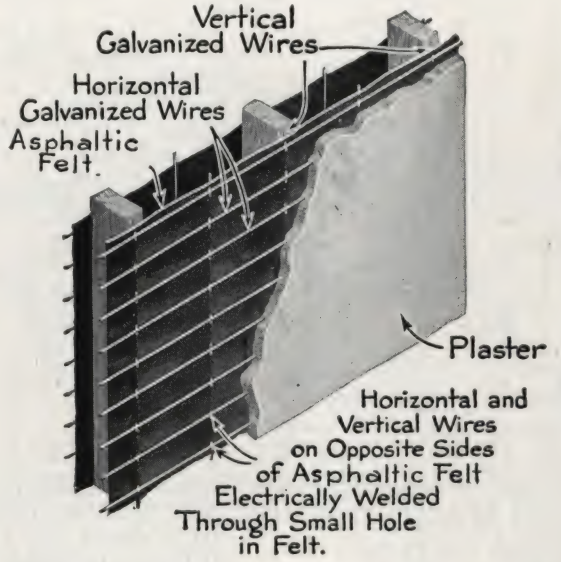
Stock grades are cut into flat sheets 32 in. wide and 8 ft. 2 in. long, packed in bundles of convenient size and crated for shipment.

Heavier wires and sheets of special size may be obtained upon special order.

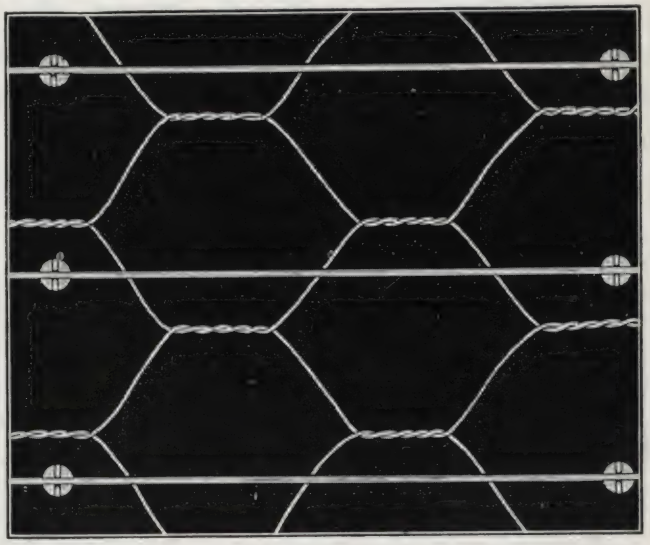
Details of Clinton Welded Sheathing

Details of standard constructions are shown on the following two pages.

A booklet showing additional details will be sent on request.



Details Showing Application of Clinton "Plain" Welded Sheathing



"Interposed" Type Clinton Welded Sheathing

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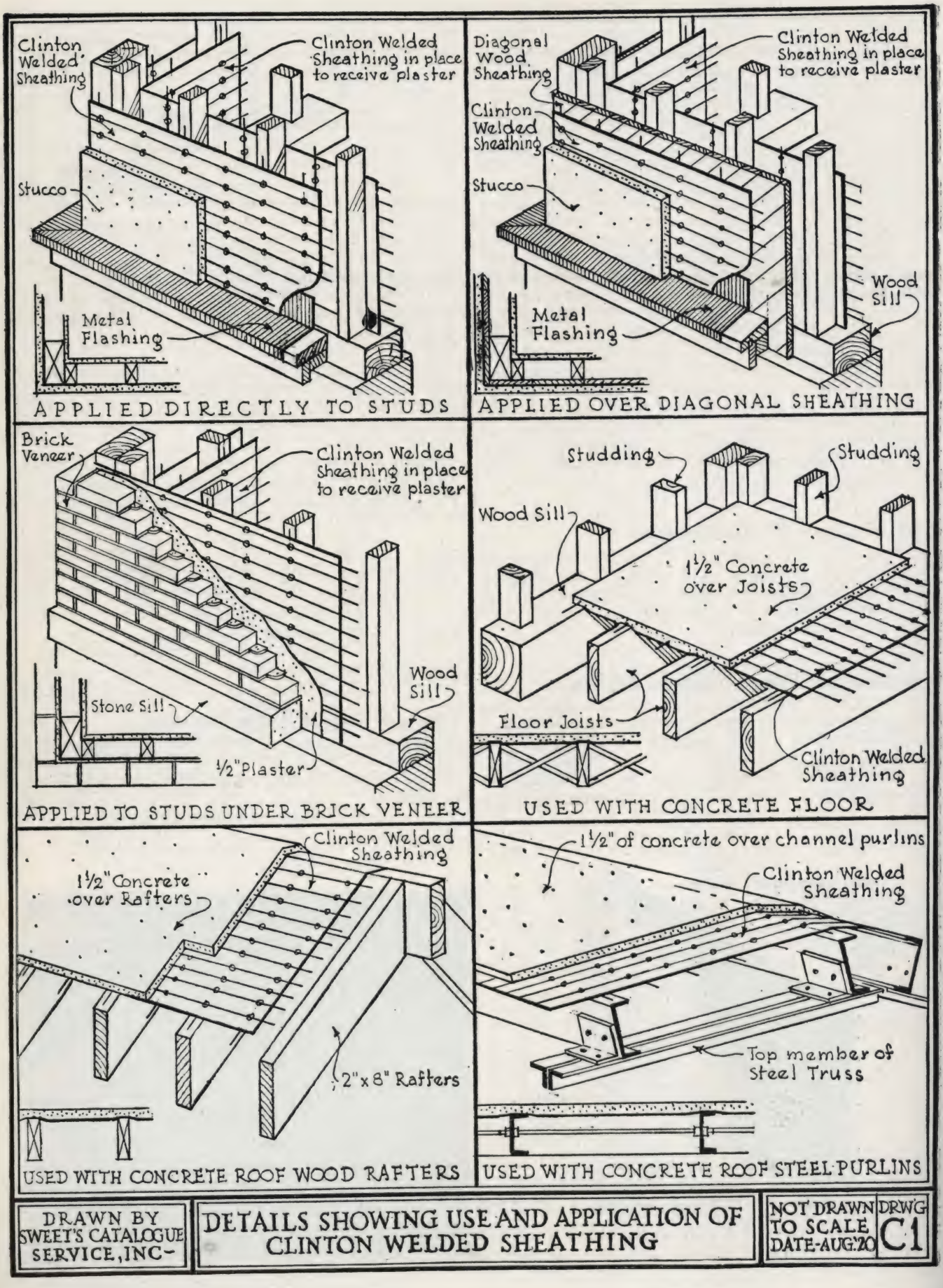

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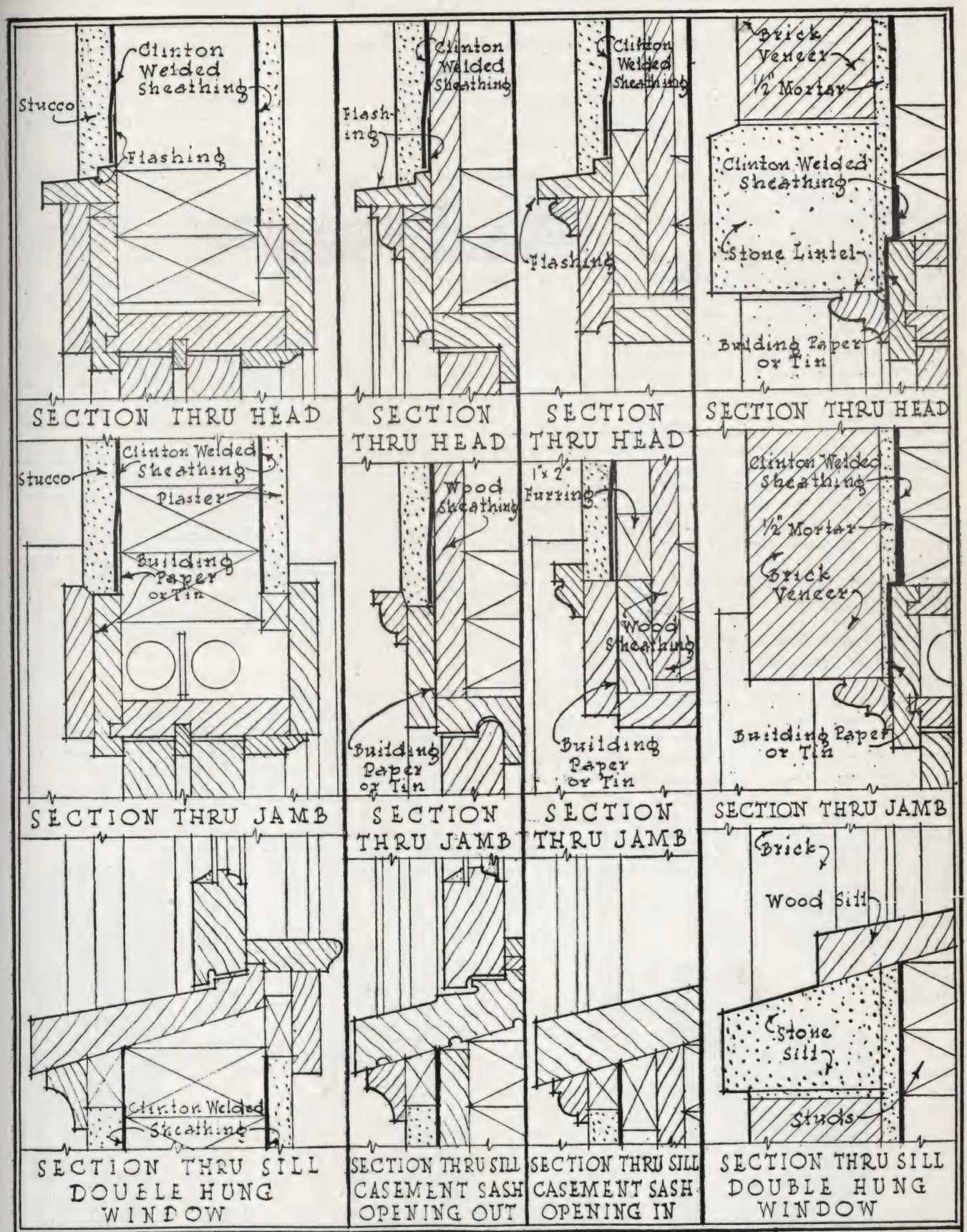


DRAWN BY SWEET'S CATALOGUE SERVICE, INC	WINDOW DETAILS FOR USE WITH CLINTON WELDED SHEATHING	SCALE 3" EQUALS 1'-0" DATE AUG. 20	DRWG C2

THE BISHOPRIC MANUFACTURING CO.

Manufacturers of Stucco, Stucco Base, Plaster Base

300 Este Avenue
Cincinnati, Ohio

NEW YORK OFFICE, 2848 Grand Central Terminal

Products

BISHOPRIC STUCCO.
BISHOPRIC STUCCO BASE.
BISHOPRIC PLASTER BASE.

THE DOVETAILED KEY INTERLOCKS THE PLASTER
BISHOPRIC STUCCO AND PLASTER BASE
TRADE MARK REGISTERED

TRADE-MARK

Bishopric Stucco

Bishopric stucco is waterproofed throughout, which provides against discoloration and deterioration. Bishopric stucco is strictly a quality product, produced under laboratory supervision, and is absolutely uniform. Bishopric stucco is ready mixed, this means that chloride, waterproofing and all other essential ingredients are included in one drum, ready for use.

The base and finish coats are identical—if the finish coat is stronger than the base coat, it is bound to "pull" and cause cracks and deterioration.

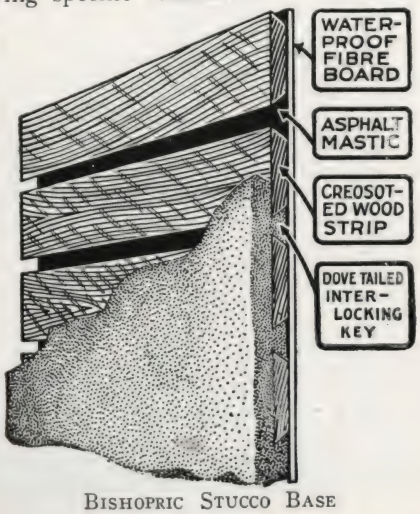
Bishopric stucco, because of its uniformity throughout, makes possible an artistic, white, stipple or splatter-dash finish which beautifies with age. This style of finish is less expensive than a stone dash. (However, stone dash finishes can be used with Bishopric stucco, if so desired). Samples showing stipple and dash finishes sent on request.

Bishopric Stucco Base

Bishopric stucco base is an everlasting, damp proof background for use wherever lath may be required for exterior cement plaster, interior plaster finishes and brick veneers on frame structures. It is made of strong, dovetailed wood strips embedded under great pressure in a thick layer of asphalt mastic having a background of extra heavy fiber board. There is no metal in it to rust and break away from the fastenings. Every piece of material is time resisting, the patented combination being proof against wind, weather and vermin.

The strong, scientifically dovetailed wood strips lock the plaster with such security that it can not loosen.

Bishopric stucco base is the logical, practical background for stucco. Contractors who specialize on stucco construction recommend the use of Bishopric base for the following specific reasons:



BISHOPRIC STUCCO BASE

1st—Bishopric base provides a strong, rigid background for stucco; it braces the building—is sufficiently elastic to take up foundation settlements, shrinkage of lumber in the frame of the building, relieving these strains from the stucco or plaster, preventing cracking. When these stresses occur, something must absorb them, which Bishopric base effectively does.

2nd—The space between the wood strips of Bishopric is uniform and just right to provide the necessary key to insure proper thickness to the base coat, eliminating guesswork that sufficient mortar will be pressed through the "curled back" to form a key.

3rd—Bishopric stucco base provides a positive wall curtain of insulation, preventing continued circulation of moisture through the stucco or plaster, which causes discoloration and deterioration. Bishopric base is the only background that provides this protection.

Backing for Brick Veneer—Bishopric stucco base should be used over the studding in place of board sheathing. The combination of the fiber board and the asphalt mastic produces a dry and warm building. The dovetailed wood strips clinch the cement mortar and make a tie for the brickwork. (See illustration, Drawing No. 2.)

Bishopric Plaster Base

Bishopric plaster base is a positive shield against dampness, extreme heat or cold. It makes possible greater uniformity of temperature, thereby increasing health conditions, reduces heating expense, is an effective sound deadener because the heavy asphalt coated fiber board is a non-conductor.

Eliminates Ceiling Streaks—In churches, clubs, apartments, etc., Bishopric plaster base eliminates unsightly ceiling streaks, due to suction between common lath, because air can not penetrate the tough asphalt mastic-fiberboard backing in which the wood strips are embedded.

Covering Capacity — The leading plaster manufacturers report that it takes:

1400 to 1700 lbs. wood fiber plaster to cover 100 sq. yds. of common lath.

1800 to 2000 lbs. wood fiber plaster to cover 100 sq. yds. of metal lath.

2200 to 2700 lbs. wood fiber plaster to cover 100 sq. yds of hollow tile.

1050 to 1275 lbs. wood fiber plaster to cover 100 sq. yds. of Bishopric board.

Note the decided saving made possible by Bishopric board.

STYLE OF SHIPPING PACKAGE

Continued on next page

Directions for the Use of Bishopric Stucco

Gutters and Rainspouts—It is advisable to set up the gutters and rainspouts before stuccoing, to eliminate any damage that might possibly be done to the Bishopric wall in case of rain or storm.

Foundation Treatment—The brick or concrete foundation should always be brought up to 10 in. above the grade line, and Bishopric applied from there up. This eliminates any trouble that might result, by running veneer coating down below the grade line.

All tools, hods, buckets and mixing boxes, must be thoroughly clean before using. Never use trowels that have been used in lime, without first cleaning them thoroughly. Lime and Bishopric stucco are enemies, and should not come in contact with each other.

Pulverize any lumps which may have formed in the material before using.

Add clear water slowly (approximately 2½ gals. to each 100 lbs.) and bring mortar to proper consistency. Stir frequently while using to insure a uniform mixture at all times. Do not retemper mortar.

Apply first coat ¼ in. thick over face of Bishopric base. Apply second coat ¼ in. thick (making thickness of Bishopric stucco ½ in. over all).

Stone Dash Finish—The dash aggregate should be cast into the finish coat before it sets. The man casting the dash should follow closely behind the plasterer who is spreading the finish coat, while the finish coat is still fresh and soft; the stone chips or whatever material is being used for dash should be thrown forcibly against the surface. Dash can be thrown in by trowels, but a stiff wooden or sheet iron paddle with a blade about 8 in. in width can be used to better advantage in obtaining a uniform surface. Great care should be taken in dashing to avoid fan marks or blotches. Such defects are the result of faulty workmanship.

A considerable portion of the dash material will not adhere to the stucco. It will, therefore, be found economical to place a canvas sheet under the scaffold so that the excess material may be saved and used over again. Never use any dash the second time that has become coated with fresh stucco or soiled in any other manner.

Stipple Finish—It is produced in the same manner as the sponge finish, except that a brush having about a 6-in. fiber bristle is used. An ordinary coarse bristle, new bar broom, cut in half, makes an excellent implement for this work.

Spatter Dash Finish—It is produced by tapping a long bristle, straight handled brush against a bar of wood so that a thinned mixture of the Stucco will spatter against the surface after the second coat has been applied and before it has fully set.

Base—The most satisfactory base for Bishopric stucco is Bishopric narrow key base manufactured expressly for the purpose, making rigid, waterproof, airtight, permanent walls.

Types and Uses of Bishopric Stucco and Plaster Base

Medium Weight—Standard key, ⅜ in. thick, well seasoned, selected wood strips, creosoted, or not creosoted. When creosoted this type is especially recommended for exterior cement stucco and brick veneer. When not creosoted, it is satisfactory for exterior cement stucco and brick veneer.

Medium Weight—Narrow key, ⅜ in. thick, well seasoned, selected wood strips, is especially adapted for magnesite stucco and all interior plastering.

Heavy Weight—Standard key ⅝ in. thick, well seasoned, selected wood strips, creosoted or untreated, made with standard key or narrow key as desired.

Insulating Base—Has felt backing in place of the fiber board backing. This type is especially adapted for conditions where special insulation features are desired. Made with standard or narrow key, ⅜ in. or ⅝ in. thick, creosoted or untreated.

Directions for Applying Bishopric Stucco Base

Care of Material—It is necessary to keep Bishopric stucco base dry until it is applied to the frame. It should be put under cover promptly on arrival and protected from rain and dampness.

As the stucco base is applied, each wood strip should be nailed with 4 nails. When once thoroughly nailed it is not affected by climatic conditions; in dry weather sprinkle the exposed surface before applying the stucco.

If the wood strips are damp there will not be so great a suction and consequent setting of the cement on the surfaces of the strips. It is therefore well to have the wood strips sprayed if dry.

Vertical and Horizontal—It is recommended to have the wood strips cross the grain of the under surface; if the stucco base is applied directly to the studs or furring strips, it should be horizontal, but if put over horizontal sheathing it should be vertical. Mortar will adhere to the vertical strips equally as satisfactorily as to the horizontal position; it is the key that insures the grip.

In construction, if sheathing is desired, a much warmer and better wall can be obtained by using Bishopric sheathing, as there is no shrinkage or movement of Bishopric sheathing and a non-circulating air space is thereby obtained, making best known insulation. (See illustration, Drawing No. 2.)

Cutting—Saw across the wood strips with a sharp, well set saw, leaving the sheets on a bench for the purpose, or on a pair of boxes with a couple of strings of scantling on top and saw between them. For lengthwise cutting, rip-saw the sheet between the wood strips.

Breaking Joints—We advocate breaking joints every 3 or 4 ft., thereby avoiding continuous joint and adding greater strength and rigidity to building. However, it can be applied in continuous strips with successful results.

The corners of any building are the weakest part of the structure and therefore require greatest protection, which Bishopric stucco base insures. Many builders further support the corners with galvanized chicken wire mesh, which we believe is a good practice, particularly as it is inexpensive.

Nailing—In applying medium weight Bishopric stucco base, use No. 5 galvanized wire box nails, nailing each strip at each bearing point when used direct to the studs or furring strips, and 4 nails to each strip when used over sheathing. Use No. 6 nails for heavy stucco base.

Nails—For convenience of our patrons who are unable to obtain galvanized wire box nails, we are prepared to supply them quickly from Cincinnati in any quantity.

For ready convenience, the following is submitted:

5d nails (galvanized), per keg	39,000
Lbs., per keg	100
Nails, per lb	390
Nails required for 1000 sq. ft. Bishopric (4 nails of each wood strip)	15⅝ lbs.

Continued on next page

Strength Tests, Bishopric Stucco Base vs. Lumber Sheathing

The illustrations below explain graphically the results of tests conducted by Robert W. Hunt & Co., to determine the comparative strength of Bishopric stucco base applied directly to studs and ⅞-in. thick lumber sheathing applied in the same manner.

Summarized, the results of tests conducted by several engineers are as follows:

ROBERT W. HUNT & CO.

Bishopric stucco base	4400-lb. pull—deformed 1.69 in.
⅞-in. sheathing	2400-lb. pull—deformed 6.11 in.

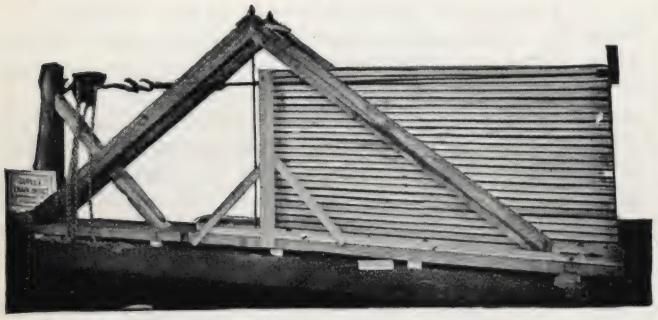
PROFESSOR SHEPARD, YALE UNIVERSITY

Bisphoric stucco base	1300-lb. pull—deformed 2.5
⅞-in. sheathing	600-lb. pull—deformed 4.5

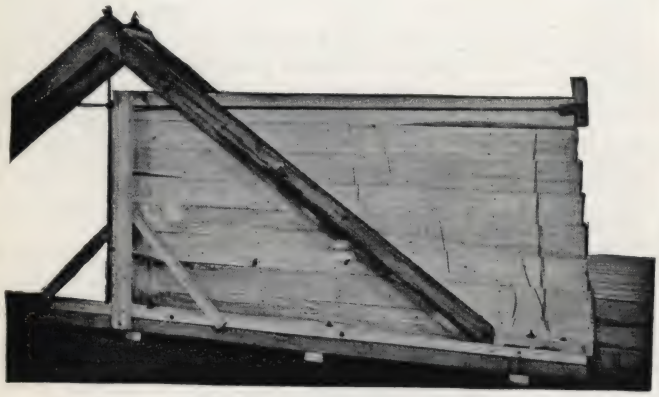
MEMPHIS, TENN., CITY TEST

Bishopric stucco base—1.5 in.; ⅞-in. sheathing—4.75 in., equal loads.

Detailed reports of the above tests will be sent on request.



CONDITION OF BISHOPRIC STUCCO BASE AFTER STRESS OF LOAD OF 4400 LBS.



SHOWING 6-IN. MOVEMENT OF FRAME OF ORDINARY SHEATHING AND LATH AFTER STRESS OF LOAD OF 2400 LBS.

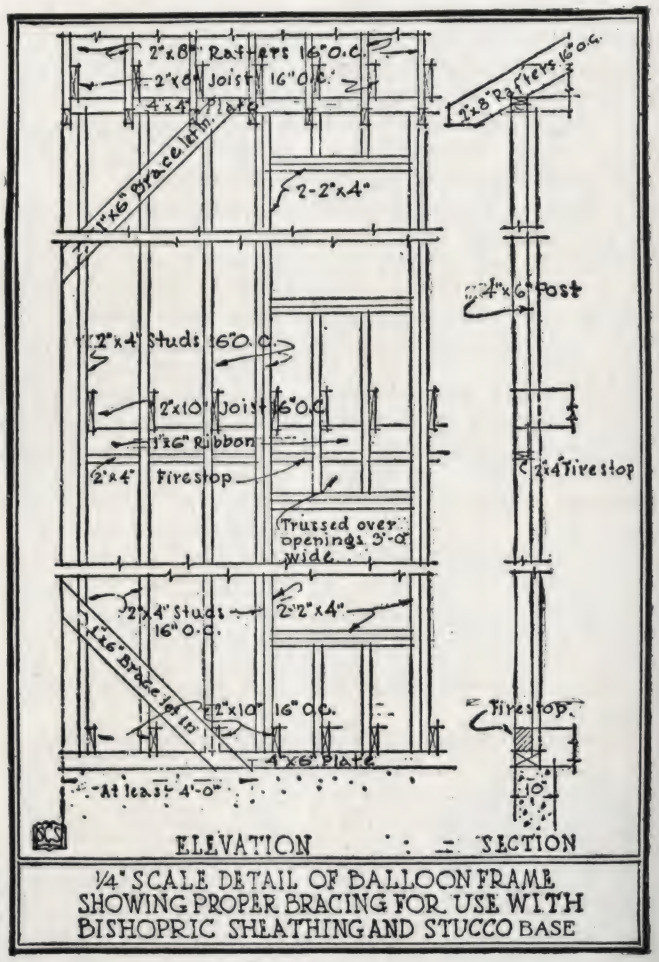
Details and Drawings Showing Application of Bishopric Stucco Over Bishopric Base, Also Bishopric Sheathing

The accompanying detail sheets give comprehensive information relating to the use and application of Bishopric stucco and Bishopric base to various constructions and conditions. The details are compiled from standard details in general use by well-known architects. Additional information will be cheerfully furnished.

Especial attention is called to Drawing No. 2 showing exterior wall conditions. The adoption of any particular method shown depends largely upon the general class of the building to be enclosed and the amount of the appropriation available.

For moderate priced work where cost is the most important consideration, the method shown of applying Bishopric stucco base directly to studs gives a perfectly satisfactory and substantial construction, insuring dependable protection from cold and heat.

The most essential requirement for successful stucco houses is that of a rigid frame, and this, combined with the proper mixture and application of the stucco, will give a successful job in every way. It is a mistaken idea that Bishopric stucco base requires any special bracing of the frame—it does not, as it is more rigid than the lumber sheathing.



¼" SCALE DETAIL OF BALLOON FRAME SHOWING PROPER BRACING FOR USE WITH BISHOPRIC SHEATHING AND STUCCO BASE

General Specifications for Bishopric Stucco Base

The following specifications are necessarily more or less general in character with only those features which are generally common to all being mentioned.

All special features should be shown by scale drawings and details, and further described in the specifications.

SPECIFICATION NO. 1

Rough Carpenter Work—(1) *General Conditions*—The work included under Rough Carpenter Work is to be subject to the "General Clauses and Conditions" written for the entire set of specifications, whether attached to this part or not, and the contractor for rough carpenter work is notified to refer thereto as an integral part of his contract work.

(2) *Work to be Done*—The contractor shall furnish and

Continued on next page

set all rough carpenter work as required by the drawings and herein specified.

(3) *Framing Timber*—All framing timber, unless otherwise specified to be well seasoned spruce, [yellow pine], [hemlock], [Douglas fir], free from all imperfections that would impair its strength.

(4) *Sizes*—Sizes to be as shown on drawings and as herein specified. Where construction or sizes of timbers are not specified or shown on drawings they shall be of design and sizes corresponding to similar adjacent work.

(5) Main sill	(4) in. x (6)	in.
Main plate	(4) in. x (4)	in.
Roof rafters	(2) in. x (6)	in. (16) in. O.C.
Collar beams	(2) in. x (6)	in. (spiked to every other rafter)
Hips and ridges	(2) in. x (10)	in.
Valley rafters	(3) in. x (10)	in.
Interior studs	(2) in. x (4)	in. (16) in. O.C.
Exterior studs	(2) in. x (4)	in. (16) in. O.C.

(6) Posts at corners and angles 4x6-in. with 2x4-in. piece spiked on side. Posts must extend in one piece from sill to the plate.

(7) Sills and caps of partitions 2x4-in. except bearing partition caps which shall be two 2x4-in.

(8) Ledger boards, ribbon boards or girts 1⅛x4-in. notched into studs.

(9) *Framing*—The building shall be substantially framed and braced in the most workmanlike manner, leveled, squared and plumbed, strongly anchored and strapped where necessary and all openings properly trussed.

(10) Cut in 1x6-in. braces 6 ft. long at corners, cut into the studs at 45° and spiked at each bearing.

(11) The underside of the sill shall receive a coat of creosote or other wood preservative, and shall be set level and bedded in mortar, mason assisting.

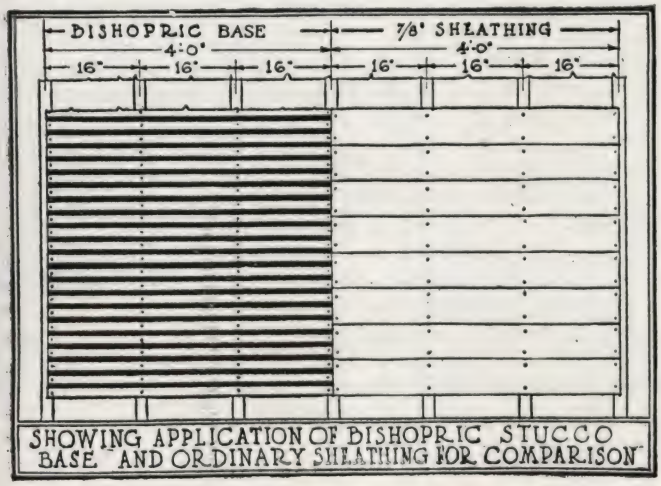
(12) Sills and plates must be halved at the corners and where necessary spliced and scarf jointed and bolted. Full length sills and plates must be used wherever possible.

(13) Sills to be anchored into masonry with ¾-in. bolts 30 in. long, 5 ft. on centers with 4x4-in. plates at bottom and washer and nut at top.

(14) The carpenter shall exercise care in framing so that important timbers will not require cutting for pipes, chimneys, etc., and he must go over with the various trades each section of the building and determine how pipes, ducts and the like are to be run before beginning work.

(15) Frame for all openings required, as stairs, chimneys, hearths, scuttles, registers, flues, slots, ventilators, plumbing and other pipes, ducts, etc.

(16) Headers up to 4 ft. in length and the trimmers of same shall be 1 in. thicker than the joists. Where headers and trimmers are more than 4 ft. long they shall be twice as thick as the joists.



(17) All timbering about chimneys must clear brickwork by at least 1 in. (In New York City headers must clear chimneys 4 in., and trimmers 2 in.)

(18) Set skewback pieces for hearths on headers opposite fireplaces.

(19) Bearings of beams shall be not less than 4 in.

(20) Headers less than 4 ft. long, all tail joists, etc., may be put together with mortise and tenon.

(21) Headers and trimmers more than 4 ft. long and floor joists supported by wood girders shall be hung in wrought iron or steel stirrups furnished and set by the contractor for rough carpenter work.

(22) Floor joists supported on steel girders shall be supported on 2x4-in. piece bolted through girder or on steel shelf angle. Joists to be set at least ½ in. above top of steel beam.

(23) Floor joists to be doubled under all partitions.

Note: To prevent shrinkage cracks, the construction specified in paragraphs 24 and 25 is recommended.

(24) Partitions running parallel with joists shall rest on 2x4-in. piece spiked at bottom of floor joists. (Or to rest on ½x4-in. wrought iron plate secured to floor joists with 4-in. lag screws.)

(25) Partitions running at right angles to floor joists to rest on ½x4-in. plate secured to joists with 2-in. lag screws.

(26) All floor joists to be machine sized to even dimensions with crown edge set at top. Sizing may be omitted where cross furring of ceilings is specified.

(27) First floor joists to be notched down (4) in. on sills and mortised (2) in. more into them, bringing the bottom of joists flush with the bottom of the sills. Second floor joists to be notched over ribbon board. Joists to be spiked to sill and studs, where possible.

(28) Jamb studs shall be doubled at all openings, exterior and interior.

(29) Studs to be full length from sill to plate for balloon frame. Each stud is to be cut with a 2-in. tenon at the lower end and is to be well spiked at the upper end with 20d spikes.

(30) The plates to be made of two pieces of 2x4-in., breaking joints and securely spiked to posts and studding.

(31) Openings exceeding 4 ft. shall be trussed or shall have substantial lintels where headroom will not permit trussing.

(32) Angles of walls and ceilings shall be so managed that lath can not "run through" but must be nailed at angles.

(33) Studs of second story partitions shall be carried down to cap of partition below where conditions will permit.

(34) All partitions shall be carefully straightened and shall have one row of 2x4-in. diagonal or horizontal bridging in each story.

(35) Partitions through which pipes pass shall be of sufficient width to completely cover joints of pipes.

(36) *Bridging*—Bridge each tier of joists with 1x3-in. or 2x2-in. double cross bridging, cut to fit neatly and secured with 2 10d nails at each end.

(37) *Fire Stops*—At first and second story levels of exterior frame walls cut in 2x4-in. pieces between studs of exterior walls to form fire stop.

(38) *Miscellaneous Framing*—Frame for all porches, overhangs, dormers, cornices, etc., in a substantial manner as required by the drawings.

(39) **Bishopric Stucco Base**—All exterior surfaces of all exterior frame walls indicated on drawings to have stucco finish (including soffits of overhangs and porch ceilings) shall be covered with medium weight, standard key, creosoted Bishopric stucco base.

(40) Bishopric Stucco Base shall be set with wood strips running horizontally and with each strip nailed at each bearing with No. 5 galvanized wire box nails. (Where Stucco Base is applied over horizontal board sheathing the strips of the Stucco Base shall run vertically.) Use No. 6 nails for heavy weight Stucco Base.

(41) The rough flooring where tile floors are required by the drawings, shall be cut in between the joists and rest on

Continued on next page

1⅛-in. cleats nailed on sides of joists 4 in. below the top of the joists.

Tops of joists under tiled surfaces to be beveled.

(42) *Permanent Grounds*—Provide grounds and blocks required to secure all trim, cisterns, brackets, basin slab supports, pipe supports and for work of other mechanics where required. Grounds shall be ¾x2 in., or as shown on details or required, and secured straight, level, even and plumb in place.

(43) Furnish and set all grounds, blocking and rough framing required to set exterior wood finish.

(44) *Cross Furring*—All ceilings and soffits throughout first and second stories shall be furred with ⅞x2-in. furring strips set 16 in. on centers. All to be set level and true.

(45) *Lathing*—The interior of all exterior walls and stud partitions throughout (basement), first and second stories (and attic) shall be covered with medium weight, standard key, untreated Bishopric Stucco Base with each strip nailed at each bearing with No. 5 galvanized wire box nails.

All ceilings and soffits of stair throughout (basement), first and second stories (and attic) (and porch ceilings) shall be covered with medium weight, narrow key, untreated Bishopric Stucco Base with each strip nailed at each bearing with No. 5 galvanized wire box nails.

Portland Cement Stucco Specifications—For Use on Bishopric Stucco Base

It is important to specify the stucco mixture and follow the directions here given.

Be sure to have all bids for stucco work furnished on the definite basis of these specifications. This insures getting a stucco mixture that has proved itself dependable wherever used.

SPECIFICATION No. 2

(1) **General Conditions**—All Bishopric Stucco Base, lime and cement to be used in the preparation of stucco shall be properly protected when delivered to the work and shall not be placed on the ground or against damp walls. In no case shall the mortar be mixed on the bare ground.

(2) While the plastering is being done, all plaster surfaces shall be properly protected against the weather, and in rainy or threatening weather all fresh surfaces must be properly protected against the direct washing effect of the rain.

(3) No fresh stucco shall be allowed to dry out rapidly and all stucco surfaces shall be kept continuously wet for 7 days by sprinkling the surfaces or hanging wet burlap or tarpaulins over the same, keeping the cloths wet.

(4) There shall not be mixed at one time more stucco than will be used within one-half hour—stucco which shall stiffen by taking on the initial set shall not be used.

(5) All stucco work shall be done with such materials as will meet with the approval of the architect, and all labor in connection therewith shall be performed by skilled and experienced workmen in accordance with the best practice and requirements of the trade.

(6) No stucco in which cracks, pits, streaks, discolorations or other defects may occur will be accepted.

(7) All mixing shall be done on a watertight platform, the different constituents thereby mixed dry to an even and uniform color. No retempering shall be done under any consideration.

(8) **Bishopric Stucco Base**—Secure the Stucco Base firmly to the studding by nailing each lath to every stud, using No. 5 galvanized wire nails, 4 nails to every lath.

(9) If the Stucco Base is used over ⅞-in. sheathing, the wood strip should run vertically and be nailed with 4 nails to each wood strip.

(10) Butt all end joints in a tight manner, and where a joint is made between the wood strip, bring down the fibre board and lap it over the fibre board below.

(11) Before applying the stucco see that the wood strips on the stucco base are well sprayed.

(12) **Stucco**—*Portland Cement*—All portland cement shall be of the standard specifications adopted by the American Society for Testing Materials and the U. S. Government, and of a brand acceptable to the architect.

(13) *Hydrated Lime*—Hydrated lime of a brand to be approved by the architect shall be used and must be delivered to the work in original packages and shall be mixed in strict accordance with the manufacturer's specifications.

(14) *Sand*—All sand shall be free from loam, salt vegetable or other deleterious matter, and shall be graded from fine to coarse. It shall be angular and sharp, and if not clean, it shall be thoroughly washed.

(15) *Mixture*—Take 1 part of hydrated lime, by volume, and mix dry with 10 parts of portland cement; mix this until a perfectly even color is obtained; then take 1 part of this mixture and add it to 2½ parts of clean, dry sand, and mix this as above. In dry, hot weather this can be made a one-third mixture to advantage. To this mixture add enough water to give a good, stiff mortar, seeing that the water is thoroughly mixed with the dry mixture. The water for the first quantity mixed shall be accurately measured and the same amount shall be used for each succeeding mixture of stucco.

(16) *Application*—Apply the first coat to the stucco base, under pressure to insure filling the dovetail key and troweling as little as possible. Cross-scratch this coat deeply and thoroughly. This coat should be ⅝ in. thick, and beginning with the second day should be kept wet for 7 days before applying the second coat.

(17) For the second coat use the same mixture as above, and apply in the same manner, omitting the scratching. Stipple or float this coat at the time of application and be sure that the under coat is thoroughly wet before applying this coat.

(18) The finishing coat shall not be less than ¼ in. thick, and shall be carried on continuously in one general direction, without allowing the mortar to dry out at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface.

(19) **Surface Finishes**—*Stippled*—Finishing coat shall be smoothed with a clean metal trowel with as little rubbing as possible, then shall be lightly patted with a brush of broom straw to give an even stippled surface.

(20) *Floated*—The finishing coat, after being brought to a smooth, even surface, shall be rubbed in a circular motion with a wood float. This floating shall be done when mortar is partially set, and a little sand shall be used to slightly roughen the surface.

(21) *Rough Coat*—After the finishing coat has been brought to an even surface and before attaining its final set, it shall be uniformly coated with a mixture of 1 part white cement to 2 parts white sand, thrown forcibly against the wall in such a manner as will produce a rough surface of uniform

(22) *Pebble Dash*—After the finishing coat has been brought to an even surface and before attaining its initial set, clean pebbles or crushed stone shall be forcibly thrown against the mortar and embedded therein. Pebbles shall vary in size from ¼ to ½ in., shall be well wetted before being cast, and shall be uniformly distributed over the surface. They should be pressed into the surface with a clean wooden trowel, but the surface shall not be otherwise disturbed.

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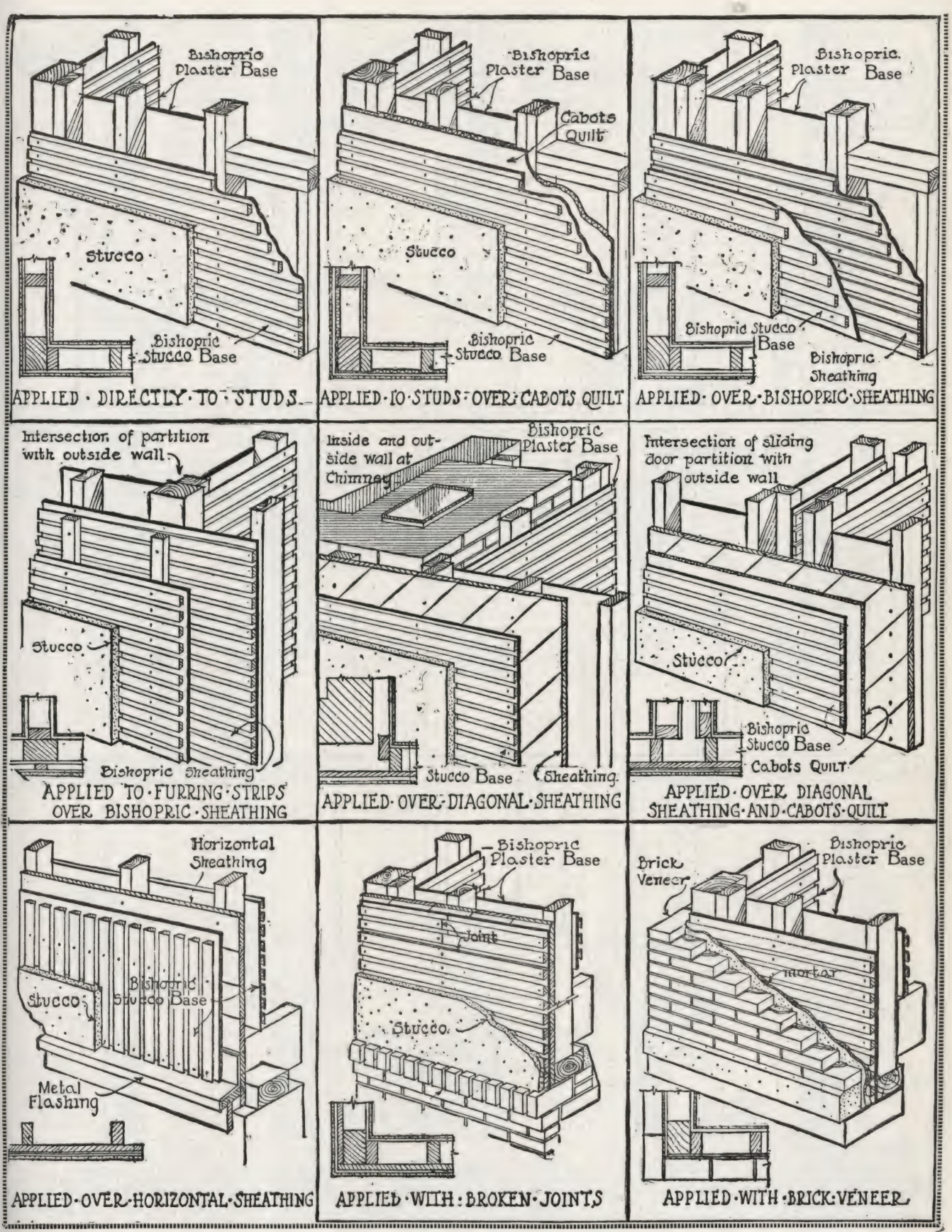

Use and Application of Bishopric Stucco Over Bishopric Base for Exterior Wall Conditions (Drawing No. 2)

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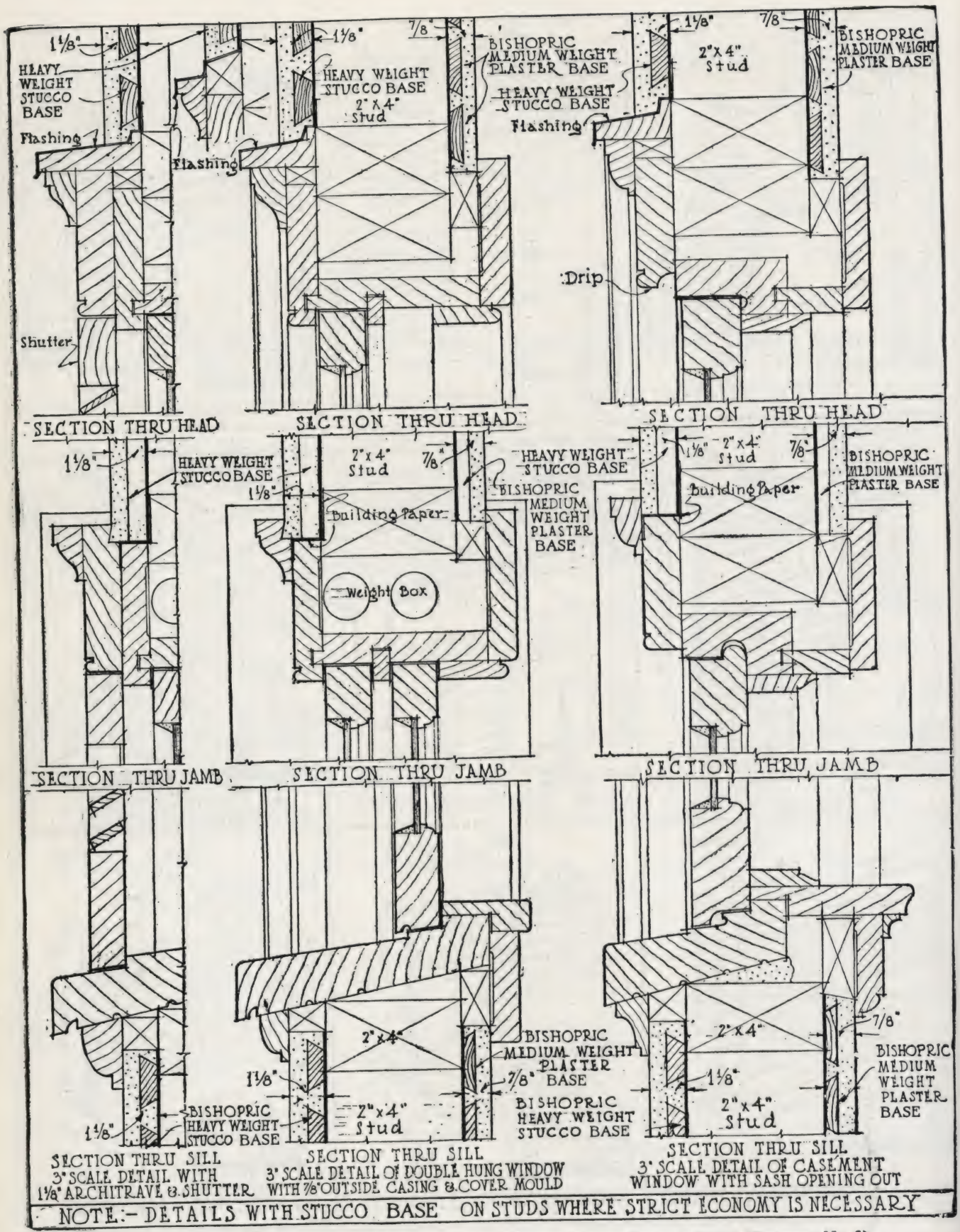

Window Details for Use with Bishopric Heavy Weight Stucco Base on Studs (Drawing No. 3)

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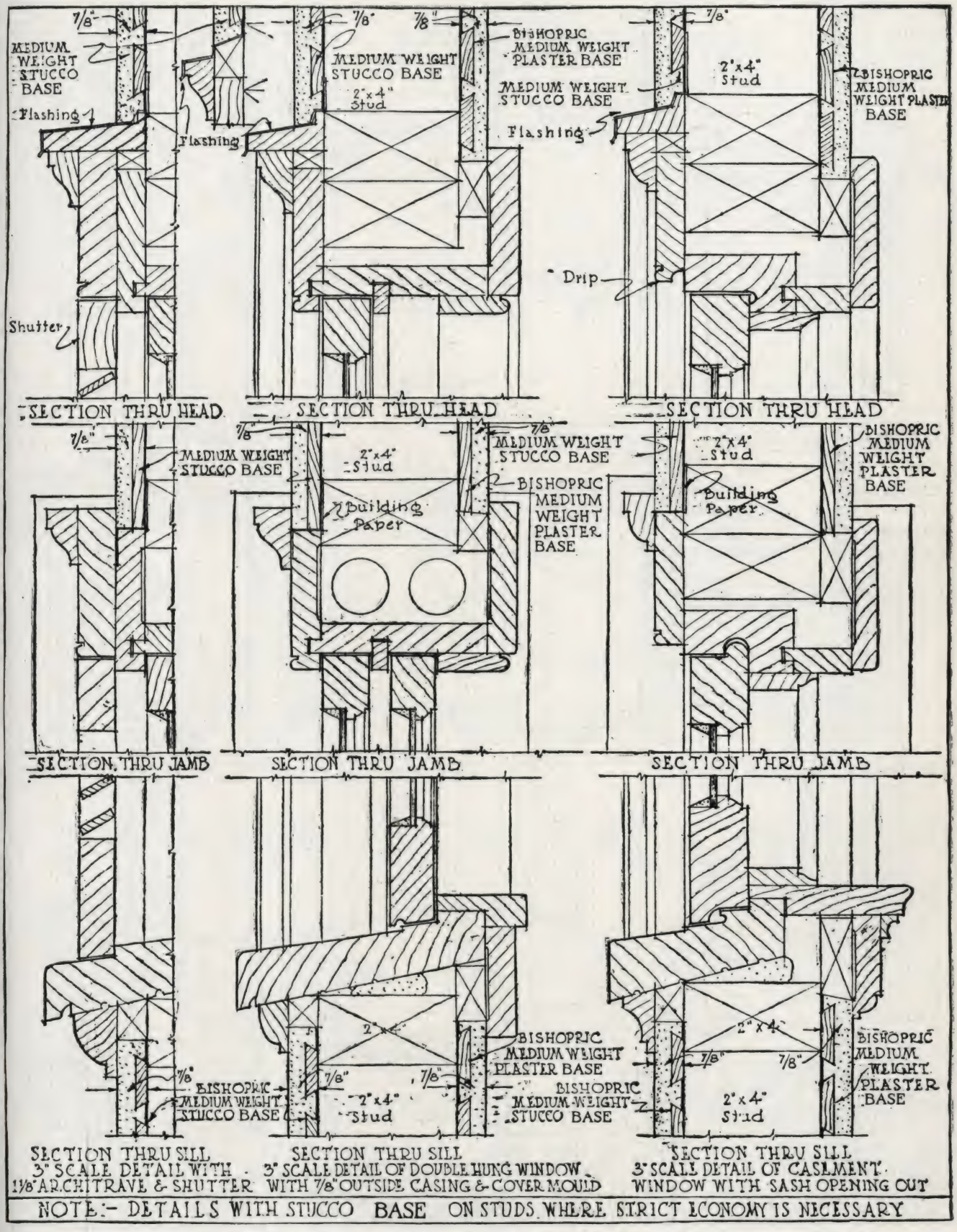

Window Details for Use with Bishopric Medium Weight Stucco Base on Studs (Drawing No. 3A)

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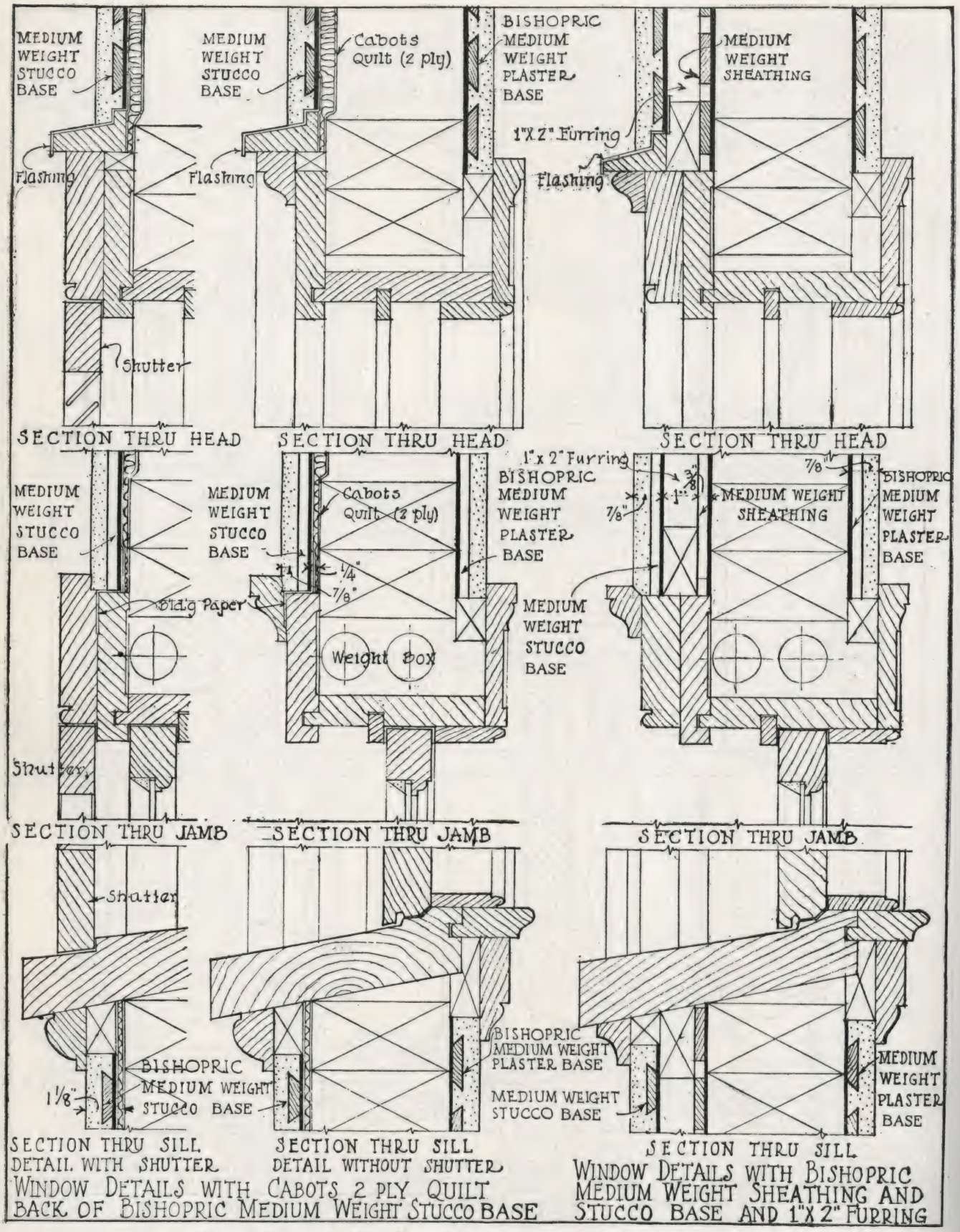

WINDOW DETAILS FOR USE WITH BISHOPRIC STUCCO BASE (DRAWING NO. 5)

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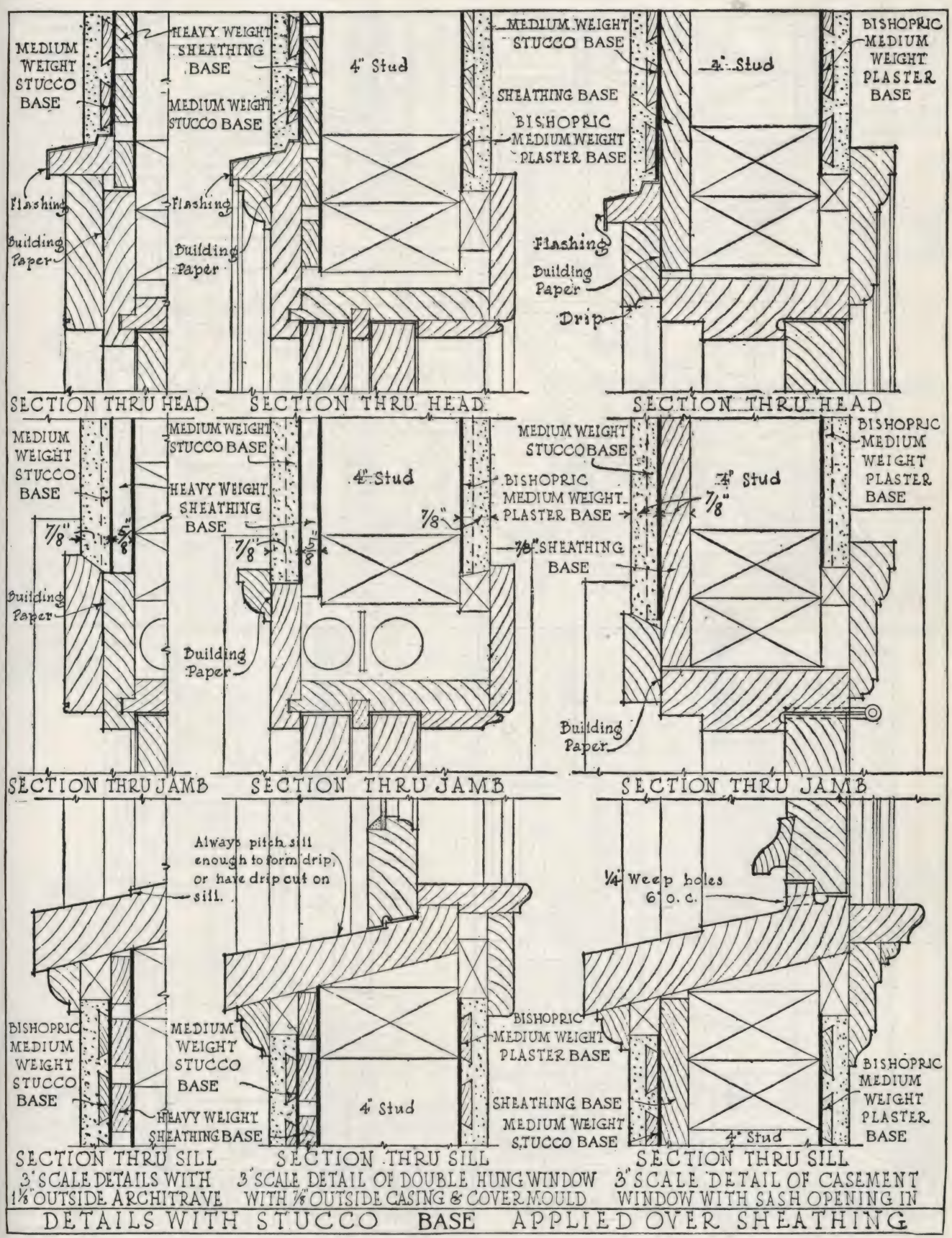

Window Details for Use with Bishopric Stucco Base and Sheathing (Drawing No. 4)

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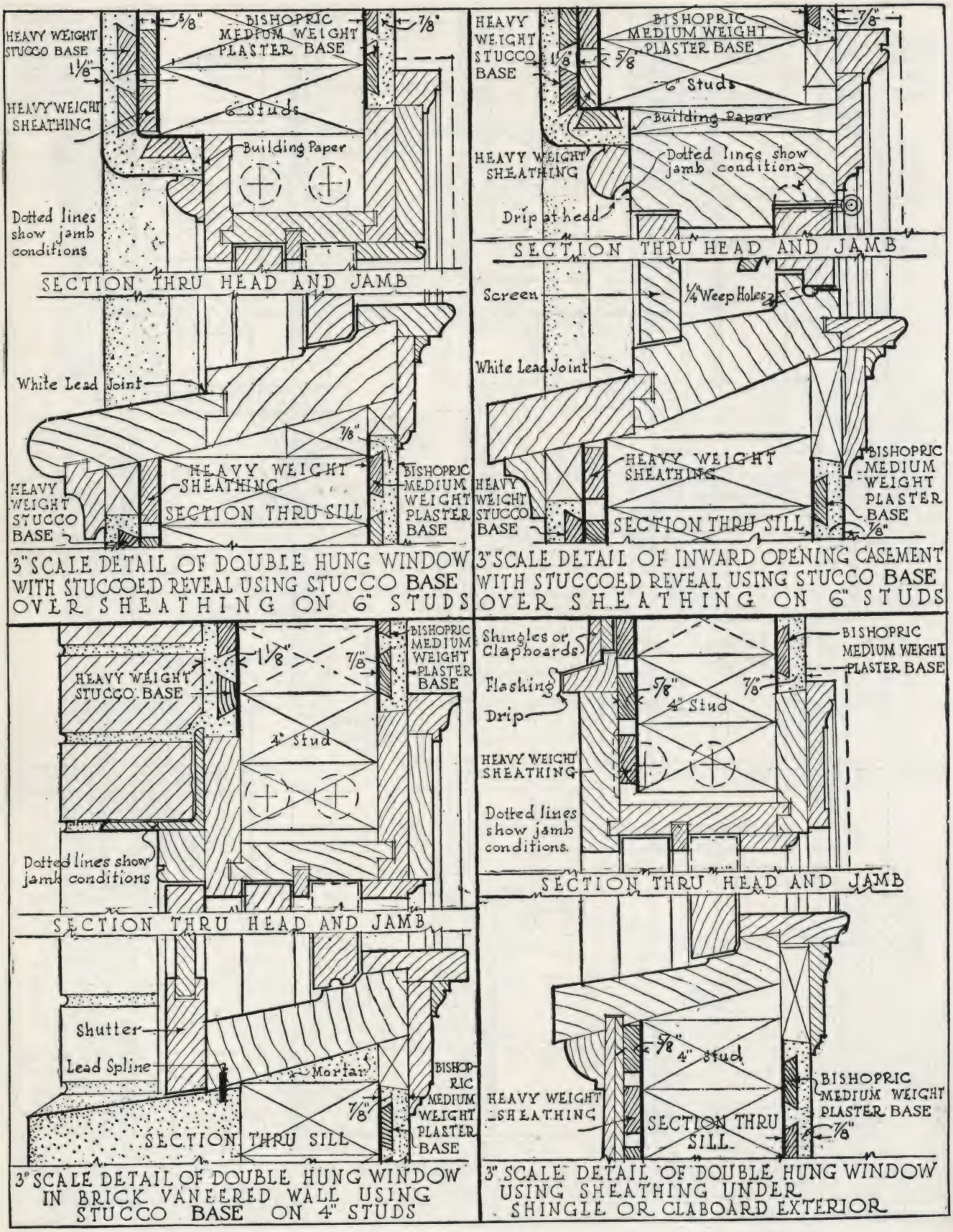

Window Details for Use with Bishopric Stucco Base and Sheathing (Drawing No. 6)

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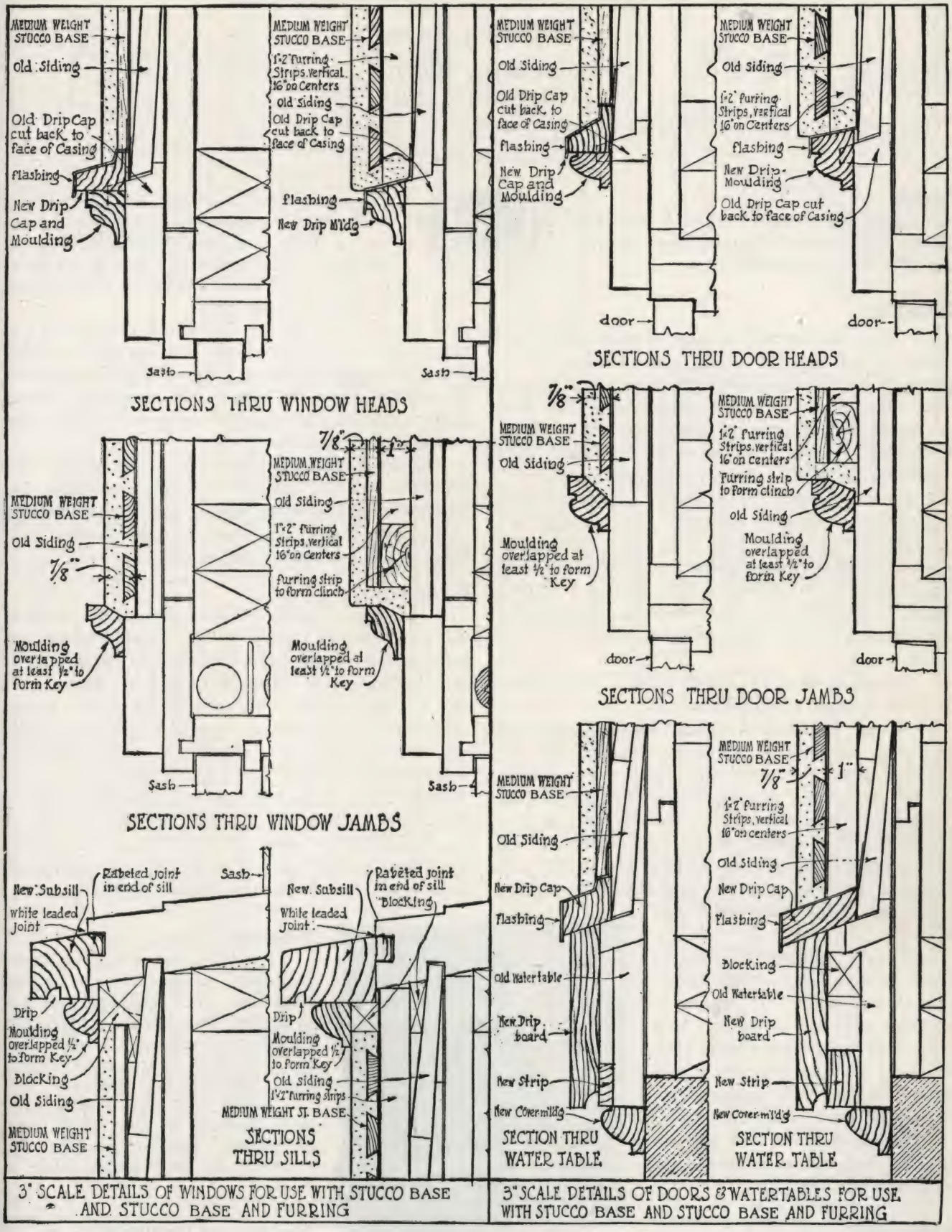

EXTERIOR DETAILS FOR USE IN OVERCOATING OLD FRAME BUILDINGS WITH BISHOPRIC STUCCO OVER BISHOPRIC STUCCO BASE (DRAWING NO. 7)

M. J. MacADAMS CORPORATION

Plastering Bases

TELEPHONE
FRANKLIN 5423

1731 Conway Building
CHICAGO, ILL.

EASTERN OFFICE, 101 Park Avenue, NEW YORK CITY, N. Y.

Product

"WIRE REINFORCED" E-COD FABRIC and "WOOD REINFORCED" E-COD FABRIC, plastering bases for exterior and interior use.

E-COD FABRIC
THE IDEAL PLASTERING BASE
TRADE-MARK

Description

"Wire Reinforced" E-Cod Fabric—Composed of asphalt saturated felt backing reinforced with No. 14 gauge galvanized wires, woven through and across the face of the felt in a 3- by 4-in. mesh. Galvanized wires are not attached, so pressure of the trowel, in plastering, forces the felt away from the wires and embeds them completely in plaster. The original bond between felt and plaster is perfect. When plaster sets, the reinforcing wires are completely embedded and protected from moisture and therefore from rust and disintegration. Tests by the Underwriters Laboratories show that "Wire Reinforced" E-Cod Fabric is fire resistant to a high degree because of complete embedding of the heavy reinforcement and the close adhesion between felt and mortar.

Shipped in sheets 32 in. wide by 98 in. long; packed 31 sheets to crate, totaling 75 sq. yds.

"Wood Reinforced" E-Cod Fabric—Composed of asphalt felt backing, reinforced vertically with No. 14-gauge galvanized wires, 4 in. apart, woven through the felt and over strong, horizontal wood strips 4 in. on center. These wood strips, securely held in place by the heavy galvanized wires, form a beam in the plaster slab producing great strength and rigidity. In plastering, the wood strips are locked in plaster and the galvanized wires completely embedded.

"Wood Reinforced" E-Cod Fabric is designed especially for 2-coat plaster work. It requires a minimum of plaster or stucco. It is particularly adapted for interior plaster work, and used extensively as a backing for stucco, being exceptionally desirable with magnesite stucco.

Shipped in sheets 30½ in. wide by 48 in. long; packed 27 sheets to a crate, totaling 30 sq. yds.

Adaptability

Both "Wire Reinforced" and "Wood Reinforced" E-Cod Fabric can be used wherever and whenever a plastering base is required. Both are adapted to all styles of construction, exterior and interior. Both have been thoroughly tested in use and in both there is an effective reinforcement of the plastered slab by the wires, adding strength wherever used.

"Wood Reinforced" E-Cod Fabric can be used for every kind of mortar, but is the best base on the market today for magnesite stucco because it does not absorb the chloride from the plaster. It produces a better, harder, stronger slab than any other base. It may be used for 2- or 3-coat work.

E-Cod Fabric is an economical, permanent base for all exterior or interior plastering combining also waterproofing, insulation, building paper, reinforcement of the plaster slab and a real economy in first cost, building better walls for less expense.

Economy

On exterior work, E-Cod Fabric serves as both lath and building paper. E-Cod Fabric can be and very often is applied direct to the studs, saving sheathing, building paper, furring strips and the labor necessary for application of all three. In the popular bridge construction (illustrated on opposite page) strong walls are secured at low cost. Applied to studs inside and out, a wall is produced which is moistureproof and insulated from cold and heat, by two thicknesses of heavy asphalt felt backing and the dead air space between.

E-Cod Fabric saves 50% to 60% of the plaster which goes to form the key on the ordinary open mesh lath. It also saves time in application of plaster.

STUCCO SLAB ON "WOOD REINFORCED" E-COD FABRIC
Note beam in plaster

Properties

E-Cod Fabric is fire-retardant, rustproof, dampproof, and sound deadening. The felt backing is one of the best sound deadeners. E-Cod Fabric is exceptionally adapted for use in walls of apartment buildings, hotels, hospitals and residences.

E-Cod Fabric absolutely prevents checking, cracking and staining of plaster. Interior walls can be decorated as soon as plastering is finished.

Samples and Catalogues

Samples and booklets describing use and construction will be sent on request.

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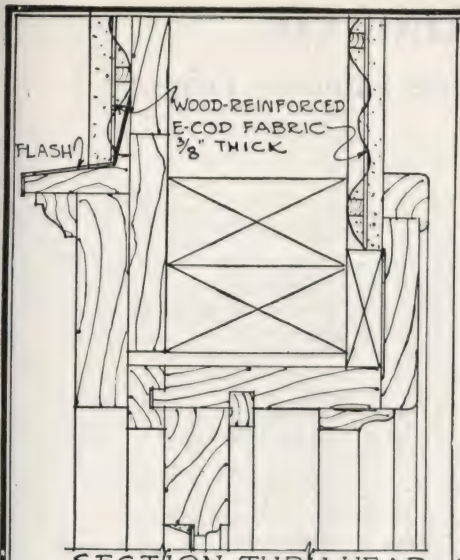

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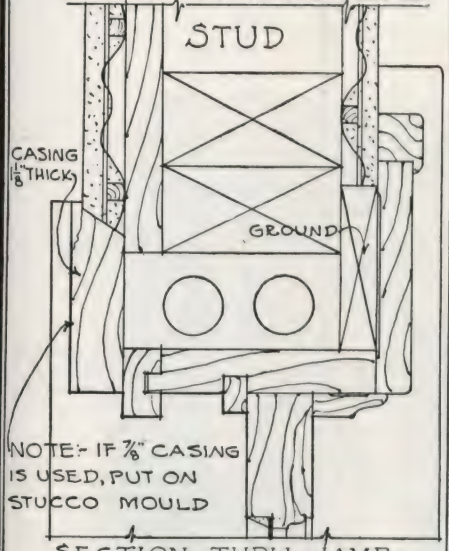

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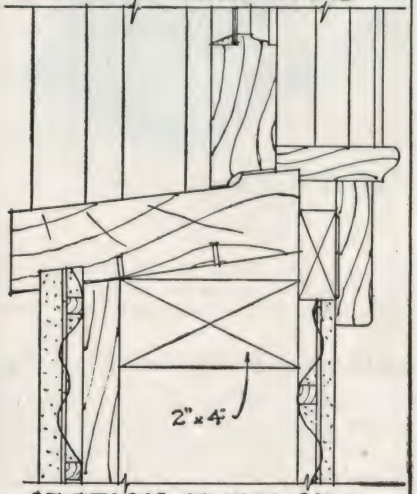
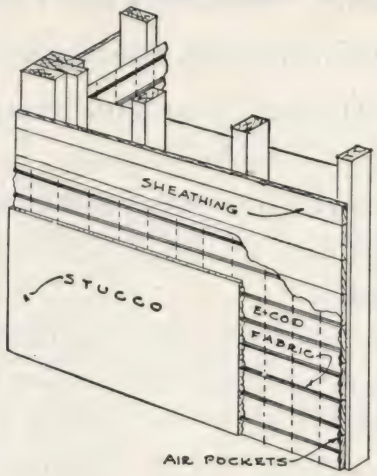
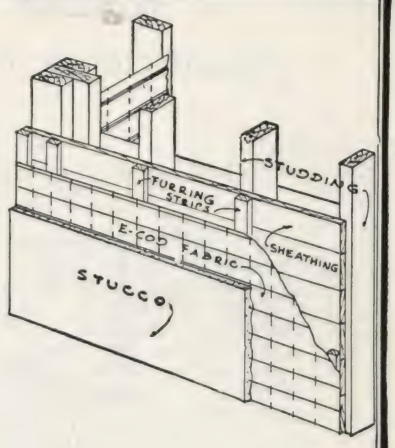


SECTION THRU SILL
DETAILS OF
DOUBLE HUNG WINDOW

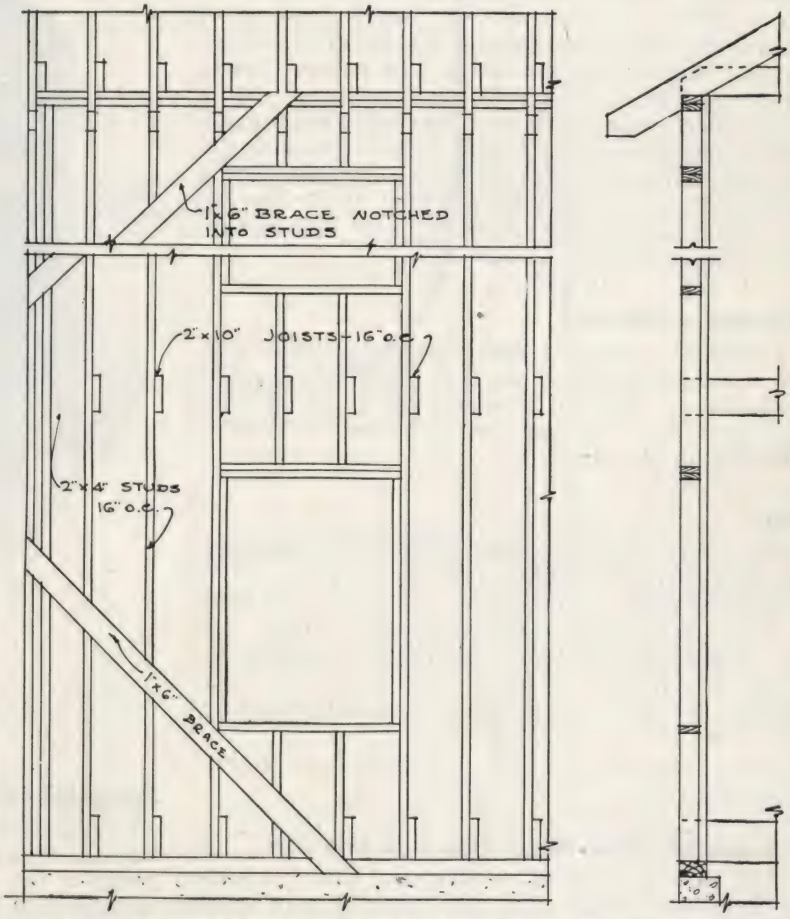


WOOD-REINFORCED E-COD FABRIC APPLIED TO SHEATHING



WIRE-REINFORCED E-COD FABRIC APPLIED TO STRIPS

NOTE: WOOD REINFORCED E-COD FABRIC USED FOR ALL INTERIOR PLASTERING. ALLOW FOR STANDARD 3/4" GROUNDS.



¼ INCH SCALE DETAILS OF BALLOON FRAME SHOWING BRACING FOR USE WITH WOOD OR WIRE REINFORCED E-COD FABRIC DIRECT ON STUDS FOR EXTERIOR STUCCO.

WINDOW DETAILS AND WALL SECTIONS FOR USE WITH E-COD FABRIC

KNAPP BROS. MANUFACTURING CO.

Manufacturers of Metal Building Specialties and Sanitary Trim

2419-2425 West 14th Street
CHICAGO, ILL.

TELEPHONE
CANAL 4975, 4992

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WATERLOO, IOWA, IOWA BUILDING MATERIAL CO.
FARGO, N. D., VICTOR H. LEEBY CO.
BOSTON, MASS., W. J. GROSVENOR CO.
LOS ANGELES, CAL., LOS ANGELES LIME CO.
ST. LOUIS, MO., H. GOLTERMAN
YOUNGSTOWN, OHIO, BUILDERS STEEL PRODUCTS CO.
GRAND RAPIDS, MICH., CHAS. VANDERVELDE
ELMIRA, N. Y., J. I. BINGHAM
DALLAS, TEX., NORTHWESTERN EXPANDED METAL CO.
TORONTO, CAN., DRUMMOND & REEVES
ATLANTA, GA., NORTHWESTERN EXPANDED METAL CO.
DENVER, COLO., GEO. P. HINES & CO.
SAN DIEGO, CAL., T. F. SNYDER
PITTSBURGH, PA., MOYER & STEWART

Products

METAL SANITARY COVE BASES (Styles 202, 205, 501, 203 and 204); SANITARY FLUSH METAL CASINGS of various styles; BULLNOSE CORNER BEADS several styles; SANITARY METAL WINDOW STOOL, TRIM and REVEAL LINING; COVE MOULDING.

Besides the above articles, Knapp Brothers manufacture a complete line of Metal Plaster Corner Beads, Metal Base Grounds, Metal Wall Ties, Partition Studs, Concrete Plaster Bond Inserts, Metal Wall Furring, Metal Blackboard Trough, Sanitary Chair Rail and Invisible Picture Moulds.

Co-Operative Service

Knapp Bros. have in their organization an experienced registered architect who will be glad to assist in the solution of technical problems connected with the Knapp products. Inquiries are invited and this service is available for all architects.

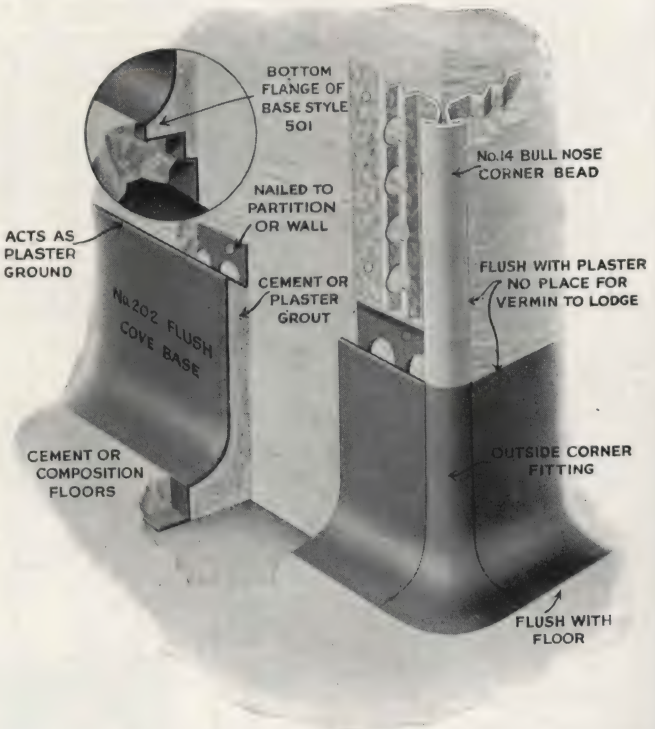
Finish

All the products are made from tight-coat galvanized steel and are primed with special paint before leaving the factory. This primer adheres to the metal and forms a basis for subsequent decorations. The many installations of these materials throughout the country testify, after years of service, to their permanency. References and list of installations on request.

Can be painted, varnished, enameled or grained over Knapp primer.

Metal Sanitary Flush Bases Nos. 202 and 205

Adapted for hospitals, sanitariums, hotels, schools, etc. They are cheaper than any other kind of coved base. Used with any kind of flooring. Eliminate the cost and necessity of wood grounds. Establish the very necessary true ground for plastering. Furnished in long lengths, easily erected by special tools. Complete fittings for corners and returns at doors in cast iron, square and radial. Grouting behind base with plaster or cement to produce solid backing and protection is recommended.



SANITARY FLUSH BASE NO. 202 USED IN CONNECTION WITH KNAPP NO. 14 BULLNOSE CORNER BEAD
Note the sanitary bullnose corner fitting

Suggested Brief Specification for Sanitary Flush Bases

Base throughout shall be Knapp Bros. Metal Sanitary Cove Base number [202 or 205] made of [No. 20 gauge or No. 18 gauge] galvanized steel painted at the factory with Knapp special primer. At all corners and at all door openings or returns at stairs use appropriate fittings. Base shall be 4 in. [or 6 in.] high. Erection shall be in accordance with printed instruction of manufacturers using special tools furnished by them.

Upon completion of plastering and floor work, clean off all plaster droppings or cement cakes and give base 3 coats (over priming coat) of enamel [or paint or varnish] in color and finish as selected by architect.

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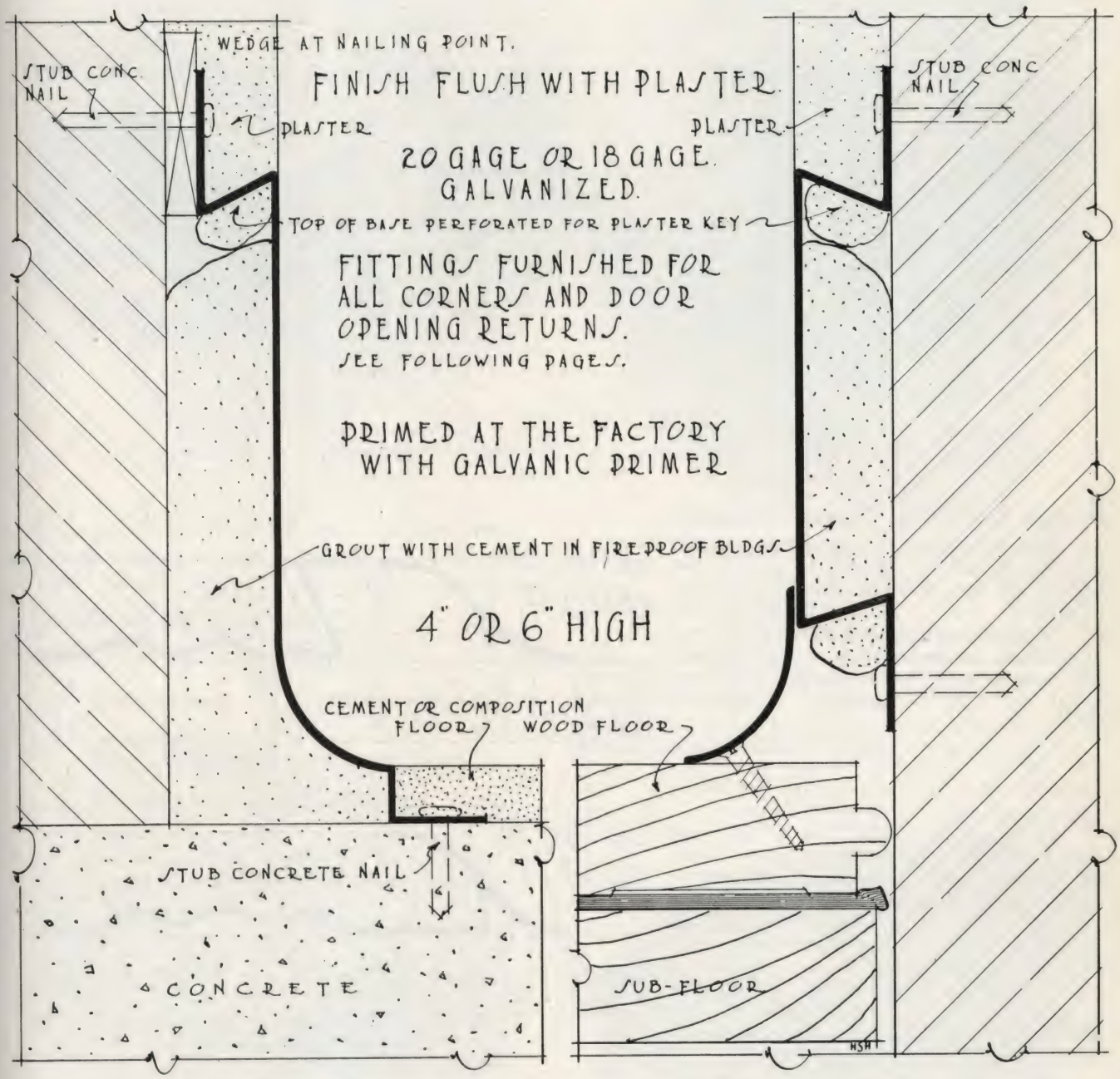


Base No. 202 (Patented)

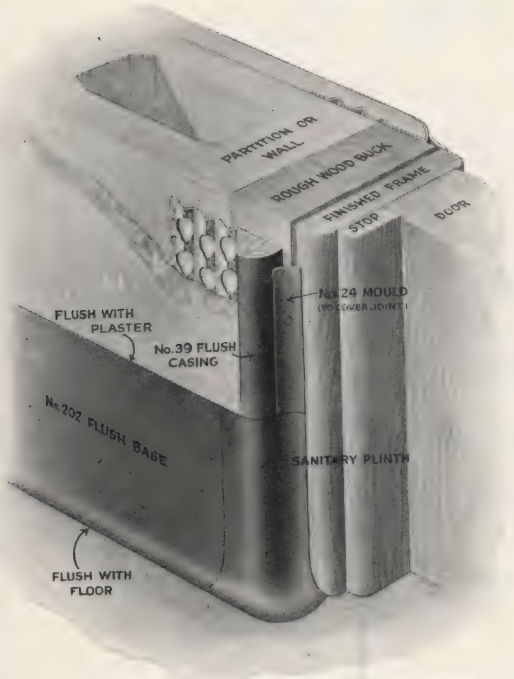
Recommended for use in fireproof buildings with cement, composition or other styles of mastic floors. This style is not recommended with wood joist construction because the shrinkage in the wood joists tends to pull the base from the wall

Base No. 205 (Patent pending)

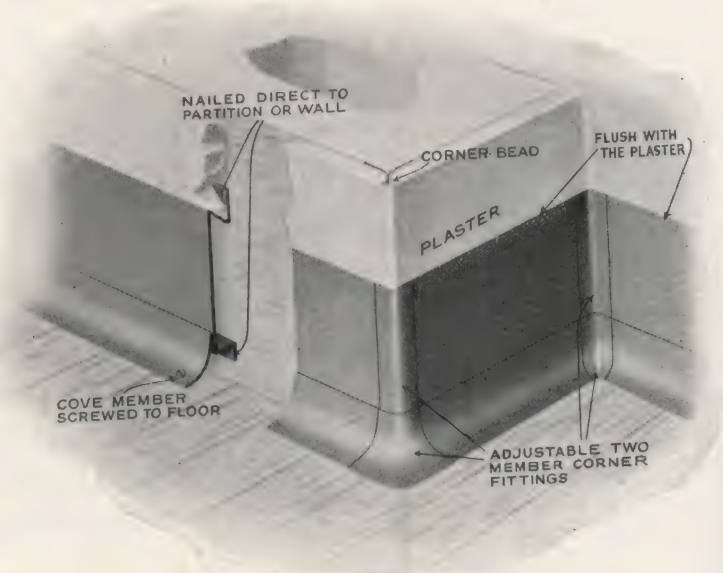
Recommended for use in non-fireproof buildings and with wood joist. Upper member is attached to the wall or partition. Lower cove member is attached to floor, so that settlement or shrinkage can take its natural course

KNAPP SANITARY METAL COVE BASES NOS. 202 AND 205

Continued on next page



SANITARY PLINTH FOR BASE, STYLE 202
Used in connection with flush door casing No. 39



SANITARY FLUSH BASE, STYLE 205
Showing adjustable cove feature and corner fittings

Sanitary Flush Metal Casings (Patented)

Especially adapted to hospitals, schools, dormitories, offices, restaurants, toilets, etc. Casings are put on before plastering and act as ground.

They are made of galvanized sheet steel of different gauges shown in the accompanying illustrations. They are coated on the exposed face with this company's special galvanic primer.

The corrugated and perforated flange not only acts as a key strip for the plaster between the buck and the partition, but also is a strengthening anchor between the two.

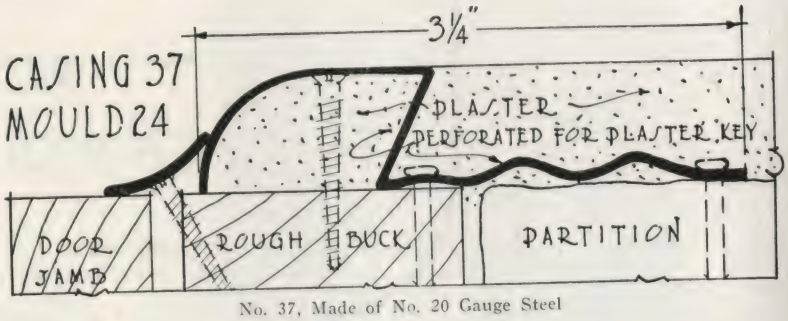
In casings No. 40 and No. 41 the wood door jambs are erected first. They should be filled and back painted and protected by paper before erection. In the other styles the door jambs are put up after plastering, and mould No. 24 is used to cover the joints between buck and jamb.

Casings No. 36 and No. 40 (without the extending flange) are designed for use on lath partitions. The lath is brought up to and overlaps the short nailing flange.

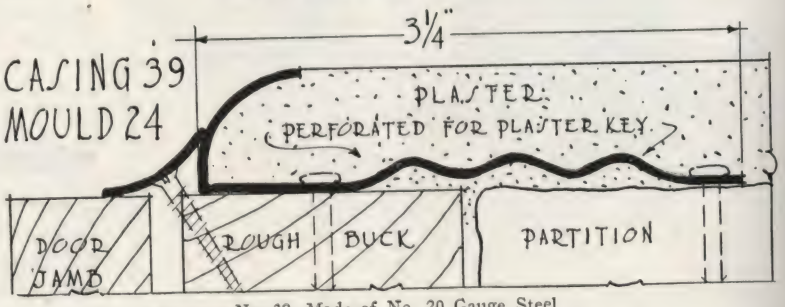
All casings are sold in the following lengths: 6 ft., 7 ft., 7 ft. 4 in., 8 ft., 9 ft., and 10 ft. They are cut and mitered on the job with an ordinary hack saw in an ordinary miter box. They are easily and quickly erected and require no particular mechanical skill. They are made for both ½- and ¾-in. thicknesses of plaster.

Knapp Bros. make a sanitary plinth fitting which allows all Knapp casings to be used in connection with their metal base. See illustrations on foregoing page.

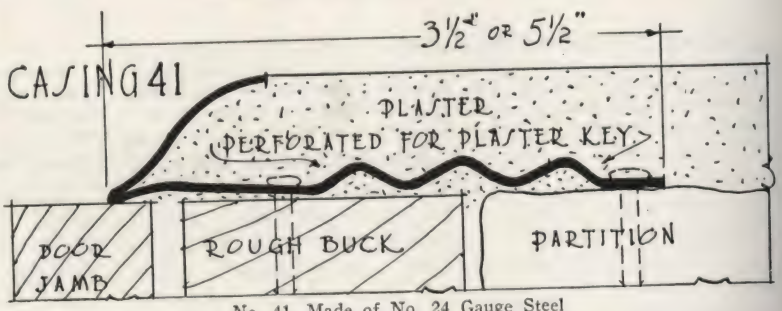
Further Details—Write for full particulars.



No. 37, Made of No. 20 Gauge Steel



No. 39, Made of No. 20 Gauge Steel
No. 36, Made without the Flange Extension



No. 41, Made of No. 24 Gauge Steel
No. 40, Made Without the Flange Extension

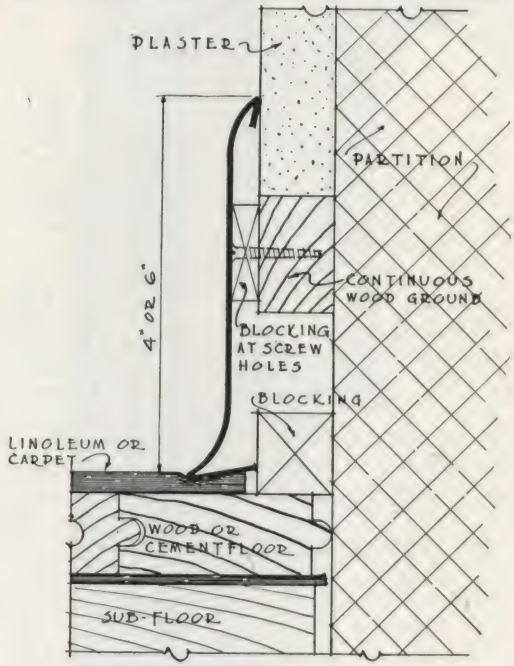
SANITARY FLUSH METAL CASINGS
Actual size

Continued on next page

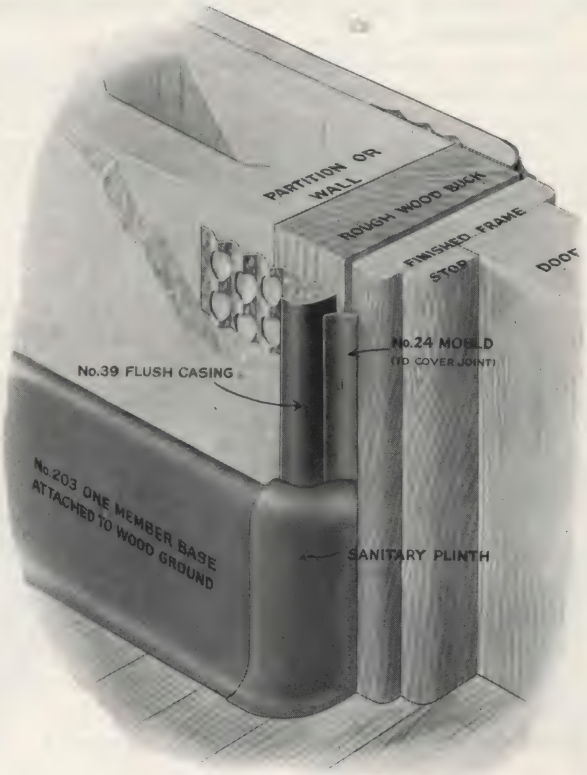
Removable Base No. 203

Made of No. 20 gauge galvanized steel coated with special galvanic primer. Base is put on after plastering in the standard manner. Fittings for corners and returns. Tools furnished for punching and erection. Base 4 and 6 in. high.

Made also with a detachable cove for use with wood floors, known as style No. 204.



SECTION NO. 203 SANITARY BASE
Half size

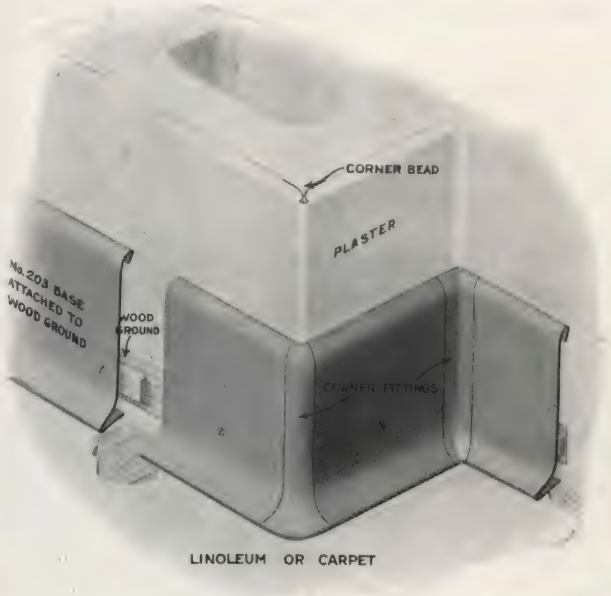


NO. 203 BASE SHOWING SANITARY PLINTH
Used in Connection with Sanitary Metal Casing

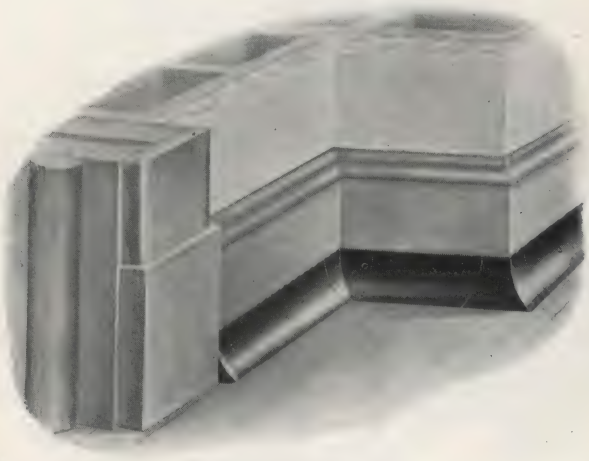
Cove No. 43 (Patented)

Made of No. 24 gauge galvanized steel coated with special galvanic primer. Is used with wood base already installed and takes the place of wood shoe. Fittings for corners and returns.

Sold in 10-ft. lengths, countersunk screw holes punched at factory.



REMOVABLE BASE NO. 203 SHOWING CORNER FITTINGS



METHOD OF FITTING COVE NO. 43 AT WALL ANGLES, RETURNS, ETC., BY USE OF END STOP AND CORNER CASTINGS

Continued on next page

Sanitary Window Stool, Trim and Reveal Lining (Patented)

Style 302 (illustrated on the right) can be used either as a stool alone or continued around the window opening as a complete trim as shown. The sanitary cove corner fittings together with the flush-with-the-plaster feature, constitute an absolutely sanitary trim. Like the sanitary flush base, this trim is erected before plastering and acts as a screed for the plaster. The curvature of the nose can be had in either 1½- or ¾-in. radius.

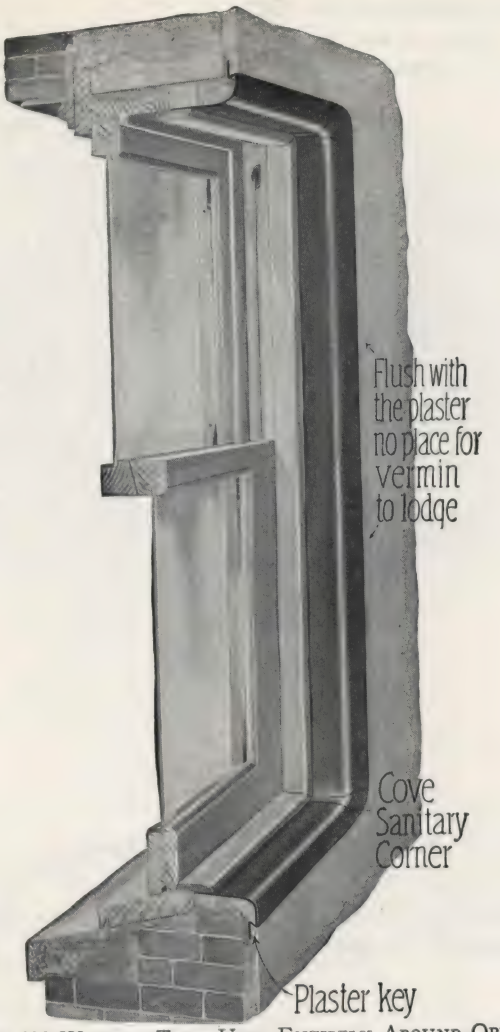
The style 304 stool (illustrated below) is flat and projects slightly beyond the plaster line. This is designed as a stool only, but is frequently used in connection with the jambs and head trim in the style 302.

The style 305 stool (illustrated below) is splayed and is designed to be used in thick walls or under conditions where it is desirable to prevent the stool from being used as a shelf. This also can be used in connection with the style 302 jambs and heads.

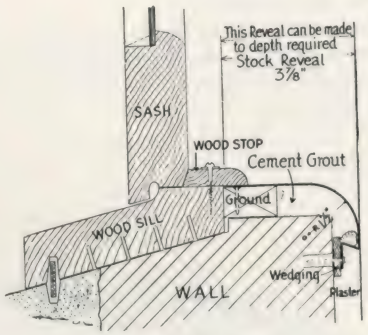
All styles are made in both No. 18- and 20-gauge galvanized steel and coated on the exposed face with the galvanic primer.

All window trim is made to order to fit the individual window opening. The manufacturers require the contractor to furnish them with exact dimensions and when this is done, the trim is shipped knock down ready to be set in place in the building.

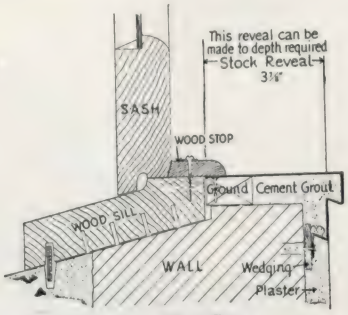
Further Details—Write for full particulars.



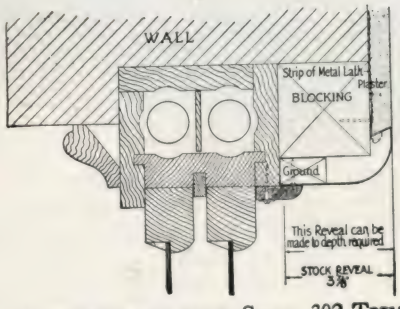
STYLE 302 WINDOW TRIM USED ENTIRELY AROUND OPENING



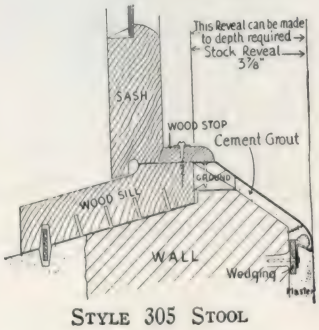
STYLE 302 STOOL



STYLE 304 STOOL



JAMB TRIMMED WITH STYLE 302 TRIM



STYLE 305 STOOL

UNITED STATES GYPSUM COMPANY

Manufacturers of Plaster Board and Partition Systems

205 West Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
BUFFALO, N. Y., Ellicott Square
BOSTON, MASS., 77 Summer Street
WASHINGTON, D. C., 410 Bond Building
BALTIMORE, MD., 910 American Building
PHILADELPHIA, PA., 107 Empire Building
PITTSBURGH, PA., 1723 Oliver Building
CLEVELAND, OHIO, 646 Hanna Building
ATLANTA, GA., 358 Williams Mill Road
CINCINNATI, OHIO, 52 Blymyer Building
DETROIT, MICH., 1360 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 650 Builders Exchange
ST. LOUIS, MO., 1339 Syndicate Trust Building
KANSAS CITY, MO., 523 Bryant Building
OMAHA, NEBR., 301 Peters Trust Building
DENVER, COLO., 401 Boston Building
LOS ANGELES, CAL., 902 Citizens National Bank Building

Products

SACKETT PLASTER BOARD, a Fire Resistive, Heat Insulating and Sound Retarding Base for Plastering.

ADAMANT PLASTER BOARD.

JESTER-SACKETT SOLID and HOLLOW PARTITIONS and SUSPENDED CEILINGS, consisting of Sackett (or Adamant) Plaster Board applied to Metal Channels.

SACKETT SOFFIT CEILINGS, Plastering Base under Concrete Joist Floors.

For Pyrobar Floor Tile, Partition and Furring Tile, and Column Covering, see pages 166-167; for Gypsum Plasters and Finishes see pages 368-371; for Reinforced Roof Tile, and Monolithic Roof, see pages 899-901; for Sheetrock Wallboard, see page 1128.

Service

We maintain a corps of experienced field superintendents and mechanics familiar with every detail of Jester-Sackett partition and ceiling construction, and we will contract for the complete installation of this system ready for plaster. Send plans for estimates.

Plaster Board

Brands: Sackett and Adamant.

Fire resisting lathing material; superior to wood or metal lath. Specifications on page 309.

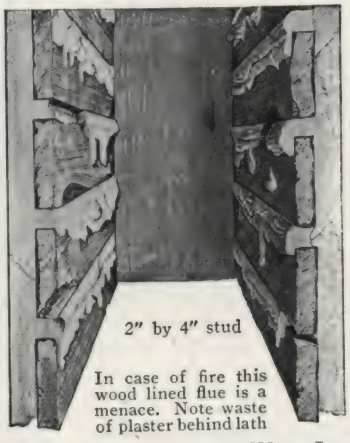
Sackett plaster board consists of 3 alternate layers of gypsum and 4 sheets of strong fibrous felt. Adamant plaster board consists of gypsum between two sheets of fibrous material.

Advantages—Combines lathing and fire resisting construction in one inexpensive commodity. Non-conductor of heat and cold; sound deadener. Easily and rapidly applied. Reduces fuel expense. No contraction or expansion; avoids buckling lath, stains and other defects of wood lath construction. The uniform backing insures a stronger and denser coat. Keeps the moisture in plastering away from the woodwork; no warping of framing or trim. The *bond between plaster and board is perfect.*

SACKETT PLASTER BOARD
Note patented reinforced nailing edges, also alternate layer construction, an exclusive Sackett feature

FIRE RESISTING
Sackett
TRADE MARK
LATHING MATERIAL

ALL GENUINE SACKETT BEARS THIS TRADE-MARK



In case of fire this wood lined flue is a menace. Note waste of plaster behind lath

Plaster board will not burn, and acts as a fire stop. No plaster wasted

SECTIONAL VIEWS OF WOOD LATH WALL AND PLASTER BOARD WALL

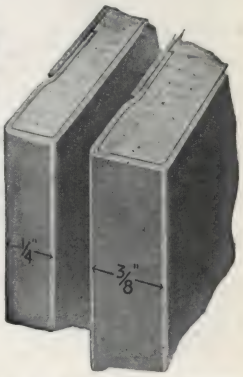
Instead of weak, flimsy, inflammable wood lathing that swells and cracks plaster, Sackett or Adamant plaster board provides a solid, continuous gypsum sheet to which plaster adheres perfectly. Does not swell, contract or warp, hence eliminates the principal cause of plaster cracks. Exhaustive tests prove Sackett walls over three and one-half times more sound resisting than walls made with wood lath

Other Uses for Plaster Board—Extensively used between clapboards and sheathing as a fire stop and insulator. Also used instead of sheathing underneath weatherboarding. Used as a fire stop and insulator under roof boards; under wood shingles or other inflammable roofing. Between floors as a fire stop and sound deadener. Under floor joists in furnace basements for protection against fire, dust and smoke. On exposed wooden surfaces in mill and warehouse construction as a fire stop.

Cost, Sizes and Weights—Plaster board walls with plaster cost much less than metal lath and plaster walls, and in most markets but little more than wood lath and plaster walls. Regular dimensions 32x36 in.—8 sq. ft. Special sizes made for Jester-Sackett system and soffit ceilings.

U.S. GYPSUM CO.
ADAMANT
PLASTER BOARD
NEW YORK CHICAGO CLEVELAND

ALL GENUINE ADAMANT BEARS THIS TRADE-MARK



ADAMANT PLASTER BOARD
Note patented reinforced nailing edges

WEIGHTS OF PLASTER BOARD

Thickness, in.	Weight per sq. ft., lbs.	Weight per board, lbs.
1/4	1½	12
3/8	2	16
1/2 (special to meet requirements of certain building laws)	2½	20

Continued on next page

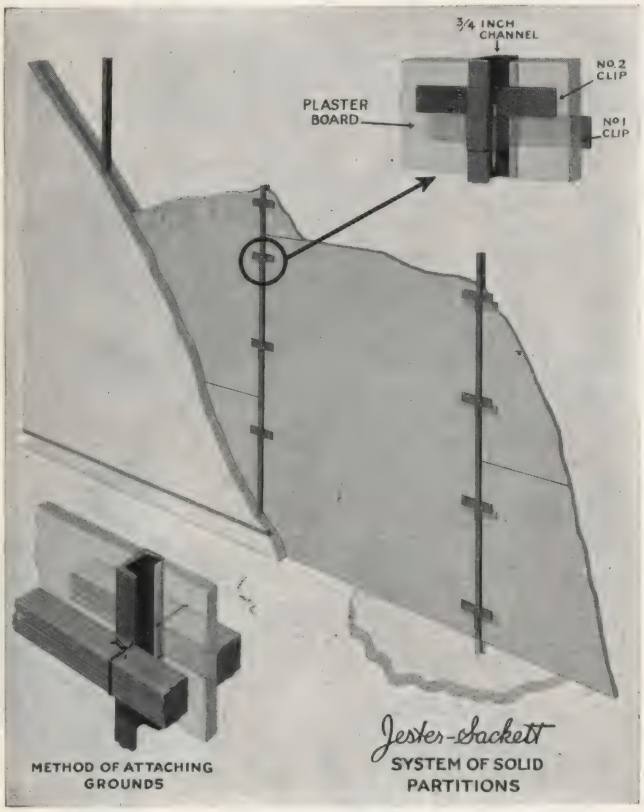
Jester-Sackett System of Partitions and Ceilings

This system involves the use of ¼- or ⅜-in. Sackett or Adamant plaster board, attached to ¾-in. hot or cold rolled channel studs by means of patented metal clips.

Advantages—The Jester-Sackett system is incombustible and even unplastered is an effective barrier against fire. When plastered both sides, the use of this system for non-bearing fireproof partitions in fireproof buildings has been approved by the National Board of Fire Underwriters and by many large cities. When plastered on both sides, Jester-Sackett partitions provide sound resistance equal to any type of incombustible lath and stud partition. This type of construction provides a smooth, rigid plastering surface, requiring no mechanical key to insure bonding of the plaster. There is no waste and excess plaster as when open flexible lath is used. The plaster board has high tensile strength, will not expand or contract and, when finished, combines with the plaster to form a solid homogeneous mass of gypsum. Jester-Sackett construction does not warp, buckle or bulge.

Jester-Sackett Solid Partitions

Jester-Sackett solid partitions are constructed in 2-in. finished thickness only. For the method of constructing see the illustration below, and specifications on following page.



DETAIL OF JESTER-SACKETT SOLID PARTITIONS

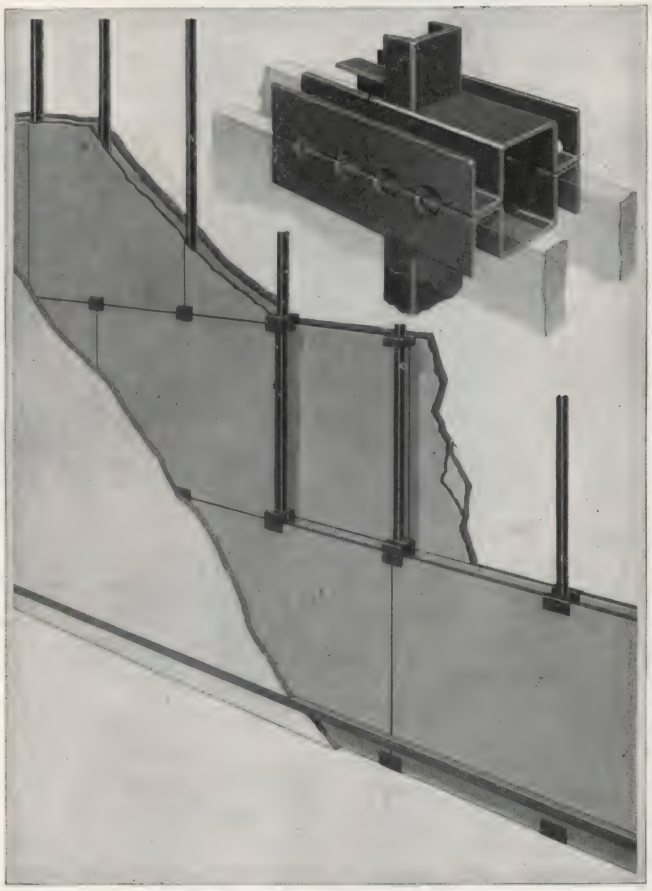
MATERIAL REQUIRED PER SQ. YD. JESTER-SACKETT SOLID PARTITION

Type	Board		Studs		Clips	
	Size, in.	Sq. ft.	Size, in.	Lin. ft.	Type	Reqd.
2" Solid	¼ or ⅜x24x32	9	¾	5½	No. 1	6
					No. 2	6

Jester-Sackett Hollow Partitions

Jester-Sackett hollow partitions can be erected in 3-, 4-, 5- and 6-in. finished thicknesses, and require one size of stud only—¾-in. hot or cold rolled channel.

For a partition of 3-in. finished thickness the ¾-in. studs are placed in a single straight line, 16-in. on centers. For 4-, 5- and 6-in. finished thicknesses the same size studs and spacing are used, but the channels are staggered. The clips maintain the alignment of the board and also provide the necessary side stiffness. See illustration below, and specifications on following page.



JESTER-SACKETT HOLLOW PARTITION

MATERIAL REQUIRED PER SQ. YD. JESTER-SACKETT HOLLOW PARTITION

Type	Hollow space between boards, in.	Board		Studs		Clips	
		Size, in.	Sq. ft.	Size, in.	Lin. ft.	Type	Reqd.
3" Holl.	1	⅜x18x32	18	¾	7½	No. 6	10
4" Holl.	2	⅜x18x32	18	¾	7½	No. 8	10
5" Holl.	3	⅜x18x32	18	¾	7½	No. 9	10
6" Holl.	4	⅜x18x32	18	¾	7½	No. 10	10

Jester-Sackett Suspended Ceilings

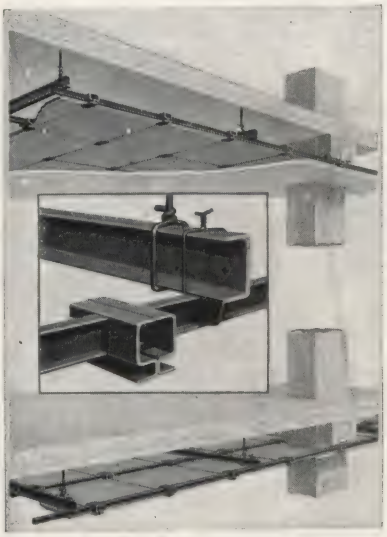
The Jester-Sackett suspended ceiling is similar in construction to the hollow partitions set in a horizontal position, except that the upper layer of plaster is omitted. The framework consists of ¾-in. hot or cold rolled channels, 16-in. on centers, wired to 1½-in. channel runners placed 4 ft. from center to center, which in turn are supported every 4 ft. by hangers. ⅜x18x32-in. plaster board is then fastened to the ¾-in. channels by No. 6 clips. See the illustration and specifications on following page. A rigid, uniform ceiling is provided which will not

Continued on next page

MATERIAL REQUIRED PER SQ. YD. JESTER-SACKETT SUSPENDED CEILING

Board		Channels		Clips	
Size, in.	Sq. ft.	Size, in.	Lin. ft.	Type	Reqd.
⅜x18x32	9	¾ 1½	7 2½	No. 6	9

sag or waste plaster. Only two coats of plaster work are required.



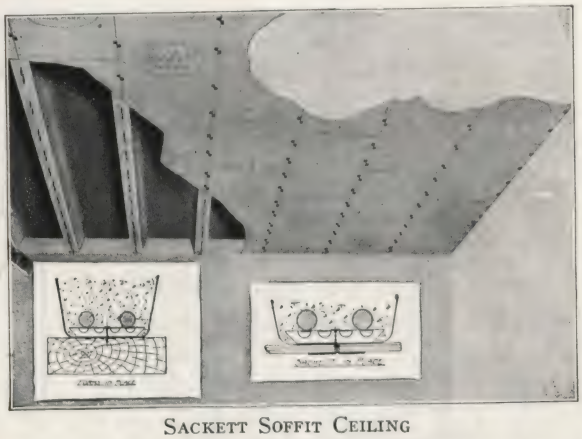
JESTER-SACKETT SUSPENDED CEILING

Sackett Soffit Ceilings

The Sackett Soffit system possesses decided advantages over open lath for flat ceilings under reinforced concrete joist floors employing permanent, or removable wood or metal forms.

By means of an easily installed steel clip embedded in the concrete, ⅜-in. Sackett or Adamant plaster board is quickly and securely fastened to the underside of the concrete joists to form the ceiling. These clips also act as a chair or spacer for the reinforcing steel. This system is very economical. Pencil rods and tie wires are entirely eliminated. Only two coats of plaster are required. The plaster board comes in sizes to meet any requirements of the job. For 24-in. joist centers use ⅜x24x36-in. plaster board. For joist spacings from 24 to 36 in. use ⅜-in. plaster board, 18 in. wide, in lengths equal to the joist spacing. An intermediate support will be required midway between joists, consisting of a ¾-in. channel hung from the floor above. No. 6 clips are then used as before. See illustration and specifications on this page.

SOFFIT CLIP



SACKETT SOFFIT CEILING

Specifications

Plaster Board on Wood Construction—*Lath*—shall be ¼-in. Sackett (or Adamant) Plaster Board made by the UNITED STATES GYPSUM COMPANY. Size of sheets, 32x36 in. Grounds shall be ¾ in. (¼-in. Sackett [Adamant], ½-in. plaster).

Note to Architect: ⅜-in. Sackett [Adamant] may be specified if preferred, and grounds should in that case be ⅞ in. Best results on ceilings requiring leveling are obtained by furring with ⅞ by 2-in. furring strips set on 8- or 12-in. centers.

Sackett [Adamant] lathing shall be applied with 3d common nails.

Directions for Application—Lay all Sackett [Adamant] sheets in parallel courses following the direction of studding, furring or joists. Start each alternate course with half sheet (32x18 in.), so as to break joints at right angles to studding on walls (horizontally) and at right angles to joists or furring on ceilings. The last sheet of Sackett [Adamant] in each course shall be cut to exactly fit space. Cut boards with a common saw, or score with the point of a hatchet and break over a straightedge. Break joints between walls and ceilings so that a vertical joint on the wall will not meet a ceiling joint. Perpendicular joints on opposite sides of partitions must not be on same stud; that is, the stud that comes at *center* of Sackett [Adamant] on one side of partition must be at *edge* of Sackett [Adamant] on opposite side. Space Sackett [Adamant] sheets ¼ in. apart at all horizontal or other joints which do not come on studs. Joints coming on studs or joists may be butted tight or come as will, but joints must not exceed ¼ in. Do not wet boards before plastering.

Plastering—See specifications for plastering on Sackett Plaster Board, Nos. 12, 23 or No. 30 on page 370.

Jester-Sackett Solid Partitions—All partitions shown on plans, except as otherwise noted, are to be of Jester-Sackett construction, consisting of Sackett [Adamant] Plaster Board, clipped to ¾-in. hot or cold rolled channel iron studs. The flanges of the studs shall not exceed ⅜ in. Channel studs shall be spaced on 24¾-in. centers and securely fastened in a suitable manner to floors and ceilings.

Sackett [Adamant] Plaster Board, ¼ or ⅜ in. thick, 24x32 in. in size, shall be placed between the channels and clipped to same with Jester Clips, spaced on 9-in. centers, starting 4 in. from floor or ceiling. Carpenter contractors are to place grounds for plastering, picture moulds, baseboards and chair rail, where required, and to set all bucks. Bucks shall be made from 2x2-in. pine, and properly braced and set.

Plastering—See specifications for plastering on Sackett Plaster Board, Nos. 12, 23 or No. 30 on page 370.

Jester-Sackett Hollow Partitions—All partitions as shown on plans, except as otherwise noted, shall be Jester-Sackett Hollow Partitions. ¾-in. channel studs shall be fastened to floor and ceiling 16-in. on centers. On each side of the channels place Sackett [Adamant] Plaster Board, ⅜ in. thick 18x32 in. size, which shall be clipped to each channel with Jester Clips, all perpendicular joints between floors and ceilings to be broken. Partition shall then be plastered with ½ in. of gypsum plaster on each side. Carpenter contractors to place grounds for plastering, picture mould, base and chair rail, where required, and to set all bucks. Bucks to be made from 2-in. lumber of width of finished wall, and properly braced and set.

Plastering—See specifications for plastering on Sackett Plaster Board, Nos. 12, 23 or No. 30 on page 370.

Note: For best results bucks should extend to ceiling.

Jester-Sackett Suspended Ceilings—All ceilings where indicated to be suspended shall be Jester-Sackett, constructed of ⅜-in. Sackett [Adamant] Plaster Board 18x32 in., attached to ¾-in. channels 16 in. on centers with Jester Clips. The ¾-in. channels shall be wired with No. 16 wires to 1½-in. channels 4 ft. apart, which are to be suspended from the construction above by ¼-in. round rods, or two No. 14 galvanized wire, spaced 4-ft. centers, both ways. All hangers are to be provided and set in place by concrete contractor, hangers to be long enough to extend at least 6 in. below finished ceiling line.

Plastering—See specifications for plastering on Sackett Plaster Board, Nos. 12, 23 or No. 30 on page 370.

Sackett Soffit Ceilings—(*To be placed in reinforced concrete specifications.*)

This contractor will install special combination reinforcing steel chairs and Sackett Ceiling Clips, 9 in. on centers, in all joists; same to be furnished by plastering contractor. Clips shall be placed in tees of beams and along walls, as well as in joists.

When joist spacing is over 24 in., this contractor shall provide suitable means of hanging an intermediate ¾-in. channel from the construction above for the support of the plaster board.

(*To be placed in plastering specifications.*)

This contractor shall supply required special Sackett Ceiling Clips. He shall install Sackett [Adamant] plaster board on all soffit ceilings, unless otherwise specified, and shall then plaster same to a full ½ in.

Plastering—See specifications for plastering on Sackett Plaster Board, Nos. 12, 23 or No. 30 on page 370.

SIMPLEX STEEL PRODUCTS CO.

Non-bearing Partitions and Suspended Ceilings

TELEPHONE
LAKEVIEW 395

1146 Roscoe Street
CHICAGO, ILL.

Product

The SIMPLEX SYSTEM of PARTITION and CEILING CONSTRUCTION.

The Simplex System

An effective and economical method of constructing fire resistive and soundproof non-bearing partitions and suspended ceilings.

The Simplex system utilizes in a new way, the well recognized advantages of plaster board and steel stud construction.

The features of the system are the designs of the studs, and the method of fastening or tying a prong, which is part of the stud itself, over a 3-in. wire pin to secure the plaster boards to the stud. This fastening is accomplished very rapidly with a special tying tool. Except for the pins, no metal extends above the surface of the plaster board. Plaster keys are provided for along the studs and horizontally between plaster boards.

The drawings and specifications on the following pages demonstrate in detail the method of erecting Simplex partitions and ceilings.

The Simplex System

TRADE-MARK

Advantages Offered by the Simplex System

(1) Adaptability—The nature of the Simplex system—its effectiveness against fire, sound, and vermin, its speed of erection and its low cost—makes it the logical method for use in the construction of homes, hotels, apartment or flat buildings, theaters, stores, office buildings, schools, churches, and public buildings.

(2) Fireproof—The absence of combustible materials, the presence of large amounts of gypsum plaster—a universally recognized, effective fire resistant—and the design of the stud which keeps it deeply embedded in plaster, combine to produce a highly fireproof construction.

(3) Soundproof—Gypsum plaster board and plaster effectively resist sound transmission. The studs are too far from the partition faces to be very active in transmitting noises from one room to another.

The air space in the hollow partition offers another important element in soundproofing.

(4) Saves Space—Because of the design of the studs and the methods of fastening plaster boards. Simplex partitions can be erected that are as effective and satisfactory as other partitions of 1 to 2½-in. greater thickness. Solid partitions can be finished 1½ in. thick if desired.

(5) Light Weight—The principles of construction of the Simplex system utilize lighter weight materials and economize on the quantity. The result is finished partitions and ceilings of light weight which in large buildings lessen the floor loads and stress throughout. A 3-in. finished hollow partition weighs 10.50 lbs. per sq. ft.

(6) Rigid Construction—In spite of the vitally important characteristics mentioned, Simplex construction is strong and rigid due to the designs of the studs, to the method of fastening plaster boards, to the many large plaster keys, and to the rigid nature of the materials used.

(7) Economical—The method of erecting studs and fastening plaster boards with the tying tool and wire pins permits rapid construction at a big saving in labor costs.

The savings in steel and plaster and the moderate cost of Simplex materials make the system a very economical method of construction.

(8) Healthful—The insulating properties of the materials maintain a uniform temperature in rooms. The smooth crackless surfaces and tight joints or bonds eliminate spaces where dust or filth can collect, or where insects or vermin may pass.

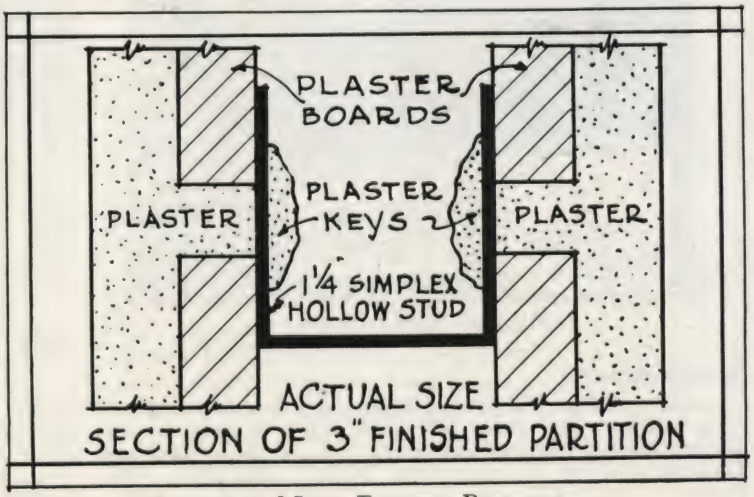
(9) Conceals Conduits—Pipes, wires, and conduits may be enclosed and concealed with Simplex construction with practically no trouble or extra work.

(10) Salvage Value—The character of the studs and fastening permits, the easy salvaging and use for reconstruction of Simplex materials with a minimum of debris and waste.

Details and Handbook

Architects can secure on request full size drawings of details to use as guides in preparing plans.

Handbooks of the Simplex system are also available.



SECTION OF 3-INCH FINISHED PARTITION

Continued on next page

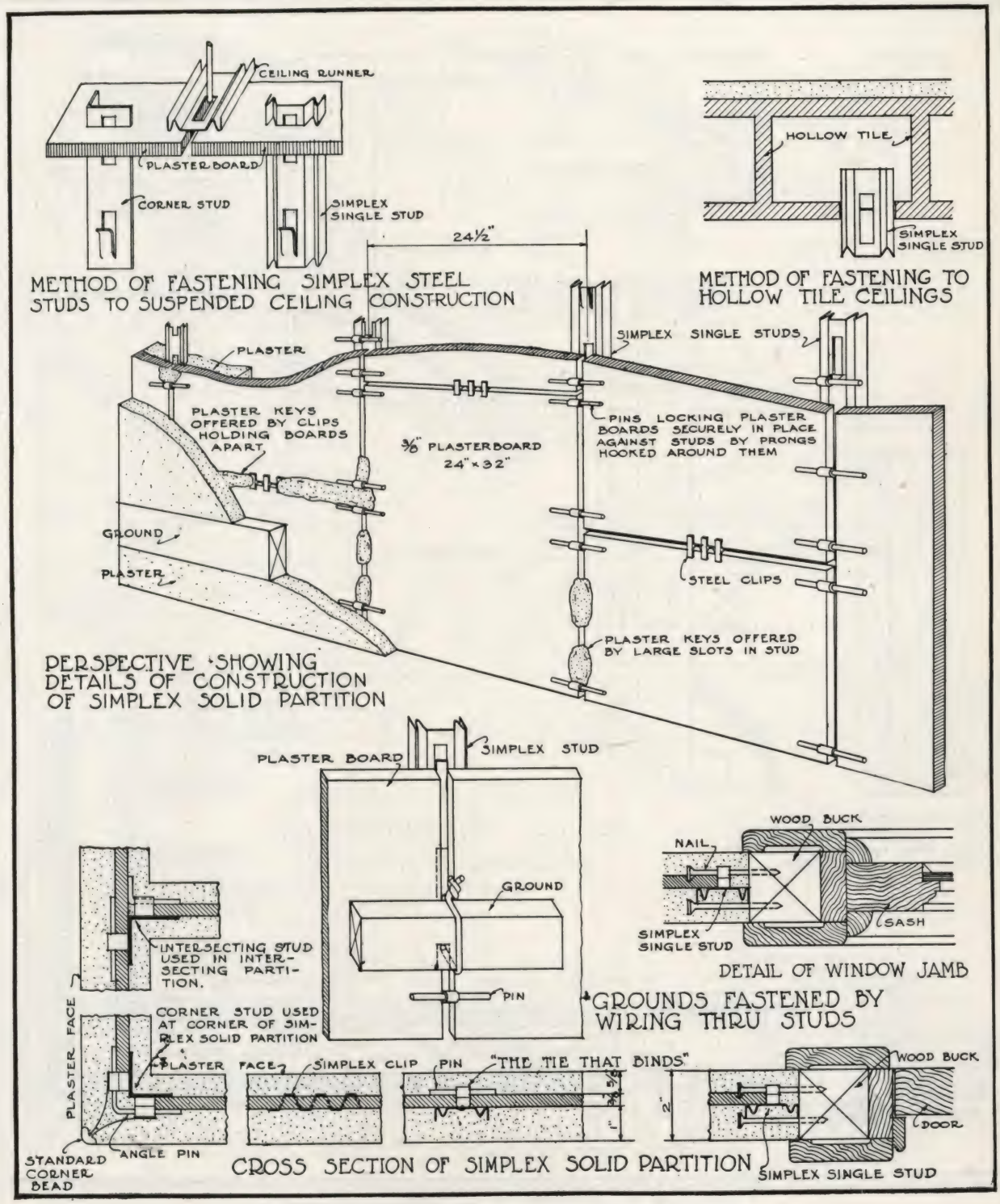
Specifications for Solid Partitions

This contractor to erect partitions where shown, by the Simplex System, using Simplex solid partition studs anchored to floor and ceiling by approved method, and properly lined up to insure a straight wall. Studs to be placed 24½ in. on centers. Corner and intersecting wall studs to be used where required.

After studs have been properly placed, erect ⅜x24x32-in. gypsum plaster boards, securing them to studs by means of wire pins 3 in. long, of not less than No. 10 gage thickness. Pins to be held in place by prongs, which are integral with the Simplex studs, using a Simplex tying tool to hook prongs tightly over pins, and securely bind plaster board to studs. Pins to be 6 in. apart or less.

The bottom row of plaster boards to be full size and half size, alternated to give broken joints. In the center of each horizontal joint between plaster boards, furnish and place one clip to separate boards not less than ¼ in., which separation and stud slots on vertical joints are to be used for plaster keys.

Apply gypsum plaster to entire surface on both sides of partition, applying brown and white coats, white coat to be not more than ⅛ in. thick. Do not wet or sprinkle plaster boards before applying plaster. All plaster to be mixed according to manufacturer's specifications, and to be applied the proper thickness to be flush with grounds when completed. All grounds will be furnished and set by carpenter contractor.



Details of Construction of Simplex Solid Partitions

Continued on next page

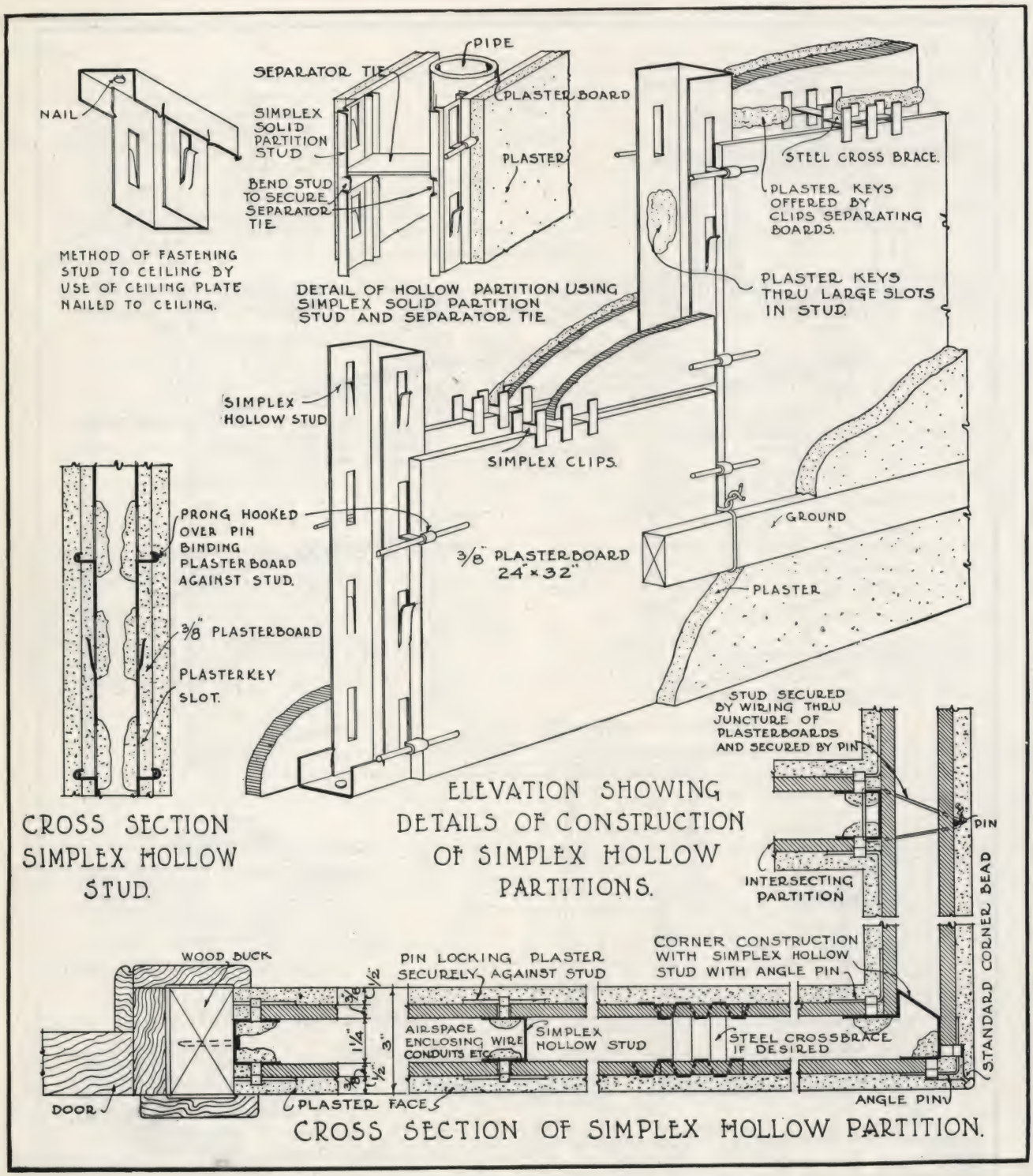
Specifications for Hollow Partitions

This contractor to erect hollow partitions where shown by the Simplex System, using Simplex hollow studs anchored to floor and ceiling by approved method, and properly lined up to insure a straight wall. Studs to be placed 24½ in. on centers. Corner studs to be used where required.

After studs have been properly placed, erect ⅜x24x32-in. gypsum plaster boards on each side of partition, securing them to studs by means of wire pins 3 in. long, of not less than No. 10 gage thickness. Pins to be held in place by prongs integral with the Simplex studs, using a Simplex tying tool to hook prongs tightly over pins and securely bind plaster boards to studs. Pins to be 6 in. apart or less.

The bottom row of plaster boards matching on opposite faces to be full and half size, alternated to give broken joints. In center of each horizontal joint between plaster boards, furnish and place one clip to separate boards not less than ¼ in., which separation and stud slots on vertical joints are to be used for plaster keys. Steel cross braces to be fastened to matching clips when necessary.

Apply brown and white coats of gypsum plaster to entire surface on both exterior faces of partition; white coat to be not more than ⅛ in. thick. Do not wet or sprinkle plaster boards before applying plaster. All plaster to be mixed according to manufacturer's specifications, and to be applied the proper thickness to be flush with grounds when completed. All grounds will be furnished and set by carpenter contractor.



Details of Construction of Simplex Hollow Partitions

Continued on next page

Specifications for Simplex Suspended Ceilings

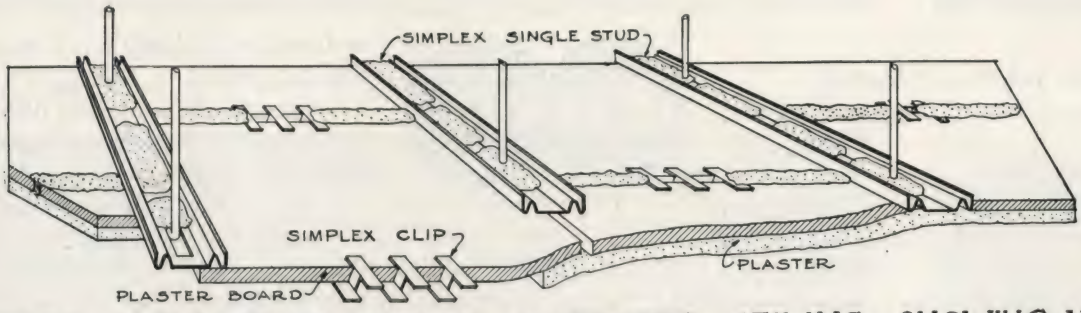
This contractor to erect suspended ceilings by the Simplex System. Securely anchor to joints, hangers of No. 9 wire, length as indicated, and placed 24½ in. on centers along joists. Form shoe by bending end of hanger to a right angle in a direction transverse with joints.

Suspend Simplex solid studs transversely with joists by inserting shoe through stud slots and tying in a suitable manner. Corner and intersecting studs to be used where required.

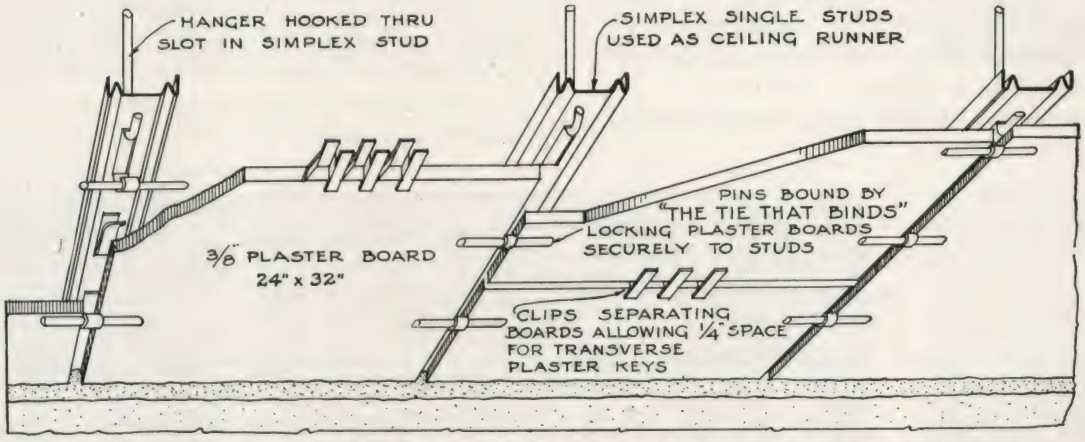
After studs have been properly placed erect ⅜x24x32-in. gypsum plaster boards, securing them to studs by means of wire pins 3 in. long, or with angle pins where required, of not less than No. 10 gage thickness. Pins to be held in place by prongs integral with studs, using a Simplex tying tool to hook prongs tightly over pins which are to be 6 in. apart or less.

Plaster board courses to be started with full and half size pieces alternated to give broken joints. In center of each joint between plaster boards, furnish and place one clip to separate boards not less than ¼ in., which separation and stud slots are to be used for plaster keys.

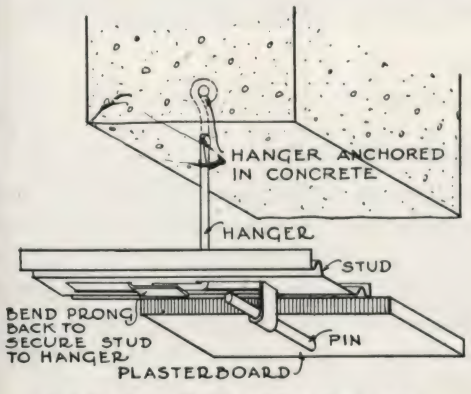
Apply brown and white coats of gypsum plaster to entire under surface of the ceiling. White coat to be not more than ⅛ in. thick. Do not wet or sprinkle plaster boards before applying plaster. All plaster to be mixed according to manufacturer's specifications and to be applied to the proper thickness when completed.



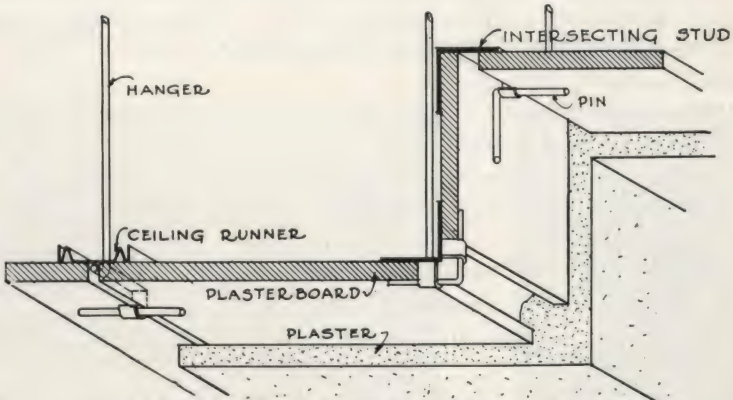
UPPER SURFACE OF SIMPLEX SUSPENDED CEILING SHOWING NETWORK OF PLASTER KEYS ALONG STUDS AND BETWEEN PLASTER BOARDS



PLASTERING SURFACE OF A SIMPLEX SUSPENDED CEILING



DETAIL OF METHOD OF FASTENING STUD TO HANGER



METHOD OF FURRING AROUND BEAMS OR PIPES IN CEILINGS

Details of Construction of Simplex Suspended Ceilings

THE ATLAS PORTLAND CEMENT COMPANY

NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL. PHILADELPHIA, PA. BOSTON, MASS. BIRMINGHAM, ALA.
DES MOINES, IOWA ST. LOUIS, MO. DAYTON, OHIO

WORKS

NORTHAMPTON, PA. HANNIBAL, MO. HUDSON, N. Y. LEEDS, ALA.

Products

ATLAS PORTLAND CEMENT.
ATLAS-WHITE PORTLAND CEMENT.

TRADE-MARKS

Quality

Over a period of more than thirty years, Atlas Portland Cement has merited the distinction of being "the Standard by which all other makes are measured." It is guaranteed to pass all standard specifications including those of:

The American Engineering Standards Committee
The United States Government
The American Society of Civil Engineers
The American Society for Testing Materials
The American Institute of Architects
The American Railway Engineering Association

Packages

Atlas Portland Cement is packed in duck or paper bags of 94 lbs. net weight, 4 bags to the barrel. For export, it is shipped in especially constructed and lined barrels of 400 lbs. gross or 376 lbs. net weight.

Atlas-White Portland Cement is packed in paper bags inside of duck bags, and for export, in barrels. Same weights as above.

Publications

For architects, the following informative publications are authoritative on the subjects covered. Any or all of these books will be furnished the architect on application, without charge.

"The Stucco House"
"Guide to Good Stucco"
"Atlas Handbook of Concrete Construction"
"Non-staining Mortar for Pointing, Setting, Backing."
"Cast Stone," with illustrations
"Appropriate War Memorials"
"Reinforced Concrete in Factory Construction"

Technical and Research Department

A technical and research department is at the disposal of architects for assistance in any problems pertaining to concrete or stucco. This service is of course offered without obligation to them, and it is hoped that architects will freely avail themselves of this department.

Attention is especially directed to the architectural possibilities of reinforced concrete construction for industrial buildings.

The Atlas Technical Department is in position to assist architects by supplying helpful data and statistics on this efficient, fireproof and economical type of construction for factories, lofts, warehouses, terminals, garages, etc.

Non-staining Atlas-White

Atlas-White is a true Portland Cement, passing the same specifications for regular Atlas Portland Cement, but in addition is pure *white* and *non-staining*.

Atlas-White is for use wherever a white color is desired, as follows:

For stucco; for stucco where color tones are introduced; for mortars for setting marble, limestone, or other fine textured materials, tile, brick and stone; for facing concrete blocks; for decorative cast concrete stone; for garden furniture, such as benches, seats, flower boxes, urns, fountains, sundials and pergolas; for wainscoting.

The architectural possibilities of Atlas-White are unlimited; for color stucco, its pure white color gives proper values where mineral pigments are introduced or where color-aggregate is used. Special reference is directed to the publications, "The Stucco House" and "Guide to Good Stucco," which contain specifications.

Stucco Finishes

The illustrations show only four of the endless variety of stucco finishes which are possible with the use of Atlas-White.

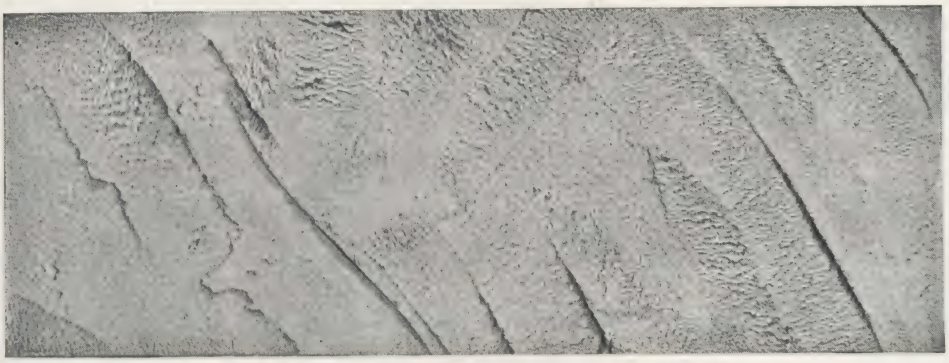
The endless number of textures possible are produced by various methods of manipulation of the plastic material. While it is difficult to describe in detail the exact method by which they are obtained, an examination by the architect of the photographs in "The Stucco House," the book referred to above, will make the manner of finishing evident.

Stucco finishes may be divided into six general classes: Stippled; sand floated; sand sprayed; roughcast or spatter dash; pebble dash; exposed aggregates. To secure permanently successful results for all of these classes, Atlas-White Portland Cement is the ideal material.

Continued on next page

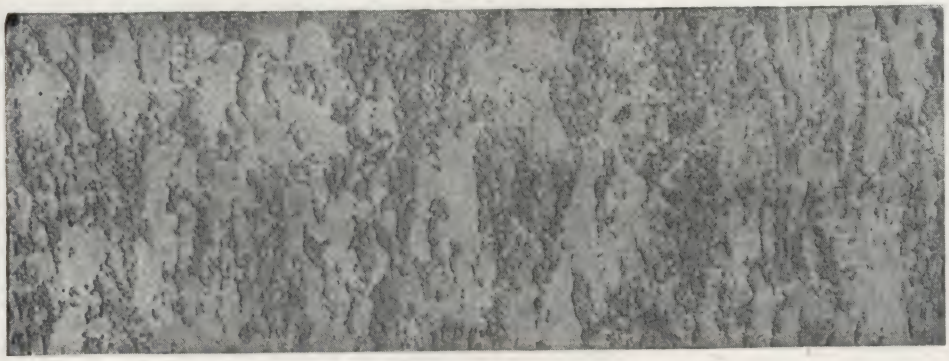
STUCCO FINISH USED ON HOUSE AT FOREST HILLS, L. I.

The house, portion of which is shown, was designed by W. L. Bottomley, New York City. The finish is from an actual wall and shows a rather dry mix applied with irregular pressure and motion of the trowel



STUCCO FINISH USED ON HOUSE AT PELHAM N. Y.

This house, for which Bloodgood Tuttle of New York was the architect, is particularly pleasing in its use of stucco. The panel shows a finish placed with a sweep of the trowel, using more pressure on one end than the other



STUCCO FINISH USED ON HOUSE AT JAMESTOWN, N. Y.

A. J. Bodker of New York was the architect for this residence. The finish was obtained by throwing a rough coat on and smoothing the high parts with a steel trowel

STUCCO FINISH USED ON HOUSE AT SPUYTEN DUYVIL, N. Y.

The adaptability of stucco to harmonize with architectural design is evident in this house for which Julius Gregory was the architect. The panel shows a finish obtained with a rather dry mix applied with an irregular motion of the trowel

THE SANDUSKY CEMENT CO.

Manufacturers of Medusa Portland Cements

CLEVELAND, OHIO

FACTORIES

BAY BRIDGE, OHIO | SYRACUSE, IND. | DIXON, ILL. | YORK, PA.

Products

MEDUSA PORTLAND CEMENTS: Medusa Gray and Medusa White Portland Cements; Medusa Waterproofed Gray and Medusa Waterproofed White Portland Cements.

For Medusa Waterproofing, see pages 94-95.

Output

Annual production, 3,000,000 bbls.

TRADE-MARK

Quality

Medusa Portland Cements are guaranteed to pass standard and United States government specifications. Every carload is tested before being shipped. A record of laboratory tests will be furnished on request.

Description

Medusa Portland cements are slow setting and quick hardening, absolutely uniform and unsurpassed in fineness and strength.

Medusa White Portland cement is perfectly white in color and non-staining; a product of unlimited artistic possibilities. It passes all the requirements of the American Society for Testing Materials. It can be furnished either plain or waterproofed.

Medusa Waterproofed cements are our regular gray and white brands, waterproofed with our celebrated Medusa Waterproofing (see our page in waterproofing section, page 94), and ready for use.

The presence of the waterproofing makes the mass more dense and compact, seals the pores and renders stucco, concrete or cast stone waterproof, dampproof and impervious. It also reduces the tendency to form shrinkage cracks.

Uses

Medusa White Cement serves an invaluable purpose in the manufacture of lawn and garden furniture and other outdoor ornaments. It combines effectiveness, usefulness and permanence when used for setting natural stone, face brick, marble, terra cotta, tile, etc., and for wall plaster, terrazzo work, tiling and similar interior finishes.

There is no waterproofed white cement except Medusa Waterproofed White cement. We are the exclusive manufacturers of this product. The illustrations show some of the practical, unique and enduring effects that can be secured in exterior work, and the specifications show definitely how any given effects may be produced.

Specifications for Waterproofed Portland Cement Stucco (Medusa White Finish, Medusa Gray Base or Brown Coat).

All trim shall be placed in such manner that it will show its proper projection in relation to the finished stucco surface, particularly in overcoating.

Materials—The cement for the first coat (base or brown coat) shall be standard gray Portland cement conforming to the Specifications of the American Society for Testing Materials, with the addition of Medusa Waterproofing Powder or Paste, to the amount of 2% by weight of the cement used (2 lbs. to the sack of cement).

The cement for the second or brown coat, and the third or finish coat, shall be Medusa Waterproofed White Portland Cement.

Fine Aggregate—Fine aggregate shall consist of sand, screenings from crushed stone, or crushed pebbles, evenly graded from fine to coarse, passing when dry a No. 8 screen. Fine aggregates should preferably be of silicious materials, clean, coarse and free from loam, vegetable or other deleterious matter.

Hydrated Lime—Hydrated lime shall meet the requirements of the standard specifications for hydrated lime of the American Society for Testing Materials, being used to add plasticity to the mixture and to act as a water retainer, sufficient to perfect crystallization and to prevent too rapid drying out.

Coloring Matter—Only permanent, limeproof colors shall be used. Finish coat containing colors shall be applied as dry as possible to prevent separation of the colors. (The use of Medusa Waterproofed Cement will prevent the gradual washing out of a color surface).

Water—Water shall be clean, free from oil, acid, strong alkali or vegetable matter.

Preparation of Mortar—*Mixing*—The ingredients of the mortar shall be mixed until thoroughly distributed and the mass is uniform in color and homogeneous. The quantity of water necessary for the desired consistency should be determined by trial, and thereafter measured in proper proportion. The water shall be added slowly to the dry mix so as to allow the aggregates to absorb as much as possible in the course of mixing.

Machine Mixing—The mortar shall preferably be mixed in a suitable mortar-mixing machine of the rotating drum type. The period of machine mixing shall be not less than 5 minutes after all the ingredients are introduced into the mixer.

RESIDENCE OF FORMER UNITED STATES SENATOR PHELAN IN THE FOOTHILLS OF SANTA CLARA COUNTY, CAL., NEAR LOS GATOS

A magnificent example of white stucco construction. Cement furnished by the Pacific Materials Co., San Francisco, Cal.
WM. CORLETT & SONS, Architects

Continued on next page

Hand Mixing—The mixing shall be done in a watertight mortar box, and the ingredients shall be mixed dry until the mass is uniform in color and homogeneous. The proper amount of water shall then be added and the mixing continued until the consistency is uniform.

Measuring Proportions—Methods of measurement of the proportions of water shall be used which will secure separate uniform measurements at all times. All proportions stated shall be by volume. A bag of cement (94 lbs. net) may be assumed to contain 1 cu. ft. The weight of 1 cu. ft. of hydrated lime may be assumed as 40 lbs. Hydrated lime shall be measured dry, and shall not be measured nor added to the mortar in the form of putty.

Retempering—Mortar which has begun to stiffen or take its initial set shall not be used.

Consistency—Only sufficient water shall be used to produce a good workable consistency. The less water in the mix, the better the quality of the mortar, within working limits.

Mortar Coats—*Mortar*—All coats shall contain not less than 3 cu. ft. of fine aggregate to 1 sack of portland cement. If hydrated lime is used, it shall not be in excess of one-fifth the volume of cement or 10% by weight.

Application—The plastering shall be applied with a steel trowel and carried on continually in one general direction without allowing the plaster to dry at the edge. If it is impossible to work the full width of the wall at one time, the joining shall be at some natural division of the surface, such as a window or door. The first coat shall thoroughly cover the base on which it is applied and shall be troweled enough to insure the best obtainable bond. Before the coat has set it shall be heavily cross-scratched with a saw-toothed metal paddle or other suitable device to provide a strong mechanical key.

The first coat shall be thoroughly wet down before the second coat is applied. The second coat shall be applied, whenever possible, on the day following the application of the scratch coat, and shall be brought to a true and even surface by screeding at intervals not exceeding 5 ft., and by constant use of straightening rod. When the second coat has stiffened sufficiently, it shall be dry floated with a wood float and lightly and evenly cross-scratched to form a good mechanical bond for the finish coat. The day following the application of the second coat, and for not less than 3 days thereafter, the stucco must be thoroughly sprayed at frequent intervals and kept from drying out. The finish coat shall be applied not less than a week after the application of the second coat. Methods of application will hereinafter be described under "Finish."

Drying Out—The finish coat must not be permitted to dry out rapidly and adequate precaution must be taken to make this certain, by sprinkling frequently after the mortar is set hard enough to permit it, or by hanging wet burlap or similar material over the surface, during hot weather.

Freezing—Stucco should not be applied when the temperature is below 32° Fahr., nor under any conditions such that ice or frost may form on the surface of the wall.

Finish—*Stippled*—The finishing coat should be troweled smooth with a metal trowel with as little rubbing as possible, and then should be lightly patted with a brush of broom straw to give an even, stippled surface.

Sand Floated—The finishing coat, after being brought to a smooth, even surface, should be rubbed with a circular motion of a wood float with the addition of a little sand to slightly roughen the surface. This floating should be done when the mortar has partly hardened.

Sand Sprayed—After the finishing coat has been brought to an even surface, it should be sprayed by means of a wide, long fiber brush (a whisk broom does very well) dipped into a creamy mixture of one part of cement to 2 or 3 parts sand, mixed fresh at least every 30 minutes and kept well stirred. This coating should be thrown forcibly against the surface to be finished. This treatment should be applied while the finishing coat is still moist and before it has attained its early hardening; that is, within 3 to 5 hours. To obtain lighter shades, add hydrated lime not to exceed 10% of the weight of the cement.

Rough Cast or Spatter Dash—After the finishing coat has been brought to a smooth, even surface with a wooden float, and before finally hardened, it should be uniformly coated with a mixture of 1 sack of cement to 3 cu. ft. of fine aggregate thrown forcibly against it to produce a rough surface of uniform texture when viewed from a distance of 20 ft. Special care should be taken to prevent the rapid drying out of this finish by thorough wetting down at intervals after stucco has hardened sufficiently to prevent injury.

Applied Aggregate—After the finishing coat has been brought to a smooth, even surface, and before it has begun to harden, clean round pebbles or other material as selected, not smaller than ¼ in. or larger than ¾ in. and previously wetted, should be thrown forcibly against the wall so as to embed themselves in the fresh mortar. They should be distributed uniformly over the mortar and tamped to an even surface with broad wood float or board. No rubbing of the surface should be done after the pebbles are embedded.

Exposed Aggregate—The finishing coat should contain an approved, selected coarse sand, crushed marble, granite or other special material, in the proportion given for finishing coats, and within 24 hours after being applied and troweled to an even surface should be scrubbed with a stiff brush and water. In case the stucco is too hard, a solution of 1 part hydrochloric (muriatic) acid in 4 parts of water by volume can be used in place of plain water. After the aggregate particles have been uniformly exposed by scrubbing, particular care should be taken to remove all traces of the acid by thoroughly spraying with water from a hose.

Stains may be readily washed off Medusa Waterproofed White Portland Cement stucco by using a brush and sapolio, or other cleaning compound.

Mortar Colors—When it is required that any of the above finishes should be made with colored mortar, not more than 10% of the weight of portland cement should be added to the mortar in the form of finely ground mineral coloring matter.

A predetermined weight of color should be added dry to each batch of dry, fine aggregate before the cement is added. The color and fine aggregate should be mixed together and then the cement mixed in. The whole should be then thoroughly mixed dry by shoveling from one pile to another through a ¼-in. mesh wire screen until the entire batch is of uniform color. Water should then be added to bring the mortar to a proper plastering consistency.

Specifications for "Dry-Dash" Stucco

Clean the surface by scrubbing with a solution of 1 part muriatic acid in 10 parts water, and rinse well with water from a hose as soon as the acid has stopped foaming.

Then wet it thoroughly and apply a creamy mixture of cement and water, to which 2% of Medusa Waterproofing has been added.

Each coat must be soaked with water to the point of saturation before applying the succeeding coat to it.

The methods of application and general specifications for stucco previously given in detail must be used with careful attention to all precautions.

First Coat or Scratch Coat—One part Gray Portland Cement; 3 parts clean, screened, sharp sand; 10% hydrated lime by weight of cement (10 lbs. to the sack of cement); 2% Medusa Waterproofing by weight of cement (2 lbs. per sack of cement). Scratch or roughen surface with stiff brush or broom before material reaches initial set.

Second Coat or Brown Coat—A second or brown coat may be employed as described under the general stucco specifications, but is not in all cases essential.

Dash Coat or Finish Coat—⅜-in. body. 1 part Medusa Waterproofed White Portland Cement; 1 part clean white sand; 1 part rough asbestos sand; 10% hydrated lime by weight of cement (10 lbs. per sack of cement). If Medusa Plain White Portland Cement is used instead of Medusa Waterproofed White Cement, add 16 lbs. of Medusa Waterproofing Paste to 20 gals. of water used to temper the stucco.

Note: Since the percentage of asbestos fibre contained in the asbestos sand is to some extent variable, it is advisable to experiment with a small panel to determine the efficiency of the asbestos sand.

Apply the aggregates by throwing them on forcibly as soon as possible after applying the finish coat.

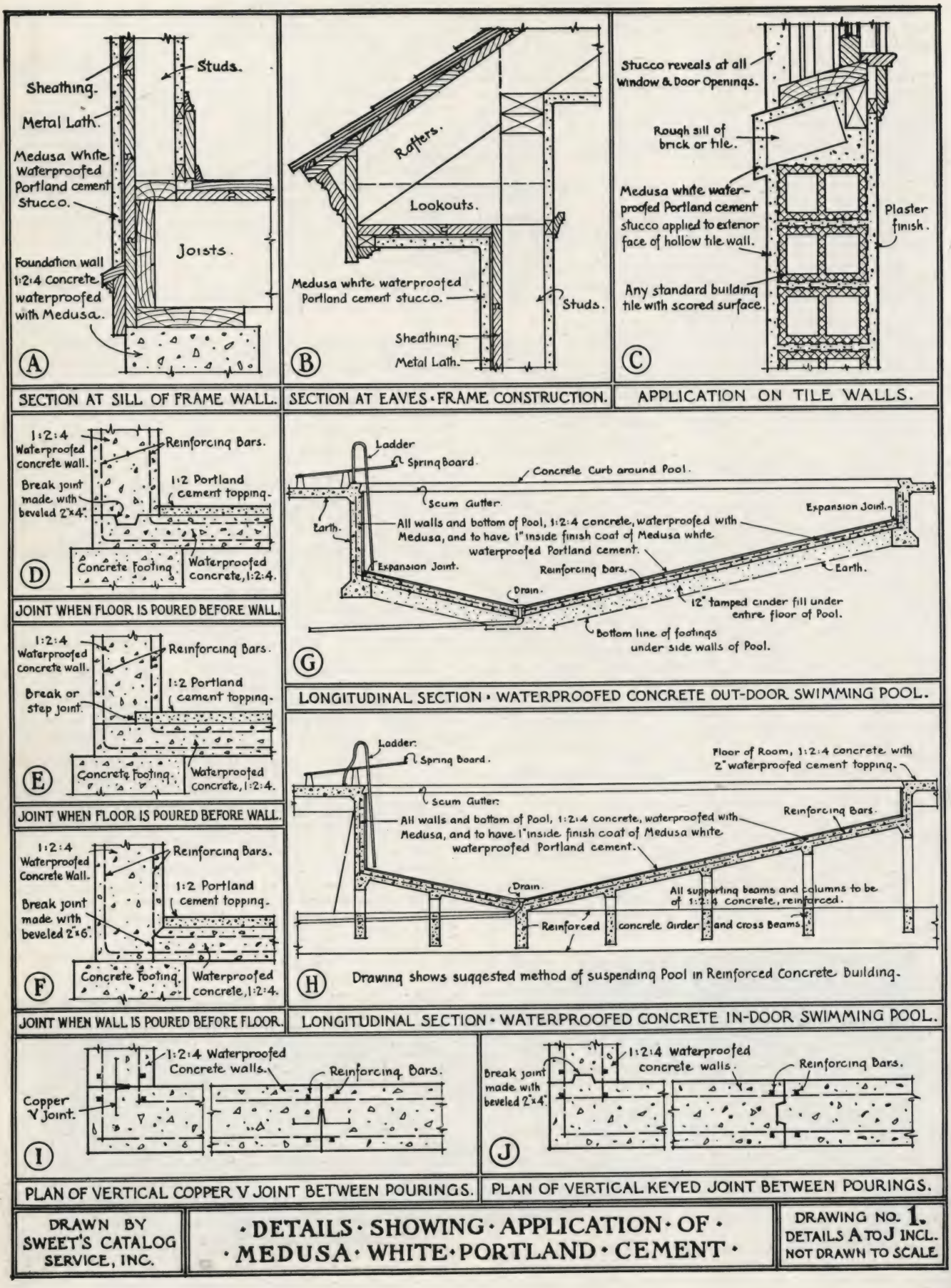
Specification Data for Medusa Waterproofed Stainless White Cement Mortar

Medusa Waterproofed Stainless White Portland Cement is a particularly valuable medium for mortar to be used in setting, backing and pointing such structural material as marble, terra cotta, glazed tile, limestone, face brick, granite, etc., both for interior and exterior service.

Medusa Waterproofed White Portland Cement will prevent discoloration of mortar, providing a white cement joint that will not discolor with age, and that remains permanently impervious to moisture. One part Medusa Waterproofed White Cement; 10% hydrated lime by weight of the cement (10 lbs. per sack of cement); 3 parts evenly graded, clean, white sand or crushed white marble, all passing through a ⅛-in. mesh sieve.

It is common practice (for a ⅝-in. joint) to estimate that 1 bbl. of cement and 3 bbls. of sand will lay up 1,000 brick. The only extra cost is the difference in price between Medusa White and Medusa *Waterproofed* White Cements. Your local dealer will supply quotations, or we will gladly furnish particulars.

Continued on next page


Sheathing.
Studs.
Metal Lath.
Medusa White Waterproofed Portland cement Stucco.
Joists.
Foundation wall 1:2:4 Concrete waterproofed with Medusa.
A
Rafters.
Lookouts.
Medusa white waterproofed Portland cement stucco.
Studs.
Sheathing.
Metal Lath.
B
Stucco reveals at all Window & Door Openings.
Rough sill of brick or tile.
Medusa white waterproofed Portland cement stucco applied to exterior face of hollow tile wall.
Plaster finish.
Any standard building tile with scored surface.
C
SECTION AT SILL OF FRAME WALL.
SECTION AT EAVES · FRAME CONSTRUCTION.
APPLICATION ON TILE WALLS.
1:2:4 Waterproofed concrete wall.
Reinforcing Bars.
Break joint made with beveled 2"x4".
1:2 Portland cement topping.
Concrete Footing.
Waterproofed concrete, 1:2:4.
D
JOINT WHEN FLOOR IS POURED BEFORE WALL.
1:2:4 Waterproofed concrete wall.
Reinforcing Bars.
Break or step joint.
1:2 Portland cement topping.
Concrete Footing.
Waterproofed concrete, 1:2:4.
E
JOINT WHEN FLOOR IS POURED BEFORE WALL.
1:2:4 Waterproofed Concrete Wall.
Reinforcing Bars.
Break joint made with beveled 2"x6".
1:2 Portland cement topping.
Concrete Footing.
Waterproofed concrete, 1:2:4.
F
JOINT WHEN WALL IS POURED BEFORE FLOOR.
Ladder
Spring Board
Concrete Curb around Pool.
Scum Gutter.
Expansion Joint.
Earth.
All walls and bottom of Pool, 1:2:4 concrete, waterproofed with Medusa, and to have 1" inside finish coat of Medusa white waterproofed Portland cement.
Expansion Joint.
Reinforcing Bars.
Earth.
Drain.
12" tamped cinder fill under entire floor of Pool.
Bottom line of footings under side walls of Pool.
G
LONGITUDINAL SECTION · WATERPROOFED CONCRETE OUT-DOOR SWIMMING POOL.
Ladder.
Spring Board.
Floor of Room, 1:2:4 concrete with 2" waterproofed cement topping.
Scum Gutter.
All walls and bottom of Pool, 1:2:4 concrete, waterproofed with Medusa, and to have 1" inside finish coat of Medusa white waterproofed Portland cement.
Reinforcing Bars.
Drain.
All supporting beams and columns to be of 1:2:4 concrete, reinforced.
Reinforced concrete Girder and cross Beams.
H
Drawing shows suggested method of suspending Pool in Reinforced Concrete Building.
LONGITUDINAL SECTION · WATERPROOFED CONCRETE IN-DOOR SWIMMING POOL.
Copper V Joint.
1:2:4 Waterproofed Concrete walls.
Reinforcing Bars.
I
PLAN OF VERTICAL COPPER V JOINT BETWEEN POURINGS.
Break joint made with beveled 2"x4".
1:2:4 Waterproofed concrete walls.
Reinforcing Bars.
J
PLAN OF VERTICAL KEYED JOINT BETWEEN POURINGS.
DRAWN BY SWEET'S CATALOG SERVICE, INC.
· DETAILS · SHOWING · APPLICATION · OF · · MEDUSA · WHITE · PORTLAND · CEMENT ·
DRAWING NO. 1. DETAILS A TO J INCL. NOT DRAWN TO SCALE

HACHMEISTER-LIND CHEMICAL CO.

Manufacturers of Magnesite Stucco

PITTSBURGH, PA.

Products

STUK-KOTE MAGNESITE STUCCO.

For Composition Flooring, see page 430.

STUK-KOTE TRADE MARK *The Everlasting Stucco*

TRADE-MARK

Stuk-Kote Characteristics

Fireproof—Stuk-Kote is absolutely fireproof because of the minerals that go into its manufacture, all of which resist high temperatures.

Waterproof—Stuk-Kote after application and when set is so dense and compact that it becomes non-porous and non-absorbent.

Tensile Strength—In comparative tests with ordinary cement stucco, Stuk-Kote has been found to be 3 to 4 times as strong.

Elasticity—Stuk-Kote possesses a high degree of elasticity which permits it to withstand settling strains and wind pressure without showing surface cracks.

Adhesiveness—Mix Stuk-Kote as directed and apply it to any surface, such as brick, tile, wood or concrete. Allow it to set thoroughly, and it will be found that it can not be removed without breaking the base to which it was applied.

Color

Stuk-Kote Magnesite Stucco, on account of its magnesite base, is pure white in color, and has none of the cold grey tints commonly found in stuccos with cement bases.

Area Covered

One ton of Stuk-Kote applied according to specifications, in 2 coats, each ¼ in. in thickness, will cover the following areas:

Clinton welded sheathi. g	60 yds.
Hollow building tile	55 yds.
Brick walls	65 yds.
Wood lath	60 yds.
Metal lath	60 yds.
Metal lath on old siding	55 yds.
Bishopric board	55 yds.
Brik-Lath.	55 yds.

These figures apply where openings have not been deducted.

Note: Where dash is used, 1200 lbs. of dash are required for every 100 sq. yds. of surface to be dashed.

Specifications

(1) Application of Stuk-Kote—*(1a) Number of coats*—Apply all Stuk-Kote in 2 coats each of ¼-in. minimum thickness. Material for the first and second coats is exactly the same. Before applying the second coat, make sure that the first coat is thoroughly set, about 12 to 24 hours. Mix in cool place away from sun.

(1b) Mixing—Use the dry Stuk-Kote powder and the Stuk-Kote mixing solution. Mix the two to a mortar to the consistency of thick mud. Never try to re-temper Stuk-Kote if it is left standing and hardened in mixing box. This will only cause trouble. The mix should be done in a wood or iron mixing box, which is clean, and absolutely free from any foreign matter, such as lime, etc. Also clean mixing box thoroughly after each batch is mixed.

(1c) Covering the Surface—Before applying the Stuk-Kote, wet all the surfaces that are to be coated with Stuk-Kote, with the mixing solution. Surface is now ready for the Stuk-Kote.

The first coat should be left roughened and allowed to set thoroughly before applying the second coat. It should always be floated roughly following initial set to close checking.

Always stop your work at a natural wall division.

All braces, scaffolds, supports, etc., should be removed before Stuk-Kote is applied. Never try to patch up a wall if you want uniform results.

(2) Finishes—Specify whether the finish is to be suction, sponge, float, broom stippled, or dash finished.

(2a) Sponge Finish—Trowel or float to a smooth surface. Immediately use a coarse sponge, and finish as you would when using a stipple brush. Depending upon the pressure applied, a finer or coarser effect can be realized.

(2b) Broom Stippled Finish—Stippling is produced in the same manner as sponge finish with the exception that instead of a sponge, a bristle brush is used.

(2c) Float Finish—Use wood float and bring to smooth finish.

(2d) Suction Finish—Use wood float flat against work drawing float away suddenly.

Note: It is quite desirable to apply "Halico Stuk-Kote Coating" in white or colors, over all undashed plain work. This eliminates any non-uniformity of color, joining lines, etc. One gallon of Halico Stuk-Kote Coating covers 50 sq. yds.—one coat. Ordinarily only one coat is required.

(2e) Dashed Finishes—Various beautiful dashed finishes can be obtained by treating the Stuk-Kote surface with various colored chips of marble or granite. Procedure as follows: Bring the base coat to a true level, plane surface, leaving it coarsely floated or broom stippled. This will enable the finish coat to adhere permanently to it. The final coat should now be applied on the base coat, and should not be less than ¼ in. in thickness, so as to allow the dash to penetrate into the finish coat. While the finish coat is still soft, one man throws the dash against it, while another, with a stick or paddle, which is about 8 in. long and 6 in. wide, presses firmly against the dash so that it will be embedded as far as possible in the Stuk-Kote.

Horizontal Surfaces—Halico Stuk-Kote, or any other plastic or veneer materials, should never be used on exposed horizontal surfaces, such as water tables, wall copings, pillars, belt courses, etc.

Gutters and Rainspouts—If the gutters and rainspouts are set up before the Stuk-Kote work is begun, you eliminate any damage that might possibly be done to the Stuk-Kote wall in case of rain or storm. This is important and to the advantage of the builder.

Foundation Treatment—In foundation, the brick or concrete should always be brought up to 10 in. above the grade line, and Stuk-Kote applied from there up. This eliminates any trouble that might be run into, by running any veneer coating down below the grade line.

Note: Lime should not be used in laying up brick and hollow tile.

A STUK-KOTE HOUSE

U. S. MATERIALS CO.

Manufacturers of Magnesite Wall Covering

Weed Street and Sheffield Avenue
CHICAGO, ILL.

AMERICAN MATERIALS COMPANY
NEW YORK, N. Y.

ART STUCCO MATERIALS COMPANY
DETROIT, MICH.

NORTH WEST MATERIALS COMPANY
ST. PAUL, MINN.

Product

ELASTICA, the ideal Exterior Wall Covering.

ELASTICA
THE IDEAL EXTERIOR WALL COVERING
TRADE-MARK

Description of Elastica

Elastica stucco is a magnesite oxy-chloride cement. Magnesite is the cementing quality, the same as portland cement is in portland stucco. Magnesite is mined originally as a white rock; it is then calcined, or burned, and ground to a fine powder between 140- and 200-mesh screen. In Elastica a very unusual chemical achievement has been accomplished whereby a *dry* mixture is made of the magnesite cement and the chloride of magnesia.

ELASTICA BAG

It is the only magnesite wall covering complete in a sack.

This method of manufacturing a magnesite stucco in which is incorporated a dry chloride mixture in the same bag renders it possible to mix and accurately proportion every ounce of the material at the factory and to ship the finished product dry and complete in a sack. Elastica requires that nothing be added at the job but water.

All raw material entering into the composition of Elastica is thoroughly analyzed before being used. Every pound of material which enters the composition of Elastica is carefully weighed and mixed for an exact length of time in the most efficient mixing machines made. Part for part and ounce for ounce, Elastica is compounded and mixed at our factory—*it is the only magnesite chloride wall covering that is shipped from factory to builder, a coherent whole*—complete in a sack. This gives a security to the product impossible to obtain by haphazard mixing by "labor chemists" at the job.

Among the many advantages of shipping magnesite stucco in this manner are the great saving in freight, the simplifying of storage and of application, and the avoidance of any possibility of error in the mixing and application of the material.

Elastica the Only Cork Insulated Wall Covering

Granulated cork constitutes a properly proportioned part of Elastica scratch coat. It has the highest insulating value of any material used for insulation. It is non-absorbent, a good non-conductor of heat, is moisture resisting and makes a stucco, in which it is used, extremely flexible. Cork is used exclusively in stucco under our patents—we being probably the largest individual users of granulated cork in the world.

Elastica Is Elastic

The use of cork makes Elastica even more elastic than a straight magnesite mixture. This elasticity is so great that in places where abnormal settling has taken place (due to improper foundations) to such a degree as to cause the inside plaster to crack badly and in some cases to fall from the wall, it has been a marked fact that Elastica on the outside walls has not shown a sign of a crack or a check. Elastica remains intact; it will not crack.

Elastica Is Fireproof

The use of magnesite (universally used in steel furnaces as a fire brick) combined with asbestos fiber (used as a binder) and silica glass sand makes Elastica absolutely fireproof. Elastica is a far better insurance risk than other building materials and naturally the insurance rates are lower.

Finishes

Elastica is supplied in 75 regular standard finishes, giving any color effect desired. The adaptability of Elastica to any style of architecture, and the variety and beauty of its finishes will commend it most highly to an architect. We are at the service of architects always and will appreciate the compliment of working with them to make special finishes to produce artistic effects.

Elastica Is the Only Guaranteed Stucco

When applied ½ in. thick and in accordance with specifications, Elastica is fully covered by a factory guarantee. Elastica may be applied equally satisfactorily in hot weather or in weather below zero.

Co-operative Service

We are glad to send list of architects and other users, *specification blanks and handsomely illustrated catalogue,* together with samples of different finishes.

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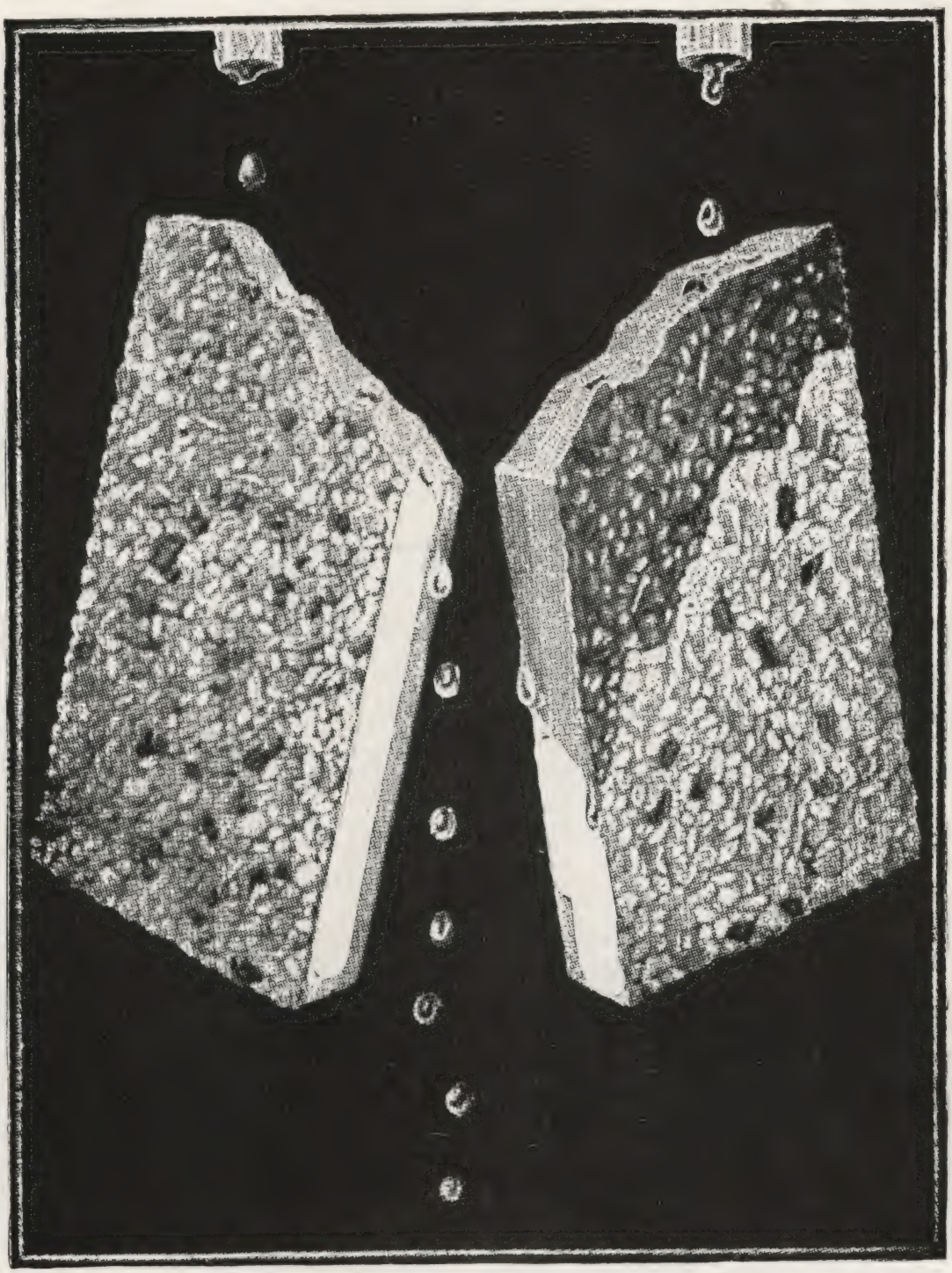

Test Showing Effect of Water on Elastica and Ordinary Stucco

Make This Simple Test

Obtain a sample of Elastica, apply water to it in this manner or in any other way. Also take a sample (have plasterer make a patty) while applying Elastica on the job. Compare it with the factory sample. Apply the same tests to any other stucco. Satisfy yourself that Elastica alone is waterproofed.

Elastica Is Thoroughly and Permanently Waterproofed

Not a single drop of water can penetrate Elastica. It is absolutely impervious to moisture of any kind all the way from the exterior surface back to the key. That is why Elastica buildings are never disfigured by water blemishes and stains. Both first coat and finish coat are permanently waterproofed. For that reason, when Elastica is used, wood backgrounds will not expand, contract or buckle. Metal lath will not rust or stain. Alkali or saltpeter from brick or tile can not effloresce or stain through Elastica.

CLIFFORD L. MILLER

Caen-stone and Lime-stone Cement

280 Madison Avenue
NEW YORK, N. Y.

Products

MONARQUE BRAND CAEN-STONE CEMENT; MONARQUE BRAND LIME-STONE CEMENT for Interior Stone Finishes.

Monarque Brand Artificial Stone Compositions

The Monarque brand of artificial stone compositions, which reproduce Caen-stone and Lime-stone cement, are being used extensively for interior finish in all types of buildings. The material is indistinguishable in tone and texture from the natural stone.

Specifications

The first or scratch coat on galvanized wire, ingot iron lath or concrete, shall consist of a mortar composed of the following:

Sand, 3 parts; hydrated lime, 1 part; Keene's cement, 1 part. Add sufficient goat hair to secure a strong clinch.

This mass shall be thoroughly mixed, while dry, then tempered with water and applied by the usual method. Double score and allow work to set (not dry) before applying brown coat. If scratch coat becomes dry, wet thoroughly before applying brown coat. The second, or "brown" coat, shall be applied on scratch coat and shall consist of the following:

Sand, 4 parts; hydrated lime, 1 part; Keene's cement, 1 part. Add sufficient cattle hair to produce a fibrous material. If Keene's cement is not obtainable use any standard brand of neat cement plaster, gaged extra well to secure hard perfect surfaces.

Brown coat alone is sufficient base on brick or terra cotta.

Where grounds are set the exact width of jambs, brown coat shall be recessed the required depth, ¼ in. to ⅜ in., and stone cement finished even with grounds.

Concrete surfaces shall be scored and cleaned with a weak dilution of muriatic acid and water, and immediately washed with clean water, to remove all traces of acid, before applying scratch coat. Grounds on concrete should be less in depth than those used for other surfaces and mortar shall be laid as thinly as possible, using only sufficient material to finish work true and level.

All browned surfaces shall be rodded and floated to true planes without voids, depressions or projections.

The finish coat shall be Monarque brand artificial Caen-stone or Lime-stone, manufactured by CLIFFORD L. MILLER, New York, N. Y.

Allow brown coat to set and dry, then cover browned surfaces with a coat of dampproof material on which a light coat of the stone cement shall be applied while the dampproof is tacky, using a steel trowel. Scratch this stone cement coat with a broom and allow it to remain until set.

Succeeding coats shall be applied with a float until specified thickness is obtained. Rod all work plumb, level and true. Fill all voids using a float (not a steel trowel). Float until required fineness of work is perfected. If cracks appear, slightly moisten and compress with float.

Patching should be avoided, therefore all base, wainscot and trim should be set and browning finished close to all trim before applying Caen-stone or Lime-stone cement.

Finished stone cement work shall be dry before being dressed. If a tooled finish is desired, specify markings per inch. If a fine rubbed finish is required, use French Gres stone (imported by CLIFFORD L. MILLER) for surfacing, which will produce true grain of natural stone. If any part of work becomes extremely hard, use a fine tooth hacksaw scraper to scrape surfaces before using the tooler or Gres stone. If discolorations appear on finished work, remove them with Gres stone.

Joints may be started with a pick tool, and finished with a tooth-saw-jointer to sizes specified, and may be pointed or left hollow. For white joints, fill with Keene's cement. For colored joints, color Keene's cement the desired tint.

Finally, to prevent dusting after work is dressed, dilute 1 part of milk with 10 parts of water and brush evenly over finished surfaces.

For Cornicing—Block all run mouldings, while brown coat is in operation, within ⅜ in. of finished surfaces with material that is gaged sufficiently strong to insure a firm moulding, using brown mortar proportions as a minimum. This work shall be in same condition of set as plain surfaces before stone finish is applied. Stone cement finish for this work not to be gaged as stiff as material used for plain surfaces.

All screeds, upon which rods are fastened and slippers of moulds are operated, shall be composed of stone cement, perfected in the usual manner and smoothed with a steel trowel. Lime putty and plaster shall not be used for screeds upon which stone mouldings are to be run.

Castings shall be made in glue moulds. Care must be taken to press stiff-gaged cement in moulds, as it will not harden if gaged thin. The more material is gaged, the harder it will become.

Burlapped plaster of paris may be used for backing stone cement castings, but allow stone cement to set before backing with plaster of paris as swelling of plaster may fracture the cast if it is reinforced before cement sets. Better results are obtained, however, by the use of Keene's cement.

Where rubbed surfaces are specified for mouldings or castings, use emery paper.

For tooled surfaces on mouldings or castings, fine wire brushes are used. Mouldings and enrichments may be finished by stone carvers. For plain surfaces and run mouldings, use slow setting cement. For castings, use quick setting cement.

References

The buildings listed below show the varied character of artificial stone compositions and indicate the growing field for this class of interior stone finish.

Hibernia Bank & Trust Co., New Orleans, La.	Favrot & Livaudais and Alfred C. Bossom
Maryland Casualty Company, Baltimore, Md.	Otto G. Simonson
Hotel Philips, Philipsburg, Pa.	Geo. S. Idell
Planters National Bank, Richmond, Va	Carneal & Johnston
L. F. Sunlin Residence, Flint, Mich.	Geo. Bachmann
Federal Reserve Bank, Richmond, Va.	Carneal & Johnston
Florida National Bank, Jacksonville, Fla.	Mowbray & Uffinger
Franklin Street Presbyterian Church, Baltimore, Md.	William Gordon Beecher
Church of the Messiah, Baltimore, Md.	Mottu & White
Industrial Trust Building, Wilmington, Del.	Mills & Haugaard
City Hall Building, Cleveland, Ohio	J. Milton Dyer
Union National Bank, Scranton, Pa.	Edw. H. Davis
East Side High School Building, Fairmount, W. Va.	Jones & Nuzum
Hotel Shelburne, Atlantic City, N. J.	Warren & Wetmore
Equitable Building, New York, N. Y.	E. R. Graham
Museum Addition, Burholme Park, Pa.	Zantzinger, Borie & Medary
Majestic Theater, Detroit, Mich.	C. R. Crane
First National Bank, Lexington, Ky.	A. C. Bossom
County Courthouse, Schenectady, N. Y.	W. L. Stoddart
Union National Bank, Mahanoy City, Pa.	Benj. R. Stevens
Reidsville Hotel, Reidsville, N. C.	H. Macklin and W. C. Northrup
Commercial Trust Building, New Britain, Conn.	W. P. Crabtree
Bulkeley School Annex, Meriden, Conn.	Dudley St. Clair Donnelly
Citizens National Bank, Evansville, Ind.	W. L. Stoddart
E. T. Stotesbury Residence, Chestnut Hill, Pa.	Horace Trumbauer
Colony Club, New York, N. Y.	Delano & Aldrich
H. J. Heinze Residence, Pittsburgh, Pa.	Robert Maurice Trimble
A. C. Goodyear, 160 Brant St., Buffalo, N. Y.	Lansing, Bly & Lyman
Rainier Building, 5th and Locust Streets, St. Louis, Mo.	Eames & Young
Louisville High School, Louisville, Ky.	J. Earl Henry
Lyon-Healy Building, Chicago, Ill.	Marshall & Fox
American Building & Loan Building, Jackson, Mich.	Claire Allen & Sons
First National Bank Building, Scranton, Pa.	Belin & Snyder

PALMER LIME & CEMENT CO.

Importers of French Caen Stone Cement

103 Park Avenue

NEW YORK, N. Y.

Products

TATÉ and DEVIGAN BRANDS of IMPORTED FRENCH CAEN STONE CEMENT for Interior Stone Finish in banks, churches, hotels, theaters, schools and residences.

Also Building and Finishing Lime.

Caen Stone Cement

Natural caen stone, found in France, has a texture and color-tone so pleasing to the eye that it has met with general approval for mantels, staircases, walls, entrance halls, etc. It has been used for centuries in artistic constructions in Europe. Its decorative possibilities are unequalled in natural stone, but although the high cost of natural caen stone has caused a general demand for a substitute, no natural stone has been found which even approaches it in color and texture.

Imported caen stone cement gives the same appearance, color and texture as natural caen stone. It is made in France from the natural caen stone crushed and mixed with a special cement and chemicals.

The comparatively low cost of this material and the great facility with which it can be worked make it available for general use. One ton (2000 lbs.) properly applied will cover from 60 to 80 sq. yds.

The PALMER LIME & CEMENT CO. are exclusive agents for Taté and Devigan brands imported French caen stone cement. They are importing these brands regularly and are prepared to make prompt deliveries.

Various domestic compositions are offered as substitutes for imported caen stone cement, but the *uncertainty of their set*, the *non-uniformity of their color*, and *their tendency to crack*, have deprived them of the consideration of experienced architects.

Taté Brand Imported French Caen Stone Cement

For coating interior decorative work. This brand sets in from 50 to 60 minutes.

Devigan Brand Imported French Caen Stone Cement

Slow Setting—For coating interior decorative work. Sets in from 50 to 60 minutes.

Quick Setting—For casting in moulds; worked exactly the same as plaster. Sets in from 15 to 20 minutes.

Standard Specification for Artificial Caen Stone

Work Included—All surfaces of walls, columns, piers, stair facia and stair soffit (list locations) shall be finished with artificial caen stone as shown on the drawings and as hereinafter specified.

Materials—*Scratch Coat*—Shall be composed of lime mortar gauged with 3 bags of Keene's cement to 1 cu. yd. of mortar.

Brown Coat—Shall be composed of lime mortar gauged with 2 bags of Keene's cement to 1 cu. yd. of mortar.

Caen Stone Cement Finish—All caen stone cement shall be the finest quality imported French caen stone cement, Taté or Devigan Brand, sold only by the PALMER LIME & CEMENT CO., New York.

All caen stone cement shall be delivered at the building in sealed bags bearing the brand name ready for mixing by the addition of water only.

Workmanship—Scratch coat mixture shall be thoroughly mixed and wet down, and applied so as to give a satisfactory clinch. The surface shall be thoroughly scratched and cross scratched and allowed to set before the brown coat is applied. The brown coat shall then be applied and must be brought out to a line within ⅜ in. of the finished imitation caen stone surface.

The caen stone cement finish coat shall be carefully mixed; no more water shall be used than is necessary to produce a stiff mortar. Care shall be used to prevent any foreign matter being introduced which may affect the tone or color. The material shall be mixed and applied in a manner to imitate as nearly as possible the natural stone. The brown coat shall be thoroughly wet down with brushes and the caen stone cement shall then be applied by hand and shall be well and thoroughly compressed to a minimum thickness of ⅜ in. When partially set, the surface shall be straightened with a long straightedge, then dressed with a tooth edge dressing tool and finally with a sharp, smooth tool so as to produce a fine grained uniform surface.

All mouldings in imitation stone shall be run with metal templates reproducing full size. Details will be supplied.

Decoration—All imitation caen stone decorations shall be made of the same material as straight work, cast in the most approved manner in glue moulds made from models which shall be executed in clay from the architects' full size details. They shall be changed as often as may be required to make them satisfactory, without extra charge. Moulds shall not be made until the models have been approved.

Finishing—After the finish coat has thoroughly dried, all surfaces shall be redressed to match approved sample. At least fifteen days shall be allowed for proper drying.

All flat and moulded surfaces shall be finished with scrapers and planers made for this express purpose, the entire surface being thus treated. (If a finer rubbed surface is desired, add:) All surfaces shall be rubbed with pumicestone or carborundum and sand papered to imitate rubbed stone finish.

All decorative work shall be finished by skilled carvers.

Jointing—All joints, as shown, shall be carefully cut true, straight and smooth with sharp saw blades selected for the purpose, to a uniform width not exceeding ¼ in.

Work on Which French Caen Stone Cement Was Used

LOCATION	ARCHITECT
Frueauff Residence, S. E. corner 88th Street and Fifth Avenue, New York, N. Y.	Horace Trumbauer
Meyrowitz Residence, South Orange, N. J.	Stephenson & Wheeler
Abraham & Straus Department Store (Show Windows), Brooklyn, N.Y.	Starrett & Van Vleck
Holthausen Department Store (Show Windows), Bergenline Avenue, Union Hill, N. J.	A. D. Seymour, Jr.
Grace Residence, Lakeville, L. I., N.Y.	Albert S. Gottlieb.
Ouachita National Bank, Monroe, La.	
Church of Notre Dame, 114th Street and Morningside Drive, New York, N. Y.	Cross & Cross
Hanan & Son (Show Windows), 56th Street and Fifth Avenue, New York, N. Y.	A. D. Seymour, Jr.
Gotham National Bank, 303-309 W. 59th Street, New York, N. Y.	Sommerfield & Steckler
Canal Commercial Building, New Orleans, La.	
Weaver Residence, Merion, Pa.	Horace Trumbauer
Scandinavian-American Line, Whitehall and Bridge Streets, New York, N. Y.	Axel S. Hedman Jas. Dwight Baum
Hoffman Residence, Fieldstone, N. Y.	
Citizens Savings Bank, Providence, R. I.	Clark & Howe
Hotel Bond Addition, Hartford, Conn.	Pleasants Pennington & Albert Wm. Lewis
Bamberger Department Store (Show Windows), Market Street, Newark, N. J.	Thos. Butcher
Childs Restaurant, 377 Fifth Avenue, New York, N. Y.	J. C. Westervelt
Apartment House, 111 E. 60th Street, New York, N. Y.	Wm. Neil Smith
North Avenue Bank, New Rochelle, N. Y.	Fred E. Winter

NATIONAL LIME ASSOCIATION

918 G Street, N. W.
WASHINGTON, D. C.

MEMBER COMPANIES

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Newark, N. J.
JESSE ALLEN LIME COMPANY
Burns, Tenn.
ALLWOOD LIME COMPANY
Manitowoc, Wis.
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CENTRE COUNTY LIME COMPANY
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FOWLER & PAY
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GAGER LIME & MFG. CO.
Chattanooga, Tenn.
GARDEN CITY LAND & LIME CO.
Elkhart Lake, Wis.
GLENCOE LIME & CEMENT CO.
St. Louis, Mo.
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Cedarburg, Wis.
M. J. GROVE LIME COMPANY
Lime Kiln, Md.
HANNIBAL LIME CO.
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BURTON K. HARRIS
R. F. D., Saylesville, R. I.
JOHN HERZOG & SON
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HOOSIER LIME COMPANY
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Longview, Ala.
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PEERLESS WHITE LIME COMPANY
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Strasburg Jct., Va.
RIVERTON LIME CO., INC.
Riverton, Va.
ROCKDALE LIME COMPANY
Tom's Brook, Va.
ROCKLAND & ROCKPORT LIME CORP.
Rockland, Me.
ROCKWELL LIME COMPANY
Chicago, Ill.
SECURITY CEMENT & LIME CO.
Hagerstown, Md.
SHEBOYGAN LIME WORKS
Sheboygan, Wis.
SHENANDOAH LIME COMPANY
Strasburg, Va.
STANDARD LIME & STONE CO.
Fond du Lac, Wis.
STAUNTON LIME PRODUCTS CO., INC.
Staunton, Va.
STEACY & WILTON CO.
Wrightsville, Pa.
STE. GENEVIEVE LIME COMPANY
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TACOMA & ROCHE HARBOR LIME CO.
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Baltimore, Md.
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VALDERS LIME & STONE CO.
Valders, Wis.
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CHARLES WARNER CO.
Wilmington, Del.
WAUKESHA LIME & STONE CO.
Waukesha, Wis.
WESTERN LIME COMPANY
Denver, Colo.
WESTERN LIME & CEMENT CO.
Milwaukee, Wis.
WHITE MARBLE LIME CO.
Manistique, Mich.
WHITEROCK QUARRIES
Bellefonte, Pa.
WISCONSIN LIME MANUFACTURERS ASSOCIATION
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WOODVILLE LIME PRODUCTS CO.
Toledo, Ohio

Continued on next page

Product

LIME.

Lime Mortar

The use of lime mortar makes possible two distinct economies without sacrificing any necessary strength. In the first place, the first cost is low, due to the high sand-carrying capacity of lime. Secondly, a decided economy in labor is made possible by its use. At the same time, better masonry is secured.

Lime mortar works smooth and free. It does not require constant tempering to bring it to a workable consistency, but always spreads easily under the mason's trowel. The brick or stone are fully bedded, which tends to increase the strength of the wall.

When lime is added to cement mortar, the mortar works more freely, thus reducing labor charges by the increase in efficiency made possible, and at the same time, the strength of the resultant masonry is increased.

The following data, secured by Professor James S. Macgregor at Columbia University, show clearly the value of lime and lime-cement mortars. Further data are available in bulletins issued by the NATIONAL LIME ASSOCIATION.

Tests by Professor Macgregor, Columbia University—Specimens were all 8 in. square and 84 in. high. Mortar was all proportioned by volume. Results given are the average of three specimens.

Mortar Composition by Volume			Ultimate Crushing Strengths (Lbs. per sq. in.)			
			Face Bricks			Common Bricks
Cement	Lime	Sand	7 Days	28 Days	3 Months	28 Days
1.00	.00	3	2630	2840	2840	1170
.90	.10	3	3080	3170	4435	1189
.85	.15	3	2890	3230	4300	1340
.75	.25	3	3120	3470	4170	1685
.50	.50	3	2670	3100	3820	1300
.25	.75	3	1945	2370	2720	1032
.00	1.00	3	1535	1870	1950	.....

In making his report upon these tests, Professor Macgregor drew the following conclusions:

"(1) The replacement of portland cement by lime renders a more plastic mortar which spreads easily on brickwork and in consequence insures more uniform bedding and this with less care.

"(2) The so-called 'suction' of the brick which steals a great deal of moisture from portland cement mortars, has been noted to affect lime-cement mortars to a much less degree. The addition or replacement by lime aids in the retention of moisture.

"(3) Moisture which is lost due to causes cited probably leaves the mortar with insufficient amount to completely hydrate or properly hydrate the portland cement, a condition which is largely overcome by the use of lime."

Lime Plaster

The functions of plaster are to provide smooth, unbroken surfaces, which hide the structural members of the building, and afford isolation and privacy, as well as a base or foundation for the reception of decoration.

The properties which should be possessed by a satisfactory plaster are: First: integrity, that is, it should be durable and free from liability of failure. Second: plaster should be sound deadening so as to provide isolation and promote quiet in the home and office. Third: plaster should lend itself readily to decoration and this without liability of damage to the decorating medium. Fourth: plaster should be as cheap as may be consistent with the other requirements.

Lime plaster has proved its excellence in every country and climate of the world by centuries of successful use. It is economical in first cost, durable, sanitary, fire resistant, and of acoustical merit. It is easy to prepare and easy to apply, which, of course, tends toward greater labor efficiency and economy.

Lime plaster dries out as rapidly as any plastering material. It hardens more slowly, however, because the action involved is entirely different. In many plasters hardening occurs through crystallization, which is comparatively rapid. All materials, including lime, require an excess of water in mixing so as to make them workable. The only way that this excess water can escape is through evaporation, which process requires approximately the same length of time for all materials.

Lime plaster hardens by absorbing carbon dioxide from the air. This converts the plaster to a material similar to limestone, which is practically unaffected by temperature and moisture. This hardening takes place gradually, thus permitting the plasterers to do excellent work, securing smooth, true surfaces free from waves and joining lines, clean sharp corners and true surfaces for the application of mouldings and trim.

In lime plaster every grain of sand is covered with a smooth and slippery, but sticky, coating. When these lime covered grains come in contact, there is a collection of the lime paste about the points of contact, which binds them into permanent position. As a result there are left innumerable small cavities or air spaces throughout the plaster. These are most efficient sound deadeners as they absorb and break up the sound waves which strike the plaster. Laboratory tests, as well as practical experience, have shown that lime is the most efficient sound deadening plaster.

Countless buildings of all types in this country present excellent examples of the merit of lime plaster. The Capitol at Washington, D. C., is plastered throughout with lime, as is also the Mormon Temple at Salt Lake City, Utah.

Lime Stucco

Lime stucco was one of the first materials used by man for protecting the exterior of his structures. Many structures—ranging from those erected centuries ago to buildings now being constructed—bear testimony to the fact that lime stucco is satisfactory in all respects. Its advantages are: First: low first cost. Second: freedom from cracks. Third: durability. Fourth: pleasing natural color and ease of tinting.

Experience and study have shown that to attain best results, stucco mixtures should be as lean as is consistent with integrity. The high sand-carrying capacity of lime is of particular value in this instance. One reason for making stucco mixtures lean is because of the difference in the coefficients of expansion of the cementing materials and the sand. If the sand grains are separated by an appreciable thickness of cementitious material, that material will be more affected by temperature and humidity changes than will the sand and consequently the variation in expansion and contraction will tend to cause the formation of cracks.

Another reason for using lean stucco is that it is necessary to use an excess of water in mixing all stucco materials in order to make the mass workable. As the mortar dries, this excess water evaporates and the cementitious portion of the mass shrinks. If the stucco is lean, the sand grains are already in close.

Continued on next page

contact and any shrinkage of the cementing material will not greatly affect the volume of the mass. Still another reason is that all cementitious materials will absorb some water and in so doing, increase their volume. It is evident, therefore, that the less cementing material there is in a mass of stucco, the smaller will be the total volume changes due to moisture or temperature, and consequently the internal stresses will be reduced, with a corresponding decrease in the likelihood of cracking.

Lime stucco meets the conditions admirably. It hardens in place rather slowly, remaining plastic and workable longer than any other material. This slower hardening permits internal readjustments of the sand grains, as the excess water evaporates without liability of permanently breaking the bond between the lime and the sand. Furthermore, the change from the hydroxide to the carbonate state is accompanied by a slight increase in volume which tends to compensate for the shrinkage due to drying. The final product of the lime in the mass has practically the same coefficient of expansion as has the sand, which tends to prevent future difficulties. Crystallized calcium carbonate is practically impervious to water and its coefficient of absorption is very low, as is also its solubility. It is, therefore, to all intents, unaffected by moisture.

The United States, as well as foreign countries, abounds in excellent examples of lime stucco. It has been successfully used in the Northern states as well as in the Southern. Examples may be found on the Western coast and along the Atlantic seaboard. Bulletin 307, "Lime Stucco," issued by the NATIONAL LIME ASSOCIATION, and obtainable directly from them or any member company, goes into full detail as to the history, use, and specifications for lime stucco.

Lime in Concrete

There are numerous advantages which may easily be obtained through the use of lime in concrete. It aids greatly in improving the workability of the mix, thus tending to reduce handling and placing costs. It makes the concrete watertight by filling the minute voids and pores which ordinarily exist, as well as by aiding materially in securing a denser mix by reason of the increased workability of the mass. The color of the finished concrete is improved, the lime tending to make it whiter, thus lending tone and color to the structure and avoiding the dull monotonous gray which is so frequently found.

Internal stresses due to variations in the moisture content of the concrete are reduced. The lime helps to stabilize the water content, keeping it more nearly constant, and thus reduces greatly the danger of damage to the finished structure from atmospheric conditions as well as from free water.

The improvement in the workability of the concrete may be secured by adding hydrated lime without the use of excess water. This ease of workability makes the concrete slide more freely through the chutes and into the forms. It flows over and around reinforcing, conduits, and steel, completely covering and embedding all metal without the formation of water pockets, gaps or unfilled corners. This affords maximum protection against rusting of the steel and its attendant dangers. Upon removal of the forms the surfaces of the concrete will be found smooth and clean and the corners sharp.

Segregation of the aggregates is avoided by using hydrated lime. The fact that it reduces the amount of water required aids in accomplishing this end. The natural stickiness of the lime also assists in this function. The final result is that the concrete is uniform and dense in character, free from stone pockets or similar blemishes and defects. Bridging in the forms or clogging in the chutes is reduced because the entire mass is uniform and mobile in character, rather than separated into its several constituents and fluid.

Numerous laboratory tests have demonstrated that the strength of the concrete to which hydrated lime has been added is but slightly affected, in fact the great majority of the reports show an improvement in the compressive strength. A large number of tests have been conducted to ascertain the effect of hydrated lime upon the watertightness of concrete, and the practically universal result is that the watertightness of specimens containing hydrated lime is greater than that of plain concrete.

It is the recommendation of the NATIONAL LIME ASSOCIATION that in all cases where hydrated lime is used in concrete there be no variation or alteration in the proportions of the other ingredients. The lime should be added to the other materials and should never be used as replacing or displacing cement.

Several bulletins which go further into the details concerning the use of hydrated lime in concrete have been prepared by this association, and are obtainable free of charge either from the association or any of the member companies.

Construction Bulletins

300. Lime-Cement Brick Mortar—
Test results obtained at Columbia University. 32 pages.

301. Watertight Concrete—
Contains interesting test results and offers many valuable suggestions as to the use of hydrated lime for waterproofing. 24 pages.

302. Improving Cement Products—
Particularly interesting to manufacturers of cement blocks, etc. Contains recommendations for mixes. 8 pages.

304. Whitewash and Cold Water Paints—
Formulas and recommendations for use of practical home made paints. 8 pages.

305. Standard Specifications for Lime Plaster—
A compact set of specifications for plaster on all types of backing. 8 pages.

306. Lime in Construction—
Practical and technical information on the use of lime in mortar, plaster, stucco and concrete. Contains recommendations and model specifications applying to the use of lime. 1921. 80 pages. Price, 50c.

307. Lime Stucco—
A comprehensive bulletin devoted to the subject of lime stucco. Brief survey of its history and development. Standard practice and specifications for lime stucco. Illustrated.

308. Lime in Concrete—
Pictures of well-known structures in which hydrated lime was used, together with letters from the engineers, architects, and contractors who did the work. 24 pages.

350. Economical Brick Mortar—
Brief discussion of mortar, together with tables showing strength of piers and quantities of brick and mortar required for walls.

353. Hydrated Lime in Concrete—
Practical pointers on the use of hydrated lime for improving the plasticity and watertightness of concrete. 8 pages.

356. A Famous Bridge and Hydrated Lime—
Michigan Boulevard Link Bridge. Engineer's opinion of hydrated lime for waterproofing. 6 pages.

Comprehensive bulletins on the use of lime in agriculture and chemical industries may also be obtained from the NATIONAL LIME ASSOCIATION.

THE KELLEY ISLAND LIME & TRANSPORT CO.

Manufacturers of Hydrated Lime

CLEVELAND, OHIO

Products

TIGER WHITE ROCK FINISH HYDRATED LIME, ordinarily known as "Tiger Finish"; TIGER MASONS HYDRATED LIME, generally known as "Tiger Masons."

Also Lime and Limestone Products of every description.

TRADE-MARK

Slogan

"Tiger Finish" advertising carries the slogan "Spreads like warm butter."

Facilities and Distribution

This company has eleven active manufacturing plants conveniently located. Plants that produce "Tiger Finish" are at White Rock and Gibsonburg, Ohio; those producing "Tiger Masons" are at Marblehead and Marion, Ohio, Huntington, Ind., and Dover Plains and Buffalo, N. Y.

All correspondence, however, should be addressed to the General Offices at Cleveland, Ohio.

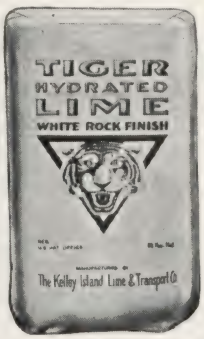
THE KELLEY ISLAND LIME & TRANSPORT CO. is the largest producer of lime and limestone products in the world, its annual capacity of manufactured products being more than half a million tons.

Tiger Finish and Tiger Masons Hydrated Lime are packed in 50-lb. valve paper sacks which always bear the Tiger trade-mark. They are handled by over four thousand builders' supply dealers in all parts of the United States.

Calcined Lump Lime and Hydrated Lime

Improper slaking of calcined lump lime on the job produces unsatisfactory results. Average laborers lack the proper conception of the importance of this operation. Facilities on the job are generally inadequate and the performance is slow, difficult and expensive. A minimum amount of unslaked lime in the mass will result in a poor job. The shipping and handling of unslaked lime is difficult.

There is no difference in the structural values of perfectly slaked lump lime and mechanically slaked (hydrated) lime; the actual value of hydrated lime lying in the impracticability of the perfect slaking of the lump lime and the assurance of perfect slaking in the hydrated product.



"TIGER FINISH" BAG

This company scientifically manufactures hydrated lime, which is mechanically slaked before shipment.

Tiger Brand Lime, properly warehoused, will keep indefinitely without spoiling.

Manufacture of Tiger Brand

The desired grade of limestone is selected and quarried; this is calcined (heated) to expel the carbon dioxide and in this calcined condition lime (or quicklime) has a great affinity for water and hydrating is the process of adding the water which is commonly called "slaking."

The calcined lime is crushed to a fineness where no piece is more than ¼ in. in any direction.

Hydrating is performed scientifically under the supervision of chemists who are specialists in this work, and by the use of specially designed and modern machinery. Water and lime are proportioned by weight in batches in large steel cylinders and the mix is absolute. (Enough of the water is evaporated by the heat generated in the slaking process to leave the lime sufficiently dry for handling and shipment; only as much water is added as will combine chemically with the lime, reducing it to fine dry powder.)

In calcining, the limestone loses its carbon dioxide and with the water added it becomes a hydroxide or dry impalpable powder, like flour. In the hydrate form, lime may be stored indefinitely providing it is protected from dampness; putty and mortar can be prepared simply by soaking—overnight for putty coat or a few hours in the case of mortar. After lime putty or mortar is applied to the job, the mass hardens and sets as the water drys out and the action of the atmosphere recarbonates the lime to its original state.

Special Advantages of Hydrated Lime

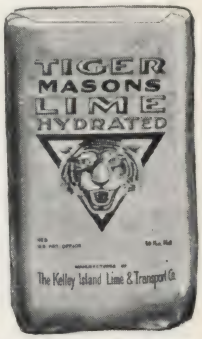
In Portland Cement Mixtures—(1) Hydrated lime lubricates the mix and renders it mobile enough to flow freely through the chutes and into the forms without the use of excess water.

(2) It stiffens the mass sufficiently while the concrete is passing through the spouts to prevent the separation of the sand and stone from the cement, thus promoting a rapid flow, and in proper proportions increases the strength of the concrete.

(3) It gives the concrete sufficient plasticity to work easily after it is deposited in the forms and thereby saves on the cost of labor required for spading and tamping.

(4) It produces smooth exterior surfaces inasmuch as it promotes intimate contact of the concrete mass with the forms and minimizes the tendency toward honeycombing and hair cracking.

(5) It increases the density and water tightness of the concrete by virtue of remarkable void filling properties, producing in the concrete intense water resisting properties.



"TIGER MASONS" BAG

(6) It greatly increases the efficiency of the finished concrete in that it lends uniformity to the mass by introducing a colloidal or "jelly-like" element through which the rock and matrix do not segregate.

(7) It eliminates the tendency toward cracking because it minimizes alternate expansion and contraction due to moisture changes.

(8) It directly and materially

Continued on next page

increases the ultimate compressive strength of the concrete by virtue of the ability to hold water in mechanical suspension, and thus supply the necessary moisture required by portland cement in order to properly set and maintain its maximum strength.

(9) It speeds the construction by greatly reducing the mechanical and manual efforts in operation.

In Portland Cement Mortars—(1) Hydrated lime makes the mixing of mortar cheaper and easier because of its workability and the elimination of the labor on the job required to slake lump lime.

(2) It eliminates the necessity of aging the putty or mortar because it comes to the job already slaked.

(3) It eliminates the element of incompetent or careless workmanship; the integrity of the material is assured.

(4) It produces a mortar sufficiently plastic to spread freely and easily under the trowel because of lubricating qualities, increasing the mechanical production by the decreased manual effort and the increased possibilities of speed.

(5) It renders the mortar thoroughly plastic so that the brick, stone, tile or other masonry units will slide freely and may be embedded firmly and without effort, while the mortar itself flows into crevices that can not be reached with a trowel. The tendency where hydrated lime cement mortar is used is for the masonry unit to seek its own natural bed.

(6) It produces compactness and, therefore, greater strength, inasmuch as it promotes intimate contact of the mortar with the masonry units.

(7) When mixed with portland cement it helps to retain sufficient amount of moisture which the so-called "suction" of brick would otherwise absorb and would thereby deprive the portland cement of sufficient water for hydration and hardening. The hydrated lime practically waterproofs the bonding surface of the masonry unit so that the absorptive qualities of the unit can not "rob" the mortar of the moisture necessary for natural curing.

(8) It tends to produce a mortar of maximum compressive strength by virtue of remarkable moisture carrying capacity and faculty to furnish the water needed by the compounds in the cement to crystallize properly and set thoroughly.

(9) Hydrated lime cement mortar permits the practical laying of masonry walls when temperatures are so low as to make cement mortar work unsafe; the oily fatness of the lime keeps the mass active during the process of the initial set.

In Exterior Stucco—(1) In general, the use of hydrated lime in stucco has the same advantageous qualities as when introduced in other portland cement mixtures.

(2) Its plastic qualities permit the application of stucco to metal lath with less pressure than is ordinarily necessary to keep the stucco to the mesh and therefore less liability of excess material back of the lath, and these same qualities greatly increase the value of the "key" and the probability of completely incasing the metal and insuring its rust resisting qualities.

(3) Hydrated lime cement stucco applied to wood lath or Bishopric Board not only produces a perfect key due to its plasticity and inclination to completely fill the joint or dovetail, but the ability to "fill" the surface of the wood and retain its own moisture insures the wood lath against the moisture absorption which causes the ordinary expansion, contraction and buckling conducive to the cracking of the stucco surface.

(4) Hydrated lime cement stucco does not soften in water after setting and is an insulator against dampness.

(5) It may be applied to wood, metal or brick-lath, or to the face of tile or brick, either by hand or by the use of cement gun.

(6) Hydrated lime used in the "butter coat" keeps it soft long enough to permit dry dash, such as marble or granite chips or pebbles to be applied or embedded. Hydrated lime stucco prevents hair crazing.

In Interior Plaster—(1) Hydrated lime has long been considered a valuable constituent of plaster and is used in regular hair plaster in one-, two- or three-coat work, or as a finish coat over gypsum or pulp plaster base coats, and is applicable to wood, metal or brick-lath, plaster board, gypsum blocks, tile or other masonry surfaces.

(2) Hydrated lime plaster is an excellent sound absorbing material. The reason for this is due to its porous nature in the hardened state, in that the mixing water in the plaster is entirely given off after application. Further, its greater sand carrying capacity makes it more absorbent of sound. Instead of transmitting sound, the million of tiny non-circulating air cells absorb it, insuring peaceful quiet interiors.

(3) It is damp resisting.

(4) It is fire resisting.

(5) Its covering capacities are extremely large.

(6) Its workable qualities not only make the highest class workmanship possible, but the ease with which it spreads greatly increases the quantity of work possible in a given time.

(7) It has great tensile strength.

(8) It is the natural plastering material owing to plasticity, easy working quality and great sand carrying capacity.

Checking List

The following is a guide to specification writers in checking items where Tiger Hydrated Lime products can be advantageously specified:

Concrete Work—Grillage, footings, foundation walls, retaining walls, piers, columns, girders, beams, vaults, floors, stairways, chimneys, roofs, partitions, enclosures, machinery foundations, cellar and area bottoms, curbs and sidewalks, subways, roadways and gutters, drives and paths, cisterns, cesspools, sumps, pits, sewer pipes, piling, steps, stucco, ramps, railings, slabs, balustrades.

Masonry—General brickwork, grouting, hearths; for granite, marble and certain stonework to prevent discoloration; cast stone.

Miscellaneous—Plastering, whitewashing, stone work, paving blocks, dampproofing, tiling, sidewalk lights, coal chutes.

Tiger Masons Hydrated Lime—"Tiger Masons"

Recommended for scratch and brown plastering as well as for portland cement concrete, masonry mortar and stucco. It is free from acids and will not corrode metal. Droppings or an unused hodful or batch may be re-tempered by wetting and used.

Manufacture—Tiger quality hydrated lime is produced from a limestone which contains by analysis all the chemical ingredients necessary for an ideal hydrate of lime for base coat plastering and for portland cement mixtures. Scientifically calcined and hydrated by correct process in well equipped plants.

Continued on next page

Tiger White Rock Finish Hydrated Lime—"Tiger Finish"

Recommended especially for the finish or white coat, or as it is sometimes called, "the putty or skim coat" of interior plaster.

Manufacture—"Tiger Finish" is manufactured under ideal conditions in the most perfect plant of its kind in the world.

The production is watched constantly by expert chemists and the utmost pains are taken with every detail to produce the best possible product. Every particle of lime is properly slaked, and inert matter removed by a thorough milling and air floating process that reduces the lime to a powder finer than flour.

Manufactured from the famous White Rock, Ohio, magnesian limestone, which, because of peculiar physical properties, is the best available rock from which a finishing lime can be produced.

It provides a pure white finish free from yellow spots and streaks. It is practically free from iron and sulphur, contains no acids, and does not disfigure color decorations.

"Tiger Finish" is economical in gaging, requiring only one-half to two-thirds as much calcined plaster as less perfectly hydrated lime.

It sets and hardens slowly enough to permit plasterers to straighten all angles and produce smooth, even, sanitary walls. It does not air slake nor are its working qualities impaired in storage; it never spoils if kept dry until used. Occasionally, it will dry-cake somewhat if piled high for a long period; this merely calls for a little longer soaking.

Architectural Service

This company will be glad to discuss with architects or contractors any problem in connection with the use of hydrated lime in the construction field.

Literature

The company's general literature and reprints of this catalogue are available on request.

Publications on the use of lime in the agricultural, chemical and construction fields are also available by addressing National Lime Association, Washington, D.C.

General Data—Tests

It is not the purpose to suggest the substitution of hydrated lime for portland cement in concrete. The following data is selected to show that the strength of the mortar was increased when 10% by weight of hydrated lime was added to portland cement in the mixture.

Tension tests conducted for the Chief of Engineers, United States Army:

Proportions cement plus lime to sand by weight	Proportions cement to sand by weight	Cement	Lime	Sand	Average tensile strength, lbs. per sq. in.	
					28 days	3 mos.
1–3	1–3	200 gms.	0 gms.	600 gms.	201	236
1–2¾	1–3	200 gms.	20 gms.	600 gms.	242	265
1–3	1–3⅓	180 gms.	20 gms.	600 gms.	238	264
1–3	1–4	150 gms.	50 gms.	600 gms.	168	171
1–3	1–6	100 gms.	100 gms.	600 gms.	57	70

Compression test conducted by Henry M. Spackman Engineering Co. The specimens were 6-in. cubes tested at three months:

Storage	1 cement 3 sand	1 cement 0.1 hydrated lime 3 sand	0.9 cement 0.1 hydrated lime 3.0 sand
Water	1793	2719	1769
Ground	1700	2405	1718

Compressive strengths — 1:2:4 mix—Du Pont Highway, Delaware:

Per cent hydrated lime	0	2.5	5	7.5
Strengths of individual specimens	3108	2908	3596	3514
	2203	3640	4381	5092
	2529	3476	3473	4498
Averages	2613	3341	3816	4368

Compressive strengths—tests made at University of Michigan, 1:2:4 mix, portland cement and hydrated lime, sand and gravel:

Per cent hydrated lime	Age in days							
	14		28		60		90	
0	(3)	723	(4)	932	(5)	1155	(5)	1393
10	(4)	1419	(4)	1703	(5)	2099	(5)	2221

Beam Action—Tests conducted at Pennsylvania State College, State College, Pa.

Reinforced beams, 6 in. wide, 8 in. high, and 7 ft. 6 in. long made from plain mixture and from 5%, 7.5%, 10% and 12.5% of hydrated lime. The lime was added to the mixture (by weight of cement) and not substitutes.

The results are expressed in terms of ultimate load at time of failure.

Per cent hydrated lime	Ultimate load, lbs.
0.0	5400
5.0	7010
7.5	6450
10.0	7010
12.5	6860

Effect of Sea Water—Tests to determine the effect of adding hydrated lime to concrete mixed with sea water, made by Dravo Construction Co., at Sparrows Point, Md.

Blocks, 4x6x12 in. 1:2:4 mix. The hydrated lime was added to the extent of 10% of the cement content, by weight.

Block No.	Mixed with	Stored in	Age in days	Total load, lbs.	Ultimate strength, lbs. per sq. in.	Per cent lime
1	F.W.	air	8	972.4	138	0
2	F.W.	air	9	864.1	122	10
3	F.W.	water	9	1405.6	198	10
4	S.W.	air	8	852.7	120	0
5	S.W.	air	9	892.6	126	10
6	S.W.	water	9	1434.1	202	10

The above specimens were all tested and broken as beams with the 4-in. dimension vertical, and maximum possible span.

Expansion and Contraction due to Weather and Moisture—Extensive tests by the Henry M. Spackman Engineering Co. would require more space than can be devoted to them to be of technical value. The following quotation, however, is made from the summary of their report:

"The investigation as a whole, in our opinion, indicates that the addition of hydrated lime will be found advantageous under ordinary climatic conditions, not only in concrete road construction, but in concrete work generally where it is exposed either in air or to fresh water, as concrete to which such additions have been made, besides being more imperishable, will show less change in volume under varying moisture content."

Water Tightness—Test by Sanford E. Thompson, Boston, Mass.

Concrete 1:2:4 mix; hydrated lime added. Specimens 4 in. thick, water pressure 80 lbs. per sq. in.:

Continued on next page

Percent hydrated lime	Flow in grams per minute		
	At 14 days	At 21 days	At 28 days
0.0	5.52	2.92	1.91
2.0	9.20	2.55	1.63
4.0	2.82	1.49	0.76

General Data—Quantity Surveys

Tiger Brand Hydrated Lime is packed in 50-lb. paper sacks which always bear the Tiger trade-mark.

For a straight first class white coat job "Tiger Finish" will cover approximately 1000 sq. yds. to the ton.

Average bulk per 50-lb. bag is about 1 cu. ft.

A ton of "Tiger Finish" equals about 40 cu. ft. in bulk.

Three-coat work on wood lath: 1 ton of "Tiger Masons" required to cover about 400 sq. yds. for scratch coat; 1 ton for about 450 sq. yds. for brown coat—⅞-in. grounds.

Three-coat work on metal lath: 1 ton "Tiger Masons" required to cover about 400 sq. yds. for scratch coat; and 1 ton for 450 sq. yds. for brown coat—¾-in. grounds.

Three-coat work on tile or brick: 1 ton required to cover 400 sq. yds. for scratch coat; 1 ton for 450 sq. yds. for brown coat—¾-in. grounds.

Two-coat work on wood lath: First coat requires 1 ton to every 850 sq. yds. of surface; finish coat (white) requires 1 ton per 1000 sq. yds. of surface; finish coat (sand) requires 1 ton per 3000 sq. yds. of surface—⅞-in. grounds.

Two-coat work on metal lath requires for first coat 1 ton per 850 sq. yds. of surface; for finish coat same as second coat finish on wood lath.

Two-coat work on brick or tile requires: 1 ton hydrated lime to 850 sq. yds. of surface for first coat; 1 ton to 1000 sq. yds. of surface for finish (white) coat; and 1 ton to 3000 sq. yds. of surface for finish (sand) coat—¾-in. grounds.

1 ton "Tiger Masons" will lay 10,000 common brick with ⅜-in. joints and in full bed of mortar.

1 ton "Tiger Masons" will lay 12,000 common brick with ⅜-in. joints, buttered only.

Specification Data

Concrete—Hydrated lime should be piled in a shed on the job, or well covered with tarpaulin, and kept dry until used. Should not be piled directly on the ground and should receive the same care as portland cement.

1:1½:3 mix, add 5 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:2:4 mix, add 8 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:2½:5 mix, add 10 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:3:6 mix, add 12 lbs. hydrated lime to each 94-lb. bag of cement in batch.

If water tightness is the important result desired specify the following:

1:1½:3 mix, add 7 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:2:4 mix, add 10 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:2½:5 mix, add 12 lbs. hydrated lime to each 94-lb. bag of cement in batch.

1:3:6 mix, add 16 lbs. hydrated lime to each 94-lb. bag of cement in batch.

As the dry materials (sand, cement and stone) are placed in the loading skip of the mixer, a small box of hydrated lime can be taken from the larger container and added to the dry materials. The mixing drum is then charged and mixing proceeds in the usual manner. It is not necessary to first mix the hydrated lime and portland cement dry before adding the sand and stone.

No special precautions are necessary in specifying the mixture of concrete with hydrated lime content. With the addition of hydrated lime less water can be used and the field superintendent should be so instructed.

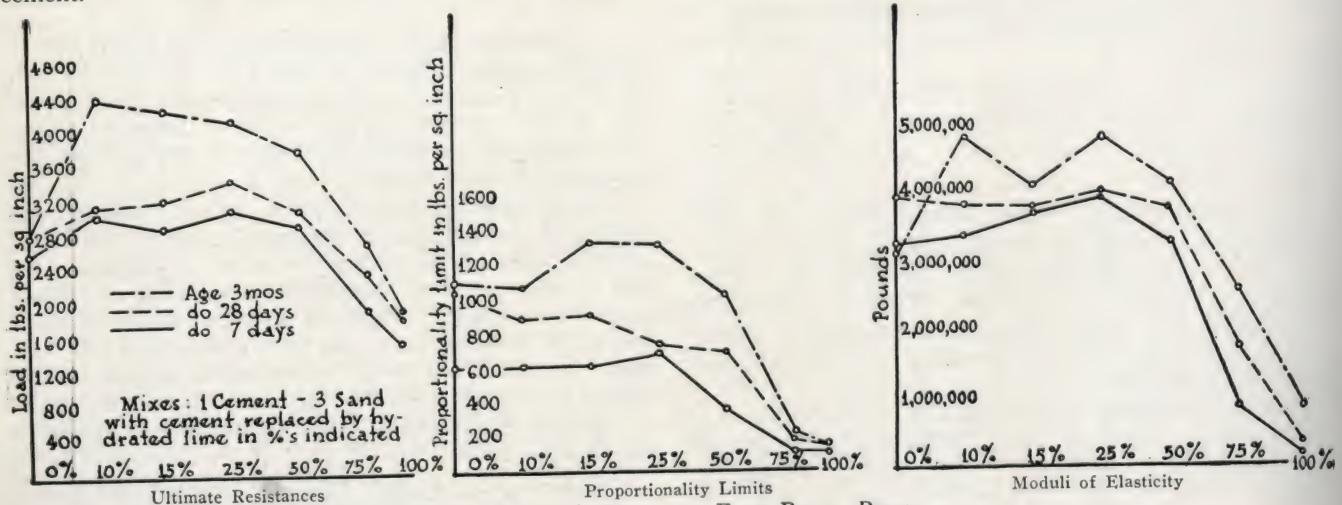
General specifications for concrete work and suggestions for porportioning portland cement, sand and stone, mixing, placing, etc., are furnished by standard portland cement manufacturers and should be followed closely.

Hydrated lime used in concrete should be specified as follows: "Hydrated Lime to be used in all concrete work to be 'Tiger Masons' Hydrated Lime."

Brickwork Tests

Tests by Prof. James S. Macgregor, Engineering Staff, Columbia University, to show the effectiveness of hydrated lime.

Composition of the Mortars—As the purpose of the investigation was to determine the effectiveness of hydrated lime, and also to determine to what extent it might be used under practical conditions with portland cement without reducing the strength, 7 mortars were mixed, containing varying proportions of hydrated lime, as follows:



Compression Tests on Face Brick Piers
Tests conducted at Columbia University, New York, N. Y.

Continued on next page

TABLE I. MORTAR MIXTURES BY VOLUME AND WEIGHT

	Mortar	By volume	By weight
Straight cement....	No. 1		
	Portland cement	1	100
	Hydrated lime	None	None
	Sand	3	300
	No. 2		
	Portland cement	0.9	90
	Hydrated lime	0.1	4
	Sand	3.0	300
	No. 3		
	Portland cement	0.85	85
	Hydrated lime	0.15	6
	Sand	3.00	300
	No. 4		
	Portland cement	0.75	75
	Hydrated lime	0.25	10
	Sand	3.00	300
Fifty-fifty mortar ..	No. 5		
	Portland cement	0.50	50
	Hydrated lime	0.50	20
	Sand	3.00	300
	No. 6		
	Portland cement	0.25	25
	Hydrated lime	0.75	30
	Sand	3.00	300
Straight lime.....	No. 7		
	Portland cement	None	None
	Hydrated lime	1.00	40
	Sand	3.00	300

Test Specimens—Sixty-three piers, 8x8x84 in., 7 sets of 9 specimens each, were laid up with face brick, the 7 mortars previously described being used, and after aging, these were tested to failure under compression.

Seven similar piers, one with each mortar, were made of common brick, and were tested at 28 days to determine whether the same general relations existed when common rather than face brick were used. As is usual in construction, the common brick were wet down when being laid. All brick were purchased in the open market.

Results of the Tests—The results recorded in Table 2 are averages for three piers with each age, 7, 28, and 90 days respectively.

TABLE II. COMPRESSIVE STRENGTH OF BRICK PIERS
Ultimate resistance, pounds per square inch, for each of 7 mortars

Age	Mortar No. 1	2	3	4	5	6	7
FACE BRICK PIERS							
7 days.....	2630	3080	2890	3120	2760	1945	1535
28 days.....	2840	3170	3230	3470	3100	2370	1870
3 months.....	2840	4435	4300	4170	3820	2720	1950
COMMON BRICK PIERS							
28 days.....	1170	1189	1340	1685	1300	1032	Not tested

TABLE III. RELATIVE COSTS OF VARIOUS CEMENTING MATERIALS

Mortar No.....	1	2	3	4	5	6	7
Per cent.....	100	94	91	85	70	55	40

TABLE IV. COST OF MORTAR TO LAY 1000 BRICK

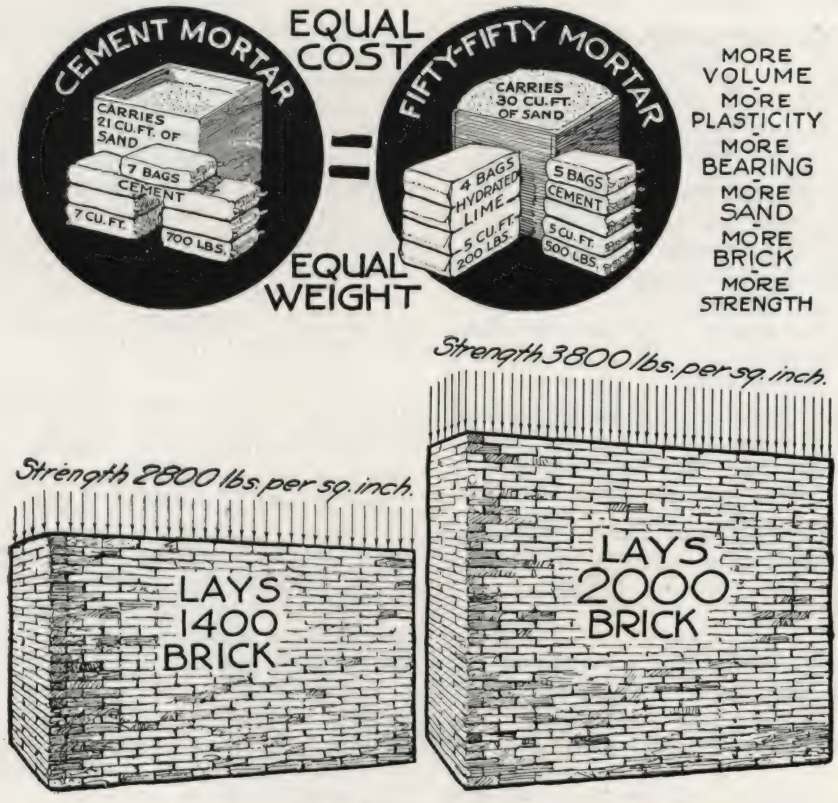
Mortar No.....	1	2	3	4	5	6	7
	Straight cement				Fifty-fifty		Straight lime
Cost.....	$2.60	2.48	2.42	2.30	2.00	1.70	1.40

Specification No. 1—Cellar Floors

(1) **Preliminary**—See that all drain pipe, etc., has been placed and inspected before commencing the concrete work.

(2) **Concrete Base**—The cellar bottom must be leveled off; pack and settle it thoroughly, and cover it flush and smooth with hydrated lime cement concrete 3 in. deep, composed of 3 parts clean, sharp, coarse gravel (or trap rock), 2 parts clean, sharp sand and 1 part approved American portland cement to which hydrated lime shall be added to equal 10% of the weight of the cement used.

Concrete shall be mixed according to standard prac-



LIME INCREASES STRENGTH AND REDUCES COST

Continued on next page

tice recommended by the Portland Cement Manufacturers Association.

The entire surface to be floated up even and true with cement and sand of equal parts to which hydrated lime shall be added to equal 10% of the weight of the cement used. This floor to be graded as directed to carry off water and the drain to be supplied with a suitable iron strainer. Block off the entire surface in squares about 4 ft. in each direction; protect the surface until it has set sufficiently to walk on and leave the whole work in good condition.

Specification No. 2—Cellar Walls and Basement Walls

(1) Use paragraph 1, Specification No. 1.

(2) Leave all openings in wall required for drain, gas, water pipes, etc.

(3) All footings, foundations and stone walls to be built to correspond with the sizes indicated. The stone used in the foundation to be approved quarry stone laid on quarry bed; the lower courses to be laid with extra large flat stone and the entire wall bonded with full and three-quarter headers.

All spaces between the stones to be well filled and flushed up on both sides with mortar and broken stones or spalls.

All foundations for steps, porch, piers, etc., to be built as above and to extend at least 6 in. below the ordinary level of extreme frost.

Level up carefully for sills, etc.

Lay both faces of walls, etc., to a line.

(4) The mortar for stone work to be hydrated lime cement mortar, made in proportion of 1 part hydrated lime and 1 part American portland cement and 3 parts clean sharp coarse sand.

(5) The outside walls of cellars and basements below grade to be plastered smooth with hydrated lime cement mortar from ½ to ¾ in. thick, composed of 1 part cement, 2 parts sand with hydrated lime added equal to 10% of the weight of the cement.

Specification No. 3—Mortar for Face Stone Work

(1) Use paragraph 4, Specification No. 2.

(2) The face stone to be pointed with hydrated lime cement mortar in proportion of 1 part cement (plus 10% of its weight in hydrated lime) and 1 part sand.

Specification No. 4—Mortar for Brickwork

(Standard specification for laying brick will be found in the catalogue of the Common Brick Manufacturers Association, represented in the current edition SWEET'S ARCHITECTURAL CATALOGUE.)

Under paragraph headed "Mortar" use the following: All brickwork throughout the job to be laid up in hydrated lime-cement mortar made in proportion of 1 part hydrated lime and 1 part American portland cement and 3 parts clean, sharp, coarse sand.

Note: Hydrated lime-cement mortar may be colored as required—the lime has no effect on mineral mortar colors.

Specification No. 5—Lime-Cement Stucco (Exterior)

Write THE KELLEY ISLAND LIME & TRANSPORT Co., Leader-News Building, Cleveland, for literature.

Notes on Plastering

(a) Plasterer's work may consist of either interior or exterior plastering on wood lath, metal lath, patent lath, sheathing lath, plaster boards or wall boards, or directly on brick, tile, stone or concrete walls or other surfaces.

(b) In order to produce good work the surfaces must be rigid and capable of holding the plaster; they must be straight, true and level or plumb.

(c) All blocking grounds or nailing for fixtures or finish must be set and secure before plastering is commenced to avoid cutting and patching.

(d) All plumbing or other pipes, electric wires or conduit, etc., must be placed before plastering is commenced to avoid cutting and patching.

(e) The surfaces to which plaster is to be applied must be clean and free from dirt, dust or foreign substances that would discolor the plaster.

(f) According to trade agreements between plasterers and tile layers it is understood that on all walls and ceilings upon which a foundation or base coat is put on by the plasterers, ample room shall be allowed for a final coat of not less than ⅜ in. to be put on by the tile layers to act as a binder and regulator for the float coat upon which the tile is placed. It is also agreed that plasterers shall use only cement and sand in the preparation of walls for this work. It is also agreed that tile layers may do scratch coating on small jobs of one or two ordinary sized bathrooms.

(g) Patching of plaster is not done as part of the contract price.

(h) In allowances for extra work it should be specified that extra work will be paid for in accordance with the standard rules for measurement of plaster adopted by the Employing Plasterers' Association of Chicago, Ill.

(i) The best wood lath is white pine, although spruce is not undesirable. Yellow pine lath contains pitch.

In nailing, lath should have a nail to each bearing (nailings should be 12 to 16 in. on centers) and if the lath are wide they require two nails at each end of lath.

The spacing of wood lath for hydrated lime plaster should be about ⅜ in. in the clear and joints broken about every sixth course. When lath rests on a bearing surface over 2 in. in width, strips of wood should be placed under lath to allow a space for keeping the plaster. Half green laths are best for use and dry laths should be wet before using. No lath should run through partitions from one room to another. All corners should be thoroughly blocked behind lath.

Strips of metal lath should be used over the wood lath at all interior angles of walls and ceilings.

Galvanized metal corner beads should be applied to all external angles before plastering is applied.

All knots (only tight knots should be permitted in wood lath used) and sappy places in the lath should be thoroughly primed with shellac before plastering is applied. Where structural timbers are not "sized" or do not produce a true plane, the surfaces should be furred to a true plane before lathing.

(j) Where plaster board is used it should be applied so as not to produce long continuous joints, and the joints covered with burlap set in plaster of paris or other suitable keying device to insure against the cracking of plaster at the joints. The center of the board should be nailed first and the edges last. Nails should be 1¼ in., 11½ gage, $\frac{7}{16}$-in. head, smooth wire nails set 4 in. apart with each nail driven firmly.

Ceilings should be furred when leveling is required.

(k) Metal lath should be applied in accordance with standard specification recommended by the Associated Metal Lath Manufacturers, Chicago, Ill.

(l) Grounds for plastering on wood lath should be ¾ in.; for metal lath, ¾ in.; over brick and tile, ¾ in. and over plaster board, ¾ in.

(m) Screeds should be used to insure the full thickness of plaster specified.

Continued on next page

Specification No. 6—General Directions for Interior Plastering (See also notes on plastering)

(1) All materials to be delivered on the job in the manufacturers' packages and proper precaution taken for their care until used.

(2) All plastering for the interior of the building to be Tiger Brand Hydrated Lime Plaster ("Tiger Masons" for base coats, "Tiger Finish" for white or putty coat) mill mixed, and delivered sanded on the job. (or [2] All plaster for the interior of the building to be Tiger Brand Hydrated Lime Plaster mixed on the job in proportions and applied according to the specification herewith.)

(3) Hydrated lime base coat plaster sanded on the job to be mixed in a mixing box 3 ft. 6 in. x 7 ft. raised at one end about 4 in.

(4) Mix a quantity of hydrated lime with water to the consistency of a thick soup. Into this sprinkle the hair which has been previously well soaked, at least overnight, to cause separation. Hoe thoroughly to insure an even distribution of the hair through the mass, then add the sand and bring the material to the proper consistency and proportion for application. To obtain best results, mix enough material to meet the requirements of the next day.

(5) Directions for preparing "Tiger Finish" putty: Use a clean, tight mortar box into which put a sufficient amount of clean water, then shake the "Tiger Finish" from the bags into the water. Be sure to have sufficient water—an inch or more above the lime, and allow to stand overnight, but 24 hours will give better results. Soak enough material to meet the requirements of the next day. But, under no circumstances, hoe "Tiger Finish" putty.

Before applying, circle the putty out on the mortar board. Fill in with a little water, then sprinkle in a sufficient quantity of calcine plaster to get the desired set and hardness; then mix the two thoroughly. Approximately 25 to 30 lbs. of slow setting calcine plaster is sufficient for 100 lbs. of "Tiger Finish."

(6) In mixing finish coat (sand) use a clean tight mortar box about 3 ft. 6 in. x 7 ft. Put in the lime together with sand enough to bring to the desired finish and hoe from one end of box and back again to thoroughly mix the two materials—add enough water to bring to the proper consistency and allow to stand over night. Mix enough material to meet the requirements of the next day.

(7) (a) Scratch coating on wood lath to be mixed in proportions of 1550 lbs. of sand to 450 lbs. hydrated lime and 3½ lbs. hair.

(b) Scratch coating on metal lath to be mixed in proportions of 1550 lbs. of sand to 450 lbs. hydrated lime and 4 lbs. hair.

(c) Scratch coating on brick or tile to be mixed in proportions of 1600 lbs. of sand to 400 lbs. hydrated lime and 1½ lbs. hair.

Apply the scratch coat lightly, but with sufficient pressure to obtain a good clinch. Scratch the face to strengthen bond for brown coat.

(8) (a) Brown coating on wood or metal lath to be mixed in proportions of 1600 lbs. of sand to 400 lbs. hydrated lime and 1½ lbs. of hair.

(b) Brown coating on brick or tile to be mixed in proportions of 1600 lbs. sand to 400 lbs. hydrated lime. Before scratch coat is thoroughly dry, but after it is well set, apply this coat, using enough material to bring out to the grounds. Darby and float entire surface to obtain a true and even plane ready for finish coat.

(9) Finish coat (white)—"Tiger Finish" putty properly gaged with a slow setting calcined plaster (25 to 30 lbs. of the latter to each 100 lbs. of lime).

Bring putty to proper consistency for application and trowel to a perfect finish, keeping surface moist.

(10) Finish coat (sand)—Mixed in per ton proportion of 1525 lbs. sand to 475 lbs. "Tiger Finish," or 320 lbs. sand to 100 lbs. "Tiger Finish." Apply and trowel to a perfect finish and brush and float well to cause surface to present a characteristic sandpaper finish.

(11) First coat (2-coat work)—Apply a thin coat to make a good, durable clinch, then bring out to grounds by doubling up on thin coat. Use darby and float to bring to a true and even surface ready for finish coat.

Specification No. 7—Three-coat Work on Wood Lath

See Plastering notes and use paragraphs 1, 2, 3, 4, 5 (or 6), 7a, 8a, 9 (or 10 or 11) of Specification No. 6.

Specification No. 8—Two-coat Work on Wood Lath

See Plastering notes and use paragraphs 1, 2, 3, 4, 5 (or 6), 7a, 9 (or 10 or 11) of Specification No. 6.

Specification No. 9—Three-coat Work on Metal Lath

See Plastering notes and use paragraphs 1, 2, 3, 4, 5 (or 6), 7b, 8a, 9 (or 10 or 11) of Specification No. 6.

Specification No. 10—Three-coat Work on Brick or Tile

See Plastering notes and use paragraphs 1, 2, 3, 4, 5 (or 6), 7c, 8b, 9 (or 10 or 11) of Specification No. 6.

Specification No. 11—Two-coat Work on Brick or Tile

See Plastering notes and use paragraphs 1, 2, 3, 4, 5 (or 6), 7c, 9 (or 10 or 11) of Specification No. 6.

Specification No. 12—Applying to Concrete

See Plastering notes and use paragraphs 1, 2, 3 and 4, Specification No. 6, and add:

Concrete must be perfectly dry before plastering.

Wash the dry surface of concrete with a solution of water and 20% muriatic acid; brush with a stiff wire brush. Mix in proportion of 100 lbs. sand to 800 lbs. hydrated lime and 250 lbs. calcined plaster; thoroughly soak lime and sand after mixing; put the putty on a mortar board circling it out and add calcined plaster, thoroughly working it in. Smooth over rough places with this plaster and apply 1 coat only thick enough to bring to a true and even plane.

Specification No. 13—One-coat Work on Wood Lath, Tile or Brick

See Plastering notes and use paragraphs 1, 2, 3, 4, 7a of Specification No. 6 and add:

Apply a thin coat for durable bond, then bring up to grounds by doubling up on the thin coat; use darby to true up where hardened so that finger prints just show; float to true and even finish, wetting the surface if necessary.

Specification No. 14—Tiger Brand Finish on Gypsum Plaster Base Coats

Use manufacturer's specifications for gypsum plaster for base coats and see Plastering notes and add paragraph 9 (or 10) of Specification No. 6.

Specification No. 15—Tiger Brand Finish on Plaster Board

See Plastering notes (paragraph j) and others and use paragraphs 1, 2, 3, 4, 5 (or 6), 7a, 9 (or 10 or 11) of Specification No. 6.

Specification No. 16—For Applying to Gypsum Blocks

Same specification as for brick or tile and add: All gypsum blocks.

NATIONAL MORTAR & SUPPLY COMPANY

Manufacturers of Lime and Limestone Products

GENERAL OFFICES
Federal Reserve Building
PITTSBURGH, PA.

PLANTS: GIBSONBURG AND COLD SPRINGS, OHIO

Products

BANNER HYDRATED FINISHING LIME; SUPERIOR MASONS HYDRATE LIME.

Also manufacturers of Lump Lime and Crushed Limestone.

Facilities

A modern 35-kiln plant, located at Gibsonburg, Ohio, in the heart of the purest rock deposits in the country, specializing in the production of Banner Hydrated Finishing Lime, known as the finishing lime that is "easy to spread—hard to beat."

Superior Masons Hydrate Lime is made at our specially equipped 10-kiln plant located at Cold Springs, Ohio, near Springfield.

Production

Our Gibsonburg Plant has a daily capacity of 350 tons of Banner Hydrated Finishing Lime. Banner is made from lump lime burned from pure limestone, which is sized mechanically by a process of screening. Uniformity in the size of the kiln stone is assured by this process, which means that all the lime is evenly and thoroughly burned. Absolute heat regulation through the use of producer gas in modern vertical kilns insures the finest quality of lump lime. It is then carefully hydrated in a series of specially designed continuous-process closed hydrators, after which it is air separated, not screened, to insure powdery fineness.

Superior Masons Hydrate Lime is the product of our Cold Springs plant, which has a daily capacity of 100 tons. This product is designed to meet the growing demand for a high class mason's material possessing all the advantages of a high grade lump lime without any of its disadvantages. Like Banner Finish it can be stored indefinitely without deterioration.

Distribution

A wide and economic distribution of Banner Finish and Superior Masons Lime is assured through our sales representatives strategically located at New York, Chicago, Philadelphia and Newark, N. J. Building supply dealers in practically every city and town in the eastern half of the United States carry large stocks at all times for immediate delivery to the job.

Shipment

Our lime is packed in 50-lb. paper valve sacks. All cars are carefully lined with a heavy paper and sacks are neatly piled to insure a minimum breakage in transit. Loading is a very important item with us and is done under the close supervision of a corps of inspectors.

TRADE-MARKS

Banner Hydrated Finishing Lime

Quality—Banner Lime is made from dolomitic limestone, quarried from the finest rock deposits in the country. It is of an extreme powdery fineness. Its easy spreading qualities permit of fast work without rolling up under the trowel. In covering capacity, Banner leads.

Uses—Banner, when used according to standard specifications, will give perfect results for:

First and second coat plastering (rough or scratch coat and brown coat). Masonry (brick, stone and tile mortar). Stucco (exterior plaster). Concrete (waterproofing and lubricating). Whitewashing.

(We will gladly furnish, on request, complete standard specifications on any or all of the above.)

Covering Capacity—For white coating or finishing walls, on average work, one ton of Banner Hydrated Finishing Lime will cover 1000 yds.

Directions—*For Mixing Finish Coat (White Finish, Skim Coat, etc.)*—Mix in an ordinary mortar box, or any water-tight box. One about 6x4x1 ft., and clean, will be found most convenient and entirely satisfactory. Fill the box half full of water first, then scatter Banner Lime in evenly until the box is almost full, the water covering the entire mass and softening it thoroughly. To secure best results, this mixture should be allowed to stand at least 12 hours before using the hoe or other tools. Always be sure to soak enough material each day to meet the requirements of the day following.

Before applying, circle the putty out on the mortar board. Fill in with a little water, sprinkle in a sufficient quantity of calcined plaster (plaster of paris) to get the desired set and hardness, and then thoroughly mix the two.

On average work, about 200 lbs. of Banner is sufficient to cover 100 yds. of plastering.

For Mixing Sand Finish Coat—Use a clean, tight mortar box, as above. Put in the lime, together with sand enough to bring to the desired finish, and hoe from one end of box and back again to thoroughly mix the two materials. Add enough water to bring to the proper consistency and allow to stand overnight. Mix enough material to meet the requirements of the next day.

Superior Masons Hydrate Lime

Quality—Springfield, Ohio, lime, from which our Superior Masons Hydrate Lime is manufactured has been conceded for many years to be the highest grade of material for masons' use, as well as for rough coat

Continued on next page

plastering. The old style Springfield lump lime has always been noted for its smooth working qualities, sand carrying capacity, and plasticity. In hydrated form this material retains all these qualities, in addition to the advantages which any good hydrated lime always has over the old style lump lime.

Uses—For first and second coat plaster, better known as rough or scratch coat and leveling or brown coat. Mortar for laying brick, stone or tile. Stucco. In concrete as a lubricant for spouting (makes concrete flow easily in chutes, also around reinforcement, complicated forms, arches, etc.) prevents segregation of aggregates and because of its extreme fineness (screen test 99% plus through 100-mesh) fills all voids, making waterproof concrete.

Directions for Using Superior—All mixing should be done in a watertight mortar box of ample size. Sufficient turnings should be given the materials, both when dry and wet, to insure uniform color and consistency. The importance of proper and thorough mixing of the ingredients can not be too strongly emphasized.

Specifications for Applying Banner Hydrated Finishing Lime

To Wood Lath—*Three-coat Work*—Where plaster is mentioned, it shall mean a mixture of Banner Hydrated Finishing Lime which passes the Standard Specifications for Hydrated Lime of the American Society for Testing Materials, and sand in proportions and applied as mentioned below.

Where wood lath is mentioned, it shall mean ⅜x1½-in. No. 1 spruce, hemlock or white and Norway pine lath, free from knots, sap, bark or other imperfections.

Lathing is to be put on a full ¼-in. apart and nailed with 3d nails well driven flush with the lath. If the lath are dry, sprinkle same with water before applying the plaster.

Grounds to be ⅞-in.

Scratch Coat—Apply the scratch coat lightly, but with sufficient pressure to obtain a good clinch. Scratch the face to strengthen bond for brown coat. When this coat is thoroughly dry apply the brown coat.

Brown Coat—Use enough material to bring out to grounds. Darby and float the entire surface to obtain a true and even plane ready for finish coat.

Finish Coat—White: Bring the putty to the proper consistency for application and trowel to a perfect finish, keeping the surface moist. *Sand:* After applying the material, use the brush and float well to cause the surface to present a characteristic sandpaper finish. [Incorporate only one paragraph, "White" or "Sand," as desired.]

Proportions for Hydrated Lime Plaster on Wood Lath, Three-coat Work—The following are the proportions in which materials should be mixed at the mixing plant or by the contractor on the job:

Per ton of Sanded Plaster	Per 100 lbs. of Banner Hydrated Lime
Scratch Coat	
1550 lbs. sand	350 lbs. sand
450 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
3½ lbs. hair	¾ lb. hair
Brown Coat	
1600 lbs. sand	400 lbs. sand
400 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
1½ lbs. hair	⅜ lb. hair
Finish Coat, White	
Banner Lime Putty properly gauged with plaster of paris	
Sand Float Finish	
1450 lbs. sand	275 lbs. sand
550 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime

These are average mixtures for first class, clean, sharp, plastering sand. Mixtures may be changed to meet other qualities of sand.

To Metal Lath—*Three-coat Work*—Where plaster is mentioned, it shall mean a mixture of Banner Hydrated Finishing Lime, which passes the Standard Specifications for Hydrated Lime of the American Society for Testing Materials, and sand in proportions and applied as mentioned below.

Grounds to be ¾-in.

(Metal Lath to be kind and grade designated by the architect.)

Scratch Coat—Apply the scratch coat lightly, but with sufficient pressure to thoroughly embed the metal lath in the plaster. Scratch the face to strengthen bond for brown coat. When this coat is thoroughly dry apply the brown coat.

Brown Coat—Bring this coat out to grounds, use the darby and float to form a true and even surface for the finish coat.

Finish Coat—White: Bring the putty to the proper consistency for application and trowel to a perfect finish, keeping the surface moist. *Sand:* After applying the material, use the brush and float well to cause the surface to present a characteristic sandpaper finish. [Incorporate only one paragraph, "White" or "Sand," as desired.]

Proportions for Hydrated Lime Plaster on Metal Lath, Three-coat Work—The following are the proportions in which materials should be mixed at the mixing plant or by the contractor on the job:

Per ton of Sanded Plaster	Per 100 lbs. of Banner Hydrated Lime
Scratch Coat	
1550 lbs. sand	350 lbs. sand
450 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
4 lbs. hair	1 lb. hair
Brown Coat	
1600 lbs. sand	400 lbs. sand
400 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
1½ lbs. hair	½ lb. hair
Finish Coat, White	
Banner Lime Putty properly gauged with plaster of paris	
Sand Float Finish	
1450 lbs. sand	275 lbs. sand
550 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime

These are average mixtures for first class, clean, sharp, plastering sand. Mixtures may be changed to meet other qualities of sand.

To Brick or Tile—*Three-coat Work*—Same as specifications for applying to metal lath, except for quantities which are:

Per ton of Sanded Plaster	Per 100 lbs. of Banner Hydrated Lime
Scratch Coat	
1600 lbs. sand	400 lbs. sand
400 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
1½ lbs. hair	⅜ lb. hair
Brown Coat	
1600 lbs. sand	400 lbs. sand
400 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime
Finish Coat, White	
Banner Lime Putty properly gauged with plaster of paris	
Sand Float Finish	
1450 lbs. sand	275 lbs. sand
550 lbs. Banner Hydrated Lime	100 lbs. Banner Hydrated Lime

Specifications for Applying Superior Masons Hydrate Lime

This can be used the same as Banner Hydrated Finishing Lime for rough and brown coat plastering, as shown in above specifications.

Full specifications for all other uses sent free on request.

THE OHIO HYDRATE & SUPPLY CO.

Manufacturers and Distributors of Hydrated Lime and Limestone Products

OFFICES AND PLANT
WOODVILLE, OHIO

Products

HYDRATED LIME: Ohio, Woodville, Buckeye and Hawk Spread White Finish for finish, scratch, and brown coats, concrete and mortars.

Also manufacturers of Lump Lime and Crushed Limestone.

All Ohio Hydrate products are guaranteed to meet the standard specifications of the American Society for Testing Materials.

Facilities and Organization

Organized in 1916, this company has enjoyed a constant, and steady growth until today its annual plant capacity is over 100,000 tons of finishing hydrate. Plant located on Pennsylvania R. R., giving through freight rates to principal centers.

Products sold by 6500 building supply dealers in all parts of the United States and Canada.

TRADE-MARKS

CLEVELAND CITY AUDITORIUM
Ohio hydrate lime used throughout

Quality of Ohio Hydrate Limes

The four brands listed above are of one quality and each will produce the same result.

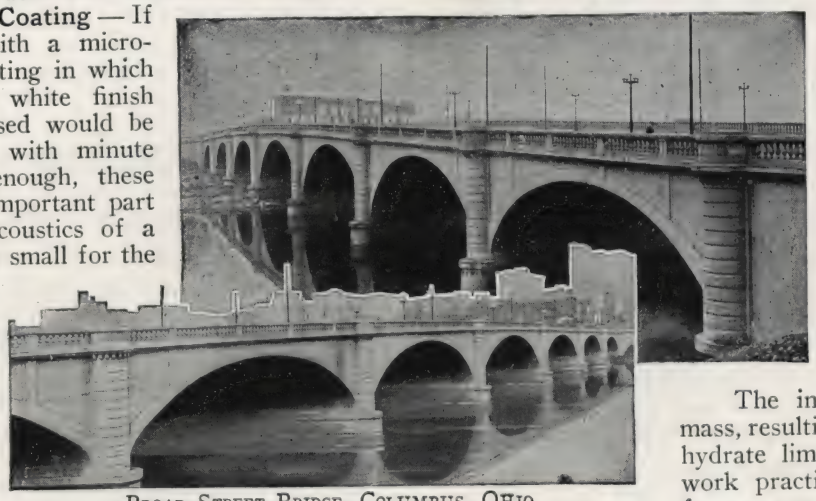
The dolomitic limestone from which Ohio hydrate limes are made is 99½% pure as it leaves the quarry. Modern methods of manufacture result in further purification. In the hands of the plasterer this exceptional purity, plus an unusual chemical content and the natural peculiar composition of the limestone rock, results in an extremely hard, smooth, white wall. This purity also explains the fire resisting, metal preserving and soundproofing properties of Ohio hydrate limes.

The fatness and workability of these limes accounts for their easy spreading and far reaching qualities.

Where Ohio Hydrate Limes Should Be Used

For convenience, the following list is given as representing the general classifications of work where Ohio hydrate limes can be used with decided advantage.

For White Coating — If closely examined with a microscope, the white coating in which any Ohio hydrate white finish product has been used would be found to be filled with minute pores. Peculiarly enough, these pores play a very important part in the successful acoustics of a room. Although too small for the naked eye to see, yet they break up and absorb the sound waves, preventing any rebound which is the reason for the echo nuisance where this porosity does not exist.



BROAD STREET BRIDGE, COLUMBUS, OHIO
Waterproofed and lubricated with Ohio hydrate lime

Another distinct advantage realized is the permanency of the walls which affords a like degree of permanency in the decorations. If white coated walls are allowed to stand undecorated for at least one year, this permits the building to settle so that any cracks which may result from the settling, can be properly filled and allowed to harden. The result is a perfectly smooth, white wall, capable of being made permanently beautiful because of the corresponding permanency of Ohio hydrate white finish limes.

Scratch and Brown Coats—The uniform quality and unusual plasticity of Ohio hydrated lime have made it an important factor in high grade interior plaster work, regardless of number of coats applied.

As a matter of fact, there is no kind of interior plaster work where Ohio hydrated lime plaster does not excel. It can be used on all kinds and grades of material with better results, in acoustics, light, sanitation, appearance and life of the wall.

Exterior Stucco Work—The use of Ohio hydrate lime as an admixture to cement greatly improves exterior stucco work because of its unusual plasticity and "fatness." This characteristic makes it possible to cover the metal lath with less pressure than is required for ordinary stucco mixtures.

In like manner is the efficiency of the mixture increased for use on wood lath because of the liberal "key" produced. Then too, the plasticity or workability of the mass aids in effecting a complete "fill" in every crack and crevice. The monolithic surface thus produced prevents any absorption of outside moisture. Naturally this adds greatly to the lasting qualities of the stucco work.

Watertight Concrete Work—The addition of Ohio hydrate to any concrete mixture in the proportion of 5% to 10% of the weight of the cement used renders the mixture much easier to handle. The plasticity of the lime lubricates the mixture making it mix better, pour easier, and run into the forms and around the reinforcing much more evenly and uniformly, making it possible to attain a clean, smooth finish.

The increased density of the mass, resulting from the use of Ohio hydrate lime, renders the concrete work practically watertight, hence far more permanent.

Continued on next page

Lime-Cement Mixtures

Portland cement mixtures are greatly improved through the use of Ohio hydrated dolomitic lime. It possesses certain lubricating properties which facilitate the movement of the mixture through the chutes as well as aiding in its handling.

It also acts adhesively, holding the mass together, thereby preventing a separation of the sand and stone from the cement. In other words, the addition of Ohio hydrated lime renders the mixture more plastic, easier to handle and easier to spread which alone effects a saving in labor.

Then too, the same qualities which cause the greater plasticity, tend toward a closer contact in the mass with the result that the density of the mixture is increased and its resistive powers greatly multiplied. It is because of this peculiar characteristic that cement mixtures in which Ohio hydrated lime is used, are much denser and far less liable to crack.

Residence Howard Candler, Atlanta, Ga.

Mortar

Portland cement mortars can be produced much easier and cheaper through the use of Ohio hydrated lime. Not only does it make the mixture easier to handle, but also does away with the labor ordinarily required to slake the lump lime.

It can readily be realized that the use of mortar of such plasticity will naturally allow the brick, stone, tile or other material, to become more firmly embedded. This, of course, produces a compactness which obviously must add strength to the entire work. Likewise does this same characteristic tend to make the work more watertight, while also making it possible to work the material in low temperatures when ordinary cement mortar could not be safely handled.

Porte-Cochere

Specifications

Materials—The building is to be plastered throughout with lime plaster made with Ohio brand hydrated lime and sand of the quality mentioned below.

All materials to be applied in thorough and workmanlike manner. Specifications must be followed in detail and contractor must remove all his unused material, scaffolding, rubbish, etc., from the premises.

Where lime is mentioned in these specifications, it shall mean Ohio brand hydrated lime, which has been slaked at the mill by the manufacturer, each sack bearing the name of the manufacturer, The Ohio Hydrate & Supply Co.

When material is delivered sanded on the job, the sacks must bear the name of the mixing plant where same was mixed.

Where sand is mentioned, it shall mean a clean, sharp sand such as will pass through a No. 8 screen (64 meshes to the square inch) and to contain not over 5% loam.

Where wood lath is mentioned, it shall mean ⅜x1½-in. No. 1 spruce, hemlock or white and Norway pine lath, free from knots, sap, bark, or other imperfections.

Where calcined plaster (plaster of paris) is mentioned it shall mean a standard grade of finely pulverized calcined plaster, free from lumps and suitable for white coat plastering.

Finish Coat—The finish coat is to be applied when the second coat is dry. The second coat is to be sprinkled generously with clean water before applying the finish coat. Soak Ohio finish hydrated lime over night (24 hours is better) before using. Form the putty into a ring on the mortar board and add about 20 lbs. of calcined plaster to each 100 lbs. of Ohio finish hydrated lime, working it thoroughly.

Finish coat is to be applied in a first class, workmanlike manner and troweled to a smoothly polished surface free from brush marks.

Wood Lath (Three-coat Work)—Scratch coat: 1500 lbs. sand, 450 lbs. Ohio hydrated lime, 3½ lbs. hair. Brown coat: 1600 lbs. sand, 400 lbs. Ohio hydrated lime, 1½ lbs. hair. Finish coat: Ohio hydrated lime putty.

Wood Lath (Two-coat Work)—First coat: 1550 lbs. sand, 450 lbs. Ohio hydrated lime, 3½ lbs. hair. Finish coat: Ohio hydrated lime putty.

Brick or Tile (Three-coat Work)—Scratch coat: 1600 lbs. sand, 400 lbs. Ohio hydrated lime, 1½ lbs. hair. Brown coat: 1600 lbs. sand, 400 lbs. Ohio hydrated lime. Finish coat: Ohio hydrated lime putty.

Brick or Tile (Two-coat Work)—First coat: 1600 lbs. sand, 400 lbs. Ohio hydrated lime, 1½ lbs. hair. Finish coat: Ohio hydrated lime putty.

Metal Lath (Three-coat Work)—Scratch coat: 1500 lbs. sand, 450 lbs. Ohio hydrated lime, 4½ lbs. hair. Brown coat: 1600 lbs. sand, 400 lbs. Ohio hydrated lime, 1½ lbs. hair. Finish coat: Ohio hydrated lime putty.

Sand Float Finish—475 lbs. Ohio hydrated lime, 1525 lbs. sand.

Portland Cement Concrete—Add 10% Ohio hydrated lime by weight of cement to secure a plastic, dense and reliable concrete.

Portland Cement Mortar—Add 40 lbs. of Ohio hydrated lime to every 100 lbs. of cement for economical mortar of maximum strength.

Booklet

An illustrated booklet on the source, manufacture, use and abuse of Ohio Hydrate Lime will be sent to any architect or contractor on request.

M. E. Church, Washington, D. C.

New Home Savings & Loan Co. Building, Youngstown, Ohio

Walker Apartments, Washington, D. C.

THE WOODVILLE LIME PRODUCTS CO.

Manufacturers of Finishing Hydrated Lime

Woodville Lime Products Building

TOLEDO, OHIO

PLANT: WOODVILLE, OHIO

Product

FINISHING HYDRATED LIME.

Long Experience, Exceptional Facilities and Supreme Quality

Our plant is located at Woodville, Ohio, about 18 miles from Toledo on the Pennsylvania Railroad. A capacity of 500 tons of hydrated lime per day is obtained from 4 batteries of 41 kilns.

A storage of 8000 tons of hydrated lime enables us at all times to make large shipments.

It is our claim that, up to date, no other limestone in the world has yet been worked commercially which can furnish lime products that are as satisfactory as those made by our own exclusive processes from the dolomitic or high magnesium rock quarried from our tract in northwestern Ohio. Our quarry is a mass of pure, clean stone without traces of dirt or seams of unworkable rock.

At this superb source of supply, where nature has given us advantages that have no counterpart in the United States, we have developed during the past 20 years a plant that is unsurpassed in point of efficiency. In this thoroughly modern plant we are able to secure an absolute uniformity of product, a factor that can not be underestimated.

Our Hydrated Lime Is Ideal for White Coat Plastering

The use of lump lime is no longer tolerated by experienced architects, who do not take chances on unsightly pitting, blistering or popping of coatings made with it.

Our hydrated lime is universally conceded to give all around satisfaction, and is absolutely ideal for white coat plastering because of its remarkable spreading and covering capacities, pure white color, economical qualities, and its superior strength, appearance and hardness. It costs little (if any) more than lump lime.

Gold Medal, White Lily Finish and White Enamel Finish are 3 brands of hydrated lime that embody the high standard of quality necessary to prove satisfactory to the architect, contractor and owner.

How Our Hydrated Lime Is Made

The 3 brands of hydrated finishing lime made by us—Gold Medal, White Lily Finish and White Enamel Finish—are factory slaked limes, composed essentially of calcium hydrate and magnesium oxide.

This hydrated lime is made from pure dolomitic or high magnesium limestone, which, to secure absolute uniformity, is burned in 4 batteries of kilns. It is then automatically mixed before it is ground, which equalizes and corrects any unevenness of burning that might have occurred in any of the batteries. The hydrating is then carried on simultaneously in 4 hydrators, after which it is again mixed for bolting (through fine mesh wire cloth), a system that leaves neither excess moisture nor any impurities in the finished product.

This successive use of 4 units during the processing is our own system and we have proved by laboratory and practical tests that by it is secured results that have not yet been equalled by any other hydrated lime.

Important Advantages to be Secured by the Use of Our Hydrated Lime

It saves the contractor the money that it costs him to slake lump lime and it can be mixed economically by means of a mortar mixer.

It keeps fresh indefinitely; there is no loss or deterioration from air slaking, therefore it requires no special airtight storage but may be piled up in any dry place.

It is a time saver in winter as it mixes readily with cold water, while bulk lime does not.

It is pure white in color, producing a hard wall that is as attractive as it is permanent. On account of its extreme fineness, plasticity and freedom from impurities, it covers more surface than lump lime putty and requires less calcined plaster for gauging.

It is unequalled for easy spreading qualities because it never works short nor rolls up under the trowel. It has good sand carrying capacity and is, therefore, extremely economical.

It is free from core or the unslaked particles so often found in lump lime and which are the causes of the blistering, popping or pitting that nearly always disfigure a wall thus white-coated.

Covering Capacity

For the average white coat job, our brands of hydrated lime will cover 1000 sq. yds. to the ton. For extra good work, or if base coat is rough, it will run somewhat less.

How Shipped

Our hydrated lime is shipped in 50-lb. paper bags.

TRADE-MARK

TRADE-MARK

TRADE-MARK

Continued on next page

Directions for Using Our Hydrated Lime

Soaking—Fill lime box with necessary amount of water (4 or 5 in.), then pour in the hydrated lime and distribute it evenly in the box. If the water is drawn from a hose, also sprinkle the lime as it is spread in. There should be enough water used so that when it is left standing to soak, it is a wet, soft mass, and to put it in this condition will take 16 to 18 gals. of water to every 100 lbs. of hydrate. Then it should be left to soak from 10 to 15 hours (as it works cooler when well soaked) and in this time do not stir.

Mixing—When ready to use, put the ordinary amount on to a mortar board, hollow the putty and fill with water and gauge with calcined plaster; use about two-thirds as much calcined plaster as in ordinary lump lime putty—about 10 to 20 lbs. to each 100 lbs. of dry finish. Then mix thoroughly and it is ready for use. If sand or marble dust is to be used in the white coating, mix in the desired amount.

Applying—In applying, smooth and trowel down with water the same as with lump lime putty. If base coat is dry, sprinkle with clean water.

Specifications for White Finishing Plaster

Note: White finishing coats made with our hydrated lime may be applied over either lime or gypsum scratch and brown coats.

(1) **White Finishing Coat**—The white finishing coat shall be composed of "White Lily Finish," "White Enamel Finish" or "Gold Medal Finish" brand hydrated lime, as manufactured by The Woodville Lime Products Co., Toledo, Ohio, mixed with plaster of paris and marble dust in the proportions of 10 to 20 lbs. of plaster of paris to each 100 lbs. of hydrated lime, and 5 lbs. of marble dust to each 10 sq. yds. of surface.

(2) The white finishing coat shall be applied to the following surfaces: (here mention surfaces to be covered).

Note: With the addition of marble dust the surface, when well troweled, will take a good polish. Without the marble dust it is not so hard and it does not take a polish. The use of 10% of clean, sharp, white sand will produce the same result as marble dust.

(3) **Sand Float Finish**—The sand finishing coat shall be composed of "White Lily Finish," "White Enamel Finish" or "Gold Medal Finish" brand hydrated lime putty and clean washed (beach) sand mixed with a small quantity of plaster of paris. To be floated with a wooden or cork-faced float to an even surface, with a texture corresponding to that of No. 1 sandpaper.

(4) Sand float finish shall be applied to the following surfaces: (here mention surfaces to be covered).

(5) **Mixing**—All mixing shall be done in clean, watertight boxes, and the boxes shall be thoroughly cleaned of mortar, etc. before beginning the mixing of each new batch. The hydrated lime to be mixed with the proper amount of water and left standing to soak from 10 to 15 hours before mixing with plaster of paris and sand.

(6) **Application**—The brown coat in connection with gypsum (hard wall) plaster shall have become dry before the finish coat is applied.

(7) The brown coat in connection with lime plaster shall have become firmly set, but not dry, before the finish coat is applied.

(8) The finish coat shall be about ⅛ in. thick, but in no place shall the finish coat be less than $\frac{1}{16}$ in. thick.

(9) The white finishing coat shall be applied with a trowel and not a float. It shall be scoured down with water until a dense, even, close grained surface is obtained, after which the surface shall be brushed and troweled to a uniform, smooth finish.

(10) The finished surfaces shall run true to the grounds and guide lines and shall be made straight, level and plumb, with all lines and arrises true and sharp.

(11) Visible joints, cracks, crazes, tool marks, waves, stains or other defects must not appear in the finished work.

Widely Used in All Types of Buildings

Following is a partial list of buildings in which our hydrated lime was used:

Curtis Publishing Co. Building, Philadelphia, Pa.
Post Office, Washington, D. C.
Commonwealth Edison Building, Chicago, Ill.
Baker-Vawter Building, Kansas City, Mo.
Nash Building, Kansas City, Mo.
Irving-Pitt Building, Kansas City, Mo.
First National Bank, Newport News, Va.
Chesapeake & Ohio Office Building, Newport News, Va.
Roosevelt School, Johnson City, N. Y.
North Side School, Endicott, N. Y.
Jefferson School, Binghamton, N. Y.
Norwood School, Toledo, Ohio
Navarre School, Toledo, Ohio, Edwin H. Gee, Architect
State Theater Building, Minneapolis, Minn., John Pridmore, Architect
Lincoln State Bank Building, Minneapolis, Minn., Long, Lamoreaux & Thorshov, Architects
Loring Theater Building, Minneapolis, Minn., Kees & Colburn, Architects
New Curtis Hotel, Minneapolis, Minn., H. L. Stevens Co., Architects
Dixie Terminal Building, Cincinnati, Ohio, Garber & Woodward, Architects
Post Publishing Co. Building, Cincinnati, Ohio, Gustave Drach, Architect
Palace Theater Building, Cincinnati, Ohio, Rapp & Rapp, Architects
Mutual Home & Savings Association Building, Dayton, Ohio, Schenck & Williams, Architects
Fidelity Building & Loan Association Building, Dayton, Ohio, Peters, Hermann & Brown, Architects
West Intermediate School, Jackson, Mich., Leonard Field, Architect
East Intermediate School, Jackson, Mich., Claire Allen & Sons, Architects
Nashville Pure Milk Co. Building, Nashville, Tenn., Asmus & Clark, Architects
The David Lipscomb College, Nashville, Tenn., Marr & Holman, Architects
Administration Building and Auditorium, Hampton Institute, Newport News, Va.
Women's Dormitory, William & Mary College, Williamsburg, Va.
Perkins School, Akron, Ohio, M. M. Konarski, Architect
Marne Hotel, Akron, Ohio, Swirsky & Miller, Architects
Orpheum Theater Building, Akron, Ohio, Harpster & Bliss, Architects
Tuberculosis Hospital, Northville, Mich., Stratton & Snyder, Detroit, Architects

Post Office, Washington, D. C.
Our hydrated limes were used throughout for finish plastering

GYPSUM INDUSTRIES ASSOCIATION

TELEPHONE
DEARBORN 1710

111 West Washington Street
CHICAGO, ILL.

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AMERICAN GYPSUM COMPANY
Port Clinton, Ohio
CARDIFF GYPSUM PLASTER COMPANY
Fort Dodge, Iowa
CENTERVILLE GYPSUM COMPANY
Centerville, Iowa
COLORADO PORTLAND CEMENT COMPANY
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CONNECTICUT ADAMANT PLASTER COMPANY
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403 Perkins Building, Tacoma, Wash.
PLYMOUTH GYPSUM COMPANY
Fort Dodge, Iowa
ROCK PLASTER CORPORATION
40 Rector Street, New York, N. Y.
SOUTHERN GYPSUM COMPANY, INC.
North Holston, Va.
TEXAS CEMENT PLASTER COMPANY
Oklahoma City, Okla.
UNITED STATES GYPSUM COMPANY
205 West Monroe Street, Chicago, Ill.
WASEM PLASTER COMPANY
Fort Dodge, Iowa

Products

(1) GYPSUM PLASTERS, fire resistive, permanent, and durable for all constructions:

(a) Gypsum Cement Plasters
(b) Gypsum Wood Fiber Plasters
(c) Gypsum Sanded Plasters
(d) Gypsum Plasters for Concrete Surfaces

(2) GYPSUM FINISHING PLASTERS, for permanent, and serviceable finishes:

(a) Gypsum Prepared Finishing Plasters
(b) Gypsum Gauging Plasters
(c) Gypsum Moulding and Casting Plasters
(d) Gypsum (Keene's) Cement Plaster

(3) GYPSUM BOARDS, for fire resistive (fireproof) and other constructions:

(a) Gypsum Plaster Boards
(b) Gypsum Wall Boards

(4) GYPSUM TILE or BLOCK, for fire resistive (fireproof) and other constructions:

(a) Gypsum Partition Tile
(b) Gypsum Furring Tile
(c) Gypsum Fireproofing Tile
(d) Gypsum Enclosure Tile
(e) Gypsum Roof Tile (Reinforced)
(f) Gypsum Floor Tile (Reinforced)

GIA
GYPSUM INDUSTRIES ASSOCIATION
111 WEST WASHINGTON STREET
CHICAGO, ILLINOIS

TRADE-MARK

Official Approval

Gypsum products and constructions are approved by The National Board of Fire Underwriters' Building Codes; The Underwriters' Laboratories, Inc.

Also by the New York City and other city building ordinances.

Procurability of Gypsum Products

Member manufacturers of the GYPSUM INDUSTRIES ASSOCIATION, arranged by states, with the location of the mine or mill are the following:

CALIFORNIA—
United States Gypsum Co., Amboy

COLORADO—
Colorado Portland Cement Co., Portland
United States Gypsum Co., Loveland

CONNECTICUT—
Connecticut Adamant Plaster Co., New Haven

IOWA—
American Cement Plaster Co., Fort Dodge
Cardiff Gypsum Plaster Co., Fort Dodge
Centerville Gypsum Co., Centerville
Plymouth Gypsum Co., Fort Dodge
United States Gypsum Co., Fort Dodge
Wasem Plaster Co., Fort Dodge

KANSAS—
American Cement Plaster Co., Blue Rapids
United States Gypsum Co., Blue Rapids

MICHIGAN—
Acme Cement Plaster Co., Grand Rapids
American Cement Plaster Co., Grand Rapids
Grand Rapids Plaster Co., Grand Rapids
Grand Rapids Plaster Co., Grandville
Michigan Gypsum Co., Grand Rapids
United States Gypsum Co., Grand Rapids
United States Gypsum Co., Alabaster

NEVADA—
Arden Plaster Co. (United States Gypsum Co.), Arden

NEW MEXICO—
Acme Cement Plaster Co., Acme

NEW YORK—
American Cement Plaster Co., Akron
American Gypsum Co., Akron
Empire Gypsum Co., Garbutt
Ebsary Gypsum Co., Wheatland
Higginson Manufacturing Co., Newburgh

Continued on next page

J. B. King & Co., New York
Niagara Gypsum Co., Oakfield
Rock Plaster Corporation, New York
United States Gypsum Co., Oakfield

OHIO—
American Cement Plaster Co., Gypsum
American Gypsum Co., Port Clinton
Kelley Plaster Co., Castalia
United States Gypsum Co., Gypsum

OKLAHOMA—
Acme Cement Plaster Co., Acme (Gladys)
Colorado Portland Cement Co., Ideal (Primm)
United States Gypsum Co., Eldorado
United States Gypsum Co., Southard

OREGON—
Acme Cement Plaster Co., Gypsum

SOUTH DAKOTA—
Dakota Plaster Co., Black Hawk
United States Gypsum Co., Piedmont

TEXAS—
Acme Cement Plaster Co., Acme
American Cement Plaster Co., Agatite
Texas Cement Plaster Co., Hamlin

UTAH—
Nephi Plaster & Manufacturing Co., Nephi

VIRGINIA—
Southern Gypsum Co., North Holston
United States Gypsum Co., Plasterco

WASHINGTON—
Pacific Coast Gypsum Co., Tacoma

WYOMING—
Acme Cement Plaster Co., Laramie
Colorado Portland Cement Co., Red Buttes
Overland Cement Plaster Co., Laramie

The J. B. King Company listed in New York State, import the gypsum rock from Windsor and Avondale, Nova Scotia, and also from Hillsborough, New Brunswick. The Rock Plaster Corporation (formerly the Rock Plaster Manufacturing Co.) also listed in New York State, import the gypsum rock from Amherst, Walton and Cheverie, Nova Scotia.

Gypsum plasters, gypsum partition, furring and enclosure tile, gypsum plaster and wall boards, gypsum roof deck tile, gypsum for floor construction and fireproofing and other building purposes, can be obtained from the manufacturers direct, or from any dealer handling building supplies. From these practically inexhaustible sources of supply the building requirements, in so far as they affect the necessary gypsum products, can always be met.

Research Activities of the Gypsum Industries Association

In order to render the greatest service possible to the architect, engineer, contractor and to scientific, technical and similar organizations, the GYPSUM INDUSTRIES ASSOCIATION is carrying forward the following researches:

(1) **The United States Bureau of Standards**—In this bureau, under the direction of Warren E. Emley, the Association is maintaining a fellowship, whose duty is the development of scientific practical data relative to the use of gypsum plasters and products in building construction.

(2) **The American Society for Testing Materials**—The Association has representation on Committee C 11 on Gypsum. This committee, with its subcommittee, has formulated A.S.T.M. Standard Specifications for the following:

Subcommittee I, on Gypsum for Various Uses
Subcommittee II, on Gypsum Plasters
Subcommittee III, on Structural Gypsum Products
Subcommittee IV, on Testing Methods.
Subcommittee V, on Nomenclature
Subcommittee VI, on Fire Resisting Properties of Gypsum

(3) **The National Fire Protection Association**—As active members of this national body, this Association is represented by membership on the Committee on Building Construction whose function is the development of Standard Specifications for office, apartment buildings and the like, the purpose being to reduce the national yearly fire waste through the adoption of specifications requiring recognized fire resistive construction.

(4) **The National Federation of Construction Industries**—As members of this federation this Association is participating in activities tending to improve the construction industry. Legislation relating to matters of interest to builders and construction, transportation, labor and building codes are receiving the consideration necessary.

(5) **The Gypsum Industries Association's Engineering and Research Department**—This department, maintained solely for the development of specifications and data relative to gypsum products, has prepared, along architectural and engineering principles, the following:

(a) *Gypsum*—Historical, geology, chemical properties; physical properties; manufacturing process; products; economy advantages.

(b) *Gypsum Plasters*—Gypsum cement plaster; gypsum wood fiber plaster; gypsum sanded plaster; gypsum plaster for concrete surfaces; gypsum finishing plasters, definitions; proportions; mixing; application on gypsum plaster board; wire, expanded and sheet metal lath; wood lath; brick, gypsum or clay tile; concrete. Also data relative to fire protection; low heat conductivity; adaptability; uniformity of strength and quality; saving of time and labor; winter operations facilitated; sanitation and health; procurability.

(c) *Gypsum Boards*—Gypsum plaster board; gypsum wall board, definition; uses in combustible and fireproof buildings; specifications of material; specifications for erection on wood and metal supports; for suspended and soffit ceilings; for solid and hollow incombustible partitions. Also data relative to fire protection; low heat conductivity, adaptability; uniformity of strength and quality; saving of time and labor; sanitation and health; procurability.

(d) *Gypsum Tile*—Definition; uses in combustible and fireproof buildings. Specifications of material; specifications for erection; physical properties; fire protection; low heat conductivity; low total expansion; low sound conductivity; homogeneous construction; light weight; strength; rapid construction; saving of time and labor; adaptability and economy; procurability.

(e) *Structural Gypsum*—Reinforced gypsum roof and floor construction. Precast and poured-in-place constructions. Reinforced gypsum floor filler tile. Flexure and other load tests; etc.

Specifications and Co-operative Service

THE GYPSUM INDUSTRIES ASSOCIATION will render, without charge or cost, the fullest co-operation and assistance to architects, engineers and contractors in the solution of their problems in so far as they are related to the proper and economic uses of gypsum products in conformity with the Association's recommendations and present accepted architectural and engineering practice.

Specifications also supplied without charge.

ACME CEMENT PLASTER CO.

Manufacturers of Cement Plaster, Keene's Cement and Gypsum Blocks

GENERAL OFFICES
ST. LOUIS, MO.
SHIPPERS OF GYPSUM PRODUCTS FROM

ACME, TEXAS LARAMIE, WYO. GRAND RAPIDS, MICH. FORT DODGE, IOWA GYPSUM, ORE. WINSLOW, ARIZ.
ACME, NEW MEX. CEMENT, OKLA. ACME, OKLA. GLADYS, OKLA. LIME, ORE.

Products

ACME CEMENT PLASTERS; ACME KEENE'S CEMENT; ACME WOOD FIBERED PLASTERS; ACME GYPSUM BLOCKS.

Also, Acme Prepared Finishing Plasters, Acme Pure White Plaster Paris Finish, Acme Moulding and Casting Plasters, Gypsum Products.

TRADE-MARK

Reputation and Guarantee

The Acme products have a national reputation and are sold under a guaranteed trade-mark, to meet every requirement of the most discriminating Standards for Testing Materials as to tensile strength, crushing strength, and fire resisting, covering, spreading, working qualities and endurance.

Acme Cement Plaster

The original natural cement plaster first introduced in the United States. It is guaranteed a perfect stock-keeper; it works very even and uniform; its working qualities and durability make it a great favorite with architects and contractors.

Brands—"Acme," "Royal," "Climax," "Laramie Standard," and "Apex," "Independent" and "Mission."

Covering Capacity—2000 lbs. of Acme will cover 200 sq. yds. on lath and 250 sq. yds. on Acme gypsum blocks.

Specifications for Acme Cement Plasters

General Information—Acme Cement Plasters are cement and must be handled like cements to get results. They must be protected from dampness by being stored in a dry place, never on the ground, against a damp wall, or in any damp place when delivered to the building.

Acme Cement Plasters "set" and can not be re-tempered after the "set" begins. A very little "set" plaster in cement plaster mortar, whether from the mortar boxes, the water-barrel in which tools have been washed, or droppings from the floor, will cause all of the plaster mortar to "set" too quickly.

Acme Cement Plaster mortar will "set" quick and work short if there is delay in tempering with water after sand has been mixed with it. It will spread a little easier if allowed to stand a few minutes after it has been tempered. To get the maximum tensile strength from Acme Cement Plasters they should be tempered as stiff as the mortar can be conveniently worked.

If finished walls are soft and chalky, it is because the water in the mortar has been evaporated before the plaster has "set." Spraying the walls with clean water, or with brush and water having powdered alum dissolved in it, is the remedy.

After Acme Cement Plaster mortars are well "set," open doors and windows and dry as quickly as possible.

General Requirements—*Grounds*—To be ¾ in. for wood or metal lath; for plaster block, brick, stone and tile, ½ in.

Plaster Board—According to the manufacturer's directions for using.

Lath—Should be good grade; free from knots, sap and bark; spaced not less than ⅜ in.; securely nailed with 3d galvanized nails. Joints broken every fifth lath, leaving space at end of lath.

Sand—Use only clean, sharp sand of good voidage, free from loam, dirt, or impurities. Avoid quicksand.

Wet the Lath—Thoroughly swell wood lath with hose and water, if necessary, at least 2 hours before applying mortar.

Suction—Wet all gypsum block, brick, stone, tile and concrete walls with water, to reduce suction, before applying plaster.

Mixing—Thoroughly mix all cement plaster with sand before adding water. At once add sufficient clean water and temper to the consistency of good stiff plasterers' mortar and allow to stand a few minutes.

Gauging for Wood or Metal Lath and Plaster Board—To Fibered Acme Cement Plaster add sand as per manufacturer's specifications.

On Gypsum Block, Brick, Stone and Tile Walls—To 1 part Unfibered Cement Plaster add 2 parts sand.

On Concrete Walls, Beams, Ceilings and Columns—To 1 part Wood Fibered or Unfibered Cement Plaster add ⅔ parts sand.

Directions for Applying—*On Wood Lath—First Coat*: Mortar to be applied promptly with sufficient pressure to fill keys and spread a good coat over lath, leaving surface rough; scratch with broom or rice-root brush and allow plaster to "set" hard.

Second Coat: When first coat is two-thirds dried, to be applied with strong pressure, even with grounds. Straighten with rod and darby ready for finish coat. Must not be floated.

On Metal Lath (See Associated Metal Lath Manufacturers' specifications in this issue.)—*First Coat:* Mortar to be applied promptly with sufficient pressure to fill keys and cover lath with a thin coat of plaster, leaving rough surface to receive second coat of plaster, applied in same way as second coat is applied on wood lath.

On Brick and Tiles (See Common Brick Manufacturers' specifications in this issue.)—All crooked uneven walls to be straightened by filling the low places. After this has "set" hard, apply 1 coat with strong pressure, even with grounds, and leave ready for finish coat. May be floated before mortar begins to "set."

On Plaster Board—According to the plaster board manufacturer's directions for using.

On Acme Gypsum Blocks—Apply 1 coat with strong pressure and sufficient to make walls even with grounds, straighten with rod and darby and leave ready to receive finish coat.

On Concrete—Thoroughly brush all walls and ceilings with steel brush; hack all smooth surfaces; thoroughly wash with brush and water, or hose, all loose substances, efflorescence, dust, dirt and oil from walls and ceilings. While walls are still damp, apply sufficient cement plaster to fill out grounds and bring to straight and even surface, ready to receive finish coat.

Acme Wood Fibered Plaster

The addition of wood fiber to Acme transmits toughness and elasticity, making plastered walls that will bend without cracking, and preventing lath cracks. An extra good material for finishing concrete ceilings.

Ideal for use where good sand is not available at reasonable cost; and can be made so that an equal measure of inferior quality of sand may be gauged with it, giving good results.

Covering Capacity—Without sand, 2000 lbs. will cover 80 to 120 sq. yds., depending upon thickness of grounds and spacing of lath. With sand, 2000 lbs. will cover 130 to 160 sq. yards.

Specifications for Acme Wood Fibered Plasters

Acme Wood Fibered Plasters, Neat—Grounds to be ⅝ in. for wood lath; laths spaced ¼ in. apart, leaving space at end of lath; joints broken every fifth lath; use no sand; temper with clean water to consistency of thin plasterers' mortar; apply 1 coat with strong pressure sufficient to bring to straight and even surface, flush with grounds, and leave ready for finish coat.

Acme Wood Fibered Plasters with Sand—Equal parts plaster and sand. Same directions for using as Acme Cement Plasters.

Continued on next page

Acme Keene's Cement

A slow setting, even and smooth working cement for interior finish, gauged for plastering mortar by mixing with hydrated lime or lime putty and sand; the only plastering material which can always be troweled to an even and true surface, making perfect angles and joinings; the very best obtainable material for interior finish. It has a tensile strength, neat, 700 lbs. per sq. in.; crushing strain, 10 times the tensile strength.

Covering Capacity—Gauged with lime, 500 lbs. will cover 100 sq. yds., 2 coats. Used neat, 300 lbs. will finish 100 sq. yds. Gauged with lime, 100 to 150 lbs. will finish 100 sq. yds.

Specifications for Acme Keene's Cement

General Requirements—*Grounds*—Lath and sand same as Acme Cement Plasters.

Directions for Applying—*Gauging for Wood Lath—First Coat:* Equal parts Acme Keene's Cement and finely strained, well seasoned lime putty, making 1 part; to this mixture add 2 parts clean, sharp sand. Fiber well with cattle hair or other equally good fiber, and add sufficient water to temper to proper consistency. Scratch or broom and then let dry.

Second Coat: When scratch coat is bone dry, dampen with clean water before applying second coat. Equal parts Acme Keene's Cement and finely strained, well seasoned lime putty, making 1 part; to this mixture add 3 parts clean, sharp sand for ceilings (add 5 parts sand for walls). Add sufficient water to temper to proper consistency. Droppings may be re-tempered and used if done promptly.

For Metal Lath—Apply first coat with sufficient pressure to fill all keys and cover all metal with a light coat of mortar. Gauge in same proportions and apply in same manner as on wood lath.

For Acme Gypsum Block, Tile or Brick—Equal parts of Acme Keene's Cement and finely strained, well seasoned lime putty, making 1 part; to this mixture add 3 parts clean, sharp sand for ceilings (add 5 parts sand for walls). Add sufficient water to temper to proper consistency.

Acme Keene's Cement Finishes—*For Smooth Finish*—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well seasoned white lime putty, making 1 part; to this mixture add 1/6 part clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Float or Sand Finish—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well seasoned white lime putty, making 1 part; to this mixture add 2 parts clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Trowel Sand Finish—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. Equal parts Acme Keene's Cement and finely strained, well seasoned white lime putty, making 1 part; to this mixture add ½ part clean, sharp sand, screened through a No. 12 sieve. Add sufficient water to temper to proper consistency.

For Wainscoting—Mortar box to be clean. When brown coat is bone dry, dampen with clean water before applying finish coat. One part Acme Keene's Cement and ½ part finely strained, well seasoned white lime putty; to this mixture add sufficient water to temper to proper consistency. In laying off wainscoting in imitation of tiling, brick or stone, the finish must be sufficiently hard for the tools to cut sharply defined lines without tearing the walls. Do not draw the lines deep; only deep enough to show distinctly.

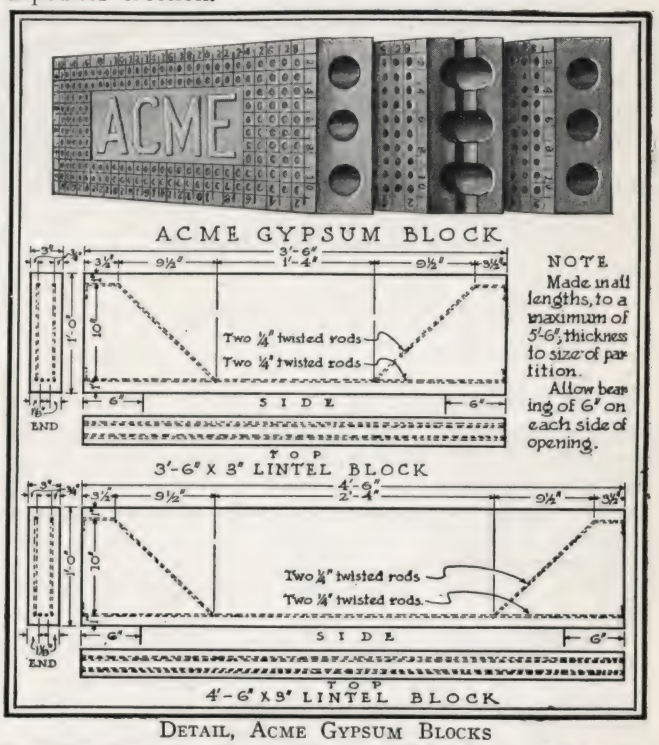
General Directions for Mixing Finish Coat—First add some clean water to the Acme Keene's Cement, and quickly break up the initial set; then add other ingredients as required for the different finishes, as given above.

Acme Gypsum Blocks and Lintels

Acme gypsum blocks and lintels are singularly adapted for use in all fireproof partitions, corridors, column covering and wall furring. Made from the purest gypsum and fibre under a fully protected formula, they are most economical, insuring a safe investment. Acme gypsum blocks by test have proved to embody maximum density, greatest crushing strength, supreme fire-, sound- and vermin-proof qualities, less absorption and negligible breakage. They are extremely light in weight, reducing cost of freight and handling.

Acme gypsum blocks are made on the only machine in the world (our own patent) that absolutely avoids creating ruinous "core-cracks"—these cracks arise around cores when bond with material is broken by "pulling." On account of their internal location, these cracks are not revealed except by close inspection, but when present the constructive permanence of the block is greatly impaired. Avoid this hazard by using Acme Gypsum blocks.

Both sides of Acme gypsum blocks have a patented scoring, marking off the inches both longitudinally and vertically. This feature minimizes labor expense and expedites erection.



DETAIL, ACME GYPSUM BLOCKS

Specifications for Acme Gypsum Blocks, and Lintels

General Requirements—All rough bucks for openings to be exact size of openings; set in place by the carpenter, securely braced and left plumb and true for the masonry contractor. All bucks to be exact size of abutting partitions and 2 in. thick, and have grounds 2½ in. wide by ½ in. thick nailed thereon to receive the ends of the Acme Gypsum Blocks.

Directions for Applying—*Furring*—Fur outside walls with 2-in. hollow back Acme Gypsum Blocks, laid up against the walls and securely spiked to the walls with 20d nails.

Interior Columns—All exposed interior columns to be covered with 2-in. solid or 3-in. hollow Acme Gypsum Blocks, securely bonded with gypsum mortar.

Mortar—Set all Acme Gypsum Blocks in a mortar composed of 1 measure Unfibered Acme Cement Plaster, 3 equal measures clean, sharp, coarse sand, and tempered with clean water to the consistency of bricklayers' cement.

Ceiling Heights—Use sizes of blocks for ceiling heights as provided by the National Board of Fire Underwriters, or as follows: Non-bearing corridor and room partitions, not exceeding 13, 17 and 22 ft. in height, 3-, 4- and 5-in. hollow blocks, respectively; 6-in. hollow block to ceilings over 22 ft. and up to 30 ft.; 8-in. hollow block when over 30 ft. and up to 40 ft.

Acme Gypsum Lintels—Over all openings less than 5 ft. in width, place an Acme Gypsum Lintel of the same thickness as the wall. This lintel to be 12 in. longer than the width of the opening, and to have not less than 6 in. bearing on wall on either side, well bedded in Gypsum mortar and kept ½ in. above wood buck or jamb. Over all openings more than 5 ft., place the iron channels supplied for these openings by the general contractor.

Co-operative Service

Representatives of the company will call on request, or any information concerning Acme Products will be furnished by mail.

THE AMERICAN CEMENT PLASTER CO.

Manufacturers of Gypsum Products Exclusively

ADMINISTRATION OFFICES
BUFFALO, N. Y.

DISTRICT SALES OFFICES
ATLANTA, GA. BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO
KANSAS CITY, MO. NEW YORK, N. Y.

MILLS
GRAND RAPIDS, MICH. FORT DODGE, IOWA GYPSUM, OHIO
AKRON, N. Y. BLUE RAPIDS, KANS. AGATITE, TEX.

Products

GYPSUM PLASTERS (Hard Wall Plasters), which include: Gypsum Cement Plasters, Unsanded (Hair Fibered or Unfibered); Gypsum Sanded Plaster; Gypsum Wood Fiber Plaster; Gypsum Plasters for Concrete Surfaces.

GYPSUM FINISHING PLASTERS, which include: Gypsum Prepared Finishing Plasters; Gypsum Gauging Plasters; Gypsum Moulding and Casting Plasters; Best Bros. Keene's Cement.

GYPSUM PLASTER BOARD.

GYPSUM HOLLOW TILE or BLOCK.

GYPSUM ROOF TILE.

Quality and Service

Architects will find this line of products full and complete. THE AMERICAN CEMENT PLASTER CO. owns and operates six of the best and largest gypsum deposits in the United States, located at the principal gypsum producing centers. This company can thus at all times advantageously serve its trade in all principal markets on short hauls and low freight at the most economical costs.

Mills are modern, unexcelled in equipment; the quality of products is established in their use.

Guarantee

All these products are fully guaranteed to be best quality and they will give the best results when used in accordance with the specifications of this company.

American Cement Plaster Co.'s Gypsum Plasters

Classification—THE AMERICAN CEMENT PLASTER CO.'s gypsum plasters (sometimes called hard wall plaster, patent plaster, cement plaster, etc.) may be broadly divided into *two* classes: (1) Plasters for base coats; (2) plasters for finish coats.

Plasters for Base Coats—These plasters are made in *four* classes, each for a particular use, as follows: (1) Cement plasters, unsanded (hair fibered or unfibered); (2) sanded plasters; (3) wood fibered plasters; (4) plasters for concrete surfaces.

Plasters for Finish Coats—These are made in *four* classes, each for a particular use, as follows: (1) Prepared finishing plasters; (2) gauging plasters; (3) moulding and casting plasters; (4) Keene's cement plaster.

Materials—All of THE AMERICAN CEMENT PLASTER CO.'s gypsum plasters have, for their cementitious base, carefully selected dry gypsum rock, scientifically ground and calcined. To this cementitious base, retarder is added for the purpose of controlling the set and producing perfect working material. Other materials such as wood fiber and hair are added, where required, to permit proper bond to the surfaces to be plastered as hereinafter described under specific headings.

All sand in sanded plasters is carefully selected, clean, sharp siliceous sand, free from salt, clay, loam or other impurities.

Advantages—Gypsum plasters have many advantages:

Adhere to all material used as backing for plaster, gypsum blocks, plaster board, stone brick, hollow tile, concrete, wood or metal lath; highly adhesive; do not crumble; work smoothly and easily under the trowel; set slowly, giving the plasterer ample time for troweling.

Gypsum plasters harden and dry quickly, permitting carpenter and other work to proceed almost immediately after plastering is finished.

The finished wall is a non-conductor of heat and cold; it resists fire and is verminproof.

Can be painted, frescoed, papered, or finished with any kind of decorative material a few days after its application.

After it sets, freezing will not harm it.

Standard Packages

Our plasters are shipped in convenient packages. Jute sacks, which are returnable, contain 100 lbs. each, and paper sacks 80 lbs. each.

100-LB. JUTE SACK

Brands

THE AMERICAN CEMENT PLASTER CO.'s gypsum plasters are marketed under the various brands listed below; all brands being of the same high standard of quality:

Crystal Rock†	Krisolite†	Agatite*	Eureka*
Akron†	Buffalo	Sampson*	Peerless*
White Rock†	Great Western†	Eagle*	Wayne
Fishack†			

*These brands are gypsite or dark plasters.
†These brands are also furnished in "Prepared Sanded Plaster."

Gypsum Cement Plaster (Unsanded) for Scratch or Brown Coat

This plaster is a "neat" plaster for scratch and brown coats. It is made for use where good sand is available at reasonable cost, or where, for other reasons, it is desirable to sand the plaster at the job.

This is an "all-purpose" plaster for scratch and brown coats on interior walls and ceilings of any material which can be plastered.

It is furnished *hair fibered* for scratch coats on metal lath and base on wood lath and plaster board, and *unfibered* for the brown (second) coat over the scratch coat on metal lath work, and for the brown coat on masonry surfaces (two-coat work)—no scratch coat being required on the last mentioned surfaces.

Sanding—Sand should be added in the proportion of 1½ parts by weight of sand to 1 of plaster, scratch coat; and 2 parts of sand to 1 of plaster, brown coat.

Continued on next page

Finishing Coats—Any type of finishing coat may be used over the brown coat, including: Gypsum plaster finish, lime putty finish, sand float finish, Keene's cement finish, caen stone finish, etc.

Brands—See "Brands" on preceding page.

Specifications—See following page.

Gypsum Sanded Plasters for Scratch or Brown Coat

THE AMERICAN CEMENT PLASTER CO.'S sanded gypsum plasters have for their base same ingredients as the "unsanded" plasters, the additional advantage being that the cement and sand are machine mixed at the factory, insuring thorough and uniform mixing of materials and *absolute correctness of the proportions.* This latter advantage is perhaps appreciated most by the architect, as it prevents all chance of using a poor quality of sand, or too much of it; it also saves the architect or owner much time in the supervision of the mixing.

This is a splendid "cold weather plaster." Needing only water to fit it for application, it may be readily and quickly mixed inside the building with no worry about sand, or troubles arising from the use of frosty sand.

Furnished *hair fibered* for scratch coats and *unfibered* for brown coats. Like the "sanded" gypsum plasters it will take any type of finishing coat.

Brands—See "Brands" on preceding page.

Specifications—See following page.

Gypsum Wood Fibered Plaster for Scratch or Brown Coat

THE AMERICAN CEMENT PLASTER CO.'S wood fiber plaster is composed of pure rock gypsum and thoroughly shredded wood fiber. It is adapted for use with the addition of not to exceed equal parts of clean sharp sand. When desirable it can be applied without the addition of sand.

Wood fibered plaster, when applied either with or without the addition of sand, produces a wall that can not be excelled for strength, elasticity and durability. These features together with lightness in weight make it an ideal plastering material. It is especially desirable where one-coat work is to be done.

Brands—See "Brands" on preceding page.

Specifications—See following page.

COVERING CAPACITIES AMERICAN CEMENT PLASTER CO.'S GYPSUM CEMENT PLASTERS PER 100 SQ. YDS.
Material mixed and used as per Specifications

Plastering surface	Gypsum cement plaster, neat, 100-lb. bags	Gypsum wood fiber plaster, 100-lb. bags	Gypsum sanded plaster, 100-lb. bags
Wood lath	9 to 12 (sanded 2 to 1)	14 to 17 unsanded	22 to 24
Metal lath	16 to 19 (sanded 2 to 1)	20 to 25 unsanded	45 to 50
American plaster board	8 or 9 (sanded 2 to 1)	12 to 15 unsanded	22 to 24
Brick and clay tile	14 to 17 (sanded 3 to 1)	18 to 20 (equal parts sand to be added)	34 to 39
American gypsum tile	10 to 12 (sanded 3 to 1)	14 to 16 (equal parts sand to be added)	26 to 29

American Bond Plaster for Concrete Surfaces

This is an especially made plaster to be used only for direct application as a brown coat on interior concrete surfaces. American bond plaster needs the addition of water only to prepare it for use, and its cohesive and adhesive properties make it an ideal plaster for application on interior surfaces.

Brands—See "Brands" on preceding page.

Specifications—See following page.

Gypsum Prepared Finishes, Trowel and Sand Float

These finishes made from gypsum contain no lime and are ready for application with the addition of water only. They are machine mixed, thereby producing an absolutely uniform distribution of the ingredients, which eliminates chance of error at mixing box. The absence of lime in these finishes eliminates troubles (which often occur when lime is used) such as pops, pits, map cracks, soft wall shrinkage, etc. Decorative treatment can be applied as soon as finish is dry. Manufactured in two classes.

Class 1—American and Smooth Trowel brands are made from the finest selected gypsum rock and ingredients of a high standard of purity.

Class 2—Sand float finish is made from high grade gypsum rock and materials that have been developed after much study to meet the demands of our trade for a moderate cost prepared finishing plaster.

Specifications—See second page following.

Gypsum Gauging Plasters for Lime Putty Finishes

Our gypsum plasters made for this purpose are manufactured from carefully selected dry gypsum rock which for its purity and adaptability for manufacturing the highest grade finishing plaster is unexcelled. They are uniformly ground to the exact proper fineness for a finishing plaster to mix freely and quickly with lime putty.

For cool-working finishing plaster to produce an enduring smooth surface of snow white appearance specify our Satin Spar brand.

Sunflower Moulding and Casting Plaster

Our Sunflower moulding and casting plaster is and can be manufactured at our Blue Rapids Kansas Mill only.

The natural purity of the gypsum and the care taken in its manufacture produce the exact proper fineness and setting time. Sunflower moulding and casting plaster has those soft and smooth working qualities which are necessary in order to form clearly and distinctly the most delicate decorative plastic ornamentation.

Best Bros. Keene's Cement

Manufactured by the Best Bros. Keene's Cement Company, Medicine Lodge, Kans. (See their pages in this edition.) Carried in stock at all mills for shipment with other commodities as manufactured by our company. The best Keene's cement manufactured in the United States.

American Gypsum Plaster Board

American gypsum plaster board is composed of gypsum plaster mixed with a small percentage of shredded wood fiber, and both sides surfaced with a specially prepared paper.

It is a fire, sound, heat and cold resisting lathing and sheathing material and forms a perfect backing for gypsum plasters. It strengthens the building when used as sheathing or lathing; avoids lath buckling, stains and discoloration; saves fuel, time, labor and money.

The American trade-mark shows prominently on every plaster board.

Sizes and Thicknesses—Manufactured in standard sizes of approximately 32x36 in.; and in two thicknesses: ¼ in. thick, weighing 1½ lbs. per sq. ft.; and ⅜ in. thick, weighing 2 lbs. per sq. ft. Each board covers 8 sq. ft. of surface. Special sizes made for Bur-

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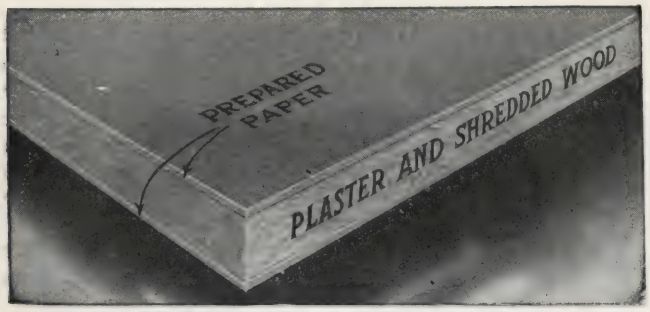


SECTION OF AMERICAN PLASTER BOARD

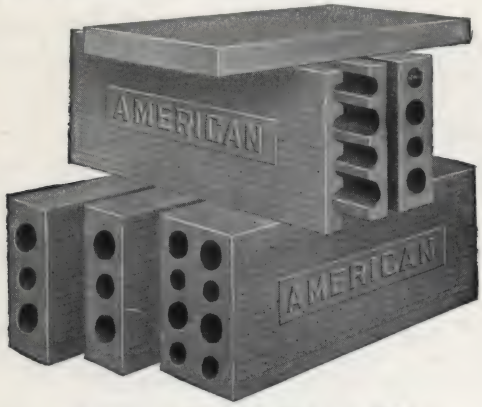
son, Ceco and Simplex systems for suspended ceilings and non-bearing partitions.

Specifications—See following page.

American Gypsum Hollow Tile

This gypsum product has established a high reputation in the building world through repeated use by representative architects, contractors and builders. It is fireproof (approved by the National Board of Fire Underwriters); is a non-conductor of heat, cold and sound; is light in weight, strong and tough; erects economically without waste, and is recognized as the modern non-bearing partition and furring material for fireproof buildings.

Specifications—See following page.



AMERICAN GYPSUM HOLLOW TILE

SIZES AND WEIGHTS OF AMERICAN GYPSUM HOLLOW TILE

Size, in.	Ceiling height, ft.	Weight tile per sq. ft., lbs.	Weight plaster 1 side per sq. ft., lbs. (¼-in. grounds)	Total weight plastered 1 side per sq. ft., lbs.	Weight plaster 2 sides per sq. ft., lbs. (¼-in. grounds)	Total weight plastered 2 sides per sq. ft., lbs.
1½-in., split 1½x12x30	Furring	5	3	8	....	....
2-in. split 2x12x30	Furring	6	3	9	....	....
2-in. solid 2x12x30	10	9.5	3	12.5	6	15.5
3-in. hollow 3x12x30	13	10	3	13	6	16
3-in. solid 3x12x30	15	12.5	3	15.5	6	18.5
4-in hollow 4x12x30	17	13.0	3	16.0	6	19.0
5-in. hollow 5x12x30	25	15	3	18	6	21
6-in. hollow 6x12x30	28	17	3	20	6	23

Specifications for American Gypsum Plasters

Studs and Joists—To be spaced not more than 16 in. between centers.

Grounds—To be ¾ in. for American Plaster Board, wood lath and metal lath; ½ in. for American Gypsum Blocks; ¾ in. for clay tile.

Wood Lath—To be of good quality, straight grained and free from knots, bark and sapwood. To be spaced ⅜ in. apart with not less than ⅛ in. space between ends; with joints broken every fifth lath. To be well nailed to each stud and joist with 3d lathing nails. If lath are dry, they are to be thoroughly wet at least 4 hours before mortar is applied to them, so that they will not swell or warp after the plaster is on them.

Grooved Sheathing Lath—To be well nailed to studs spaced not more than 16 in. between centers; to be spaced at least ⅛ in. apart, and to be thoroughly wet at least 4 hours before plaster is applied to them, so that they will not swell or warp after plaster is on them.

Brick and Tile—To be dampened before plaster is applied to them.

Concrete—Surface to be cleaned free from all efflorescence, dust, dirt and oil, and, where very smooth, to be well hacked before mortar is applied.

Sand—To be clean, sharp, and free from clay, soil, alkali, salt and quicksand.

Mortar; Hair Fibered and Unfibered Plasters—*On American Plaster Board*—To be 1 part plaster to 2 parts sand.

On Wood Lath and Metal Lath—First coat to be one part plaster to 1½ part sand; second coat to be 1 part plaster to 2 parts sand.

On Brick and Tile—Mortar to be 1 part plaster to not more than 2½ parts sand.

On Concrete—To be equal parts plaster and sand.

Mortar; Wood Fiber Plaster—For making extremely light tough plastering, it is recommended that the wood fiber plaster be used without sand; but it will make excellent plastering when the mortar is equal parts of the wood fiber plaster and clean sharp sand. For plastering on concrete wood fiber plaster should be used without sand.

Mortar; American Bond Plaster—On concrete, to be American Bond Plaster mixed with water, with the addition of no other material.

Mixing Sanded Mortar—All mortar to be mixed in clean tight boxes; the plaster and sand to be first thoroughly mixed dry, then immediately tempered with sufficient water to make good stiff mortar. No part of one batch of mortar is to be mixed with another batch in the mortar box or on the mortar board, and no mortar is to be used or worked after it has partly set. Mortar box, tools, hods, mortar board and water to be kept clean and free from set and partly set plaster, unless quick setting mortar is desired.

Mixing Wood Fiber Mortar—Plaster to be put in one end of mortar box, water in other end; then plaster to be slowly hoed into water and thoroughly mixed until there are no lumps or dry plaster in the mortar. No part of one batch of mortar is to be mixed with another batch in the mortar box or on the mortar board, and no mortar is to be used or worked after it has partly set. Mortar box, tools, hods, mortar board and water to be kept clean and free from set or partly set mortar, unless quick setting mortar is desired.

Applying Mortar to American Plaster Board—The boards not to be wet before mortar is applied. All spaces between boards to be well filled with mortar, either by pointing the joint with quick setting neat plaster, or by carefully pressing the mortar used for first coat into the spaces between the boards as the first coat is put on. The second coat to be straightened with rod and darby ready for the finish coat, and must not be floated.

Applying to Wood Lath—First coat to be applied with sufficient pressure to form good keys, leaving a light coat of mortar over the lath, with surface rough. The second coat to be applied with strong pressure, when the first coat has set hard, but before the first coat is dry; and is to be straightened with rod and darby, broomed ready for finish coat, and must not be floated.

Applying to Metal Lath—The first coat to be applied so as to fill the meshes and lightly cover the lath. The second coat to be applied when the first coat is set hard, but before the first coat is dry.

Applying to Brick and Clay Tile—Crooked, uneven walls to be first straightened by filling the low places with mortar. After mortar used to straighten walls has set, sufficient mortar to fill out to grounds to be applied with strong pressure, and straightened ready for the finish coat.

Applying to Concrete—Where work can be straightened with 1 light coat of mortar, sufficient mortar to fill out to grounds is to be applied in 1 coat with strong pressure, and straightened ready for the finish coat. Where work can not be straightened with 1 light coat, 2 coats are to be applied; the first coat to be set hard before applying second coat.

Continued on next page

Finishing Plaster—*Mortar for Smooth White Finish*—To be 1 measure of Gypsum Finishing Plaster to not more than 3 measures of perfectly slaked lime putty; the plaster and lime to be thoroughly and uniformly mixed.

Mortar for Cement Finish—To be 3 measures of Unfibered Cement Plaster to not more than 1 measure of perfectly slaked lime putty, thoroughly and uniformly mixed.

Mortar for Sand Float Finish—To be Unfibered Cement Plaster, perfectly slaked lime putty, and clean, sharp sand, thoroughly mixed in the proportions of 4 measures of plaster, 1 measure of lime, and 5 measures of sand.

Mortar of Prepared Finishes—To be made of the prepared finish mixed with water only.

Applying Finish Coat—Troweled finish coat to be applied after base coat has set and dried, the base coat to be slightly dampened to reduce suction, before finish coat is applied.

Applying Sand Float Finish Coat—The base coat to be set hard, but not dry, when finish is applied.

Care of Plaster After It Is On the Wall—In hot, dry, or windy weather, plastering is to be protected from wind, and if necessary, sprinkled with water, to prevent the plastering drying out too much before it has set. In freezing weather, plastering to be protected from frost until it has set hard. When plastering has set, doors and windows are to be kept open, so that the plastering will dry quickly.

Specifications for Plaster Boards

Boards are not to be wet before applying mortar to them.

Studs and Joists—To be set on 12- or 16-in. centers.

Spacing—Boards to be spaced ¼ in. apart with nailing edges bearing not less than ¾ in. on studs or joists, with horizontal joints in walls and joints at right angles with ceiling joists, broken at each board and with vertical joints on opposite sides of partitions not on the same studs.

Nailing—Nails to be 1¼-in., 11½ gauge, 7/8-in. head wire nails, set not more than 6 in. apart, and driven home, the center of board to be nailed first.

Pointing—The spaces between boards to be well filled with mortar, either by pointing the joints with quick setting neat mortar before the first coat of plaster is applied, or by pressing mortar used for the first coat well into the joints when the first coat is applied.

Specifications for American Gypsum Partition and Furring Tile

Work to be Done—All partitions and furring, unless otherwise specified or shown, shall be built of American Gypsum Tile as manufactured by The American Cement Plaster Co., Buffalo, N. Y., of thickness indicated on plans.

General—In fireproof construction all American Gypsum Tile shall be started with a gypsum mortar bed laid on fireproof construction. Tile courses must not be started on frozen concrete nor on cinder concrete when such is used for the purpose of fill only.

Partitions—All non-bearing partitions of American Gypsum Tile shall be laid with vertical joints broken. Such partitions shall extend from floor to ceiling, shall be wedged at the ceiling, and the joints slushed with gypsum mortar.

Intersections—All intersecting partitions shall be bonded by overlapping not less than at every third course.

Partitions intersecting brick, or other masonry walls, shall be securely anchored to such walls by means of "approved" masonry bond or metal anchors, or by 10d steel cut nails driven into the masonry joints at each gypsum tile course.

Corners—Partitions shall be bonded at the corners by overlapping alternate courses (log cabin fashion).

Furring—American Gypsum Tile furring shall be laid as herein required for partitions. All furring in contact with the construction shall be securely anchored to the masonry by means of 10d steel cut nails driven into the masonry joints at intervals not greater than every 3 ft. horizontally and vertically. Free standing furring shall be of not less thickness, nor of greater height, than is required for partitions. Metal ties or other "approved" methods for securing furring to the masonry may be used.

Bucks—*Wood*—Where wood bucks are used they shall be of not less than 2-in. lumber and of a width equal to the total thickness of the tile and plaster construction, and may or may not be rabbeted to receive the ends of the tile; or the bucks shall be of a width equal to the thickness of tile only and have not less than ½-in. grounds nailed to the sides and projecting beyond the buck not less than ¾ in., forming a rabbet to receive the ends of partition tile.

All wood bucks shall be secured to the ends of the partition tile with 10d cut nails driven into every course.

Metal—Where metal bucks are used they shall be of a width not less than the thickness of the tile construction, and of such form as to receive the ends of the tile. When the metal bucks are of a width equal to the thickness of the tile construction, furring strips of wood shall be secured to the buck as a stop for the plaster coats and for a nailing base for trim. Where metal bucks are of a width to include the total thickness of the tile and plaster construction, the trim shall be secured direct to the metal bucks or to wood nailing blocks bolted to the face of the bucks.

Lintels, Built-up—Openings in partitions of gypsum tile not more than 22 in. in width can be spanned by a gypsum tile. When such openings are more than 22 in. but not more than 4 ft. in width, the gypsum tile over the opening shall be laid in the form of a jack arch. Skew-backs shall be cut in the tile over the jambs, intermediate tile shall be beveled to fit the skew-jacks, and a key tile to fit shall be set in the center. Bevel cuts shall not be less than 4 in. to the foot. The skew-back tile shall have a bearing on the jambs of not less than 12 in. nor shall they be set so as to protect beyond the face of the jambs more than one-third of the bearing.

When jack arch construction is employed, the jack arch shall be reinforced with strips of not less than No. 14 gauge woven wire mesh not less than 2 in. in width, or the reinforcement may consist of two strips of not less than No. 24 gauge perforated metal not less than 1 in. in width. The reinforcement shall be continuous, and shall be laid in the mortar joint between the jack arch and the course immediately above, extending into the partition construction not less than 30 in. beyond the face of each jamb.

Lintels, Reinforced and Cast—Openings in partitions of gypsum tile which are more than 4 ft. but not over 6 ft. in width shall be spanned by lintels of reinforced gypsum of monolithic design.

(*a*) *Mat Reinforcement*—Mat reinforced lintels shall be 12 in. in height and shall be reinforced with a galvanized welded wire mat on each side (face) of the lintel. Each of the welded wire mats required shall consist of not less than three No. 12 gauge wires, for the full length of the lintel, spaced 5 in. on center, the bottom wire to be 1 in. from the bottom of the lintel. The longitudinal wires shall be secured to transverse wires of not less than No. 12 gauge which shall occur at not less than 9-in. intervals and shall be welded to the longitudinal reinforcement.

(*b*) *Rod Reinforcement*—Rod reinforced lintels shall be 12 in. in height and shall be reinforced with not less than two ¼-in. twisted rods for the full length of the lintel. One of the required rods shall be straight and the other sh ll be bent up for shear. The horizontal part of the reinforcement, at the bottom, shall be 1 in. from the lower face of the lintel and both ends of both rods shall, at their extreme ends, be bent so as to form an anchor within the material.

All reinforced gypsum lintels shall have a bearing on each jamb of not less than 8 in.

Lintels, Metal—Openings in partitions of gypsum tile which are more than 6 ft. in width shall be spanned by metal lintels of approved design.

All metal lintels shall provide a distributed and uniform bearing on each jamb of not less than 8 in.

Mortar—All American Gypsum Tile construction shall be laid up with a gypsum mortar composed of hydrated calcined gypsum thoroughly mixed in the proportions by weight of 1 part calcined gypsum to not more than 3 parts of clean, sharp, dry sand. Gypsum mortar shall not be retempered.

Plastering—All plastering on American Gypsum Tile shall be done with gypsum plasters applied in accordance with the architect's specifications, or the specifications of The American Cement Plaster Co. When the plaster is applied, the American Gypsum Tile surface shall be so wet that water will not be rapidly absorbed from the plaster, but not so wet that water will remain standing on the surface.

Metal Lath—Lintels or bucks of metal or wood, and vertical joints between American Gypsum Tile and other masonry construction shall be covered with strips of metal lath not less than 8 in. in width.

Trim—All wood or metal trim shall be of such design as to completely cover any junction between metal bucks or furring and the plaster coats.

Baseboards, chair rail, picture moulding and similar trim shall be secured to grounds or to nailing blocks set in the tile construction for this purpose. Nailing blocks shall be not less than ⅞ in. thick, shall be nailed directly to the end of the gypsum tile and shall be of such other dimensions as to completely cover the end of the tile. When nailing blocks are used they shall be spaced not to exceed 30 in.

Blackboards, toilet and heavy fixtures shall be secured by bolting through the tile construction, or shall be nailed to nailing blocks not less than 1½ in. thick of the character required for other trim, and spaced not to exceed 15 in.

THE AMERICAN GYPSUM COMPANY

Manufacturers of Wall Plasters and Other Gypsum Products

PORT CLINTON, OHIO

Products

WALL PLASTERS and GYPSUM PRODUCTS which include:

"Anchor," "Monarch," "20th Century" and "White Rock" (Neat) Cement Hair Fibered Plasters.

"Anchor," "Monarch," "20th Century" and "White Rock" Wood Fiber Plasters.

"20th Century" Genuine Pulp Plasters.

"Anchor," "Monarch," and "20th Century" Asbestos (Neat) Plasters.

Bond Plasters for concrete walls.

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Wall Plasters (machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Wood Fiber Plasters (machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sanded Asbestos Plasters (machine-mixed).

"Anchor," "Monarch," "20th Century" and "White Rock" Prepared Sand Finish Plasters.

"Anchor," "Monarch," "20th Century" and "White Rock" Regular Grade Plaster Paris for White Coat.

"Anchor," "Monarch," "20th Century" and "White Rock" Superfine Grade Plaster Paris for White Coat.

"Anchor" Moulding and Casting Plaster.

"20th Century" Special Prepared White Finish.

"Anchor" Gypsum Partition Blocks and Roof Tile.

Keene's Cement.

Rainbow Brand Hydrated Lime.

"20th Century" Brand Masons Lime.

Barrel Lump Lime.

"Monarch" Plaster Board.

"White Rock" Wall Board (reversible).

Location and Facilities

Centrally located in that part of the United States east of Chicago, Ill., on the main lines of the New York Central Railroad, which, with its numerous systems, lines and connection roads, enables shipment in any direction.

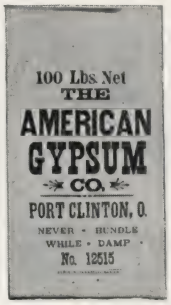
Strictly up-to-date. Electrically operated machinery and modern reinforced concrete fireproof buildings. Capacity, 700 tons per day, or 35 twenty-ton cars.

Reputation

THE AMERICAN GYPSUM COMPANY'S products have been on the market for more than ten years and their merits are well known, having been used on many of the largest buildings in our territory.

Guarantee

All these products are guaranteed to be of the best quality, and to give first class results if used in accordance with this company's instructions.



STANDARD 100-LB. SACK

"20TH CENTURY" PLASTER BAG

"MONARCH" BRAND BAG

"ANCHOR" CEMENT PLASTER BAG

Specifications for The American Gypsum Company's Cement Plasters

Grounds—To be ¾ in. for plaster boards, wood lath, wire and metal lath; ½ in. for gypsum blocks, and ⅝ in. to ¾ in. for clay tile and brick walls.

Lathing—*Wood Lath*—They should be of a good grade, free from knots, sap and bark; to be spaced not less than ¼ in. apart and well nailed with not less than two 3d lathing nails for each stud to each lath, and driven well home. Half green lath are best, as dry lath will buckle and crack plaster unless thoroughly soaked with water 8 to 10 hours before plaster is applied. Lath must have ¼-in. space between ends, and must not project through partitions.

Mortar—To be any brand of THE AMERICAN GYPSUM COMPANY'S Cement Plaster, and to be mixed and applied according to manufacturer's directions.

Directions for Mixing—Use a clean, tight box, 3½x7 ft. x 12 in. deep. The box should be thoroughly cleaned after each mixing and kept free from dirt and lumps of old plaster. Raise one end of the box about 4 in.

First put in 1 layer of sand, then 1 of plaster; hoe dry from one end of box to the other, then back again, working the sand and plaster until thoroughly mixed; now mix with water immediately. Draw the material to the high end of the box, put the water into the lower end of the box and hoe the plaster into the water. Mix water and plaster thoroughly. Mix thin at first, then add sufficient dry plaster and sand to bring to proper consistency for applying. Let the mortar stand 10 minutes after mixing with the water.

Always use clean water, free from alkali, salt and other impurities. Never wash tools in water to be used in mixing plaster; have a separate barrel of water for this purpose. Do not mix more material at one time than can be used in 1 hour. Never retemper plaster after it has commenced to set. Do not mix one gaging with another.

Sand—Use only clean, sharp sand free from loam, dirt or frost. Use sand which passes through a 10-mesh and remains on a 30-mesh sieve. Avoid quicksand.

Quantity—When using AMERICAN GYPSUM COMPANY'S Cement Plasters on plaster board and wood lath, mix 2 parts by weight of clean, sharp, dry sand and 1 part of plaster. For brick, clay tile, or gypsum blocks, mix 3 parts by weight of clean, sharp, dry sand with 1 part of plaster. For metal lath or expanded metal, use 1½ parts to 2 parts clean, sharp, dry sand by weight, to 1 part of plaster.

General Instructions for Applying—*Plaster Board*—First fill all joints between the boards. When this is set, apply the base of browning coat, filling out to grounds and darbying to a straight and even surface, ready to receive finish coat. Darby lightly and use water sparingly. Do not wet boards before applying plaster.

Wire and Expanded Metal Lath—Apply a scratch coat lightly, covering the lath and filling meshes. After the scratch coat has set hard, but before it is dry, apply the second coat, bringing it to a straight and even surface with rod and darby, ready to receive the finish coat. Darby lightly and use water sparingly.

On Wood Lath—If lath are dry, soak thoroughly; give them all the water they will take. This should be done 8 to 10 hours before applying plaster, so that lath will have a chance to swell and buckle.

Continued on next page

This will prevent their doing so after plaster is applied and insure a first class hard wall, which is often lacking where plaster is applied to dry lath.

Lay plaster on, using sufficient pressure to force through lath and form a good key and fill up grounds as the work progresses. Darby lightly, so as not to force mortar through lath spaces, and use water sparingly. Never apply at one time more than can be darbied before material begins to set.

On Brick, Tile or Gypsum Block Walls—First soak walls thoroughly to reduce the suction; apply sufficient mortar to fill out the grounds, bring to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

Specifications for The American Gypsum Company's Wood Fiber Plasters

Grounds—Same as specified for Neat Cement Plasters.

Lathing—Same as specified for Neat Cement Plasters.

Mortar—To be any brand of The American Gypsum Company's Wood Fiber or Genuine Pulp Plasters, and to be mixed and applied according to manufacturer's directions. Only water is to be added to this plaster in sufficient quantity to temper to proper consistency for applying to walls, and under no circumstances will contractor be allowed to add sand or other solid material.

Note: Wood Fiber is also manufactured under a special formula, allowing the use or addition of sand on the job in proportions of equal parts sand by weight, which makes a good hard wall, but not as good as the Wood Fiber used without sand.

Directions for Mixing and Applying—First put water in box, then throw in such amounts of Wood Fiber Plaster as could be used in about 1 hour, spreading it out so the water can soak in. Allow the plaster to soak for 10 or 15 minutes without mixing. This is necessary, owing to the fact that this plaster requires lots of water, and if not allowed to soak it will mix hard and also work hard. After this period of soaking has elapsed, hoe the material back and forth thoroughly, adding sufficient water to bring mortar to right consistency for application; and if before mortar is all used up it becomes too stiff in the box, re-temper with water.

By observing these instructions, plaster will work much easier and give the best results. General directions for applying are the same as given for Neat Cement Plasters.

Specifications for The American Gypsum Company's Prepared Wall Plasters

Grounds—Same as specified for Cement Plasters.

Lathing—Same as specified for Cement Plasters.

Mortar—To be any brand of The American Gypsum Company's Prepared Wall Plasters, and to be applied according to the manufacturer's direction.

Directions for Mixing and Applying—Nothing but water to be added to this plaster, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

Put plaster in raised end of box and water in low end. Hoe plaster into water, mixing thoroughly. Mix thin at first, as this permits free chemical action and prevents lumps forming. Add sufficient dry plaster to bring to proper consistency for application. The best results are obtained by allowing mortar to stand 10 or 15 minutes after mixing.

Note: Pelee Island, Lake Erie, sand is used in all brands of Prepared Plasters; conceded to be the best plastering sand in this territory. It is dried, then graded and blended to insure uniform grade, accurately weighed to insure proper quantities, and mechanically mixed to insure proper distribution with plaster.

Covering Capacity of The American Gypsum Company's Plasters

The depth of grounds, uniform thickness of plaster, the skill of the mechanic, and the many different kinds of walls to which plaster is applied necessarily affect the amount of square yards of surface 1 ton of plaster will cover. But for estimating purposes and for general average results 1 ton of cement plaster with 2 parts sand added, when applied to wood or metal lath, will cover 200 yds.; and with 3 parts sand added, on brick, tile or gypsum block, will cover 200 yds.

Wood fiber and Genuine Pulp Plasters will average 220 yds. per ton. Prepared, ready mixed, sanded plasters will average 60 to 70 yds. per ton; and under favorable conditions either kind will cover 25% more.

Specifications for The American Gypsum Company's Prepared Sand Float Finish

Finish to be any brand of The American Gypsum Company's Prepared Sand Finishes, and to be mixed and applied according to the directions of the manufacturer. This finish is prepared so that nothing but water need be added, and under no circumstances will contractor be allowed to mix sand or other solid matter.

Directions for Mixing—Same as for Prepared Plaster.

General Directions for Applying—The best results are obtained with float finish, by first allowing base coat to set firm and hard and while still green apply finish, which should be done in about 12 hours after base coat is put on.

Lay on with a trowel, and then use cork carpet or felt float, working material to a true and even surface, free from float marks and cat-faces. Use as little water as possible while floating, to avoid killing surface of finish. Best to use only a damp brush. Never attempt to float after finish commences to or has set.

Specifications for The American Gypsum Company's Prepared Trowel Finish

Trowel finish to be The American Gypsum Company's "20th Century" Special White Finish, and to be mixed and applied according to the directions of the manufacturer. These finishes are prepared so that nothing but water need be added, and under no circumstances will contractor be permitted to add sand or any other solid materials.

Directions for Mixing—Mixing box and board to be perfectly clean, and clear water used in mixing. Place finish in high end of box and water in low end. Hoe finish into water and mix fairly thin, and allow to stand for 4 or 6 hours before using. If stiff when ready to use, thin by adding water, and mix same thoroughly to the proper consistency and carry in buckets.

General Directions for Applying—Base coat must be thoroughly dry before applying finish, so that any cracks will be filled with finish. If suction is too strong, sprinkle or brush with water. Apply surface in 3 coats. For first coat apply enough finish to cover surface filling, using it very thin, and press it firmly on base coat. Allow this to dry a few minutes to prevent blistering, then apply the second coat, bringing surface up level; then apply third coat, using material thin as can be handled on the hawk and fill in the cat-faces and imperfections. After finish has stiffened sufficiently for troweling, trowel to a smooth surface, using water sparingly.

Note: "20th Century" Finish, like Keene's Cement, can not be killed by mixing or working after it commences to set. In fact, it can be broken down as often as desired, and each time done it improves its working qualities. It makes a very white, uniform color and is exceptionally hard. It can be blocked off to imitate tile if desired. When walls are dirty, can be washed with clean water. Pronounced by mechanics the best Prepared Finish on the market.

Specifications for The American Gypsum Company's Bond Plaster

Undressed lumber should be used for concrete forms, so that walls will be left rough. Paraffin or oil should never be used on forms. Concrete walls must be thoroughly dry and never contain frost. All dust must be removed; also any oil, greases or paraffin before plaster is applied.

Grounds—To be on side walls ⅝ in. and on ceilings of sufficient thickness to bring on an even surface.

Mortar—To be The American Gypsum Company's Bond Plaster for concrete walls, to be mixed and applied in accordance with the instructions of the manufacturer's expert, who will be on the ground when the job is started, to personally inspect the work and consult with architect and contractor.

Anchor Solid Reinforced Gypsum Roof Tile

These are made of the same material as the hollow gypsum blocks and are reinforced with special mesh reinforcing material. The lightest roofing material on the market, which very naturally reduces weights and cost of steel roof supports.

They are the most effective fire resistant known. Will not disintegrate, and also prevent condensation or sweating, which is so objectionable in all factory buildings; neither will they transmit heat to interior of building. Such a combination makes them an ideal material for roof decks. Unskilled labor can be used in

Continued on next page

erection. These tiles are made plain white or dampproof black. Sizes are all standard, 29½ in. long, and have T-iron supports placed 30 in. on center.

Anchor gypsum roof tile made in the following sizes:

2x12x29½ in.—reinforced weight per sq. ft., 10 lbs.
3x12x29½ in.—reinforced weight per sq. ft., 13¼ lbs.

Anchor Hollow and Solid Gypsum Blocks

Are made of pure calcined gypsum. They are very light, but are tough. They have been approved by the underwriters; are fireproof, verminproof and practically soundproof. They are rapidly being recognized as the nearest to the ideal material for partitions and wall furring known, and are filling a long felt want of architects and engineers for a material that possesses such qualities; and, in addition, are so light that they make material reductions in building loads.

ANCHOR GYPSUM BLOCKS

Size	For ceiling heights up to	Weight of block, per sq. ft., lbs.	Weight of mortar, per sq. ft., lbs.	Weight of plaster one side, per sq. ft., lbs.	Total weight of partition plastered one side, per sq. ft., lbs.	Weight of plaster two sides, per sq. ft., lbs.	Total weight of partition plastered two sides, per sq. ft., lbs.
1½-in. split	Furring	5.6	1.25	3.5	9.8	.....	.....
2 -in. split	Furring	7	1.25	3.5	11.05	.....	.....
2 -in. solid	Vents	10.2	1.25	3.5	13.95	7	17.45
3 -in. hollow	13 ft.	11.2	1.9	3.5	15.5	7	19
3 -in. solid	15 ft.	15	1.9	3.5	18.9	7	22.4
4 -in. hollow	17 ft.	14	2.5	3.5	18.6	7	22.1
5 -in. hollow	20 ft.	17	3.1	3.5	21.9	7	25.4
6 -in. hollow	30 ft.	19.4	3.75	3.5	24.7	7	28.2
8 -in. hollow	40 ft.	22.6	5.00	3.5	28.8	7	32.3

Specifications for Anchor Gypsum Blocks

Partitions—Partitions to be American Gypsum Company's Anchor Gypsum Block of thickness shown; all to be started on fireproof floor, and block set plumb and true so that not over ⅝ in. of plaster on the average will be required. Partitions to be wedged at ceiling and slushed in with mortar. All blocks to be laid in mortar composed of American Gypsum Company's Cement Plaster, 1 part of plaster to 3 parts clean, sharp sand, thoroughly mixed, or American Gypsum Company's ready mixed Gypsum Block Mortar. Portland cement or lime mortar is prohibited. All block shall be laid with full flush joints not exceeding ½ in. in thickness.

Pipe Shafts, Heating and Vent Ducts—Pipe shafts, heating and vent ducts to be of 2-in. solid Anchor Gypsum Block. Heating ducts, where galvanized iron is not used, to be plastered ½ in. thick on the inside with gypsum mortar applied as the work progresses. All vent ducts to be smooth on the inside.

Furring—Outside walls to be furred with Anchor Furring Tile of thickness shown. For close furring, set inside of block ½ in. from face of outside wall and secure same to wall every square yard with 10d nails embedded in the mortar joints. Free standing furring shall be standard partition block of thickness indicated.

Lintels—Unless otherwise specified, block over all openings to be laid in jack arches with key or of Anchor Gypsum Lintels with steel reinforcement according to width of opening.

Column and Girder Protection—All interior columns and exposed girders to be covered with Anchor Gypsum Block as per details. All corners shall be alternately bonded and have galvanized wall tiles in each joint; mortar to be same as specified for partitions.

Insert in Carpenter's Specifications—The carpenter contractor shall set all rough bucks required for openings and keep ahead with his work so as to cause no delay. Bucks to be kept plumb and true by the carpenter contractor until partitions are built and to be the thickness of partition block. Plastering grounds to be placed on all rough frames as per details. Where nailing blocks are required for base, chair rail, blackboard, or picture mould, ⅞-in. blocks 12 in. high and the thickness of the partitions shall be nailed to ends of partition block by the carpenter contractor.

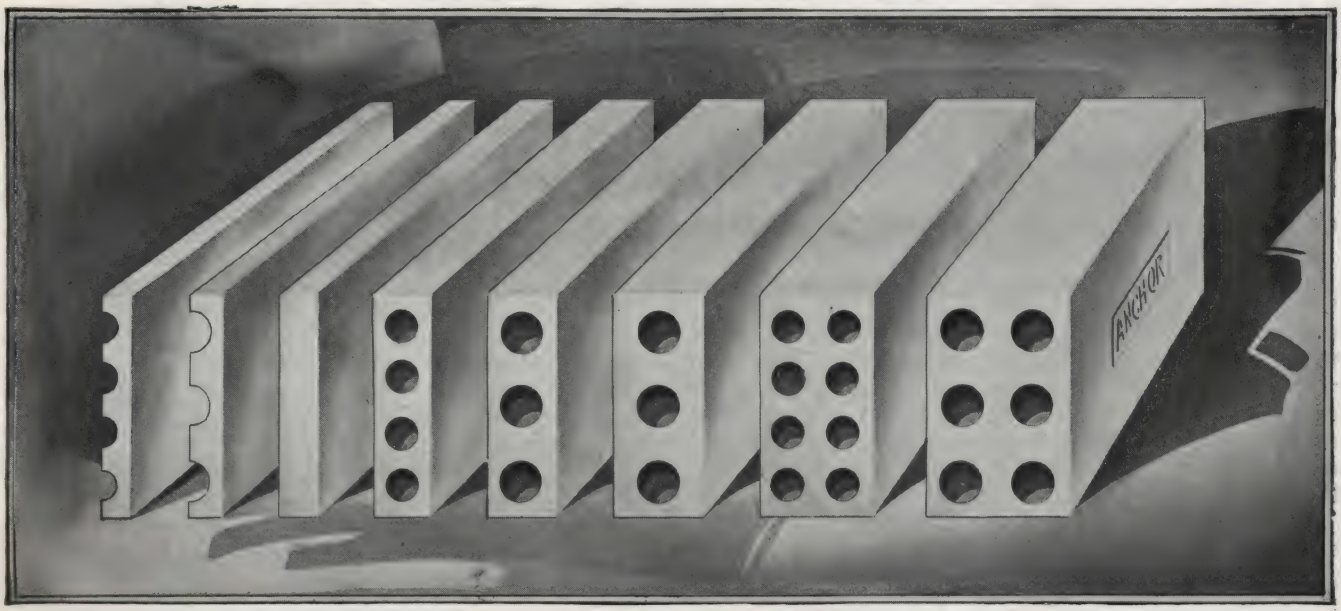
Insert Under Plastering Specifications—Where wood, pipes, or ducts are not completely enclosed in the partition, cover them with a strip of metal lath extending 4 in. on the partition at both sides. Where partitions abut steel or concrete columns, brickwork or other material in the same plane, cover the joint with a strip of metal lath extending 4 in. on each side of joint. At all rough bucks or openings, place a strip of metal lath securely fastened to the buck and extending 4-in. on to partition. Secure to buck and partitions with staples.

Suggestions for Insertion Under Tile and Marble Work—Before applying portland cement plaster, cover the gypsum walls with any standard brand of waterproof paint or apply 2 coats of thin portland cement grout. For places where waterproofing the gypsum is not necessary, a satisfactory mechanical bond may be obtained by boring holes in the gypsum block 9 in. on centers or toe nailing large headed nails 9 in. apart.

References

The American Gypsum Company's products have been used on many of the largest buildings erected in the Central States territory in the last ten years, by the United States, state and municipal governments, and other public, fraternal and private interests.

Complete classified list will be mailed on request.



Various Forms and Thicknesses of Anchor Gypsum Blocks

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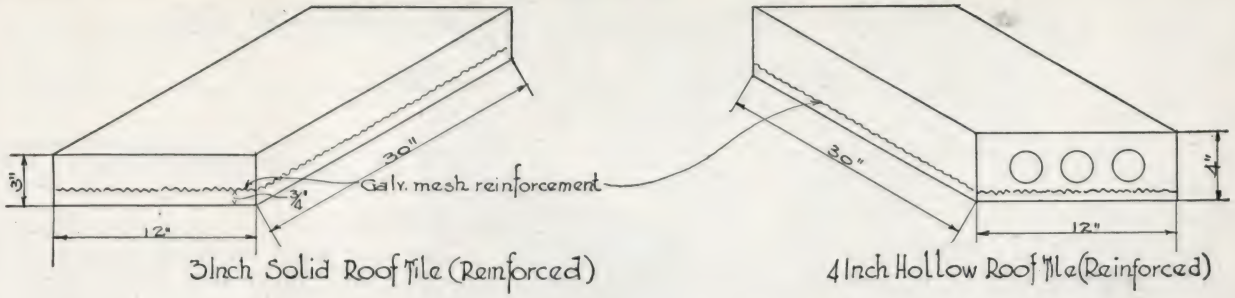
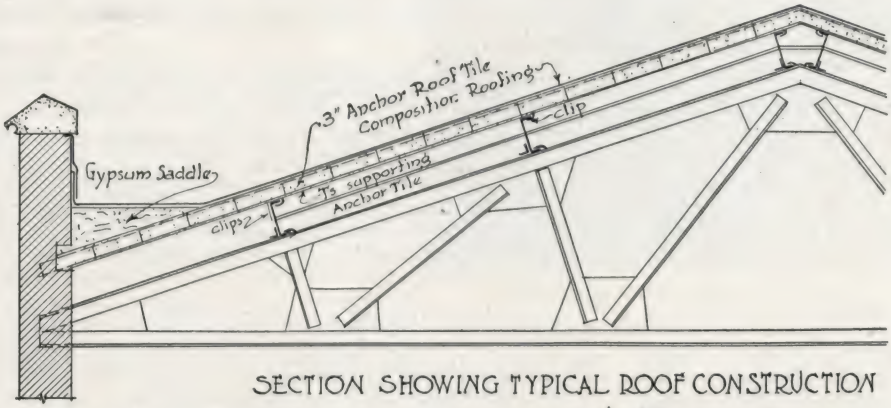
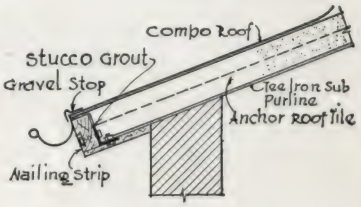


3 Inch Solid Roof Tile (Reinforced)

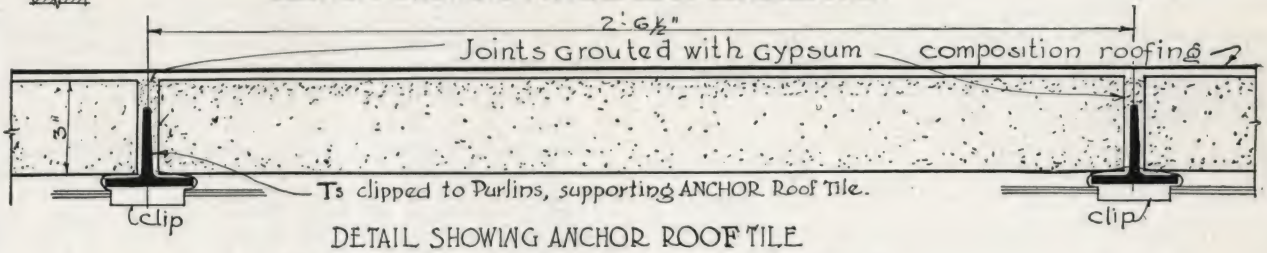
4 Inch Hollow Roof Tile (Reinforced)



SECTION SHOWING TYPICAL ROOF CONSTRUCTION

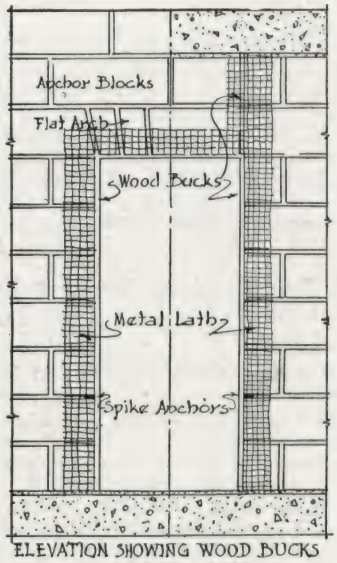


SECTION THROUGH EAVE

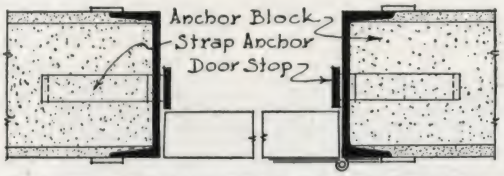


DETAIL SHOWING ANCHOR ROOF TILE

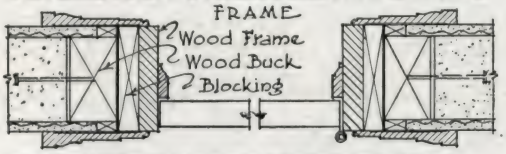
DETAIL OF ROOF CONSTRUCTION



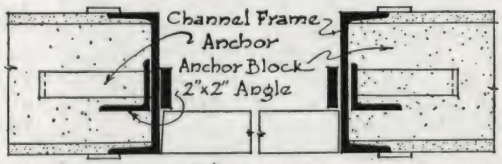
ELEVATION SHOWING WOOD BUCKS WITH METAL LATH.
ONE-HALF SHOWING FLAT ARCH AT HEAD
ONE-HALF SHOWING BUCK EXTEND'G TO CEIL'G.



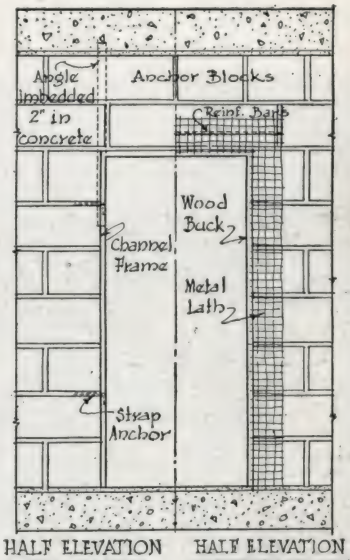
CONSTRUCTION AT FIRE DOORS WITH CHANNEL FRAME



CONSTRUCTION AT DOORS WITH WOOD BUCKS



DETAIL SHOWING 2"x2" ANGLES ATTACHED TO CHANNEL FRAME



HALF ELEVATION WITH CHANNEL IRON FRAME.

HALF ELEVATION SHOWING WOOD BUCK WITH METAL LATH & REINF. GYPSUM LINTEL

DETAILS OF DOOR CONSTRUCTION

The American Gypsum Co.
Port Clinton, Ohio.

DETAILS OF GYPSUM ROOF & GYPSUM BLOCK PARTITION.

Sheet No. 1
July 18, 1921.

ESTABLISHED 1889

THE BEST BROS. KEENE'S CEMENT CO.

MEDICINE LODGE, KANS.

BRANCH OFFICES

NEW YORK, N. Y., 8 West 40th Street — CHICAGO, ILL., 1558 Conway Building

Products

Manufacturers of BEST BROS. KEENE'S CEMENT.

Grades of Cement

Best Bros. Keene's "Regular," for general plastering purposes.

Best Bros. Keene's "Fine," for wainscots, columns and extra white finish; also, for caen stone finish, and for backing artificial marble.

Best Bros. Keene's "Superfine," for facing artificial marble.

Best Bros. Keene's "Quickset," for castings and mouldings.

Description

The various grades of Best Bros. Keene's Cement are manufactured from the only pure gypsum so far found in the United States. The purity of this gypsum has been determined by analysis of the United States Geological Survey and Bureau of Standards.

Best Bros. Keene's Cement has been manufactured in the United States since the year 1889.

Advantages

Best Bros. Keene's Cement forms absolutely the hardest and whitest wall it is possible to obtain, and can be troweled to a marblelike finish.

It is non-resonant, fireproof and sanitary.

Best Bros. Keene's Cement is entirely free from acid, and will not affect the most delicate colors.

STRAND THEATER, NEW YORK, N. Y.
THOMAS W. LAMB, Architect

All ornamental work on the sidewalls of the lobby, on the proscenium jambs and around the proscenium boxes was executed in Best Bros. Keene's Cement

Specifications

The following specifications are alternative. The first form may be employed when hydrated lime is used in the mixture, and the second form when lump lime is used.

No. 1 Specifications for Best Bros. Keene's Cement with Hydrated Lime

Three-coat Work on Wood or Metal Lath—

(A) Scratch Coat—Shall consist of equal parts of dry hydrated lime and Best Bros. Keene's "Regular" in proportions of 1 cu. ft. of hydrated lime, 1 cu. ft. of Best Bros. Keene's "Regular" and not to exceed 5 cu. ft. of sand, in which shall be thoroughly and evenly incorporated plenty of good, well-beaten, water soaked, long, winter slaughtered cattle hair.

(B) Brown Coat—Shall consist of equal parts of dry, hydrated lime and Best Bros. Keene's "Regular" in proportions of 1 cu. ft. of hydrated lime, 1 cu. ft. of Best Bros. Keene's "Regular" and not to exceed 7 cu. ft. of sand.

(C) Finish Coat—Shall be mixed in the proportions of 400 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry hydrated lime.

Two-coat Work on Tile and Brickwork—

Brown Coat—Use brown coat (B), omitting scratch coat.

Finish Coat—Shall be mixed in proportions of 400 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry, hydrated lime.

One-coat Work on Concrete—

Finish Coat—Shall be mixed in proportions of 400 lbs. Best Bros. Keene's "Regular" and 100 lbs. of dry, hydrated lime.

Alternative Finishes—

Smooth, Hard Finish—For bathroom wainscots and similar work.

Use Best Bros. Keene's "Regular" neat. No lime to be added. If an extra fine white finish is desired, use Best Bros. Keene's "Fine."

Sand Float Finish—Shall consist of equal parts of dry hydrated lime and Best Bros. Keene's "Regular" in proportions of 1 cu. ft. of hydrated lime, 1 cu. ft. of Best Bros. Keene's "Regular" and not to exceed 7 cu. ft of sand.

No. 2 Specifications for Best Bros. Keene's Cement with Lump Lime

Three-coat Work on Wood or Metal Lath—

(A) Scratch Coat—Shall be mixed in the following proportions: To 1 barrel of lime paste add 3 barrels of sand and plenty of good, well-beaten, water soaked, long, winter slaughtered cattle hair. Gage each cubic yard of this mixture with 3 bags of Best Bros. Keene's "Regular" of 100 lbs. each. Keene's Cement and sand to be mixed dry before adding lime paste.

(B) Brown Coat—To 1 barrel of lime paste add 4 barrels of sand, and gage each cubic yard of this mixture with 3 bags of Keene's Cement, as above. Keene's Cement and sand to be mixed dry before adding lime paste.

(C) Finish Coat—To each 100 lbs. of Best Bros. Keene's "Regular" add 60 lbs. of lime paste.

Continued on next page

Two-coat Work on Tile and Brickwork—

Brown Coat—Use brown coat (B), omitting scratch coat.

Finish Coat—To each 100 lbs. of Best Bros. Keene's "Regular" add 60 lbs. of lime paste.

One-coat Work on Concrete—

To each 100 lbs. of Best Bros. Keene's "Regular" add 60 lbs. of lime paste.

Alternative Finishes—

Smooth, Hard Finish—For bathroom wainscots and similar work.

Use Best Bros. Keene's "Regular" neat. No lime to be added. If an extra fine white finish is desired, use Best Bros. Keene's "Fine."

Sand Float Finish—To 1 barrel of lime paste add 4 barrels of sand, and gage with 3 bags of Best Bros. Keene's "Regular" of 100 lbs. each. Keene's Cement and sand to be mixed dry before adding lime paste.

Brick and Tile Surfaces—

All brick and tile surfaces shall be thoroughly broomed off and washed before the mortar is applied, and shall be damp when it is applied.

Concrete Surfaces—

Concrete or cement surfaces shall be washed and scrubbed with a steel brush so as to remove all dust and loose particles. The surface shall then be thoroughly washed with a 10% solution of muriatic acid in water. The concrete must be thoroughly dampened while the plaster is applied. The one-coat finish plaster applied to this shall be a thin coat thoroughly troweled and worked into the surface of the concrete to make adhesion perfect.

Lime—

Hydrated lime shall be soaked in watertight boxes for at least 12 hours before using.

Lump lime shall be prepared and run through a fine sieve, $\frac{1}{8}$-in. mesh, and properly stored and protected for a sufficient time before using, to insure all particles being thoroughly slaked.

ST. ADALBERT'S CHURCH, CHICAGO, ILL.
HENRY J. SCHLACKS, Architect
Best Bros. Keene's Cement used for wainscot and decorative plaster

References

A partial list of important buildings (and their architects) in which Best Bros. Keene's Cement has been used:

New York State Educational Building, Albany, N. Y., Palmer & Hornbostel
United States Penitentiary, Atlanta, Ga., Eames & Young.
State Asylum, Bangor, Me., J. Calvin Stevens
Country Club, Birmingham, Ala., Miller & Martin
Hillman Hospital, Birmingham, Ala., Chas. Wheelock & Son
Massachusetts Institute of Technology, Boston, Mass., W. W. Bosworth
Albright Art Gallery, Buffalo, N. Y., Green & Wicks
Buffalo Historical Society Building, Buffalo, N. Y., Geo. Cary
Victor Building No. 2, Camden, N. J., Ballinger & Perrot
J. Ogden Armour Residence, Chicago, Ill., Arthur Heun
H. McCormick Blair Residence, Chicago, Ill., Arthur Heun
Capitol Theater, Chicago, Ill., Rapp & Rapp
Chicago & North Western Station, Chicago, Ill., Frost & Granger
City Hall Building, Chicago, Ill., Holabird & Roche
Daily News Sanitarium, Chicago, Ill., Perkins, Fellows & Hamilton
Public Library, Chicago, Ill., Shepley, Rutan & Coolidge
First National Bank, Cleveland, Ohio, J. Milton Dyer
New City Hall, Cleveland, Ohio, J. Milton Dyer
St. Luke's Hospital, Cleveland, Ohio, F. W. Striebinger
Missouri State Library, Columbia, Mo., Jas. P. Jamieson
Ohio National Bank, Columbus, Ohio, Richards, McCarty & Bulford
Henry Ford Residence, Dearborn, Mich., W. H. Van Tine
Henry Ford Hospital, Detroit, Mich., Albert Wood
New Terminal Station, Detroit, Mich., Reed & Stem, and Warren & Wetmore
State Library and Supreme Court, Hartford, Conn., Donn Barber
State Capitol, Jackson, Miss., Theo. C. Link
Kansas City Star Building, Kansas City, Mo., Jarvis Hunt
R. A. Long Residence, Kansas City, Mo., Henry F. Hoit
New Union Station, Kansas City, Mo., Jarvis Hunt
H. W. Hellman Building, Los Angeles, Cal., A. S. Rosenheim
First National Bank, Lynchburg, Va., Lewis Burnham
State Capitol, Madison, Wis., Geo. B. Post & Son
Jewish Hospital, Memphis, Tenn., Schmidt, Garden & Martin
C. S. Pillsbury, Minneapolis, Minn., Hewitt & Brown
Provincial Mental Hospital, Mt. Coquitlam, B. C., H. S. Griffith
Astor Court Apartments, New York, N. Y., Chas A. Platt
Fifth Avenue Office Building, New York, N. Y., Maynicke & Franke
Gimbel Bros. Building, New York, N. Y., D. H. Burnham & Co., and Clinton & Russell.
Grand Central Terminal, New York, N. Y., Reed & Stem, and Warren & Wetmore
Hudson Terminal Building, New York, N. Y., Clinton & Russell
Lord & Taylor Store, New York, N. Y., Starrett & Van Vleck
Montefiore Home for Jewish People, New York, N. Y., Buchman & Fox
National City Bank, New York, N. Y., McKim, Mead & White
New York Subway Extensions, New York, N. Y., Public Service Commission
Rialto Theater, New York, N. Y., Thos. W. Lamb
Ritz-Carlton, New York, N. Y., Warren & Wetmore
United States Naval Station, North Chicago, Ill., Jarvis Hunt
University of Pennsylvania, Philadelphia, Pa., Cope & Stewardson
Wanamaker Building, Philadelphia, Pa., D. H. Burnham & Co.
National Bank of Pennsylvania, Pittsburgh, Pa., Geo. S. Orth & Bro.
St. Francis Hospital, Pittsburgh, Pa., S. F. Heckert
Western National Bank, Pittsburgh, Pa., Geo. S. Orth & Bro.
City Hall Building, Portland, Me., Carrére & Hastings
First National Bank, Roanoke, Va., John K. Peebles
Adolphus Busch, St. Louis, Mo., Widmann, Walsh & Boisselier
Grover Cleveland High School, St. Louis, Mo., W. B. Ittner
Convent of the Sacred Heart, St. Louis, Mo., J. H. McNamara
St. John's Hospital, St. Louis, Mo., Barnett, Haynes & Barnett
Washington University, St. Louis, Mo., Cope & Stewardson
New Palace Hotel, San Francisco, Cal., Trowbridge & Livingston
State Capitol, Sante Fé, N. M., I. H. & W. M. Rapp
Sacred Heart Hospital, Spokane, Wash., Albert Held
Hotel Kimball, Springfield, Mass., Samuel Green, Inc.
Bank of Topeka, Topeka, Kan., J. C. Holland
Santa Fé General Office Buildings, Topeka, Kan., Root & Siemens
Rensselaer Polytechnic Institute, Troy, N. Y., Lawlor & Haase
National Museum, Washington, D. C., Hornblower & Marshall
United States Senate Office Building, Washington, D. C., Elliott Woods, and Carrére & Hastings
University Club, Washington, D. C., Geo. Oakley Totten, Jr.
Zoological Laboratories, West Philadelphia, Pa., Cope & Stewardson

EBSARY GYPSUM COMPANY, INC.

171 Court Street

ROCHESTER, N. Y.

OFFICES

NEW YORK, N. Y., 140 West 42nd Street
PHILADELPHIA, PA., 4816 North 12th Street
TORONTO, ONT., 81 Victoria Street
BOSTON, MASS., 161 Summer Street
MONTREAL, QUE., New Birks Building

Products

EBSARY GYPSUM PLASTER: Ebsary Brand, Arrow Brand and Victory Brand.
EBSARY GYPSUM PARTITION TILE.
EBSARY GYPSUM ROOF TILE.
EBSARY GYPSUM FLOOR TILE.

Ebsary Gypsum Plaster

Made in two grades—Cement Plaster and Wood Fibered Plaster.

Shipped in 100-lb. jute sacks and 80-lb. paper sacks.

Ebsary Cement Plaster is ready to be used on the building when mixed with clean, sharp sand and water, in accordance with the instructions on the tags attached to each sack.

Ebsary Wood Fibered Plaster is prepared especially for the trade which prefers this type of plaster, and is made to be used neat or with the addition of sand as desired by the plasterer.

Either of these plasters, when properly mixed and applied, will make a tough, dense plastered wall free from cracks and soft spots; they will adhere perfectly to brick, terra cotta or gypsum tile walls and to plaster board, metal lath or wood lath partitions and ceilings.

These plasters are particularly free from impurities and are smooth working and easy to apply. They will carry as much sand and will cover as much surface as any other gypsum wall plaster.

Ebsary Gypsum Partition Tile

These tile are made in accordance with standards established by the National Board of Fire Underwriters and subject to their inspection.

They are fireproof, soundproof, light in weight, easy and economical to install and are the best material made for the construction of fireproof partitions, wall furring and column covering in buildings of the highest type.

They are made in the following sizes, the table also showing weight per square foot and the sizes best suited to various ceiling heights.

EBSARY GYPSUM PARTITION TILE

Size	Weight per sq. ft.	Height
2-in. solid	10.5 lbs.	11 ft.
3-in. hollow	11 lbs.	11 ft.
3-in. solid	14 lbs.	Skylight curbs
4-in. hollow	14 lbs.	18 ft.
5-in. hollow	16 lbs.	20 ft.
6-in. hollow	21 lbs.	22 ft.
8-in. hollow	25 lbs.	30 ft.

All tile are 12 in. x 30 in. in size and their area is 2½ sq. ft.

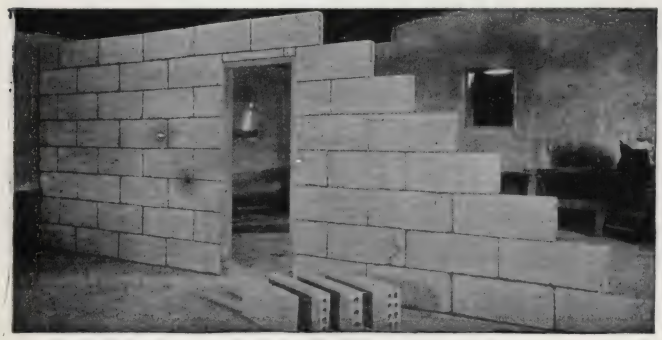
Ebsary gypsum partition tile in the 3-in. solid size are made especially for sound deadening purposes. They were selected for use in the new $3,000,000.00 Eastman School of Music in Rochester after a series of tests lasting six months. These tests were made to show the comparative soundproofing qualities of the various types of gypsum, terra cotta, metal lath and other fireproof partitions and they proved that Ebsary gypsum partition tile are unquestionably the best material for that purpose.

Ebsary Gypsum Roof Tile

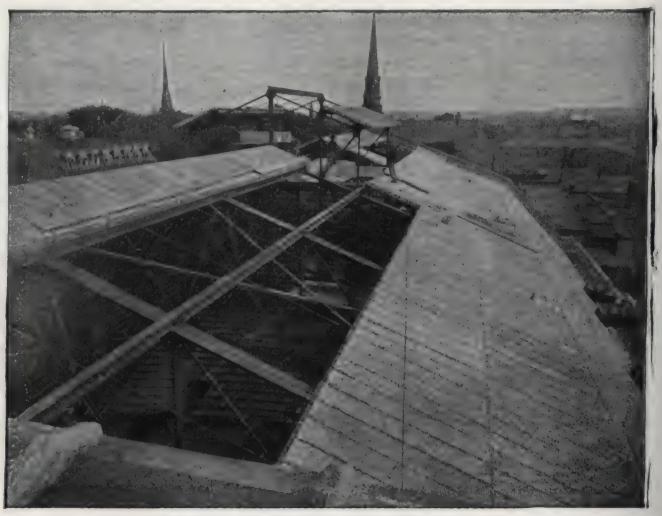
These roof tile are solid, and are 4 in. thick, 15 in. wide and made in any length up to 7 ft. to fit the spacing of steel roof purlins.

Each tile is reinforced with three cold-rolled steel channel irons placed longitudinally in the tile and the size of these channels is increased as required by the length of the span and the weight to be carried.

In general, these tile are designed to carry a live load of 50 lbs. per sq. ft. figuring a factor of safety of 4.



EBSARY GYPSUM PARTITION TILE



EBSARY GYPSUM ROOF TILE

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These tile are laid dry on the steel purlins and all joints are filled with gypsum mortar and the joints are pointed on the lower side, making a smooth, level ceiling.

They are particularly adapted for the roof construction of churches, theaters, industrial buildings, garages and power plants as, due to the fact that gypsum is a non-conductor of heat and cold, they prevent any condensation on the lower surface of the roof. This eliminates any damage by moisture to the decorated suspended ceilings in theaters or to valuable machinery and manufactured articles in factories.

Ebsary gypsum roof tile are also made in the 12-in. x 30-in. size, 3 in. thick and reinforced with wire mesh, for use in roof construction in conjunction with tee-irons.

Ebsary Gypsum Floor Tile

These floor tile are made to meet the increasing demand for a gypsum tile filler to be used in connection with reinforced concrete joist construction for long span floors in fireproof buildings.

The advantages of this type are that the tile are light in weight, easily installed and give a level ceiling of gypsum to plaster upon, and they do away with the necessity for installing metal lath ceilings.

On account of the insulating qualities of gypsum, they tend to prevent the freezing of the concrete in winter time, enabling it to get its proper set more quickly.

These tile are made in two widths, 20 and 16 in., so that the concrete joists may be spaced either 24 or 20 in. on centers, and are 6, 8, 10 and 12 in. in thickness.

Ebsary Gypsum Floor Tile

The following tables give the total weight per square foot of the floor construction in place, including 2 in. of concrete over the top of the tile and 4-in. concrete joists between the tile, also the cubic feet of concrete per square foot of floor area and the square feet of tile per square foot of floor area.

Soffit tile made of gypsum board are supplied to cover the bottom face of the concrete joists so that all plastering is applied to gypsum and not to alternate sections of gypsum and concrete.

EBSARY GYPSUM FLOOR TILE

Joists Spaced 24 in. on Centers

Size	Weight of floors	Concrete	Tile
6 in.	54.4 lbs.	.266 cu. ft.	.80 sq. ft.
8 in.	62.4 lbs.	.300 cu. ft.	.80 so. ft.
10 in.	71.2 lbs.	.333 cu. ft.	.80 sq. ft.
12 in.	78.7 lbs.	.366 cu. ft.	.80 sq. ft.

Joists Spaced 20 in. on Centers

6 in.	57.0 lbs.	.290 cu. ft.	.75 sq. ft.
8 in.	66.0 lbs.	.330 cu. ft.	.75 sq. ft.
10 in.	75.75 lbs.	.375 cu. ft.	.75 sq. ft.
12 in.	85.5 lbs.	.420 cu. ft.	.75 sq. ft.

SIZES AND WEIGHTS OF EBSARY GYPSUM FLOOR TILE

Size of tile	Weight per sq. ft.
6 by 20 by 21 in.	20 lbs.
8 by 20 by 21 in.	25 lbs.
10 by 20 by 21 in.	30 lbs.
12 by 20 by 21 in.	35 lbs.
6 by 16 by 21 in.	20 lbs.
8 by 16 by 21 in.	25 lbs.
10 by 16 by 21 in.	30 lbs.
12 by 16 by 21 in.	35 lbs.

Information

For further information regarding any of the foregoing products, communicate with the main office or the nearest sales office.

Large quantities of Ebsary gypsum tile are always carried at the mills in New York State and the Province of Ontario, so that immediate shipments may be made anywhere in the Eastern United States and Canada.

During the past 10 years the products of the Ebsary Gypsum Company, Inc. have been successfully used in buildings of the highest type of construction. These buildings include some of the best hotels, apartment houses, colleges, public schools, churches, theaters, industrial buildings and residences in this country and Canada.

Prices, details and suggestions will be gladly given upon application.

This company is also thoroughly organized to take contracts for the complete installation of Ebsary gypsum partition tile and Ebsary gypsum roof tile.

GRAND RAPIDS PLASTER COMPANY

Manufacturers of Wall Plasters and Other Gypsum Products
Sales Agent for Sackett Plaster Board

GRAND RAPIDS, MICH.

Products

G. R. P. Gypsum Plasters (Hard Wall Plasters):
Gypsum Wood Fiber Plaster.
Gypsum Hair Fibered Plaster.
Finishing Plasters.
Sackett Plaster Board.
Also Climax Wall Board.

G. R. P. Gypsum Plasters (Hard Wall Plasters)

The basic material of G. R. P. gypsum plasters, commonly known as hard wall plasters, is pure gypsum rock from this company's own Central Michigan mines. This rock is placed in heavy crushers and ground into flourlike particles. It is then scientifically calcined to partially expel the water, producing *straight calcined gypsum.*

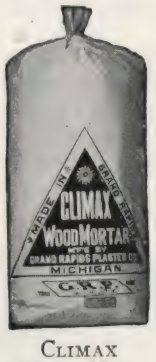
Gauging water added to this material causes crystallization into the same form as the material possessed before calcination, in other words into hard rock. Straight calcined gypsum, however, sets in a very few minutes. Retarder is added to control the set, and other materials, such as wood fiber and hair, are incorporated to permit proper application to the surfaces to be plastered.

Advantages—Among the advantages gained by the use of G. R. P. gypsum plasters are uniformity in strength and quality, extra hardness and toughness, freedom from pitting, saving in time in making and drying, less weight and moisture in the building and great resistance to the action of fire.

Classes—G. R. P. gypsum plasters for base coats are made in two classes: gypsum wood fiber plaster and gypsum hair fibered plaster.

G. R. P. Gypsum Wood Fiber Plaster

This product is manufactured by mixing this company's scientifically calcined gypsum with wood fiber and other materials by a special process. It contains no sand and no sand should be put into it. There is nothing to add but water. It is therefore especially recommended for localities where good sand is difficult to obtain.



Climax Wood Mortar Bag

The wood fiber adds a third to the bulk of the plaster, giving it a correspondingly greater covering capacity with less weight and more tensile strength than other plasters.

It can be sawed, dented with a hammer or banged by furniture without chipping or cracking. Picture nails may be driven and withdrawn and the nailhole will not enlarge nor the plaster around it become ragged.

Adaptability—G. R. P. gypsum wood fiber plaster is an ideal material for plastering interior walls and ceilings, over wood or metal lath, brick, tile or any surface on which plaster can be used. It has a natural affinity for Sackett plaster board which welds the two substances into one, forming a wall that can not warp or crack under the most trying conditions.

Covering Capacity—1 ton will cover 125 to 150 sq. yds. of wall surface ⅝-in. grounds.

Brands—G. R. P. gypsum wood fiber plaster is marketed under the brands listed below, all brands being of the same high standard of quality:

Climax Wood Mortar; Superior Wood Fiber Plaster; Crystal Wood Fiber Plaster; Elephant Wood Fiber Plaster; Blue Rock Wood Fiber Plaster.

G. R. P. Gypsum Hair Fibered Plaster

This product has for its base the same scientifically calcined gypsum which is used in all G. R. P. gypsum plasters. To the base is added hair and other materials by a special process. To this material there must be added *at the job* 2 parts clean, sharp sand before applying.

Hercules Wall Plaster Bag

It is a hard, even setting plaster which for enduring strength, density and wear resisting quality has no rival among the other plasters of its type. It is plastic, works smooth and will not of itself crack, swell or shrink.

Adaptability—In common with this company's other types of wall plasters, it is an ideal material for plastering interior walls and ceilings on any surface on which plaster can be applied.

Covering Capacity—Its great economy is in its spreading quality. 1 ton of G. R. P. gypsum hair fibered plaster (after sand is added) will cover from 225 to 250 sq. yds., grounds ⅝ in.

Brands—G. R. P. gypsum hair fibered plaster is marketed under the brands listed below, all brands being of the same high standard of quality:

Hercules Wall Plaster; Gypsum Wall Plaster; Crystal Cement Plaster; Elephant Wall Plaster; Blue Rock Cement Plaster.

G. R. P. Finishing Plasters

G. R. P. finishing plasters in common with this company's other plasters are made from pure gypsum rock taken from the company's own mines.

Hovey's Eagle Calcined Plaster—To be gauged with 50% to 70% lime putty.

Eagle Trowel Finish—Used in place of lime and calcined plaster. It is ready for use after the addition of water only.

For high class residences, hotels, theaters, public buildings, etc., Eagle Trowel Finish is the logical specification.

Crystal Gray Finish—This finish is especially adapted for bathrooms, hospitals, kitchens, etc., where a very hard or durable finish is required. This finish can be left smooth or may be marked off in squares if desired.

Continued on next page

Directions for Using G. R. P. Gypsum Wood Fiber Plaster

The following directions apply to any brand of G. R. P. gypsum wood fiber plasters:

Wood Lath—Set grounds ⅝ to ¾ in. Lath ¼ to ⅜ in. key. Add nothing but clean water; mix well.

Two-coat Work, White Trowel Finish—Apply base coat of Climax Wood Mortar, using only enough to fill out to grounds, make walls straight and plumb; rod and darby to a rough surface, making all angles and corners true.

When base coat is dry, apply Eagle White Trowel Finish, or a finish composed of lime putty gauged with calcined plaster. Work to a smooth hard finish, free from trowel or brush marks.

Bathrooms, Hospitals, Wainscoting or Kitchens—Where a very hard or durable finish is required, use the Gray Hard Finish, but apply when base coat is about half dry. Trowel well and smooth, using as little water as possible.

This finish may be left smooth, or marked off in squares if desired.

Sand Float Finish—First apply base coat of Climax Wood Mortar, using enough to fill out the grounds; make wall straight and plumb; rod and darby to a rough surface, making angles and corners true.

Use 1 part unfibered Hercules Wall Plaster, 1 part lime putty, 2 parts clean, sharp, dry sand, adding sufficient water to make the material work freely and easily. Apply after base coat is thoroughly dry.

Three-coat Work—Apply base coat of Climax Wood Mortar, using enough to fill the meshes of the lath full; when set, apply second coat, using enough to fill out to the grounds; make walls straight and plumb; rod and darby to a rough surface, making angles and corners true.

Apply finish coats as directed for 2-coat work.

Metal Lath—Apply same as on wood lath.

Sackett Plaster Board—Set grounds ⅝ to ¾ in., drive nails home firm and tight. Do not wet the boards.

Apply plaster same as on wood lath.

Directions for Using G. R. P. Gypsum Hair Fibered Plasters

The following directions apply to any brand of G. R. P. gypsum hair fibered plasters:

Wood Lath—Key or clinch should be ¼ to ⅜ in. Green lath are better than dry. When dry lath are used dampen with water before plastering. All lath should be nailed with 3d common nails.

Jambs or Grounds—Should be ¾ in. for lath and ⅜ in. for brick, tiling, etc. In screening the sand, always use a No. 5 screen.

For Sackett plaster board, wood or metal lath, use 2 parts screened sand and 1 part Hercules Wall Plaster, by measure. Dry mix thoroughly, and temper with clean water to a good, stiff mortar.

Brick, Stone, Tile or Terra Cotta—Use 3 parts sand and 1 part Hercules Wall Plaster, by measure; mix as above. After applying first coat, double up closely, sprinkle lightly, darby and rod. Do not try to float the work unless last coat was put on over solid surface. When sand finish is required, use fine, clean sand. Mix 1 part Hercules Sand Finish, 1 part lime putty and 2 parts clean, sharp sand. Apply after brown coat is dry. Carpet float.

This mixture is a fine wainscoting when troweled.

Putty Coat—Use good stiff lime putty and Hercules Hard Finish, or Hovey's Eagle Calcined Plaster. Mix to suit convenience. Apply after the browning is perfectly dry, and thus avoid lath stains.

Skim Coat—Use lime putty and Hercules Hard Finish, equal parts. Apply while brown coat is green.

Two-coat Work on Brick or Terra Cotta—First apply Hercules Wall Plaster, mixed with 3 parts of good, sharp sand, made into mortar. Apply sufficient to fill out and make straight walls and true angles and corners.

Apply white, gray or sand coat finishes as directed on lath work.

One-coat Work on Wood or Metal Lath for Cellar Ceiling—Apply a good heavy coat of "Hercules" Wall Plaster, mixed with 2 parts of good, sharp sand, made into mortar, which, after bringing to true, even surface, trowel until smooth and hard, free from cat faces or other imperfections.

General—In hot or windy weather it is very important that windows and all other openings be protected by canvas or other material to prevent the mortar from drying on the walls before it has time to set. Plaster which dries on the wall before it sets will turn white and remain very soft. In cases of this kind, sprinkle the walls thoroughly with clean water. By closely following the above instruction, serious trouble and expense are saved.

Sackett Plaster Board

Used instead of wood and metal lath, Sackett plaster board is the foundation for the ideal modern wall. It is highly recommended by leading architects and builders for use in edifices of every type. It makes a warmer wall than wood lath, is cheaper than metal, and resists fire better than either.

Sackett plaster board consists of alternate layers of felt and stucco rolled into sheets which are nailed to studding. Plaster adheres perfectly. Boards are ¼ and ⅜ in. thick and cut into sheets 32x36 in. They can be sawed and nailed like wood.

Directions for Applying Sackett Plaster Board

Boards are nailed directly to studding, set 16 in. from centers. For buildings of slow burning construction, nail the boards solid to wooden surface. First nail entire middle of board, then outer edges.

In nailing, use 1-in. wire nails, with large head, set 4 to 6 in. apart, with each nail driven home firm and tight to prevent any working under the plaster coat. Break joints horizontally on walls and at right angles with rafters on ceiling.

Do not wet boards before applying plaster. Adhesion between plastering materials and dry board is perfect. Unnecessary moisture causes studs and other woodwork to warp, delays drying and weakens plaster.

To avoid any possibility of cracking at joints, first apply a light scratch coat, working into all joints thoroughly, thus uniting in one piece the entire wall base. Next apply base or brown coat, fill out to grounds and darby to an even surface to make ready for finish coat.

While some builders have omitted the use of the base coat over Sackett plaster board, this is not advised, as satisfactory results are not insured where the finish coat alone is used.

The grounds for Sackett plaster board should be not less than ⅝ in.; ¾- or ⅞-in. grounds are recommended.

Packages

G. R. P. plasters are put up in paper sacks, 80 lbs. net, and in jute bags 100 lbs. net. The use of paper sacks is recommended, as the material keeps fresh longer.

Services

There is always a supply of all G. R. P. products on hand sufficient to fill any rush order. Shipping facilities at the plant are such that reliability can be placed on prompt delivery of G. R. P. products.

G. R. P. products are handled by dealers in building materials in nearly every locality. If, however, they can not be procured from a local dealer, this company will make prompt delivery from the nearest distributing point without additional expense to the purchaser.

J. B. KING & COMPANY

Nova Scotia Gypsum Products

GENERAL OFFICES
17 State Street
NEW YORK, N. Y.

FACTORY
NEW YORK, N. Y.

BRANCH OFFICES AND WAREHOUSES
BOSTON, MASS. PROVIDENCE, R. I. BUFFALO, N. Y. PHILADELPHIA, PA. NORFOLK, VA.

GYPSUM MINES
WINDSOR, NOVA SCOTIA AVONDALE, NOVA SCOTIA HILLSBOROUGH, NEW BRUNSWICK

Products

KING'S WINDSOR CEMENT (Neat and Ready Sanded).

KING'S WINDSOR SUPERFINE CEMENT.

KING'S DIAMOND, HILLSBOROUGH and SNOWFLAKE BRANDS PLASTER OF PARIS.

KING'S "DIAMOND" BRAND FIBROUS PLASTER BOARD.

KING'S WOOD FIBRE PLASTER.

KING'S WINDSOR GYPSUM BLOCK.

KING'S SPECIAL WINDSOR CEMENT for plastering on concrete.

KING'S ORIENTAL STUCCO.

Also manufacturers of King's Ready Finish; King's Windsor Pulp Plaster; King's Marble Dust; King's Marble Flour; King's Terra Alba; King's Diamond Brand Hydrated Finishing Lime and King's Portland Cement Dry Mortars (Ready Sanded).

Reputation

King's Nova Scotia gypsum products are examples of the highest art in plaster manufacture in America. That they are deemed the standard of excellence is shown by architects and contractors throughout the country in selecting them for use in the most expensive public and private buildings.

Location and Shipping Facilities

The Windsor Plaster Mills are situated on the water front at New York City and the company owns a large fleet of tugs, lighters and barges which make possible prompt shipments of plastering materials in any quantity not only to all local points but also to all railroads and steamship lines.

King's Windsor Cement

King's Windsor Cement is a perfected plastering material for base coats (scratch and browning). It is composed of calcined gypsum manufactured from the finest quality of selected rock imported from Nova Scotia, incorporated with the correct proportion (determined by our forty-seven years' experience) of other high-grade plastic ingredients, fibre, etc. It is made in two forms, namely, Neat (to be mixed with local sand) and Ready Sanded (requiring only water to be added).

It is fire resisting.
It is verminproof and germproof.
It is hard but not brittle.
It does not transmit sound.
It does not rust metal lath or mason's tools.
It does not chip nor pit.
It does not discolor decorations.

It saves time—the quick setting quality of Windsor Cement is especially valuable for investors, as the rent of buildings for time saved in completion will, in many instances, reimburse owners for the entire cost of the plastering.

King's Wood Fibre Plaster

King's Wood Fibre Plaster, a combination of calcined gypsum and wood fibre, is exceedingly tough but light in weight which results in a dense, durable wall having superior fire resistive and sound retarding qualities. Because of its fibrous nature, it works freely under the trowel; it is applied in the same manner as King's Windsor Cement. Being ready for use without sand it is especially desirable where good sand is difficult to obtain.

King's Special Windsor Cement for Plastering on Concrete

The greatly increased amount of concrete construction in the last few years has brought a number of new problems to the architect and builder. Probably no one of these new problems has been more troublesome and vexing than securing a plastering material that will really stick to concrete.

We have studied from a practical and scientific viewpoint the question of proper adhesion of plaster to concrete just as we have studied the proper adhesion of plaster to other backgrounds and we now have perfected a material that meets the exacting requirements. This plaster is called Special Windsor Cement for Plastering on Concrete. It is compounded with the same skill and care that have made King's Windsor Cement the standard wall plaster—and it sticks.

King's Windsor Superfine Cement

King's Windsor Superfine Cement, a specially prepared hard finish, is designed to produce a hard, durable, smooth, white surface, free from so-called fire cracks, that will withstand the hardest usage. It is a finish adapted for use not only in hospitals, but in all places where really good walls and ceilings are desired or where wear is great. Its hard surface, which will take a polish equal to "Keene's Cement," is very dense and easily cleansed.

An especially desirable feature is the imitation of tile or brick in bathrooms and kitchens.

Windsor Superfine Cement has stood for thirty-four years the practical test of actual use.

Continued on next page

Plasters for Hard Finish, Moulding and Casting

King's Diamond, Hillsborough and Snowflake Brands of calcined gypsum (plaster of paris) are all standard plasters, cool working, uniform in set, pure white and very strong.

King's "Diamond" Brand Fibrous Plaster Board

King's "Diamond" Brand Fibrous Plaster Board is a gypsum lath for interior walls and ceilings; it is practical and, unlike wood or metal lath, it is fire resisting and a non-conductor of sound, heat and cold.

It is composed of Nova Scotia gypsum and fibre compressed into a solid fibrous sheet, reinforced on both sides with a specially prepared felt ("A" Board) or with a heavy, light colored chip paper ("C" Board). Wall paper and burlap may be placed directly on the board if desired, but the primary function of the board is that of lath to which hard wall plaster is applied. It is manufactured for that purpose and is not a substitute for both lath and plaster.

King's "Diamond" Brand Fibrous Plaster Boards make strong, solid walls. They produce quick drying plastering. They protect the wood frame from moisture. By their use there is no confined dampness in partition walls. They save time in construction. Their incombustible properties insure protection to human life and property.

Size of boards, 32x36 in.; $\frac{5}{16}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. in thickness; adapted for use on 8, 12, 16 and 18 in. centers.

Erecting King's "Diamond" Brand Fibrous Plaster Board

King's Windsor Gypsum Block

King's Windsor Gypsum Blocks are manufactured to meet the most exacting demands for strong, light, highly fire resistive partitions. They measure 12x30 in. and are made in the following thicknesses and styles:

1½-in. Furring	3-in. Hollow
2-in. Furring	4-in. Hollow
2-in. Solid	5-in. Hollow
3-in. Solid	6-in. Hollow
	8-in. Hollow

King's Windsor Gypsum Block

King's Oriental Stucco

King's Oriental Stucco is stucco at its best. It is prepared from a special formula, based on the European stuccos which are in excellent preservation after many centuries of exposure. Its ingredients are automatically weighed and mixed by machines which can not make mistakes, thus insuring exactly the right proportions and a thoroughly uniform mixture and color—two essentials to good stucco which are impossible to obtain when the mixing is done by hand. It is delivered ready for use by the addition of clean water.

The beautiful color effects obtainable with King's Oriental Stucco are unfading and permanent even when exposed to extremes of heat or cold, moisture or dryness. The slow setting nature of the material makes is possible for workmen to take adequate time to apply it properly and avoids all possibility of the unsightly shadows and joinings which frequently mar the effect of ordinary stucco. Moreover, King's Oriental Stucco is thoroughly waterproofed. As it can be retempered, mixed material left overnight is not wasted—a feature found in no other stucco. In every respect the use of King's Oriental Stucco eliminates all of the objectionable characteristics of many ordinary preparations.

It is manufactured in white and nine standard colors.

Short Form of Plastering Specifications

The following form, though brief, is comprehensive and explicit. By its use the architect may clearly indicate the materials he wishes to have used.

Preparation of building and lathing to be same as ordinarily written for good work.

Plastering—For base coats, use King's Windsor Cement
- Ready Sanded.[1]
- Neat.[2]
- Special for Plastering on Concrete.[3]

For smooth white trowel finish, use
- King's Windsor Superfine Cement.[4]
- King's Ready Finish.[5]
- King's Diamond or Hillsborough Brand Plaster of Paris.[6]

For rough float finish, use
- King's Float Sand Finish.[7]

Plastering materials are to be mixed and applied in strict accordance with instructions given by the manufacturer.

1. Ready Sanded—Ready for immediate use by adding water only.
2. Neat—To be mixed with local sand.
3. Special for Plastering on Concrete—Ready for immediate use by adding water only.
4. King's Windsor Superfine Cement—To be mixed with well seasoned lime putty.
5. King's Ready Finish—Ready for immediate use by adding water only.
6. King's Diamond or Hillsborough Brand Plaster of Paris—To be mixed with well seasoned lime putty.
7. King's Float Sand Finish—Ready for immediate use by adding water only.

EMPIRE GYPSUM COMPANY

Manufacturers of Gypsum Wall Plasters

318-319 Cutler Building

ROCHESTER, N. Y.

MILLS AND MINES, GARBUTT, N. Y.

Products

EMPIRE NEAT CEMENT PLASTER.
RELIANCE WOOD FIBER PLASTER.
EXCELSIOR SANDED WALL PLASTER.
EMPIRE CONCRETE PLASTER.

Gypsum Hard Wall Plasters

Gypsum is the basis of all hard wall plasters made by this company. Through the use of these plasters, *harder and firmer walls are obtained with lighter grounds,* thus removing enormous weight from the construction. The adhesive and formative properties permit of a solid wall in two or three hours after tempering. Plastering repairs are eliminated.

Iron-clad formulae, based on established facts, are followed in the process of manufacture, and utmost care is exercised in the mixing, each batch being accurately timed. Delivered on the job *ready for use.*

The brands of Empire Gypsum Plaster are:

Empire Neat Cement, or Hair Plaster

Manufactured under a formula that demands sand under all conditions; with 1 part of Empire Neat Plaster (haired mortar), 2 parts of sand on lath, and 3 parts on brick or tile are required to be mixed.

Reliance Wood Fiber Plaster

Contains *wood pulp* as a binder, giving it a light, stretchy, working action. Used in neat condition to a great extent, but will carry 1 part of sand on wood and metal lath work, and 2 parts on brick or tile. It sets in 2 hours and dries out rapidly.

Excelsior Sanded Plaster

Used in localities not having sand in immediate vicinity. Sand is clean and sharp, screened to proper mesh for plaster work and thoroughly dried.

Empire Concrete Plaster

To be applied direct to concrete interior walls and ceilings. Ready for use, water only is to be added. Grounds to be ½ in. See that concrete work is thoroughly dry before base coat is applied.

Concrete plaster should be allowed to soak in the water for about 10 minutes before hoeing; after which it is to be mixed the same as any other hard plaster. Concrete plaster may be trowel or float finished as any other hard plaster. Before applying finish, be sure base coat is dry and hard.

It is very important that concrete surface be rough, and under no circumstances should oiled boards be used for casting forms.

Grounds

The grounds required for all the above brands are as follows: ½ in., for brick or tile; ¾ in., for plaster boards, wood lath, wire or expanded metal lath.

General Specifications

Lath—Wood space ⅜ to ¼ in. Spray in warm weather if exceedingly dry. Nail lath firmly. Break joints. Wire or metal must be rigid to insure results. Too much give means sagging.

Brick or Tile—Wet surface before application. Do not apply any brand of plaster to brick or tile which does not contain sand. The correct proportions are: wood fiber, 1 part, sand, 2 parts; neat, 1 part, sand, 3 parts, weight, not volume.

Sand—Clean, sharp sand free from gravel must be used.

Mixing—Sand and plaster must be thoroughly mixed before adding water. Use clean tools and clean water. Mix only that amount which will be applied in one hour. Do not re-temper. Work the material to a light consistency for best results.

Application—Hard wall plaster can be applied to any surface—wood or metal lath, brick, tile, plaster board. Use a firm but even pressure to secure clinch. Apply a light coat first on all surfaces. Scratch or darby same for doubling up or second coat. Fill out to grounds and run an even surface with darby. Permit walls to dry before finish coat is applied; then wet down lightly. Use water sparingly in applying finish coat.

LARGEST HOTEL IN THE WORLD, HOTEL PENNSYLVANIA, NEW YORK, N. Y.

McKIM, MEAD & WHITE, New York, Architects; GEORGE A. FULLER CO., New York, General Contractors, H. W. MILLER, INC., New York, Plastering Contractors

Plastered with Empire Neat Cement

LYCOMING CALCINING CO.

Manufacturers of Gypsum Products, Raw and Finished

Susquehanna Trust Building

WILLIAMSPORT, PA.

MINE AND MILLS, GARBUTT, N. Y.

Products

DIAMOND WALL CEMENT PLASTER and MARBLE WALL PLASTERS.

Facilities

This company started the business of manufacturing plaster in 1895 and have, therefore, had 27 years' experience. Mill and mine located at Garbutt, N. Y., fully equipped with modern, up-to-date machinery.

Buffalo, Rochester & Pittsburgh and Pennsylvania railroads insure at all times an adequate supply of cars and prompt service to customers.

Diamond and Marble Wall Plasters

Neat Plaster—For lath work, add 2 parts *by weight* of sand to 1 part *by weight* of plaster. For brick or tile, add 3 parts *by weight* of sand to 1 part *by weight* of plaster.

Neat Wood Fiber Plaster—May be used neat, or preferably add 1 part of sand *by weight* to 1 part of wood fiber plaster, when applied to wood or metal.

Very desirable for use on plaster board.

Sanded Plaster—Add nothing but water.

Sanded Wood Fiber Plaster—Add nothing but water.

Exterior Wood Fiber Plaster—Add nothing but water.

Bonded Plaster—Water only to be added. Surface must be rough, thoroughly dry and free from oil or dirt. Used principally on concrete ceilings and walls.

Specifications

Lathing—Space the lath ¼ in. apart. Always spray the lath enough to thoroughly wet them. Dry lath may buckle and crack the plaster. Wire or metal must be rigid to insure best results. Too much *give* means sagging.

Brick or Tile—Wet thoroughly the brick or tile surface before applying plaster. Never put anything but sanded mixture on brick or tile.

Sand—Use only clean sharp sand, free from loam or gravel.

Mixing—Use clean mortar box and mortar. Do not mix at one time more than can be applied in one hour. Do not re-temper.

Guarantee

All products are tested before they are shipped, and are guaranteed to be as represented. The quality of the finished work depends on proper mixing of sand and plaster and application to the wall as directed above.

Partial List of Prominent Buildings Plastered with Diamond Wall Cement Plaster

Christian Science Benevolent Association Building, Brookline, Mass.
Hotel and 60 houses at Coatesville, Pa.
Masonic A.A.S.R. buildings at Williamsport, Pa.
High School, Shenandoah, Pa.
St. Bonaventure's College, Allegany, N. Y.
Women's Infirmary, State Hospital for the Insane, Danville, Pa.
Shelburne Hotel, Atlantic City, N. J.
School Building, Troy, N. Y.
School Building, Port Jervis, N. Y.
Columbia County Tuberculosis Hospital, Philmont, N. Y.
School Building, Stratford, Conn.
Ridgewood High School, Ridgewood, N. J.
Union Trust Building, Rochester, N. Y.
Post Office Building, South Bethlehem, Pa.
Haws Refractories Company Building, Hawstone, Pa.
Naval Academy Buildings, Annapolis, Md.
New Hotel Lycoming, Williamsport, Pa.

THE SHELBURNE, ATLANTIC CITY, N. J.
WARREN & WETMORE, Architects, New York, N. Y.
GEO. A. FULLER CO., Building Contractors, New York, N. Y.
D. S. SCHAFFER CO., Plastering Contractors, Baltimore, Md.

THE LYCOMING, WILLIAMSPORT, PA.
W. L. STODDART, Architect, New York, N. Y.
WM. M. SUTHERLAND BUILDING & CONTRACTING CO., General Contractors, St. Louis, Mo.

NIAGARA GYPSUM COMPANY

Manufacturers of Plasters and Gypsum Products

BUFFALO, N. Y.

MINES AND MILLS
OAKFIELD, N. Y.

Products

NIAGARA PLASTERS and GYPSUM PRODUCTS as follows: NEAT CEMENT PLASTER (unsanded); WOOD FIBER PLASTER (wood pulp); SANDED MORTAR (haired); "KON-KREET" PLASTER (for plastering concrete); PREPARED FINISHING PLASTERS; PLASTER BOARD; GYPSUM BLOCKS; WALL BOARD.

Also manufacturers of Finishing Limes, Plaster of Paris, etc., in mixed car shipments.

TRADE-MARK

Facilities

The mines and mills of this company are located at Oakfield, N. Y., on the West Shore Railway (New York Central & Hudson River Railroad), convenient for the rapid filling of orders and shipment without delays. Mines and mills electrically operated, with a daily capacity of 600 tons.

Gypsum Rock

Report of state geologists, which is available on request, shows our rock to be of high analysis and uniform run. The deposits are extensive and insure many years' supply.

Neat Cement Plaster

Requires the addition of sand at the work. Economical on large operations. Used largely in localities where good sand is available. When mixed according to directions below, 1 ton should cover as much surface as 3 tons of sanded mortar.

How to Use—Grounds should be ¾ in. for 2-coat work and ⅞ in. for 3-coat work. Wood lath should be free from sap, bark and knots, spaced about ⅜ in. apart, joints broken every seventh lath. Thoroughly swell the lath, and do not let them shrink before application of plaster. Use 2 parts sand to 1 part plaster for wood lath, and 3 parts sand to 1 of plaster for brick, tile, or gypsum block surfaces, by weight, mixing materials well together before adding water.

Wood Fiber Plaster (Wood Pulp)

Characteristic ingredient is wood fiber, which gives the plaster toughness, flexibility and bulk. Spreads easily. Especially suitable for use in plastering over plaster board. Special mixtures prepared for particular cases.

How to Use—Ready to apply by adding water only; if desired, equal weight of sand may be added. On account of greater bulk should cover more surface per ton than other grades of wall plaster.

Sanded Mortar

Splendid working qualities. For use on wood or metal lath, brick, tile or gypsum block; 3 grades are manufactured. Ready for use. Add water only.

Prepared Finishes

Gray skim coat; economical for giving a smooth, hard surface for papering. Also, a ready finish for hard, glossy body coat, and sand finish for walls to be tinted.

How to Use—Add water only. Mix in small batches, as required, while being applied.

"Kon-Kreet" Plaster

Increasing use of reinforced concrete construction calls for a specially manufactured plaster with strongest possible bonding features, to insure thorough adhesion when applied to these surfaces. Used by addition of water only. Light gray color. Can be finished by troweling.

Plaster Board

A better material than lath. Plaster applied directly to the board, which is nailed direct on studding and on 2-in. furring strips set on 12-in. or 16-in. centers on joists.

A fire retardant and sound deadener. Made in sheets 32x36 in. Thicknesses, ¼, $\frac{5}{16}$, ⅜ and ½ in. Use large flat headed galvanized nails, 1¼ in. long, which are supplied for the purpose, spaced 6 in. apart around the board.

Gypsum Blocks

For laying up partitions. Used in fireproofing. Light in weight. Surface sizes, 12x30 in. and 13½x 32 in. Thicknesses, 2, 3, 4 and 6 in., and 2-in. furring.

Fireproof Wall Board

The modern substitute for lath and plaster. Both 32- and 48-in. widths, ⅜-in. thickness, and lengths from 6 to 10 ft. Ceiling high sections nailed to studs and immediately decorated by painting, papering, or calciming. 40 lbs. of joint filler free with every 1000 ft. Fire resisting, sound deadening, a good non-conductor of heat and cold. Lasts as long as the building itself.

Buildings of Prominence Plastered with Niagara Plaster, and Their Architects

Academic Bldg., Johns Hopkins University, Baltimore, Md., Parker, Thomas & Rice, Baltimore, Md.
Widener Memorial Library Bldg., Harvard College, Cambridge, Mass., H. Trumbauer, Philadelphia, Pa.
Springfield Municipal Bldg., Springfield, Mass., Pell & Corbett, New York, N. Y.
Grand Central Terminal, New York, N. Y., Reid & Stein, New York, N. Y.
Ritz-Carlton Hotel, Philadelphia, Pa., H. Trumbauer, Philadelphia, Pa.
Otis Bldg., New York, N. Y., Clinton & Russell, New York, N. Y.
Addition to Hudson Terminals, New York, N. Y., Clinton & Russell, New York, N. Y.
Manry High School Bldg., Norfolk, Va., Neff & Thompson, Norfolk, Va.
Edison Electric Bldg., New York, N. Y., (Own Architects)
National Biscuit Co. Bldg., New York, N. Y., (Own Architects)
Baltimore Medical College and Laboratory, Baltimore, Md., Mottu & White, Baltimore, Md.
State Normal School, Oswego, N. Y., N. Y. State Architects
Hotel Bancroft, Worcester, Mass., Esenwein & Johnson, Buffalo, N. Y.
Oaklyn School Bldg., Camden, N. J., Wm. T. Towner, New York, N. Y.
New York Telephone Co. Bldg., Binghamton, N. Y.
Masonic Homes, Elizabethtown, Pa., C. Emlen Urban, Lancaster, Pa.
John Hancock Mutual Life Insurance Co. Bldg., Boston, Mass., Parker, Thomas & Rice, Baltimore, Md.
United States Post Office, New Haven, Conn., Government Architects

ESTABLISHED 1887

M. A. REEB CORPORATION

Manufacturers of Wall Plasters and Products of Gypsum

GENERAL OFFICE

BUFFALO, N. Y.

MILLS AT

BUFFALO, N. Y. (N. Y. C. & H. R. R. R.) — OAKFIELD, N. Y. (WEST SHORE R. R.)

Products

PEERLESS PLASTERS and GYPSUM PRODUCTS as follows: NEAT CEMENT PLASTER (sand to be added), WOOD FIBER PLASTER, SANDED PLASTER (add water only), CONCRETE PLASTER, PLASTER BOARD, GYPSUM PARTITION BLOCKS, PORTLAND CEMENT MORTAR and ASBESTOS MORTAR.

Also Finishing Limes and Plaster of Paris for mixed car shipments.

TRADE-MARK

Facilities

Mills are situated at Oakfield, N. Y., on the West Shore R. R. and at Buffalo, N. Y., on the New York Central & Hudson River R. R., with excellent manufacturing and shipping arrangements at each point, insuring prompt and efficient service to customers. Extensive daily capacities to take care of large jobs.

Quality of Gypsum

The gypsum, which is the base of all the materials, is of highest grade. It is mined and calcined at one of the most extensive deposits of gypsum rock in the country. Analysis is high and uniform, as New York State geologist's records will show.

Neat Cement Plaster

It is a material used on big work and in localities where a good clean, sharp sand can be readily obtained. Economical and makes strong job. Requires addition of sand at the work. When mixed according to directions below, 1 ton with sand added will cover three times as much surface as 1 ton ready sanded plaster.

Directions—Grounds should be ⅞ in. for three-coat work or ¾ in. for two-coat work. Thoroughly swell wood lath. Do not let them shrink before plaster is applied. Lath should be free from sap, bark and knots and should be spaced ⅜ in. apart, and joinings broken every seventh lath. For lath, 2 parts sand to 1 part plaster. For brick, tile or gypsum block surfaces, 3 parts sand to 1 part plaster. Materials well mixed together before adding water.

Wood Fiber Plaster

As the name implies, largely composed of wood fiber. Makes a light, tough and elastic plaster; easily applied.

Particularly desirable as a material for applying over plaster board. Ready to apply with the addition of water only. If desired, equal parts good clean sand may be added at the work. More bulky than other grades of wall plaster and covers more surface per ton.

Sanded Plaster

This materia. is ready to use with the addition of water only. The sand is clean and sharp, and the sanded plaster of this company is noted for its easy and smooth working qualities. Three grades, for use on wood, metal lath and brick, are manufactured.

Asbestos Mortar

An asbestos mortar required by architects and contractors for particular work is also manufactured. Further information on request.

Concrete Plaster

A material especially manufactured for application to interior concrete walls and ceilings. It has strong bonding features in connection with concrete.

Portland Cement Mortar

A mortar made of standard portland cement and clean sharp sand in exact proportions. Shipped in dry form, ready for water only at the job.

This material is also shipped in neat form, so that sand may be added at the job.

Special formulas prepared and waterproofed for exterior stucco work.

Plaster Board

A substitute for wood and metal lath. Comes in sheets 32x36 in. and in thicknesses as follows: ¼, $\frac{5}{16}$, ⅜ and ½ in. Applied directly to studding on side walls and to 2-in. furring strips set on 12-in. or 16-in. centers or joists. A splendid sound deadener and fire retardative. Plaster is applied directly to the board with perfect bond between the two. Use large flat headed galvanized nails about 1¼ in. long, spaced about 6 in. apart around the board.

Gypsum Partition Block

For partitions and furring of other walls. Made in 12x30-in. and 13½x32-in. surface measurements, and in following thicknesses: 2, 3, 4 and 6 in, and 2-in. furring.

Partial List of Prominent Work Done with "Peerless"

BUILDING	LOCATION	CONTRACTOR	ARCHITECT
New Vendig Hotel	Philadelphia, Pa.	P. J. Durcan, Inc., New York	Esenwein & Johnson, Buffalo, N. Y.
Chamber of Commerce	Buffalo, N. Y.	Metz Bros. Co., Buffalo, N. Y.	Green & Wicks, Buffalo, N. Y.
The Electric Building	Buffalo, N. Y.	John Gill & Sons, Cleveland, Ohio	Esenwein & Johnson, Buffalo, N. Y.
65th Regiment Armory	Buffalo, N. Y.	Mosier & Summers, Buffalo, N. Y.	George J. Metzger, Buffalo, N. Y.
Emergency Hospital	Washington, D. C.	A. Bussard & Co., Washington, D. C.	N. C. Wyeth, Washington, D. C.
Columbian Hospital	Washington, D. C.	R. F. Barber, Washington, D. C.	N. C. Wyeth, Washington, D. C.
University of Buffalo	Buffalo, N. Y.	John W. Cowper Co.	McKim, Mead & White, New York, N. Y.
Albany Theater	Albany, N. Y.	P. J. Durcan, Inc., New York	Francis H. Kimball
Ten Eyck Hotel	Albany, N. Y.	John W. Kissell Co.	Esenwein & Johnson, Buffalo, N. Y.
Longfellow Court	Cambridge, Mass.	P. J. Durcan, New York, N. Y.	National Engineering Corp., Boston, Mass.
Bank of Buffalo	Buffalo, N. Y.	James G. Davis, Buffalo, N. Y.	McKim, Mead & White, New York, N. Y.
Masten Park High School	Buffalo, N. Y.	Metz Bros. Co., Buffalo, N. Y.	Esenwein & Johnson, Buffalo, N. Y.
Technical High School	Buffalo, N. Y.	Mosier & Summers, Buffalo, N. Y.	M. C. Miller, Buffalo, N. Y.
New York Telephone Building	Buffalo, N. Y.	George C. Rossell, Rochester, N. Y.	McKenzie, Voorhees & Gmelin
John B. Cary School	Richmond, Va.	Wise Granite Co.	Charles M. Robinson
Stuart Circle Hospital	Richmond, Va.	A. M. Walkuf	C. M. Robinson, Inc.

THE PLYMOUTH GYPSUM CO.

FORT DODGE, IOWA

BRANCHES

CHICAGO, ILL., 1313 Chamber of Commerce Building

MINNEAPOLIS, MINN., 211 Lumber Exchange

Products

CEMENT PLASTERS: "Plymouth," "Hardernell," "Iowa Special," "Acolite," "Wood Fiber," "Concrete," "Sanded"; FIREPROOF GYPSUM PARTITION TILE; PLASTER BOARD; WALL BOARD; HARDERNELL EXTERIOR STUCCO.

Also Gypstone Prepared Finishing Plaster, Moulding Plaster, Stucco, Keene's Cement, Marble Stone Exterior Stucco (a magnesite product), Mortar Colors, Retarder, Hydrated Lime and Barrel Lime.

Plymouth Cement Plasters

Advantages of Hard Wall Plaster—The recognized ideal for interior walls and ceilings. Plymouth cement plaster sets hard in 2 hours after application and its tensile strength is 200 times greater than lime. It dries quickly, enabling contractors to proceed with the finishing of buildings. Can be applied to wood and metal lath, brick, tile and plaster board, and is strongly recommended for its fire resisting qualities, enduring intense heat before disintegrating. Its smooth, hard surface lends itself most pliably for decorating purposes. Its great adhesiveness and strength, great density and non-conductive properties render walls practically indestructible. Buildings are warmer in winter and cooler in summer than with any other plastering material known. Costs no more than lime plaster and is 200% better.

METHOD OF PACKING PLYMOUTH GYPSUM PLASTERS

Container	Capacity, lbs.	Credit, each
Jute bags	100	$0.15
Paper bags	80	Not returnable
Barrels	250	Not returnable

Plymouth Cement Plaster (New Process)

This company is now producing a remarkable gypsum plaster, by a new process developed by the Bureau of Standards at Washington, D. C., which embodies all of the features of our original Plymouth cement plaster with many added advantages over any gypsum material heretofore produced.

Outstanding Features—This new process plaster does not lose its sand carrying capacity nor deteriorate while in storage as quickly as the old process plaster, but retains its rich plastic qualities. Its tensile strength is 20% to 25% greater than old process plaster. It mixes more readily with sand, spreads freely under the trowel and can be darbied without water. It does not dust and is 10% whiter than old process plaster.

Specifications, Cement Plaster

Care of Plaster—Store in dry, cool place and avoid circulation of air through warehouse. Never place on ground, against damp wall, or damp place when delivered to building.

Grounds—For plaster board, wood lath, wire and metal lath, grounds to be not less than ¾ in. For plaster blocks, brick or tile walls, grounds to be not less than ½ in.

Plaster Board—Apply according to manufacturer's directions.

Lathing—For wood lath, use best grade. Space not less than ¼ in. apart, nail securely with 3d galvanized lath nails. Break joints every fifth lath, leave space of ¼ in. between ends. Half-green laths are best. Dry laths must be thoroughly soaked day before or not less than 2 to 5 hours before plastering.

Sand—*Quality*—Use only clean, sharp sand free from loam, dirt and frost. Avoid quicksand. Sand should pass through a 10-mesh, and remain on a 30-mesh sieve.

Quantity—For plaster board, wood lath, wire and metal lath, use 2 parts sand, of above quality, to 1 part fibered plaster. For plaster blocks, brick or tile walls, use 3 parts sand, of above quality, to 1 part unfibered plaster.

Proportions—The following is a convenient way to arrive at the above proportions.

Two to one: Use eight 10-qt. buckets of sand, struck measure, to 100 lbs. of plaster.

Three to one: Use ten 10-qt. buckets of sand, struck measure, to 100 lbs. of plaster.

If other than above quality and quantities of sand are used, the manufacturer will not be responsible for results.

Mixing—Mix with water immediately after sand and plaster are dry mixed. Always use clean water, free from alkali, salt and other impurities.

General Directions for Applying—*On Plaster Board*—First thoroughly fill joints between boards. By doing this, a perfect bond is formed between plaster in board and base coat. When this has set, apply base or browning coat, filling out to grounds and darbying to a straight and even surface, ready to receive finishing coat. Darby lightly and use water sparingly.

On Wire and Metal Lath—Apply scratch coat, lightly covering lath and filling meshes, thoroughly brooming it before it sets. After scratch coat has set firm and hard, but before it is dry, apply second coat, bringing it to a straight and even surface with rod and darby, ready to receive finishing coat. Darby lightly and use water sparingly.

On Wood Lath—Lay scratch coat lightly, with sufficient pressure to obtain good key, follow with second coat, filling to grounds. Darby lightly, use water sparingly. Do not apply more at one time than can be darbied before material begins to set.

On Plaster Block, Brick or Tile Walls—First soak walls thoroughly to reduce suction. Apply sufficient material to fill out grounds. Bring to a straight and even surface with rod and darby, ready to receive finishing coat.

For Concrete Walls and Ceilings—Use Plymouth concrete plaster already prepared by addition of water.

Care of Plaster Until Set—During summer months protect walls and ceilings from hot and dry winds by closing up openings until plaster has fully set and become hard. This will prevent drying out before plaster has set and causing it to turn soft and chalky. In winter, exercise the same caution against freezing. In all cases, after plaster has thoroughly set and become hard, allow free circulation of air to cause quick drying.

Specifications, Plymouth Finishes

Mixing—In mixing finishes, keep mixing box, mortar board and tools perfectly clean, and use clean water. In applying, work top and bottom together whenever possible, and thus avoid joinings. In troweling finishes, do not use any more water than necessary, to avoid killing the surface.

White Hard Finish—Use 1 part Plymouth Superfine, Gilt Edge, or Iowa Finish, with 2 parts lime putty thoroughly mixed. These finishes are used the same as stucco or plaster of paris, but are slower in setting and give ample time to be worked to a finer surface. The base coat should be dry before using a finish of this kind, so that lath cracks or other imperfections will be covered. Where a white finish is not desired, second coat can be troweled down smooth for papering.

Covering Capacity—100 lbs. of above finishes, stucco or plaster of paris mixed with 2 parts lime putty will cover 100 yds. of wall surface. If walls are unusually trim and even, above amounts may cover a little more than 100 yds.

Sand Float Finish—Walls should be left the same as for white coating. Our prepared sand float finish should be mixed rather thin and applied after walls have set firm and hard, but before entirely dry. Use a carpet or cork float and bring material to a true and even surface, free from float marks and cat faces. Do not use any more water than possible on face while floating. Do top and bottom of sidewalls together whenever possible, and thus avoid joinings. On brick walls, follow closely after base coat. (For covering capacity, see table.)

Empire Finish—A prepared finish, ready for use after mixing with water. Base coat must be thoroughly dry in order to secure a white wall. Mix material very thin and apply in 2 or 3 coats. Apply a light coat the first time over, just filling in pores, grinding in wall and allowing to draw a few minutes. For 2-coat finishing, second coat should be laid on perfectly level, filling in cat faces and imperfections; when partly set, trowel well, using a damp brush. Later it can be troweled or brushed

Continued on next page

with a dry brush to bring out a glassy surface. For 3-coat finishing, last coat should be mixed as thin as can be handled on hawk, troweled and finished the same as 2-coat work. Mix material thoroughly in a mortar box, but same must be as near perfectly clean and free from foreign matter as possible. (For covering capacity, see table.)

No. 4 Finish—A light gray finish and used for wainscoting, especially in bathrooms and basements. Prepared finish and is ready to use after mixing with water only.

Plymouth Wood Fiber Plaster—This is a prepared plaster and is ready for use after mixing with water only. It is mixed in the same manner as Plymouth cement plaster; and in order to get a first class wall, strong and elastic, no sand should be added, as the wood fiber takes the place of sand and hair. One ton of this plaster covers from 120 to 140 yds. Cost is about 3¢ more a yard than Plymouth or Hardernell, and is preferred by some contractors and builders, especially in places where good sand is impossible to get. The same finishes that are used on our other brands of plaster can be applied to the Wood Fiber.

COVERING CAPACITIES PLYMOUTH FINISHES

Finishes	How used	Covering cap. lbs. to 10 yds. wall surface
Plymouth and Gilt Edge	2 parts lime putty to 1 part finish	100 to 150
Plymouth Empire (a white no-lime finish)	Ready for use by addition of water	400 to 500
Plymouth No. 4 (a light gray finish for wainscoting)	Ready for use by addition of water	400 to 500
Plymouth White (sand float)	Ready for use by addition of water	400 to 500

Plymouth Fireproof Partition Tile

Pure gypsum mixed with a special fiber and moulded into uniform blocks 2, 3, 4, 5, 6, to 8 in. thick. Tested and approved by National Board of Fire Underwriters. Report of test furnished on application, also names of users of Plymouth tile.

PLYMOUTH FIREPROOF PARTITION TILE

Plymouth Rock Wall Board

Answers the demand for a wall board for small structures not requiring plastering. Pulp and paper composition boards are unsatisfactory because they contract, expand and buckle, forming a housing for vermin and insects. This is not possible with Plymouth Rock wall board which is made from gypsum with heavy paper on both sides, giving an even, true surface that does not buckle, expand or get out of place. It is a non-conductor of heat, cold and sound, and is well adapted for calcimining, papering or oil painting. Joints may be filled with crack filler and covered with gummed tape or paneled with wooden strips.

Made in sizes $\frac{5}{16}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. thick, 32 and 48 in. wide and in lengths to 10 ft. Can be shipped in mixed cars with plaster at same freight rate.

Plymouth Plaster Board

Made from gypsum mixed with ingredients making it strong and flexible for ease and safety in handling. The gypsum, between two layers of paper, forms a veritable sheet of rock. The cohesion is perfect, paper being so rolled and pressed into soft gypsum that they can not be separated. Plymouth plaster board can be applied to the wall in half the time it takes to apply lath.

Made in sizes $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, and $\frac{1}{2}$ in. thick, 32 in. wide and 36 in. long. Nailed to walls and ceilings with wire nails, 11½ gauge, head $\frac{7}{16}$ in. and 1¼ in. long. Approximately 12 lbs. required per 1000 ft. of board.

Hardernell Exterior Stucco

Permanence—Hardernell exterior stucco is a ready mixed stucco that has Portland cement for its base, which, together with other carefully selected ingredients—all scientifically proportioned and mixed in large quantities by machines—combine to produce easily workable, uniformly dependable and permanent stucco.

Hardernell exterior stucco needs only the addition of water to make it ready to apply.

Beauty—Hardernell exterior stucco finish coat contains non-staining white Portland cement which permits the building of any type of home, the choice of the higher class, much desired white finishes known as floated, stippled and rough cast; also a variety of textures secured by unusual troweling or floating, limited only by ingenuity of architect or stucco contractor.

Note: The base coats are made from standard gray portland cement and other selected ingredients, correctly proportioned.

Economy—The first coat is the last. There is no upkeep for painting or repairing.

Specifications for Hardernell Exterior Stucco

Hardernell exterior stucco can be applied over any good backing. Concrete wall, concrete block, hollow tile, brick, stone or metal lath backings are preferable. Metal lath should be galvanized or painted expanded lath, weighing not less than 3.4 lbs. per sq. yd., should be furred out ¼ to ⅜ in. by furring strips, or by using self-furring lath.

It can be applied over wood lath backing if desired, but results are not as favorable as metal lath; the extra cost of metal lath should not be considered when permanency is required. Hardernell exterior stucco applied on metal lath and used according to specifications will stand as long as the foundation.

It shall be mixed with clean water, until the mortar is evenly wet throughout. Nothing shall be added but water. There shall not be mixed at one time more mortar than will be used within one hour. No retempered mortar shall be used under any circumstances.

It shall be applied in 3 coats, each coat not less than ¼ in. nor more than ⅜ in. in thickness, the whole finishing 1 in. thick. The first 2 coats shall be applied with Hardernell base coat. Hardernell finish mortar shall be used for the third or finish coat.

The first coat shall be applied under pressure to secure a good bond. After the first coat has set, but before it is thoroughly hardened—preferably the day following—the second coat shall be applied and floated to a true and even surface. The undercoats should be cross scratched before the initial set has taken place and shall be thoroughly wetted when necessary before the succeeding coats are applied.

The plastering shall be carried on continually in one general direction without allowing the mortar drying at the edge. Where this is impossible, the joints shall be made at a break, an opening or other natural division of the surface.

Hardernell finish coat shall not be applied until after the second coat is thoroughly hardened. If convenient, allow 7 days' interval, or as much longer as possible. The finishing coat shall be kept moist for at least 4 days, either by spraying gently with water after the mortar has hardened sufficiently to permit it, or by hanging wet burlap or other fabric over the surface. If the suction is too great to apply the finish coat evenly, sprinkle base coat thoroughly with clean water.

Scratch as much surface as possible before applying the second coat so as to allow scratch coat to stiffen up sufficiently to receive the second base coat. The mechanic will have to use his own judgment as to when he can apply the second base coat. It is not necessary that the base coat should set before applying the second base coat.

Use straight edge, and darby on second base coat, as the straighter the base coat the easier and more uniform the finish coat will be brought to a true surface.

Scratch the second base coat with an ordinary broom. This is done to make a perfect bond for the No. 2 coat or finish coat.

Mix the material in an ordinary mortar mixing box, free from all foreign substances, to insure the best results.

Base Coat—From 2½ to 3 tons of the No. 1 or base coat will cover 100 yds. ¾ in. thick, more or less, depending on openings in building.

Finish Coat—One ton of the No. 2 or finish coat will cover 100 yds. ¼ in. thick, more or less, depending on openings in building.

ROCK PLASTER CORPORATION

Manufacturers of Plastering Materials

QUARRIES
WALTON, N. S.

GENERAL OFFICES
40 Rector Street
NEW YORK, N. Y.

FACTORY
NEW YORK, N. Y.

Products

GYPSUM BUILDING MATERIALS of every description.

Advantages of "Rock Wall" Products

The gypsum products of the ROCK PLASTER CORPORATION are distinguished by advantages in location of quarries, in manufacture, and in distribution that should especially recommend them to architects who desire the best:

Desirable Location of Quarries—"Rock Wall" gypsum is quarried at Walton, Nova Scotia, in the middle of the famous gypsum deposits of that province. The Walton beds of gypsum, which are under the exclusive control of this company, are accessible, practically inexhaustible, and produce rock of the whitest and finest quality—absolutely the best than can be procured. From Walton, the gypsum is transported by water to the "Rock Wall" factory in New York City.

Skill in Manufacture—In the New York factory "Rock Wall" products have been manufactured for over a quarter of a century by the same owners and operators. The skill and progressive efficiency developed throughout this long period, together with the unexcelled supply of Nova Scotia gypsum, have established a standard for "Rock Wall" products of the highest class.

In our calcining we use the "Slow Process" exclusively—it insures uniformity of quality and set.

Direct Shipping Facilities—We possess direct rail connections. New York, New Haven & Hartford R. R. sidings on the premises.

We maintain our own steam lighter service, thus facilitating prompt deliveries to all yards, railroads and steamship lines in the Metropolitan and Port districts of New York.

A Few of Our Standard Products

We make all kinds of building materials of which gypsum is the base, including "Rock Wall" Board, "Rock Wall" Plaster Block, and the following plasters:

"Rock Wall Blue Seal" Neat Cement Plaster—For use when sand is added at the job.

"Rock Wall Ready Mixed" Sanded Plaster—A complete plaster, requiring only the addition of water at the job.

"Rock Wall Walton Concrete" Plaster—For use on concrete surfaces. Its adhesive and cohesive properties are perfect. Ready for use by adding water only.

"Riverside" Plaster of Paris—For the finishing coat of walls and ceilings. A superfine quality called "Riverside Casting" plaster is made for ornamental work, cornices, etc.

Some New York City Buildings in which "Rock Wall" Products were Used

BUILDING	ARCHITECT
New York Telephone & Telegraph Building	Wm. Welles Bosworth
Monastery of The Blessed Sacrament	Maginnis & Walsh
New York Stock Exchange (1922 Addition)	Trowbridge & Livingston
Westchester Biltmore Country Club	Warren & Wetmore
Munson S. S. Line Building	Kenneth M. Murchison
Cunard S. S. Line Building	Benjamin W. Morris Carrère & Hastings
Guaranty Trust Co.	Cross & Cross
Strauss Building	Warren & Wetmore
Columbia Trust Co.	McKim, Mead & White
Garment Center Buildings	Walter M. Mason
Mount Sinai Hospital	Arnold W. Brunner
Seaboard Bank	Alfred C. Bossom
Union Club	Cass Gilbert
University Club	McKim, Mead & White
N. Y. Yacht Club	Warren & Wetmore
Harvard Club	McKim, Mead & White
Yale Club	Tracy & Swartwout
Elks Club	J. Riley Gordon
No. 42 Broadway	Henry Ives Cobb
Bowery Savings Bank	McKim, Mead & White
Bankers Trust Company	Trowbridge & Livingston
Emigrant Industrial Savings Bank	Raymond Almirall
National Park Bank	Donn Barber
East River Savings Bank	Clinton & Russell
New York Stock Exchange	Geo. B. Post & Sons
Ritz-Carlton Hotel	Warren & Wetmore
New York Public Library	Carrère & Hastings
St. Luke's Hospital	Ernest Flagg
Gorham Building	McKim, Mead & White
Bowling Green Building	N. J. & G. A. Audsley
B. Altman & Co. Building	Trowbridge & Livingston
Columbia University (14 buildings)	McKim, Mead & White
New York Public Schools (over 100)	C. B. J. Snyder

RAIL AND WATER CONNECTIONS AT FACTORY OF ROCK PLASTER CORPORATION

SOUTHERN GYPSUM CO., INC.

Manufacturers of Gypsum Wall Plasters, Plaster Finishes and Plaster Board

GENERAL OFFICE AND PLANT

NORTH HOLSTON, VA.

CHICAGO OFFICE, Tacoma Building, 5 North La Salle Street

Products

PLASTERS and PLASTER FINISHES, which include:

Cement (neat) Wall Plasters: "Cherokee," "King's Mountain," "Boone," "White Top," "Watauga," "Tennessee Special."

Wood Fiber Gypsum Plasters: "Cherokee," "King's Mountain," "Boone," "White Top," "Watauga," "Tennessee Special."

Plaster Finishes: "Pearl Gray," "Natural," "White Quartz Sand Finish."

PLASTER BOARD: "Southern."

"CONCRETE SPECIAL" for concrete interiors, walls and ceilings.

TRADE-MARK

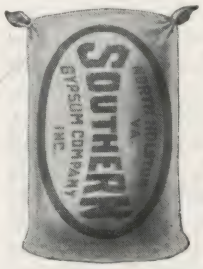
Quality

Our plasters are made of the purest gypsum rock, treated with the greatest care in grinding, calcining and mixing. Maximum strength, toughness, uniformity, covering capacity and working qualities guaranteed.

Specification Data for Wall Plasters, Finishes and Plaster Board

Cement Plaster—Cement plaster is made for those who are able to obtain good sand and prefer to sand their own mortar. For base coat on wood lath, mix 2 parts of clean sharp sand with 1 part plaster. For base coat on brick or tile, the proportion is 3 parts of sand to 1 of plaster. For base or scratch coat on wire or metal lath, mix 2 parts clean sharp sand with 1 part plaster. For base coat on "Southern " plaster board, mix 2 parts clean sharp sand with 1 part of plaster. (Write for copy of "Standard Specifications for the Use of Cement Plaster.")

Wood Fiber Plaster—Wood fiber plaster is to be used "neat"—all it needs is water. You can not improve its quality by adding sand. Though wood fiber has been used with sand for walls, we do not recommend it. Be safe and get the best results—use it neat. When a float or trowel finish is desired, the surface of base coat must be broomed—left rough—to receive the finish. Broom before the plaster begins to set, otherwise there is danger of killing the surface. In the manufacture of wood fiber plaster, we have replaced the sand by adding finely shredded wood fiber, which is uniformly distributed in the process of manufacture. Where wood fiber is used, a good flexible wall is secured which allows the building to adjust itself and settle within certain limits without danger of cracking.



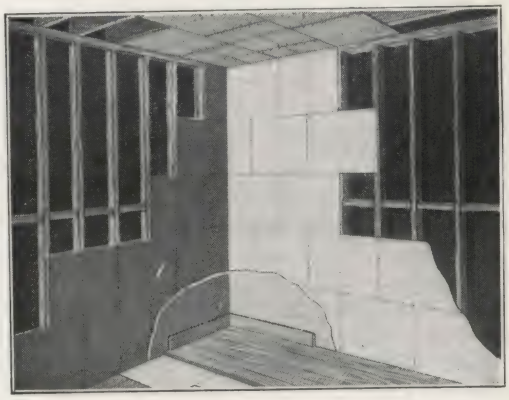
SOUTHERN GYPSUM CO. BAG

"Pearl Gray" Finish—A light gray trowel finish. Ready to use with the addition of water only.

"Natural" Finish—Ready to use with the addition of water only.

"White Quartz Sand" Finish—Ready to use with the addition of water only.

"Southern" Plaster Board—A substitute for wood and metal lath. Nail directly to studding or joist, using nails with 3/8-in. heads, 21 nails to the board for sidewalls and 28 for ceilings. Space boards not less than 1/4 in. apart at all horizontal or other joints which do not come on studs or joists. All vertical or other joints coming on studs or joists are butted tight. Each nailing edge of "Southern" plaster board must have a bearing on studs or joists of not less than 3/4 in.



ROOM PARTLY COVERED WITH PLASTER BOARD

"Concrete Special"—Water only is needed to fit this material for application to work.

Co-operative Service

It will be a pleasure to have a representative call at any time, and the office force stands ready to discuss any subject that may be presented.

References

Partial list of prominent buildings on which the products of the SOUTHERN GYPSUM CO., INC., were used:

Fulton County Courthouse, Atlanta, Ga.
Georgian Terrace, Atlanta, Ga.
Asheville High School, Asheville, N. C.
Clark County Courthouse, Athens, Ga.
University Hospital, Augusta, Ga.
Sullins College, Bristol, Va.
High School Building, Bluefield, W. Va.
West End High School, Birmingham, Ala.
Y. M. C. A. Building, Birmingham, Ala.
U. S. Post Office, Charlotte, N. C.
Masonic Temple, Charlotte, N. C.
Hamilton County Courthouse, Chattanooga, Tenn.
Gresham Hotel, Columbia, S. C.
Y. M. C. A. Building, Columbia, S. C.
New Citadel, Charleston, S. C.
Emory and Henry College, Emory, Va.
O'Henry Hotel and Annex, Greensboro, N. C.
Rhodes Building, Jacksonville, Fla.
Southern Railway Station, Lynchburg, Va.
City Hall, Roanoke, Va.
Murphy's Hotel, Richmond, Va.
Department of Commerce, Washington, D. C.
U. S. Custom House, Wilmington, N. C.
Carl Fisher Residence, Alton Beach, Miami, Fla.

UNITED STATES GYPSUM COMPANY

Plasters and Finishes

205 West Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
BUFFALO, N. Y. Ellicott Square
BOSTON, MASS., 77 Summer Street
WASHINGTON, D. C., 410 Bond Building
BALTIMORE, MD., 910 American Building
PHILADELPHIA, PA., 107 Empire Building
PITTSBURGH, PA., 1723 Oliver Building
CLEVELAND, OHIO, 646 Hanna Building
ATLANTA, GA., 358 Williams Mill Road
CINCINNATI, OHIO, 52 Blymyer Building
DETROIT, MICH., 1360 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 650 Builders Exchange
ST. LOUIS, MO., 1339 Syndicate Trust Building
KANSAS CITY, MO., 523 Bryant Building
OMAHA, NEBR., 301 Peters Trust Building
DENVER, COLO., 401 Boston Building
LOS ANGELES, CAL., 902 Citizens National Bank Building

Products

GYPSUM CEMENT PLASTER.
GYPSUM WOOD FIBRE PLASTER.
GYPSUM SANDED PLASTER.
BONDCRETE PLASTER, for plastering Interior Concrete Surfaces.
IVORY KEENE'S CEMENT.
PREPARED TROWEL and SAND FLOAT FINISHES.
ARIDIZE GYPSUM GAUGING PLASTERS (including Pure White Plasters), for Lime Putty Finishes.
ARIDIZE GYPSUM MOULDING and CASTING PLASTERS.
IVORY HYDRATED FINISHING LIME (High Magnesia).

For Pyrobar Floor Tile, Partition and Furring Tile, and Column Covering, see pages 166-167; for Gypsum Plaster Board and Plaster Board Partition Systems, see pages 307-309; for Reinforced Roof Tile, and Monolithic Roof, see pages 899-901; for Sheetrock Wallboard, see page 1128.

Service

Twenty-one producing mills, located at strategic points throughout the United States, afford national distribution.

This company is represented in all parts of the country, and will be glad to confer with architects on the use and application of its products.

An Engineering Department is maintained for the purpose of furnishing, without obligation, technical information and estimates.

The company contracts for the installation of Pyrobar partitions, Pyrobar roof and floor tile, Pyrofill Monolithic roof and floor construction and Jester-Sackett systems.

Lists of representative installations will be furnished on request.

United States Gypsum Company Plasters

UNITED STATES GYPSUM COMPANY plasters, made from calcined gypsum rock, adhere equally well to wood lath, metal lath, plaster board, brick, tile, or other plastering bases. They set uniformly hard throughout within 2 or 3 hours after application, and within 36 hours the walls are dry—no further possibility of dampness or sweating—and the carpenters can immediately proceed to apply the wood trim. These plasters resist fire, and because of our patented process of manufacture, possess unequaled strength, uniformity, and economical features.

Advantages of Syanize Plaster—By a patented and exclusive process of treating the gypsum, the plaster is made practically impervious to atmospheric moisture, so that, instead of losing in sand-carrying capacity each month while in storage, it continues to carry its full measure of sand, producing walls of maximum strength and economy. The patented process also gives to the plaster greater plasticity. It has also "standardized" the plaster, so that the material has the same superior working qualities, from whatever mill it is shipped or in whatever climate it is used. The cement plaster, wood fibre plaster, and sanded plaster described below are now made under this process.

TRADE-MARK

Standard Package

Unless otherwise stated, all plasters are shipped in 100-lb. jute bags and 80-lb. paper sacks.

80-LB. PAPER SACK

Brands and Classes

UNITED STATES GYPSUM COMPANY'S wall plasters are furnished in three general classes:

Gypsum cement plaster, Gypsum wood fibre plaster, and Gypsum sanded plaster.

Each class is marketed under the various brands listed below; all brands of each class, except Adamant, being of the same standard of quality:

Adamant §	Eldorado *	Ivory §
Alabaster	Flint	O. K.*
Baker	Granite §	Pyramid *
Big Four §	Imperial §	Syanize
Buckhorn †	Arden Hardwall †	Zenith

* Gypsite or "dark plasters."
§ Supplied also in sanded form.
† Cement plasters only.

Gypsum Cement Plaster

This class of plaster is supplied in hair fibred for scratch coat on metal lath and for base coat on wood lath and Sackett or Adamant plaster board. It is also supplied unfibred for use on brick, Pyrobar gypsum tile, clay tile, and for browning coat (second coat) on metal lath. Sand is to be added at the job. The material is made for use where good sand is available at reasonable cost and where the purchaser prefers to sand his own mortar. See brands above and specifications on second page following.

Continued on next page

Gypsum Wood Fibre Plaster

This class of plaster requires the addition of water only to prepare it for use. It contains finely shredded wood fibre, machine mixed to insure uniform distribution. As the wood fibre plaster requires no sand, all danger of poor sand or of oversanding is averted.

It makes a dense, durable wall, of almost half the weight of a sanded mortar wall, and has superior fire resisting, insulating and sound retarding qualities.

Its "tough" nature renders it more capable of withstanding shock and vibration. See brands on preceding page and specifications on following page.

Gypsum Sanded Plaster

This product consists of gypsum cement plaster and clean, sharp silica sand, machine mixed in mathematically correct proportions. It needs only water to fit it for application; it may be readily and quickly mixed inside the building, saving time and labor. There is no possibility of poor sand or of oversanding. See brands on preceding page and specifications on following page.

COVERING CAPACITIES OF WALL PLASTERS PER 100 SQ. YDS.
Material mixed and used as per Specifications

Surface	Gypsum cement plaster. Number 100-lb. bags	Gypsum wood fibre plaster. Number 100-lb. bags	Gypsum sanded plaster. Number 100-lb. bags
Wood lath	9 to 11 (sanded 2 to 1)	14 to 17 unsanded	22 to 24
Metal lath	17 to 20 (sanded 2 to 1)	22 to 27 unsanded	45 to 50
Sackett plaster board	8 to 9 (sanded 2 to 1)	13 to 16 unsanded	20 to 22
Brick and clay tile	14 to 17 (sanded 3 to 1)	18 to 20 (equal parts sand to be added)	35 to 40
Pyrobar gypsum tile	10 to 12 (sanded 3 to 1)	14 to 16 (equal parts sand to be added)	25 to 28

All conditions equal, these plasters are guaranteed to cover as much surface as any similar material made.

Bondcrete Plaster

This is the safest and best plaster made for direct application to interior concrete surfaces.

Bondcrete plaster is so compounded that it counteracts the bond breaking effect of the surplus water expelled from concrete during crystallization and drying out. It adheres strongly to the concrete because of its cementitious qualities and because it maintains a practically unchanging volume during the process of setting and hardening. Bondcrete plaster is dense, durable and fire resisting. The plaster works well under tools, and needs only water to fit it for use.

Average covering capacity, 125 to 140 yds. to the ton. Specifications on following page.

Ivory Keene's Cement

Ivory Keene's cement is made from the pure gypsum found at Southard, Okla.

The gypsum is carefully hand-selected, and up-to-date manufacturing processes, and rigid inspection insure maximum strength and perfect uniformity.

Ivory Keene's cement can be applied as a finishing coat over gypsum or lime bases. It requires the addition of water only to fit it for use.

The material is very hard and dense and will take a very high polish. Walls finished with it may be sponged with soft water without injury.

Ivory Keene's cement is equal to any imported "Keene's" for scagliola work. Shipped in new 100-lb. cloth sacks. Specifications on second page following.

Gypsum Prepared Finishes, Trowel and Sand Float

These finishes contain no lime; are ready for use when water only is added, and set extremely hard. They are thoroughly and uniformly mixed in absolutely correct proportions. As there is no lime to be slaked and no gauging, these finishes save time and labor. They work freely under the tools and their use does away with mistakes at the mortar box.

They set up hard within a few hours—no time lost waiting for walls to dry out. They eliminate lime trouble such as "pops," pits, map cracks, shrinking, staining. Their hard enduring surface is ideal for decorations. The finishes contain nothing to stain, bleach or discolor the most delicate tints. Decorations of any kind may be applied immediately following the drying out of the finish coat.

They are made in two general groups:

Group 1, Adamant finishes, have exceptional quality and hardness.

Group 2 finishes are very high grade materials that have been developed to supply the demand for a moderate cost prepared finish. See table below for brands, descriptions, etc. Specifications on second page following.

GYPSUM PREPARED FINISHES

Finish	Color and description	Covering capacity
	Group No. 1	
Adamant IXXX Adamant No. 1 Adamant No. 40	White, trowel Gray, trowel Slate, trowel	Ton covers 350 to 400 sq. yds.
Adamant IXX	Light gray sand float finish	Ton covers 250 to 300 sq. yds.
	Group No. 2	
Universal No. 3 Imperial W. T.	White, trowel	Ton covers 350 to 400 sq. yds.
Universal No. 1 Badger	Grayish-white trowel finishes	
Silico Imperial	Light gray sand float finishes	Ton covers 250 to 300 sq. yds.

Shipped in 100-lb. cloth and 80-lb. paper bags.

Aridize Gypsum Gauging Plasters for Lime Putty Finishes

These plasters are made from carefully selected raw materials under our patented process. This process, together with the uniform calcination and fineness to which the plaster is ground, insures rapid absorption and superior spreading qualities. See specifications for Lime Putty and Sand Float Finishes on second page following.

Slow-Set Brands—Gold Medal, Matchless Pearl, Quality. *Pure* white brands: Challenge, Star.

Quick-Set Brands—Michigan "A," Big Four, N.Y.C. Mills, "O. K.," Arden Superior Finish. *Pure* white brand, Champion.

Aridize Gypsum Moulding and Casting Plasters

These plasters are very carefully manufactured from specially selected white gypsum rock under our patented process, resulting in cool, smooth working and uniform setting qualities. U.S.G. Moulding No. 1, U.S.G. Moulding No. 2, and Golden Seal are exceptionally pure and fine ground. Ivory Moulding, N.Y.C. Mills and Arden Gypsum Casting brands are grayish white in color.

Ivory Hydrated Finishing Lime

This finishing lime is made of pure white limestone from Genoa, Ohio, which contains the highest percentage of magnesium (the component which gives to lime its whiteness and smooth, easy spreading qualities). It has exceptional covering capacity; 1 ton mixed with 1000 lbs. of gauging plaster covers about 1000 sq. yds. See specification for Lime Putty and Sand Float Finish on second page following.

Continued on next page

Gypsum Plaster Specifications

The following general directions apply to all brands of cement, plaster, wood fibre and prepared plasters:

(1) **General Directions—**

(2) Use a clean, tight mixing box, about 3½x7 ft., raised about 4 in. at one end. Mix with a hoe; the manufacturer disclaims all responsibility if mixing is done by machine.

(3) Use only clean water, free from alkali and impurities; keep tools clean. Never rinse tools in gauging water.

(4) Do not mix more material than can be applied in about 1 hour.

(5) Do not mix one gauging with another; and never retemper plaster after it has commenced to set. Clean the mixing box after each gauging.

(6) Keep plaster from freezing for 24 hours after application.

(7) In hot, dry weather, close all openings while plastering to prevent drying out of the material before it is set. Should this happen, however, and the work show soft, white spots, the condition can be remedied by sprinkling with clean water from a spray pump or brush until the material sets.

(8) After plastering has set, open the windows and permit the wall to dry out as quickly as possible.

(9) Keep plaster in a dry place; never store it on the bare ground.

Specifications for Gypsum Cement Plasters

(1) **General Requirements—**

(2) *Grounds*—To be not less than ¾ in. for ¼-in. Sackett or Adamant Plaster Board, wood, wire or expanded metal lath; ⅞ in. for ⅜-in. Sackett or Adamant Plaster Board; ½ in. for Pyrobar Tile; ⅝ in. for brick or clay tile.

(3) *Lathing*—Preferably ¼-in. or ⅜-in. Sackett or Adamant Plaster Board, applied according to manufacturer's specifications. If wood lath, it should be of good grade—free from knots, sap or bark. White pine, cypress or spruce lath are best. Must be well nailed; not less than 4 3d common nails to each 4-ft. lath, driven well home. Double nailing should be resorted to on very particular jobs, especially if lath are not up to standard in quality and condition.

Break joints every fifth lath, and do not permit ends of lath to butt or overlap; at least ¼ in. space between ends is best.

(4) *Mortar*—To be any brand of United States Gypsum Company's Cement Plaster (see page 368), and to be mixed and applied according to directions of the manufacturer.

(5) **Directions for Mixing—**

(6) First put in a layer of sand, then one of plaster in raised end of box. Hoe dry from one end of the box to the other, then back again, working sand and plaster thoroughly together to a uniform color. Put water in the other end of the box; hoe plaster into the water, mixing thoroughly. Mix thin at first, then add sufficient dry plaster and sand in right proportions to bring it to the proper consistency for application.

(7) Do not mix sand and plaster until ready to add the water.

(8) Use only dry, clean, sharp sand, free from loam and dirt. Screen through a 6-mesh screen. Avoid quicksand.

(9) *For Sackett Plaster Board, Wood, Wire and Expanded Metal Lath*—Mix 2 parts by weight of clean, sharp, dry sand with 1 part of plaster.

(10) *For Brick, Pyrobar Tile, Clay Tile and Second or Browning Coat*—Mix 3 parts by weight of clean, sharp, dry sand with 1 part of plaster.

(11) **Directions for Applying—**

(12) *On Sackett Plaster Board*—Do not wet board. Plastering to be 3-coat work, scratch coat to be allowed to set before brown coat is applied. *Plaster is to be ½ in. thick.* Straighten all angles and base ready to receive finish.

(13) *On Wood Lath*—If lath are dry, soak thoroughly the day before or several hours before applying the plaster, so that they will absorb all the water they can hold. Lay plaster on lightly, but with sufficient pressure to obtain a good key, and fill up grounds. Darby lightly, and use water sparingly.

(14) *On Wire or Expanded Metal Lath*—Apply a scratch coat, lightly covering the lath and filling meshes. After the scratch coat is set firm and hard, but before it is dry, apply the second coat, bringing it to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

(15) *On Brick, Pyrobar Gypsum Tile, or Clay Tile Walls*—Soak brick or clay tile walls thoroughly—and if necessary sprinkle Pyrobar lightly—to reduce the suction. Supply sufficient material to fill out grounds. Bring to a straight and even surface with rod and darby, ready to receive the finishing coat. Darby lightly and use water sparingly.

Specifications for Gypsum Wood Fibre Plasters

See General Directions, No. 1, in opposite column.

(16) **General Requirements—**

(17) *Grounds and Lathing*—Same as specified for cement plasters, 2 and 3 in opposite column.

(18) *Mortar*—To be any brand of the United States Gypsum Company's Wood Fibre Plaster, to be mixed and applied according to directions of the manufacturer.

(19) Only water is to be applied to this material to fit it for application, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

(20) **Directions for Mixing—**

(21) Place the plaster in upper end of box and water in lower end. Hoe the plaster into the water and allow it to soak from 10 to 20 minutes. Then mix to correct consistency.

(22) **Directions for Applying—**

(23) *For Sackett Plaster Board*—Do not wet board. Plastering to be 3-coat work, scratch coat to be allowed to set before brown coat is applied. Plaster is to be ½ in. thick. Straighten all angles and base. Leave base coat rough to receive finish.

(24) *Wood Lath*—If lath are dry, soak thoroughly the day before or several hours before plastering. Apply first a thin coat of mortar, following up at once before it sets with sufficient material to fill out the grounds. When the wood fibre is to be troweled down smooth for a finish, it should be used neat. When a float or trowel finish coat is desired, the surface of base coat must be broomed—left rough—to receive the finish. Broom before the plaster begins to set.

(25) *For Wire and Metal Lath*—Apply the mortar a little stiff. Scratch a thin coat on the lath. After this coat is set hard, apply a second coat mixed same as for brick (see No. 26) straightening up the walls. The second coat should be left rough or broomed to receive the finish.

Note: The company also manufactures wood fibre plaster under a formula allowing the use of an equal amount of sand by weight, but recommends the use of the neat material for application to wood lath and plaster board, as the addition of sand reduces the flexibility and toughness and adds weight.

(26) *For Pyrobar Tile, Brick or Clay Tile*—Mix equal parts by weight of plaster and clean sharp sand. Apply plaster in usual manner. Material must be specially retarded for use with sand.

Specifications for Sanded Wall Plasters

See General Directions, No. 1, in opposite column.

(27) **General Requirements—**

(28) *Grounds and Lathing*—Same as specified for cement plasters, Nos. 2 and 3, in opposite column.

(29) *Mortar*—To be any brand (see preceding page) of the United States Gypsum Company's Sanded Wall Plaster.

(30) **Directions for Mixing and Applying—**

(31) Nothing is to be added to this material but water, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

(32) Put plaster in one end and water in the other end of box. Hoe plaster into water, mixing thoroughly. Mix thin at first, then add a sufficient amount of dry material, and work to proper consistency for application.

Apply same as specified for cement plaster, Nos. 11, 12, 13, 14 and 15, in opposite column.

Specifications for Bondcrete Plaster

General Requirements—

Caution—Use rough form boards. Avoid dressed or oiled boards. The concrete surface must be dry and free from dust, oils and efflorescence before base coat plaster is applied. If oil or grease is on the concrete surfaces, burn off with a torch. If there is any efflorescence, remove the frost with a wire brush, then wash with a diluted solution (1 to 5) of muriatic acid. Wash off acid with clean water.

Mortar—To be Bondcrete Plaster, manufactured by the United States Gypsum Company, only water to be added, the plaster to be mixed and applied according to direction of manufacturer.

Grounds—To be of sufficient thickness to bring to a true and even surface.

Directions for Mixing and Applying—

Same as for unsanded wood fibre plaster, Nos. 20 and 22, on this page.

Specifications for Ivory Keene's Cement

For a smooth, hard finish, add water only, mix thoroughly, bring to working consistency, and apply. In applying, follow directions for Prepared Trowel Finishes on next page. A

Continued on next page

smooth, highly polished surface may be produced by rubbing the walls with a cloth after the cement is dry.

In cases where extra plasticity is desired, 1 pail of lime putty may be added to each 100-lb. bag of Ivory Keene's Cement.

Specifications for Prepared Trowel Finishes

General Requirements—

Trowel Finish—To be Adamant, Imperial, Ivory or Universal Light Gray Trowel Finish or Adamant, Universal or Imperial White Trowel Finish, to be mixed and applied according to directions of manufacturer.

These finishes require nothing added but water to fit them for application, and under no circumstances will the contractor be allowed to mix in other material.

Directions for Mixing—

Observe "General Directions No. 1," on preceding page, except use a small mixing box, about 2 ft. 6 in. x 4 ft. 6 in. x 10 in. deep.

Put material in raised end of mixing box and water in lower end. Hoe the material into the water (using approximately 1 part of water to 2 parts of material measured by volume). Allow the material to soak and draw in the water without hoeing for at least 10 minutes. Then, after all the material has soaked and shows no further signs of air bubbles, mix thoroughly and, with particular care, break down the mix to a smooth, even, creamy consistency.

Bring the mix finally to a very thin consistency.

The mixture is too thin to carry in a hod; use a bucket.

Directions for Applying—

Base coat must be dry before finish is applied. If suction is too great, sprinkle lightly with clean water from a clean brush.

Apply in 3 coats. The first time over, put on enough material to cover the surface completely, using material as thin as possible, and grinding it thoroughly into the base coat. Allow this to draw a few moments to avoid blistering.

The second time over, lay the material on perfectly level; and the third time, make the material as thin as can be handled on the hawk and fill in cat faces and imperfections. After it has drawn a few moments, trowel to smooth surface, applying water with a damp brush. Do not drench with water, as it will kill the face of the material.

Work top and bottom of the wall at the same time to avoid joinings.

Caution—Never apply a finish coat on a base coat which contains frost, and keep from freezing for 24 hours after the finish is applied.

Specifications for Prepared Sand Float Finishes

General Requirements—

Sand Float Finish—To be Adamant White Sand Float Finish or Adamant, Imperial or Silico Gray Sand Float Finish, and to be mixed and applied according to directions of manufacturer.

These finishes require nothing but water to be added to fit them for application, and under no circumstances will the contractor be allowed to mix in sand or other solid material.

Directions for Mixing—

Same as for prepared trowel finishes above, but do not mix so thin.

Directions for Applying—

Float finish shall be applied after base coat has set firm and hard, but while still green and within 12 hours after base coat is applied.

Lay on with trowel and then use cork, carpet or felt float (cork float is best), working material to a true and even surface, free from float marks and cat faces.

Use as little water as possible in floating, so as to avoid killing the surface. Use damp brush only.

Do not attempt to float after the material begins to set.

Caution—Same as for trowel finishes, in column at left.

Specifications for Lime Putty and Sand Float Finishes

Add water to United States Gypsum Company's Ivory Hydrated Finishing Lime and allow lime to soak without hoeing for 24 hours.

Trowel Finish—Mix 3 parts of this lime putty by measure with 1 part of dry United States Gypsum Company's Gauging Plaster (see brands, page 368) equal to 2 parts of dry hydrated lime and 1 part dry gauging plaster by weight. Lime putty must stand 24 hours before mixing in the plaster. Mix thoroughly and apply in customary manner.

Float Finish—Use 1 part United States Gypsum Company's Unfibered Gypsum Cement Plaster (see brands, page 368) to 1 part clean, sharp sand. Screen sand through No. 12 screen. Mix thoroughly and apply in usual manner.

Modern Plant of United States Gypsum Company at Oakfield, N. Y.

TEXAS CEMENT PLASTER CO.

SALES OFFICE
OKLAHOMA CITY, OKLA.
MILL: PLASTERCO, TEX.

Products

TEXAS CEMENT PLASTER; FINISHING PLASTER.

Texas Cement Plaster

Texas cement plaster is cement and must be handled like cement to get results. It must be protected from dampness by being stored in a dry place, never on the ground, against a damp wall, or in any damp place when delivered to the building.

Texas cement plaster can not be re-tempered after the "set" begins. A very little "set" plaster in cement plaster mortar, whether from the mortar boxes, the water barrel in which tools have been washed, or droppings from the floor, will cause all of the plaster mortar to "set" too quickly.

Texas cement plaster mortar will "set" quick and work short if there is delay in tempering with water after sand has been mixed with it. It will spread a little easier if allowed to stand a few minutes after it has been tempered. To get the maximum tensile strength from Texas cement plaster it should be tempered as stiff as the mortar can conveniently be worked.

If finished walls are soft and chalky, it is because the water in the mortar has been evaporated before the plaster has "set." Spraying the walls with clean water, or with brush and water having powdered alum dissolved in it, is the remedy.

Specifications for Texas Cement Plaster

Studs and Joists—To be spaced not more than 16 in. between centers.

Grounds—To be ¾ in. for plaster board, wood lath and metal lath; ½ in. for gypsum blocks; ¾ in. for clay tile.

Plaster Boards—To be spaced ¼ in. apart; with nailing edges bearing at least ¾ in. on stud or joists; with horizontal joints in walls and joints at right angles with ceiling joists, broken at each board; and with vertical joints on opposite sides of partitions, not on the same studs; to be well nailed to studs, joists or furring, with 1¼-in. No. 11½ gauge, 7/16-in. head wire nails, spaced not more than 6 in. apart; all of the center of each board to be nailed before the edges are nailed.

Wood Lath—To be of good quality, straight grained, and free from knots, bark and sapwood. To be spaced ⅜ in. apart with not less than ⅛-in. space between ends; with joints broken every fifth lath. To be well nailed to each stud and joist with 3d lathing nails.

If lath are dry, they are to be thoroughly wet at least 4 hours before mortar is applied to them, so that they will not swell nor warp after the plaster is on them.

Grooved Sheathing Lath—To be well nailed to studs spaced not more than 16 in. between centers; to be spaced at least ⅛ in. apart, and to be thoroughly wet at least 4 hours before plaster is applied to them, so that they will not swell nor warp after plaster is on them.

Brick and Tile—To be dampened before plaster is applied to them.

Concrete—The surface to be cleaned free from all efflorescence, dust, dirt and oil and, where very smooth, to be well hacked before mortar is applied.

Sand—To be clean, sharp and free from clay, soil, alkali, salt and quicksand.

Mortar—*Hair Fibered and Unfibered Plasters on Plaster Board*—To be 1 part plaster and 2 parts sand.

On Wood Lath and Metal Lath—First coat to be 1 part plaster to 1½ parts sand; second coat to be 1 part plaster to 2 parts sand.

On Brick and Tile—To be 1 part plaster to 2½ parts sand.

On Concrete—To be equal parts plaster and sand.

Mortar—*Wood Fiber Plaster*—For making extremely light, tough plastering, it is recommended that the wood fiber plaster be used without sand, but it will make excellent plaster when the mortar is equal parts of the wood fiber plaster and clean sharp sand.

TRADE-MARK

Mixing Sanded Mortar—All mortar to be mixed in clean, tight boxes; the plaster and sand to be first thoroughly mixed dry, then immediately tempered with sufficient water to make good stiff mortar. No part of one batch of mortar is to be mixed with another batch in the mortar box or on the mortar board, and no mortar is to be used or worked after it has partly set. Mortar box, tools, hods, mortar board and water to be kept clean and free from set and partly set plaster, unless quick setting mortar is desired.

Application—*Mortar to Plaster Board*—The boards not to be wet before mortar is applied. All spaces between boards to be well filled with mortar, either by pointing the joint with quick setting neat plaster, or by carefully pressing the mortar used for first coat into the spaces between the boards as the first coat is put on. The second coat to be straightened with rod and darby ready for the finish coat, and must not be floated.

To Wood Lath—First coat to be applied with sufficient pressure to form good keys, leaving a light coat of mortar over the lath, with surface rough. The second coat to be applied with strong pressure, when the first coat has set hard but before the first coat is dry, and is to be straightened with rod and darby, broomed ready for finish coat, and must not be floated

To Metal Lath—The first coat to be applied so as to fill the meshes and lightly cover the lath. The second coat to be applied when the first coat is set hard, but before the first coat is dry.

To Brick and Clay Tile—Crooked, uneven walls to be first straightened by filling the low places with mortar. After mortar used to straighten walls has set, sufficient mortar to fill out to grounds to be applied with strong pressure and straightened ready for finish coat.

To Concrete—Where work can be straightened with 1 light coat of mortar, sufficient mortar to fill out to grounds is to be applied in 1 coat with strong pressure, and straightened ready for the finish coat. Where work can not be straightened with 1 light coat 2 coats are to be applied; the first coat to be set hard before applying second coat.

Specifications for Finishing Plaster

Mortar—*For Smooth White Finish*—To be 1 measure of Plaster Paris finishing plaster to not more than 3 measures of perfectly slaked lime putty; the plaster and lime to be thoroughly and uniformly mixed.

For Cement Finish—To be 3 measures of unfibered cement plaster to not more than 1 measure of perfectly slaked lime putty, thoroughly and uniformly mixed.

For Sand Float Finish—To be unfibered cement plaster, perfectly slaked lime putty, and clean, sharp sand, thoroughly mixed in the proportions of 4 measures of plaster, 1 measure of lime and 5 measures of sand.

Application—*Finish Coat*—Trowelled finish coat to be applied after base coat has set and dried, the base coat to be slightly dampened to reduce suction, before finish coat is applied.

Sand Float Finish Coat—The base coat to be set hard, but not dry, when finish is applied.

Care of Plaster

In hot, dry and windy weather, plastering is to be protected from wind, and, if necessary, sprinkled with water, to prevent the plaster drying out too much before it is set.

In freezing weather, plaster to be protected from frost until open, so that the plastering will dry quickly.

Guarantee

All products are fully guaranteed to be of the best quality, and to give the best of results when used in accordance with above specifications.

JACOBSON & COMPANY

Craftsmen, Designers and Plasterers

241 East 44th Street

NEW YORK, N. Y.

Products

Specialists in ARCHITECTURAL PLASTERING, DECORATIVE SCULPTURE, STUCCO and CEMENT STONE PRODUCTS of every description; COMPOSITION ORNAMENTS for Woodwork; Expert CHIMNEYPIECE makers.

Scope of Service

Monumental buildings such as banks, theaters, public buildings and private homes of distinction are especially within the scope of JACOBSON & COMPANY and contracts may include metal furring and lathing besides all plain or ornamental plastering.

General

JACOBSON & COMPANY make ornaments in plaster and composition for interior and exterior purposes, particularly for theaters, banks, public buildings and fine residences.

Famous early English masterpieces of plaster work are reproduced. Architects who have visited the studios of this company, 241 East 44th Street, New York City, have gained a perfect understanding of the unusual products on display, such as ceilings, chimneypieces and plastic embellishments, many modeled from the originals in the old world.

Chimneypieces reproduced from originals designed and carved in the earlier centuries, provide the one feature of interior decoration that is most valued by the residence owner of discriminating mind. The true beauty of these reproductions lies in their faithfulness to the original and their true stone texture. They are not adaptations of ideas, or copies in part, but careful perfect replicas, showing, in the new, the most minute evidences of age as in the old.

Lignoid compo ornaments come in a great variety of designs. When stained or painted the desired color, they have all the effect of expensive natural wood, richly carved.

JACOBSON & COMPANY manufacture decorative artificial stones for interior, and stucco for exterior work.

Catalogue

Write for catalogue of designs. From the many plates an antique design best suited to any room interior can be selected. A new catalogue of Old English ornaments has just been issued.

TYPICAL EXAMPLES OF JACOBSON ARCHITECTURAL ORNAMENTS IN PLASTER OR ART STONE

THE ASSOCIATED TILE MANUFACTURERS

Tiles, Ceramic Mosaic and Faience

BEAVER FALLS, PA.

MEMBERS OF THE ASSOCIATION

ALHAMBRA TILE COMPANY
Newport, Ky.

AMERICAN ENCAUSTIC TILING CO., LTD.
Zanesville, Ohio
Maurer, N. J.
Los Angeles, Cal.
New York, 16 East 41st Street

BEAVER FALLS ART TILE COMPANY
Beaver Falls, Pa.
New York, 156 West 49th Street
Chicago, 306 South Wabash Avenue

CAMBRIDGE TILE MANUFACTURING COMPANY
Covington, Ky.
New York, 2-4 West 19th Street

GRUEBY FAIENCE AND TILE COMPANY
Perth Amboy, N. J.
New York, 9 East 45th Street

MATAWAN TILE COMPANY
Matawan, N. J.

MOSAIC TILE COMPANY
Zanesville, Ohio
Matawan, N. J.
New York, 327 West 42nd Street

NATIONAL TILE COMPANY
Anderson, Ind.
New York, 1328 Broadway
Chicago, 59 East Adams Street
St. Louis, 1982 Railway Exchange Building
San Francisco, 1003 Crocker Building

OLD BRIDGE ENAMELED BRICK AND TILE CO.
Old Bridge, N. J.
Chicago, 122 South Michigan Boulevard
San Francisco, Maskey Building

THE C. PARDEE WORKS
Perth Amboy, N. J.
New York, 9 East 45th Street

PERTH AMBOY TILE WORKS
Perth Amboy, N. J.

UNITED STATES ENCAUSTIC TILE WORKS
Indianapolis, Ind.
New York, 101 Park Avenue
Chicago, 918 First National Bank Building

WHEELING TILE COMPANY
Wheeling, W. Va.

Products

Members of THE ASSOCIATED TILE MANUFACTURERS specialize in the manufacture of VITREOUS, SEMI-VITREOUS, INLAID, CERAMIC MOSAIC and ART MOSAIC TILES for floors; GLAZED, ENAMELED, EMBOSSED, DECORATED and TRIM TILES for walls, ceilings, etc.; and FAIENCE for walls and floors—in all standard and many special sizes and shapes in a great diversity of colors.

Co-operative Service

A service department is maintained by this Association to meet the occasional need of architects for information of a technical character. The service extends not only to tiles, but to any and all parts of a structure which in any way have to do with the successful installation of tiles. Architects are assured that the service is purely co-operative and separate from promotion work. The department will assist in selecting and specifying tiles best suited for any purpose, or in solving problems that involve special conditions or requirements.

Merits of Tile

An unlimited range of colors and textures makes tile a very desirable material for decorative purposes. Its use in the architectural triumphs of all ages speaks plainly for its artistic merit.

The practical advantages of tile include: Absolute sanitation, easy cleaning qualities, unexcelled wearing qualities and durability, and permanency of colors. It is absolutely fireproof, and acidproof to all acids except hydrofluoric.

Scope of Use

All classes and sizes of buildings or other places requiring sanitary, durable, fireproof or decorative treatment are proper fields for tile, and there is no limit to either its usefulness or appropriateness. Its scope is as wide and varied as the work of the architect.

Any one of the kinds of tile enumerated is suitable for interior work.

For exterior surfaces, especially in colder climates, the vitreous varieties and Faience are to be preferred.

Stucco and concrete buildings are now decorated to an ever increasing extent with tile borders, panels and inserts. This form of decoration is the simplest and most satisfactory means of adding color to concrete houses.

Certification of Grades

Special attention is called to the necessity and the advantages of incorporating into specifications on tile-work a clause requiring that the tile contractor furnish a certificate on the special form of Grade Certificate issued by THE ASSOCIATED TILE MANUFACTURERS for all tile used, as provided for in the Basic Specifications for Tile-work. These certificates of grade will be issued by each member of this Association on request at time of shipment, with such identifying information as may be necessary.

Publications

Of particular value to architects are the two latest technical publications entitled: "Tiles—No. K-200, Basic Information," and "No. K-300, Basic Specification and Related Documents." The first book contains complete information about the various kinds of tiles, the second gives in detail the procedure to be followed with respect to any kind of tile installation in connection with practically every type of construction, and is especially prepared for the use of architects, specification writers and architectural draftsmen. Mailed on application.

THE ASSOCIATED TILE MANUFACTURERS have also issued books on the use of tile in homes, hospitals, swimming pools and butcher shops, which are available and will be mailed free to architects on request. Others are in course of preparation.

Continued on next page

THE ASSOCIATED TILE MANUFACTURERS
BEAVER FALLS, PA.

CONDENSED LIST OF TILES
AND THEIR CHARACTERISTICS

KIND OF TILES	GRADES (see note)	THICKNESS	SHAPES AND SIZES	COLORS	SURFACES AND FINISHES
CERAMIC MOSAIC	Sel (In White) Sel. & Com	$\frac{1}{4}$	Square $\frac{3}{4}$ $\frac{1}{2}$ Oblong $2\frac{1}{16} \times 1$ $1\frac{1}{16} \times \frac{1}{2}$ Hexagon $1\frac{1}{4}$ 1 Round $\frac{13}{16}$	see Vitreous and Semivitreous Tiles	Unglazed
Enamel Mosaic Glazed Mosaic	Sel			see Dull Glazed Tiles	Bright
Dull Glazed Mosaic Matt Glazed Mosaic					Dull Matt
PLASTIC MOSAIC	Sel	Variable	Any shape or size less than $2\frac{1}{4}$ square inches in area	see Plastic Tiles	Plain or Embossed Unglazed
FAIENCE MOSAIC	Sel	Variable		see Dull Glazed Tiles	Plain or Embossed Bright, Dull or Matt
VITREOUS TILES Glazed Dull Glazed Matt Glazed	Sel and Com.	$\frac{1}{2}$	Square 3 $2\frac{1}{8}$ $1\frac{1}{2}$ $1\frac{1}{16}$ Oblong $3 \times 1\frac{1}{2}$ 3×1 $3 \times \frac{1}{2}$ $2\frac{1}{8} \times 1\frac{1}{16}$ $1\frac{1}{16} \times \frac{17}{32}$ Hexagon 3 2 Octagon 3 Triangle 3 $1\frac{47}{64}$ $1\frac{5}{32}$	White, celadon, silver-gray, green, blue green, light blue, dark blue, pink, cream, and "granites" of these colors.	Unglazed Bright Dull Matt
SEMIVITREOUS TILES Glazed Dull Glazed Matt Glazed	Sel		Same as Vitreous Tiles, also Square 6 $4\frac{1}{4}$ Oblong 9×3 6×4 6×3 6×2 $6 \times 1\frac{1}{2}$ $6 \times \frac{3}{4}$ $6 \times \frac{1}{2}$ $4\frac{1}{4} \times 2\frac{1}{8}$ $4\frac{1}{4} \times 1\frac{1}{16}$ Hexagon 6 $4\frac{1}{4}$ 6×3 $4\frac{1}{4} \times 2\frac{1}{8}$ Octagon 6 $4\frac{1}{4}$ Pentagon $5\frac{5}{16} \times 2\frac{1}{8}$	Buff, salmon, light gray, dark gray, red, black, chocolate and "granites" of these colors	Unglazed Bright Dull Matt
Flint **PAVING TILES**	Sel and Com	$\frac{3}{4}$	Square 6 $4\frac{1}{4}$ Oblong 6×4 6×3 $6 \times \frac{1}{2}$ Hexagon 6 $4\frac{1}{4}$ Octagon 6	White, light gray, dark gray, celadon, sage, light blue, dark blue, green, cream	Unglazed
Hydraulic	Sel.	$\frac{3}{4}$ and $\frac{21}{32}$	Square 6 $4\frac{1}{4}$ Oblong 9×3 6×3 10×5 $6 \times \frac{1}{2}$ Hexagon 6 $4\frac{1}{4}$	see Semivitreous Tiles	
WHITE GLAZED TILES	Sel., Std., and Com.	$\frac{1}{2}$ and $\frac{3}{8}$	Square 6 $4\frac{1}{4}$ 3 $2\frac{1}{8}$ $1\frac{1}{2}$ $1\frac{1}{16}$ $\frac{3}{4}$ $\frac{1}{2}$ Oblong 6×3 6×2 $6 \times 1\frac{1}{2}$ 6×1 $6 \times \frac{3}{4}$ $6 \times \frac{1}{2}$ $4\frac{1}{4} \times 2\frac{1}{8}$ $4\frac{1}{4} \times 1\frac{1}{16}$ $3 \times 1\frac{1}{2}$ 3×1 $3 \times \frac{1}{2}$ $3 \times \frac{1}{4}$ $2\frac{1}{8} \times 1\frac{1}{16}$ Hexagon 3 2 Octagon 3	White	Plain or Embossed Bright
DULL GLAZED TILES **MATT GLAZED TILES** **ENAMELS**	Sel and Com.	$\frac{1}{2}$		Selection must be made from samples and colors specified by numbers.	Plain or Embossed Dull, Matt, Bright
PLASTIC TILES	Sel	$\frac{1}{2}$ and over	Obtainable in all of the above and special sizes	Colors that result from firing of natural clays	Plain or Embossed Smooth or Rough
FAIENCE	Sel and Com			see Dull Glazed Tiles	Plain or Embossed Bright, Dull, Matt

Grades: Sel = Selected, Std. = Standard, Com = Commercial
For complete information see our publication No. K-200, Basic Information on Tiles
Copy will be sent to architects and members of their organizations

AMERICAN ENCAUSTIC TILING CO., LTD.

Aetco Floor and Wall Tile Products

16 East 41st Street
NEW YORK, N. Y.

OFFICES

NEW YORK, N. Y. CHICAGO, ILL. ST. LOUIS, MO. ZANESVILLE, OHIO. MAURER, N. J. LOS ANGELES, CAL.

WORKS

CENTRAL PLANT: ZANESVILLE, OHIO WEST COAST PLANT: LOS ANGELES, CAL.
EAST COAST PLANT: MAURER, N. J.

Products

WALL and FLOOR TILES of every description.

DECORATIVE ARCHITECTURAL FAIENCE and FAIENCE TILE.

TRADE-MARK

Character, Scope and Extent of Use

It is not possible to enumerate the various types of product made by the AMERICAN ENCAUSTIC TILING CO., LTD., in this limited space; these cover every type of wall and floor tile, faience for interior and exterior decoration, and special structural pieces.

In over 90% of the open specification for tile drawn up by architects in the United States, the standard phraseology for quality is "American Encaustic or equal"; in about 10% a direct specification is made of the product without alternate, this latter proportion being on the increase.

A new type of bathroom fixtures has recently been designed, introducing novel features in design and structure; an illustrated booklet is published. Many staple and decorative lines are made exclusively by this company regarding which information will be supplied.

As the sanitary properties of tile now rank second to its decorative capacity, architects are recommended to apply to our Art Department, 16 East 41st Street, New York City, stating conditions and requirements for effect.

New decorative developments are now matters of almost daily occurrence, owing to the fact that decorative interest is desired for the simplest installations; this phase of the industry has hitherto been undeveloped. Sketches are supplied on application to the Art Department.

RECEPTION ROOM OF THE AMERICAN ENCAUSTIC TILING COMPANY'S OFFICE, THE AETCO BUILDING, 16 EAST 41ST STREET, NEW YORK, N. Y.
Faience used exclusively for architectural detail

MUELLER MOSAIC COMPANY

Tilemakers

TELEPHONE, 1210

WORKS AND MAIN OFFICE
TRENTON, N. J.

NEW YORK SHOWROOM: Rossman's, Seventh Avenue and 49th Street—Telephone, Bryant 3626

Products

Floor and Wall Tile.
Faience.
Mosaics.
Frostproof Exterior Tile.
Mural Decorations.

FAIENCE M M C
TRADE-MARK

Signs

Weatherproof and frostproof in all colors and styles.

Norman-Flash Mosaic

A characteristic non-slip flooring for interiors.

Flemish Tile

For porches, lobbies, garages, etc. A strong artistic flooring product.

Architectural Work

Special designs, mouldings, decorative details, etc.

Ecclesiastical Work

Floor and wall tiling, emblems, etc.

Standard and Special Sizes

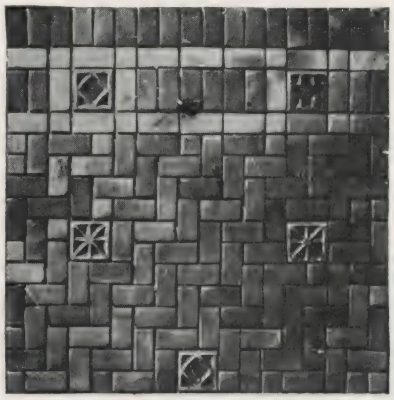
Standard sizes of every known shape. Special sizes and shapes.

Colors

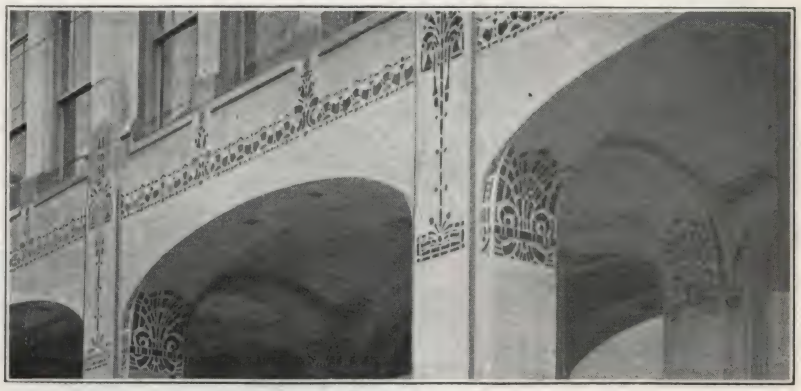
A complete palette of harmonizing colors and tints.

Co-operation

Suggestive designs, samples and desired information promptly furnished.



Flemish Herringbone



Faience Inserts in Stucco

Exterior of Store in Mueller Faience

Faience Tile and Brick

NATIONAL FLOOR TILE COMPANY

Manufacturers of Floor Tile

MAIN OFFICE AND WORKS
MOBILE, ALA.

EASTERN DISTRIBUTORS: LIGHT, HOLLISTER & FERGUSON, INC., Engineers, Land Title Building, Philadelphia, Pa.

Products

"ADAMANTILE" FLOOR TILE.
"ADAMANTILE" STRAIGHT BASE.
"ADAMANTILE" COVE BASE.
"DIAMANTILE" FLOOR TILE.

Co-operative Service

This company is prepared to render such services as may be desired by architects in the design, manufacture and installation of "Adamantile." Architects are cordially invited to consult them on the many uses and effects to be secured through the installation of plain colored and designed "Adamantile."

"Adamantile" is shipped to all parts of the United States, and exported to foreign countries.

Merits of "Adamantile"

The practical merits of "Adamantile" include durability, non-slip surface, permanence and variety of colors, flexibility of designs, sanitary, sound-resisting and absolute fireproof qualities. It does not warp, and possesses the rare virtue of improving in beauty with age. "Adamantile," because of its extremely hard, smooth surface, is very desirable for spaces subjected to hard usage, and because of its wide range of colors and flexibility of design, it is very appropriate for spaces where decorative effects are required.

Manufacture of "Adamantile" and "Diamantile"

In the manufacture of "Adamantile" and "Diamantile" only the highest grade of materials and mineral colors are used. By pouring the raw materials, by hand, into specially constructed, highly polished steel molds, and subjecting same, while plastic, to an enormous hydraulic pressure, all voids are excluded, and an absolute uniformity of size, and a perfectly flat, smooth surface is obtained. The high standard of workmanship entering into the manufacture of "Adamantile" and "Diamantile" is maintained through employing only the most highly skilled Spanish tilewrights, who acquired the art from their fathers. For this reason, "Adamantile" is sometimes called Spanish tile.

"Adamantile" is made in all plain, solid colors and shades, and in a great variety of color designs in well-known Spanish and conventional patterns. New designs are constantly being added, and this company has the facilities for executing any special designs that may be submitted by architects.

"Diamantile" is made in all plain, solid colors, but differs from "Adamantile" in that small aggregates are mixed with the face material. The tile is then rubbed, which brings out the aggregates, and produces a very striking effect.

PATTERNS HARMONIOUS WITH AND ENTIRELY SUBORDINATED TO ARCHITECTURAL DESIGN ARE TO BE HAD IN "ADAMANTILE"

Publications

The NATIONAL FLOOR TILE COMPANY has color plates of many designs for which dies have been made. These are available, and will be mailed free to architects upon request. There is also other literature available, and issued from time to time, and if desired will be mailed when issued. In addition photographic reproductions of some prominent "Adamantile" installations are available, and will be sent to interested architects.

Standard Method for Setting "Adamantile" and "Diamantile"

Section 1, Foundation—A perfectly solid and level foundation free from spring or vibration is absolutely necessary.

Tile must be laid on:

A—A concrete bed of not less than 2½-in. thickness (cinder concrete beds should be not less than 3½ in.); or

B—A concrete bed of 1½ to 2-in. thickness with a leveling coat of a thickness to complete 2½ in. on top; or

C—A sand concrete bed of not less than 2½-in. thickness, laid in successive layers of about 1 in. each.

The surface of this bed must be uniformly rough and brought to within 1½ to 2 in. of the finished floor line, leaving ¾ to 1¼ in. for cement mortar setting bed.

Section 2, Concrete—Shall consist of 1 part portland cement, 2 parts clean, washed sand, and 4 parts clean gravel, broken stone or clean washed cinders.

Cinders containing sulphur in any form shall not be used for work requiring steel reinforcing material. In all cases, cinders (vitreous clinkers) shall be washed free of unburned coal and ashes or particles smaller than ¼-in. in diameter. The strength of cinder concrete is very low, being about one-half that of good stone or gravel concrete, but it is very much lighter.

Thoroughly mix cement and sand dry; add gravel, broken stone or cinders, and mix again; then add sufficient water to make a firm mortar when tamped or floated to a bed.

Concrete shall be allowed to harden thoroughly before laying the tile, and care taken that it is perfectly

Continued on next page

clean. If concrete has been installed for any length of time, all dust must be brushed from it, and the surface shall then be thoroughly saturated with clean water, and dry cement evenly sprinkled over it to a thickness of about $\frac{1}{16}$-in., before cement mortar is spread.

The leveling coat shall consist of 1 part portland cement and 4 parts clean, washed sand, and shall be placed immediately after the concrete.

The sand concrete shall consist of 1 part portland cement and 5 parts clean, washed sand.

Section 3, Floors in New Buildings—Joists shall be set 5½ in. below the finished floor line (for small floor areas 5 in. is sufficient), spaced 12 in. on centers, thoroughly bridged to make a stiff floor, free from spring or vibration, covered with 1-in. rough boards not over 6 in. wide, ¼ in. apart to allow for swelling, and thoroughly nailed. Place a layer of tar paper on top of rough floor to protect boards from moisture of the concrete and prevent water from dripping through to the ceiling below.

Section 4, Iron Beams—Shall be set 5 in. below finished floor line to permit an adequate foundation for the tile floor. A metal or hollow tile cover shall be placed on top of the beams to take care of expansion and contraction and obviate the likelihood of cracks from this source.

Where hollow tile arches are used, the covering coat must conform to the requirements of Sections 1 and 2.

Section 5, Floors in Old Buildings—Joists shall be thoroughly bridged and free from spring and vibration. Where strength of joists permit, 1 in. or more should be cut off the top. Where joists are too weak, they shall be strengthened by securely nailing cleats, 6 in. wide, the full length of the joists. The upper edges of the joists must be chamfered off to a sharp point, thus reducing the bearing and the chance of cracking in case of settlement.

Cleats shall be nailed to joists 5½ in. below finished floor line (for small areas 5 in. is sufficient), and short pieces of board (not over 6 in. wide), ¼ in. apart, fitted between the joists on the cleats, and well nailed. A layer of tar paper shall be placed over the boards and carried up the joists; separate pieces shall then be put closely over the joists and overlapping those on boards.

The method described in section 3 should be used wherever possible.

Section 6, Floor Binder (Optional)—Open and well painted, expanded metal or galvanized wire netting shall be placed on top of leveling coat of concrete, overlapping at least 6 in. where more than 1 width is required. Wire netting should be stretched tightly and fastened at ends. This reinforcement will tend to counteract volume changes within cement mortar as well as distribute strains, and thus prevent floor cracks.

Section 7, Cement Mortar—Shall consist of 1½ parts portland cement and ½ part hydrated lime, and 5 parts clean, washed sand, thoroughly mixed as directed for concrete (Section 2). Cement mortar must be used while fresh, before it reaches its initial set.

Section 8, Sand Cushion (Optional)—On top of leveling coat of concrete spread ¼-in. of clean sand evenly over face of the foundation. When this method is employed the sprinkling of dry cement on top of foundation mentioned in Section 2, is to be omitted; also the floor binder or reinforcement under Section 6 will be unnecessary.

Section 9, Laying Floor Tile—Clean foundation thoroughly, then prepare same as noted in Sections 2, 6 or 8. Lines should then be stretched to mark the first course of tile, which should preferably be in center of space to be tiled. This line should be supported at intervals so that it would represent the floor level. If area is large and several workmen are employed, other lines crossing the first at right angles should be stretched.

Mortar should then be spread for 3 or 4 tiles at a time, using a square and level on every course to keep the tile even and the joints uniform. As the tiles are placed in the mortar they should be tamped down with the handle of a hammer until they are absolutely level and firmly imbedded in the cement, and at precisely the proper grade.

Tile shall be thoroughly soaked in clean water for 20 minutes and allowed to drain the same length of time, before laying.

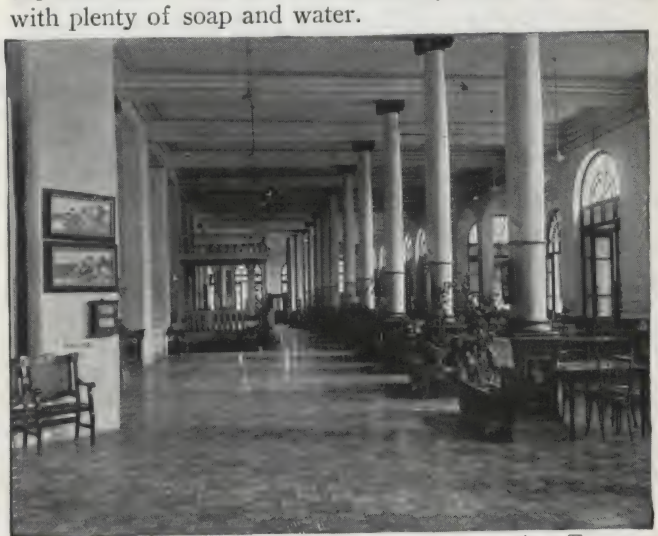
Only a small amount of mortar should be spread at one time and all joints of unfinished portions should be beveled off.

Joints shall be grouted with portland cement mixed with water to the consistency of cream. Use broom to wash this grout into joints. After dry cement has been sprinkled on the floor, remove all surplus of the grout with sawdust and excelsior or bagging.

All floor tile laid on one day shall be grouted not later than the following morning to insure a proper bond between grouting and cement mortar.

Section 10, Cleaning Floor Tile—A white scum caused by cement sometimes appears on the surface of the floor tile. This can be removed by frequent washing with plenty of soap and water.

DIGNITY AND SIMPLICITY OF DESIGN ARE OBTAINED IN THIS SIMPLE ARRANGEMENT OF BLACK AND WHITE "ADAMANTILE" AND "DIAMANTILE"



INTERIORS OF HOTELS, CLUBS AND APARTMENTS ARE ENRICHED WITH "ADAMANTILE"

THE ROOKWOOD POTTERY COMPANY

TELEPHONE
CANAL 6135, 6136

MAIN OFFICE AND WORKS
CINCINNATI, OHIO

EASTERN BRANCH OFFICE
NEW YORK, N. Y., Architects Building, 101 Park Avenue—Telephone, Murray Hill 6459

Products

"ROOKWOOD" MAT GLAZED ARCHITECTURAL FAIENCE; FLOOR and WALL TILE; DECORATIVE TILE; GARDEN ORNAMENTS; POTTERY.

Facilities

Complete architectural faience and pottery plants unrivaled in their technical resources and representing 42 years' experience in the making of faience bodies and colored glazes.

The plants are thoroughly equipped to execute the designs of architects and decorators, or special designs by Rookwood artists, working in collaboration or independently.

Rookwood artists, selected especially on account of their skill in the ceramic arts, can be depended upon to produce decorative effects of individual character and of the highest artistic merit.

"Rookwood" Mat Glazes

The charm of "Rookwood" mat glazes lies largely in their variations of shade and texture. These arise from delicate changes in the glaze structure occurring in the fire and calculated upon in the composition of the glazes.

These variations are not sufficient to throw any color out of harmony, but only such as stamp the material with its true character as a product of one of the arts of fire.

No attempt is made to have it otherwise, and those who seek the monotonous uniformity of a painted wall will not find it in "Rookwood."

Adaptability

"Rookwood" products have the widest range of decorative possibilities, varying from a tile insert to the complete decorative or sanitary treatment of the walls, floors and ceilings of rooms, including all architectural features or members in any form or combination of colors.

The accompanying illustrations suggest a few of the many uses in which "Rookwood" products have been employed.

Estimates and Co-operation

Assistance will be given in the adaptation of materials and architects' designs, and in estimating costs for appropriations. Satisfactory results require that faience should be specified under allowance, reserving to the architect the right of selection. Appropriate forms sent on request.

THE ROOKWOOD POTTERY COMPANY does not contract for installation.

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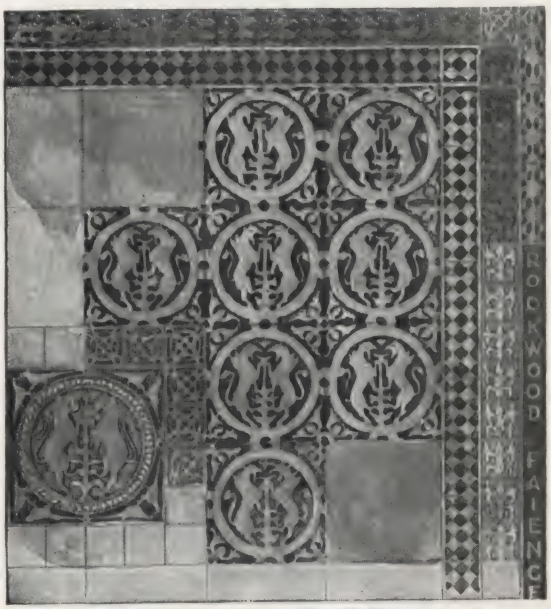
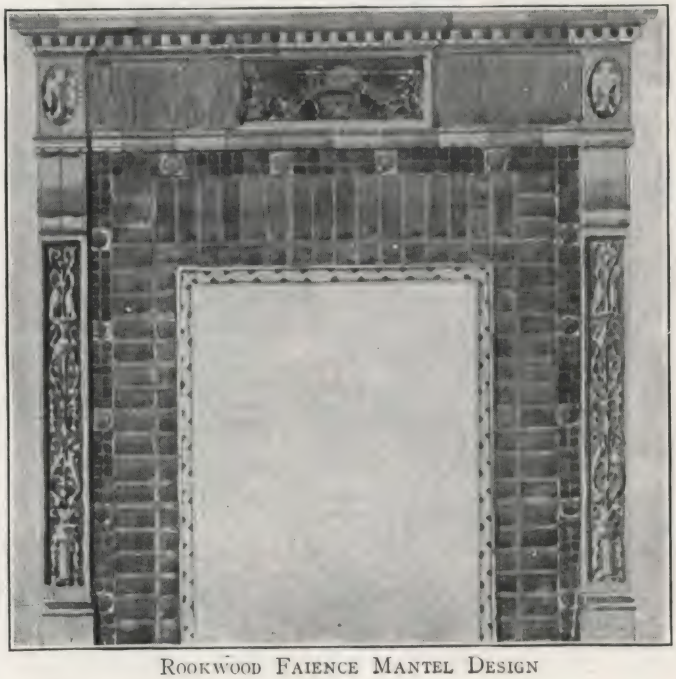
Continued on next page

Rookwood Vases and Garden Pottery



Rookwood Faience Floor Design

Rookwood Faience Medallion for Wall Insert



Rookwood Faience Mantel Design

Rookwood Faience Bathroom

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Sanitary Swimming Pool Construction and Equipment

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Photographs of the oldest pools equipped by our organization, from 1894 to 1899, show plainly that architects treated them merely as water tanks. They have required no repairs, as they were sturdily built, but what they contain and what they do not contain make them curiosities in the light of subsequent development.

Radical initial developments originated by us have been and still are imitated, but not equaled or duplicated, and our list of completed operations, enthusiastically endorsed, is much too long for publication here. Over 250 pools include duplicate and triplicate orders from some architects.

Co-operative Service

Architects are invited to consult us at first stage of swimming pool design.

Details of Booraem features and working drawings of previous installations are at the disposal of architects for preparing layouts and specifications of any or all equipment. Itemized bids also furnished. All features are patented, providing full protection to owner as to cost and against infringement.

Ask for large cuts of prominent pools and other data in booklet.

Detail and Working Drawings

We furnish detail fabrication plans on all contracts, laying out all features chosen for the prospective pool. These plans serve for locating all "roughing-in," building of concrete forms and location of all centers before pouring concrete.

Send for new 1922 Sectional Perspective One-quarter Scale Details, 7 sheets, size 12x18 in., blue line prints; also full size and half-size details of essential features.

Skeleton Specifications and Installation Data

ENAMELED TERRA COTTA FEATURES

All life rail, cap course and gutter units are made in uniform cross section; no *rights* and *lefts*. Furnished in uniform 12-in. lengths, (or nearest equivalent which layout of job will permit). All units finished on grinding table with ground joints for uniform ⅛-in. joints and set up in shop for alignment before shipment.

(1) Life Rail—Life rail unit furnished (with finger grip recess) set level to water line and arranged either flush or offset with respect to cap course as desired, but life rail unit flush with face of pool (see Figs. 1 and 2).

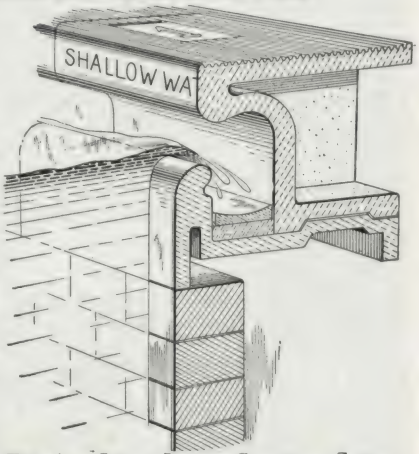


FIG. 1. LIFE RAIL, SLOPING SCUM GUTTER AND CAP COURSE; DESIGN NO. 6250
With non-slip surface integral

Note: These are first and original designs of life rails flush with water line, eliminating overhanging iron or bronze railings; also furnishing the first and only system of steeply sloping gutter for quick flushing, and requiring no right and left construction or setting.

(2) Sloping Scum Gutter—All gutter units are of uniform cross section but designed to be set on a slope. Furnished as layout permits, in 12-in. long units, in 1914 model (design 73431); and in 6-in. long units in 1915-1919 models (design 6250), and 1922 models (designs 31808 and 31915). For 1915-1919 models (design 6250), longitudinal sloping gutter, see Figs. 1 and 2.

Standard slope, ⅛ to ¼ in. per ft. arranged on 10-ft. slope lengths right and left from high point; outlets, 20 ft. apart. For pools whose lengths or widths are not multiples of 20 ft. see chart for locating outlets (1922 Sectional Perspective Details). This system affords a saving of 75% of plumbing cost over 5 ft. outlet spacing, the customary practice on level gutter system.

For 1922 model (designs 31808 and 31915), transverse spill trench gutter, see third page following.

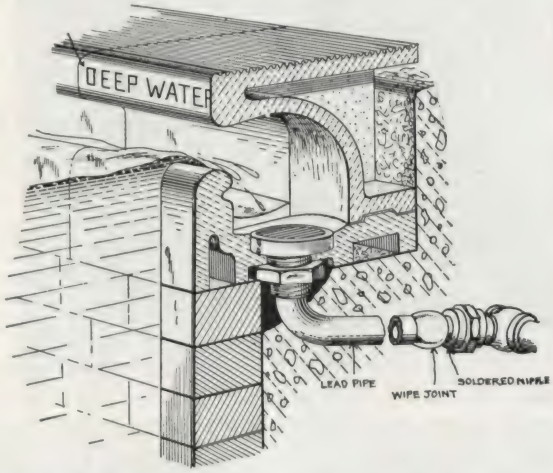


FIG. 2. LIFE RAIL, SLOPING SCUM GUTTER, OUTLET SECTION AND CAP COURSE; DESIGN NO. 6250
With non-slip surface integral. With bronze outlet thimble, including strainer and soft pipe connection with solder nipple to hard pipe and flexible expansion joint.

(3) Level Cap Course—Furnished in 12-in. long units. 1915-1919 cap course models are integral with back wall, forming canalization for insertion of 6-in. sloping gutter tile (Figs. 1 and 2).

Arranged optionally with

(4) Non-Slip Surface—Integral on top of cap course (Figs. 1 and 2), or

(4a) Non-Slip Surface—By insert in rabbet in cap course to receive same. Price of cap course unit is the same for either method. Insert such as cement, cork, tile, etc., not included in price.

(5) Gutter Outlet Units in Terra Cotta—These gutter outlets in combination with bronze thimbles (with removable strainer) and sweated joint to thimble, connected to hard pipe waste line by a solder nipple, soft lead pipe (2 in. o. d.) enables rectification of plumbers' roughing-in errors to exact center position of terra cotta outlet units (Fig. 2; see also Fig. 12).

(6) Terra Cotta Housing for Bottom Outlet Fittings—Bottom outlet—horizontal (Fig. 13); side outlet—vertical (Figs. 3 and 14).

(7) Sloping Sanitary Cove Base—Made in sections, of lengths established for each tank; each section comprising 3 or more units approximately 12 in. long. Made right and left for both sides of tank, establishing predetermined slope of bottom. Tops of sections of sloping base, all level, receive first

Continued on next page

courses of brick, sections repeating to end of tank. Abutting ends of each section stepped to receive next corresponding course of brick eliminating all cutting and fitting of bricks at intersections of sloping bottom and horizontal courses of side walls.

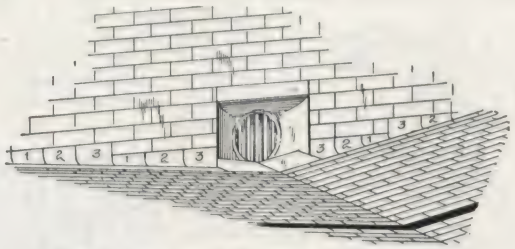


FIG 3. SLOPING SANITARY COVE BASE
Showing also vertical bottom outlet and lane marks

(8) Flush and Sanitary Step Ladder Units—With hand grip and Mexican stirrup-like pocket for the foot and weep-hole

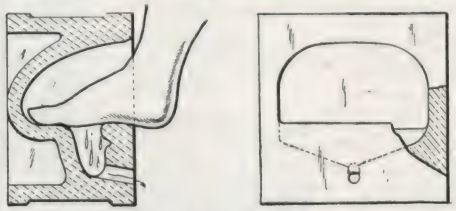


FIG. 4. FLUSH STEP LADDER UNIT

drain for pocket. Flush and non-slip terra cotta step ladder units built flush in wall with uniform rise of 12 in.; in 3 standard lengths, 9, 12 and 18 in. All edges square and straight for bonding with enameled brick. Ladder tread especially designed for support of toe and arch of foot, and finger grip for the hands, rendering use easier and safer than the pipe rung or ship ladder. The 18-in. units are economical for horizontal flush foot rest longitudinally of tank in deep water end. If not used continuously, individual units are recommended to be placed immediately under gutter outlet points, at a depth of 4 ft. 6 in. below water, to induce expectoration at outlets, when resting.

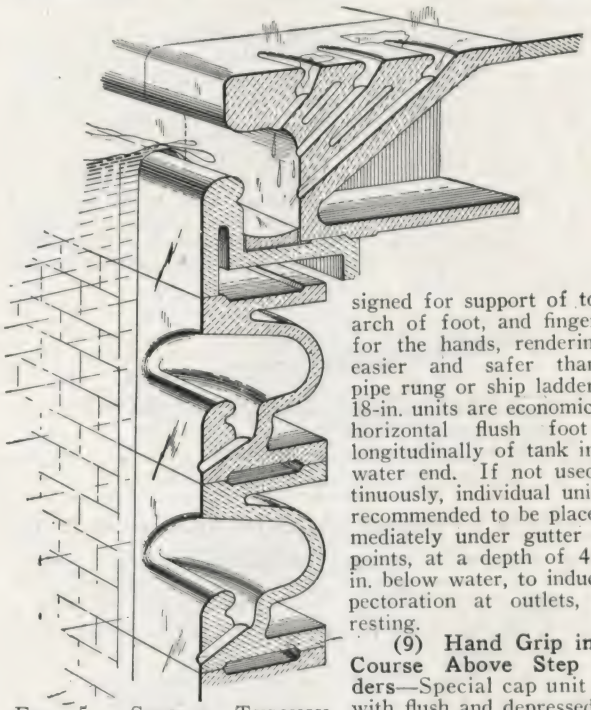


FIG. 5. SECTION THROUGH FLUSH STEP LADDER SHOWING STEP LADDER UNITS AND HAND GRIP UNIT IN CAP COURSE

(9) Hand Grip in Cap Course Above Step Ladders—Special cap unit made with flush and depressed hand grips set in floor, eliminating use of old style hand rail. Hand grips provided with weep-hole drains.

(10) Ornamental Terra Cotta Inlet Fittings—Statuettes and lion heads. Send for designs and photographs.

UNDERGLAZED LETTERING ON TERRA COTTA

(11) Yard marks (3 in. by ½-in.) with numerals (2½-in. by 1¾-in.) from 1 to length of tank with intermediate foot marks (1-in. by ¼-in.) on top or face of cap course to measure swimming or diving contests (see Fig. 1).

(12) Deep and Shallow Water Signs—On face of cap course: "Safety First" warning to non-swimmers and reckless divers—letters 3 in. high (see Figs. 1 and 2).

(13) Depth Numerals on Face of Cap Course—"Goal" signs and marks for polo games, also depth figures, viz: (4 ft.).

ENAMELED BRICK LINING FOR SIDES, ENDS AND BOTTOM

(14) Enameled Brick Lining for Sides, Ends and Bottom—Afford maximum efficiency of constructive durability against inward hydrostatic pressure and germproof qualities for sanitary purposes (see booklet for details).

(15) Lane Marks—On bottom of pool in colored brick to guide underwater swimmers (see Fig. 3).

BRONZE FITTINGS AND WHITE ENAMELED TERRA COTTA HOUSINGS FOR PLUMBING TERMINALS AND CONNECTIONS TO CLEANING FEATURES

(16) Combination Bronze and White Enameled Terra Cotta Surface Skimming Inlets in Battery—Includes pressure surface spray for skimming top of full pool. These units register and joint up with terra cotta rail units, and except for change in form for special duty, their finish is indistinguishable from the enameled terra cotta rail units.

All skimming inlet delivery ducts are connected in a battery to a header feed line under one valve control, and are located on *one long side of pool only*. All floating scum and overflow removed to gutter on three remaining sides of pool, discharging simultaneously at surface of the full tank, sweeping saliva scum and floating impurities into gutter.

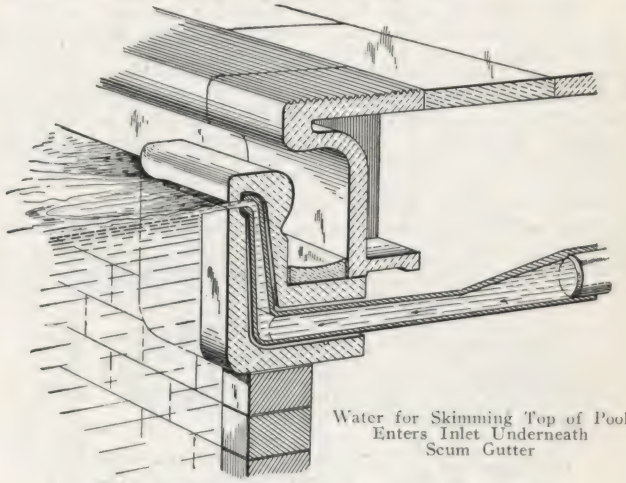


FIG. 6. SKIMMING INLET UNIT, DESIGN NO. 6250

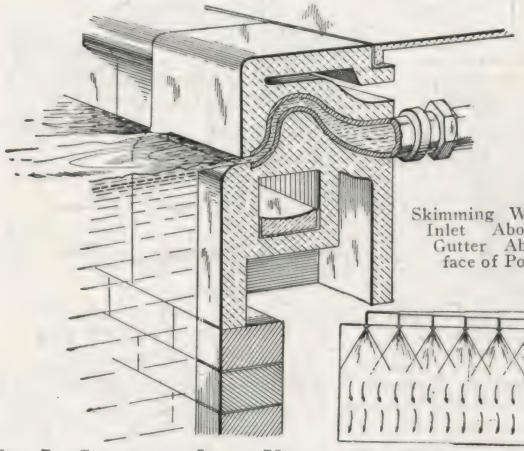


FIG. 7. SKIMMING INLET UNIT, DESIGN NO. 6250

FIG. 8. PLAN VIEW SHOWING ARRANGEMENT AND OPERATION OF SKIMMING INLETS

(17) Pressure Inlet and Suction Cleaner Outlet Unit—Includes suction cleaner discharge for cleaning bottom of full pool, and pressure hose inlet for washing empty pool. Two or more pressure inlet and suction cleaner outlet units, housed in terra cotta boxes, are usually supplied for each pool. Furnished with standard 2-in. hose terminal connection and nickelplated flush cover. This terminal connection is piped to a 2-way

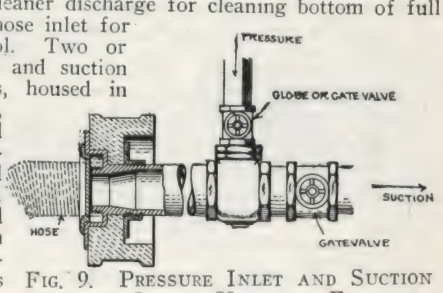


FIG. 9. PRESSURE INLET AND SUCTION CLEANER OUTLET UNIT AND FITTINGS

Continued on next page

read end connection under individual valve control, one side being connected to hydrant pressure and the other side to centrifugal jump on filtration circuit. When working under pressure, the unit serves for cleaning down walls of empty pool. When working under suction, it serves to remove all impurities which have settled to the bottom, through the same duct by suction discharge, out of full pool to sewer. The outlet fitting being below water level, the breaking of the priming of the pump is prevented. No special pump required, as system connects with centrifugal pump on refiltration system.

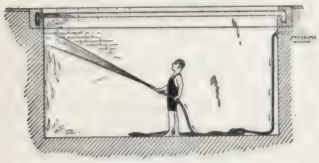


FIG. 10. CLEANING DOWN WALLS OF EMPTY POOL

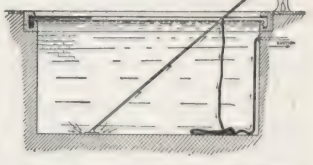


FIG. 11. CLEANING BOTTOM OF FULL POOL BY SUCTION

(18) Bronze Scum Gutter Outlet Thimbles—With removable strainer and groove for sweated joints under strainer for soft lead pipe (2 in. o. d.) connecting through thimbles and terra cotta outlet unit, by wiped joint to solid nipple and hard pipe roughing-in (see also Fig. 2). Makes watertight joint with terra cotta at the outlet in gutter. Lead pipe affords adjustment of plumber's roughing-in to exact position predetermined for all terra cotta outlet units, and prevents strain on terra cotta if pipe expands. Outlet thimbles are fastened to rail member, for which a special unit is furnished. See item (5) and Fig. 2.

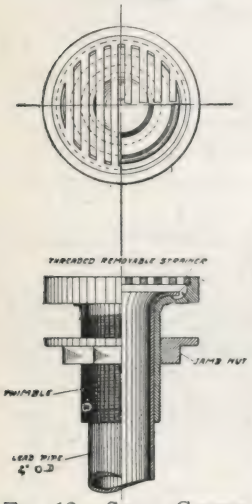


FIG. 12. SCUM GUTTER OUTLET THIMBLE

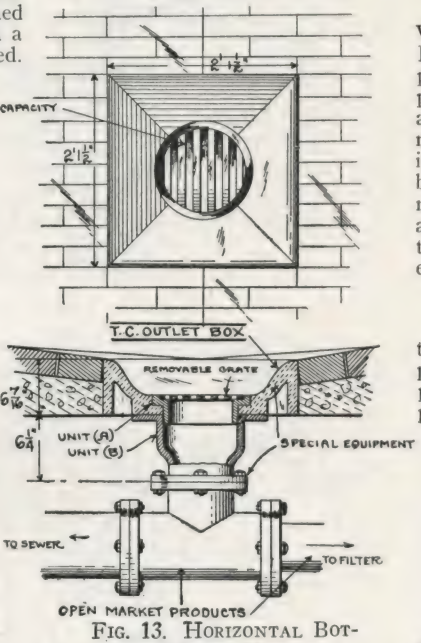
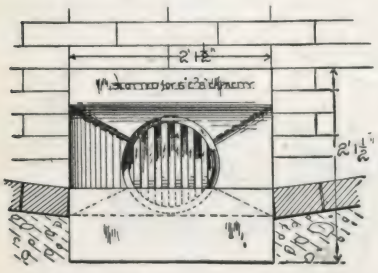


FIG. 13. HORIZONTAL BOTTOM OUTLET UNIT AND FITTINGS

(19) Bronze Bottom Outlet Fittings; Unit "A" and Unit "B"—Unit "A" with removable strainer, passing freely the capacity of bottom outlet pipe, optional 6-, 8- or 12-in. diameter, arranged with reducer unit "B" to standard 6-, 8- or 12-in. pipe of standard wrought iron flange pipe dimensions, standard bolt circle drilling. This makes a watertight joint which will afford allowance for expansion and contraction and workmanlike connection from pool lining to wrought iron outlet main. See item (6).



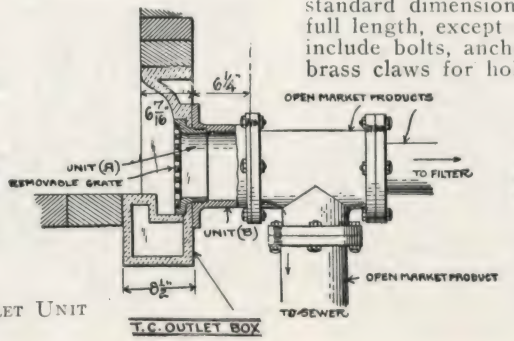


FIG. 14. VERTICAL BOTTOM OUTLET UNIT AND FITTINGS

(20) Filtration Inlet Fittings and Terra Cotta Housing—Similar to gutter outlet thimbles with lead pipe, solder nipple and wiped joint, making flexible connection for expansion and contraction, or cored and tapped to make hard pipe coupling connection to main line. These fittings countersunk flush to face of enameled brick in special countersunk terra cotta boxes to fit.

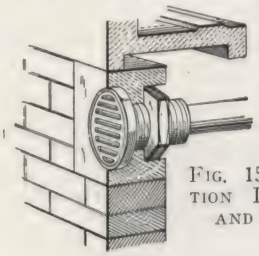


FIG. 15. FILTRATION INLET UNIT AND FITTINGS

REINFORCED CONCRETE CONSTRUCTION

(21) Section of Concrete Retaining Tank—With horizontal dimensions for thickness of concrete and centers for all reinforcing, suitable for maximum depth of any pool.

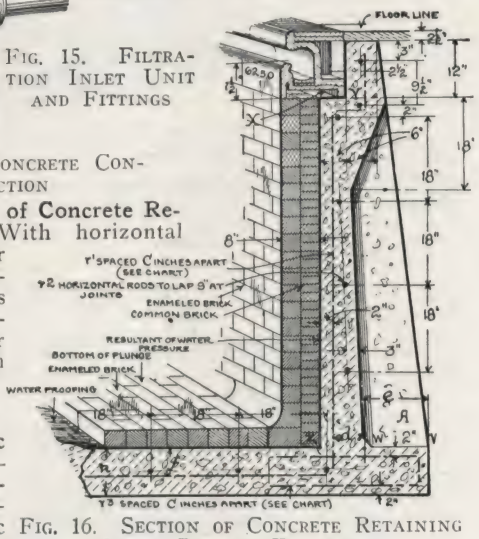


FIG. 16. SECTION OF CONCRETE RETAINING TANK—DETAILS FURNISHED

WATERPROOFING

(22) Fabric Waterproofing—Fabric waterproofing 3- to 5-ply durable fabric and asphalt recommended instead of integral waterproofing, unless desired to supplement the former by using both. This waterproofing behind a course of common brick, back of 4-in. course of enameled brick, furnishes a reliable waterproof membrane with stable interior lining, able to resist inward hydrostatic pressure acting when tank is emptied quickly.

ADJUSTABLE SPRINGBOARD HOLDER AND SPRINGBOARD

(23) Springboard Holder—Galvanized cast iron interior grip portion, bronze and nickelplated bronze working parts. Has smooth, convex bronze cover carrying Armstrong pressed cork insert tread, 18 in. wide by 24 in. long, or having plain corrugated surface.

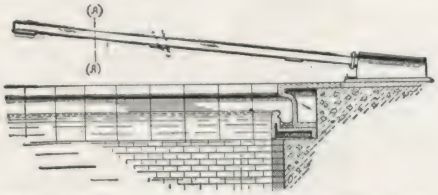


FIG. 17. WOOD SPRINGBOARD AND ADJUSTABLE METAL HOLDER

(23a) Compound Hickory Springboard—16 in. wide; 2 in. thick at base, tapering to 1¼ in. at tip. Compounded of 8-in. hickory planks, firmly bolted in the grip portion and battened on underside of overhanging portion. Top surface covered with non-slip corrugated rubber.

ALL WOOD SPRINGBOARD AND ANCHORAGE

(24) Board made of selected hickory planks, built to standard dimensions; covered with corrugated rubber mat full length, except tread which is cocoa matting. Fittings include bolts, anchor plates, wood saddle or fulcrum, and brass claws for holding board down to fulcrum.

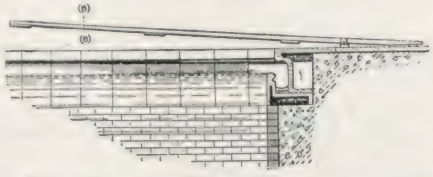


FIG. 18. ALL WOOD SPRINGBOARD AND ANCHORAGE

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Patented Trench Gutter System for Handling Pool Surface Overflow and All Floor Drainage

Another entirely new departure in swimming pool design. Consists of special terra cotta units so arranged as to drain the floor around the pool, and to handle the pool overflow by *transverse* spill, all water being carried off in the trench gutter to one or two drainage outlets per pool (see illustrations). The terra cotta units embody the original Booraem flush life rail and the entirely new transverse overflow system, eliminating the longitudinal flow of water in gutter. Removal openings or outlets to the trench are provided at every foot of the length and width of the pool.

All special features of the older system, such as surface skimming inlets, suction and pressure cleaners, etc., which are related and associated with the coping courses, have been redesigned for application to this radical improvement in swimming pool treatment.

Advantages—Eliminates all piping required for other systems for handling of scum gutter overflow, and for draining drip from bathers or wash water from the floor surrounding the pool.

Eliminates punctures of retaining tank to connect old style gutter with round-about pipe for scum removal.

Saves 1 sq. ft. of "flooring surface" per lineal foot of pool perimeter, due to greater depth of cap unit measured back from edge of pool.

Saves labor of installation and material cost for features eliminated as mentioned above. This saving is from $500 to $1000 and upwards on pools of various sizes.

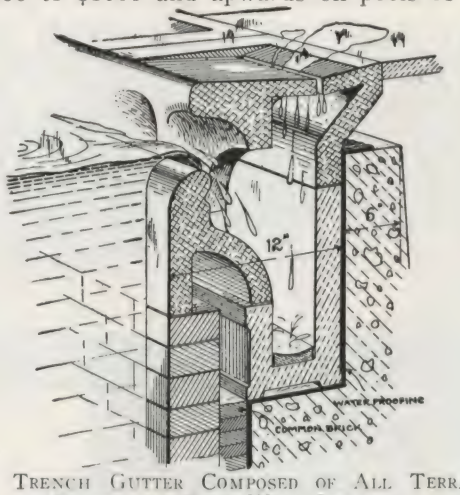


FIG. 19. TRENCH GUTTER COMPOSED OF ALL TERRA COTTA UNITS—FOR 18 IN. WALL SECTION

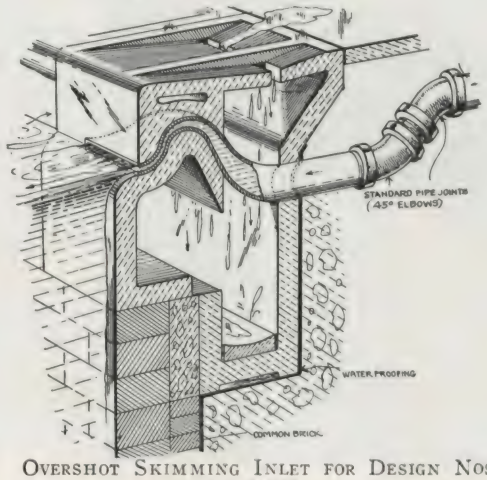


FIG. 21. OVERSHOT SKIMMING INLET FOR DESIGN NOS. 31915 AND 31934

Applicable with slight variations in design to Designs Nos. 31807 and 31808

Accessibility for Cleaning—The trench gutter may be readily cleaned by steam or hot water hose from standing position on pool floor. Has removable floor plates at suitable intervals.

Ornamental Design—Provided in the coping of the pool in the form of a repeating arch effect between top of life rail and nose of cap course, when viewed from opposite sides or ends of pool.

Gutter Spillways—For removing water from trench gutter to sewer. Designed to be used singly or in pairs. Located convenient to sewer.

Note: Patents on this system are broad and cover production in any material, concrete alone, or ceramic or mosaic coated concrete, as well as the method herewith shown. Under certain conditions license will be issued, for reasonable consideration, to use this general cross section if our terra cotta section is not desired. Persons adopting this section without authority must be prosecuted in protection of our business interests.

Double Level Pools

For double level pools, with lower level for standard use from 4 to 6 ft. deep, and upper level from 7 to 9 ft. deep for polo and other water games, combinations of various designs, including double trench gutter systems, may be used for upper and lower levels.

Lower gutter may be shut off by a single valve to prevent loss of water when using upper level. Upper gutter always handles floor drain when either level is in use. Each level discharges through its own spillway.

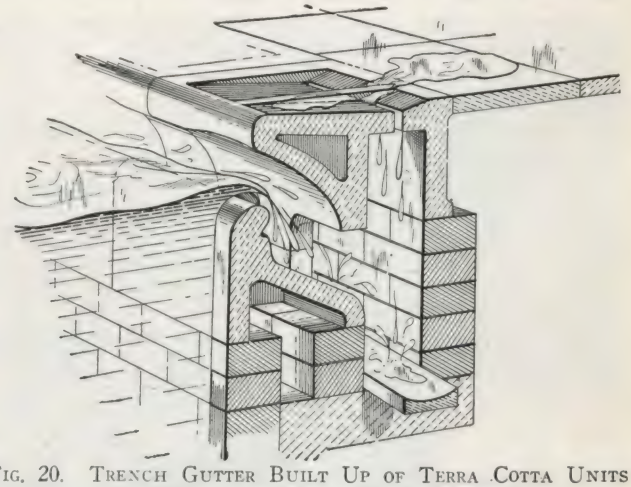


FIG. 20. TRENCH GUTTER BUILT UP OF TERRA COTTA UNITS AND BRICK—FOR 24 IN. WALL SECTION

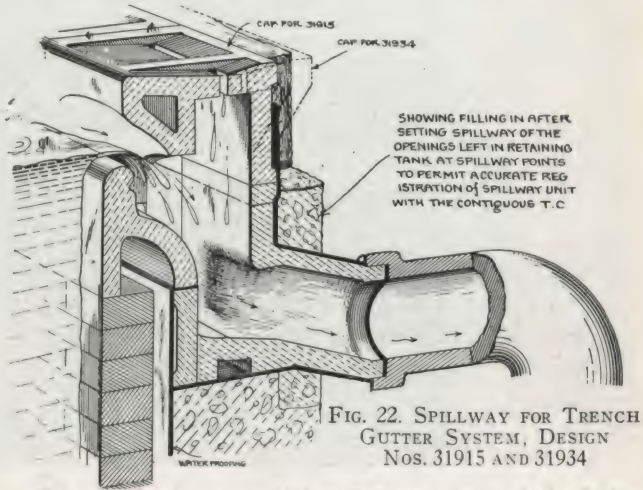


FIG. 22. SPILLWAY FOR TRENCH GUTTER SYSTEM, DESIGN NOS. 31915 AND 31934

For connection to ornamental free discharge or to standard soil pipe. Applicable with slight variations in design to Design Nos. 31807 and 31808

HASBROUCK-KING CO.

Swimming Pool Specialists

16 East 41st Street

NEW YORK, N. Y.

Product

Design and construction of SWIMMING POOLS, NATATORIUMS, WADING POOLS, and WATER BASINS.

The Swimming Pool Problem

Architects in the past were apt to treat swimming pools as if they were merely tanks in which to put water. The results were unfortunate. Either expensive repairs were necessary, or else the pools had to be abandoned altogether.

Today the building of a swimming pool is an increasingly complex proposition. It embraces problems of layout, structural design, waterproofing, plumbing and mechanical equipment, and finishing and decorating. These problems vary with each individual pool.

Faced by these difficulties, architects of buildings in which swimming pools are located have discovered that it is necessary to take one of two courses: either they must spend valuable time studying the subject, or else—and this course is both easier, and more efficient in its results—they must employ such experienced swimming pool engineers as the HASBROUCK-KING CO.

Main Problems We Must Solve

The problems we encounter in building a swimming pool may be grouped under five main heads.

First there is the problem of planning the layout. The pool must be properly located in regard to other parts of the building and in regard to structural considerations. Dressing rooms, shower baths, rest rooms, toilets, Turkish baths, galleries for spectators, and such other conveniences as are desired must be properly grouped around the pool. The size and depth of the pool itself are important considerations; in many cases the A. A. U. and Intercollegiate Swimming rules must be taken into account.

The second group of problems is structural. Supports for the pool must be provided. The strength of the walls of the pool must be calculated. Usually these walls are built of reinforced concrete, but in many locations steel tanks lined with concrete may be necessary—and here experience must dictate.

Closely allied to the structural problem is the problem of waterproofing. There are many methods of providing against leakage, and sometimes all of them must be used. In some cases a lead lining is covered with a waterproofing membrane, and this in turn is covered with concrete waterproofed integrally. Occasionally the integral method alone is sufficient. On work below the ground level, pressure plays an important part; in addition to keeping the tank water in, seepage water must be kept out. Architects without previous experience in waterproofing this type of work have difficulty in providing for all these considerations.

The fourth problem is that of mechanical equipment. The rooms surrounding the pool must be heated and ventilated, and, owing to the heavy moisture in the air, require a different treatment from the rest of the building. Water for the pool must be supplied, heated, sterilized, drained and recirculated. Owing to the com-

SWIMMING POOL AT DARTMOUTH COLLEGE, HANOVER, N. H.

Continued on next page

plexity of the necessary equipment and to the fact that it must stand up under constant service, it should be designed and specified by engineers of long experience.

Finally, there are the problems of accessories and decoration. There should be ladders, depth markers, swimming lanes, diving boards and a host of other accessories, and these must be arranged to harmonize with the general decorative scheme.

Even from this brief and incomplete outline of good swimming pool construction, the difficulty of the work is evident. Our years of successful experience qualify us to undertake it, thereby lifting a great burden from the shoulders of the architect.

Our Services—Of What They Consist

We are swimming pool engineers and contractors.

We design swimming and wading pools, natatoriums, and water basins, furnishing all necessary drawings.

We do all the necessary engineering work for the concrete steel for pool construction.

We lay out all mechanical equipment and plumbing and write specifications for everything connected with the pool.

In addition we undertake contracts for that part of the work in which we specialize—namely, for the tile and waterproofing for the pool, and for the mechanical equipment, consisting of pumps, filtration equipment, pool heater, and sterilizer.

We are in a position to contract for the pool from the rough to the finished product.

If these contracts are awarded to us, we make no charge for our engineering and architectural work. If, on the other hand, these contracts are awarded to others, we make a regular engineering fee.

References

The following are some of the pools with which we have been connected:

Topel Pool, New York, N. Y.
Dalton Pools, New York, N. Y.
Berkeley-Irving School, New York, N. Y.
Brooklyn Polytechnic Preparatory School, Brooklyn, N. Y.
Tome School, Port Deposit, Md.
Dartmouth College, Hanover, N. H.
Merrill School, Mamaroneck, N. Y.
Jewish Center, New York, N. Y.
Morris County Golf Club, Morristown, N. J.
Englewood Club, Englewood, N. J.
Riverview Park, Baltimore, Md.
Watertown Y. W. C. A., Watertown, N. Y.
Harlem Y. W. C. A., New York, N. Y.
Reading Y. W. C. A., Reading, Pa.
Charlestown Y. W. C. A., Charlestown, Va.
Ridgefield Park School, Ridgefield, N. J.
Easton Y. M. C. A., Easton, Pa.
Buckwood Inn, Shawnee-on-Delaware, Pa.

Swimming Pool, Morris Co. (N. J.) Golf Club

The Result When Wrong Information is Given to the Architect

Swimming Pool, Englewood (N. J.) Field Club

Copyright, Underwood & Underwood Studios, N. Y.
An Old Cow Stable Remodeled

ROBERTSON ART TILE CO.

MAIN OFFICE
TRENTON, N. J.
FACTORY: MORRISVILLE, PA.

Products

GLAZED WALL TILE including extensive line of TRIM and CERAMIC MOSAIC TILE.

Services

The Technical Department of the ROBERTSON ART TILE CO. is at the service of interested parties and will supply any desired information, furnish plans, sketches and samples upon request.

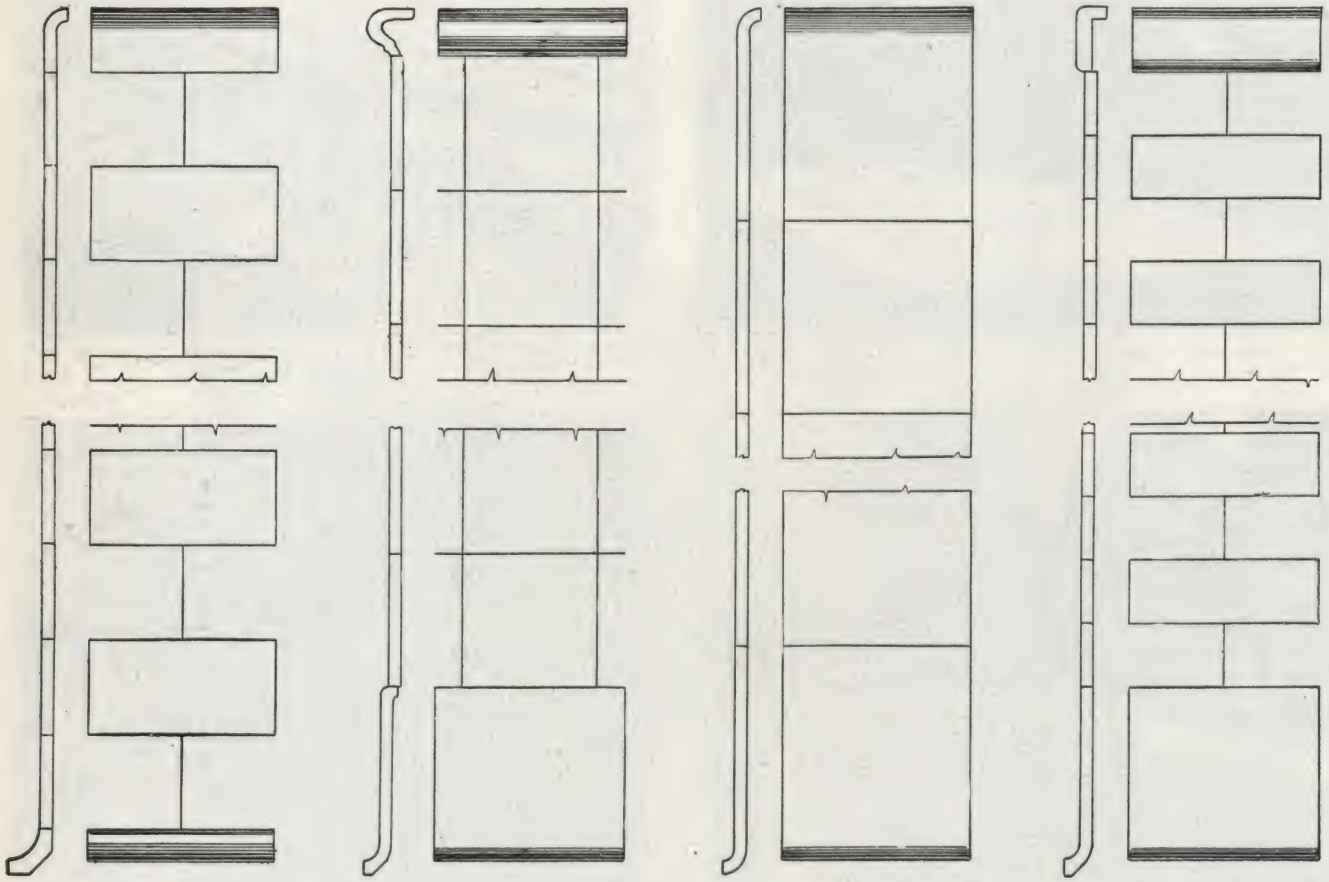
Glazed Wall Tile

We aim to carry in stock the most popular sizes of white glazed wall tile, which includes 6x6, 6x3, 6x2, 4¼x4¼ and 4¼x2⅛ in., together with base and cap mouldings, combination corners, and various angles to work out desired combinations or special treatment. We are especially well equipped in this respect to take care of hospital, hotel, society, residential construction, etc.

In the manufacture of floor tile we can furnish ceramic mosaic tile in any of the following sizes: 1¼ in. hexagon, 1-in. hexagon, ¾-in. square, $\frac{13}{16}$-in. round, and 1x½-in. white.

We also manufacture a full line of colors in the above sizes enabling us to make any design or pattern desired.

Below we illustrate four typical wainscot treatments in white glazed wall tile with design numbers inserted. Many other combinations can be made up from catalogue designs.



6x2-in. Cap No. 1035-O
6x3-in. Plain
6x2-in. Cove, No. 1040

6x1½-in. Cap No. X36
4¼x4¼-in. Plain
6x6-in. Base No. 3

6x6¾-in. Cap No. 1137-O
6x6-in. Plain
6x6¾-in. Base No. 1137-I

6x2-in. Cap No. X52
6x2-in. Plain
6x6-in. Base No. 9

FOUR TYPICAL WAINSCOT TREATMENTS IN WHITE GLAZED TILE

Continued on next page

Ceramic Mosaic Tile for Swimming Pools

Advantages—Ceramic mosaic tile is recognized as the most sanitary, durable and attractive material known for the veneering of swimming pools.

The Robertson Art Tile Co. was the first to introduce this material for this purpose, and it has been used very successfully for years past, and is being specified by leading architects and swimming pool experts. It is also being used just as successfully for the veneering of walls around the pool, wainscoting of the main building and galleries, as well as shower rooms.

Advantages—We have no hesitancy in saying there is no other material on the market that possesses all the good qualities of Ceramic mosaic tile.

It is entirely vitreous, consequently impervious to moisture.

It is exceedingly strong, does not stain easily and can be readily cleaned.

This material takes up very little room, as it is only ¼ in. thick and, including the cement coating in which it is set, requires only from 1 in. to 1¼ in. in thickness.

The small tesserae lends itself readily to the undulation of walls and floors, especially since we have provided all necessary coves and angles with suitable curved tile.

Colors—We manufacture this material in a variety of colors, making it possible to obtain very attractive effects. Experience convinces us that swimming pools should be veneered with white tile and have colored lines extending through the bottom to indicate swimming alleys. If desired, a simple, attractive border can be placed at the water line.

Overflow Trough—The overflow trough is usually made in some attractive design and numerals set in to indicate distances; while at either end the depth of the pool should be indicated in the same way. The numerals are all made with colored ceramic mosaic tile and are just as permanent as the rest of the work.

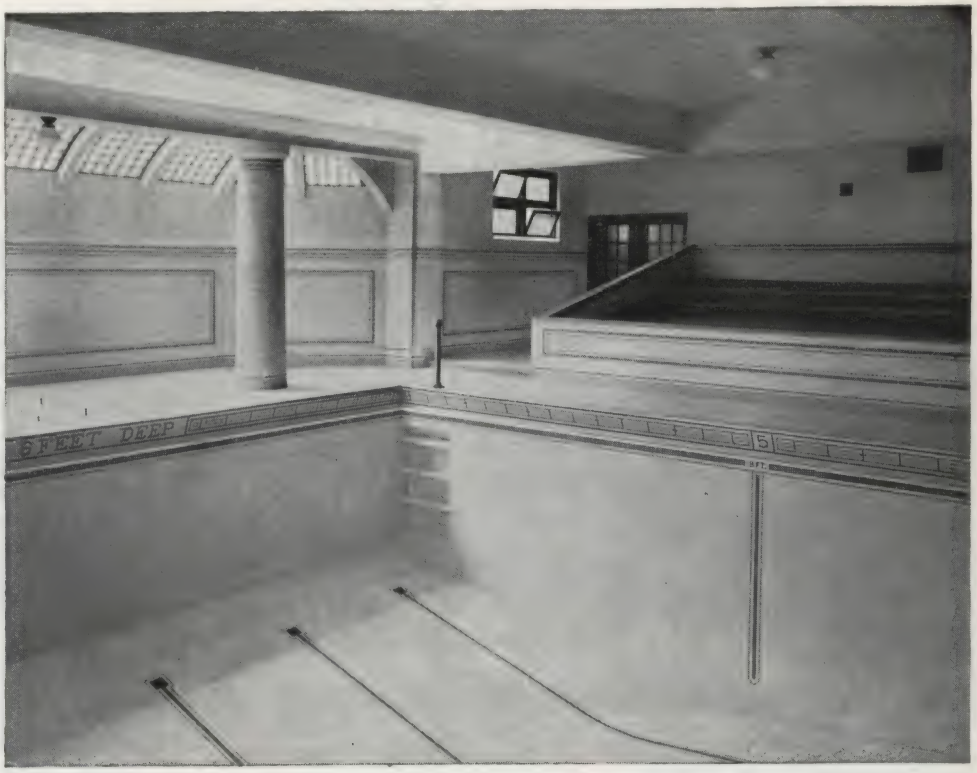
The formation of an overflow trough is one of the important features in swimming pool construction. While there are several forms being used, we herewith illustrate trough No. 2 and believe it to be the most practical design.

Illustration of trough No. 2 also shows a very satisfactory design of life rail. The trough is arranged so that all surplus water from the walk around the pool will fall into it.

References—We have furnished, and in many instances made the plans, for more than 200 prominent swimming pools throughout the country, and would be glad to furnish interested parties with a list of same and their location.

Ceramic Mosaic Gutter No. 2

4-in. Radius Corners of Pool



Typical Swimming Pool Treatment

ESTABLISHED 1827

WM. H. JACKSON COMPANY

Tile for Swimming Pools and General Decorative Purposes

TELEPHONE
BRYANT 8430

2 West 47th Street
NEW YORK, N. Y.

OFFICES

CHICAGO, ILL., 746 South Michigan Boulevard

MONTREAL, CAN., 112 St. James Street

FACTORIES AND SHOPS, 335 Carroll Street, BROOKLYN, N. Y.

Products and Services

TILE for the Lining of Swimming Pools, Overflow Gutters, Ladders, Floors, etc.

The Furnishing and Application of the proper Waterproofing in connection with the tile application and the essential Metal Strainers, Inlets, Outlets, etc.

For Ornamental Metal Work, see page 613.

Experience, Co-operative Service, and Construction

Our organization, established in 1827, is the pioneer in the development of the tile industry for swimming pools.

In addition to the general service in the study of decorative tile application this organization co-operates with architects and others in the development and study of swimming pool problems, including the correct waterproofing and, if required, will furnish drawings and specifications for the general construction together with estimates for furnishing and installing same.

Jackson Tile Lined Pools

Jackson Swimming Pools, both interior and exterior, installed by our firm, combine either a simple or highly elaborate decorative effect with perfect serviceability. Our tile is suitable not only for the pool, but for the floor, walls and wainscotings as well, thereby obtaining a most satisfactory unity of effect.

Some of the special features of Jackson swimming pools are the Jackson pool life rail, the grip coping, the overflow gutters, depth and distance numerals, safety guides, etc.

We, also, furnish the necessary metal strainers, inlet, outlet, and floor drains, for which we have many special patterns, and diving boards if required.

Installations

The following pools have been furnished and installed by us:

Brooklyn Polytechnic Institute, Brooklyn, N. Y.
Broadmoor Hotel, Colorado Springs, Colo.
Y. W. C. A., 124th Street and Lenox Avenue, New York, N. Y.
Bethlehem High School, Bethlehem, Pa.
Proximity Mfg. Co., Greensboro, N. C.
Bristol High School, Bristol, Conn.

Also, over 100 other successful installations both private and institutional.

EXTERIOR POOL DESIGNED FOR PRIVATE ESTATE

SYNTHETIC TILE CO.

SUCCESSORS TO THE TILE DEPARTMENT OF THE FRANK A. SEIFERT PLASTIC RELIEF CO.

2627-2631 Dayton Street

ST. LOUIS, MO.

Products

FLOOR TILE, SANITARY COVE BASE, ONE-PIECE STAIR TREADS and RISERS.

Marble Mosaic or Terrazzo Tile

These tile are made of crushed marble and portland cement, pressed with hydraulic pressure into 8-in., 9-in., 10-in., and 12 in. square, and 11½ in. hexagon tile, and are suitable for any kind of floor where durability as well as design is desired.

They are cured in specially designed curing rooms, thereby attaining the maximum amount of strength in the portland cement.

Inlay Pattern Tile

An inlay pattern tile is also made in various colors as suggested by illustration below, in one size only—namely 8 in. square. This tile can be made in various colors and designs and lends itself admirably where a more ornate floor is desired. They are also made in a plain tile. The colors are permanent and the wearing qualities are excellent.

Non-slip Tile

Attention is called to the carborundum non-slip tile which is made in a checker board as well as a plain 8-in. square tile, and which is a non-wearing tile also.

Standard Sanitary Cove Base

This company's standard 6-in. cove base is made in 5 different colors, and in 3-ft. lengths with special internal and external miters. It can also be made to order in any other colors used in their work. This cove base is the most practical and the most economical of any similar article made today.

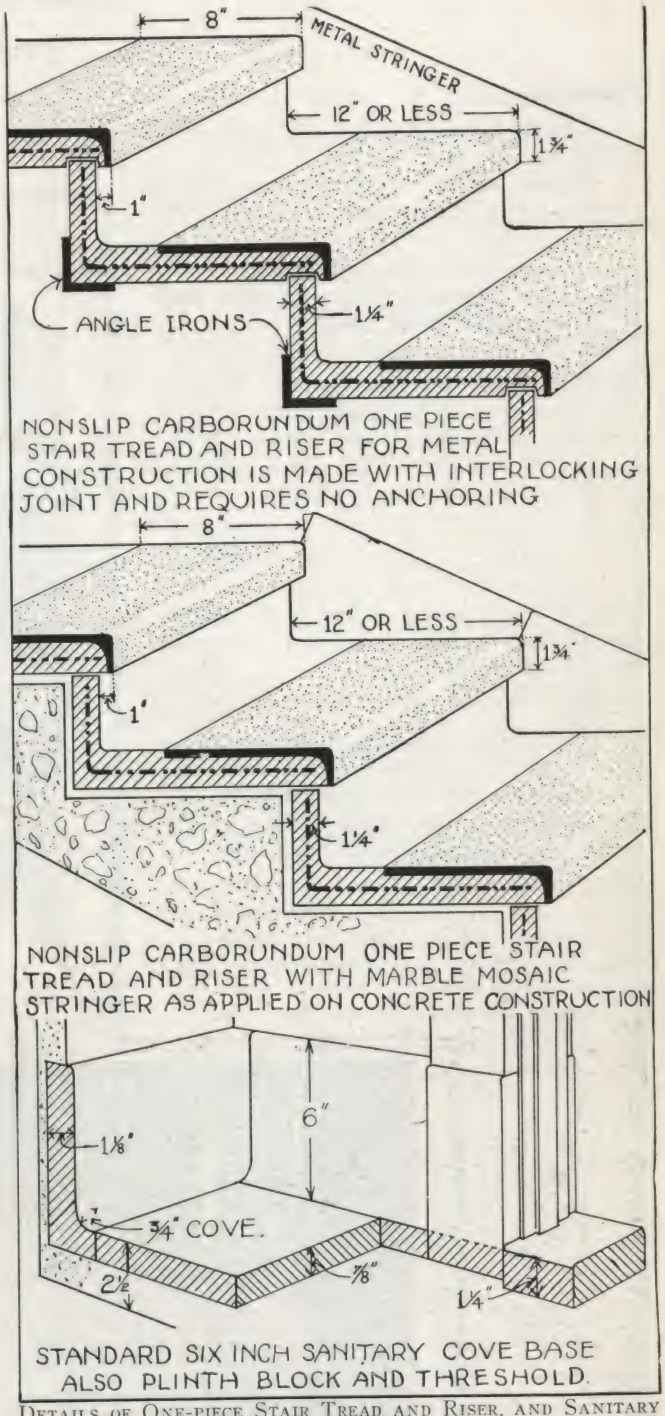
One-piece Stair Tread and Riser

Special attention is directed to the one-piece stair tread and riser made either with or without a carborundum non-slip tread, as shown herewith, and reinforced with metal as shown by dotted lines in the cut.

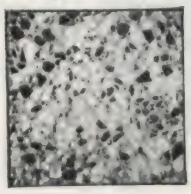
They are cast complete in one operation, making them one solid piece, carborundum and all—unquestionably the best one-piece stair tread and riser made—and can be used with concrete construction or with metal construction as indicated.

Catalogues and Prices

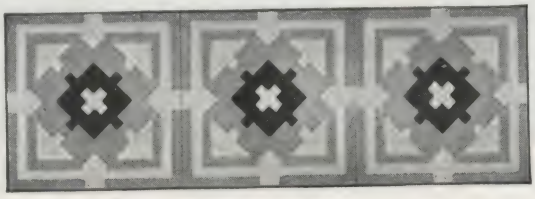
Catalogues and prices will be sent to interested persons on request.



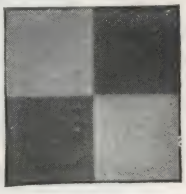
DETAILS OF ONE-PIECE STAIR TREAD AND RISER, AND SANITARY COVE BASE



TERRAZZO TILE



SPECIMEN OF INLAY PATTERN TILE



NON-SLIP TILE

L. DEL TURCO & BROS.

Mosaic and Terrazzo Work; Terrazzo Floor Dividers

229-231-233 Cleveland Avenue
HARRISON, N. J.

Products

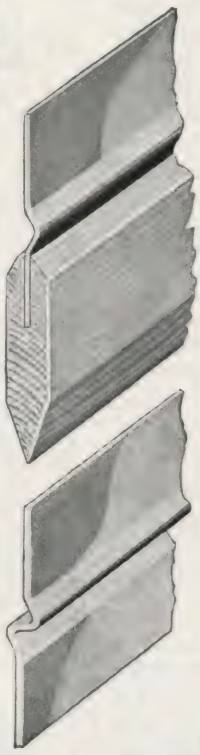
Contractors for MOSAIC and TERRAZZO WORK, FLOOR and WALL TILING.

Manufacturers of TERRAZZO FLOOR DIVIDERS and CORRUGATED BRASS STRIPS.

Del Turco Terrazzo Floor Divider and Corrugated Brass Strip

The improved method of laying terrazzo flooring, originated by us a few years ago, has met with the general approval of architects and builders and terrazzo floors are now almost without exception specified to be set between brass dividers. This method practically eliminates cracks, permits the laying of the terrazzo surface all in one operation, and furnishes a better bond between underbed and wearing surface. These results are accomplished by the use of the Del Turco Terrazzo Floor Dividers and Corrugated Brass Strips.

The Floor Divider—Consists of a thin brass edge grooved at the lower end and mounted in a wooden strip ¼ in. thick. This groove adds rigidity to the metal and holds the brass firmly into the floor if the joint opens, localizing the crack. The divider is a continuous and unperforated strip which absolutely divides the various units of the floor. The absence of perforations prevents the bonding of one unit of the floor to another and the possible fracture that might otherwise result on the face of the finished terrazzo.



ABOVE-FLOOR DIVIDER
BELOW-CORRUGATED BRASS STRIP

The divider is inserted in the wet mortar underbed, and the wooden part becomes thus saturated with water, causing it to expand. After the terrazzo has set, the wooden part dries out and shrinks, leaving a void around itself which allows for expansion and for certain adjustments due to settlements and vibrations.

The Corrugated Brass Strip—A development of our original divider, designed especially for dividing the terrazzo in small sections with borders, etc., thus giving a more elegant appearance to the floor. The brass being heavier than that used in our regular divider will provide prominent outlines to the borders and will sharply divide one color from the other. With the help of mosaic strips and insert, very attractive floors can be designed. The strip forms a continuous joint separating absolutely one panel from adjoining ones, insuring against cracks.

Guarantee—We will guarantee all terrazzo floors laid by us over a sand cushion, in accordance with specification No. 1, against cracks for a period of 3 years.

TERRAZZO FLOOR IN ENTRANCE LOBBY OF TIVOLI THEATRE NEWARK N.J.

Continued on next page

Specifications

Specification No. 1 (for use of Dividers)—The concrete under terrazzo floors provided for elsewhere, will be left 3¼ in. below finished floor line. Spread over it a bed of dry sand ½ in. thick, well leveled off and cover with a layer of tar paper. Over this lay concrete underbed 2 in. thick (1 part portland cement, 1 part sand and 3 parts grit). Divide space in sections as directed by architect (generally 40 sq. ft. each) and while underbed is still green, set dividers, as manufactured by L. Del Turco & Bros., Harrison, N. J. Dividers must be forced down to tar paper with top of brass edge level with finished floor.

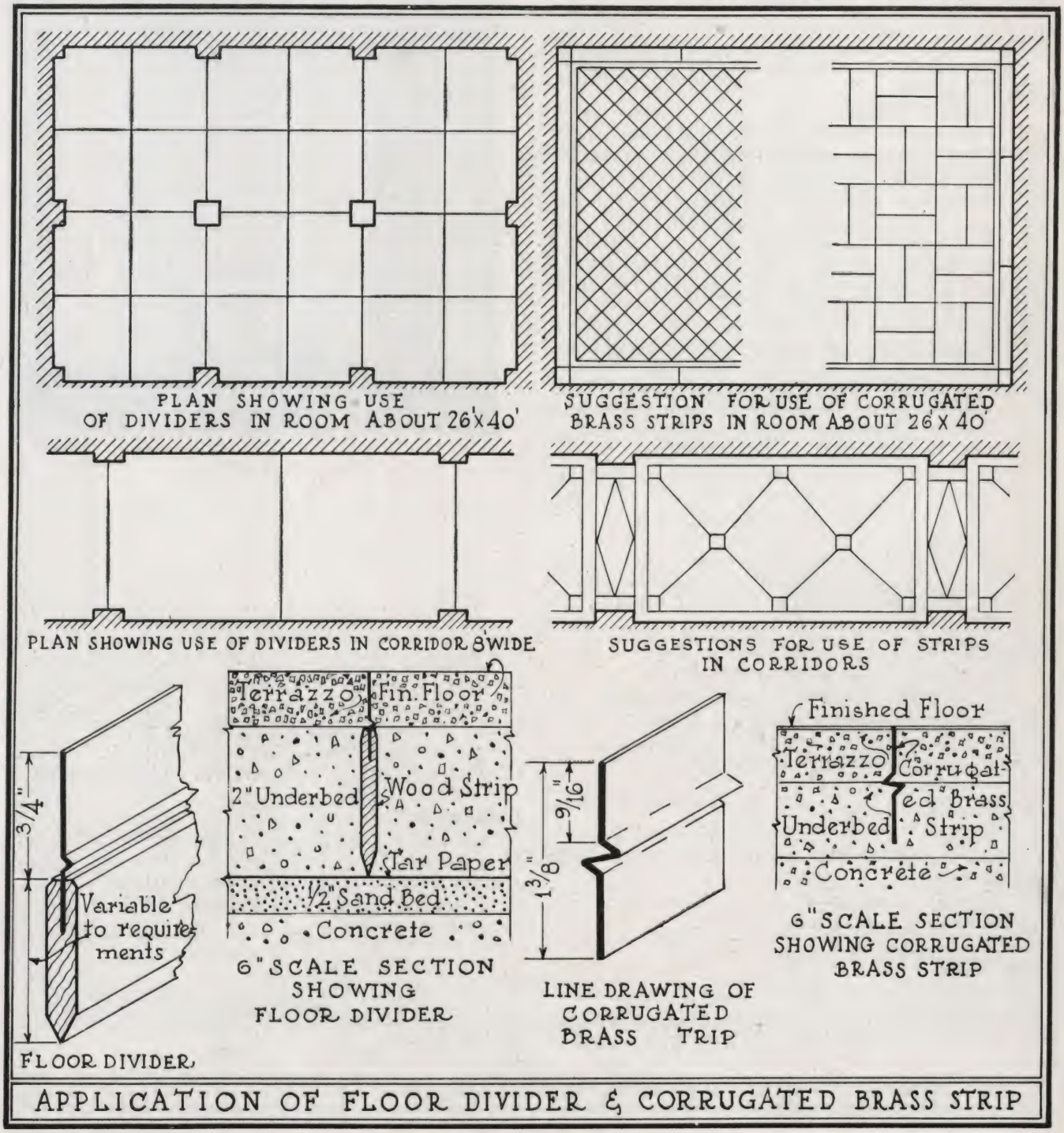
As soon as underbed has hardened sufficiently to withstand rolling, spread wearing surface ¾ in. thick (2 parts marble chips and 1 part cement) and roll and trowel in best manner. After terrazzo has set, rub surface with approved machines and by hand where machines can not reach. Leave surface smooth and free from holes and protect it by covering with shavings or building paper. Clean thoroughly when directed by architect and deliver in perfect condition.

Specification No. 2 (for use of Corrugated Brass Strips)—Concrete fill provided for elsewhere will be left 2 in. below finished floor line. Lay over it the underbed (1 part cement, 1 part sand and 3 parts grit) and level off to ¾ in. below finished floor. Form borders and fields as shown on plans by embedding in the green mortar, corrugated brass strips as made by L. Del Turco & Bros., of Harrison, N. J.

Finish as prescribed in Specification No. 1.

References

New York Trust Co., 100 Broadway, New York, N. Y., Walker & Gillette, Architects
Metropolitan Life Ins. Co. Annex, New York, N. Y., Everett D. Waid, Architect
Elizabeth Telephone Building, Elizabeth, N. J., Mc Kenzie Voorhees & Gemlin, Architects
Cathedral College, Washington and Atlantic Avenues, Brooklyn, N. Y., F. J. Berlenbach, Architect
Springfield Avenue Trust Co., Newark, N. J., Guilbert & Betelle, Architects
Wellmont Theater, Montclair, N. J., Reilly & Hall, Architects
Seymour School, Newark, N. J., J. H. & W. C. Ely, Architects



ESTABLISHED 1891

FRANK L. DAVIS

DAVIS MARBLE COMPANY

TELEPHONE
VANDERBILT 8352

124 East 41st Street
NEW YORK, N. Y.

CHICAGO, 1450 West North Avenue, Telephone Monroe 3057

PHILADELPHIA

Products and Services

Contractors for INTERIOR MARBLE WORK; WALL and FLOOR TILING; MARBLE, CERAMIC, GLASS and ENAMEL MOSAICS; TERRAZZO WORK and DAVIS DIVIDING STRIP.

DAVIS STRIP
TRADE MARK

Terrazzo

Contractors for all kinds of terrazzo work.

Terrazzo Floors—Laid in panels, with metal dividing strips, permits the use of different colors in designs and prevents cracking.

Dividing Strips—The "Davis Dividing Strip" (patented) is simple in section, easy to handle and set, effective in service and reinforces the pavement.

The Section—The section is such that any metal becomes rigid when bent to this form and this permits the use of zinc, copper or brass. Made in 1¼ in. or more in depth, and in 6-ft. lengths.

Handling—This form of strip will nest for packing, handling and shipping and thus remains straight and true for use.

Setting—This section gives a continuous angle bearing the entire length of the strip when set in the leveling cement bed and keeps the strip straight after setting, with all the top edges level and in one plane.

"Arterrazzo"—By the use of the Davis dividing strip, an "Arterrazzo" floor can be divided into square, rectangular or other shaped panels and can be set at a considerable saving of time and expense.

Installations—Furnished and installed with our Arterrazzo floors or sold separately at reasonable prices to others, whenever specified or wherever required.

Mosaic Work

Contractors for all kinds of mosaics.

Marble Mosaic—Carefully designed and well laid marble mosaic floors are attractive and durable.

Glass Mosaic—Glass and enamel mosaic imported for artistic mural decorations.

Marble Work

Contractors for all kinds of foreign and domestic marbles for building interiors, including wainscotings, columns, mantels and stairs.

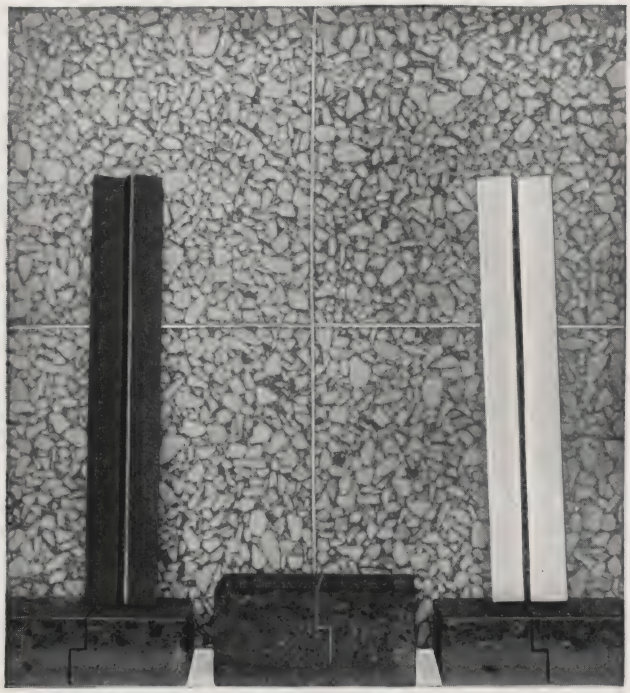
Domestic Marbles—Alabama, Tennessee, Carthage, Napoleon and Vermont marbles.

Tiling Work

Contractors for all kinds of tiling.

Floor Tiling—Vitrified floor tiles make a sanitary and durable floor. All kinds of these tiles furnished and set.

Wall Tiling—Glazed tiles are both sanitary and decorative, being desirable material for walls and ceilings.



Brass Strip — Zinc Strip

DAVIS DIVIDING STRIPS

Faience Tiles—Used for inserts in tile walls, for pictorial panels or for a decorative color treatment.

Weatherproof Tiles—Handmade for wall surfaces exposed to the weather. Furnished in all shapes and colors.

Quarry Tiles—Imported and domestic for kitchens, porches and halls.

Ceramic Mosaic—Practical and effective when used for bathrooms, swimming pools and similar places.

Bathroom Accessories—In tile, china and faience; furnished and set.

"Rim Grip" Tile—Patented grip back, best obtainable for ceilings, refrigerators and steamships.

References

NEW YORK, N. Y.
Plaza Hotel
Ambassador Hotel
Fifth Avenue Hospital
Metropolitan Annex
Roosevelt Hospital
Pershing Square Building

PHILADELPHIA, PA.
Bellevue Stratford Hotel
Midland Building
Misericordia Hospital

PROVIDENCE, R. I.
Providence-Biltmore Hotel

ATLANTIC CITY, N. J.
Ambassador Hotel
Ritz-Carlton Hotel
Shelburne Hotel

NEWARK, N. J.
Bamberger Store

CHICAGO, ILL.
Peoples Gas Building
Corn Exchange Bank
Railway Exchange

DAVENPORT, IOWA
Putnam Building

THE TRAITEL MARBLE CO.

Manufacturers of The T. M. C. Lock or Bonding Strips

LONG ISLAND CITY, N. Y.

Products

The T.M.C. Lock Strip (Patented), for Marble and Cement Aggregate Floors and for Walls and Cement Wearing Surfaces.

T.M.C. LOCKSTRIP

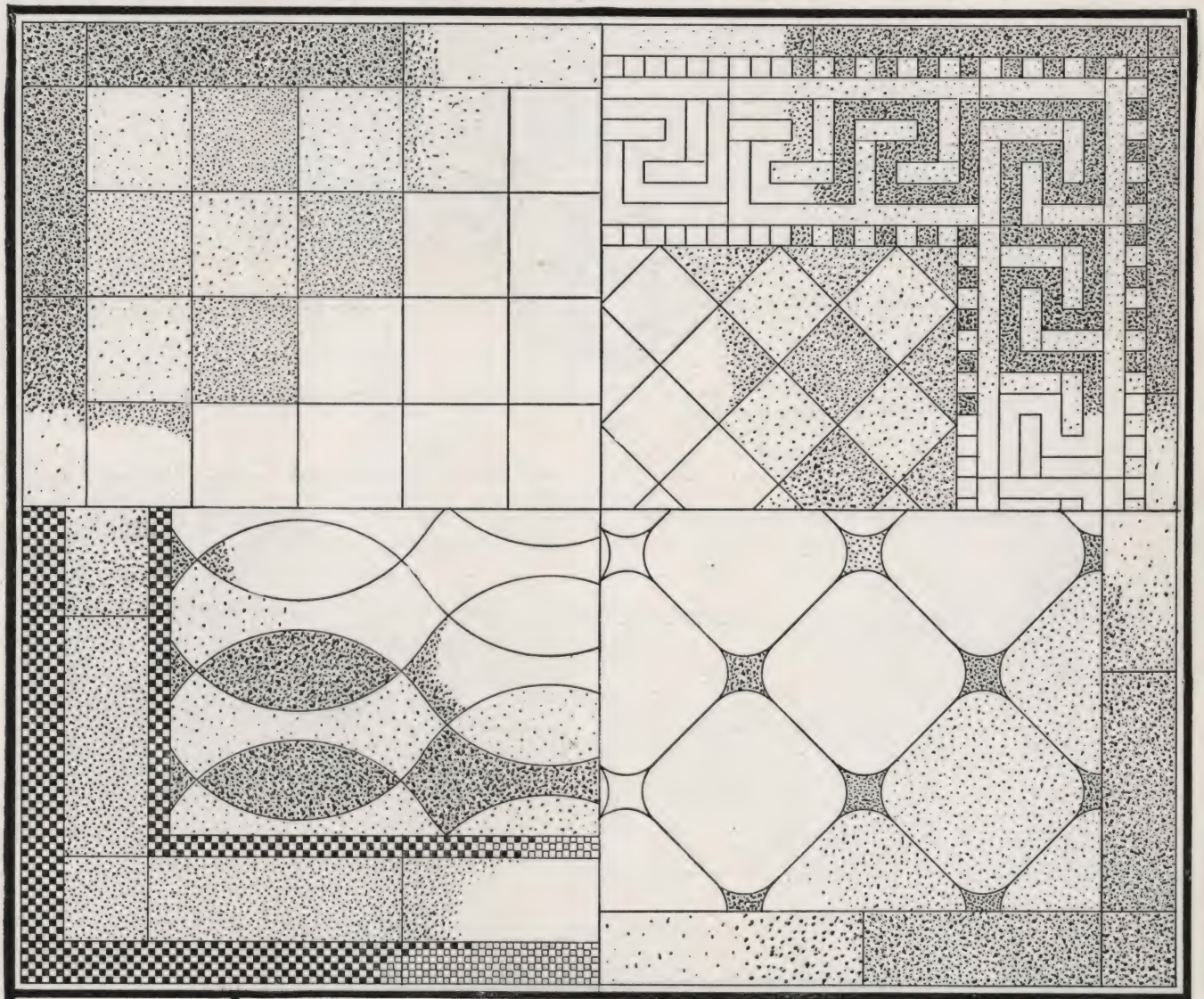
TRADE-MARK

The Aesthetic and Practicable Possibilities of Cloisonn-A Floors and Walls

The Traitel Marble Co's. patented (March 15, 1921) T.M.C. Lock Strip makes possible, for the first time, the full expression of the aesthetic possibilities of cloisonné floors. By the use of this device, the designs of floors are no longer limited to stock or straight line patterns with a limited number of color combinations and forms. With the T.M.C. Strip the designer is provided with the means for unlimited expression of harmonious arrangement of color, tone and figure, thus the charm of the new and artistic Cloisonn-A supersedes the old mechanical terrazzo.

In the past when installing terrazzo floors of several colors it was necessary to place wood guide strips to form these patterns. With the introduction of two or more colors each panel was laid at separate intervals; after one color had hardened sufficiently these guide strips were removed and the alternating panels of different color laid in. This method caused delay, greater cost, and often inferior work resulted from it, as for example in the removing of the wood guide strips the edges of the terrazzo were apt to be broken. Our method of laying in all panels simultaneously by the use of T.M.C. Lock Strip enables the surfacing of the floors to be done on a uniformly hard surface, obviates the breaking of edges and in general gives better results. The cost is reduced materially and pattern work made a commercially priced possibility.

The T.M.C. Lock Strip is of brass and vertically rigid, but horizontally it is sufficiently pliable to permit its conforming to practically any shape desired for the



THE TRAITEL MARBLE CO.

STANDARD DESIGNS OF T.M.C. LOCKSTRIP IN CLOISONN-A FLOORS

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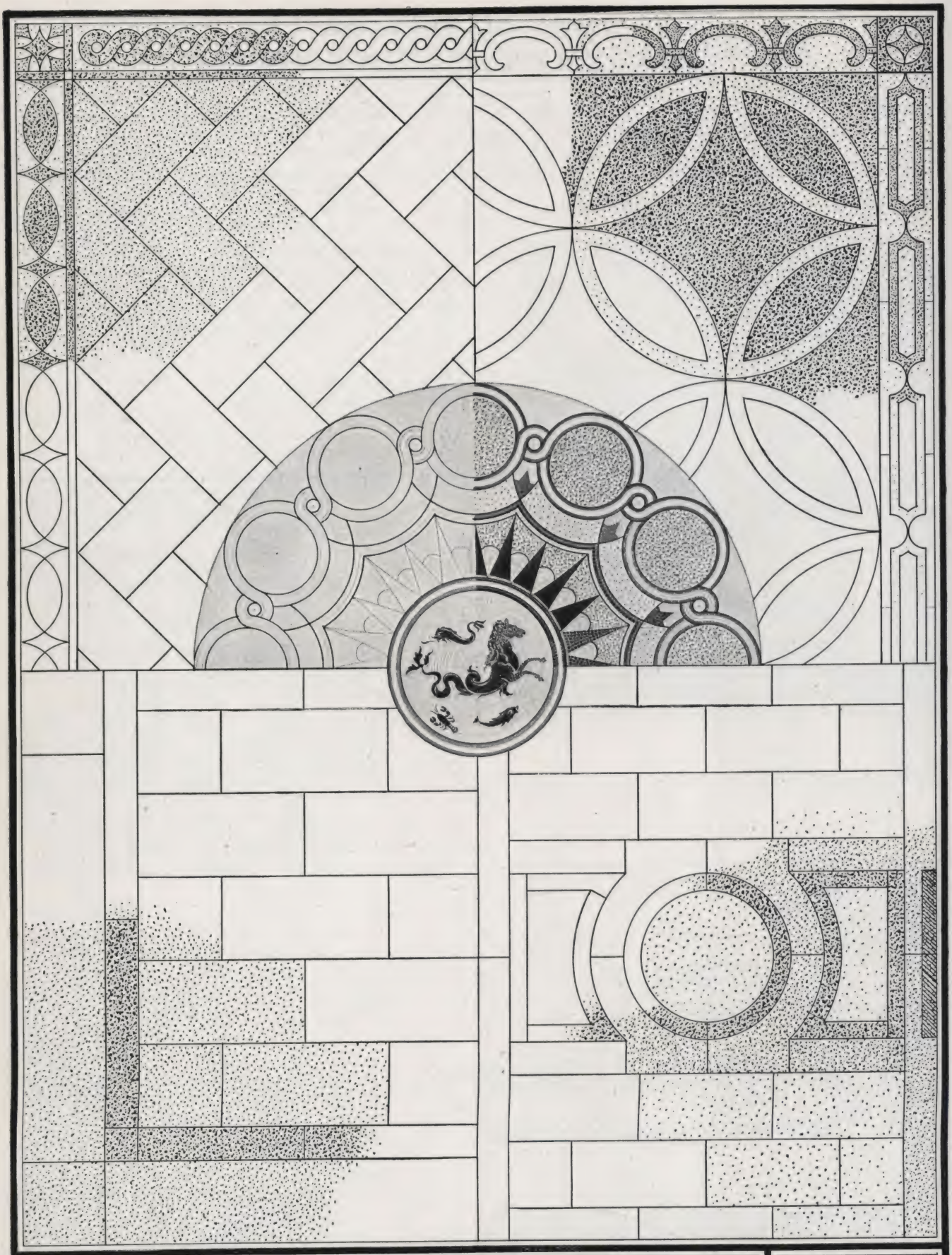


THE TRAITEL MARBLE CO.

ILLUSTRATING FLEXIBILITY OF T.M.C LOCKSTRIP IN CLOISONN-A FLOORS

Continued on next page

outlines of the figures forming the design. The upper edge of the strip being flush with the floor surface contributes an outline to the figures the tone and color of which are pleasing, and suggestive of golden thread that gives luster to the texture of an interesting fabric.

The T.M.C. Lock Strip reinforcement has eliminated cracking due to contraction or any other cause, excepting at the point of least resistance—the concrete plug in the opening of the Lock Strip, where it may go, if anywhere, with no resulting surface cracks, the movement being absorbed by the Lock Strip along the line of section joint or plug. The wearing properties of marble and cement aggregates are much greater than marble or cement alone. Expense of upkeep and cleaning is less than in any other kind of flooring, hand scrubbing is not necessary as with encaustic tiles. Repairing is practically eliminated as there is nothing to get loose, the Lock Strip tieing all panels together.

As sanitary flooring it has no superior and of greater importance is its almost soundproof qualities.

Special Aggregates

By the use of special aggregates we produce non-slip floors, hard and durable, particularly suitable for public buildings, railroad stations, ramps, etc., in connection with any desired marble.

T. M. C. Lock Strip in Concrete Floors

This strip is particularly practical for use in finished cement floors of all descriptions. By its use the finished flooring is divided into figures desired with the joints directly over the expansion joint of the slab below, and the units locked and bonded together.

How Furnished

T.M.C. Lock Strips are sold in any length desired and any contractor can purchase and install T.M.C. Lock Strip.

Specifications for Cloisonn-A Floors

The contractor for this work shall include and properly install the work as hereinafter described.

(1) On top of floor arches lay a ½ in. bed of clean, sharp, well screened sand, free from loam, well rolled or tamped.

(2) Cover entire surface of sand with tar paper overlapping at edges 2 in. and flanging at wall sides not less than 1 in.

(3) Upon tar paper install a bed of concrete composed of portland cement, clean cinders and sand mixed in proportion of 1:6:1. Concrete shall be thoroughly rammed and rolled to form a compact and level surface finished to within 1½ in. below finished level of floor. Upon this lay a ⅜ in. screed coat composed of: 1 part portland cement; 5 parts sharp, well screened sand free from loam, into which the T. M. Co's. Brass Lock Strip shall be bonded ready to receive panels of such dimensions, color and design as shown on plans.

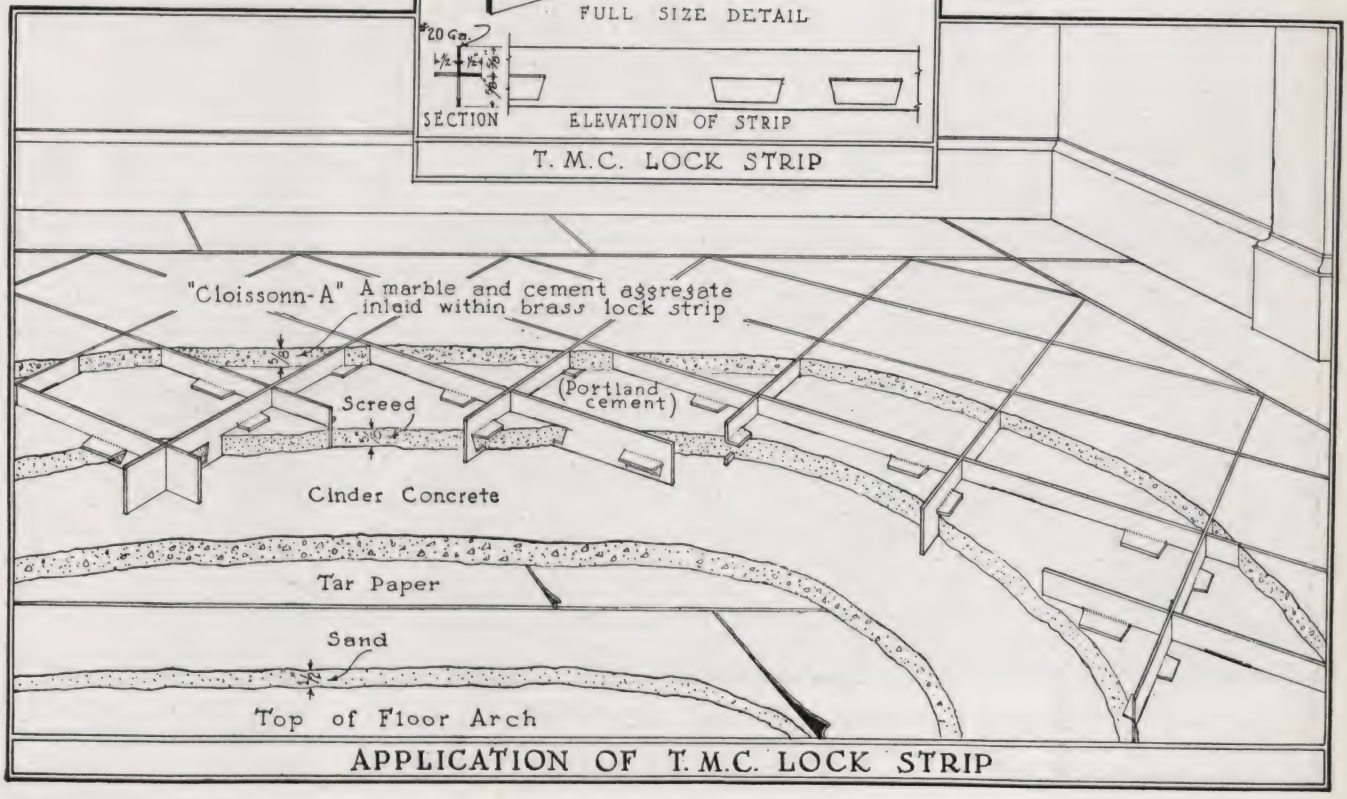
(4) Finished aggregate shall be of the marble or marbles specified. The marble or marbles shall be not less than ⅝ in. in thickness. These aggregates shall be mixed dry with the proper proportion of portland cement to form a binder, then wet and again mixed and laid in between the brass strips to a point level with top of same. A sprinkling of dry marble chips of the finishing aggregates shall then be made and the whole rolled into a compact mass.

(5) After rolling, floor shall be sprinkled with dry portland cement and then hand troweled to give a uniform surface and close the air pockets. Floor shall then be allowed to set, then ground to a true and even surface. It shall then be carefully grouted so as to fill all voids and at finish show a maximum of marble.

Grinding or rubbing of these floors shall not be started until within the judgment of this contractor the cement binder has set sufficiently to permit of it without dragging or defacing the finished surface. Where aggregate is of colored marble these floors shall be oiled by this contractor after all other mechanics are out of the building.

Note: All pipes and conduits must be laid close to floor arches and securely fastened, and so arranged as not to cross or overlap each other, or project above sand cushion.

Base—Base shall project at top ¼ in. beyond finished plaster line. This contractor shall apply a screed of portland cement to walls at back of wall base and will run base to a wood ground set by another contractor to a specified height above finished floor line, projecting ¼ in. beyond the finished plaster line, unless otherwise specified.



B. MIFFLIN HOOD BRICK COMPANY

Manufacturers of Floor Tile, Roof Tile, Brick and Chemical Stoneware

Tenth Floor, Candler Building

ATLANTA, GA.

BRANCHES

CHARLOTTE, N. C., 604 Trust Building
CHATTANOOGA, TENN., Post Office, Daisy, Tenn.
GREENVILLE, S. C., 206 Bruce Building
MEMPHIS, TENN., 324 Madison Avenue Building
NEW ORLEANS, LA., 533 Whitney Central Building
RALEIGH, N. C., 117 West Morgan Street

REPRESENTED BY LEADING TILE AND BRICK DEALERS IN PRINCIPAL CITIES

Products

"POTTRY" TRADE-MARK

"Pottry" (trade-mark registered) Tile for all purposes; Quarrie Tile; Promenade Tile; True Mission Roof Tile; Brick for all architectural and structural uses; Fireplaces; Chemical Stoneware; Cylindrical Spiral Ring Tower Packing.

Also manufacturers of Steps, Briquettes, Landscape Tile, Garden and Terrace Tile, Floor Tile, Heavy Traffic Tile, Non-slip Ramps, and Brick and Stucco Inserts.

Representation

This company is represented by the leading mantel and tile dealers for "Pottry" fireplaces and tile, and by brick agents for inserts and landscape work.

Shipments are made to all parts of the United States, and chemical ware and floor tile are exported. For long distance shipments the special tile ½ in. thick is economical.

New sizes, shapes, colors, and textures are being developed from time to time.

"Pottry" Tile

Quality—"Pottry" tile is made from pulverized pottery and fragments of old jugs, mixed with high grade shale.

The pottery grog acts as the reinforcement, like steel in reinforcing concrete, thus enabling this company to burn at much higher temperatures and to produce a wealth of beautiful colors and rich textures heretofore unequalled, while at the same time preserving trueness as to shape and size.

Textures—"Pottry" Quarrie products are made in 4 textures, as follows:

(B) *Smooth Surface, Wire-cut Edge*—With corrugated backs.

Texture B is a smooth surface with wire-cut edge and corrugated back. Used extensively to replace repressed tile.

(C) *Flemish Texture*—Die surface coarse grog.

Texture C, Old Flemish, is a comparatively smooth texture surface with a wire-cut edge. It is made with Old Flemish one side, matt or Oriental texture other side.

(D) *Matt Texture*—Fine wire-cut.

Texture D, matt texture, is a fine wire-cut surface and edge. Coarser than Old Flemish.

(E) *Oriental Texture*—Coarse wire-cut.

Texture E, oriental texture, is coarse wire-cut, particularly adapted to conditions where a non-skid surface is desired, or for fireplaces or brick and stucco inserts.

Shades—Hood's "Pottry" tile are unique in color as well as texture value. They are made in a number of rich dull shades, as follows:

(2) Red, light.
(3) Red, medium.
(4) Red, dark.
(5) Red with slight flash.
(6) Fire flashed autumnal blends.

The blended colors (shade No. 6) resemble autumn foliage: fire flashed reds, browns, bronzes, coppers, greens, and bluish purples.

Grades—Hood's "Pottry" tiles are made in 3 grades, as follows:

Standard—Representing the standard of Hood's manufacture.

Select—A special hand selection from the standard grade.

Commercial—A good quality of tile with minor imperfections and defects.

Rubble Random—Tile of odd and irregular shapes possessing exceptional color value resembling autumn foliage. Comes in uniform thickness. Many artistic settings are made with Rubble Random.

Shapes—100 different sizes and shapes in the 3 artistic textures are carried in stock for immediate shipment. These shapes add tone and dignity to fireplaces, hearths, steps, and terrace.

The triangular shapes are perfectly cut and especially adapted for diagonal patterns, in walls, fireplaces, and floors in any of the 3 textures.

Special shapes, other than stock specials, will be executed in accordance with the architect's designs. A free service department is at the command of architects.

SIZES AND THICKNESSES OF "POTTRY" TILE

Square		Rectangle		Triangle	
Size, in.	Thickness, in.	Size, in.	Thickness, in.	Size, in.	Thickness, in.
8 x 8	1, 2 and 4	8 x 4	1, 2 and 4	3 x 3	1 and 2
6 x 6	¾, 1 and 2	6 x 9	¾	4 x 4	1 and 2
4 x 4	½, 1, 2 and 4	6 x 3	1 and 2	6 x 6	1 and 2
		6 x 2¼	1 and 2	8 x 8	1 and 2
		6 x 1	1 and 2		
3 x 3	½, 1 and 2				
2¼ x 2¼	1, 2 and 4	2 x 1	2		
2 x 2	1	4 x 2¼	1, 2 and 4		
1 x 1	1 and 2	8 x 2¼	1, 2 and 3¾		

Square Edged and Nosed for Step Treads		Step Risers	
Size	Thickness	Size	Thickness
6 x 12	2	6 x 12	2
		5 x 12	2

Specials made from any detail furnished.

Guarantee—This product is guaranteed to stand Canadian winters. It is used extensively in acid tower construction, because it is insoluble in boiling nitric and sulphuric acids. Due to its vitrification and toughness it is used as a lining for ladles in steel plants.

Continued on next page

Estimates and Co-operation—Assistance will be gladly rendered in the adaptation of "Pottry" material to architects' designs and in estimating costs for appropriations.

To secure the best results, "Pottry" should be specified under allowance, reserving to the architect the right of selection. Samples sent on request.

Fireplaces

Hood's fireplaces are furnished in tile of 1-in. and 2-in. thicknesses, also brick thickness. Thousands of interesting designs can be executed from stock mantel shapes, in either smooth or rough texture.

Catalogue—Write for the mantel catalogue showing 25 designs; individual and artistic.

Roof Tile, Mission and Shingle

"Riviera" Mission roof tile, as illustrated at bottom of page, is a true reproduction of the old Spanish Mission roof tile as seen along the Mediterranean, produced in a soft mingling of fire flashed (autumn foliage) shades and also rugged enough in manufacture to relieve the mechanical straight line and painted color effect of ordinary red tile.

Mission tile is made in 15-in. lengths, 11 in. exposure to weather. Can also be laid in random courses with varying weather exposures. Specials: Eave closures, starter tile, and eave pan tile with water opening for concealed gutter. Regular cap tile is used for saddling hips and ridge.

"Riviera" Shingle Roof Tile

Same material as Mission tile and in same mingled shades.

Made in flat shingles (not interlocking) 9x12 in. punched with two holes at top for nailing. Double lap (like ordinary wood shingles) with 4½ in. to weather.

Write for leaflet "Installation Instructions and suggested Specifications."

Face Brick and Hollow Tile

All "Pottry" face brick, hollow tile and roof tile is also made of shale burned at a high temperature producing the highest type of product possible, being mechanically perfect and impervious to water and dirt.

Chemical Stoneware

The Chemico spiral ring (patented) is a scientifically designed, mechanically perfect packing for absorption, cooling, reaction and condensing towers, producing most effective contact surfaces per unit reaction space.

A perfect packing must have the following requirements: intensive mixing motion of gases, large contact surface, large free volume, durability, self-supporting, cheap unit cost. These requirements are entirely filled by the Chemico packing ring.

The United States Government has used approximately 80,000,000 Chemico spiral rings in the building of nitrate plants. The leading fertilizer manufacturers in the United States are satisfied users.

Specify

Hood's "Pottry":
Quarrie Floor Tile.
Fireplace Design No. — Texture ——.
Tile Inserts for stucco and brick.
Brickettes.
Tile Step Treads and Risers.
Landscape Tile in 2-in. thickness (Flemish Texture.)
Chemico Spiral Rings 3 or 6 in. diameter.
"Riviera" True Mission (or Shingle) Roofing Tile.

Roof of Hood's "Riviera" Mission Roof Tile in Fire-lashed Shades on an Atlanta, Ga. Residence
DeFord Smith, Atlanta, Ga., Architect

KUSHEQUA KERAMIC COMPANY

ELISHA K. KANE, LESSEE

Manufacturer of Oxblood Floor and Roof Tiles

KUSHEQUA, PA.

Products

KUSHEQUA FLOOR and ROOF TILES.

Oxblood Tiles

Oxblood tiles show superiority in clear, deep red color, high vitrification, even texture and neat finish. No artificial glaze or coloring, the color and substance being uniform throughout.

The material is a stratified mountain shale of uniform composition. It is ground very fine and highly vitrified by natural gas.

Size and Grading

Oxblood tiles are made in 4 principal sizes: 1x6x9 in. (Promenade), $1\frac{3}{16}$x12x12 in. (Quarry), $1\frac{1}{8}$x9x9 in. (Quarry), and 1x6x6 in. (Quarry).

The Promenade size is graded into 3 qualities: flooring quality (very choice), roofing quality (suitable for floors, excellent for roofs) and seconds (serviceable for roofs or cheap floors). The Quarry sizes are graded into flooring quality (choice) and seconds (slightly defective). All sizes have also thirds (inferior).

When crated, 12 sq. ft. fill each crate.

Color

Each grade and size is sorted into 3 shades of clear red color: A (dark red), B (deep red) and C (bright red). Oriental tiles, with dark red centers fading toward gray edges, are also made in 6x6 in. and 6x9 in.

Specials

A full line of cove base, quoins, angles, wainscot caps, plinths, step treads, coping and other shapes are carried in stock. Also, key quarries, 3 in. and 1½ in., red or black, diagonals and fractional tile for course starters. Other special shapes are made to order on reasonable notice.

Copyright, 1916, by Equitable Office Building Corporation

EQUITABLE BUILDING, NEW YORK, N. Y.
GRAHAM-BURNHAM, Architects
Roofed with Kushequa Promenade Tile

Uses

Vitrified tiles are used wherever there is need for a surface which is proof against fire, frost, water, acid, grease and dirt. If, in addition to these requirements, beauty of color and resistance to wear are required, Kushequa oxblood tiles are best.

Flooring quality is recommended for parlors, halls, dining rooms, restaurants, hospital operating rooms and laboratories. Roofing quality for roof gardens, roofs, porches, promenades, kitchens, laundries, packing houses, engine rooms, bridges, etc. Seconds for roofs, dye vat linings, acid towers, fertilizer plants.

Facilities

Monthly output 250,000 tile. Large stock enables prompt shipment.

Transportation facilities unexcelled, factory connected with Erie R. R., Buffalo, Rochester & Pittsburgh R. R., Pennsylvania R. R. and Baltimore & Ohio R. R.

Direct Sale

Although represented in principal cities by capable wholesale dealers, customers who so desire may buy direct at open published prices. There will be a reasonable discrimination in favor of tile setters and dealers.

References

Stock Yards Inn, Chicago, Ill., R. L. Lindstrom, Architect
Engineering Laboratory, University of Michigan, Ann Arbor, Mich., Smith, Hinchman & Gryllis, Architects
Niagara Falls Bridges, Niagara Falls, N. Y.
Canadian Pacific Hotels, Edmonton and Laggan, Alta.
Tennessee Coal and Iron & Railroad Co., Fairfield, Ala.
Metropolitan Museum of Art, New York, N. Y., McKim, Mead & White, Architects
Swift & Co., Packing House, Montreal, Que.
Giles Residence, Orlando, Fla., L. Percival Hutton, Architect
Geological Building, Interior Department, Washington, D. C.
Bureau of Engraving and Printing, Washington, D. C.
J. K. Billings, Residence, Locust Valley, L. I., Guy Lowell, Architect
Rockefeller Institute, East 64th Street, New York, N. Y., Shepley, Rutan & Coolidge, Architects
High School, Waterbury, Conn., Griggs & Hunt, Architects
St. Augustine's Church, Convent and School, San Juan, P. R.
Broadmoor Hotel, Colorado Springs, Colo.
Pennsylvania Hotel, 33rd Street and 7th Avenue, New York, N. Y., McKim, Mead & White, Architects
University of Southern California Administration Building, Los Angeles, Cal., John Parkinson, Architect
Hotel Commodore, New York, N. Y.

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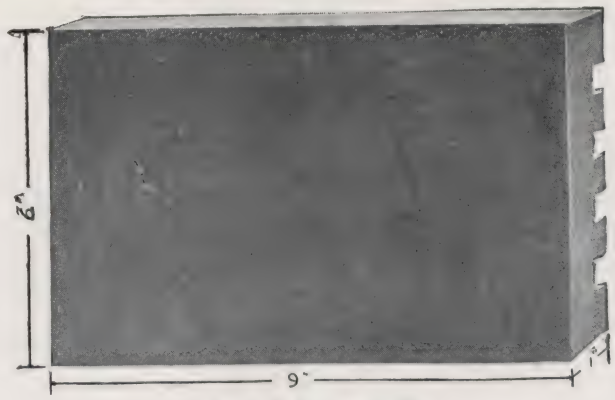
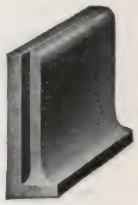


Oxblood Promenade Tile

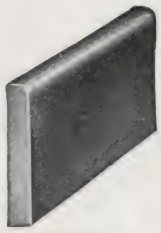
Straight Sizes	Fractional Sizes
Nos. 9 and 92, 9x9 in.	No. 99 Diagonal, 9x9 in.
Nos. 1, 10, 11, 12, 13 and 14, 6x9 in.	No. 26 Diagonal, 6x6 in.
Nos. 6, 60, 61 and 62, 6x6 in.	No. 95 Starter, 9x4½ in.
Nos. 3 and 22, 3x3 in.	No. 24 Starter, 6x4½ in.
Nos. 2 and 20, 1½x1½ in.	No. 23 Starter, 6x3 in.

Internal Quoin
No. 64, height, 6 in.
No. 54, height, 6 in.
No. 34, height, 3 in.

External Quoin
No. 65, height, 6 in.
No. 55, height, 6 in.
No. 35, height, 3 in.



No. 58, Right Stop
No. 59, Left Stop
No. 68, Right Stop
No. 69, Left Stop



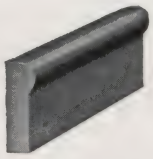
Bullnose
No. 80, 6x9 in.
No. 81, 6x6 in.

Internal Radius
No. 76, 6 in.
No. 77, 9 in.

External Radius
No. 78, 6 in.
No. 79, 9 in.

External Cove Angle, Left Hand
No. 43, height, 4½ in.
No. 53, height, 6 in.
No. 42, height, 4½ in., Right Hand
No. 52, height, 6 in., Right Hand

Cove Base, 4½ in., Square Top
No. 40, height, 4½ in.; length, 9 in.
No. 46, height, 4½ in.; length, 6 in.
No. 50, height, 6 in.; length, 9 in.
No. 56, height, 6 in.; length, 6 in.
No. 30, height, 3 in.; length, 9 in.
No. 36, height, 3 in.; length, 6 in.



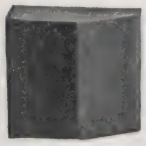
Wainscot Cap
No. 70, 4 in. high, 9 in. long
No. 71, 4 in. high, 6 in. long

Bullnose Stop
No. 82, 6x6 in.

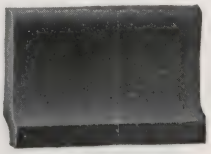
No. 100. Porch Coping

No. 101. Coping Corner

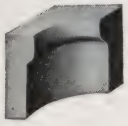
Internal Cove Angle
No. 41, height, 4½ in.
No. 51, height, 6 in.



Square Plinth
No. 57, height 6 in.
No. 47, height, 4½ in.
No. 67, Rounded

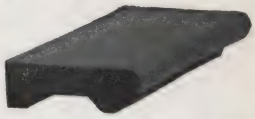


Cove Base, 6 in., Round Top
No. 63, length, 9 in.
No. 66, length, 6 in.



No. 72 Cap
Internal Quoin

No. 73 Cap
External Quoin



No. 102 Step Tread Tile

KUSHEQUA PROMENADE TILE, SANITARY BASES AND WAINSCOTS

NUMERICAL LIST OF ABOVE TO FACILITATE ORDERING BY NUMBER

1 Promenade Tile, 6x9x1 in., Flooring Quality
2 Key Quarry, 1½x1½x1 in., Flooring Quality
3 Key Quarry, 3x3x1 in., Flooring Quality
4 Key Quarry, 4x4x1 in., Flooring Quality
6 Quarry, 6x6x1 in., Flooring Quality
9 Quarry, 9x9x1⅛ in., Flooring Quality
10 Promenade Tile, Oriental, Flooring Quality
11 Promenade Tile, Roofing Quality
12 Promenade Tile, Second Quality
13 Promenade Tile, Third Quality
14 Promenade Tile, Oriental, Seconds
20 Key Quarry, 1½x1½x1 in., Blackish
22 Key Quarry, 3x3x1 in., Blackish
23 Course Starter, 6x3x1 in.
24 Course Starter, 6x4½x1 in.
25 Course Starter, 3x9x1 in.
26 Diagonal, 6x6x1 in.
30 Cove, 3 in. high, square top, 9 in. long
34 Cove, 3 in. high, square top, Internal Quoin
35 Cove, 3 in. high, square top, External Quoin
36 Cove, 3 in. high, square top, 6 in. long
40 Cove Base, 4½ in. high, square top, 9 in. long
41 Cove Base, 4½ in. high, square top, Internal Angle
42 Cove Base, 4½ in. high, square top, External Angle, Right Hand
43 Cove Base, 4½ in. high, square top, External Angle, Left Hand
46 Cove Base, 4½ in. high, square top, 6 in. long
47 Cove Base, 4½ in. high, square top, Plinth
50 Cove Base, 6 in. high, square top, 9 in. long
51 Cove Base, 6 in. high, square top, Internal Angle
52 Cove Base, 6 in. high, square top, External Angle, Right Hand
53 Cove Base, 6 in. high, square top, External Angle, Left Hand
54 Cove Base, 6 in. high, square top, Internal Quoin
55 Cove Base, 6 in. high, square top, External Quoin
56 Cove Base, 6 in. high, square top, 6 in. long
57 Cove Base, 6 in. high, square top, Plinth
58 Cove Base, 6 in. high, square top, Right Stop
59 Cove Base, 6 in. high, Left Stop
60 Quarry, 6x6x1 in., Oriental, Flooring Quality
61 Quarry, 6x6x1 in., Seconds
62 Quarry, 6x6x1 in., Oriental, Seconds
63 Cove Base, 6 in. high, round top
64 Cove Base, 6 in. high, round top, Internal Quoin
65 Cove Base, 6 in. high, round top, External Quoin
66 Cove Base, 6 in. high, round top, 6 in. long
67 Cove Base, 6 in. high, Plinth, all edges rounded
68 Cove Base, 6 in. high, round top, Right Stop
69 Cove Base, 6 in. high, round top, Left Stop
70 Wainscot Cap, 4 in. high, 9 in. long
71 Wainscot Cap, 4 in. high, 6 in. long
72 Wainscot Cap, 4 in. high, Internal Quoin
73 Wainscot Cap, 4 in. high, External Quoin
74 Wainscot Cap, 4 in. high, Internal or External Miter
75 Wainscot Cap, 4 in. high, Right or Left Stop
76 Wainscot, Internal Radius 6 in.
77 Wainscot, Internal Radius 9 in.
78 Wainscot, External Radius 6 in.
79 Wainscot, External Radius 9 in.
80 Bullnose, 6x9x1 in.
81 Bullnose, 6x6x1 in.
82 Bullnose Stop, 6x6x1 in.
83 Bullnose, Internal Quoin, 6 in. high
84 Bullnose, External Quoin, 6 in. high
90 Quarry, 9x9x1⅛ in., Oriental
92 Quarry, 9x9x1⅛ in., Second Quality
95 Course Starter, 9x4½x1⅛ in.
99 Diagonal, 9x9x1⅛ in.
100 Porch Coping, 6x9x2 in.
101 Porch Coping Corner, 9x9x2 in.
102 Step Tread Tile, 6 in. wide, 9 in. long, 2 in. deep
103 Step Tread Corner, 6 in. wide, 6 in. long
106 Step Tread Tile, 6 in. wide, 6 in. long
120 Quarry Tile, 12x12x1⅜ in., Flooring Quality
121 Quarry Tile, 12x12x1⅜ in., Second Quality

THE UNITED STATES ROOFING TILE CO.

Manufacturers of Quarry or Promenade Tiles

Sixth Floor, Union Trust Building

PARKERSBURG, W. VA.

FACTORIES: PARKERSBURG, W. VA., EAST SPARTA, OHIO

Products

FLOOR TILES; QUARRY OR PROMENADE TILES; COVE BASE, WAINSCOT CAP, ANGLES, STOPS, etc.

Also manufacturers of Stair Treads and Acid Tower Lining.

U. S. Quarry Tiles

Material—Made from shale by modern methods, resulting in a perfect product with low absorption.

Colors—Made in rich, natural reds, ivory, gray and brown.

Grades and Uses of Quarry or Promenade Tiles for Floors and Flat Roofs

No. 1 Select—These tiles are sound and solid in every particular. Approximately level and regular in lines with only slight variation in lengths, widths and shades, and lay up well in floor work.

Commercial—Same as No. 1 Select, assorted to size, but not to shade.

Seconds—These tiles are those rejected from our first and commercial grades. The imperfections consist of slightly broken corners and chipped edges. There are no cracks running into the tiles. They are not selected with as much care as to level surface and regular lines, but will make a good roof, or a satisfactory floor where first class tiles are not required. They are selected to size, but not to shade.

Specifications and Instructions

General—A good foundation is always necessary and should be solid and perfectly level, free from spring or vibration. Tile must be laid upon a concrete foundation, prepared from the best quality portland cement and clean, sharp, washed sand and gravel. Cinders, if used, should have ashes screened out and the vitrified cinder or clinker thoroughly washed (sulphur in cinders will destroy the reinforcing in concrete). Concrete should be allowed to harden thoroughly before laying floor; thoroughly brushed to remove all dust; well soaked with water. dusting on concrete thin coat of pure portland cement before applying cement mortar for laying tile. Concrete should never be allowed to stand more than 3 or 4 days before laying tile.

Lime Mortar—Lime mortar should never be mixed with concrete.

Concrete—Concrete to consist of 1 part portland cement, 3 parts clean, washed, sharp sand, 4 parts clean gravel, clean, fine broken stone, or cinders free from ashes. Mix cement and sand thoroughly dry, add gravel or broken stone and mix, adding sufficient water to form, when laid, a hard, solid mass when well beaten to a bed. Bed should not be less than 3 in. thick. Surface of concrete must be level and finished within 2 in. of finished floor line (1½ in. when ½-in. tiles are used), which will leave space of 1 in. for cement mortar.

Cement Mortar—Cement mortar to consist of 1 part best quality portland cement, 2 parts clean, washed, sharp sand, thoroughly mixed as directed for concrete. All mortar to be used fresh, before it has its initial setting.

Laying Tiles—Tiles must be soaked in water not less than ½ hour before being placed upon mortar which must be stiff enough to hold weight of tiles and not work up between the joints. Tiles are firmly pressed into mortar and tamped down with block and hammer to a true even jointed surface. Lay tiles with smooth edges running the same way.

Grouting—When cement is sufficiently set, which should be in about 1 day, floor should be well scrubbed with clean water and broom, and joints grouted flush with cement grout to consist of 2 parts best quality portland cement and 1 part clean, washed, sharp sand. Before grouting, rub face of tiles with oily waste to facilitate cleaning. When grouting is colored, only the best mineral color should be used.

Joints—These tiles should never be laid with joints of less than ¼ in. for the smaller tiles. With larger tiles, the width of joints should be increased proportionately. Natural cement joints are preferable and more durable.

Cleaning Tiles—A white scum sometimes appears on the surface of tiles, caused by cement. This can generally be removed by washing frequently with Wyandot (or similar cleaning powders) and water. If scum or dirt can not be removed by washing, then use a solution of muriatic acid and water (1 pt. of acid to a wooden bucket of water) applied with scrubbing brush. Allow acid to remain on floor for a few seconds only, then thoroughly wash off.

To Brighten Floors—Saturate a clean cloth with equal parts of raw linseed oil and turpentine. Rub well over surface of tiles and wipe dry with clean cotton cloth.

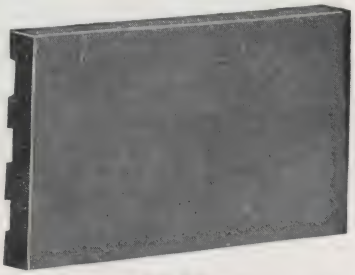
Facilities

This company operates two factories and carries large stocks from which prompt shipment can be made.

Catalogue and Samples

Catalogue and samples will be sent on request.

6x6x1 in.



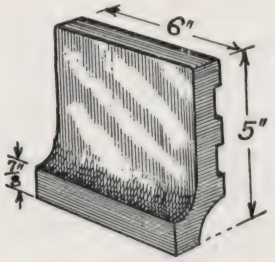
6x9x1 in.

9x9x1 in.

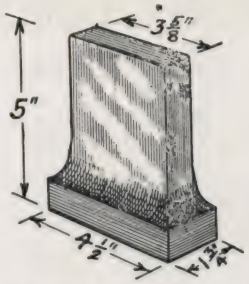
12x12x1½ in.

U. S. QUARRY TILES

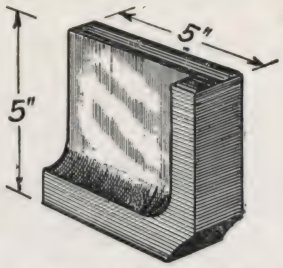
Continued on next page



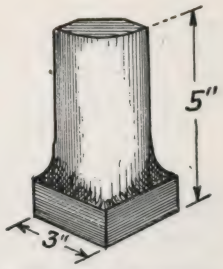
Cove Base No. 1
Also made 3 and 9 in. long
No. 31. Same dimensions except 3 in. high



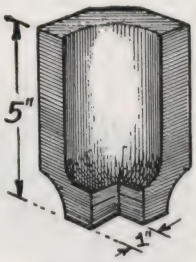
Cove Base Angle External No. 2
No. 32. Same dimensions except 3 in. high



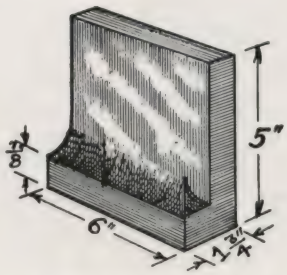
Cove Base Angle Internal No. 3
No. 33. Same dimensions except 3 in. high



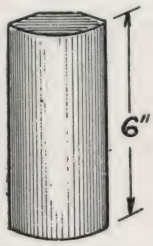
Cove Base Angle External No. 4
No. 34. Same dimensions except 3 in. high



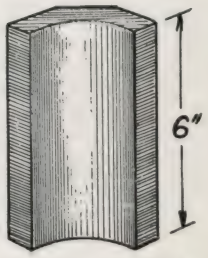
Cove Base Angle Internal No. 5
No. 35. Same dimensions except 3 in. high



Left Door Stop Cove Base No. 1

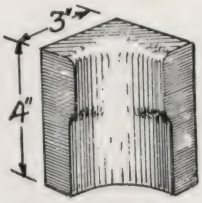


Wainscot Angle External No. 6

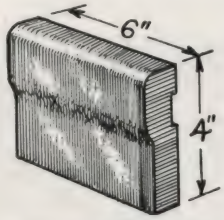


Wainscot Angle Internal No. 7

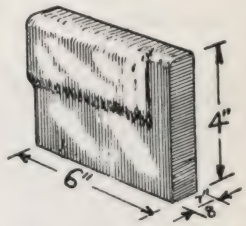
Wainscot Cap Angle External No. 8



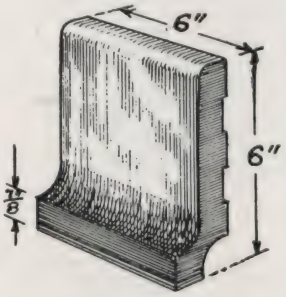
Wainscot Cap Angle Internal No. 9



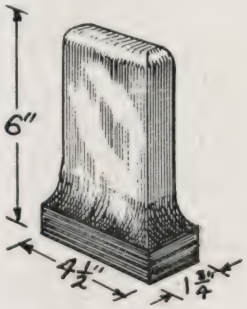
Wainscot Cap No. 10
Also made 3 and 9 in. long



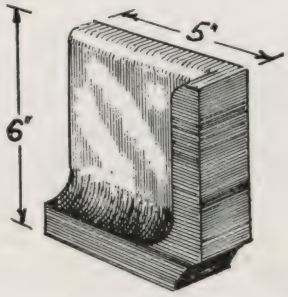
Left Stop for Wainscot Cap No. 10



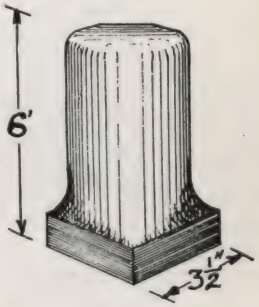
Cove Base No. 11
Also made 3 and 9 in. long



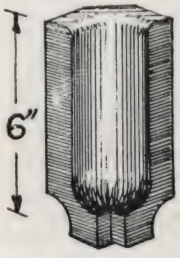
Cove Base Angle External No. 12



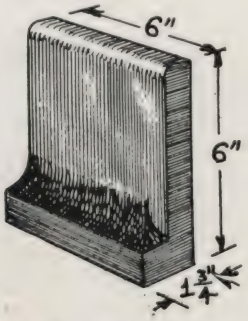
Cove Base Angle Internal No. 13



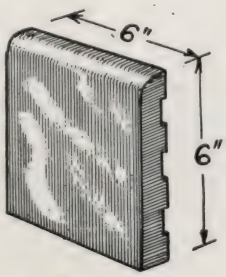
Cove Base Angle External No. 14



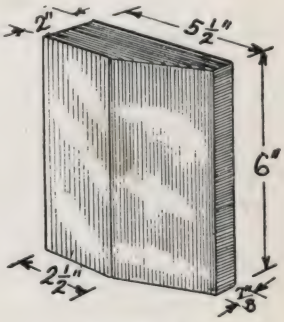
Cove Base Angle Internal No. 15



Left Door Stop for Cove Base No. 11



Bullnose Tile
Made in any size



Plinth Block

SPECIMENS OF U. S. QUARRY TILE TRIMMINGS

THE JENNISON-WRIGHT COMPANY

Manufacturers of Kreolite Wood Block Floors

2480 Broadway
TOLEDO, OHIO
BRANCH OFFICES IN ALL PRINCIPAL CITIES

Products and Services

KREOLITE
TRADE-MARK

KREOLITE WOOD BLOCK FLOORS and PAVEMENTS.

SPECIALISTS IN WOOD PRESERVING.

Also Timbers, Cross Ties, etc.

This company maintains a corps of expert superintendents for the purpose of instructing purchasers how to properly install Kreolite Wood Block Floors, or to supervise the construction; if preferred, they will contract to install the floors complete.

Use

Kreolite wood block floors are used in factories, machineshops, printing plants, warerooms, loading platforms, annealing rooms, foundries, pickling rooms, dye rooms, glass factories, paper mills, rubber tire plants, garages and stables. They are also used on bridge floors and streets.

General Description of Kreolite Wood Blocks

Manufactured in two general designs (see illustrations) to meet dry or wet conditions. They are rectangular in shape, surfaced on both sides and one end to a uniform size, either 3 or 4 in. in width and from 2 to 4 in. in depth depending on the severity of service. All blocks are furnished of the same width and depth for any one job. (A variation of $\frac{1}{16}$ in. in the depth and $\frac{1}{8}$ in. in the width to be allowed.)

Material—All blocks are manufactured from carefully selected Southern long leaf yellow pine, thoroughly air seasoned and free from bark, loose or rotten knots or other injurious defects.

Treatment—All blocks for interior floors are treated in airtight cylinders by the Kreolite pressure and vacuum process; the quantity of preservative injected per cubic foot of timber depends on the service and conditions the floor must withstand, but in no case leaving less than 6 lbs. of oil per cu. ft. of timber. Blocks that are to be used for exterior purposes—such as driveways, loading platforms and court pavements, or that are subjected to considerable moisture—are treated by the Kreolite "two-stage" process which consists of a second application of hot Kreolite oil injected to insure a more thorough waterproofing of the blocks.

A pure grade of Kreolite creosote oil is used.

Conspicuous Features

In the average machineshop or iron working plant where sharp heavy castings are handled or where trucking is done, Kreolite wood blocks will outwear any other type of floor except iron plates. United States Government experts rank wood blocks just slightly below granite blocks in point of durability. The dropping of iron castings or the constant passing of heavy trucks on Kreolite wood blocks has the tendency to further compress the fibers, making the blocks tougher and harder.

After a Kreolite wood block floor is once laid there will be no expense for repairs for many years to come. As the blocks are not ground by wear, there is no dust to get into the bearings of valuable machinery.

They are non-conductors of heat and very easy under the workmen's feet.

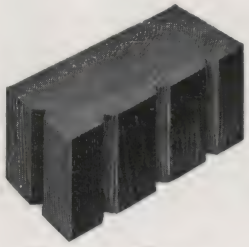
Specifications for Installing Kreolite Block Floors

The following method of laying Kreolite blocks is recommended for the average floor. If unusual conditions are to be met, special specifications will be gladly furnished.

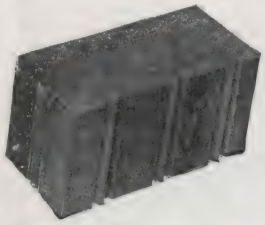
Blocks—Kreolite Grooved Wood Blocks shall be used wherever the floors are subjected to dry conditions and Kreolite Kountersunk Lug Wood Blocks where the conditions are wet, or considerable moisture is encountered. They shall be — in. in depth, approximately 3 or 4 in. in width, and may vary from 5 to 8 in. in length.

They shall be manufactured by THE JENNISON-WRIGHT COMPANY of Toledo, Ohio, and laid according to the following specifications, under the direction of the manufacturer's superintendent.

They shall be manufactured from thoroughly air seasoned, carefully selected, long leaf yellow pine, and shall be treated in accordance with the Kreolite Pressure and Vacuum Process, with not less than 6 lbs. of Kreolite Oil per cubic foot of timber.



KREOLITE GROOVED BLOCK
For dry heated conditions



KREOLITE KOUNTERSUNK LUG BLOCK
For use under wet conditions where the factor of expansion is to be encountered; also to offset slipperiness on grades

Concrete Foundation—The blocks shall be installed on a concrete base, which shall be finished smooth, exactly the depth below the finished floor level corresponding with the depth of the block used. Care must be taken to see that there are no projections in the concrete that will form an uneven bearing for the blocks.

Kreolite Koncrete Coating—After the concrete has thoroughly dried out, it shall be swept clean and given a thin, even coating of Kreolite Bitumen, not exceeding $\frac{1}{8}$-in. in thickness. The coating shall be allowed to harden before laying the blocks and shall not be applied over 20 ft. in advance of the block laying.

Laying the Blocks—Upon the base, as above prepared, the blocks shall be laid tightly together, with the grain vertical; the courses of the blocks shall be kept straight and parallel, starting from one side of the building and carried through to the other side; all joints shall be broken by a lap of at least 2 in. In truckways, and whenever possible, the blocks shall be laid with their length at right angles with the line of traffic.

Blocks to Be Tightened Before Applying Filler—*(A) Dry Floor Conditions*—Heated interior rooms, etc., Kreolite Groove Blocks shall be used, and after every four rows of blocks shall have been laid in place, a piece of 2 x 4 planking shall be laid along the outside edge of the blocks and the courses driven together as tightly as possible. The blocks in each separate row shall also be tightened lengthwise before the filler is applied, by forcing the blocks together from the ends, with a lever, pick or other instrument.

(B) Wet Floor Conditions—For floors subjected to moisture, high humidity, etc., Kreolite Kountersunk Lug Blocks, which provide an individual expansion joint between each block, shall be used, and shall be laid with the lugs in close contact with the adjoining blocks.

Expansion Joints—Against the walls on all sides of the floor, as well as around all columns and other obstructions, a bituminous expansion joint 1 in. in width shall be formed by,

Continued on next page

first, laying a strip of that width and after removal, filling the space to within an inch of the top with Kreolite Bituminous Filler.

Application of Kreolite Bituminous Filler—After the blocks have been laid in place and brought to as true and level a surface as possible, the joints between the blocks shall be filled with Kreolite Bituminous Filler applied at a temperature of not less than 350° Fahr.

The filler shall be applied by flushing over the surface of the floor, using a rubber-edged squeegee to force it into the joints. Care must be taken to see that the filler penetrates the full depth of the blocks and that the joints are completely filled at the time of application. The filler, in cooling, shall not settle more than ¾-in. from the surface. With proper care, the floor surface will be practically free from bitumen. Dry, sharp sand shall then be swept over the floor, completely covering the blocks, same to be left on the floor until the blocks are well set, if possible for a period of three weeks. Traffic during that time will wear off the thin film of bitumen left on the surface.

Solution of Various Floor Problems

The illustrations show three different types of floor problems, and in each case a satisfactory solution was reached by installing a type of Kreolite wood block floor, which was designed to give the best results under the conditions to be met.

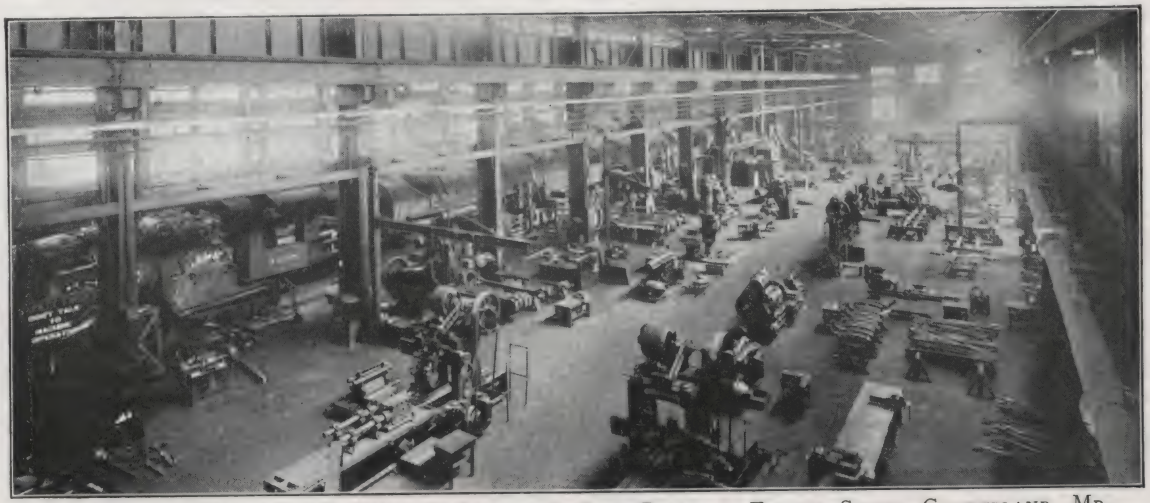
Co-operative Service

Our engineering department will furnish information as to how Kreolite wood block floors can be used to advantage in your factory; how they will reduce maintenance and repair bills, increase the efficiency of workmen, and cut production costs. Inform us as to the requirements. *Detailed specifications sent on request.*

View of Kreolite Wood Block Flooring in Building No. 21, National Cash Register Company, Dayton, Ohio

This building contains the printing department and every modern development of the printing industry. Over 145,000 sq. ft. of Kreolite block floors in service in this plant

Kreolite Wood Block Floor in Assembling Room of the A. O. Norton Co., Inc., Boston, Mass.



Kreolite Wood Block Floor, Baltimore & Ohio Railroad Engine Shops, Cumberland, Md.

This floor is subjected to very heavy and rough usage and is frequently flooded with water

REPUBLIC CREOSOTING COMPANY

Original Makers of Creosoted Wood Block Floors

1614 Merchants Bank Building
INDIANAPOLIS, IND.

BRANCH OFFICES

CHICAGO, ILL., 1015 Chamber of Commerce Building
PHILADELPHIA, PA., 834 Real Estate Trust Building
CLEVELAND, OHIO, 1296 Nicolson Avenue, Lakewood
DETROIT, MICH., 804 Hammond Building
BUFFALO, N. Y., 204 Erie County Bank
BOSTON, MASS., 516 Beacon Building

Products

KREODONE INTERIOR WOOD BLOCK FLOORS.

Also manufacturers of Creosote Ties, Poles, Piling and Timber; Creosote Oil; Reilly's Wood Preservative Oil.

Pioneers in the Industry

The first creosoted wood block floor in the United States was manufactured by this Company. It was a complete success and is still giving entirely satisfactory service, as are all other Kreodone floors produced since then.

The present tremendous demand for Kreodone interior wood block floors is the best possible proof of their unequaled efficiency. No other type of floor is now considered where the floor must withstand heavy service and where the wood must be properly preserved against decay.

Unlike concrete and other rigid, abrasive floor materials, it does not chip, crack, pulverize or grind up into dust. It can never disintegrate or develop ruts and bumps like composition flooring.

Long, hard service simply makes this floor smoother and more durable.

Wood Block Floors

The ideal industrial floor must be one that will withstand greater wear than plank, brick, cement, asphalt, composition or any of the abrasive disintegrating floor materials.

It must not splinter, crumble, chip, crack, scale, fracture, become uneven or create dust.

It must be easily cleaned and sanitary. It must be permanently smooth, and proof against the action of moisture and dilute acids and alkaline solutions.

The one industrial flooring material that meets all of these requirements—fair and square—is the Kreodone wood block.

Production Efficiency

Production engineers have demonstrated by repeated time studies that a wood block floor will show a decided increase in production per man, together with a decrease in labor expense. These two things are due to the greater comfort and freedom from fatigue. Kreodone wood blocks are warm in winter and cool in summer. They do not tire the feet.

Freedom from glaring light reflection brings relief to tired eyes. Noise of falling articles and truck wheels is practically eliminated and there is a marked decrease in vibration noises.

Kreodone Interior Wood Block Floors Are Durable and Economical

Kreodone interior wood block floors are more durable than any other type of floor.

The first cost is practically the only cost, as there is no maintenance expense.

Alterations are quickly and easily made, for the individual blocks can be lifted out and set back in place at will.

Being composed of comparatively small units, with the grain exposed, trucking and wear tend to iron out the wood and make it even more dense and durable. They remain permanently level, because they are bonded directly to the concrete base and the blocks can not give or splinter. The pure creosote oil with which they are treated assures at least 50 years' perfect service without decay.

Such a floor is never slippery and it never originates dust.

For warmth and comfort of workmen, this floor is without an equal. No moisture can penetrate. Workmen are not obliged to build platforms to protect themselves against dampness and fatigue.

Pure Creosote Oil Is Used in Impregnating Kreodone Blocks

The preservative used in impregnating Kreodone blocks is the highest type of pure creosote oil—superior to every other wood preservative.

Kreodone creosote oil contains no tar or other adulterants.

Kreodone interior wood block floors are absolutely decayproof and practically fireproof.

Sanitation

Kreodone oil is a pure distillate of coal tar and contains a large proportion of germicidal ingredients. It possesses the power of quickly killing the germs of tuberculosis and other contagious diseases, thus rendering the floor permanently and highly antiseptic. It is also repellant to insects, rats, mice, etc.

Adaptation

Kreodone interior wood block floors are ideal for every industrial floor which is subjected to trucking or other heavy service, or where workmen must stand at their work. They are widely used in all branches of the metal industries, automobile, implement and machinery factories, paper and rubber plants, railroad shops, roundhouses, platforms, private drives, etc.

Shipping Service

Our manufacturing plants are located at Indianapolis, Minneapolis, Mobile and Norfolk, favorable locations to give prompt and efficient service to all parts of the country on the lowest possible freight rates. Capacity is practically unlimited; equaling that of all of the other block floor plants in the country.

Our Engineering Department will gladly make a study of your plant conditions.

Continued on next page

Specifications of Interior Wood Block for Floors

Timber—Highest grade obtainable, viz:

The blocks to be manufactured from thoroughly air-seasoned Long Leaf Yellow Pine timber, square edged, sound and free from knots, shakes, bark and other defects detrimental to their strength and durability. The timber shall average at least six (6) annular rings per inch.

Size of Blocks—Careful study should be given to the loads, frequency of service and general shop conditions so that most economical as well as the most serviceable size may be selected, viz:

Blocks 2 in. deep should be used where truck loads carried do not exceed 1000 lbs. and the trucking conditions are light, such as light assembly, warehouse storage, light machinework, etc.

Blocks 2½ in. deep should be used where truck loads carried do not exceed 4000 lbs. This size block is suitable for manufacturing, machineshops, paper plants, etc.

Blocks 3 in. deep should be used where truck loads carried reach 20,000 lbs., such as heavy factory work, heavy machineshops, roundhouses, loading platforms, etc.

Blocks shall be surfaced on two sides and one end, 3 in. to 4 in. in width, as desired. The length shall not exceed three (3) times the depth and in no case shall the width of the block be equal to the depth. A variation of ⅛ in. in width shall be allowed. The blocks are manufactured in standard depths of 2, 2½ and 3 in. The depth of the block varies according to the severity of service.

Standard Dimensions—

Depth, in.	Width, in.	Length, in.
2	3 or 4	5-6
2½	3 or 4	5-7
3	4	6-9

Constantly wet floors require special construction and treatment.

Note: We can manufacture any shape of blocks, standard rectangular, groove, lug or corner cut at your option.

Method of Preserving the Blocks Against Wear and Decay

The preservative used is a pure unadulterated distillate creosote oil—viz: Kreodone.

Specifications for Kreodone Creosote Oil—The oil shall be wholly an unadulterated distillate of coal tar. No material of any kind such as liquid tar, petroleum or other products shall be added to or mixed with it. Its specific gravity at 38° C. shall be not less than 1.09 and not more than 1.12.

It shall conform to the following points:

Up to 200°C., not more than 2% shall distill.

Up to 210°C., not less than 3% and not more than 5% total shall distill.

Up to 235°C., not less than 10% and not more than 20% total shall distill.

Up to 315°C., not less than 30% total and not more than 40% total shall distill.

The residue at 355° must be a crystalline solid, and shall not be in the least sticky, and when a small portion of it is placed on white filter paper and warmed, the oil spot produced, when viewed by transmitted light, shall appear of a dark amber color. The specific gravity of the residue shall not be less than one and fifteen hundreths (1.15). The Coke test applied to the oil, according to the N.E.L.A. method, shall show not more than 1½% coke.

The specific gravity of the distillate between 235°C. and 315°C. shall be not less than 1.04 and the unsulphonated residue of this fraction shall not exceed 2½%. Also, a distillate shall be taken from the oil between 300°C. and 360°C., inclusive, and the unsulphonated residue of this fraction shall not exceed 2½%.

Treatment of Block—The block shall be placed in air-tight cylinders, where they shall be subjected to an air pressure of from 50 to 75 lbs. to the sq. in., after which the cylinder shall be filled with creosote oil as specified at a temperature of 170°C., the oil being introduced at the same pressure as the air maintained in the cylinder and additional creosote oil pumped in until from 150 to 200 lbs. to the sq. in. shall be recorded in the gauges. This pressure shall be maintained until the block has absorbed sufficient oil, after which the creosote shall be forced back into the storage tanks, the air pressure on the treating cylinders released and a vacuum of 24 in. raised to hasten the ejecting of surplus creosote oil from the pores of the wood, leaving not less than 6 lbs. or more than 8 lbs. of creosote oil to the cu. ft. of timber so that the *open* cell walls are coated with creosote oil.

Specifications for Construction of Floors

Pitch Bed—The concrete base built by others shall be dry, level and smooth and swept clean of dust and debris. A coating of coal tar pitch of 140° to 150° melting point shall be applied to the surface thereof. The pitch shall be heated to a point where it will pour and spread freely and evenly when applied to the surface and distributed by means of a rubber-edged squeegee. The wood blocks are laid directly upon this pitch bed after it has been allowed to harden. Pitch bed should not average more than ⅛ in. in thickness. Approximately 6 lbs. of pitch per sq. yd. are required for this purpose.

Laying of Block—Two courses of block shall be laid parallel to the sides of the building with the grain of the wood vertical. The major portion of the floor shall be laid in straight parallel lines at right angles to the two courses mentioned above. The blocks shall be laid with their length at right angles to the general direction of the traffic. After four or eight rows have been laid, they shall be rammed tight in the direction of the course and also at right angles to it until all blocks are in contact and courses are in straight line. All courses shall break joints alternately by a lap of not less than 1 in.

Liquid Pitch Filler—After all the blocks have been laid and the floor approved by the engineer in charge, the floor should be left unused for at least 10 days—then joints between the blocks shall be filled with Kreodone pitch filler applied hot over the surface of the floor and distributed into the joints by means of a rubber-edged squeegee until all the joints are sealed, at time of application.

Care must be taken that as little pitch as possible be left on the floor surface. Dry, sharp sand shall be swept over the filled floor and allowed to remain several days or until the floor is put into service.

Powdered Plastic Filler—A week or 10 days after all the blocks have been laid and the floor approved by the engineer in charge, the joints between the blocks shall be filled with powdered plastic filler. The filler shall be mixed dry on the floor and swept into the joints with a broom until the joints are completely filled. The floor is then to be sprayed with a small quantity of liquid solvent and worked into the joints with a rubber edged squeegee. This liquid solvent will fuse the powdered filler into a perfect adhesive binder at the sides of the blocks, and the finished floor surface shall be free from any sticky substance.

Expansion Joints—A 1-in. expansion joint shall be provided adjacent to all walls and other parts of the floor when deemed necessary by the engineer in charge. By laying the block against a 1-in. separator board, which shall be removed after the blocks have been laid and the expansion joints thus made shall be filled to one-half their depth with hot pitch. After the pitch has set the remainder shall be filled with dry sand, to seal the opening and prevent the pitch from being forced out upon the floor in case of expansion.

Handling of Blocks—All floor blocks are shipped in closed or box cars and should be promptly unloaded on arrival and placed at a point convenient to installation under cover and at all times protected from the weather or moisture.

Concrete Base—The concrete base shall be of suitable depth and texture as specified by the engineer or architect. The top surface shall have a smooth, true finish, finished exactly the depth of the block below the final floor grade—viz:

2 in. below for 2-in. block, 2½ in. below for 2½-in. block and 3 in. below for 3-in. block. In finishing the surface of the concrete, extreme care should be taken to prevent the water content from puddling and rising to the surface which upon drying will leave a thin dust film on the surface, and prevent a substantial bond of the pitch bed to the base. The finished concrete base shall, when thoroughly dry, present an unyielding hard finish and be a true contour of the finished floor.

Plank Base—When plank subflooring is used it should be of creosoted timber so constructed and supported to form a rigid foundation and smooth surface under the blocks. Tar paper shall be securely fastened on the smooth surface and the paper mopped with hot coal tar pitch to serve as a bed for the block. The block shall then be laid as before specified under heading: "Laying of Blocks."

Special Conditions

Exposed pavements for loading platforms, driveways, court pavements, pickling rooms, stables or other abnormal conditions frequently require positive waterproofing treatment, and our Engineering Department should be consulted for special recommendations as to treatment.

THE RODD COMPANY

Contract Engineers for Redwood Block Floors Manufactured by The Pacific Lumber Company of San Francisco

PITTSBURGH, PA.

Products and Service

Sole Eastern Contract Engineers for CALIFORNIA REDWOOD BLOCK FLOORS.

Slogan

"Everwearing Floors that do not Shrink or Buckle."

Why California Redwood Is Unrivaled for Wood Block Floors

Resists Decay—Some years ago the trunk of a California Redwood was found buried under the roots of a forest giant whose age, indicated by the annular rings, was more than 600 years. For over six centuries the Redwood had lain in the moist earth. Yet when it was dug up it was sound and free from decay or worm holes. It was sawn into good lumber.

Here is indisputable evidence of one very desirable quality in wood for block floors—*resistance to rot* and the aversion of worms and insects.

No Treatment Necessary—Redwood *requires no preservative treatment.* During the long centuries of growth every fiber of Redwood is impregnated by a *natural* odorless preservative which protects the wood fiber against the development of decay-producing fungus and against the ravages of boring worms and insects.

This gives Rodd Redwood floors several points of superiority over ordinary wood block floors. In the first place *the cost of treating the blocks is saved.*

Light Color—Then there is the advantage of lighter colored floors which makes for *lighter, more pleasant working conditions.*

Freedom from Odor—A third and important advantage is the *absence of odor.* Freedom from pitch and resin makes Redwood odorless. The pungent odor of treated blocks makes floors of that type undesirable for dairies and food storage depots because of the injury the strong odors do to so many kinds of foods. The odor also rules out treated block floors for many other purposes where the advantages of wood block floors would otherwise lead to their specification. Redwood block floors are untreated and odorless.

Shrinkage and Expansion—An objection to wood block floors has been their tendency to swell and shrink under conditions of moisture and dryness. Seasoned Redwood has a very *low coefficient of contraction and expansion.* Exhaustive tests and experiments have proved that Redwood block floors stay flat.

Under heavy traffic conditions the ends of the wood fiber iron out and form a surface that grows stronger with use. It does not crack or corrugate, does not become slippery and is comparatively noiseless.

Rodd Redwood floors can be laid and sanded absolutely smooth, and are therefore suitable for situations where treated blocks can not be used, or where a finished surface which will not catch lint is desired. The surface of the floor may be filled and varnished to a gloss, or velvet waterproof finish and, if desired, can be stained any color.

These are some of the reasons why we have standardized on California Redwood block floors.

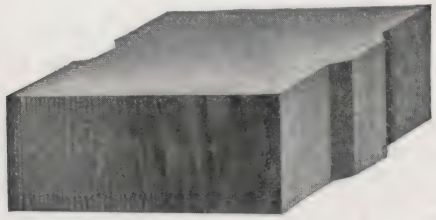
The Desirable Qualities of Redwood Block Floors

Rodd floors have all the qualities of a perfect wearing floor surface—smooth, noiseless, wonderfully resilient, and durable, always at an even temperature. Splinters, nails, warps and the rapid wear of plank floors, as well as the hard, cold, slippery and dust-producing qualities of non-resilient surfaces are entirely eliminated. The first cost is reasonable and the upkeep cost practically nil. Rodd Redwood floors stand the wear and tear of heavy service indefinitely.

The "Bulletin of Safe Practices" issued by the National Safety Council gives these requirements for a good floor:

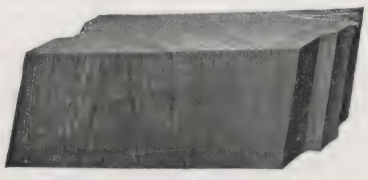
"(a) It should be as nearly noiseless as possible. A noisy floor may wear well, but the noise of feet, truck wheels and machinery has an irritating effect on workmen.

"(b) It should be dry, of low heat conductivity, durable and easily cleaned.



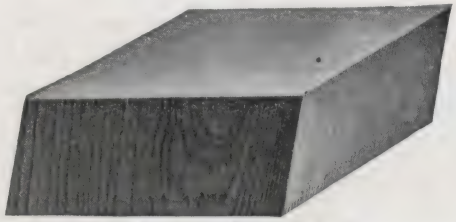
LOCKBLOX—E

Cut from 4 x 6-in. stock. Matched, tongued and grooved as shown. Variation in depth or width not to exceed $\frac{1}{16}$ in.



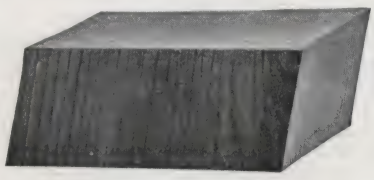
BEVELED LOCKBLOX—B

Cut from 2 x 6-in. stock. Matched, tongued and grooved as shown Variation in depth or width not to exceed $\frac{1}{16}$ in.



BEVELED BLOCK—C

Manufactured from 4 x 6-in. stock. S4S to 3⅜ x 5⅝ in., or SISIE to 3¾ x 5¾ in. Variation in width and depth not to exceed $\frac{1}{16}$ in.



BEVELED BLOCK—D

Manufactured from 2 x 6-in. stock. S4S to 1⅝ x 5⅝ in., or SISIE to 1¾ x 5¾ in. Variation in width and depth not to exceed $\frac{1}{16}$ in.

Continued on next page

"(c) It should not be slippery or be made of material which will wear slippery.

"(d) It should be smooth and free from nails, bolts, and other projections; also from holes and splinters, etc."

Discussing concrete floors the Bulletin disapproves them for these reasons:

"Their quality of cold and dampness when used in basements and their bad effects on the feet of men working at benches or machines."

The same may be said of brick or asphalt floors. Another objectionable feature of concrete floors is the great amount of dust they produce.

The best engineering practice favors wood block floors in place of cement floors for an ever-widening range of uses.

The Value of Good Floors

Good floors are a vital element in the cost of production. In mills, factories, machineshops, warehouses, freight sheds and piers, the good condition of the floors should be as carefully maintained as the good condition of the tracks and roadbed of a railroad.

In all these places good floors *that stay in good condition* prevent much unnecessary expense for the repair and upkeep of hand trucks. They keep down the loss caused by dropped tools and machined parts. They make transportation of goods and materials from one department to another easier, safer, faster and more economical. They help to speed up production.

Fire Hazard

Not the least of the remarkable qualities of Redwood is its great resistance to fire. This combined with the slow burning construction of Rodd Redwood floors make it an extremely safe floor.

Maintenance and Repairs

The unit construction of Rodd Redwood floors make alterations or repairs a very simple matter.

Resurfacing Old Floors

The problem of repaving or replacing old floors is constantly before the architect and industrial engineer. With Redwood blocks and Rodd methods of construction such repairs can be easily accomplished. For example, if it is a question of an old concrete floor. The surface can be brought to a uniform level with a cushion of Creolignum mastic cement, and the Redwood blocks of the proper thickness bedded firmly therein. The entire surface can then be sanded smooth, and varnished if desired. Other conditions can be equally well met.

The architects or owner in reaching their decision should consider first the wonderful qualities of California Redwood, and the special methods of seasoning and manufacture used by The Pacific Lumber Company at their mills at Scotia. Then, as it is only with proper utilization of these qualities and sound construction methods that the best results can be obtained, assure themselves that a sound and experienced organization will perform and complete the work.

We have tried to make it clear that Redwood is not only suitable for heavy duty floors, but for textile mills, factories, department stores, pressrooms, hospitals, dairies, produce warehouses, office buildings, etc. where heretofore no wood block floor has given complete satisfaction, due to certain fundamental weaknesses. Redwood floors are suitable anywhere where service and beauty at a reasonable cost are desired.

Creolignum Asphaltic Cement

This material is our own invention. It is used in waterproofing the base, and to form a strong permanent binding cushion in which to set the blocks. On some floors, where a dark color is no objection, Creolignum Asphaltic Cement is also used as a seal coat and joint filler on top of the blocks.

Rodd's "Infrangible" Cement

This material is a white colorless waterproof cement of great strength used for attaching the blocks to the base either of wood or cement, where a stronger bond is required than that given with Creolignum Asphaltic Cement.

Rodd's Floor Finishes

Rodd's "Velvet" Lacquer, Rodd's "Indurating" Filler, Rodd's "Adamantine" Varnish, Rodd's "Pure" Shellac, Rodd's "Prepared" Wax.

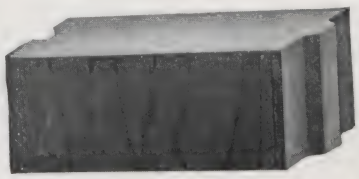
These products have been developed particularly for Rodd's Floors. They are the best of their respective kinds and are exactly suited to the fine end grain texture of Redwood.

Detailed instructions for use accompany each shipment.

Any color or tint can be furnished.

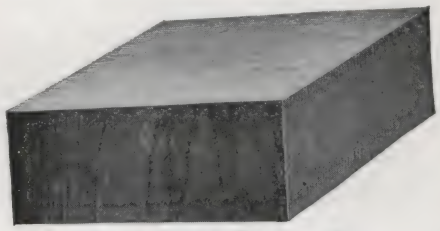
BEVELED LOCKBLOX—A

Cut from 4 x 6-in. stock. S4S to 3⅝ x 5⅝ in. Matched, tongued and grooved. Variation in width and depth not to exceed ⅛ in.



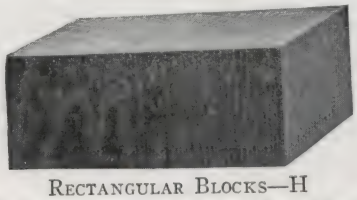
LOCKBLOX—F

Cut from 2 x 6-in. stock. S4S to 1⅝ x 5⅝ in. Matched, tongued and grooved. Variation in width and depth not to exceed ⅛ in.



RECTANGULAR BLOCKS—G

Cut from 4 x 6-in. stock. S4S to 3⅝ x 5⅝ in., or SISIE to 3¾ x 5¾ in. Variation in width and depth not to exceed ⅛ in.



RECTANGULAR BLOCKS—H

Cut from 2 x 6-in. stock. S4S to 1⅝ x 5⅝ in. or SISIE to 1¾ x 5¾ in. Variation in width and depth not to exceed ⅛ in.

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REDWOOD BLOCK FLOORING IN CELLAR OF PALACE HOTEL, SAN FRANCISCO, CAL.

Redwood Blocks of Highest Quality

The high quality of our blocks is guaranteed by The Pacific Lumber Company, the largest manufacturers and distributers of California Redwood. All our Redwood blocks are made in their mills at Scotia, California. We alone can furnish these quality blocks from these mills, in which every block is selected from the best stock, as well as being specially cured for flooring use in the Leaver Special Drying Kilns, a process of curing designed and patented by an officer of The Pacific Lumber Company, and held for its sole use.

Tested Under Unusual Conditions

Not only have Redwood blocks successfully stood over a quarter century of use in the Union Iron Works, where they are still in good condition, but The Pacific Lumber Company, itself, before offering to furnish us with blocks, has tested the utility and service of Redwood in its own large machineshops, where for years these Redwood blocks have been subject to usages seldom given in industrial plants, with the sole idea of determining exactly what service can be guaranteed.

We are authorized to state that The Pacific Lumber Company is prepared to supply the requirements that will now be forthcoming, and this assurance, combined with the guarantee of performance in laying good floors, which our years of experience justifies, should overcome any hesitancy on the part of architects, engineers, or owners of industrial plants.

A Service Organization

THE RODD COMPANY sells good floors—not floor materials.

Our organization has furnished and installed floors for many of the leading railroad and industrial organizations of the country. Detailed information and estimates furnished on request.

We invite inquiries.

Installation

No element of the finished floor is more important than the actual construction and the material used. The following specifications set forth clearly, and in detail, the methods to be followed.

We can undertake complete installations, or supply competent superintendents to oversee the work.

Specification No. 1. For Machineshops, Factories, Loading Platforms; Warehouses, Glass Factories, Linoleum Mills, Rubber Factories, etc.

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood Lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Concrete Base—

A concrete base 4 to 6 in. thick, depending on the service, shall be installed and finished to a uniform and level surface with a wooden float.

(4) Creolignum Cushion—

Upon the concrete base spread a heavy coat of "Creolignum," Grade A (Heavy), taking care that the entire surface is covered.

(5) Laying Blocks—

The blocks shall be laid in straight, parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints.

(6) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with specification and correct any other errors which may have occurred.

(7) Creolignum Seal Coat—

Rodd's Infrangible Cement may be substituted if desired.

On the surface of the entire floor spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(8) Sand Cover—

The entire floor shall then be covered with clean, dry, sharp sand, and allowed to remain for at least 2 weeks.

ALTERNATES FOR LIGHT COLORED FLOORS

Where light colored floor is desired, eliminate sections 7 and 8, or substitute the following:

(7) (Alternate) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of "Creolignum" Paste Filler, working all excess into the joints, and carefully removing all excess from the surface. Allow to dry at least 24 hours.

(8) (Alternate) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, finish the entire floor with a thin brush coat of Rodd's "Adamantine" Varnish. A second coat may be applied if desired. Allow to dry thoroughly before putting the floor into service.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 2. For Textile Mills, Pressrooms, Food Products, Condensed Milk Factories, Paper Storage, Packing Houses, Refrigerating Plants, Ice Cream Plants

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood Lumber. They shall be uniform, close grained, and of a size and design specifically

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recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Concrete Base—

A concrete base 4 to 6 in. thick, depending on the service, shall be installed and finished to a uniform and level surface with a wooden float.

(4) Creolignum Cushion—

(Rodd's "Infrangible" Cement may be substituted). (See specification.)

Upon the concrete base spread a heavy coat of "Creolignum," Grade A (Heavy), taking care that the entire surface is covered.

(5) Laying Blocks—

The blocks shall be laid in straight, parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints.

(6) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specification and correct any other errors which may have occurred.

(7) Scraping—

The entire floor shall be scraped or ground to a perfectly smooth surface, by hand or with a suitable machine.

(8) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of Rodd's "Indurated" Paste Filler, working all excess into the joints, and remove all excess from surface. Allow to dry at least 24 hours.

(9) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, finish the entire floor with a thin brush coat of Rodd's "Adamantine" Varnish. A second coat may be applied if desired. Allow to dry thoroughly before putting the floor into service.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 3. For Department Stores, Hospitals, etc.

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood Lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Concrete Base—

A concrete base 4 to 6 in. thick, depending on the service, shall be installed and finished to a uniform and level surface with a wooden float.

(4) Rodd's "Infrangible" Cement—

Upon subplank floor concrete base spread a heavy coat of Rodd's "Infrangible" Cement mixed strictly in accordance with instructions taking care that entire surface is covered.

(5) Laying Blocks—

The blocks shall be laid in straight parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints. The entire surface shall immediately be carefully rolled or tamped to a uniform level.

(6) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specification and correct any other errors which may have occurred.

(7) Scraping—

The entire floor shall be scraped or ground to a perfectly smooth surface, by hand or with a suitable machine.

(8) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of Rodd's "Indurated" Paste Filler, working all excess into the joints, and allow to dry at least 24 hours.

(9) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, 2 to 3 coats of Rodd's "Adamantine" Varnish shall be carefully applied to the entire surface, ample time being given between coats to permit each coat to thoroughly dry. If particularly fine finish is required, each preliminary coat of Rodd's "Adamantine" Varnish shall be rubbed before the application of the next coat.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 4. For Installing Blocks on Joist and Plank Floors

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Cushion and Seal—

Upon subplank floor spread a heavy brush coat of "Creolignum," Grade A (Heavy); spread thereon 1 layer of slater's felt, two-ply, lapping joints at least 3 in. and applying Creolignum between each lap. A

REDWOOD BLOCK FLOORING USED ON THE BALCONY OF THE LARGEST MACHINE SHOP ON THE PACIFIC COAST
130,000 sq. ft. used altogether

Continued on next page

second coat of Creolignum, Grade A (Heavy), shall be applied on the slater's felt.

(4) Laying Blocks—

The blocks shall be laid in straight, parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints. The entire surface shall immediately be carefully rolled or tamped to a uniform level.

(5) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specifications and correct any other errors which may have occurred.

(6) Creolignum Seal Coat—

On the surface of the entire floor spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(7) Sand Cover—

The entire floor shall then be covered with clean, dry, sharp sand, and allowed to remain for at least 2 weeks.

ALTERNATES FOR LIGHT COLORED FLOORS

Where light colored floor is desired, eliminate sections 6 and 7, or substitute the following:

(6) (Alternate) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of Rodd's "Indurated" Paste Filler, working all excess into the joints, and allow to dry at least 24 hours.

(7) (Alternate) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, finish the entire floor with a thin brush coat of Rodd's "Adamantine" Varnish. A second coat may be applied if desired. Allow to dry thoroughly before putting the floor into service.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 5—Installing Blocks on Old Worn Plank Floors

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

REDWOOD BLOCK FLOOR RECENTLY LAID IN ONE OF THE LARGEST MACHINESHOPS ON THE PACIFIC COAST

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Calking—

All cracks and openings shall be carefully calked, and the openings closed and filled with "Creolignum" Mastic.

(4) Cushion and Seal—

(Rodd's "Infrangible" Cement may be substituted).

Upon subplank floor spread a heavy brush coat of "Creolignum," Grade A (Heavy); spread thereon 1 layer of slater's felt, two-ply, lapping joints at least 3 in., and applying Creolignum between each lap. A second coat of "Creolignum," Grade A (Heavy), shall be applied on the slater's felt.

(5) Laying Blocks—

The blocks shall be laid in straight, parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints. The entire surface shall immediately be carefully rolled or tamped to a uniform level.

(6) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specifications and correct any other errors which may have occurred.

(7) Creolignum Seal Coat—

On the surface of the entire floor spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(8) Sand Cover—

The entire floor shall then be covered with clean, dry, sharp sand, and allowed to remain for at least 2 weeks.

ALTERNATES FOR LIGHT COLORED FLOORS

Where light colored floor is desired, eliminate sections 7 and 8, or substitute the following:

(7) (Alternate) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of Rodd's "Indurated" Paste Filler, working all excess into the joints, and allow to dry at least 24 hours.

(8) (Alternate) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, finish the entire floor with a thin brush coat of Rodd's "Adamantine" Varnish. A second coat may be applied if desired. Allow to dry thoroughly before putting the floor into service.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 6—For Resurfacing Worn Concrete Floors with Blocks

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Handling—

All blocks shall be shipped from the plant in sealed box cars, affording complete protection from the weather.

They shall be unloaded carefully and stored out of the weather.

(3) Cushion—

On the concrete base spread a cushion of "Creolignum" Mastic sufficient to take up all unevenness, and form a uniform base for the blocks.

Continued on next page

(4) Laying Blocks—

The blocks shall be laid in straight, parallel lines, breaking joints not less than 2 in. Every six to eight courses the blocks shall be carefully and thoroughly rammed in both directions to insure tight and even joints. The entire surface shall then be carefully rolled or tamped to a uniform level.

(5) Inspection—

The inspector, or superintendent of the work shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specification and correct any other errors which may have occurred.

(6) Creolignum Seal Coat—

On the surface of the entire floor spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(7) Sand Cover—

The entire floor shall then be covered with clean, dry, sharp sand, and allowed to remain for at least 2 weeks.

ALTERNATES FOR LIGHT COLORED FLOORS

Where light colored floor is desired, eliminate sections 6 and 7, or substitute the following:

(6) (Alternate) Rodd's "Indurated" Filler—

On the surface of the entire floor spread a heavy brush or squeegeed coat of Rodd's "Indurated" Paste Filler, working all excess into the joints, and allow to dry at least 24 hours.

(7) (Alternate) Rodd's "Adamantine" Varnish—

After the filler coat has thoroughly dried, finish the entire floor with a thin brush coat of Rodd's Adamantine" Varnish. A second coat may be applied if desired. Allow to dry thoroughly before putting the floor into service.

Note: Any refinement of finish can be given or omitted. These specifications are designed to meet average requirements.

Specification No. 7—For Bridges, and Paving on Concrete Base

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Concrete Base—

A concrete base 6 to 8 in. thick depending on the service shall be installed and finished to a uniform and level surface with a wooden float.

(3) Creolignum Cushion—

Upon the concrete base spread a heavy coat of "Creolignum," Grade A (Heavy), taking care that the entire surface is covered.

(4) Laying Blocks—

The blocks shall be laid hand-tight in straight, parallel lines, breaking joints not less than 2 in. The entire surface shall then be carefully rolled or tamped to a uniform level.

(5) Inspection—

The inspector, or superintendent of the work, shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specifications and correct any other errors which may have occurred.

(6) Sand Cover—

On the surface of the blocks spread a layer of clean, dry sand, carefully sweeping it into all joints and openings. Clean all the remaining sand from the surface.

REDWOOD BLOCK FLOORING LAID IN THE AMERICAN CAN COMPANY'S SHOPS, OAKLAND, CAL.
Total area of Redwood block flooring, 45,000 sq. ft.

(7) Creolignum Seal Coat—

On the surface of the entire pavement spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(8) Final Sand Cover—

The entire pavement shall then be covered with clean, dry sharp sand, and allowed to remain for at least 2 weeks.

Specification No. 8—For Bridges, Plank Subfloors

(1) Material—

Blocks shall be manufactured from air seasoned, kiln dried, Redwood lumber. They shall be uniform, close grained, and of a size and design specifically recommended by THE RODD COMPANY for the particular condition.

(2) Cushion and Seal—

Upon subplank floor spread a heavy brush coat of "Creolignum," Grade A (Heavy), and spread thereon 1 layer of slater's felt, two-ply, lapping joints at least 3 in. and applying Creolignum between each lap. A second coat of "Creolignum," Grade A (Heavy), shall be applied upon the slater's felt.

(3) Laying Blocks—

The blocks shall be laid hand-tight in straight, parallel lines, breaking joints not less than 2 in. The entire surface shall then be carefully rolled or tamped to a uniform level.

(4) Inspection—

The inspector, or superintendent of the work shall go over the same immediately after they are installed, mark such blocks as are not in accordance with the specification and correct any other errors which may have occurred.

(5) Sand Cover—

On the surface of the blocks spread a layer of clean, dry sand, carefully sweeping it into all joints and openings. Clean all the remaining sand from the surface.

(6) Creolignum Seal Coat—

On the surface of the entire floor spread a heavy squeegeed coat of "Creolignum," Grade B (Medium), thoroughly working all excess material into the joints.

(7) Final Sand Cover—

The entire floor shall then be covered with clean, dry, sharp sand, and allowed to remain for at least 2 weeks.

THE HASTINGS PAVEMENT COMPANY

TELEPHONE
BROAD 1496

25 Broad Street
NEW YORK, N. Y.

WORKS
HASTINGS-ON-HUDSON, N. Y.

Products

COMPRESSED ASPHALT FLOORING and PAVING BLOCKS.

Asphalt Blocks

A scientifically manufactured material for the wearing surface of streets and roads, and of piers, warehouses, loading platforms, factory floors, bridges, driveways, courtyards, etc.

Manufactured at a large permanent plant; shipped in block form ready to lay; and always obtainable in any quantity for extension and repairs.

Composition—A properly proportioned mixture of natural asphalt, crushed rock and limestone dust is heated to 300° Fahr., and shaped into uniform blocks under a pressure of 6000 lbs. per sq. in.

SIZES AND WEIGHTS

Width, in.	Length, in.	Depth, in.	Weight, lbs.	
5	12	2	11	
5	12	2½	13½	
4	8	1¼	3½	("Eightfours")

A square foot of 2-in. block weighs 26 lbs.
A square foot of 1¼-in. "Eightfours" weighs 15½ lbs.
The specific gravity of asphalt block is 2.40.

"Eightfour" Blocks

The "Eightfour" asphalt flooring block is designed especially to meet those conditions in which weight and thickness of flooring must be at a minimum consistent with durability under heavy traffic. The "Eightfour" is also suitable for roofs subject to traffic.

Advantages—Asphalt blocks are pleasing in appearance; smooth, noiseless, dustless, warm and easy under foot; sanitary, because non-absorbent; and next to granite, the most durable. They present a gritty, non-slippery, non-skiddable surface, and are easily taken up and relaid. They are non-expansive, odorless and free from exudations; and are not affected by standing loads, extremes of temperature, or by automobile oils. They are reasonable in cost, and are made to suit any climate and traffic conditions.

Method of Laying—Upon the surface of the concrete foundation there is spread a bed of portland cement mortar ½ in. thick, which is struck to a true and even surface. Upon this bed the blocks are immediately laid, with close joints and uniform top surface, the joints being broken 4 in. After being laid, the blocks are given a light coat of sharp, fine sand, well broomed into the joints. The joints of the "Eightfours" are grouted. Traffic is permitted in 4 or 5 days.

References

MANUFACTURING PLANTS, ETC.

Quintard Iron Works, New York, N. Y.
Remington Arms Co., Bridgeport, Conn.
Otis Elevator Co., Harrison, N. J.
Westinghouse Electric & Mfg. Co., Essington, Pa.
United States Navy Yards: Brooklyn, N. Y.; Boston, Mass.; Washington, D. C.
United States Naval Supply Base, Brooklyn, N. Y.
United States Naval Operating Base, Hampton Roads, Va.
Scovill Manufacturing Co., Waterbury, Conn.
American Copper Products Corporation, Baway, Elizabeth, N. J.
Studebaker Corporation, South Bend, Ind.
Morgan Engineering Co., Alliance, Ohio
Standard Steel Works, Burnham, Pa.

PIERS

Bush Terminal Pier No. 6, Brooklyn, N. Y.
New York Dock Co. Piers Nos. 16, 18, 26 and 36, Brooklyn, N. Y.
Ocean Steamship Co., Piers, Savannah, Ga.
Pennsylvania Railroad Pier, Greenville, N. J.
Lamport & Holt Line Piers, Hoboken, N. J.
United States Army Supply Base Piers, Brooklyn, N. Y.
New York City Piers, Stapleton, Staten Island, N. Y.

LOADING PLATFORMS

Arbuckle Building, Brooklyn, N. Y.
B. R. & P. Warehouse, Rochester, N. Y.
United States Army Supply Base, Brooklyn, N. Y.

BRIDGES

New York Central Railroad, New York & Westchester Co., N. Y.
Pennsylvania Railroad, Sunnyside Yards, New York, N. Y.
Long Island Railroad, Bay Ridge, Brooklyn, N. Y.

DRIVEWAYS AND COURTYARDS

Whitelaw Reid Residence, New York, N. Y.
Apthorp Apartments, New York, N. Y.
Greenwood Cemetery, Brooklyn, N. Y.
United Hospital, Port Chester, N. Y.
Biltmore Country Club, Rye, N. Y.
Cab Stand, Grand Central Station, New York, N. Y.

STREETS AND ROADS

Bronx and Pelham Parkway, New York, N. Y.
Albany Post Road, North Tarrytown, N. Y.
Boston Post Road, Rye, N. Y.
Bronx River Parkway Drive, Westchester Co., N. Y.
Nassau Street, Princeton, N. J.
Wyoming Avenue, Wyoming, Pa.
Broad Street, Richmond, Va.
Memorial Boulevard, Hillsborough Co., Fla.

COMPRESSED ASPHALT FLOORING AND PAVING BLOCKS

THE BARRETT COMPANY

Asphalt Paving and Waterproofing Material; Acid and Alkali Resistants

40 Rector Street
NEW YORK, N. Y.

For Branch Offices, see page 870

Products

ANCHOR ROCK ASPHALT FLOORS and PAVEMENTS; ACID PROOF ANCHOR ROCK ASPHALT FLOORS; ANCHOR ACID PROOF PAINTS.

Also manufacturers of Acid Proof Asphalt Filler for brick and tile floors.

For Roofing, Waterproofing, Building Papers, Preservative Paints, etc., see pages 870-875; for Flashings for Brick and Concrete Walls, see pages 946-947; for Roof Leader and Vent Connections, see pages 948-949.

Rock Asphalt Floors and Pavements

General Qualities—Rock Asphalt Floors afford sure foothold. Monolithic, no joints. Elastic, silent, tough, durable, dustless, non-absorbent, sanitary and waterproof. They can be laid over wooden or cement floors and can be used as soon as the mixture has cooled, usually in 3 or 4 hours. Cuts made in Rock Asphalt Floors because of alterations are quickly and easily repaired. The fresh hot mastic bonds perfectly with the old floor, preserving its monolithic character.

Adaptability—For armories, comfort stations, corridors, dampproof cellars, driveways, glass and glue factories, jails, laundries, lavatories, loading platforms, operating rooms, shipping rooms, shops, shower baths, stair treads and landings, swimming pools, sidewalks, stables, tennis courts, warehouses.

Bottling plants, canneries, cold storage plants, dairies, hotel kitchens, ice cream plants, molasses refineries, packing houses, pickle establishments, starch factories, sugar and syrup refineries, tobacco plants.

Railroads: baggage rooms, ferry terminals, freight houses, passenger stations, piers, roundhouses and shops.

Schoolhouses: corridors, lavatories, locker rooms, manual training rooms, play rooms, toilets.

Anchor Rock Asphalt Mastic

A combination of natural asphalt and crushed rock tempered with natural asphaltic fluxes to a uniform consistency. When properly mixed with clean, sharp, sand, grit, etc. (see specification), it produces a wearing surface superficially resembling cement, but much superior because of certain desirable qualities above mentioned. In round cakes weighing about 50 lbs. and branded as per illustration.

Anchor Hard Flux

Used to harden where floors are to be subject to high temperatures. In barrels stenciled "Anchor Hard Flux."

Anchor Soft Flux

Used for softening where floors must remain elastic under reduced temperatures. In barrels stenciled "Anchor Soft Flux."

Acid Proof Paints and Tank Linings

For protecting all masonry, metal or wooden surfaces exposed to the action of dilute acids and alkalis.

Alkali and Acid Proof Floors

The economical maintenance of factory floors subject to acid and alkali solutions has long been recognized as a most serious problem. While many types of floors are more or less acid-resisting and often serve remarkably well under trying conditions, the fact remains that the margin of safety decreases with the increasing strength of the acid solutions. Hence we offer:

Acid Proof Anchor Rock Asphalt Mastic

A super-acid-resisting grade, so treated as to render it immune against the corroding action of the acid and alkali solutions generally employed in manufacturing establishments. In round cakes weighing about 50 lbs., and branded:

Adaptability—For bleacheries, chemical laboratories, coke oven plants (saturator houses, sulphate storage rooms, dryer platform floors), copper refineries, cyanide gold plants, nickel platers, oil refineries (acid storage rooms), steel mills (metal pickling departments), storage battery rooms, tanneries and morocco plants. Also for plants making aniline, caustic soda, drugs, medicines, dyes, explosives, fertilizers, heavy chemicals, paper pulp and soap.

Specification for Barrett Acid Proof Anchor Rock Asphalt Mastic Floors—All floor grades shall be properly established before the mastic is laid.‡

By weight, the mixture shall consist of:	From	To
(I) Anchor Soft or Anchor Hard Flux.....	4%	6%
(II) Acid Proof Anchor Rock Asphalt Mastic §	48%	52%
(III) Sharp, dry, alkali- and acid-proof sand and grit ¶.....	48%	42%
	100%	100%

The Mastic shall be delivered to the work in the original branded cakes, and the Flux in the original barrels. The sand and grit shall be sharp and dry; not over one-third shall be sand —10 mesh and finer; at least two-thirds shall be grit—10 mesh to ¼ in. The proportions of all ingredients, within the above limits, to be subject to the approval of the architect.

These materials to be charged into kettles in this order: I, II and III. I and II to be melted before the addition of III. All to be mixed in the usual manner (the kettle temperature at no time to exceed 450° Fahr.), and spread at a temperature of not less than 350° Fahr. Finished floor shall have a uniform thickness of * ....

After spreading, and as the hot mastic cools and sets, it shall be lightly sprinkled with hard sand of uniform size and rubbed to a smooth surface finish with the usual smoothing tools or floats.

NOTES FOR ARCHITECT:

‡(a) Over wood foundation specify that a sheet of building paper first be laid.

§(b) Where no special protection against alkalis or acids is important, change to "Anchor Rock Asphalt Mastic."

¶(c) Where no special protection against acids or alkalis is important, omit the words "alkali- and acid-proof."

*(d) Any thickness between 1 and 2 in. may be specified, depending on traffic expected; 1 in. is sufficient for ordinary foot traffic.

If finished floor is to be over 1 in. thick, specify here, "Mastic to be laid in 2 layers of equal thickness, breaking joints."

(e) It is usually estimated that 1 sq. ft. of finished floor 1½ in. thick weighs about 18 lbs.; 1 in. thick about 12 lbs. Apply above percentages to ascertain quantities of materials required for any given area.

(f) We recommend that the full text of the Specification be used. If, however, an abbreviated form is desired, we suggest: "Floors shall be Barrett Acid Proof Anchor Rock Asphalt Mastic laid strictly in accordance with the printed specifications dated March 1, 1922, using the materials specified."

ESTABLISHED
OVER 20 YEARS

E. N. BIEGLER MFG. CO.

Composition and Mastic Floors and Sanitary Cove Base; Plastic Tile

GENERAL OFFICE AND FACTORY
2728-2736 North Rockwell Street and C. & N. W. R. R.
CHICAGO, ILL.

TELEPHONES
HUMBOLDT 0135, 0136

AGENCIES IN MOST PRINCIPAL CITIES OF THE UNITED STATES

Products and Services

BIEGLER'S MAS-OLEUM MASTIC FLOORING.

E-N-B MAGNESITE COMPOSITION SANITARY FLOORING and COVE BASE.

BIEGLER'S NON-SLIP PLASTIC TILE.

We contract for installation anywhere in the United States.

For Waterproofing and Dampproofing, see pages 68-69; for Biegler's Rubbertex Plastic Tile Flooring, see page 470.

MINERS REFINERS FIRE PROOF WATER PROOF BIEGLER'S ACID PROOF ROT PROOF ASPHALT PRODUCTS

TRADE-MARK

Biegler Service

We are in shape and position to handle any technical floor proposition you may present to us. We can furnish materials only if desired, or will estimate on installing work. We stand back of all installations with our own responsibility, besides surety bond of maintenance if desired.

Samples and estimates, also circulars and specifications, submitted on request.

QUIGLEY PREPARATORY SEMINARY, CHICAGO, ILL.

Biegler's Mas-Oleum mastic floors were installed in gymnasium, locker room, balconies, etc., of this building. Foundation walls below grade and swimming pool waterproofed with Biegler's Foundation Waterproof Coating No. 15 and Evertite Plastic Cement (No. 23 Mastic)

Biegler's Mas-Oleum Mastic Flooring

A mineral rubber, plastic, resilient, acidproof and waterproof floor covering. Laid monolithic (or in sheet colored tile or design effect) in 5 or more coats from ⅛ in. upward in thickness, at small initial and minimum maintenance expense. When completed, it has the appearance of battleship linoleum without the seams. Any ordinary workmen can lay it. Can be applied over old or new cement floors, will not crack or be affected by heat or cold and is noise resisting and non-slipping.

Made in black, brown, red or green.

Biegler's Mas-Oleum mastic flooring is practical for school houses, hospitals, corridors, roof gardens, office buildings, wash rooms, locker rooms, laboratories, etc.

Specifications—Over a finished troweled, smooth, level surface of cement apply 2 coats of Mas-Oleum primer, 5 coats of Mas-Oleum mastic and 1 coat of Mas-Oleum finish (black, brown, red or green) equaling approximately $\frac{3}{16}$ in. in thickness when completed, using not less than 150 lbs. of material per 100 sq. ft., after which the entire surface is to be given a coat of Mas-Oleum wax, all as manufactured, applied and guaranteed by the E. N. BIEGLER MFG. CO., Chicago, Ill.

E-N-B Magnesite Composition Sanitary Flooring and Cove Base

Furnished in packages with directions ready for installation, or installed by our own workmen and fully guaranteed. Can be laid in effective colors and variations with border effect. Standard colors are red, black, brown, buff and gray, but special colors can be made up. Can be applied over old or new wood or concrete floors. It is practical for hospitals, churches, club rooms, schools, public institutions, offices, restaurants, in fact any place where a sanitary, effective floor is desired. It is usually applied ½ in. or over in thickness, in 2 coats, the cushion coat ¼ in. and the finish coat ¼ in. Absolutely fireproof and resilient. Light in weight. Can be laid in monolithic or tile effect or special design pattern.

Specifications — *On Concrete*—Sub-floors should consist of 1 part portland cement, 2 parts sharp sand, 4 parts stone or gravel, leveled and tamped and brought to within ½ in. of the finished floor line. After the concrete has thoroughly set, apply E-N-B Magnesite Composition Floor in 2 coats, first coat being known as a cushion coat ¼ in. thick, second or finish coat being ¼ in., any color (black, brown, red and gray). Cove base 6 in. high to be furnished around all walls. On the cove base the backing for the composition, when not of wood, is to be covered with a coating of portland cement, not less than 1 in. in thickness of 1:3 mix.

On Wood—When E-N-B Magnesite Composition floors are to be applied over wood, the cushion coat is to be reinforced with either metal wire or lath, fastened firmly to wood underfloor proper with large headed, galvanized roofing nails not over 6 in. apart. Completed floor to be not less than ½ in. in thickness and properly oiled and waxed on its completion, and guaranteed by manufacturer, the E. N. BIEGLER MFG. CO., Chicago, Ill., against all defects of workmanship and material.

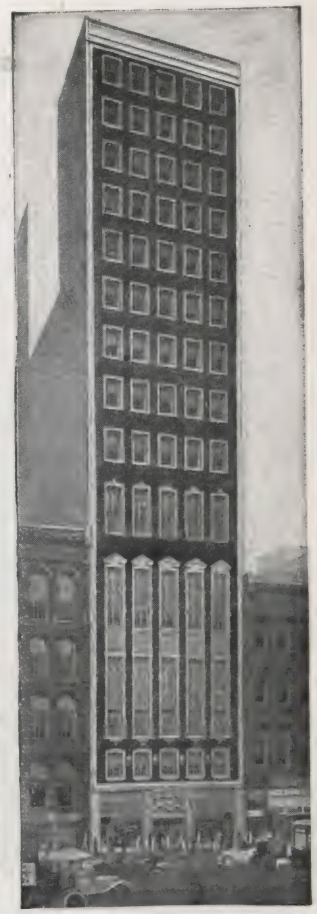
Biegler's Non-slip Plastic Tile

Thickness $\frac{3}{16}$ in. and upwards in checkerboard design and border effect in red, black, green and special color combinations. Appropriate design plans and specifications furnished according to size of areas. Illustration shown on page 470.

CAFETERIA, WHITCOMB HOTEL, ST. JOSEPH, MICH.

Continued on next page

MUNICIPAL PIER (HOME OF THE PAGEANT OF PROGRESS), CHICAGO, ILL.
PASCHEN BROTHERS, Chicago, Ill., General Contractors
Floors in ladies' and men's toilet rooms, Dr. Dill Robertson's laboratory, refreshment booths, wash rooms, etc., covered with Biegler's Mas-Oleum mastic flooring



AUSTIN (MINN.) HIGH SCHOOL
All corridors, stair halls, stair landings and stair treads covered with Mas-Oleum mastic flooring

HOTEL RALEIGH, WASHINGTON, D. C.
Helps' Dining Rooms covered with Mas-Oleum mastic flooring

WESTERN UNION BUILDING, CHICAGO, ILL.
GRAHAM, ANDERSON, PROBST & WHITE, Architects
Over 80,000 sq. ft. covered with Mas-Oleum mastic flooring—offices, workrooms, factory rooms, switchboard rooms, etc.

LOCKER ROOM, AUSTIN, (MINN.) HIGH SCHOOL

ELKS CLUB HOUSE, CHICAGO, ILL.
WM. J. SCOWN CO., Contractors
OTTENHEIMER, STERN & REICHERT, Chicago, Ill., Architects
All stair treads and platforms lodge hall platforms, balconies, etc., of this 20-story building covered with Mas-Oleum mastic flooring

MUNICIPAL BATH HOUSE, CHICAGO, ILL.
CHAS. W. KALLAL, City Architect
All floors, platforms, stair treads, etc., covered with Mas-Oleum mastic waterproof floors

INTERIOR OF WARD BUILDING, ELGIN STATE HOSPITAL, ELGIN, ILL.

CORRIDOR, CONTINENTAL CAN CO., CLEARING, ILL.
DAVIDSON & WEISS, Chicago, Ill., Architects and Engineers

References

A partial list of installations follows:

U. S. Naval Hospital, Fort Lyon, Colo.
Western Union Building, Miami, Fla.
Courthouse, Cambridge, Ill.
Chicago Arena, Chicago, Ill.
Evangelical Lutheran Church, Chicago, Ill.
Halsted Industrial Hospital, Chicago, Ill.
Northwestern University, Evanston, Ill.
Resurrection Fathers Home, Chicago, Ill.
Akron School, Akron, Ia.
West Union High School, Sioux City, Ia.
Standard Oil Building, Louisville, Ky.
Nurses Home, Brooklyn Navy Yard, Brooklyn, N. Y.
Laboratories of Gilpin & Langdon, Baltimore, Md.
Benton Harbor High School, Benton Harbor, Mich.
Kirby, Winterhalter and McMichael Schools, Detroit, Mich.
East Intermediate School, Jackson, Mich.
Hotel Whitcomb, St. Joseph, Mich.
Western Tablet Co., St. Joseph, Mo.
Continental Can Co., Jersey City, N. J.
Y. M. C. A., Cincinnati, Ohio
Peabody Hospital, Webster, S. D.
Western Union Company, Memphis, Tenn.
Wise City Courthouse, Big Stone Gap, W. Va.
Milwaukee Sanatorium, South Milwaukee, Wis.
Alton State Hospital, Alton, Ill.
Jacksonville State Hospital, Jacksonville, Ill.
Juvenile Detention Home, Chicago, Ill.
Minnesota State Highway Building, St. Paul, Minn.
York Community High School, Elmhurst, Ill.
School No. 75, Evanston, Ill.
Bowman Dairy Co., Chicago, Ill.
Fort Dodge High School, Fort Dodge, Ia.
Junior High School, Gladstone, Mich.

ESTABLISHED 1870

FULTON ASPHALT COMPANY

Manufacturers of Asphalt Mastic Floors

Monadnock Block
CHICAGO, ILL.

PLANTS: CLEARING, ILL., AND CHICAGO, ILL.

Products

ASPHALT MASTIC FLOORS.
ACIDPROOF MASTIC FLOORS.
Also manufacturers of:
Fulton 1870 Brand Asphalt Mastic.
Fulton 1870 Brand Acidproof Mastic.
Fulton 1870 Brand Waterproofing Mastic.
Fulton 1870 Brand Pure Asphalts.
Fulton 1870 Brand Asphalt Paints.

Fulton Service

Over 50 years of experience and service in the manufacture and installation of asphalt and acidproof mastic floors in all types of building construction throughout the country, have given us the practical knowledge and ability necessary to efficiently and correctly install this type of flooring to meet all conditions. Pure asphalts, specially manufactured to meet each individual flooring condition, installed by expert mechanics who have laid this particular type of floor for 25 years or more, insure the engineer or owner of the best quality of workmanship and materials obtainable.

Floors installed in all parts of the United States and Canada.

Uses of Asphalt and Acidproof Mastic Floors

The practical flooring for the following types of buildings:

Railroad passenger and freight terminals,
Manufacturing plants and machineshops,
Rubber plants, paper and textile mills,
Garages and stables,
Warehouses and cold storage plants,
Chemical, acid, plating, engraving, battery and dye plants, vinegar, preserving, pickle and yeast plants,
Dairies and ice cream plants,
Schools and colleges.

Advantages and Adaptability of Asphalt Mastic Floors

Asphalt mastic floors are unsurpassed for their durable, resilient, waterproof, sanitary, fireproof, dustless and noiseless qualities.

Our installations in place for the last 25 years are giving excellent service today without maintenance, under conditions which other types of flooring have failed to withstand.

Heavy trucking does not grind or wear the surface of this floor.

There are no joints or cracks for liquids to lodge in, hence its waterproof and sanitary qualities.

All the above qualities combine to make this flooring the best as well as the lowest priced, measuring cost per year of service, that can be laid.

Acidproof Mastic Floors

In addition to having all of the excellent and necessary qualities of a satisfactory flooring, this type of floor is proof against all commercial, fruit and vinegar acids.

Installation

Both types of mastic floors are successfully installed over wood or concrete base in new or old buildings by our expert mechanics.

Guarantee

All work is guaranteed by us to give the service for which it is installed.

Specifications

Specifications, sample, full details and information gladly furnished on request.

ST. PAUL UNION PASSENGER TERMINAL, ST. PAUL, MINN.
W. C. ARMSTRONG, Chief Engineer

BAGGAGE ROOM, ST. PAUL UNION PASSENGER TERMINAL
Asphalt Mastic floors throughout mail, baggage, express and milk departments

ALBERT GRAUER & COMPANY

Mastic, Composition and Cement Finished Floors

648 East Columbia Street

DETROIT, MICH.

BRANCH OFFICES AND AGENCIES

ATLANTA, GA., Strafford R. Hewitt
BOSTON, MASS., Rubin-Burke Co.
CLEVELAND, OHIO, Albert Grauer & Company
COLUMBUS, OHIO, The B. M. Freeman Co.
DAYTON, OHIO, The John G. Pool Co.
FORT WAYNE, IND., Jocquel-Schulz Co.
GRAND RAPIDS, MICH., Ralph E. Seeger
INDIANAPOLIS, IND., General Construction Supply Co.
PITTSBURGH, PA., J. Willis Dalzell Co.

Products

Mastic Flooring.

For Sidewalk Lights and Skylights, see pages 490-492.

Services

This company is prepared to furnish samples and estimates on laying Mastic flooring in any part of the country. This includes building up wooden sub-floors to desired height with best grade of composition, or concrete subfloors with guaranteed cement base, before laying the mastic. Many years' experience in this line assures proper execution of work under all conditions, where both surface and built-up base are required.

Mastic Flooring

A red, brown or green surfacing material of rubber-like texture, composed of asbestos fiber, minerals, and mineral oils, applied in plastic form to a thickness of ⅛ to ¼ in. Laid with a trowel in 5 or more thin coats forming a continuous, seamless sheet and bonding to subfloor so as to become practically part of same. Can be laid on wood, concrete or iron, and a cove base can be extended to any height desired, forming a perfectly sanitary floor.

Properties and Uses

Mastic flooring, laid by this company, is perfectly elastic, will not crack, check, peel, crawl or wrinkle, but expands and contracts with its base. Waterproof, non-absorbent, easily cleaned, dries quickly after washing.

Ordinary acids do not affect it, making it particularly suitable for schools, churches and theaters. Being a non-conductor of electricity, it is extensively used for insulating around switchboards in power houses and telephone exchanges. It is also well suited for use in stores, factories, banks, gymnasiums, offices, shower and toilet rooms and as an outdoor flooring on roofs and porches.

Durability

Our mastic flooring is the most durable flooring made and will last as long as best quality linoleum. Time and hard usage compact and smooth the material and improve the surface. Worn or damaged parts are fully restored by applying additional material to bring these parts to their original thickness. Patches bond perfectly and are guaranteed to match original floor so they will not be noticed. Mastic flooring gives the highest grade of service and costs less for upkeep than any other floor.

Detroit Brand

The best for ordinary usage, applied in 7 or more coats at a price to compete with similar products.

Specifications

Mastic Flooring—Where shown on plans, all floors, cove base, stair treads and risers and stair platforms shall be covered with Detroit Brand Mastic, furnished and laid by Albert Grauer & Company, 648 East Columbia Street, Detroit, Mich.

Subfloor or Foundation—Wherever mastic is specified or shown on plans, this contractor shall be provided with suitable base on which to apply the mastic. Subfloor, to be furnished in place by others, must be of sufficient strength to withstand load, traffic or usage, to which finished floor may be subjected.

Over Cement Surfaces—Cement subfloor shall be troweled to a hard, smooth, sidewalk finish, left ⅛ in. below finished grade, and laid true and level without high or low spots.

Over Wood Surfaces—Wood subfloor to be covered with mastic shall be of well seasoned or kiln dried matched boards securely nailed, so they will not warp or permit motion between adjoining boards. Subfloor shall be ⅝ in. below finished grade. On wood floor this contractor shall apply ½ in. of Detroit Brand Scratch Coat (composition) reinforced with wire mesh or metal lath, securely nailed in place.

All subfloors shall be delivered to this contractor bone dry, broom cleaned and free from plaster, grease or paint.

Floors—On all floors where mastic is indicated on plans, this contractor shall apply 7 coats of Detroit Brand Mastic to a total thickness of not less than ⅛ in.

Cove Base—Where mastic covered cove base is specified or indicated on plans, this contractor shall be furnished a cove base, put in place by others, on which mastic is to be applied. Cove shall be smooth and even with a radius not to exceed 1½ in., and a height not to exceed 6 in.

Stair Treads and Platforms—Where mastic covered stair treads or platforms are indicated on plans, this contractor shall be supplied with a clean dry base on which to apply the mastic. Cement treads to have a smooth, hard, level surface. Iron treads to be free from scale. All treads and platforms with suitable nosings furnished by another contractor so that a ⅛-in. thickness of mastic finishes flush with top of nosings.

Protection of Finished Work—Finished mastic floors, stair treads and platforms shall not be subjected to any use whatever for a period of 1 week after mastic work has been completed.

Guarantee—All mastic work shall be guaranteed for a period of 2 years from date of completion against any defects of materials and workmanship, and be repaired free should defects appear during said term.

Guarantee

All floors laid by Albert Grauer & Co., whether mastic, composition, or cement, are fully guaranteed as to materials and workmanship, for a period of 2 years from date of completion.

Barbour Intermediate School
Malcomson, Higginbotham & Palmer, Architects, Detroit, Mich.
"Detroit" brand mastic was laid by us. Also "Bruner" skylights were installed

INSULITE CHEMICAL COMPANY

Maufacturers of Mastic Flooring, Battleship Flooring, Waterproofing and Dampproofing

HOME OFFICE AND FACTORY

AURORA, ILL.

PACIFIC COAST OFFICE, 373 Monadnock Building, SAN FRANCISCO, CAL.
REPRESENTATIVES IN THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Products

INSULITE MASTIC FLOORING, INSULITE BATTLESHIP FLOORING, INSULITE WATERPROOFING and INSULITE DAMPPROOFING.

Insulite Mastic Flooring

Description—Insulite Mastic is a plastic material, formed principally of a pure bituminous gum (refined Utah Elaterite, or Wurtzelite) and asbestos fiber: no Gilsonite, asphaltum, coal tar, rosin, vegetable oils or animal fats are contained in it. Its elements are chemically inert and are unaffected by change in temperature, acids or alkalis. Furnished in shades of red or green and in black. Used over concrete or wood.

Application—Insulite Mastic is applied without heating, with an ordinary trowel in several coats, laid in thicknesses from $\frac{1}{8}$ to $\frac{3}{16}$ in. as required. It sets rapidly and may be used for foot traffic within 48 hours.

Preparation of Surface—No special provision need be made for concrete surfaces, except that it be brought to a smooth, level surface by a float or trowel finish; of sufficient strength and proper distance below the finished floor level; cove and base to be left with a smooth trowel finish.

Wood Floors—Our method of covering wood floors is necessarily varied. We can meet any condition of old or new wood floors. Full information on request.

Advantages—Some advantages that make Insulite Mastic Flooring superior to other flooring materials are:

(1) It bonds permanently to a base of wood, concrete, brick, tile or metal and will not crack or loosen under any usage.

(2) When used over worn wood floors which are easily brought to a level they are rendered as good as new.

(3) Practically wearproof for foot usage, and will withstand the heavy trucking in warehouses.

(4) Absolutely sanitary, being non-absorbent; is easily cleaned and kept in order.

(5) It deadens noise—a special advantage in corridors, classrooms, hospitals and offices.

(6) It retains its elasticity and always presents an attractive appearance.

(7) It is not affected by change in temperature, and may be used for exterior work in any climate.

(8) It is fireproof, as after it is set it will not sustain a flame.

(9) If injured in any way it can be repaired perfectly by anyone almost without expense or trouble.

General Use—Insulite Mastic flooring is used as a covering for concrete or wood floors, old or new; for exterior or interior work—concrete roofs, roof gardens, stair treads, wainscoting work, and wherever it is desired to protect concrete floors from dusting and wear; or to provide a floor having the advantages of high grade linoleum. Also used for swimming pool and reservoir work.

It forms an ideal floor for schools, churches, hospitals, asylums; theaters, offices, restaurants, and all buildings where wearing qualities and sanitary considerations are of high importance.

Special Work—Our experience in the development and manufacture of this flooring enables us to meet conditions which may require specially prepared material. We furnish the most expert assistance for superintending special or difficult work.

Installations—Insulite Mastic flooring is in many of the most important buildings in the United States, including government work, many state universities, normal schools, colleges, etc. It is giving ideal results in numerous high schools and grade schools and has been extensively used in Canada, Panama Canal Zone, and parts of Europe.

History—Insulite Mastic was the first floor of the thin mastic type. It has been in successful use more than twelve years.

Insulite Battleship Flooring

Insulite Battleship Flooring differs very little from our regular Insulite Mastic. It is put in sheet form at the factory, varied in size as required, usually $\frac{3}{16}$ in. in thickness. "Battleship" is used to great advantage over wood floors, to which it adheres as readily as to concrete or iron. Having been cured at the factory, it may be used as soon as applied. We recommend Insulite Battleship for use over wood floors, and under any severe or unusual conditions. It is cut to the required size for stair treads, landing, etc.

Finished Battleship—This is brought to a finish in sheet form and applied so that the joints of the matched sheets are welded together. Finished Battleship is also laid in blocks of various sizes, usually 18x18 in., of alternating colors in black, red and green, giving an attractive tile effect.

Unfinished Battleship—Sheets are left in a rough condition, the finish coat being applied after the sheets are matched on the floor.

Patents—Insulite Battleship flooring and the process of manufacture is patented. The exclusive use of the patents is held by us.

Insulite Waterproofing and Insulite Dampproofing

Insulite waterproofing and dampproofing are manufactured from reduced Elaterite and are applied as a paint. The waterproofing is used to waterproof all concrete, stucco, brick or stone work, on either exterior or interior surfaces; for basements, cisterns, reservoirs, swimming pools, etc. Insulite dampproofing is used for dampproofing walls and as a plaster bond. It is also used to prevent staining.

THOS. MOULDING BRICK CO.

Mastic and Composition Flooring

133 West Washington Street
CHICAGO, ILL.

REPRESENTATIVES

BALTIMORE, MD., Frank Brady, 2 East Lexington Street
INDIANAPOLIS, IND., J. M. Breyer & Co., 608 Kahn Building
SEATTLE, WASH., Brown Equipment Co., Lowman Building
PORTLAND, ORE., Merrill Co., Chamber of Commerce Building
NEW YORK, N. Y., Builders Material Supply Co., 501 Fifth Avenue
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GREENSBORO, N. C., Hood Brick Co., 324 So. Edgeworth Street
RALEIGH, N. C., Hood Brick Co., 117 W. Morgan Street
DENVER, COLO., Geo. P. Heinz Co., 1740 Champa Street
PHILADELPHIA, PA., Robert M. Hewes, Jr., 711 Walnut Street
PITTSBURGH, PA., Martin Brick Co., Chamber of Commerce Building
BUFFALO, N. Y., R. E. Carlisle, 270 W. Genesee Street
CLEVELAND, OHIO, Mechanically Applied Products Co., 1242 Webster Avenue
GRAND RAPIDS, MICH., Michigan Face Brick Co., 907 Michigan Trust Co. Building
GREEN BAY, WIS., Northern Roofing Co., P. O. Box 397
KANSAS CITY, MO., Permanent Waterproofing Co., Lathrop Building
COLUMBUS, OHIO, Thos. Moulding Brick Co., 613 Hartman Building
DULUTH, MINN., Thomson-Williams Co., 206 Manhattan Building
DES MOINES, IOWA, Tower Materials Co., Hubbell Building
DAVENPORT, IOWA, R. S. Truitt Company, Security Building
SAN FRANCISCO, CAL., Abeel-Jensen Co., Call Building
PASADENA, CAL., Cheesewright Studios
EL PASO, TEX., Sheehan-North Co.
DALLAS, TEX., S. W. Nichols Co., 1915½ N. Main Street
TORONTO, CAN., Vulcan Asphalt & Supply Co., 1542 Bloor Street
WINNIPEG, CAN., Vulcan Asphalt & Supply Co., 604 Trust & Loan Building
MILWAUKEE, WIS., Wisconsin Face & Fire Brick Co., Caswell Block

Products

T-M-B Mastic Flooring; Moulstone Magnesite Flooring.

T·M·B FLOORING

TRADE-MARK
The Mastic Floor

Service

Floors installed by us or by our established representatives everywhere. Estimates, samples and references furnished. Material sold by special request.

T-M-B Flooring

Description—T-M-B is distinctively a serviceable, long wearing flooring. It can be installed over new or old floors of cement, wood, composition or steel. Supplied in green, red or black. Every ingredient is tested, and mixed with care to assure the best results in appearance, service and durability. Tough, resilient and smooth, it has a rubberlike surface, is easy under foot and is non-slippery. T-M-B is laid in plastic form and is seamless. It bonds perfectly to, and becomes an integral part of, the subfloor, and will last as long as the latter. When finished, it presents a continuous sheet without a crack or a seam, and will never rot, bulge, loosen, expand or shrink. Its colors are uniform throughout and will never fade or streak.

Du Pont Hotel and Office Building, Wilmington, Del.
Contains 100,000 sq. ft., of T-M-B Flooring which has given good service for over 4 years

Special Features—T-M-B is a warm, comfortable and quiet floor. It is dustless, sanitary, non-absorbent and easily cleaned. Acidproof and chemically inert, it is an ideal work floor in laboratories. A non-conductor of heat and electricity, it is recommended as an insulating floor in power plants. Waterproof in character, it is a perfect covering over corkboard in refrigerating rooms. Preferred as a flooring for roof gardens, gymnasiums, and for all purposes where a durable, weatherproof floor is demanded.

Repairs are made invisibly, without a joint or a crack, and with colors perfectly matched.

Adaptability—T-M-B flooring is recommended by leading architects throughout the United States and Canada for rooms, corridors, hallways and stair treads. It is unexcelled for schools, hospitals, sanitariums, churches, office buildings, banks, hotels, theaters, club houses, railroad stations, libraries, stores, residences, jails, etc.

Specifications—T-M-B flooring applied ⅛ in. thick over cement which must be level and troweled to a smooth, hard finished surface. Applied ½ in. thick over wood, which must be tight, firm and level. For stair treads, stairs must be provided with metal nosing, and cement left ⅛ in. low.

Moulstone

A magnesite composition flooring of the highest quality and material through and through, especially adapted for use in factories and warehouses, also in printing and newspaper plants, and all types of buildings. Obtainable in a great variety of colors.

Guarantee

Our floors are fully guaranteed by us and our representatives.

References

We have space to mention only a few installations and architects:

Standard Oil Building, Baltimore, Md., 100,000 sq. ft.
Michael Reese Hospital, Chicago, Ill., 10,000 sq. ft.
Bancroft Hall, Annapolis Naval Academy, Annapolis, Md., 100,000 sq. ft.
DuPont Hotel and Office Building, Wilmington, Del., 100,000 sq. ft.
Illinois Masonic Home, Sullivan, Ill., 10,000 sq. ft.
S. B. Berkenstein & Sons, Chicago, Ill., 7,000 sq. ft.

Architects

William B. Ittner, St. Louis, Mo.
Perkins, Fellows & Hamilton, Chicago, Ill.
J. C. Llewellyn, Chicago, Ill.
Arthur L. Pillsbury, Bloomington, Ill.
Arthur Foster, Chicago, Ill.
Pond & Pond, Chicago, Ill.

THE COPPERSTONE PRODUCTS CO.

Composition and Cement Finished Floors

TOLEDO, OHIO

BRANCH OFFICES

CLEVELAND, OHIO DETROIT, MICH. MINNEAPOLIS, MINN. CHICAGO, ILL. WASHINGTON, D. C.

Products and Services

COPPERSTONE, a hard, refined mineral aggregate for Finishing and Hardening Concrete Floors and Pavements.

COPPERSTONE COMPOSITION FLOORING.

We will install Copperstone Flooring complete, furnish Copperstone for installation by other contractors or provide supervision through our Engineering Department. The latter is at the disposal of architects and others, without obligation on their part, for the solution of flooring problems.

Copperstone

Copperstone is a dark red conglomerate ore, taken from the only deposit of its kind in the country. It is crushed and graded from ¼ in. in size to fine. Gradings are carefully proportioned so that every particle delivers its full unit of strength, producing a concrete that has no equal in wear, crushing strength and toughness.

Copperstone Cement Finish Floors

Copperstone, mixed dry with portland cement and troweled over the concrete slab immediately after the latter is laid, produces a natural gray cement floor finish that is dustless and wearproof and which will not chip, warp, dust nor disintegrate. Copperstone is impervious to moisture, thus it protects and preserves any cement with which it is used.

The Copperstone finish acts as a drier for the concrete slab, thus drier coat and top dressing are placed in one operation, eliminating the cost of floating such as is necessary where most patent floor hardeners are used.

Copperstone cement finish makes permanent floors for factories, machineshops, loading platforms, and warehouses. It also makes an excellent seal coat wearing surface for cement road work and for sidewalks.

In the French test (the standard test for wear of paving materials) Copperstone received a rating of 25.32%. As 20% is considered excellent in this test. Copperstone thus exceeds the recognized standard of excellence in point of wear and durability.

How to Specify Copperstone Cement Finish—*Monolithic Finish*—Immediately after concrete slab is laid, surface shall be rodded to accurate level. Spread over surface of slab a dry mixture of 1 part portland cement to 2 parts Copperstone, troweled as usual for monolithic finish.

Note: The mixture of Copperstone and cement should be at least ¼ in. in thickness, and where especially heavy wearing qualities are desired, thickness may be as much as ½ in. Where still heavier finish is necessary, the material should be applied as a wet mixture over seasoned or partly seasoned concrete base.

Finish Applied Separately—Surface of concrete slab shall be brought to an approximately accurate level, sufficiently roughened by raking. If raking is not done, surface shall be roughened with a pick. Surface shall be kept free from dirt, chips, etc. Wet down surface with clean water and apply thin coat of neat cement grout, well worked in with a stiff brush. Follow immediately with a mixture of 1 part portland cement and 2 parts Copperstone, troweled or floated to give the type of surface desired.

MORGAN & WRIGHT BUILDING, DETROIT, MICH.
LOCKWOOD, GREENE & CO., Engineers STONE & WEBSTER, Contractors
Over 1,000,000 sq. ft. of Copperstone cement finish installed

Copperstone Ground Finish Floors

These floors are produced by mixing Copperstone aggregate with portland cement, and laying it 1 in. thick over green or seasoned concrete slabs. The surface is then ground, which removes the laitance from the cement and exposes the natural dark red color of the Copperstone aggregate. This produces a rich, pleasing dustless floor suitable for corridors, public buildings, market houses and similar places where a sanitary waterproof floor is required.

Copperstone ground finish floors are laid in a manner similar to terrazzo floors, except that instead of using sand and marble chips, a well graded, clean and exceedingly hard Copperstone aggregate is used, thus greatly lengthening the life of the floor.

Copperstone ground finish floors look better, wear better and cost considerably less than terrazzo floors.

Continued on next page

Copperstone Composition Flooring

Copperstone composition flooring is made of a light weight, fireproof, resilient material of which magnesite and chloride form the basic ingredients, together with the highest grade of inert fillers. It is laid plastic in any thickness from ⅜ to 1 in. over wood, metal or concrete. The undercoat is of a loose texture, giving resiliency and deadening sound. The top coat is hard and close grained so as to withstand traffic without abrasion.

Copperstone composition flooring sets within 48 hours to a tough, warm, seamless mass, ready for use, and is particularly recommended for auditoriums, banks, bathrooms, churches, corridors, stores, hotels, hospitals, factories, offices, restaurants, residences, schools, vestibules, etc.

Copperstone composition flooring forms a perfect seal having no cracks or joints, thus it presents no refuge for germs and dirt. It is absolutely quiet, elastic and immune from expansion and contraction. Its flexibility keeps it from cracking under severe loads or when buildings settle and shrink. For durability, Copperstone flooring can be compared to marble or mosaic; it will outlive the usefulness of the building in which it is installed.

It weighs slightly more than wood but much less than concrete. The cost varies according to areas, but usually ranges from 30c to 60c per sq. ft.

Colors are permanent and include various shades of gray, buff, red and green, also black.

How to Specify Copperstone Composition Flooring—Where cement foundation is specified contractor shall be provided with a slab composed of portland cement, clean sharp sand and broken stone, gravel or steam cinders of 1:2:4 mix (and not less than 3 in. thick when used as a fill) at or not more than ½ in. below the established grade of the finished composition floors, poured true and sufficiently level so that the variation will not be more than ¼ in. in 30 ft. This foundation shall have a raked or otherwise rough finish and must be thoroughly dry before the composition flooring is installed.

Where wood foundation is specified contractor shall be provided with a subfloor of well seasoned or kilndried matched boards laid directly over the rough floor lining without the use of intervening furring or nailing strips, and shall be blind nailed and face nailed, nails to be not over 16 in. apart, and of sufficient strength to carry the loads and traffic to which the finished composition floors may be subjected.

For heavy traffic purposes the contractor shall be provided with a subfloor of dry 2x6-in. planks bolted or spiked in place with rough side up and laid close together.

Where composition stair treads and platforms are specified on the plans in connection with metal stair cases, the contractor shall be provided with strong, rigid metal for base with anchors for proper bonding, not more than 1 in. or less than ¾ in. below the established grade of the finished composition treads and platforms, and all such treads and platforms shall be provided with suitable tread nosings at the established level of the finished composition tread or platform.

Temperature should be maintained at not less than 65° Fahr. during installation of floor or wainscot, and for ten days thereafter.

When a brick, tile, terra cotta, gypsum block, or cement wall, also wood partition or walls, is to receive wainscot or base of composition it must have a backing not less than ¾ in. in thickness or within ½ in. of the wainscot or base finished to the height of the wainscot or base, composed of 1 part portland cement and 2 of sharp sand, finished straight and true.

Samples and Estimates

Samples of Copperstone products will be sent on request.

When writing for estimates, give a brief description of foundation, area and nature of space to be covered.

A Few Users of Copperstone

Bancroft Hall, U. S. Naval Academy, Annapolis, Md.
Montgomery-Ward Co., St. Paul, Minn.
Willys-Overland Co., Toledo, Ohio
Board of Education, Minneapolis, Minn.
Tillotson Mfg. Co., Toledo, Ohio
Detroit Edison Co., Detroit, Mich.
Kresge Co., Detroit, Mich.
Quaker Oats Co., Peterboro, Ont.
Edward Ford Plate Glass Co., Rossford, Ohio
Lincoln Motor Co., Detroit, Mich.
Paramount Knitting Co., Kankakee, Ill.
Joseph M. Feiss Co., Cleveland, Ohio
Mullins Body Co., Salem, Ohio
Ohio Body and Blower Co., Cleveland, Ohio
MacDiarmid Candy Co., Detroit, Mich.
Lucas Auto Sales Co., Toledo, Ohio
Aluminum Goods Mfg. Co., Two Rivers, Wis.
Board of Education, New Castle, Pa.
Falls Rivet Co., Kent, Ohio
Swift & Co., Cleveland, Ohio
Toledo University, Toledo, Ohio
Dept. of Water Works, Toledo, Ohio
Electric Auto-Lite Co., Toledo, Ohio

MONTGOMERY-WARD BUILDING, ST. PAUL, MINN.

W. H. MACCAULEY, Engineer — WELLS BROS. CONSTRUCTION CO., Contractors

Copperstone composition floors used throughout in administration building

E. E. DAVIS CO.

Floor Construction and Floor Finish: Concrete Fireproofing

608 South Dearborn Street
CHICAGO, ILL.
BRANCH OFFICES
DETROIT, MICH. PITTSBURGH, PA. LOUISVILLE, KY. MONTREAL, CAN.

Products and Services

Designers and contractors for DAVIS MONOLITHIC SEMI-HEAVY DUTY and HEAVY DUTY CEMENT FLOORS; KORKOLEUM MASTIC; NATURAL CORK TILE FLOORS; COLORED COMPOSITION CORK FLOORS.

Also special design with specifications furnished on request for Floor Arch Construction, including Floor and Column Forms for Flat Slab, Dome, Steel, Tile Construction.

Davis Monolithic Cement Floors

A standard cement floor for use in industrial buildings of every character which demand a wearproof, dustproof, waterproof flooring.

This company guarantees its floors fully and will support this guaranty with surety bond if desired.

Specifications for Semi-Heavy Duty Floors—This specification covers the installation of a cement dressing floated into the top surface of the concrete slab soon after it is poured and properly finished to give a monolithic finish floor.

(1) The concrete contractor shall pour the structural concrete to the finished floor level.

(2) The floor contractor shall screed the wet concrete with a straight edge and see that all low places are filled with concrete.

(3) The floor contractor shall agitate the concrete so that the surplus water, laitance, etc., is brought to the surface and removed.

(4) A dry mixture of 1 part cement and 1 part clean sharp sand shall then be evenly distributed on the slab and floated by hand into the top surface, thus enriching the top and producing a smooth level surface on which the final top finish shall be applied.

(5) After this surface has set sufficiently to carry the weight of knee boards a heavy application of Davis Metallic Floor Hardener mixed in equal parts with portland cement shall be evenly distributed on the surface and trowelled once over with a heavy steel trowel.

(6) After this process a final application of Metallic Hardener and cement will be made and the surface trowelled in order to eliminate entirely all wrinkles and any unevenness in the floor. The total amount of Davis Metallic Hardener used shall be at least 25 lbs. per 100 sq. ft.

(7) Cement finishers shall then polish and burnish the surface with steel trowels, producing a smooth, hard, even finish.

(8) Early the following day before the floors are used in any way they shall be covered with a heavy layer of shavings which shall be wet down daily for a period of 5 days. In no event shall the finished floors be used for a period of 36 hours after they are finished, unless special permit is secured from the architect.

All cement finish floors shall be installed by E. E. DAVIS CO.

Specifications for Heavy Duty Floors—This specification covers the installation of a top dressing of approximately 1 in. in thickness on the concrete slab soon after it is poured and properly prepared so that a true monolithic finish is obtained.

(1) The general contractor shall pour the structural concrete slab up to within 1 in. of the finished floor level. The floor contractor will then float the concrete, agitating same until the surplus water, laitance and other deleterious matter in the concrete is brought to the surface. This must all be removed. As the concrete stiffens, it is again screeded so that a level surface is obtained fully 1 in. below the finished floor level.

(2) The floor contractor will then by means of long runs, supported, if possible, on the column rods, deposit a top dressing 1 in. in thickness on the slab, screeding it off to a true level surface at the level of the finished floor. This top dressing to consist of 1 part cement, ½ part clean sharp sand and 1½ parts coarse aggregate mixed thoroughly in a revolving mixer as follows: First, place in the mixer, water and cement, and after this has been well mixed and all cement hydrated add the aggregate; care must be taken in adding water as mass must be as stiff as it is possible to handle it.

(3) After topping has been applied it shall be rolled and made very compact and dense, squeezing out all water possible.

(4) Cement finishers shall then, using knee boards, hand float into the top a mixture of Davis Metallic Hardener and cement mixed in equal parts.

(5) After this has set sufficiently the surface shall again be sprinkled with the mixture of cement and Metallic Hardener and be given two hard trowellings with a heavy steel trowel.

(6) The following morning the surface shall be covered with a heavy layer of shavings which shall first be thoroughly wet and the slab wet down daily for at least 5 days.

There shall be used a special process as developed by E. E. DAVIS CO. for removing the water and foreign matter in the concrete as called for under item No. 1 and also for the application of the top dressing in order that there will be no foot prints in the slab; which has a tendency to produce waves and depression in the finished surface.

In no event shall the finished floor surfaces be used for 48 hours after they have been finished unless a special permit is secured from the architect.

All cement finish floors shall be installed by E. E. DAVIS CO.

Davis Korkoleum Mastic

A surfacing material of a resilient texture, laid with trowel in successive coats forming a continuous, seamless sheet bonded to subfloor. Specially adaptable for covering concrete floors. Usual thickness ⅛ in. to $\frac{3}{16}$ in. thick. Will not crack, check, peel, crawl or wrinkle; waterproof, non-absorbent; durable; non-slip; sanitary; economical to lay; easily cleaned.

Colors—Light, medium, dark red, green, brown.

Davis Natural Cork Tile Floors

These floor tiles are made ½ in. thick of pure cork shavings throughout, compressed under 500 tons hydraulic pressure. Installed with liquid waterproof cement on any smooth surface.

Colors—Light, medium, dark brown.

Sizes—3x3 in. to 18x18 in.

A sanitary resilient, non-absorbent floor covering used wherever wearing qualities, comfort, durability and attractive design are required.

Davis Colored Composition Cork Floors

These floor tiles are made ¼ in. thick of pure powdered cork flour, rubber substitute gums and coloring matter. Installed with liquid waterproof cement.

Colors—Black, white, dark brown, buff, red, green, blue, gray.

Styles—Interlocking; square; diagonal, with or without feature joints, suitable border, etc.; any size from 3x3 in. to 18x18 in. with different combinations as to color and design to conform with any decorative scheme.

Samples, Information, etc.

Samples, literature and further information of products will be gladly furnished on request.

A Partial List of Installations

General Motors Office Building, Detroit, Mich.
Crane Co. Plant, Pittsburgh, Pa.
First National Bank Building, Detroit, Mich.
Philipsborns, Inc., Mail Order House, Chicago, Ill.
Blums, Inc., Building, Chicago, Ill.
Oakland County Jail, Pontiac, Mich.
Chicago, Racine & Milwaukee Boat Line Terminal, Milwaukee.
Mount Royal Hotel, Montreal, Can.
First National Bank Building, Miami, Fla.
Belknap Hardware & Mfg. Co., Warehouse 12, Louisville, Ky.
Jos. Horne Land Co. Store Building, Pittsburgh, Pa.
Atwell Printing & Binding Co. Plant, Chicago, Ill.
Illinois Merchants Trust Co. Building, Chicago, Ill.

ACME ASBESTOS COVERING & SUPPLY CO.

Manufacturers of Composition Flooring

218-230 North Elizabeth Street

CHICAGO, ILL.

Product

ACMETYLE COMPOSITION FLOORING.

Acmetyle Composition Flooring

Acmetyle is a modern sanitary fireproof floor.

Composition—Acmetyle is a composition of a magnesium base and an aggregate of other finely graded minerals which in plastic, forms a smooth, monolithic surface—thoroughly fireproof, non-dusting and comparatively light in weight. Acmetyle is laid in a number of strong, warm colors in either plain or paneled effects.

Life—In ordinary service, Acmetyle is practically indestructible. The repeated trowelings when it is in the process of setting form a tough, solid mass of extremely close texture with a non-dusting surface which is remarkable for its resistance to wear.

Cost—The installed cost of Acmetyle is comparatively low—ordinarily being but little more than for finished hardwood. It must be remembered that there is seldom any extra subfloor expense occasioned by the use of Acmetyle. This fact, together with its unusual durability and low cost of maintenance, means Acmetyle is a floor of genuine economy in every way.

Installation of Acmetyle

Acmetyle is laid in plastic form in two coats, to a total thickness of ¼ to 1 in. (½ in. being standard), is troweled to a smooth, even surface. Both first and finish coats are of the same color. It can be laid on any firm subsurface, new or old, of wood, concrete or cement as flooring, cove base, wainscot, stair treads, etc. Where laid over wood, a heavy metal reinforcement is firmly nailed down to receive the application of the first coat. Where desired it may be surface-scored to imitate tiles of any size.

Suitability of Acmetyle

The all-round suitability of Acmetyle makes it adaptable for almost every type of building. It is recommended for public buildings of all kinds, residences, theaters, stores and offices, institutions, hospitals and schools. It is especially serviceable for reconstruction work as it can be laid directly over old floors without the expense of their removal.

Guarantee

Our usual guarantee of Acmetyle is for a period of one year: That it will be free from cracks or other material defects due to fault of the Acmetyle or workmanship. This guarantee is backed by our long experience as responsible manufacturers and contractors.

Specification Data for Acmetyle Floors

Subfloors—Subfloors must be reasonably level, free from holes and projections and brought to within ½ in. of the finishing line (or for other depths as may be provided by the architect's specification). Any slope desired in the finished floors must be provided in the subfloor.

Concrete—A 1:2:4 mix is desirable; using only good portland cement, clean sharp torpedo sand and gravel or crushed stone, well tamped and given a rough float or broom finish.

Where the slab form of construction is used, fill to within ½ in. of the finished floor line as above after the finished coat of plaster has been applied. The slab must be thoroughly cleaned so as to remove all lime and other impurities and should be well dampened before applying the fill. This fill should not be less than 1 in. in thickness at the thinnest point. Hot pipes running through concrete must be insulated properly with asbestos; on top of same there must be not less than 2 in. of concrete.

Cinder concrete is not acceptable unless it is a 1:3:4 mix, well tamped and covered with ¾-in. topping of a 1:3 sharp sand and cement mix. The topping must be applied at the same time the lower course is installed. Concrete fill per the above on hollow tile should be 2½ in. or more. Concrete fill on iron landings and platforms should be 2½ in. or more and reinforced.

Note: Acmetyle flooring will not adhere to wet, limey, porous or weak concrete. Concrete must be bone dry—when laid on the ground should be waterproofed to prevent moisture from coming through. All concrete shall be installed by other contractors.

Wood Subfloors—Six-inch sheathing, not less than ⅞ in. thick, laid rough side up, fairly close together is preferable; boards must be well seasoned, securely nailed and supported so that floor is firm and not springy; a metal reinforcer shall be nailed securely to the wood, with roofing nails 6 in. apart or less.

Backing for Wainscot and Base—Acmetyle can be laid directly on brick, terra cotta, concrete and stone, all of which should be brought to within ⅜ in. of the finishing line; to bring same to the proper level use a mixture of 1:2 portland cement. Composition will not adhere to lime plaster or gypsum tile. Wood sheathing ⅜ in. or thicker may be used as above, securely nailed.

FACTORY BEHIND ACMETYLE

Floors, Wainscot, Base, Miscellaneous—A wood or metal strip shall be installed to divide the plaster and Acmetyle. Plastering shall be completed and all plaster, debris, etc., cleaned from the floors and spaces where Acmetyle is to be laid. Windows and doors must be installed; trim set, but trim that is to come in contact with the Acmetyle shall not receive the final finish until the flooring is completed.

All Acmetyle shall be laid two layers and both shall be colored. Finish surfacing shall be done with a trowel in a first class, workmanlike manner, in such colors as chosen by the architect. The temperature of rooms shall not be lower than 60° Fahr. and shall be so maintained for at least 24 hours after completion.

Protection of Finished Work—It is important that the laying of Acmetyle be postponed as late as possible, as the floor is installed in a finished condition and must be protected if other mechanics are to work over it.

EVERLASBESTOS FLOORING CO.

Manufacturers of Magnesite Composition Flooring

ROCHESTER, N. Y.

Product

EVERLASBESTOS, a Magnesite Composition for Floors, Wainscot and Stairways.

Everlasbestos Flooring

REG. U. S. PAT. OFF.

TRADE-MARK

Scope of Use

Adapted for residences, office buildings, stores, factories, restaurants, banks, theaters, libraries, schools, hotels and apartment houses, churches, hospitals, institutions, etc.

Description

Everlasbestos is a plastic composition made of asbestos fiber and various chemical ingredients. Consists of a dry powder, shipped in bags, and a liquid chemical shipped in cans or drums. Mixed at the job and troweled on to the floor by any mason, cement finisher or plasterer. Directions with order.

Weighs approximately 3 lbs. per sq. ft. laid.

Advantages in Using Everlasbestos Flooring

Attractive—The smooth, softly glowing surface of Everlasbestos makes it a most attractive floor. Comes in three colors—royal red, golden buff and natural gray, combined as desired, or may be marked off in squares. Blends with any color scheme.

Quiet—Everlasbestos has valuable sound deadening properties, because of its asbestos fiber.

Non-slippery—Perfect freedom from slipperiness is assured, rendering it valuable for inclines in theaters, schools and churches.

Easy to Clean—Easily washed with soap and water.

Bonds with Wood or Concrete—When applied over wood foundations as floor, base or wainscot, an inexpensive No. 27 gauge steel lath is first nailed down. Everlasbestos is then troweled in over its meshes, providing the strongest possible mechanical bond, offsetting expansion or contraction and reinforcing the Everlasbestos slab. Bonds equally well with brick, hollow tile or steel. Also used in reinforced concrete buildings, laid directly over concrete floors without steel lath.

Repairs made quickly, neatly and inexpensively.

Sanitary—Laid in a plastic state ½ in. thick, without any joints or seams, it hardens into a continuous, close grained, smooth surface, forming an airtight seal, and which may be continued up the wall, if desired, as a sanitary base or wainscoting.

Dustless—Does not give off dust under heavy wear and needs no surface application to keep it dustless.

Flexible—Possessing considerable elasticity, it easily accommodates the vibration of heavy machinery.

Durable—Possesses great durability and does not disintegrate. Its wonderful wearing qualities improve with use.

Comfortable—Everlasbestos is easy to the tread, warm and flexible.

Ease of Installation—Can be laid directly over old or new floors, of wood or concrete. A floor can be laid in a few hours and put into service the next day. Everlasbestos does not raise floor level appreciably, thus making it unnecessary to change plumbing fixtures or take up old floors and cut down joists.

Comparative Cost—Initial cost of Everlasbestos is low. Price on fair sized installations, including laying, is but a trifle more than good linoleum. Costs about one-half the price of tile. All things considered, it is an inexpensive floor.

Installation

We install Everlasbestos floors with our own crew of floor layers and contract to make complete installations or furnish mechanics. The average mason can easily install first class Everlasbestos floors by following instructions furnished.

Specifications for Composition Wearing Surfaces

Work to be Done—All floors (cove base, wainscot, stair treads and risers) as indicated on drawings (or herein specified) shall be Everlasbestos Magnesite Composition as manufactured by the EVERLASBESTOS FLOORING CO., Rochester, N. Y., and installed in strict accordance with the rules and directions of the manufacturers and in accordance with their standard process and procedure.

To be of color as selected by the architect (or specify color here), and with surfaces scored to represent tile or marble as may be directed by the architect.

Note: The following clause should be included in the lathing section:

All wooden surfaces specified to have Composition Wearing Surfaces to be covered with No. 27 gauge painted expanded metal lath nailed flat against the foundations at 6-in. intervals.

Y. M. C. A. LOBBY, ROCHESTER, N. Y.

FIRE HOUSE NO. 12, ROCHESTER, N. Y.

CLASS ROOM, NO. 22 SCHOOL, ROCHESTER, N. Y.

GENERAL KOMPOLITE CO.

Composition Floors and Wainscots, and Mastic Floors

325-327 Borden Avenue
LONG ISLAND CITY, N. Y.

TELEPHONE
HUNTERS POINT 5361, 5362

Products

"KOMPOLITE," a Monoplastic, Sanitary, Seamless Composition Floor and Wainscot.

"MASTOLITH," a Mastic, Plastic Flooring.

"Kompolite"

"Kompolite" is a magnesium asbestos composition made in many attractive colors. It is sanitary, seamless, fireproof, sound deadening, water repelling, easy under foot, germproof and dustproof. For heavy service and hard wear. Applied in plastic form on concrete, wood or iron, in new or old buildings.

It is light in weight, so that it can be used on weak structures where heavier material can not be employed. It is in daily use in places where wood, cement, asphalt, concrete, slate, marble, etc., have not been satisfactory.

Fifteen years of successful application and millions of feet of it in daily satisfactory use attest to the value of "Kompolite." It has proved wonderfully durable under the most severe conditions.

A floor now in use nearly 12 years, over which loads of 2 to 4 tons are drawn and sharp shod horses are driven, shows hardly any sign of wear.

Another floor, over which 60,000 to 80,000 people have passed each day, has been in uninterrupted use for over 8 years.

Nearly 250,000 ft. of "Kompolite" have been installed in a public institution and after almost 6 years of use not a single foot was removed, repaired or relaid because of defective or unsatisfactory material or workmanship.

After 2 years of test and service and in comparison with many other composition floors, "Kompolite" was accepted by the architects of the Grand Central Terminal, New York, and is the only composition floor laid in that great railroad station.

After careful, scientific test and numerous experiments by the Bureau of Standards, Washington, "Kompolite" was installed in many of the United States Post Offices, Government Printing Offices, the Capitol of the United States and other public buildings.

"Kompolite" has been laid in fine residences, tenements, hotels, restaurants, factories, stores, railroad stations, hospitals, schools, churches, office and loft buildings, theaters, clubs, etc. In all it has been satisfactory.

Every foot is guaranteed by a contract which has never been questioned and has always been carried out to the satisfaction of architect, contractor or owner.

"Kompolite" is specified by leading architects, indorsed by noted contractors, and approved by property owners as the solution of many floor troubles.

Being calciners and grinders of magnesite this company can guarantee the quality of the most important materials used in every composition floor installation.

"Mastolith"

"Mastolith" is a plastic, seamless surface made from mineral gum with vulcanized oil and asbestos fiber. It has the advantages of light grade battleship linoleum without any of its disadvantages.

It is furnished in a medium red, chocolate brown and dark gray, laid $\frac{1}{8}$ in. to $\frac{3}{16}$ in. thick. It sets rapidly and may be used for foot traffic within 24 hours.

"Mastolith" is waterproof and is not affected by foot usage or trucks in warehouses.

It deadens noise and is agreeable to the tread.

It is absolutely sanitary and non-absorbent.

It will not crack or loosen from the underflooring.

It can be repaired perfectly with little trouble.

It retains its elasticity and always presents an attractive appearance.

"Mastolith," used as a covering, bonds excellently to concrete or wood floors, either old or new, concrete roofs, porches, walks, stair treads, or is used to protect concrete floors from dusting or from wear.

It forms an ideal floor for schools, churches, hospitals, asylums, jails, and for theaters, restaurants and all public or private buildings.

References

"Kompolite" and "Mastolith" have been subjected to most severe tests in practical use. References will be given to architects, engineers, or contractors to prove that "Kompolite" and "Mastolith" are the most reliable and, quality considered, the most moderate priced monoplastic floors and wainscots now made.

INCORPORATED 1914

THE FLEXSTONE FLOORING CO.

214 Comstock Building
COLUMBUS, OHIO

CLEVELAND OFFICE, 434 Bulkley Building

Product

FLEXSTONE COMPOSITION FLOORING.

PLASTIC FLEXSTONE FLOORING

TRADE-MARK
(Reg. U. S. Pat. Off.)

Flexstone Plastic Flooring

A well balanced dependable floor distinctive in character and performance for commercial buildings, office buildings, bank buildings, apartment houses, schoolhouses, hospitals, and wherever sanitation and endurance is required.

Flexstone flooring is offered primarily for use where durability is considered the first essential. It is a solid, substantial floor of great tensile, compressive and adhesive strength and of strong impact, fire and water resistance. Flexstone contains no vegetable fiber or other hygroscopic materials but is composed of mineral matter only. Its basic ingredient is granite crushed and refashioned without the use of any coloring or other matter that is subject to decay. The solid material used in the manufacture of Flexstone contributes much to the beauty of the floors, giving them the quiet, dignified attractiveness of the natural object.

The even surface of Flexstone takes on a quiet, velvety, dustless, non-slippery polish which does not give way under severe usage but on the contrary becomes more pronounced and stable.

Flexstone is susceptible to varied design of depressed lines forming borders, block or slab of any size. The Flexstone range of colors is confined to those which we guarantee to hold fast.

Tireless Tread

Notwithstanding the opposing elements of the solid materials used in the manufacture of Flexstone, it responds with a non-fatiguing, tireless tread as thousands of hospital nurses, school teachers, bank employees, salespeople, office employees, barbers and others who walk or stand on these floors daily, cheerfully testify and declare.

This tireless tread gives Flexstone the distinction of being available for use where solid substantial floors are preferable, but often sacrificed to the use of a soft texture and, that too, very often at the expense and inconvenience of frequent repair and early replacement.

The Lighter Weight Fireproof Building

The elimination of the heavy, space absorbing cement or concrete finished floor slab presupposes the use of a substitute of enduring permanency and economic advantage. Flexstone meets all these requirements and in addition thereto provides a finished surface that requires no painting or other expensive upkeep.

The standard thickness of Flexstone is 3/8 in. and its weight is about 4 lbs. per sq. ft.

Recovering Old Wood Floors

In addition to its special fitness for use in modern fireproof structures, Flexstone is being used successfully

50,000 SQ. FT. OF FLEXSTONE IN MOREHOUSE-MARTEN'S DEPARTMENT STORE
FRANK L. PACKARD, Architect, Columbus, Ohio

An extract from the souvenir booklet of Morehouse-Marten's Company department store, Columbus, Ohio:

"Even the floors are non-inflammable. The upper floors and that part of the main floor behind the counters, are of Flexstone, a granite composition, laid like cement, yet possessing a cushion-like resiliency that never tires."

Continued on next page

in recovering old wood floors thereby adding the element of fire resistance which is a matter of much concern in remodeling old buildings for modern need and purpose.

Sole Manufacturers

Flexstone floors are manufactured and installed by none other than our own skilled workmen.

No expensive upkeep—no replacement cost.

Specifications for Flexstone

Foundations shall be furnished and installed by the general contractor or owner to conform with the following requirements, and shall be subject to our approval. Foundations shall be thoroughly dry and cleaned by general contractor or owner, care being taken to remove all lime or plaster from the surface. Wherever pitch or slope in the finished floor is desired the same shall be provided for in the foundation.

Concrete—Foundations shall be 1 part portland cement, 2 parts clean sand and 4 parts broken stone or gravel, ½-in. ring size. It shall not be less than 3 in. in thickness, and shall be installed at one operation and brought up to within ⅜ in. of the finished floor level, and shall be given a broomed finish.

Wood—Foundations shall be of tongue and grooved lumber not over 6 in. wide and not less than ⅞ in. thick, securely nailed to joists, and brought up to within a ⅜ in. of the finished floor line.

Cement for Backing Wainscot and Cove Base—To be composed of 1 part portland cement and 2 parts clean sand and shall be furnished and installed by the general contractor or owner against all walls and partitions where base or wainscot is used, shall be given a broom finish, and brought to within ⅜ in. of the finished line. Where cove base or wainscot is to project beyond the finished wall line, backing for same shall be finished flush. Where cove base or wainscot is to be installed flush with finished wall line a galvanized metal ground must be furnished and installed by the general contractor or owner to separate the plaster from our material. Backing must be thoroughly dry. Flexstone can not be installed directly over plaster, plaster board, patent plaster, Keene's cement or terra cotta, nor over concrete or cement containing lime or compounds thereof.

Ward in Franklin County Tuberculosis Hospital
W. H. Tremain, Architect
Floors laid with 20,000 sq. ft. of Flexstone flooring

In cold weather artificial heat shall be furnished by general contractor or owner in sufficient quantity to maintain a temperature of at least 65° Rahr. Salamanders or fire pots do not constitute adequate heating devices.

Flexstone shall not be installed until practically all other work has been finished, plastering completed, trim set and level for floors in the adjoining rooms laid.

60,000 sq. ft. of Flexstone Flooring Were Laid in the Rowland Building
Chas. L. Incho, Architect, Columbus, Ohio

HACHMEISTER-LIND CHEMICAL CO.

Manufacturers of Magnesite Composition Flooring

PITTSBURGH, PA.

Products

HALICOMP MAGNESITE COMPOSITION FLOORING.

Also Halicomp Floor Dressing.

For Magnesite Stucco, see page 319.

HALICOMP FLOORING

TRADE-MARK

Halicomp Floors

Halicomp floors are modern, sanitary, resilient, fireproof, waterproof and vermin-proof.

Halicomp Characteristics

Composition—A Halicomp floor is an all-mineral floor, composed chiefly of magnesite and other ingredients in sufficient quantities to make it resilient and tough, assuring comfort and durability in use. Halicomp contains no gypsum, lime or cement, thus making dustproof floors.

Application—Dry Halicomp powder is mixed with Halicomp mixing solution. This mixture, when still in a plastic state is then applied to the subfloor. The floor sets within 24 hours into a seamless, elastic, fine grain, smooth surface that is easy to tread on and has no crevices to harbor germs or dirt.

Adaptability—Halicomp floors can be installed over wood, concrete, tile or iron, and may be applied over old flooring with the same success as on new foundations, in a variety of colors.

These floors are particularly adapted for use in schools, hospitals, banks, offices, restaurants, kitchens and wherever durable and sanitary floors, that can stand hard usage are a requisite.

Fireproof—Halicomp floors are fireproof, because of the magnesite and other fireproof materials from which they are manufactured. Halicomp is especially favored in schools where fireproof materials are essential.

Sanitary—Halicomp floors are entirely sanitary because the entire area, including a 6-in. coved base, is one continuous non-absorbent surface. There are no dirt catching square corners, joints or cracks that can harbor dust, dirt or germs; they are all coved or rounded, affording quick and easy cleaning.

Permanence and Durability—Halicomp floors when properly installed will serve the entire life of the building. Although comparatively light in weight, they have great compressive and tensile strength and do not expand or contract due to variations in the temperature.

Waterproof—On account of the density of the materials used and also because it is laid in one continuous operation without joints, a Halicomp floor forms a perfectly watertight surface that permits frequent washing with no permeation of water.

Economy—The cost of Halicomp floors is less than other high grade flooring materials. Because of its durability and the great cohesive and resilient properties of Halicomp, time makes no noticeable change in its composition or appearance. For these reasons its use in public buildings, where durability, foot-comfort and good looks are requisites, Halicomp is particularly recommended.

Specification Data

General—Halicomp is applied to a total thickness of ½ in. in one uniform homogeneous coat—allowing a complete bond with the base foundation.

Foundation is to be provided by general contractor or contractee and should be brought to within ½ in. of finished floor or wainscot line.

Wood Foundation—Halicomp is installed upon new or old wood floors, steps, etc.; rough stock can be used. Thickness of board should not be less than ⅞ in.; width, not wider than 8 in. Floor must be well nailed and rigid.

Reinforcing for Wood Floors—Diamond mesh steel floor binder is to be provided and applied by Halicomp contractor. This must be firmly nailed. Use large head roofing nails.

Concrete Foundation—Surface should be leveled with straightedge or wood float and left rough by brooming; concrete should be 3 in. thick or more and is to be brought to ½ in. from true finished floor line. Foundation must be thoroughly set and dried, and if smooth should be roughened by chipping, before Halicomp is applied. All lime and plaster must be removed from surface.

Iron and Steel Foundation—Surface must be rough finished and usually requires a key for bonding.

Brick, Terra Cotta, Tile or Stone Foundation—A coating of ¾ to ⅞ in. of cement consisting of 1 part portland cement and 2 parts sharp river sand should be applied, bringing foundation to proper height, allowing ½ in. for Halicomp Flooring. Surface should be level but rough.

Plaster, Keene's Cement, Gypsum, Plaster Board, etc.—These usual wall coatings do not offer a suitable foundation for Halicomp on account of high lime content and must be removed before Halicomp is applied.

Metal Lath Foundation—For wainscot and sanitary base use metal lath securely nailed directly to the studs. Apply to this a cement mix consisting of 1 part portland cement and 2 parts sand. Finish rough, allowing usual ½ in. for finished Halicomp floor, sanitary base or walls.

Pipes, Conduits, etc.—When in concrete they must be embedded at least 2 in. from the surface; sleeves should be provided to take care of expansion and contraction, using sectional asbestos pipe covering for heating purposes; cold pipes should be covered with No. 24 gauge wire lath and the concrete firmly packed against this. Pipes coming through concrete or wood floor should be surrounded by asbestos sleeve.

Halicomp Filler—Where the conditions are such that the foundation can not be brought level within ½ in. of the finished Halicomp floor line, Halicomp filler is to be used to bring the foundation to the proper level, such filler to be installed by Halicomp contractor. Our proposal does not cover either the furnishing or installation of this filler unless specifically mentioned.

Time for Installation—Plastering, finishing, glass setting, all fitting, etc., to be completed before Halicomp is installed.

Temperature for Installation—During cold weather, heat is to be supplied by general contractor or contractee; temperature should not be below 60° Fahr. during installation.

Finished Floor Protection—Halicomp sets sufficiently hard in 24 hours to be walked on without damage if ordinary care is exercised. The maximum hardness of the floor, however, is not reached for several days after installation. Floors should be kept covered with heavy paper when other mechanics must work on them. A new floor can be made unsightly by carelessness of other workmen. A new Halicomp floor must have the same protective care given a finished hardwood floor. Anything that will scratch or stain must be kept away. Laying planks or piling material on a new Halicomp floor may cause uneven drying—avoid this.

Tile Effects—All proposals covering Halicomp are based for the installation of a plain floor of one or more colors as specified. Scoring of floor to produce tile effect is not included unless specifically mentioned in bid. Halicomp can be scored to perfectly represent tile or marble effect.

MARINE DECKING AND SUPPLY COMPANY

Manufacturers, Contractors, Engineers

MAIN OFFICE
116 North Delaware Avenue
PHILADELPHIA, PA.

FACTORY
PHILADELPHIA, PA.

BRANCH OFFICES
NEW YORK, N. Y. PITTSBURGH, PA. BALTIMORE, MD. BOSTON, MASS. NEW HAVEN, CONN.

Products and Services

Manufacturers of AMERICAN LIT-O-SIL-O FLOORING, a Magnesite Composition Flooring, and AMERICAN LIT-O-SIL-O DECKING, a Magnesite Composition Decking.

Flooring Engineers and Contractors handling complete installation of American Lit-O-Sil-O Flooring, manufactured in our own plant under supervision of industrial chemists. Flooring specialists visit every job, study conditions for which floor is to be used, and personally supervise application.

American Lit-O-Sil-O Flooring

American Lit-O-Sil-O flooring is the leader in the marine field where it has been installed as a decking on 400 of the world's largest ships. Over 4,000,000 sq. ft. are now in active service. It was here that it gained its reputation for durability, for under no other conditions can a flooring material receive so severe a test as when used as a decking on ships. The deck of a ship receives the most constant and brutal treatment in the form of trucking and handling of heavy cargo, and in the stress and strain when under the action of a heavy sea. American Lit-O-Sil-O has always withstood this extreme test without wearing out, cracking or pulling away from the deck plates. The hob nailed shoes of the dough boys during the war failed to injure its unprotected surface in any way.

Due to the heavy demand for American Lit-O-Sil-O decking in the marine field from 1917 to 1921, this product was laid as a flooring in buildings during that time by a subsidiary company, under the name of "Macanite." The parent organization has now taken over the flooring business, assuming active control of both the marine and building field, where the product is now known as "American Lit-O-Sil-O Decking and Flooring."

Characteristics—American Lit-O-Sil-O flooring is a durable, fireproof and sanitary flooring that is light in weight, non-slippery, resilient, watertight, verminproof and ratproof. It is laid in a plastic state, 1½ in. in thickness, and when dry becomes a solid, one-piece floor, with a smooth, seamless surface. Inert mineral colors incorporated in the composition when it is mixed produce a pleasing and attractive effect. The field may be different in color from the border, with a ribbon of still another color. Red, brown, tan, green, yellow, gray, black and white are the usual colors furnished and a harmonious choice from these can readily be made. There is practically no limit to the designs which may be worked out in this way. The entire floor may also be blocked or paneled. This presents an unusually charming and attractive appearance.

American Lit-O-Sil-O flooring is principally composed of asbestos, magnesite and magnesium chloride, all of which are absolutely non-inflammable.

It does not dust, warp or disintegrate. It is non-slippery, having been successfully used on inclines and in shoe stores where an absolute non-slippery material was demanded. The spring and resiliency of the finished floor provides a decided relief from a hard, unresisting material, and at the same time assures quietness, which is so essential to hospitals, schools, banks, libraries, theaters and churches.

American Lit-O-Sil-O flooring requires no scraping, painting, varnishing or protective covering.

The first cost is the last, as it will not wear out under ordinary wear and tear.

It adheres firmly to wood, concrete, iron or steel, and may be installed over old flooring, base and wainscot, as well as on new construction. No extra reinforcing is necessary to install American Lit-O-Sil-O flooring, as it weighs only 3½ lbs. to the sq. ft.

Quick Installation

American Lit-O-Sil-O flooring sets and hardens in a few hours after it is laid, and is ready to be used in from 24 to 72 hours, depending on temperature conditions. One mechanic and helpers are able to lay from 300 to 400 sq. ft. per working day.

Materials Carefully Tested

The formulae used in the mixing of American Lit-O-Sil-O flooring are founded on the research work of the Mellon Institute of Pittsburgh, the University of Wisconsin, the Dow Chemical Company and the published records of the United States Bureau of Standards. Our laboratory is in charge of a well-known expert in plastic materials who tests all materials used in American Lit-O-Sil-O flooring for:

Magnesite—Fineness, setting time, modulus of rupture, change in volume, chemical analysis, plasticity.
Magnesium Chloride—Chemical analysis, specific gravity.
Fillers—Bulk, absorption, fineness.
Colors—Staining power, permanency, purity.

Guarantee

American Lit-O-Sil-O flooring is fully guaranteed against any defects in material or workmanship. We also guarantee that every American Lit-O-Sil-O floor is laid according to our standard specifications.

Specifications

Standard specifications covering every detail in the construction of an American Lit-O-Sil-O floor will be forwarded to architects on request, together with samples of the material and a booklet containing indorsements of many well-known architects and building owners. Charts and drawings may also be obtained.

American Lit-O-Sil-O flooring is a proprietary flooring material made under a secret formula that has proved to be the most successful. In order to be absolutely sure of obtaining the highest quality of composition flooring, *specify*, "American Lit-O-Sil-O Flooring, as applied by the MARINE DECKING AND SUPPLY COMPANY, Philadelphia, Pa."

Representative List of Installations

INDUSTRIAL PLANTS—Baldwin Locomotive Works; Du Pont Motors, Inc.; E. I. du Pont de Nemours & Co.; Midvale Steel Co.; Jonathan Ring & Sons; J. A. Roebling's Sons & Co.; Commercial Truck Co.; Philadelphia Fire Brick Co.; Sun Oil Company; National Aniline & Chemical Co.

HOSPITALS—Philadelphia General Hospital; Chester Hospital; Twin Falls Hospital; Gloucester Emergency Hospital.

OFFICE BUILDINGS—Mutual Trust Bldg., Philadelphia, Pa.; American Telephone and Telegraph Co., Harrisburg, Pa.; Manhattan Bldg., Philadelphia, Pa.; Guaranty Trust Co., Philadelphia, Pa.; West End Trust Bldg., Philadelphia, Pa.; Clyde Steamship Station, Jacksonville, Fla.; Laboratory Office Building, Indian Head, Md.; Hoboken Land & Improvement Co., Hoboken, N. J.; E. I. du Pont de Nemours & Co., Wilmington, Del.; and Post Offices in Philadelphia and Harrisburg, Pa.

CHURCHES—Trinity Church, Vineland, N. J.; St. George's Episcopal Church, Philadelphia, Pa.; Methodist Episcopal Church, Lansdowne, Pa.; First Baptist Church, Chester, Pa.; Mt. Zion M. E. Church, Darby, Pa; Presbyterian Church, Huntingdon, Pa.

STORES—MacDonald & Campbell, Philadelphia, Pa.; Judd Pharmacy, Philadelphia, Pa.; Betson Hat Stores, Philadelphia, Pa.; Gueting's Shoe Stores, Philadelphia, Pa.; Bell Bakery, Lansdowne, Pa.; United Cigar Stores, Philadelphia, Pa.; Mendel's Department Store, New Haven, Conn.; Heppe Piano Company, Philadelphia, Pa.

THE MARBLELOID COMPANY

Manufacturers of and Contractors for Magnesite Products

461 Eighth Avenue at Thirty-fourth Street
NEW YORK, N. Y.

FACTORY, NEW DURHAM, N. J.

BRANCH OFFICES

*PITTSBURGH, PA., 6624 Hamilton Avenue
*PHILADELPHIA, PA., 1524 Chestnut Street
*CLEVELAND, OHIO, 528 Erie Building
*DETROIT, MICH., 1333 Dime Bank Building
*BOSTON, MASS., 200 Devonshire Street
MONTREAL, CANADA, 908 New Burks Building
CINCINNATI, OHIO, 507 Mercantile Library Building
NORFOLK, VA., 905 National Bank of Commerce Building
KNOXVILLE, TENN., 407 Burwell Building
WASHINGTON, D. C., 1121 Vermont Avenue
MINNEAPOLIS, MINN., 1115 Metropolitan Life Building
ST. LOUIS, MO., 1723 Missouri Avenue

Products

"MARBLELOID" FIREPROOF PLASTIC FLOORING, a Magnesite Composition for Floors, Coved Sanitary Base, Wainscot, Trim, Treads, etc.

Marbleloid Flooring

Physical Characteristics, Properties and Advantages—Marbleloid is a sanitary, standardized, permanent, light weight, fireproof and resilient composition. It is installed in a plastic state, ½ in. thick, and sets in a few hours into a seamless, tough, elastic body, presenting a fine grained, smooth surface.

The fact that it is jointless, remarkably free from a tendency to crack and practically non-absorbent gives it unusual sanitary value. It is easily kept clean; it is quiet to the tread; it is non-dusting, offering high resistance to abrasion; it is not slippery. Owing to its elasticity, it is not fatiguing; it is a non-conductor of heat and, therefore, never cold; it has great crushing and structural strength and does not contract nor expand to any appreciable degree.

Marbleloid adheres firmly to wood, concrete or iron, and may be installed over old flooring, base or wainscot, as well as upon new construction. It is made in all colors, offering possibilities in the working out of any desired color scheme. Only inert mineral colors are used.

Adaptability—Marbleloid has been in use for the past eighteen years and is constantly being installed in almost every type of building. Because of the advantages enumerated, it is used to a very large extent in offices, institutions, schools, public buildings, churches, restaurants, clubs, hotels, theaters, libraries, banks, industrial plants, residences, apartment houses, laboratories, stores, garages, and in railroad cars, railroad stations, and steamships. Approximately 2,000,000 sq. ft. of Marbleloid are annually installed in the United States and Canada.

Physical Tests—Marbleloid weighs approximately 3 lbs. to the sq. ft.; it has a very low percentage of absorption; its compressive strength is over 6000 lbs. per sq. in.; it has a tensile strength of from 800 to 1100 lbs. per sq. in.

It has great resistance to abrasion and will stand under light trucking.

Marbleloid has been tested and approved by the Bureau of Buildings, Borough of Manhattan, New York City, as *fireproof material*. Copies of this report and other physical tests made by Prof. Woolson at Columbia University may be had on request.

Marbleloid Service—THE MARBLELOID COMPANY maintains thoroughly trained and skilled workmen at the principal building centers of the country and is, therefore, unusually well equipped to perform work in any section with its usual high standard of excellence.

Owing to the fact that installations are unsuccessful when made by local cement masons, inexperienced in the handling of material of this nature, Marbleloid flooring is not sold in bulk. *All work is installed by the Marbleloid organization and is rigidly guaranteed.*

MARBLELOID INSTALLATION IN MEISENHELDER SANITARIUM, YORK, PA.

*Indicates warehouse

MARBLELOID INSTALLED THROUGHOUT OFFICE OF AMERICAN PULLEY COMPANY, PHILADELPHIA, PA.
HEACOCK & HOKANSON, Architects

Continued on next page

Before actually beginning the installation of the Marbleloid material, a preliminary inspection is made by an engineer thoroughly familiar with all phases of building construction. At the plant and in the field, Marbleloid facilities are such that the company is always prepared to handle all work, no matter how large, with the utmost dispatch and efficiency.

In order to maintain the superior merit of its product, THE MARBLELOID COMPANY carefully tests all raw materials before acceptance at the factory. All shipments which do not come within the Marbleloid standard are rejected. The laboratory is equipped to make both chemical analyses and complete standard physical tests.

Relative Low Cost—Marbleloid is a permanent flooring which requires no unusual or expensive foundation. It may be put into service 24 hours after it has been installed. It may be used just as readily over wood flooring (finished or subfloor) as it can be over concrete fill or finished cement subfloor. Thus in alteration work both the time and expense of the preparation of a special foundation may be eliminated. In the larger areas it costs a little less than the best grade of hardwood flooring and but a little more than linoleum—Marbleloid outwearing many applications of the latter.

Marbleloid Specifications

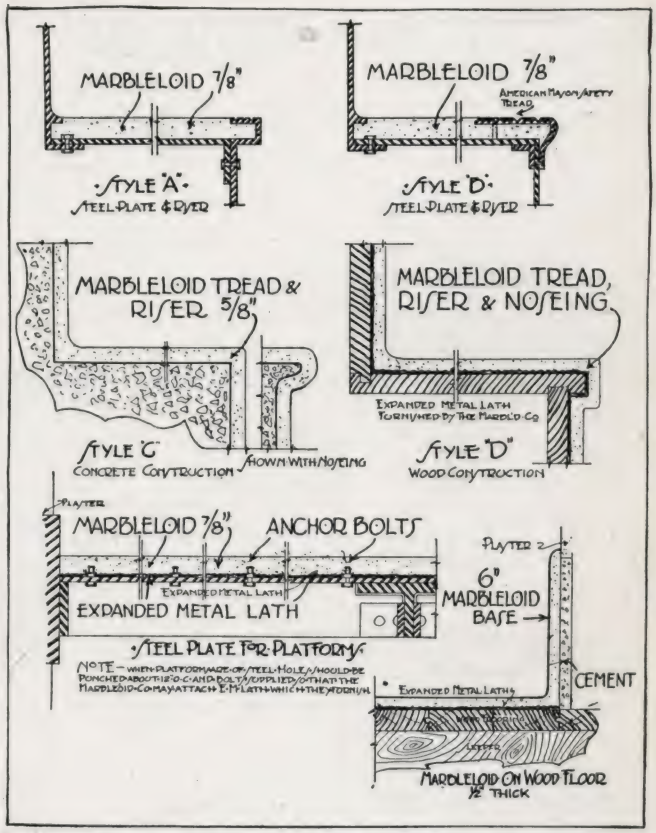
Before drawing up specifications covering the use of Marbleloid, the company suggests that engineers or architects secure a copy of this company's Standard Specification Sheet. This Specification Sheet contains foundation requirements and other data that is essential for securing satisfactory results.

The price of Marbleloid flooring, sanitary coved base, wainscoting, stair work, etc., varies, naturally, with the area involved, nature of the foundation (wood, concrete, or iron) and location. With crews of Marbleloid mechanics in the various building centers of the country, economy and efficiency are assured.

Upon receipt of data giving information regarding nature of foundation, the area of floor and wainscot, lineal extent of sanitary base, treads, etc., a definite proposal for the work completely installed will be furnished.

Guarantee

The Marbleloid Company rigidly guarantees the quality of its material and all work performed by its workmen, and will repair, free of charge, all defects due to the use of improper materials or workmanship.



SECTIONS SHOWING METHOD OF APPLICATION OF MARBLELOID IN DIFFERENT TYPES OF CONSTRUCTION

Samples, etc.

Samples and color card, together with full literature including booklet, Standard Specification, etc., will be gladly mailed on request.

References

As an indication of the merits of Marbleloid flooring, a portion of a list, giving the names of nationally known corporations for whom repeated installations of this material have been placed, is printed below:

FIRM	CONTRACTS	FIRM	CONTRACTS
American Sheet & Tin Plate Co.	11	General Electric Co.	20
Atlas Powder Co.	14	New Jersey, State of	19
Bethlehem Steel Co.	12	New York Edison Co.	19
Carnegie Steel Co.	26	Pennsylvania R. R.	28
Crucible Steel Co.	12	Standard Oil Co.	11
		Yale & Towne Mfg. Co.	7

MARBLELOID INSTALLATION IN CLUB BUILDING CORRIDOR, SCRANTON, PA.

MARBLELOID INSTALLATION IN KINGSTON CITY HOSPITAL, KINGSTON, N. Y.

THE MECHANICALLY APPLIED PRODUCTS CO.

Manufacturers of Magnesite Flooring and Stucco; Flooring Contractors

323-24 Bulkley Building

CLEVELAND, OHIO

Products and Services

"M.A.P. Magnesite Composition Flooring."

"M.A.P. Mag-stucco."

Contractors for Installation of Flooring.

For "M.A.P. Macoustic Plaster," see page 17.

M·A·P PRODUCTS FLOORS MAG-STUCCO

TRADE-MARK

"M.A.P. Magnesite Composition Flooring"

A resilient floor despite a hard surface because of a cushion coat laid beneath.

This is purely a mineral floor; it does not crack or otherwise disintegrate as many composition floors do. Tests for abrasion show that it possesses twice the wearing quality of the average composition floor.

It is especially adapted for floors in school corridors, hospitals, stores and apartment houses, and the like, instead of wood floors. It is also much used for refinishing old wooden floors, stairs and landings.

This floor is laid in an excellent variety of colors. If desired, special colors will be furnished to order.

To date we have not been obliged to replace a single foot of magnesite flooring because of cracking or disintegration of any kind. It is remarkably durable for a floor at its price of installation—one of the most economical and surely the most satisfactory of all composition floors.

Installation—It is not so much what is put down, but how it is put down that counts. In specifying "M.A.P. Magnesite Composition Flooring" you not only specify a material but also a method of laying same. All work is done by licensed representatives. This naturally makes our specifications brief.

Specifications—"M.A.P. Magnesite Composition Flooring" is to be laid in all areas called for as per plans and specifications. Same to be laid by an authorized representative as per manufacturer's specifications.

Public Hall, Cleveland, Ohio
J. H. MacDowell, Architect

Continued on next page

A Few Installations—

Cleveland's New Public Hall, 10,000 sq. ft.

Cleveland City Hospital, 60,000 sq. ft.

West Side Community House, Cleveland, 10,000 sq. ft.

Delft Lunch, Cleveland, 10,000 sq. ft.

"M.A.P. Mag-Stucco"

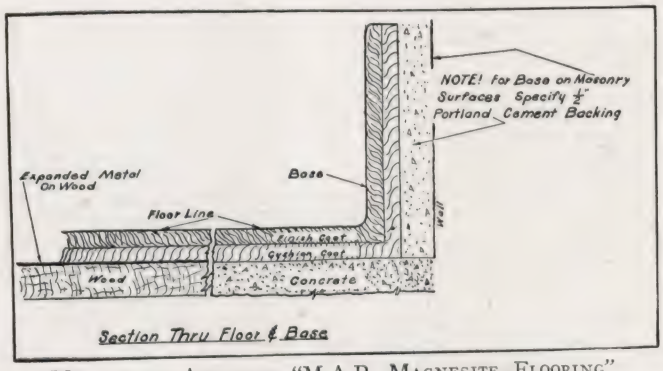
After establishing an enviable record in the use of magnesite for floors we have developed a magnesite stucco in which we have eliminated all the objections that have formerly existed against the use of magnesite stucco. Compare the density of "M.A.P. Mag-Stucco" with any stucco on the market and it will be found that we have a perfectly graded material which is as permanent as granite. "M.A.P. Mag-Stucco" covers 60 yds. to the ton.

"M.A.P. Mag-Stucco" is strictly a mineral stucco and contains no vegetable or animal substances. Applied in 2 coats, both of the same material. This eliminates confusion in application.

Application—"M.A.P. Mag-Stucco" is applied in 2 coats ¼-in. thick each.

As the specifications for applying magnesite stucco are lengthy, we will not attempt to print same. The safest way to specify our materials is given below.

Specifications—"M.A.P. Mag-Stucco" is to be applied on all areas called for in plans and specifications. Same to be applied as per manufacturer's directions.



Method of Applying "M.A.P. Magnesite Flooring"

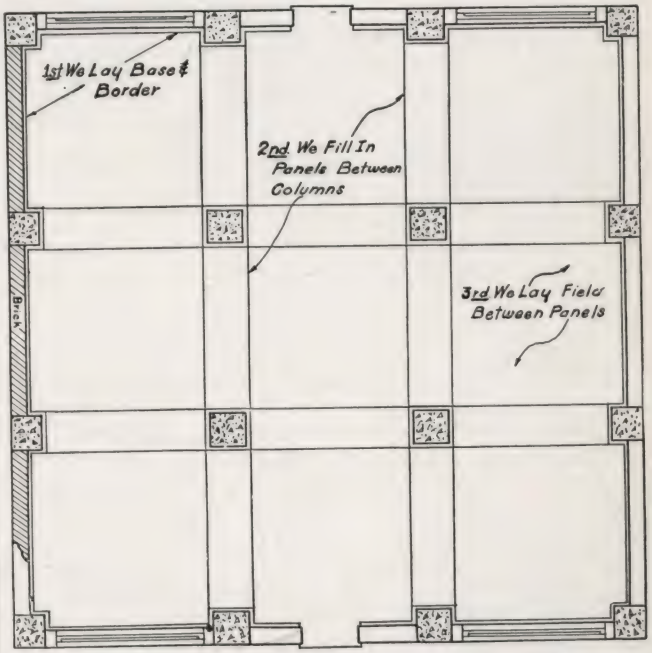
Service Department

Besides being manufacturers we are also contractors. This means that we recommend and install other floors than those we manufacture. We have gathered about us an organization of flooring experts who have spent years in the study of various types and makes of floors.

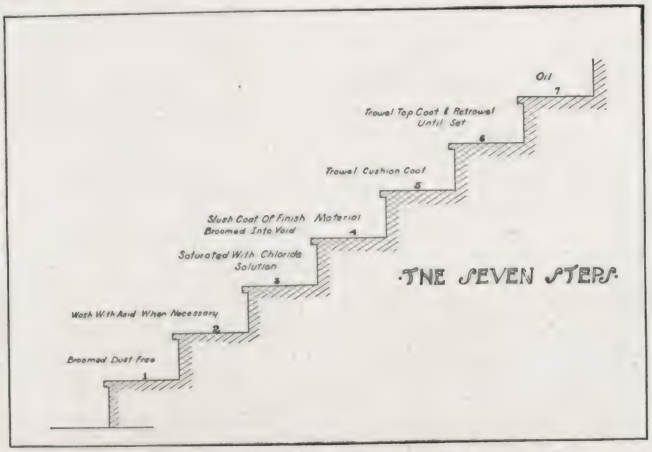
When plans are drawn and ready for notations on floors, you have come to the most important part of the work. The reason is this: floors get a thousand times the abuse any other part of the building gets, and as the floor is the foundation to each individual room, hall or corridor, the success of the rest of the work rests wholly upon the proper selecting of floors.

Dozens of different kinds of floors are enthusiastically urged upon you as the *best*. Each has its particular merit in its place.

Allow us to send you our folder entitled "Floors." It explains a service of which architects are daily availing themselves.



Floor Plan Showing Merely the Mechanical Process Followed in Laying "M.A.P." Floors



The Seven Steps Followed in Laying "M.A.P. Magnesite Composition Flooring"

ESTABLISHED 1906

FRANKLYN R. MULLER & CO.

Manufacturers of Composition Flooring and Stucco

MAIN OFFICE AND FACTORY
900 Madison Street
WAUKEGAN, ILL.

BRANCH OFFICES IN ALL PRINCIPAL CITIES IN THE UNITED STATES

Products

ASBESTONE FIREPROOF and HYGIENIC COMPOSITION FLOORING, a Magnesite Composition for floors, cove base, wainscot, stair treads, etc.; ASBESTONE EVERLASTIC STUCCO, a Magnesite Stucco Plaster for exterior and interior work.

MULLER ASBESTONE GUARANTEED PRODUCTS TRADE MARK

Territory and Estimates

Estimates furnished for floor installations throughout North America. State location of building and supply copies of blue prints and specifications. If unable to supply blue prints, state number of square feet of floor and number of lineal feet of sanitary cove base, wainscot, stair treads, etc. State whether underfloors furnished are to be of wood, concrete or other construction.

Composition Flooring

Asbestone composition flooring, unlike all other hard finished floors, is resilient and easy to the tread; firm and blow resisting, smooth and hygienic without joints or crevices to harbor germs and dirt. It is manufactured in a variety of soft, warm colors that will harmonize with practically any color scheme and impart a cheerful and homelike atmosphere to all classes of interiors.

Asbestone composition flooring is prepared as ordered for the individual job. The composition is a scientifically compounded mixture of calcined magnesite, magnesium chloride and other proper ingredients to insure a uniform flooring material to be used for sanitary and fireproof floors which will give satisfaction as to durability, appearance and easiness to the tread—one that is easy to keep clean and of moderate cost. All ingredients are scientifically tested as to their chemical and physical properties by graduate chemists in our completely equipped laboratory. They are then carefully compounded by competent workmen under the supervision of experts. A thoroughly equipped plant and unequalled transportation facilities enable us to guarantee prompt deliveries.

Specifications—*Concrete Underfloors*—Should be composed of 1 part of a good standard portland cement, 2 parts of clean, sharp sand, and 4 parts of clean gravel or crushed limestone.

Same must be thoroughly tamped and leveled with wood float, and brought up to within ½ in. of desired finished floor line to a true, even surface, free from holes or projections.

All concrete shall be thoroughly dry and set before Asbestone is applied.

All pitches to drains, slopes and levels must be provided for within ½ in. of desired finished floor line in underfloors.

Wherever pipes that are subject to expansion and contraction pass through concrete underfloors, they shall be surrounded by sleeves large enough to allow for necessary expansion. All pipes embedded in concrete, and subject to expansion and contraction, shall be covered with asbestos pipe covering, over the top of which there shall be not less than 2 in. of concrete. This work to be included in masonry contract.

Backing for Base and Wainscot—All plaster shall be brought down to a ground, preferably of metal, at a point where composition shall terminate. The desired backings for composition, if of brick, terra cotta, stone or metal lath, shall be covered with a coating of portland cement free from lime and brought up to within ⅜ in. of desired finished surface. This cement shall be not less than 1 in. thick and be 1:4 mix.

Wood Backing—This applies to floor, base and wainscoting over wood. Wood backing shall be of soft wood, rough stock not over 8-in. face, securely face nailed to joists or studding, and made as rigid as possible. The same shall be brought up for floors to within ½ in. of desired finished surface and within ⅜ in. for sanitary base and wainscoting. If lumber is faced one side, have rough side up or out, as composition can then get a better bond. This work to be included in carpenter's contract.

Metal Binder Over Soft Wood Underfloors and Backing—Where Asbestone is to be laid over soft wood underfloors, nail down over the floors with large headed roofing nails either 1-in. mesh, galvanized after-woven wire netting, or flat, diamond mesh metal lath. Either binder should be nailed every 6 in., in all directions.

Hardwood Underfloors—When installations are to be made over hardwood floors, they should first be covered with light weight tarred felt known as slater's felt, to prevent warping during setting action, then proceed as for soft wood underfloors.

Composition Floors, Wainscoting and Base—Composition floor shall be laid ½ in. thick in 2 coats, namely, scratch and finish coat of ¼ in. each, over underfloor as specified. Composition wainscoting shall be laid ⅜ in. thick over backings as specified. Installation of composition shall not take place until after trim is set, all glass in and plastering done; in fact, all construction work as nearly as possible to be completed.

Temperature where installation is made to be not less than 60° Fahr.

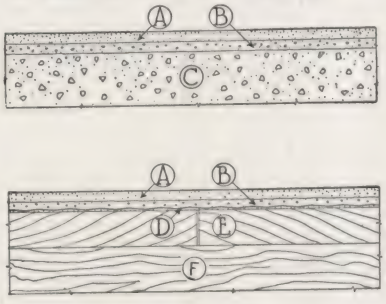
Surfacing of composition floors shall be done in first class, workmanlike manner with a trowel, and any composition surfaced by grinding, honing or scraping shall be removed and replaced by new material finished with a trowel. The surface of composition shall be true and even and of permanent color.

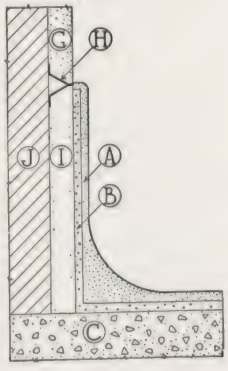
To Secure Tile Effects—The finished floor shall be surface scored to represent tile or marble slab in such sizes as may be specified by the architect. Inlaid border or base and border may be made of different color from the field. Plans for the same will be submitted by the architect.

Final Surfacing—After floor has had its final set, it shall be properly and thoroughly oiled and waxed.

Note: A neatly arranged specification in regular filing size, according to standard of American Institute of Architects, furnished on request.

Guarantee—We guarantee all our work against any defects in material or workmanship.





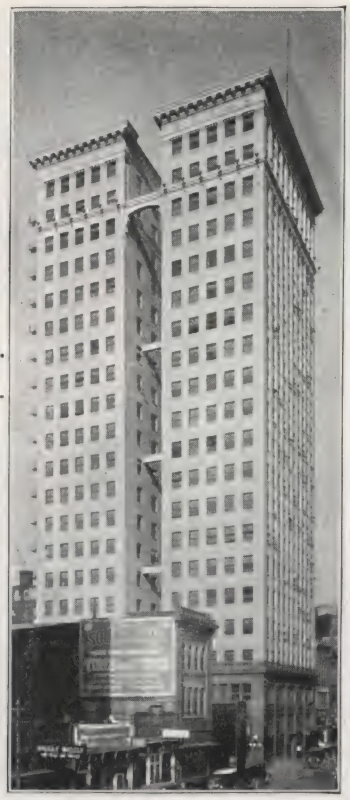
Cove Base Over Concrete

NEW METHOD OF INSTALLING ASBESTONE FLOORING OVER CONCRETE OR WOOD UNDERFLOORS

(A) Asbestone top coat. (B) Asbestone cushion coat. (C) Concrete subfloor. (D) Metal binder. (E) Wood subfloor. (F) Joist. (G) Plaster. (H) Metal ground. (I) Cement backing. (J) Wall

Continued on next page

JACKSONVILLE HIGH SCHOOL, JACKSONVILLE, ILL.
J. W. ROYER, Architect, Urbana, Ill.
36,000 sq. ft. Asbestone composition flooring installed in class rooms and corridors



WAGGONER BUILDING, FORT WORTH, TEX.
SANQUINET & STAATS, Architects, Fort Worth, Tex.
Asbestone composition flooring installed in all offices; total installation, 89,000 sq. ft.

RECREATION ROOM, OAK FOREST INFIRMARY, OAK FOREST, ILL.
Illustrating Asbestone composition flooring and inlay border work

FLOOR, WAINSCOT AND STAIRWAY, GRADE SCHOOL, WAUKEGAN, ILL.
C. W. WEBSTER, Architect, Joliet, Ill.
10,000 sq. ft. Asbestone composition flooring installed

FLOORING INSTALLED IN THE CHRISTIE LITHOGRAPH COMPANY'S PLANT, DULUTH, MINN.

Asbestone Everlastic Magnesite Stucco

Asbestone Everlastic stucco is a magnesium oxychloride stucco plaster presenting numerous advantages over cement stucco. Among a few of the many advantages which might be mentioned are the following:

Asbestone Everlastic stucco is resilient and elastic with high tensile strength. It does not wholly depend on a key for bond. When applied correctly will neither crack, warp nor come loose from the foundation on which it is applied. It is light in weight, absolutely fireproof and water resisting; being a non-conductor it is impervious to heat or cold.

Asbestone Everlastic stucco can be applied successfully at all times of the year, is not affected by frost or heat; it forms an absolutely tight joint against all trim, coping, etc., thus obviating all possibilities of dampness penetrating behind the material causing it to loosen from the foundation over which it is applied—a very serious objection in cement stucco.

Asbestone Everlastic stucco is usually applied in 3 coats—scratch coat, finish coat and stone dash. The actual plastering is done in 2 coats; the stone dash is then thrown on the finish coat while same is still plastic. A large and artistic variety of stone dashes can be supplied, thus enabling architects to secure finish effects in keeping with all classes of architectural design.

Asbestone Everlastic stucco can be applied over wood, hollow tile, brick, stone, cement, etc. Old frame buildings stuccoed with Asbestone Everlastic magnesite stucco are made fireproof, so much so that insurance companies quote a lower premium rate. For new frame construction it is not necessary to use siding. The stucco can be applied on any of the patent lathings nailed direct to the studding. Where siding is used stucco can be applied on either wood, or galvanized or well painted metal lath nailed direct to the siding.

Under no circumstances should Asbestone Everlastic stucco ever be brought down to the grade line. Stucco should never be applied lower than a line 8 to 10 in. above the grade line.

Detailed specifications and full particulars regarding the proper application of Asbestone Everlastic stucco, samples, prices, etc., furnished on request.

FIRST CHURCH OF CHRIST, SCIENTIST, PORT HURON, MICH.
Exterior of Asbestone Everlastic magnesite stucco

SPECIAL SERVICE FLOORING CORPORATION

Manufacturers of Composition and Asphalt Industrial Floors

ENGINEERS AND CONTRACTORS

2039 Grand Central Terminal

NEW YORK, N. Y.

FACTORIES: MAMARONECK, N. Y., SAN DIEGO, CAL.

WESTERN EXECUTIVE OFFICE: 53 Sefton Building, SAN DIEGO, CAL.

BRANCH OFFICES

ATLANTA, GA., 140 Peachtree Street
BALTIMORE, MD., 1127 Calvert Building
BOSTON, MASS., 73 Tremont Street
CINCINNATI, OHIO, 1008 Mercantile Library Building
CLEVELAND, OHIO, Schofield Building
DALLAS, TEX., Liberty Street Bank Building
DAYTON, OHIO, 600 U. B. Building
DENVER, COLO., 427 17th Street
EL PASO, TEX., 400 North Street
MONTREAL, QUE., Read Building
NORFOLK, VA., 302 Arcade Building
PHILADELPHIA, PA., Builders Exchange
SAN ANTONIO, TEX., Russel Building
TORONTO, ONT., 43 Jarvis Street
UTICA, N. Y., 41 Faxton Street
WASHINGTON, D. C., 401 Union Savings Bank Building

Products and Services

SPECIAL SERVICE FLOORING: Magnesite Composition Servoleum, Bayshan Waterproof Compound, Eoleum, Asphalt Mastic, Acidproof Mastic, and Colored Cement.

MAGNESITE STUCCO in a great variety of finishes.

FLOORING ENGINEERS and CONTRACTORS, assuming the entire flooring problem. Our engineers study the requirements that the floor must meet and suggest the proper one of the many types of Special Service Floors that will best fulfil the conditions. The flooring materials are then manufactured at the factory, expressly for the special service to which the new floor is to be subjected, and are installed by our own force of skilled mechanics.

Special Service Floors

There is no accident or mere good fortune associated with the international prestige of Special Service Floors. Nothing but prestige could result from the methods employed—careful analysis of raw materials, accurate compounding and thorough machine mixing, prompt shipments, skilled installations by the expert mechanics of our large, flexible organization, under direct supervision of one of our engineers, mean Special Service Floors. Skilled crews of our own mechanics are available from coast to coast.

Guarantee

All products which we install are guaranteed against all defects of materials or workmanship.

Special Service Magnesite Composition Servoleum Flooring

This type of material can be installed over wood, concrete or steel, and is generally laid plastic ½ in. thick, in two coats; a fibrous cushion coat $\frac{3}{16}$ in. thick of great strength and pliability, and a top coat $\frac{5}{16}$ in. thick of exceedingly fine grained texture, highly immune to abrasive wear under the most severe conditions.

It is fireproof, smooth, dustless, quiet and sanitary, and since it has the quality of springiness, it does not tire a person standing on it. Made in all colors.

References—It is significant that a great number of these installations are repeat orders.

Aluminum Co., of America; American Can Co.; American Locomotive Co.; American Woolen Co.; Beechnut Packing Co.; Apartment Houses, Muriel Arms and Northland, New York City; Bethlehem Hotel; Brooklyn Rapid Transit Co.; Chesapeake & Ohio R. R. Co.; Creighton University; City Market, Norfolk, Va.; Dayton Power & Light Co.; Thomas A. Edison Co.; General Chemical Co.; General Electric Co.; International Harvester Co.; Johnson & Johnson; Kelly Tire & Rubber Co.; National Carbon Co.; National Screw & Tank Co.; New York Central R. R.; New York Edison Co.; New York Telephone Co.; New York University; Proctor & Gamble Co.; Owl Drug Co.; Sprague Electric Co.; Turner Falls Power & Electric Co.; U. S. Military Academy, West Point, N. Y.; U. S. Naval Hospitals at Brooklyn, Pelham Bay, Wards Island, and San Diego; U. S. Public Health Service Hospitals at Cincinnati, Ohio, Ft. Bayard, N. M., Oteen, N. C., Perryville, Md., and Washington, D. C.; Westinghouse Electric & Mfg. Co.; White Tar Co.; Wm. Wrigley, Jr.; Worthington Pump Co.

U. S. NAVAL HOSPITAL, SAN DIEGO, CAL.

Special Service Waterproof Colored Compounded Flooring "Bayshan"

Years of research by our chemists have resulted in a compounded floor, which has and will successfully withstand water without disintegration or softening. This achievement is the greatest improvement in colored plastic floors since the original discovery of Sorel cement as it overcomes the only real objection to this type of flooring. Special Service Floors can now be installed in rooms which demand an absolute watertight floor without fear of leaks or disintegration.

Special Service Asphaltic Floors

Eoleum flooring: resilient, flashproof, and a good thermal and electric insulator. Laid ⅛ in. thick in red, brown and green, over concrete, composition, wood or steel.

Acidproof Mastic Flooring

An acidproof floor which is being used successfully in metal pickling rooms, battery plants and plating works. Usually installed 1 to 2 in. thick over wood, concrete or steel.

Asphalt Mastic Flooring

A standard Trinidad floor which is used where extremely resilient, durable and waterproof floor or decking is required. Usually laid ¾ to 1½ in. thick over wood, concrete or steel.

References—Aeolian Co.; American Ever Ready Works; Botany Worsted Mills; Buffalo Dry Dock Co.; Curtis Engineering Co.; Electro-Dynamic Co.; General Electric Co.; Harvard University Hospital; Lang Body Co.; Linde Air Products; New Departure Mfg. Co.; New York Chronic Hospital; Tweedy Silk Mills; U. S. Naval Drill Hall, Pelham, N. Y.; U. S. Naval Operating Base, Hampton Roads, Va.; U. S. Submarine Base, Newport, R. I.; White Auto Co.; Worthington Pump Co.

Magnesite Stucco

High tensile strength, very elastic, therefore does not crack like ordinary portland cement stucco. Easily applied over wood or metal lath. Made in a great variety of colors. Good insulator.

Specifications, Estimates, etc.

Complete specifications and information regarding any of our products will be mailed on request. Samples and estimates furnished promptly.

L. W. FERDINAND & CO.

Manufacturers, Importers and Exporters of Linoleum Cements, Marine and Waterproof Liquid Glues

BOSTON, MASS.

Products

LINOLEUM CEMENTS and MARINE GLUE.
Also manufacturers of Waterproof Liquid Glue.

20th Century Linoleum Glue-Cement, Grade A

Our Grade A is recommended for attaching any kind of floor covering to any kind of floor. We have never had occasion to qualify this statement; over 25 years' experience in making and selling linoleum cement enables us to produce an article filling every requirement.

BRAND MARK

This cement is a combination of chemicals, with minimum quick drying and maximum toughness as its principal properties.

Registration—20th Century Linoleum Glue-Cement, Grade A, has been registered with the Building Data League, Inc. This means:

(1) That the League has submitted this material to a thorough investigation including analysis, laboratory tests, investigation of its record in service, and inspection of the factory, in order to verify our claims as to its qualities and reliability.

(2) That the truth of these claims is certified to by the League's technical committee on Miscellaneous Products appointed by the Board of Governors of the League, a board composed of disinterested architects, engineers, chemists and physicists.

(3) That a record of this investigation, how it was made, what tests were made, what companies or individuals were communicated with, is now filed with the League.

(4) That a "Findings" on the material including a complete report of the investigation is available to members of the League.

References—Adopted and specified by United States Government and used in numberless custom houses and post offices through the country, as well as in institutions, colleges, etc. Recently supplied to the Universities of Wisconsin, Michigan and Minnesota; also to Wellesley College and Buffalo Municipal Hospital.

Directions for Cementing All Kinds of Floor Coverings to All Kinds of Floors

In cementing linoleum to various floors, it should be borne in mind that method of applying is similar to that of gluing 2 pieces of wood together with animal glue, viz.: (1) Too much or too little cement should be avoided; if too much is used it will dry out slowly, and if too little it will not hold when dry. Experience will show thickness of coat necessary to produce best results. (2) As with animal glue, it is necessary that contact should be perfect; that is, that linoleum should be held tight to floor during drying out or setting process. Unless this is attended to carefully, bulges or blisters are liable to occur. (3) It takes time; 48 hours is about the limit of time when weights can be safely removed. Tenacity and toughness are essential in linoleum cement. A quick drying cement must be brittle and will be sure to produce unsatisfactory results sooner or later.

The linoleum should first be laid on the floor without cementing until all stretch and roll are taken out of it.

To cement down linoleum, if best result is desired, surfaces of both floor and linoleum should receive a fairly heavy coat of cement. Satisfactory results are, however, obtained by coating floor only with cement, and often seams and edges alone are cemented. Where surface of floor is covered with cement, 1 gal. will lay about 12 sq. yds. On cement floors, if porous, a little more will be required; if hard and smooth, a little less.

After cement has been applied and linoleum laid, roll down thoroughly with a long handled cast iron roller such as is used for lawns. This not only takes the roll out, but is quite an assistance in placing it properly in position. Roll from center to edges; this will force out any air which may collect and prevent air bubbles or blisters. It is then ready for weights or uprights. Should any blisters be discovered, a small puncture will let out the air; sufficient cement should then be forced into the hole, using for the purpose an engineer's oiler with a spring bottom. That spot must be especially weighed to attach it properly.

One of the best methods of weighting is by using canvas sand bags 25 to 50 lbs. in weight, which will conform to any uneven surface of floor, or by laying planks and covering them with some heavy substance. These planks should be laid along edges and seams, and not less than 18 in. apart over entire surface; weight with any material heavy enough to keep contact perfect between linoleum and floor. The United States Government specifications call for 12 lbs. to the sq. in. for 48 hours at a temperature of 70° Fahr.

Send for booklet, "Linoleum, How to Lay It and How to Care for It."

"Victory Brand" 20th Century Glue-Cement

The extremely high cost of the ingredients used in the Grade A cement (on which we have a national reputation), and that make its price almost prohibitive, compelled us to use inferior substitutes or *create* something. We did the latter, and in the "Victory Brand" have incorporated many of the well-known properties of the Grade A, but at a lower price.

"Victory Brand" is supplied to many of our customers who formerly used the Grade A exclusively. We feel confident that "Victory Brand" will answer every requirement where a waterproof linoleum cement is necessary.

Special Navy Brand Linoleum Cement

For the money, an exceptionally good cement for use on floors of all kinds. This is not a waterproof material and we do not recommend it where a really first-class job is required. It can be used, however, for cementing the center of the linoleum, using the Grade A or the "Victory Brand" for the edges and seams.

Jeffery's Marine Glue

Made in many grades, each intended to meet a special condition. The ingredients are the best and the finished product is always uniformly serviceable. Pound for pound, it will go farther and do better and more lasting job than other marine glues.

Jeffery's marine glue can be had at all yacht, boat, and canoe supply houses, ship chandlery, hardware and sporting goods dealers. See that the Jeffery trademark is on every package.

AMERICAN LINOLEUM MANUFACTURING COMPANY

Manufacturers of Genuine Linoleum and Cork Carpet

SOLE SELLING AGENTS

JOSEPH WILD & CO.

EXECUTIVE OFFICE AND MAIN SHOWROOM

230 Fifth Avenue

NEW YORK, N. Y.

BRANCHES

BOSTON, MASS., 91-93 Summer Street — CHICAGO, ILL., 116 So. Wells Street — SAN FRANCISCO, CAL., 180 New Montgomery Street

Products

WILD'S ORIGINAL BATTLESHIP LINOLEUM; WILD'S CORK CARPET; WILD'S "KEYSTONE" LINOLEUM CEMENT.

Also Wild's "Straight Line" Inlaid Linoleum.

Genuine Linoleum

Only true linoleum ingredients are used—pure linseed oil, ground cork, kauri gum, rosin, coloring pigments, etc. Many experiments have proved that substitute materials do not produce equally satisfactory linoleum, chiefly in the matter of durability.

Battleship Linoleum

Originally made for the United States Naval Department shortly after the Spanish American war and used as a general flooring for battleships to eliminate the casualties resulting from splintering wood floors during an engagement. Now used on all battleships, but far more extensively for public buildings, hospitals, colleges, offices, city halls, courthouses, schools, etc.

Made in three standard thicknesses — Heavy (¼-in.), Medium ($\frac{3}{16}$-in.) and Light Weight (about ⅛-in.)—and in brown, dark green, gray and terra cotta colors, also in special colors. Only one grade, the best; no second grade made in the same thicknesses.

Cork Carpet

A linoleum made of coarsely ground cork. Best quality, full ¼ in. thick, 5 colors. Very resilient and noiseless. Desirable for libraries, lecture halls, theaters, churches, etc.

Keystone Linoleum Cement

An inexpensive, quick-drying, gum and pigment paste adhesive used in securing linoleum to wood and concrete floors. No weights, no rollers or drags required. Will not generate gas and positively does not contain any ingredients injurious to linoleum, thus eliminating various troubles caused by certain linoleum cements. Being a paste it fills up small irregularities in the floor surface and provides a smooth, even bed for the linoleum. One gallon will spread about 12 sq. yds.

FAMOUS OLD BATTLESHIP KEARSARGE (ON THE RIGHT)

The first Battleship Linoleum ever made (Wild's) was laid on this battleship in 1899 and was still in use 22 years later when the Kearsarge was converted into a crane ship

Advantages of Linoleum

Germicidal—Genuine linoleum is death on germs. Experiments by Dr. Ludwig Bitter and by Dr. Jacobowitz proved that the very resistant Staphylococci (the germs of infection) perished within 24 hours on the surface of linoleum, the same results being secured with linoleum that had been in use for 4 years. "Linoleum operates to kill the majority of microorganisms brought in on the shoes."

Semi-fireproof—Genuine linoleum is far less inflammable than wood floors. A red hot coal dropped upon wood will cause it to burst into flames while on linoleum it will simply char a hole, smolder and go out. This semi-fireproof quality is due to:

(1) The linoleum is more compact than wood, owing to the pressure it receives in its manufacture.

(2) The greater content of mineral matter, about 23 times as much as wood, which acts as a diluent to the combustible matter present.

(3) The fire points of the materials used in linoleum lie in the neighborhood of 600° Fahr.

Impervious to Water—The City of New York in testing a purchase of Wild's ¼-in. Battleship Linoleum under the New York specifications, which are far more rigid than the U. S. Naval Department, found that after immersion in water for 48 hours its weight had increased only 3½%.

Because of its imperviousness, Battleship Linoleum is one of the few floorings that will remain dry in ice skating rinks.

Durability—A heavy compact Battleship Linoleum is phenomenally durable. In Lord and Taylor's old store on Broadway, New York, Wild's Linoleum on the first floor wore only about $\frac{1}{32}$ in. in

Continued on next page

6 years. The ¼-in. goods would have lasted 42 years.

In the May Co. Store, Cleveland, with an estimated traffic of 45,000,000 people during the years it was down, Wild's Battleship Linoleum wore only $\frac{1}{12}$ in.

The cost per yard is nominal; the cost per year, insignificant.

Specifications for Laying Battleship Linoleum over Wood or Concrete

The two following paragraphs to be inserted in the carpentry or masonry specifications:

Level—The floor level shall be ..... (insert thickness of linoleum) below the floor line shown on the drawings.

Floor—The floor shall be thoroughly dry, smooth and free from plaster and all foreign materials ready for the linoleum contractor.

The paragraph following to be inserted in the heating specifications:

Heating — The heating contractor shall furnish sufficient heat to maintain a temperature of at least 70° Fahr. in the rooms where linoleum is to be laid, commencing 48 hours before the linoleum work starts and continuing until it is finished.

Linoleum — The linoleum contractor shall furnish and install Wild's ..... Battleship Linoleum (insert ¼-in. Heavy, or $\frac{3}{16}$-in. Medium Weight, or Light Weight), color ..... (insert color).

Linoleum Cement—The adhesive used in securing the linoleum to the floor shall be Wild's Keystone Linoleum Cement (or equal). It shall be a quick drying gum and pigment paste that will not generate gas and that does not contain any ingredients injurious to linoleum.

Heating—The heating contractor (or owner) is required to maintain a temperature of 70° Fahr. in all parts of the building where linoleum is to be laid, but the responsibility shall rest with the linoleum contractor to see that this temperature is maintained. No linoleum shall be unrolled or laid that has not been heated for 48 hours at a temperature of 70° Fahr.

Laying—Unroll and lay out the linoleum with seams overlapped ½-in. and with ends and wall edges cut full to the floor. Taking one breadth at a time, pull linoleum back over itself and spread cement evenly over floor about 6 or 8 sq. yds. at a time and just thick enough so 1 gal. covers about 12 sq. yds. Ease linoleum back into place and proceed in the same manner with the entire breadth. Cement next breadth in place; trim ends and cut through the overlapped edges, making perfectly met seams. Hammer along ends and along seams to level edges. Thus proceed with each room or hall. Tread over linoleum a little, especially at seams and ends, making the cement grip securely. Wash off within 1 or 2 hours any cement that may get on the surface of the linoleum.

After laying the linoleum, the linoleum contractor shall remove all scraps and surplus material, leaving the floors clean and ready for occupancy.

AMERICAN TELEPHONE AND TELEGRAPH BUILDING, NEW YORK
14 miles of Wild's ¼-in. Battleship Linoleum 2 yds. wide (50,000 sq. yds.) were laid in this building, cemented direct to the concrete floors

Samples

For samples, special information, etc., address Joseph Wild & Co., 230 Fifth Avenue, New York.

Government Contracts

Since 1899, when Wild's Battleship Linoleum was first produced, it has been used by the Government on numerous superdreadnoughts, dreadnoughts, battleships, torpedo boat destroyers, etc. A few of them are listed below. On some from 5000 to 9000 yds., were laid, while on others a smaller quantity was used.

Arkansas
Cassin
Charleston
Culgoa
Delaware
Fanning
Florida
Illinois
Kearsarge
Kentucky
Louisiana
Maryland
Maine
Minnesota
Missouri
Monaghan
New Hampshire
North Carolina
North Dakota
Ossipee
Ozark
Pennsylvania
Roe
Tallapoosa
Tennessee
Terry
Utah
Vermont
Virginia
West Virginia
Wyoming
Texas

General Contracts

The diversified character of the buildings in which Wild's Battleship Linoleum has been laid in recent years, and the extent to which it is used, is well typified by the following list of a few of the larger general contracts:

	Sq. Yds.
New York Telephone Building	50,000
San Francisco City Hall	18,000
U. S. Rubber Co. Building, New York, N. Y.	12,000
San Francisco Hospital	12,000
Hamilton County Courthouse, Cincinnati, Ohio	11,000
Wells Fargo Building, New York, N. Y.	10,000
Alaska Commercial Building, San Francisco, Cal.	8,000
Examiner Building, San Francisco, Cal.	8,000
Union Pacific and Southern Pacific R. R. Offices, New York, N. Y.	7,000
Ward's Island Hospital, New York, N. Y.	7,000
Call Building, San Francisco, Cal.	6,000
State Capitol, Madison, Wis.	4,500
Bell Telephone Building, Pittsburgh, Pa.	4,300
Rockefeller Institute, New York, N. Y.	3,000
Essex County Hospital, Overbrook, N. J.	1,800
Standard Oil Building, San Francisco, Cal.	3,000
Western Electric Offices, New York, N. Y.	3,000
U. S. Forest Products Laboratory, Madison, Wis.	2,500
University of California	3,000
Iowa State Teachers College	2,500
Pacific Telephone Building, Portland, Ore.	3,000
Courthouse, Winston, Iowa	2,500
Children's Hospital, San Francisco, Cal.	2,500
Corn Products Refining Co. Offices, New York, N. Y.	2,000

ARMSTRONG CORK COMPANY

LINOLEUM DIVISION

Manufacturers of Linoleum and Cork Carpet Floorings

HOME OFFICE
LANCASTER, PA.

BRANCH OFFICES

NEW YORK, N. Y., 212 Fifth Avenue
ATLANTA, GA., 1228 Candler Building
CHICAGO, ILL., 1206 Heyworth Building
DENVER, COLO., 725 Symes Building
CLEVELAND, OHIO, 1205-6 Ulmer Building
SAN FRANCISCO, CAL., 525 Rialto Building

Products

ARMSTRONG'S LINOLEUM: Battleship and Plain; Jaspe (two-tone effect); Inlaid (straight line and moulded); Inset Tile; Marble Tile; Granite.

ARMSTRONG'S CORK CARPET.

ARMSTRONG'S SANITARY COVE and BASE.

ARMSTRONG'S WATERPROOF LINOLEUM CEMENT.

ARMSTRONG'S LINOLEUM PASTE.

All genuine Armstrong goods bear the name and the Circle A trade-mark.

Armstrong's Linoleum
for Every Floor Ⓐ in the House
TRADE-MARK

Linoleums

Linoleum takes its name from one of its principal ingredients, linseed oil (*linum*, flax, and *oleum*, oil). The oil is oxidized by exposing it to the air until it hardens into a tough, rubberlike substance, and is then thoroughly mixed with powdered cork, wood flour, various gums, and suitable color pigments. The resulting plastic mass is pressed on burlap by means of heavy calenders, the exact processes varying with different kinds of linoleum. The "green" linoleum then passes into drying buildings called "stoves," where it is cured and seasoned from 2 to 6 weeks, depending on the thickness of the material.

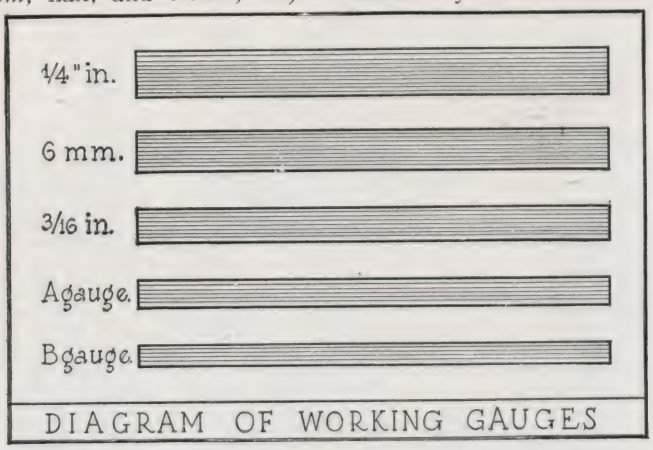


DIAGRAM OF WORKING GAUGES

TABLE OF LINOLEUM GAUGES AND WEIGHTS

Gauges	Width, yds.	Approximate thickness, in.	Finished gauge, in.	Average net weight per sq. yd., lbs.
Plain Linoleum—				
Battleship ¼-in.	2	1/4	.250	12.5
Battleship 6 mm	2	15/64	.235	11.5
Battleship 3/16-in.	2	3/16	.185	9.0
A-grade (Light Battleship)	2	9/64	.142	8.0
B-grade	2	1/8	.019	6.5
C-grade	2	5/32	.095	5.5
Jaspe Linoleum—				
A-grade	2	9/64	.142	8.5
B-grade	2	3/16	.119	7.0
Inset Tile Linoleum	2	7/64	.114	7.3
Granite Inlaid	2	5/32	.095	5.2
Carpet Inlaid	2	5/64	.071	4.0
Parquetry Inlaid	2	7/64	.114	7.3
Hamilton Straight Line Inlaid—				
A-grade	2	7/64	.114	7.3
Fulton Inlaid—				
B-grade	2 and 4	3/32	.095	5.2
Acco Inlaid	2 and 4	5/64	.071	4.0
Cork Carpet* Unpolished—				
Grade XXX	2	17/64	.264	7.5
Grade XX	2	15/64	.230	6.5

The weights and gauges given in this table are the manufacturing standards for the various grades of linoleum. Slight variations will occur, but for practical purposes, these weights and gauges are substantially correct.

*The 2 grades of cork carpet may be had with either unpolished or polished (sanded) surface.

Armstrong's Linoleum

Every yard of Armstrong's Linoleum is fully guaranteed. The company will make good any piece that proves defective in manufacture.

Both in manufacturing methods and equipment, the Armstrong plant at Lancaster, Pa., is the most modern in America.

Only the best obtainable ingredients are used in the manufacture of Armstrong's Linoleum. Most of the cork comes from the company's own factories here and abroad. Every car of linseed oil and all color pigments are tested in the laboratory. The whole manufacturing process is under chemical control.

The ARMSTRONG CORK COMPANY possesses an organization of thoroughly experienced linoleum experts. Many of these men were trained abroad where linoleum traditions were founded and developed.

Exceptional attention is paid to the designing of the patterns and the selection of the colorings.

Tests—Armstrong's Linoleum is carefully tested at every step of the making. The final inspections of the finished product are especially rigid.

Among the rigid tests to which Battleship Linoleum at the Armstrong factory is subjected are the following:

(1) **Penetrometer Test**—Applied to the "cement" or "binder" (oxidized linseed oil mixed with gums and resins). Electrically operated needles are pressed into samples of the elastic "cement," and the exact degree of hardness is registered. This test insures proper consistency of the binder for mixing with pulverized cork.

(2) **Abrasion Test** — Before leaving the "stoves," samples of every "run" of linoleum are tested to see if the material is thoroughly seasoned. The rounded nose of a vertical shaft is revolved rapidly on the linoleum for 60 seconds under 150 lbs. pressure. If the linoleum is properly matured, no abrasion on the surface is noticeable.

(3) **Indentation Test**—Applied to all Battleship Linoleum. A plunger (about ¼-in. in diameter) under 80 lbs. pressure is applied against the linoleum for 60 seconds. Provided the material is thoroughly seasoned, there is no surface breaking and any perceptible indentation will disappear.

Protection of Customer—For the protection of the purchaser the gauge mark is printed on the back of every yard of Armstrong's Battleship Linoleum, and where there are slight imperfections which cause the goods to be sold at a discount, the word "Seconds" is plainly marked on the burlap back.

Note: In some cases attempts have been made to substitute 6 mm Battleship Linoleum for Quarter-Inch Battleship Linoleum under some such designation as "Commercial Quarter-Inch Battleship Linoleum." Insist that contractors state exact thickness in all bids, and that the goods furnished are of the thickness specified.

Continued on next page

Armstrong's Battleship Linoleum more than meets the exacting specifications of the United States Navy Department (dated September 1, 1916—No. 29L-1C).

Grand Prize—Armstrong's Linoleum received the grand prize at the Panama-Pacific International Exposition—the highest possible award—conferred on no other brand of linoleum, foreign or domestic.

Advantages of Linoleum Floors

Linoleum as a permanent floor has certain marked advantages when installed while the building is being erected. It is equally satisfactory whether installed over a wood or concrete base.

Linoleum floors are: (1) Sanitary, because they are non-absorbent, smooth, free from cracks and germicidal. (2) Easily cleaned. (3) Comfortable, because they are resilient, quiet, warm and odorless. (4) Artistic. (5) durable. (6) Adapted to fireproof construction. (7) Easy to install. (8) Economical, because they are reasonable in first cost and inexpensive to maintain.

Varieties of Armstrong's Linoleum

Plain Linoleum—Solid colors without pattern—the four heavier gauges of which are known as Quarter-Inch, 6 mm, $\frac{3}{16}$-in., and Light Battleship (A gauge with unpainted back). Plain Linoleum is of the same quality as Battleship Linoleum, but lighter in gauge. Altogether, there are 7 thicknesses of Plain Linoleum and 7 colors.

Color No. 20—Brown
Color No. 21—Green
Color No. 22—Dark gray
Color No. 23—Light gray
Color No. 24—Tan
Color No. 25—Light blue
Color No. 27—Black

The four Battleship thicknesses are made only in brown (No. 20), green (No. 21) and dark gray (No. 22). All Armstrong's Battleship and Plain Linoleum is manufactured regularly 2 yds. wide only.

Jaspe Linoleum—A species of inlaid linoleum, since the colors run clear through to the back. It presents a striated appearance with a 2-tone effect and is made in 2 gauges A and B, and 4 colors:

Color No. 10—Green
Color No. 11—Brown
Color No. 12—Gray
Color No. 14—Blue

Inlaid Linoleum (Straight Line and Moulded)—The colors of the patterns go through to the burlap. In making Straight Line Inlaids, the individual parts of the pattern are die cut, laid in position and finally keyed on the burlap under enormous pressure. In making Moulded Inlaids, the designs are worked out on the burlap by means of metal "stencils." The loose "mixes" mould slightly into each other along the lines of the design, thus making possible very artistic effects in Carpet Inlaids and similar patterns. Designated according to pattern, Armstrong's Inlaid Linoleum comes in Tile Inlaids, Parquetry Inlaids and Carpet Inlaids.

Inset Tile Linoleum—A Straight Line Inlaid Linoleum in which the pattern consists of solid color blocks 5½-in. square with ½-in. interliners of a contrasting color. Made only in A gauge and in various colors.

Marble Tile Linoleum—A Straight Line Inlaid Linoleum of the same design as Inset Tile, except that the 5½-in. square blocks are marbled in appearance. Made in A gauge only.

Granite Linoleum—Also a variety of inlaid, in which colors go clear through. It has a mottled appearance resembling terrazzo and is made in B gauge only and in 3 colors as follows:

Color No. 3—Green
Color No. 5—Blue
Color No. 6—Brown

Armstrong's Cork Carpet

Cork carpet is made of relatively large granules of cork by a process which preserves the natural elasticity to a high degree. Cork carpet, therefore, not only softens footsteps, but helps absorb other noises as well. For auditoriums and other rooms in churches, lodges, libraries, museums, etc., where excessive dirt is not tracked in directly from the street and where heavy traffic is not an everyday occurrence, cork carpet is admirably adapted.

Where the wear is severe, and the floor is in almost daily use, hence needs frequent cleaning, Armstrong's Linoleum in the "Battleship" thicknesses is recommended.

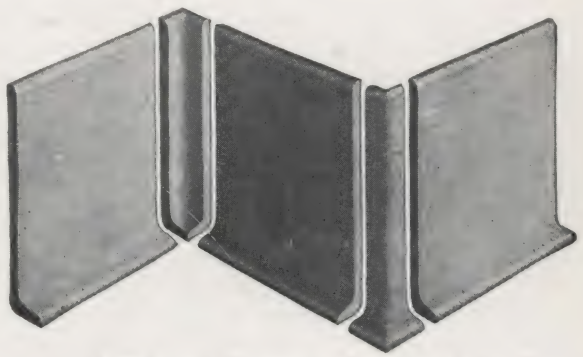
Armstrong's Cork Carpet is made in two gauges: XXX (.264-in.) and XX (.230-in.). Each gauge is made in 2 colors:

No. 30—Brown
No. 32—Green

Armstrong's Sanitary Cove and Base

For hospitals and institutions of similar character where it is necessary to provide a sanitary trim that meets the floor and which affords no place for the collection of dirt, Armstrong's Sanitary Cove and Base is especially recommended. This cove and base is made of the same materials used in Armstrong's Linoleum—ground cork, wood flour, gums and oxidized linseed oil—and comes in the three Battleship colorings, brown, green and gray. It is made 6 in. high only and in sections 20 in. long, with convex and concave corner sections made separately.

Samples of Armstrong's Sanitary Cove and Base will be mailed to any architect free on request.



Armstrong's Sanitary Cove and Base

Recommended Uses for Armstrong's Linoleums

The following will give an idea of the gauges and patterns of Armstrong's Linoleum which are especially recommended for use in various types of buildings:

Business Buildings—Including banks, lofts, office buildings, restaurants and stores: ¼ in. or $\frac{3}{16}$-in. Battleship (for corridors and areas subjected to heavy traffic); A gauge Plain; Jaspe; Inset Tile, Marble Tile or Straight Line Inlaid.

Educational Buildings—Including gymnasiums, laboratories, libraries, museums, observatories, schools

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and colleges (private and public): ¼-in. or $\frac{3}{16}$-in. Battleship; Cork Carpet (for rooms where a silent and resilient floor is a first consideration).

Hospitals and Institutions—Including homes, institutions, hospitals and sanitariums: ¼-in. or $\frac{3}{16}$-in. Battleship (for corridors and areas subjected to heavy traffic); A gauge Plain; Jaspe; Straight Line Inlaid.

Industrial Buildings—¼-in., 6 mm., or $\frac{3}{16}$-in. Battleship.

Public Buildings—Including capitols, city halls, town halls, court and custom houses, comfort stations, fire and police stations, jails and reformatories, and post offices: ¼-in., 6 mm., or $\frac{3}{16}$-in. Battleship.

Religious and Memorial Buildings—Including churches, chapels and parish houses, convents and monasteries: ¼-in. or $\frac{3}{16}$-in. Battleship (for areas where traffic is very heavy); Cork Carpet (for rooms where a silent and resilient floor is a first consideration); A gauge Plain; Jaspe.

Residential Buildings—Including apartments, flats and tenements, dwellings, dormitories and hotels: ¼-in. or $\frac{3}{16}$-in. Battleship (for corridors and areas where traffic is exceptionally heavy); A or B gauge Plain; Jaspe; Granite; Inset Tile; Marble Tile; Straight Line Inlaid.

Social and Recreational Buildings—Including auditoriums and halls, clubs, lodges, natatoriums, bathhouses and locker buildings, theaters, service buildings (Y. M. C. A., Y. W. C. A., K. of C., and Salvation Army): ¼-in., 6 mm. or $\frac{3}{16}$-in. Battleship; Cork Carpet (where a silent and resilient floor is a first consideration).

Method of Laying Linoleum and Cork Carpet

There is only one absolutely satisfactory way to lay linoleum or cork carpet over wood, and that is to cement it down over a layer of heavy felt. The best obtainable grade of builder's deadening felt, weighing 1½ lbs. per sq. yd., is first pasted to the floor and the linoleum is then pasted to the felt. The seams and edges of the linoleum are glued down with waterproof cement. Laid in this manner, linoleum will wear longer and retain its resiliency indefinitely. There will be no trouble from buckling or shrinking. The work of laying can be done expeditiously. No retrimming is required.

On concrete floors, linoleum should always be cemented, preferably over felt.

Specification Data

The following data in combination with the specifications that follow will insure satisfactory installation of Armstrong's Linoleum floors over wood or concrete base.

(1) Linoleum floors should not be installed in basements unless the base, floors and walls below grade have been thoroughly waterproofed and are absolutely dry before the floor is laid.

(2) All linoleum floors on a wood base should be laid with a felt interlining. All wood underfloors are subject to expansion and contraction due to heat, cold and varying atmospheric changes. The felt takes up the expansion and contraction and prevents bulging, cracking or breaking of the linoleum floor. It also permits the removal of the linoleum with little difficulty and without damage, if the occasion should arise.

(3) Architects will simplify their specification work by specifying the floors that are to be laid and the gauge and pattern, and identifying the specifications that govern the laying, in SWEET'S ARCHITECTURAL CATALOGUE, 17th Edition.

(4) Wood floors to which linoleum is to be applied should preferably be double floors with the underfloor laid diagonally to the floor joists. Underfloors should be of matched and end matched, kiln dried boards, not more than 4½-in. face, the ends of all boards to come directly over bearings and all to be blind nailed to each and every bearing with 8d common nails. Where underfloors are of greater width than 4½-in. face, each board should be toed face nailed with 8d finish nails to every bearing in addition to the blind nailing.

(5) Top floors to which linoleum floors are to be applied (whether single or double floors) should be of kiln dried, comb grained, matched and end matched boards free from large or loose knots, not more than 3½-in. face and thoroughly blind nailed (if single floors), to each and every bearing, and if double floors, blind nailed to the underfloor every 16 in. with 8d common nails.

(6) The surface of the top of wood floor to which linoleum is to be applied should be true, even, level, clean and dry, and should be ⅛ in. plus the thickness of the gauge of linoleum selected, below the desired finished linoleum floor level.

(7) Concrete floors must be brought to a true, even and level surface, ⅛ in. plus the thickness of the gauge of linoleum selected, below the desired finished linoleum floor level.

(8) General contractor (or owner) must make provision for maintaining a temperature of 70° Fahr. in all rooms where Linoleum floors are to be laid.

(9) Where wood base is used in connection with linoleum floors, the carpenter work specifications should provide for a quarter-round or other suitable floor mould to cover the junction of baseboard and linoleum, to be secured by the carpenter after the linoleum is laid.

Specification No. 1—Laying Linoleum or Cork Carpet Over Wood

(1) The contractor for this work will furnish all labor and materials to cover the entire floor surfaces in the rooms herein specified, or indicated on the drawings as follows:

(*Note*: A list of rooms and gauge and pattern to follow here.)

(2) Before any materials are laid, the contractor will satisfy himself that all base wood floors are thoroughly nailed to all bearings, that the surfaces are true and even and that there are no loose knots, nails or other protrusions that might cause damage to the finished linoleum floors.

(3) Contractor for this work will furnish a satisfactory crack and seam filler and fill all joints that are open more than ⅛ in. between boards and will clean the surface free from dirt or foreign matter before proceeding. He will also satisfy himself that the floors are thoroughly dry.

(4) Cover the entire floor surfaces to which linoleum floors are to be applied, with an approved gray, unsaturated, building felt, approximately ⅛ in. thick and weighing 1½ lbs. per sq. yd. Place the first width closely against the side wall and at right angles to the boards, and trim the ends to fit snugly. Turn back one end of the loose felt about half way and apply to the floor, with a saw edged piece of metal or rubber, an even coat of Armstrong's Linoleum Paste (non-waterproof), sufficient to insure firm adhesion of felt to floor. Re-

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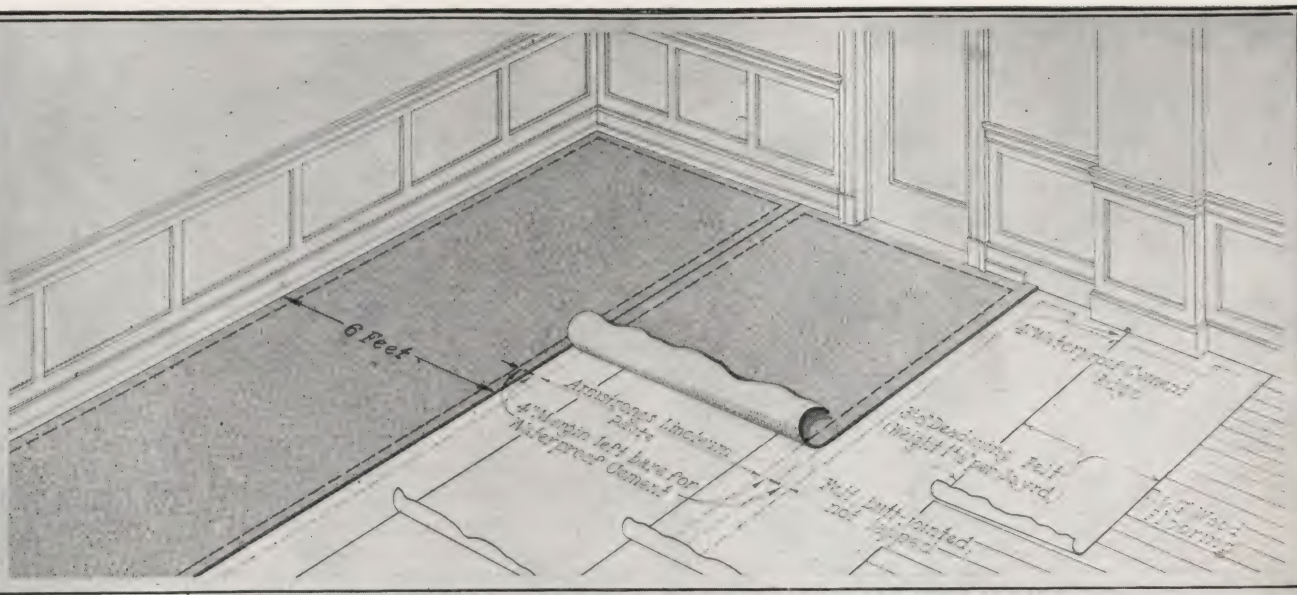
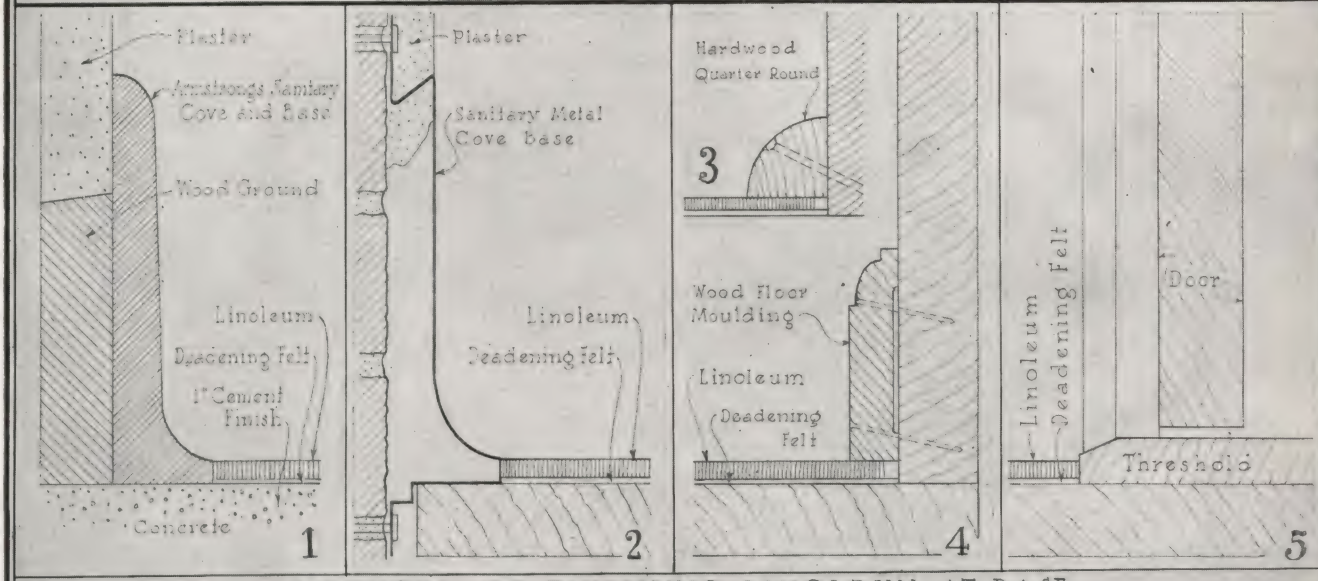
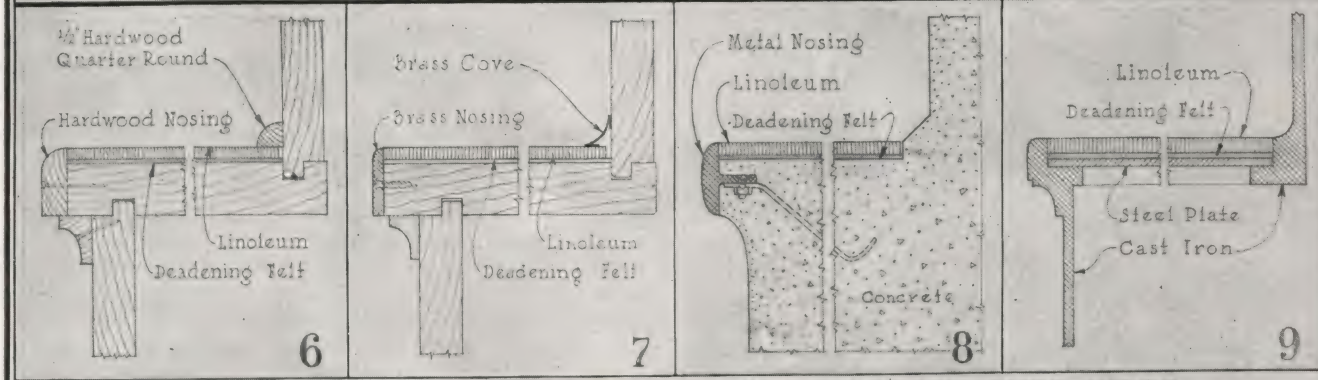


PERSPECTIVE VIEW SHOWING METHOD OF LAYING LINOLEUM OVER FELT ON WOOD FLOOR



METHODS OF FINISHING LINOLEUM AT BASE OVER WOOD AND CONCRETE FLOORS



3" SCALE DETAILS SHOWING LINOLEUM LAID OVER WOOD CONCRETE AND METAL STAIRS WITH VARIOUS KINDS OF NOSINGS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC..	FINISHING OF ARMSTRONG'S LINOLEUM AT BASEBOARDS AND ON STAIR TREADS	SCALE 6"&3" EQUALS 1-0 DATE-AUG. 22	DWRG 1

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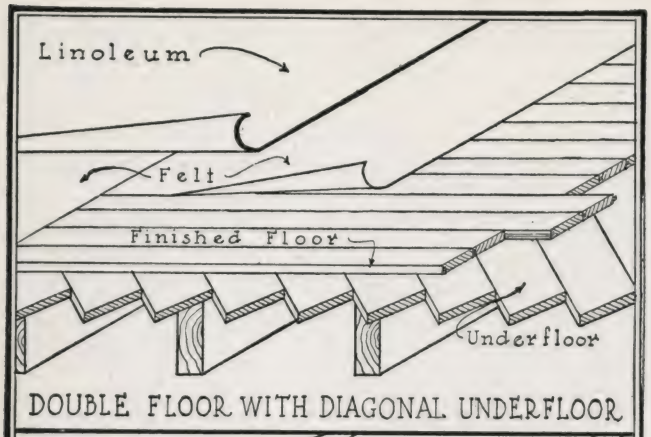
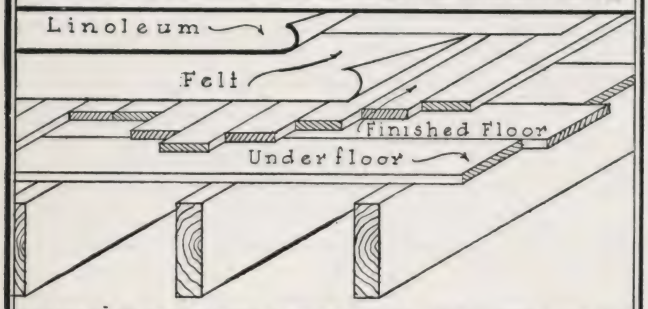
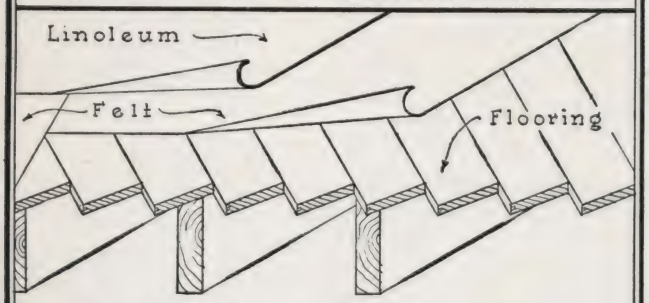


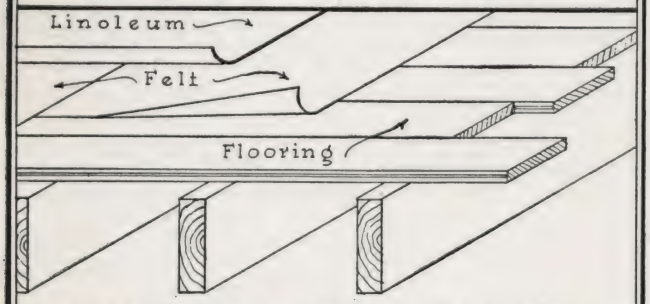
DOUBLE FLOOR WITH DIAGONAL UNDERFLOOR



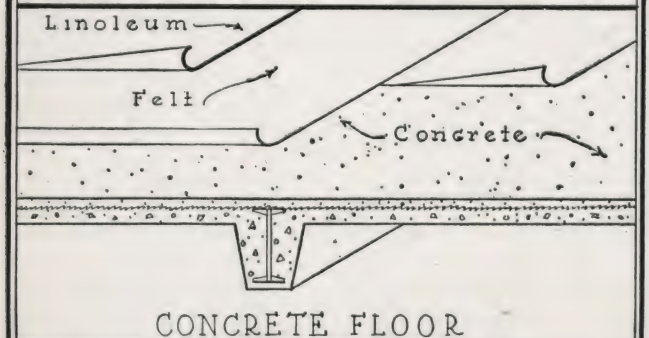
DOUBLE FLOOR WITH UNDERFLOOR AT RIGHT ANGLES



SINGLE FLOOR LAID DIAGONALLY



SINGLE FLOOR AT RIGHT ANGLES



CONCRETE FLOOR

·METHOD·OF·LAYING·LINOLEUM·AND·FELT·OVER·VARIOUS·TYPES·OF·FLOOR·CONSTRUCTION

place the pasted half in position on floor and press and smooth out all air blisters. Paste the other half of width in like manner and proceed to cover the entire surface in the same way, carefully butting the edges of the felt and being sure that there are no portions lapping. Cut and neatly fit up to all built-in furniture, pipes, radiator feet, door jambs and thresholds. Each width of felt when completely pasted is to be rolled and smoothed out with a 150-lb. iron roller to insure firm and uniform adhesion.

(5) All linoleum to be delivered on the job in the original packages as shipped by the manufacturer, and during the winter months to be kept on end in a room heated to 70° Fahr. with the strings on the roll cut, for at least 48 hours before unrolling. Every yard of Battleship to have the name and gauge printed plainly on the back.

(6) Contractor for this work will advise the architect (or owner) sufficiently in advance so that a temperature of at least 70° Fahr. is supplied and maintained in all rooms where linoleum floors are to be applied, and shall not proceed with his work unless this condition exists.

(7) As soon as the felt has been secured to the wood floor (although a lapse of several hours is preferable) and the work and materials thus far have been inspected and approved by the architect (or owner) who shall also be given an opportunity to inspect the name and gauge marks on the back of the linoleum, the contractor will proceed to sweep the surface of the felt clean and to lay the linoleum as follows:

(8) The widths of linoleum for each room to be cut to measure. The workman will chalk mark the felt parallel to the felt lining, to indicate the seams of the linoleum. The first width of linoleum to be fitted into position, pressing the edges firmly against the baseboard or wall and fitted neatly and snugly around all pipes, etc. Roll up one end of the linoleum about half way, and cover the entire surface of the felt lining up to from 4 to 6 in. of the edges of the linoleum (which space must *not* be pasted) with Armstrong's Linoleum Paste applied as specified in Paragraph 4. Proceed in the same manner with the other end of the "width" and with each succeeding width.

(9) Match the patterns or figures and carefully and snugly butt the edges of all inlaid linoleums.

(10) The seams of all Battleship, Granite, Jaspe Linoleums and Cork Carpets are to be made tight by lapping the edges of the several strips approximately ½ in. when pasting them to the under layer of felt and then cutting through both thicknesses simultaneously with a sharp knife.

(11) When the top surface of the felt has been properly coated with paste and each width carefully fitted and rolled with a 150-lb. roller, all air blisters completely smoothed out and the paste given sufficient time to properly set, the edges of the linoleum are to be lifted sufficiently to apply a good coat of Armstrong's Waterproof Linoleum Cement on both sides of the seams and around all edges, pipes, etc., so that it will completely fill the space back to the paste. As soon as seams are cemented, they are to be thoroughly rolled (and if necessary to insure a perfectly even surface, tapped gently with a light hammer) and weighted with sand bags, or other weights which are to be kept in position for 24 hours, and until the cement has firmly set.

(12) Clean the entire surface and remove with alcohol any and all cement that may appear on the face

Continued on next page

of the linoleum and turn the entire job over to the owner in a perfectly clean and workmanlike condition.

Specification No. 2—Laying Linoleum or Cork Carpet Over Concrete Floors

(1) Use paragraph 1, Specification No. 1.

(2) Before proceeding with the work, the contractor will ascertain the condition of the concrete and assure himself that it is thoroughly dry and that the surface is true and even. He will test the floor for moisture by laying six pieces of linoleum 4 in. sq. face downward on the concrete, one in each corner of the room and the others in the center, weighing them with brick or other weights, and allowing them to remain at least 18 hours. If when the pieces are taken up, moisture appears on the surface of concrete or linoleum, the room shall be kept heated for 4 or 5 days and the test repeated. When no moisture follows this procedure, the contractor will proceed with the work as herein specified.

(3) Clean the surface free from dirt or foreign matter and fill all cracks with plaster of paris.

(4) Use paragraph 4, Specification No. 1, omitting the words "and at right angles to the boards."

(5, 6, 7, 8, 9, 10, 11 and 12) Use same paragraphs as in Specification No. 1.

Linoleum Cement

Armstrong's Waterproof Linoleum Cement is guaranteed to make a waterproof joint at seams and edges, when properly applied. It has marked adhesive power and possesses ample covering capacity. A gallon will cover from 60 to 80 sq. ft. Because of its uniformity and high quality, its use is strongly recommended wherever Armstrong's Linoleum is laid.

Linoleum Paste

Armstrong's Linoleum Paste is a high grade non-waterproof adhesive intended for use in fastening the felt paper to the floor and the centers of the strips of the linoleum to the felt. A gallon will cover approximately 100 sq. ft.

Samples and Literature

Samples of any coloring or pattern or thickness of Armstrong's Linoleum and Cork Carpet will be sent cheerfully to any architect, contractor or builder on request.

The following literature is also offered:

(a) "Armstrong's Linoleum Floors," prepared in the form recommended by the American Institute of Architects. In addition to a description of linoleum and its uses, this handbook contains the essential information needed in the selection of Armstrong's Linoleum for any particular purpose, and information regarding the laying of linoleum over wood or concrete, including architects' detailed specifications.

(b) "Pocket Size Pattern Book," showing all of the coloring and patterns in Armstrong's Linoleum reproduced in full color.

(c) "Pocket Size Quality Sample Books," three books containing actual samples of all of the various thicknesses of plain, printed and inlaid linoleum.

(d) "The Art of Home Furnishing and Decoration," by Frank Alvah Parsons, a prominent authority on interior decoration. Sent for 20c in stamps.

(e) "Business Floors," a 48-page booklet setting forth the advantages of linoleum for offices, stores, theaters, schools, public buildings, churches, etc., contains illustrations of actual installations, color plates of linoleum designs and directions and specifications for laying and caring for linoleum floors. Sent free on request.

Installations

Armstrong's Linoleum and Cork Carpet have given years of satisfactory service in scores of offices, stores, hospitals, gymnasiums, libraries and hotels throughout the country.

A few recent installations include:

Hotel Pennsylvania and Hotel Commodore, New York, N. Y.
Buffalo General Hospital, Buffalo, N. Y.
Benjamin Stickney Cable Memorial Hospital, Ipswich, Mass.
Wellesley College, Wellesley, Mass.
United States Military Station, Bedloe's Island, N. Y.
Remington Typewriter Company Building, New York, N. Y.
Phoenix Insurance Company, Hartford, Conn.
Elizabeth Steel Magee Hospital, Pittsburgh, Pa.
Bell Telephone Building, Detroit, Mich.
Ford Motor Car Company, Detroit, Mich.
International Harvester Company, Chicago, Ill.
Quaker Oats Company, Chicago, Ill.
Joseph T. Ryerson & Company, Chicago, Ill.
Benjamin Ide Wheeler Hall, University of California, Berkeley, Cal.
City and County Courthouse, Denver, Colo.
Connecticut Hospital for the Insane, Middletown, Conn.
Bensinger's Billiard Hall, Chicago, Ill.
Studebaker Corporation, South Bend, Ind.
St. Luke's Hospital, Davenport, Iowa
Carney Hall, Pittsburg State Normal School, Pittsburg, Kans.
Puritan Apartment, Louisville, Ky.
University of Michigan, Ann Arbor, Mich.
Marshall Wells Company, Duluth, Minn.
Children's Mercy Hospital, Kansas City, Mo.
Jersey City Hospital, Jersey City, N. J.
Army Supply Base, Brooklyn, N. Y.
Ohio Gas & Fuel Co., Columbus, Ohio
American Exchange National Bank, New York, N. Y.
Anchor Savings Bank, Pittsburgh, Pa.
Bank of Detroit, Detroit, Mich.
Broadway Bank, Portland, Ore.
Citizens' National Bank, Boston, Mass.
Colorado National Bank, Denver, Colo.
Commerce Safe Deposit, Portland, Ore.
Delhi National Bank, Delhi, N. Y.
Drexel State Bank, Chicago, Ill.
Erie Trust Co., Erie, Pa.
First National Bank, Springfield, Ill.
Gotham National Bank, New York, N. Y.
Home Bank, Washington, D. C.
Home Savings Bank, Boston, Mass.
Kern National Bank, Bakersfield, Cal.
Merchants' National Bank, Allentown, Pa.
Moxham State Deposit Bank, Johnstown, Pa.
Peoples' National Bank, Winston-Salem, N. C.
River Rouge State Bank, Detroit, Mich.
Schenectady Trust Co., Schenectady, N. Y.
State Savings Loan & Trust Co., Quincy, Ill.
Strathmore State Bank, Detroit, Mich.
Union National Bank, Schenectady, N. Y.
Warren Inst. for Savings, Boston, Mass.
All American Cables Building, New York, N. Y.
American Railway Express Co., Chicago, Ill.
American Locomotive Co., Schenectady, N. Y.
Bemis Brothers Bag Co., Bemis, Tenn.
Berkshire Knitting Mills, Reading, Pa.
Butterick Publishing Co., New York City
Cadillac Motor Car Co., Cadillac, Mich.
Cambria Steel Co., New York, N. Y.
Chamber of Commerce Building, Pittsburgh, Pa.
Chicago Telephone Co., Chicago, Ill.
Citizens' Securities Corp., Boston, Mass.
Cluett-Peabody & Co., Detroit, Mich.
Combustion Engineering Co., New York, N. Y.
Continental Oil Co., Denver, Colo.
Cunard Building, New York, N. Y.

Armstrong's Linoleum has been used on many of the war vessels of the United States and of foreign nations, including the superdreadnaughts Pennsylvania, Tennessee, and California.

THE GEORGE W. BLABON COMPANY

Manufacturers of Linoleum, Kindred Products and Linseed Oil

EXECUTIVE OFFICES AND PLANT

PHILADELPHIA, PA.

HEAD OFFICE OF THE SALES DEPARTMENT: 212 Fifth Avenue, NEW YORK, N. Y.

Products

BLABON "INVINCIBLE" BATTLESHIP LINOLEUM; BLABON ART LINOLEUMS; BLABON CORK CARPET.

Also "Korsho" Linoleum Rugs and Linseed Oil.

Varieties of Linoleum

Battleship; plain, in a variety of colors; inlaid; carpet inlaid; granite inlaid; printed; linoleum rugs (printed).

LABEL
(The identifying mark on the face of all Blabon Art Linoleums)

Composition of Linoleum

The principal ingredient of linoleum is linseed oil. The quality of this ingredient is the first governing factor in the wearing quality of the finished product and it is of the highest importance, therefore, that the linseed oil be of the finest quality, and be properly and thoroughly processed.

Only by producing his own linseed oil can the linoleum manufacturer be absolutely certain of its excellence. For this reason this company makes its own linseed oil, being the only linoleum manufacturer in America equipped to do so. In making linoleum the linseed oil is oxidized by exposure to the air into a tough, rubber-like substance. It is then mixed with powdered cork, kauri gum, rosin, coloring matter and other ingredients; and the resultant plastic substance is pressed upon a backing of burlap, after which it is passed into drying ovens, where it is thoroughly cured and seasoned.

The colors and designs of inlaid linoleum go clear through the thickness of the material to the burlap back; therefore the figures and colors comprising the design do not disappear with wear.

Plain linoleum has no design, one solid color going clear through the thickness of the material to the burlap back.

Printed linoleum is plain brown linoleum with a design painted on its face.

Linoleum and Its Imitations

As there are numerous imitation products on the market today which superficially resemble linoleum, and are sometimes sold as linoleum, it is important that the difference between linoleum and these imitations be made plain.

Floor coverings made upon a felt paper base are *not* linoleum. Such products have a black interior which is easily detected upon examining the edge of the fabric. A simple and effective test to distinguish linoleum is as follows: first, look at the back and make sure it is burlap, for linoleum has a burlap foundation; second, try to tear it, for imitations (being merely felt paper) can be torn easily between the fingers.

BLABON "INVINCIBLE" BATTLESHIP LINOLEUM
Pliable, tough and wear resisting

The Federal Trade Commission on June 9th, 1919, ruled that to advertise or sell felt paper floor coverings as linoleum is a violation of the Act of Congress approved September 26th, 1914, because such practice deceives and misleads the public.

The Commission finds that the term, "linoleum," has a definite meaning in both technical and trade usage, namely: A floor covering composed of oxidized oil and gums intimately mixed with ground cork or wood flour and pressed on a suitable fabric back. The Commission further finds that floor coverings made of felt paper, impregnated with asphaltum and printed with oil paint, are not linoleum, and must not be described, advertised or sold as such.

Advantages of Linoleum Floors

There are many weighty reasons to support the assertion that linoleum is an ideal flooring for office buildings, schools, theaters, club and lodge buildings, libraries, hotels, churches, banks, stores and many other commercial and public or semi-public buildings. For such uses, and in fact for all uses where traffic is heavy, the "battleship" grades of linoleum are recommended. Because of the thickness of the material, they make the most durable and most comfortable linoleum floors that can be installed.

The principal advantages of linoleum as a flooring are:

(1) Serves as Floor and Floor Covering in One—Where linoleum is used over concrete as a flooring, in place of wood, tile or some other material, it becomes unnecessary to use rugs or carpets. Because of its quietness, resilience and comfort to the tread, linoleum serves both as floor and floor covering.

It is particularly advantageous where persons are compelled to stand for long hours.

(2) Durability—A floor of Blabon "Invincible" Battleship Linoleum will wear for many years. In fact, its durability is such that if properly laid and given proper care it will outwear hardwood of the same thickness.

(3) Sanitation—A linoleum floor is sanitary, because it has a non-absorbent surface through which dust and dirt can not penetrate; and because, when properly laid, its infrequent joints are

Continued on next page

likewise practically sealed against such penetration.

Further, a well-known European chemist has established by original researches that the linseed oil in linoleum yields certain acid gases which destroy the bacterial germs that find habitation in other floors and floor coverings.

(4) Economy—The cost of linoleum floors under normal conditions is very much less than that of hardwood, tiling and other usual materials. This is true not only of the cost of the material itself, but the cost of installing it. And it is further true of the cost of maintenance.

In large buildings, for example, the cost of periodically refinishing hardwood floors is an expense that can be done away with by the use of linoleum floors, which never require refinishing, but merely an occasional waxing or varnishing.

(5) Easy to Clean—In office buildings and other large structures having wood floors, the cost of scrubbing and keeping clean these floors is a considerable item in the building's upkeep. But where linoleum floors are used this item is reduced to a minimum. Linoleum does not require constant scrubbing—nor, as has been said before, refinishing. The only daily treatment required by linoleum is a light sweeping or wiping with a damp mop.

(6) Suitable for Fireproof Construction—The volume of inflammable substance represented in a linoleum floor is much less than in a wood floor, particularly since linoleum floors can be laid on concrete without wood underneath to hold them in place, as is needed with wood floors.

(7) Artistic and Decorative Values—Linoleum is beginning to be worthy of the architect's and decorator's consideration from the artistic viewpoint, as well as the practical.

There is no prohibitive reason why linoleum should not equal, and in some respects surpass, the decorative effects achieved in woven floor coverings. American linoleum manufacturers have visioned the artistic possibilities of their product, and have developed it to a high estate.

Whereas in the past, even in office buildings and other commercial structures, it has been a custom to use rugs and carpets when exceptionally attractive effects were desired, the necessity for this no longer holds good with the artistic development of linoleum.

Where rugs or carpets would formerly have been used, Blabon linoleum in carpet effects can be installed with the construction of the building, and serve not only as a durable, economical, sanitary floor, but as an artistic, comfortable, quiet floor covering as well.

Linoleum Designs and Colors

Blabon linoleum is today made in 236 diversified designs, portraying the styles of tile, mosaic, terrazzo, parquetry, hardwood, carpet, matting and other types of ornamentation suitable for a wide variety of uses.

Blabon linoleum is also made in 4 plain colors: brown, green, gray and terra cotta. These plain linoleums (especially in the "battleship" grades) are probably the most advantageous for installation in commercial or public buildings.

All Blabon "Invincible" Battleship Linoleums are made in accordance with the rigid specifications of the United States government.

Where Blabon Linoleum Can Be Obtained

In nearly every city of the country Blabon linoleums are sold by leading floor covering dealers, department stores and furniture stores. Usually these stores employ experienced layers; if not, they can invariably refer to one.

For the handling of large installations, there are contract linoleum layers in most good sized cities, who will bid on furnishing and installing Blabon linoleum. This company will gladly supply architects, decorators or builders with the names either of reliable merchants or contract layers who are competent to handle large orders.

How to Lay Linoleum Floors

Preferred Method—The best method of laying linoleum floors, especially when they are installed as an integral part of a new structure, is to paste a layer of heavy unsaturated felt paper over the concrete or wood or whatever material is used to support the linoleum and then cement the linoleum to the felt layer.

This method of laying a linoleum floor actually prolongs its life, and insures perfect satisfaction in all ways—as follows:

First, when correctly pasted to the felt, the linoleum will not bulge, expand or contract, and retrimming is therefore unnecessary. Second, the presence of the felt paper gives the floor a certain "cushion," which makes it springy and exceptionally agreeable to the tread. This cushion action induced by the felt paper also increases the life of the linoleum. Third, a linoleum floor laid in this way is much warmer in winter. Fourth, in case it is desired to remove the linoleum, it can be done with comparative ease and no damage to the linoleum.

Caution: In all methods of laying, care should be taken that the waterproof cement used be of a known quality and composition. Avoid cements which contain silicate of soda (*waterglass*) as a base. They are not

Park Avenue Baptist Church, New York

Blabon "Invincible" Battleship Linoleum used in Sunday School rooms, offices and in the pews in church auditorium

Massachusetts Motor Vehicle Registry

4000 yards of Blabon "Invincible" Battleship Linoleum used in offices, etc., Commonwealth Pier, Boston

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really waterproof, and they are harmful to the fabric of the linoleum. Names of reliable brands of linoleum cement will be furnished on request.

Other Methods—Laying linoleum directly over wood or concrete without an intermediary layer of felt is the most common method. In laying linoleum this way, it is of the utmost importance when cutting the linoleum to allow from ½ in. to 1 in. more than is needed on all sides for possible contraction or expansion; the linoleum should not be fastened down to the floor until it has lain loose on the floor for 10 days or 2 weeks. After such period has past, giving the linoleum plenty of time for expansion or contraction, it can be fastened down.

This is usually done in one of three ways, named in the order of merit:

First, by cementing the entire back surface of the linoleum to the floor.

Second, by cementing only the seams and edges to the floor.

Third, when laid over wood, by fastening it down along the seams and edges with No. 18, ¾ in. brads, spaced about 3 in. apart.

TABLE OF GRADES, GAUGES AND WEIGHTS OF BLABON LINOLEUMS

Grades	Width, yards	Finished Gauges		Standard weight per sq. yd., lbs.
		in.	mm.	
PLAIN LINOLEUM				
¼" Battleship	2	.250	6.35	13.00
6 mm Battleship	2	.236	6.00	12.10
3/16" Battleship	2	.1875	4.76	9.70
Light Battleship	2	.150	3.81	8.00
A Grade	2 and 4	.150	3.81	7.90
B Grade	2 and 4	.118	3.00	6.50
C Grade	2 and 4	.098	2.49	5.50
D Grade	2 and 4	.080	2.00	4.20
INLAID LINOLEUM				
A Grade	2	.118	3.00	8.00
B Grade	2	.098	2.49	6.60
Granite	2	.098	2.49	6.60
Tioga Grade	2	.080	2.00	5.20
Midvale	2	.070	1.77	5.00
PRINTED LINOLEUM				
D Grade	2, 2½, 3, 4	.080	2.03	5.10
E Grade	2, 2½, 4	.070	1.78	4.60
F Grade	2	.055	1.40	4.10
CORK CARPET				
Unpolished	2	.235	5.97	7.10
Polished	2	.220	5.59	7.00

The above linoleums are made in the following colors: brown, green, gray and terra cotta.

Cork Carpet may be had with either the polished or unpolished (natural) finish in brown or green shades. The polished cork carpet is about .015 in. thinner than the unpolished.

The gauges and weights shown in the table are the recognized standards for the grades indicated. While slight variations will occasionally occur, the figures given are substantially correct for all practical purposes.

Specifications for Laying Linoleum

The following specifications cover the installation of a linoleum floor over a wood or concrete base, as well as the preparation of the wood or concrete to receive the linoleum.

Specification A—For Laying Linoleum (or Cork Carpet) over a Layer of Deadening Felt

The linoleum contractor shall furnish and install Blabon Linoleum, Pattern No. .... grade .... of good, durable quality, according to the following directions and specifications:

(1) The general contractor (or owner) shall make provision for maintaining a temperature of 70° Fahr. in all locations where Blabon linoleum is being laid, from the time the linoleum is delivered until the completion of the contract.

(2) The linoleum shall not be unrolled until it has been subjected continuously to a temperature not less than 70° Fahr. for at least 48 hours.

(3) The linoleum contractor shall furnish unsaturated building felt of good quality weighing 1½ lbs. to the sq. yd., sufficient to cover the whole area on which the linoleum is to be laid. He shall also furnish linoleum paste of good quality for pasting the felt to the floor and the main area of the linoleum to the felt, and in addition shall supply water-proof linoleum cement of good quality for glueing down the seams and edges.

(4) The linoleum contractor shall employ the following method in laying the felt: the felt shall be cut to fit the short way of the room, hall or corridor, and shall be so laid. A good coat of linoleum paste of good quality shall be applied to the back of the felt, which shall at once be smoothly and accurately fitted to the base, and the entire surface rolled thoroughly from center to edges with a 150-lb. iron roller. The same process shall be repeated for each width in turn. The edges of the felt shall be butted carefully, and no ridges shall be left under the linoleum. The strips of linoleum shall be laid in the opposite direction to the strips of felt.

(5) Not less than 24 hours after the felt has been pasted in place, the entire upper surface shall be swept clean and the linoleum laid in the following manner: the linoleum shall be accurately fitted to the walls and around all pipes and other projections in the floor. A linoleum paste of good quality shall then be applied to the surface of the felt in sufficient quantity to insure firm adhesion, except for a space 5 or 6 in. in width at those points where the edges and joints in the linoleum fall (which spaces shall be left bare for the later application of waterproof linoleum cement of good quality). The linoleum shall be placed in position immediately after the paste is applied to the felt, and the surface rolled thoroughly with a 150-lb. iron roller, until all air blisters are smoothed out.

The seams of all printed and inlaid linoleum laid under these specifications shall be made tight by butting the edges of the several strips snugly together, care being taken to preserve the symmetry of the pattern. The seams in all plain, battleship, and granite linoleum (and cork carpet) shall be made tight by lapping the edges of the several strips approximately ½ in. when pasting them to the under layer of felt, and later cutting through both thicknesses simultaneously with a sharp knife.

Along all seams, edges and joints in the linoleum, waterproof linoleum cement of good quality shall be used to secure the material firmly to the felt. At all such points the edges of the linoleum shall be lifted, and the cement applied thickly to the surface of the felt as far back under the linoleum as the edge of the coating of paste. The cemented edges of the linoleum shall then be pressed firmly into place and thoroughly rolled until the surface is smooth and even. All seams, edges and joints shall be weighted down with pressed bricks, sandbags, or other suitable weights for not less than 24 hours.

(6) Any cement coming in contact with the surface of the linoleum shall be removed with alcohol at once.

(7) The linoleum contractor shall remove the bricks, or other weights after the cement has set, and clean up all debris or dirt.

(8) To protect the linoleum floor against abuse or accident while the building is under completion, the linoleum contractor shall cover the entire surface of the linoleum floor with builder's felt, which shall not be removed until the building is ready for occupancy.

Specification B—Preparation of Wood Floor for Laying Linoleum

The following paragraph is to be added to the article of the architect's specifications that relates to the furnishing and installation of the wood flooring which is to serve as a base for the linoleum:

The tongued and grooved flooring, as specified, shall be thoroughly dry and well seasoned. The wood floor level shall be * inch below the finished floor level, to allow for the felt and the linoleum. The wood floor shall be sanded to a smooth, level finish. No dirt, plaster or foreign matter shall be left on the surface.

Specification C—Preparation of Concrete Base for Laying Linoleum

The following paragraph is to be added to the article of the architect's specifications that relates to the furnishing and installation of the concrete base upon which the linoleum is later to be laid:

*Note. (In figuring the thickness of the linoleum floor, allow ⅛ in. for the deadening felt, plus the thickness of the grade of linoleum selected.)

Continued on next page

The cement finish level shall be * in. below the finished floor line, to allow for the felt and the linoleum, and shall be troweled to an absolutely smooth and level surface. After the cement finish is thoroughly dry and well seasoned, all expansion joints shall be filled with plaster of paris, and the surface left perfectly smooth, even and free from loose particles of dirt.

Cork Carpet

This product, which is made especially for use in churches, theaters, public libraries, and other places where a soft, silent, springy floor is desired, deserves special mention here. Cork Carpet contains the same ingredients and is manufactured by the same process as a high grade of plain linoleum, but the cork composition is pressed less compactly on the burlap foundation and for this reason cork carpet retains greater resilience than linoleum, yet is a highly durable material.

Guarantee

There is nothing new or untried about the quality of Blabon products, as The George W. Blabon Company has been manufacturing, at first oilcloth, and then linoleum, for the past 71 years, and were pioneers in the industry.

Architects and decorators can specify or recommend Blabon products with absolute safety, because every yard is guaranteed to give satisfaction.

How to Clean and Preserve Linoleum

The life of linoleum will be greatly prolonged and the freshness and brightness of its color indefinitely preserved if it is washed or scrubbed with lukewarm water and a good soap containing no free alkali. Always avoid strong scouring soaps or quick-cleaning preparations.

The beauty and wearing qualities of inlaid or plain linoleum are likewise benefited by an occasional polishing with a good polish made of wax and pure oils, free from acid. There are several wax preparations on the market which give excellent results.

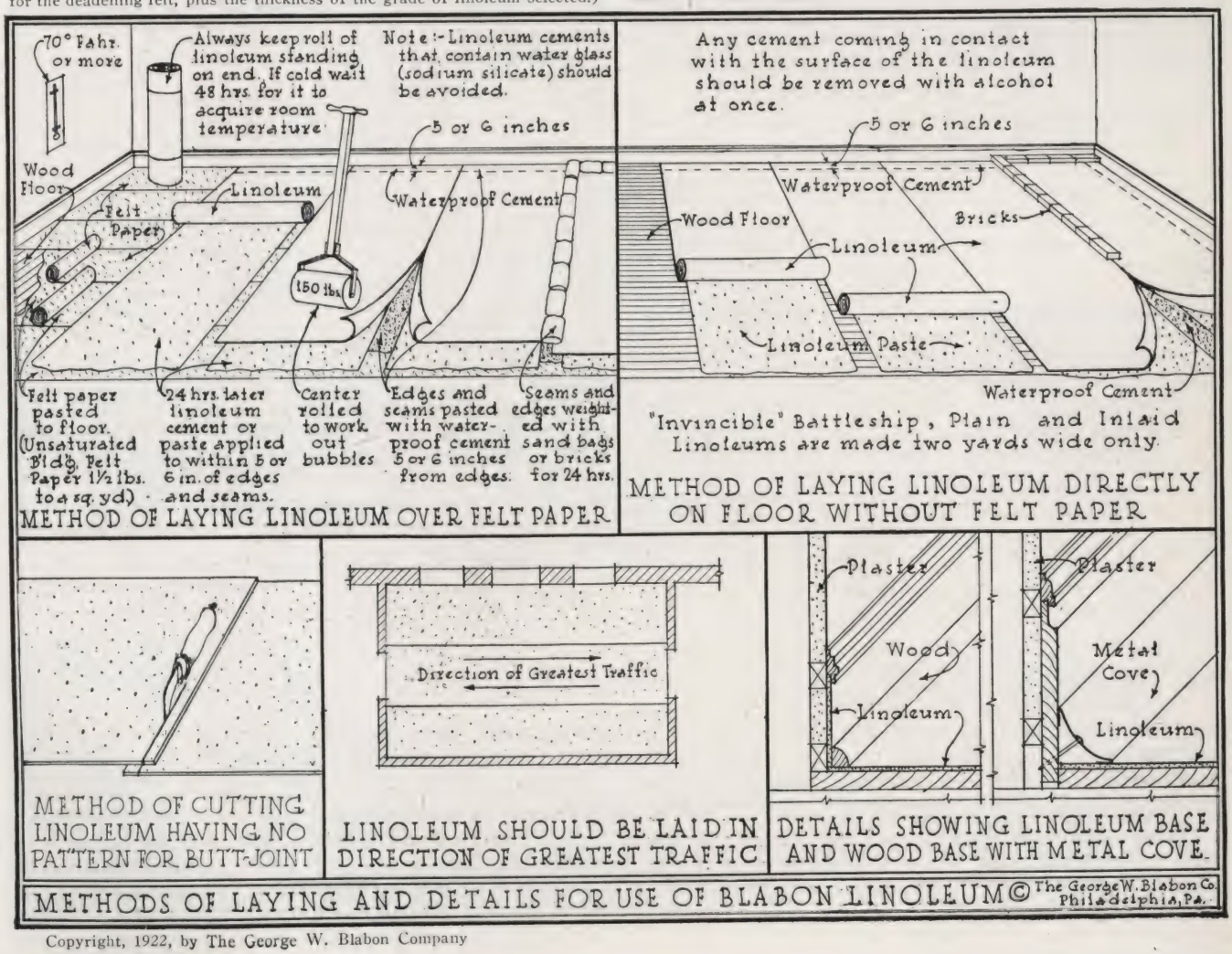
A good method of preserving printed linoleum is to give the surface of the goods a coat of good varnish or white shellac. This will brighten the appearance of the linoleum and make it easier to clean.

Where heavy furniture is used, metal domes, glass shoes or rubber tips should be substituted for casters as the usual small metal casters cause undue wear and may cut through the linoleum. Glass shoes are made in several sizes, have a similar shank to that on a regular caster, and will fit into the same sockets. If glass shoes or metal domes are not obtainable, rubber tips placed on the legs of heavy furniture will answer the same purpose.

Pattern and Sample Books

Information of any character will gladly be given to architects, decorators and builders who address the company. The Blabon Pocket Size Pattern Book, showing all patterns in colors, and the Handy Quality Sample Folder, showing specimens of various grades of linoleum, are two reference books architects may wish to have in their files.

*Note. (In figuring the thickness of the linoleum floor, allow ⅛ in. for the deadening felt, plus the thickness of the grade of linoleum selected.)



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CONGOLEUM COMPANY, INC.

Manufacturers of Linoleum and Cork Carpet

PHILADELPHIA, PA.

SALESROOMS AT

NEW YORK, N. Y.	CHICAGO, ILL.	ATLANTA, GA.	KANSAS CITY, MO.	SAN FRANCISCO, CAL.
BOSTON, MASS.	MINNEAPOLIS, MINN.	PITTSBURGH, PA.	DALLAS, TEX.	MONTREAL, QUE.

Products

GOLD-SEAL BATTLESHIP LINOLEUM; GOLD-SEAL CORK CARPET; GOLD-SEAL INLAID LINOLEUM.

Also Gold-Seal Plain Brown Linoleum.

Gold-Seal Battleship Linoleum

Genuine linoleum—a scientific combination of powdered cork, Kauri and other gums, and oxidized linseed oil pressed securely to a high grade burlap base. It is made to more than meet the rigid specifications set by the United States Navy for battleship linoleum. The high quality ingredients, the thoroughness of manufacture, and particularly the time taken to cure and dry it, account for the exceptional durability of *Gold-Seal* linoleum.

Gold-Seal battleship linoleum is made in plain brown, terra cotta, and green in three weights: heavy, medium and light, ¼ in., $\frac{3}{16}$ in. and ⅛ in. thick, respectively.

Gold-Seal Cork Carpet

A superior product made of first quality materials. The cork is twice ground—assuring a smoother, better finish, more resiliency and less tendency to chip. *Gold-Seal* cork carpet comes in brown, green, and terra cotta—polished and unpolished—6 attractive shades in all.

The Gold-Seal Guarantee

In recommending *Gold-Seal* battleship linoleum or cork carpet as a permanent floor, the architect can dispel from his mind all fear that the floor will not give satisfactory service. Every roll of material that leaves our factory is guaranteed by the Gold Seal, which reads: "Satisfaction guaranteed or your money back."

Specifications for Laying Gold-Seal Battleship Linoleum (or Cork Carpet).

Where linoleum floor is to be laid over a wood base the following paragraphs are to be inserted in specifications for carpenter work:

Carpenter Work—*Levels*—The wood flooring level shall be ... (insert here thickness of linoleum to be used) below finished floor level given or shown on the drawings.

Flooring—The flooring shall be of well seasoned (kiln dried) tongued and grooved boards, free from moisture, large or loose knots, or cracks. They shall be securely nailed in place, smooth and forced up tight with joints struck or planed to insure an even surface.

Floor—The floor shall be thoroughly dry, clean and free from plaster and all foreign material ready for the linoleum contractor.

Baseboards—All baseboards shall be set in place. Surbase or quarter round shall be cut and fitted and temporarily loosely nailed in place until after linoleum has been laid.

Where linoleum floor is to be laid over a concrete base the following paragraphs are to be inserted in specifications for masonry work:

Masonry Work—*Levels*—The finished concrete floor level shall be ... (insert here thickness of linoleum to be used) below finished floor line given or shown on the drawings.

Cement Finish—The concrete floor slab shall be finished 1-in. cement mortar top coat and trowelled to an absolutely even and smooth finish. Surface should be free from dirt, mortar and all alkali.

The cement mortar top coat must be well seasoned and thoroughly dry before the linoleum is laid.

All cracks and expansion joints must be filled with cement grout or plaster of Paris and the surface made smooth and even.

The following paragraph is to be inserted in the heating specifications:

Temporary Heating—The heating contractor shall furnish temporary heat necessary to maintain a temperature in the rooms where linoleum is to be laid of not less than 70° Fahr.; commencing 48 hours before the linoleum work is to start and continuously until finished.

Linoleum—The linoleum contractor shall furnish and install *Gold-Seal* ..... (here insert color as required) Battleship Linoleum where and of the grade specified on the drawings, which shall pass the requirements of the U. S. Navy specification. It shall have a maximum thickness of ...* an inch and a minimum thickness of ...* an inch.

Note: *Heavy weight—minimum, 0.243, maximum, 0.265. Medium weight—minimum, 0.185, maximum, 0.201. Light weight—minimum, 0.126, maximum, 0.142.

Samples—The linoleum contractor shall submit with his proposal two samples of the linoleum which he proposes to furnish. Samples shall bear contractor's and manufacturer's names. One sample of the approved linoleum is to be returned to the contractor, the other being held by the architect for comparison with the linoleum delivered, which shall be in every respect equal to the approved sample.

Heating—The general contractor [or owner] shall maintain a temperature, day and night, of 70° Fahr. or over, in all parts of the building where linoleum is to be laid or stored until the completion of the linoleum contractor's work.

Handling—The linoleum shall not be unrolled until it has been subjected to a temperature of not less than 70° Fahr. for a period of 48 hours, or laid while temperature is below 70° Fahr.

Laying—First: Roll out the linoleum, cutting it into the lengths required, allowing sufficient additional for trimming at the ends of each strip. Lay with all seams lapping approximately ½ to ¾ in. Where time element permits, linoleum should be left in this position from one to two weeks before cementing. Secure the body by applying approved waterproof cement to the floor to within 4 to 6 in .of the seams. Sufficient cement should be applied to thoroughly key the burlap to the floor. Roll the linoleum thoroughly with a steel roller or sandbag drag to smooth out any air blisters and secure proper adhesion.

Second: Where linoleum has been lapped for seams, cut through both thicknesses with a sharp knife.

Third: Lift up the edges of the linoleum on both sides of the seam back to where linoleum is already cemented, and apply a thick coat of approved waterproof cement to the floor. Roll the seams thoroughly and weight them down with bricks, sand bags, or other suitable weights until the cement has firmly set, allowing not less than 24 hours for setting to take place. *Note:* Bricks, sandbags, or other weights should be thoroughly dry.

Fourth: Any cement coming in contact with the surface of the linoleum is to be immediately removed, denatured alcohol to be used for this purpose.

General—Seams shall be straight and tight.

The linoleum shall be cut to fit accurately and snugly against all walls, pipes, floor outlet boxes and other permanent projections in the floor.

When the work is completed the entire under surface of the linoleum shall be firmly secured to the wood base and the entire upper surface smooth, clean, and free from imperfections of any description.

Abbreviated Specification

Finished Flooring—Shall be *Gold-Seal* Battleship Linoleum ..... (here insert heavy, medium or light weight, brown, terra cotta, or green, as conditions require) laid in accordance with the *Gold-Seal* Specification, dated Dec. 15, 1920, for laying *Gold-Seal* Battleship Linoleum over wood or concrete base.

Inlaid Linoleum

The CONGOLEUM COMPANY, INC., manufactures genuine inlaid linoleum in a variety of patterns. Write for samples and detailed information.

Continued on next page

·SCHOOL·OF·MINES· ·LIBRARY· ·UNIV·OF·MINN·
·CLARENCE·JOHNSON· ·ARCHITECT· ST PAUL·MINN·
·GOLD-SEAL·BATTLESHIP·LINOLEUM·LAID·IN·THIS·INSTALLATION·
·BY·K·J·HENNING· ·CONTRACTOR· ·MINNEAPOLIS·MINN·

DIRECTIONS FOR LAYING GOLD-SEAL LINOLEUM AND CORK CARPET

Unroll Linoleum or Cork Carpet & cut to length so that floor is covered with minimum waste, allowing excess at the ends for trimming & lap-ping each length 4" to 6" over preceding length of Linoleum or Cork Carpet. For method of application see perspective below. (Full specification given on the back of this sheet)

·GOLD-SEAL·LINOLEUM·&·CORK·
·CARPET·FURNISHED·AS·FOLLOWS·

·GRADES·

All Gold-Seal Battleship Linoleum made according to U.S. Navy Standard.

	Thickness	Wt. per sq yd.
Gold-Seal Linoleum – Battleship Heavy	¼"	9½ lbs.
– Battleship Medium	7/32"	7 lbs.
– Battleship Light	3/16"	5 lbs.
Gold-Seal Cork Carpet	¼"	6 lbs. unpolished, 5 lbs. polished

·SIZES·

Gold-Seal Linoleum 72" wide by 90' long.
Gold-Seal Cork Carpet 72" wide by 30' long.

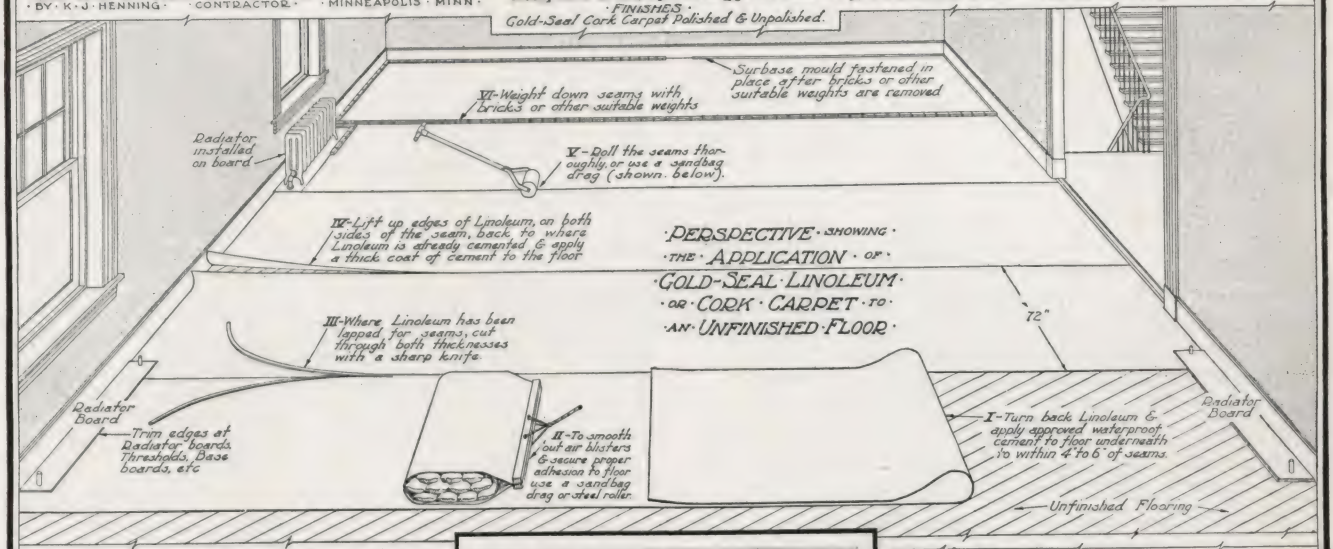
·COLORS·

Gold-Seal Linoleum–Brown, Green, Terra Cotta
Gold-Seal Cork Carpet–Terra Cotta, Light Green, Dark Green, Light Brown, Dark Brown

·FINISHES·

Gold-Seal Cork Carpet Polished & Unpolished.

·W·R·GRACE·&·CO· ·OFFICES NEW·YORK·N·Y·
·J·W·O'CONNOR· ·ARCHITECT ·NEW·YORK·N·Y·
·GOLD-SEAL·BATTLESHIP LINOLEUM LAID·IN·THESE·OFFICES·
·BY·P·W·BURNHAM·&·CO· ·CONTRACTORS· ·NEW·YORK·N·Y·



·BASES·

·FIG·1·
·CEMENT·BASE·
Dimension "X" shall be made to suit grade of Linoleum. Thickness of grades given at top of sheet.
Linoleum
X

·FIG·2·
·METAL·BASE·
is screwed direct to ground after Linoleum is laid.
·SCALE·1½"=1'-0"

·WOOD·
·BASEBOARD·
erected before Linoleum is laid.
·FIG·3·
·METAL·COVE·
is secured to floor, after Linoleum is laid, by means of screws.
QUARTER-ROUND
is nailed in place after Linoleum is laid.
·FIG·4·

·THRESHOLDS·

·FIG·5·
·WOOD·OR·MARBLE·
Other Flooring
Linoleum
·FIG·6·
·METAL·
Linoleum
·FIG·7·
·METAL·
·SCALE·1½"=1'-0"

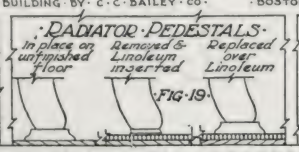
·STRIPPING·PIECES·
Wood
Metal
·FIG·8· ·FIG·9· ·FIG·10·

·RADIATOR·BASES·

·FIG·11·
Radiator
Boiler Plate
·FIG·12·
Radiator
Radiator Board
Wood, Marble or Slate

·LITTLE·BUILDING· ·BOSTON·MASS·
·BLACKALL, CLAPP·&·WHITEMORE· ·ARCHITECTS· ·BOSTON·MASS·
·17,000·YDS.·OF·GOLD-SEAL·BATTLESHIP·LINOLEUM·LAID·
·IN·THIS·BUILDING·BY·C·C·BAILEY·CO· ·BOSTON·MASS·

·RADIATOR·PEDESTALS·



·FIG·19·

·STAIR·DETAILS·

·FIG·13·
·METAL·NOSING·
·OVER·CONCRETE·
Metal nosing should project above the concrete tread a distance equal to the thickness of Linoleum to be used.
Linoleum
Anchor

·FIG·14·
·METAL·NOSING·&·
·RISER·OVER·CONCRETE·

·FIG·15·
·METAL·
·TREAD·&·RISER·
Supporting members of stairway not shown

·WOOD·TREAD·&·RISER·
·DETAILS·SHOWING·STEPS, LANDING,
·NOSING·&·STRING·PIECE·
Depth of ploughing or rebating depends on grade of Linoleum to be used. Thickness of grades given at top of sheet.

·FIG·16·
·LANDING·

·FIG·18·
·STRING·PIECE·
·WITH·RAIL·

·FIG·17·
·NOSING·DETAIL·
·SCALE·1½"=1'-0"

REPRODUCED FROM "SERVICE SHEETS." DUPLICATES OBTAINABLE FROM CONGOLEUM COMPANY

PREPARED BY THE ARCHITECTURAL SERVICE CORPORATION

LAYING GOLD-SEAL LINOLEUM

SHEET NO. 1
SCALE 1½" EQUALS 1'-0"

THE NAIRN LINOLEUM CO.

KEARNY, N. J.

SOLE SELLING AGENTS
W. & J. SLOANE
NEW YORK, N. Y., Fifth Avenue and 47th Street

CHICAGO, ILL., 223 West Jackson Boulevard
PHILADELPHIA, PA., 11th and Market Streets
BOSTON, MASS., 42 Summer Street
ST. LOUIS, MO., 613 Locust Street
DENVER, COLO., 15th and Curtis Streets
DALLAS, TEX., Deere Building
SAN FRANCISCO, CAL., Phelan Building
PORTLAND, ORE., 264 Third Street
LOS ANGELES CAL., Meredith Building

Products

NAIRN LINOLEUM:
Straight Line Inlaid, Moulded Inlaid, Granite and Moiré Inlaid, Plain, Printed, Cork Carpet, and Pro-Lino.

TRADE-MARK

Advantages of Nairn Linoleum

Charm—Dining room, living room, bedroom, nursery, sewing room, even the attic den of some member of the family, may be made bright and attractive by one of the artistic effects offered in Nairn linoleum. The designs and colorings are sufficiently varied and numerous to afford an easy selection for the proper decoration of the floor in such rooms.

Economy—The worthy argument of economy loses nothing of its effectiveness in these days when people seek a floor covering that will wear equally with a hardwood floor, cost much less and embrace greater possibilities for decorative treatment.

Labor Saving—Nairn linoleum presents a smooth, unbroken surface, impervious to dust or dirt, and keeping it clean, bright and fresh is an easy matter in comparison with woven fabrics. The physical and mental energy conserved is a material consideration.

Sanitation—The distinct germ killing property in Nairn linoleum, combined with the labor saving and other features, accounts for its extensive use in hospitals, where all equipment must be absolutely sanitary. These features commend it as well for homes, especially where there are small children. Again the resiliency of Nairn linoleum reduces noise, and walking thereon is less tiring.

Contract Linoleums

Walton Quality Battleship Linoleums—Made in the following thicknesses:

XXX—¼-in. (6.35 mm.) U. S. Government standard.
XX—6.00 mm.
X—$\frac{3}{16}$-in. (4.75 mm.) U. S. Government standard.

Nairn battleship linoleum, made as it is of the very best materials and in the most thorough fashion, has met without difficulty the severe specifications of the United States Government, and is supplied to the Navy for use on dreadnaughts, battleships, cruisers, and other craft. Nothing could more convincingly prove the exceptional quality of these goods which is further emphasized by their installation in many Government, State, and Municipal buildings, as well as innumerable office buildings. Made in the following colors: brown, green, gray and terra cotta.

NAIRN PLAIN LINOLEUM FLOOR IN OFFICES OF CLARENCE WHITMAN & SON, NEW YORK, N. Y.

Marine Quality Battleship Linoleums—Made in the following thicknesses:

XXX—¼-in. (6.35 mm.)
XX—6.00 mm.
X—$\frac{3}{16}$-in. (4.75 mm.)

Made in the same U. S. Government standard and commercial thicknesses as the Walton grade; but not as highly finished. Excellent for all industrial and commercial use. Made in brown, green, gray and terra cotta. Fully guaranteed.

Extra Light Weight Battleship—Gauge, 3.60 mm. For use where large floor space is to be covered with a linoleum and the heavy grades of Battleship are more costly than the conditions require. A moderate priced contract linoleum of splendid durability and ample weight, with usual Battleship backing and finish. All public buildings, such as hospitals, churches, schools, theatres, courtrooms, stores, restaurants, offices, railroad depots, etc., can well use Nairn Extra Light Weight Battleship Linoleum which embodies sanitation, durability, resiliency, ease in cleaning and in fact every essential of a high grade plain linoleum floor covering.

Plain Linoleum—Gauges: A, 3.60 mm.; B, 3.00 mm.; S, 2.40 mm.; M, 2.00 mm.; E, 1.70 mm.

Nothing but the best ingredients find their way into Nairn Plain Linoleum. The process of manufacture is the same as in the Battleship grades. Nairn Plains, in all grades—A, B, S and M—are of "Walton" finish, which lends to their surface the smoothness and firmness that is essential to withstand hard service.

Nairn Plain Linoleums are particularly well adapted for use as a background for rugs, being equally as durable, more sanitary and resilient, as well as less costly than hardwood floors.

The A and B grades are made in brown, green, gray and terra cotta; the S, M and E grades in brown, green and gray only.

Cork Carpet—Made in the following gauges:
A—Unpolished, 6.70 mm.; polished, 6.20 mm.
Special—Unpolished, 5.85 mm.; polished, 5.35 mm.
B—Unpolished, 4.60 mm.; polished, 4.10 mm.

In all buildings where floor coverings should have sound-reducing as well as wear-resisting qualities, Nairn Cork Carpet, which embodies unusual resiliency, will find a place of pre-eminence. Hotels, churches, lecture rooms, clubs, billiard rooms, lodge rooms, dormitories, gymnasiums, are among the establishments where Nairn Cork Carpet is found in brown, terra cotta, green, blue, tan or chocolate.

Continued on next page

Inlaid Linoleums

Straight Line Inlaid—A million dollar machine, the only one of its kind in America, is used to make Nairn Straight Line Inlaids. The patterns are of uniform size and color; are built in piece by piece; and go through to the very backbone of the fabric; insuring longer life, and a new appearance until actually worn through. Three grades: Newark, Sussex, Universal, the only difference being in thickness.

Newark—Gauge, 3.10 mm. This grade will prove most durable under equal conditions of wear because it is heaviest. Patterns and colorings are sufficient in scope to meet every variety of decorative scheme.

Sussex—Gauge, 2.10 mm. Slightly thinner and consequently lower in price than Newark, but equal in respect to design, materials and workmanship.

Universal—Gauge, 1.90 mm. Represents a popular priced straight line inlaid, lighter in weight than Newark or Sussex but embodying all the other features of these grades.

Moulded Inlaid—A wealth of elaborate designs, readily adapted to creation of artistic room effects, are embraced in the Nairn line of moulded inlaid. Possessing all the features of durability, pattern through to the back, etc., that are insured by the word "inlaid," these goods can be depended upon to retain an appearance of beauty during the long life of the linoleum.

Two thicknesses are offered:

Hudson—Gauge, 1.90 to 2.00 mm. A particularly well known grade, by reason of its intrinsic merit and its wide variety of distinctive designs and colorings. Excellently adapted to bedrooms, sewing rooms, nurseries, small hotel rooms and the like.

Reliance—Gauge, 1.80 to 1.90 mm. A quality of popular price, similar to Hudson but of less thickness. It affords genuine inlaid linoleum in attractive designs and colorings at a price within reach of all.

Granite Inlaid—Gauge, 1.75 mm. The vestibule, sleeping porch, hallways and other similar spaces are made cheery and bright when covered with these goods. Also appropriate for small offices, show rooms, etc. Three colorings: blue, green and tan, are offered in a popular priced quality.

Plank and Moiré Inlaid—Gauge: Moiré, 2.40 mm.; Plank, 2.00 mm. Especially suited for use under fabric rug. Made in colors that harmonize with well-planned interiors. Moiré is made in blue, gray and tan.

How Linoleums Should Be Laid

Our many years of experience has proven that the best way of laying linoleum is to cement it directly to the surface of the floor; and *not* over a felt base. Nairn linoleum is sufficiently resilient and durable to make the use of felt unnecessary.

Model Interior Arranged by Daniels & Fisher Stores Co., Denver, Colo.

Showing how Nairn inlaid linoleum harmonizes with and sets off the furniture of a room

Specifications for Laying Nairn Linoleum

Preparation of Floors—The floor shall be thoroughly dry, smooth and even and free from all foreign material ready for the linoleum contractor.

The following paragraph should be inserted in the heating specifications:

Temporary Heating—The heating contractor shall furnish heat to maintain a temperature of not less than 70° Fahr. in places where the linoleum is to be laid. This must commence 48 hours before the linoleum work is to start and be maintained until 24 hours after laying.

General—The linoleum contractor shall furnish all labor and material necessary to properly install all linoleum as shown on the plans and as hereinafter specified.

Linoleum—The linoleum contractor shall furnish and install Nairn ..... (Insert kind, such as Battleship, Plain, Inlaid) linoleum, color ..... (insert color). It shall have a maximum thickness of ..... and a minimum thickness of .....

Samples—The linoleum contractor shall submit with his proposal two samples of the linoleum and grade on which his proposal is based. These shall bear the contractor's and manufacturer's names. One sample shall be returned to the contractor and the other be retained by the architect for comparison with the linoleum furnished which shall be equal in every respect.

Heating—The heating contractor (or owner) is required to supply a temperature of 70° Fahr., starting 48 hours before the linoleum work is begun and maintained until 24 hours after laying, but the linoleum contractor will be responsible for seeing that this temperature is maintained. The linoleum shall not be unrolled until it has been subjected to this temperature for at least 48 hours. No laying shall be carried on below 70° Fahr.

Cement—All cement used shall, when set, have sufficient adhesive strength to cause the linoleum to securely adhere to the floor. No cement shall be used that has any ingredient which is injurious to the linoleum. The cement to be used shall be Sisk's Lino-Tack or its equal.

Fitting—In fitting, care shall be taken to lay out the work to make as little waste and as few seams as possible. Allowance should be made for trimming the ends, and with plain linoleum, allowance must be made for ½-in. lap between each sheet along the seam. When possible, the seams should run parallel to the length of the room. The use of small pieces resulting in unnecessary seams shall not be permitted. All seams shall be straight, tight and practically invisible.

The linoleum shall be cut to accurately fit against all walls, pipes, outlets and other permanent projections on the floor. Where the linoleum joins the base it should be forced up tight against the base, cemented and rolled as hereinafter specified. This joint to be covered with a ⅞-in. quarter round molding to be furnished and applied by the carpenter after the linoleum has been laid. (This specification can be changed to suit any special molding chosen by the architect.)

Laying Plain Linoleum—Lay out the linoleum with the seams lapping ½ in. Cement is applied to within 3 in. of each seam. This should be thoroughly rolled to smooth out any air pockets and secure proper adhesion.

Where seams have been lapped, cut through both thicknesses. These edges must then be thoroughly cemented, rolled and weighted down. These weights must be thoroughly dry and allowed to remain on the seam for at least 2 hours. Any cement coming in contact with the surface must be immediately wiped off with a damp cloth.

Laying Figured Linoleum—Figured linoleum is laid in the same manner as described for plain linoleum, except that the pattern must be carefully matched and seams cannot be lapped, but must be forced up close together. The whole surface can be cemented at one time.

Cleaning—Upon completion of the work, the linoleum contractor shall clean up all surplus material and leave the floors clean and ready for occupancy.

Guarantee—The contractor shall guarantee all materials and workmanship furnished to be new and strictly first-class in every respect. He shall make good any defects due to inferior materials or workmanship which may develop within 1 year from completion of the work without cost to the owner.

Pattern Book

A 72-page booklet showing the wide range of Nairn patterns in full colors, will be sent free on request to any architect, decorator or builder. Address The Nairn Linoleum Co., Newark, N. J.

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Linotile and Cork Tile Floors

135 Twenty-fourth Street
PITTSBURGH, PA.

BRANCH OFFICES IN THE LARGER CITIES

Products

LINOTILE for floors and stair treads, sanitary cove and base.

ARMSTRONG'S CORK TILE for floors and stair treads, sanitary cove and base.

For Cold Storage Insulating Materials, see page 1799.

Linotile

Linotile is a composition of powdered cork and wood flour, oxidized linseed oil, gums and pigments, thoroughly mixed and calendered into sheets ¼-in. thick. After being subjected to a seasoning process, these are cut into square or oblong tiles of various sizes and into narrow strips used for interlining between the tiles. At all stages of manufacture the sheets and tiles are kept flat to eliminate any tendency to curl.

Advantages—Because of the elasticity of the ingredients, Linotile is resilient and restful underfoot, nonslippery and practically noiseless.

It is a warm, comfortable floor, entirely free from objectionable odor.

Being impervious to moisture, Linotile is perfectly sanitary and easy to clean and keep clean.

Linotile can be laid over any smooth, dry base—wood, concrete or metal. Linotile can not be installed satisfactorily in basements or over any base which rests directly on top of the ground. Hence, it should never be specified under such conditions.

Because of its wide range of colors and sizes, Linotile can be laid in a great variety of designs and lends itself readily to individual treatment.

Durability—Linotile has no grain like wood and will not splinter or flake off; neither will it crumble nor "dust" like hard, brittle materials. Its resistance to abrasion is such that, when properly laid and cared for, Linotile will last for years under the heaviest foot traffic.

As Linotile does not appreciably expand or contract with temperature changes, it does not buckle or warp on the floor.

Where Used—The peculiar properties of Linotile make it the most satisfactory solution for the always troublesome floor problem in offices, banks, churches, libraries, hospitals, apartment and hotel corridors, restaurants, theaters, schools, etc., as well as in many residence rooms such as sun porches, bathrooms, kitchens, pantries and billiard rooms.

LAYING A LINOTILE FLOOR IN THE GENERAL OFFICE OF THE RALSTON-PURINA CO., ST. LOUIS, MO.

FLOOR OF 10x10-IN. BLACK AND WHITE LINOTILE IN THE TEA ROOM OF THE BRUNSWICK HOTEL, BOSTON, MASS.

While Linotile is not a cheap floor, it is not expensive when consideration is given to its long life in service and its many points of superiority over other flooring materials.

Sizes and Shapes—Linotile is made in the following standard sizes:

Squares—2, 3, 4, 6, 8, 10, 12 and 16 in.

Oblongs—2x4 and 6 in.; 3x6 and 4x8 in.; 4, 6 and 8x12 in.; 8x16 in.; 1, 1½, 2, 3, 4 and 6x18 in., and 18x36 in.

Interlining Strips—For use between tiles ¼, ⅜, ½, ¾ and 1 in. wide.

Sanitary Cove and Base—Standard height, 6 in.

Special Designs—Monograms, fleur-de-lis and tiles of shapes and sizes not listed as standard can be supplied on special order.

Colors—Tiles, strips and cove and base are supplied in the following colors:

Light brown	Dark gray	Light green
Dark brown	Light blue	Dark green
Light gray	Dark blue	White
Black		Red

Installation—Linotile is sold only on a contract basis, to be furnished and installed by the ARMSTRONG CORK & INSULATION COMPANY or its authorized agents. This is necessary in order to eliminate all risk of unskilled workmanship.

All branches and agents are qualified to submit estimates for furnishing and laying Linotile floors and all maintain specially trained mechanics to install Linotile.

Short Specification—Architects desiring to use a brief form of specification will find the following entirely adequate:

The Linotile floors, of color and design to be approved by the architect (or owner) shall be furnished and installed by the ARMSTRONG CORK & INSULATION COMPANY, or its authorized agent, in accordance with that Company's standard specification.

Continued on next page

Samples, Literature and Designs—Linotile is described in complete detail in the 44-page book, "Linotile Floors," which, with samples, will be furnished free on request. This book is illustrated in color and contains complete specifications and many design plates.

Armstrong's Cork Tile

Armstrong's Cork Tile is made from clean cork shavings compressed in moulds and baked. The effect of the heat is to drive off any moisture and to liquefy the natural gum in the cork, which gives the separate particles a waterproof coating and serves to bind them together. To the baking process, also, is due the beautiful brown color of cork tile, three shades—light, medium and dark brown—being produced by varying the time of baking. After removal from the moulds, the sheets are cut into tiles, ½ in. in thickness, of the size desired, and carefully sorted for color.

Armstrong's Cork Tile Floor of 12x12-in. Medium Shade, Aldine Trust Co., Philadelphia, Pa.

Advantages—Armstrong's Cork Tile can be laid over any smooth, dry base—wood, concrete or metal. Armstrong's Cork Tile can not be installed satisfactorily in basements or over any floor in direct contact with the ground, and should never be specified under such conditions.

Armstrong's Cork Tile is yielding and practically noiseless underfoot. Due to the frictional quality of cork, it affords a firm and sure foothold even when laid on an incline at a considerable angle.

Cork is a nonconductor of heat; hence, a floor of Armstrong's Cork Tile is always comfortable. In cold weather it does not permit the heat to be drawn away from the feet, as is the case with a hard tile or concrete floor.

While not fireproof, Armstrong's Cork Tile is fire-retarding. It will not burn or support combustion without the application of heat from some external source.

Durability—Armstrong's Cork Tile will meet the most exacting demands on the score of durability. The toughness and elasticity of the cork and the tenacious binding quality of the natural gum gives it a high power of resistance to wear, abrasion and shock. It will not "dust" or crumble. It will stand comparatively heavy loads and sudden temperature change without cracking or breaking; and it will not splinter or warp. With all its other distinctive merits, Armstrong's Cork Tile has the lasting endurance of many floorings much harder and more costly.

Durability has a most important bearing on the question of price. The first cost of Armstrong's Cork Tile, while higher than that of some other materials, is not excessive when considered in relation to the length of service rendered and the many advantages afforded.

Field of Usefulness—Obviously, Armstrong's Cork Tile is not an "all purpose" floor. There is, however, a large class of rooms and buildings where its peculiar features commend it at once to the discriminating architect and owner as the most desirable and satisfactory flooring that can be installed. Wherever it is essential to have quiet, comfort and cleanliness and security against slipping; where workers are on their feet for long periods; where beauty and durability are desirable—in short, wherever the floor is to be a real architectural feature, Armstrong's Cork Tile offers the best solution.

The three warm, soft shades of brown, the distinctive texture and peculiar mottled surface, and the variety of shapes and sizes in which it is supplied, make it an easy matter to design floors of Armstrong's Cork Tile which have a distinctiveness not attained with ordinary floorings.

Colors, Shapes and Sizes—Armstrong's Cork Tile is made in three shades—light, medium and dark brown—and in the following shapes and sizes:

Squares—2, 3, 4, 4½, 6, 9 and 12 in.

Oblongs—2x6 in.; 3x9 in.; 3, 4, and 6x12 in.; 1, 1½, 2, 3, 4, 4½, 6, 9 and 12x18 in.; 12x24 in.; 3, 4, 4½, 6, 9 and 12x36 in.

Cove and Base—Sanitary cove and corner cove—1¼x1¼ in.—and sanitary base in the standard 6-in. height are furnished in all three colors.

Installation—In order to eliminate the risk of unskilled workmanship, Armstrong's Cork Tile is installed only by the Armstrong Cork & Insulation Company, or its authorized agents.

Special trained workmen are maintained in the principal cities of the United States and Canada and all branches and agencies are qualified to furnish estimates of cost and other information.

Short Specification—Architects desiring to use a brief form of specification will find the following entirely adequate:

Armstrong's Cork Tile floors, of color and design to be approved by the architect (or owner) shall be furnished and installed by the Armstrong Cork & Insulation Company or its authorized agents, in accordance with that Company's standard specification.

Samples and Literature—The 24-page book, "Armstrong's Cork Tile," contains complete information with detailed specifications and illustrations in color. This publication, with samples, will be gladly furnished on request without charge.

Armstrong's Cork Tile in a Pleasing Design—the Lobby Floor in the Oak Park, Ill., Y. M. C. A.

DREADNOUGHT FLOORING CO., INC.

115 East 23rd Street
NEW YORK, N. Y.

AGENCIES

PHILADELPHIA, PA., S. W. Heaton, 1802 Chestnut Street
BOSTON, MASS., Boston Floor Company, 22 Kingston Street
TOLEDO, OHIO, Charles F. Heine, 1010 Monroe Street
DENVER, COLO., George W. Summers & Co., 420 Century Building
ALBANY, N. Y., Joseph E. Nord, 10 McPherson Terrace
BALTIMORE, MD., J. M. Adams, 330 North Charles Street
KANSAS CITY, MO., John B. Ricketts, 604 Ridge Building
LOS ANGELES, CAL., B. V. Collins, 945 South Los Angeles Street
ATLANTA, GA., Jos. F. Gardner
SAN FRANCISCO, CAL., James P. Dwan, Inc., 1113 Hearst Building
MINNEAPOLIS, MINN., General Equipment Co., 4th floor, First National-Soo Line Building
ST. LOUIS, MO., W. A. Wheeland, 1215 Syndicate Trust Building
MEMPHIS, TENN., Chears Floor & Screen Co., 217 Court Avenue
PITTSBURGH, PA., Pittsburgh Hardwood Floor Company, 923 Park Building
DETROIT, MICH., George R. Mehling, 106 Henry Street
WASHINGTON, D. C., J. M. Adams, 1216 Connecticut Avenue
MILWAUKEE, WIS., J. Doubrawa & Son, 482 Market Street

Product

Manufacturers of "Dreadnought Elastic Tiling."

TRADE-MARK

Description

Utility—"Dreadnought Elastic Tiling" is an ideal flooring for public buildings, such as hospitals, churches, libraries, courthouses, office buildings, banking institutions, hotels, etc. It has no equal in private houses for kitchens, laundries, hallways, pantries, bathrooms, bedrooms, billiard rooms and nurseries. "Dreadnought Elastic Tiling" is light in weight, only 1 lb. to the sq. ft., and is, therefore, especially suitable for elevator cars, yachts and steamships, where weight is an important factor.

Advantage—"Dreadnought Elastic Tiling," a compound of cork, embodies the most modern idea of floor covering, on account of its resilient and noiseless surface and attractive appearance. It is non-absorbent, has no objectionable odor, is easily cleaned and not slippery when wet. Liquids such as ink, grease, oil, etc., can be removed without leaving a stain.

Durability—"Dreadnought Elastic Tiling" has been thoroughly tested for durability, and evidence can be furnished showing how the flooring has worn under twelve years of severe use.

Installation—"Dreadnought Elastic Tiling" is furnished in interlocking units (3 in. from center to center) and in squares and rectangles of any desired size. The two latter can be outlined with inserted "Dreadnought Elastic Tiling" seams (¼ in. wide and up) of any contrasting colors, producing the effect of stone tile.

"Dreadnought Elastic Tiling" is laid in an elastic and waterproof cement which adheres equally well to wood, concrete or steel.

Colors—"Dreadnought Elastic Tiling" is made in 11 colors:

Light blue, dark and light green, buff, gray, pearl gray, brown, black, red, white and mahogany.

Stair Tread and Brass Nosing

"Dreadnought Elastic Tiling" is especially suitable for stair treads, on account of its being non-slippery and noiseless, and, when edged with our special brass nosing, presents a neat and attractive appearance.

Specifications

"Dreadnought Elastic Tiling" is uniformly ¼ in. thick. The underfloor, if of concrete, must be troweled to a smooth and level surface, to within ¼ in. of the finished floor level desired; and if of wood, it must be "tongue and groove" boards not over 4 in. wide, free from knots, well seasoned, nailed and planed.

Hallway, International Banking Co. Building,
60 Wall Street, New York, N. Y.

Executive Offices, Childs Restaurant Co.,
200 Fifth Avenue, New York, N. Y.
Installed Sept. 30, 1911, and still in excellent condition

Continued on next page

Samples and Catalogues

Designs, samples and our new catalogue, giving further information, will be furnished on request.

"Dreadnought Elastic Tiling" in Use

The following list gives some of the buildings in which "Dreadnought Elastic Tiling" is installed:

BANKS

Central Trust Co., New York, N. Y., Raymond F. Almirall, Architect
National State Bank, Newark, N. J., Cass Gilbert, Architect
Mechanics Bank, Brooklyn, N. Y., Frank J. Helmle, Architect
Citizens Savings Bank, Stamford, Conn., L. E. Jallade, Architect
Farmers National Bank, York, Pa., J. A. Dempwolf, Architect

PUBLIC BUILDINGS

Grand Central Station, New York, N. Y., Warren & Wetmore, Architects
Public Library, 160th Street, New York, N. Y., McKim, Mead & White, Architects
New Municipal Building, New York, N. Y., McKim, Mead & White, Architects
Rochester Station, New York Central and Hudson River R. R. Co., Rochester, N. Y., D. H. Collin, Architect
American Museum of Natural History, New York, N. Y.

CHURCHES

First Baptist Church, Plainfield, N. J., C. H. Smith, Architect
Chapel, St. Mary's Hospital, Orange, N. J., H. A. Walker, Architect
Chapel, Seamen's Church Institute, New York, N. Y., Warren & Wetmore, Architects
Congregational Church, New Canaan, Conn., Ernest Greene, Architect
First Baptist Church, Montclair, N. J., Dodge & Morrison, Architects

HOTELS

Biltmore, New York, N. Y., Warren & Wetmore, Architects
Copley Plaza, Boston, Mass., H. J. Hardenbergh, Architect
New Greenbrier Hotel, White Sulphur Springs, W. Va., F. J. Sterner, Architect
Waldorf-Astoria, New York, N. Y.
Plaza, New York, N. Y.

THEATERS

Columbia Theater, New York, N. Y., Columbia Amusement Co.
Gaiety Theater, Washington, D. C., Columbia Amusement Co.
Proctor's Theater, 125th Street, New York, N. Y., Proctor's Theater Co.
Lyric Theater, Newark, N. J., Proctor's Theater Co.
Park Theater, Youngstown, Ohio, Feibre & Shea, Architects

OFFICES

Childs Co., 200 Fifth Avenue, New York, N. Y.
American Metals Co., 61 Broadway, New York, N. Y., Francis H. Kimball, Architect
Union Carbide Co., 30 East 42nd Street, New York, N. Y.
Chas. Scribner's Sons, 597 Fifth Avenue, New York, N. Y., Ernest Flagg, Architect
Lawyers' Westchester Mortgage & Title Company, White Plains, N. Y., A. G. C. Fletcher, Architect

RESIDENCES

F. W. Woolworth, Esq., Glen Cove, L. I., C. P. H. Gilbert, Architect
S. M. Colgate, Esq., Orange, N. J., Geo. Melendy, Architect
Chas. Scribner, Esq., New York, N. Y., Ernest Flagg, Architect
Henry P. Davison, Esq., Locust Valley, L. I., Walker & Gillette, Architects
D. S. Walton, Esq., Llewellyn Park, West Orange, N. J.

OFFICE BUILDINGS

Colgate & Co., 109 Hudson Street, Jersey City, N. J.
International Banking Co. Building, 60 Wall Street, New York, N. Y., Clinton & Russell, Architects
Wm. R. Grace Building, New York, N. Y., D'Oench and Yost, Architects
Queens Plaza Court Building, Long Island City, N. Y., Thompson & Frohling, Architects
Apartment House Company Building, Youngstown, Ohio, Stanley & Scheibel, Architects

YACHTS AND STEAMSHIPS

Yacht "Corsair," J. P. Morgan
Yacht "Captiva," Harry Payne Whitney
Yacht "Galatia," Wm. Gardner & Co., Architects
Schooner "Radiant," Wm. Gardner & Co., Architects
Stewart Yacht, The Pusey & Jones Co.
Battleship "Moreno," Argentine Republic
S.S. "Lenephe," Clyde Line
S.S. "Great Northern," Spokane, Portland & Seattle Railway Co.
S.S. "Northern Pacific," Spokane, Portland & Seattle Railway Co.
S.S. "Berkshire," Hudson Navigation Co.
S.S. "Allianca," Panama Railroad Co.
Steamer "City of Detroit, III," Detroit & Cleveland Navigation Co.

FIRST CLASS LOBBY, "A" DECK, S.S. "NORTHERN PACIFIC"

FIRST CLASS DINING SALON. S.S. "GREAT NORTHERN"

BEAVER TILE, INCORPORATED

440-442 West 42nd Street

NEW YORK, N. Y.

AGENCIES IN PRINCIPAL CITIES

Products

Manufacturers of and contractors for BEAVER COLORED CORK COMPOSITION TILE; BEAVER NATURAL CORK TILE; BEAVER SANITARY COVE BASE.

Also Beaver Steel Studded Elevator Tile; Beaver Stair Tread Tile and Nosings; Beaver Drainboard and Dresser Tops.

TRADE-MARK

Beaver Colored Cork Composition Tile

These tiles are made ¼ in. thick of pure granulated cork and coloring matter.

Colors—Black, white, brown, buff, red, green, blue and gray.

Styles — Interlocking, squares, and squares with feature joints.

Sizes—*Squares*—3 by 3 in. up to 18 by 18 in., and oblongs, with joints of any width required and borders of any width or style.

Interlocking—3-in. unit in any color and design to correspond with all interior decorations.

Installation — Installed with a liquid waterproof cement on any smooth floor.

Specification—Tile to be Beaver Cork Composition Tile ¼ in. thick, made of pure granulated cork and coloring matter, laid in Beaver liquid waterproof cement. Designs and colors selected by architect. Where laid on new wood floors, a lining to be provided of paper, covered with cotton cloth, tacked to floor with 16 tacks to the sq. ft. or 1½-lb. felt paper, tacked 16 tacks to the sq. ft. and tile cemented thereon.

Beaver Natural Cork Tile

These tiles are made ½ in. thick from pure cork shavings throughout. Tiles are made under 500 tons hydraulic pressure.

The bottom of each tile is as clean and smooth as the top.

Colors—Light, medium and dark brown.

Sizes—3 by 3 in., 6 by 6 in., 9 by 9 in., 12 by 12 in., 18 by 18 in., and oblongs.

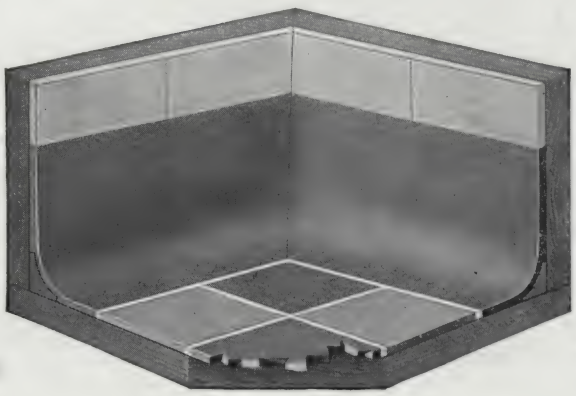
Installation—Installed with a liquid waterproof cement on any smooth surface.

Specification—Tile to be ½ in. thick, composed of pure cork shavings from top to bottom, compressed under 500 tons hydraulic pressure, with no filler or binder other than the *natural* gum in the cork and no granulated cork or cork bark mixed with the shavings.

Tile to be laid in Beaver liquid waterproof cement under pressure, in panels not to exceed 10 to 12 ft. square, and thoroughly bradded to the floor with headless steel brads. All joints to be thoroughly cemented. The tile to be sanded with No. 2½ sandpaper and finished with No. ½.

Concrete Floors — Where plans or specifications require cork tile, floor should have a top layer or finish of nailable concrete 1 in. thick.

A FEW BEAVER DESIGNS



BEAVER COVE BASE

Advantages

Beaver Colored Cork Composition and Natural Cork Tile make a sanitary, resilient, non-absorbent floor covering. Its resilience produces a sound deadening floor which, together with its excellent wearing qualities and attractive designs, make it suitable for private residences as well as for public buildings.

Samples

Samples submitted on request.

LIBERTY CORK TILE CO., INC.

Manufacturers of Cork Tile

TELEPHONE
MADISON SQUARE 0825

122 East 25th Street

NEW YORK, N. Y.

AGENCIES IN PRINCIPAL CITIES

Products

NATURAL CORK TILE.
COMPOSITION CORK TILE.
RUBBER TILE.
CORK BULLETIN BOARD.
Also, Mastic Flooring.

Natural Cork Tile

By means of our improved methods, using a special press and highest type of modern machinery and skill, we compress 8½ in. of cork shavings into ½ in. The old method uses but 6½ in. of shavings to make the same ½-in. tile. This ordinary tile almost always wore rough, became pitted and was difficult to clean.

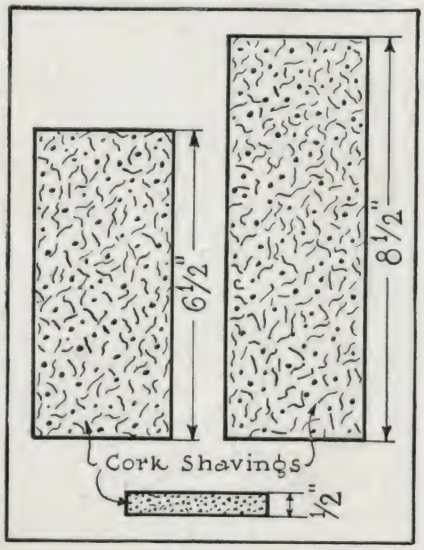
Advantages—Liberty tile is more sanitary; has longer life and is therefore more economical; makes a better appearance and holds its color better because of its finer texture.

Weight—Liberty natural cork tile weighs from 18 to 21 oz. per sq. ft. The ordinary tile weighs only 14 to 15 oz. per sq. ft. We therefore guarantee absolutely that Liberty tile will not wear rough.

Colors—Liberty cork tile is made in 3 shades of brown, light, medium and dark.

Sizes—Liberty tile is made in sizes 6x6 in., 12x12 in., or oblong and also in any sizes which can be made from slabs 12x36 in.

Liberty Sanitary Cove Base—This is made in the same colors as Liberty cork tile and can be furnished in any height desired.



COMPARISON
Showing quantity of material used in ordinary method and quantity used in our improved method

Composition Cork Tile

Composition—Liberty composition cork tile is made of granulated cork, oxidized linseed oil, select gums and pigments all of the highest quality scientifically combined according to the most efficient process and pressed hydraulically.

Colors—Liberty composition cork tile is made in all standard colors.

Sizes—Liberty composition cork tile is made in all standard sizes.

Rubber Tile

Liberty rubber tile is made in sizes $\frac{3}{16}$-in., ¼-in., and ⅜-in., in marble effect or plain, in a variety of colors. It is made from the purest Para gum and retains its smooth surface and original color. Made in a variety of sizes: 6x6 in., 6x12 in., 9x9 in., 9x18 in., 11x11 in., 11x12 in., 12x12 in., 12x24 in., 18x18 in., 18x36 in., and 36x36 in.

Cork Bulletin Board

Liberty bulletin board is made of granulated cork ¼ in. thick, furnished unmounted or mounted on sectional board.

Specifications

To insure the best kind of cork to be laid on a floor so that satisfactory service will be obtained, specifications should be written as follows:

To be made of clean cork shavings steamed and pressed to a thickness of ½ in. and to weigh not less than 18 oz. per sq. ft. when laid on the floor.

Note: Laid the same as all other cork tile. The best results are obtained by the use of Liberty waterproof cement.

DAVID E. KENNEDY COMPANY

INCORPORATED

Cork Tile Floors, Everlastic Tile Floors, Rubber-Marble Tile Floors, Linoleum Tile Floors, Battleship Linoleum, Kencor Bulletin Boards

Fisk Building
NEW YORK, N. Y.

Rand McNally Building
CHICAGO, ILL.

Real Estate Trust Building
PHILADELPHIA, PA.

Story Building
LOS ANGELES, CAL.

BRANCHES OR AGENCIES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA

Products

CORK TILE FLOORS and SANITARY COVE BASE, for flooring, stair treads, etc., and desk, table and counter tops.

EVERLASTIC TILE FLOORS and SANITARY COVE BASE, made in interlocking, square or oblong tiles.

RUBBER TILE FLOORS in plain and marble effects.

BATTLESHIP LINOLEUM.

KENCOR BULLETIN BOARDS, CHART BOARDS and TACKING SPACES, for schools, museums, auditoriums and industrial plants.

Cork Tile Floors

Kennedy cork tile floors are the original cork tile floors. The Kennedy Company is the pioneer in this line, having in 1899 installed the *first* cork tile floor, and more than 80% of all the cork tile floors ever laid. It is upon the floors laid by DAVID E. KENNEDY COMPANY that the reputation of cork tile floors is based. The reason you contemplate the use of cork tile is because of the reputation achieved by the cork tile floors laid by the Kennedy Company. We have equipped a new plant for the manufacture of cork tile with improved machinery, where we are manufacturing under the direct supervision of David E. Kennedy the best cork tile ever made. Manufactured from selected cork shavings heavily compressed and baked in closed steel moulds without the addition of artificial binder or any foreign material.

Colors—Cork tile is furnished in varying shades of brown, from a light oak to dark walnut. For convenience of reference the many shades of brown are grouped into three classifications, namely: light, medium and dark.

Standard Shapes and Sizes—Squares: 6x6, 12x12 in. Oblongs: 6x12, 12x24, 12x36 in. Standard thicknesses ½ and $\frac{5}{16}$ in. These sizes are usually carried in stock. Other sizes furnished at slightly higher cost.

Backing—Kennedy cork tile floors can be laid on any smooth backing: wood, concrete, etc.

Standard Specifications for Cork Tile Floors—All cork tile floors [stair treads, etc.] shall be ½ in. [$\frac{5}{16}$ in.] thick, made only of the best quality of clean ground cork throughout, compressed solid in closed moulds and thoroughly baked, producing a durable, impervious material that will not disintegrate. It shall be free from all foreign substances and cement of any kind other than the natural gum of the cork. It shall be set with a special elastic waterproof cement, so applied as to seal hermetically and bind all joints. All cork tile floors shall be installed by a cork tile contractor who can refer to at least 3 installations of cork tile floors of above description, each of equal extent to these specified herein, furnished and installed by him not less than 10 years prior to taking of bids on this work, which floors at this time are in good physical condition, show no pitting, disintegration or effects of wear, are thoroughly and securely attached to their base, and on inspection are found satisfactory to the architect in all respects. The contractor for the cork tile floors and samples of same must be approved by the architect in writing.

Note: If a short form of specification is desired the following may be substituted: "All cork tile floors [stair treads] shall be of Kennedy Cork Tile ½ in. [$\frac{5}{16}$ in.] thick furnished and installed by DAVID E. KENNEDY COMPANY or its duly authorized agents."

Top Finish of Concrete Backing—(Include in mason specifications, floors.)

Concrete floors in all spaces where plans or specifications require cork tile floors shall have a top layer or finish, 1 in. thick, composed of 1 part standard portland cement and 3 parts clean, coarse, screened sand. This top layer shall be troweled to a smooth and even finish exactly ½ in. [$\frac{5}{16}$ in.] below the required finished floor level. (Kennedy cork tile is ½ in. or $\frac{5}{16}$ in. thick.) No lines shall be struck in the surface.

Wood Backing—(Include in carpenter specifications, floors.)

Wood flooring in all spaces where plans or specifications require cork tile floors shall be $\frac{7}{8}$-in. tongued and grooved flooring not more than 4 in. wide, driven tight and well nailed and finished true and level ½ in. [$\frac{5}{16}$ in.] below the finished floor level. All high butts and joints to be planed smooth.

Backing for Cove Base—The plaster (or other material) walls shall be carried down to and finished square with floor backing, making a clean corner free from lumps of cement or plaster.

Everlastic Tile Floors (Linoleum Tile)

Soft, elastic, durable, sanitary, non-absorbent cork composition floor tiles, that can be laid on any smooth backing—wood, concrete, metal, marble, etc. Set with a waterproof adhesive cement that firmly grips the scoriated back. Everlastic tile floors offer a wide scope to the designer and are capable of architectural and artistic color treatment. Under foot this material is soft and quiet, yet durable and sanitary as tile. It is clean and easy to keep clean. It is inexpensive in first cost and its maintenance cost is practically nil. This type of flooring (linoleum tile) was originated in 1911 by the Kennedy Company, who recognized the need for a soft, elastic tile in white, black, grays, blues, greens and other colors that natural cork tile can not be made in, for office buildings, school and hotel corridors; stores; restaurants; theaters; churches; hospitals; libraries; kitchens; laundries; pantries; bathrooms and stair treads.

Colors—Sumac Red, Burgundy Red, Italian Red,

Continued on next page

Nankin Yellow, Beige, Oxford Blue, Mediterranean Blue, Peacock Blue, Delft Blue, Chinese Blue, Moss Green, Leaf Green, Van Dyke Brown, Leather Brown, Rust Brown, Buff, Tan, Gold, Colonial Buff, Slate Gray, Steel Gray, French Gray, Quaker Gray, Silver Gray, Oyster White, Ivory White and India Black.

Standard Shapes and Sizes—Interlocking, 2⅜x 2⅜ in. Squares: 6x6, 9x9, 12x12, 18x18 in. Oblongs: 6x12, 9x18, 12x24 in., 18x36 in. Thickness ¼ in. These sizes and colors are usually carried in stock. Other squares and oblongs furnished at slightly higher cost. Featured joint strips or interliners (made of the same material) of any width or color can be laid between the squares and oblong tiles, giving the effects of Dutch or quarry tile and greatly enhancing the design possibilities.

Standard Specification for Everlastic Tile Floors—All material from which tile is fabricated shall be made of clean powdered cork, wood flour, linseed oil, gums and pigments, thoroughly mixed, rolled, and thoroughly seasoned in heated drying rooms. It must pass all the tests required by the United States Navy Standard Specification for Battleship Linoleum. Tile must be homogeneous throughout. No tile with a top surface or crust harder or denser than inside or core will be accepted. All tile shall be ¼ in. thick, cut true to size and shape with perfectly square, clean cut edges absolutely without bevel. Underside of tile shall be scorated to insure proper bond with cement. Tile shall be set with Everlastic waterproof cement; on concrete backing, directly on concrete; on wood backing, canvas or strong cotton fabric shall be thoroughly tacked to the wood and tile cemented to same. All joints must be absolutely watertight, and surface smooth and even. All Everlastic tile floors shall be manufactured and installed by David E. Kennedy Company or its duly authorized agents. (State color, size and shape of tile desired. If cove base is specified, state height.)

Backing—Everlastic tile floors can be laid on any smooth backing: wood, concrete, etc.

Specifications for Backing—Use same specifications as given previously for Cork Tile Floors. Note, however, in connection with level that Everlastic tile is ¼ in. thick.

Backing for Everlastic Tile Cove Base—Use same specifications as given previously for backing for cork tile cove base.

Rubber-Marble Tile Floors

Made of the best quality of new, live rubber pigments and filler. No cotton is used in our rubber tile, as our exhaustive experiments have demonstrated that the cotton fibre holds the dirt, creates absorption and shortens the life of the tile. A large percentage of cotton fibre prevails in tile made from old automobile tires, because it is too costly to remove it. It serves no desirable function whatever in a rubber tile floor but is distinctly detrimental.

Colors—Plain and marble effects are produced in any desired color. Cove base is made.

Standard Shapes and Sizes—Squares: 6x6, 9x9, 12x12 in. Oblongs: 6x9, 6x12, 9x12, 9x18, 12x24 in. Thickness, $\frac{3}{16}$ and ¼ in.

Standard Specifications for Rubber-Marble Tile Floor—All rubber-marble tile shall be ¼ in. [$\frac{3}{16}$ in.] thick furnished and installed by David E. Kennedy Company or its duly authorized agents. (State color and size of tile desired. State height of cove base.)

Backing—Kennedy Rubber-Marble can be laid on any smooth backing. Specifications for backing can be same as for Cork Tile Floors given previously. Note, however, in connection with level that Rubber-Marble is $\frac{3}{16}$ or ¼ in. thick.

Battleship Linoleum

We specialize on Battleship linoleum in two respects, namely: special and distinctive colors, and methods of installation.

Colors—In addition to the standard colors of dark brown and terra cotta we finish Battleship linoleum in many very beautiful shades of gray, blue, green, brown, red, tan, gold, beige and in black and white. Borders of a different but harmonious color give an artistic and individual effect to our linoleum floors that is distinctive.

Installation—Our method of installation makes the linoleum a physical part of the building and not merely a covering, doubling its life and making it a thoroughly sanitary floor. We use a special waterproof cement that will not deteriorate, secure absolutely tight joints and perfect fitting to base and trim. We use methods gained in our long experience in attaching soft, pliable materials like cork and Everlastic tile floors to concrete and wood.

Kencor Bulletin Boards

Kencor bulletin boards are a necessity in the modern classroom and are used extensively to facilitate the showing of photographs, charts, diagrams, drawings and exhibits. They are as essential as the blackboards.

Kencor bulletin boards are specially constructed of a resilient cork composition, veneered with a special cement to a substantial three-ply wood and composition backing. They will not warp nor buckle. They receive a thumb tack readily and hold it securely. When removed the cork closes together so that the puncture heals.

Kencor bulletin boards are a standardized product correctly designed and constructed. Therefore they are not only better suited for the purpose but are less expensive than any makeshift bulletin board constructed of less suitable material by the carpenter unfamiliar with the requirements.

Kencor bulletin boards are manufactured in any specified size (sizes larger than 4x6 ft. are made in sections) and they can be readily nailed in place by any carpenter.

Standard Specifications for Kencor Bulletin Boards—Furnish and install Kencor bulletin boards and Kencor chart boards as shown on drawings. Furnish and install Kencor tacking spaces in connection with all blackboards, as shown on drawings.

All bulletin boards, chart boards and tacking spaces shall be Kencor bulletin boards manufactured by David E. Kennedy Company of New York and Chicago. They shall be ½ in. thick, consisting of sheet cork of uniform color and resiliency ¼ in. thick, cemented to special three-ply composition board backing ¼ in. thick.

Carpenter contractor shall securely install wood grounds to which Kencor bulletin boards and tacking strips shall be securely nailed. Grounds to be not less than ⅞ in. thick by 2 in. face. In each bulletin board or tacking strips space a ground shall be set in the middle running the long way. Additional grounds shall be set at each end and at top and bottom of all bulletin boards and tacking strip spaces, and also at any line where two sections of bulletin boards may join.

LIPPINCOTT-BRADLEY, INC.

Flooring Engineers and Contractors

12 West 40th Street

NEW YORK, N. Y.

Products

COMPOSITION CORK TILE and CORK TILE FLOORING; RUBBER TILE FLOORING; CORK BULLETIN BOARDS.

TRADE-MARK

"Treadlite" Tile

Description—"Treadlite" tile is a soft, resilient compound of cork, gums and pigments. It possesses to a remarkable degree the permanent resiliency, sure foot-hold and freedom from disintegration which are so characteristic of cork, its principal ingredient. It is absolutely non-absorbent, durable even beyond the requirements of the average floor, quiet, bright and clean in appearance, sanitary and easily washed—in fact, it satisfies every utilitarian flooring requirement from the corridor of the greatest office buildings to the daintiest rooms in the private home. It is adaptable to any type of construction, and can be laid on any smooth, solid backing, such as wood, concrete, steel, marble, etc.

It affords an opportunity to provide a floor which is artistic, distinctive, and thoroughly in keeping with the general scheme of color and design of the room in which it is to be laid.

There is no other flooring material available at the low cost of "Treadlite" tile that so nearly fills all of the very many requirements of flooring work.

Colors—It is made in extremely attractive colors as follows: black, dark gray, light gray, white, buff, gold, brown, mahogany brown, terra cotta, green, blue.

Sizes—Square tile: 6x6, 9x9, 12x12, 15x15 in.
Oblong tile: 6x12, 9x18, 12x24 in.
Border strips of any desired width.
Joint strips: ¼, ⅜, ½ and ¾ in. wide.
Tile ¼ in. thick.

Decorative Effect—In the illustration below, "Treadlite" tile was selected because it is quiet, comfortable to walk upon, affords a secure foot-hold, is easy to clean, and is extremely durable. The black and gold design is in harmony with the general scheme of decoration and the result is one of the most strikingly beautiful restaurants in the City of New York. "Treadlite" tile affords unlimited decorative possibilities.

CANADIAN PACIFIC BUILDING, NEW YORK, N. Y.
A. D. PICKERING and STARRETT & VAN VLECK, Architects
CUSHMAN and WAKEFIELD, INC., Operators
There are 45,000 sq. ft. of Treadlite tile in the corridors of this building

WILFRED'S RESTAURANT, 67 WALL STREET, NEW YORK, N. Y.
WILFRED J. TAUPIER, Managing Director KENNETH M. MURCHISON, Architect

Sanitary Coved Base—Made in any desired height.

Stair Treads—"Treadlite" tile is ideal for stair work. It may be laid as a mat, covering part of the tread only, or over the entire tread. It is also frequently used as a combined tread and riser with sanitary cove at the intersection. This is a particularly desirable construction where the treads are closed at both sides.

Contracts—We usually take contracts for "Treadlite" floors installed complete. Estimates will be given from plans, which can be sent to any office of the company, or we will send representatives to measure up plans or buildings. We are prepared to give all necessary technical data regarding construction and general conditions, and maintain a designing and draughting department which will make up layouts and designs for all work.

Continued on next page

LODGE ROOM, MASONIC CLUB HOUSE, NEWARK, N. J.
C. P. BALDWIN and HENRY BAECHLIN, Architects

Standard Specifications for "Treadlite" Tile Floors

General—"Treadlite" tile shall be laid in (specify spaces or rooms) and on the treads and landings of (mention stairways). Tile shall be ¼ in. thick, homogeneous in texture throughout, cut true to size and shape with absolutely square, clean cut edges. The underside of tile shall be scored to insure proper bond and shall be set with "Treadlite" waterproof cement. "Treadlite" tile shall be furnished and laid by LIPPINCOTT-BRADLEY, INC., or their regular agents.

HECKSHER BUILDING, 57TH STREET AND 5TH AVENUE, NEW YORK, N. Y.

WARREN and WETMORE, Architects
CUSHMAN AND WAKEFIELD, INC., Operators

For Concrete Backing (Include in Mason Specifications for Floors)—Concrete sub-floor to receive "Treadlite" tile shall have a top layer 1 to 1½ in. thick composed of 1 part portland cement to 2½ parts clean, screened sand, troweled to a smooth sidewalk finish and free from high and low spots, ¼ in. below the required finished floor level. Joints shall be cut through top layer 20 ft. apart, following the lines of floor beams and girders. After the concrete has set, the joints are to be filled and troweled even with top surface. No lines shall be struck on the surface and it shall be delivered to us dry, clean, and free from foreign material. Concrete which has been frozen, which has chalky or scaly surface or which is not well bonded to fill must be removed and replaced with top coat as above.

For Wood Backing (Include in Carpenter Specifications)—Wood flooring to receive "Treadlite" shall be ⅞-in. tongued and grooved, not more than 4 in. wide, driven tight, well nailed, and finished true and level ¼ in. below the finished floor level. Joints and butts must be planed or scraped perfectly smooth.

For Backing for Coved Base—Plaster, wood or other material against which base or wainscoting is to be installed shall be carried down to and finished square with the underfloor, making a clean, straight, right angle with same and free from lumps, dirt or other obstructions.

Diamond Seal Cork Bulletin Boards

Diamond Seal cork bulletin boards are manufactured by the approved standard method. They are made of the best grade of finely granulated cork mixed with gums and oils, compressed to proper density into sheets ¼ in. thick, forming a tough, resilient, cushion-like material suitable to receive pins and thumb-tacks. The cork is attached with a special cement to a strong ¼-in. thick three-ply wood and composition backing.

Advantages—Diamond Seal cork bulletin boards are specially designed and constructed, and best meet all requirements for posting notices, bulletins, etc. They will not disintegrate, warp or buckle and are practically indestructible. Pins and thumb-tacks are inserted with very light pressure and hold firmly in place.

LIGGETT BUILDING, 42ND STREET AND MADISON AVENUE, NEW YORK, N. Y.

CARRERE & HASTINGS and R. H. SHREVE, Architects
ALBERT B. ASHFORTH, INC., Operators

The public corridors of many of New York's finest office buildings are floored with "Treadlite" tile. Durability, easy maintenance, low cost, and an appearance in keeping with high class buildings prompted its use in these operations

Sizes—Diamond Seal cork bulletin boards are furnished in any size (sizes larger than 4 ft. x 6 ft. are made in sections). They can be easily installed by any carpenter.

Continued on next page

Diamond Seal Rubber Tile

Description—Diamond Seal rubber tile is a permanently resilient and elastic rubber floor. It is compounded entirely with the highest class materials, very closely approximating the compound used in the manufacture of high grade automobile tire treads. It contains no shoddy, reclaimed rubber, or rubber substitutes of any kind, nor any cotton fiber, wood flour, or other coarse fillers of a similar nature. There are no chemicals used in the vulcanization of Diamond Seal rubber tile floors which would cause them to harden materially after a period of years.

It is absolutely non-absorbent, is impervious to acids, alkalis, antiseptics, inks, etc. In service it wears to a smooth, glossy surface, constantly improving in appearance under traffic.

It is made in many attractive color combinations, some of them closely approximating marble in appearance.

Sizes—Square tile: 6x6, 9x9, 12x12, 18x18 in.
Oblong tile: 6x12, 9x18, 12x24 in.
Border strips of any desired width.
Tile 7/32 and ¼ in. thick.

Sanitary Coved Base—Base and border with a sanitary coved intersection are installed all in one piece, thus doing away with unnecessary and usually unsightly joints.

Contracts — Contracts taken for floors installed complete. Estimates given from plans sent to any office of the company, or representatives sent to measure up plans or buildings. We will furnish all necessary technical data regarding construction and general conditions. Our designing and drafting department will make up layouts and designs for all work.

Diamond Seal Rubber Tile Flooring

Medical Arts Drug Store, 1019 Broad Street, Newark, N. J.
Keller & Schweig, Proprietors
Wm. E. Lehman, Architect

Specifications for Diamond Seal Rubber Tile Floors

For Concrete Backing (Include in Mason Specifications for Floors)—Concrete sub-floor to receive Diamond Seal rubber tile shall have a top layer 1 to 1½ in. thick composed of 1 part portland cement to 2½ parts clean, screened sand, troweled to a smooth sidewalk finish and free from high and low spots, ¼ in. below the required finished floor level. Joints shall be cut through top layer 20 ft. apart, following the lines of floor beams and girders.

After the concrete has set, the joints are to be filled and troweled even with top surface. No lines shall be struck on the surface and it shall be delivered to us dry, clean, and free from foreign material. Concrete which has been frozen, which has a chalky or scaly surface or which is not well bonded to fill must be removed and replaced with top coat as above.

Important Note—Rubber tile floors can not be laid on wet concrete. All concrete laid below grade must be thoroughly waterproofed, preferably by the membrane method. Concrete laid on grade must also be waterproofed, but for this purpose the integral method is considered sufficient if proper care is used. Whether on grade or not, concrete must be bone dry when finished floors are laid.

Trowel only enough to obtain a true, smooth surface. Do not sprinkle with portland cement when troweling and do not trowel hard enough to obtain a hard, glazed finish. This glaze seals the surface and materially retards evaporation, thus increasing the time required for drying out.

Allow all possible ventilation in rooms where Diamond Seal rubber floors are to be laid.

Showroom of the Fisk Rubber Co., 57th Street and 8th Avenue, New York, N. Y.
Carrere & Hastings, Architects

For Wood Backing (Include in Carpenter Specifications)—In spaces where Diamond Seal rubber tile is called for in the plans and specifications, lay double floors, the top or finished floor to be ⅞ in. tongued and grooved, not more than 4 in. wide, driven tight, and finished true and level ¼ in. below the required finished floor level. Joints and butts must be planed or scraped smooth.

On old work, all loose, springy boards should be surface nailed to prevent squeaks in the floor after the rubber tile is laid. All rotten or badly worn boards must be replaced and the floor delivered to the contractor smooth and level.

Alternate—Where it is desired to use a single floor only, this should be of 1¼ in. material (finished 1⅛ in.) and the joists shall be set or shimmed up high enough so that the wood floor will finish up ¼ in. below the required finished floor level. Other requirements as to smooth level finish, etc., must be complied with as called for above.

Note: Rubber tile should never be installed on a wood floor which is laid over concrete on sleepers unless the concrete has had ample time to become absolutely dry. If this rule is not observed, the moisture from the concrete will rot the wood floor, thus destroying the entire job. It is always considered better construction to lay rubber and Treadlite floors directly on concrete and all new work should be so designed.

For Backing for Coved Base—Plaster, wood or other material against which base or wainscoting is to be installed shall be carried down to and finished square with the underfloor, making a clean, straight, right-angle with same and free from lumps, dirt or other obstructions.

Continued on next page

Diamond Seal Cork Tile

Description and Manufacture—Diamond Seal cork tile is manufactured from the finest quality of carefully selected, pure cork shavings, under the most approved process. The cork is compressed in closed molds and baked. It is free from artificial binder or foreign substance of any kind. The extreme heat of the baking liquifies the gum of the cork, causing it to fill all voids and to act as a natural cement or binder.

Advantages—*Durability*—Cork is recognized as a remarkably durable and resilient flooring material. Its toughness and elasticity are proof against the hardest kind of service. Diamond Seal cork tile floors will last a life-time.

Appearance—Diamond Seal cork tile floors are of natural varying shades of brown. The squares and oblongs of numerous sizes lend themselves to many interesting forms of design which are always pleasing, unobtrusive and architectural in appearance.

Economy—It requires no care but ordinary washing with soap and water—no scraping, waxing, etc. Its first cost is its only cost and that is comparatively low.

Special Features—*Resiliency*—The permanent elasticity of Diamond Seal cork tile makes walking on it as pleasant and restful as walking on the thickest carpet. Cork being an insulator of heat and cold, it neither chills, burns, nor tires the feet.

Safety and Noiselessness—Diamond Seal cork tile is non-slippery and noiseless under foot.

Sanitation—Being non-absorbent, it is clean, dustproof, verminproof, and impervious to grease, water and other liquids.

Scope of Use—Diamond Seal cork tile is the logical floor for libraries, schools, colleges, hospitals, museums, banks, theaters, art galleries, court rooms, billiard rooms, gymnasiums, offices, stair treads, etc.

Installation—Cork tile is laid in an elastic, waterproof, adhesive cement, and can be applied to any smooth, dry, level surface such as concrete, wood, steel etc. Cork tile floors should be purchased from and installed only by a firm thoroughly experienced in this class of work. This company is organized and equipped to execute contracts for the installation of its flooring materials.

Sanitary Cove Base—Diamond Seal cork cove base can be furnished to any height desired; 6 in. is standard. It may be applied to any smooth, nailable, wall surface.

Colors—Light, medium and dark brown.

Standard Sizes—Square tile: 6x6, 12x12 in.
Oblong tile: 6x12, 9x12, 12x24 in.
Border tile: 3x36, 6x36, 12x36 in.
Other sizes to order.
Diamond Seal cork tile is uniformly ½ in. thick.
Estimates, samples, etc., furnished on request.

Standard Specifications for Diamond Seal Cork Tile

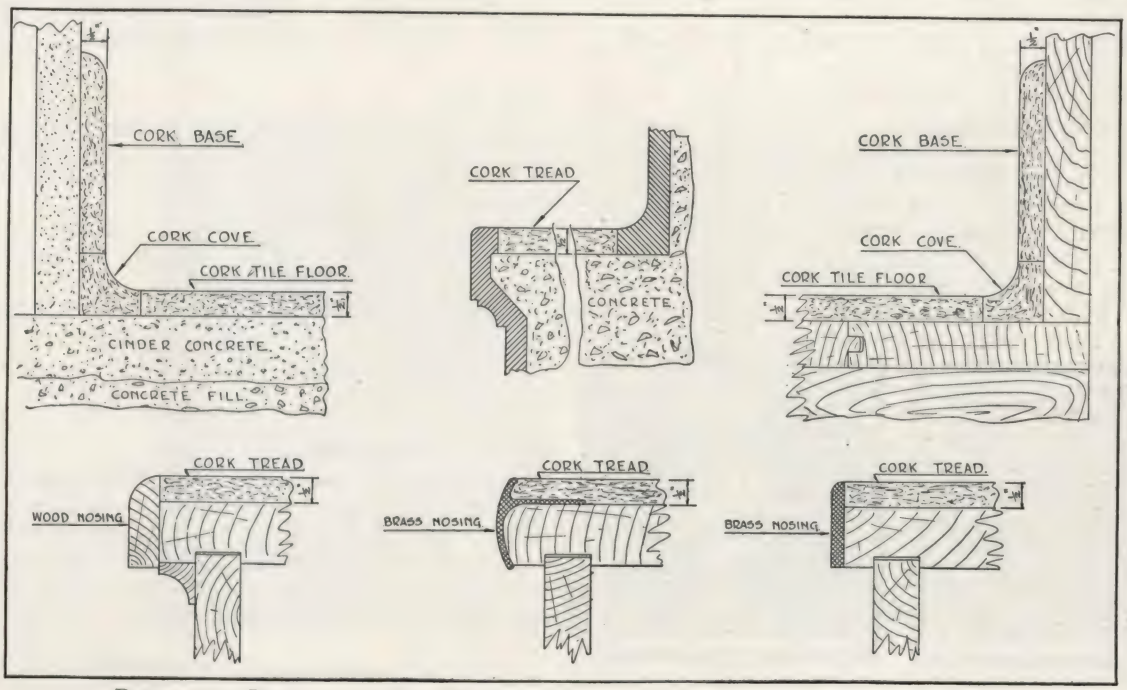
For Floors, Stair Treads and Cove Base—Floors (or stair treads) shall be of Diamond Seal cork tile ½ in. thick, made entirely of the best grade of clear, carefully selected cork shavings; compressed solidly in closed moulds and thoroughly baked. It shall be free from all foreign substances and cement of any kind, other than the natural gum of the cork. It shall be set in a waterproof cement, so applied to the tile and foundation as to achieve perfect adherence and hermetically seal and bind all joints. All cork tile to be furnished under this specification shall be installed by a contractor thoroughly experienced in this line of work.

If cove base is desired, state height required.

Note: The mention of our name will unmistakably identify the kind of material required and preclude the substitution of all inferior makes and imitations.

For Concrete Backing (Include in Mason Specifications for Floors)—All areas which are to have cork tile floors shall have a top surface or finish, not less than 1 in. thick, composed of 1 part Atlas portland cement (or equal); 2 parts screened sand and 5 parts clean, screened, anthracite cinders, troweled to a level, smooth sidewalk finish, exactly ½ in. below the required finished floor level, strictly in accordance with the directions of the cork tile contractor.

For Wood Backing (Include in Carpenter Specifications for Floors)—The wood floor on which the cork tile is to be laid shall be of good quality, at least ⅞ in. thick, dry, seasoned, dressed flooring, tongued and grooved, not over 6 in. wide. This flooring shall be laid with tight joints, perfectly smooth, even and level, and thoroughly well nailed. If laid over a concrete fill, this wood floor shall not be laid until this fill is absolutely dry. This work to be done strictly in accordance with the directions of the cork tile contractor.



Details of Installations of Diamond Seal Cork Tile, Cove Base and Treads

ECONOMART FLOOR CO., INC.

229-233 East 41st Street
NEW YORK, N. Y.

BRANCH OFFICES
BUFFALO, N. Y. BALTIMORE, MD.

Products and Services

RUBBER FLOOR TILE; CORK COMPOSITION FLOOR TILE; CORK FLOOR TILE.

We will install the above floor coverings or furnish them for installation by others.

Economart—the All Live Rubber Floor Tile

The superiority of *all live* rubber floor tile over rubber tile containing fabrics and other fillers is now generally conceded. Economart contains no fabrics or other fillers.

Economart contains *live rubber* and coloring only, thus its permanently high degree of resiliency and elasticity enables it to resist the heaviest traffic and most severe abrasion without pitting, chipping, cracking, peeling, roughing up or appreciably showing any signs of wear.

Economart can be installed over all smooth, hard, dry surfaces such as wood, cement, stone, etc. It is applied with rubber cement which grips it tenaciously and prevents it from warping or buckling.

Economart will not disintegrate and will never require any treatment to preserve its life or attractive appearance other than an occasional washing.

Economart has remarkable fire resisting qualities. Burning matches or lighted cigarettes do not mar its surface except for a slight discoloration which is readily removed with water.

Economart deadens the sound of traffic passing over it, permanently assures a firm foothold and can be adjusted to uneven floors. It is soft to the tread and will not tire persons walking upon it.

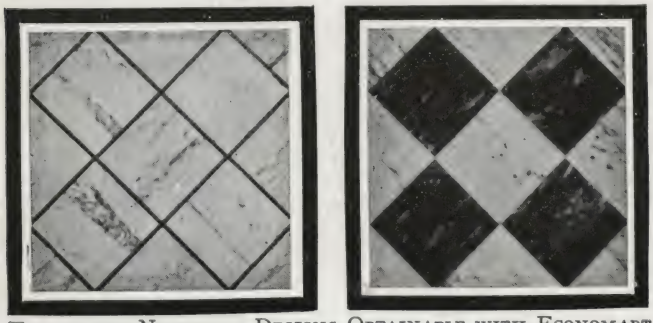
From the standpoint of longevity, Economart compares favorably with the most durable floor coverings known.

A floor covered with Economart is free from cracks and absolutely waterproof, thus it can be thoroughly washed or flooded without danger of seepage or absorption of moisture.

Cost—The cost of Economart *all live* rubber floor tile compares favorably with all other makes or types of rubber floor tile on the market.

Designs and Colors—The most pleasing designs and color effects can be obtained.

Colors are white, black, red and green, in solid colors or with veinings in imitation of marble. It can be laid in such designs as checker board effect of two colors, laid square or diagonally, or a solid field of any one color with ¼- or ½-in. joint of a contrasting color.



TWO OF THE NUMEROUS DESIGNS OBTAINABLE WITH ECONOMART ALL LIVE RUBBER FLOOR TILE

Standard Sizes—Square or oblong shapes from 3x3 to 24x24 in. Thicknesses, $\frac{3}{16}$ and ¼ in.

Border in any width from ½ to 12 in.

Sanitary cove and base usually 6 in. high.

Cork Composition Tile

Made of powdered cork, linseed oil, binder and coloring matter, resulting in a smooth, non-slippery, noiseless, sanitary, elastic and extremely durable floor covering.

Can be installed on all smooth, hard, dry surfaces such as wood, cement, stone, etc.

Easily cleaned with non-alkali soap and water to which a little kerosene has been added.

Colors and Designs—Colors obtainable are white, black, red, blue, green, light gray, dark gray, light brown and dark brown.

The design is usually a checkered effect of any two of the above colors, laid either square or diagonally. This can be varied by the use of a ¼- or ½-in. joint of a third contrasting color inserted between tiles. The border will follow the outline of the space laid. No half-tile or parts of tile need be used, except where tile is laid diagonally.

With the 9 colors listed above and with joint strips of the same colors, the number of color combinations is practically unlimited.

Special designs such as fraternity insignia, trademarks, etc. can be installed.

Standard Sizes—Square or oblong shapes, in sizes varying by inches from 3x3 to 12x12 in. Thickness, ¼ in. Special sizes made to order.

Border strips and filler in any width from ½ to 12 in. Sanitary cove and base, usually 6 in. high.

Cork Tile

Made from clean cork shavings of pure quality, resulting in a product that is the best possible to produce.

Can be installed on all hard, smooth, dry surfaces such as wood, cement, stone, etc.

Can be cleaned with soap and water.

Colors—Various shades of brown, from light to dark.

Standard Sizes—Squares of 6x6, 9x9 and 12x12 in. Border in 3-, 4-, 6- or 12-in. widths.

Standard thickness, ½ in.

Sanitary cove and base, 6 in. high.

Field of Application

All floor coverings described have been installed in kitchens, pantries, entries, bathrooms and sun porches of private residences and apartment houses, also in churches, stores, theaters, banks, office buildings, restaurants, schoolrooms, courtrooms, libraries, corridors, and in fact wherever silence, durability, beauty and comfort is a desideratum.

Also suitable for use on stair treads, with or without metal nosings.

NEW YORK BELTING & PACKING CO.

Rubber Tile Flooring

NEW YORK, N. Y., 91-93 Chambers Street
CHICAGO, ILL., 124-26 West Lake Street
PHILADELPHIA, PA., 821-23 Arch Street
ST. LOUIS, MO., 218-20 Chestnut Street
SALT LAKE CITY, UTAH, Felt Building
SAN FRANCISCO, CAL., 519 Mission Street
BOSTON, MASS., 65 Pearl Street
PITTSBURGH, PA., 420 First Avenue
MINNEAPOLIS, MINN., W. S. Norr Co., Second Avenue and Third Street

Products

INTERLOCKING RUBBER TILING.
ROMANTILE RUBBER FLOORING.

Interlocking Rubber Tiling

Interlocking rubber tiling is manufactured of high grade, wear resisting rubber in two skilfully designed tiles which interlock perfectly.

The impervious liquid cement employed in the laying hermetically seals the joints, rendering the floor absolutely waterproof and germproof, and making it impossible for the tiles to become separated or loosened from the underfloor.

INTERLOCKING RUBBER TILES
3/8 in. thick

Adaptability—The increasing use of rubber tiling demonstrates that the merits are well established.

Rubber tiling is universally recognized as the ideal floor for residences, churches, banks, office buildings, theaters, courthouses, clubs, hospitals, libraries, railroad cars, steamships, etc.

Wearing Quality—Floors of rubber tiling are wonderfully durable. Will last a lifetime under the most severe traffic conditions.

The resiliency of the rubber prevents wear resulting from the effects of abrasion and friction. The elasticity of the rubber saves it from cracking and becoming unsightly, as is sometimes the case with mosaic and marble floors.

Other Advantages—Rubber tiling is odorless, non-slippery, sanitary, non-absorbent, waterproof, fire resisting and noiseless.

Colors and Designs—Many artistic effects can be produced by combining any of the following colors: red, white, light and dark green, buff, salmon, black, light and dark gray, blue, light and dark brown.

Romantile Rubber Flooring

The type of rubber tile shown in the illustration below meets the requirements of a floor having rectangular units.

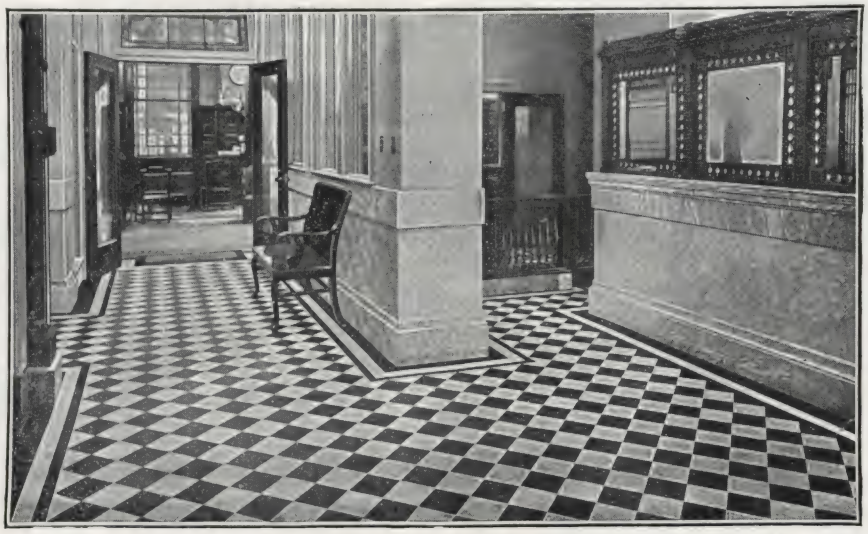
Designs with character and dignity can thus be produced to harmonize with any scheme of decoration.

Interlocking Rubber Nosing

Used in connection with rubber tiling, it forms a safe, non-slippery stair tread. Made in 5 sizes for iron, wood or marble steps, and in any color.

Catalogues and Samples

Full information, samples, and illustrated catalogue in colors will be sent on request.



OFFICE OF HARVEY FISK & SONS, NEW YORK, N. Y., LAID WITH 6x6-IN. ROMANTILE

E. N. BIEGLER MFG. CO.

Rubbertex Plastic Tile Flooring

GENERAL OFFICE AND FACTORY
2728-2740 North Rockwell Street and C. & N. W. R. R.
CHICAGO, ILL.

TELEPHONES
HUMBOLDT 0135-0136

AGENCIES IN PRINCIPAL CITIES OF THE UNITED STATES

Product

BIEGLER'S RUBBERTEX PLASTIC TILE FLOORING.

For Waterproofing and Dampproofing, see pages 68-69; for Biegler's Mas-Oleum Mastic and E-N-B Magnesite Composition Floors, see pages 416-417.

Service

We will contract to install Rubbertex tile floors complete or will furnish material together with Rubbertex tile cement and all applying materials, actual laying to be done by others.

We are prepared to furnish a complete flooring service and to furnish and install the various types of flooring and floor covering best suited to the requirements of the particular installation in question. Inquiries are solicited.

Biegler's Rubbertex Tile

Biegler's Rubbertex tile is composed of asbestos fibre and finely divided cork with a combination of vegetable and mineral rubber as a binder, together with the necessary coloring pigment.

This tile has been developed to furnish at a moderate price a flooring or floor covering which is exceedingly durable, resilient, warm and comfortable under foot, and pleasing in appearance, color and design. It is also waterproof, acidproof and alkaliproof, dustless and sanitary in every way.

Rubbertex tile floors can be laid in a number of pleasing color combinations and a wide range of patterns and designs, including field and border, panel or checkerboard designs in two or more colors.

Colors—Green, red, brown and black.

Sizes and Thicknesses—Standard sizes, 9x9 in., 12x12 in. and 12x24 in. Borders and inserts of any desired width can be furnished.

Standard thickness, $\frac{1}{8}$ in. Heavy thickness, $\frac{3}{16}$ in. Special thicknesses of $\frac{1}{4}$ in. and more can be furnished when required.

Continuous Surface and Seamless Floors—Standard Rubbertex tile floors are laid tile effect with tight joints, the adjoining tile thoroughly cemented together with waterproof cement, giving a tight and sanitary surface. Where a continuous and seamless surface is required, this is obtained by finishing a standard Rubbertex tile floor with one or more thin coats of plastic Rubbertex.

Coved Base—Rubbertex tile flooring can be carried up against a suitable foundation to form a coved base of any desired height. Special flexible material is usually furnished for covering coved base and is fitted and moulded on the job.

Stair Treads—Rubbertex tile is especially suited to stair treads and landings, not only on account of its great durability and wearing qualities, but because it is non-slip and provides a safe footing. Stair treads are either cut from standard sizes on the job or made up in special shapes and sizes as ordered.

Repairs—Should Rubbertex tile floors be damaged by accident or eventually by excessive wear, a perfect repair can be made by applying sufficient of the same material in plastic form to bring the flooring back to its original thickness and to a smooth condition. Repairs of this kind make a perfect bond with the original Rubbertex tile floor even to a feather edge and can not be detected after a few days use.

Uses of Rubbertex Tile

Rubbertex tile floors give satisfactory economical service and pleasing appearance in the following spaces:

School buildings; hospitals (wards, rooms, corridors, etc.); office buildings and office spaces; toilets, wash rooms, locker rooms; chemical and other laboratories; public institutions, jails, etc.; telephone and telegraph buildings; electric power houses and substations; spaces used for light manufacturing; railway coaches; ships (as a deck covering applied directly over steel decks).

Application of Rubbertex Tile

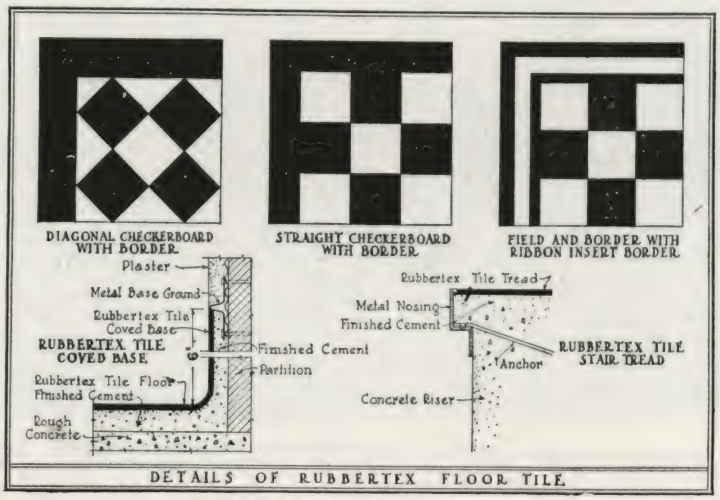
Sub-Floors—A hard sound smooth *finished* cement floor is the best foundation or ground upon which to apply Rubbertex tile floor.

Coved Base—When Rubbertex tile coved base is required, a coved base of *finished* cement or other *finished* material should be provided as a foundation upon which to apply the Rubbertex material.

Stair Treads and Platforms—Where Rubbertex tile stair treads and platforms are specified, treads and platforms should be provided with a metal nosing, so set that specified thickness of Rubbertex when applied to treads or platforms will finish flush with top of nosing.

Old Cement, Terrazzo, Marble or Composition Floors—Rubbertex tile can be applied to old cement, composition, terrazzo or marble floors or stairs without seriously interrupting the use of the rooms or corridors.

Wood Floors—Old or new wood floors usually require special preparation before the Rubbertex flooring is applied. Where the Rubbertex tile flooring is contemplated over wooden floors, we should be consulted in each particular case.



DETAILS OF RUBBERTEX FLOOR TILE

Specifications

All floors, stair treads and platforms (here mention location) shall be covered with Rubbertex tile flooring as manufactured by E. N. BIEGLER MFG. CO., 2730 North Rockwell Street, Chicago, Ill. Size to be ..... Colors to be ..... Design (here mention design such as field and border, checkerboard and border, etc.). All Rubbertex tile to be laid in waterproof cement in strict accordance with manufacturer's directions.

Note: Where Rubbertex tile coved base is desired, specify that *finished* cement base is to be covered with Rubbertex tile.

WRIGHT RUBBER PRODUCTS CO.

Manufacturers of Wright Rubber Tile

RACINE, WIS.

NEW YORK OFFICE
103 Park Avenue

Product

The **Wright Rubber Tile** for floors and stair treads.

Description

The Wright Rubber Tile is a composition of rubber and other wear-resisting materials, specially prepared, through a new and exclusive process, to give the highest type of satisfying service.

Where Used

Because it embraces all the attributes of durability, cleanliness, noiselessness and fine appearance, so desirable in a floor covering, the Wright Rubber Tile is the ideal floor for all classes of service and is particularly adaptable to certain specialized varieties of service. It furnishes a very real solution of the always troublesome floor problem in factories, banks, churches, offices, libraries, hospitals, hotel and apartment corridors, schools, theatres, restaurants, etc., as well as in many residence rooms such as sun porches, billiard rooms, kitchens, bathrooms, pantries, etc.

Durability

The toughness of the materials composing the Wright Rubber Tile gives it a wearing quality which is remarkable. Without grain, it will not splinter. Unlike concrete, it is not hard or brittle and is guaranteed not to crumple or "dust." Properly installed and cared for, a Wright Rubber Tile floor will wear for years under the heaviest traffic because of its great resistance to abrasion. Not susceptible to temperature changes, to any appreciable degree, Wright Rubber Tile will not curl or warp.

Advantages

Wright Rubber Tile is equipped with patented, interlapping flaps. These flaps are provided with countersunk holes which make it possible to both nail and cement Wright Rubber Tile to wood, cinder concrete or any nailable surface. (See Figs. 3 and 4.)

Wright Rubber Tile is adaptable for use with all styles of fireproof and sanitary bases and with concrete marble and terrazza borders. (See Fig. 2).

Wright Rubber Tile is unsurpassed as a durable, noiseless and sanitary covering for stair treads. (See Fig. 1).

Cleanliness

Wright Rubber Tile wipes clean with a wet mop or cloth. Easy to clean and keep clean. Powdered cleansing agents or scrubbing brushes can also be used freely without injury to Wright Rubber Tile.

Sanitary

Non-absorbent on surface and at edges. Joints are close and absolutely sealed with insoluble cement. There are no pores, open joints or seams to take up water or harbor dust and disease germs.

TRADE MARK

Non-staining

Ink, grease, antiseptic solutions and almost every other commonly known staining and soiling agent have no effect on Wright Rubber Tile.

Noiseless

The peculiar composition of Wright Rubber Tile gives it a pleasing resiliency under foot which makes it noiseless and comfortable to walk on. It does not "draw" the feet or cause fatigue. Gives a reassuring footage that prevents slipping.

Non-odorous

Wright Rubber Tile gives off no perceptible odor when first laid nor at any time during its long life.

Appearance

Wright Rubber Tile can be furnished in a wide variety of colors that are suitable for any use, however artistic the surroundings may be.

Colors

Plain, mottled or grained effects may be had in extensive variety. All colors are permanent. The colors in Wright Rubber Tile permeate its entire thickness and will appear just as distinct and fresh after years of service as it did the day it was installed.

Samples

Samples will be sent to architects on request. Or, if preferred, we will advise with you if you will tell us the color scheme.

Estimates

Estimates from blue prints and description or specifications furnished promptly. Where desired we can also arrange to supervise the installation of Wright Rubber Tile anywhere in the United States.

Cost

Costs of Wright Rubber Tile vary with market conditions, labor charges, transportation and many other factors differing geographically from time to time. Yet, at any price within reason, Wright Rubber Tile is not expensive when consideration is given to its long life in service and its many distinct features of superiority over other flooring materials.

Production

We are able financially and mechanically to fill orders of any magnitude and deliver them at destination by date stipulated, insofar as we are obligated by circumstances within our control.

Guarantee

All our materials are covered by our guarantee comprehending first class workmanship, wear and color permanence.

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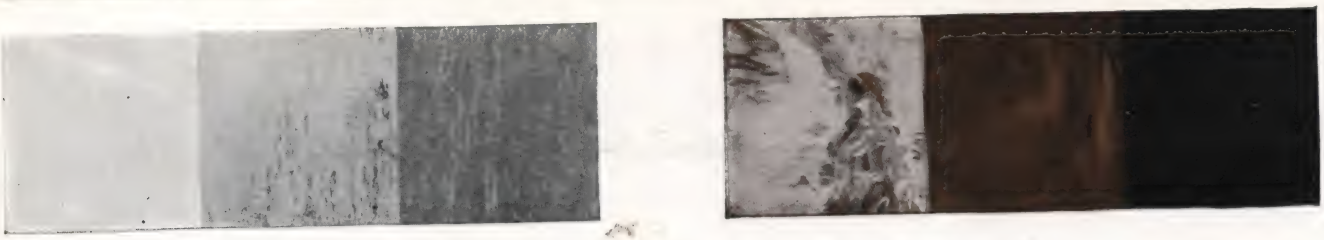
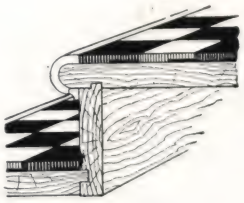


Representative Group of Effects Obtainable with Wright Rubber Tile

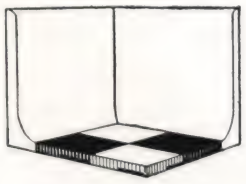
Possible Color Effects

Beautifully artistic color effects are being obtained through the use of Wright Rubber Tile. Where the architect is faced with the problem of specifying floors that will harmonize with marble, painted stucco and plaster or any of the various natural or stained wood trims, he can now obtain Wright Rubber Tile in the desired color with the proper grain or mottling. And when he specifies Wright Rubber Tile he can be sure that he is recommending a tile that will retain its original coloring. Like some of the fine grained hard woods, Wright Rubber Tile takes on a beautiful lustre through wear.



(FIG. 1)

For stairs, halls and entrances, Wright Rubber Tile is an ideal covering. Durable, noiseless and sanitary, it is restful to walk on.



(FIG. 2)

Wright Rubber Tile is adaptable for use with all styles of fire-proof and sanitary bases, and with concrete, marble and terrazza borders.

Pattern Arrangements

Color possibilities and pattern arrangements are unlimited. Laying in squares to conform with the shape of the room with surrounding lines of another color is an effective and generally popular treatment.

Decorative Quality

Since the advent of Wright Rubber Tile, floors are no longer considered merely the foundation for carpets and other coverings. For now builders are beginning to realize that properly tiled floors have a decorative quality as well as their well recognized one of serviceability.

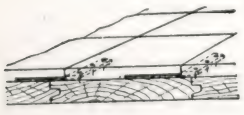
It is doubtful whether there is anything lovelier than an entrance hall in a fine home with black and white marble blocks running crosswise. With Wright Rubber Tile it is possible to obtain this effect and yet enjoy the many added advantages of rubber tile.

Noiseless, non-absorbant, easy to clean and non-staining Wright Rubber Tile overcomes the disadvantages of other tiled floors.

Appropriate Uses

Wright Rubber Tiled floors may be waxed and polished. When given proper care they are a credit to the most luxurious surroundings. While many people still believe that tiled floors should be confined to halls, kitchens, baths, churches, clubs, theatres and offices the adaptability of Wright Rubber Tile to any surroundings is causing it to be recommended for floors in living, dining and bed rooms in homes and apartments as well as for general flooring in:

Auditoriums
Asylums
Banks
Bakeries
Barber shops
Bowling alleys
Busses
Capitols
Court houses
City halls
Dance halls
Elevators
Factories
Soda fountains
Forts
Gymnasiums
Garage show rooms
Hospitals
Hotels
Jails
Libraries
Laundries
Lodge rooms
Laboratories
Lavatories
Museums
Natatoriums
Pool halls
Postoffices
Restaurants
Railroad cars
Stations
Stores
Ships
Schools
Settlement houses
Street cars
Undertaking establishments
Wash rooms, etc.



(FIG. 3)

Wright Rubber Tile may be used over either wood or concrete floors. Exclusive interlapping flaps make possible nailing as well as cementing Wright Rubber Tile to the floor.

Co-operation With Architect

We are always at your service to submit laying specifications and recommendations covering the installation of Wright Rubber Tile on any commission you may submit. Or if preferred we will, upon request, furnish you with standard specifications for laying Wright Rubber Tile.

Our organization is equipped to supervise the laying of Wright Rubber Tile anywhere in the United States. It is our aim to co-operate with you in securing an entirely satisfactory installation whereever Wright Rubber Tile is specified.

Upon receipt of a detail color sketch showing the graining or mottling effect desired, we will be glad to furnish samples which the architect may use to show his client. If blue prints are sent us, we will submit estimates covering the approximate cost of the Wright Rubber Tile needed for the job. Complete specifications for laying each floor will accompany the estimate.

Architects who are seeking the most satisfactory, long wearing, well appearing flooring, should investigate the Wright Rubber Tile.

(FIG. 4)

The interlapping flaps of Wright Rubber Tile squares are provided with counter sunk holes for nailing to wood or cinder concrete floors.

JUNIUS H. STONE CORPORATION

Rubberstone Flooring, Pure Cork Tile and Architectural Acoustics

1400 Broadway
NEW YORK, N. Y.

For Branch Offices, see page 1800

Products

RUBBERSTONE FLOORING; PURE CORK TILE; ARCHITECTURAL ACOUSTICS.

For Corkboard, Corkboard Finish, and Cork Pipe Covering, see page 1800.

Rubberstone Floor Covering

Rubberstone is made in sheet or tile form, 12x12 in., 12x24 in. and 12x36 in. in two thicknesses: Standard, ⅛ in., and Heavy, $\frac{3}{16}$ in.

It is composed of india rubber, mineral rubber, asbestos fiber, cork and coloring matter.

Rubberstone is laid in a plastic, waterproof cement which fills and seals the joints. This process gives, in effect, a continuous, one-piece floor covering that is practically an integral part of the underlying floor. It can be started and stopped at any given line without regard to edges because it can be laid to a featheredge and bonds perfectly with the underlying floor. There are no seams to open up and it will not crack, wrinkle, crawl nor become loose. It has a smooth, even surface that is improved by traffic.

Rubberstone can be laid without interrupting the normal use of the premises when necessary, the work being done at night, or it can be laid between Saturday noon and Monday morning.

Its outstanding superiority is that worn spots can be brought back to their original thickness and value easily and quickly by applying the same material in plastic form which bonds perfectly even to a featheredge with the original flooring, the patch being quite invisible. Furthermore, slight injuries to the flooring heal themselves under traffic instead of becoming worse and requiring patching as is the case with all other floorings.

Under ordinary conditions, Rubberstone will last as long as the building in which it is installed.

Rubberstone resists perfectly the action of sulphuric, nitric and hydrochloric acids and concentrated alkalis. It is therefore specially suited for flooring and table tops in chemical plants and laboratories. Rubberstone is impervious to moisture. It can be washed or scrubbed with any cleansing agent without injury. There are no pores, or open joints or seams to take up water or harbor dust and disease germs. Moreover, it does not originate dust.

It can be coved and carried up on the walls as desired for sanitary purposes and to facilitate cleaning.

The rubber and cork give Rubberstone a pleasing resiliency under foot and a warmth and quietness that is very valuable. It does not cause foot soreness and fatigue like hard unyielding floors. Where trucks are used, its resiliency does away with a large amount of the noise that such trucking always causes.

It has a peculiar holding quality which prevents slipping, yet when waxed, makes an excellent dance floor.

Rubberstone is fire resisting and will not carry flame. Burning matches do not injure it.

Rubberstone is a high non-conductor of electricity. A recent test at one of the New York powerhouses showed it to be a perfect insulator at 16,000 volts, the limit of the testing instruments used.

It is made in terra cotta, olive green, brown and black. It presents a pleasing dull finish like an eggshell gloss, which can be brightened by waxing.

Rubberstone can be successfully installed by any one. Skilled labor is not required, although it is desirable to have an experienced man direct the installation of large work. We are prepared to furnish such men and we also install the flooring complete.

It is suitable wherever linoleum, magnesite or mastic can be used. It is not recommended where appreciable quantities of oil or grease remain more or less continuously on the floor or where heavy trucking is done.

Pure Cork Tile

This floor covering, first manufactured in 1896 by Stone & Duryee at Bridgeport, Conn., has gained wide popularity and use for all places where a high grade, noiseless, durable floor is required.

It is manufactured in tile form, ½ in. thick, sizes 12x12 in., 6x6 in., and 4x4 in.; also in strips for borders, 36 in. long by 12, 6, 4 and 3 in. wide. There are three colors: dark, medium and light, the shading being determined by the baking temperature used.

Pure Cork Tile is manufactured of selected, fine quality, ground cork and cork shavings, and the process of manufacture consists of compressing and baking in closed molds, the same as Pure Corkboard. (See page 1800.)

Cork Tile is recommended particularly for banks, libraries, gymnasiums, museums, billiard rooms, and wherever a quiet, durable, artistic, non-slip floor, at reasonable cost, is desired.

Architectural Acoustics

We maintain an expert Engineering Department to assist architects, without charge, in avoiding acoustical troubles and also in correcting those that exist. For proposed auditoriums, banks or other buildings, we can foretell with accuracy from the plans what the acoustical results will be, when the architect's mental conception is "frozen into stone."

The use of hard wall, ceiling and flooring materials in modern construction is usually responsible for poor acoustical conditions. The solution in such rooms lies in the application of highly sound absorptive materials to insure the complete dying out of sounds within the proper time after they originate. The area of treatment and its proper location must be determined by our engineers.

The main sound absorbing element in Stone's Acoustical Treatment is a chemically cleansed hair felt. It is free from attacks by vermin and rodents, and is strongly reinforced. It is usually used in 1 in. thickness. The felt is covered and concealed by a strong cloth stretched to drumhead tension. The membrane is then decorated in color desired with Stone's Flexolite Fabric Coating.

This treatment is used extensively in banking and office buildings on the ceilings of noisy work spaces. In the average office, this treatment will reduce all noises 70%.

THE STEDMAN PRODUCTS COMPANY

Manufacturers of Stedman Naturized Flooring

SOUTH BRAINTREE, MASS.

NEW YORK OFFICE AND DISPLAY ROOMS, 101 Park Avenue
AGENTS IN ALL LARGE CITIES

Products

STEDMAN NATURIZED FLOORING (Patents pending): Square and Rectangular Tiles, Runners and Panel Strips in marble, granite and rug effects, solid colors and tones.

Also Wainscoting; Sanitary Bases; Stair Treads; Interior Decorative Units; Wall Coverings; Table and Desk Tops; Drain Mats.

Stedman Naturized Flooring

Description—A product formulated from rubber, reinforced with cotton fiber under vulcanizing heat and great hydraulic pressure, resulting in a material so integrally tenacious as to withstand the shock of severest traffic abrasion. Adamantean, yet resilient. It is laid over wood or concrete to which it is adhered by a waterproof cement.

Uses—Hospitals, banks, hotels, residences, clubs and public buildings for both work spaces and public corridors, light industrial buildings, department stores, laboratories, barber shops, schools, libraries, churches, auditoriums, boats, railroad trains, elevators; in brief, any floor subject to heavy pedestrian wear, requiring cleanliness, freedom from relaying, and good appearance together with silence, foot-comfort, and low maintenance cost.

Advantages—*Appearance*—In its sheer beauty and gracefulness of color and texture, it is completely satisfying to the eye. Its color and variegations are permanent, while the mottlings or veinings run through the entire thickness of the material. To the architect and the decorator, its appeal is both specific and general as from its wide range of types any scheme or motif may be completed.

Noiselessness — It possesses in full the property of being non-resonant and non-vibrant. Yielding slightly to footfall, it produces quietness.

Comfort — It furnishes true comfort under foot, as to shock absorbing qualities, temperature and sure-footedness. The fiber reinforcement prevents "drawing" of the feet and provides a reassuring tread.

Maintenance — Waxing or oiling is not necessary. Proper washing or wiping keeps floor and surface in a permanently efficient condition.

Durability—The combination of rubber and cotton fiber is one of the toughest known in rubber manufacture. By test its abrasion resistance equals, and in some cases exceeds, marble. It does not indent under standing or moving furniture. Installations of selected severity have not in 8 years indicated its probable life.

Sanitation—Manufactured under tremendous hydraulic pressure which results in a material of great density, whose body is pleasingly resilient, while its surface is slightly glazed and non-absorbent. Almost every common soiling or staining agent, ink, antiseptic washes, grease and urine have little or no effect upon it. Its joints are close and easily sealed with insoluble cement. It does not generate dust. It is non-odorous.

Fire Resistance—It possesses to a high degree the virtue of being non-combustible.

Continuous Availability—Replacement in case of accident, or repairs to pipes and conduits is easily made without marring its appearance. Unbroken tenancy of spaces is insured as refinishing of floor is never required.

Limitations—Stedman Naturized Flooring should not be laid on basement floors nor where it is continually subject to contact of strong acids or alkalis, oils or moisture. It should not be laid out-of-doors.

Colors—Plain, veinings, blendings, and paisley effects. Certain examples are provided for hospital use; others for the bank, the shop or the residence. Blended types are obtainable which neutralize the effects of heavy foot traffic. The different notes of cheerfulness, gaiety, impressiveness or dignity may be struck; harmonizing effects and contrasts are equally available through its unlimited variety of types.

Construction—Built after 10 years' experience in chemistry, processes, and actual floor-test installations. All manufacturing processes are under accurate control and include several secret formulae, the use of which eliminates the shortcomings of the old type rubber flooring.

STEDMAN NATURIZED FLOOR IN RECEPTION HALL OF MCKIM, MEAD & WHITE, NEW YORK, N. Y.

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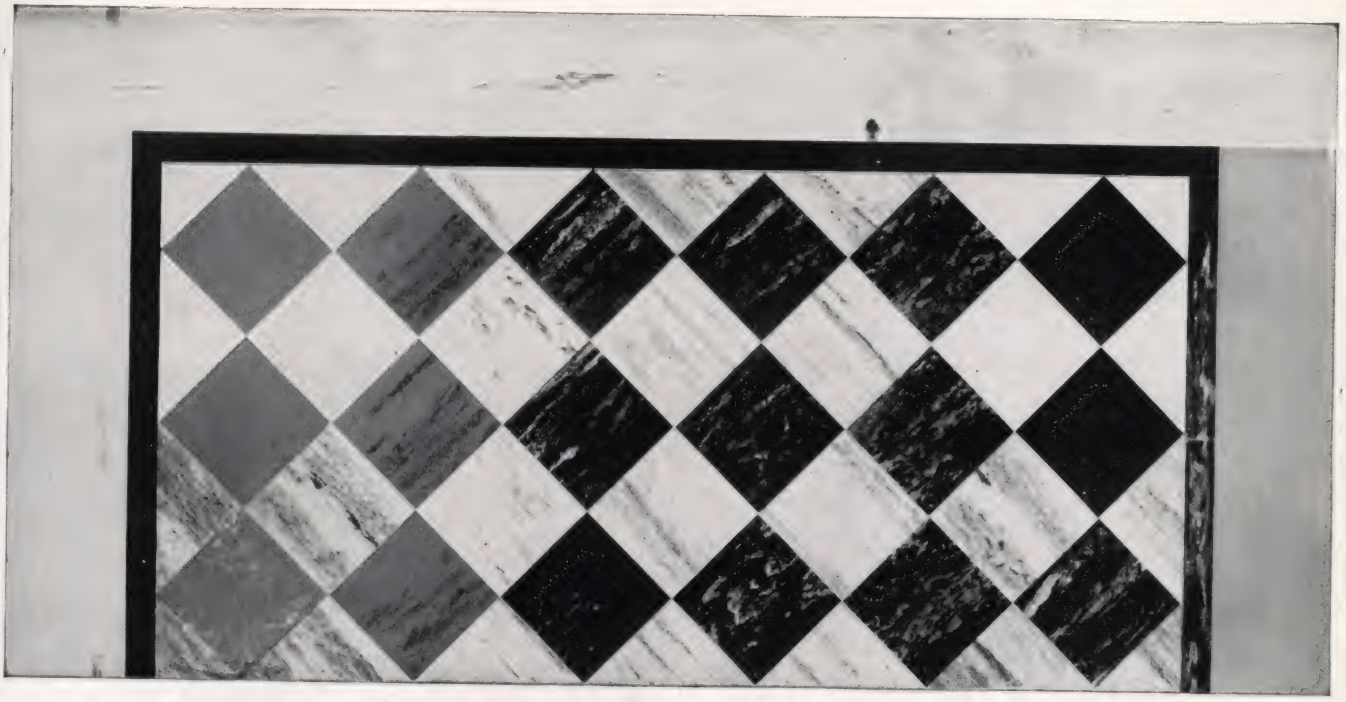
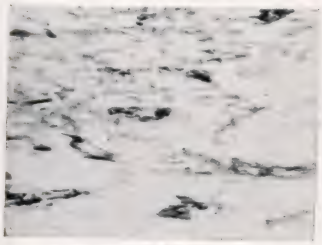
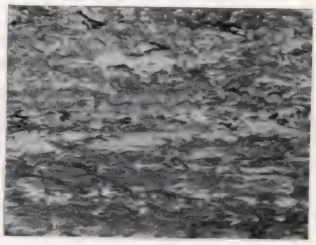



O

Red

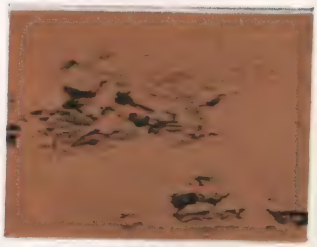
Buff

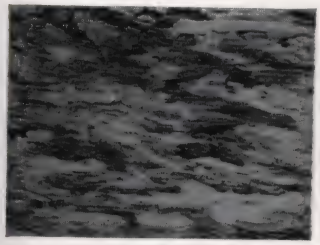

O. S.

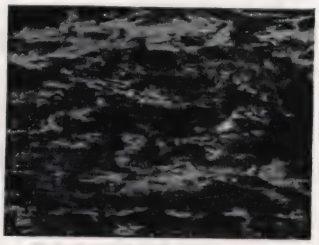
Gray

B. W.

W. R. B.

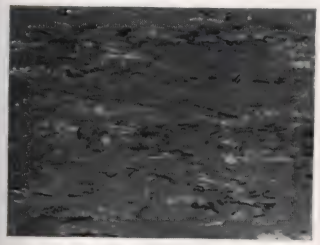

Buff-Black

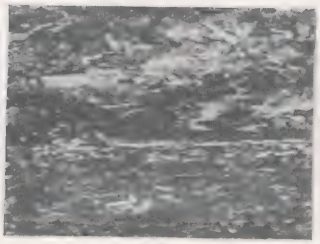

R. B.


B. R.

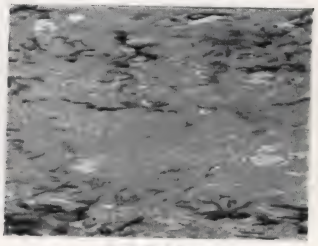
White

Black Paisley


Gray Paisley


R. W.

Black


Red Paisley

REPRESENTATIVE GROUP OF COLORS AND TYPES OF STEDMAN NATURIZED FLOORING

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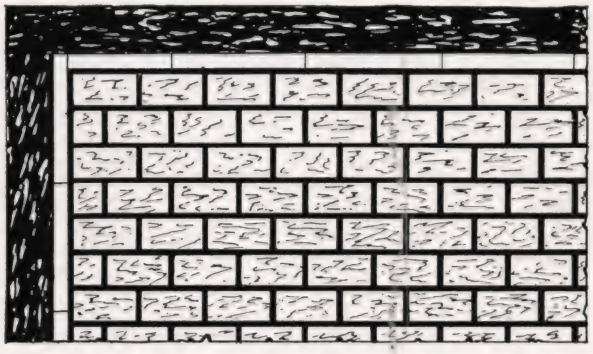
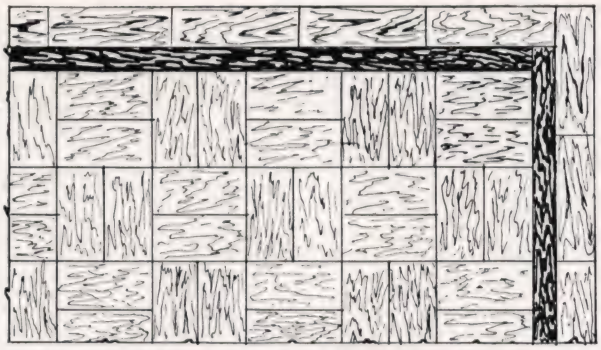
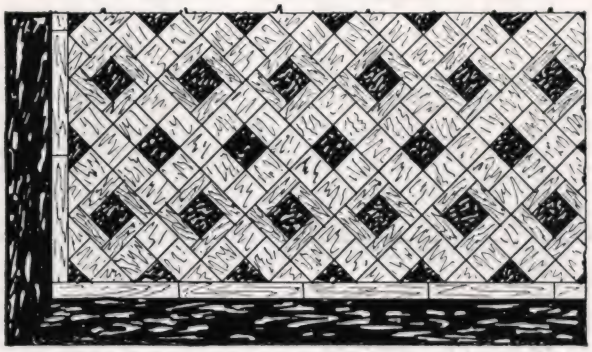
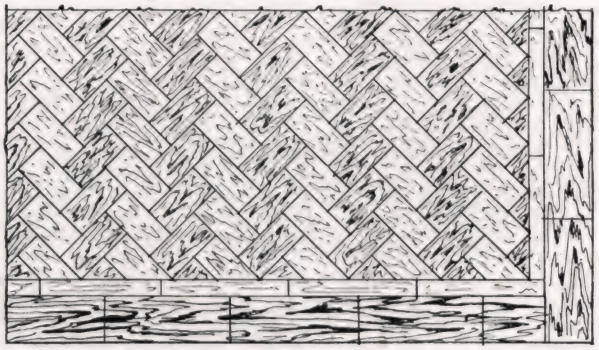
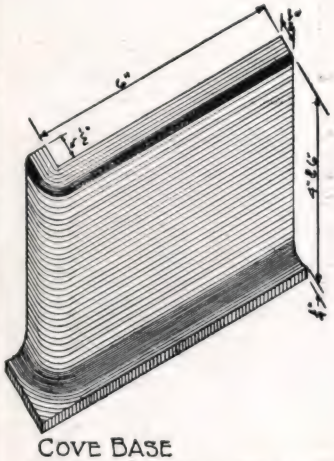


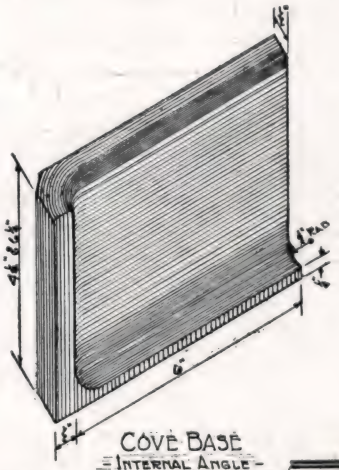




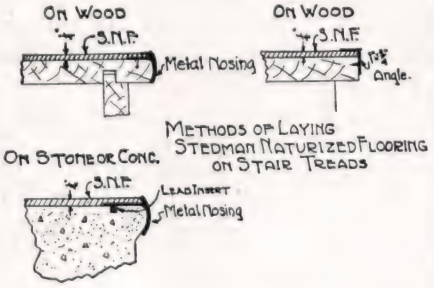


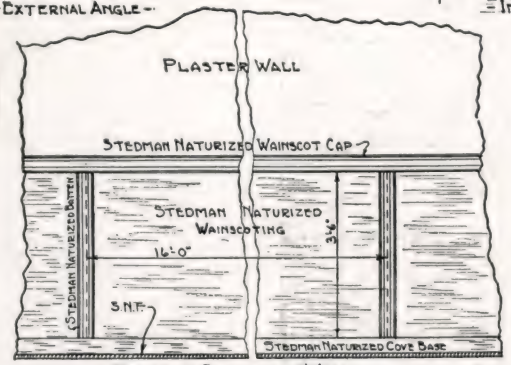


COVE BASE
-EXTERNAL ANGLE-

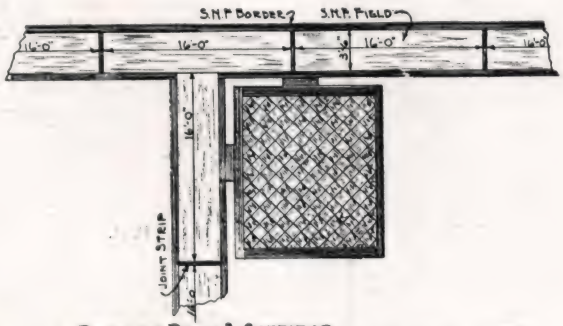


COVE BASE
-INTERNAL ANGLE-





DETAIL – SECTION OF WALL
SUGGESTION - SHOWING APPLICATION OF STEDMAN NATURIZED PRODUCTS



PLAN OF ROOM & CORRIDOR
SHOWING APPLICATION OF STEDMAN NATURIZED FLOORING
USING 16'-0" × 3'-6" SHEETS & STANDARD SIZE TILE

STEDMAN NATURIZED FLOORING

Continued on next page

Production—We are financially and mechanically equipped to take orders of any magnitude.

Samples—Samples will be sent to any architect on request, or tell us the color scheme and we will advise with you.

Estimates—Floor requirements promptly estimated from blue prints and description or specifications, wherever located.

Costs—Costs vary with market conditions, labor charges, transportation, and many other factors differing geographically and from time to time. In large cities in the East, Stedman Naturized Flooring is now being laid for $0.40 to $2.00 per sq. ft., thus making it in years of service one of the cheapest floors in its utility group because of its low upkeep cost.

Technical Data—*Sizes of Tile*—
Squares, 6x6, 9x9, 12x12, 18x18, 20x20, 40x40 in.
Rectangles, 6x12, 9x12, 9x18, 12x18, 12x24, 18x24 in.
Runners, 16 ft.x40 in.
Borders—Proportionate.
Thickness—
Tile, 3/16, ¼, 3/8, ½ in.
Runners, ⅛, 3/16, ¼ in.
Wainscoting 1/16, ⅛, 3/16, ¼ in.
Wall coverings, 1/16, ⅛, 3/16, ¼ in.
Colors—Mottled; a wide variety of marble and granite effects. Paisley; a skilful blending suggesting tapestry and rug types. Solid colors; a complete range.
Designs—This product may be laid square, diagonally, in rectangles or any of the conventional forms. With it the herringbone, log cabin, basket weave or ashlar designs are obtainable. It may be also laid at random both as to color and size or in special designs per template.

The New Product—Stedman Naturized Flooring is now available in long runners, especially suitable for corridors as well as spaces where a tile effect is not desired. Its size admits of its use in wainscoting, paneling and wall covering besides special flooring designs.

For wall use only, the new oatmeal and grasscloth effects are extremely interesting.

Guarantee—All installations are covered by our guarantee comprehending first class workmanship, wear, service and color permanence.

Special Flooring Service

We have made a study of the flooring requirements of hospitals and are prepared to furnish special installation treatment where advisable. This product fulfils all the points held to be requisites by the American Hospital Association Flooring Committee.

For factory service we have provided a very durable material which will make for increased individual efficiency because of its quietness, comfort and sanitary features.

For interior decoration, many beautiful and harmonious effects are possible through the adaptation of Stedman Naturized Flooring to special purposes, such as walls, wainscoting, paneling, table tops and desk tops, counter display and kindred uses. The new variegated types now available in long lengths open up a wider field of uses wherein the architect or decorator may achieve new and important results.

Specifications for Stedman Naturized Flooring

Note—(Stedman Naturized Flooring lays over any smooth, level and dry surface of wood or concrete. Allow 5/16, 7/16 or 9/16 in. for corresponding ¼-, 3/8- or ½-in. thicknesses of Stedman Naturized Flooring, according to type selected).

In spaces so indicated, furnish and apply Stedman Naturized Flooring made by The Stedman Products Company, South Braintree, Mass., in accordance with manufacturer's directions throughout, using cement supplied by them for bed and joints.

Preparation of Wood Floor—In all spaces designated as "Stedman Naturized Flooring," bring under flooring within 5/16, 7/16 or 9/16 in. of the required finished level. The under floor shall be not less than ¾-in. tongue and groove flooring, not more than 4 in. wide, driven in tight and blind nailed. Secure all ends of boards and bring irregularities to a smooth surface.

Preparation of Concrete Floor—In all spaces designated as "Stedman Naturized Flooring," bring the surface of the concrete within 5/16, 7/16 or 9/16 in. of the finished level and trowel smooth. Over a cinder concrete or coarse stone concrete, use a top dressing of 1 to 3 cement and sand, at least ½ in. in thickness and finish at the level clearance, above mentioned. Concrete which has been frozen or has a choppy or crumbly surface can not be accepted. Work must be completed at least 2 weeks before ready to lay the Stedman Naturized Flooring, and must be dry.

Laying—At least 2 weeks after concrete has set and when thoroughly dry, sweep carefully of dust and remove any lumps or roughness. Lay the Stedman Naturized Flooring in the cement supplied by The Stedman Products Company, using little or more as necessary to preserve an even surface at the joints. Lay with a slide or "push" motion to insure complete coating of all contact edges.

Base—Where called for, shall be set even and straight, flush with floor and to come ⅛ in. in advance of finished wall surface tile, or plaster.

Cleaning Up—Soon after laying and before it finally hardens, wipe up all surplus cement with cloth moistened with alcohol and leave the floor clean, smooth and level, covering it with sheathing paper.

Stedman Naturized Floor in Henrici's Restaurant, Chicago, Ill.
Richard E. Schmidt, Garden & Martin, Architects, Chicago, Ill.

Stedman Naturized Floor in C. C. Harvey Co. Piano Showroom, Boston, Mass.
Kilham, Hopkins & Greeley, Architects

MAPLE FLOORING MANUFACTURERS' ASS'N

Maple, Beech and Birch Flooring

Stock Exchange Building

CHICAGO, ILL.

Products

MAPLE, BEECH, and BIRCH FLOORING standardized, trade-marked, and guaranteed as to grade and manufacture.

Slogan

Floor *with* Maple
Beech *or* Birch

General Characteristics

Although Maple, Beech and Birch represent a versatile range so far as color possibilities and uses are concerned, the three woods are closely related in general characteristics.

All three are close grained, hard fibered, free from slivering and splintering, and polish under friction in a way which increases their wearing qualities.

All three have natural beauty when given a wax or varnish finish, and are suitable for use in any room of a fine dwelling, as well as for hard industrial service.

All three have a subdued grain pattern, in keeping with the changing taste, which is away from gaudiness in woods.

All three are particularly clean and sanitary, since the closeness of their grain and the smoothness of their surface afford no lodging place for dirt or germs.

Individual Characteristics

Maple—This flooring is dense, strong, heavy, and very hard, and is supremely durable. The color of the heartwood is brownish and the sapwood is much lighter. There is no difference in wearing qualities between the two colors. The grain is close—sometimes curly or birdseye.

Maple has unusual ability to resist pointed pressure without abrasion. It takes a high polish but is too tight grained for extensive staining.

Beech—This wood shows slightly more grain pattern than Maple and has slightly more color when varnished or waxed. In physical properties it is so close to Maple that it is frequently used in Maple's stead.

Beech takes a beautiful stain.

Birch—The ability of Birch to take color stain is so well known from its uses for other purposes than floors as to need little comment.

The fact that is ordinarily not known about Birch is that the natural wood takes a colorful finish and makes a beautiful and serviceable floor.

Wearing Qualities

Tests show, in the order named, the following comparative values for wearing qualities, under practically the same conditions, of woods used for flooring:

(1) Maple
(2) Beech and Birch
(3) Oak, quarter sawed
(4) Yellow Pine, quarter sawed
(5) Fir, quarter sawed.
(6) Oak, plain sawed
(7) Yellow Pine, plain sawed
(8) Fir, plain sawed
(9) Norway Pine
(10) White Pine

Soft wood Maple

A CONTRAST IN CLEANLINESS AND COMFORT

A comparative illustration, showing how a soft wood has worn alongside Maple, where both have been subject to the same traffic conditions for 18 years

MAPLE OUTWEARS STONE

Maple floor and a stone sill—a familiar sight in older buildings, which demonstrates the greater wearing tenure of Maple

Continued on next page

Beauty

Due to their leadership in wearing qualities, these woods have sometimes been stressed for service uses, to the exclusion of any consideration of their beauty. And yet no one who has seen the mirrorlike luster of a dance floor can deny that such a floor has beauty.

Color Possibilities

Maple shows an attractive golden hue under varnish, and this color mellows and ripens with passing years.

Beech and Birch, in addition to their natural colors, will take a variety of stains which open new and alluring possibilities to the home builder who wishes to try rich and unusual harmonies in flooring.

Standardization

MFMA flooring is made to accurate specifications. This accuracy is attained by the use of steel gauges and by impartial inspection by a traveling representative of the Association.

MFMA Grading Rules

Maple, Beech, and Birch are sold in standard grades, described in accurate detail in a book of grade rules which may be had on application to the headquarters of the Association.

Uses of the Different Grades

Clear—This grade is the first quality. It makes the most durable and desirable floor for any building, and is particularly suited for fine homes, apartment buildings, churches, clubs, dance floors, gymnasiums, hospitals, hotels, office buildings, public buildings, roller skating rinks, schools, stores and other buildings where fine appearance as well as wear is desired.

No. 1—Is the second quality—just as serviceable as Clear, and can be used in the same type of buildings as Clear, when slight imperfections in appearance are admissible. The No. 1 grade is also used for finer industrial floors.

THE BRUSH TEST IN TEXTILE MILLS AND OTHER BUILDINGS WHERE CLINGING PARTICLES FALL ON THE FLOOR

The complete absence of splintering, slithering, or even roughness, is shown

Factory—Is the third grade. It will give excellent satisfaction in factories, creameries, granaries, mills, warehouses, workshops, or at mines, on farms, etc. Where a low priced floor is wanted for wear, nothing better than this grade can be obtained at a relative cost.

MAPLE, BEECH AND BIRCH, MATCHED STOCK

	Faces	Grades
Standard thickness, $\frac{13}{16}$ in.	$1\frac{1}{2}$, 2, $2\frac{1}{4}$, $3\frac{1}{4}$	Clear, No. 1, Factory
Special thicknesses,		
$1\frac{1}{16}$, $1\frac{5}{16}$, $1\frac{1}{4}$ in.	2, $2\frac{1}{4}$, $3\frac{1}{4}$	Clear, No. 1, Factory
$\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ in.	$1\frac{1}{2}$, 2, $2\frac{1}{4}$	Clear and No. 1 only

Uses of Different Thicknesses

The $\frac{13}{16}$-in. thickness of Maple, Beech, and Birch flooring is most commonly used. It can be laid directly on the joists, or on strips embedded in cement when the latter is used for fireproofing, but is more frequently laid on a subfloor.

For ordinary purposes a diagonal subfloor made of soft wood boards surfaced one or two sides is sufficient. This may be used for the work floor during the progress of building and the hardwood floor should not be laid until the building is dry.

For factories and warehouses where greater strength and slow burning construction are required, the subfloor should be made of matched soft wood $1\frac{3}{4}$ in. thick.

The $1\frac{1}{16}$-in. thick hardwood flooring is sometimes preferred when the floor is to be subjected to extraordinary strain, but the $\frac{13}{16}$ in. is suitable for general purposes.

The $\frac{3}{8}$-in. thickness is the most popular thickness under $\frac{13}{16}$-in. It is superior to parquetry, because the sides and ends of the flooring are matched so that it can be laid with the nails entirely concealed, and they can not work out. It is suitable for residences, apartment buildings, offices, churches, etc., where both its appearance and utility are important. Factory $\frac{13}{16}$-in. Maple, Beech or Birch makes an ideal subfloor for the $\frac{3}{8}$-in. thickness.

Guarantee

MFMA Flooring is guaranteed by the Association to be properly graded and properly manufactured.

Provision is made for inspection by an official inspector of the Association should doubt arise regarding flooring manufactured under the MFMA trade-mark, and proper adjustment will be made in the event that the flooring does not conform to MFMA standards.

Literature for Free Distribution

The following books and pamphlets are offered through the offices of the Association, and new literature will be issued during the year. These will gladly be mailed on request.

Flooring of Maple, Beech and Birch.
How to Lay and Finish Maple, Beech and Birch Floors.
Grading Rules for MFMA Flooring.
Color Harmony in Floors—A new book containing twelve examples of Maple, Beech and Birch flooring showing the beautiful color effects which may be obtained.

E. L. BRUCE COMPANY

Manufacturers of Oak Flooring

EXECUTIVE OFFICES

MEMPHIS, TENN.

MILLS: Memphis, Tenn., and Little Rock, Ark.

Products

OAK FLOORING; CEDA'LINE, genuine Tennessee Aromatic Red Cedar Lining for clothes closets.

Also Hardwood Lumber: Oak, Gum and Beech.

TRADE-MARK

Bruce Oak Flooring

Bruce Oak Flooring is made of the best of raw material. Sixty per cent of the desirable and available supply of Oak Lumber is to be found within a radius of two hundred miles of Memphis and Little Rock.

Bruce Oak Flooring is manufactured in two modern daylight plants built expressly for the purpose and equipped with machinery and tools of the latest and most efficient type.

The kiln drying of the raw material represents the latest improvements in the proper seasoning and conditioning of the lumber in order to guard against cupping, twisting and other troubles due to improperly seasoned material. Specially trained operators in well equipped laboratories keep a careful check on the lumber at all stages in its journey through the kilns.

Tests of the finished product as it comes from the machines are made every few minutes by experienced workers with steel templets to insure proper fitting of all flooring.

In fact, every precaution is taken to see that all manufacturing problems are carefully dealt with in order to make Bruce Oak Flooring live up to the good name that it has always enjoyed.

Sizes—Being members of the Oak Flooring Manufacturers Association (page 481), our flooring is made in all the standard sizes and may be used interchangeably with flooring made by any member of the Association.

The standard sizes are:

$\frac{3}{8}$-in. thickness in 1½- and 2-in. face in plain or quartered red and white oak.

½-in. thickness in 1½- and 2-in. face in plain or quartered red and white oak.

$\frac{13}{16}$-in. thickness in 1½- and 2¼-in. face in plain or quartered red and white oak.

Grades—The grades as set forth by the Oak Flooring Manufacturers Association are strictly adhered to. Each bundle is marked as to grade to insure correct delivery of material desired. Check graders are regrading bundles continuously to see that the primary graders are using the proper care and judgment in marking grades. There is a grade of Bruce Oak Flooring to meet any pocketbook.

Method of Packing—Bruce Oak Flooring is carefully packed in bundles securely bound by wires—enough to guard against one or two wires opening and the breaking of bundles. Length of bundles varies according to the grade, but due to our careful manufacturing facilities, a much better than the standard average length is maintained.

Oak flooring designs in a wide variety of patterns from squares to herringbone. Made in $\frac{13}{16}$-in. thickness in 1½- and 2¼-in. face in plain or quartered red or white oak. Our catalogue on oak flooring design, showing many possible patterns, is awaiting your request.

Square edge flooring made in $\frac{5}{16}$-in. thickness in ⅞-in. and 2-in. face, plain or quartered red or white oak.

Identification—Every piece of Bruce Oak Flooring is stamped Bruce Memphis-Little Rock. Every bundle bears a label.

Ceda'line

This genuine Tennessee aromatic red cedar is unexcelled for use in lining clothes closets. Ceda'line is manufactured exclusively by E. L. BRUCE COMPANY at Memphis, Tenn. It may be obtained through your local lumber dealer.

Sizes—$\frac{3}{8}$x1½, $\frac{3}{8}$x2, $\frac{3}{8}$x3¼, $\frac{13}{16}$x2¼ in. (latter size for floors) and quarter round (for corners of walls, ceilings and floors).

Application—Ceda'line is manufactured similar to oak flooring, tongued, grooved and end matched. It is recommended that building paper be used, applying Ceda'line horizontally, blind nailing to studding. A layer of inexpensive ceiling may be used and the Ceda'line applied vertically. The inside of doors may be lined or not as desired. Furring strips should be used in applying over lath and plaster in old homes.

Finish—Use no finish whatsoever. Varnish destroys aromatic qualities.

Grade—Ceda'line is furnished in one grade permitting any amount of knots or other sound defects.

Cost—Ceda'line, material and labor, should cost little more than the lath and plaster it usually replaces.

Literature

Booklets, technical literature and circulars describing our products in detail, giving information of interest to architects as well as home owners, deal with floors from their selection to their laying and finishing. This literature will gladly be sent to you or your clients on request. We will be glad to answer inquiries at any time regarding our products and their use and will appreciate suggestions.

OAK FLOORING ADVERTISING BUREAU

OFFICE OF SECRETARY
1015 Ashland Block
CHICAGO, ILL.

Products

OAK FLOORING, Plain Sawed and Quarter Sawed, White or Red; scientifically and thoroughly Kiln Dried, properly Milled and Graded; Standardized.

Slogan

Oak Floors for Everlasting Economy.

Advantages

The natural characteristics of oak are too well known to require any eulogy.

When made into flooring the diversified figure of oak is exhibited to perfection. It is a wood that will harmonize with any kind of interior trim, and will do more to give distinction to a home than any other part of the interior construction.

Oak flooring is demanded, because it is rich and cheerful in color and blends harmoniously with any type of furniture and color decoration. It combines beauty, distinctiveness and durability.

Oak is a sanitary wood, and requires but little care to keep it in good condition. Real estate dealers and owners know the value of oak flooring, and emphasize oak flooring when advertising their property. It assures better renting and selling values and attracts a better class of tenants.

For economy, 3/8-in. thickness may be laid at a very low cost over old floors in old homes, or in new buildings over cheap subfloors. It is matched and end matched so that it can be blind nailed. When laid, it has in every respect the appearance of heavy flooring.

Durability

In numerous public buildings and houses throughout the country in which oak flooring was laid from 25 to 50 years ago, these floors are in good condition today. The word "Oak" has long been a synonym for *strength, beauty* and *endurance.*

Standard Thicknesses and Widths

13/16-in. thickness: widths, 1½-in. face, 2-in. face and 2¼-in. face.

3/8-in. thickness: widths, 1½-in. face and 2-in. face.

½-in. thickness: widths, 1½-in. face and 2-in. face.

Standard Oak Flooring Grades

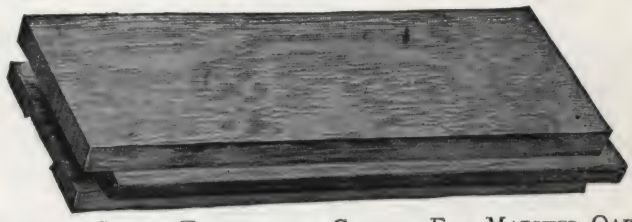
The grades of oak flooring are known as:

Clear, Sap Clear, Select, No. 1 Common, and No. 2 Common.

Quarter Sawed

Clear—Shall have one face practically free from defects, except 3/8 in. of bright sap; the question of color shall not be considered; lengths in this grade to be 2 ft. and up, not to exceed 15% under 4 ft.

Sap Clear—Shall have one face practically free of defects, but will admit unlimited bright sap; the question of color shall not be considered; lengths in this grade to be 1 ft. and up.



QUARTER SAWED, TONGUED AND GROOVED, END MATCHED OAK FLOORING

Select—May contain bright sap, and will admit pinworm holes, slight imperfections in dressing or a small, tight knot, not to exceed one to every 3 ft. in length; lengths to be 1 ft. and up.

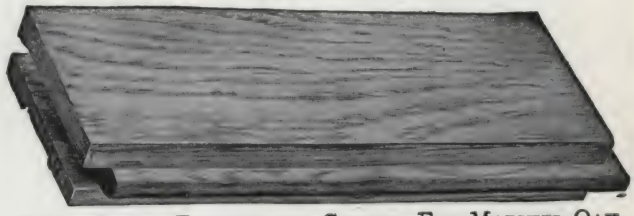
Plain Sawed

Clear—Shall have one face practically free from defects, except 3/8 in. of bright sap; the question of color shall not be considered; lengths in this grade to be 2 ft. and up, not to exceed 15% under 4 ft.

Select—May contain bright sap, and will admit pinworm holes, slight imperfections in dressing, or a small, tight knot, not to exceed one to every 3 ft. in length; lengths to be 1 ft. and up.

No. 1 Common—Shall be of such nature as will make and lay a sound floor without cutting; lengths 1 ft. and up.

No. 2 Common—May contain every character of defects, but will lay a serviceable floor with some cutting; lengths 1 ft. and up.



PLAIN SAWED, TONGUED AND GROOVED, END MATCHED OAK FLOORING

The Use of the Different Grades

Clear, Quarter Sawed—*Red or White*—High class residences, hotels, apartment houses and club houses.

Sap Clear or Select—*Quartered, Red or White*—An economical substitute for clear quartered where a dark finish is desired. These grades make a flooring equally as durable as the first grade.

Clear, Plain Sawed—*Red or White*—High class residences, hotels, apartment houses, churches and club houses.

Select, Plain Sawed—*Red or White*—Medium priced residences, hotels and apartments, schools, office buildings and stores.

No. 1 Common—Cheap dwellings, tenements, stores, high class factories and manufacturers' buildings.

No. 2 Common—Warehouse, factories and cheap tenements.

Correspondence

Correspondence solicited. Write for books.

STEVENS PARTITION & FLOOR DEADENER CO.

175 West Washington Street
CHICAGO, ILL.
BRANCH OFFICES IN ALL PRINCIPAL CITIES

Product

"STEVENS SYSTEM" of "SOUNDPROOFING" for buildings, bowling alleys foundations, music rooms, machinery platforms etc.

Method

Complete "soundproofing" by separation of solids and elimination of "drum effect," wherever applied, whether it be floors, partitions, ceilings, etc.

Savings

In fireproof construction, saves from 12 to 14 lbs. per sq. ft. of floor load, which is the difference in weight between cinder-concrete and dry cinder fills in the pipe space. The only successful method of holding the finished floor securely, doing away with all buckling.

In ordinary construction, saves all cutting of nailing strips and partition plates by the pipe trades and electricians, saves all quilts and labor of laying.

How to Specify

Fireproof Construction—All floor chairs to be fastened to nailing strips by carpenter and spotted by mason in rows of 16 in. centers and 18 in. apart. As men clean off arch with wire brush, grout with pure cement and water for binder, spottings to be of 1 part portland cement to 1 of sand; insert chairs, taking care that feet are well covered, level same in rows with straightedge; all hold downs to be set 36 in. on centers on nailing strips and 32 in. in rows, making every other chair a hold down. No hold down chairs required to be closer than 3 ft. from walls or partitions. After spottings have set, fill in with plaster and masonry droppings and fill rest on top of same with dry screened cinders, free from clinkers to top of nailing strips.

Ordinary Construction—Cover rough floor with heavy building paper turned up on enclosing wall only. All chairs to be securely fastened to rough or lining floor with 6d. nails, all rows to be 16 in. apart and chairs spaced 18 in. on centers on nailing strips. Hold downs to be every other chair in every row, placing same staggered across rows. No hold down chairs required to be closer than 3 ft. from walls or partitions. After same is completed, fill with screened dry cinders to top of nailing strips.

General Information

All material is completely assembled and shipped ready for use; all chairs are punched for hold downs. Great care should be exercised to see that cinders are dry before finished floors are laid. All work to be per specifications and instructions of the STEVENS PARTITION & FLOOR DEADENER CO., 175 West Washington Street, Chicago, Ill.

Castellane Apartments, Chicago
FUGARD & KNAPP, Architects

Harbor Apartments, Chicago
P. J. WEBER, Architect

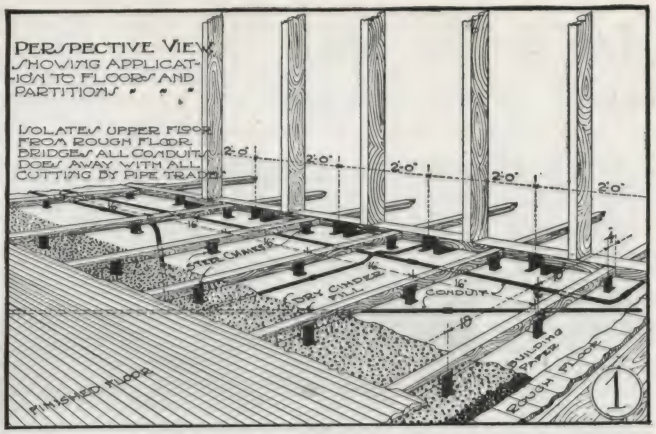
Apartments, 60 to 70 Scott Street, Chicago
ECKLAND, FUGARD & KNAPP, Architects

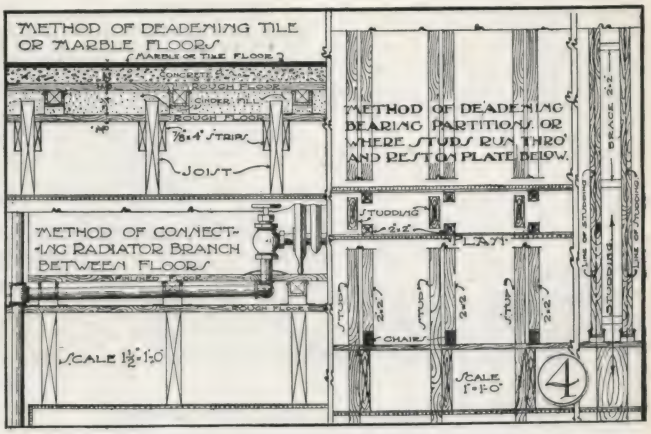
Hess Apartments, Chicago
ROY F. FRANCE, Architect

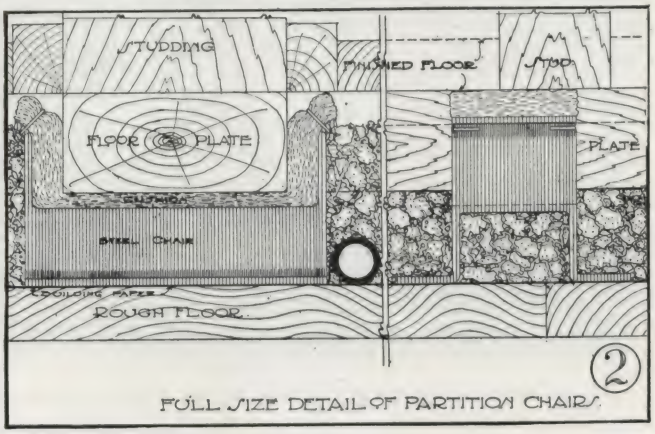
Uihlein Residence, Milwaukee, Wis.
KIRCHOFF & ROSE, Architects

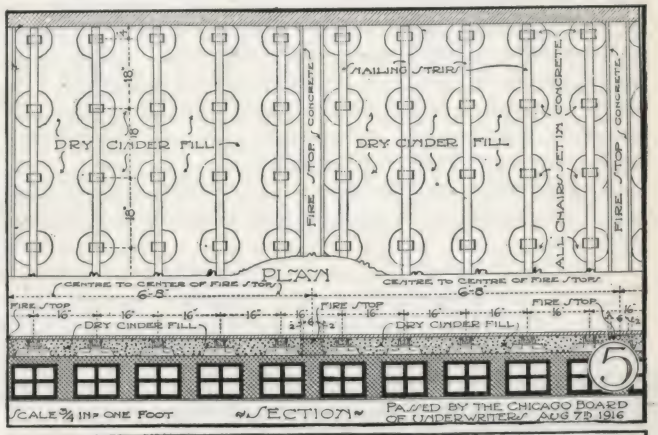
BUILDINGS IN WHICH STEVENS SYSTEM OF FLOOR DEADENING IS INSTALLED

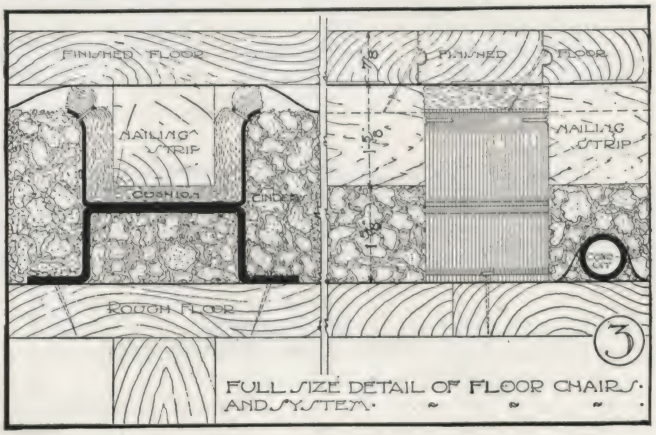
Continued on next page

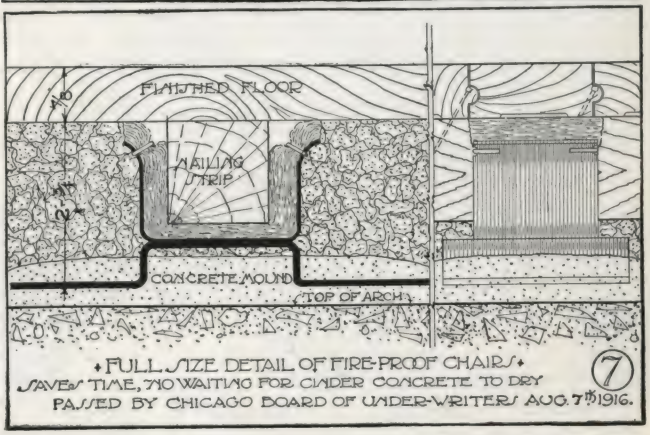


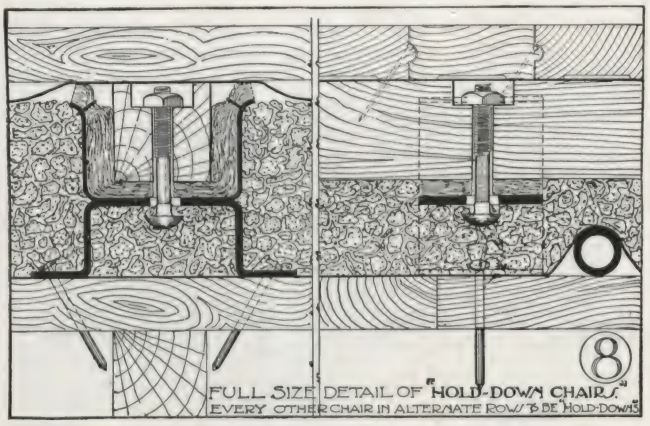


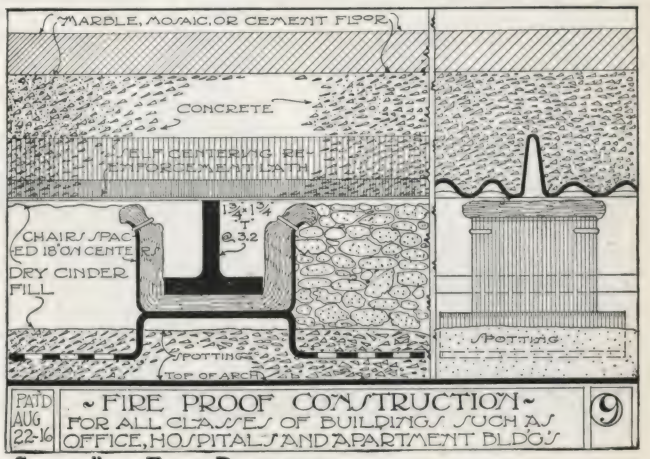












DETAILED DRAWINGS, "STEVENS SYSTEM" OF FLOOR DEADENING

ORDINARY CONSTRUCTION

(1) Isolates upper floor from rough floor. Bridges all conduits. Does away with all cutting by pipe trades. (2) This method eliminates all cutting of the floor plate. It bridges all conduits. (3) This method eliminates squeaky floors. Floors adjust themselves, "always level." (4) No more steam connections above floors. By this method bearing partitions are isolated. (8) Hold down chairs for use where floors have tendency to buckle, in center of rooms, etc.

FIREPROOF CONSTRUCTION

(5) Eliminates buckling of finished floors. Saves all cinder concrete fill. Conduits easily changed. (7) Saves time. No waiting for the cinder concrete to dry. (8) Hold down chairs to prevent buckling floors. (9) Method of deadening marble, cement or tile floors

AMERICAN BAR-LOCK CO., INC.

Sidewalk Lights, Floor Lights and Roof Lights

MAIN OFFICE AND WORKS
327-329 Jackson Avenue
LONG ISLAND CITY, N. Y.
BRANCH OFFICES OR REPRESENTATIVES IN ALL LARGE CITIES

Products

Specialists in highest quality VAULT LIGHTS, FLOOR LIGHTS, SKYLIGHTS and ROOF LIGHTS.

SIDEWALK DOORS of all descriptions.

Adaptability of American Bar-Lock System

"American Bar-Lock" systems are comprehensive in meeting every need. They are mechanically correct and all make use of the perfect "Lazalite" polariscope tested glass. These constructions make possible all of the advantages of a light shaft without the sacrifice of valuable floor space. They are built to support the loads required in all types of buildings.

Especially adapted for use in all kinds of buildings where *permanence, freedom from leakage and maintenance charges* are equally important.

Bar-Lock trussed steel double reinforced concrete skylights are rapidly taking the place of the old style metal skylights for the following reasons:

(1) Bar-Lock skylights will last the life of the building. (2) The special quality polariscope tested glass will not break up. (3) No leaks, no damage, no corrosion, ornate appearance. (4) May be walked on, are fireproof and burglarproof. (5) Require no protecting screens. (6) Save tremendous annual maintenance charges.

Methods of Construction

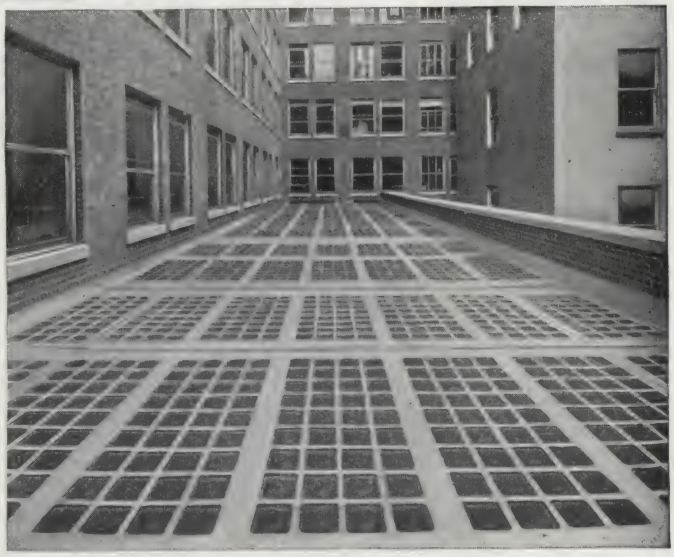
This system is manufactured in our own factory by skilled mechanics (men who have grown up with the business) in semiformed, double reinforced concrete slabs which are delivered to the building operation ready to receive the Lazalite polariscope tested lenses and the cement top-finish; or in the form of *completed,* factory-made slabs ready to lay over the openings over which they are to be used.

The material is shipped ready to be installed by local labor or we will send our own mechanics, if preferred, anywhere in the United States.

SIZES OF GLASS UNITS

Glass No.	Size, in.	Glass area, per cent	Thickness of construction, in.
71B	6⅛ x 6⅛	66½	2¾
31A	4 x 4	71	2½
61-3	3⅛ x 3⅛	54	2½

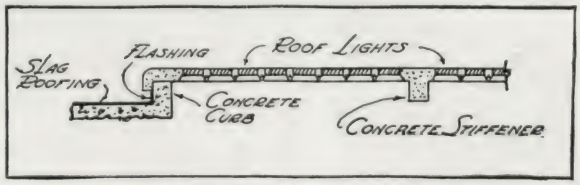
Average weight of finished construction is 25 lbs. per sq. ft.



TYPICAL INSTALLATION OF AMERICAN BAR-LOCK CONSTRUCTION

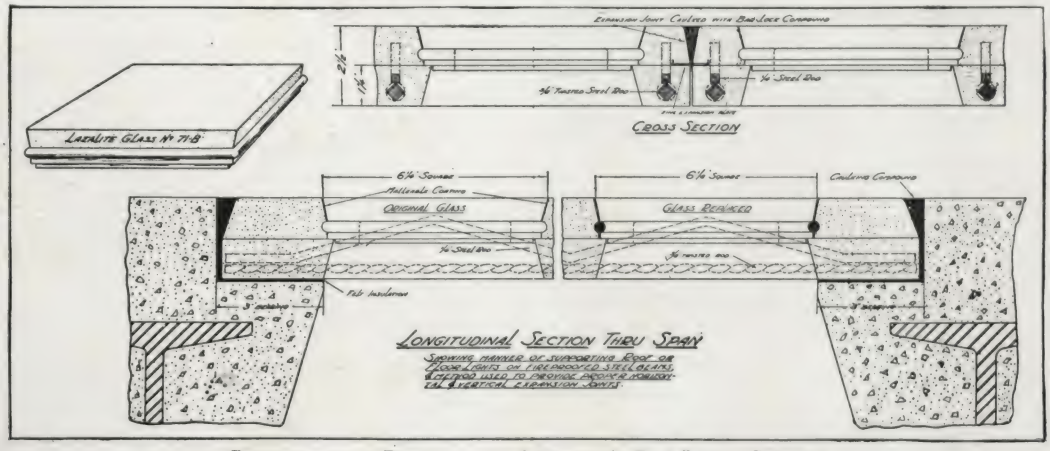
Guarantee

All work is executed in the best mechanical and workmanlike manner and is guaranteed against all defects in workmanship and materials for a period of two years.



RAISED TYPE ROOFING CONSTRUCTION

Recommended if slag roofing adjoins roof lights, in order to provide a thoroughly watertight connection with roofing. No leakage, no exposed metal on top or underneath to rust, no glass breakage from expansion or contraction

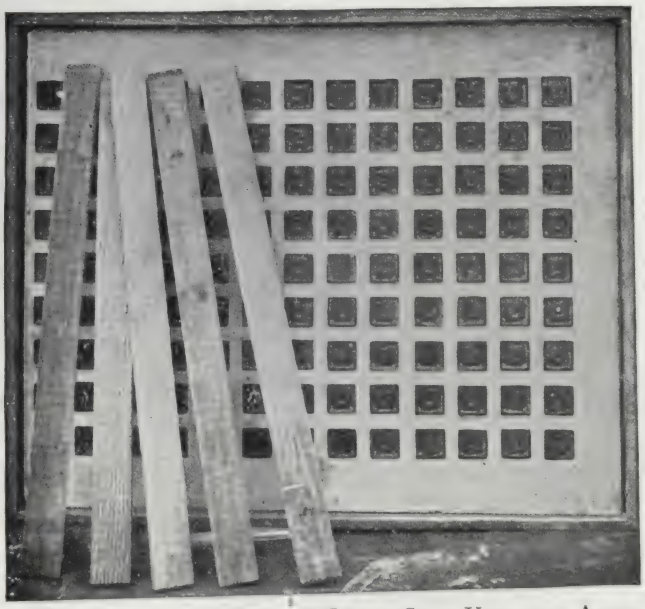


CONSTRUCTION DETAILS OF AMERICAN BAR-LOCK SYSTEM

Continued on next page

Factory Finished Sidewalk Light Slabs

This system consists of complete factory-made slabs of extra heavy reinforced concrete with different types and sizes of replaceable glass, with this company's new patented expansion joints, all ready to place in



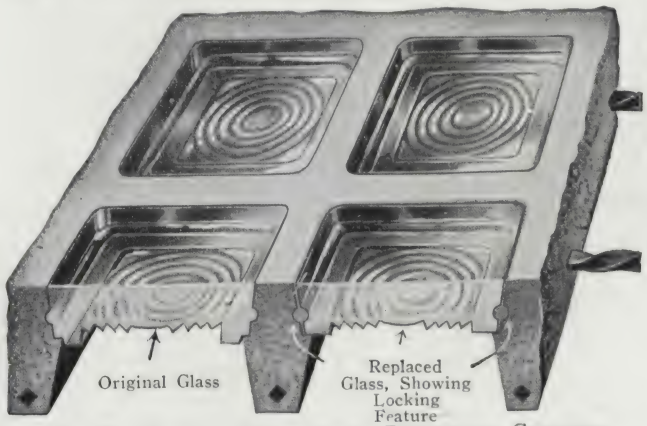
FACTORY FINISHED SIDEWALK LIGHT SLAB UNCRATED AFTER SHIPMENT

position. Glasses are designed to meet the many different conditions of use. All of this work is produced by expert mechanics in the shops of this company, insuring not only the quality of materials, but the proper mixture of cement and placing of reinforcing members. Only the highest grade of polariscope tested glass, cement and sand is used.

Lazalite Replaceable Glass

The use of our replaceable glass units permits repairs to be made in a few minutes (if any should become broken through accident) without damaging or cutting the surrounding concrete and will not affect the appearance of the installation.

The glass used in this construction is made not only from a specially prepared, soft, tough mixture, but each piece is separately polariscope tested, which effectually prevents all cracking or breakage from expansion or contraction. The lenses, being of pure crystal annealed glass, permit of the full unrestricted volume of light being transmitted and diffused.



No. 31. SIMPLEX REPLACEABLE REINFORCED CONCRETE CONSTRUCTION
4 by 4-in. Fresnel lens. 71% glass area

Bar-Lock Replaceable Construction with Cast Iron Ring

Bar-Lock double reinforced concrete construction and patented *double* gutter cast iron protected glass with safety tread, is the most durable sidewalk light ever placed on the market in our 26 years experience in this line of business.

The construction, which is 2½ in. thick, will carry almost double the load per square foot of other constructions, and while not necessary from the standpoint of strength, it prevents vibration, a very important factor in preventing breakage of glass and leakage.

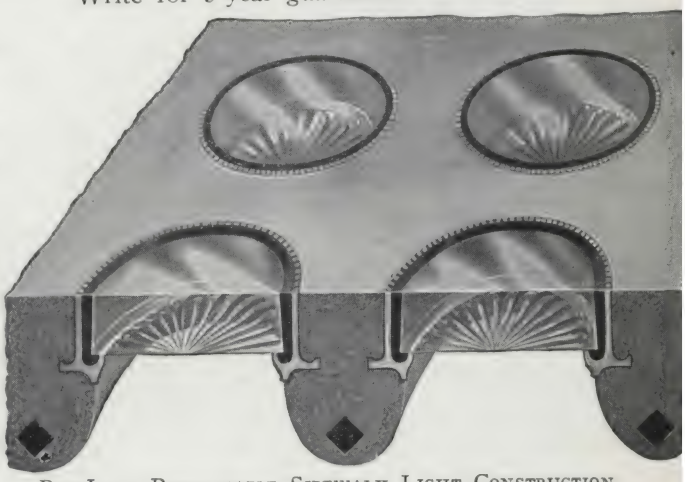
The *double* gutter cast iron ring with safety tread not only enables a watertight joint under and around glass, but also between outside of ring and concrete, a very important feature.

The heavy body of reinforced concrete does not come in contact with the glass, eliminating another previous cause of breakage of glass from expansion.

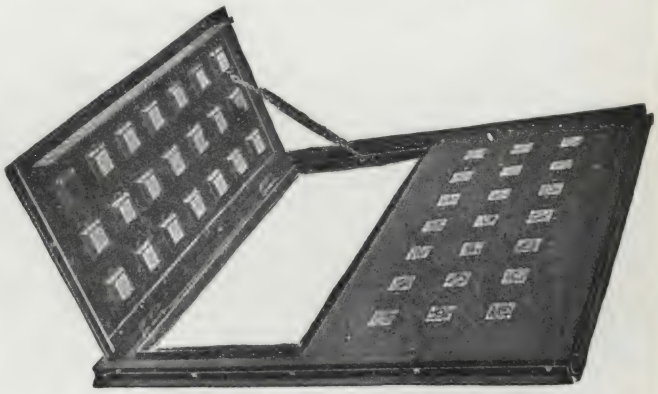
The cast iron rings are solidly embedded in the heavy concrete construction and will last the life of the building. Should a glass become broken by accident, it can be replaced immediately by unskilled labor, in a few minutes, without defacing the concrete and making patchwork, thereby insuring a permanent perfect installation.

The glass used is "Lazalite" quality, 2¾-in. round only, having sunburst undersurface and diffusing the greatest possible amount of light.

Write for 5-year guarantee.



BAR-LOCK REPLACEABLE SIDEWALK LIGHT CONSTRUCTION
Patented Double Gutter Insures Watertightness



BAR-LOCK FLUSH SIDEWALK DOORS

Catalogues and Service

Special catalogues, blue print details, price lists, etc., sent on request.

AMERICAN 3 WAY-LUXFER PRISM CO.

Distributers of Daylight

13th Street and 55th Court
CICERO, ILL.
(Suburb of Chicago)

139-41 Spring Street
NEW YORK, N. Y.

BRANCH OFFICES

DETROIT, MICH., 400 Penobscot Building
ST. LOUIS, MO., 1944 Louisiana Avenue
KANSAS CITY, MO., E. P. WILKINS, 604 Grand Avenue Temple Building
MINNEAPOLIS, MINN., 300 Builders Exchange
CLEVELAND, OHIO, D. A. COWAN, 304 National Building
BOSTON, MASS., 453 Washington Street

WESTERN REPRESENTATIVES

CALIFORNIA: WATERHOUSE-WILCOX Co., 523 Market Street, San Francisco, Cal., and 331 East Fourth Street, Los Angeles, Cal.
WASHINGTON AND OREGON: D. E. FRYER & Co., Lumber Exchange Building, Seattle, Wash.; Spokane, Wash.; Tacoma, Wash., and Portland, Ore.
REPRESENTATIVES IN ALL LARGE CENTERS

Products

PRISM GLASS:
- 3-Way Pressed Prism Tile.
- Luxfer Pressed Prism Tile.
- Pressed Diffusing Tile.
- Sheet Prism and Wired Sheet Prism.
- Glazed Tile Transom Lights with Plain or Colored Ornamental Border.
- Glazed Ornamental Diffusing Tile with Border.
- Glazed Sheet Prism in Ornamental Designs.
- Transom Ventilators with and without Screens.
- Canopies of Pressed Prism Tile.

SIDEWALK LIGHTS, FLOOR LIGHTS and SKYLIGHTS:
- 3-Way Simplex Sidewalk Vault Light Construction.
- Simplex Fresnel.
- Armored Glass Sidewalk Lights.
- Paschall Interlocking Vault Light Construction.
- 3 Way-Luxfer Reinforced Concrete Sidewalk Lights and Floor Lights.
- Cast Iron Vault Light Constructions.
- Extension Skylights.

DOORS and SPECIALTIES:
- Flush Watertight Sidewalk Doors.
- Coalhole Covers and Vent Doors.
- Sidewalk Gratings and other Cast Iron Paving and Sidewalk Specialties.

TYTE-LITE, a calking preparation.

Also 3-Way Metal Expansion Joint; Crystolux Non-slip Surfacer.

For Skylight Construction, see pages 982-983.

3 Way-Luxfer Prism Tile Transoms

3 Way-Luxfer prisms, set either in transom panels or in the upper sash of factory or school windows, are the only proven method of successfully daylighting the interior of stores, shops, factories, schools, etc. The glass prism, as commercialized in the 3 Way-Luxfer prism tile and sheets is nature's own method of changing the direction of the light rays.

Light rays always travel in a straight line unless turned by reflection or refraction. The prism refracts the rays, for when the rays pass from one medium to another, they change their direction in relation to the angle of approach.

As Fig. 2 shows, when light rays pass through a sheet of plate glass, they continue in their same general direction because the faces of the glass are parallel. When passing through a prism as Fig. 3 shows, the light rays, approaching at the same angle, are refracted up on leaving the glass, due to the angle of the face. This gives a horizontal direction to the rays which were projecting down. And light from other directions would be, by the prism, refracted up against the ceiling and so reflected to the ends of the room. Thus rooms as deep as 200 ft. may be daylighted. See Fig. No. 4.

FIG. 1. 3 WAY-LUXFER PRISM TRANSMISSION WITH SWINGING VENTILATOR AND NAMEPLATE SET IN COLORED PANELS

3 Way-Luxfer prisms are pressed, from Lazalite glass which does not turn pink or purple, into 4 in. square tiles with a number of prisms on the face and the backs, either the plain Luxfer type or the lenticular 3-Way type. The latter have the advantage of making use of the light rays that approach from the sides, thus increasing their daylighting value at least 33% in many locations. (See Fig. 5, next page.)

These 4-in. tiles are built up, with special hard metal cold-drawn glazing bars into panels to fit the transoms of stores. All panels are reinforced at regular intervals with concealed steel stiffeners so that they are always absolutely flat. The mounting edge is the thickness of plate glass and is so reinforced that it does not crush. This makes it easier to install than plate glass.

In addition to the great value of 3 Way-Luxfer prisms as a daylighting medium is their value as a "modernizer" of the store front. No other investment adds so much class and attractiveness to a store building as to have the transoms fitted with 3 Way-Luxfer prism panels. To make this even more valuable, many have their firm name and business set in the panels in colored glass. This gives them a sign which works day and night.

3-Way Ornamental Diffusing Tile—In those installations which do not require the daylighting value of

FIG. 2. PATH OF LIGHT RAY THROUGH PLAIN GLASS

FIG. 3. PATH OF LIGHT RAYS THROUGH GLASS PRISM

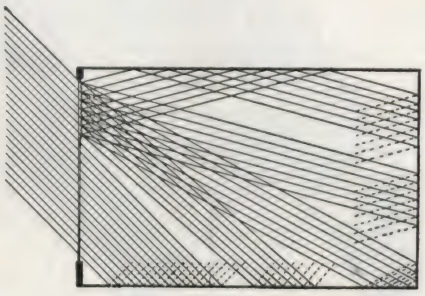


FIG. 4. DISTRIBUTION OF LIGHT THROUGH OPEN DISPLAY WINDOW WITH 3 WAY-LUXFER PRISM TRANSOM

Continued on next page

the prisms but for which the tile panel is demanded for its attraction value, we offer the 3-Way ornamental Diffusing Tile. This is a molded tile of Lazalite glass, with both front and back formed into diagonal cylindrical lenses, at right angles to each other. These catch the light rays, break them up and diffuse them in a pleasing manner, yet without "rainbow" effects. These tile can be used, if desired, as a border in the prism tile transoms. One advantage of these "Lux" lens tile is that they are practically self-cleaning on the outside. Name signs can be included in these as well as in the prism panels.

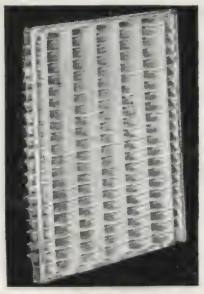


FIG. 5. 3 WAY LENS BACK 4-IN. PRESSED PRISM TILE

Ventilators—In both the prism panels and the ornamental tile panels ventilators can be installed, if desired. These are the swinging, self-closing and locking type. Fitted with the 3-Way patented flat fly screens on order.

FIG. 6. 3 WAY ORNAMENTAL LUX LENS TILE

Specifications for 3 Way-Luxfer Prism Transoms

All windows and transoms marked on drawings "prismatic glass" or "ornamental glass" shall be (3-Way or Luxfer) 4-in. pressed tiles of the type indicated in plans or by the location. These shall be set in electro-copperplated bar mounting formed into sash as shown, with steel stiffeners. Ornamental border of tile shall be inserted. (Or diffusing tile of ..... design shall be used as a border). All shall be as manufactured and built up by the AMERICAN 3 WAY-LUXFER PRISM CO.

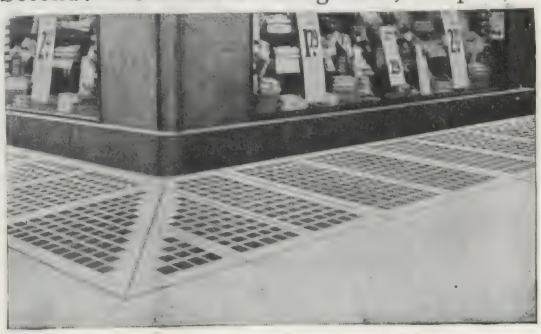
3-Way Sheet Prism Glass—For factories, schools and all public buildings requiring daylighting, we recommend the glazing of the upper half of the windows with 3-Way sheet prism glass. This, by its prismatic action, will project the daylight to the dark corners of the rooms. Write for details.

3 Way-Luxfer Sidewalk Light and Vault Light Construction

The superiority of the several 3 Way-Luxfer types of sidewalk lights and vault lights lies not only in the form of construction but also in the materials we use as well as the workmanship. 3 Way-Luxfer sidewalk lights never break a glass through internal pressure. Glasses may be broken by accident, but if they are they can be quickly replaced without chipping the cement top.

Regarding Materials—First: All 3 Way-Luxfer lenses are pressed from Lazalite glass that never turns pink or purple. To be certain that every lens is perfect, with no hidden cracks, stresses or strains, invisible to the naked eye, we test each glass separately under the polariscope and reject all but those showing absolute perfection in texture. Thus no faulty lenses are used in any 3 Way-Luxfer construction.

Second: To insure a homogenous, compact, water-proof concrete which will not soak, slake and expand in setting after completion, we use only the finest reground cement. This is so fine that less than 3% fails to go through a 200-mesh sieve. The elimination of internal expansion prevents a large portion of glass breakage.



EXAMPLE OF SIMPLEX FRESNEL SIDEWALK LIGHT CONSTRUCTION

TESTING 3 WAY-LUXFER SIDEWALK GLASS UNDER POLARISCOPE

Third: All our preformed and factory finished slabs are made on iron molds in our own factories where atmospheric conditions are perfectly regulated for proper curing. Made to plans to fit each particular job.

3 Way-Simplex Construction—The strongest sidewalk light construction ever made. Double reinforced concrete. Reinforcing is steel "I" bars punched and interlaced with "deformed" rods at right angles. Supplied either in preformed slabs to be finished on the job or in complete factory finished, ready-to-set slabs in any size or shape to fit the job. Made only with reground cement and fitted with polariscope tested Lazalite glass lenses. All exposed surfaces concrete and glass; never needs paint on under side.

CROSS SECTION OF SIMPLEX SIDEWALK LIGHT CONSTRUCTION

Simplex Fresnel—71% of the sight opening is glass—4-in. square lenses set 4¾-in. centers, molded into the light diffusing Fresnel lens, polariscope tested Lazalite glass. Great strength. Carrying capacity, 500 lbs. to the sq. ft. on 5-ft. clear span.

Lenses replaceable without chipping cement top.

Standard Simplex—44% to 60% of sight opening is glass—3⅛ in. square or round lenses set 4¼ in. centers. Lenses either plain, 3-Way prism or multi-prism, of polariscope tested Lazalite glass. Lenses replaceable without chipping cement. Great strength—300 lbs. per sq. ft. on 5-ft. clear span. Easily installed.

3-Way Reinforced Concrete—Ready to set, factory finished slabs. Reinforcement by Ransom System twisted rods. Made only with reground cement. Lenses 2⅞ in. square or round—plain, 3-Way prism or multi-prism, of polariscope tested Lazalite glass, set 4¼ in. centers.

3-Way Sidewalk Doors and Coalhole Covers

Steel Doors—Flush and watertight when closed. Plain top, diamond top and illuminated top. All standard sizes in stock; special sizes to order.

3-Way Coal Hole Covers—Cast iron or concrete, with or without glass. Complete with ring or thimble. All standard sizes in stock.

Tyte-Lite Caulking Compound

For caulking sidewalks and skylights. Never gets hard; absolutely watertight.

BROOKLYN VAULT LIGHT COMPANY

262-272 Monitor Street
BROOKLYN, N. Y.

Products

SAFETY DUPLEX COALHOLE COVER with VENTILATOR.

REINFORCED CONCRETE ALL-GLASS UNDERSURFACE VAULT and ROOF LIGHTS; CAST IRON VAULT and ROOF LIGHTS, Bullseye or Prismatic Lenses; CAST IRON AND REINFORCED CONCRETE VAULT LIGHTS; ILLUMINATING DOORS for Cellars and Hatchways.

Safety Duplex Coalhole Cover and Ventilator

Constructed to give proper protection to coalhole, and to furnish, by means of easy manipulations, ventilation when desired.

Cone lock (see illustration) is a fastening for ventilating grate and top cover.

COVER SHOWING RELATION OF PARTS
A—Bearing lugs C—Cone lock
B—Cover D—Grating

Installation — Ordinarily set flush with sidewalk.

Cone lock holds both covers by chain, fastened in cellar.

Top cover is unhooked, removed, and replaced with grating for ventilation.

Installed by any mason.

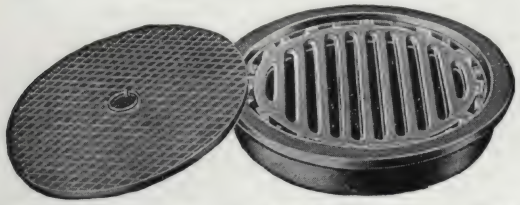
See detail No. 1.

GRATING IN PLACE FLUSH WITH SIDEWALK

COVER SHOWING REINFORCEMENT

Sizes and Prices—Kept in stock in 20- and 24-in. openings.

Prices quoted on application.



DUPLEX VENTILATING COALHOLE COVER AND RING

Reinforced Concrete All-glass Undersurface Lights (Patented)

An all-glass undersurface, non-scaling light consisting of prismatic lenses embedded in reinforced concrete.

The lenses are 3 in. square on top and 4 in. square on bottom and they are arranged to form, with their wider underside, one continuous glass undersurface.

They will sustain a load of 700 lbs. per sq. ft. safely.

While the cost of this vault light construction is higher than for the ordinary, greater efficiency, durability, and beauty commend it for high class work.

See detail No. 2.

Cast Iron Frame Lights

Knob Protected Bullseye—Cast iron plate frames furnished with elongated or round knobs to protect glass and prevent slipping.

Bullseye lenses 1⅝ in. in diameter, ¾ in. thick; or 2 in. in diameter, ⅝ in. thick.

See detail No. 5.

Concrete—Cast iron skeleton frame. Lenses set in cement bed with or without brass protecting bands. Bands overcome effects of expansion and contraction, and increase life of lenses.

Lens diameters, 2 and 3 in.

See detail No. 4.

Prismatic—Cast iron skeleton frame. Lenses set in cement bed. Lenses furnished 3 in. square, plain or pendant.

See detail No. 3.

Cast Iron and Reinforced Concrete Vault Lights

Durable and efficient, combining the advantages of concrete and the replaceable feature of cast iron construction.

Cast iron cup and elastic waterproof compound provides for expansion, eliminates breakage of glass and makes repairs simple.

See detail No. 6.

Illuminating Doors (Patented)

Made up of 2-in. round lenses, set in malleable iron cups riveted to No. 12 steel sheet strongly reinforced on underside. Doors hung to cast iron frame by means of heavy brass hinges.

For sidewalk elevators, hatchways, etc.

See detail No. 7.

Facilities

As this company has its own foundry and pattern shop, orders can be filled quickly. Work is fabricated from architects' design and specification, and to suit individual conditions and requirements. This means a substantial guarantee of efficiency and durability.

Products shown in this catalogue can be made any size desired.

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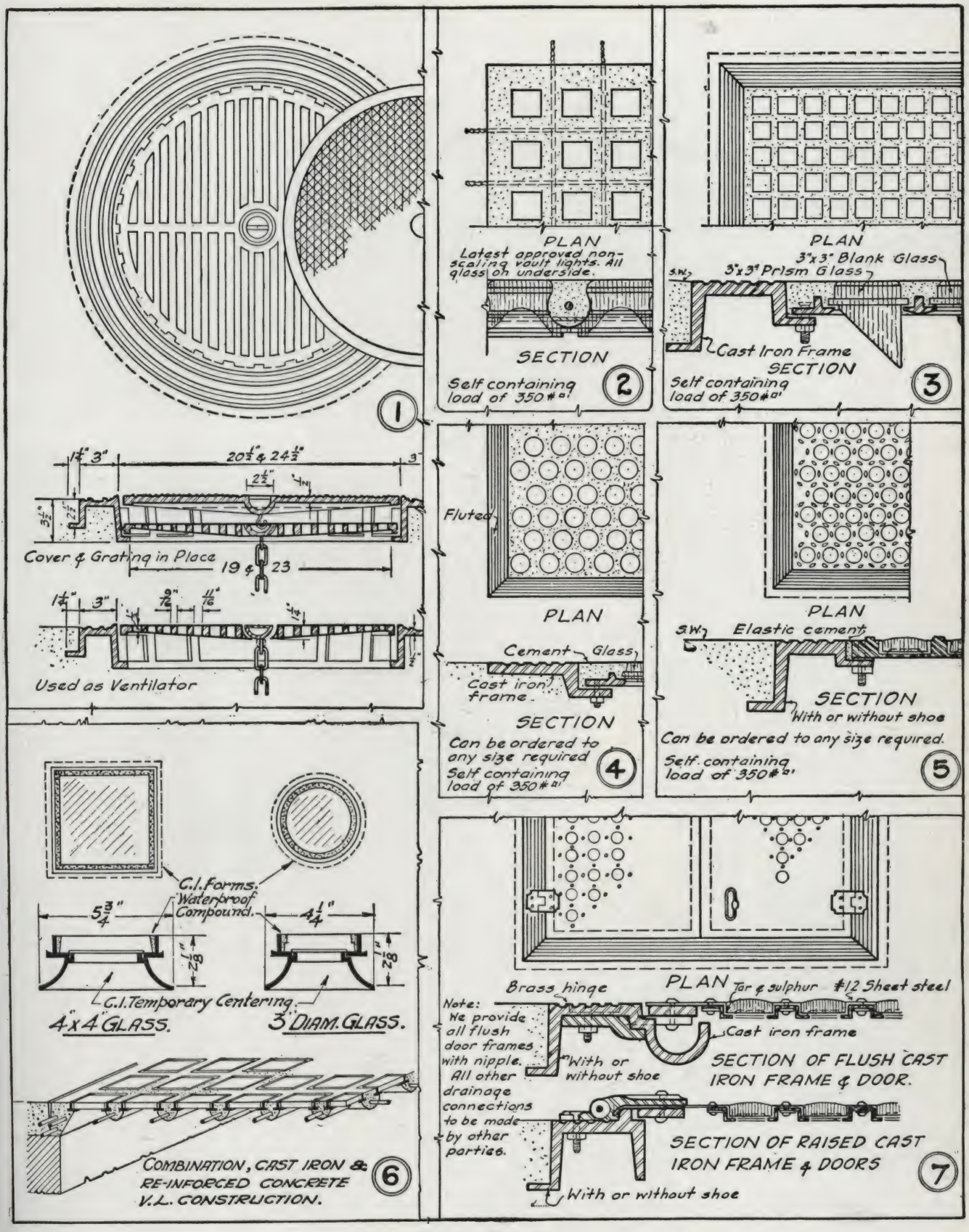


TYPICAL DETAILS

1. Duplex Safety Coalhole Cover and Ventilator
2. Reinforced Concrete Vault Lights, All-glass Undersurface
3. Prism and Blank Glass Set in Cast Iron Frame and Cement
4. 2-in. and 3-in. Concrete Lights
5. Elongated Knob Protected Lights
6. Cast Iron and Reinforced Concrete Vault Light Construction
7. Latest Improved Sheet Steel Patent Light Doors

ALBERT GRAUER & COMPANY

Manufacturers and Builders of Reinforced Concrete Specialties

648 East Columbia Street
DETROIT, MICH.

BRANCH OFFICES AND AGENCIES

BOSTON, MASS., Rubin-Burke Co.
CLEVELAND, OHIO, Albert Grauer & Company
COLUMBUS, OHIO, The B. M. Freeman Co.
DAYTON, OHIO, The John G. Pool Co.
FORT WAYNE, IND., Jocquel-Schulz Co.
GRAND RAPIDS, MICH., Ralph E. Seeger
INDIANAPOLIS, IND., General Construction Supply Co.
PITTSBURGH, PA., J. Willis Dalzell Co.

Products

Bruner System of Reinforced Concrete Sidewalk Lights, Skylights and Floor Lights, used in all classes of buildings, tunnels, subways, trainsheds, etc. installed in place or shipped in slabs, ready to set.

Also manufacturers of Illuminating Sidewalk Doors; Coalhole Covers and Rings; Sidewalk Ventilators; Bullseye Glasses of every size for repairing iron frame sidewalk lights.

For Mastic Floors, see page 419.

Service and Facilities

Our Engineering Department will furnish details and structural designs, also estimates for work installed in place, or for slabs completely glazed ready to set into the opening. The fact that we have been using the same general design, with only minor changes and improvements during the past twenty-nine years tends to show that the Bruner system is built scientifically correct.

Stocks are carried at Detroit, Cleveland and Columbus.

Bruner Sidewalk Lights

In the Bruner system, shown below, concrete is poured around lenses placed on removable steel forms, assembled on the job, insuring smooth neat undersurface. Glass slab carried by concrete ribs, 4⅝ in. on centers and 3½ in. or more deep, set at right angles to building line. Reinforcing steel accurately spaced and held by rustproof wire hangers in concrete. Watertight expansion joints as needed —usually 10 to 15 ft. apart.

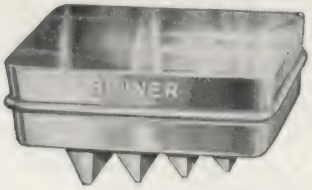
Glass—Lenses, made for us by experienced vault light manufacturers, are annealed and tested and imperfect glasses rejected. Edges coated with plastic cushion, preventing cracking and shaling. Made in plain, triple angle and multiprism designs. Standard alley lenses, 3¼ in. square by 1½ in. thick. Broken glasses easily replaced without cutting into construction by using our patented repair glasses.

Bearings—Rabbet 4x4 in. should be provided on four sides in spans 6 ft. or less, and 5x5 in. on larger spans. At building line beam flange will suffice.

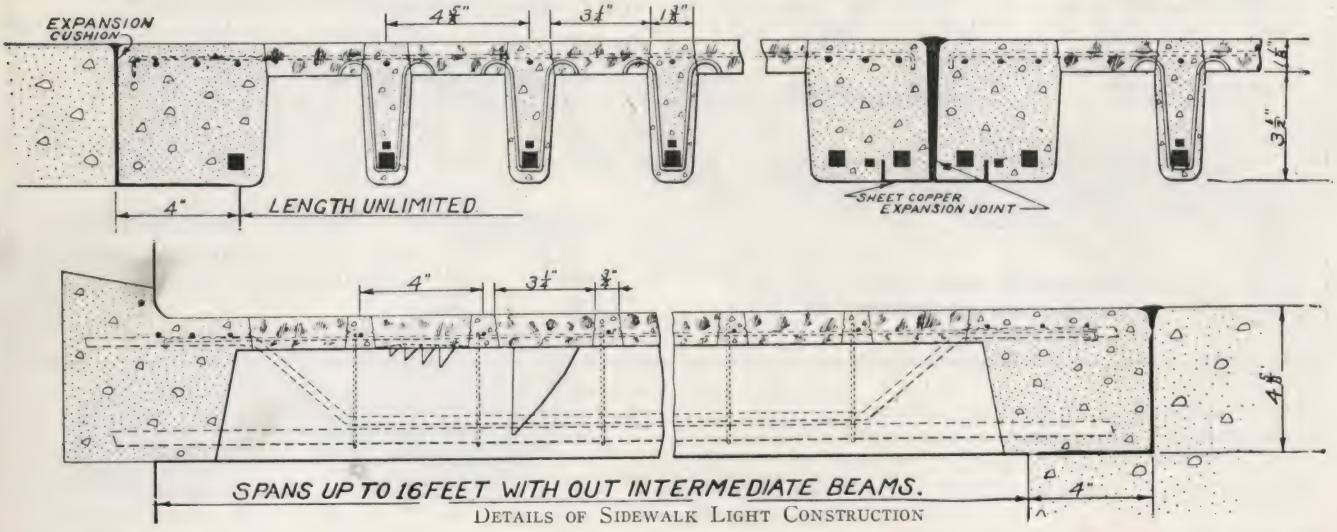
Bruner Sidewalk Lights

Bruner Triple Angle Prism No. 46

Bruner Plain Glass No. 47



Bruner Multiprism No. 52



Details of Sidewalk Light Construction

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Bruner Skylights

The Bruner system of skylights, shown in the details herewith, is the final result of a number of years of experimenting to produce a skylight which would permit as much daylight to pass through as the ordinary metal skylight, and in addition to be so durable that practically all maintenance charges would be eliminated. During the 8 years this construction has been in use, replacements of glass have amounted to 1/10 of 1%.

Glass—The Bruner skylight is unique in having a glass area of 75.8%. All lenses are made of a special mixture, are thoroughly annealed and polariscope tested. The standard lenses are 8 in. square and 1¼ in. thick. Plain glass No. 10, ornamental glass No. 11, and ornamental glass No. 12. Glasses which are accidentally broken can be easily replaced by the use of our patented repair glasses.

Bearings—The Bruner skylight construction requires a rabbet 5x5 in. on the four sides of the opening, or can be supported on beams or channels set 5 in. below grade.

BRUNER SKYLIGHT

Spans—The Bruner skylight is designed to span up to 18 ft. clear without the use of intermediate beams of any kind. It can be built flush with the roof, or raised on a curb.

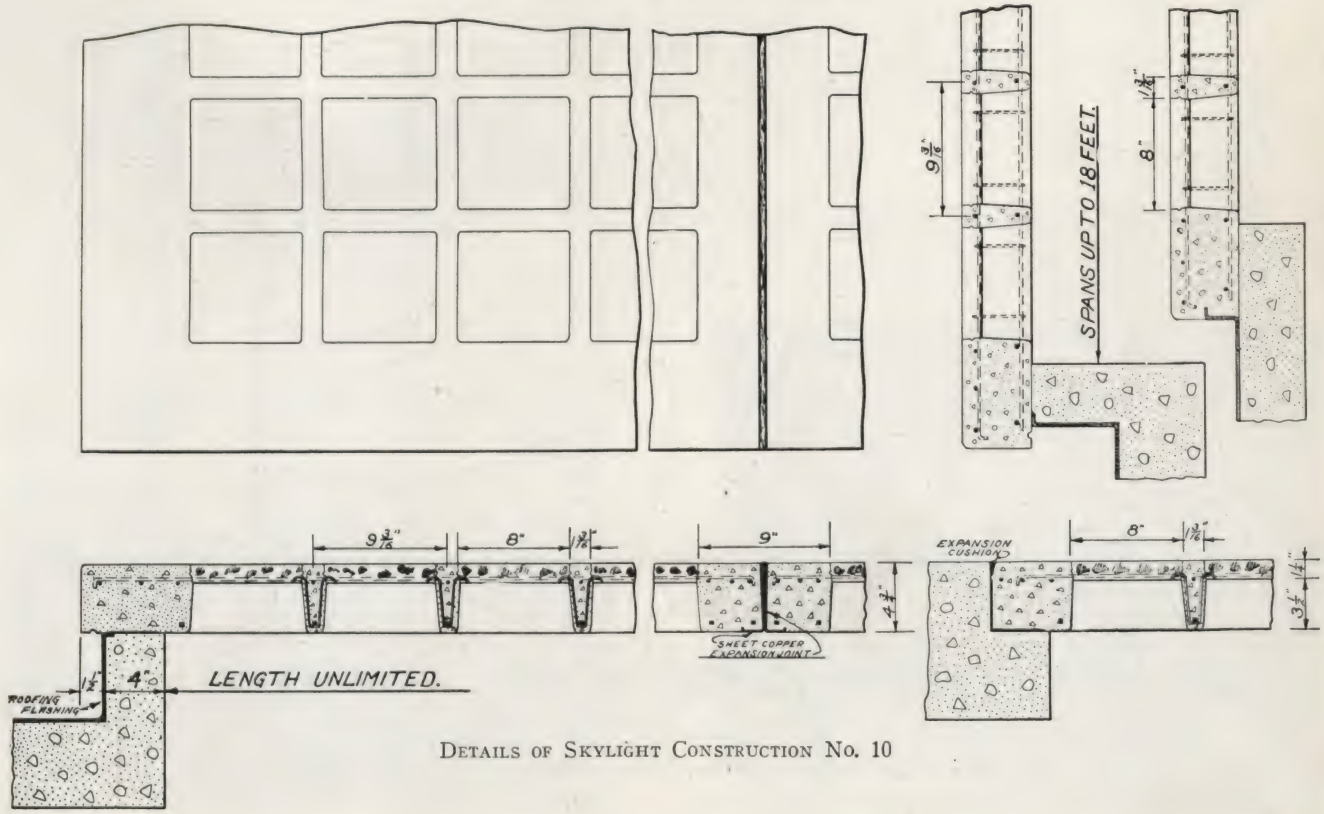
Loads—The Bruner skylight is figured to carry 100 lbs. per sq. ft., with factor of safety of 4. The construction weighs approximately 40 lbs. per sq. ft.

Specifications—The Reinforced concrete skylights shall be constructed in place according to the Bruner system, installed by ALBERT GRAUER & COMPANY. The glass shall be Bruner No. ...., 8 in. square. The construction shall span the openings without the use of intermediate beams, and shall be designed to carry a uniform load of 100 lbs. per sq. ft. The work shall be guaranteed to remain waterproof and in first class condition for 3 years from date of completion.

BRUNER SKYLIGHT NO. 10

BRUNER SKYLIGHT NO. 11

BRUNER SKYLIGHT NO. 12



DETAILS OF SKYLIGHT CONSTRUCTION NO. 10

Continued on next page

Bruner Floor Lights

The Bruner system of reinforced concrete floor lights, shown in the details herewith, is built along lines similar to the sidewalk lights. The concrete carrying ribs, however, run in both directions, which gives a more ornamental appearance from underneath. These ribs are spaced 6 in. on centers, and are 2½ in. below bottom of glasses. The reinforcing steel is held in the proper position by the use of metal seats embedded in the concrete.

Watertight expansion joints of sheet copper and special calking compound are placed as needed, usually 10 to 15 ft. apart.

Glass—The lenses used in Bruner floor lights are of the same high quality as those used in the sidewalk light construction. They are thoroughly annealed and polariscope tested, and all imperfect ones rejected at the factory. The standard lenses are 4¾ in. square and 1 in. thick. Diffusing glass No. 88, and plain glass No. 89.

Glasses which are accidentally broken can be easily replaced by the use of our patented repair glasses.

Bearings—The Bruner floor light construction requires a rabbet 3½x3½ in. on the four sides of the opening, or can be supported on beams or channels set 3½ in. below grade.

Spans—The Bruner floor light is designed to span up to 10 ft. in the clear, thus avoiding the necessity of auxiliary supports.

Loads—The steel area used in each installation is figured by our Engineering Department to carry 100 lbs. per sq. ft. with factor of safety of 4. The finished construction weighs approximately 35 lbs. per sq. ft.

Specifications—The floor lights shall be constructed in place according to the Bruner System, installed by Albert Grauer & Company. The glass shall be Bruner No. ....., 4¾ in. square. The construction shall span the openings without the use of intermediate beams, and shall be designed to carry a uniform load of 100 lbs. per sq. ft. The work shall be guaranteed to remain waterproof and in first class condition for 3 years from date of completion.

Guarantee

Every installation of the Bruner system carries a standard written guarantee to remain waterproof and in first class condition for 3 years from date of completion. We will arrange for longer guarantees at a slight additional charge.

Prominent Work

Skylights—New Public Library, Detroit, Mich., Cass Gilbert, Architect

Skylights and Sidewalk Lights—Bank of Detroit, Giaver, Dinkelberg & Ellington, Architects

Sidewalk Lights—Union Trust Building, Detroit, Mich., Donaldson & Meier, Architects

Skylights and Sidewalk Lights—Marquette Building, Detroit, Mich., Albert Kahn, Architect

Sidewalk Lights—Edison Service Building, Detroit, Mich., Smith, Hinchman & Grylls, Architects

Skylights—Detroit Edison Co., Marysville, Mich., Smith, Hinchman & Grylls, Architects

Skylights and Sidewalk Lights—Book Building, Detroit, Mich., Louis Kamper, Architect

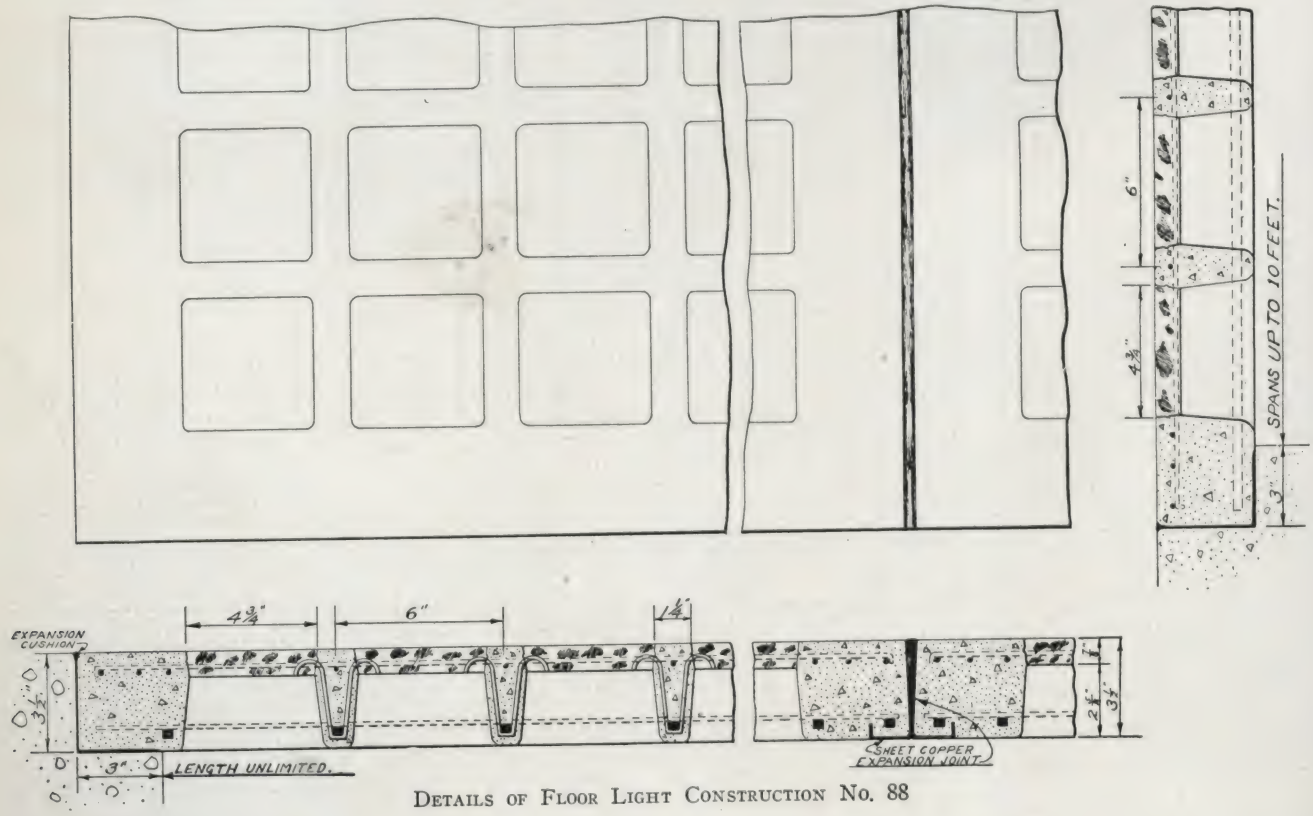
Skylights and Sidewalk Lights—Real Estate Exchange, Detroit, Mich., Louis Kamper, Architect

Skylights, Sidewalk Lights and Marquise Lights—Stroh Building, Detroit, Mich., Giaver, Dinkelberg & Ellington, Architects

Ceiling Lights—Lima State Hospitals, Lima, Ohio, Frank L. Packard, Architect

Skylights—Wilson Body Co., Detroit, Mich., Esselstyn, Murpny & Hanford, Architects

Skylights—Niagara Falls Power Co., Niagara Falls, N. Y., Company Engineers



Details of Floor Light Construction No. 88

J. M. RICHARDS

Glass and Concrete Constructions

119 West First Street (Station 27)
BOSTON, MASS.

Products

RICHARDS UNITY ROOF LIGHT, FLOOR LIGHT and SIDEWALK LIGHT CONSTRUCTIONS.

Also manufacturers of Skylights, and Factory Roof Lights.

Principal Advantages

Superior glass; maximum dispersed light; watertight; no metal exposed; low up-keep; simple details for supporting constructions and flashings; glass units easily replaced.

Constructions in General

Consist of glass units set in waterproofed cement and reinforced with deformed steel bars of such sizes as to give the desired strength for the purpose they are to serve.

Unity Glass Units—They are scientifically designed to admit the maximum of dispersed light, to give the required strength and to insure a perfectly annealed glass free from interior strains. Their sections show no uneven masses of glass so that their manufacture is simplified and the process of annealing (cooling) is therefore perfectly performed. The glass is manufactured by a pioneer factory with special equipment under a formula to give a clear crystal product which will not turn purple.

Expansion and Contraction—Taken care of in every direction. The glass units are first white enameled, then coated with an elastic compound, plastic in all temperatures, wherever they are in contact with cement to take up the differences in the coefficients of expansion.

Monolithic glass slabs are limited in size to about 50 sq. ft. They are separated by expansion joints extending through the entire thickness of slabs and are calked watertight. Every bearing is provided with a slip joint.

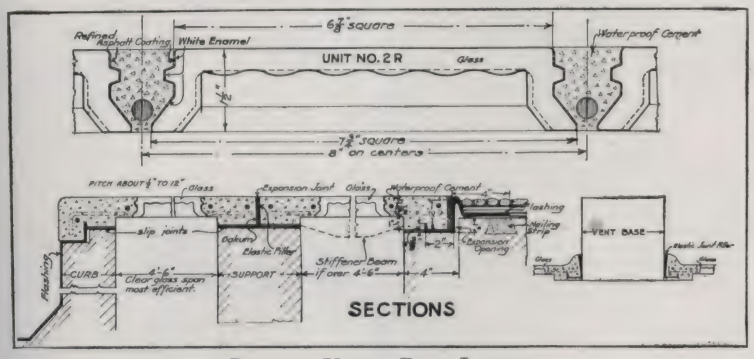
Ventilation—Any type of ventilator set in roof lights.

DATA

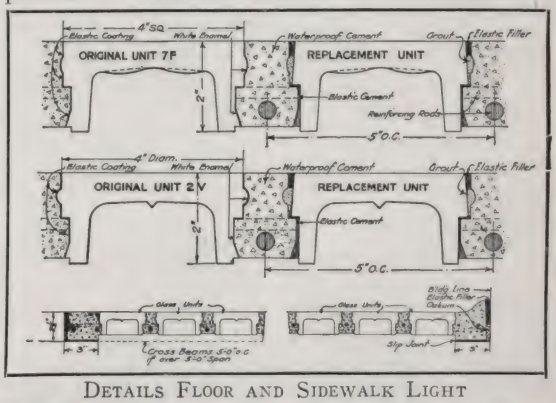
	Unity glass unit number	Size of unit, in.	Supports on centers, ft.	Live loads up, lbs.	Weight of constr., lbs.	Allow thickness, in.	Guarantee, yrs.
Roof	1-R, 2-R	7¾ square	5	40	15–17	2	2
Floor	7-F	4 square	5	150	19	2½	5
Sidewalk	2-V	4 diam.	5	250	20	2½	1

Information

Consider Richards Unity roof lights for the next lighting problem. Write for additional information.



DETAILS UNITY ROOF LIGHTS



DETAILS FLOOR AND SIDEWALK LIGHT

JOHN HANCOCK BUILDING, BOSTON, MASS.
F. A. WALDRON, Engineer — PARKER, THOMAS & RICE, Architects

FEDERAL RESERVE BANK OF BOSTON
R. CLIPSTON STURGIS, Architect

RICHARDS & KELLY MANUFACTURING CO.

Manufacturers of Prismatic Lights

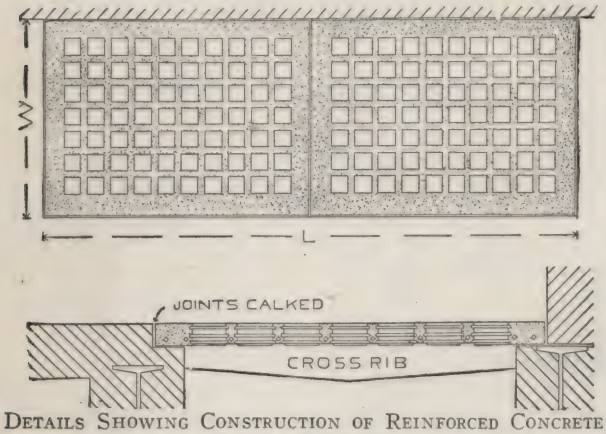
309-311 West Twenty-third Street
CHICAGO, ILL.

Products

REINFORCED CONCRETE SIDEWALK LIGHTS; CAST IRON SIDEWALK LIGHTS; FLOOR LIGHTS; SIDEWALK DOORS; COALHOLE COVERS.

Reinforced Concrete Sidewalk Lights

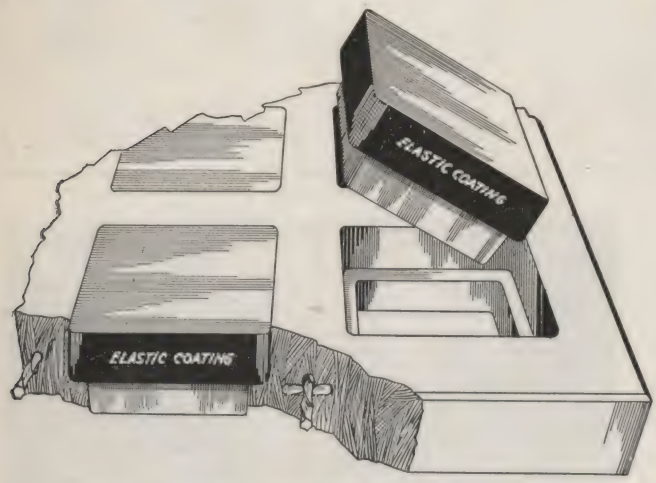
Constructed of a body of concrete reinforced with twisted steel bars set between the rows of glass and around the outer edges of panels.



DETAILS SHOWING CONSTRUCTION OF REINFORCED CONCRETE SIDEWALK LIGHTS

Glass—Replaceable type glass, 2¼ in. square plain lens, 3¼ in. square multiprism lens and 3¼ in. round plain lens.

Standard type glass, 2¾ in. square plain lens and 2¾ in. square multiprism lens.



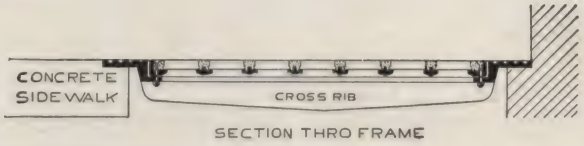
DETAILS SHOWING PANEL WITH REPLACEABLE GLASS

Floor Lights

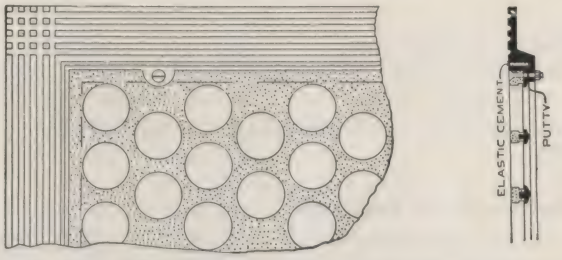
Floor lights are constructed of cast iron panels glazed with either 4 in. square or 6 in. square glass.

Cast Iron Sidewalk Lights

Constructed of cast iron panels glazed with various sizes of glass set in concrete, or in panels with projecting iron knobs with glass set with elastic cement.



SECTION THRO FRAME



DETAILS SHOWING CONSTRUCTION OF CAST IRON SIDEWALK LIGHTS, CONCRETE SETTING

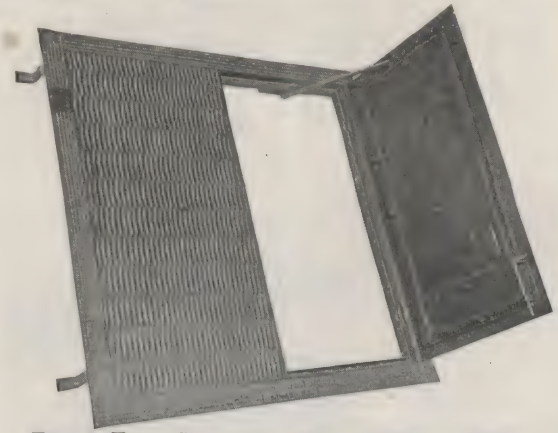
Furnished with panels only or with panels and cast iron outer framework.

Glass—For concrete surface panels, 2, 2½, 3 in. diameter; 3 in. square; 2½x3½ in. and 2¼x5 in. For projecting iron knob surface panels, 1⅝ in. diameter.

Sidewalk Doors

Manufactured in flush or raised types, with either checkered steel or plain surface steel. In illuminating type, with various sizes of glass set in cast iron construction, or with square glass set in steel plates.

All doors are fitted with brass hinges, flush lift rings, device to hold in place while open and slide bolt to lock from below. Flush door frames are cast with gutter to carry off water which seeps through the joints between doors and frames.



FLUSH TYPE CHECKERED STEEL SIDEWALK DOOR

Coalhole Covers and Frames

We carry a complete line of plain and illuminated coalhole covers, grates and frames, 16, 18, 20 and 24 in. in diameter. We also have patterns for 26-, 28-, 30- and 36-in. diameter covers and frames.

Sketches and Prices

Send sketches or dimensions of work required and estimates will be furnished promptly. Prices given f.o.b. cars or set in place at building.

THE PHILIP CAREY COMPANY

Manufacturers of Expansion Joints

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES
FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Product

CAREY ELASTITE EXPANSION JOINT.

For Waterproofing and Dampproofing, see pages 70-71; for Built-up Roofing, see pages 876-879; for Asphalt Shingles, see page 907; for Pipe Coverings, see pages 1736-1737.

Experience and Facilities

This company is the largest organization in the world devoted exclusively to the production, refining and manufacture of the products enumerated. Control of raw materials, large manufacturing capacity and continuous operation for a half century result in low manufacturing costs.

Engineering Service

Through capable and experienced engineers this company is glad to assist in the solution of problems that may arise in connection with the application or installation of any of its products. Advice and counsel is offered free of charge or obligation.

ELASTITE USED FOR EXPANSION JOINTS IN YALE BOWL

Elastite Expansion Joint

Elastite expansion joint consists of a body of compressible asphaltic compound sandwiched between two walls of asphalt saturated felt, the whole being inseparably bonded together to a uniform thickness by mechanical pressure. It has for many years been specified and used by progressive engineers and architects in floors, sidewalks, roofs, pavements, viaducts and other structures throughout the land.

It is furnished regularly in thicknesses from ¼ to 1 in., widths from 3 to 36 in. and lengths up to 10 ft., although 5 or 6 ft. pieces are recommended as being much more economical to handle. It can be supplied cut to special shapes or formed to meet unusual conditions or requirements of installation.

It is cheap; easy to handle and install; does not stick together in summer or become brittle in winter; is used without loss or waste; and once installed becomes an integral part of the work, functioning efficiently as long as the structure itself endures.

In Roofs

Elastite expansion joint is extensively used in concrete or similar roof slabs. Prevention of cracks and ruptures eliminates many annoying roofing troubles. Installed between slab and parapet walls it acts as a safety measure to prevent displacement of parapets and subsequent danger to lives and property.

In Concrete Floors

Elastite expansion joint, placed vertically and extending entirely through the slab, should be used to lay off extensive floor areas, such as public garages, warehouses and industrial buildings, into panels of convenient size. It should be used in a similar manner to separate all walls, column bases and other obstructions from the floor slab. This prevents damage to the building, while the absence of dirt collecting cracks, makes floor easy to keep clean.

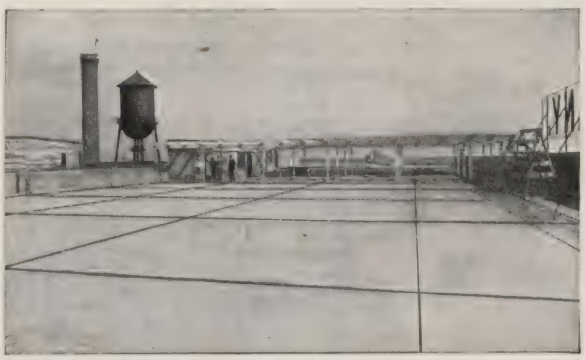
In Sidewalks and Driveways

Elastite expansion joint should be built into all concrete sidewalks and driveways at intervals of about 30 ft. placed perpendicular to the surface and at right angles to the length of the pavement. Similar installations should always be made at points where the sidewalk or the driveway joins the curb.

Other Uses

For Elastite expansion joint, non-deteriorating through action of the elements, or by water, possessed of valuable acid resisting qualities, and resilient at all atmospheric temperatures, new applications and fields of usefulness are constantly being discovered.

Send for sample and literature.



ELASTITE EXPANSION JOINT IN ROOF GARDEN SLAB
United Drug Co. Building, St. Louis, Mo.

SIDEWALK APPLICATION OF ELASTITE EXPANSION JOINT AT WAYNE AND WYOMING AVENUES, LOCKLAND, OHIO

TRUSCON STEEL COMPANY

Manufacturers of Steel Plate Girder Joists

YOUNGSTOWN, OHIO

For List of Offices, See Page 848

Product

STEEL PLATE GIRDER JOISTS.

For Reinforcing Steel and Steel Buildings see pages 42-43; for Hy-rib Metal Lath, see pages 268-269; for Steel Windows, see pages 848-851.

TRUSCON STEEL JOISTS

TRADE-MARK

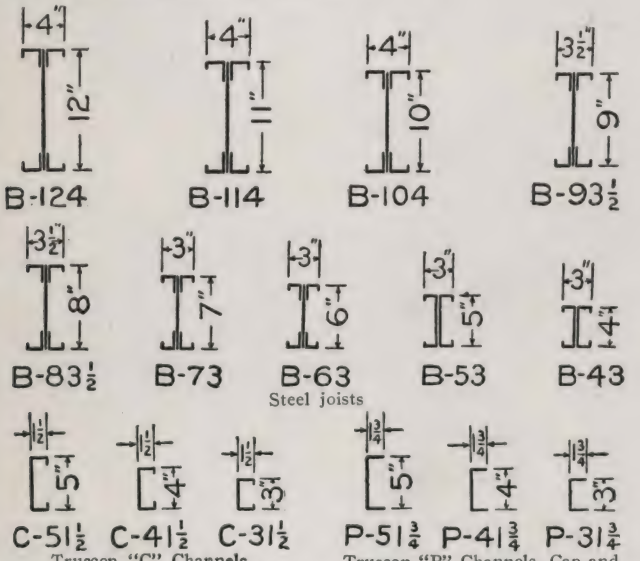
Steel Joist Loading Tables Adopted by all Manufacturers

All values are for joists braced laterally as in standard floor construction. All square foot loads include weight of floor construction. To find safe live load deduct weight of floor and ceiling. (Average approximately 40 lbs.) Square foot loads produce no deflection more than 1/360 span per sq. in. All values are based on moment of ⅛ WL with extreme fiber stress not exceeding 16,000 lbs. per sq. in.

Truscon Steel Joist Construction

No matter what the building conditions may be, engineers, architects and builders require strength and economy. Truscon plate girder joists meet all these requirements. This type of construction has great strength with no excess weight. For office buildings, apartments, schools, hospitals and other structures, where there are no excessive floor loads, Truscon plate girder joists should be specified. They eliminate concrete form work; increased speed of handling and erection; reduce the amount of concrete. These are a few reasons why they are so popular, practical and economical for fireproof construction. Truscon plate girder joists can be furnished in a large number of sizes cut to exact length.

For detailed information and service, consult one of our 43 Engineering Offices.



SECTIONS SHOWING TYPES AND SIZES OF TRUSCON STEEL JOISTS AND CHANNELS

DESCRIPTION AND PROPERTIES OF TRUSCON STEEL JOISTS

Section index	Wt. per lin. ft., lbs.	Gauge flange	Gauge web	Area, sq. in.	Moment of inertia	Section modulus
B-43	3.7	15	..	1.08	2.60	1.3
B-53	4.2	15	..	1.22	4.38	1.75
B-63	4.9	15	15	1.44	6.90	2.3
B-73	5.4	15	14	1.59	11.20	3.2
B-83½	5.9	15	14	1.74	16.80	4.2
B-93½	6.6	15	13	1.94	23.85	5.3
B-104	7.6	15	12	2.24	33.25	6.65
B-114	9.0	14	11	2.65	46.20	8.4
B-124	10.0	14	10	2.94	60.00	10.0

DESCRIPTION OF CHANNELS

Weight per lin. ft., lbs.	Depth, in.	Gauge	"C" channels		*"P" channels	
			Section index	Width flange, in.	Section index	Width flange, in.
1.6	3	15	C-3 1½	1½	P-3 ¾	1¾
1.85	4	15	C-4 1½	1½	P-4 ¾	1¾
2.10	5	15	C-5 1½	1½	P-5 ¾	1¾

*Cap and sill plates.

TOTAL SAFE UNIFORM LOADS IN POUNDS ON TRUSCON STEEL JOISTS

Clear span in feet	Section index	B-43	B-53	B-63	B-73	B-83½	B-93½	B-104	B-114	B-124
	Wt. per lin. ft., lbs.	3.7	4.2	4.9	5.4	5.9	6.6	7.6	9.0	10.0
6		2311	.....	.....	.....	.....	.....	.....	.....	.....
7		1981	2667	.....	.....	.....	.....	.....	.....	.....
8		1733	2333	3067	.....	.....	.....	.....	.....	.....
9		1380	2074	2726	3793	.....	.....	.....	.....	.....
10		1118	1867	2453	3413	.....	.....	.....	.....	.....
11		922	1550	2230	3103	.....	.....	.....	.....	.....
12		773	1305	2045	2845	3733	.....	.....	.....	.....
13		.....	1113	1754	2626	3446	4348	.....	.....	.....
14		....	958	1511	2438	3200	4038	.....	.....	.....
15		.....	.....	1318	2135	2986	3769	4729	5973	7111
16		.....	.....	1159	1880	2800	3533	4433	5600	6666
17		.....	.....	.....	1669	2500	3325	4172	5271	6275
18		.....	.....	.....	1481	2225	3141	3940	4978	5926
19		.....	.....	.....	.....	2000	2844	3733	4716	5614
20		.....	.....	.....	.....	1800	2562	3546	4480	5333
21		.....	.....	.....	.....	1637	2322	3250	4267	5079
22		.....	.....	.....	.....	.....	2120	2942	4073	4848
23		.....	.....	.....	.....	.....	1937	2700	3752	4638
24		.....	.....	.....	.....	.....	.....	2475	3446	4445
25		.....	.....	.....	.....	.....	.....	2285	3181	4133
26		.....	.....	.....	.....	.....	.....	2115	2930	3820
Max. safe load		.....	3940	4890	3840	4600	5900	6624	8050	

TOTAL SAFE UNIFORM LOADS IN POUNDS PER SQUARE FOOT

Section index	B-43	B-53	B-63	B-73	B-83½	B-93½	B-104	B-114	B-124
Wt. per lin. ft., lbs.	3.7	4.2	4.9	5.4	5.9	6.6	7.6	9.0	10.0

FLOOR AND ROOF SLABS—JOISTS SPACED 24 IN. ON CENTERS

Clear span in feet										
6	193	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	142	191	.....	.....	.....	.....	.....	.....	.....	.....
8	108	146	192	.....	.....	.....	.....	.....	.....	.....
9	77	115	152	211	.....	.....	.....	.....	.....	.....
10	56	94	123	171	.....	.....	.....	.....	.....	.....
11	42	70	102	141	.....	.....	.....	.....	.....	.....
12	32	54	85	119	156	.....	.....	.....	.....	.....
13	.....	43	67	101	133	167	.....	.....	.....	.....
14	.....	34	54	87	115	144	.....	.....	.....	.....
15	.....	.....	44	71	100	126	158	199	237	
16	.....	.....	37	59	88	111	139	175	209	
17	.....	.....	.....	49	74	98	123	155	185	
18	.....	.....	.....	41	62	88	110	139	165	
19	.....	.....	.....	.....	53	75	99	124	148	
20	.....	.....	.....	.....	45	64	89	112	134	
21	.....	.....	.....	.....	39	56	78	102	121	
22	.....	.....	.....	.....	.....	48	67	93	110	
23	.....	.....	.....	.....	.....	42	59	82	101	
24	.....	.....	.....	.....	.....	.....	52	72	93	
25	.....	.....	.....	.....	.....	.....	46	64	83	
26	.....	.....	.....	.....	.....	.....	41	57	74	

FLOOR AND ROOF SLABS—JOISTS SPACED 16 IN. ON CENTERS

Clear span in feet										
6	289	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	212	286	.....	.....	.....	.....	.....	.....	.....	.....
8	163	219	287	.....	.....	.....	.....	.....	.....	.....
9	116	173	227	316	.....	.....	.....	.....	.....	.....
10	84	140	184	256	.....	.....	.....	.....	.....	.....
11	63	106	152	212	.....	.....	.....	.....	.....	.....
12	48	82	128	178	234	.....	.....	.....	.....	.....
13	.....	64	101	152	199	251	.....	.....	.....	.....
14	.....	51	81	130	172	216	.....	.....	.....	.....
15	.....	.....	66	107	150	188	236	299	356	
16	.....	.....	54	88	131	166	208	262	313	
17	.....	.....	.....	74	110	147	184	232	277	
18	.....	.....	.....	62	93	131	164	208	247	
19	.....	.....	.....	.....	79	113	147	186	221	
20	.....	.....	.....	.....	68	96	133	168	200	
21	.....	.....	.....	.....	58	83	116	152	182	
22	.....	.....	.....	.....	.....	72	101	139	165	
23	.....	.....	.....	.....	.....	63	88	123	151	
24	.....	.....	.....	.....	.....	.....	77	108	139	
25	.....	.....	.....	.....	.....	.....	68	95	124	
26	.....	.....	.....	.....	.....	.....	61	85	110	

THE DUPLEX HANGER CO.

GENERAL OFFICE AND WORKS
East 53rd Street and Lakeside Avenue
CLEVELAND, OHIO

BRANCH OFFICES
NEW YORK, N. Y., 16 Warren Street
PHILADELPHIA, PA., 1513 Wood Street
NEW ORLEANS, LA., Queen & Crescent Building
BOSTON, MASS., 88 Broad Street

Products

"Duplex" Joist, Wall, Concrete Block and I-beam Hangers; "Duplex" Post Caps, Post Bases, Wall Plates and Wall Boxes, both in Steel and Malleable Iron, for use in heavy mill construction, warehouses and factory buildings as well as in ordinary joist constructed buildings.

Also the "Cleveland" Galvanized Wall Ties and Snow Guards; "Duplex" Concrete Inserts.

Indorsement

"Duplex" hangers and post caps are recognized by architects and builders as the standard.

Indorsed by the building commissioners of the large cities and tested by the National Board of Fire Underwriters.

Specifications

If architects and engineers will, when specifying hangers and post caps, mention the name "Duplex," the proper hangers and caps for the timbers will be furnished. "Duplex" hangers and post caps are designed with a large factor of safety to carry the timbers for which they are intended.

Catalogue

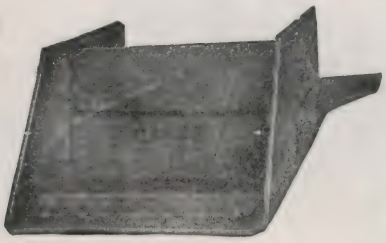
The latest catalogue, Edition No. 19, contains full information relative to "Duplex" line, and also valuable engineering information for architect and builder.

Reference

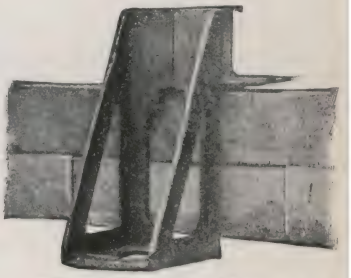
List of installations furnished on request.

"Duplex" Joist Hanger

"Duplex" Joist Hanger
For very heavy mill construction

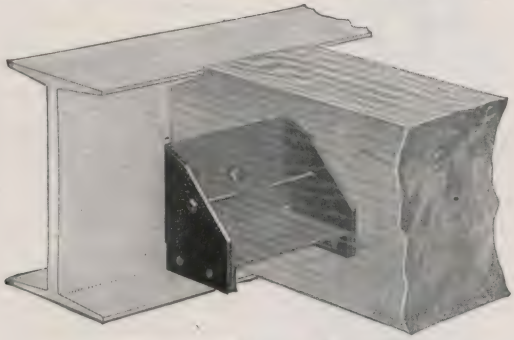


"Duplex" Extra Heavy Wall Hanger



"Duplex" Wall Hanger

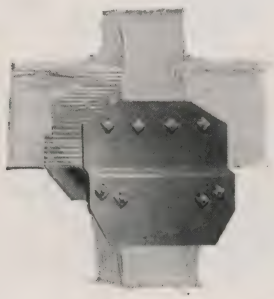
"Duplex" Concrete Block Wall Hanger



"Duplex" I-beam Hanger

"Duplex" Wall Box

"Duplex" Steel Post Base



"Duplex" Steel Post Caps
For one-, two-, three- or four-way to suit any framing

THE IDEAL HANGER COMPANY

1270 East 53d Street

CLEVELAND, OHIO

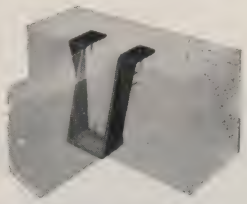
Products

IDEAL JOIST HANGERS, POST CAPS and POST BASES.

Ideal Joist Hangers

Introduction—Ideal hangers are made of best grade open hearth steel bars and formed so the hanger fits flat against the timber. This permits the use of spikes or lag screws to fasten the hanger to the timber and gives the advantage of holding the hanger close to the girder, increasing the carrying capacity of the hanger. The hanger fitting close on all sides does not interfere with furring if this is required. Also adapted for stair well, chimney, light shaft and similar framing.

No costly framing. Easily applied and neat in appearance. The same section of bar is used throughout the hanger, giving the strongest construction and most economical in cost.



IDEAL SINGLE HANGER, STYLE "A"

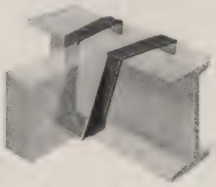
Single Hanger, Style "A"—These hangers are standard construction and carried in stock for every size timber.

Double Hanger, Style "B"—For use where joists frame opposite each other on a wood girder or against an I-beam girder. The double hanger consists of two single hangers each riveted to strap connections so as to hang over the wood girder, or, in case of an I-beam girder, to go over the flange. Unquestionably the strongest construction.

IDEAL DOUBLE HANGER, STYLE "B"

Directions for Ordering—Give size of joists and also width of girder over which hanger must span, or, in case of an I-beam, exact width of flange, or if more convenient, height of I-beam and weight per foot, so that flange width can be obtained.

Single Hanger, Style "C"—For use where a single joist frames against an I-beam or channel, the arms of the joist hanger running over the top. Also used with wood girders.

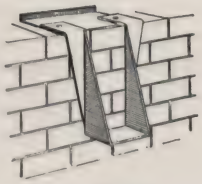


IDEAL SINGLE HANGER, STYLE "C"

Directions for Ordering—Give size of joist and dimensions over which hanger arms must go, namely: width of timber header, or, in case of I-beams or channels, width of flange or height and weight per foot so flange width can be obtained.

Wall Hanger, Style "D"—A steel plate is riveted to the single hanger for distributing the load over the wall. The plate is bent up at the back and forms an anchor in the brickwork. For hangers carrying joists less than 8 in. in width, the plate extends 4½ in. in the wall; 8 in. or more in width, 8 in. in wall.

Wall hangers for all size joists are made with a drop of 8 in., unless otherwise ordered. Where joist is less than 8 in. deep, hanger is made the same drop as depth of joist.



IDEAL WALL HANGER, STYLE "D"

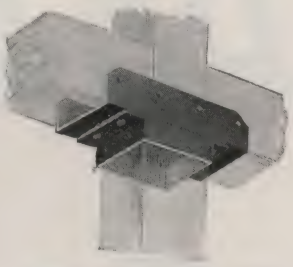
Ideal Steel Post Caps

Cap No. 2—Combines all the features of strength in construction and is easily installed on the post. No framing necessary. The angles on bottom of cap are bent to form a socket into which the post fits and prevents cap from twisting. Channel is made of open hearth plate steel and riveted to socket, forming a rigid construction.

This cap meets with the approval of the National Board of Fire Underwriters.

Made in 1-, 2-, 3- and 4-way construction.

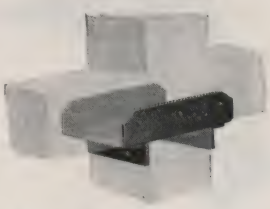
The brackets on the side of the cap are riveted thereon to carry the beams framing in at the side and are placed so the girder and beams will be flush on top, unless otherwise noted.



IDEAL STEEL POST CAP No. 2

Directions for Ordering—In ordering 3- or 4-way construction, give the following information: size post below; size post above; width and height of main girder; width and height of beams on side of cap.

Cap No. 3—The cap forms a complete bearing channel for the girder and through the support of heavy angles underneath gives the necessary strength for lighter constructions. Holes for ⅜-in. lag screws are punched in the cap for tying the girders and post to the cap.



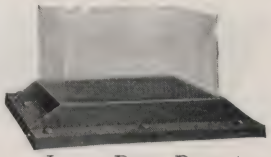
IDEAL STEEL POST CAP No. 3

This cap will permit the use of either a wider or smaller girder than the post and may be furnished in any size. All size post caps carried in stock.

Directions for Ordering—Always give size of post on which cap is placed, size of post which rests on top of cap and size of girder.

Ideal Post Bases

Made of heavy steel plate with angles riveted on to form a socket for the post. Provides necessary spread for standard construction.



IDEAL POST BASE

CHAS. MULVEY MANUFACTURING CO.

Joist Hangers, Post Caps and Building Specialties

TELEPHONE
SEELEY 0595

1840 Carroll Avenue
CHICAGO, ILL.

Products

JOIST HANGERS, POST CAPS, POST BASES and WALL ANCHORS.

Also General Miscellaneous Iron Work.

Joist Hangers

Machine made, accurate and neat in design, of the proper size metal. In writing for prices always give size of joists. For double joist hangers also give width across girders.

Post Caps

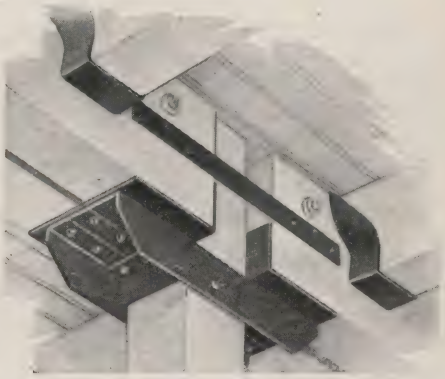
Post caps are made up of angles or steel plates, heavily riveted together, gage of steel depending on size of timber construction. Are much lighter in weight than cast iron caps and can be handled easier and cheaper by mechanics on the building. Made two-, three- or four-way.

Post Bases

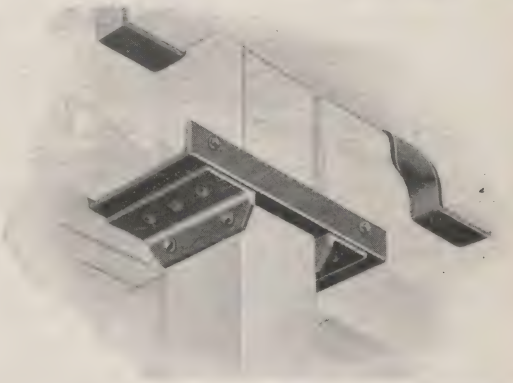
Made as illustrated, of heavy steel bearing plate with angle iron protection around bottom of wood column, all heavily riveted together. Lighter and cheaper than the old time cast iron base.

Wall Anchors

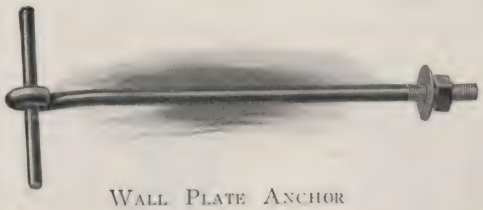
The accompanying illustrations indicate various types of anchors made and carried in stock. Any special kind desired will be manufactured. In ordering state size of timber to be anchored.



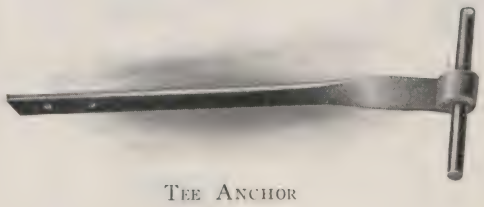
TWO-WAY POST CAP SHOWING GIRDER WIDER THAN WOOD POST



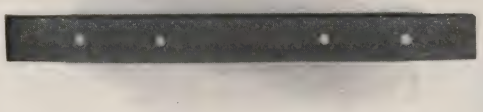
TWO-WAY POST CAP SHOWING GIRDER SAME WIDTH AS WOOD POST



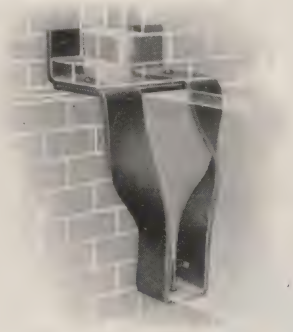
WALL PLATE ANCHOR



TEE ANCHOR

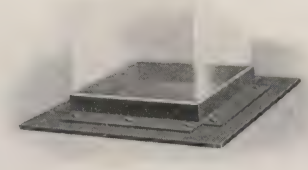


STRAP ANCHOR

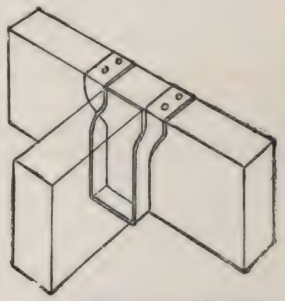


WALL JOIST HANGER

Similar in construction to single joint hanger. Used at brick or concrete walls; can be bricked in without extra cost. Allows entire freedom of removal of joists; releases the joists in case of fire

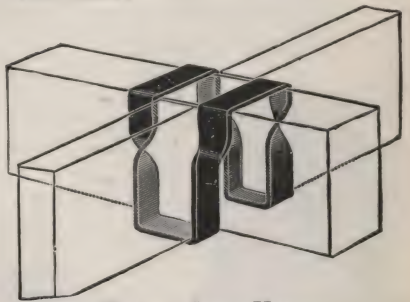


POST BASE



SINGLE JOIST HANGER

Made from soft, pliable steel, shaped while hot and cooled gradually. Used at wood headers



DOUBLE JOIST HANGER

Welded by machine in one piece at center of girder. Costs no more to attach than single joint hanger; does twice the work

THE VAN DORN IRON WORKS COMPANY

Manufacturers of Post Caps and Joist Hangers

CLEVELAND, OHIO

EASTERN OFFICE AND WAREHOUSE: 324 William Street, LONG ISLAND CITY, N. Y.

Products

STEEL POST CAPS; POST BASES; WALL BOXES; JOIST, WALL and I-BEAM HANGERS.

Also manufacturers of Wall Ties and Anchors, Wall and Floor Plugs, Metallic Furniture, Structural Steel Work, Ornamental Iron Work, Steel Truck Bodies and Frames, and Dumping Hoists for Truck Bodies.

For Steel Jail Construction, see pages 578-579.

Materials and Guarantee

The steel used in all Van Dorn products is the best obtainable. All goods are guaranteed to be first class, both as to materials and workmanship, and "just as represented."

General Description

Van Dorn post caps are made to sizes which will permit close framing of all timbers, being made to conform to actual timber sizes as published by the Southern Pine Association. The construction is such that every ounce of metal is used to the best advantage.

Blue Prints—Blue prints showing the exact details and dimensions of the various Van Dorn post caps, hangers, etc., will be furnished on request.

Van Dorn Steel Post Caps

Van Dorn steel post caps are made to meet all conditions of timber framing. They are manufactured to carry timbers either one, two, three or four ways. They are made from special steel plate, which adds greatly to their carrying capacity.

Description—Van Dorn standard steel post caps have a girder carrying channel 6 in. deep, made of ¼-in. mild steel plate. The overhang is 6 in., reinforced by the riveted leg of the angle, which forms a closed socket fitting closely around the post.

A Van Dorn post cap, identical to those illustrated, of standard stock material, tested at the Case School of Applied Science, carried a sustained load of 150,000 lbs. Substantiated by other tests, the carrying capacity of Van Dorn post caps is assured.

Van Dorn Steel Wall Boxes

Van Dorn wall boxes have a close fitting cover and ample anchorage at back of box; timber is self-releasing. Ventilation is provided around the beam.

Van Dorn Hangers

Van Dorn steel joist hangers are made from specially rolled ribbed bar and special rolled angle. Superior to any other make on the market. By adding bent plates of the desired shapes, the standard (No. 1) joist hanger is readily adapted to the production of a number of different styles for use over steel I-beams, or in brick or concrete walls.

No. 1 or Regular Joist Hanger—The side flanges are wrought with a groove and ridge, the ridge serving as additional strength, especially at the angle of the prong where the severest strain comes. The spikes hold joist and headers together—season cracks will not affect the strength of the connection.

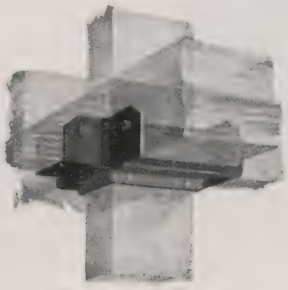
DETAILS REGULAR (NO. 1) HANGER

Size of hanger width all depths, in.	Length of prong, in.	Width of prong, in.	Width of seat, in.	Thickness of metal in seat, in.
2	2	1 1/2	3	1/8
3	3	1 1/2	3	1/8
4	3 1/2	1 1/2	3	3/16
5	3 1/2	1 1/2	3	3/16
6	3 1/2	1 1/2	3	1/4
8	4 1/2	2	3 1/2	1/4
10	4 1/2	2	3 1/2	5/16
12	4 1/2	2	3 1/2	3/8

Catalogue and Prices

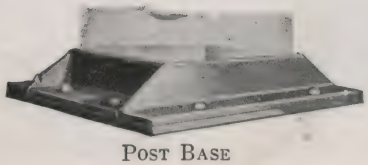
Catalogue and prices furnished on request.

TWO-WAY CAP

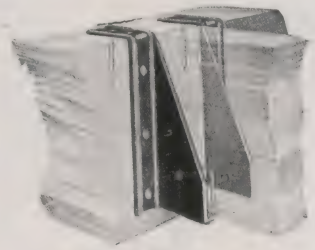


FOUR-WAY CAP

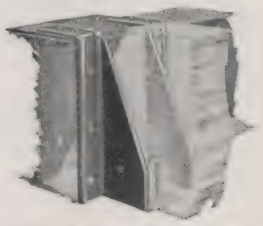
STEEL WALL BOX



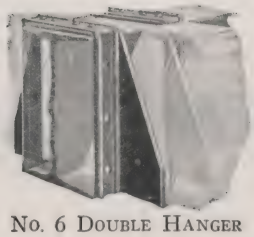
POST BASE



NO. 1 HANGER



NO. 7 I-BEAM HANGER
(Hooking over flange at back)



NO. 6 DOUBLE HANGER

NO. 4 WALL HANGER

THE H. W. COVERT COMPANY

Manufacturers of Sidewalk Doors
137 East 46th Street
NEW YORK, N. Y.

Products

Ross Watertight Sidewalk Door.

Also manufacturers of Iron Coal Windows, Cleanout Doors, Ash Dumps, Safety Coal Hole Covers, Andirons and Fireplace Tools.

For Covert Patent Iron Fireplace Throat and Damper, see pages 508-509.

Ross Watertight Sidewalk Door

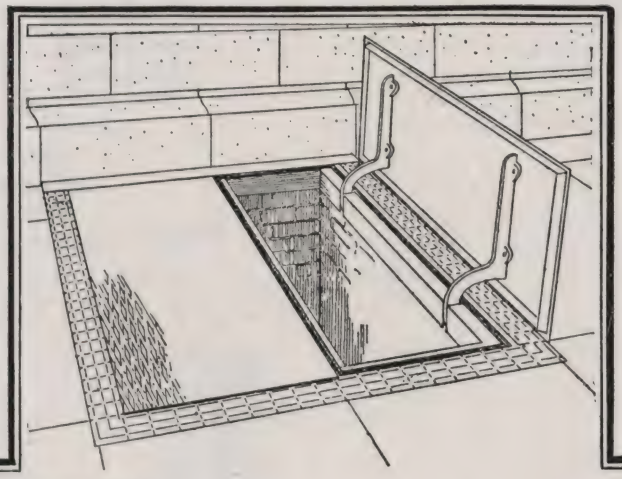
This is a flush type sidewalk door, which when closed, is absolutely watertight without the use of gutters or drains.

As shown in the detail below, a wedge shaped piece of steel is fastened to the underside of the doors on all edges and enters the packing in the groove in the iron frame. The packing is compressed and effectually seals the door.

It is built exceptionally rigid and heavy to withstand hard traffic. It is not a cheap door but is economical, as it requires no repairs and will last indefinitely.

Details of Construction

Construction and installation details are shown below. The frame is cast in one piece and is grooved and slightly pitched to carry off the water. The doors are of 3-16-in. non-slip rolled steel reinforced with heavy malleable iron hinge straps 1½ in. deep and supported through the center by a heavy cast bar bearing directly on the frame. The hinges are of heavy malleable castings on ½-in. brass pins concealed under the door in pockets cast in the frame.

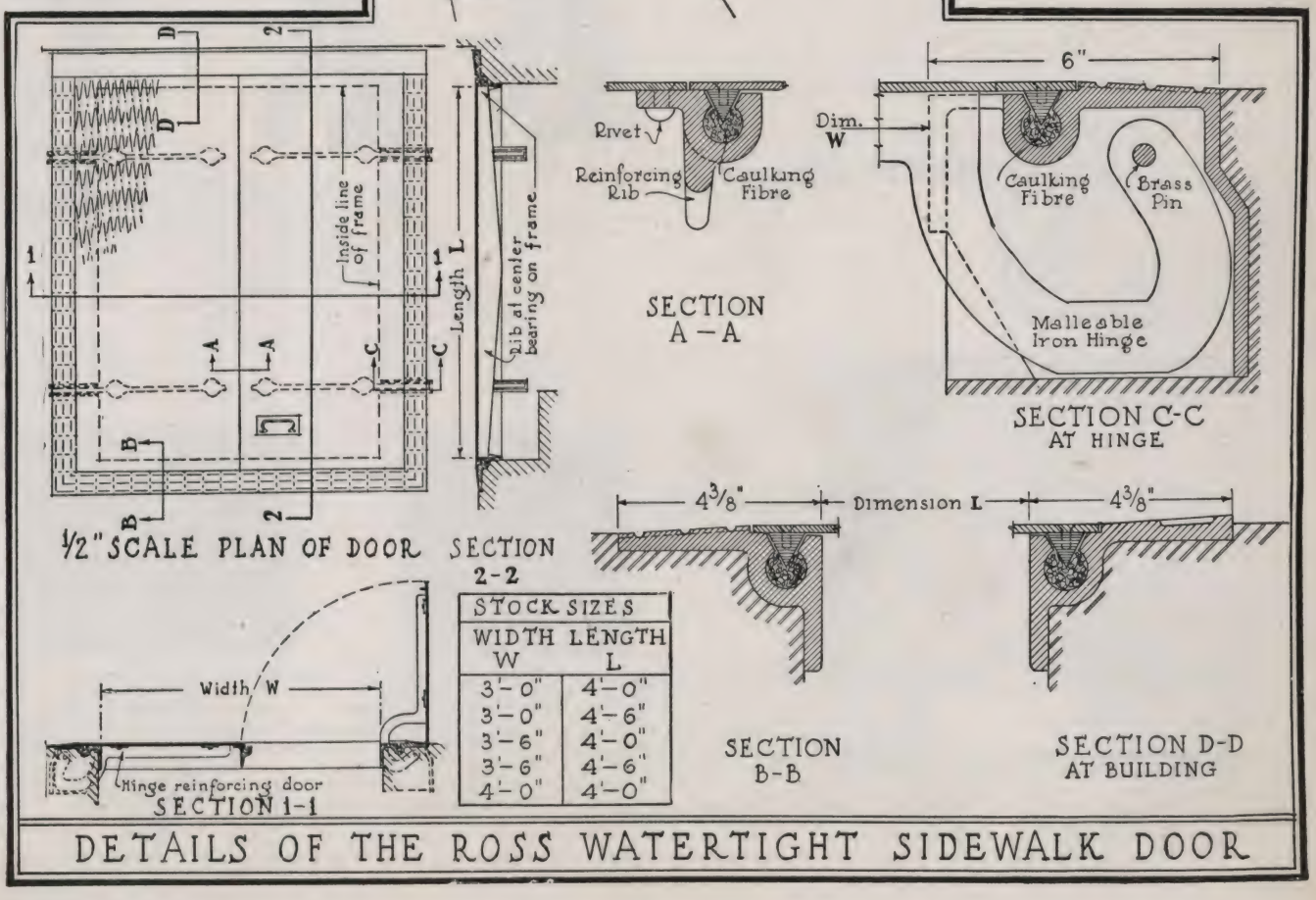


Stock Sizes and Finish

This door is made in stock sizes as given in the table and is shipped with one priming coat. Special sizes made if required.

3 ft. 0 in. wide x 4 ft. 0 in. long	$140.00
3 ft. 0 in. wide x 4 ft. 6 in. long	155.00
3 ft. 6 in. wide x 4 ft. 0 in. long	160.00
3 ft. 6 in. wide x 4 ft. 6 in. long	175.00
4 ft. 0 in. wide x 4 ft. 0 in. long	180.00

Note: Sizes are the neat openings in the frame.



DETAILS OF THE ROSS WATERTIGHT SIDEWALK DOOR

THE SAMUEL J. CRESWELL IRON WORKS

Twenty-third and Cherry Streets
PHILADELPHIA. PA.

Products

ARCHITECTURAL WROUGHT and CAST IRON WORK, and GENERAL FOUNDRY WORK, including Columns, Spiral Stairs, Wheel Guards, Lamp Brackets and Standards, Manhole Doors and Frames, Fenders, Roadway Drain Grates and Frames, Vault Plates and Frames, Ash Pit Doors and Frames, Cleanout Doors and Frames, Trench Covers and Frames, Cesspools, Drain Gutters, Pavement Doors, Gates and Grilles, Post Caps, Elevator Enclosures, Railings, etc.

Facilities

THE SAMUEL J. CRESWELL IRON WORKS is one of the largest and best equipped plants in the vicinity of Philadelphia for the production of the various kinds of architectural wrought and cast iron work mentioned above. Further, this company is prepared to submit estimates, or designs and estimates, for any ornamental work for large or small buildings, etc., on short notice.

General Foundry Work

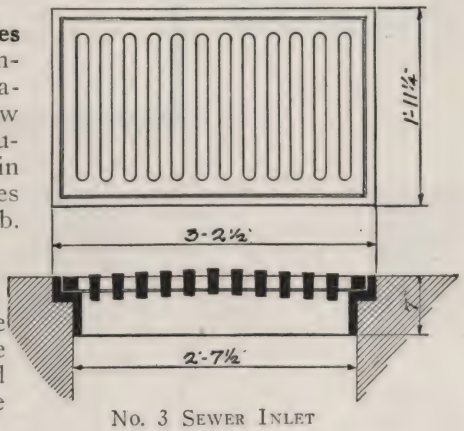
In addition to architectural work, a fully equipped foundry is prepared to produce special castings and do general foundry work, including cast iron ornamental or plain columns from stock designs (sent on request) or to architects' designs.

Stock Specialties

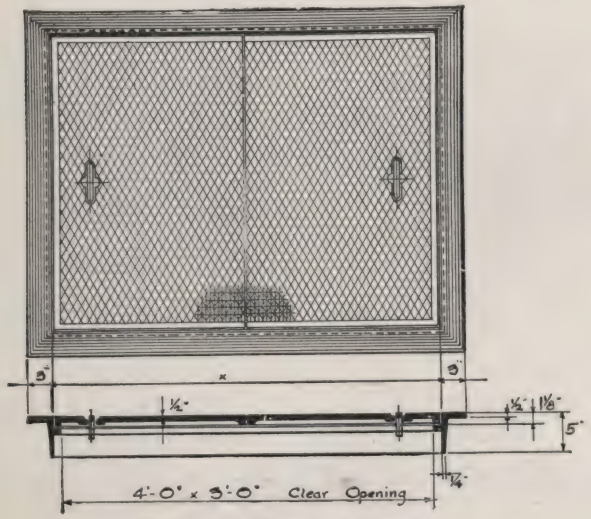
The accompanying illustrations show a few specialties regularly carried in stock. The prices quoted are f. o. b. Philadelphia.

Catalogue

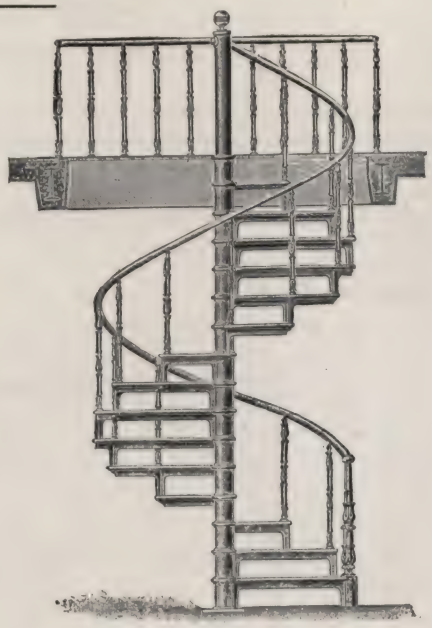
A catalogue illustrating the entire line, and discounts will be sent on request.



No. 3 SEWER INLET
Price, $22.00



No. 34 MANHOLE COVER
Price, $35.00. Extra heavy pattern, price, $55.00



SPIRAL STAIRWAY
Following sizes stock pattern 3'6", 4', 4'6", 5', 5'6" and 6' diameters. Any height.

No. 1
LAMP STANDARD
Price, $90.00

No. 15 FENDER
9" projection
3' 5" high

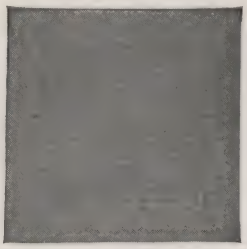
Wall	Price
9"	$23.00
13"	23.50
18"	25.00
22"	28.50
24"	30.00

Can be made for walls to 36 in. thick.

NOS. 16 AND 17
CORNER FENDERS

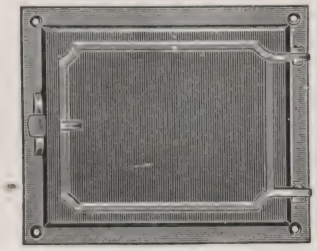
Design No.	Projection	High	Price
16	9"	3' 5"	$ 9.50
17	9"	2' 8"	7.50
17A	14"	3' 0"	25.00
17B	8¾"	2' 0"	7.00

No. 201
LAMP
BRACKET
Price, $30.00



No. 9 ASH DUMP FOR FIREPLACES

Opening	Price
6" x 6"	$1.25
6" x 8"	1.50



No. 8 CLEAN OUT DOORS AND FRAMES

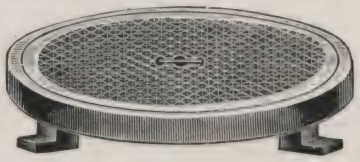
Wide	High	Price
16"	24"	$7.00
16"	12"	3.50
12"	12"	2.25
12"	10"	2.00
10"	8"	1.75
9"	7"	1.25
8"	6"	1.25
7"	5"	1.25

Continued on next page

No. 1 Manhole Door and Frame

Width	Height	Price	Width	Height	Price
36″	36″	$30.00	24″	30″	$11.75
33″	49″	30.00	24″	24″	11.00
24″	48″	20.00	20″	24″	10.00
24″	36″	12.50	18″	24″	8.50

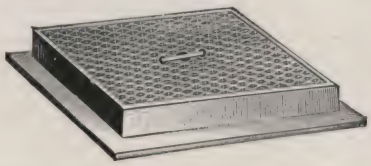
All manhole doors and frames have return flanges 4 in. deep.



No. 1 Vault Plate and Frame; No. 2 Vault Gratings and Frame

Size	Price
14″	$ 3.00
16″	3.25
18″	5.00
20″	6.50
24″	8.75
36″	20.00

Depth of frame, 3 in.

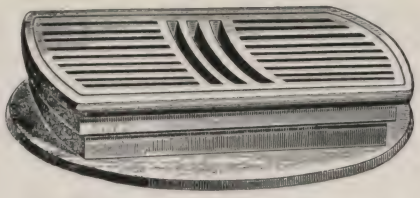


No. 7 Vault Plate and Frame; No. 8 Vault Grating and Frame

Size	Price	Size	Price
36″ x 36″	$27.00	7½″ x 7½″	$2.00
30″ x 30″	18.00	14″ x 24″	7.00
24″ x 24″	10.00	18″ x 24″	8.50
20″ x 20″	8.50	18″x 30″	10.00
18″ x 18″	7.50	18″ x 36″	12.50
16″ x 16″	6.50	24″ x 30″	13.50
14″ x 14″	5.00	24″ x 36″	18.00
12″ x 12″	3.00	24″ x 42″	20.00
		24″ x 48″	25.00

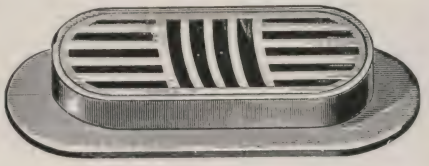
Depth of frame, 3 in.

All sizes can be made extra heavy at additional cost.



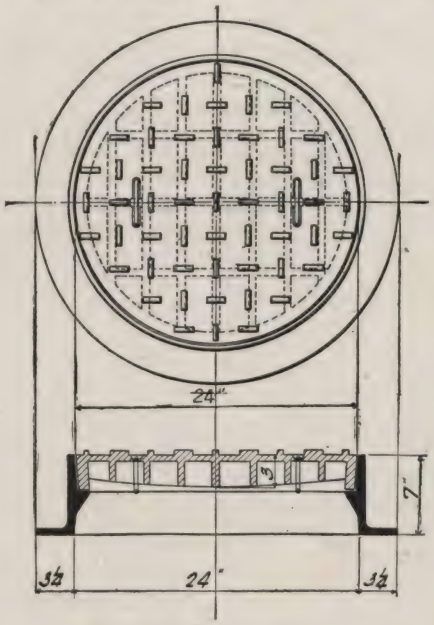
No. 10 Roadway Drain Grate and Frame

13¼″x24½″ grating.....$7.00
12″ x18″ grating..... 6.00



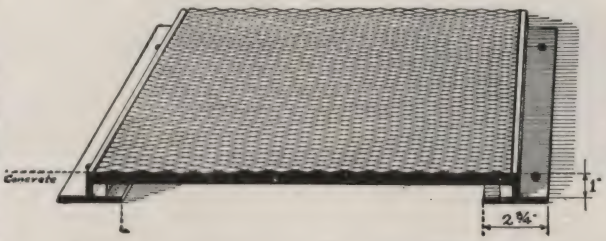
No. 11 Roadway Drain Grate and Frame

11″ x22½″ grating.....$6.00
8¼″x17¼″ grating..... 4.00



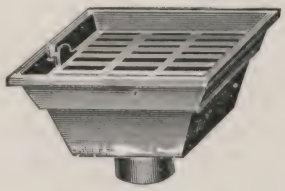
No. 19 Manhole Cover

Extra heavy for city use.....$17.00
With concrete or asphalt filled cover..... 22.00



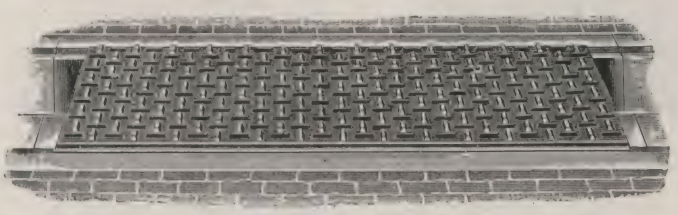
Cover and Curbing for Ducts or Trenches

Plates made to suit conditions. Curbing carried in stock. Prices on application.



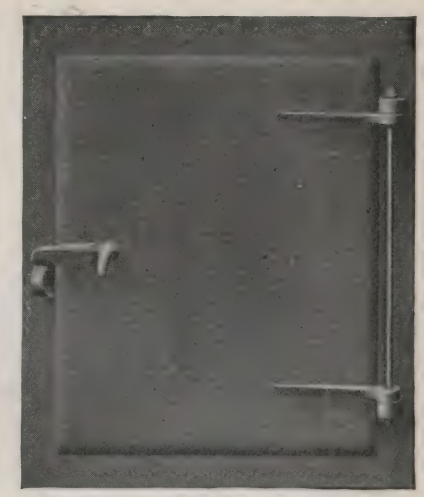
No. 23 Cesspool

13″x13″, 4-in. outlet.
Price, painted.....$3.00



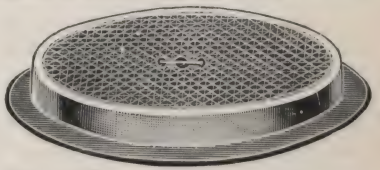
No. 28 Gutter Cover Plate

18″ wide, 1″ thick, $3.00 per lineal ft.
24″ wide, 1½″ thick, $6.00 per lineal ft.



No. 3 Manhole Door and Frame

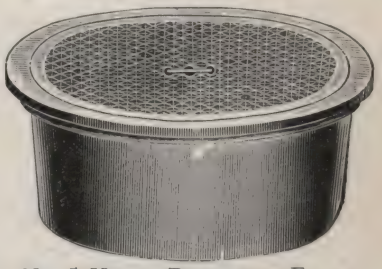
Width	Height	Price	Width	Height	Price
24″	36″	$12.50	16″	24″	$ 8.00
24″	24″	11.00	16″	20″	7.25
18″	24″	8.50	16″	10″	4.50
18″	18″	7.50	12″	16″	4.50



No. 3 Vault Plate and Frame; No. 4 Vault Grating and Frame

Size	Price	Size	Price
16″	$5.00	24″	$9.50
18″	6.00	30″	22.00
20″	7.00	34″	25.00

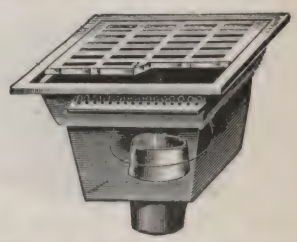
Depth of frame, 3 in.



No. 5 Vault Plate and Frame; No. 6 Vault Grating and Frame

Size	Price
14″	$ 4.00
18″	7.25
20″	9.00
24″	10.00
30″	15.00
36″	30.00

Depth of frame, 9 in.



No. 22 Bell Trap Cesspool

16″x16″, 4-in. outlet.
Price.....$5.00
12″x12″, 4-in. outlet.
Price.....$3.75

OLNEY J. DEAN & CO.

Manufacturers of Scuppers

179 West Washington Street

CHICAGO, ILL.

TELEPHONE
STATE 5940, 5941

Products

DEAN'S CHICAGO TYPE SCUPPERS.

Also Concrete Inserts, Sash Operating Devices, Reinforcing Steel.

Advantages of the Chicago Scuppers

Dean's Chicago scuppers reduce the insurance rates from 3% to 5% on the contents of the building. These scuppers are windproof and rainproof and meet the fire underwriters' requirements in all respects as well as all the recommendations of the National Fire Protective Association.

The initial cost of the scuppers is insignificant when compared with the saving in insurance premiums which are paid from year to year.

Buildings properly equipped with scuppers meeting the underwriters' requirements are much more easily rented, as the tenants get lower rates of insurance on the contents of the building and, in addition to this, they have the assurance of a minimum water loss and less interruption to their business in case of fire, for the water is automatically drained to the outside of the building instead of from floor to floor through elevator and stair openings.

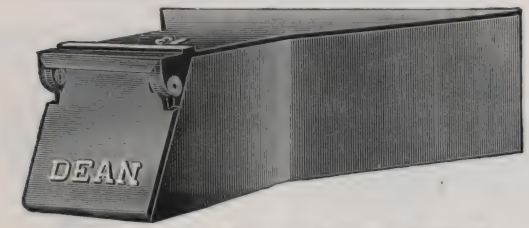
The majority of stock losses in fires is not from the fire itself, but from water; and a similar loss may be caused by a defective water or sprinkler system. Therefore scuppers should be used in all classes of buildings, whether sprinkled or not.

In case of standing water more damage will be done to a wood floor than to one of cement, therefore scuppers are essential in a well constructed mill building. They should be used with every kind of floor finish.

Construction

Our Chicago scupper has 48-sq. in. capacity at the inlet and 16-sq. in. capacity at the outlet.

INSIDE VIEW OF DEAN'S CHICAGO SCUPPER



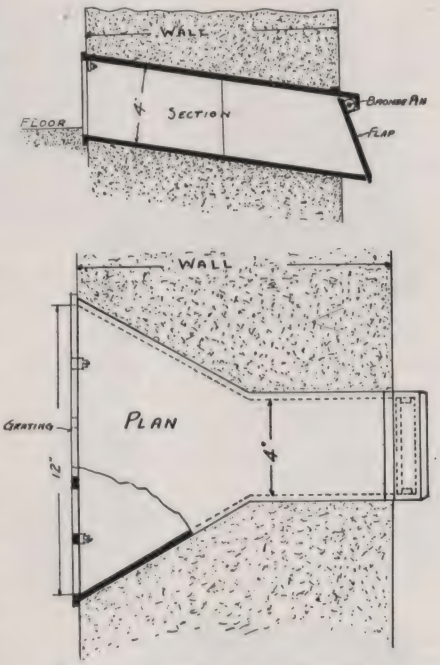
OUTSIDE VIEW OF DEAN'S CHICAGO SCUPPER

The wide inlet increases the water pressure on the flap at the outlet. This flap is hung on bronze pins at such an angle that its weight holds it snug against the walls of the scupper making it windtight and watertight, but a very small flow of water from within will open it. A small shelf projecting from the outside of the scupper protects the hinges and valve from clogging with mortar, dirt or ice. The grating within prevents clogging from the inside of the building and allows a clear inspection of the interior of the scupper at all times.

Installation

The National Fire Protective Association recommends, under ordinary conditions, one Dean Chicago type scupper to every 1000 sq. ft. of floor, or, in a building equipped with a sprinkler system, one to every 500 sq. ft. of floor.

It is not necessary to slope the floor with a Dean scupper. If the inside end is placed well below the finished floor line and the scupper given a pitch of 2 to 12 in. outward, perfect drainage will be secured.



SECTION AND PLAN OF DEAN'S CHICAGO SCUPPER

Specification

The mason contractor shall furnish and set one Dean Chicago Type Scupper in each bay of the exterior wall as shown on plans.

The scuppers are to meet the recommendation of the National Fire Protective Association and to be approved by the Fire Underwriters Laboratories and shall be set in the masonry walls above the ground floor levels as shown on details.

Care must be taken in setting the scuppers to see that the pitch is not less than 2 in. in 12 in., that the lower inside edges of scuppers are set 1 in. below finished floor line, and that scuppers are set true to wall lines and are not sprung or broken during construction work.

On completion of the job, flaps must be cleaned and left in perfect working order and all exposed parts of scuppers are to be cleaned and given a heavy coat of paint.

Service

A complete stock of all sizes is kept in the Chicago warehouse.

Chicago being centrally located with exceptionally good package car service on all railroads, delivery can be made within a few days time to all points. This is an important consideration in regard to scuppers, as they are very often forgotten until actually needed on the job.

WATERTITE DRAIN & SCUPPER CO., INC.

TELEPHONE
MURRAY HILL 7666

137 East 46th Street
NEW YORK, N. Y.

AGENTS

BOSTON, FOLSOM SNOW GUARD CO.
PHILADELPHIA, BALTIMORE and PITTSBURGH, THE PENN BUILDING SPECIALTIES CO.
ST. LOUIS, H. C. UHLENHAUT
CLEVELAND, R. L. QUEISSER CO.
RICHMOND, EARNEST BROS.
INDIANAPOLIS, VAN CAMP HARDWARE CO.
NORFOLK, S. H. HODGES
MILWAUKEE, BUILDERS SUPPLY CO.
SAN FRANCISCO and LOS ANGELES WATERHOUSE-WILCOX CO.

Products

WINDPROOF HOODED SCUPPERS.
Also manufacturers of Interior Scupper Systems.

Test and Approval

The Underwriters' Laboratories, Inc., have tested the Type B scupper with fender and have formally approved it as meeting all the requirements of the National Fire Protection Association. Abstracts of their findings are on file in the offices of the various underwriters' associations and the full report can be seen at this company's office. These tests developed that this scupper has a discharge capacity of 100 gals. per minute under 3-in. head of water on the floor or 60 gals. per minute under 1-in. head. They recommend setting the scuppers 1 in. below the finished floor line as shown by the sectional view.

Construction

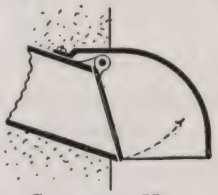
All parts of the scupper are cast iron except the windproof valve closing the outer end, which is of cast bronze, and the hinge pin which is copper bushed with lead to prevent corrosion. The valve is guaranteed to be windproof and practically airtight.

Pitch

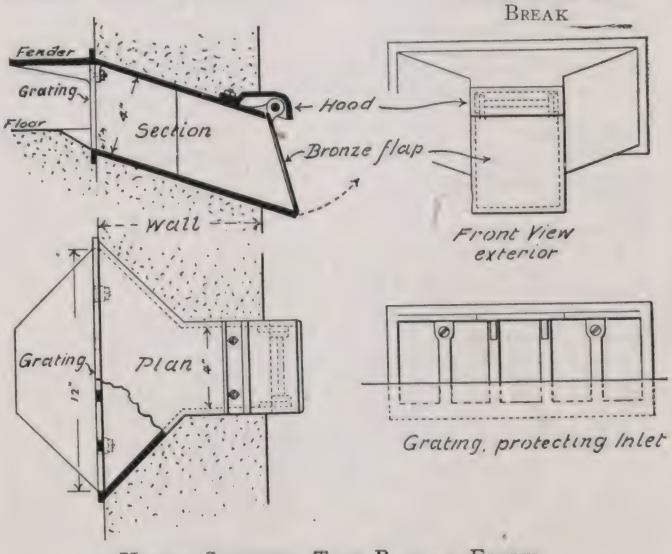
Scuppers have a downward pitch toward the outlet of 2 in. to the foot, and at least this pitch is necessary to secure sufficient pressure to open the valve.

Complete Hood

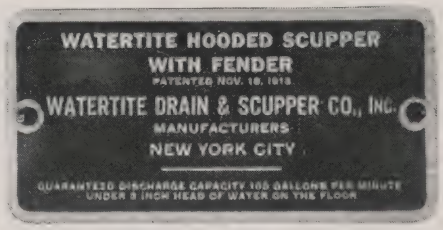
The complete hood is strongly favored by leading New England underwriters' associations as giving absolute protection to the valve under all conditions of weather.



COMPLETE HOOD FORMING WIND BREAK



HOODED SCUPPERS, TYPE B, WITH FENDER
Patented November 18, 1913



BRASS LABEL APPEARING ON TYPE B HOODED SCUPPERS WITH FENDER
(None genuine without this label)

Specification

Furnish and set in exterior walls, where indicated, at the level of each floor above the ground, cast iron (painted or galvanized) scuppers with 12x4-in. inlet and 4x4-in. outlet. Scuppers to be made with a grade or pitch toward the outlet of not less than 2 in. to the foot and to be set 1 in. below the finished floor level. Inlet to be protected by a cast iron grating with vertical bars not over 2 in. apart and a fender projecting at least 4 in. into the room. Outlet to extend at least 2 in. outside the wall and to be closed with a cast bronze or brass gravity valve about $\frac{1}{16}$ in. thick hanging free and clear at the outer end of the scupper but fitting same closely, and to be hinged at the top with brass or copper pin. Valve to be protected by cast iron (small or complete) hood, as made by the WATERTITE DRAIN & SCUPPER CO., INC., of New York. Scuppers shall have the approval of the Underwriters' Laboratories, Inc.

Catalogue and Prices

Send for catalogue giving full information as to all types of scuppers made by this company and the recommendations of the National Board of Fire Protection in full. Also for prices of scuppers for all different thicknesses of walls.

Installations

A few of the many installations are as follows:

U. S. Army Supply Base, Brooklyn, N. Y., 1181 scuppers
U. S. Army Supply Depot, New Orleans, La., 1070 scuppers
U. S. Aircraft Storehouse, Philadelphia, Pa., Navy Yard
Frankford Arsenal, Philadelphia, Pa.
Cluett-Peabody Company Mill, Troy, N. Y.
Pennsylvania R. R. Co., Inbound Warehouse, East Liberty, Pa.
Oliver Chilled Plow Works, South Bend, Ind.
Arlington Mills, Lawrence, Mass.
Standard Oil Co. Building, Brooklyn, N. Y.
Eastman Kodak Co., Rochester, N. Y.
Hill Publishing Company, New York, N. Y.
American Ever-Ready Co., Long Island City, N. Y.
Reymann Abattoir and Packing House, Wheeling, W. Va.
Mica Insulator Company Building, Schenectady, N. Y.
American Cigar Company Factory, Hartford; Conn.
Illuminating Building, Cleveland, Ohio.
Diamond Match Company Building, Oshkosh, Wis.
Bagby Furniture Company Building, Baltimore, Md.
Holtzer-Cabot Building, Cambridge, Mass.
Printing Crafts Building, New York, N. Y.
Sunbury Converting Works, Sunbury, Pa.
Schoellkopf Agricultural & Chemical Works, Buffalo, N. Y.
Belleville Warehouse, New Bedford, Mass.
United Drug Co., Boston, Mass.
Harris Bros. Mill, Paterson, N. J.
Davenport Building, Greenfield, Mass.

WINDSHIELD SCUPPER COMPANY

16 Warren Street
NEW YORK, N. Y.

AGENTS

ATLANTA, GA., R. C. Lieb Co., 340 Whitehall Street
BALTIMORE, MD., Edwin Cugle, 2 East Lexington Street
BOSTON, MASS., E. A. Simpson, 88 Broad Street
BUFFALO, N. Y., W. E. Gardiner, 402 Lafayette Square Building
CHICAGO, ILL., M. R. Duffy, 1119 Chamber of Commerce Building
CINCINNATI, OHIO, Brick Sales Co., 315 Hammond Street
CLEVELAND, OHIO, Building Products Co., 412 Stuyvesant Building
DETROIT, MICH., L. T. Ollesheimer, 962 Penobscot Building
INDIANAPOLIS, IND., F. O. Duvall Co., 136 West Maryland Street
LOS ANGELES, CAL., Maritzen-Kuns Co., 226 West 9th Street
LOUISVILLE, KY., Belknap Hardware & Mfg. Co., 127 Washington St.
MILWAUKEE, WIS., Philip Gross Hardware & Supply Co., 216 Third St.
MONTREAL, QUE., David McGill, 320 Laqauchetiere Street, West
PHILADELPHIA, PA., Harry Kahn, 1509 Wood Street
PITTSBURGH, PA., Fort Pitt Hardware Co., 807 Liberty Avenue
PORTLAND, ORE., Timms Cress & Co., 184 Second Street
RICHMOND, VA., Construction Supply Co., Hancock & Marshall Streets
ROCHESTER, N. Y., American Clay & Cement Co., 1175 Main Street, East
ST. LOUIS, MO., F. A. Camman Builder's Service Co., 927 Century Building
SAN FRANCISCO, CAL., M. E. Hammond, Pacific Building
SYRACUSE, N. Y., Edward H. Goodrich, 130 Fitch Street
UTICA, N. Y., American Hard Wall Plaster Co.

Product

Windshield Scuppers.

Windshield Scuppers

This device should be installed in the walls of all mercantile buildings, such as factories, warehouses, department stores and lofts. Its chief function is to drain off excess water in case of fire; but it has proved invaluable as an emergency drain in case of bursting pipes, defective sprinklers, etc.

Value of the Windshield (Patented)

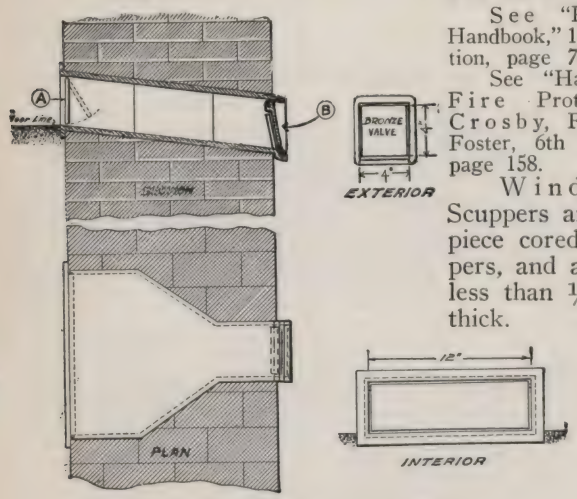
Old type scuppers with grating cause drafts that seriously hamper employees in their work, with the result that they stuff them with waste material, defeating the purpose for which scuppers are intended, and rendering them useless. Windshield scuppers positively prevent drafts. The slightest air current closes the Windshield.

The Windshield, in addition, acts as a fire retardant. When an adjoining building is burning, there is a tendency for the flames to communicate through an open scupper and ignite merchandise on the floor. The Windshield, by shutting off the drafts and fire, acts as a retardant or shield to keep out the flames.

See "Kidder's Handbook," 17th edition, page 767.

See "Handbook Fire Protection," Crosby, Fiske & Foster, 6th edition, page 158.

Windshield Scuppers are one piece cored scuppers, and are not less than ¼ inch thick.



Details of Windshield Scuppers
"A" shows patented windshield. "B" shows external storm gate

Reduced Insurance Rates

More actual damage is done by water than by fire. Buildings equipped with these scuppers are subject to a reduction in insurance rates from 2 to 5 per cent. (See article 377 of Insurance Schedule Form No. 115.)

This great saving is far out of proportion to the small initial cost of the scuppers.

Inside View of Windshield Scupper

PRICES AND SIZES

Thickness of wall, in.	Type S heavy ⅜-in. with brass windshield	Type K heavy ⅜-in. with galvanized windshield	Type L ¼-in. with galvanized windshield	Type M ¼-in. metal with grating (no windshield)
6 to 8	$6.55	$5.55	$4.55	$4.00
9 to 11	6 80	5.80	4.90	4.25
12 to 14	7.60	6.60	5.25	4.60
15 to 17	8.50	7.50	6.15	5.35
18 to 20	9.00	8.00	6.55	5.60
21 to 23	9.40	8.40	7.15	5.90
24 to 26	9.80	8.80	7.60	6.20

Specification for One Piece Cored Windshield Scuppers

Provide for each bay in exterior walls as shown on plans, Windshield Scuppers, Type (....) one-piece cored scuppers. Exterior door to be of bronze or copper hung on bronze hinge pins; equipped with windshield hung on bronze hinge pins, as manufactured by Windshield Scupper Company, 16 Warren Street, New York, N. Y.

Note: Scuppers, made in several parts, less than ¼ in. thick, assembled and bolted together, are not considered equal. Only one piece cored scuppers will be accepted.

References

Note the class of firms installing Windshield scuppers. It indicates its superiority.

Austin, Nichols & Co. Building, New York, N. Y.
Chelsea Warehouse, New York, N. Y.
Lord & Taylor Building, New York, N. Y.
National Casket Co., Brooklyn, N. Y.
Standard Oil Co., Long Island City, N. Y.
Colgate & Co., Jersey City, N. J.
General Electric Co., Harrison, N. J.
Victor Talking Machine Co., Camden, N. J.
Naumkeag Steam Cotton Mills, Salem, Mass.
Merchants Terminal Warehouse, New Bedford, Mass.
Packard Motor Co., Chicago, Ill.
American Can Co., San Francisco, Cal.
American Safety Razor Co., Brooklyn, N. Y.
Studebaker Buildings, South Bend, Ind., and Detroit, Mich.
Fisher Body Corp., Cleveland, Ohio, and Detroit, Mich.
Clark Thread Co., Newark, N. J.
Belknap Hardware Manufacturing Co., Louisville, Ky.
Baltimore & Ohio R. R. Co. Warehouses, Philadelphia and Pittsburgh, Pa.

STOVER MANUFACTURING & ENGINE CO.

Manufacturers of Fireplace Dampers and Accessories

746 East Street

FREEPORT, ILL.

Products

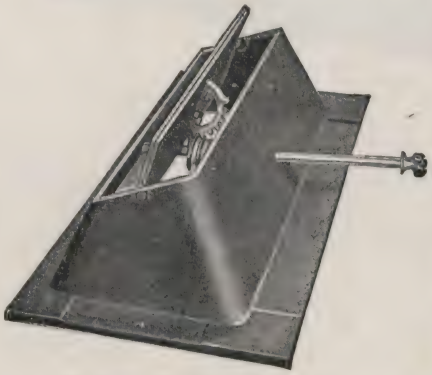
FIREPLACE DOME DAMPERS; ASH TRAP DOORS.
FOUNDATION COAL CHUTES, CLEAN-OUT DOORS.
Also manufacturers of Fire Baskets, Andirons, Fire Sets, Chimney Thimbles, Steel Angles for Fireplaces.

"Improved" Dome Damper

The dome forms a throat that is smooth and acts as the connection between the fireplace and the chimney flue.

The cover is hinged at the center and operated by a worm gear, resulting in easy operation and permitting of fine adjustment. Can be arranged for operation from the center or the right end of the front of damper.

Damper has a heavy flange, wide enough to take a full course of brick. It acts as the roof of the fireplace and is very easily installed. Its use saves considerable time over other forms of construction.



"IMPROVED" DOME DAMPER
End view showing worm, segment, rod, etc. Notice wide flanges on frame

Ratchet Dome Damper

Designed for fireplaces having tile or marble fronts, whose beauty is impaired by cutting. Has the same frame and cover as the "Improved" damper, but the cover operates by means of a ratchet lever. The lever does not extend beyond the face of the fireplace and is very inconspicuous, but readily accessible.

Also made with extra long lever and bracket (Style X) for use with fireplaces where a steel angle is used.

RATCHET DOME DAMPER

"IMPROVED" FIREPLACE DOME DAMPERS

Damper	Front length, in.	Rear length, in.	Depth, in.	Base of dome			Weight each, lbs.
				Front, in.	Rear, in.	Depth, in.	
No. 15	30	25	13¾	24½	21	10	37½
No. 16	34	29	13¾	28½	25	10	38½
No. 17	38½	33½	13¾	33	28½	10	43½
No. 17½	42	37	13¾	36	32	10	50
No. 18	44½	39½	13¾	39	35	10	51½
No. 18½	47½	42½	13¾	42	38	10	60
No. 19	54	49	13¾	49	45	10	70
No. 20	60	55	13¾	55	51	10	73
No. 21	78	73	13¾	72	68	10	90

Ratchet dampers are made in same sizes and dimensions as "Improved" dampers. If ratchet dampers are to be used in fireplaces having steel angle in front, specify "Style X" instead of regular style.

Foundation Coal Chute

A new style coal chute of great convenience and strength. Door and frame are of cast iron, black enameled, and body is of heavy wrought steel. Door has steel side plates that form a hopper when door is dropped down to open position. A heavy steel shield is hinged to back of side plates and is thrown up to protect house from coal. When shield is lowered and door closed, it locks automatically.

Chute is opened and closed by means of a chain, which is attached to frame of door and can be extended to any part of cellar. It is not necessary to enter coal bin at any time.

The carefully ground and machined castings make the coal chute weather-tight. It can be opened only from the inside. The hinge arrangements make it necessary to use a sledge hammer to get in from the outside.

Also made with heavy wire glass in door to admit light into coal bin.

FOUNDATION COAL CHUTE
Iron frame, 25 in. wide x 19 in. high. Steel frame, 21⅝ in. wide x 15⅝ in. high outside x 18⅞ in. high inside x 12 in. deep. Net weight, approximately 80 lbs.

CLEAN-OUT DOOR

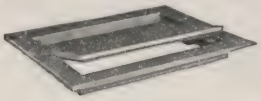
Clean-out Doors

Made of cast iron, ground to fit tight. Provided with reversible lock and can be set for either right or left hand opening. Can be securely bolted to brick through holes in frame.

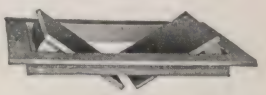
Made in three sizes: 8x8 in., 8x10 in., 10x12 in.

Ash Trap Doors

Made of select gray iron, doors well counterbalanced and securely wired into the frame.



No. 1



No. 2

Door	Floor opening, in.	Outside dimensions of plate, in.	Weight each, lbs.
No. 1. Single cover	5 x8	7x10	3
No. 2. Duplex cover	4¼x8¼	6x 9¾	2¾

Catalogue

Complete catalogue sent on request. Please mention "SWEET'S ARCHITECTURAL CATALOGUE."

THE H. W. COVERT COMPANY

Manufacturers of Fireplace Specialties

137 East 46th Street
NEW YORK, N. Y.

BRANCH OFFICES

Los Angeles, Cal., Waterhouse-Wilcox-Pacific Company
Kansas City, Mo., Union Material & Supply Company
Minneapolis, Minn., Belt Line Brick Company
Chicago, Ill., Crescent Sales & Mfg. Company
Detroit, Mich., Reindel & Reindel
St. Louis, Mo., Schurk Iron Works

Products

Covert Patent Iron Fireplace Throat and Damper.

Also manufacturers of Iron Coal Windows, Clean-out Doors, Ash Dumps, Safety Coalhole Covers, Andirons and Fireplace Tools.

For Watertight Sidewalk Doors see page 501.

Covert "Improved" Fireplace Throat and Damper

The illustration shows proper construction of fireplace to secure best results. The wind shelf is important for checking down-drafts which are liable to occur under certain atmospheric conditions. The slope of the back should be started well down in the fireplace, as shown, and should be a straight, and not a curved line.

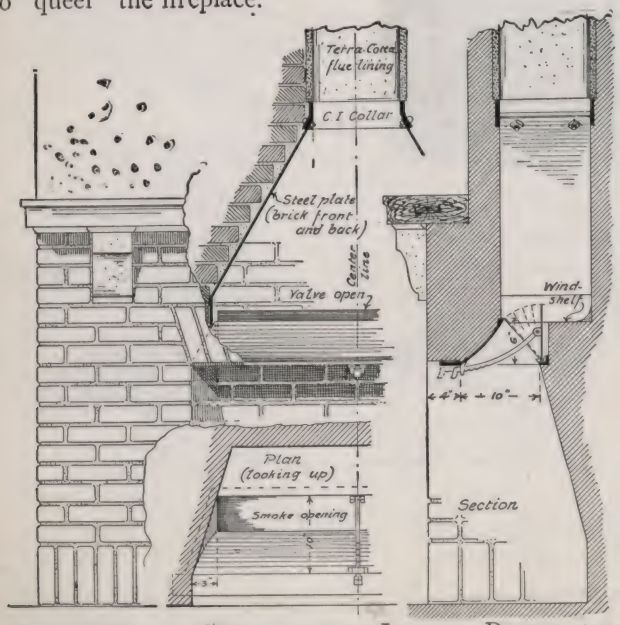
This damper is good for fireplaces not over 20 in. deep; but in large fireplaces, where the height is 3 ft. or over, it may be used up to 24 in. deep. For wider and deeper fireplaces use "Old Style" dampers shown in the Covert catalogue.

The operating ratchet regulating the smoke opening is under the arch at the front, but it is not conspicuous. Should a ratchet be broken a new one can be inserted in half a minute. The valve plate is removable for cleaning.

The front of the damper is sufficiently strong to act as a lintel.

Steel Smoke Chamber

To secure the best results a Covert steel smoke chamber should be built above the damper, forming a smooth and properly shaped approach to the flue, thereby reducing friction, increasing the flue power 25% and making it practically impossible for a careless workman to "queer" the fireplace.



Construction of Fireplace with Improved Damper and Steel Smoke Chamber

Specification

"Every fireplace to have a Covert 'Improved' iron throat and damper built in over the fireplace, same acting as a lintel. To be built as shown on detail drawings or as illustrated in the printed matter of The H. W. Covert Company, New York. Form wind break or shelf at the level of the upper edge of the throat, and connect the iron throat with the flue by setting a Covert steel smoke chamber with cast iron collar of proper size."

Perspective View of Improved Damper

PRICE LIST

Improved Throat and Damper				Steel Smoke Chamber		
Damper No.	Front width of fireplace, in.	Telegraphic code word	Price	Proper flue lining exterior dimensions, in.	Code word	Price
524	24	Intro	$ 7.25	8½ x 8½	Force	$4.75
530	30	Impart	8.25	8½ x13	Freak	5.00
532	32	Impel	8.50	8½ x13	Face	5.25
536	36	Inert	8.75	8½ x13	Frond	5.50
542	42	Infer	10.00	13 x13	Fold	5.75
548	48	Impost	11.00	13 x13	Friend	6.00
554	54	Incur	12.50	13 x18	Fleece	6.50
560	60	Impale	14.00	13 x18	Field	7.00

Note: "Old Style" dampers are sized up to 84 in. See page following.

Rotary Face-Operating Damper

Our new face-operating damper has none of the objectionable features of the other dampers of its type. Ours has no worm or gear to become clogged or rusted, being operated by a simple lever movement. One-quarter turn opens or closes the valve plate; the action is positive and the construction simple and strong. The plate and other parts are easily removed or replaced.

Send for special circular and prices.

Catalogue

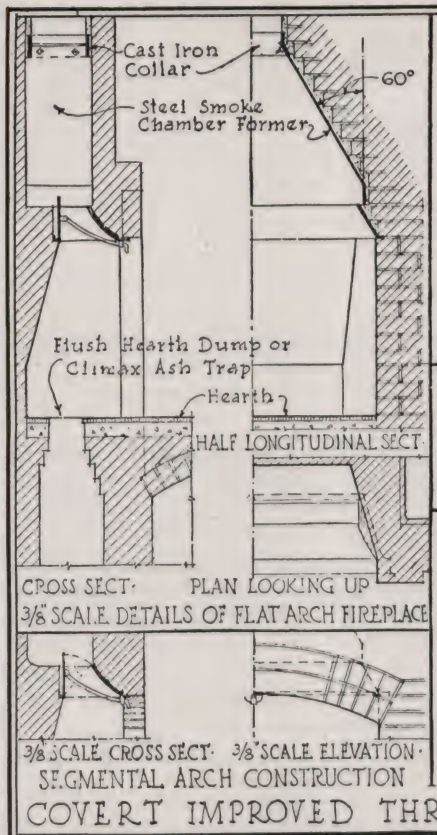
Send for catalogue containing "Hints on Fireplace Construction."

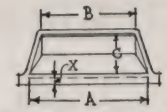
References

The following is a partial list of the architects who specify Covert products for fireplace construction:

McKim, Mead & White
Clinton & Russell
Warren & Wetmore
Carrère & Hastings
Grosvenor Atterbury
John Russell Pope
Rutan & Russell
Bragdon & Hillman
Dwight J. Baum
Taylor & Mosley
Dennison & Hirons
F. G. Hasselman
Walter Leslie Walker
Wilson Brothers and Co.
Cope & Stewardson
Day & Klauder
Charles Barton Keen
Wilson Eyre
Stearns & Castor
William Warren Sabin
Delano & Aldrich
Davis, McGrath & Kiessling
John Cox, Jr.
Jackson & Rosencrans
Radcliffe & Kelly
A. E. Barlow

Continued on next page





KEY PLAN
See Table

NOTE: Throat for Segmental Arch is same as for Flat Arch except that Flange X is cut off. See detail

TABLE OF SIZES

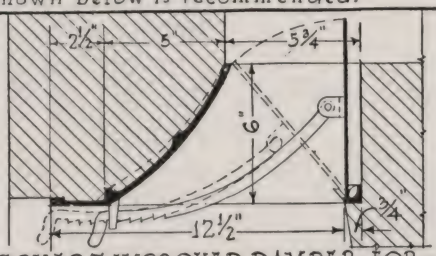
DAMPER NO.	THROAT & DAMPER: FRONT WIDTH OF FIREPL. OPG IN INCHES	BASE OPENG OF THROAT NOT INCLUDING FLANGE IN INCHES: A	B	C	SHIPPING WEIGHT IN POUNDS	FLUE: PROPER FLUE LINING EXTERIOR DIMENSIONS	EQUIVALENT ROUND FLUE INSIDE DIAMETER	SMOKE CHAMBER FORMER: WIDTH OF SMOKE CHAMBER IN INCHES	SHIPPING WEIGHT IN POUNDS
524	24	24	18	10	33	8½ x 8½	8	19	12
530	30	30	24	10	40	8½ x 13	10	25	15
532	32	32	26	10	46	8½ x 13	10	27	20
536	36	36	30	10	52	8½ x 13	10	31	25
542	42	42	36	10	60	13 x 13	12	37	30
548	48	48	42	10	67	13 x 13	12	43	35
554	54	54	48	10	75	13 x 18	15	49	50
560	60	60	54	10	87	13 x 18	15	55	60

Area of fireplace flue always 1/10 to 1/12 of area of fireplace opening

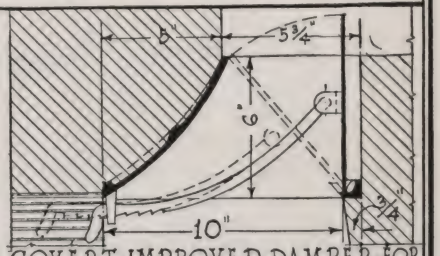
—NOTES—

Steel Smoke Chamber Former with cast iron collar of proper size with proper flue will be furnished when ordered. This furnishes a smooth passage for the smoke into the flue.

This damper is good for fireplaces not over 20 inches deep, having splayed jambs and back. For deeper fireplaces the Old Style Damper shown below is recommended.

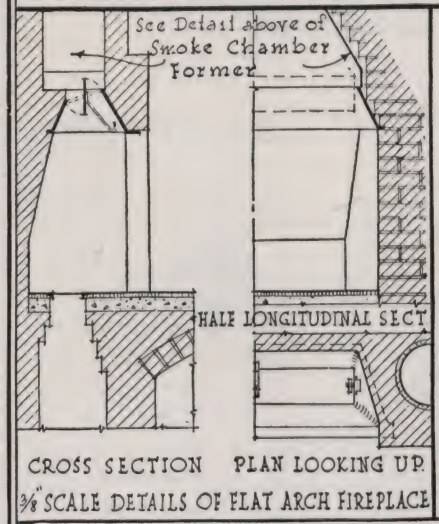


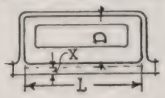
COVERT IMPROVED DAMPER FOR FLAT ARCH SCALE 1½"=1'-0"



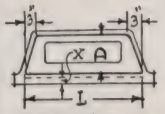
COVERT IMPROVED DAMPER FOR SEGMENTAL ARCH SCALE 1½"=1'-0"

COVERT IMPROVED THROAT AND DAMPER ALSO SMOKE CHAMBER FORMER





SERIES A&B

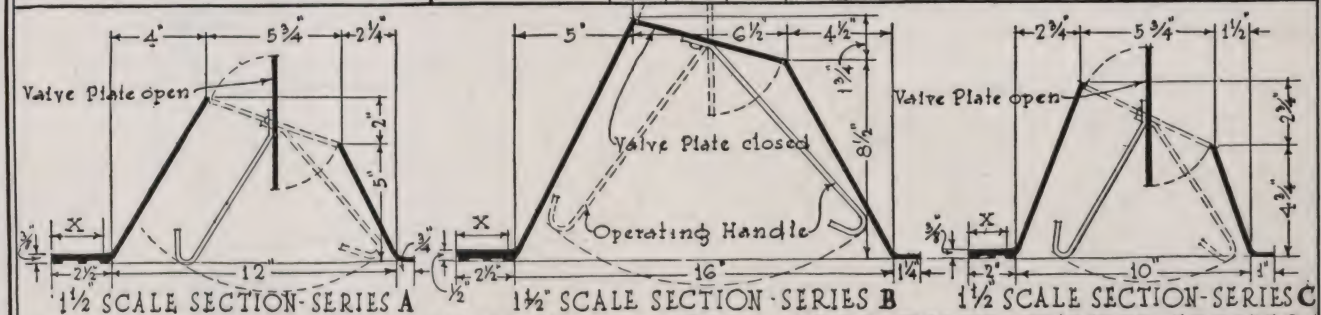


SERIES C

NOTE: Flange X removed for use with segmental arch construction See detail.

Also see general note above on improved throat and damper.

DAMPER NO.	SIZE OF THROAT & DAMPER: WIDTH OF FIREPLACE OPENING	LENGTH L INCHES	DEPTH D INCHES	SMOKE OPENING IN INCHES	WEIGHT IN POUNDS	SIZE OF FLUE: PROPER FLUE LINING EXT DIMEN. INCHES	EQUIVALENT ROUND FLUE INSIDE DIAM.	SMOKE CHAMBER FORMER: WIDTH E INCHES	SHIPPING WEIGHT POUNDS
SERIES A SQUARE ENDS									
224	2'-0"	24	12	6 x 18	26	8½ x 8½	8	19	12
230	2'-6"	30	12	6 x 24	36	8½ x 13	10	25	15
232	2'-8"	32	12	6 x 26	40	8½ x 13	10	27	20
236	3'-0"	36	12	6 x 30	46	8½ x 13	10	31	25
242	3'-6"	42	12	6 x 36	56	13 x 13	12	37	30
248	4'-0"	48	12	6 x 42	66	13 x 13	12	43	35
254	4'-6"	54	12	6 x 48	80	13 x 18	15	49	50
260	5'-0"	60	12	6 x 54	97	13 x 18	15	55	60
272	6'-0"	72	12	6 x 66	110	18 x 18	20	67	75
SERIES B SQUARE ENDS									
36½	3'-0"	36	16	6½ x 30	85	8½ x 13	10	31	25
42½	3'-6"	42	16	6½ x 36	93	13 x 13	12	36	30
48½	4'-0"	48	16	6½ x 42	105	13 x 13	12	43	35
54½	4'-6"	54	16	6½ x 48	120	13 x 18	15	46	50
60½	5'-0"	60	16	6½ x 54	130	13 x 18	15	55	60
72½	6'-0"	72	16	6½ x 66	176	18 x 18	20	67	75
84½	7'-0"	84	16	6½ x 78	210	18 x 24	22	79	90
SERIES C SPLAYED ENDS									
30	2'-6"	30	10	6½ x 24	36	8½ x 13	8	25	15
36	3'-0"	36	10	6½ x 30	46	8½ x 13	10	31	25
42	3'-6"	42	10	6½ x 36	56	13 x 13	12	37	30
48	4'-0"	48	10	6½ x 42	66	13 x 13	12	43	35



COVERT OLD STYLE THROAT AND DAMPER ALSO SMOKE CHAMBER FORMER

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

DETAILS OF COVERT IMPROVED AND OLD STYLE FIREPLACE THROATS AND DAMPERS

SCALE 3/8 & 1½ EQUALS 1'-0" DATE-APR-'21 DRWG. 1

PEERLESS MANUFACTURING CO., INC.

Fireplace Dampers and Fixtures

LOUISVILLE, KY.

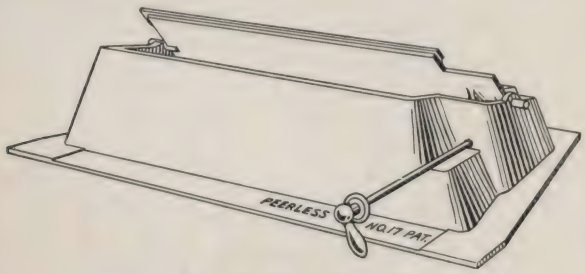
Products

DOME (FIREPLACE) DAMPERS; COAL CHUTES; ASH DUMPS; CLEANOUT DOORS.

Also manufacturers of Fireplace Fixtures, including Andirons, Screens, Grates, etc.; Gas Ranges, Coal Ranges, and Combination Coal and Gas Ranges; Gas Heaters.

Peerless Dome (Fireplace) Damper

This damper is designed to insure a good draft under all atmospheric conditions. It consists of a flanged dome with a door at the top and is manufactured from select gray iron. The front flange is sufficiently strong to support the fireplace arch without the use of angle iron or bar lintel; when a segmental brick arch is used this flange may be cut off as shown on Drawing No. 1. The door is so constructed that it can be readily removed (without the use of tools) giving access to the



No. 17 DOME DAMPER

flue at all times and is operated (a) by means of a handle attached to a shaft extending through the mantel at the front; (b) by means of a handle attached to a shaft extending through the right side of the chimney breast; (c) by means of an underslung ratchet with a handle under the right side of fireplace arch. The door is so constructed that it automatically locks itself in the position to which it is adjusted.

Types of Peerless Dome Dampers

These dampers are made in 3 types, the dimensions of each of these types, the size of the fireplace to which they are adapted and the size of the flues to be used with each is given in the table on Drawing No. 1.

Type Nos. 17 and 17B—Operated by means of a brass handle attached to a shaft extending through the face of the mantel. By means of a worm gear and cam arrangement, a three-quarter turn of the handle completely opens or closes the door. The cam is exposed inside the dome so that the damper rod may be adjusted after the fireplace is built.

Type Nos. 21 and 21B—Made in all sizes of the regular No. 17 damper, except that the door is operated by means of an underslung ratchet which operates in a pocket at the extreme right hand side of the damper. This ratchet is notched and works through a loop, the notches engaging the loop hold the door securely in any position desired.

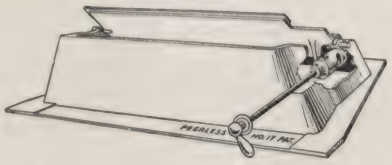
Type Nos. 22 and 22B—This damper is made in all sizes of the regular No. 17 except that the door is operated by means of a handle attached to a shaft extending through the right side of the chimney breast.

Specification for Peerless Dome Dampers—Peerless dome dampers are to be installed in accordance with detailed drawings and instructions issued by the manufacturers. Damper is to be placed immediately above the fire chamber, covering its full length, back of damper to rest on top of smoke shelf, the flange at the front of damper to act as an arch bar.

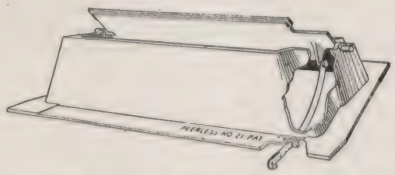
Furnish and set Peerless dome dampers as manufactured by THE PEERLESS MANUFACTURING CO., INC., Louisville, Ky., for all fireplaces throughout. To be (mention here the size and the particular type of operation desired as described above).

Blue Prints

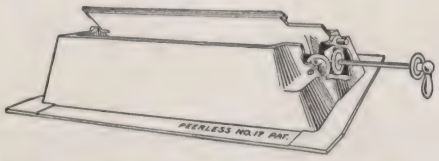
Blue prints and booklet showing complete line sent free on request.



Sectional View of No. 17 Damper
Showing operations of cam and rod



Sectional View of No. 21 Dome Damper
Showing operation of underslung attachment

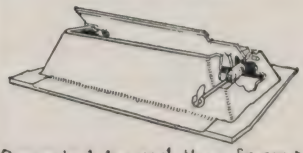


Sectional View of No. 22 Damper
Showing end or side view—opening damper through right side of chimney breast. Chimney breast must clear wall 10 in. or more.

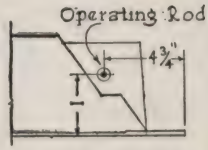
PEERLESS DOME DAMPERS

Continued on next page

The handle and casing thru which operating rod works is of brass

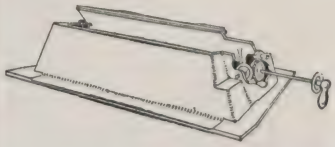


Operated by rod thru facing of mantel, cam being attached to square rod, and pinion which is fastened to door working in slotted groove of cam

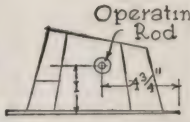


ELEVATION AT END (Showing location of operating rod)

DAMPER Nº 17

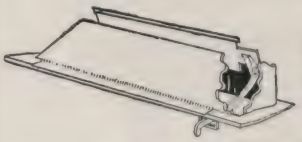


Operated by attachment thru side of Chimney Breast



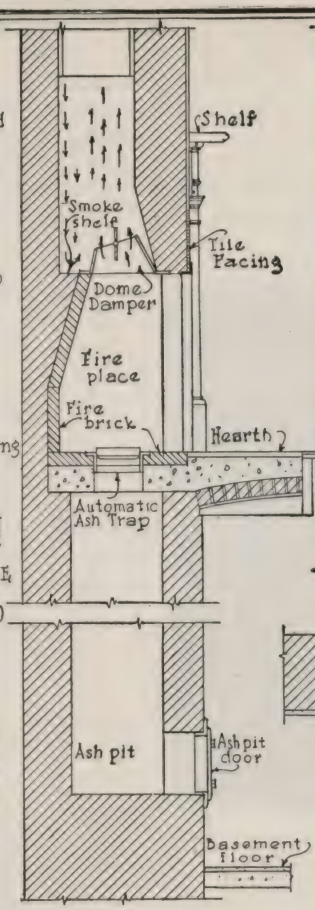
ELEVATION OF SIDE (Showing location of operating rod)

DAMPER Nº 22

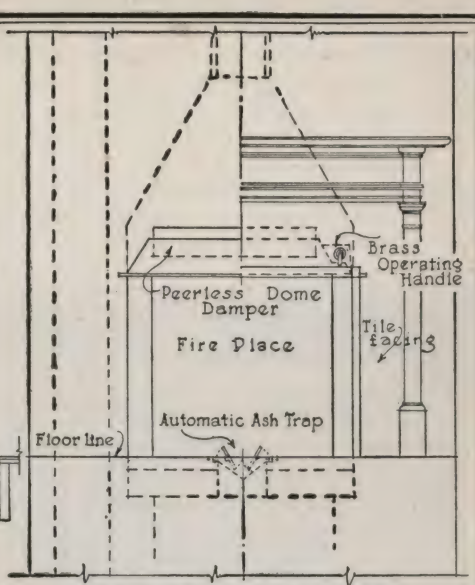


NOTE - This damper is operated by means of an underslung apparatus at the extreme right hand side operating in a side pocket. The pull is of forged steel, notched, and works through a loop under the front flange of the body

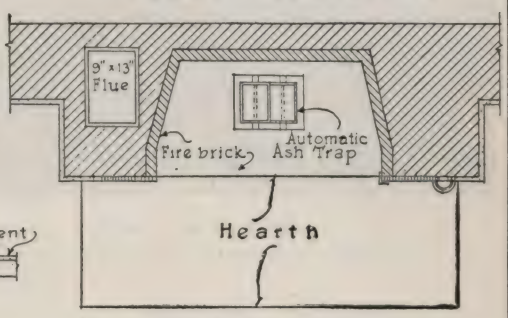
DAMPER Nº 21



VERTICAL SECTION

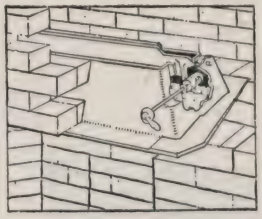


FRONT ELEVATION

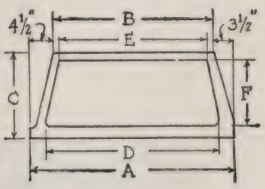


PLAN

DETAILS OF FLAT ARCH FIREPLACE



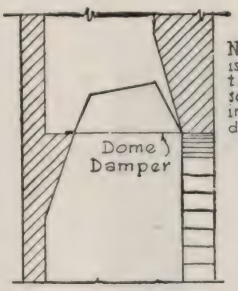
PERSPECTIVE SHOWING METHOD OF SETTING DAMPER



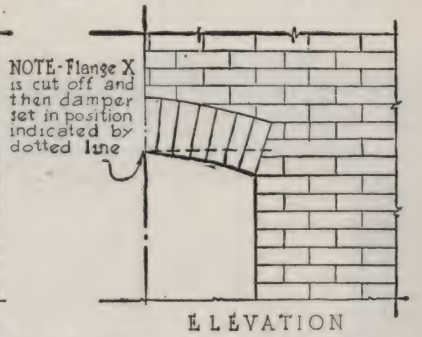
KEY PLAN (See Table Below for Dimensions)

Damper Number	Front Width of Fireplace in Inches	Overall Base Dimensions of Damper A	B	C	Inside Dimensions at Base of Damper D	E	F	Dome Dimensions G	H	I	Proper Flue Lining Ext. Dim	Round Flue Inside Dimen.	Shipping Weights (Boxed)
17,	24	28	20½	15½	24	18½	12¼	5	3½	2¾	9×13	9	38
21,	28	32	24½	15½	28	22	12¼	5	3½	2¾	9×13	10	40
&	30	34	26¼	15½	30	24	12¼	6	4¼	3⅜	9×13	10	45
22	33	37	29½	15½	33	27	12¼	6	4¼	3⅜	9×13	10	50
	36	40	32	15½	36	30	12¼	6	4¼	3⅜	9×13	10	55
	38	43	35¼	15½	38	33	12¼	6	4¼	3⅜	13×13	12	61
	42	46	38	15½	42	36	12¼	6	4¼	3⅜	13×13	12	65
	48	52	44½	15½	48	42	12¼	6	4¼	3⅜	13×13	12	68
	54	58	50¾	15½	54	48	12¼	6	4¼	3⅜	13×18	15	85
	59½	64	55¼	15½	59¼	53½	14	6	4¼	3⅜	18×18	18	100
17B	22½	28	20¼	13	22½	18	10¼	5	3½	2¾	9×13	8	31
&	27½	31½	25½	13	27½	23	10¼	5	3½	2¾	9×13	10	34
	28	34	26	13	28	24	10¼	6	4¼	3⅜	9×13	10	36
21B	34	40	32	13	34	30	10¼	6	4¼	3⅜	9×13	10	43
	40	46	37½	13	40	35	10¼	6	4¼	3⅜	13×13	12	50

NOTE. Above table based on fireplace height of 30 in.

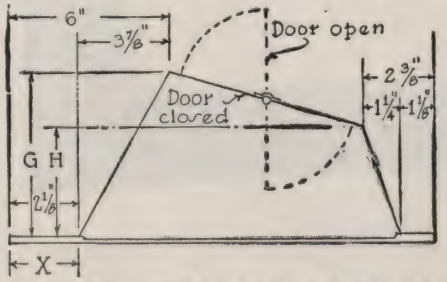


CROSS SECTION



ELEVATION

DETAILS OF SEGMENTAL ARCH FIREPLACE



DETAIL OF PEERLESS DOME DAMPER

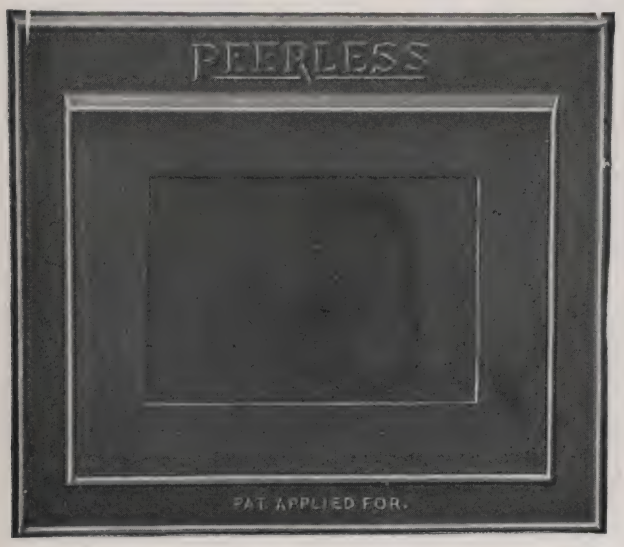
DRAWN BY SWEETS CATALOGUE SERVICE, INC	DETAILS OF PEERLESS DOME DAMPER	NOT DRAWN TO SCALE DATE - AUG. '22	DRWG 1

Continued on next page

Peerless Chain Operated Coal Chutes

Operated entirely from within the building, doing away with necessity of raising the window from outside. Opened by pull chain, which may be conducted to any part of the house. No hinges or locks on outside, assuring safety from entrance by thieves.

Materials—Frame of cast iron. Chute of extra heavy sheet iron, reinforced by wrought iron braces. Door panel of cast iron or glass with iron mesh reinforcements. Lock is automatic.



CLOSED COAL CHUTE
No hinges or locks on outside. Entranceproof

DIMENSIONS
Outside: Width, 26 in.; height, 23 in.
Size of opening in door: width, 16½ in.; height, 15¼ in.
Panel, 14 in. wide by 10 in. high.

OPEN COAL CHUTE
At pull of chain inside, door swings up and back under top frame

Specifications for Peerless Coal Chutes—Furnish and set where shown on drawings (or herein specified; mention location) Peerless coal chutes as manufactured by the PEERLESS MANUFACTURING CO., INC., Louisville, Ky.

To be (here mention size) and securely built into the masonry.

Depth of casing, 13 in.

Opening in wall should measure approximately 24 in. wide by 20 in. high.

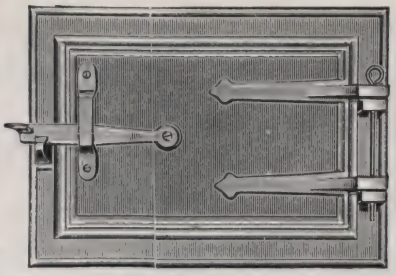
Peerless Ash Pit Doors

No. 1 Latched Door Type—Frame and door heavy cast iron. Latch and hinges malleable iron.

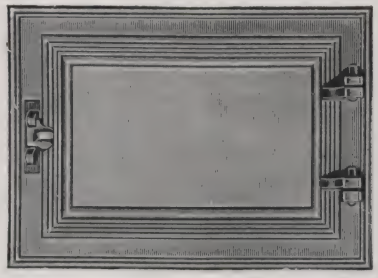
No. 2 Reversible—Hinge and latch construction permit placing door to open to either side.

PEERLESS ASH PIT DOORS

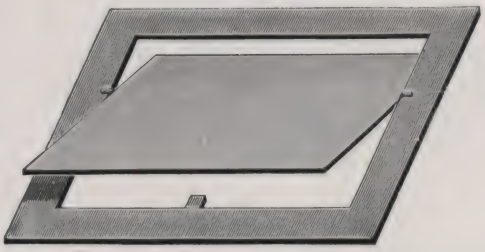
No.	Opening, in.	Shipping weight, lbs.
1 and 2	8x 8	13
	8x10	14
	8x12	15
	10x12	16
	12x12	17
2	12x16	20
	14x20	29



Malleable Iron Latch
No. 1. LATCHED ASH PIT DOOR

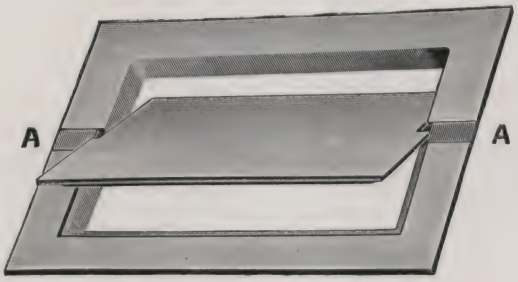


No. 2. REVERSIBLE ASH PIT DOOR



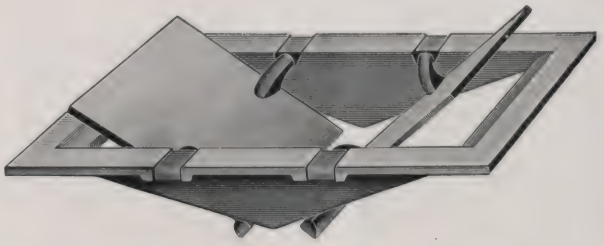
COMMON ASH TRAP

Size, 9x11 in.; weight 5 lbs.
Size, 7x9 in.; weight 2½ lbs.



No. 5. LOCKED DOOR ASH TRAP

Size, 7x10 in.; weight 3½ lbs.
Size, 9x11 in.; weight, 5 lbs.



No. 6. AUTOMATIC LOCKED DOOR ASH TRAP

Size, 7¾x9 in.; weight 3½ lbs.

COLONIAL FIREPLACE COMPANY

TELEPHONE
LAWNDALE 0140

4644 West Roosevelt Road
CHICAGO, ILL.

Products and Services

The IMPROVED COLONIAL HEAD THROAT and DAMPER for Fireplaces.

Also Fireplaces; Fireplace Trimmings, Fenders, Grates and Andirons; Special Brass and Wrought Iron Work for Fireplaces.

Bestovall Garbage Receivers.

Improved Colonial Head Throat and Damper for Fireplaces

The Colonial head throat and damper is *not* a one-piece casting; it is a *built-up* damper of the best gray iron castings, *reinforced* with steel angle, *locked* and *bolted* in such a manner that it can sustain great weight and stand intense heat. Construction provides automatically for *expansion* and *contraction* within itself, thus avoiding any possibility of *cracking* the face of the fireplace, and *prevents warping* of *castings when heated.*

The Colonial head throat and damper is easy to set, and adapts itself to all conditions of construction. The draft is controlled from the outside by a key placed either in the front or the end of the fireplace (see drawings of Style A, B and C). Style C can be used only on fireplaces which stand 7 in. or more into the room. By means of this external key, the damper may be adjusted to any weather condition, because it can be opened or closed a *fraction of an inch* at a time. The position of the damper door when opened prevents down-drafts.

Nothing is so important as perfect construction where the fire opening joins the throat to the flue, and the *Colonial head makes faulty construction here impossible.* The simplicity of its shape and construction *insures* the architect of a fireplace *properly built* at the *most vital part,* even by incompetent workmen. It will save its entire cost in the labor ordinarily required to properly construct this part of the fireplace.

Style A—The regular style of Colonial head throat and damper. Controlled with a key operated from the face of the fireplace on the left-hand side.

Style B—This is operated with a key which comes out just below the arch bar of the fireplace, on the left-hand side. May be had with key in center.

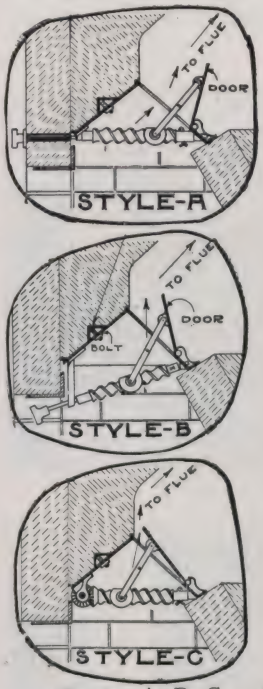
Style C—This is made with key coming through at the end or return of the fireplace at the right-hand side when facing it. Can come through left-hand end.

Style D—This is the old rachet damper opening from underneath.

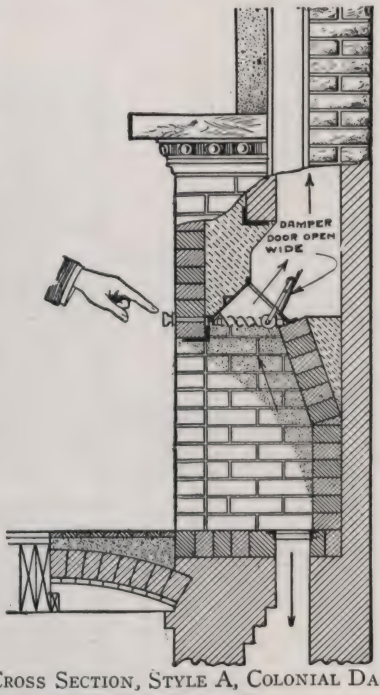
Style E—The latest improved style of Colonial head. Can be used in any style of fireplace—stone or marble, brick, tile or wood, arched or square opening. No need to cut through the facing or the end (return) for a key. Style E can be set in any desired position in the chimney throat: high or low, forward or back, according to the requirements of the fireplace design and the flue construction.

The draft is controlled by a lever arm which comes down in the center of the fireplace opening. This lever arm can be lengthened or inclined toward the front or rear as the construction requires. A poker is easily hooked through the large ring in the end, so that the draft may be regulated without stooping.

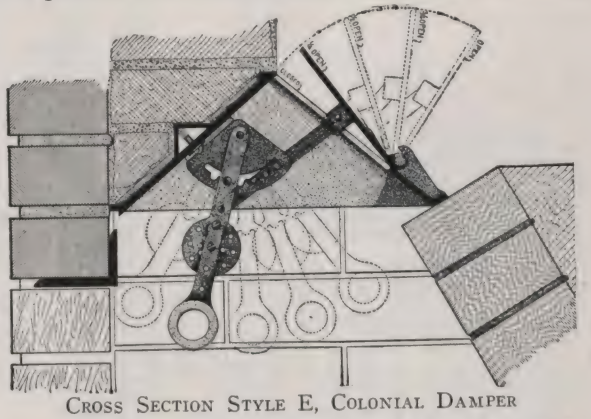
The five positions of the damper door are ample to insure perfect draft control under all weather conditions.



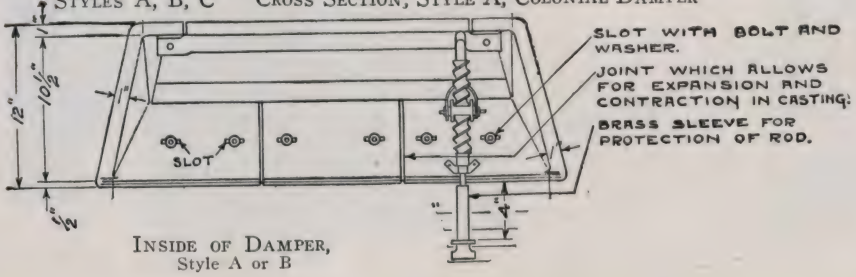
STYLES A, B, C



CROSS SECTION, STYLE A, COLONIAL DAMPER



CROSS SECTION STYLE E, COLONIAL DAMPER



INSIDE OF DAMPER,
Style A or B

COLONIAL FIREPLACE DAMPERS

Damper No.	Width of fireplace opening, in.	Proper size of flue, in.
00	20 to 23	8x 8
0	24 to 28	8x 8
1	29 to 32	8x12
1-A	33 to 35	8x12
2	36 to 38	8x12
2-A	39 to 41	8x16
3	42 to 44	8x16
3-A	45 to 47	8x16
4	48 to 51	12x12
5	52 to 57	12x12
6	58 to 64	12x16
7	66 to 72	16x16

THE COLUMBIA IRON & WIRE WORKS COMPANY

Manufacturers of Ornamental Iron and Bronze, General Builders' Iron and Wire Work

CANTON, OHIO

Products

COAL CHUTES, Window and Grade Line; SAFETY SIDEWALK DOORS; STEEL STAIRS; ELEVATOR FRONTS; ORNAMENTAL and MISCELLANEOUS IRON WORK.

Also manufacturers of Wire Work of all kinds.

Columbia Window Coal Chute (Patented)

A window and a patent coal chute in combination, both designed for insertion and permanent installation in basement walls, to permit entry of coal, etc., without damage to building.

The window itself is provided with metal frame of cast gray iron, burglarproof hinges cast solid on frames, ribbed and wire glass, together with other accessories.

WINDOW COAL CHUTE

DIMENSIONS

Description	No. 1 for Residences		No. 2 for Residences and Apartments		No. 3 for Public Buildings	
	Weight, lbs.	Wall Op'g., in.	Weight, lbs.	Wall Op'g., in.	Weight, lbs.	Wall Op'g., in.
Complete with glass door	90	22½ wide	107	25 wide	170	36 wide
Complete with solid door	80	17 high	96	17 high	155	24 high
Without hopper, glass door	77	13 deep	88	13 deep	153	18 deep
Without hopper, solid door	56		80		137	

No. 4. Grade Line Chute (Patented)

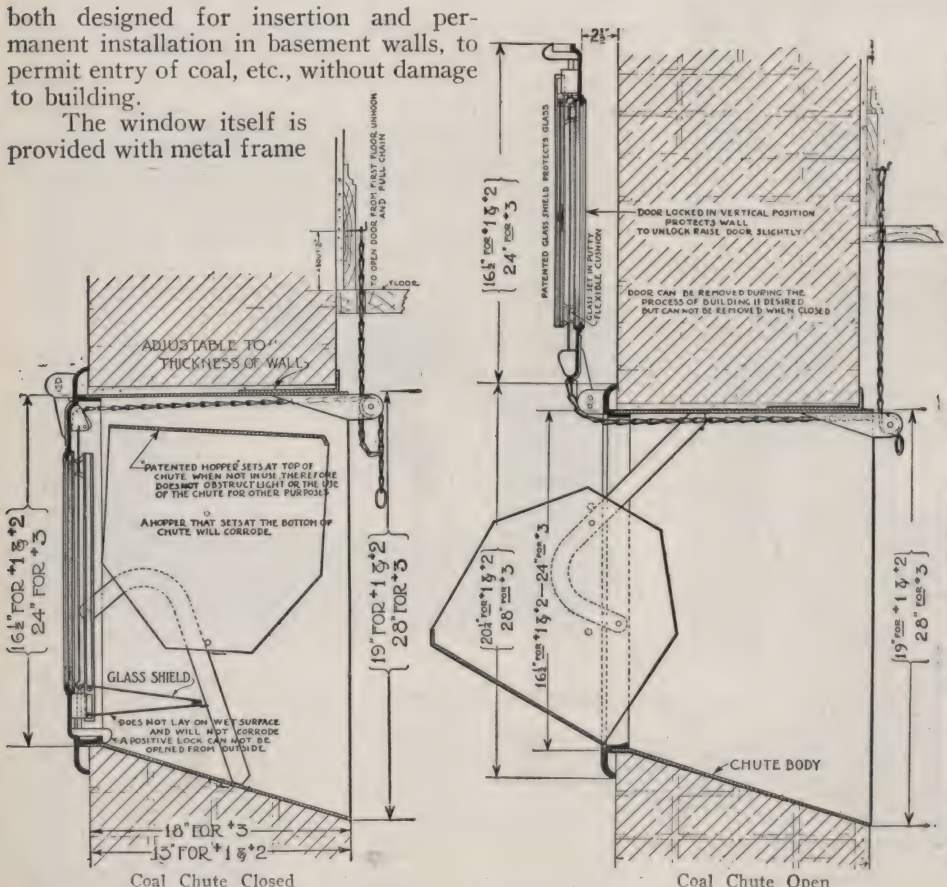
Designed for service where space between outside grade and basement ceiling will not permit installation of window chute.

To open, pull chain ½ in. from first floor or basement; coal man can then open door; when coal man closes door, *it locks automatically.*

Grade line coal chutes are made to suit buildings where floors are above or level with the grade on sidewalk. In ordering, specify if floors are level with sidewalk.

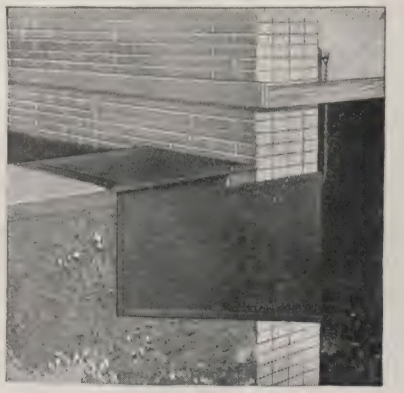
DIMENSIONS

No. 4 Grade Line Coal Chute	Size, in.	Weight, lbs.
Door opening	20 x 20	165
Door opening	27 x 27	242



Coal Chute Closed — Coal Chute Open

DETAILS OF COLUMBIA WINDOW COAL CHUTE



Door Closed and Locked

Door Open

NO. 4 GRADE LINE CHUTE

Continued on next page

Columbia Safety Flush Sidewalk Door (Patented)

A wrought steel, diamond top sidewalk door; top is absolutely flush, and its diamond shapes eliminate danger of slipping.

Malleable iron handle on top is self-releasing, watertight and never freezes (no receptacle to catch water).

Hinges and Lock—Each hinge is concealed and works in a case filled with lubricant; does not rotate on a pin, hence it can not rust, bind or break.

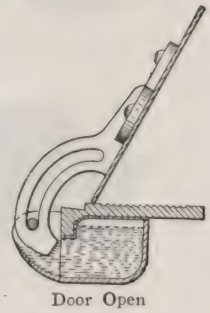
Both hinge and case are made of malleable iron; no strain on hinge at any time; no chain is required to hold doors open. (See sectional view.)

The lock on Columbia sidewalk doors can be operated with key outside or lever inside.

COLUMBIA DOUBLE SIDEWALK DOOR

One-half of door is open and remains open without use of chain or other sustaining device

Door Closed



Door Open

DIAGRAMS SHOWING INTERNAL CONSTRUCTION OF SIDEWALK DOOR HINGES

Note changed position of hinge as door is opened or closed

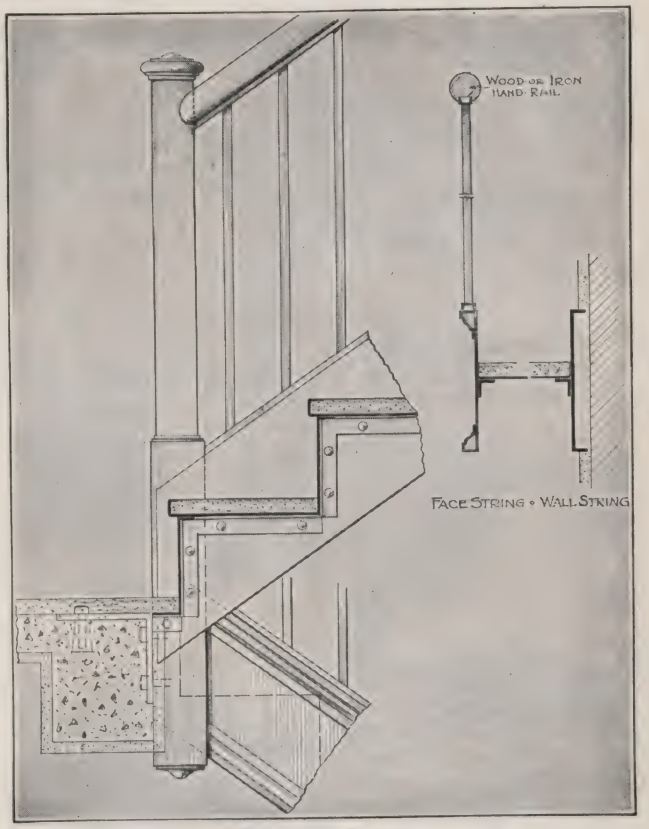
Columbia Elevator Fronts

Fireproof elevator fronts are made complete with sills, bucks, jambs, doors, glass, tracks, hangers, and operating devices, to suit the individual requirements of each building, and in any finish desired.

ELEVATOR FRONT

Columbia Stairs

These are made to receive any kind of tread: cement, composition, slate, marble, steel or cast iron. General construction made to meet the architectural requirements of each job. Stairs can be assembled at factory or shipped "knocked down."



COLUMBIA STAIRS

Ornamental and Miscellaneous Iron and Wire Work

We are prepared to furnish ornamental iron and bronze work of all kinds, from our own designs or in accordance with architects' details.

Bank screens, railings, grilles, marquises, etc., are among our specialties.

All types of wire work, including window guards, etc., will be supplied on order.

BANK GRILLES

ESTABLISHED 1895 INCORPORATED 1911

THE DONLEY BROTHERS CO.

Building Specialties

East 74th Street and Aetna Road

CLEVELAND, OHIO

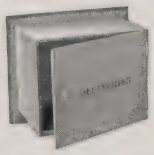
Products

DONLEY PACKAGE RECEIVERS; DONLEY COAL CHUTES; DONLEY ASH DUMPS and FIREPLACE DAMPERS; DONLEY METER BOXES; DONLEY RUBBISH BURNERS; DONLEY GARBAGE RECEIVERS.

Also Donley Concrete Inserts and other Building Specialties.

Donley Package Receiver

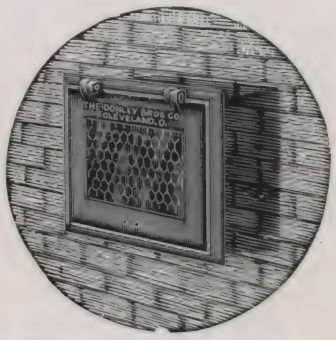
A steel receptacle built into the outer wall of kitchen or entry, for safe delivery of meat, milk, groceries, etc. Outer door locks automatically when closed and is released automatically when inner door is opened. Just fits between 16-in. center studding with screw holes for attachment. Inside height, 11 in., inside width, 8½ in., inside length, 13½ in., shipping weight, 22 lbs.



DONLEY PACKAGE RECEIVER

Donley Coal Chute

Superseding the coal window. Chute protects building from marring effect of coal deliveries and gives security against burglars. Door easily unlatched from within without entering coal bin. When open, door rests against wall above opening. Steel shield protects glass in this position. Glass door and hopper are optional, as shown in annexed table.



DONLEY COAL CHUTE CLOSED

The shadow line illustrates the body of the chute in the wall

SIZES AND WEIGHTS OF DONLEY COAL CHUTES

No.	Description	Wall width	Opening height	Body depth	Shipping weight
10	Glass door and hopper.....	24″	17″	13″	95 lbs.
11	Glass door, no hopper.....	24″	17″	13″	80 lbs.
12	Cast iron door and hopper...	24″	17″	13″	85 lbs.
13	Cast iron door, no hopper....	24″	17″	13″	65 lbs.
14	Cast iron door, no hopper....	24″	17″	8″	59 lbs.
15	Glass door, no hopper.....	24″	17″	8″	58 lbs.
20	Glass door and hopper.....	30″	22″	18″	180 lbs.
21	Glass door, no hopper.....	30″	22″	18″	160 lbs.
22	Cast iron door and hopper...	30″	22″	18″	155 lbs.
23	Cast iron door, no hopper...	30″	22″	18″	135 lbs.

Pulley and chain attachments on all styles.

Donley Ash Dumps

Are iron trap doors in the hearth above the ash pit. Automatic, self-closing dumps are 5 by 7 in. in size. The common dumps are 5 by 8 in. Keep odors and dust from the living rooms.

AUTOMATIC DUMP

COMMON DUMP

Donley Fireplace Damper

A correctly formed throat and draft regulator combined, the Donley damper simplifies correct fireplace construction and promotes clean, economical fires through proper draft regulation. Two types of control, with poker or with rotating key on fireplace front, are illustrated herewith.

ROTARY CONTROL

POKER CONTROL

DONLEY FIREPLACE DAMPER

SIZES AND WEIGHTS OF DONLEY FIREPLACE DAMPERS

No. rotary control	No. poker control	Size front	Shipping weight
324	224	24″	26 lbs.
330	230	30″	29 lbs.
336	236	36″	32 lbs.
342	242	42″	42 lbs.
348	248	48″	49 lbs.
...	254	54″	80 lbs.
...	260	60″	90 lbs.

Donley Meter Box

A steel cabinet built into basement wall where service wire enters. Meter placed in it can be read through glass door from outside without entering building. Locking doors inside and out. "Knockout" holes for wiring. Height 11½ in., width 11 in., depth 13 in., including 4-in. projection into basement.

Donley Rubbish Burner

Cast iron front, top and grate for small brick furnace to burn refuse without heating building. Front is 36 in. high by 30 in. wide, with top depth of 14 in. Firepot is 17 by 17 in. Burner can be placed at one side of chimney or in front.

Donley Garbage Receiver

Prevents nuisances arising from ordinary garbage can. Consists of outer shell and inner receptacle that can be removed for emptying. Service lid of Parkerized steel operated by foot lever, which fits snugly, excluding flies. Made in 6-, 10-, 14-, and 21-gal. capacities. Approved by Good Housekeeping Institute.

DONLEY GARBAGE RECEIVER

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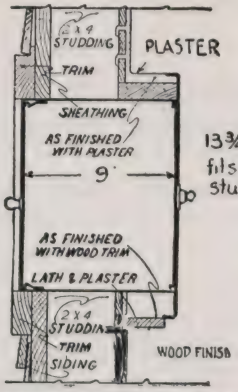
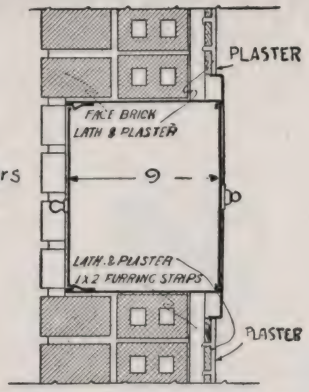
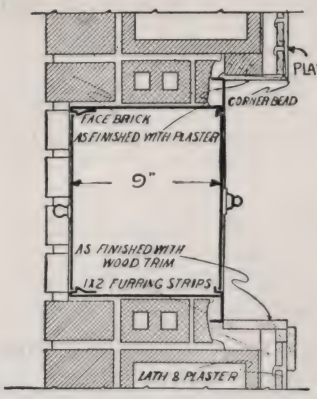


DONLEY PACKAGE RECEIVER AS INSTALLED IN FRAME WALL

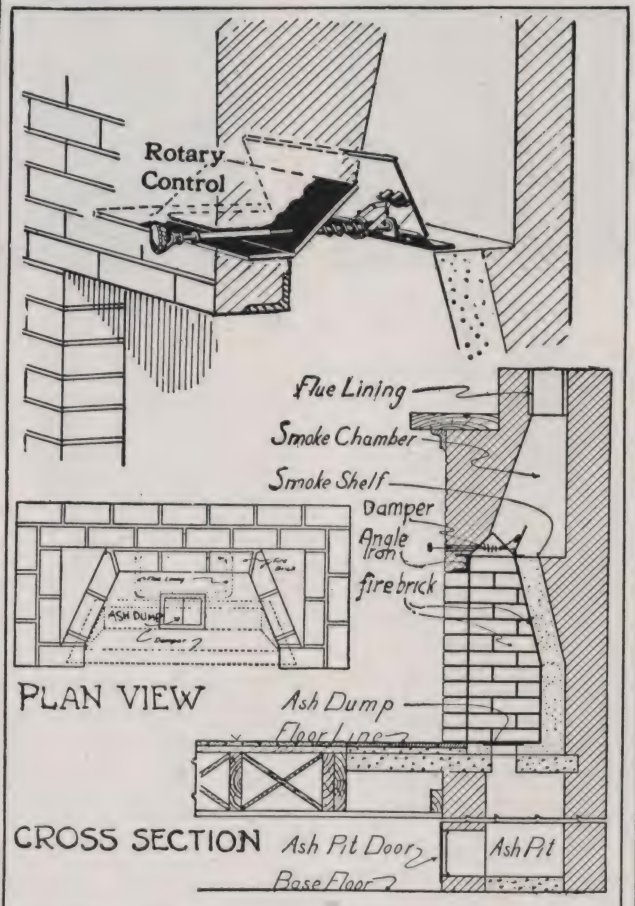


DONLEY PACKAGE RECEIVER AS INSTALLED IN 9" BRICK WALL

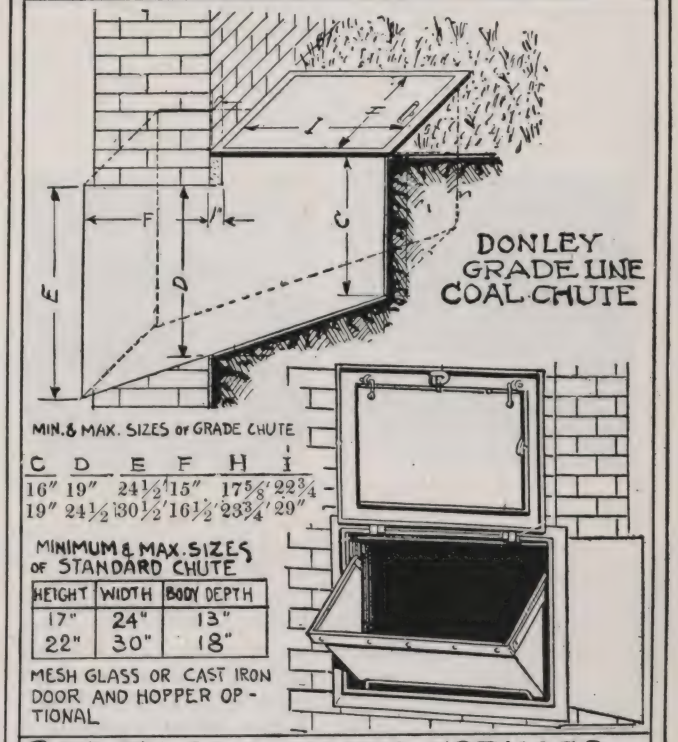


DONLEY PACKAGE RECEIVER AS INSTALLED IN 13" BRICK WALL

DONLEY PACKAGE RECEIVER IN 3 TYPES OF WALL CONSTRUCTION



PROFILE & PERSPECTIVE OF DONLEY DAMPER



MIN. & MAX. SIZES OF GRADE CHUTE

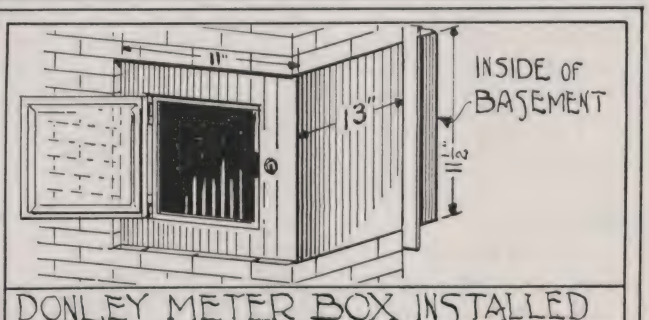
C	D	E	F	H	I
16"	19"	24½"	15"	17⅝"	22¾"
19"	24½"	30½"	16½"	23¾"	29"

MINIMUM & MAX. SIZES OF STANDARD CHUTE

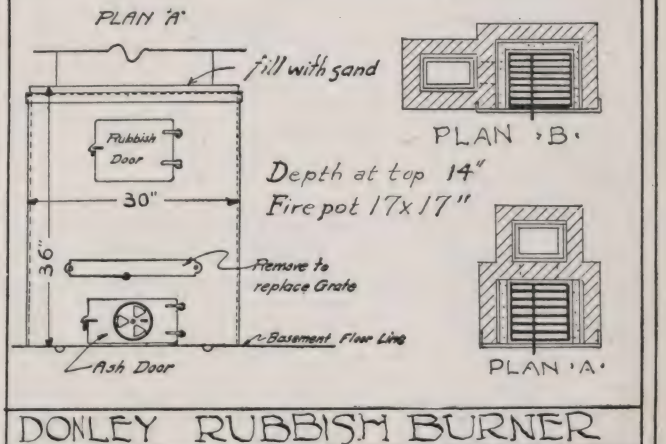
HEIGHT	WIDTH	BODY DEPTH
17"	24"	13"
22"	30"	18"

MESH GLASS OR CAST IRON DOOR AND HOPPER OPTIONAL

DONLEY COAL CHUTES INSTALLED



DONLEY METER BOX INSTALLED



DONLEY RUBBISH BURNER

KEWANEE MANUFACTURING COMPANY

Coal Chutes

KEWANEE, ILL.

CANADIAN BRANCH: Cast Stone Block & Machine Co., Ltd., WINDSOR, ONTARIO

Distributed through Dealers in Building Materials, Hardware and Structural Steel (Name of nearest dealer on request).

SPECIAL EXHIBIT: Building Material Exhibit, 15 E. Van Buren Street, CHICAGO, ILL.

Products

Kewanee "Armor Plate" Coal Chutes and Coal Doors.

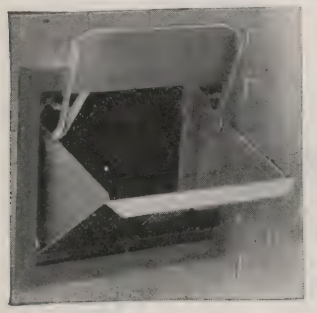
Also Portable Chutes and Equipment for Coal Yards.

TRADE-MARK

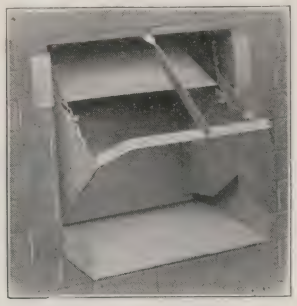
Kewanee Coal Chutes and Coal Doors

Kewanee "Armor Plate" coal chutes and coal doors afford efficient facilities through which to deliver coal to the basements of private residences, apartments, schools, office and other buildings. They can be readily installed in old, as well as new structures.

Advantages—Kewanees, guaranteed against breakage, stand the hard knocks which shatter ordinary construction. They protect the building from damage and defacement, and are simple and convenient to operate. The saving in repair bills alone quickly overcomes the small difference in first cost between a Kewanee and the common basement window.



Open—Outside View

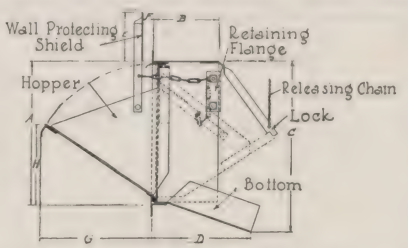


Closed—Inside View

The Kewanee Coal Chute

Construction—Kewanee "Armor Plate" coal chutes and coal doors are built throughout of heavy, rust resistant "copper steel." No cast iron, glass or other brittle material is used in their construction. There are no delicate or complicated parts to get out of order. The dimensions of the two standard sizes are shown. Special sizes to fit unusual conditions will be made to order.

Operation of Kewanee Chutes (with Hoppers)—The door of the Kewanee chute is hinged at the bottom and opens to form a convenient hopper for the reception of coal. The lock can be released, by means of a cord or chain, from any convenient place inside the building. If unlocked, a simple pull on the door from outside opens the hopper ready for coal, the wall protecting shield automatically raising into place. A push inward serves to close and lock the chute.



Details of Kewanee Coal Chutes
(Dimensions in inches)

Size No.	Wall opening High	Wall opening Wide	(Outside) Thick	Frame over all	Hopper opening
1	18	24	8 to 13*	20¼x25¾	13½x21
2	22	30	8 to 13*	25¼x32¾	16½x27

Size No.	A	B	C	D	E	F	G	H	Net and shpg. wt.
1	18	8	20½	13*	6	2	14	9½	68 lbs.
2	22	8	24½	13*	7½	2¼	17½	12	115 lbs.

*For walls thicker than 13 in., chute bottom will be suitably extended, if specified.

Operation of Kewanee Doors (without Hopper)—The Kewanee door is hinged at the top. It is locked by a gravity catch, which can be released, by means of cord or chain, without entering the coal bin. The door opens upward and forms a protection for the wall above, being held in place by a latch. When the door is closed, it locks automatically.

Closed

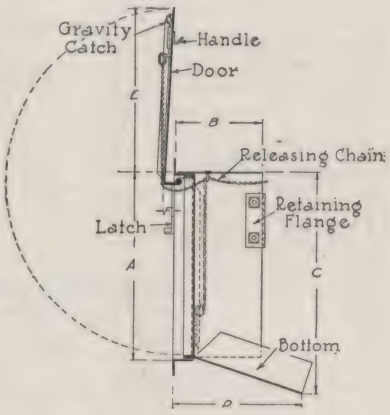
Open

The Kewanee Coal Door

Installation of Coal Chutes

Substantial retaining flanges prevent Kewanees from pitching forward when weight bears down on the hopper. The standard flanges can be used, where the wall is thicker than 8 in., by merely allowing them to project into the wall, instead of embracing it. If desired and specified, special flanges, to embrace a wall thicker than 8 in., will be furnished.

The standard bottom spans a wall 13 in. thick. Where the wall is thicker than 13 in., an extension to the standard bottom, sufficient to cover the wall, is recommended, and will be furnished, if specified.



Details of Kewanee Doors
(Dimensions in inches)

Size No.	Wall opening High	Wall opening Wide	(Outside) Thick	Frame over all	Frame opening
11	18	24	8 to 13*	20¼x25¾	16x21½
12	22	30	8 to 13*	25¼x32¾	20x27½

Size No.	A	B	C	D	E	F	Net and shpg. wt.
11	18	8	20½	13*	15½	1	50 lbs.
12	22	8	24½	13*	19	1¼	85 lbs.

*For walls thicker than 13 in., chute bottom will be suitably extended, if specified.

Specifications

For Masonry—Leave proper opening in wall, and secure coal chute firmly with cement mortar.

For Wood—Leave proper opening in wall, and secure coal chute to frame with lag bolts.

STERLING FOUNDRY CO.

Manufacturers of Coal Chutes and Cast Iron Structural Specialties

STERLING, ILL.

Product

"STAR" COAL CHUTE (patent pending).

Also manufacturers of "Best" Coal Chutes, Revolving Chimney Tops, Chimney Copings, Stud Sockets, Cesspools, Cesspool Traps, Cistern Covers, Clean-out Doors, Foot Scrapers, Pump Stand, Hog Waterer, Foundation Gratings.

"Star" Coal Chute

A simple, durable and attractive chute, built into the foundation, which not only protects the building by permitting the entry of coal without damage, but improves

Door Shut and Locked — Door Open and Locked

"STAR" COAL CHUTE

the appearance of the property to a marked extent. The frame is of cast iron with an embossed steel door, concealed hinges and automatic locks making it absolutely burglarproof. The cost of a "Star" coal chute is very little more than an ordinary cellar window with wooden frame, which is so easily damaged, and once installed it will last as long as the house itself.

Ten Reasons for Specifying "Star" Coal Chutes

(1) Cast iron frame makes it very durable.
(2) Embossed steel door makes it rigid and strong.
(3) Galvanized metal finish makes it non-corrosive.
(4) Housing on frame makes it weatherproof.
(5) Concealed hinges improve the appearance.
(6) Automatic lock—shut—protects from intruders.
(7) Automatic lock—open—protects house walls.
(8) Packed in a carton, making possible shipment by express or parcel post.
(9) Design provides simple and effective lines.
(10) Low cost made possible by metal being placed so as to give maximum strength with minimum weight.

Specifications

Frame—Cast iron; over-all dimensions, 24x19x5 in.; clear opening, 15x20 in. Lugs on all four sides for anchoring into masonry of foundation walls. Watertight housing at top, giving absolute protection to the door against the weather.

Opening—The size of the hole in masonry should be 22 in. wide x 17 in. high, the bottom being sloped to form a concrete sill.

Door—Stamped sheet steel, galvanized No. 18 gauge. It is embossed, making it very rigid.

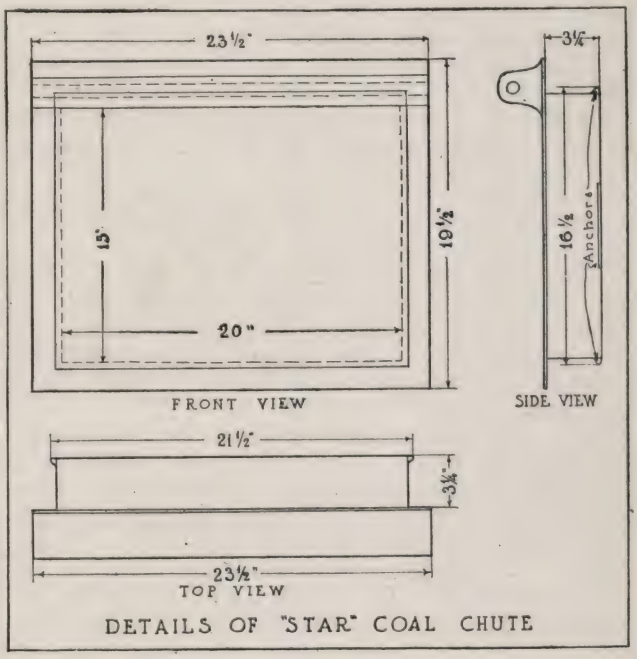
Hinges—Concealed and protected under housing; designed so as to automatically lock the door in an open position.

Lock—Automatic catch at bottom of door to lock door shut. Extension chain may be attached for operating catch, making it unnecessary to climb over coal.

Finish—Painted one coat of gray iron filler.

Weight—Ready for shipment in carton, 40 lbs.

Packing—Packed singly in fiber carton. May be shipped by freight, express or parcel post.



DETAILS OF "STAR" COAL CHUTE

THE MAJESTIC COMPANY

Manufacturers of Coal Windows and Building Specialties

HUNTINGTON, IND.

Distributed through more than 4000 Hardware, Building Supplies and Structural Iron Dealers and Jobbers

Products

MAJESTIC COAL WINDOWS; GRADE LINE and STORE COAL CHUTES; MILK BOTTLE and PACKAGE RECEIVERS; ALL METAL BASEMENT WINDOWS.

Also manufacturers of Underground and Built-in Garbage Receivers, All-metal Flower Boxes, Rubbish Burners, Ash Dumps, Ash Pit Doors, Flue Clean-outs, Cistern Rings and Covers, Cellar Wall Grates, Cast Iron Flue Thimbles, Porch Column Bases and Drain Tile Covers.

Majestic Coal Windows

The Majestic coal window protects against damage, lessens depreciation, enhances property value, and saves money for the owner by permitting the entry of coal without damage to the house or building. It has a heavy steel body, cast semisteel door and frame, and boiler plate hopper. The patented Majestic hinge holds door open in a vertical position, protecting building above opening when coal is delivered. When closed, the gravity latch automatically locks the door flush with foundation. Can be unlocked from the inside only. A chain attached to latch permits unlocking at a distance from the coal bin.

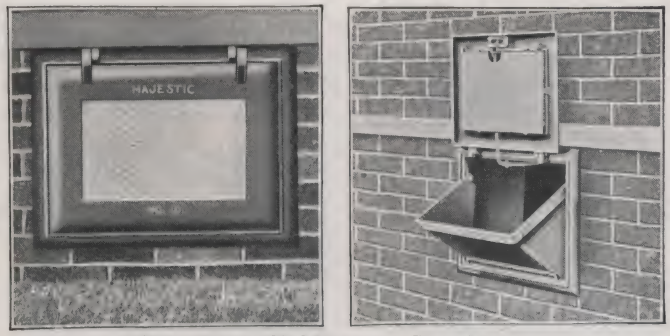
The Nos. 10 and 20, A and C styles, have doors that are fitted with ¼-in. wire glass panels protected by a steel shield when open. When closed the shield lies flat in the bottom, allowing the daylight to shine into the coal bin, lighting the basement. Style A is more than a coal window—it is fitted with a steel hopper which catches the coal and prevents scattering about the lawn. Style C is without hopper.

The Nos. 10 and 20, B and D styles, have steel panels instead of glass. They are convertible into styles A and C by inserting glass panels and using the steel panel as a shield. Style B is with hopper, Style D without hopper.

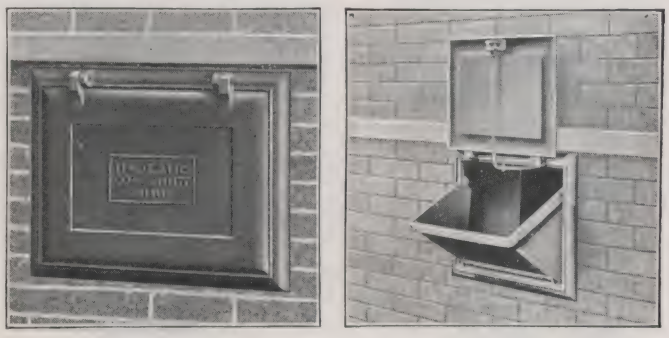
All A and B styles in Nos. 10 and 101, also Nos. 20 and 203 sizes are convertible into C and D styles by removing the hoppers and vice versa.

The Nos. 101 and 203 Majestic coal windows have solid cast doors. No provision is made for changing over to a glass or steel panel. Otherwise their construction in the respective sizes conforms to the Nos. 10 and 20. Style B, with hopper. Style D, without hopper.

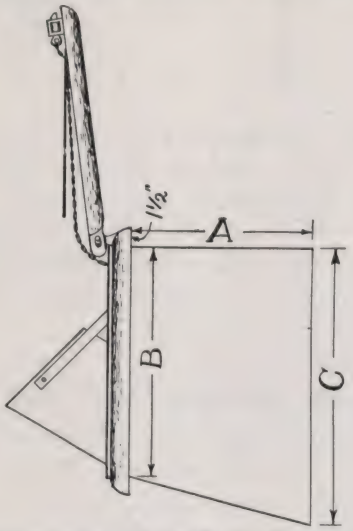
The Nos. 500 and 600 are built particularly for 8-in. basement walls. They have 9-in. straight bottom bodies instead of sloping bottoms, used in the No. 10 and No. 101 styles. They are not equipped with hoppers or chains to the gravity latch. Otherwise the construction, material and quality are the same as in the No. 101 D or No. 10 C. The No. 500 has solid cast door. The No. 600 has glass panel and shield.



NOS. 10 AND 20 MAJESTIC COAL WINDOWS



NOS. 101 AND 203 MAJESTIC COAL WINDOWS



DIMENSION DIAGRAM OF MAJESTIC COAL WINDOWS—NOS. 10, 20, 101 AND 203

	A in.	B in.	C in.	Frame opening, in.	Frame over all, in.	Hopper opening, in.	Glass sizes, in.	Body width over all, in.
No. 10	11⅞	16¼	18	21x15	24⅞x19	19½x12½	16½x10½	22
No. 20	16⅝	20¾	24	29x19⅜	34¼x24½	27⅛x16½	24 x14	30½
No 101	11⅞	16¼	18	21x15	24⅞x19	19½x12½	No Glass	22
No 203	16⅝	20¾	24	29x19⅜	34¼x24½	27⅛x16½	No Glass	30½

Continued on next page

SIZES, MAJESTIC COAL WINDOWS

No.	Style	Description	Wall opening, in.			Shipping weight, lbs.
			Wide	High	Deep	
10	A	Glass panel; hopper	24	17	13	79
10	C	Glass panel; no hopper	24	17	13	67
20	A	Glass panel; hopper	33	22	18	154
20	C	Glass panel; no hopper	33	22	18	131
10	B	Steel panel; hopper	24	17	13	72
10	D	Steel panel; no hopper	24	17	13	59
20	B	Steel panel; hopper	33	22	18	138
20	D	Steel panel; no hopper	33	22	18	118
101	B	Cast panel; hopper	24	17	13	78
101	D	Cast panel; no hopper	24	17	13	63
203	B	Cast panel; hopper	33	22	18	146
203	D	Cast panel; no hopper	33	22	18	127
500		Cast panel; no hopper	24	17	9	57
600		Glass panel; no hopper	24	17	9	60

Majestic Grade Line Coal Chutes

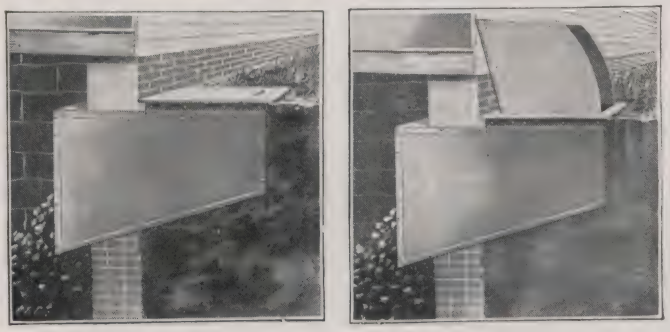
The Majestic grade line chutes are designed for homes or stores with little or no foundation above the ground.

The door when raised forms part of the hopper and becomes the shield which protects the building.

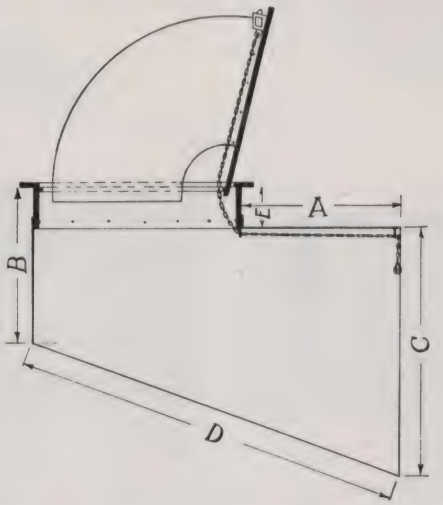
This chute, like all Majestic coal windows, locks automatically and can only be unlocked from the inside.

SIZES, MAJESTIC GRADE LINE COAL CHUTES

No.	Door, in.	Wall opening, in.		Length, in.	Shipping weight, lbs.
		Wide	High		
16	18 x 24	25	24	35	173
18	24 x 30	31	31	42	274



MAJESTIC GRADE LINE COAL CHUTE



DIMENSION DIAGRAM OF MAJESTIC GRADE LINE CHUTE

	A, in.	B, in.	C, in.	D, in.	E, in.	Frame, opening, in.	Frame, over all, in.	Body width over all, in.
No. 16	15¾	15¾	24½	36⅝	3⅛	22 x16¼	26⅛x20¾	24½
No. 18	17¾	19	30½	45⅛	3⅛	28¼x21½	32½x27½	30⅜

Majestic Store Coal Chutes

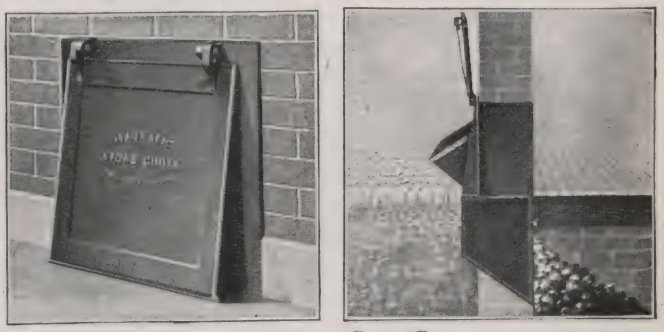
The Majestic store chutes are designed particularly for store and office buildings.

They do away with the sidewalk coalhole and protect property owners from putting up bonds for the protection of pedestrians.

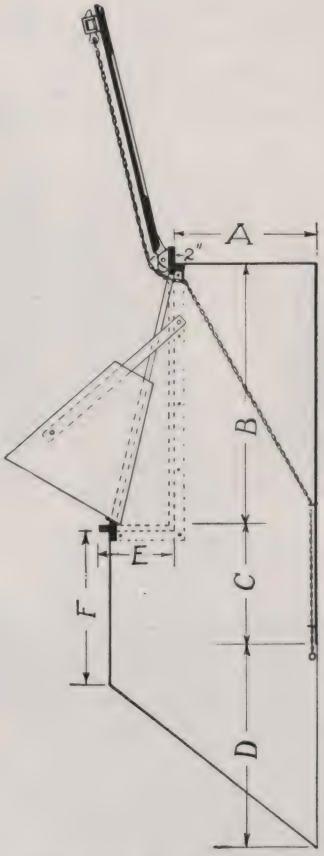
Equipped with Majestic gravity latch and chain. Either with or without hopper.

SIZES, MAJESTIC STORE COAL CHUTES

No.	Door, in.		Total height, in.	Opening at grade, in.	Shipping weight, lbs.
	Wide	High			
12	22	20	48	24 x 16	167
15	30	24	52	30 x 20	222



MAJESTIC STORE COAL CHUTE



DIMENSION DIAGRAM OF MAJESTIC STORE COAL CHUTE

	A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	Frame opening, in.	Frame over all, in.	Rear opening, in.	Body width overall in.
No. 12	12½	21	10	15	4⅜	13¼	21x19	26⅞x22½	20¾x15	23½
No. 15	12½	25⅛	7¼	18¼	4	13¼	29x22¾	34¾x26½	28½x17½	31

Continued on next page

Majestic Milk and Package Receiver

The Majestic milk bottle and package receiver is designed to hold 6 or more quart bottles of milk, depending on the thickness of the building wall in which it is installed.

It is constructed of two cast iron frames and doors, connected by a steel body, adjustable to the thickness of the walls in which it is placed.

The gravity latch on the outside door can be unlocked only from the inside. The kitchen side door is provided with a nickeled refrigerator type latch and handle, and can not be opened from the outside.

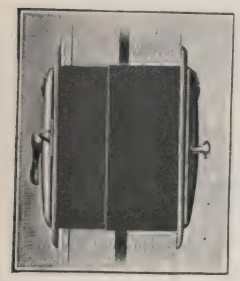
Operation—A chain attached to the gravity latch runs through three cast iron eyes to the inside frame, where a cast iron ball is suspended. When empty bottles are placed in the receiver, the ball is pulled down. Its weight and friction of the chain holds the latch on outside door unlocked. The inside door is then closed and locked by the refrigerator latch. When the outside door is opened, the chain is drawn outward and held by friction. This leaves the gravity latch in locking position, and when the door is closed, it locks automatically.

Coating—Castings and steel body have a dull black baked enamel finish.

Dimensions—The outside measurements of the package receiver frames are 16¼ in. wide by 14 in. high. The wall opening required is 14 in. wide by 11½ in. high.

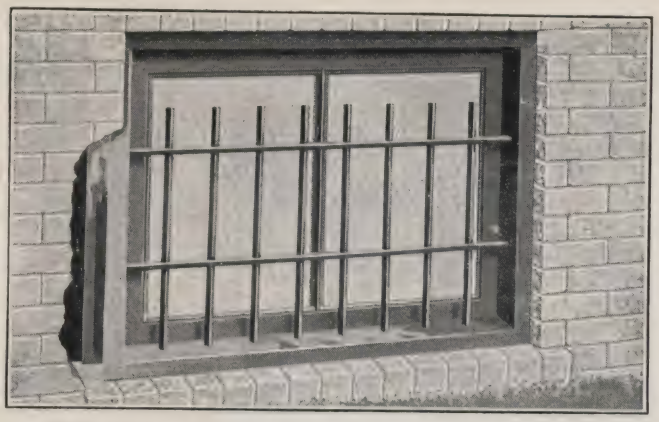
Majestic milk bottle and package receivers are made in two different depths of adjustable bodies, adapting them to any wall depth.

No. 1 body is adjustable to wall from 5 to 8 in. deep. No. 2 is adjustable to walls from 8 to 14 in. deep.



Installation in Wall

Majestic Milk and Package Receiver



Majestic All-metal Basement Window

A section of the foundation removed to show how the solid cast semi-steel channel frame is embedded in the masonry, permanently sealed

The Majestic All-metal Basement Window

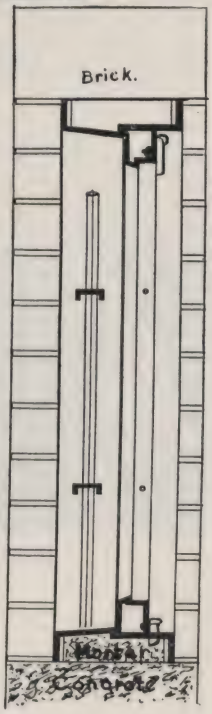
The Majestic all-metal basement window has a 5-in. solid cast semi-steel channel frame which can not warp or shrink away from the foundation; also a solid section steel sash.

No lintels are required to support the masonry above the frame of a Majestic all-metal basement window.

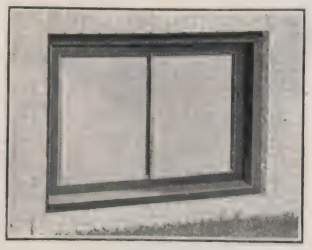
This is a big advantage to masons as well as improving the appearance architecturally.

Majestic all-metal basement windows are easily installed in all types of foundations, brick, stone or concrete. They are supplied with or without a steel guard with ½-in. square bars. The guard is held firmly in place by cotter keys that are embedded in the masonry when the frame is set in the foundation.

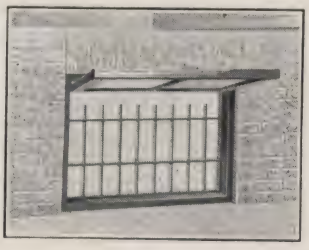
This type of window is also easily screened.



Sectional View



Outside View, Without Guard



Inside View Showing Guard

Majestic All-metal Basement Window

No.	Wall opening, in.	Sash size, in.	Glass size, in.	Shipping weight, lbs.	
				With guard	Without guard
16	32 x 16	29⅛ x 12⅜	2–13 x 10	82	74
24	32 x 24	29⅛ x 21⅛	2–13 x 18	105	94

SHARP ROTARY ASH RECEIVER CORPORATION

Manufacturers of Rotary Underground Ash and Garbage Receivers

SPRINGFIELD, MASS.

Product

The SHARP ROTARY UNDERGROUND ASH and GARBAGE RECEIVING SYSTEM, The Modern Method of Ash Disposal.

What It Is

The Sharp Rotary Underground Ash Receiver is a device placed partly under the heater to receive ashes. Can be installed under any kind of old or new heater. Consists of a circular pit extending partly under the heater and a number of specially shaped cans mounted on a revolving steel framework, part of which is under the ash pit. The cans and pit are covered with iron or concrete, which is level with cellar floor.

May also be used for garbage, as odors are drawn up through firebox and pass out of the chimney.

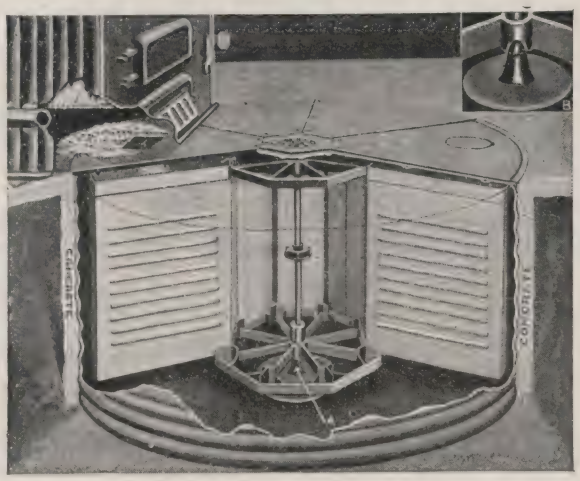


FIG. 1. SECTION SHOWING RECEIVER AS INSTALLED

What It Does

It eliminates dust from the cellar. Only one handling of ashes—that of removing cans to street when full. Saves room by having all ashes underground. Provides fire protection from hot ashes. Sweepings from basement may be swept directly into cans. Turns easily even when cans are full. Always stands perfectly plumb.

FIG. 2. RECEIVER ASSEMBLED WITH REMOVABLE COVER AT SIDE

Detailed Description

The Sharp Rotary Underground Ash Receiver consists of a number of cans mounted on a revolving iron frame in a pit. The pit is enclosed with an iron cover level with the floor. In the section of the cover which extends under boiler or furnace is a hole through which ashes are dropped into a can directly below (Figs. 1 and 3).

When can is filled, the frame within is revolved by a removable iron lever and an empty can takes its place. The cover does not revolve. A small dial indicates position of the cans. After all cans are full, they are removed through an opening made by removing a plate in the iron cover (Figs. 2 and 5).

There are two flanged wheels attached to a perpendicular shaft. The cans rest on bottom wheel and a hook on the cans holds them to the top wheel, the whole revolving on a pivot made fast on a concrete footing (Fig. 1, "A").

Types and Sizes

The company makes two types of receivers — Flush type with plain cast iron top (Fig. 5), and the Recessed type (Fig. 6). Interior construction is the same, the latter having cast iron plates dropped below floor level, and cement carried over the plates with only the removable plate and dial showing. They can be dropped 4 or 6 in. (2 in. standard). Special castings made for recessed type to allow removable plate and dial to be kept flush with the floor.

FIG. 3. ASHES ARE RAKED THROUGH HOLE IN BACK PLATE

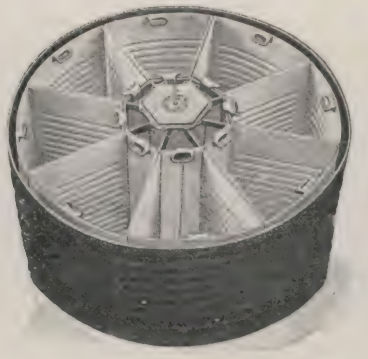


FIG. 4. INTERIOR OF RECEIVER WITH ENTIRE TOP OFF, SHOWING ARRANGEMENT OF CANS

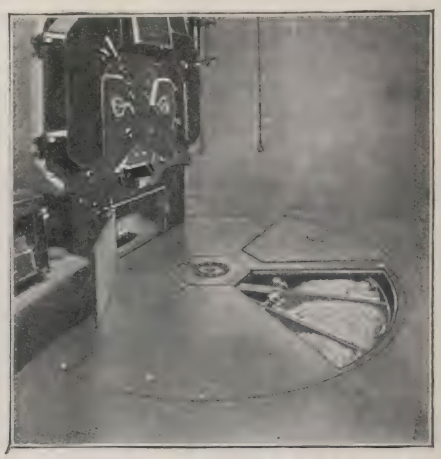


FIG. 5. REMOVABLE PLATE LIFTED OFF TO ALLOW CANS TO BE REMOVED

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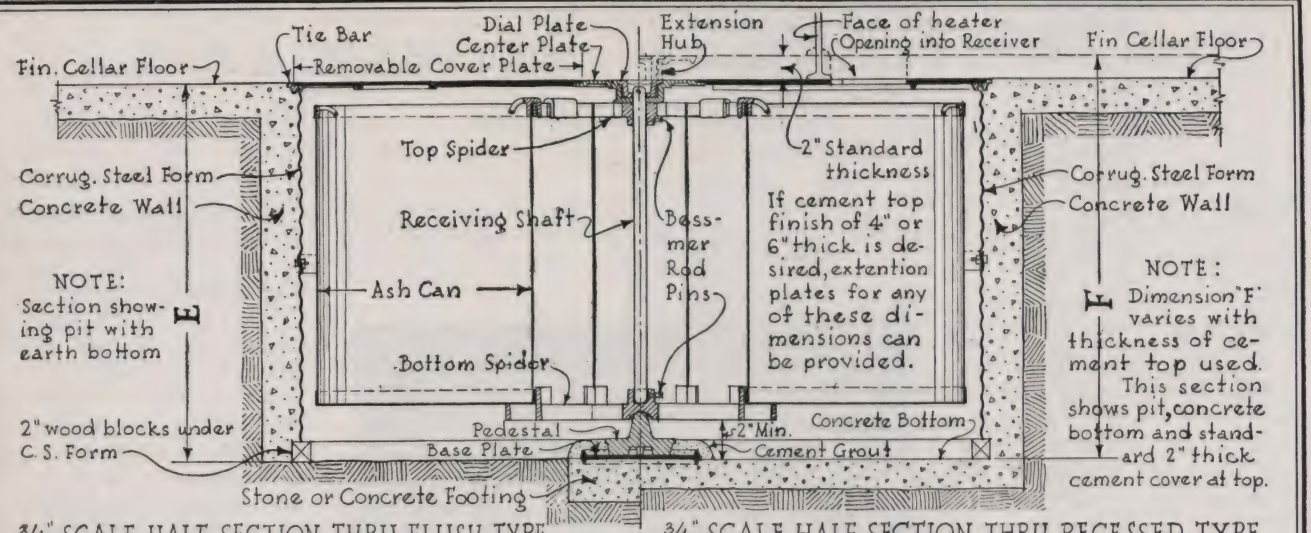


3/4" SCALE HALF SECTION THRU FLUSH TYPE NO. 1 OUTFIT WITH C.I. COVER PLATES EXPOSED

3/4" SCALE HALF SECTION THRU RECESSED TYPE NO. 1 OUTFIT WITH MONOLITHIC FLOOR SLAB ON TOP

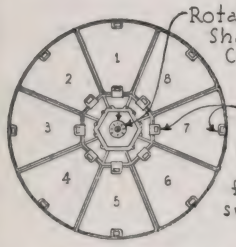
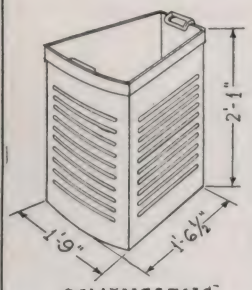
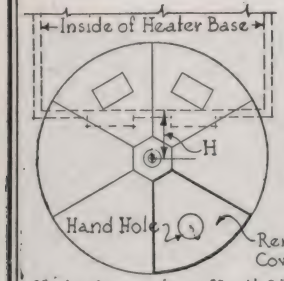


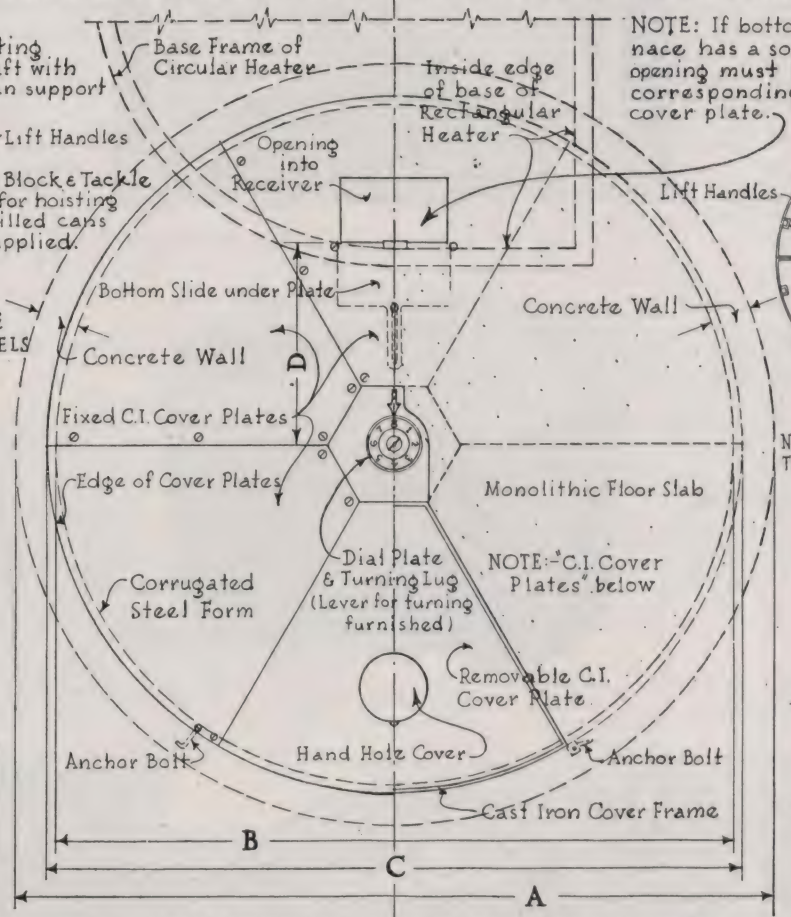
DIAGRAM SHOWING NO. 1 RECEIVER - 8 CAN SIZE TOTAL CAPACITY = 24 BUSHELS



DIMENSIONS OF CORRUG. STEEL CAN FOR NO. 1 OUTFIT



No. 1 – 8 can size – H = 1'-2"
No. 2 – 12 can size – H = 1'-5½"
DIAGRAM OF COVER PLATES WHERE TWO OPENINGS IN ASH PIT FOR LARGE FURNACE ARE REQUIRED



NOTE: If bottom of ash pit in furnace has a solid iron base, an opening must be cut through same, corresponding with opening in the cover plate.

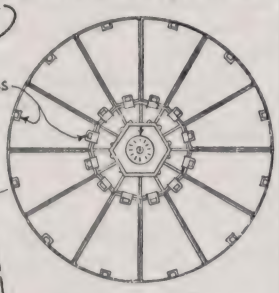
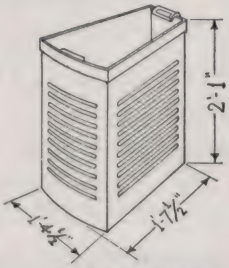


DIAGRAM SHOWING NO. 2 RECEIVER - 12 CAN SIZE TOTAL CAPACITY = 33 BUSHELS



DIMENSIONS OF CORRUG. STEEL CAN FOR NO. 2 OUTFIT

Block and tackle for hoisting filled cans is furnished.

HALF PLAN SHOWING FLUSH TYPE

HALF PLAN SHOWING RECESSED TYPE

OF NO. 1 OR NO. 2 RECEIVER

TABLE OF DIMENSIONS						
RECEIVERS	A	B	C	D	E	F with Cam't Top
No. 1 – 8 Can Size	5'-4"	4'-10"	4'-11"	1'-5"	2'-8"	2'-10" up to 3'-2"
No. 2 – 12 Can Size	6'-4"	5'-9½"	5'-10¼"	1'-9"	2'-8"	2'-10 up to 3'-2"

NOTE:
A steel watertight tank can be furnished where conditions make it extremely difficult to waterproof the pit.
No. 1 Outfit – 57½" dia. 30" deep – 3/16" thick
No. 2 " 69" " " "

DRAWN BY SWEET'S CATALOGUE SERVICE, INC-	DETAILS AND REQUIREMENTS FOR "SHARP" ROTARY ASH RECEIVING SYSTEMS	SCALE – 3/4" EQUALS 1'-0" DATE-AUG. 21	DRWG 1

Continued on next page

Block and tackle for removing cans, and a cast iron lever, are supplied with each equipment.

Receiver No. 1—A popular size for dwellings, as it holds several weeks' accumulation of ashes.

Receiver No. 2—Especially recommended for large residences, schools, churches, apartments, office buildings, etc., as it holds one dray load.

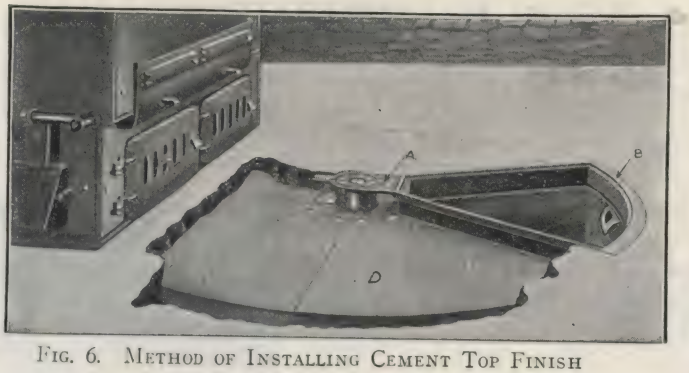


Fig. 6. Method of Installing Cement Top Finish

Receiver No. 15—Provided to meet conditions where obstructions in the soil necessitate the use of a shallow receiver or in cases where a can of smaller capacity is desired.

Receiver No. 5—For use in the small residence or bungalow and also adaptable for use under hot water heaters.

SIZES

Receiver No.	Corrugated steel cans	Cover plates	Capacity, bu.	Diameter, in.	Height, in.	Height of can, in.	Shipping weight, lbs.
1	8	6	24	60	32	25	600
1A	8	6	24	60	34	25	565
2	12	6	33	72	32	25	800
2A	12	6	33	72	34	25	780
15	8	6	14	60	22	15	500
15A	8	6	14	60	24	15	485
5	5	1	6	44	20	16	300

Nos. 1A, 2A and 15A are made with extension castings for cement top. No. 15 is used where obstructions in soil require shallow receiver. Watertight tanks can be furnished for all sizes. Prices on request.

The Cans

Made of heavy galvanized steel heavily reinforced with an iron band and the larger ones are also corrugated to give additional strength. Hold from 1 to 3 bu. The cans fit snugly together, and very little dust can get down between them. Do not need to be cleaned out underneath them but once every 2 years. These cans usually last about 7 years. The company sells replacements.

Where Used

These Sharp Rotary Underground Ash Receivers are used in residences, apartment houses, stores, office buildings, schools, libraries and other public buildings and institutions throughout the country, for use under furnaces, boilers, ranges, and bake ovens.

Installation

After the excavation is made, the corrugated metal form is put in and 3 in. of concrete poured around it and filled level with the top. Stone base for the pivot is all that is usually required for the bottom of the pit. When the concrete is hard, cans are put in and the receiver is ready for use. Where water is present, galvanized iron or steel tanks can be furnished on order or the receiver may be installed in a waterproofed concrete pit.

Any one with an understanding of the mixing of concrete can make these installations. Complete instructions accompany each order.

How Shipped

Each receiver shipped in two parts, namely bundle of cans and castings and crate of castings f.o.b. shipping point.

Specifications

Rotary Ash Receiver—The Heating (General) Contractor shall furnish and install complete (one) No..... (here specify size and type of receiver [see table]) Sharp Rotary Ash Receiver, as manufactured by the Sharp Rotary Ash Receiver Corporation, Springfield, Mass. To be located where shown on drawings (or as directed by the architect) and to be installed in strict accordance with detailed directions furnished by the manufacturer.

Note: Provisions for the following work in connection with installing rotary ash receivers should be incorporated in the specifications under the proper headings:

Excavation—Do all excavation required to install rotary ash receiver as hereinafter specified.

Concrete Work—Furnish and set 12x12x6 in. thick concrete foundation under base plate of rotary ash receiver, as hereinafter specified, and incase the metal drum of the ash receiver in concrete, 3 in. thick. (Also provide 3-in. thick concrete floor under the ash receiver.)

Note: While a concrete floor is not required under the receiver, the inclusion of a concrete floor makes a neater job.

Heating—The Heating Contractor shall cut an opening of proper size in the bottom of ash pit floor to fit over rotary ash receiver as herein specified.

Concrete Floor—The finish of concrete floor shall be flush with iron cover plate, or shall be extended over top of plate, according to type selected.

Residence of Arthur T. Murray, Springfield, Mass. No. 2A Receiver Installed

C. H. STEPHENSON

Manufacturer of Household Specialties

TELEPHONE
944

48 Farrar Street
LYNN, MASS.

ALL GOODS SOLD DIRECT FROM FACTORY

Products

"The Stephenson" Standard Underground Garbage Receiver; Underfloor Ash and Refuse Receivers; Underground Street Sweepings Receiver; Spiral Truss Ribbed Ash Barrel; Half-round Garbage Bucket; All-steel Ash Barrel Truck; Indoor Chemical Closets.

Also manufacturers of Portable Earth and Chemical Closets with Metal Houses for contractors and campers.

Trade-mark

Architects should note carefully our construction, and when specifying should designate all our goods by the trade-marked name "The Stephenson," giving style number. Our 17 years' practical experience, with thousands of satisfied users, has made possible this trade-mark which protects architects, their clients and us from substitution.

Architects' specification card on request.

Underground Garbage Receiver

"The Stephenson" standard underground garbage receiver sets deep in the ground, holding a heavy galvanized bucket with bail. It thus avoids the unsightly and injurious effects of wooden boxes, with their attendant annoyance of rats, cats, dogs and flies, attracted by scattered refuse. It is impossible to spill garbage between bucket and receiver, as the chute empties directly into the barrel. It is practical for all seasons; the objectionable features in the above ground garbage bucket nuisance are eliminated.

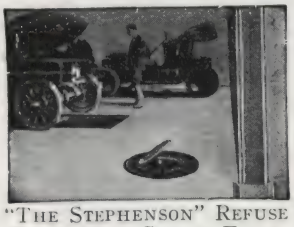
"The Stephenson" Standard Underground Garbage Receiver
As it appears when out of the ground, showing maid using foot trip
Sold direct from factory

"The Stephenson" Street Sweepings Receiver at Fifth Avenue and 24th Street, New York, N. Y.
1000 in use
Sold direct from factory

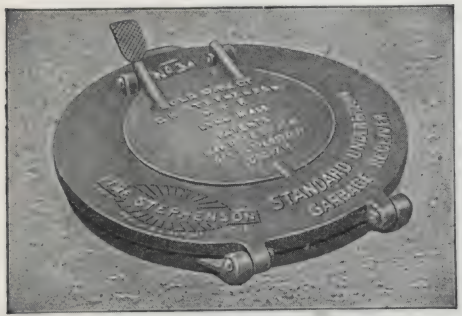
"The Stephenson" Fireproof Underfloor Ash Receiver
A clean and sanitary cellar
Sold direct from factory

"The Stephenson" Refuse Receiver in Factory
Flush with floor, easy to sweep into—sanitary
Sold direct from factory

"The Stephenson" All-Steel Ash Barrel Truck
Wheels up steps
Sold direct from factory



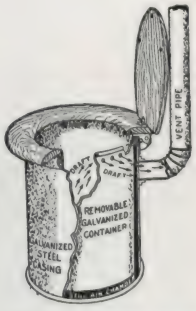
"The Stephenson" Refuse Receiver in Garage Floor
For sweeping and oily waste. Fireproof
Sold direct from factory



"The Stephenson" Standard Underground Garbage Receiver
As it appears when in the ground. Note carefully our construction
Sold direct from factory

"The Stephenson" Half-Round Bucket
Sold direct from factory

"The Stephenson" Spiral Truss Ribbed Ash Barrel
Note construction carefully
Sold direct from factory



"The Stephenson" Indoor Chemical Closet
Showing wooden seat with the cover open
Sold direct from factory

MILFORD IRON FOUNDRY

Manufacturers of Concrete Filled Columns

MILFORD, MASS.

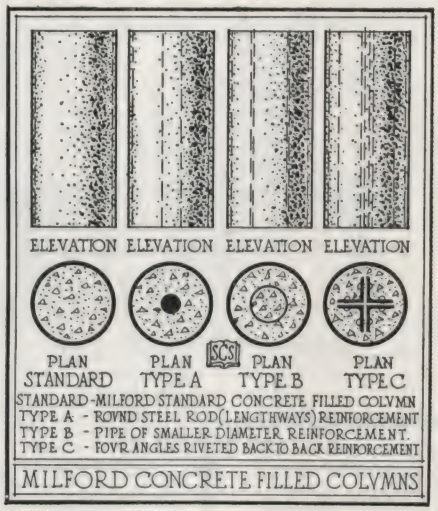
Products

STEEL CONCRETE FILLED COLUMNS; STANDARD and SPECIAL CAPS and BASES.

TRADE-MARK

Description of Milford Columns

A combination of steel shell and concrete filling. Steel is either thin tubes (for light weight columns) or standard steel pipe (for heavy weight columns). Concrete is best grade American portland cement, clean sharp grit sand, and ½-in. screened trap rock — machine mixed 1:2:3.



Steel shell is placed on end, filled from overhead hopper and repeatedly raised and dropped in a perpendicular position. Direction of the compacting forces is along the long axis of pipe, and the entire concrete mass receives the shock. Mass becomes close and dense with initial blow, and an even distribution of aggregates is insured.

Special attention is given to producing accurate stock or special lengths, the cut being perfectly square, flat, and at right angles to axis of pipe.

Design of Columns

For good design, length should not exceed 30 times diameter of column. For safe loads, see accompanying table.

TABLE 1. SAFE LOADS FOR COLUMNS, IN TONS OF 2000 LBS.

Size, column, in.	Weight, column, per ft., lbs.	Nominal thickness of steel, in.	Length, feet														
			6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LIGHT WEIGHT COLUMNS																	
3	9	0.109	7	6	5												
3½	13	0.120	10	9	8	7											
4	17	0.134	13	13	12	12	11										
4½	21	0.134	18	17	16	15	14	13									
5	26	0.148	24	23	21	20	19	18	17	17							
6	35	0.165	35	33	32	30	29	28	27	26	25	23					
HEAVY WEIGHT COLUMNS																	
2⅞	10	0.203	9	8	7												
3½	15	0.216	14	13	12	11											
4	20	0.226	19	18	17	16	15										
4½	24	0.237	24	23	22	20	18	17									
5	29	0.247	28	28	27	25	24	23	22	20							
5½	36	0.258	34	34	33	32	31	29	28	27	26						
6⅝	49	0.280	45	45	45	45	45	43	41	39	37	36	35	33			
7⅝	64	0.301	60	60	59	58	58	58	56	54	52	50	49	48	47	46	
8⅝	81	0.322	75	74	73	72	71	71	71	71	69	66	63	61	60	58	56
9⅝	100	0.342	93	92	91	90	89	88	87	87	87	85	83	81	79	77	75
10¾	123	0.365	112	111	110	109	108	107	106	106	106	106	106	104	101	97	94
11¾	146	0.375	130	129	128	127	126	125	125	125	125	125	125	124	123	120	116
12¾	169	0.375	150	149	148	147	146	145	144	143	142	141	140	139	139	138	136

Types of Columns

Light Weight—Smaller sizes are mainly used in residental work, or where loads are not an important factor. Larger sizes are used when diameter of heavy weight column is too small in proportion to its length for load carried.

Heavy Weight—For conditions where carrying capacities are essential.

Extra Heavy and Double Extra Heavy—Seldom used and then only when especially called for. In this case, smaller diameter can be obtained for load carried.

Reinforced—(See drawings of types "A," "B" and "C" in first column). To increase load bearing capacity of columns of given diameter or to meet insurance classification requirements, various forms of standard and special reinforcements are occasionally used. The types shown are most common.

Formula for Safe Working Load of Columns

As a result of tests, the Massachusetts Institute of Technology, Jan. 26, 1915, suggests the following formula as giving safe working load that can be applied to Milford columns for values of $\frac{l}{r}$ between 0 and 120.

This information is given to assist the architect when he wishes to use a reinforced column and to ascertain the minimum diameter of column required.

Where $\frac{l}{d}$ = 0 to 15, safe load = 1100 $(A_c + A_s \times 9.6)$. Where $\frac{l}{d}$ = 15 to 30, safe load = $(A_c + A_s \times 9.6)\ (1600 - 7\frac{l}{r})$. A_c = Area of concrete in cross section. A_s = Area of steel in cross section. $\frac{E_s}{E_c} = 9.6$. E_s = Modulus of elasticity of steel. E_c = Modulus of elasticity of concrete (sets deducted). l = Length of column in inches. d = Diameter of column in inches. r = Radius of gyration (solid section). Safe load is in pounds.

For Detailing or Ordering Columns

Show the number of columns wanted; whether light or heavy weight; over-all length from under side of base plate or upper side of cap; style of cap; height and weight of I-beam or size of wooden beam framed thereto, also details showing location of intermediate side brackets; pillow block requirements, etc., if any. If bolt holes are other than standard (¾ in., and located as per list), show what is desired. Use order number when practicable.

See accompanying pages for standards.

Milford Standard Caps and Bases

The following types have been designed to cover as far as possible the great variety of framing this company has had to deal with in the 19 years of specialization in this work.

Attention has been given to economy and efficiency of material, and to architectural proportion.

Continued on next page

Standard Bases—(See Table 2 and details on following page). Each designed for maximum load for each size column, figured on allowable load of 30 tons per sq. ft. on concrete, with sufficient thickness and stiffness to distribute load uniformly under base. Bearing surfaces for bases for 6⅝-in. columns, or larger, are machined.

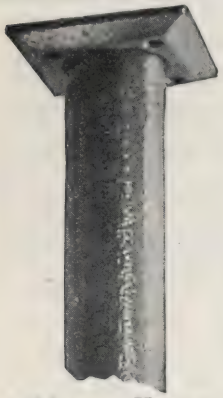
Flat Caps—(See Table 3 and details on following page). Flat caps are used when there are no second section columns, and where beams extend to center of column. These caps are made for wooden and double or single I-beams.

Standard Bracket Caps—(See Tables 4 and 7 and details on following page). Wings are as short as practicable for concentric loading close to column axis. Wing ends bevel 1½ in., preventing load concentrating on outer edge from excessive bending of beams.

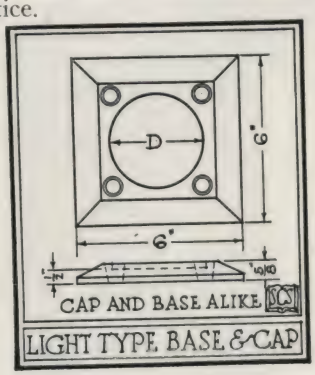
Light Type Bases and Caps—(See Tables 5 and 6 and illustrations). These plates are cheaper and are recommended only when small columns carry less than their full listed loads. Adapted for cellar supports in the less pretentious residences.

Milford House Columns

For housing construction, light weight columns (3, 3½ and 4 in.) with light type bases and caps are used. These are stocked by dealers and can be obtained on short notice.



MILFORD HOUSE COLUMN



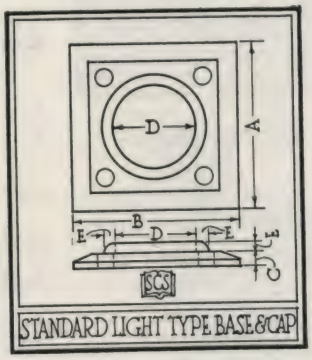


TABLE 2. DIMENSIONS OF STANDARD BASES
(See Details on following page)

Diam column, in.	Weight	Dimensions, in. A	B	C	D	E	F	G	Order No.
2⅞	Heavy	6	6	⅞	3	½	⅜	½	7
3	Light	6	6	⅞	3⅛	½	⅜	½	1
3½	Light	7	7	1	3⅝	½	½	½	2
3½	Heavy	8	8	1¼	3⅝	½	½	½	8
4	Light	8	8	1⅛	4⅛	½	½	½	3
4	Heavy	9	9	1½	4⅛	½	⅝	½	9
4½	Light	8	8	1¼	4⅝	½	½	½	4
4½	Heavy	10	10	1⅝	4⅝	½	¾	½	10
5	Light	9	9	1⅜	5⅛	¾	½	¾	5
5	Heavy	11	11	1¾	5⅛	¾	¾	¾	11
5½	Heavy	12	12	1⅞	5⅝	¾	¾	¾	12
6	Light	11	11	1½	6⅛	¾	¾	¾	6
6⅝	Heavy	14	14	2⅛	6¾	¾	⅞	¾	13
7⅝	Heavy	16	16	2⅝	7⅞	¾	⅞	¾	14
8⅝	Heavy	18	18	2⅝	8⅞	¾	1	¾	15
9⅝	Heavy	20	20	3	9⅞	¾	1	¾	16
10¾	Heavy	22	22	3¼	11	¾	1	¾	17
11¾	Heavy	24	24	3½	12	¾	1	¾	18
12¾	Heavy	25	25	3½	13	¾	1	¾	19

TABLE 3. DIMENSIONS OF FLAT CAPS
(See Details on following page)

Diam. column, in.	Dimensions. in. A Wood beam	A I-beam	B Wood beam	B I-beam	C	D	E	F Wood beam	F I-beam	G Wood beam	G I-beam	H	J	Order No. Wood beam	Order No. I-beam
2⅞	6	4½	8	9	½	3	½	3	To suit flanges of I-beams used (see following page)	5	6	½	4	30	45
3	6	4½	8	9	½	3⅛	½	3		5	6	½	4⅛	31	46
3½	6	4½	8	9	½	3⅝	½	3		5½	6½	½	4⅝	32	47
4	8	4¾	8	10	⅝	4⅛	½	4		5½	7	½	5⅛	33	48
4½	8	5	8	10	¾	4⅝	½	5½		5½	7½	½	5⅝	34	49
5	8	5½	10	11	¾	5⅛	¾	5½		7	8½	¾	6⅝	35	50
5½	10	6	10	12	¾	5⅝	¾	7		7	9	¾	7⅛	36	51
6	10	6	10	12	¾	6⅛	¾	7½		7½	9½	¾	7⅝	37	52
6⅝	10	6	13	13	1	6⅝	¾	7		10	10	¾	8¼	38	53
7⅝	12	6	14	14	1	7⅝	¾	9		11	11	¾	9¼	39	54
8⅝	12	6¼	15	15	1	8⅝	¾	9		12	12	¾	10¼	40	55
9⅝	12	6½	16	16	1	9⅝	¾	9		13	13	¾	11¼	41	56
10¾	14	7	17	17	1	11	¾	10		14	14	¾	12½	42	57
11¾	14	7½	18	18	1	12	¾	10		15	15	¾	13½	43	58
12¾	16	8	19	19	1	13	¾	12		16	16	¾	14½	44	59

TABLE 4. STANDARD BRACKET CAPS FOR SINGLE I-BEAMS
For 1-way, 2-way, 2-way right angle, 3-way and 4-way
(See Details on following page)

Diam. column, in	Dimensions, in. A	B 1-way	B 2-way 3-way 4-way	B 2-way, right angle	C	E	G 1-way, 2-way right angle	G 2-way 3-way 4-way	H	J 1-way, 2-way, 2-way right angle	J 3-way	K	L	M	N 3-way only	Order No. 1-way	2-way	2-way right angle	3-way	4-way
2⅞	6	7	10	8	⅝	½	3½	7	3	4	8	¼	⅝	½	3½	135	150	165	180	195
3	6	7	10	8	⅝	½	3½	7	3	4⅛	8	¼	⅝	½	3½	136	151	166	181	196
3½	6½	8	11	8¾	⅝	⅝	4	8	3	4⅞	8¾	⅜	¾	⅝	4	137	152	167	182	197
4	6½	8½	11½	9	¾	¾	4¼	8½	3	5⅝	9	⅜	¾	¾	4¼	138	153	168	183	198
4½	6½	9	12	9¼	¾	¾	4½	9	3	6⅛	9¼	⅜	¾	¾	4½	139	154	169	184	199
5	6½	9½	12½	9½	1	¾	4¾	9½	3	6⅝	9½	⅜	¾	¾	4¾	140	155	170	185	200
5½	7	10	13	10	1	¾	5	10	3	7⅛	10	⅜	1	¾	5	141	156	171	186	201
6	7	10½	13½	10½	1	¾	5¼	10½	3	7⅝	10½	⅜	1	¾	5¼	142	157	172	187	202
6⅝	8	12	14½	12	1	1	6	11½	3	8¾	12	⅜	1	1	6	143	158	173	188	203
7⅝	8	13	15½	13	1	1	6½	12½	3	9¾	13	⅜	1	1	6½	144	159	174	189	204
8⅝	8	14	16½	14	1	1	7	13½	3	10¾	14	⅜	1	1	7	145	160	175	190	205
9⅝	8	15	17½	15	1	1	7½	14½	3	11¾	15	⅜	1	1	7½	146	161	176	191	206
10¾	8	16	18½	16	1	1	8	15½	3¼	13	16	⅜	1¼	1	8	147	162	177	192	207
11¾	8	17	19½	17	1	1	8½	16½	3¼	14	17	⅜	1¼	1	8½	148	163	178	193	208
12¾	8	18	20½	18	1	1	9	17½	3¼	15	18	⅜	1¼	1	9	149	164	179	194	209

TABLE 5. DIMENSIONS OF STANDARD LIGHT TYPE BASES AND CAPS

Diam. column, in.	Weight	Dimensions, in. A and B	C	D	E	Order No
4	Light	8	⅝	4⅛	½	20
4	Heavy	8	⅝	4⅛	½	21
4½	Light	8	⅝	4⅝	½	22
4½	Heavy	8	¾	4⅝	½	23
5	Light	8	¾	5⅛	¾	24
5	Heavy	10	¾	5⅛	¾	25
6	Light	10	¾	6⅛	¾	26
5½	Heavy	12	1	5⅝	¾	26A

TABLE 6. DIMENSIONS OF LIGHT TYPE BASES AND CAPS

Diam. column, in.	D, in.	Order No.
3	3⅛	27
3½	3⅝	28
4	4⅛	29

TABLE 7. STANDARD BRACKET CAPS FOR WOODEN BEAMS OR DOUBLE I-BEAMS
For 1-way, 2-way, 2-way right angle, 3-way and 4-way
(See Details on following page)

Diam. column, in.	Dimensions, in. A	B 1-way	B 2-way, 3-way, 4-way	B 2-way right angle	C	D*	E	F	G 1-way, 2-way right angle	G 2-way, 3-way, 4-way	H	J 3-way only	K	L	M	N 3-way only	Order No. 1-way	2-way	2-way right angle	3-way	4-way
2⅞	6	7	10	8	⅝	...	½	3	3½	7	3	8	¼	⅝	½	3½	60	75	90	105	120
3	6	7	10	8	⅝	...	½	3	3½	7	3	8	¼	⅝	½	3½	61	76	91	106	121
3½	6	8	11	8½	⅝	...	⅝	3	4	8	3	8½	⅜	¾	⅝	4	62	77	92	107	122
4	8	8½	11½	9¾	¾	...	¾	5	4¼	8½	3	9¾	⅜	¾	¾	4¼	63	78	93	108	123
4½	8	9	12	10	¾	...	¾	5	4½	9	3	10	⅜	¾	¾	4½	64	79	94	109	124
5	10	9½	12½	11¼	1	...	¾	7	4¾	9½	3	11¼	⅜	¾	¾	4¾	65	80	95	110	125
5½	10	10	13	11½	1	...	¾	7	5	10	3	11½	⅜	1	¾	5	66	81	96	111	126
6	10	10½	13½	11¾	1	...	¾	7	5¼	10½	3	11¾	⅜	1	¾	5¼	67	82	97	112	127
6⅝	10	12	14½	12½	1	...	1	7	6	11½	3	12½	⅜	1	1	6	68	83	98	113	128
7⅝	12	13	15½	14	1	...	1	8	6½	12½	3	14	⅜	1	1	6½	69	84	99	114	129
8⅝	12	14	16½	14½	1	...	1	8	7	13½	3	14½	⅜	1	1	7	70	85	100	115	130
9⅝	12	15	17½	15	1	...	1	8	7½	14½	3	15	⅜	1	1	7½	71	86	101	116	131
10¾	14	16	18½	16½	1	...	1	10	8	15½	3¼	16½	⅜	1¼	1	8	72	87	102	117	132
11¾	14	17	19½	17	1	...	1	10	8½	16½	3¼	17	⅜	1¼	1	8½	73	88	103	118	133
12¾	16	18	20½	18½	1	...	1	12	9	17½	3¼	18½	⅜	1¼	1	9	74	89	104	119	134

*Dimension D is ⅛ in. more than column diameter. For columns 6⅝ in. in diameter and larger, bearing surfaces are machined. Wings 10 in. or more have 2 brackets. (See standards on following page.)

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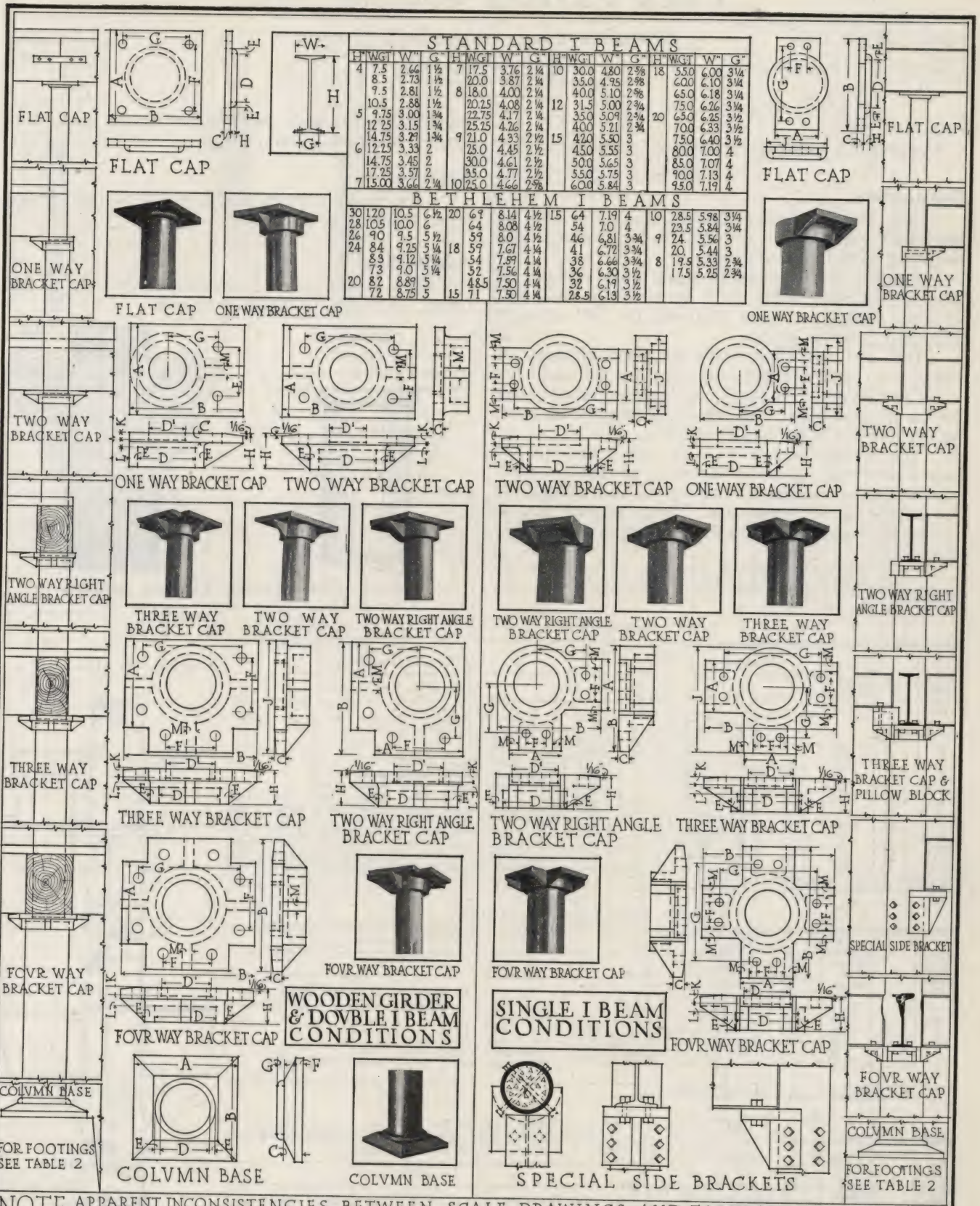


NOTE APPARENT INCONSISTENCIES BETWEEN SCALE DRAWINGS AND TABVLATED DIMENSIONS ARE DVE TO THE VARIENCE OF PROPORTIONS OF PARTS (A J ETC) OF CAPS FOR THE DIFFERENT SIZES OF COLVMNS — THE SIZES GIVEN IN THE TABLES ARE CORRECT

DRAWN BY SWEET'S CATALOGVE SERVICE, INC.

MILFORD "STANDARD" BRACKET CAPS AND "STANDARD" BASE

DETAILS NOT MADE TO SCALE

CREX PATENT COLUMN CO.

TELEPHONE
LAWNDALE 2634, 2635

2300-2310 South Springfield Avenue
CHICAGO, ILL.

Product

Manufacturers of CREX PATENT COLUMNS.

Construction

Crex Patent columns consist of an outer shell of steel filled with concrete, and only the best materials are employed in their manufacture.

Especial care is taken in filling these columns so that the concrete filling shall be perfectly solid and uniform throughout, thus obtaining the full strength of a solid concrete interior.

The caps and connections are made of steel, of sufficient strength to receive the superimposed loads.

CREX PATENT COLUMN CO. holds the original patent for an all-steel cap. The cap being entirely of steel, its strength can be reliably computed.

The connections are made in such a manner that only a steel plate separates the shaft of the lower column from the one above, securing the full strength of the column at the connection. Crex columns can be furnished in about one-fifth the time required for other columns.

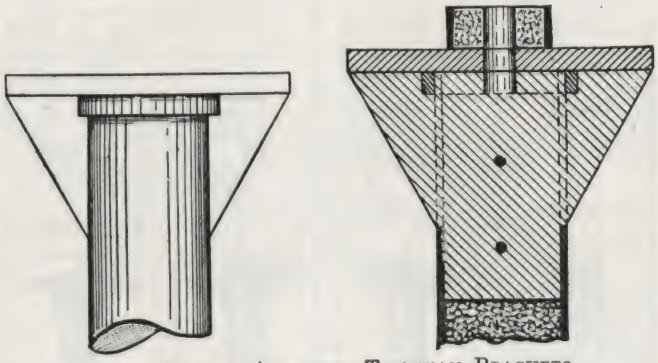
CREX PATENT COLUMN CO. was formed for the purpose of supplying the increased demand for this class of columns with the best that can be made, both as regards strength and appearance.

Approval

Crex Patent columns are approved by the building departments of all large cities.

Adaptability

Crex Patent columns are used extensively in factories, apartment buildings, stores, etc.



CREX PATENT ALL-STEEL TWO-WAY BRACKETS

HEAVY WEIGHT CREX COLUMNS

Outside diam., in.	r	Thickness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lbs.	Area of concrete, sq. in.	Weight of column per ft., lbs.	Safe loads in pounds — Length in feet: 6	8	10	12	14	16	18	20	22
3½	1.18	.216	2.24	7.58	7.07	14.65	30200	26920	24000						
4	1.32	.226	2.69	9.11	9.62	18.81	36800	33900	30600	27200					
4½	1.45	.237	3.19	10.79	12.57	23.47	44100	42100	38400	34800	31200				
5	1.70	.247	3.71	12.54	15.90	28.70	51200	51200	47800	44200	40500	37000			
5½	1.87	.258	4.32	14.62	19.64	34.51	59600	59600	57800	53800	50000	46200	42200		
6⅝	2.22	.280	5.61	18.97	28.27	47.58	77400	77400	77400	74400	70200	66200	61800	59700	53400
7⅝	2.61	.301	6.96	23.54	38.48	62.48	96600	96600	96600	96600	93100	86800	84600	79700	75500
8⅝	2.97	.322	8.44	28.55	50.27	79.46	117800	117800	117800	117800	117800	113400	108600	104000	99200
9 11/16	3.28	.344	10.03	33.91	63.62	98.60	143800	143800	143800	143800	143800	142800	137600	132600	127000
10¾	3.66	.366	11.92	40.48	78.54	120.10	167000	167000	167000	167000	167000	167000	165600	159000	154800
11¾	4.01	.375	13.46	45.56	95.03	141.00	187600	187600	187600	187600	187600	187600	187600	185200	179600
12¾	4.36	.375	14.62	49.56	113.10	164.40	205600	205600	205600	205600	205600	204000	204000	204000	200000

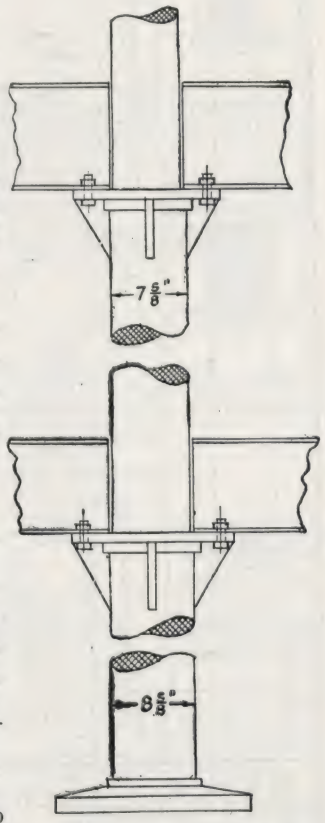
LIGHT WEIGHT CREX COLUMNS

Outside diam., in.	r	Thickness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lbs.	Area of concrete, sq. in.	Weight of column per ft., lbs.	Safe loads in pounds — Length in feet: 6	8	10	12	14	16	18	20	22
3½	1.20	.120	1.28	4.33	8.35	12.79	17660	15840	14000						
4	1.33	.134	1.64	5.53	10.93	14.57	23000	21200	19200	17100					
4½	1.54	.134	1.85	6.25	14.10	20.57	25900	25240	23200	21200	19120				
5	1.71	.148	2.29	7.67	17.42	25.38	32100	32100	30000	27500	25500	23300			
6	2.04	.165	3.05	10.28	25.25	35.95	42400	42400	42000	39600	37160	34600	32000	29600	

Standard steel boiler tubes, Crane Co., 1913.

EXTRA HEAVY WEIGHT CREX COLUMNS

Outside diam., in.	r	Thickness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lbs.	Area of concrete, sq. in.	Weight of column per ft., lbs.	Safe loads in pounds — Length in feet: 6	8	10	12	14	16	18	20	22
3½	1.15	.300	3.03	10.25	6.67	17.05	40200	35900	31600	27500					
4	1.30	.318	3.70	12.51	8.87	21.52	51800	47440	42760	38000	33100				
4½	1.47	.331	4.43	14.98	11.45	26.66	62300	59400	54400	49600	44500	39440			
5	1.65	.356	5.21	17 61	14 39	32.90	73500	72000	67720	62500	57600	51700	46400		
5⅝	1.83	.375	6.14	20.78	18.19	39.07	85500	85500	81900	76400	70800	65200	59400	53800	
6⅝	2.19	.432	8.44	28.57	25.97	55.07	119000	119000	119000	113600	107100	100800	94100	87500	81100
7⅝	2.54	.500	11.26	38.05	34.47	72.86	156800	156800	156800	156800	149400	142000	134800	127600	120000
8⅝	2.89	.500	12.81	43.39	45.66	89.50	178600	178600	178600	178600	178200	170200	163000	155400	148000



STEEL BRACKET CAP CONSTRUCTION

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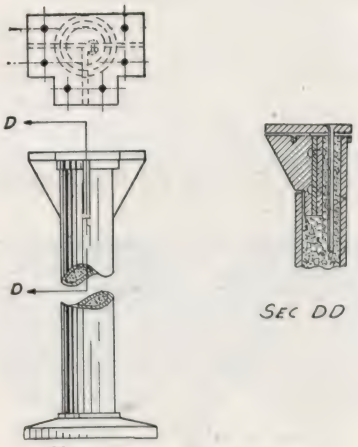
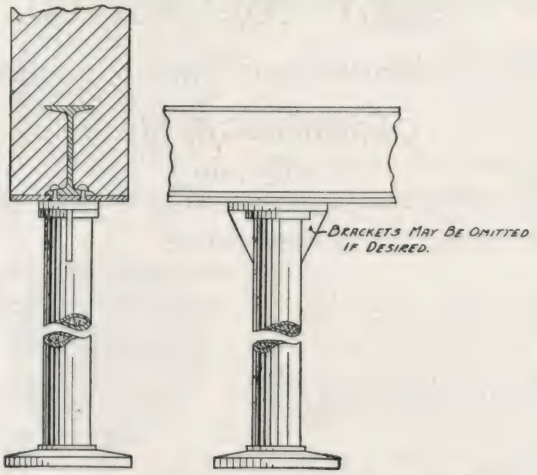
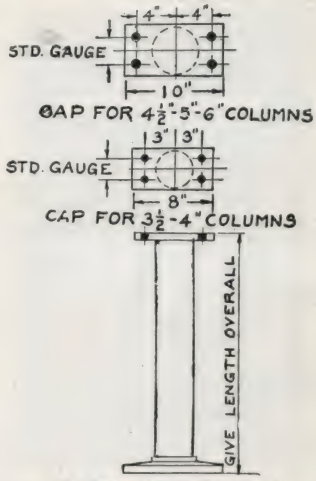
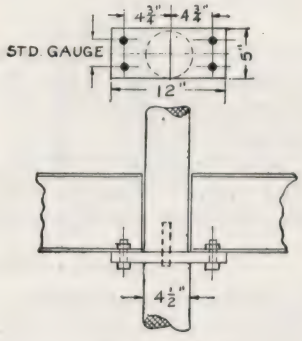


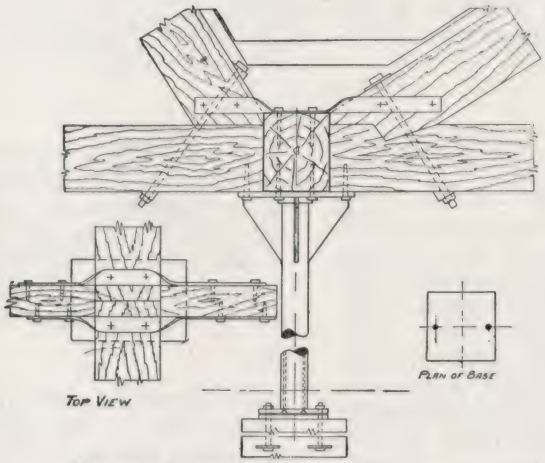
THREE-WAY BRACKET



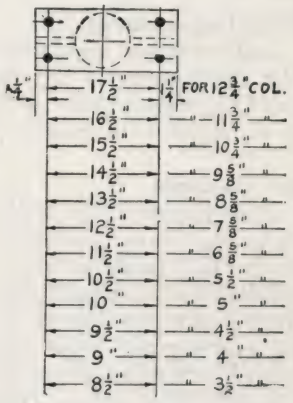
DETAILS SHOWING CREX COLUMNS IN STORE FRONT CONSTRUCTION



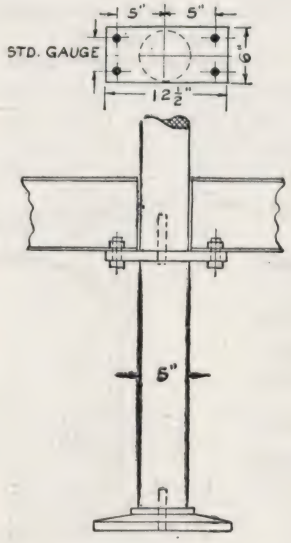




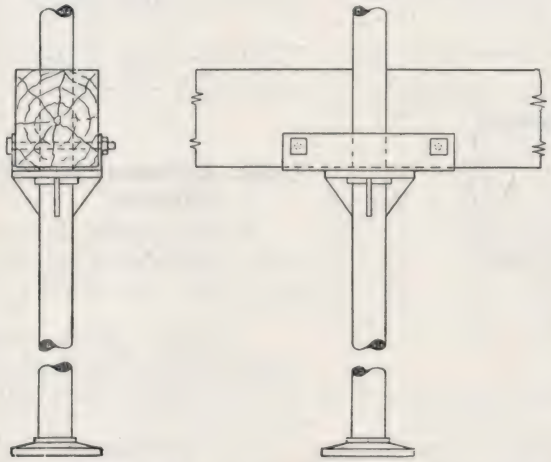
DETAILS SHOWING CREX COLUMNS IN SAWTOOTH CONSTRUCTION



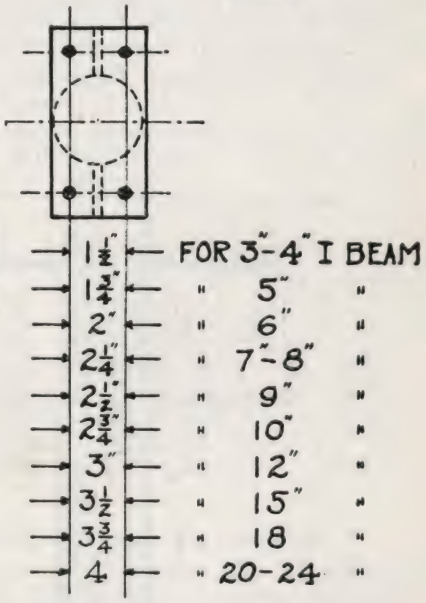
STANDARD GAUGE FOR I-BEAMS



STACK FOR PARTITIONS, APARTMENT BUILDINGS



ELEVATION OF CREX COLUMNS SHOWING STEEL CORBEL USED IN MILL CONSTRUCTION



Prices, etc.

Quotations and any additional information furnished on request.

Installations

Crex columns have been installed in 17,225 buildings in various parts of the United States, many of these installations being repeat orders. The United States Ball Bearing Mfg. Co.'s building, 4535 Palmer Street, Chicago, used 96 Crex columns. 190 columns were installed in the Clarendon Beach Hotel, Chicago, and 120 in the Smith Form-A-Truck building at Clearing, Ill. 98 Crex columns were used in the Old Folk's Home, Chicago; 192 columns in Victor Mfg. & Gasket Co.'s building, 58th Avenue and Roosevelt Road, Chicago; 308 columns in Hoyt Printing Co.'s building, 47th Street and Kedzie Avenue; 232 columns in Doehler Die Castings Co., 97th Street and Cottage Grove Avenue, Chicago.

These facts give proof of the economy, reliability and fine appearance of Crex columns.

ESTABLISHED 1897

LALLY COLUMN CO.

Manufacturers of Patent Columns

CAMBRIDGE, MASS.

FACTORIES

CHICAGO, ILL., 4001 Wentworth Avenue CAMBRIDGE, MASS., Erie and Albany Streets BROOKLYN, N. Y., Calyer and Russell Streets

Products

LALLY PATENT COLUMNS.

Patents

Various improvements on Lally columns are covered by numerous patents under different dates extending from 1898 to the present time.

Infringements will be prosecuted.

Official Indorsement

Lally columns are indorsed by the Chief Engineer of the Department of the Supervising Architect United States Government, and by leading engineers and architects throughout the country.

Lally Columns

Description—The Lally column is manufactured in light and heavy weight sections; is the cheapest and most durable building support; is made up of a steel outer shell and a compact inner filling of concrete. Each column passes through a certain process of manufacture, whereby air holes or cavities are eliminated by means of special machinery; each column is filled, under the supervision of an official inspector, with sand, cement and blue trap rock of highest quality, automatically measured, machine mixed and *thoroughly compressed,* giving highest possible results obtainable from compression of concrete. Shipped ready for use.

Lally Patent Steel Cap—All sizes and shapes. Far superior to the old style loose cast iron cap. Cast iron caps are uncertain and yield readily to uneven stresses at top of column, resulting in cracks, etc.

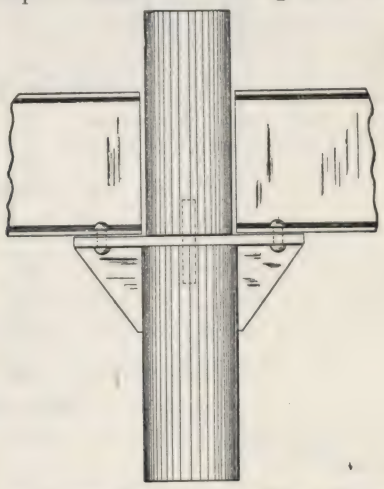


FIG. 1. STEEL BRACKET AND BEAM SUPPORT
Latest construction

Bracket and Beam Support (New Style of Cap)—Where one column sets over the other, our latest construction of bracket and beam support is used, as shown in Fig. 1. This style of cap consists of crown plate and steel bracket inserted through slots in column shaft and firmly affixed thereto.

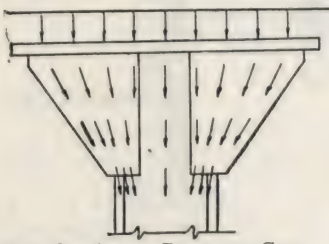


FIG. 2. STEEL BRACKET CAP
Cross section of a typical Lally steel bracket cap showing diagrammatically with arrows how all the load on the cap plate is distributed to the column, eliminating the chance of failure due to improper distribution of the load

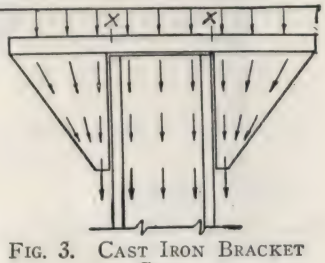


FIG. 3. CAST IRON BRACKET CAP
Cross section of a typical loose cast iron cap showing by means of arrows that only part of the load is distributed directly to the column, thereby causing failure by shear at the points marked "x." Load between points "x—x" is the only load carried by the column

Tests—This company has reports of a full line of tests from the United States Arsenal, which prove the efficiency, strength and enduring qualities of Lally columns. These will be mailed on application.

See Tables of Carrying Capacities and Fig. 8.

Carrying Capacities—For light columns see table below; for heavy weight columns see following page.

SAFE CARRYING CAPACITY OF LIGHT-WEIGHT LALLY COLUMNS
In tons of 2000 lbs.

Diam. of col., in.	Weight per foot, lbs.	Area of steel, sq. in.	Area of concrete sq. in.	Length in feet					
				6	7	8	9	10	11
				tons	tons	tons	tons	tons	tons
3½	13	1.27	8.35	10	10	9	9	8	.....
4	17	1.63	10.94	13	13	12	12	11	11

Lally Columns in Railroad Stations

Lally columns, through their ready application, possess many advantages in railroad station shelters.

Inquiries from interested persons along this line of construction will receive particular attention.

Correspondence solicited.

The accompanying illustration shows a connection wherein the brackets are inserted through the pipe and embedded into the concrete.

This type of construction permits a double flange tie, thus adding greatly to the strength of the brackets as well as making a rigid wind bracing.

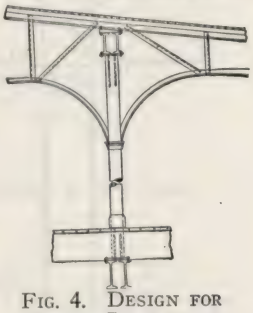


FIG. 4. DESIGN FOR LALLY COLUMN IN RAILROAD SHELTERS

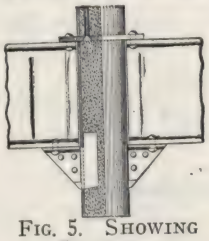


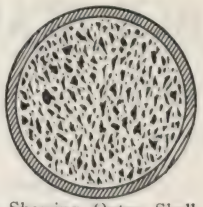
FIG. 5. SHOWING BRACKETS THROUGH PIPE

Continued on next page

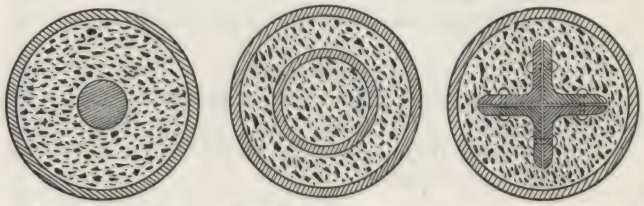
Reinforcements for Lally Columns

To meet various requirements, including the amount of load to be carried, Lally columns can be reinforced as shown in the accompanying illustrations.

In all cases the concrete is *compressed,* eliminating all air voids (Fig. 6).



Showing Outer Shell Filled with Compressed Concrete



Single Steel Bar Reinforcement — Pipe Reinforcement — Four Angle Iron Reinforcement

FIG. 6. SECTIONAL VIEWS SHOWING MANNER OF REINFORCEMENT OF LALLY COLUMNS

NOTE—The angle iron reinforcement above makes a compact fireproof column; column is designed so that load is carried by the 4 angle irons and concrete within radius of same; outer shell and outer concrete act as fireproofing, making a column practically indestructible

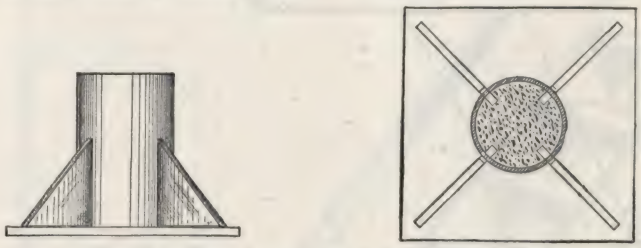
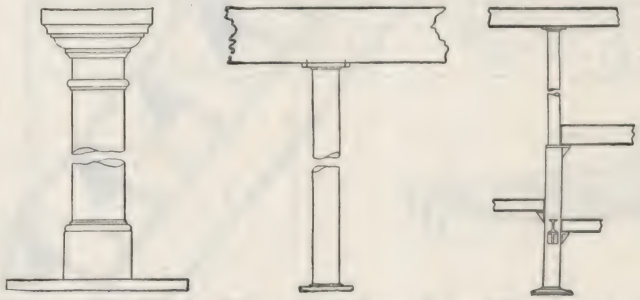


FIG. 7. NEW STEEL BUILT-UP COLUMN BASE

Column Bases

Method of attachment to Lally columns: Base consists of a steel bottom plate fastened to column with countersunk head bolts and 4 steel brackets, which are firmly fastened to column shaft through slots in same. A larger base and additional brackets can be used, determined by load and character of foundation.



Ornamental, for Exterior and Interior Work — Plain, with Ordinary Plate for Wood Beam Connection — With Beam Supports at Different Elevations

FIG. 8. VARIOUS TYPES OF LALLY COLUMNS

Safe Load Formula

The following formula may be used in computing the safe carrying capacity of light-weight and heavy-weight Lally Columns:

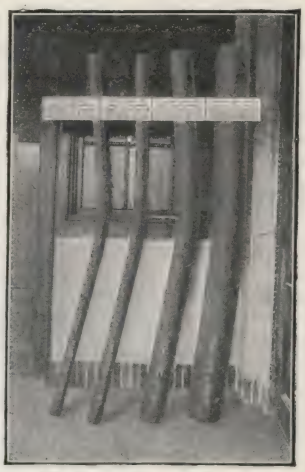
$$P = As\left(13{,}500 - 140\frac{L}{d}\right) + Ac\left(1{,}000 - 11\frac{L}{d}\right).$$

P = Safe carrying capacity in pounds.
As = Area of steel in square inches.
Ac = Area of concrete in square inches.
L = Length of column in inches.
d = Diameter of column in inches.

Lally Heavy Weight Columns

Manufactured in several sizes, diameters of which range from 3½ to 12¾ in. For sizes of steel bracket caps, plates, cast iron caps and bases (with other dimensions), carrying capacities, etc., see all tables hereunder.

Write for photographs showing Lally columns that stood erect in defiance of the ravages of the terrible fires in Chelsea and Salem, Mass.



A B C D

FIG. 10. FOUR LALLY COLUMNS (LIGHT AND HEAVY WEIGHT) TESTED BY THE WENTWORTH INSTITUTE, BOSTON, MASS.

Without any solicitation
See table at left

LALLY COLUMN TEST (FIG. 10)

Column	Length ft.	Diam., in.	Safe Load, tons	Failure at tons
LIGHT WEIGHT				
A	8	3	6	22
C	8	6	27	110
HEAVY WEIGHT				
B	8	3½	11	40
D	8	8⅝	72	330

LALLY HEAVY WEIGHT COLUMNS

Col. diam., in	Steel bracket caps				Area metal section, sq. in.	Area concrete section, sq. in.	Size of cast iron cap, in.	Size of cast iron base, in.
	1-way	2-way	3-way	4-way				
3½	4x 8x1½	4x12x1½	8x12x1½	12x12x1½	2.23	7.38	6x 8x ½	6x 8x ½
4	6x 8x1½	6x12x1½	8x12x1½	12x12x1½	2.68	9.88	8x 8x ⅝	8x 8x ⅝
4½	6x 9x1½	6x14x1½	9x14x1½	14x14x1½	3.17	12.73	8x 8x ¾	8x 8x ¾
5	6x10x⅝	8x15x⅝	10x15x⅝	15x15x⅝	3.67	15.96	10x10x ¾	10x10x ¾
5½	6x10x⅝	8x15x⅝	10x15x⅝	15x15x⅝	4.32	19.98	10x10x ¾	12x12x1
6⅝	8x12x⅝	10x17x¾	12x17x¾	17x17x¾	5.58	28.88	10x14x1	16x16x1¼*
7	8x14x¾	10x18x¾	14x18x¾	18x18x¾	6.92	38.72	12x14x1¼	18x18x2*
8⅝	10x15x¾	10x20x¾	15x20x¾	20x20x¾	8.40	50.02	12x14x1½	20x20x2¼*
9⅝	10x16x¾	10x22x¾	16x22x¾	22x22x¾	10.04	62.72	Special	22x22x3*
10¾	12x17x¾	12x24x¾	17x24x¾	24x24x¾	11.94	78.82	Special	24x24x3*
12¾	13x19x¾	13x24x¾	19x24x¾	24x24x¾	14.59	113.09	Special	Special

*Beveled

*Steel bracket caps any size and shape to meet any and all requirements.

SAFE CARRYING CAPACITY OF HEAVY WEIGHT LALLY COLUMNS

In tons of 2000 lbs.

Diam. of col., in.	Weight per foot, lbs.	Area of steel, sq. in.	Area of concrete, sq. in.	Length in ft.							
				6 tons	8 tons	10 tons	12 tons	14 tons	16 tons	18 tons	20 tons
3½	15	2.23	7.39	15	13	12	11	.....	.....	.....	.....
4	20	2.68	9.80	19	17	16	14	13	.....	.....	.....
4½	24	3.17	12.73	23	22	20	18	17	.....	.....	.....
5	29	3.69	15.95	28	26	25	23	21	20	.....	.....
5½	36	4.30	20.01	34	32	30	28	27	25	23	.....
6⅝	49	5.58	28.89	46	44	42	40	38	36	34	32
7⅞	64	6.93	38.74	60	57	55	53	51	49	46	44
8⅝	81	8.40	50.03	74	72	70	67	65	63	60	58
9⅝	100	9.97	62.79	91	88	85	82	80	78	75	73
10¾	123	11.91	78.86	111	109	106	103	100	97	95	92
12¾	169	14.58	113.10	146	143	139	136	133	130	127	124

A Few Reasons for Specifying Lally Columns

A full line of tests. Special machinery for making Lally columns. Lally steel beam connections are more reliable than cast iron. Not one accident caused by Lally columns in hundreds of thousands of installations during 21 years. Furnished in less than one-quarter the time required for cast iron or steel make-up columns —a *large saving of time and money.*

References

The names and addresses of the principal purchasers and satisfied users of Lally columns will be furnished on request.

THE BESSLER MOVABLE STAIRWAY CO.

AKRON, OHIO

Product

The Bessler Ceiling-suspended Folding Stairway.

Description

The Bessler ceiling-suspended folding stairway is a substantial, sightly and practical flight of stairs for one- or two-story residences, and other types of buildings, providing proper stair access to an upper floor when desired, and leaving clear the floor space ordinarily occupied by stairs when that is wanted. While not in use, the stair folds into the ceiling out of the way.

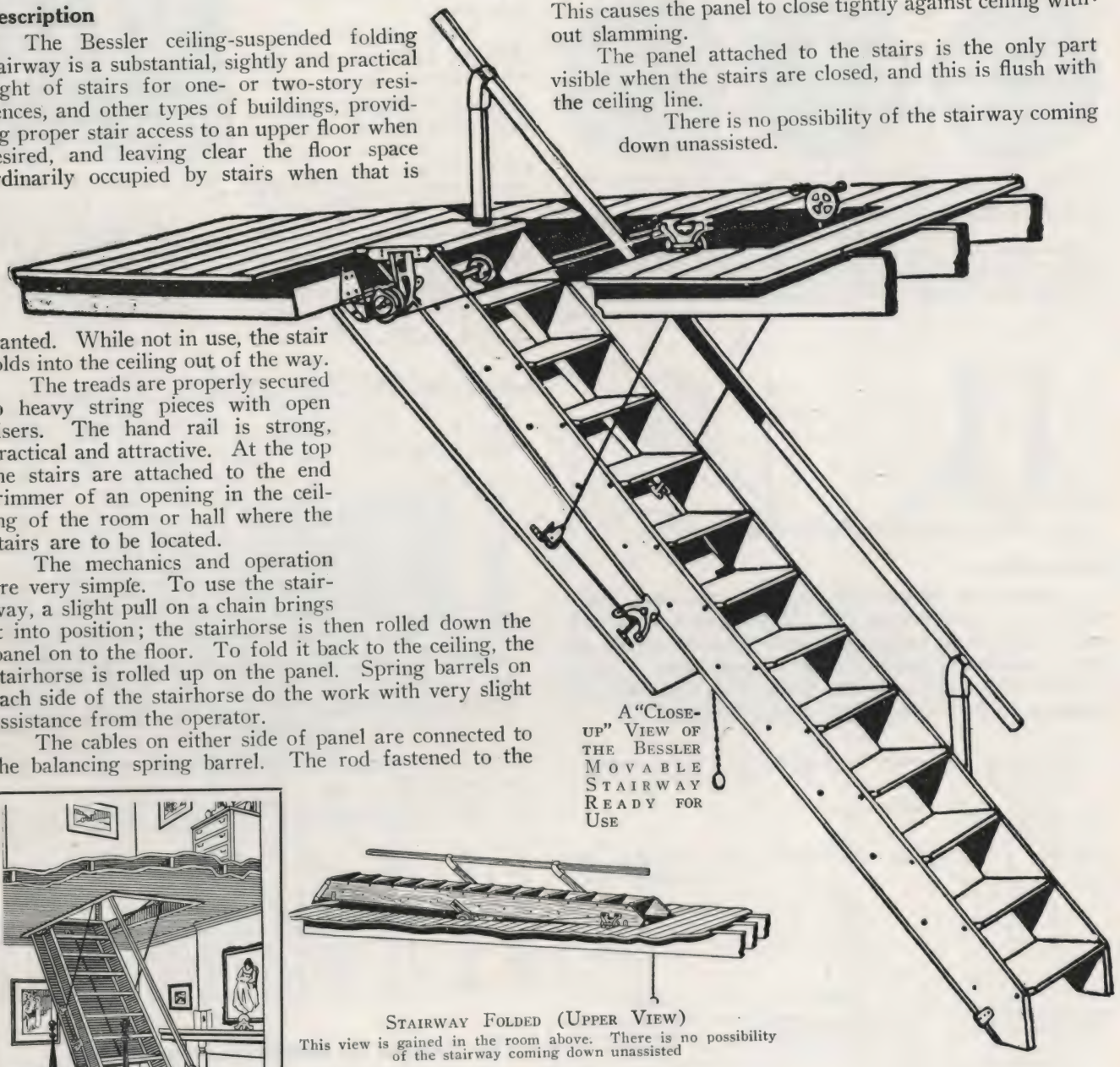
The treads are properly secured to heavy string pieces with open risers. The hand rail is strong, practical and attractive. At the top the stairs are attached to the end trimmer of an opening in the ceiling of the room or hall where the stairs are to be located.

The mechanics and operation are very simple. To use the stairway, a slight pull on a chain brings it into position; the stairhorse is then rolled down the panel on to the floor. To fold it back to the ceiling, the stairhorse is rolled up on the panel. Spring barrels on each side of the stairhorse do the work with very slight assistance from the operator.

The cables on either side of panel are connected to the balancing spring barrel. The rod fastened to the inside of the panel is the equalization-bar. Its function is to equalize the pull, regardless of the position of the stairway. This is accomplished by pulleys fastened to cables and which move forward as the stairway goes up. This causes the panel to close tightly against ceiling without slamming.

The panel attached to the stairs is the only part visible when the stairs are closed, and this is flush with the ceiling line.

There is no possibility of the stairway coming down unassisted.



A "Close-up" View of the Bessler Movable Stairway Ready for Use

Stairway Folded (Upper View)
This view is gained in the room above. There is no possibility of the stairway coming down unassisted

Interior of Bungalow Showing Bessler Stairway
A room, otherwise inaccessible, was thus virtually added to this bungalow

Stairway Folded (Lower View)
Nothing visible but this neat panel. Panel furnished in pine, birch or oak

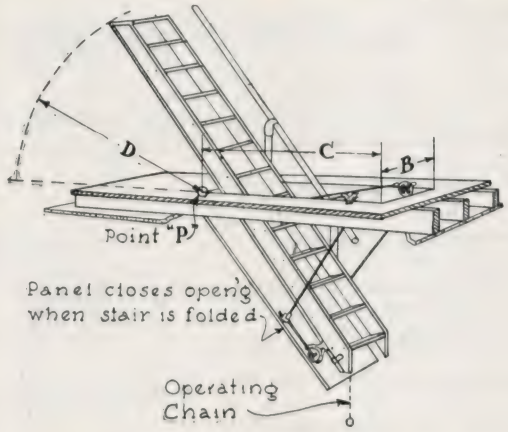
Guarantee

We absolutely guarantee the Bessler movable stairway to be all we claim.

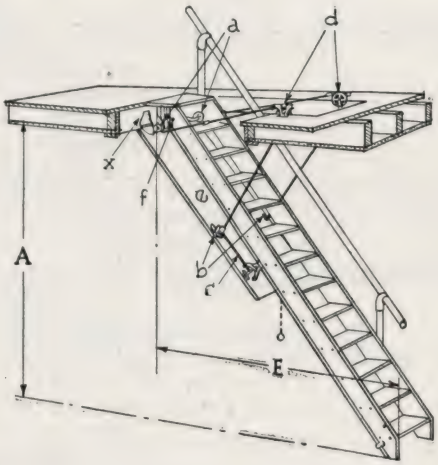
Estimates

Prices and literature furnished on request.

Continued on next page



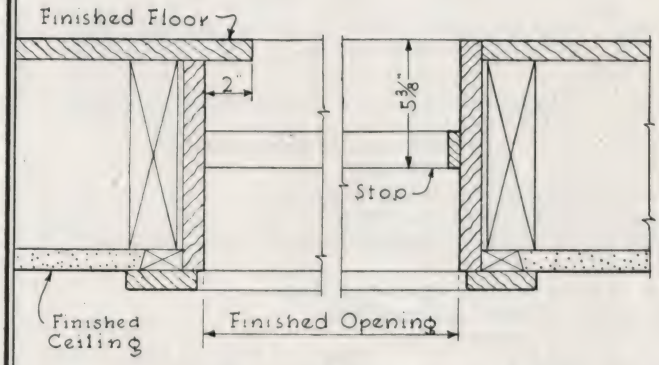
STAIRWAY PARTLY DOWN ON PANEL



KEY

a - Spring Barrels
b - Cable Holders
c - Equalizing Bars
d - Pulley Brackets
e - Stair Panel
f - Lugs
x - Trimmer

STAIRWAY IN POSITION FOR USE



NOTE- Jambs to extend full depth of opening as shown.

1½" SCALE SECTION THRU STAIR OPENING

TABLE OF DIMENSIONS FOR VARIOUS CEILING HEIGHTS

A HEIGHT OF CEILING FROM FINISHED FLOOR BELOW	B WIDTH OF FINISHED OPENING BETWEEN JAMBS.	C LENGTH OF FINISHED OPENING BETWEEN JAMBS.	D DIMENSION FROM UPPER END OF STAIR-HORSE TO POINT "P"	E DISTANCE FROM FRONT EDGE OF STAIR-HORSE TO FINISHED JAMB.
7' - 0"	2' - 6"	5' - 10"	4' - 5"	6' - 8"
7' - 6"	2' - 6"	5' - 10"	4' - 11"	7' - 0"
8' - 0"	2' - 6"	5' - 10"	5' - 4"	7' - 4"
8' - 6"	2' - 6"	6' - 0"	5' - 8"	7' - 7"
9' - 0"	2' - 6"	6' - 4"	6' - 1"	8' - 1"
9' - 6"	2' - 6"	6' - 8"	6' - 6"	8' - 5"
10' - 0"	2' - 6"	6' - 11"	6' - 11"	8' - 9"
10' - 6"	2' - 6"	7' - 3"	7' - 1"	9' - 1"
11' - 0"	2' - 6"	7' - 6"	7' - 6"	9' - 7"
11' - 6"	2' - 6"	7' - 9"	7' - 10"	9' - 11"
12' - 0"	2' - 6"	8' - 1"	8' - 1"	10' - 3"
12' - 6"	2' - 6"	8' - 4"	8' - 4"	10' - 7"
13' - 0"	2' - 6"	8 - 8"	8' - 8"	10' - 10"
13' - 6"	2 - 6"	9' - 0"	8' - 11"	11' - 2"
14' - 0"	2' - 6"	9' - 3"	9' - 3"	11' - 5"
14' - 6"	2' - 6"	9' - 6"	9' - 7"	11' - 9"
15' - 0"	2' - 6"	9' - 9"	9' - 10"	12' - 0"
15' - 6"	2' - 6"	10' - 1"	10' - 2"	12 - 4"
16' - 0"	2' - 6"	10' - 5"	10' - 6"	12 - 7"

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DIMENSIONS, AND DETAILS SHOWING OPERATION OF THE BESSLER MOVABLE STAIRWAY	SCALE - 1½" EQUALS 1'-0" DATE - SEPT '21	DRWG 1

BOIS PATENTED INTERLOCKING STEEL STAIR CO.

2846 California Street
SAN FRANCISCO, CAL.

MANUFACTURED IN THE UNITED STATES AND CANADA BY THE FOLLOWING COMPANIES

FOR NEW YORK, NORTHERN NEW JERSEY, WEST VIRGINIA, KENTUCKY
Riser and Moulding Co., Inc., Thomas Street and Stewart Avenue, Brooklyn, N. Y.

FOR PENNSYLVANIA, SOUTHERN NEW JERSEY, MARYLAND, DELAWARE, DISTRICT OF COLUMBIA
McFarland-Meade Co., 70th Street and Kinsessing Avenue, Philadelphia, Pa.

FOR ILLINOIS, WISCONSIN, IOWA
Wetzel Iron Works, 3348 West Grand Avenue, Chicago, Ill.

FOR NEW ENGLAND STATES
E. Van Noorden & Co., 100 Magazine Street, Boston, Mass.

FOR OHIO, MICHIGAN, INDIANA
Riester & Thesmacher, 1512 West 25th Street, Cleveland, Ohio

FOR MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA
Thomas Finn, 50 West 10th Street, St. Paul, Minn

FOR OREGON
Columbia Wire & Iron Works, East 8th and Market Streets, Portland, Ore.

FOR NORTHERN CALIFORNIA
United States Metal Products Co., 555 10th Street, San Francisco, Cal.

FOR QUEBEC, NEW BRUNSWICK, ONTARIO, NOVA SCOTIA, PRINCE EDWARD'S ISLAND
Geo. W. Reed & Co., 37 St. Antoine Street, Montreal, Que.

FOR MANITOBA, SASKATCHEWAN, ALBERTA
Vulcan Iron Works, Winnipeg, Man.

FOR WASHINGTON, IDAHO, MONTANA
Western Iron & Wire Works, east end of 11th Avenue Bridge, Tacoma, Wash.

FOR GEORGIA, TENNESSEE, FLORIDA, VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA
Dowman-Dozier Manufacturing Co., Camplton Road, Atlanta, Ga.

FOR TEXAS
Southern Wire & Iron Co., Dallas, Tex.

FOR KANSAS, NEBRASKA, OKLAHOMA
Paxton & Vierling Iron Works, South 17th Street and Union Pacific Ry., Omaha, Nebr.

FOR COLORADO, UTAH, WYOMING, NEW MEXICO
Midwest Steel & Iron Works, 32nd and Blake Streets, Denver, Colo.

FOR SOUTHERN CALIFORNIA, ARIZONA, HAWAII
Bayer-Rothgeb Co., Slauson and Santa Fé Avenues, Los Angeles, Cal.

FOR MISSOURI
Lasar Manufacturing Co., 16th and O'Fallon Streets, St. Louis, Mo.

FOR ALABAMA, LOUISIANA, MISSISSIPPI, ARKANSAS
Decatur Cornice and Roofing Co., Albany, Ala.

FOR BRITISH COLUMBIA
Westminster Iron Works, New Westminster, B. C.

Products

Bois Patented Interlocking Steel Treads and Risers.

Patents

United States: 1244021, 1304533; Canadian: 194134, 194135; French: 501494.

Patents pending in Great Britain and Belgium.

Bois Patented Interlocking Steel Treads and Risers

These interlocking treads and risers can be used in connection with any type of cast iron or steel stringer and the patented interlocking feature along the nosing line does away with the bolting and riveting in the ordinary type of stair work and speeds up the erection.

The double thickness of metal in the interlocking treads and risers affords ample support under the heaviest traffic. The interlocking treads and risers used in conjunction with the best steel stringer (drawing No. 1) make a stairway that is strong and rigid. A tie rod under each tread forms a truss construction that will hold the stair to line under the heaviest use.

These stairs can be assembled at the factory and shipped ready for installation as the building progresses, eliminating temporary stairs or ladders.

The interlocking treads and risers are made to receive marble, slate, cement, composition, asphalt or safety treads of any kind and make a fireproof stairway. The details of stringer construction can be made to suit the architectural requirements of the building.

Expanded metal, to receive plaster, can be easily applied to the soffit of stairs by using the bolts that connect treads and risers to lower flanges of stringers.

The Bois stairs were tested and approved by the Bureau of Buildings, New York City, Oct. 27, 1909 and by the Building Department, Boston, July 8, 1921 and were found to safely carry a load of 300 lbs. per sq. ft.

Specifications

All metal stairs throughout the building shall be of the Bois Interlocking Tread and Riser construction, type (see sheet No. 1), with No. 10 gauge steel stringers connected by tie rods under each tread, with ornamental moulding on top and bottom, all as shown on plans.

Each tread and riser shall be in a continuous piece with interlocking connections along the nosing line and shall be of No. 12 or No. 14 gauge sheet steel, securely fastened to stringers with ⅝-in. bolts.

Platforms or landings shall be of No. 14 gauge corrugated steel plates, of sizes shown, with interlocking nosing for connection with riser and shall be securely fastened to angle iron supports connected to stringers.

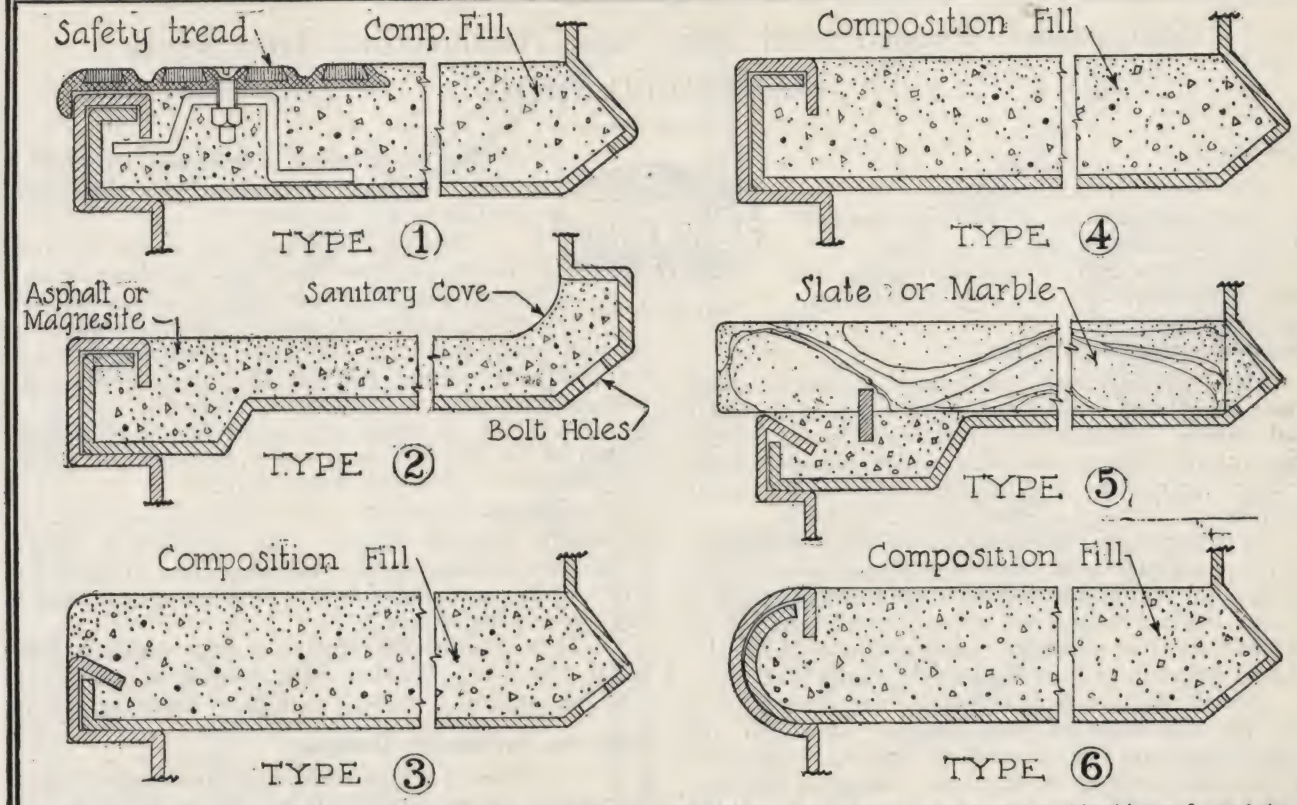
Newels and railing to be of design and construction as indicated on plans.

All work to have 1 shop coat of approved paint.

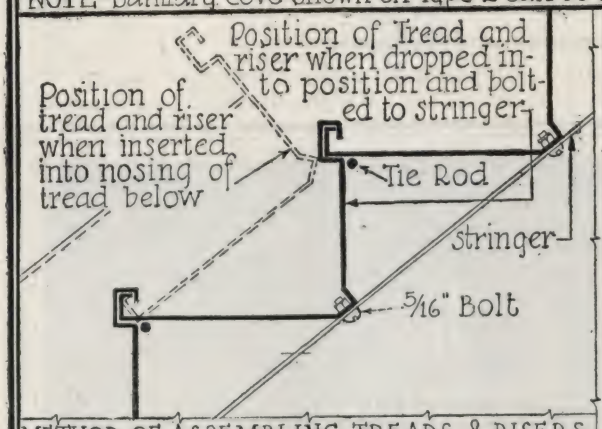
Information and Prices

Ask the nearest office for information and prices, stating number of risers, width, type of stringer and nature of tread.

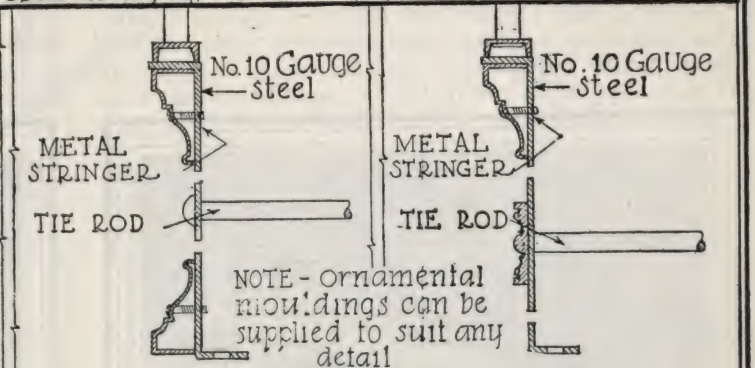
Continued on next page



6 IN SCALE DETAILS OF VARIOUS TYPES OF INTERLOCKING TREADS & RISERS
NOTE-Sanitary cove shown on Type 2 can be used on any type shown and prevents cracking at corner



METHOD OF ASSEMBLING TREADS & RISERS



3 IN SCALE DETAILS OF METAL STRINGERS

APPROXIMATE WEIGHT OF BOIS INTERLOCKING TREADS AND RISERS WHEN THE SUM OF THE TREAD AND RISER DOES NOT EXCEED 18 IN

WIDTH OF STAIRS	SQ. FT. OF METAL IN ONE INTERLOCKING TR. & RISER	WEIGHT OF ONE INTERLOCKING TREAD AND RISER			WEIGHT OF ONE INTERLOCKING TR. & RISER INCLUDING 10 GA. FACE & WALL STRINGERS					WEIGHT OF TIE RODS FOR ONE INTERLOCKING TR. & RISER		
					WT. OF STRINGERS 12 LB. = 1 TR. & RISER 12 IN. GIRT			WT. OF STRINGERS 15 LB. = 1 TR. & RISER 15 IN. GIRT				
		NO. 12 GA.	NO. 14 GA.	NO. 16 GA.	NO. 12 GA.	NO. 14 GA.	NO. 16 GA.	NO. 12 GA.	NO. 14 GA.	3/8" DIAM.	7/16" DIAM.	1/2" DIAM.
2'-0"	4 sq. feet	18.0 lbs.	12.8 lbs.	10.4 lbs.	30.0 lbs.	24.8 lbs.	22.4 lbs.	33.0 lbs.	27.8 lbs.	.75 lbs.		
2'-6"	5 " "	22.5 "	16.0 "	13.0 "	34.5 "	28.0 "	25.0 "	37.5 "	31.0 "	1.00 "		
3'-0"	6 " "	27.0 "	19.2 "	15.6 "	39.0 "	31.2 "	27.6 "	42.0 "	34.2 "	1.25 "		
3'-6"	7 " "	31.5 "	22.4 "		43.5 "	34.4 "		46.5 "	37.4 "		1.6 lbs.	
4'-0"	8 " "	36.0 "	25.6 "		48.0 "	37.6 "		51.0 "	40.6 "		2.1 "	
4'-6"	9 " "	40.5 "	28.8 "		52.5 "	40.8 "		55.5 "	43.8 "			3.1 lbs.
5'-0"	10 " "	45.0 "	32.0 "		57.0 "	44.0 "		60.0 "	47.0 "			3.4 "
5'-6"	11 " "	49.5 "			61.5 "			64.5 "				3.8 "
6'-0"	12 " "	54.0 "			66.0 "			69.0 "				4.2 "

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	TYPICAL DETAILS SHOWING CONSTRUCTION OF BOIS PATENTED INTERLOCKING TREADS AND RISERS	SCALE 6" & 3" EQUALS 1 FT DATE JUNE 20	DRWG 1

THE HUGHES-KEENAN CO.

Safety-Lock Pressed Steel Stairs and Architectural Iron Work

MANSFIELD, OHIO

Products

FIREPROOF STEEL STAIRS.

Also manufacturers of Fire Escapes and Architectural Iron Work.

For Hygea Steel Toilet Partitions, see pages 1560-1561.

TRADE-MARK

Hughes-Keenan Steel Stairs

The Hughes-Keenan steel stairs (patent pending) consist of Safety-Lock treads and risers with safety tread nosing construction, interlocked pressed steel stringers and baluster mounting which permits adjustment for maintaining the balusters in vertical position regardless of the pitch of the stairs. See details.

In presenting a safety-locking pressed steel tread and risers together with their interlocking pressed steel stringers for stair construction, THE HUGHES-KEENAN Co. has really brought out a product of considerable merit and one that eliminates many of the objectionable features found in pressed steel stair construction.

Special attention is directed to the safety nosing with this new type of construction. Architects and builders have long felt the need of a product embodying a safety stair construction at a lower cost than has heretofore been possible. In this construction we accomplish this very desirable feature.

Safety-Lock Treads and Risers—Consist of steel riser and tread members interlocked at nosing, secured firmly to the stringers and reinforced by tie rods, one to each step, which run under the angle of nosings from stringer to stringer. The treads are made to receive cement, composition or asphalt tread surfaces.

Nosings—Nosings are made in plain design, as shown in details on the following page, and also with safety or non-slipping tread, which will tend to prevent accident to the user of the stairs, the nose piece also acting as a lock for positively holding together the tread member and riser and avoiding any displacement thereof.

Two types of the safety or non-slipping tread are shown on the following page and in each type the nosing is removable to allow for replacement.

Stringers—Stringers are formed of two sections or sheets, secured together with interlocking flanges which provide seats for the stair risers and treads and to which are secured the balusters which are adjustable to any pitch of the stringer.

The assembled stair forms a mass which is practically free from vibration under loading stress.

Installation—Shipped complete, ready to set up.

Stairs to Architect's Designs

In addition to the patented stair construction manufactured by us, we are in a position to furnish steel stair construction of many designs and to meet all architects' requirements.

Information and Estimates

For information and estimates, write THE HUGHES-KEENAN CO., Mansfield, Ohio.

EXAMPLES OF ARCHITECTURAL IRON WORK EXECUTED BY THE HUGHES-KEENAN CO.

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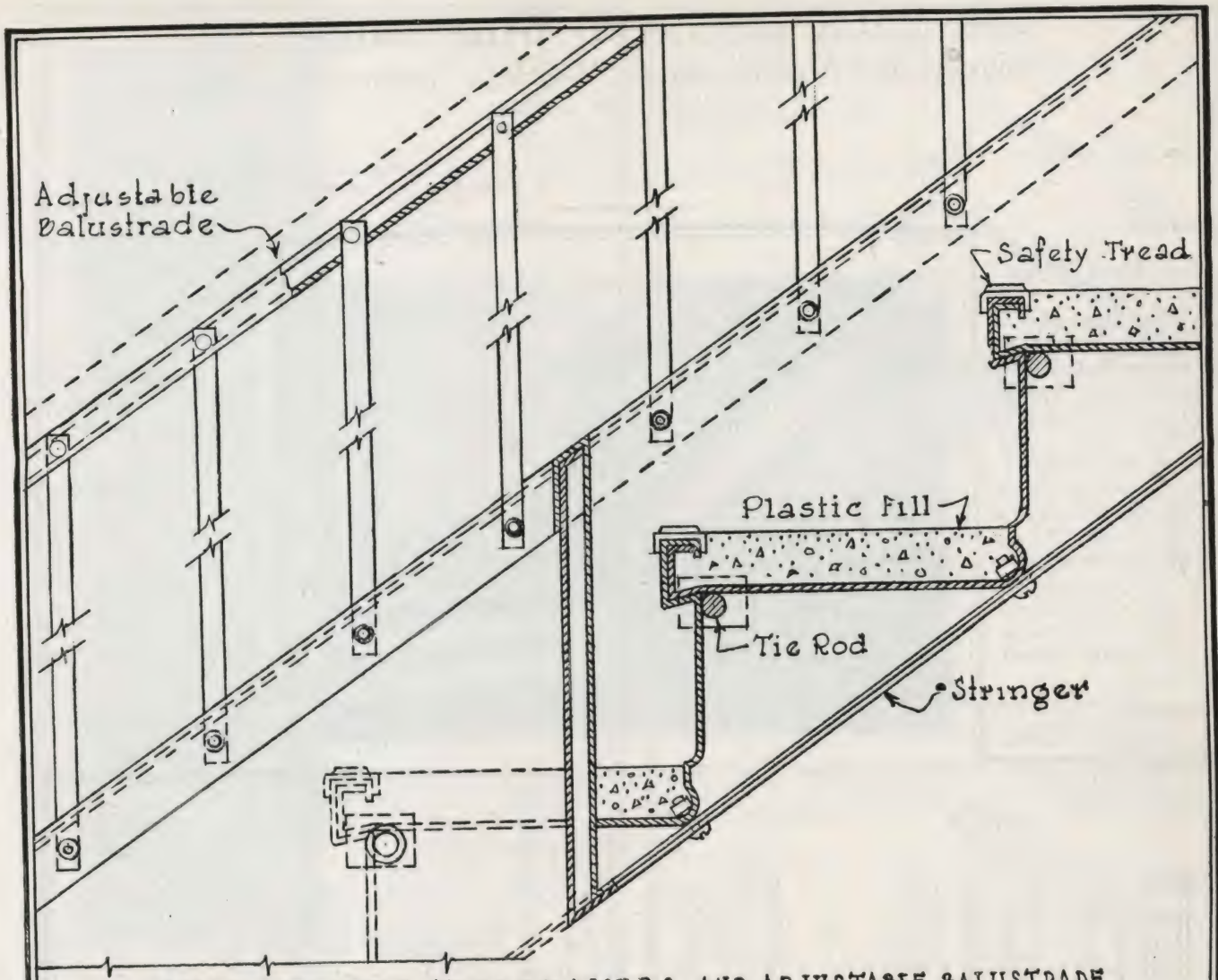
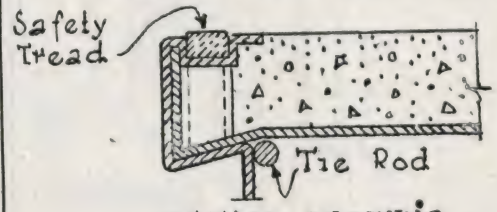
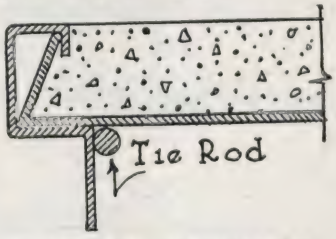


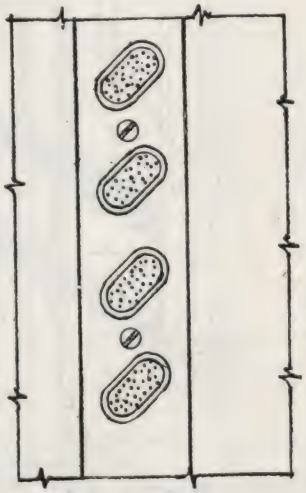
DETAIL SHOWING TREADS RISERS AND ADJUSTABLE BALUSTRADE



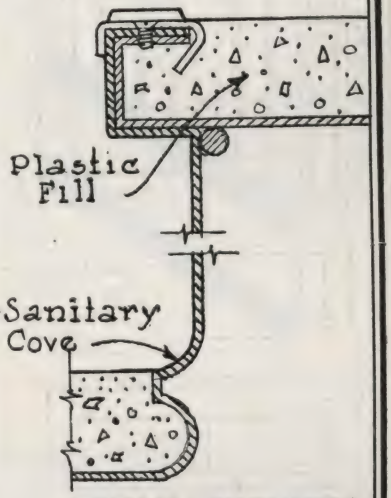
DETAIL SHOWING NOSING WITH SAFETY TREAD



DETAIL SHOWING PLAIN NOSING



PLAN OF SAFETY TREAD NOSING



DETAIL SHOWING TREAD AND RISER

DRAWN BY SWEETS CATALOGUE SERVICE INC.	DETAILS OF THE HUGHES-KEENAN STEEL STAIRS	NOT DRAWN TO SCALE	DRWG 1

JOHN D. MACK, PRESIDENT — H. V. FREEMAN, SECRETARY

THE MACK IRON AND WIRE WORKS CO.

Designers and Manufacturers "Maciron" Stairs and Products

SANDUSKY, OHIO

REPRESENTATIVES

COLUMBUS, OHIO, W. R. EDMISTER & Co., 209 S. High Street — DAYTON, OHIO, J. G. POOL Co., Schwind Building
INDIANAPOLIS, IND., W. R. EDMISTER & Co., 1413 Merchants Bank Building

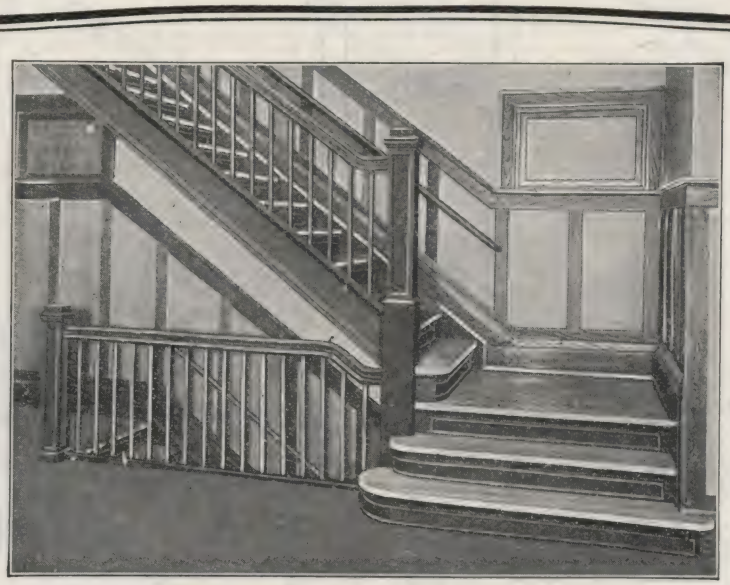
Products

ORNAMENTAL IRON WORK, including:

Iron Stairs, Spiral Stairs, Steel Ladders, Ornamental Railings, Pipe Railings, Bridge Railings, Fire Escapes, Folding Gates, Area Grating, Steel Window Guards, Grilles, Wire Partitions, Sidewalk Doors, Steel Doors, Clean-out Doors, Coal-hole Covers, Jail and Cell Work, Marquises, Iron and Brass Thresholds, Steel Settees.

Location

Sandusky, Ohio.



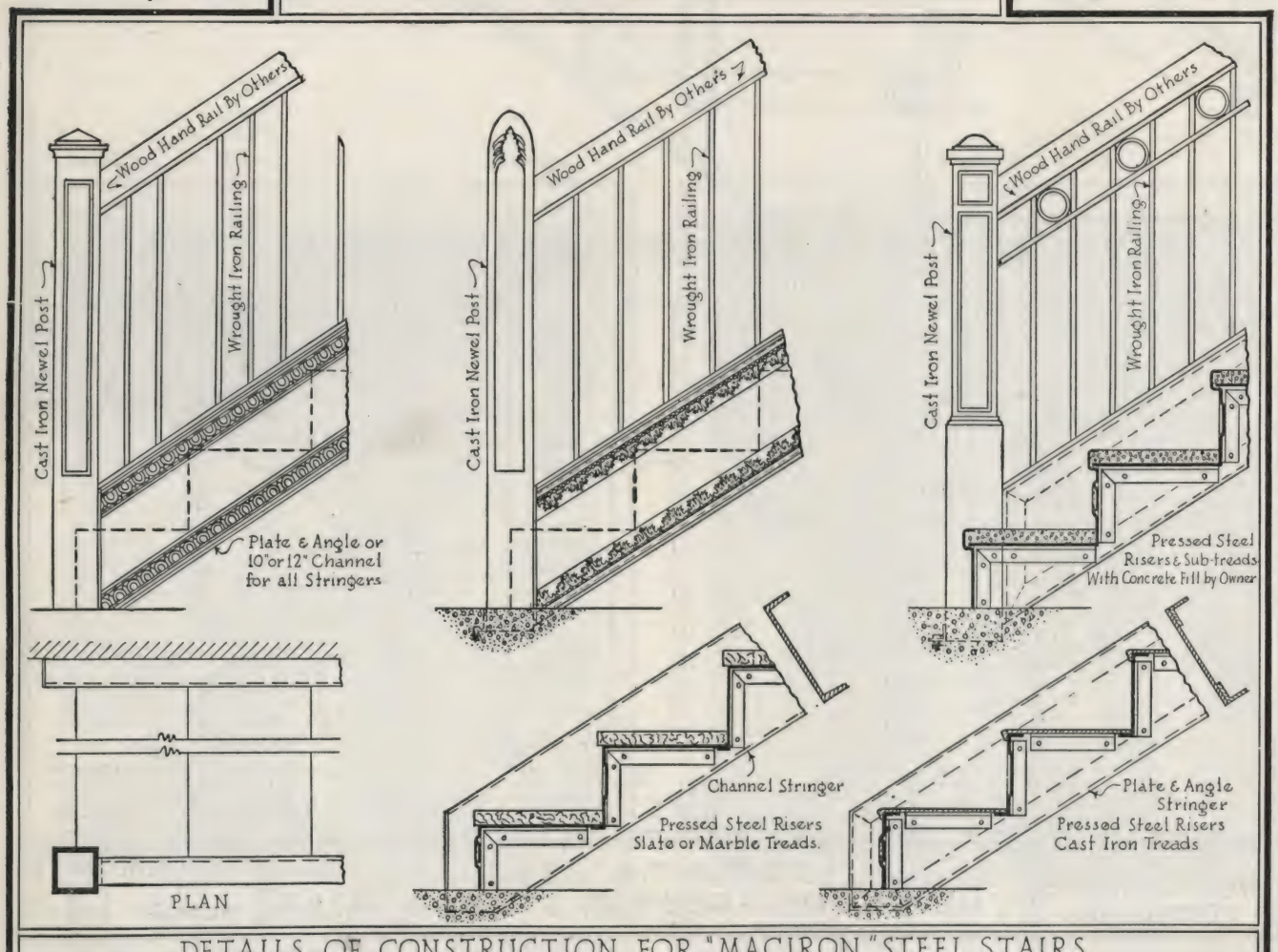
In the heart of the great industrial belt of the Middle West.

Transportation

Five great railroads, two electric lines and boat connections for all lake points.

Facilities

The "Maciron" shop is well equipped with modern and up-to-date machinery guaranteeing the production of accurate work at lowest cost. A competent designing and engineering force is prepared to submit designs and quotation on requirements.



DETAILS OF CONSTRUCTION FOR "MACIRON" STEEL STAIRS.

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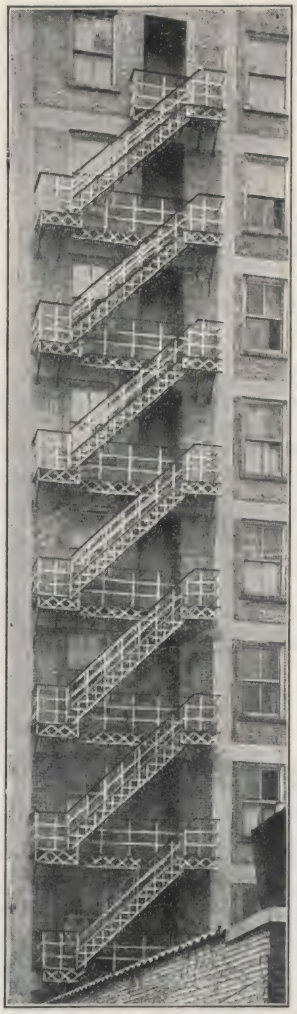
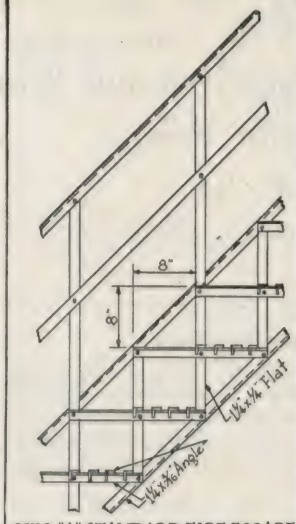
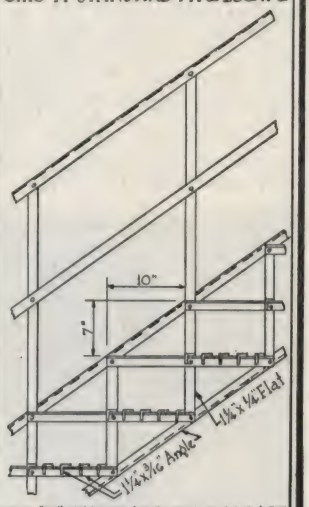
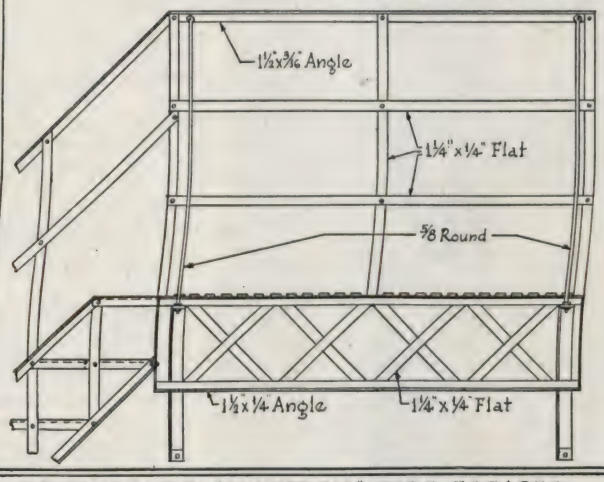




OHIO "A" STANDARD FIRE ESCAPE

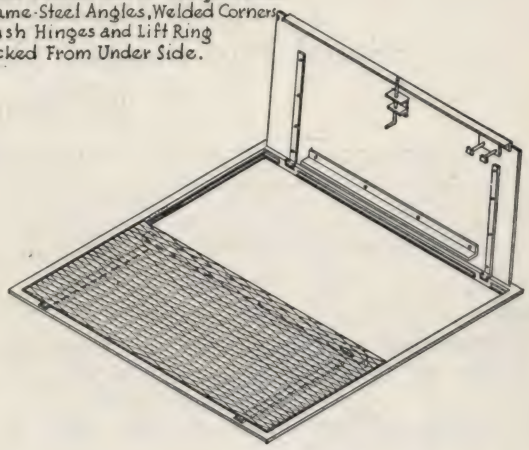


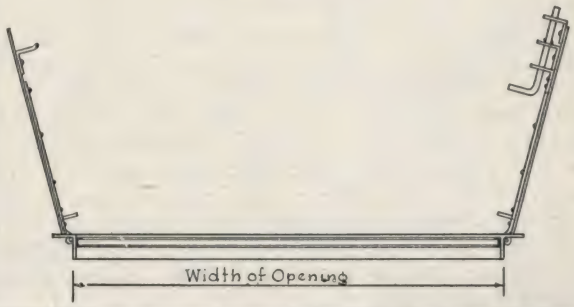
OHIO "B" STANDARD FIRE ESCAPE



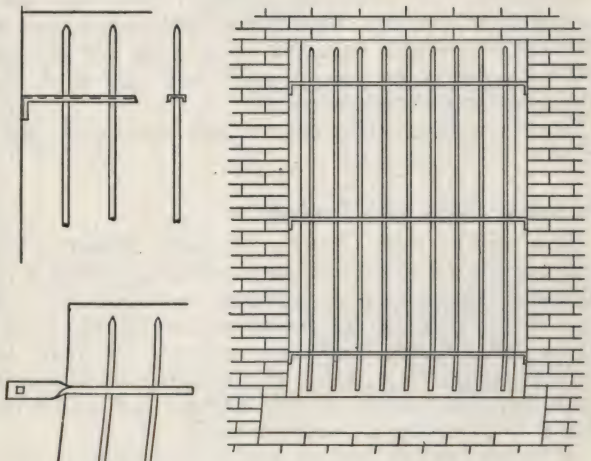
DETAILS OF "MACIRON" FIRE ESCAPES

Door-Diamond Checkered Steel
Plates Reinforced with Angle Irons.
Frame-Steel Angles, Welded Corners
Flush Hinges and Lift Ring
Locked From Under Side.





DETAILS OF "MACIRON" SIDE WALK DOOR



DETAILS OF "MACIRON" WINDOW GUARDS

STANDARD "A" OHIO FIRE ESCAPES

Platform, ft.-in.	3-10 and 1-10 wide
Stairs, ft.	2 wide
Rise, in.	8
Tread, in.	8

STANDARD "B, C & D" OHIO FIRE ESCAPES

Platforms, ft.-in.	3-10 or 6-0
Stairs, ft.-in.	3-6 wide
Rise, in.	7
Tread, in.	10

"MACIRON" SIDEWALK DOOR

Plate, ft.-in.	3-16, 1-4, 5-16 or 3-8
	Diamond checkered steel plate

"MACIRON" WINDOW GUARDS

Vertical bars (round), in. on centers	½ or ⅝
Horizontal cross bars (channel or flat), in.	1½ or 2

THE DOW CO.

INCORPORATED

Spiral Fire Escapes, Ornamental Iron and Wire Work

209 North Buchanan Street

LOUISVILLE, KY.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

Manufacturers of FIRE ESCAPES, ORNAMENTAL IRON WORK for Buildings, ELEVATOR ENCLOSURES and CABS.

Also Grille and Cage Work for Banks; Wire Work; Coalhole Covers and Rings; Bronze Elevator Doors, Bronze and Iron Entrance Doors, Cast Iron Sidewalk Doors; Elevating and Conveying Machinery, Inclined Automatic Elevators; Wire Stock and Tool Room Enclosures; Fencing of Iron, Wire, and Woven Wire; Folding and Expansion Gates, Iron and Bronze Gates (plain and ornamental); Gratings (sidewalk, area, etc.); Door and Window, Skylight, Machinery, and Belt Wire Guards, Screen Door Guards and Grilles; Brass, Copper, and Iron Ladders; Marquises; Wire Netting and Partitions; Cast Iron and Bronze Railings, Pipe Railings; Wire Signs; Bronze and Iron Stairs, Spiral Stairs; Wrought Iron Work.

Miscellaneous Metal Work

THE DOW CO. makes all kinds of iron work and wire work for buildings, both ornamental and plain, and specializes on elevator cabs and enclosures, fire escapes of all kinds, heavy wire work, grille and cage work for banks and heavy sheet iron work.

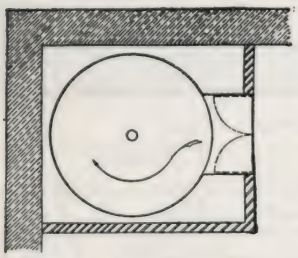
Comprehensive catalogues on each subject are published for those interested.

Dow Spiral Slide Fire Escapes

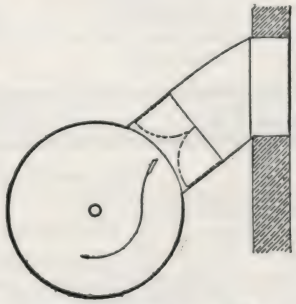
This escape, made entirely of steel, consists of a smooth galvanized spiral slide enclosed in a cylinder 5 ft. in diameter, equipped with automatic entrance and exit doors. It rests on its own foundation and does not depend on the building walls for support. It may be erected either on the exterior of a building, as shown in the accompanying illustration, or incorporated within the walls of the building as detailed below.

Advantages—It has no steps; consequently there is no stumbling or falling.

Being wholly enclosed, it is impossible for rain or snow, smoke or fire to enter.



ENTRANCE TO DOW FIRE ESCAPE—INTERIOR INSTALLATION



ENTRANCE TO DOW FIRE ESCAPE—EXTERIOR INSTALLATION

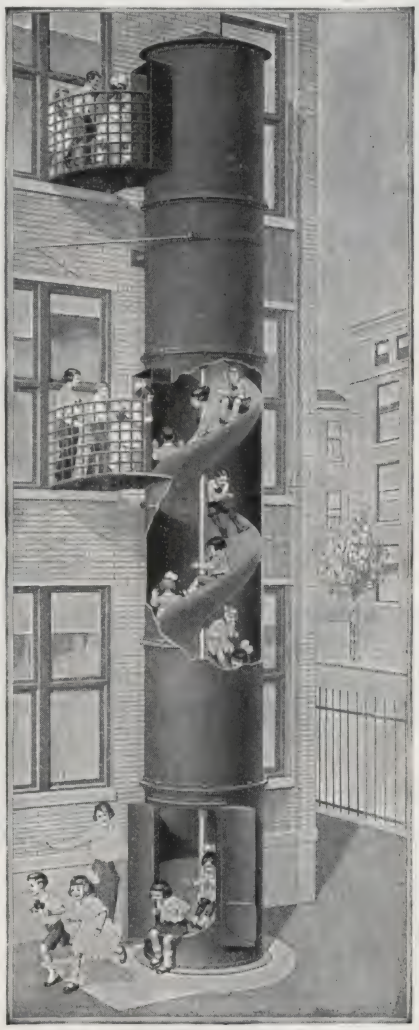
Specifications

The fire escape shall be the Dow Spiral Slide made by THE Dow Co., Louisville, Ky., or equal. It shall be placed on a concrete foundation.

The escape proper shall be entirely of steel, 5 ft. diameter, placed as shown on plans, and shall have one entrance at each floor above the first.

The cylinder shall be of No. 12 U. S. Standard gauge sheet steel, for the first 18 in.; the next 6 ft. of No. 14 gauge, and the remainder of No. 16. The spiral slide shall be of No. 16 gauge galvanized sheet securely attached to a center core of 3-in. inside diameter standard black pipe. Runway floors shall be of perforated sheet steel not less than No. 14 gauge on suitable angle framing and protected on each side by wrought iron lattice railing 3 ft. 8 in. high.

An enclosed vestibule with water drain in floor shall be provided at each entrance with entrance doors in two leaves each, arranged to swing in, and provided with torsion springs of phosphor bronze. Doors shall be set away from cylinder far enough to clear same when swung open.



THE DOW FIRE ESCAPE INSTALLED ON THE EXTERIOR OF A BUILDING

Exit doors shall be in two leaves opening outward and provided with brass automatic inside latch with touch-plate to operate by the pressure of the smallest child.

The entire escape shall be manufactured in assembled sections about 7 ft. high, with an angle ring at the top and bottom of each section, shall be set up at the factory to insure proper fitting, and each section properly marked to correspond with a setting diagram to be furnished by manufacturers. There shall be no projections of any sort on the upper surface of slide; all rivets being recessed and all edges of sheets ground smooth.

Entire escape except slide, which is galvanized, shall have one coat of best mineral paint at factory, and sufficient additional paint furnished to give a second coat after erection.

THE RIESTER & THESMACHER COMPANY

Manufacturers and Erectors of Steel Stairways

1512-1526 West 25th Street

CLEVELAND, OHIO

Products

BOIS INTERLOCKING STEEL STAIRWAYS.

Also Fireproof Windows and other structural materials in Sheet Metal.

For Hollow Metal Fireproof Doors and Partitions, see page 691.

Advantages of Bois Steel Stairway

The Bois steel stair offers distinctive advantages of economy, rigidity, rapid erection and adaptability to any desired tread material owing to its simple, interlocking method of installation.

Description—Tread and riser, combined, are formed from a single sheet of steel, with flanges that interlock at the nosing line, producing a reinforced edge that is always straight, horizontally.

Gage of metal varies with width of stair and weight to be carried.

Labor Saving Installation

Interlocking feature dispenses with all riveting and makes rapid installation possible with unskilled labor.

Advantages During Construction

Stair erection can be kept nearly abreast of steel frame construction, dispensing with use of ladders during ensuing operations and promoting safety and efficiency of workmen.

Delivered or Erected

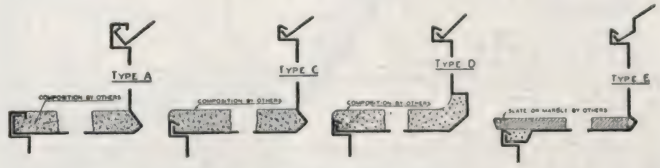
Stair material will be delivered by us f. o. b. building, or erected by our construction department, as desired.

Inquiries

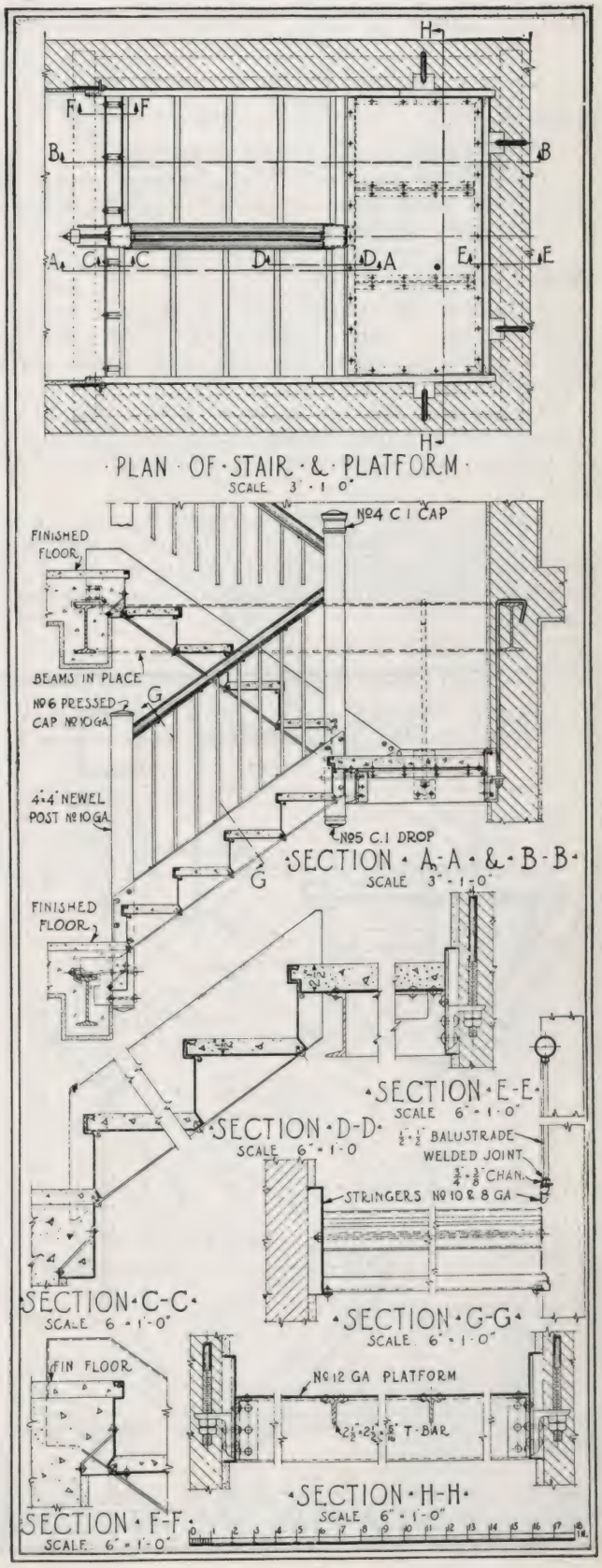
Inquiries for estimates should state type and proposed use of building, and include sketch or drawing on which all dimensions and quantities are indicated.

Typical Installations

Bois Stairways have been erected by us on the following building operations in Cleveland: The 14-story Hanna Building, the 8-story Hanna Annex, the 12-story Bulkley Building, the 8-story Film Exchange Building, the 20-story Cleveland Discount Co. Building, the 24-story Keith Building, the 8-story Brotherhood of Locomotive Trainmen Building, the 10-story Federal Reserve Bank Building and the Lennox Park School in West Park, a Cleveland suburb. Names of architects and builders furnished for reference on application.



FOUR TYPES OF BOIS STEEL STAIRS
Adapted to different tread treatments



WOLVERINE IRON WORKS

Manufacturers of Steel Stairs and Ornamental Iron Work

Dragoon Avenue and P. M. R. R.
DETROIT, MICH.

Products

"Wolverine" Steel Stairs (a specialty).

Also Ornamental Iron Work, including cast iron store fronts, spiral stairs, ornamental railings, window guards, elevator enclosures, marquises, etc.

"Wolverine" Steel Stairs

Stringers—Of rolled steel cut channel section, 10 to 15 in. wide; also of plate, 10 to 14 in. wide; ⅛ to ½ in. thick. Face stringers are covered with heavy steel mouldings, paneled.

Treads and Risers—Formed of Nos. 10, 12 or 14 gauge steel in one piece with nosing, and can be used for the various tread materials as illustrated in the details.

Newels—Are of *steel;* either plain square newels of sizes ranging from 2 to 5 in. square, of paneled steel newels of sizes ranging from 2½ to 5½ in. square, as illustrated in the details, with cast iron caps and drops attached.

Erection

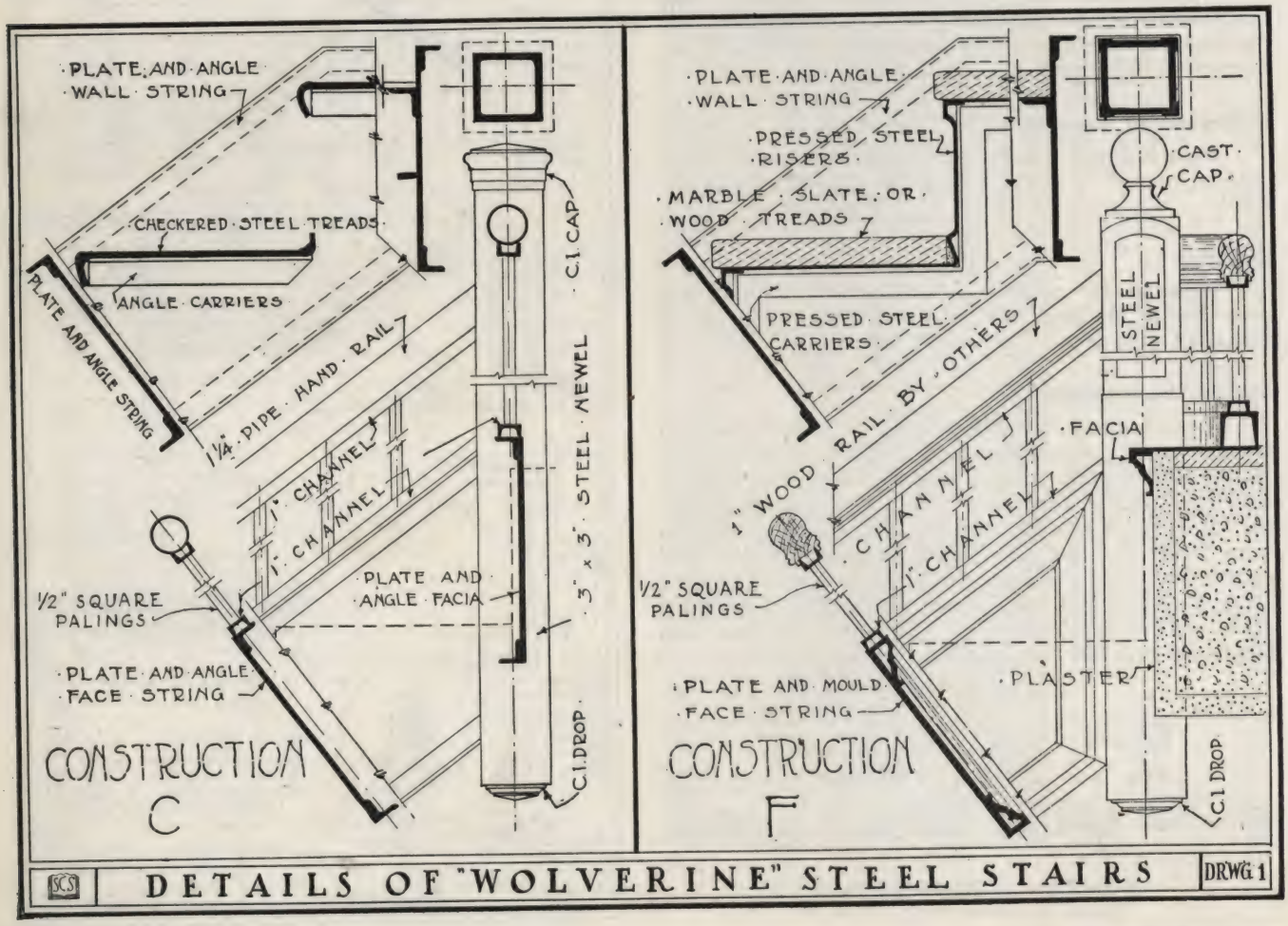
Correctly and scientifically constructed, these steel stairs are designed to be erected by ordinary tools as found on any job. Being so easily assembled, they are suitable for a wide range of use, from the checkered tread of fire escape stairs to the staircase decorated with period ornamentation, as used in buildings of the highest grade.

Costs

"Wolverine" steel stairs compare favorably in cost with any other metal stair. Not only is their installation cost low, but the cost of manufacture has been reduced to a minimum through the use of specially designed machinery.

Information

Information relative to weights, costs, deliveries, construction details, designs or existing installations will be furnished on request.



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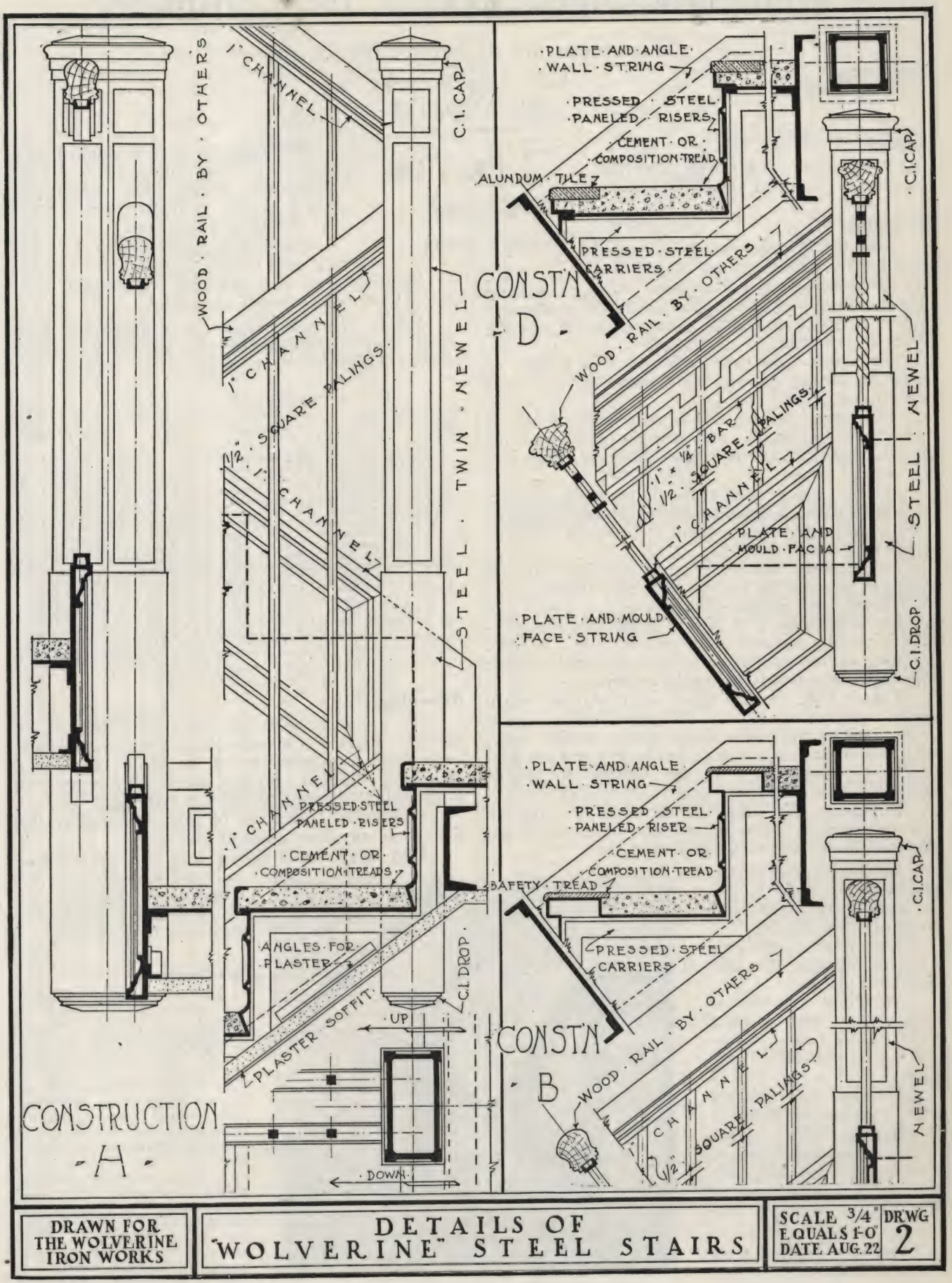


DRAWN FOR THE WOLVERINE IRON WORKS	DETAILS OF "WOLVERINE" STEEL STAIRS	SCALE 3/4" EQUALS 1-0" DATE AUG. 22	DRWG 2

WOODBRIDGE ORNAMENTAL IRON COMPANY

Manufacturers of Presteel Stairways

TELEPHONE
DIVERSEY 5800

1521 Altgeld Street
CHICAGO, ILL.

Product

WOODBRIDGE PATENTED PRESTEEL STAIRWAYS (Patented March 20, 1917).

PRESTEEL

TRADE-MARK

Description

The Woodbridge patented Presteel stairs are manufactured in a modern factory, designed to manufacture steel stairways with the utmost economy. Machinery and tools are of the most modern design, enabling us to meet promptly and efficiently all demands.

Our standardized construction provides a light, inexpensive, strong, durable, non-combustible, and easily assembled stairway.

The lightest construction is guaranteed to support over 250 lbs. per sq. ft. This strength has been proved by tests conducted for us by the Robert W. Hunt Co., Engineers, Chicago.

Woodbridge Presteel stairs are adaptable to office, hotel, warehouse, factory, school and hospital construction; in fact, any building where fire resistant construction is required.

For further information not contained in this catalogue, please write for our 1921 Stair Catalogue.

Treads and Risers—The treads and risers are multiple sections made of No. 12 gauge steel sheets recessed for 2-in. composition or cement filling. A tread and riser are one unit supported by and bolted to angle iron hips which are riveted to the stringers.

Types—Note various types of treads and risers shown on Drawing No. 2. We have designs to suit every condition and requirement; plan or paneled risers, with or without sanitary cove; treads arranged for composition or cement fill, or as steel subtreads for marble or slate stairways.

Stringers—We construct stringers to suit the stair requirements. Presteel stringers have proved the most satisfactory and cheapest in most cases.

Types—Presteel stringers, made of 12x$\frac{3}{16}$ in. universal mill plates formed into shape of 10-in. channel.

Fat plate stringers, made of 10x$\frac{5}{16}$-in. flat universal mill plates.

Structural steel channel stringers are used on extra wide stairways and to support exceptionally heavy loads.

Stringers are furnished with or without moulding.

Newels—May be plain or ornamental to suit design. Newels are furnished made of cast iron, pressed steel, or 3-in. square wrought iron tubing.

Fascias—Made of steel plates and paneled with steel moulding where required.

Railings—Made of wrought iron or cast iron, plain or ornamental, to suit any architectural design. For school use, plain sheet steel, perforated steel, or woven wire railings are furnished.

Platform Supports—Made of structural steel tees and angles.

Painting—All work is given 1 shop coat of approved paint before leaving the factory.

Prices—We will be pleased to quote you prices on our stairways, either f.o.b. cars Chicago with freight allowed to destination, or erected in the building.

DESIGN NUMBERS, PRESTEEL STAIRWAYS

Design No.	Stringers	Newel posts	Railing	Treads and risers
1	*12"x$\frac{3}{16}$" bent plate	4" sq. cast iron	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
2	*12"x$\frac{3}{16}$" bent plate	3" sq. w.i. tubing	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
3	*10"—15.3-lb. channel	4" sq. cast iron	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
4	*10"—15.3-lb. channel	3" sq. w.i. tubing	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
5	12"x$\frac{3}{16}$" bent plate	4" sq. cast iron	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
6	12"x$\frac{3}{16}$" bent plate	3" sq. w.i. tubing	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
7	10"—15.3-lb. channel	4" sq. cast iron	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
8	10"—15.3-lb. channel	3" sq. w.i. tubing	$\frac{1}{2}$" sq. w.i.	No. 12 gauge B.A. steel
9	12"x$\frac{3}{16}$" bent plate	3" sq. w.i. tubing	2" o.d. pipe	No. 12 gauge B.A. steel
10	10"x$\frac{5}{16}$" flat plate	3" sq. w.i. tubing	2" o.d. pipe	No. 12 gauge B.A. steel
11	10"—15.3-lb. channel	3" sq. w.i. tubing	2" o.d. pipe	No. 12 gauge B.A. steel
12	†12"x$\frac{3}{16}$" bent plate	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate
13	†10"x$\frac{5}{16}$" flat plate	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate
14	†10"—15.3-lb. channel	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate
15	12"x$\frac{3}{16}$" bent plate	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate
16	10"x$\frac{5}{16}$" flat plate	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate
17	10"—15.3-lb. channel	3" sq. w.i. tubing	2" o.d. pipe	$\frac{3}{16}$" Diamond plate

*Note—Designs 1, 2, 3 and 4, only, have steel moulding on face strings.
†Note—Designs 12, 13 and 14, only, have open risers.

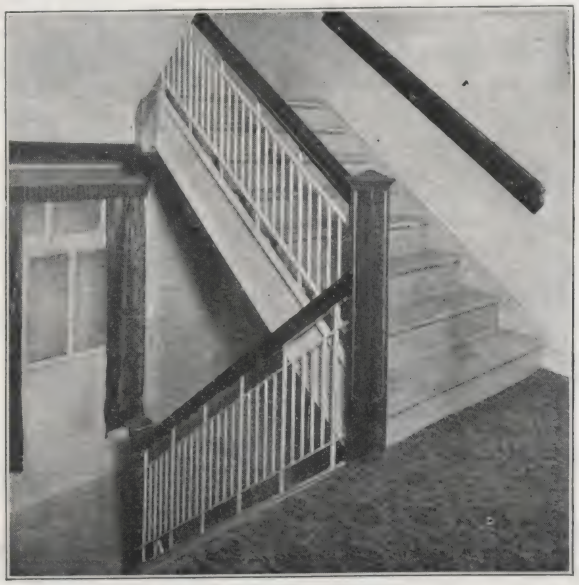
Advantages

We are stair specialists, and having made an exhaustive study of manufacturing standardized steel stairs are in a position not only to produce promptly in accordance with our contracts, but to offer valuable aid in designing stairways to suit any building.

Woodbridge stairs can be furnished cheaper than concrete or any other make of iron stairs.

They weigh less, reducing floor load, but still have sufficient strength to give a large margin of safety.

For neatness of appearance they have no peer.



MAIN STAIR, SOVEREIGN HOTEL, CHICAGO, ILL.

Specifications

All metal stairs throughout the building shall be of the Woodbridge Patented Presteel construction (for type of stringers and type of treads and risers see Drawing 2). A tread and riser shall be one unit, made of No. 12 gauge B. A. steel, supported by and bolted to angle iron hips which are riveted to the stringers. Platforms or landings shall be of No. 12 gauge B. A. steel sheets supported and reinforced by structural steel tees and angles riveted to stringers and platform channel. Newel posts and railings shall be of design and construction as indicated on plans. All work to have 1 shop coat of approved paint before delivery.

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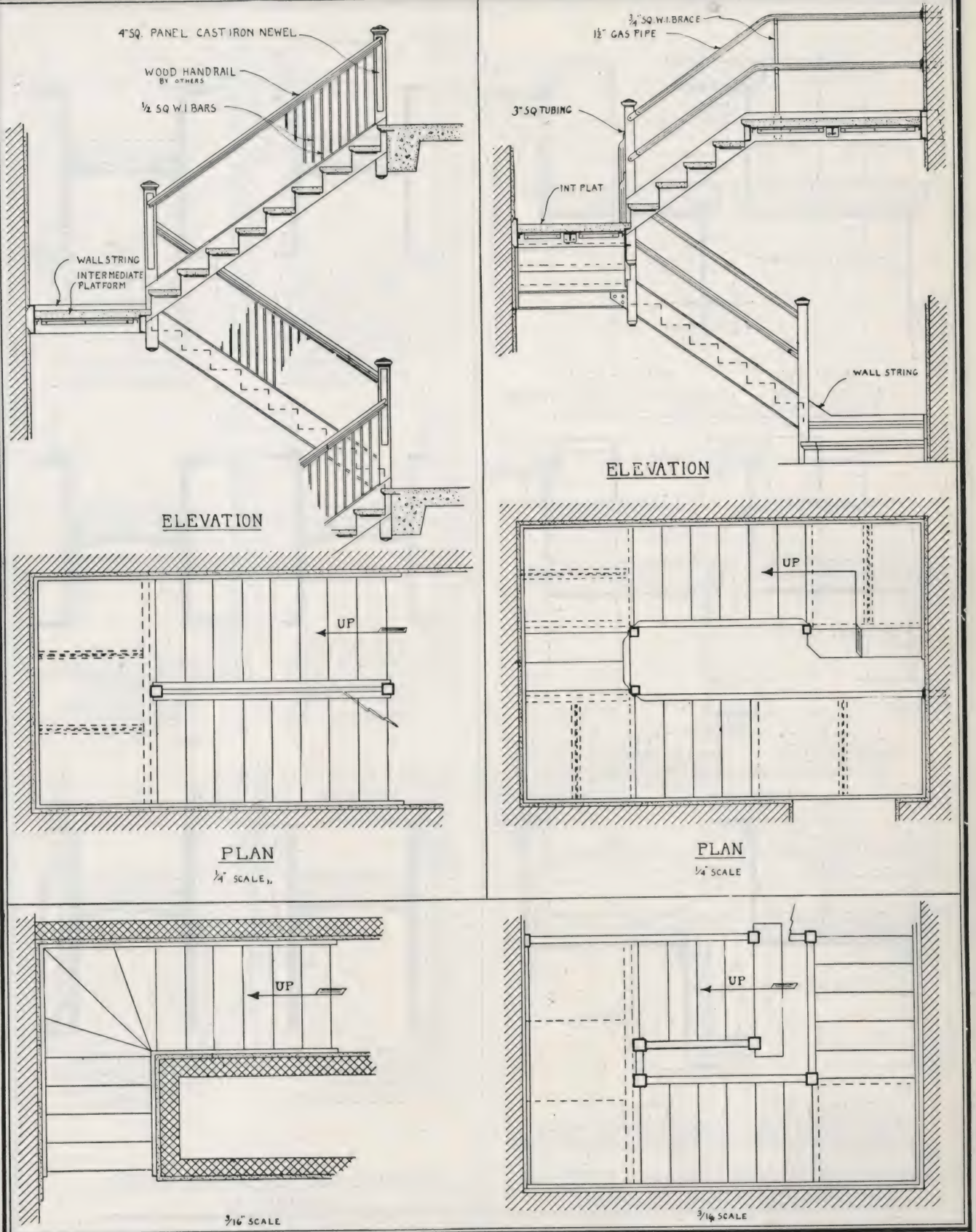
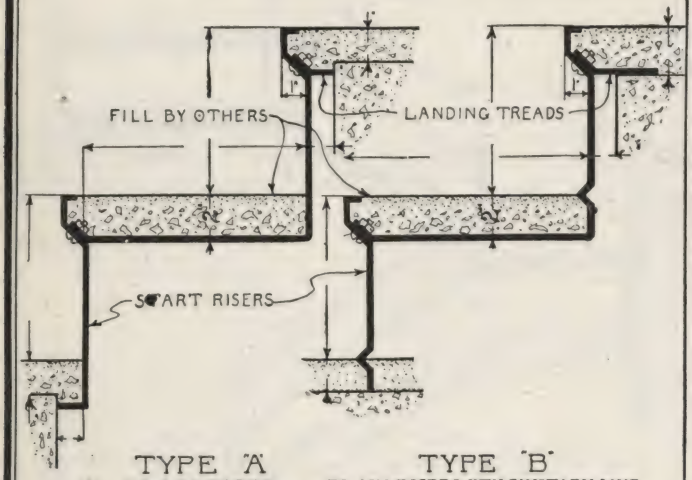


WOODBRIDGE ORNAMENTAL IRON CO.	TYPICAL PLANS AND LAYOUTS OF PRESTEEL STAIRS	DRAWING No. 1

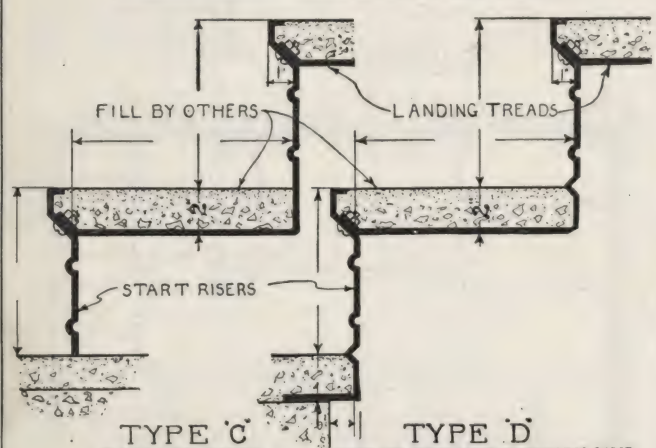
Continued on next page



TYPE "A" PLAIN RISER

TYPE "B" PLAIN RISER WITH SANITARY COVE

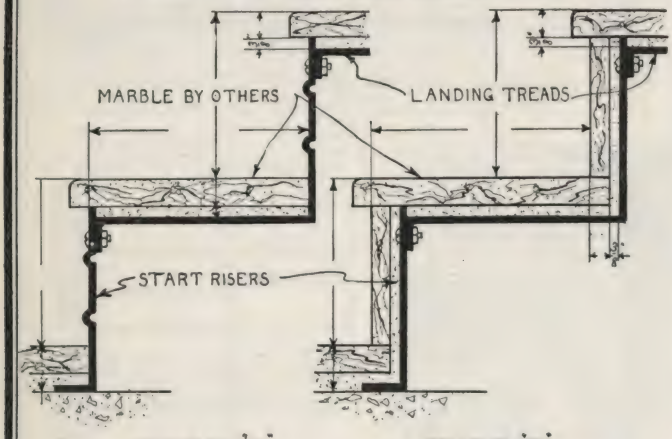
TREADS FINISHED WITH CEMENT OR COMPOSITION.



TYPE "C" PANELED RISER

TYPE "D" PANELED RISER WITH SANITARY COVE.

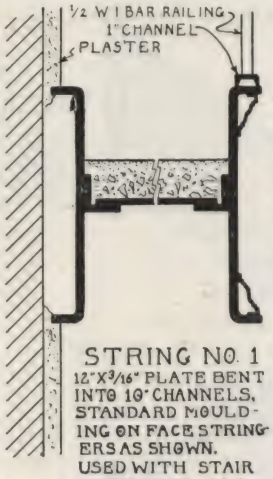
TREADS FINISHED WITH CEMENT OR COMPOSITION.



TYPE "E" PANELED RISER WITH SLATE OR MARBLE TREADS

TYPE "F" SLATE OR MARBLE TREADS AND RISERS WITH STEEL SUB-TREADS

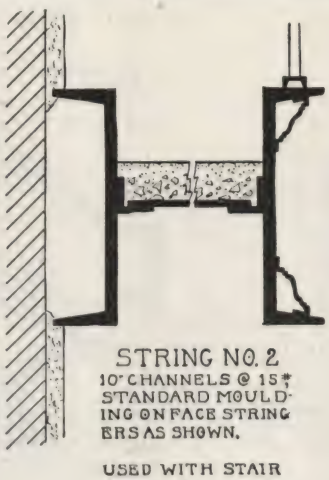
1½" SCALE DETAILS OF STANDARD TYPES OF "PRESTEEL" STAIR TREADS.



STRING NO. 1

12"X3/16" PLATE BENT INTO 10" CHANNELS. STANDARD MOULDING ON FACE STRINGERS AS SHOWN.

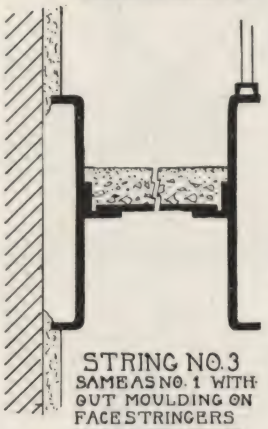
USED WITH STAIR DESIGNS NO. 1 & 2.



STRING NO. 2

10" CHANNELS @ 15# STANDARD MOULDING ON FACE STRINGERS AS SHOWN.

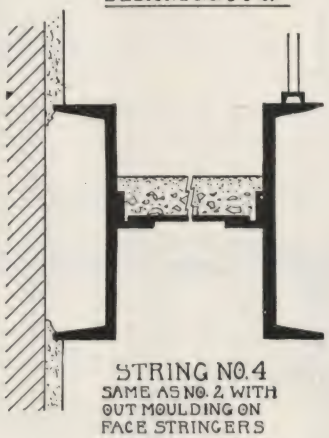
USED WITH STAIR DESIGNS NO. 3 & 4.



STRING NO. 3

SAME AS NO. 1 WITHOUT MOULDING ON FACE STRINGERS

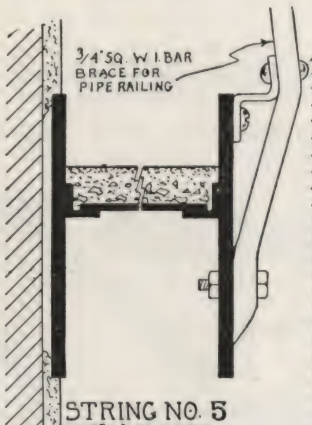
USED WITH STAIR DESIGNS NO. 5-6-9-12-15



STRING NO. 4

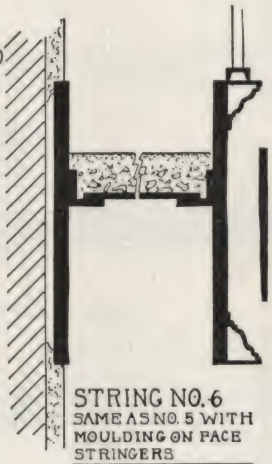
SAME AS NO. 2 WITHOUT MOULDING ON FACE STRINGERS

USED WITH STAIR DESIGNS NO. 7-8-11-14-17.



STRING NO. 5

10"X5/16" PLATES USED ON STAIR DESIGNS NO. 10-13-16.



STRING NO. 6

SAME AS NO. 5 WITH MOULDING ON FACE STRINGERS

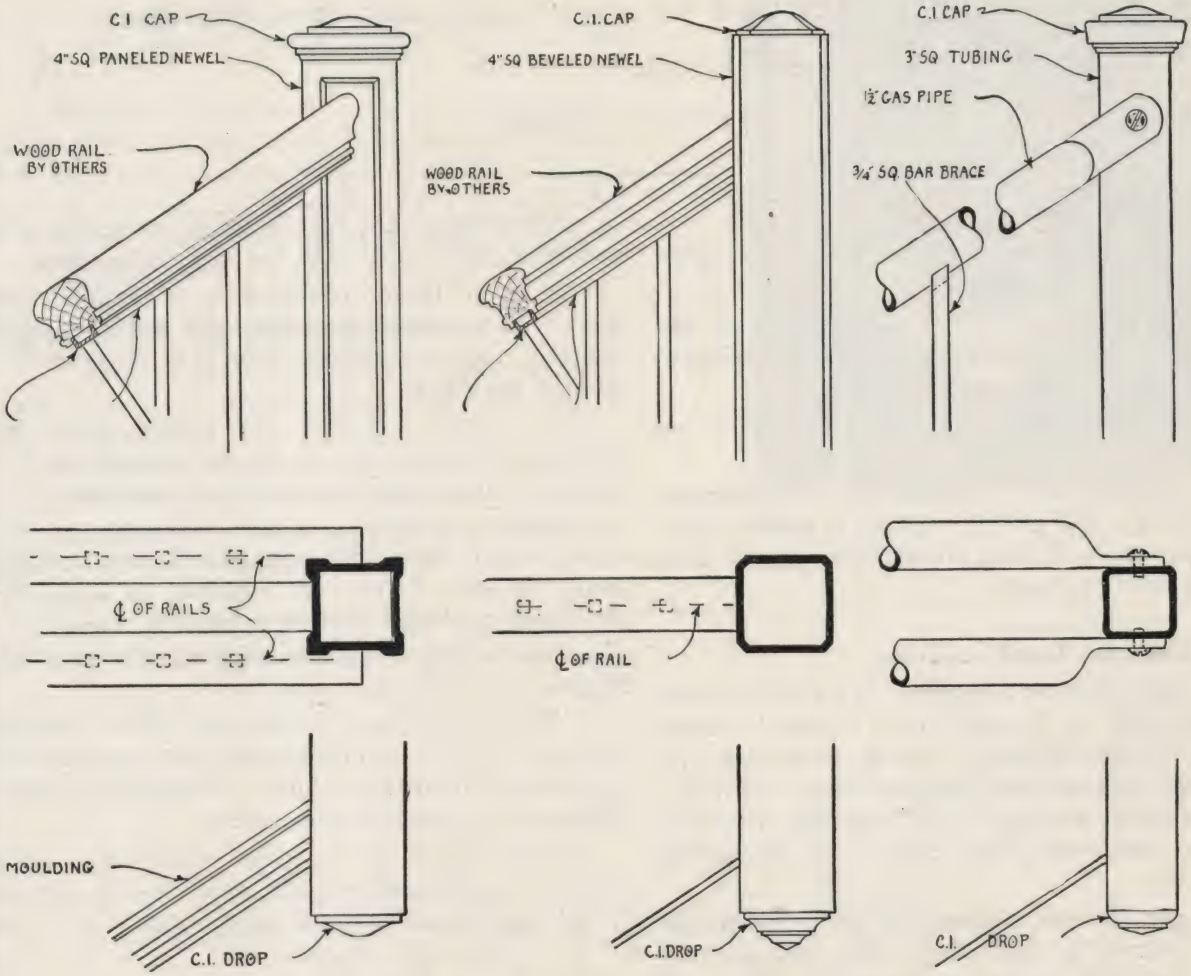
1½ SCALE SECTIONS THRU STAIR STRINGERS

WOODBRIDGE ORNAMENTAL IRON CO.

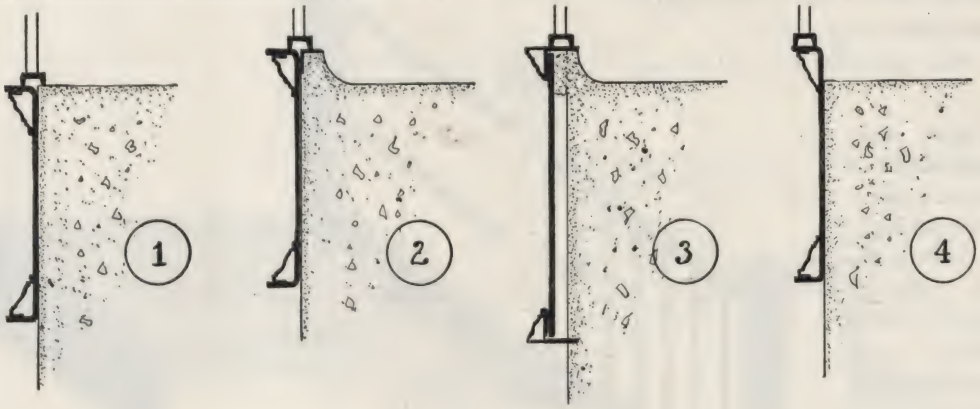
TYPICAL TREAD, RISER AND STRINGER DETAILS FOR PRESTEEL STAIRS

DRAWING No. 2

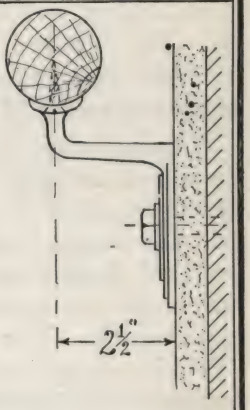
Continued on next page



1½ SCALE DETAILS OF TYPICAL NEWELS AND RAILINGS



1½" SCALE DETAILS OF TYPICAL FACIAS FOR LANDING PLATFORMS AND FLOORS



3" SCALE DETAIL OF HANDRAIL BRACKET

WOODBRIDGE ORNAMENTAL IRON CO.	TYPICAL DETAILS OF NEWELS, RAILINGS & FACIAS USED ON PRESTEEL STAIRS.	DRAWING No. 3

BABCOCK-DAVIS CORPORATION

Manufacturers of Pre-Cast Concrete Stairs with Steel Stringers

474 Dorchester Avenue

BOSTON, MASS.

Products and Services

BABCOCK-DAVIS PRE-CAST CONCRETE STAIRS WITH STEEL STRINGERS. (Patented.)

ORNAMENTAL IRON WORK: including Cast and Wrought Iron Stairs; Railings, Marquises; Wire Grilles; Elevator Fronts, Frames and Thresholds.

For Counterbalanced Elevator Fire Doors, see pages 735-737.

Our engineers invite consultation during preparation of plans and will gladly co-operate in making working drawings and computing proper sizes required. Estimates submitted on request.

Pre-Cast Concrete Tread and Riser

No matter what the advantages of a particular stair construction may be, it must first, of course, be strong and safe. Though lightness is one of the valuable features of the Babcock-Davis patented stair, which is a "pre-cast concrete tread and riser" combined with steel, exhaustive tests have proved that it has exceptional strength.

Strength (Factor of Safety, 10)—At the Massachusetts Institute of Technology tests were made by Professor Irving H. Cowdrey on 4 units. Each unit consisted of a pre-cast concrete tread, 4 ft. long by 11¼ in. wide, and 8-in. riser mounted on steel channel iron stringers. The average of these tests shows:

First hair crack in riser at 2300 lbs. total load. Maximum load 3575 lbs.

Construction—"Pre-cast concrete tread and riser" construction is more economical to install and maintain, and is made from a scientifically prepared formula which makes the stair as hard as stone and practically indestructible. The Babcock-Davis "Pre-Cast Tread and Riser" stair marks a decided advancement in stair construction for either inside or outside installation. As the name suggests, it is a combined reinforced concrete tread and riser cast in one interlocking unit. This work is done in our own shop and the units are shipped to the building under construction, where they are applied to the steel stringers.

Advantages—Its very practical principle of interlocking, replaceable units has many advantages:

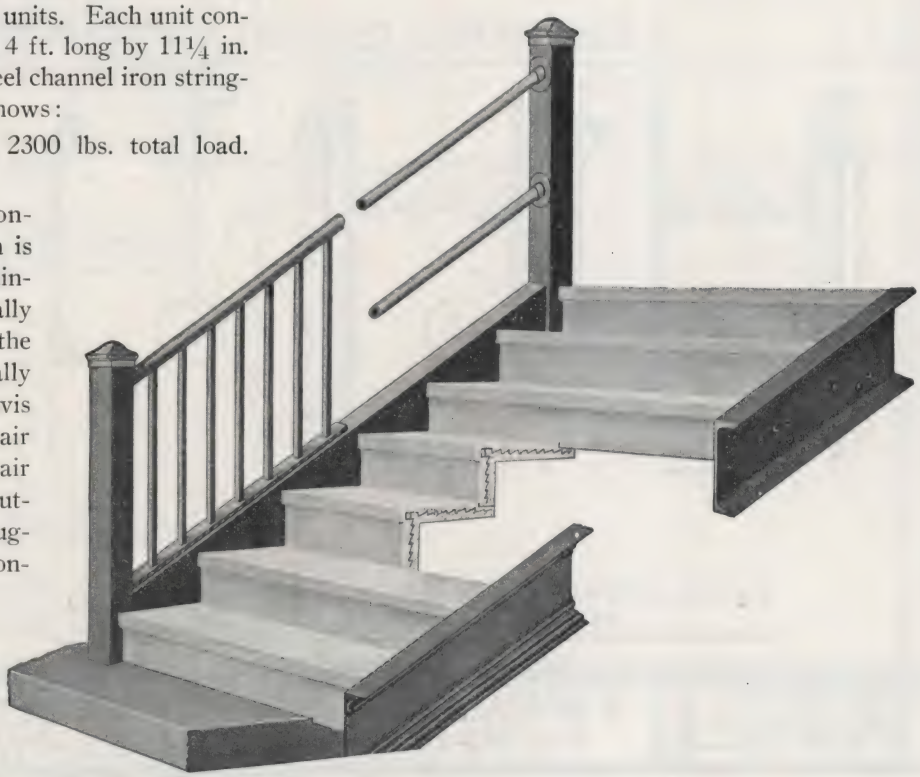
It is of lighter construction, is installed more quickly, at a smaller cost than stairs made entirely of concrete, and has a *stringer buttress* as required by insurance engineers.

Wood forms, and such obstructions which delay building operations while the cement is hardening in all-concrete stair construction, are done away with.

There is no ringing sound or vibration to "Pre-Cast Concrete Stairs" when in use, for they are practically noiseless. They are attractive in appearance. All joints are tight. Their upkeep is reduced to a minimum, as steps require no painting, and, being dustless, they are easily kept clean.

"Pre-Cast Concrete Treads and Risers" are more fireproof than iron or pressed steel stairs, concrete filled at building, and have the further advantages of quicker installation and much greater rigidity.

Specifications—In writing specification, state: "Stairs are to be made of steel, with 'Pre-Cast Concrete Treads and Risers,' as made by BABCOCK-DAVIS COR-



PRE-CAST CONCRETE STAIR CONSTRUCTION

Continued on next page

PORATION, 474 Dorchester Avenue, Boston, Mass., Patentee."

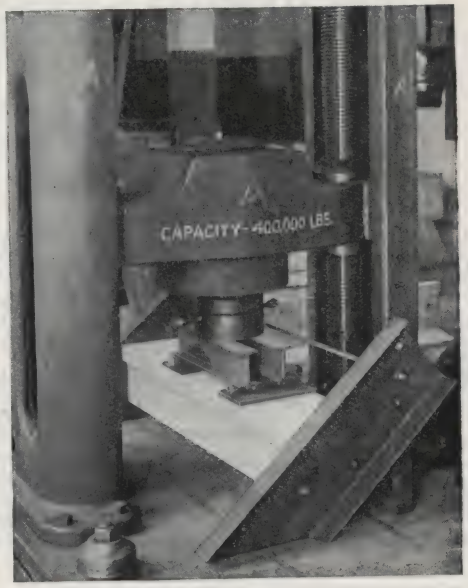
For schools, hospitals and public buildings, where non-slipping qualities are desired, specify "To be treaded with BABCOCK-DAVIS CORPORATION Non-slipping Formula."

Installations—We have installed our pre-cast concrete stairs in a great many buildings in the United States and in every case they have received the highest praise and approval of every engineer and architect who has investigated them including the Building Department of the City of Boston.

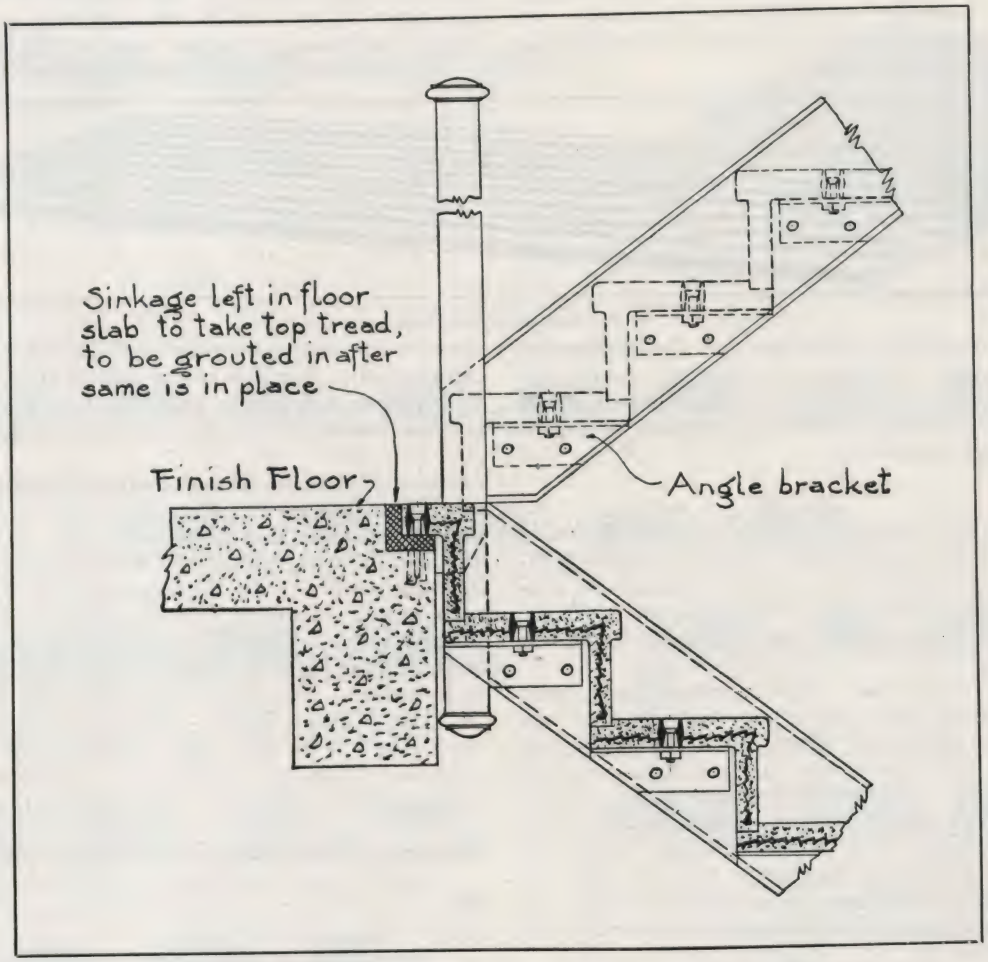
Ornamental Iron and Structural Steel

We have adequate facilities for fabricating and erecting all kinds of ornamental iron work, wire or light structural steel work.

Our stock of structural steel shapes is large and varied which insures efficiency and speed. The best modern business and scientific methods characterize our activities in every department.



TEST SHOWING GREAT STRENGTH OF BABCOCK-DAVIS PRE-CAST CONCRETE STAIR
Holding Load of 2 Tons



TYPICAL ¾-IN. SCALE DETAIL SHOWING CONSTRUCTION OF STAIRS AT FLOOR LEVELS AND LANDINGS
Patent No. 1,388,329

AMERICAN MASON SAFETY TREAD CO.

LOWELL, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 41 East 42nd Street — PHILADELPHIA, PA., 900 Widener Building
CHICAGO, ILL.; ST. LOUIS, MO. — BOSTON, MASS., 101 Milk Street
GENERAL WESTERN DISTRIBUTERS, Joseph T. Ryerson & Son, CHICAGO, ILL.; ST. LOUIS, MO.; CLEVELAND, OHIO; DETROIT, MICH.; MINNEAPOLIS, MINN.; MILWAUKEE, WIS.
CANADIAN REPRESENTATIVE: Darling Brothers, Ltd., 120 Prince Street, Montreal.
Branches in Halifax, Ottawa, Winnipeg, Calgary and Vancouver

Products

Mason Safety Tread (lead or carborundum filled; Stanwood Step and Tread; Stair Nosings; Mason Non-slip Ladder Shoes; Karbolith Flooring.

Uses of Mason Safety Treads

Mason safety treads are adaptable to all situations, inside or outside of a building, where the surface with which the foot comes in contact is liable to become slippery or where the steps have become worn, cupped or hollowed to an uneven surface. Mason safety treads are suitable for use on granite, marble, slate, cement, iron or wood stairs. They can be installed during the construction of a building or on old stairs. Being a surface tread, Mason safety treads replace worn-out structural safety treads (so-called), without any necessity for the demolition or rebuilding of the stairway itself.

UNDERWRITERS' LABEL

They are especially desirable for the equipment of stairs in school buildings, department stores and wherever the traffic is heavy; for thresholds of doors and elevators, fire doors, inclined passageways, ramps and floors around machinery.

Insurance

Establishments employing labor find it desirable to equip their stairs with Mason safety tread, as accident insurance companies expect and demand all reasonable endeavor on the policy-holder's part to make the plant safe. They indorse and recommend the use of this material.

We know of no case where damages have been claimed for injuries from slipping or tripping that has been lost to the defendant when Mason safety treads have been used as a preventive and we have a record of many cases of such claims that have been decided in the defendant's favor. Many hundreds of school buildings are equipped with these treads and not a single accident has ever been reported to us from this use.

Mason safety treads have been used constantly for over 25 years, and over 6,000,000 sq. ft. have been sold.

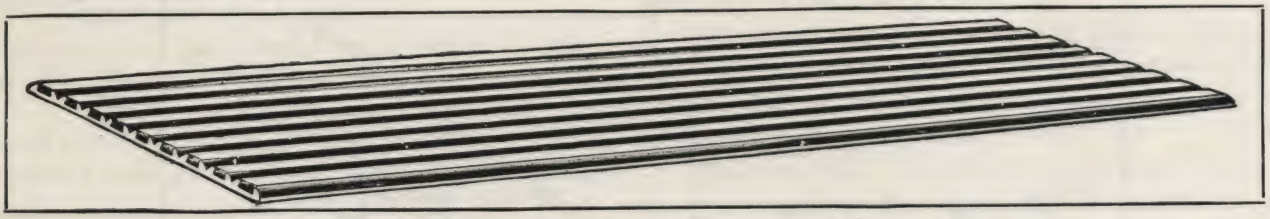
Description of Mason Safety Treads

Mason safety treads are made of rolled steel or extruded hard brass (delta metal) of substantial thickness (¼ in.) with alternate dovetailed and U-shaped grooves. The dovetailed grooves are filled either with lead or a mixture containing a large proportion of carborundum and other abrasive substances, firmly held in place by the continuous supporting ribs of hard metal, which give long wear, preserving the non-slipping quality of the tread for a long series of years.

The open U-shaped grooves not only add to the slip-resisting quality of the tread, but facilitate cleanliness, as they can be easily swept or washed out. They also serve as a protection against the danger inherent in a flat surface tread, as they catch and hold any foreign substance which might be dropped upon them, such as pencils, burned matches, cigar ends or wads of paper, thus giving the foot a sure and effective contact.

With the Mason safety tread there can be no filling of open grooves with mushrooming or creeping lead, no jagged edges for the retention of filth or germs, and there is no abrasive top dressing to wear off and leave a polished, dangerous, slip-inviting surface.

Mason safety treads are especially desirable for use on concrete stairs, as they prevent the raw edge from chipping off. For this use, a special anchor is furnished which holds the treads firmly in place. These anchors are easily worked into the soft concrete when laid.



Mason Safety Tread

Standard Sizes of Mason Safety Treads

Steel Base—Widths, 2½, 3¾, 4, 4¾ and 6 in. flat; 3 in. with nosing or overhang and square back and 3½ in. with nosing and beveled back. These sizes in combination (with the exception of the 3-in. width with nosing having a square back) will produce any desired width. Cut to order with necessary countersunk holes and with anchors when used in connection with cement. See details on following page.

Hard Brass Base—Widths, 2, 2¼, 2½, 2¾, 3, 3½, 4 and 6 in. flat; with nosings similar to that of steel base in widths of 2⅛ and 3½ in. and with deep nosings in width of 2¾ in. See details on following page.

Repairing Worn Stairs with Mason Safety Tread

Badly worn stairs are brought to a finished condition by the use of Karbolith filling, which forms a bed for Mason safety tread.

The width of safety tread required can readily be determined by the amount of wear on the wood or marble stairs but should never be less than 7½ in. When the stairs are so deeply worn that the nosing shown on the 3½-in. section (Fig. 4 or 11) will not cover the edge of the filling used to restore the level, Fig. 14 or a false nosing of steel is furnished, conforming to the shape of the edge of the stair tread, to which the safety tread is welded.

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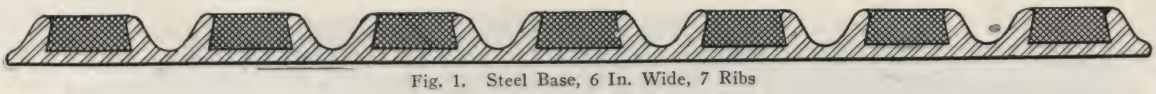


Fig. 1. Steel Base, 6 In. Wide, 7 Ribs

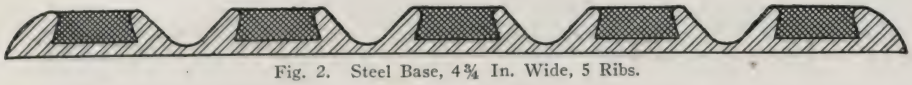


Fig. 2. Steel Base, 4¾ In. Wide, 5 Ribs.

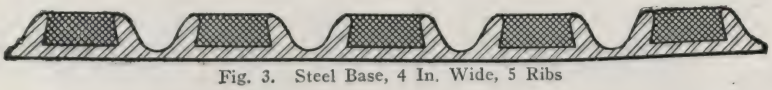


Fig. 3. Steel Base, 4 In. Wide, 5 Ribs

Fig. 3A. Steel Base, 3¾ In. Wide, 4 Ribs

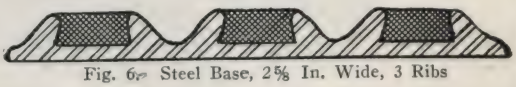


Fig. 6. Steel Base, 2⅝ In. Wide, 3 Ribs

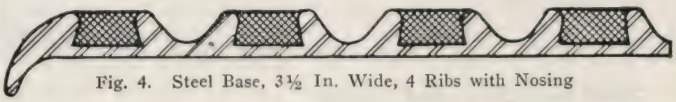


Fig. 4. Steel Base, 3½ In. Wide, 4 Ribs with Nosing

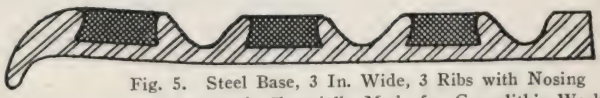
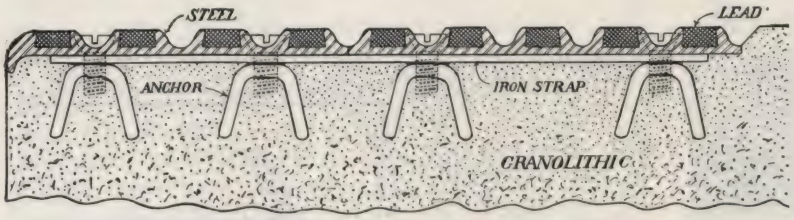


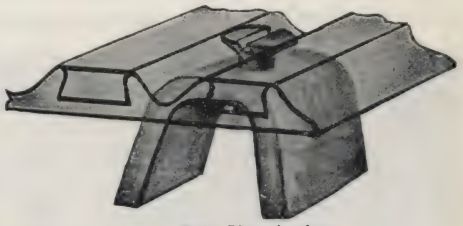
Fig. 5. Steel Base, 3 In. Wide, 3 Ribs with Nosing
Straight Back, Especially Made for Granolithic Work or for Use with Cork Backing

FULL SIZE SECTIONS OF MASON SAFETY TREAD WITH STEEL BASE

Base is of rolled, unperforated steel with alternate U-shaped and dovetailed grooves filled with lead or carborundum



As Applied to New Concrete. Scale, ½ Full Size



Full Size Anchor

SHOWING APPLICATION OF STEEL BASE MASON SAFETY TREAD

For use in new cement work, treads should be ordered with anchors and screws. When thus received, they should be embedded into the plastic cement and held firmly in place. Iron scrap is only necessary when tread is composed of two or more sections

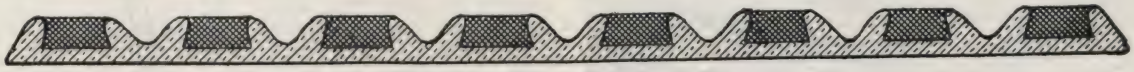


Fig. 7. Hard Brass Base, 6 In. Wide, 8 Ribs

Fig. 8. Hard Brass Base, 4 In. Wide, 5 Ribs.

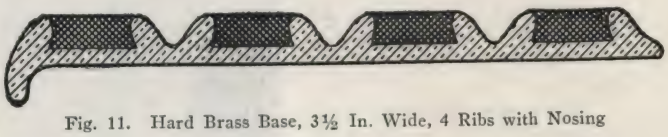


Fig. 11. Hard Brass Base, 3½ In. Wide, 4 Ribs with Nosing

Fig. 12. Hard Brass Base, 2⅛ In. Wide, 3 Ribs with Nosing

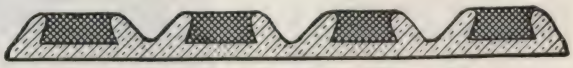


Fig. 9. Hard Brass Base, 3 In. Wide, 4 Ribs

Fig. 10. Hard Brass Base, 2¼ In. Wide, 3 Ribs

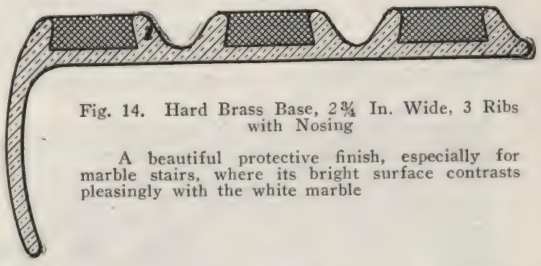


Fig. 14. Hard Brass Base, 2¾ In. Wide, 3 Ribs with Nosing

A beautiful protective finish, especially for marble stairs, where its bright surface contrasts pleasingly with the white marble

FULL SIZE SECTIONS OF MASON SAFETY TREAD WITH HARD BRASS BASE

Base is of hard brass with alternate U-shaped and dovetailed grooves filled with lead. Flat sections similar to Figs. 7 and 8 are made in various widths. Widths usually carried in stock are 2¼, 3, 4 and 6 in.

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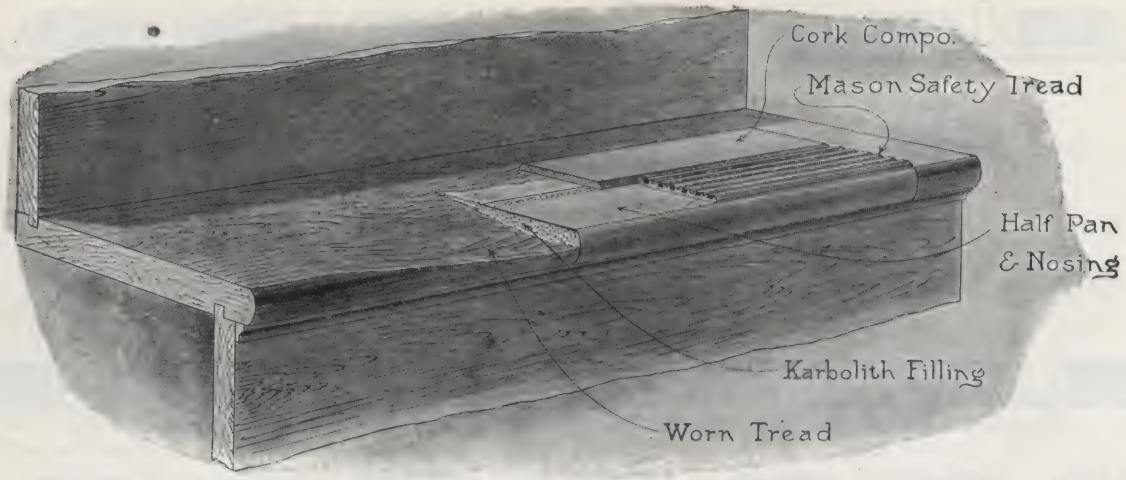
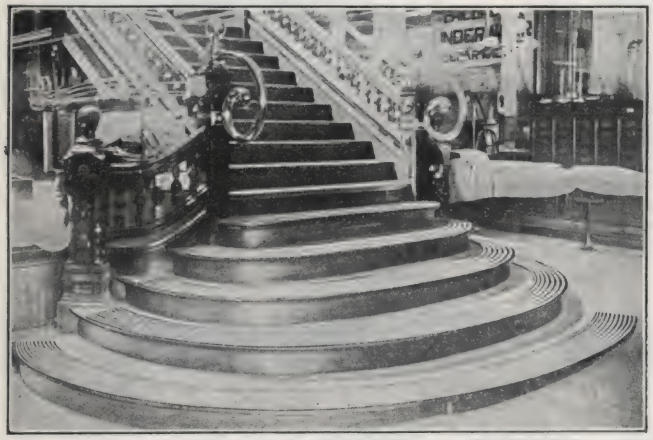


Method of Repairing Worn Treads by Use of Mason Safety Tread, Karbolith and Cork Carpet

In many cases where economy is desired, a section of safety tread is used at the front, backed by cork carpet, all securely attached to a "half pan" and nosing as shown above.

Mason Safety Treads for Curved Stairs

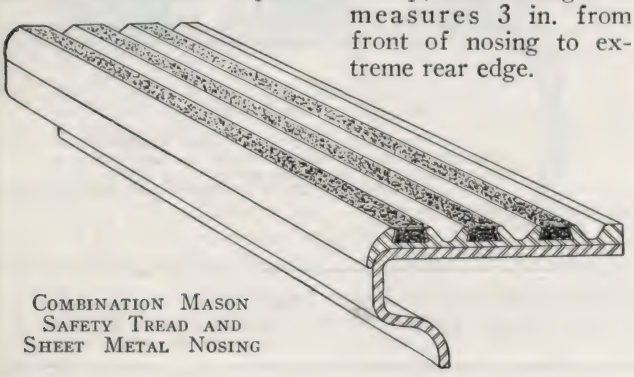
Mason safety treads may be curved to any radius such as is usually specified at the bottom of a stairway.



A Good Example of Mason Safety Tread Applied to Curved Stairs

Combination Mason Safety Tread and Nosing

A safety nosing made of 1/8-in. sheet steel plate and a standard section of Mason safety tread welded securely to it. This type of nosing is effective, reasonable in price and can be made in any length or width desired. The type illustrated below is especially suited for use in connection with steel stairways which call for a concrete, asphalt or composition filling. It measures 3 in. from front of nosing to extreme rear edge.



Combination Mason Safety Tread and Sheet Metal Nosing

Stanwood Step and Tread

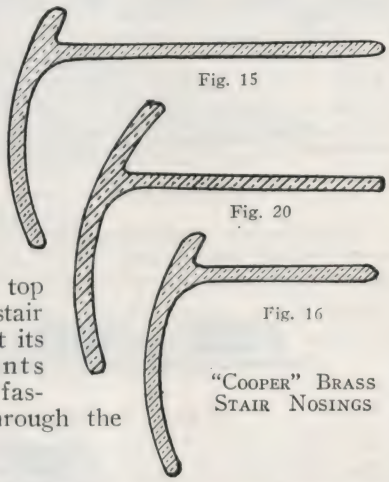
Frames of rolled steel, provided with a ledge to carry steel strips set on edge and tied together with rods, forming a series of openings.

Made with hangers for car steps; also suitable for stairways to engine rooms, for areaways, etc.

"Cooper" Brass Stair Nosings

"Cooper" brass stair nosings are for use with safety tread, cork carpet, linoleum, rubber, interlocking tile or composition treads.

All sizes have a vertical edge at the top which protects the stair covering from wear at its edge and prevents chipping. They are fastened with screws through the flange.

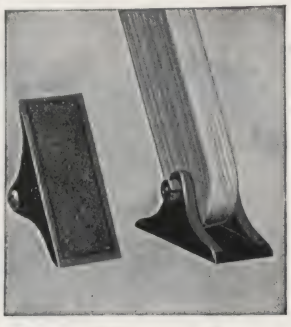


"Cooper" Brass Stair Nosings

Mason Non-slip Ladder Shoes

Many thousands of these ladder shoes are in use in factories throughout the country.

They are indorsed and recommended by accident liability companies and recognized by the courts as an efficient safety device.



Mason Non-slip Ladder Shoes

Showing method of application and abrasive material in bottom of shoes

Karbolith Flooring

A composition with a base largely of magnesium that produces a hard, durable surface, proof against rats, fire and germs. It is impervious to heat, cold and dampness and will not chip, crack, tear loose nor disintegrate. It can be laid over cement, iron or wood, and binds firmly to the base.

We manufacture this flooring and furnish instructions for installing it.

AMERICAN ABRASIVE METALS CO.

Manufacturers of Anti-slip Tread Surfaces

Hudson Terminal Building, 50 Church Street
NEW YORK, N. Y.
AGENCIES AND BRANCHES IN PRINCIPAL CITIES

TELEPHONE
CORTLANDT 7444, 7445

Products

Manufacturers of FERALUN, BRONZALUN, ALUMALUN and VULCALUN ANTI-SLIP TREAD SURFACES.

United States Sales Representatives for CARBORUNDUM ANTI-SLIP TILE.

Feralun

Feralun is a hard metal with abrasive grit embedded in the wearing surface to provide an approved durable and effective anti-slip tread.

This grit, embedded at the time of casting, projects slightly and bites, so that slipping is prevented. Being excelled in hardness only by the diamond and being firmly held by the metal partly surrounding each grain, the abrasive grit in combination with the metal gives to Feralun its extreme durability.

Durability—Feralun anti-slip stair treads are non-porous and "fireproof," "rustproof," and "slip-proof," lasting much longer than iron, steel, slate, marble, or treads having lead, cement or asphalt as the body.

On the stairs of the New York subway and elevated railroads, where they are the accepted standard, Feralun anti-slip treads last from 5 to 12 years. They carry approximately 14,000,000 people on a stairway 30 in. wide before losing effectiveness as an anti-slip tread. In floors, 8 years' concentrated wear from trucking loads of 1200 to 1800 lbs. has not caused Feralun to become slippery.

Approval—Feralun anti-slip treads are approved without any qualifications as a fire-safe and anti-slip tread by the Underwriters' Laboratories, Inc., and by Pennsylvania and New York State Industrial Boards.

Sizes and Designs—Feralun may be obtained in practically any form in which metal can be cast as a tread surface. Certain forms are so frequently demanded that they have become a standard. These are shown in a booklet of suggestive forms sent on request to architects.

Uses—Feralun is especially suitable for treads and walkway surfaces where durability and protection against slipping is desired, such as stair treads, coal-hole covers, area covers, gutter plates, elevator door thresholds, freight elevator landings, floor plates, trench covers, shipping platforms, ramps, etc.

Bronzalun

Bronzalun is a combination of bronze and abrasive grit manufactured in the same manner as Feralun. It has all the good qualities of Feralun. Architectural superiority is combined with durability and anti-slip effectiveness.

Uses—Bronzalun is largely used for tread surfaces such as entrance door saddles, main floor elevator saddles, safety treads on marble stairs, etc.

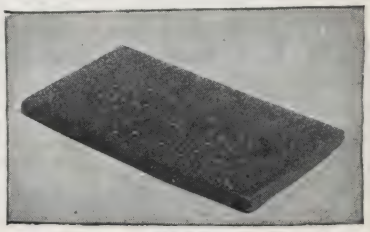
Alumalun

Alumalun is a combination of aluminum and abrasive grit manufactured in the same manner as Feralun and Bronzalun. It has the anti-slip effectiveness and architectural value of Bronzalun and is extremely light in weight, weighing 1 lb. per sq. ft. for each $\frac{1}{16}$ in. thickness. It is immune to the action of sea water and does not tarnish nor deteriorate on account of exposure.

Uses—Alumalun is very desirable for high grade work where beauty, lightness and protection against slipping are required.

Vulcalun

Vulcalun is a mixture of rubber and abrasive grit vulcanized under heavy pressure. It has been developed for making safe certain walkway surfaces for which materials hitherto available were not so well suited.



VULCALUN WALKWAY SURFACE

Its outstanding advantages are:

(1) High dielectric strength, showing no flash-over up to 15,000 volts. It is therefore desirable for walkway surfaces around switchboards, etc.

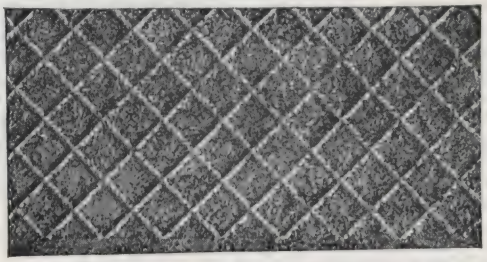
(2) Light weight—from 3½ to 7 lbs. per sq. ft. making it desirable for elevator car floors, etc.

(3) Does not corrode, is not absorbent, does not disintegrate when saturated and exposed to freezing, nor discolor when tobacco, ink, oil, etc., get on it; it can, therefore, be used on marble and elsewhere without fear of stains.

Vulcalun is uniform in finish and manufacture, easily kept clean, extremely durable, but easily replaced if necessary. Made in sheets up to 12x30 in. and in tile of suitable sizes.

Feralun, Bronzalun and Alumalun Anti-slip Stair Treads

Feralun treads are made with a plain, hatch or fluted abrasive metal surface. Bronzalun and Alumalun treads are made with a hatch or fluted surface only. The



BRONZALUN AND ALUMALUN HATCH SURFACE ANTI-SLIP TREAD
Bronzalun also made with fluted surface

FERALUN PLAIN SURFACE ANTI-SLIP TREAD
Also made with hatch or fluted surface

Continued on next page

anti-slip element is carried down over the nosing. No dangerous, slippery nosing edge or heel-catching grooves. Made in the following styles:

Styles A and C—Used on a subtread of concrete, iron, steel, wood, marble, etc. Made $\frac{5}{16}$ in. thick, usually 4, 4½, 5 or 6 in. wide and not exceeding 72 in. long in one piece. Longer treads furnished in sections. On new stairs, length of safety tread is usually 6 or 8 in. shorter than distance between stringers. Width should be not less than five-eighths the distance from nosing to riser and should cover nosing edge. Widths 6 to 9 in. are ⅜ in. thick; 9 to 12 in., $\frac{7}{16}$ in. thick; over 12 in., ½ in. thick. Style A standard lip extends ¼ in. from underside of tread. At times it may be necessary to use a longer lip, especially in repair work, where it is desirable to cover all signs of wear on nosing edges of old and worn steps. For this purpose a Style A lip from ⅜ to 1 in. is furnished at a slight additional cost.

Style D—Made ⅜ in. thick and in same widths and lengths as Styles A and C. Nosing is ¾x¾ in.

Style F—Made 4, 5 or 6 in. wide and not exceeding 72 in. in one piece. Standard nosing is 1x1 in. Special nosing, not exceeding 1¼ in. from underside of tread, will be furnished when desired. Tread is ⅜ in. thick. Pads are ¼ or ⅜ in. thick and spaced approximately 12 in. on centers, with bolt holes staggered. Total height or thickness of tread and pad, ⅝ in.

Style O—Requires no subtread. Made ⅜, $\frac{7}{16}$, ½, ⅝, or ¾ in. thick. Treads not exceeding 9 in. wide back of nosing by 60 in. long furnished ⅜ in. thick, if desired, and should be supported by risers. Treads over 9x60 in., and not exceeding 12x60 in., should be not less than $\frac{7}{16}$ in. thick and should be supported by risers. Platforms and landings in sections not exceeding 24x48 in. should be not less than ½ in. thick; not exceeding 30x48 in. should be not less than ⅝ in.; and not exceeding 36x60 in. should be not less than ¾ in. thick. Platforms usually have a truss rib cast on the underside. Style "O" nosing extends ¾ in. beyond the riser line and ¾ in. down from underside of tread. If nosing is required 1x1 in., we will furnish Style "S."

Style R—Bolted direct to stringers. Requires no subtread. Used extensively for open stairs, fire escapes, around machinery, in engine and boiler rooms, etc. Made ½, ⅝, and ¾ in. thick, according to span and has truss rib. Treads 48 to 60 in. long made not less than ⅝ in. thick; 60 to 72 in. long, ¾ in. thick. This style is reversible, having anti-slip nosing at front and back.

Style G—Same as R with drainage perforations.

Style K—Does not require a subtread and is made $\frac{7}{16}$, ½, ⅝ and ¾ in. thick. Treads not exceeding 48 in. long will be furnished $\frac{7}{16}$ in. thick and 48 to 72 in. will be ½ in. thick. When risers are omitted, treads should be ½ in. thick, and when over 42 in. and not over 60 in. long should also have a truss rib. From 60 to 72 in. long, treads should be ⅝ in. thick with a truss rib.

Styles of Treads for Repairs to Worn Steps—Styles A, C or D are applied to existing steps. If necessary to remove old steps, they may be replaced by either Styles O or R, without using a subtread. If old and worn steps are to be repaired and Style A is preferred, it may be desirable to cover all signs of wear on the nosing edges. For this purpose, a lip ½ to 1 in. deep will be furnished.

Anti-slip Treads for Other Purposes

Anti-slip Thresholds and Saddles—Styles L and T are extensively used. Made ⅜ to 1 in. thick. Sizes up to 6x48 in. should be not less than ⅜ in. thick; up to 9x48 in. should be not less than $\frac{7}{16}$ in. thick; and up to 12x60 in. should be not less than ½ in. thick.

Elevator Saddles—Made with one or two door grooves, not less than ½ in. thick and not exceeding 8 in. wide and 96 in. long in one piece. Longer saddles made in sections. Grooves are ½ in. wide; depth of grooves should not exceed ½ in. Grooves are not machined but are true and free from fins. Lip at nosing is usually 2 in. over all. If a deeper lip is required the extra length is usually lap-jointed and bolted to the 2-in. piece. Door saddles without grooves are made $\frac{7}{16}$ to ¾ in. thick.

Floor Plates and Trench Covers—Made ½ in. thick, and in sections not exceeding 24x48 in. Sections not exceeding 30x48 in., not less than ⅝ in. thick; 36x60 in., not less than ¾ in. thick.

Safety Coalhole and Manhole Covers and Frames—Have no heel-catching projections or depressions and are flush with sidewalk. Hinges are especially constructed to overcome breakage and are concealed. When open, they are enclosed on all sides and top, except toward curb where coal chute is inserted. Do not permit leakage of surface water. Made in 3 sizes: 18, 20 and 24 in. The Feralun safety covers and frames comply with the requirements of New York City Department of Public Works.

Strips for Inclines and Ramps—Made ⅜ in. thick in sizes up to 9x60 in.

Sidewalk Doors—Have no projections or depressions and are flush with sidewalk. Hinges are especially strong and are concealed. Standard size, 4x4 ft. Can be made in any size desired.

Specifications for Anti-slip Tread Surfaces

New Concrete Steps, Platforms and Landings—All new concrete steps and nosing edges of platforms and landings in (mention locations such as service stairs, fire towers, area stairs, etc.) shall be equipped with American Abrasive Metals Co.'s "Feralun," style [A or C], anti-slip treads, ... in. wide, extending along steps or platform to within 4 in. of stringers. Treads shall be set flush with concrete surface and securely anchored.

Marble, Slate, Wood and Old Concrete Steps and Landings—All marble, slate, wood and old concrete steps and landings in (mention locations) shall be equipped with American Abrasive Metals Co.'s "Feralun," style [A or C], anti-slip treads. Treads shall extend to within 3 in. of stringers and riser and have rounded edges. If steps are worn, worn spots shall be filled with magnesite (quick setting) cement before tread is laid.

Structural Steel Steps and Landings—All structural steel steps and landings in (mention locations) shall be equipped with American Abrasive Metals Co.'s "Feralun," style [D, F, G, K, O, or R], anti-slip treads.

Thresholds—All entrance, elevator and fire door thresholds shall be equipped with American Abrasive Metals Co.'s "Feralun," style [L, T or V], anti-slip saddles as shown on drawings.

All freight elevator openings and shipping platforms shall be equipped with "Feralun," style W, anti-slip threshold, ... in. wide.

Covers—All covers for (mention location such as trenches, pits, coalholes, sidewalk doors, manholes, etc.) shall be of American Abrasive Metals Co.'s "Feralun." (Size .....)

Floors, Ramps, etc.—All (mention location such as boiler room floors, floors around dangerous machinery, inclines, ramps, elevator floors, vestibules, freight corridors, etc.) shall be equipped with American Abrasive Metals Co.'s "Feralun" anti-slip treads as shown on drawings.

Note: "Bronzalun" or "Alumalun" instead of "Feralun" may be specified for architectural reasons.

Anti-slip Tile—For specifications for Carborundum Anti-slip Tile see second page following.

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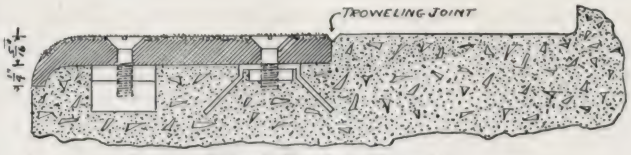
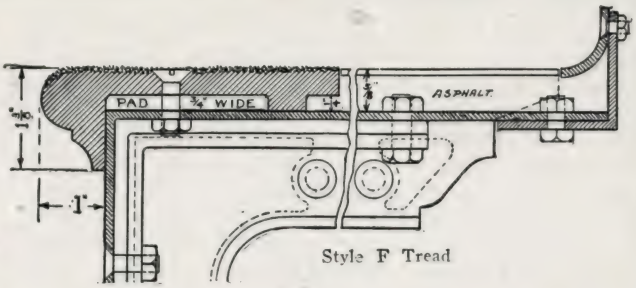
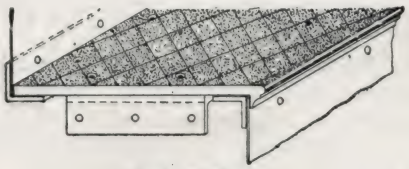


Style A Tread in Concrete

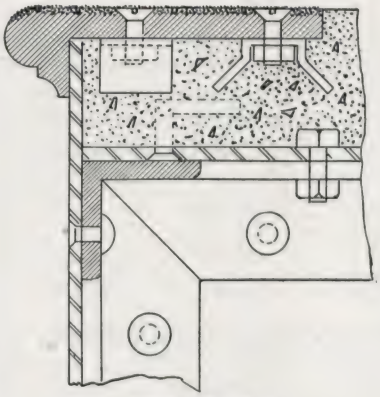
Style C Tread



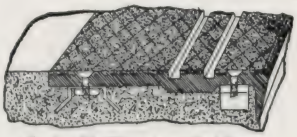
Style F Tread



Style O Tread
No subtread required

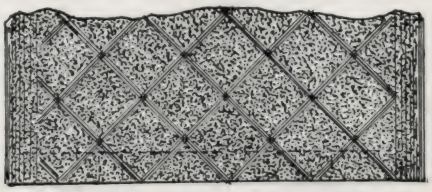


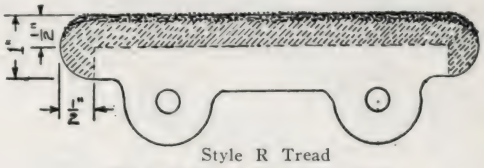
Style D Tread



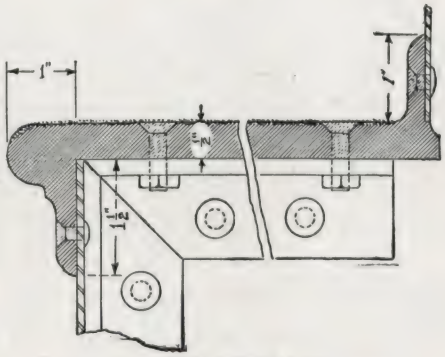
Style V Elevator Saddles
With or without grooves

Style W Shipping Platform and
Elevator Door Thresholds





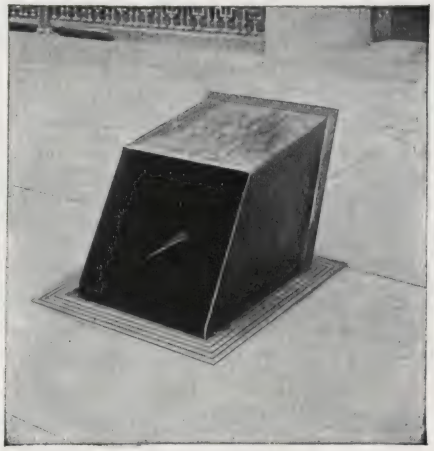
Style R Tread
No angles or subtread required.
Bolts direct to stringer



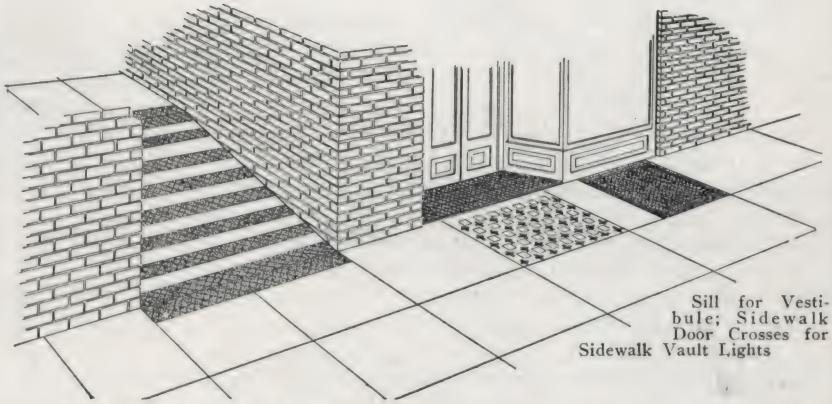
Style K Tread
No subtread required

Style L

Style T
Door Thresholds and Saddles



Safety Coalhole Cover



Sill for Vestibule; Sidewalk Door Crosses for Sidewalk Vault Lights

Strips for Inclines and Ramps

FERALUN, BRONZALUN AND ALUMALUN ANTI-SLIP TREAD SURFACES

Continued on next page

Carborundum Anti-slip Tile

This tile is made of both carborundum and aloxite, abrasive products of the electric furnace. These artificial abrasives have been recognized for years as among the greatest of all grinding materials, and are extensively used for the grinding of steel, iron, brass, bronze and other metals. Both are produced by fusing crude materials in electric furnaces at extremely high temperatures. The resultant crystal masses are taken from the furnace and are broken and crushed to standard sizes of grains or crystals. These crystals are mixed with clays and ceramic materials and moulded into the various sizes and shapes of tile. The tile are then vitrified in high temperature kilns.

Carborundum Anti-slip Tile presents a gripping, safe surface that can not wear smooth. It is of the same structure and texture, and the same degree of hardness throughout. It retains its safe, anti-slip surface as long as the tile itself lasts.

The tile is made in white or light brown color in all standard shapes and sizes and in any special shapes within the range of manufacturing possibilities. Other colors are being perfected and the Carborundum Anti-slip Tile soon will be obtainable in black, blue, buff and green.

Advantages of Carborundum Anti-slip Tile

Carborundum Anti-slip Tile never loses its anti-slip surface and is practically non-wearing. Under the slight wearing action of traffic it literally renews its safe surface.

It is safe under all conditions. Oil, water or grease does not affect its anti-slip qualities.

The tile is remarkably strong. Tests at room temperature have shown it to have a *transverse strength* of about 5500 lbs. per sq. in.

Carborundum Anti-slip Tile presents a fine appearance and can be used with any building material such as concrete, marble, granite, brick, steel or wood.

Where this tile is used an even, flat surface is presented underfoot. The tile is laid flush with the stair tread or floor. There are no corrugations, ribs or ridges to cause tripping or to annoy by accumlating dirt.

The resistance of the tile to wear eliminates the cost of maintenance.

Uses of Carborundum Anti-slip Tile

Stair Treads—Carborundum Anti-slip Tile makes permanently safe and architecturally complete the stair treads of stores, theaters, churches, schools, factories, office buildings and similar structures. For these purposes the tile is made with a rounded nose giving a safe, secure footing even on the edge of the step.

In Concrete—Whether in reinforced concrete stairs or cement filled steel treads, the Carborundum Anti-slip tread can be used advantageously, being placed at the time the concrete is poured. In conjunction with tile or terrazzo this tile provides an architecturally pleasing form of stair tread construction and at the same time one that is absolutely slipproof.

Other Forms—Stair treads, such as slate, marble, wood, metal, etc., may be made safe by the use of Carborundum Anti-slip Tile suitably applied. For retreading old steps the tile is furnished, if desired, with countersunk holes for screws.

Floors—Entrances to shops, stores, moving picture theaters, swimming pool edges, floors in shower baths and lavatories, hotel and theater lobbies, restaurant kitchens, floor landings at elevators, and in industrial plants the floors around dangerous machinery, are made safe from the slipping hazard by the use of Carborundum Anti-slip Tile. For such purposes the tile may be used solely or in varying proportions with ordinary tile to form designs. It is laid over old floors or incorporated in new construction in the same manner as ordinary tile.

Ramps—In no type of walkway surface is prevention of the slipping hazard so essential as in the construction of ramps. Here the Carborundum Anti-slip Tile is especially suited. It will stand up indefinitely under the severest traffic and its architectural attractiveness for finer work does not preclude its use for heavy duty where its anti-slip qualities give needed foot purchase to workmen handling loads.

Entrances—Stores and building entrance floors are made safe for pedestrians by Carborundum Anti-slip Tile. It eliminates the menace of slippery doorways, gives long service and provides architectural attractiveness. It can be laid solid or in conjunction with ordinary tile to form various designs.

Swimming Pools—Carborundum Anti-slip Tile is particularly suitable for use along the edges of swimming pools, presenting a safe, secure footing for swimmers. Water does not affect its anti-slip qualities.

Specifications for Laying Carborundum Anti-slip Tile

Laying Tile in Concrete on Floors, Ramps, etc.—Tile to be soaked in water and laid in same manner as ordinary vitrified tile. (Note: detailed specification will be furnished on request.)

Laying Tile in Mastic on Wooden, Steel and Concrete Surfaces—Surface shall be thoroughly cleaned and dry. Tile shall be thoroughly cleaned and dry. Surface shall be coated with boiling asphalt roofing mastic, ¼ in. thick, for an area of not more than 4 tile at one time. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be (1/16 to ¼ in.) wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer.

Laying Tile in Treads of Concrete Stairways—Pour concrete stairs and finish as usual. When tread is hard enough, just before concrete sets, from area to be covered by tile remove concrete for a depth of ⅝ in. Tamp water soaked tile into concrete to level, even surface. Joints shall be (1/16 to ¼ in.) wide and filled with cement grout.

Laying Tile on Wooden Stair Treads—Tread shall be recessed for a depth of 13/16 in. and for length and width to suit number and size of tile to be used. Recessed surface shall be thoroughly cleaned and coated with boiling asphalt roofing mastic 1/16 in. thick. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be (1/16 to ¼ in.) wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer.

Tile shall be held in position by 2 wood screws per tile, or by a No. 20 gauge brass, 1x¼-in. angle, toe guard, the 1-in. leg being fastened to wood tread by screws.

Laying Tile on Metal Stair Treads—Metal surface shall be cleaned and a 1½-in. layer of 1:2½ cement mortar placed on tread and finished to proper level. When this bed of mortar is hard enough, just before it sets, from area to be covered by tile remove mortar for a depth of ⅝ in. Tamp water soaked tile into mortar to level, even surface. Joints shall be (1/16 to ¼ in.) wide and filled with cement grout.

STANDARD SIZES OF CARBORUNDUM ANTI-SLIP TILE

Square floor tile, in.	Rectangular floor tile, in.	Stair tread tile with rounded nose, in.
3 x 3 x ½	3 x 1½ x ½	6 x 6 x ¾
6 x 6 x ½	6 x 3 x ½	9 x 4 x ¾
6 x 6 x ¾	6 x 3 x ¾	9 x 6 x ¾
8 x 8 x ¾	8 x 4 x ¾	12 x 12 x 1¼
9 x 9 x 1	9 x 4½ x 1	
12 x 12 x 1	12 x 6 x 1	
12 x 12 x 1¼	12 x 6 x 1¼	

Carborundum Mosaic anti-slip floor tile, ¾ in. square, 1 1/16 in. square and 1 in. hexagonal, in black, white or brown, are furnished for use alone or in conjunction with ordinary tile.

Diagonal and square halves of above sizes also are made.

When specified, stair tread tile will be furnished with two screw holes for attaching to under treads of wood, metal, etc.

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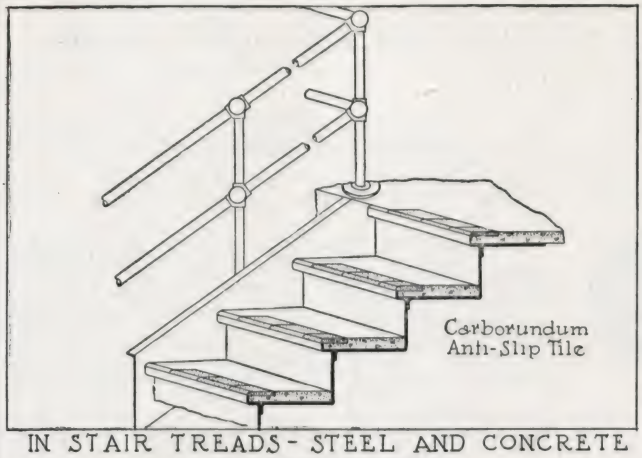
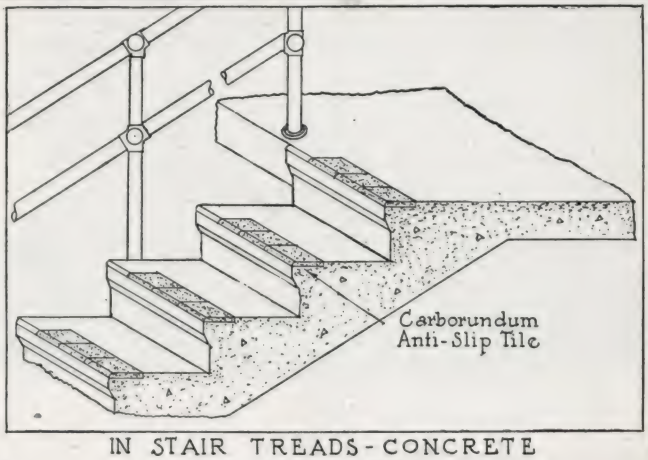
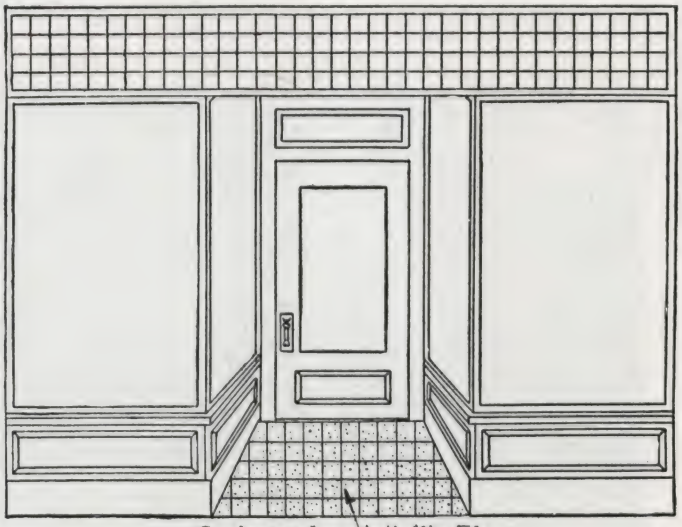


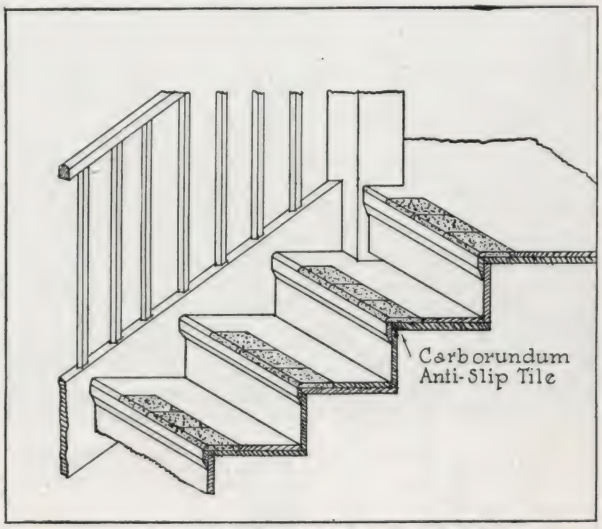
IN STAIR TREADS - STEEL AND CONCRETE CONSTRUCTION



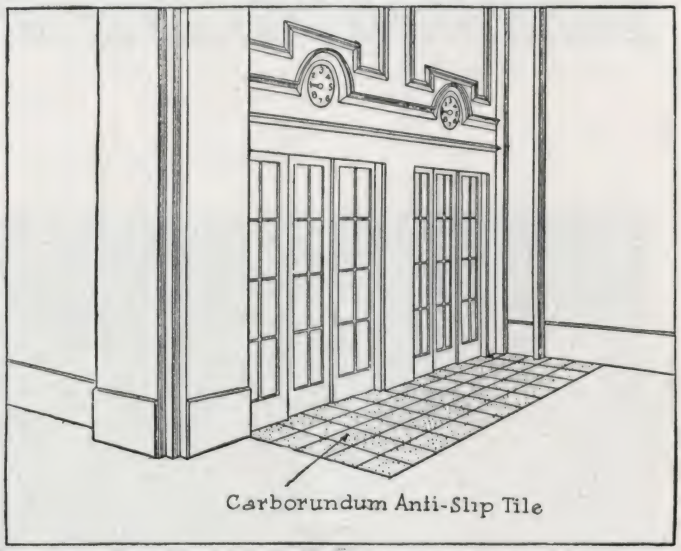
IN STAIR TREADS - CONCRETE CONSTRUCTION



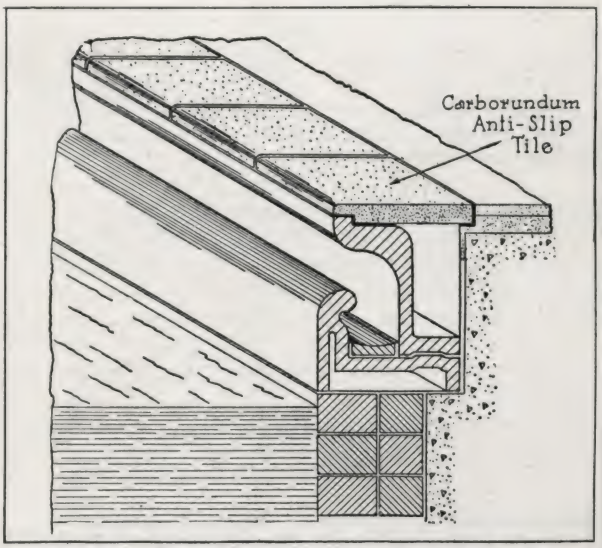
Carborundum Anti-Slip Tile
IN ENTRANCE WAY



IN STAIR TREADS - WOOD CONSTRUCTION



FOR ELEVATOR ENTRANCES AND FLOORS



FOR EDGES OF SWIMMING POOLS (BOORAEM PATENTS)

DRAWN FOR AMERICAN ABRASIVE METALS CO.	DETAILS SHOWING SOME OF THE USES FOR CARBORUNDUM ANTI-SLIP TILE	NOT DRAWN TO SCALE. DATE AUG 22	DRWG 1

NORTON COMPANY

Manufacturers of Alundum Safety Tile Products for Floors and Stairs

WORCESTER, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 53 Park Place CHICAGO, ILL., 11 North Jefferson Street

DETROIT, MICH., 233 West Congress Street

NORTON COMPANY OF CANADA, LTD., HAMILTON, ONT.

Products

ALUNDUM SAFETY TILE
ALUNDUM SAFETY TILE (CERAMIC MOSAIC)
ALUNDUM SAFETY AGGREGATE TILE AND TREADS
ALUNDUM SAFETY AGGREGATES
ALUNDUM SAFETY UNIT TREADS

Alundum Safety Tile

A product which provides a slip-proof surface under all conditions, for floors, stair treads, ramps, elevator landings, shower baths, swimming pools and around dangerous machines. It is used with concrete, steel, brick, wood, marble and granite. It makes an ideal stair tread for schoolhouses and other public buildings, railway and subway stations, and floors for store entrances, ramps and other places where foot traffic is heavy and there is danger from slipping. Furnished with a round nose for stair treads which never wears smooth.

STANDARD SIZES ALUNDUM SAFETY TILE

Size, in.	Colors
FLOOR TILE (SQUARE AND OBLONG)	
3 x 3 x ½	Brown, buff, gray, white granite
3 x 4½ x ½	Brown, buff, gray, white granite
6 x 6 x ½	Brown, buff, gray
6 x 6 x ¾	Brown, buff, gray, white granite
9 x 4 x ¾	Brown, buff, gray, white granite
9 x 6 x ¾	Brown, buff, gray, white granite
9 x 9 x 1	Brown
12 x 6 x 1	Brown
12 x 6 x 1¼	Brown
12 x 12 x 1	Brown
12 x 12 x 1¼	Brown

Diagonal and square halves furnished.

STAIR TILE	
6 x 6 x ½	Brown, buff, gray
6 x 6 x ¾	Brown, buff, gray, white granite
9 x 4 x ¾	Brown, buff, gray, white granite
9 x 6 x ¾	Brown, buff, gray, white granite
12 x 12 x 1¼	Brown

Approximate weight, 150 lbs. per cu. ft.

Alundum Safety Tile (Ceramic Mosaic)

It has the same slip-proof and non-wearing properties as the regular Alundum safety tile. Desirable for use in combination with other tiles for special artistic effects and color schemes. The slip-proof feature makes this type of floor practicable in many places where a smooth tile floor would be dangerous.

Squares: ¾ and 1⅛ in. Hexagonal: 1 in.
Colors: Brown, buff, green and white granite.
Square halves and diagonal halves furnished.

Alundum Safety Aggregate Tile and Treads

This is a slip-proof tile composed of Alundum safety aggregates and marble chips combined and bonded together with cement. The tile has a uniform structure, the surface is machined perfectly straight and level, and it is so made that it bonds perfectly with cement and will not become loose if properly set. When compared with terrazzo and marble floors this tile is practically noiseless.

With the various colors of safety aggregates and the variety of marble chips available, the architect has an unlimited range of combinations to choose from. This tile is made to order, the architect selecting his own combinations. Specimen combinations will be sent on request.

It is slip-proof wet or dry and can be cleaned. It makes an ideal floor for vestibules, corridors, reception rooms, cafes, swimming pool platforms and other places where an artistic but safe floor is desirable.

ALUNDUM SAFETY TILE STORE ENTRANCE OF NEWCOMB-ENDICOTT BUILDING, DETROIT, MICH.
HARRY S. ANGELL, Architect
No tripping or slipping. No rubber or cork mats are necessary. Alundum safety tile is slip-proof, wet or dry

ALUNDUM SAFETY TILE STEPS TO ENTRANCE OF ADMINISTRATION BUILDING OF BUICK MOTOR CAR CO., FLINT, MICH.
BUICK MOTOR CAR CO.'S ENGINEERS
A typical example of the application of Alundum safety tile to concrete steps for industrial plants

Continued on next page

STANDARD SIZES ALUNDUM SAFETY AGGREGATE TILE

Square, in.		Oblong, in.	
8x8 9x9	10x10 12x12	8x16 9x18	10x20

Diagonal and square halves furnished.

Alundum Safety Aggregates

For use with marble chips in terrazzo and cement floors. They give a non-slip surface and greater durability. Sold in any quantity.

Alundum Safety Unit Treads

They are composed of Alundum safety tile set in mastic. Recommended for repair work in connection with worn marble, slate, wood and concrete steps. Furnished in sizes up to 12 in. wide and 4 ft. long. They present a flat surface, no corrugations. They are slip-proof wet or dry. Have a rounded non-slip nose that never wears smooth.

Materials and Processes

The slip-proof and non-wearing properties of Alundum safety floor products are the result of using an electric furnace abrasive material known by the trade-mark "Alundum." It is the same hard, sharp, tough abrasive widely used for many years in the metal industries in the form of grinding wheels for the grinding of steel and other metal products. Alundum safety tile is a vitrified product produced by practically the same process used in the manufacture of vitrified grinding wheels. The entire mass is homogeneous throughout. The Alundum safety aggregates are made by first producing a safety tile product which is crushed and screened to standard size aggregates. Thus each aggregate consists of a number of small particles of abrasive bonded together by the vitrifying process.

Alundum safety aggregate tile is made by combining the Alundum safety aggregates with marble chips.

The trade-mark "Alundum" stands for an electric furnace product known throughout the world in metal working industries. It represents the farthest advancement in the development of electric furnace abrasives. These floor products are the result of scientific development, having back of them an organization with a third of a century's experience in the bonding of abrasive products.

Instructions for Installing

Alundum safety tile is semivitreous and special care must be taken to keep cement off the face.

Method of Laying Alundum Safety Tile—

(1) Soak the tile in clean water for at least 10 minutes before starting to set.

(2) Set mortar bed, consisting of 1 part portland cement and 2 parts cleaned, washed, sharp sand, to receive tile.

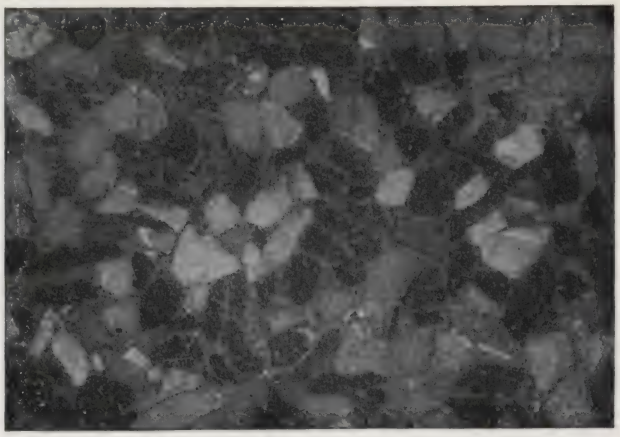
(3) Set tile same as any large unit floor tile, only be as careful as possible not to get cement on the face.

(4) Wash face and edges clean and let set for about 24 hours.

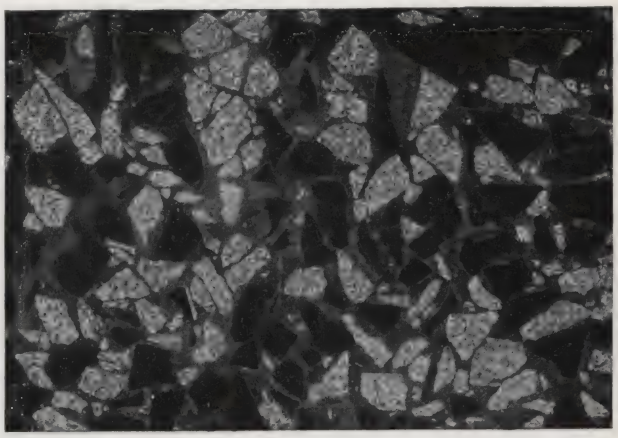
(5) The joints should be pointed or struck and not grouted.

(6) Joints should be $\frac{1}{16}$ in. and up depending on size of tile, also area or size of space. The larger the tile unit, area or space the wider the joint should be.

(7) After joints are well filled, take sawdust and a burlap bag (or clean cloth) and remove all surplus cement, leaving joints well filled and face of tile free from cement or stain. If not clean, repeat until all cement has been removed.



RED VERONA MARBLE AND BROWN ALUNDUM AGGREGATES —No. 2



BELGIAN BLACK MARBLE AND BUFF ALUNDUM AGGREGATES —No. 2.

Joints recommended:

Floor tile 3x3 in., $\frac{1}{16}$-in. joint
Floor tile 6x6 in., $\frac{1}{4}$ to $\frac{1}{2}$-in. joint
Floor tile 8x8 in., $\frac{1}{4}$ to $\frac{3}{4}$-in. joint
Floor tile 9x9 in., $\frac{1}{4}$ to $\frac{3}{4}$-in. joint
Floor tile 12x12 in., $\frac{1}{4}$ to $\frac{3}{4}$-in. joint
Stair tile nosings $\frac{1}{16}$ to $\frac{1}{8}$-in. joint

(8) Place building paper on tile, spread sand on paper to keep it in place and protect tile from dirt, at least 36 hours, until ready to clean.

(9) *Ceramic Mosaic*—Set the same as any papered vitreous ceramic mosaic, only after grouting special care must be taken to remove all cement before it becomes dry by using sawdust as directed in paragraph No. 7.

(10) *Alundum Safety Aggregate Floor Tile*—Set the same as marble tile, all joints to be pointed and not grouted.

How to Clean Alundum Safety Tile—

(1) Wash with a solution of muriatic acid and water (6 oz. of acid to a 12-qt. *wooden bucket* of clean water) applied with fiber scrubbing brush, allow acid to remain on floor a few minutes only, then thoroughly wash off.

(2) If a white scum appears on the surface of tile, caused by the cement, this can generally be removed by washing frequently with plenty of good soap or soap powder and water, rubbing same with a piece of soft grindstone or grit, removing with a soft cloth.

Further information on request.

Literature and Samples

Descriptive matter covering tests, methods of application of the Alundum safety tile products and samples will be sent on application.

UNIVERSAL SAFETY TREAD COMPANY

40 Court Street
BOSTON, MASS.

FACTORY
WALTHAM, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 120 Liberty Street
CHICAGO, ILL., 711 First National Bank Building
MILWAUKEE, WIS., 1040 Kinnickinnic Avenue

REPRESENTATIVES

PHILADELPHIA, PA., R. R. Hammond & Co., 417 Widener Building
SEATTLE, WASH., S. W. R. Dally, 332 Pioneer Building
CHICAGO, ILL., Ray P. Lee, 711 First National Bank Building
SAN FRANCISCO, CAL., G. H. Trask, 76 Sacramento Street
DETROIT, MICH., A. H. Sloan Co., Inc.
LOS ANGELES, CAL., A. W. Arlin, Central Building
ST. PAUL, MINN., E. V. Walsh, 1116 St. Clair Street
CINCINNATI, OHIO, Durbrow & Otte, 206 W. Court Street
FORT WORTH, TEX., Southwell Builders Supply Co.
OMAHA, NEBR., F. R. McConnell, 427 Railway Exchange

Products

Universal Safety Tread; Universal Anti-Slip Metal Tread.

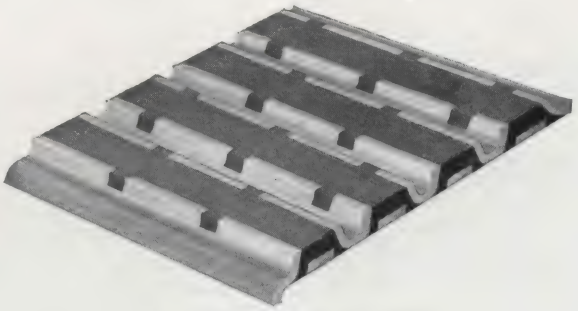
Universal Safety Tread

Uses—It may be used on wood, iron, concrete or stone; on stairs and inclines in all kinds of buildings; on car steps and ladders.

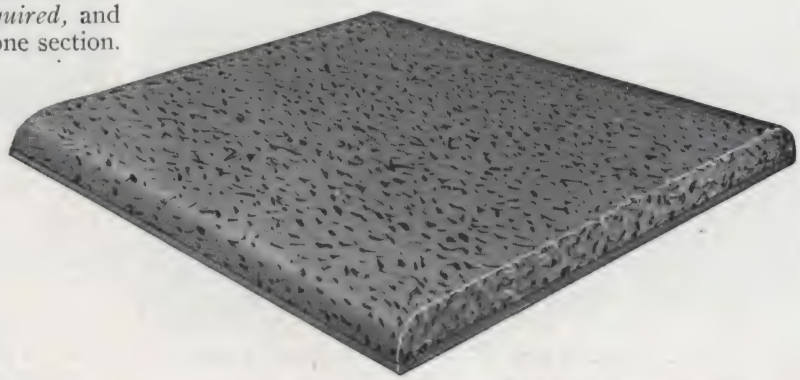
Construction—The baseplate is of steel or brass, punched to receive the lead inserts, which are firmly interlocked. By this construction a continuous non-slip wearing surface of lead is presented, reinforced by the steel teeth to insure durability. The baseplate can be extended to form a nosing *of any depth required,* and the tread made in any widths up to 12 in. in one section.

Naval Work—The baseplate can be furnished of special *alloy-coated* or *galvanized* iron to resist the action of salt water; or of *brass* if desired, thereby rendering the tread *rustproof.*

Anchors—In concrete work special anchors for attaching the treads are furnished.



Universal Safety Tread



Flat Type of Universal Anti-Slip Metal Tread

Universal Anti-Slip Metal Tread

Construction—This tread is designed in two types, *flat* and *corrugated,* for situations where the wear is exceptionally severe, as on sidewalks, subway stairs, etc. The surface is composed of grains of alundum, the hardest mineral known, held to the steel base by a binder of lead. The alundum is uniformly distributed throughout the depth of the lead, so that irrespective of the amount of wear, a surface containing numerous grains will always be presented. Hence, perfect safety combined with the greatest durability is assured.

Advantages—The surface presents no steel whatever to become slippery, as the steel base is used merely as a stiffener for the non-slip abrasive material attached to it. The lead coating on all sides, combined with the tinned steel base, renders double protection against atmosphere, thereby rendering the tread absolutely rustproof, equal to or better than a galvanized product. The reinforced nosing, as illustrated, should always be specified where possible, as this construction will greatly increase the life of the tread, presenting a double-thick body of abrasive at the point of hardest wear.

Section of Reinforced Nosing

Corrugated Type of Universal Anti-Slip Metal Tread
The most effective and durable safety tread on the market

ARROWHEAD IRON WORKS, INC.

Manufacturers of Steel Flooring, Grating and Treads

531 West Fifth Street
KANSAS CITY, MO.

AFFILIATED COMPANIES
ARROWHEAD IRON WORKS OF CHICAGO, INCORPORATED, 816 West Erie Street, CHICAGO, ILL.
ARROWHEAD IRON WORKS OF PENNSYLVANIA, INCORPORATED, 2414 Sedgley Avenue, PHILADELPHIA, PA.
ARROWHEAD IRON WORKS, INCORPORATED, OAKLAND, CAL.

Products

TYPE H ARROWHEAD FLOORING for floors, sidewalks and Areaways (patented).

TYPE A ARROWHEAD GRATING for walkways (patented).

ARROWHEAD GRATING TREADS for industrial stairs and fire escapes (patented).

Type H Arrowhead Flooring

Consists of two comparatively heavy steel bars disposed on edge, notched to fit bearing, and connected by two or more cross bars riveted at contact points to which is riveted a web of Arrowhead Grating ⅝ inch deep, the span of which, from cross bar to cross bar, is always less than 2 feet. The result is a grating, not only much stronger than the older types of fabricated grating; but one which, owing to notch at bearing, does not require clips for fastening to channels or beams; can be erected by simply laying in place, and is absolutely trouble-proof thereafter.

The outer bars are of depths to carry required load on any span without varying the depth of grating at bearings, thus insuring a floor of uniform strength. When necessary, the notch at bearing can be made of depth to take care of any variation in levels of supporting steel without the use of fillers.

The notch, together with the filler bar which contacts with the supporting steel and web of grating, makes it practical to have a grating of any specified depth.

The heavy outer bars being 15 inches apart, with the shallow web, make the floor so open that an incandescent light can be clearly seen through three floors of Arrowhead. As the primary reasons for using a grating floor are light and ventilation, this puts Arrowhead in a class by itself.

Where cutouts occur, reinforcing angles are supplied with special roundheaded bolts to fasten to adjacent heavy outer bars, an important advantage as the floor is not weakened around openings as would necessarily be the case if the reinforcing bars were attached to small grating bars.

The surface of Type H, having all the beauty and non-slip qualities of Arrowhead design, makes, when installed, an ideal open floor. In walking, wheeling, or putting heavy weights on small areas, Type H directly distributes the load to its supports through the entire panel instead of a few bars receiving the load or shock, as is the case with most grating. This reduces deflection entirely out of proportion to its guaranteed strength.

Specifications of Arrowhead Type H Flooring—The following numbered paragraphs are explanatory of the numbered parts in the illustration shown below.

(1) ***Side Bars***—Proportioned to safely carry required load without excessive deflection. Usual size, 2x¼ to 4x¼ inches. Distance between supports may be as great as 10 or 12 feet, with small weight per square foot of grating because strongest members are thus placed where needed.

(2) ***Cross Bars***—Riveted between side bars to support shallow web. Usual size 1¼x¼ inch, with maximum spacing about 2 feet for ordinary loads. (All sizes given are subject to increase for extra heavy loads, but the construction used in special designs is similar to that shown.)

(3) ***Web Bars***—Continuous over cross bars and riveted to side bars. Usual size ⅝x$\frac{3}{16}$ inch for straight bars and ⅝x⅛ inch for crimped bars. Shallow web presents minimum interference to passage of light and air, aids painting, and lessens area for lodgement of dirt. Right angle shoulders of crimped bars distribute part of load laterally, increase frictional resistance against slipping, and stiffen entire panel by truss action.

(4) ***Notches at Bearing***—Made of any required depth at supports. Automatically prevent longitudinal shifting on supports, without the use of troublesome fastening devices. Permit supporting steel to be at any convenient level, without regard to variation in depth of side bars to meet specific conditions.

(5) Notches over any intermediate supporting steel can be made as required.

(6) ***Bearing Bars***—Placed at ends of panel over supports, as needed to agree with depth of notches, thus furnishing even bearing for ends of web bars. Where any of the main bars are to be cut for openings, reinforcement is provided to assure required strength and continuity.

General—Clearance between web bars is usually 1$\frac{3}{16}$ inch for industrial size, and 1 inch for sidewalk areaways. Rivet spacing is about 6 inches for the former and 4½ inches for the latter. Usual standard panel width is about 15 inches, but odd widths can be made up to 33 inches to suit specific conditions.

Type A Arrowhead Grating

Consists of parallel steel bars disposed on edge and connected by crimped bars of equal depth bent so as to form combination stay and oblique braces. The result is a grating, beautiful in design and strong for its weight of metal. The side brace every 6 inches trusses it against lateral compression and consequently reduces strain on rivets when overloaded. The brace being in alignment every 6 inches effectually prevents the side slip, so noticeable in most gratings where oil or grease accumulate.

This type makes an ideal walkway where spans are short and no heavy loading occurs; in fact, wherever a light grating is desired, we believe it has no equal. It is made in ¾ inch for spans of 3 feet and *under,* and 1 inch for spans of 4 feet and *under.*

Clips for fastening to supports are furnished attached to grating. Panels are punched and ⅜-inch machine bolts are furnished for bolting panels together, thus making a continuous floor.

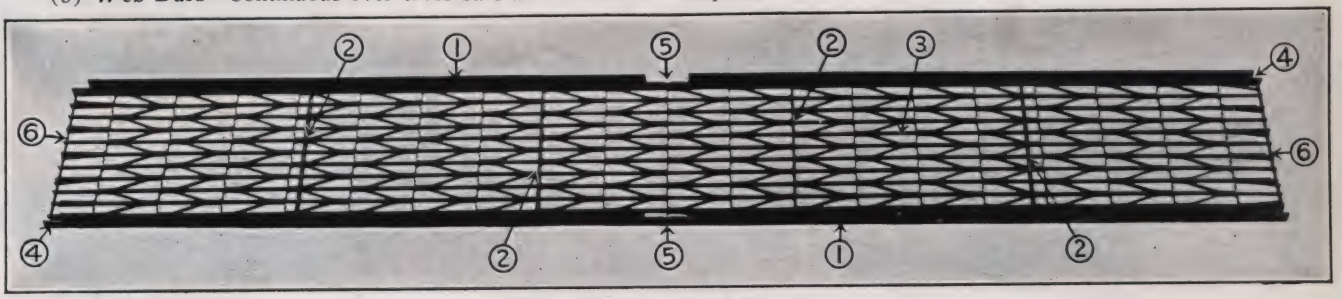
Arrowhead Treads

Arrowhead treads were designed to put the weight of metal where it would do the most good.

A heavy nosing bar is continuous, to which is riveted a ¾-inch web of Arrowhead grating and supported by two carrier bars. It is no exaggeration to say these treads have taken the place of other metallic steps in new construction wherever their advantages are known. They make a light dead weight on stringers, are non-slippable, easy to erect, and fill every requirement of an industrial tread.

Information

Further information, catalogue and prices furnished on request.



Type H Arrowhead Flooring

To any engineering firm wishing to make tests, we will furnish a stock sample of Type H. Arrowhead flooring in any length up to 12 ft. of standard 15-in. width

IRVING IRON WORKS COMPANY

Manufacturers of Grating Flooring and Safety Steps

TELEPHONE
HUNTERS POINT 3342

Dutchkill Creek and Third Street
LONG ISLAND CITY, N. Y.

Products

Sole manufacturers of "IRVING SUBWAY" GRATING or METALLIC FLOORING; "IRVING SAFSTEP" STAIR and LADDER STEPS.

Also manufacturers of "Sunway," "Reticuline," "Eggcrate," "Honeycomb," and other forms of Grating, Grating-flooring, and Grating-flooring Accessories; Irving Walkways; Metal Accessories for power and industrial plants.

IRVING SUBWAY TRADE MARK (PATENTED) THE FIREPROOF VENTILATING FLOORING

IRVING SAFSTEP TRADE MARK (PATENTED) ABSOLUTELY NON-SLIPPING ALWAYS

Trade-marks

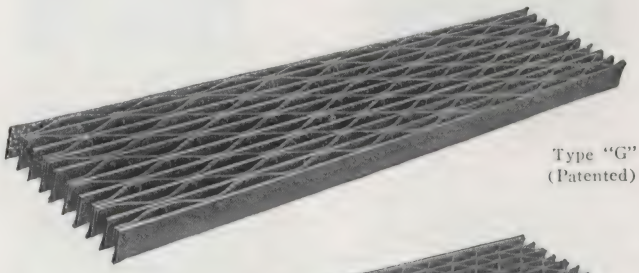
The trade-marks "Subway," "Sunway" "Reticuline," and "Safstep" are registered in the United States Patent Office, are the exclusive property of this company, and can not legally be used in connection with any other grating or grating-flooring product made by any other company.

"Irving Subway" Grating

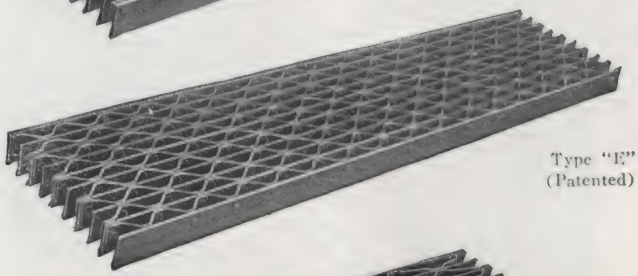
Construction—"Irving Subway" consists of a series of light steel bars placed on edge, between each pair of which a reticuline bar is firmly riveted in position. The finished section is a light, inflexible panel embodying the well-known truss principle by which a load applied at any point is distributed over a wide area. Maximum strength is thus secured with the minimum weight. Each section of "Irving Subway" is, in all essentials, a solid unit, in which there is, and can be, no looseness, no play, no rattling.

Types—There are three standard types of "Irving Subway" as illustrated below, differing in appearance and in price, but not in strength or general merit. The rated load capacity is the same for all. Choice between them is to be determined by the factor of size and shape of mesh.

Exclusive Advantages—Maximum strength per unit of weight; maximum weight per unit of load and span; uniform distribution of load by truss construction; maximum lighting and ventilation opening (80% of panel area); absolutely non-slipping surface; can not become loose and rattly; oil or grease, age or wear does not impair its non-slipping qualities; small size of individual openings (mesh) prevents passage of tools, etc.; wheels or rib-hooped barrels can be rolled over it in any direction without going through; its light weight permits minimum weight and cost of the supporting structure; safe to work under because nothing large or heavy can fall through it; openings for pipes, columns, etc., can be cut out without seriously impairing the strength; easily fitted into corners or formed in irregular shapes; easily mounted or attached to any type of construction without drilling, tapping, bolts or screws.



Type "G" (Patented)



Type "E" (Patented)

Type "M" (Patented)

THREE STANDARD TYPES OF "IRVING SUBWAY" GRATING

Applications

For all purposes where a permanent, non-slipping, fireproof ventilating flooring is required: Elevator and hatchway gratings; elevator floors; penthouse floors; covers for ventilating shafts, sidewalk areas, pipe trenches, register openings; window guards; parapet railings; surface armoring for concrete; galleries and walkways; stair steps; storage rack galleries and mezzanine floors.

TYPICAL INSTALLATION OF "IRVING SUBWAY" AS COVER FOR AREAS

"Safstep" Stair and Ladder Steps

Made entirely of steel, in reticuline construction, these safety steps are light and strong, fireproof, and permanently non-slipping under all conditions—no safety treads to wear out or work loose. Made in twenty-four standard sizes and types. Each unit is self-contained and complete, with carrier plate attached ready for mounting.

Catalogue

Catalogue No. 3A16, sent on request, gives complete description, load rating, sizes, spans, weights, etc.

C. K. ERNST SPECIALTY CO.

Manufacturers of Iron Specialties

998-1006 East Ferry Street

BUFFALO, N. Y.

Products

SELF-RAISING PLATFORM LIFTS, Hand and Motor Driven.

TELESCOPIC ASH HOISTS, Sidewalk and Wagon Height, Hand Power and Motor Operated.

AUTOMATIC SAFETY-GUARDED and COUNTERBALANCED SIDEWALK DOORS with OPENING and CLOSING ATTACHMENT.

PERFECTION CELLAR WINDOW ASH LIFTS.

TYPE "A" PLATFORM LIFTS, Hand and Motor Operated.

Ernst Self-raising Platform Lift

A platform lift of unusual merit that can be used through a cellar window or sidewalk door for handling material, ashes, etc., to and from the basement, requiring *the least amount of labor to operate.* Lowers loads of 300 to 1000 lbs. capacity by gravity, controlled by powerful band brake. Platform, when empty, *rises automatically* to grade level. 7-in. channel uprights inclined at cellar floor, but 2 ft. 5-in. (standard) from channels to supporting angles for stores, banks, hotels, heating plants, etc.

Special Features—An *endless chain drive* fitted to special sprocket wheels and *cranking mechanism being directly* attached to uprights, eliminates replacements of cable ordinarily used to wind up on drums.

The counterbalanced platform and endless chain drive make elevator operate the same at all times. Lift is self-supported, requiring but 4 anchor bolts to set in place, making installation easy. *Empty platform rises automatically without cranking.*

Window Type Ash Lift—Especially suitable for large heating plants, such as schools, apartments, public and office buildings, hotels, etc. This lift, installed alongside a cellar window 3 ft. or more in height, is *particularly suited to handle 4 to 6 full ash cans at a time to grade level,* eliminating building an outside areaway and danger of an open hatchway. A hinged window is required to swing out. Only *one man* is required to operate the elevator. Operator and lift are *sheltered* at all times from rain and snow (Fig. 4). Lift is convenient to boilers.

Motor Driven Ash Lift—*Handles 4 full ash cans at a time* at hoisting speed of 20 ft. a minute, controlled by an automatic switch at both floor levels by one man. Motor and switch mounted on stand built between uprights, taking up no extra room. One of the *finest, simplest and least expensive motor driven lifts made.*

The motor driven lift is recommended for large heating plants where a considerable amount of ashes is hoisted daily, and for high cellars. Especially suited for *schools, office buildings, public institutions, hotels, etc.* See detail drawing for space and pit dimensions.

When Specifying—Provide an areaway 2 ft. wider than size of sidewalk door used, to provide space for operator to crank lift from the side. A 4x4-ft. door will permit a platform 3 ft. 10 in. wide by 3 ft. long. Detailed drawing sent on request. Furnished also with double door and hoop to open doors automatically. Lifts are made with any size platform.

Prices—For heights up to 10 ft., with platforms up to 4 ft. square, $295.00 for hand power lift; for additional height, $5.00 per ft. State current available on premises for quotation on motor driven lift.

FIG. 1. Lift with Platform Level with Floor

Only 2-ft. space required for operator to crank lift at side

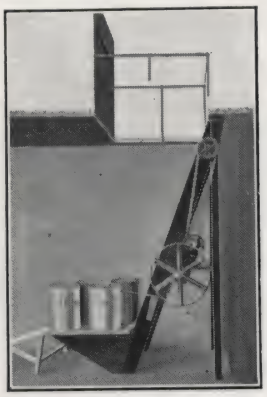


FIG. 2. Platform without Pit Only 18 in. from Cellar Floor

Shown with Ernst safety guarded door

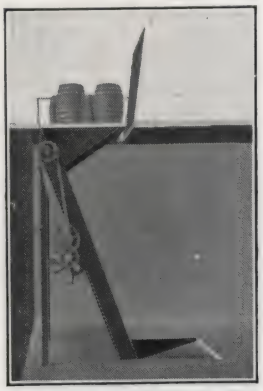


FIG. 3. Platform Level with Sidewalk

Inclined only 2 ft. 5 in. Made in hand power and electric motor driven

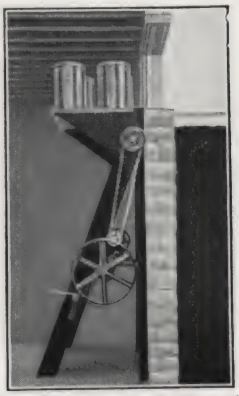


FIG. 4. Lift Used Through Cellar Window 3 ft. High or More

4 cans raised to grade in one minute. One-man operated

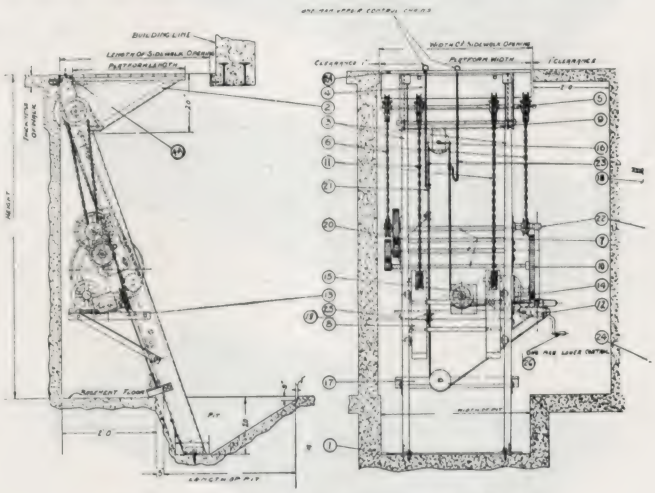


FIG. 5. Self-raising Lift Electrically Equipped 1000 lbs. capacity. One-man operated

ERNST SELF-RAISING PLATFORM LIFTS

Made for all heights of cellars. Cranking mechanisms furnished to operate on either side. Motor directly connected; takes up no extra room in basement

Continued on next page

Ernst Telescopic Ash Hoist

A practical, compact one-man operated lift designed to handle ash cans, barrels, boxes, crates, etc., to and from the basement with perfect ease and safety. When not in use, *hoist telescopes under sidewalk.* The entire operation of hoisting full cans to grade and lowering of empty cans to the cellar is accomplished by *one operator* on sidewalk level. Bolted to and sets on cellar floor.

Construction—Only the strongest and finest materials are used in the construction of this hoist. Every labor saving feature has been attached to make it the fastest, safest and easiest lift for unskilled labor to operate. Ball bearings, where load is carried, make it quiet and easy in operation. *A gear shift operated by the foot at sidewalk level allows loads to be lowered by brake.* Operating handle does not revolve. Machine cut gears, as well as machined safety ratchets and pinion made of steel, are provided. Drum is cable grooved for ⅜-in. steel cable. Cranking mechanism detachable for storing away when lift is not used. Hoisting speed 35 ft. a minute, one-man operated. Capacity, 400 to 500 lbs. Shipped completely assembled after undergoing actual working tests. Detailed drawing and directions for installing furnished with each order.

Price—Hoist alone, $140.00, f.o.b. Buffalo, N. Y. It is recommended that this hoist be used with the Ernst patented safety-guarded door with door opening mechanism described below.

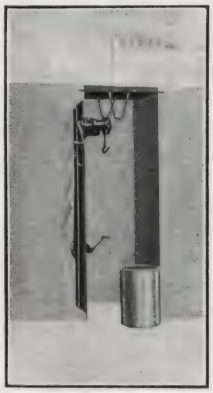


Fig. 6. Door Closed
Note compact hoist under closed door.
Door automatically closed by operator from the cellar, when through hoisting

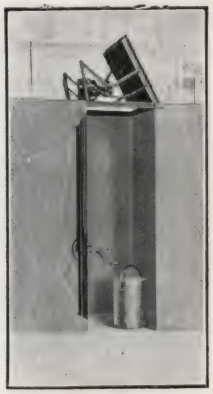


Fig. 7. Hoist and Door Automatically Raised in a Single Operation by Operator from the Cellar
Door locked in any position

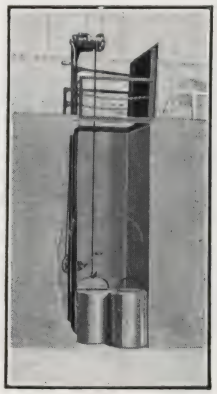


Fig. 8. Hoist Extended, Door Opening Completely Safety-guarded on 4 Sides
Door locked in open position, cans hooked on by operator on sidewalk level

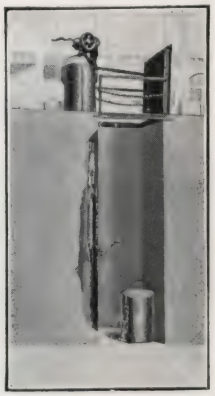


Fig. 9. Can Hoisted and Swung on Walk without Lifting or Touching Ash Can
Empty cans lowered by brake. Hoisting handle does not revolve

Ernst Combination Telescopic Ash Hoist and Sidewalk Door with Door Opening Mechanism

Ernst Combination Telescopic Hoist and Door with Door Opening, Closing and Locking Mechanism

The opening and closing of sidewalk door is *automatically* taken care of by operator turning the telescopic crank from cellar floor level in a *single operation.* This outfit is designated to permit *one man* to perform the *entire operation* of hoisting the full cans to grade and lowering of empty cans to cellar, the open hatchway being *automatically safety-guarded.* The sidewalk door is *automatically locked,* whether *open or closed.* Note simplicity of outfit and the few working parts easily installed. Nothing complicated to get out of order.

The sidewalk door is of the flush type, having concealed frame and hinges, checkered plate level with sidewalk. The finest appearing door made, in addition to being *safety-guarded.* Hoist is this company's regular sidewalk operated telescopic ash hoist.

Prices—Telescopic ash hoist complete with sidewalk door, 4x4 ft., and frame with automatic guards, door opening, closing and locking device, $240.00, f.o.b. Buffalo, N. Y. Swing bail ash cans 18x26 in., $8.00 each. Vault light doors also made.

Specifications—Provide where shown on plans one Ernst Telescopic Ash Hoist complete with sidewalk door, size 4x4 ft., having automatic guards and automatic door opening, closing and locking device, with one ash can truck.

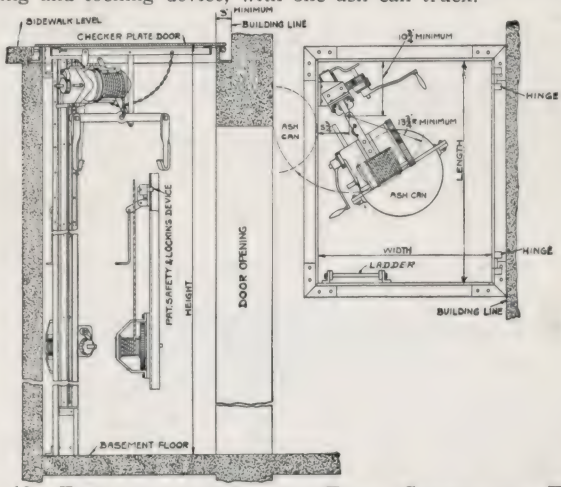


Fig. 10. Elevation and Plan of Ernst Combination Telescopic Ash Hoist and Sidewalk Door with Door Operating Device

Ernst Hand Operated Telescopic Vehicle Ash Hoist

Fig. 11 shows that but one operator is required, who stands on grade level to hoist, swing over wagon and empty ash cans directly from the cellar to save rehandling of cans at grade level. Hatchway should be so located that a wagon or truck can be driven alongside of areaway.

Hoist has a capacity of 300 lbs., operates at a speed of 30 ft. per minute, has our regular automatic gear shifting and braking device for lowering empty cans to cellar by gravity. Extension crane telescopes under sidewalk level.

We recommend using our safety-guarded sidewalk door and frame having our automatic door operating device, with the vehicle type ash hoist.

To Specify—Provide where shown on plans an Ernst telescopic vehicle type ash hoist complete with a 4x4-ft. safety-guarded sidewalk door and frame, with Ernst automatic door opening, closing and locking device for complete one-man operation. Also furnish 6 swing bail ash cans and ash can truck.

Continued on next page

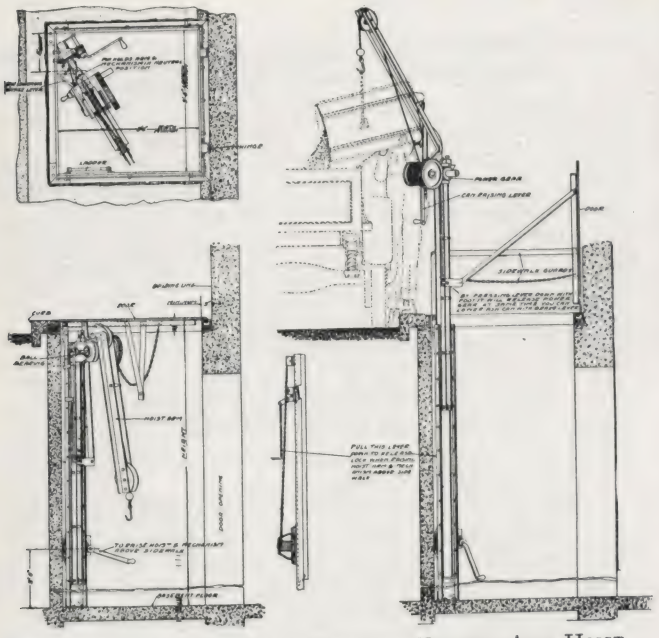


FIG. 11. TELESCOPIC HAND OPERATED VEHICLE ASH HOIST

Ernst Electric Telescopic Vehicle Ash Hoist

Permits ash cans to be hoisted from cellars of large heating plants directly onto a wagon 7 ft. 6 in. above grade very rapidly as well as economically. Hoists cans at speed of 70 ft. per minute. Automatic upper and lower limits, one hoisting speed hand controller, magnetic switch, worm gear driven, 1½ h. p. motor.

Recommended for use with our safety-guarded sidewalk door and frame, having our automatic door opening, closing and locking device.

Detailed drawing of this model sent upon request.

Ernst Counterbalanced Telescopic Ash Hoist

The regular Ernst telescopic hoist furnished with counterweight instead of telescopic cranking mechanism, permits operator to *open sidewalk door, elevate hoist in position above sidewalk, and the entire operation of hoisting ashes and lowering of empty cans to cellar without operator needing to leave sidewalk. Hoist is lowered in basement and sidewalk doors closed by operator at sidewalk level. Entirely one-man operated from sidewalk level.*

Ernst Perfection Cellar Window Lift

This handy and compact lift makes use of a *cellar window* to hoist and *swing* ash cans or produce directly on to the *sidewalk*.

Can be used in any new or existing building to advantage, in a few hours' time, ready for use.

Any window 28 in. wide by 28 in. high will allow *all standard makes* of ash cans to be passed through the window, size of window governing size of can or package that can be handled on elevator platform.

Made for all heights of basements.

Made entirely of metal, consisting of a 3-in. iron pipe upright securely fastened to the ceiling and cellar floor by flanges, on which rides a platform, 21 in. in diameter, operated by cranking mechanism directly attached to the upright.

Upright is but 8 in. from wall, just clear of window.

Platform lowers to within 1½ in. from floor and requires *no pit*.

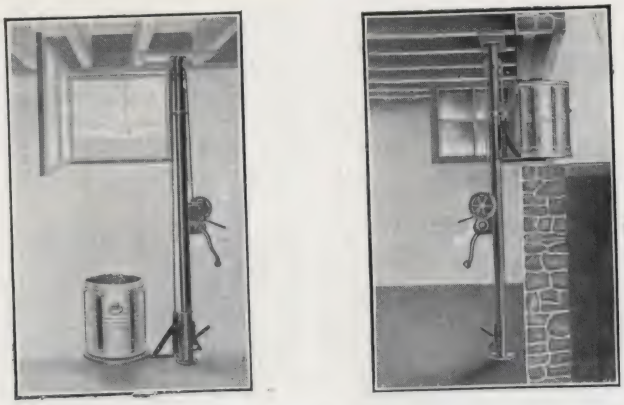


FIG. 12. ERNST PERFECTION CELLAR WINDOW LIFT

It operates at speed of 15 to 25 ft. per minute, and handles any load up to 300 lbs.

Elevator equipped with compound machine cut gears, replaceable steel bearings, powerful brake to lower empty cans, window height regulator, steady pin, cable grooved drum for ⅜-in. steel cable, etc.

Lift is easy to install to concrete or plastered ceiling, wood joists and to cellar floor.

By use of a ladder, the operator can perform the entire operation of hoisting full cans to grade, removing cans, and lowering of empty cans to cellar. Excellent to use for handling baskets of wash from laundry, ashes and produce to and from cellar.

Price—Elevators complete to 8-ft. heights, $85.00 f.o.b. Buffalo, N. Y. To order, give height from floor to ceiling. Each additional foot required over 8-ft. basements adds $1.50 to above price.

A handy ash can truck for wheeling ash cans from furnace to ash lift platform is furnished for $7.00 extra.

Ernst Type "A" Hand Operated Platform Lifts

A fast operating, strong and serviceable elevator made in two capacities—500 and 750 lbs.

Designed for use in almost any areaway. Can be easily and inexpensively installed. Suitable for stores, banks, theaters, small hotels, apartments, etc.

Lift raises flush with sidewalk and with cellar floor if provided with a pit.

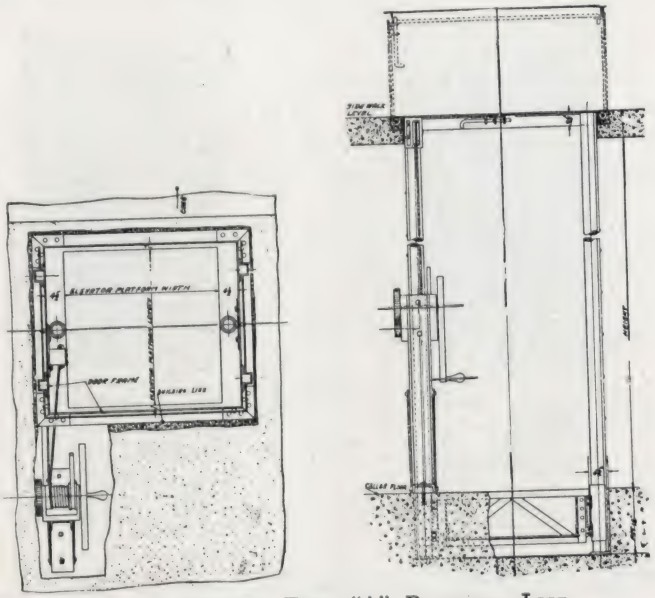


FIG. 13. DETAILS TYPE "A" PLATFORM LIFT

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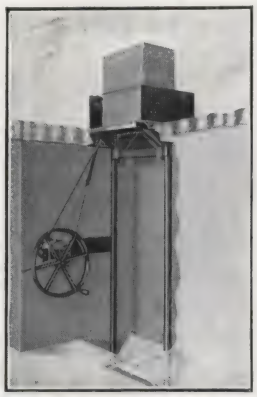


FIG. 14. ERNST TYPE "A" HAND OPERATED PLATFORM LIFT
Platform raised flush with sidewalk, 500-lb. capacity
Cranking mechanism secured to wall. Takes up only a foot of space

Constructed entirely of metal, platform of heavy galvanized iron, uprights made of 3-in. iron pipe. Lift is operated by a single cable, platform slides of non-binding type. Gears all machine cut and keyseated to shaft. Has safety ratchet, powerful brake, cable grooved drum, etc. Platform lowers within 15 in. of floor where no pit is used. Crank wheel, 24 in. diameter.

Prices—Type 'A," 500 lbs. capacity. Platform made in any size up to 3 ft. square, $165.00. A platform lift 3 ft. square requires a sidewalk door-opening 3 ft. 2 in. x 3 ft 9 in. (the latter dimension being parallel to the building). We can furnish a double leaf door with connections for easy installation, for $70.00 extra.

Type "A," 750 lbs. capacity. Platform made in any size up to 4 ft. sq., $190.00. A platform 4 ft. sq. requires a sidewalk door-opening 4 ft. 2 in. x 4 ft. 9 in. (the latter dimension being parallel to the building). We can furnish a double leaf door and frame 4 ft. sq., having our regular concealed flush type frame, for $75.00 extra. Can furnish also door-operating hoop on platform, when required, for operating sidewalk doors.

Pit—To provide pit, make same size as door used, and 15 in. deep.

Ernst Type "A" Motor Driven Platform Lifts

We can furnish the Type "A" platform lift with motor directly connected to stand as shown in Fig. 15, which makes an excellent and inexpensive motor driven sidewalk lift. Motor, 1½ h.p., worm gear driven.

An automatic limit switch stops platform at sidewalk and street level automatically. Push button or hand controller can be furnished, as desired. Limit switch and controller mounted on cranking mechanism stand, practically taking up no extra room in the basement.

Operates at a speed approximately 18 ft. per minute.

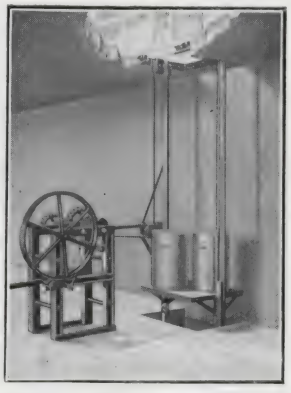


FIG. 15. ERNST TYPE "A" MOTOR DRIVEN PLATFORM LIFT
Lift off floor 15 in., 750-lb. capacity
Excellent where no pit is desired. Cranking mechanism mounted on stand bolted to floor

Ernst One-piece Safety-guarded Sidewalk Door

Practically no single article in the construction of a modern building causes more annoyance than the sidewalk doors now in use, due to their imperfections.

The Ernst door is the *only* door made that is *automatically safety-guarded* and *counterbalanced* to offer the best protection to pedestrians when door is *open*.

The guards *open* and *close* automatically when door is moved, and are invisible when door is closed.

Constructed of a 3-in. high x 2-in. wide angle, and one-piece checkered top (non-slippery) plate ¼ in. thick, strongly reinforced by stiffener angles and hinges to withstand loads of 300 lbs. per sq. ft. Hinges are concealed, but ¼ in. of frame is visible.

Heavy counterbalance weights allow easy opening and closing of door. Has no middle seams to bend down or leak.

Prices—Made in all sizes—stock sizes ranging from 3 ft. to 5 ft. square.

Note—When ordering, designate on which side door is to be hinged. Double doors having same flush frame and construction, and automatic guards also made.

Doors made also with watertight frames; also with vault light.

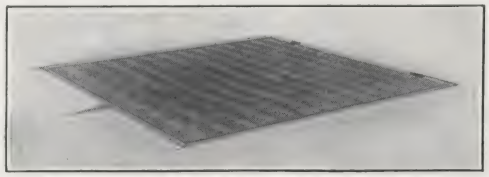


FIG. 16. Note Concealed Frame, Flush with Walk and Neat Appearance of Door Closed. Rail Guards Invisible

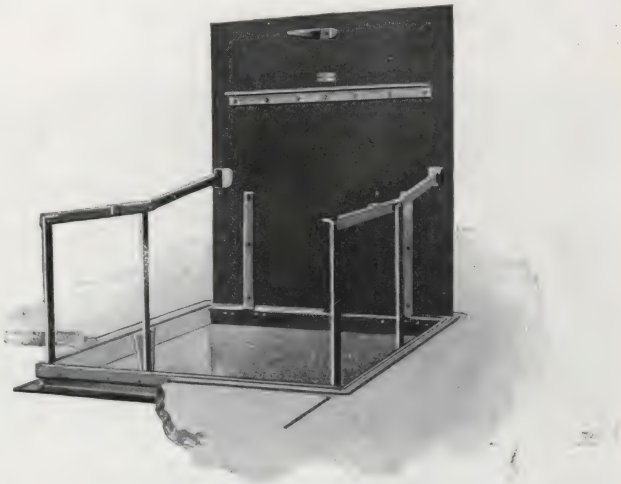


FIG. 17. Door Opened, Showing Complete Rail Guard and Concealed Frame
A rod encloses front side of door, thus completely protecting hatchway
ERNST ONE-PIECE SAFETY-GUARDED SIDEWALK DOOR

HERBERT MORRIS INCORPORATED

Manufacturers of Hoists

MAIN OFFICE

BUFFALO, N. Y.

BRANCH OFFICES

NEW YORK, N. Y. BOSTON, MASS. DETROIT, MICH. CHICAGO, ILL.

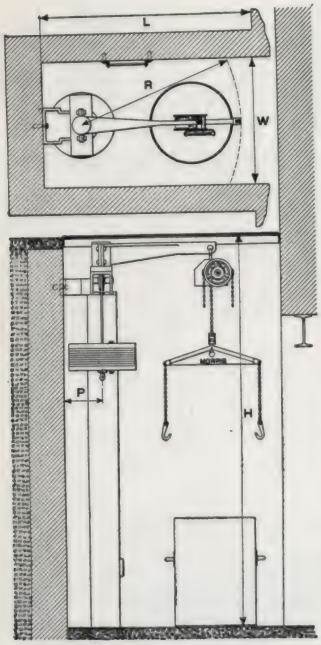
ASSOCIATED COMPANIES

HERBERT MORRIS, LTD., England
HERBERT MORRIS CRANE & HOIST CO. LTD., Canada
ETABLISSEMENTS HERBERT MORRIS, France
ENGINS DE LEVAGE HERBERT MORRIS, Belgium

Product

ASH HOISTS: Cellar Window and Telescopic.

Morris Telescopic Ash Hoists



PLAN AND ELEVATION TELESCOPIC ASH HOIST

They are used to raise ashes or other material from the basement. They can be arranged to lift either to the sidewalk level or to dump directly into a wagon, 5 ft. above grade.

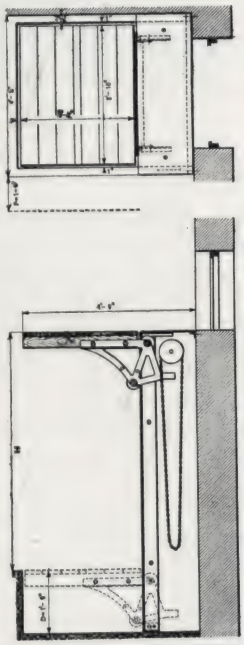
The telescoping portion is counterweighted. There is nothing to get out of order.

The lifting mechanism is a standard Morris chain hoist, efficient, economical, reliable. This hoist can be supplied to lift 500 lbs. or 250 lbs. of ashes at a time; in the latter case the speed of lift is 30 ft. per minute.

The diagram shows the method of installation. Two expansion bolts attach the top to the wall; the base is set into the concrete floor.

The minimum size of areaway is 3x3 ft., but the standard size is 3 ft. 3 in. x 3 ft. 3 in.

Morris Platform Ash Hoists



PLAN AND ELEVATION PLATFORM ASH HOIST

These are most commonly employed in basements having no areaway. They will lift flush with the sill of a window: the latter need only be large enough to pass an ordinary ash can.

These hoists have a lifting capacity of 1000 lbs., the platform measuring 4 ft. wide by 3 ft. 2 in. front to back.

Connection to the wall is obtained by means of two expansion bolts.

The hoists may be set on a level floor, using a light wooden ramp if desired, or a shallow pit, 4 ft. 2 in. long by 4 ft. 10 in. wide and 1 ft. deep may be provided to bring the platform level with the floor.

Electric operation of Morris platform ash hoists involves no changes in general arrangement. It is obtained by the attachment of a standard Morris electric rope hoist; arranged for the most convenient current supply.

Other Morris Products

These include chain blocks, trolleys, monorail systems, jib cranes, overhead traveling cranes, jacks, slings and floor trucks.

MORRIS TELESCOPIC ASH HOIST

MORRIS PLATFORM HOIST

F. S. PAYNE CO.

Manufacturers of Hydraulic Ash Hoists

CAMBRIDGE, MASS.

BRANCH OFFICES

BOSTON, MASS. LOWELL, MASS. NEW HAVEN, CONN.

Product

HYDRAULIC ASH HOISTS.

For Passenger and Freight Elevators, see pages 1964-1965; for Dumbwaiters, see pages 1986-1987.

PAYNE

TRADE-MARK

The hoist can be moved and re-located without sacrificing any part of the apparatus.

When ordering, please furnish (1) water pressure available; (2) distance between loading and unloading levels.

Hydraulic Ash Hoist

Payne hydraulic ash hoist is the ideal solution of the ash hoist problem where permanence, economy of operation and maintenance are considered.

After years of actual operation in varied uses, it has been conclusively demonstrated that this equipment is practically self-maintaining.

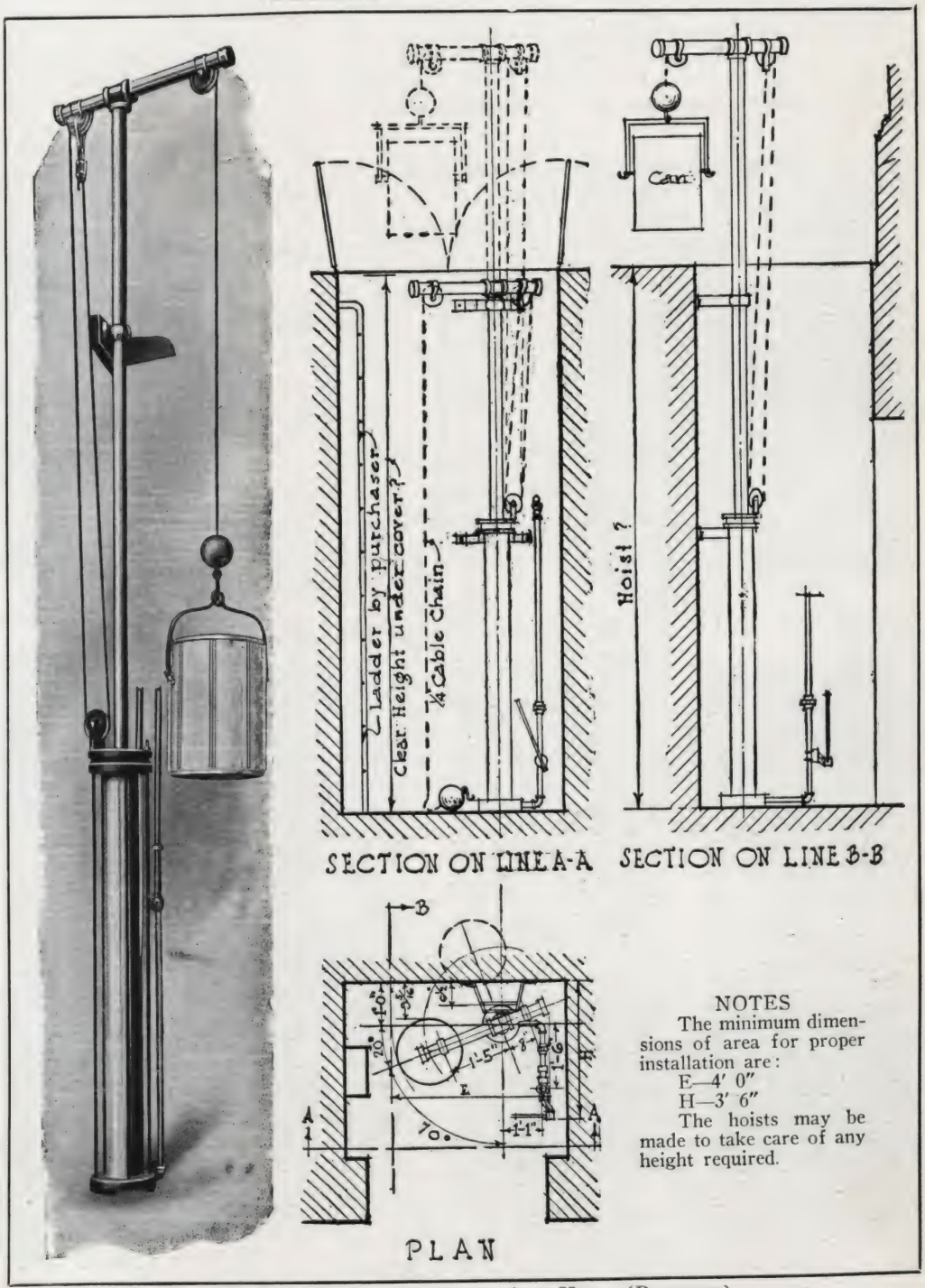
It is the most economically operated hoist ever designed, as the water consumption is invariably less than 2 cu. ft. a trip.

Skilled attention is not essential to satisfactory operation.

These machines were originally designed for use in schoolhouses and, due to their success in this service, are now being used wherever it is necessary to raise ashes or other materials from basement to sidewalk level.

The machine is designed not to disturb conditions in existing buildings nor to require special provision for it in the building.

Any mechanic can install this machine, as it is free from any mechanical complications and detailed instructions are furnished for the erection of the apparatus.



DETAILS OF PAYNE HYDRAULIC ASH HOIST (PATENTED)

WASHBURN & GRANGER, INC.

Manufacturers of Ash Can Hoists, Incinerators and Grate Bars

50 Church Street
NEW YORK, N. Y.

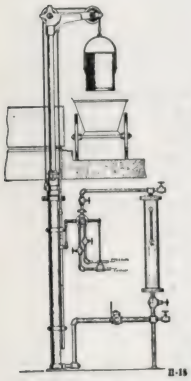
WORKS
MYERSTOWN, PA.

BOSTON, MASS., 141 Milk Street

Products

ASH CAN HOISTS: Telescopic, Air, Steam, Hydraulic, Electric or Hand Power; INCINERATORS (Garbage Destructors); DUMPING and SHAKING GRATES.

Also manufacturers of Ash Hopper Gates; Flat Suspended Arches; Fire Brick Linings for Boiler Furnaces; Manhole, Trench and Sump Pit Covers, Frames and Plates; Sidewalk Safety Doors and Door Opening Devices; Metal Ladders; Cast Iron Tanks; Ash Cans; Ash Can Trucks; Clean-out Doors; Crematories; Cast Iron Chimney Caps.

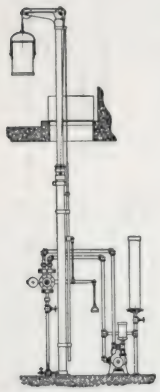


"DEAN" HYDRO-STEAM ASH CAN HOIST, TYPE A

"Dean" Hydro-steam Ash Can Hoists, Type A

Hydro-steam for 70 lbs. at operating valve. Piston of polished steel tubing; cylinder of standard, lap-welded pipe. The crosshead is of cast iron, mounted on a ball bearing and turning independent of the plunger from the position of hoisting through the area opening to a position above the cart.

Automatic action to retard piston speed and stop at extreme limits of the up and down strokes. Operating valves are of simple construction and provide for suitable pressure, exhaust and circulating connections.



"DEAN" ELECTRIC ASH CAN HOIST, TYPE F

"Dean" Electric Ash Can Hoists, Type F

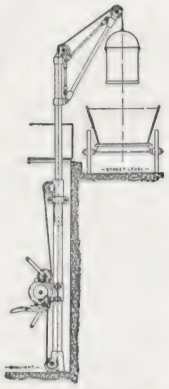
Rope geared 2-to-1. Electric motor is coupled direct to rotary pump mounted on a bedplate of cast iron to secure perfect alignment of parts. Operating valve is a combination by-pass of special design, arranged to supply the liquid under pressure to discharge and circulate the liquid to and from the hoist and the reservoir, as required.

Perfect control is secured at all times in the operation of hoisting by means of hand manipulation of the operating valve and automatic control at limits of up and down strokes.

"Dean" Hand Hoist, Type B

This hand operated, telescopic hoist is intended for ordinary service and for a maximum capacity of 300 lbs. This load can be raised by a force on the winch handle of 16 lbs. The principal feature of construction includes a drum geared hand winch for lifting the load, a direct drum hand winch for raising the spar to proper position for hoisting and a jib supported upon the end of the spar and arranged to rotate from the area opening to a position above the ash cart. The brake is enclosed within the gear and winch casing, which arrangement protects the brake surface from dirt.

The winch is provided with safety pawls to prevent backward rotation. The hoist winch and pinion are out of engagement with the drum gear when the brake is used for lowering, and can not be made to revolve in any direction until re-engagement of the pinion with the gear is established.

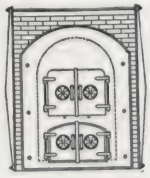


"DEAN" HAND HOIST, TYPE B

Incinerators

We have patterns and designs for incinerators for burning rubbish, garbage, etc., suitable for factories, hotels, hospitals, etc.

Send for catalogue No. 9.



INCINERATOR

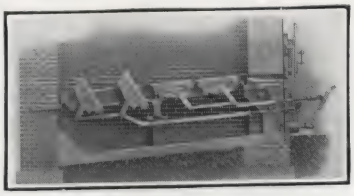
"Dean" Dumping Grates

Built for burning the small sizes of anthracite coal with either natural or forced draft. Bars tip in tandem to an angle of 65° and are supported at both ends by a rectangular frame which eliminates entirely the tendency of the bars to hang downward on the ends.

Air spaces ⅛- to ⅜-in. slot. Also built in the pinhole form with ¼- or $\frac{5}{16}$-in. diameter openings.

Fires can be cleaned in one-half the time required with stationary bars.

Catalogue No. 7 on request.

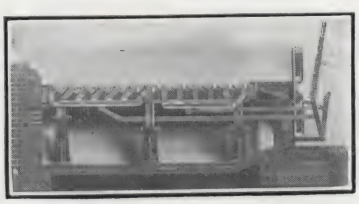


"DEAN" DUMPING GRATE

"Dean" Shaking Grates

Used for bituminous and larger sizes of anthracite coal, both fuels requiring a grate with an oscillating or shaking movement. Supported by a frame resting on the ash pit floor independent of the brickwork, with bars placed on 8-in. centers, allowing ample opening for the largest clinkers. Journals self-locking, requiring no caps. The sides of the bars are made solid, which is necessary, as 90% of the wear comes along these edges. Construction is of the most durable form to withstand hard service.

Catalogue No. 7 on request.



"DEAN" SHAKING GRATE

THE POLE & TUBE WORKS, INC.

SUCCEEDING "POLE DEPARTMENT" JOHN SIMMONS COMPANY, NEW YORK CITY

TELEPHONE
WAVERLY 3808

Avenue D and Murray Street
NEWARK, N. J.

CABLE
"POLETUBE"

REPRESENTATIVE: J. B. BARRETT, 907 Evans Building, WASHINGTON, D. C.

Product

CONICALLY WELDED and TUBULAR STEEL FLAGPOLES.

Also Steel Booms, Spars, Radio Masts, and a complete line of Pole Appurtenances including Ornamental Pedestals, Escutcheons, Base Plates, Adjustable Tubular Braces, Flashing Collars, etc.

Experience

Since 1901, we have been specialists in the design and production of over 15,000 flagpoles, of which we erected a majority together with their appurtenances for roof and ground settings.

Construction

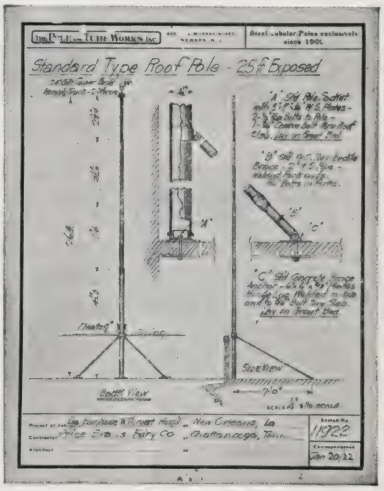
Our poles are made by special swaging and shrinking machinery as illustrated below and shipped in the longest permissible knocked-down sections with field joints. These sections may be composed of 1, 2, or 3 sizes of pipe with shop finished joints to effect proper taper. Field joints are merely telescoped by the erector and the chamfer calked "steel to steel" to make them watertight. No pins, rivets, screws or lead plugging used, as these loosen under vibration, breaking the paint film, admit moisture to the pole surfaces and set up interior corrosion which, unobserved, renders the pole dangerous within a few years. Our poles are 90% shop fabricated, remain permanently airtight and are shop cleaned and varnished ready for painting.

Co-operative Service

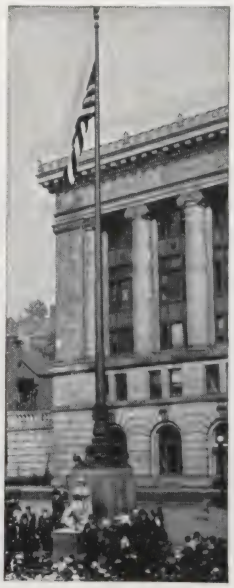
To architects stating their requirements, we will submit detailed drawings of any pole project, large or small, without obligation.

SPECIAL SWAGING PRESS
Capacity 60 ton, bed length 50 ft.

TYPICAL "SHOP JOINT" AND "FIELD JOINT"
(in knocked-down sections) (between sections)



TYPICAL DETAIL DRAWING
Worked out by us for architects' approval

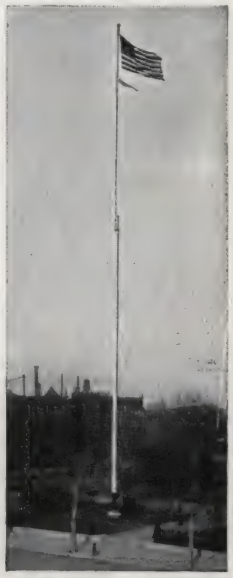


CITY HALL, DULUTH, MINN.
50 ft. above socle, conically welded poles
CASS GILBERT, Architect

RIVERDALE, N. Y. ON HUDSON
"Standard" 100x110-ft. pole

NAUGATUCK, CONN.
"Standard" spirally copper jacketted, 100x110-ft. pole
HENRY BACON, Architect

SWOPE PARK, KANSAS CITY, MO.
200x218-ft. mast
R. A. HIGGINSON, Architect



WHARTON SQUARE, PHILADELPHIA, PA.
"Standard" 125x135-ft. mast

ESTABLISHED 1842

WALWORTH MANUFACTURING COMPANY

Manufacturers of Steel Flag Poles and Automobile Washers

GENERAL OFFICE

BOSTON, MASS.

BRANCH HOUSES

NEW YORK, N. Y. BOSTON, MASS. CHICAGO, ILL.
EASTERN DIVISION: OFFICE AND WORKS
BOSTON, MASS.

SEATTLE, WASH. PHILADELPHIA, PA. PORTLAND, ORE.
WESTERN DIVISION: OFFICE AND WORKS
KEWANEE, ILL.

EXPORT SALES AGENTS: WALWORTH INTERNATIONAL COMPANY, NEW YORK, N. Y.

FOREIGN SALES OFFICES

ALEXANDRIA	CALCUTTA	JOHANNESBURG	MEXICO CITY	SAN FRANCISCO, U. S. A	SHANGHAI
BRUSSELS	COPENHAGEN	LONDON	MILAN	SANTIAGO DE CHILE	SURABAYA
BUENOS AIRES	HAVANA	SYDNEY	PARIS	SAO PAULO	TOKIO

Products

WALWORTH STEEL FLAG POLES with Patent Ball Bearing, Revolving Halyard Top.

WALWORTH AUTOMOBILE WASHER with Swinging Arm.

Also manufacturers of a complete line of Pipe Brackets, Bends, Hangers, Walmanco Flanges and Joints, Expansion Joints; Floor Stands; Grease and Oil Cups; Radiators; Pipe Railings; Water Gauges; Safety Valves; Kewanee Unions, Nipples; Walworth Spring Plug Cocks.

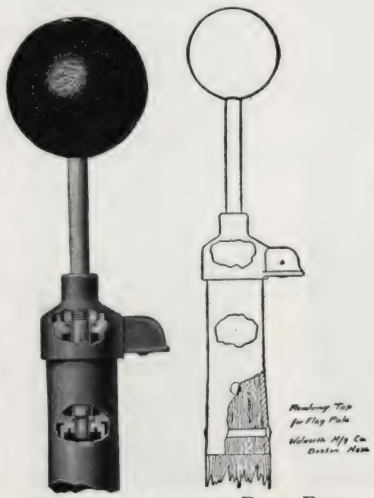
For Valves and Power Plant Piping, see pages 2026-2027.

Walworth Steel Flag Poles

Furnished complete in any height from 20 ft. to 125 ft., and in continuous construction. No topmast required. Standard Walworth Flag Poles are designed to withstand the strains of unusual gales, ballooning of the flag, climbing, hauling and hoisting.

The poles are symmetrical and are built up in sections from perfect wrought steel pipe, of lengths and diameters best suited to the heights. Each section telescopes into the next lower section a distance of 2 ft., with a snug fit. Four steel pins are driven at right angles to one another at the junction, and, headed over on the outside of the larger pipe, hold the joint absolutely rigid. The top of the joint is then calked with lead as far down as the head pin in order to insure its being watertight. The Walworth joint has a record of reports of no failures, accidents or dissatisfaction.

The poles are shipped in sections of transportable lengths, consisting of two or more sections with shop joints made permanently tight. The field joints between transportable lengths are drilled true to template. The insertion of the steel pins (drive fit) brings the sections into perfect alignment and makes a rigid joint, free from vibration. We recommend that field joints be calked with hot lead after erection, and not on the ground. This calking is a simple but an *important* matter.



WALWORTH PATENT BALL BEARING, REVOLVING HALYARD TOP FOR STEEL AND WOOD FLAG POLES
Note Simple Method of Attaching the Top to a Wood Pole

The upper section of the pole is equipped with Walworth Patent Ball Bearing, Revolving Halyard Top and capped with a gilded copper ball of proportionate diameter, or with weathervane of heavy copper covered with gold leaf. The lower section is provided with a galvanized steel cleat of proper size for securing the halyards.

Walworth Patent Ball Bearing, Revolving Halyard Top (Single or Double Sheave)—The top is so sensitive that it responds and adjusts itself instantly to the slightest shift of direction of the lightest breeze or of the heaviest gale. The use of this top prevents the fouling of flag or halyards, and greatly lessens the wear on both. There is no complicated mechanism in the adjusting device to get out of order. The 2-in. diameter sheave wheel is of bronze and is carefully housed from the weather. The top can likewise be furnished with two bronze sheave wheels. All take ⅜-in. halyards. Tops made to fit only into 2½-in. or 4-in. top sections.

Adaptability—Walworth Steel Flag Poles are adaptable to any condition or position that may be required for public or private use, and may be set either in the ground or anchored to the face of buildings or to roofs.

Sizes—The following sizes are in stock for quick shipment. Special sizes to specification are ordinarily produced promptly.

STOCK SIZES, WALWORTH STEEL FLAG POLES

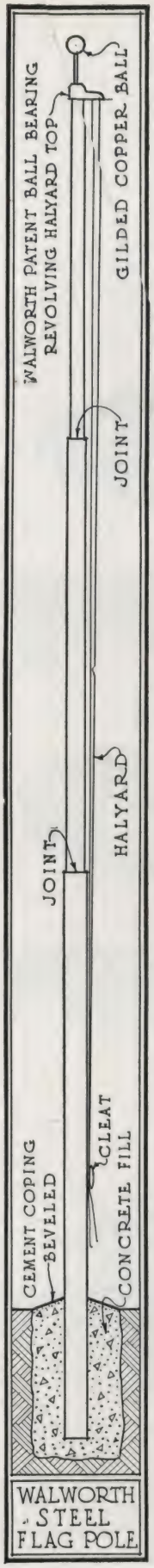
No.	Depth in ground, ft.	Height above ground, ft.	Diameter gilded copper ball, in.	Number of sections	Nominal diameter of sections, in.	Price
00	Roof	20	6	2	3–2½	
0	Roof	25	6	2	3–2½	
1	5	25	8	2	5–4	
3	5	35	8	3	6–5–4	On applicat'n
6	5	50	8	4	7–6–5–4	
8	6	60	8	4	7–6–5–4	
11	8	75	8	5	8–7–6–5–4	
16	10	100	8	7	10–9–8–7–6–5–4	

Poles shipped knocked down. Directions for erection given.

Foundation, Erection, etc.—Instructions for erection and concrete foundation of poles for ground setting can be furnished on request, with each pole. The depth in the ground should be one-tenth of the unsupported height.

Roof Anchorage—Any size of pole can be furnished as a roof pole, in which case the bottom end is usually threaded to receive a base plate. Roof braces with adequate roof connections can be furnished on application.

Continued on next page



100-Foot Walworth Steel Flag Pole, Swathmore College, Swathmore, Pa.

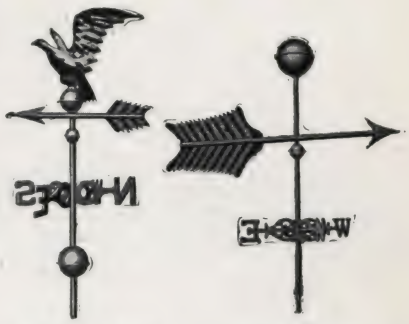
Detail of Bronze Plate on 100-Foot Walworth Steel Flag Pole

Two 50-Foot Walworth Steel Flag Poles on Barton Building and Amoskeag National Bank, Manchester, N. H.

Weathervanes—Furnished in practically any stock or special design required.

Arrow and eagle vanes are of heavy copper covered with gold leaf.

Stock sizes of arrow vanes are 12, 15, 18, 24, 30, 36, 42, 48 and 60 in. Eagle vanes are stocked in 15-, 18-, 24-, 36-, 42-, 48-, 54-, 60-, 66- and 72-in. spread.



Eagle Vane Arrow Vane

Walworth Patent Halyard Top for Wooden Flag Poles

Walworth Patented Revolving Halyard Top for wooden flag poles is the same top which is furnished on the steel poles, and is fastened to the wooden pole by slipping the top into a short steel sleeve, which in turn is slipped over the top of the pole and held fast by means of wood screws. This arrangement is furnished complete by this company and makes a very neat finish when erected.

Walworth Halyard Top for Steel or Wooden Flag Poles

Inside diameter sleeve, in.	Outside diameter sleeve, in.	Length sleeve, in.	Diameter ball, in.	Diameter bronze sleeve, in.	Price	
					Without ball	With gilded copper ball
2½	2⅞	18	6	2	$10.00	$17.00
4	4½	18	8	2	11.00	19.00

A similar top with two bronze sheaves can also be furnished. Prices on application.

Walworth Auto Washer

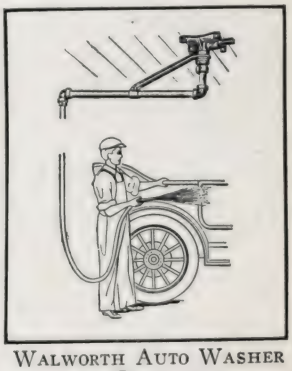
This washer is easily attached to the ceiling of the garage. It is made with a free swinging joint that allows the arm to swing as desired, so that the stream of water can be guided quickly to any part of the car.

It saves time and work, and does away with the ungainly length of hose to drag along the floor.

When not in use, the arm can be swung against the wall.

The stuffing box, hose connection and all working parts are of brass, the other parts being made of wrought or cast iron, heavily galvanized. The washer takes ¾-in. feed pipe, swings in an 8 ft. 6 in. circle and requires 10½-in. clearance.

Prices on application.



Walworth Auto Washer in Operation

Fig. A4371. Walworth Auto Washer

THE CANTON FOUNDRY & MACHINE CO.

Manufacturers of Serpentine Track Automobile Turntables

CANTON, OHIO

NEW YORK OFFICE, 45 West 18th Street

REPRESENTATIVES

MILWAUKEE, WIS., Fred F. Stoll, 453 East Water Street
BOSTON, MASS., Zenas R. Taylor, Inc., 423 Dorchester Avenue, South
PHILADELPHIA, PA., Robt. B. Lederle, Witherspoon Building
CHICAGO, ILL., E. C. Moore, 10 South La Salle Street
PITTSBURGH, PA., Geo. C. Webb, 207 Fulton Building
DETROIT, MICH., Geo. T. Wallace Sales Co., 400 Penobscot Building
SAN FRANCISCO, CAL., C. J. Jorgenson Co., 356 Market Street
LOS ANGELES, CAL., J. E. Dwan, Citizens National Bank Building

Products

"Universal" Automobile Turntables for pleasure cars.

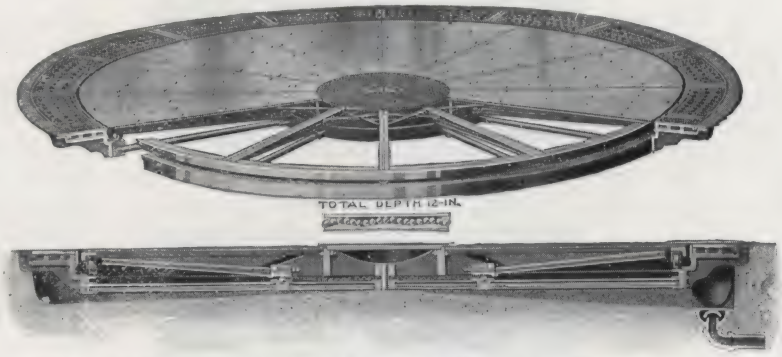
For the "Pitless" Turntable, see following page.

Description

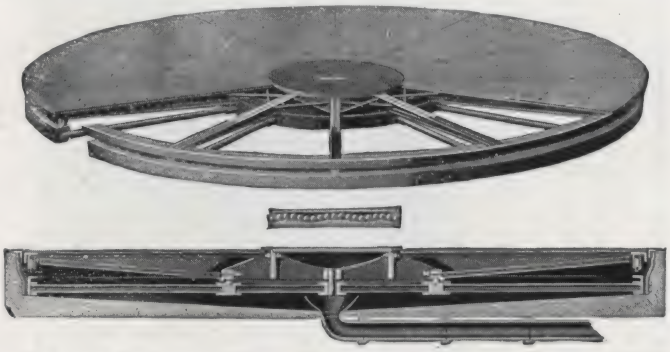
Two styles, with and without washrack extension. Mechanically perfect in construction, and easy to turn. Weight of table and load it supports rests on 2-in. ball bearings, that rest on the high points of serpentine, circular track, 6 ft. in diameter, reducing friction to a minimum.

Superstructure is of structural steel, built in truss form to give greatest possible strength; top of table made of $\frac{3}{16}$-in. steel plates. All parts made of iron and steel; simple in construction.

"Universals" may be placed on upper floors as well as on ground floors. Castor wheels at periphery of table are used only to prevent table from tilting. Heavy load does not substantially increase friction.



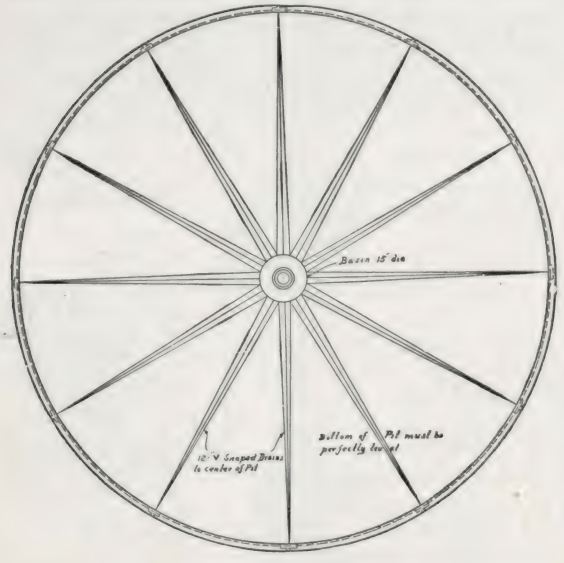
Top and Sectional View Showing Details of Construction of the "Universal" with Washback Extension

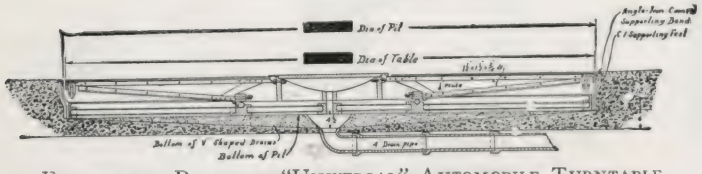


Top and Sectional View, Showing Details of Construction of the "Universal"

Advantages

Removable ribbed steel plates on top, adjustable by means of truss bolts to take care of any wear; water drains to rim, then through grooves back to center of pit or outlet; can not tilt, always perfectly poised; easily turned. Quickly and easily erected from knocked down shipment, by one man; always ready; only 12 in. in depth.





Foundation Plan for "Universal" Automobile Turntable
Patented December 27, 1904; June 29, 1909; October 4, 1910; January 2, 1912

For Pleasure Cars

Wheelbase, in.	108	132	144	156
Diameter, ft.	12	14	15	16
Supporting capacities, lbs.	8000	8000	8000	8000
Shipping weights, lbs.	4550	5300	5600	6000

Angle iron supporting band for concrete floors comes fastened to outer circle of table.

Specifications

Blue print, complete specifications and directions for building pit and erecting table furnished with each order. Any careful mechanic can erect.

Catalogue

Send for catalogue "C-99."

THE CANTON FOUNDRY & MACHINE CO.

SUCCESSORS TO
THE PITLESS AUTO TURNTABLE COMPANY (KANSAS CITY, MO.)

Manufacturers of the "Pitless" Auto Turntable

CANTON, OHIO

Product

"PITLESS" AUTOMOBILE TURNTABLES.

For the "Universal" Automobile Turntable, see preceding page.

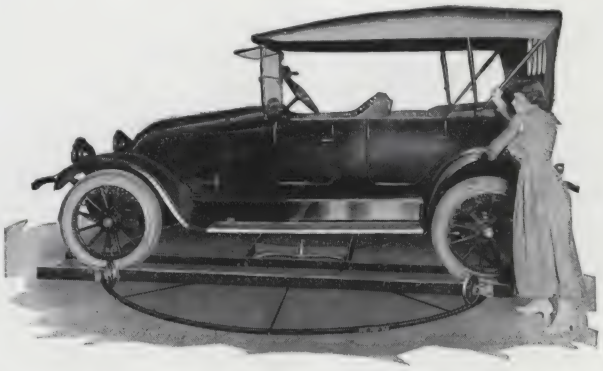
Advantages

An automobile turntable is almost as essential for human comfort as the automobile itself. In fact, the automobile is dangerous and destructive when the driver is under the handicap of facing in one direction, while he drives in another.

The "Pitless" requires no elaborate and expensive preparation for installing. Since it needs no pit, it can be set down anywhere on a solid base and it is ready to turn the car. But it may also be installed with the track and bracing embedded in the concrete floor. This is easily done in a new garage when the concrete is soft. It may also be installed in the same way in an old garage by chipping away channels for the track and brace rods.

Since the working parts are not covered by a solid platform, but merely have two runways to receive the car, a minimum of steel is used, and therefore a minimum of weight and a minimum of expense result.

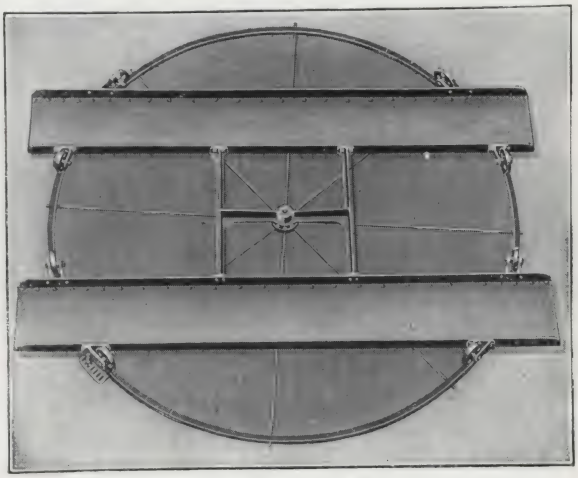
The "Pitless" turntable may be locked so it will not glide or wobble when the car is being driven off or back on the turntable.



TURNING A CAR ON THE "PITLESS" AUTOMOBILE TURNTABLE
A light construction, completely equipped with steel ball bearings makes this easy

A woman can turn the heaviest car with no more effort than opening the garage door. This turntable revolves on 208 balls incased in 16 bearings, 2 bearings on each wheel. It is the lightest type of design known.

The runway idea provides a platform only where a platform is needed, under the wheels, eliminating costly, heavy and superfluous steel.



"PITLESS" AUTOMOBILE TURNTABLE
Turntable can be locked after the car has been turned, providing a solid runway

Description

A circular steel track, 1½ in. high, surrounds a center plate, to which it is attached and held rigid by 8 radial rods. The track is surmounted by 2 steel runways, each 18 in. wide and 13 ft. long. Each runway has 4 ball bearing wheels as shown in accompanying illustrations, and the entire weight of the car is borne by these bearings, reducing friction to the minimum. The wheels support the runways ¾ in. above the track. The runways are held in place by a brace at the middle. A steel king pin, running through this brace and the center plate, forms the pivot of the turntable. The track is 11 ft. in diameter.

Advisory Service

If the desired location for the garage is difficult of access, information will be given as to how the turntable should be placed to solve the problem. Specifications and detailed instructions go with each turntable.

Write for Catalogue G, giving further description and prices.

Portable Type

Heavy portable turntables for trucks are also made by this company.

ESTABLISHED 1856

PAULY JAIL BUILDING COMPANY

INCORPORATED

FACTORY AND MAIN OFFICE
2215 De Kalb Street
ST. LOUIS, MO.

TELEPHONE
SIDNEY 246

GENERAL EASTERN OFFICE: New York, N. Y., 1270 Broadway—Telephone, Pennsylvania 5245

Products

Builders, exclusively, of CELLS for Jails, Prisons, Police Stations and Lockups; equipped with Automatic Sliding Door and Hand Pull Locking Devices; Prison Plumbing Fixtures; Round and Flat Interlocking Bar Grating for window guards, corridors, gratings, etc.

Advantages

Perfect mechanism and durability of "Pauly" cells resulting from 66 years' experience.

Steel

We use "Pauly" special non-annealable five-ply steel for all grated work, made according to our own formula—in place of the regular five-ply referred to in specification as toolproof—consisting of alternate layers of high carbon and low carbon steel. All layers thoroughly welded, and the high carbon steel layers hardened to resist action of cutting tools, even after the application of a high heat, which may be used to draw the temper.

Exterior Plate and Grated Work

We advocate toolproof steel plates and toolproof grating for all exterior sections of cell blocks, where absolute security is desired.

Niches

We are the originators and builders of the niche system of cell plumbing.

Cell Door Locking Device

Cell doors operated on the sliding principle by an automatic lever locking device, controlled from jailer's corridor so that any one door or all doors in a row can be operated at the same time. This device is simple in construction and yet durable, needing very little care and attention, as there are no springs, wires, cogs or small parts to wear out, requiring adjustment and replacement at frequent intervals.

All locking device parts fully enclosed in steel casing protecting same from prisoners.

Automatic Corridor Door Lock

Corridor entrance doors secured with automatic device arranged with series of hardened steel bolts to each door placed on the inside of steel box, and released only by deadlock device allowing doors to be opened and closed automatically.

Cell and Special Equipment

We equip cells complete with modern steel bunks, tables, seats, etc., also furnish special ventilating system in connection with cells, window guards, heavy wire screens, steel entrance doors, steel sash for glazed partitions, consultation booths, padded cells for insane and miscellaneous prison grating.

Service Department

Our Service Department will co-operate with architects and engineers in preparing sketches and plans for city and county jails or state penitentiaries, furnishing them with drawings of modern cell arrangement, together with the necessary details, specifications and approximate costs covering each individual requirement.

We do not issue any catalogue on our high grade cell work on account of the difference in the laws of the various states controlling building and equipping of jails and prisons. We have exclusive representatives in various parts of the country with years of experience, who will call and give personal attention, when desired.

Reference

Pauly cells are known throughout the country and are endorsed by the leading architects and jail specialists.

GENERAL VIEW OF PRISONERS' AND JAILER'S CORRIDOR

Continued on next page

POLICE STATION CELLS
Showing hand-pull sliding door with automatic lock

PRISONERS' CORRIDOR
Showing automatic device for operating and locking cell doors

TYPICAL INTERIOR VIEW OF CELL
Showing niche water closet with full enameled seat; also, folding bunk

THE VAN DORN IRON WORKS COMPANY

Jail and Prison Builders

CLEVELAND, OHIO

Products

Manufacturers of VAN DORN STEEL JAIL and PRISON CELLS (White Diamond Burglarproof Materials, Patented Interlocked and Counterlocked Grating Construction).

For Steel Joist Hangers, Post Caps and Bases, see page 500.

Experience

THE VAN DORN IRON WORKS COMPANY have been known as expert jail builders and manufacturers of steel jail and prison cell work for over 40 years. They have installed work of this character in some of the largest and most important penal institutions in the United States, Canada, Mexico, Cuba, Hawaii, and the Philippines.

There are 352 Van Dorn jail cells in the Tombs Prison, New York City; also over 1000 cells, Maryland State Prison, Baltimore; 540 cells, Allegheny County Jail, Pittsburgh; and numerous others.

Van Dorn Burglarproof Material

The Van Dorn White Diamond steel bar is manufactured by a special patented process, and is offered by no other company. By this process burglarproof work is made with an exterior coat of steel, uniform in thickness and hardness, absolutely sawproof and fileproof, the core or center part being soft iron. The hard steel on the exterior of the bar makes it impossible for the prisoner to mutilate it in any way; every inch of the bar can be tested after erection.

Class of Buildings for Jail Equipment

There are five (5) general classes of buildings which will require jail equipment, as follows:

Class No. 1, Village Lockup or Calaboose—The smallest village lockup or calaboose requires at least 2 steel cells. The standard size of each is 5 ft. wide, 7 ft. long, by 7 ft. high. The building should be of fireproof construction, including roof. The cement floor could act as the floor of the cells, to which they would be anchored. The cell enclosures would be steel plate, except the fronts and possibly the tops, which would be bar work. The lockup entrance door should be steel plate, the windows protected with steel bar guards. Cells have been made as narrow as 4 ft. and as wide as 7 ft. Each cell is provided with one bunk and water closet, or in the absence of sewerage connections, a special night soil bucket.

Class No. 2, Town Halls or Municipal Buildings Equipped with Cells—Such buildings should be provided with 3 lockup departments, 1 each for male, female and juvenile prisoners, located preferably in the first story, although they are sometimes placed in the basement. Standard cells would be 5 ft. wide, 7 ft. long, by 7 ft. high, of solid steel plate, except the fronts and tops of bar work, each provided with one bunk and sewerage connected water closet. Cell room doors should be of steel plate, and the windows protected with bar work. The room walls, floor and ceilings should be fireproof construction, the cells anchored to the cement floor.

Class No. 3, Police Station Cells—Police headquarters buildings and station houses should also provide separate quarters for male, female and juvenile prisoners. Cell sizes can be varied to suit size of rooms, but should be at least standard, 5 ft. wide, 7 ft. long, by 7 ft. high. Cell rooms should be fireproof construction, including cement floor to which cell can be anchored. Cell enclosures should be steel plate, except fronts and possibly tops, which should be bar work. Proper windows, protected with bar guards, should be provided for light and ventilation. Doors entering the various departments and the guards' corridors should be steel plate construction. Each cell should be equipped with one bunk and water closet connected with sewerage.

Class No. 4, County Jails—County jails must necessarily provide for absolute segregation, i.e., separate departments or ranges of cells for male and female (white and black) and juvenile prisoners; witness or detention rooms; hospital cells or rooms for both male and female; padded cell for the insane. The opposite page gives a general idea of the proper layout of the various departments necessary in a modern county jail. Cell sizes vary somewhat, according to the requirements of various state boards; the usual standard is 5 ft. wide by 8 ft. high in the clear; prisoners' exercise corridors vary from 4 ft. 6 in. to 6 ft. wide, according to the number of cells in a row. The building, especially for the jail departments should be absolutely fireproof, with 4-in. cement floor over the cell and corridor steel flooring. The jail cell contractor should lay and be responsible for this concrete flooring. Male cells should be extra strong, with toolproof steel bar work; also the prisoners' exercise corridor, window guards, and certain steel plate portions. Department entrance doors should be steel—double doors for male cell rooms, single for other departments. Each cell should be properly ventilated with a register connecting into a utility vent shaft, and provided with water closet and lavatory connected with sewerage.

Class No. 5, State Prison or Penitentiary Cells—These cells are arranged in tiers in the center of the building, with utility corridor, vent and plumbing shaft between. Minimum cell size 5 ft. wide, 8 ft. long, by 8 ft. high. Each cell equipped with one bunk and water closet and lavatory connected with sewerage. Each cell to be ventilated through register opening into utility vent shaft. Cell enclosures to be solid steel plate, except fronts and doors to be bar work, as should the enclosure of guards' corridors or balconies. The cell contractor should lay and be responsible for a 4-in. concrete flooring over the steel floor construction of the cells and prisoners' corridors.

Van Dorn Service Department

Special expert jail representative is at the service of architects in preparation of drawings and specification data. Special prison catalogue sent on request.

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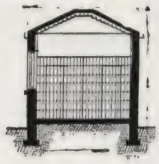
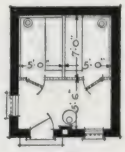
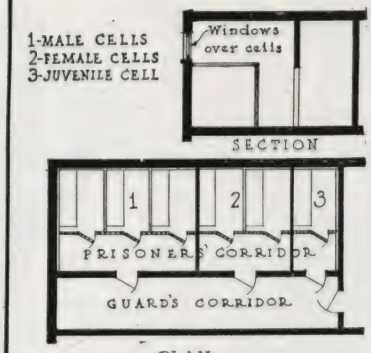


SECTION



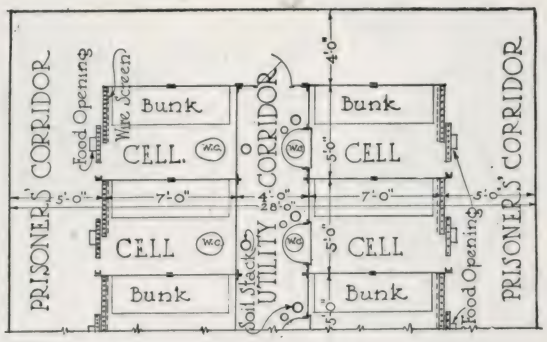
PLAN
SCALE 3/64" = 1'-0"

CLASS 1. VILLAGE LOCKUP MINIMUM REQUIREMENTS



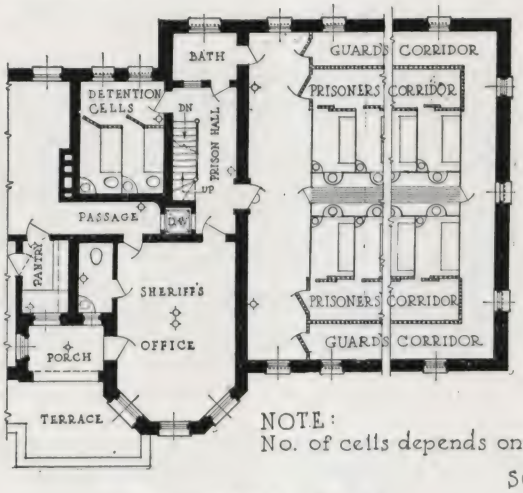
PLAN
SCALE 3/64" = 1'-0"

CLASS 2. TOWN HALLS EQUIPPED WITH CELLS

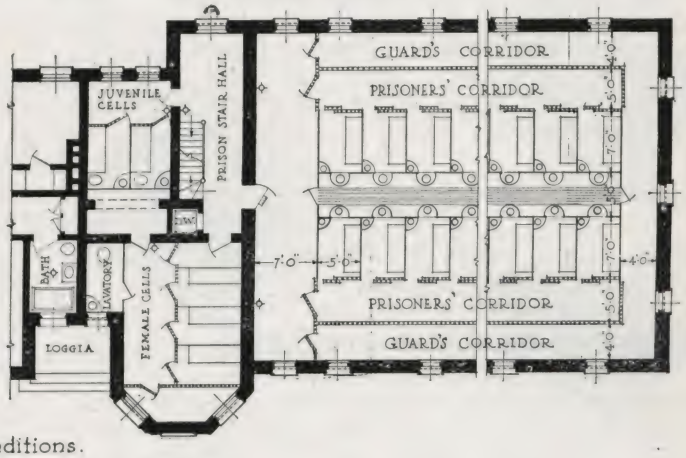


SCALE 3/32" = 1'-0"

CLASS 3. POLICE STATION CELLS.



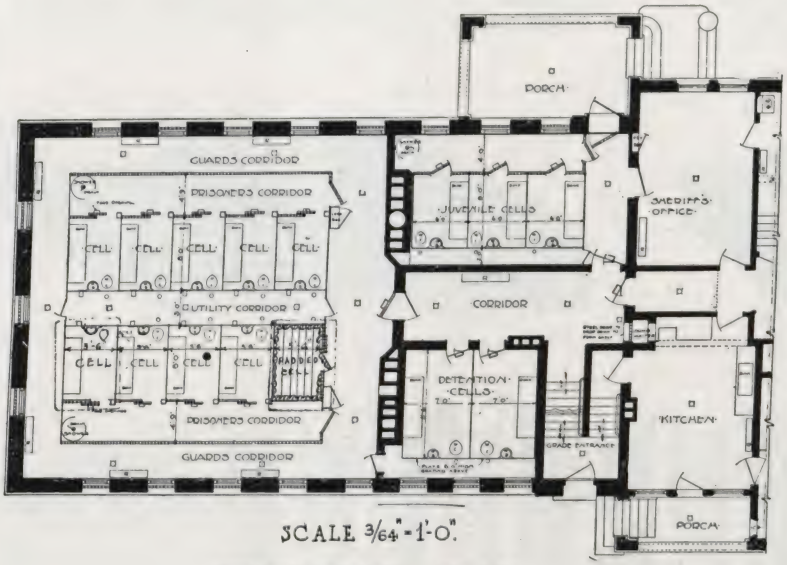
NOTE:
No. of cells depends on conditions.



SCALE 3/64" = 1'-0"

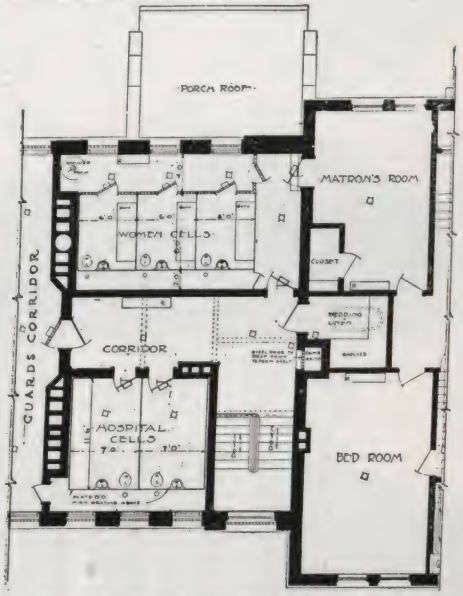
FIRST FLOOR PLAN

SECOND FLOOR PLAN



SCALE 3/64" = 1'-0"

FIRST FLOOR PLAN



SECOND FLOOR PLAN

CLASS 4. SHOWING TWO TYPES OF COUNTY JAILS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC..	CLASSES 1,2,3&4 LOCKUPS FOR VILLAGE, TOWN HALL AND COUNTY	SCALE 3/64" & 3/32" EQUALS 1'-0" DATE AUG. '20	DRWG 1

JULIUS BLUM & CO.

Wrought Iron Mouldings and Steel Tubing

532-540 West 22nd Street
NEW YORK, N. Y.

MILLS AT BORDENTOWN, N. J.

Products

Dealers and manufacturers of HOT ROLLED (WROUGHT IRON) MOULDINGS, Plain and Ornamented; ROLLED STEEL DOOR SILLS; BRIDGE and HAND RAILS; ALL-STEEL STAIR POSTS; SQUARE and RECTANGULAR MECHANICAL STEEL TUBING.

Also, Concrete or Asphalt Step Nosings; Sash Bars, Skylight Bars; Light Angles, Channels, Tees, Zees; Drop Forged Fence Pickets; Rosettes, Leaves, Cups, Shields, Flowers, hand hammered and drop forged; Seamless Drawn Round Steel Tubing; Flexible Metal Hose and Tubing.

Special Rolled Steel Shapes

We will roll to order any section, no matter how difficult, if the quantity is sufficiently large. Inquiries are solicited for difficult rolling propositions.

Rolled Steel (Wrought Iron) Mouldings

Especially adapted for the construction of store fronts, steel stairways, elevator enclosures and cars, iron doors and door jambs, fences, marquises, partitions, sash and skylight work, furniture, and all other ornamental iron work.

Mouldings are rolled true and smooth with sharp lines, of best wrought iron or soft steel. They are capable of being bent, formed and forged. Bars are 17 to 20 ft. long and are thoroughly straightened. A large variety of shapes is carried in stock. Some typical designs are shown on the opposite page.

Wrought iron mouldings are cleaner in appearance and are cheaper than cast iron. They are free from blemishes and sand holes, which is important when polishing or plating is desired. They are fireproof, can not break, and are lighter in weight than cast iron, which means a big saving in freight and trucking charges.

Square and Rectangular Steel Tubing

A large variety of sizes and gauges (running from ½ in. square to 3 in. square) carried in stock. This tubing is especially adapted for door constructions, elevator work and glass partitions. Special hardware to fit square and rectangular tubing carried in stock.

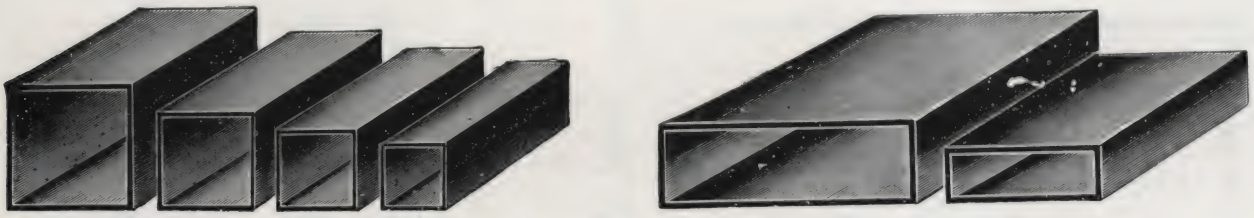
All-steel Stair Posts

Special 3 in. square by $\frac{3}{16}$ in. wall square steel tubing for stair posts. Pressed steel tops and drops carried in stock. Complete posts furnished to specified lengths.

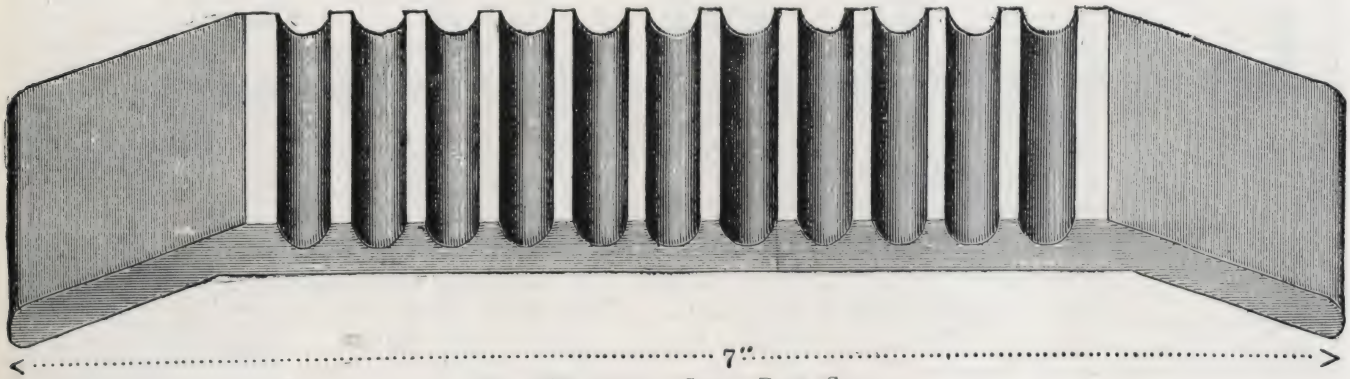
All-steel stair posts are stronger than cast iron posts; are fireproof, sanitary and neat in appearance. On account of their greater strength, smaller diameter posts may be used, thereby gaining space on stairways and saving weight.

Catalogue

Catalogue mailed on request, free of charge.

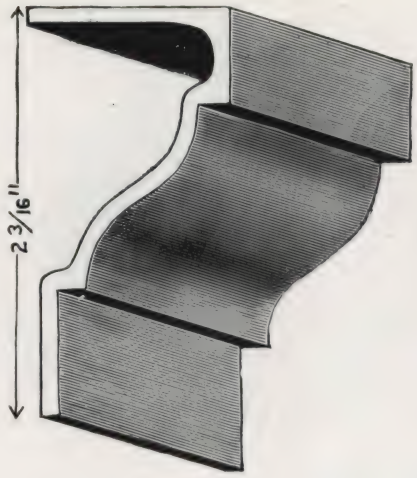


COLD DRAWN MECHANICAL STEEL TUBING



No. 4500 ROLLED STEEL DOOR SILL

Continued on next page



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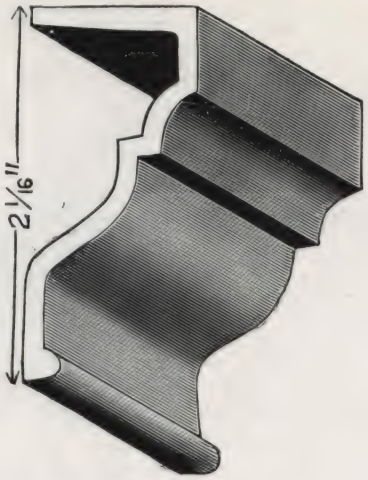

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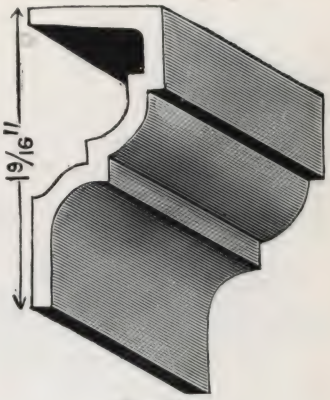

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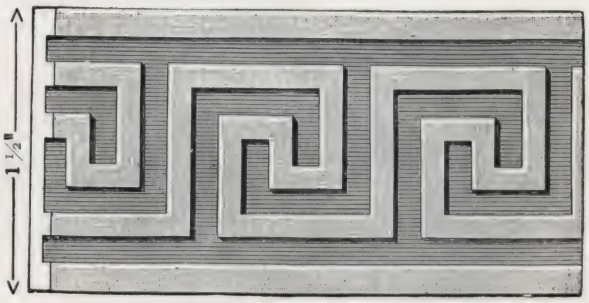

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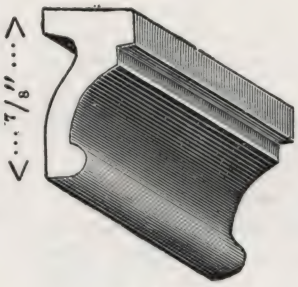

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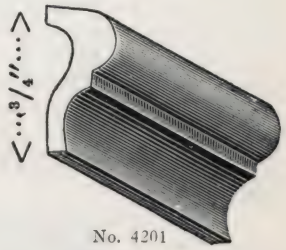

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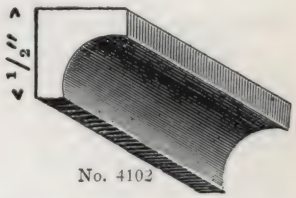

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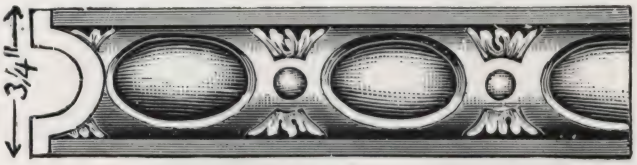

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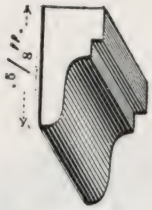

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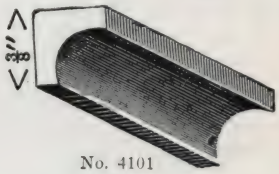
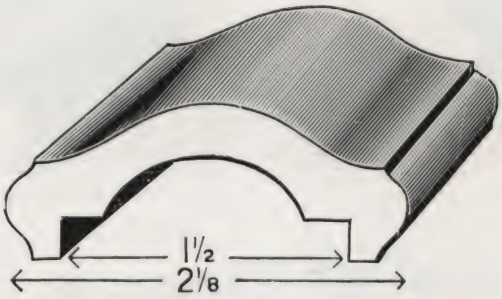
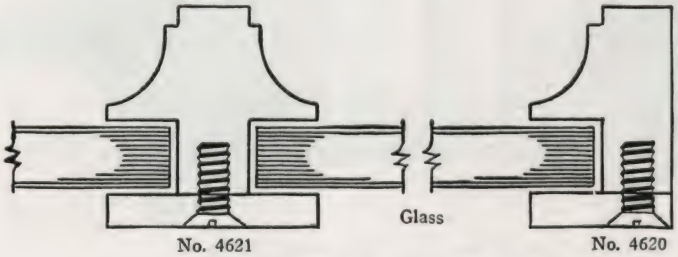


No. 4101

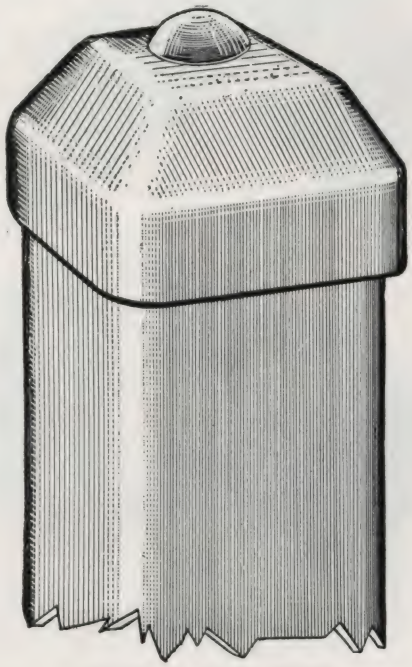
Rolled Steel (Wrought Iron) Mouldings



No. 4441 Rolled Steel Hand Rail



Typical Glass Construction
Nos. 4621 and 4620 mouldings



All-steel Stair Posts

J. G. BRAUN

Steel Mouldings

TELEPHONE
WEST 0713, 2373

609-615 South Paulina Street
CHICAGO, ILL.

EASTERN BRANCH AND WAREHOUSE: NEW YORK, N. Y., 158-160 Green Street—Telephone, Spring 0863

Products

STEEL MOULDINGS, Plain and Ornamental; HAND RAILS, COVE MOULDINGS, GLASS STOPS, PANEL MOULDINGS, STAIR STRINGER MOULDINGS, ROLLED STEEL DOOR SILLS, ORNAMENTAL STORE FRONT MOULDINGS; patented STEEL STAIR NOSING for Concrete Stairs.

Also manufacturers of Rolled Steel Door Frame Sections, Skylight Bars, Sash Bars for light window construction, Square and Rectangular Steel Tubing, Ornamental Fence Work, Fence Pickets and Iron Balls, Rivets and Screws, Rolled Steel Shapes, Standard and Special.

For Lighting Fixtures and Steel Ornaments, see page 1864.

Steel Mouldings

Mouldings adapted for store front construction, stringers on steel stairways, elevator enclosures and cabs, window sash, glass stops, panel, door frame and other ornamental iron work are carried in stock.

Mouldings are all hot rolled; lengths are from 15 to 20 ft. We carry a large stock in both our New York and Chicago warehouses.

Rolled steel mouldings are better adapted for general iron work purposes than those of cast iron because they have a smoother surface, do not break, as cast iron does, are much lighter and therefore cost less.

Special Rolled Steel Shapes

We are prepared to roll to order any shape in iron or steel, no matter how difficult, in a quantity of 5 tons or more; charges for roll are extra.

We solicit your inquiries on special shapes.

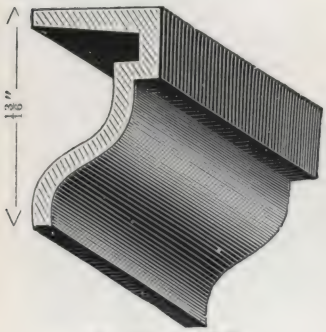
Steel Tubing and Square Pipe

A large stock of this product is always carried, especially adapted for door construction, grilles and elevator work, stairway newels, etc.

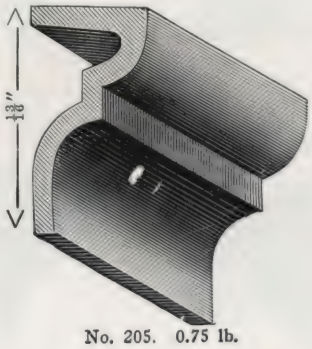
Special hardware for steel tubing also carried in stock.

Catalogue

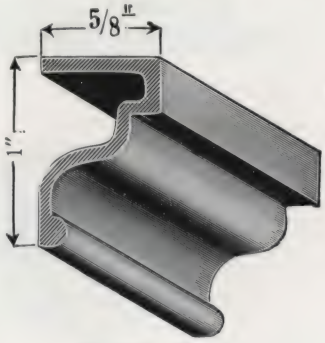
Catalogue on steel mouldings and on other products mailed on request.



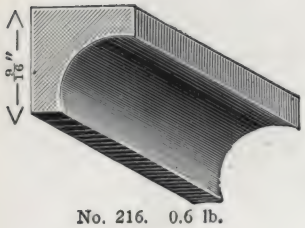
No. 153. 0.77 lb.



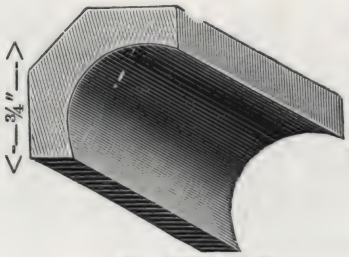
No. 205. 0.75 lb.



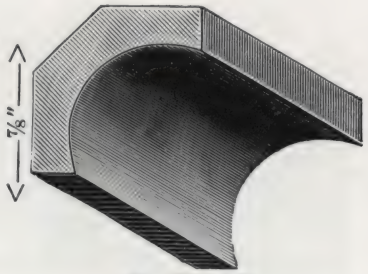
No. 208. 0.56 lb.



No. 216. 0.6 lb.



No. 218. 0.84 lb.

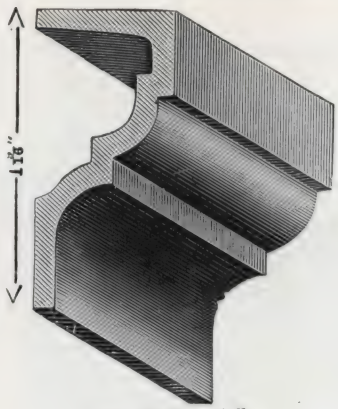


No. 219. 1 lb.

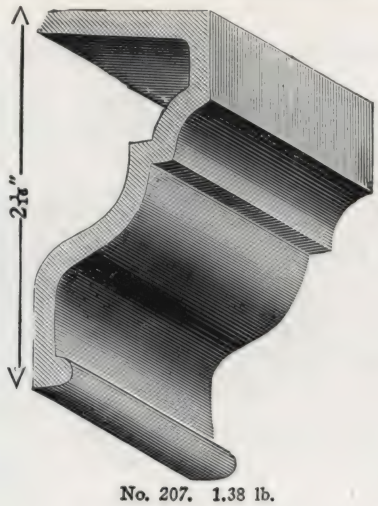
STEEL CORNICE AND PANEL MOULDINGS—A FEW OF THE PATTERNS CARRIED IN STOCK

Weights shown are approximate pounds and feet. Glass stops No. 216 supplied in ⅜- and ½-in. sizes

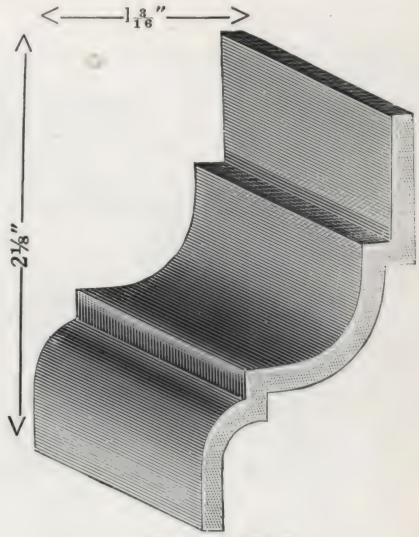
Continued on next page



No. 206. 0.95 lb.

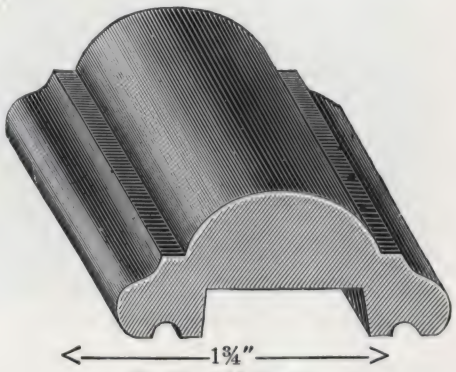


No. 207. 1.38 lb.

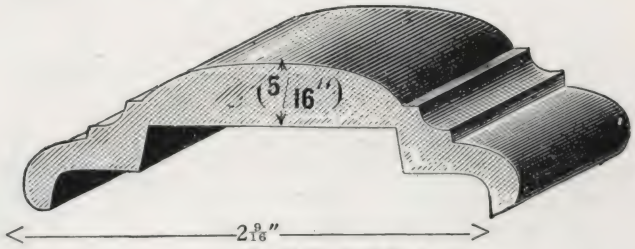


No. 342. 1.11 lb.

Stair Stringer Mouldings



No. 66. 2.18 lbs.



No. 1143. 2.12 lbs.

Hand Rail Mouldings

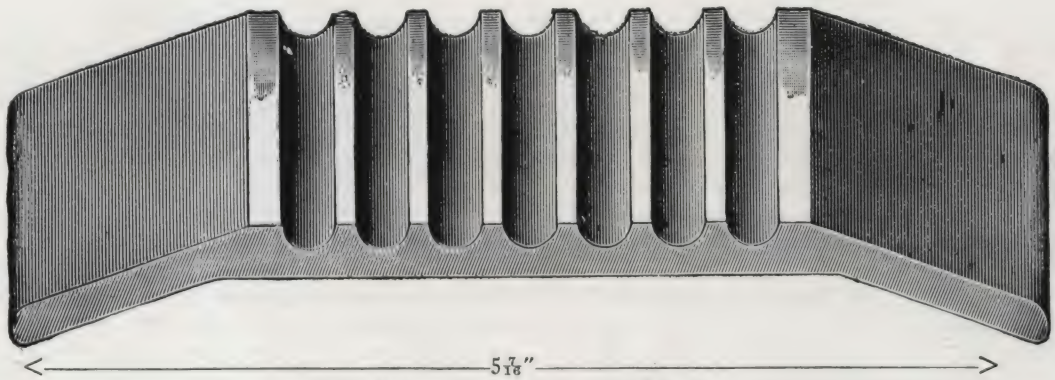
No. 66 supplied in 2- 2⅛-, 2 9/16-in. and No. 1143 in 2⅛-in. widths

No. 1167

Patented Stair Nosing

With Anchor Attached.

For concrete and asphalt stairs and steps. Also furnished with plain or lead filled tread



No. 1166. 3.86 lbs.

Door Saddle Moulding

THE AMERICAN BRASS COMPANY

Manufacturers of Copper, Bronze and Brass in All Forms of Sheet, Wire, Rods and Tubes

GENERAL OFFICES
WATERBURY, CONN.

MILLS AND FACTORIES

ANSONIA, CONN. TORRINGTON, CONN. WATERBURY, CONN. BUFFALO, N. Y. KENOSHA, WIS.

OFFICES AND AGENCIES

NEW YORK, N. Y., 25 Broadway
BOSTON, MASS., 201 Devonshire Street
PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., 1128 Widener Building
PITTSBURGH, PA., 904 Union Bank Building
CHICAGO, ILL., 29 East Madison Street
CLEVELAND, OHIO, 1118 Citizens Building
CINCINNATI, OHIO, 1026 Union Central Building
DETROIT, MICH., 3-132 General Motors Building
ST. LOUIS, MO., Security Building
SAN FRANCISCO, CAL., 351 California Street

Products

ANACONDA ARCHITECTURAL BRONZE, BRASS AND COPPER for cornice work, Pilasters, Grilles, Wickets, Counter Work, Door and Window Trim, Screens, Hand Rails, etc.

For Anaconda Brass Pipe, Admiralty and Benedict Nickel Alloys, see pages 1452-1453.

ANACONDA
from mine to consumer
TRADE-MARK

Extruded Shapes

Shapes of Anaconda extruded architectural bronze are stronger and more durable than bronze castings or the various wrought materials made by other processes. The enormous pressure used in the extrusion process increases the density of the metal and produces a more homogeneous structure. Blowhole "pipes" and similar defects found in castings are absent in Anaconda extruded bronze. Its tensile strength is in no case less than 50,000 lbs. to the sq. in.

Fidelity to Architectural Design

The processes by which Anaconda extruded architectural shapes are made make possible absolute fidelity to the architect's design, thus assuring a character and distinction that is often lacking in shapes produced by other methods.

Color Effects

Anaconda extruded architectural shapes have a natural golden beauty. After exposure they darken and gradually assume the color of bronze. If designed for interior use the metal can be artificially colored to match verde antique or any other finish desired by the architect.

Shapes and Weights

Anaconda extruded architectural shapes are produced from billets weighing 100 lbs. or more. The length of an extruded shape is governed by the cross section and the amount of metal contained in the billet, but in no case can orders be executed for a smaller quantity than that obtained from a 100-lb. billet.

Cold Drawn Shapes

In order to successfully produce extruded shapes the thickness of the metal must exceed $\frac{1}{8}$ in. Light mouldings and shapes with walls $\frac{1}{8}$ in. and thinner are manufactured by the cold drawing process and include a wide variety of forms and sizes suitable for fabricating store fronts, window frames, etc.

Estimates and Co-operative Service

The Service Department of THE AMERICAN BRASS COMPANY offers full co-operation in furnishing estimates and determining the suitability of Anaconda extruded shapes for various uses. While estimates can usually be prepared from detailed blueprints and specifications, a representative of THE AMERICAN BRASS COMPANY will be sent at any time to consult with architects or fabricators whenever such consultation is requested.

Although first made according to special drawings and specifications, extruded shapes may be re-ordered with the assurance of prompt delivery as the tools and dies are carefully reserved for this purpose.

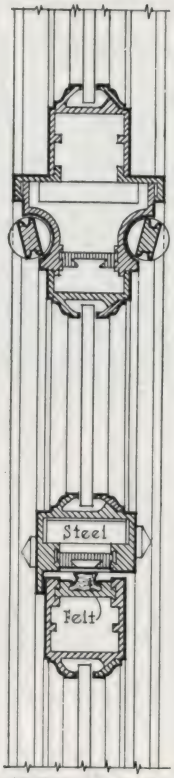
Designs and specifications entrusted to THE AMERICAN BRASS COMPANY will be treated confidentially and held for the exclusive use of the customer whenever so desired.

Facilities

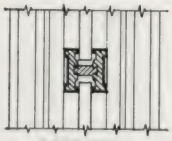
THE AMERICAN BRASS COMPANY is equipped for extensive production of Anaconda extruded architectural shapes. The company has complete facilities for serving the East from its mill at Ansonia, Conn., and the West from its mill at Kenosha, Wis. Inquiries or orders should be sent to the nearest mill.

Continued on next page

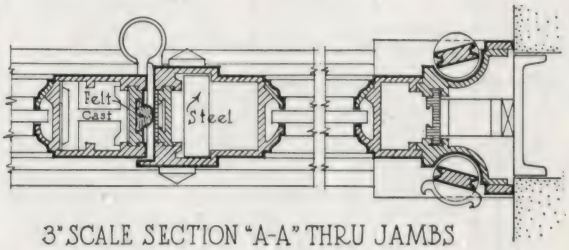
EXTRUDED METAL SCREEN FOR
FREER COLLECTION BUILDING
SMITHSONIAN INSTITUTE, WASHINGTON, D.C.
CHARLES A. PLATT, ARCHITECT, NEW YORK
EXECUTED BY
THE GORHAM CO., ARCHITECTURAL BRONZE DEP'T.
EXTRUDED BARS AND SHAPES SUPPLIED BY
THE AMERICAN BRASS COMPANY



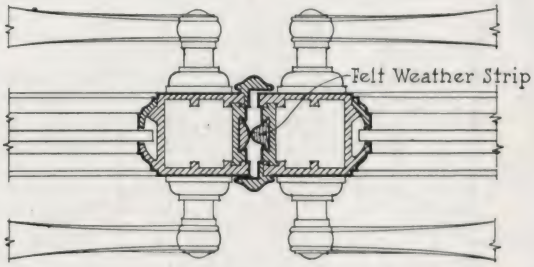
SECTION "C-C"



MUNTIN

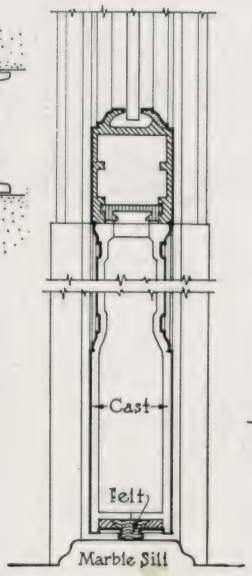


3" SCALE SECTION "A-A" THRU JAMBS

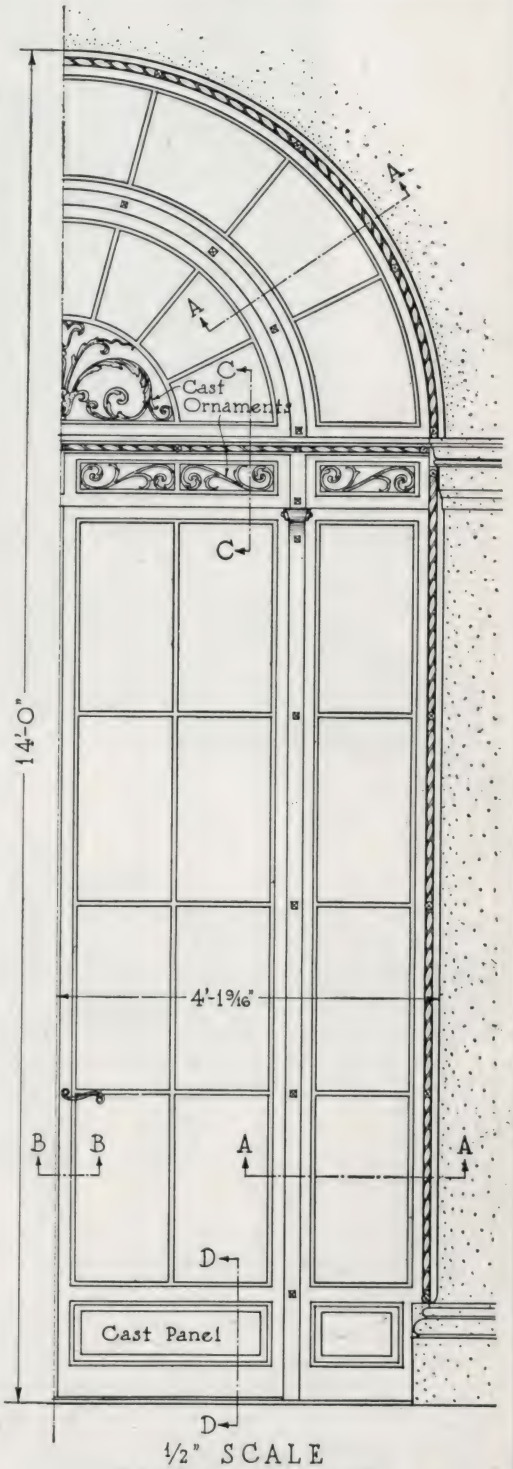


3" SCALE SECTION "B-B" THRU MEETING STILES

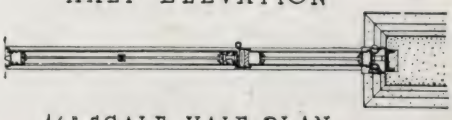
NOTE:—EXTRUDED SECTIONS SHOWN THUS



3" SCALE
VERTICAL SECTION "D-D"



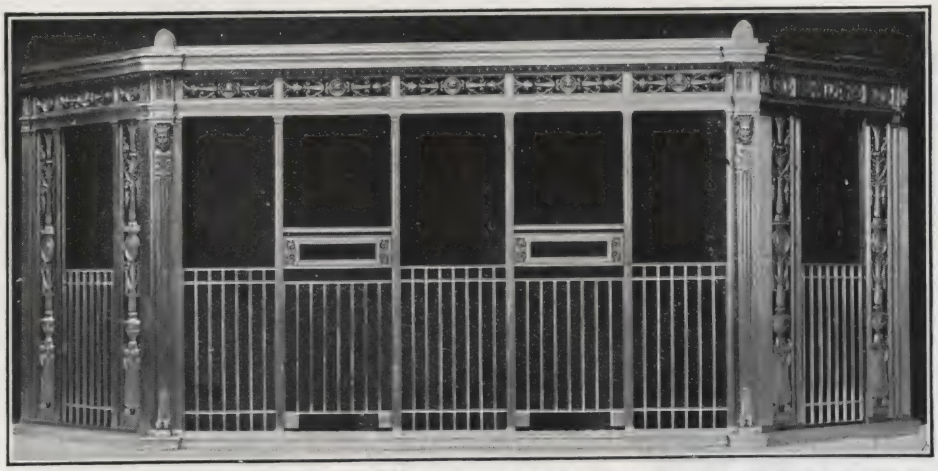
½" SCALE
HALF ELEVATION



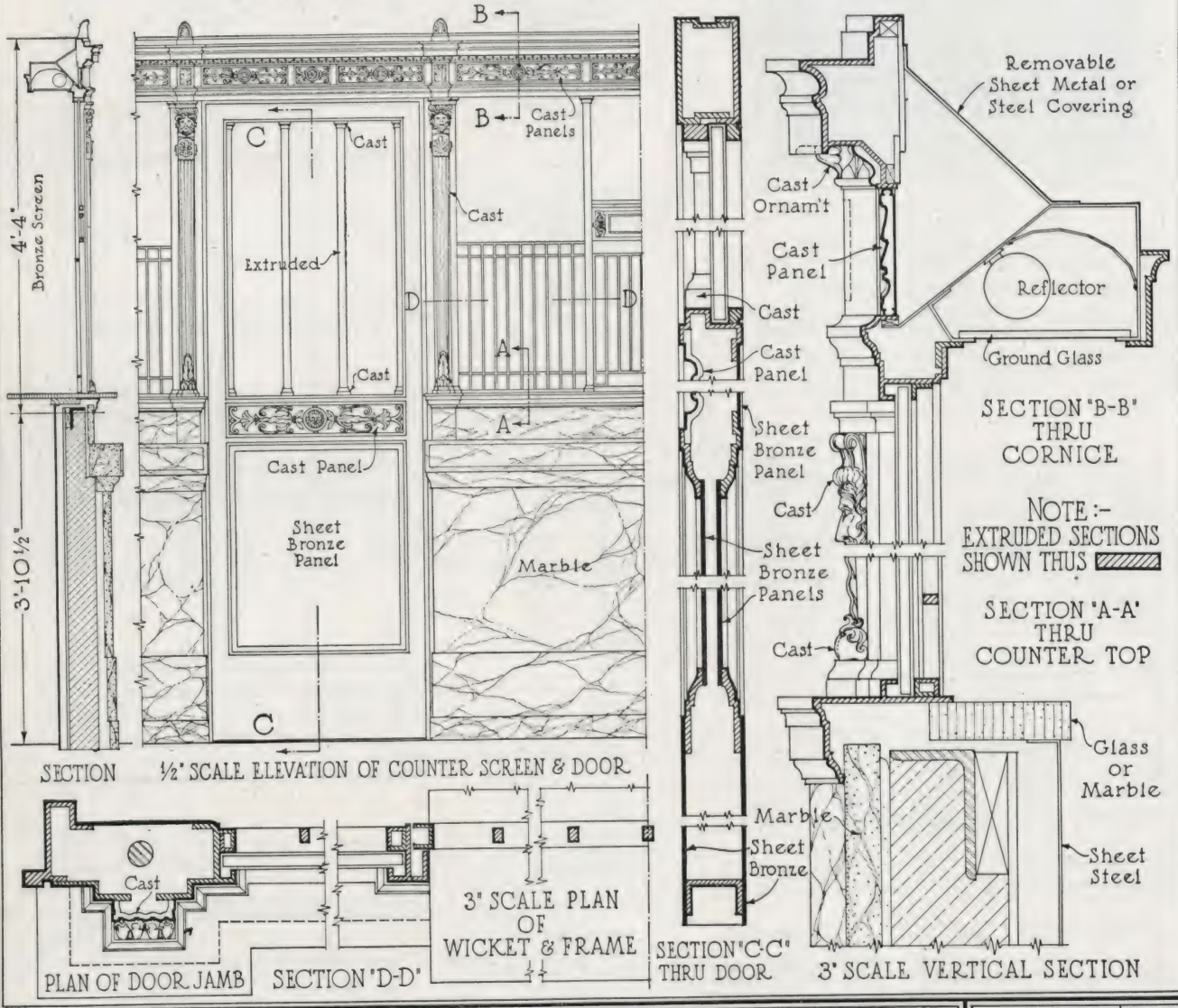
½" SCALE HALF PLAN

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	ANACONDA ARCHITECTURAL BRONZE SECTIONS FOR DOORS, SIDELIGHTS, TRANSOMS & FRAMES	SCALE ½" & 3" EQUALS 1'-0" DATE-MARCH-21	DRWG 2

Continued on next page



EXTRUDED METAL SCREEN FOR ASTOR TRUST COMPANY, NEW YORK CITY
CHARLES E. BIRGE, ARCHITECT, NEW YORK, CITY
EXECUTED BY THE GORHAM COMPANY, ARCHITECTURAL BRONZE DEPARTMENT
EXTRUDED BARS AND SHAPES SUPPLIED BY THE AMERICAN BRASS COMPANY



DRAWN BY SWEETS CATALOGUE SERVICE, INC.	ANACONDA ARCHITECTURAL BRONZE SECTIONS FOR BRONZE BANKING SCREEN AND PARTITIONS	SCALE ½" & 3" EQUALS 1'-0" DATE-MARCH-21	DRW'G 3

ACORN WIRE AND IRON WORKS

Unit Sectional Wire Partitions, Wire Cages and Wire Window Guards

TELEPHONE
NORMAL 1895

5906 Lowe Avenue
CHICAGO, ILL.

Products

Manufacturers of ACORN UNIT SECTIONAL DIAMOND MESH PARTITIONS; CAGES for Banks and Offices; DIAMOND MESH WINDOW GUARDS.

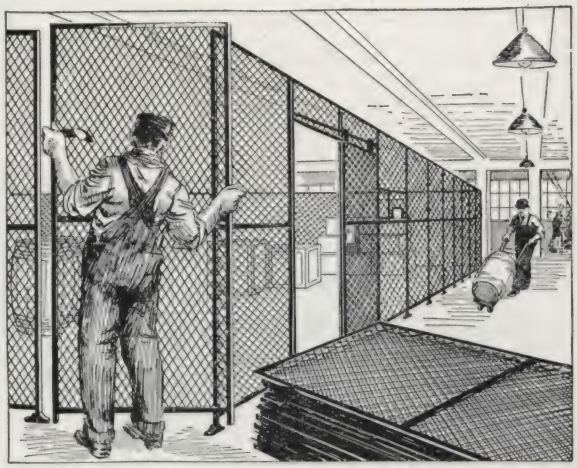
Also manufacturers of Skylight Guards, Machinery Guards; Elevator Enclosures, Wickets and Grilles; Railings for Stairs, Porches, Balconies and Windows; Area Gratings and Sidewalk Doors; Wire Signs and Collapsible Folding Gates.

Acorn Unit Sectional Diamond Mesh Partitions

A fireproof partition which allows free circulation of air and unobstructed light is a requisite for every industrial plant.

Acorn unit partitions give systematic effectiveness —the aim of every factory executive; they eliminate loss of tools and supplies, and do away with petty thievery.

They are 100% interchangeable. They can be rearranged, added to or moved quickly and by inexperienced workmen. They permit the forming of a corner at any intersection and the placing of doors between any two sections.



ACORN UNIT SECTIONAL DIAMOND MESH PARTITIONS

Material Specifications—*Height*—Standard partitions are made in two heights, 7 and 8 ft. Can be increased to any height by adding special panels at top.

Width of Sections—Standard sections are 5 ft. wide. This extra width is used to eliminate the weakness caused by too many connections. It also saves from 15% to 20% installation cost. Special width sections furnished to fill in where necessary.

Cut-outs and Special Panels—Cut-outs, or special size or shape panels furnished to meet special conditions.

Door Sections—Standard door sections are 3 ft., 3 ft. 6 in., and 4 ft. wide, and of height to match partitions. Doors are 6 ft. 6 in. high with transom panel overhead. Door sections interchangeable with other sections. Either sliding or swinging types furnished. Sliding doors up to 4 ft. wide made self-closing without extra cost. Special sizes when necessary.

Locks—Made of brass set in aluminum case. Operated with pin tumbler cylinders from outside, and recessed knob from inside. Master-keyed locks furnished at slight additional cost. Doors equipped with hasp for padlock instead of regular lock with reduction in cost.

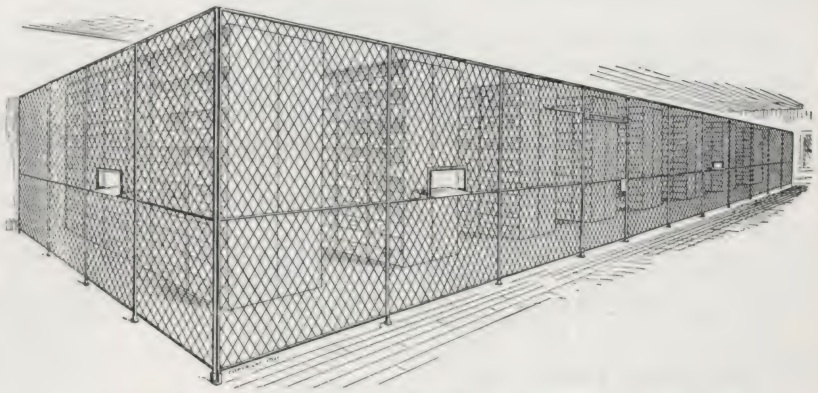
Service Windows—See illustrations of details.

Hangers—All sliding doors equipped with ball bearing hangers.

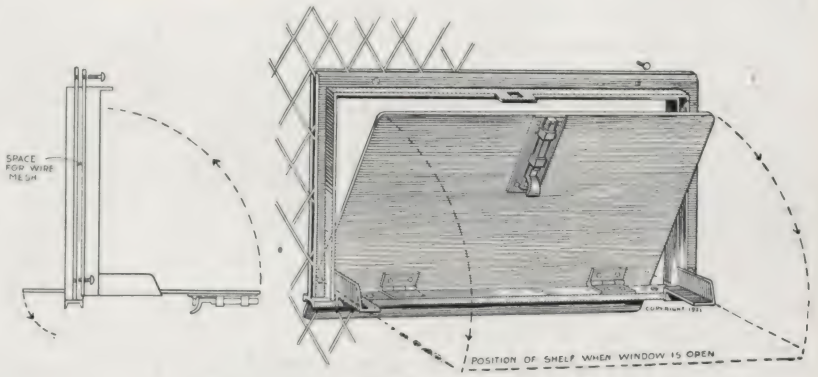
Wire, Web and Mesh—No. 10 (⅛-in.) open hearth steel wire used. Entire web in one piece with wires passing through center stiffening bar, eliminating unnecessary joints. Mesh is 1⅝-in. diamond mesh.

Framing and Stiffening Bar—Framing, 1x½-in. steel channel. Center stiffening bar, 1x⅜-in. channel steel securely riveted to frame.

Capping Bar—2x⅛-in. steel channel extending from center of one panel to center of next, thereby breaking joints.



STANDARD INTERCHANGEABLE SECTIONS ADAPTABLE TO ANY USE
An excellent arrangement for tool or stock room



COMBINATION SERVICE WINDOW AND SHELF

Shelf swings up, closing opening, and is locked from inside with improved dead locking push bolt. After it is locked, a spring back of bolt lodges the band into recess when it can not be opened until bolt is pressed against plate. Installed before shipment or after partition is in place. Special service windows furnished to suit requirements.

2 sizes; "A," 15 in. wide by 9 in. high, "B," 24 in. wide by 15 in. high. Each fitted with metal shelf extending about 2 in. on outside, and 9 in. and 15 in., respectively, on inside.

Continued on next page

Bracing—While capping bars will carry a reasonably long partition, simple methods of bracing can be effected by use of wire strands from top of partition slantwise to ceiling.

Floor Sockets—2½ in. high to allow for adjustment where floors are uneven.

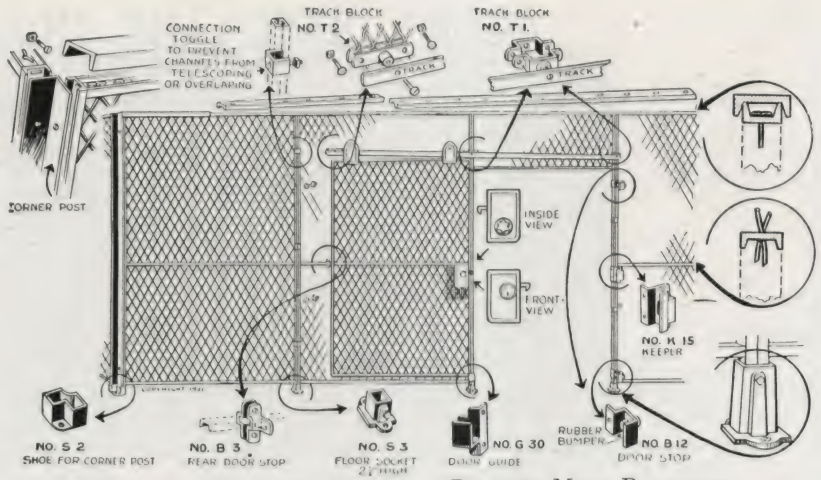
Corner Posts—1x1-in. steel angle with floor socket. This permits the making of corner at any intersection.

Connection Toggles—In addition to the regular bolts furnished for bolting panels together, 3 special toggles are furnished at each intersection to prevent channels from telescoping or overlapping, thereby overcoming the difficulty otherwise experienced in erection.

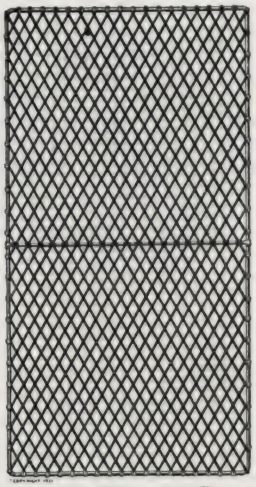
General Hardware—All hardware that is subject to strain is made of malleable iron or wrought steel to prevent breaking. The balance is made of soft grey iron.

Paint—Standard factory green unless otherwise specified. Special colors may be had at slight additional cost.

Erection—Many original and exclusive features make Acorn partitions extremely easy to erect. No experience or special skill is necessary. Diagram and complete setting instructions sent with each order.



DETAILS OF ACORN UNIT SECTIONAL DIAMOND MESH PARTITIONS



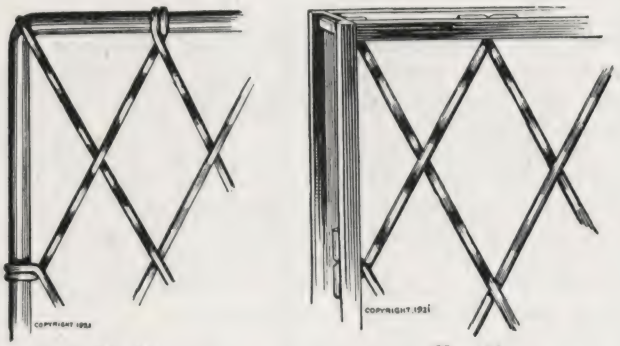
No. 121 WINDOW GUARD

Acorn Diamond Mesh Window Guards

They permit the opening of windows for ventilation without danger of burglary or damage to material or tools, and safeguard windows against accidental or intentional breaking.

Material Specifications—Made of three principal specifications: 1¼-in. mesh, No. 12 wire; 1½-in. mesh, No. 10 wire; 2-in. mesh, No. 8 wire. The 1½-in. mesh, No. 10 wire is most used, being the meeting point of burglary and glass protection. Guards can be furnished in any wire or mesh desired.

No. H-5 hinge and No. H-6 hasp, of malleable iron, are recommended. They afford an excellent means of fastening and are adaptable to any style window frame by reversing same where necessary. Hinges are fastened to window by lag screws making it difficult to remove from outside. Hasps are locked to a heavy screweye which can not be removed when padlock is in place.

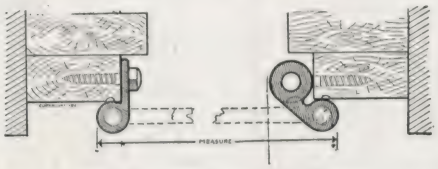


No. 121 No. 122

DETAILS SHOWING CONSTRUCTION OF SCREENS

No. 121 guard has round steel frame of ⅞- or ⅜-in. diameter according to size of guard. Furnished in either stationary or hinged type. Hinged type permits washing windows.

No. 122 guard has channel frame varying from ¾ to 1 in. wide. These are satisfactory when designed to fit opening, but are not recommended when outer grooved edge is exposed to view.



H-5 HINGE AND H-6 HASP

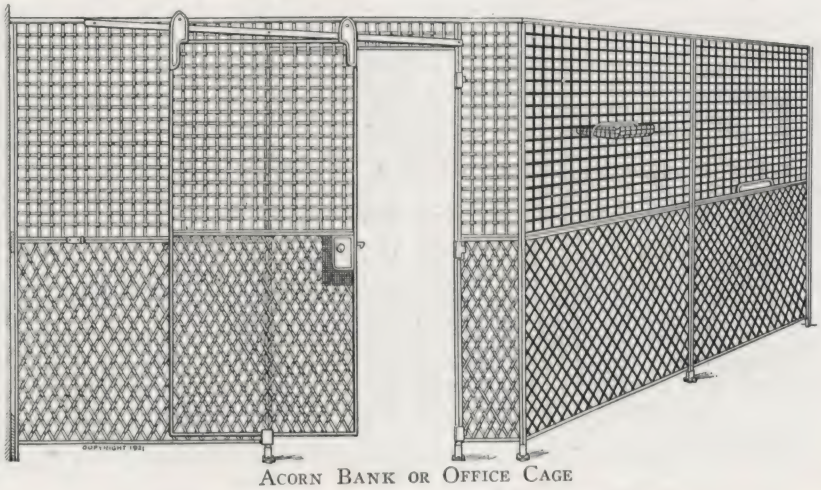
Cages for Banks, Offices, etc.

The ACORN WIRE AND IRON WORKS have developed and are using the press crimp type of construction in bank and office cages (see detail). This type of crimp adds much to the character and distinctiveness of the work. The old type double crimp can still be furnished when it is necessary to match old work.

Press crimp can be furnished in either square or flat wire, but because of its greater utility and rigidity, square wire is recommended (see typical specification following).

Nos. 142 and 143 cages are commonly used in offices and small banks.

The upper part is made either of ⅛-in. square wire or ¼-in. flat wire, 1½-in. square mesh. The ⅛-in. square wire is preferable because of its greater strength. Wires are pressed at each intersection, making a neat and pleasing appearance. The lower part is made of round



ACORN BANK OR OFFICE CAGE

No. 142, upper part square wire. No. 143, upper part flat wire

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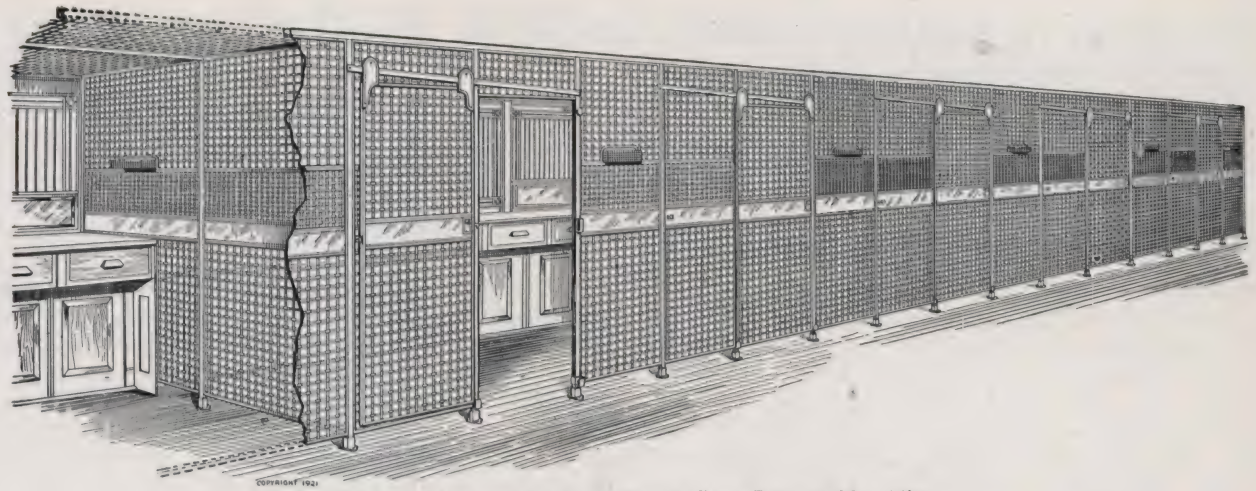
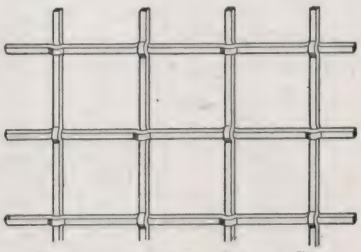


TYPICAL ARRANGEMENT OF BANK CAGE DESIGN NO. 147

Same as Design No. 146 except that ¾-in. square mesh panels 1 ft. high are fitted at top of solid panels

wire, 1½-in. diamond mesh.

Doors furnished either sliding or swinging type; sliding doors being made self-closing unless otherwise specified. Doors fitted with cylinder locks operating with key from outside and knob from inside.

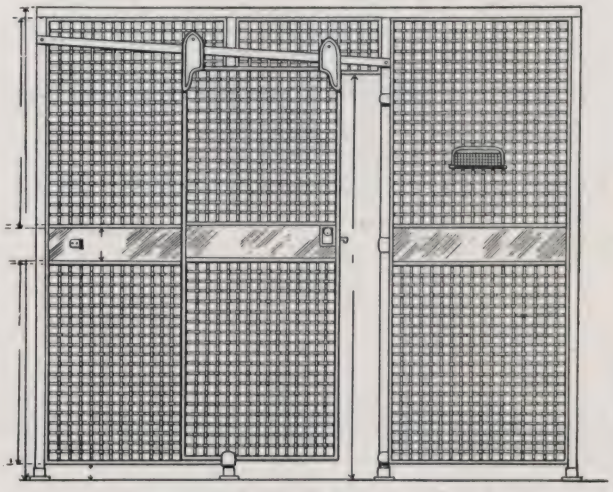


DETAIL OF PRESS CRIMP CONSTRUCTION

Typical Specifications—Cages shall be of a height to conform to front fixture and shall be made of ⅛-in. square wire, 1½-in. square mesh of press crimped type. Framing to be of 1x½-in. channel, tenoned and riveted at corners. Posts at doors and at each intersection shall be of 1¼-in. square Shelby tubing No. 14 gage in thickness. The same tubing shall be used to finish top of cages. (See Design No. 146, Catalogue 200, Acorn Wire and Iron Works, Chicago.)

Note: If flat wire is specified, ¼x⅛-in. wire, 1½-in. square mesh is recommended.

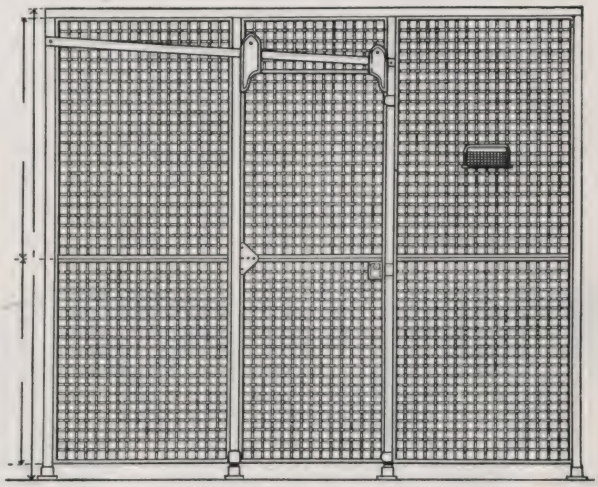
Each section, including doors, to be fitted with metal panel 7 in. wide; bottom of panel to be flush with top of counter.



BANK CAGE DESIGN NO. 146

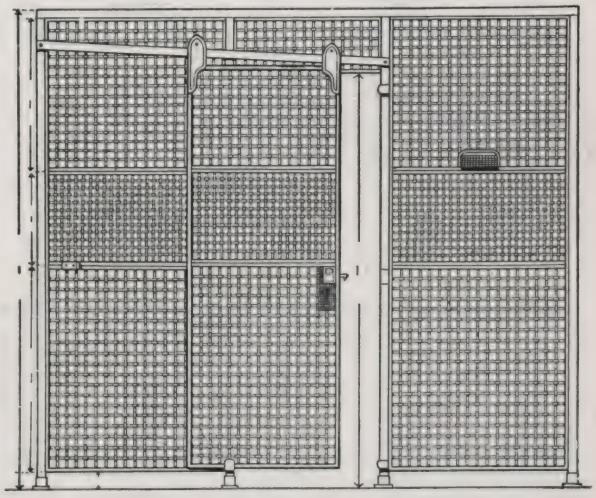
Doors to be of sliding gravity, self-closing type hung on ball bearing hangers and fitted with Yale master-keyed cylinders; master keys to be of series different from balance of building.

Pass baskets 8 in. wide, 10 in. long shall be included for each division. Pass baskets 8x8 in. shall be included for the rear of each cage. Basket to be fitted flush with outside of cage.



BANK CAGE DESIGN NO. 144

Same as Design No. 146 except that solid metal panels are eliminated



BANK CAGE DESIGN NO. 145

Same as Design No. 146 except that ¾-in. square mesh panels 1 ft. 6 in. high are substituted for solid panels

Finish—Usually furnished in flat black, verde green, or natural bronze, but can be furnished in any finish desired.

Catalogue

Complete catalogue sent on request.

BADGER WIRE & IRON WORKS

1210-1226 25th Avenue

MILWAUKEE, WIS.

Products

ORNAMENTAL WIRE and IRON WORK:

Window Guards, Wire Partitions, Railings, Wire and Iron Fences, Grilles, Panels, Wire Signs, Skylight Guards, Iron Gratings, Folding Gates, Balcony Railings, Sidewalk Doors, Marquises, Fire Escapes, Iron Stairs, Entrance Gates, Bank and Tool Room and Elevator Enclosures, Elevator Cars, Stable Fixtures, Lawn Furniture, and Lockers.

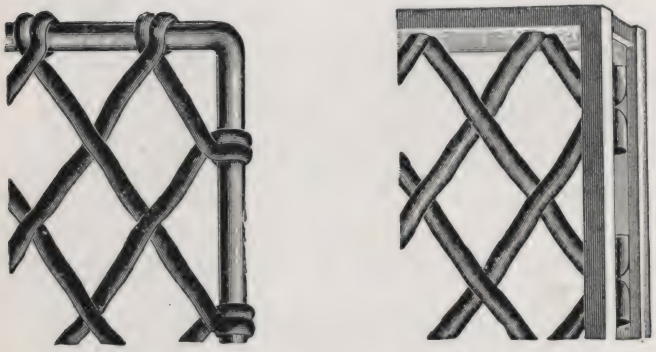
Service

Ornamental iron and wire work of whatever nature required either from customers' or architects' designs will be furnished by this company. Prices will be found to compare favorably with those charged by others, for goods of equal quality.

BADGER WIRE & IRON WORKS own and operate a new plant where with ample space and increased facilities they are able to give prompt and satisfactory service.

Standard Sectional Wire Partitions

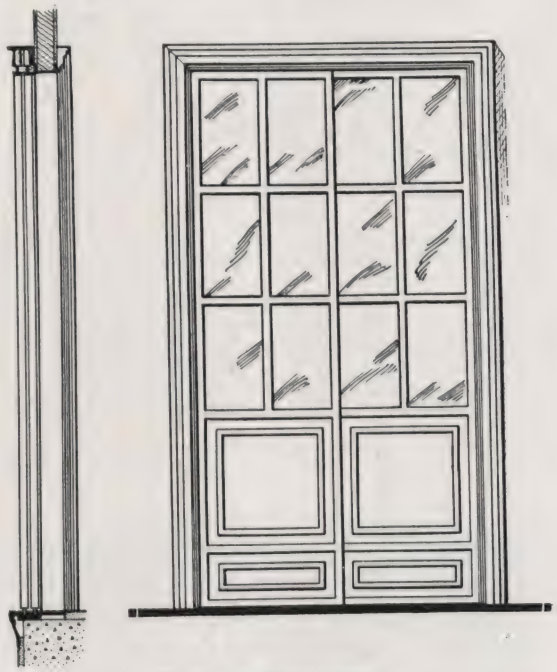
These standard partitions are adapted principally for tool and stock rooms enclosure. They are interchangeable so that rearrangement is possible without drilling or fitting. Standard partitions are made 4x7, 5x7, 4x8, and 5x8 ft. They are made of No. 10 wire, 1½-in. diamond mesh, 1x½-in. channel frames, horizontal bar through center, 1½-in. channel cover bar at top. Regular finish is black.



WIRE WINDOW GUARDS

A particular specialty is made of the manufacture of wire window guards, and this class of work will be turned out at minimum prices.

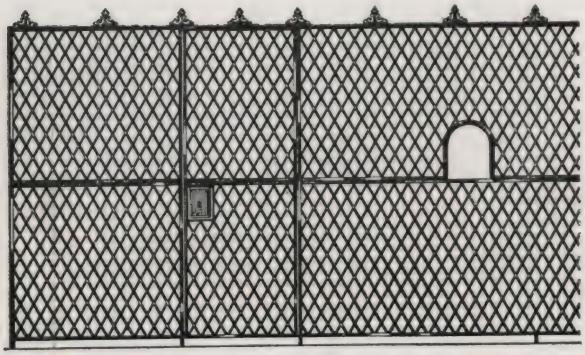
Inquiry should specify quantity and sizes, besides specifications covering the construction desired



ELEVATOR ENCLOSURE

Any kind of elevator enclosure of wire, wrought iron or sheet steel can be furnished; either open work or filled with wire glass as shown above.

Send drawing for quotation or this company will submit sketch if the requirements are explained



WIRE PARTITION

Used extensively where it is desirable to enclose a space effectively without obstructing the light.

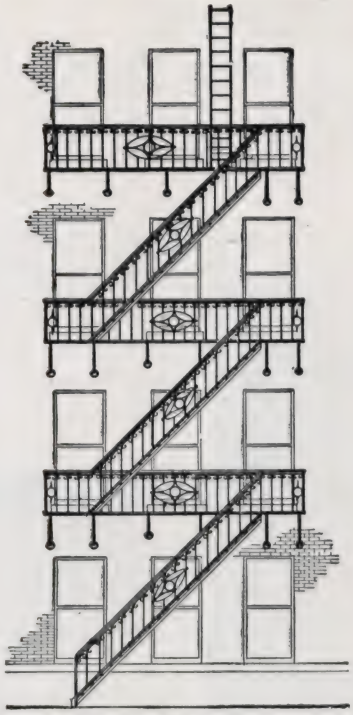
Generally made of No. 10 wire, 1½-in. diamond mesh, 1 by ½-in. channel frames; cover bar and cast pickets at top as shown

IRON GATE AND FENCE

In this department exceptionally good service is given, and low prices consistent with the quality of the product are quoted.

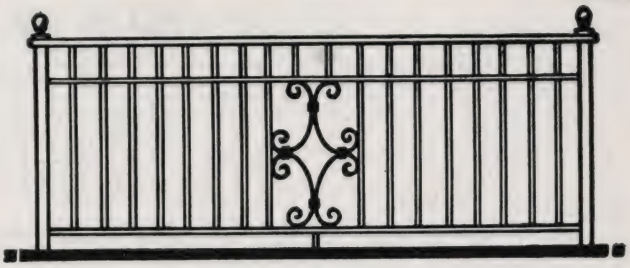
Catalogue showing a number of styles will be sent on application. Special designs furnished

Continued on next page



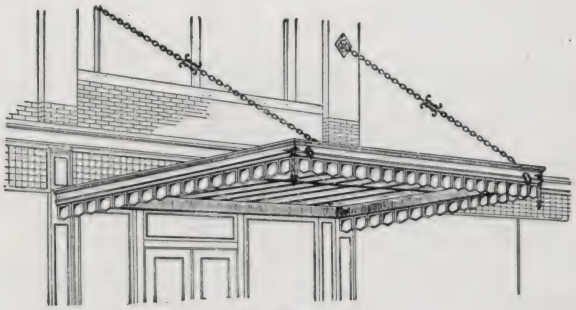
FIRE ESCAPE

Prices will be quoted on receipt of information covering the requirements. Fire escapes made according to whatever specifications may be provided by local ordinance or state laws. Send sketch showing that part of the building where fire escape is to be placed



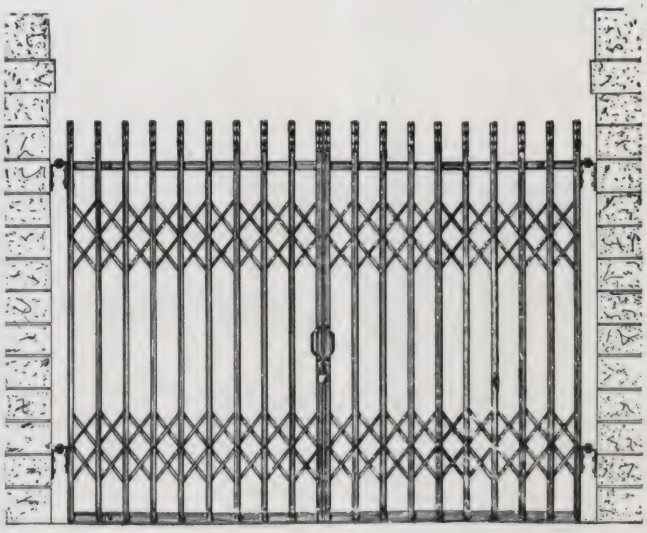
BALCONY RAILING

A design recently manufactured and installed by this company. Detail of same or other designs sent on request



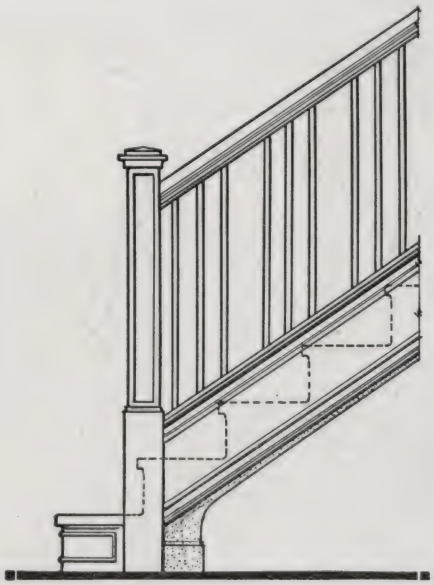
MARQUISE

Generally manufactured according to special designs, but prints of styles the company have already made will be submitted



FOLDING OR COLLAPSIBLE GATE

Furnished in a number of different designs, of which drawings or prints will be submitted on request. In writing for price state width of opening and height gate is to be; also state character of opening to be filled, so something appropriate for the purpose may be suggested



IRON STAIR

The most elaborate as well as plain stairs can be furnished. The design shown is one of the most popular rails

WIRE SIGN

A specialty is made of the manufacture of wire signs and BADGER WIRE & IRON WORKS have furnished some of the largest in use. In writing for price state length, height and lettering wanted, also the position of the sign so that the proper bracing may be figured. Complete specifications will be submitted in quoting

ATLAS IRON & STEEL COMPANY

Manufacturers of Ornamental Iron and Bronze Work

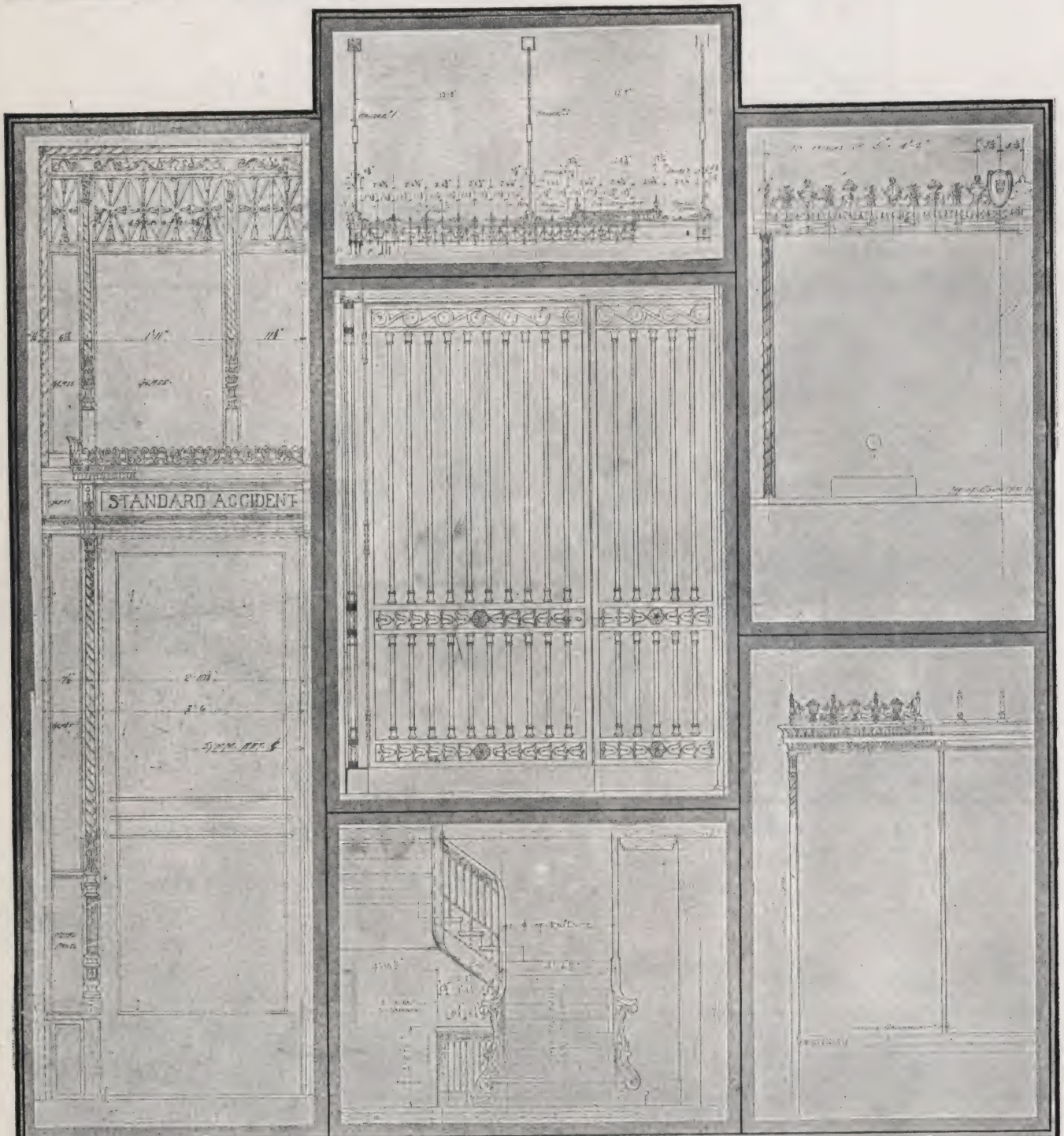
Martin Avenue and M. C. R. R.
DETROIT, MICH.

Products

ORNAMENTAL METAL WORK, including Stairs, Marquises, Elevator Inclosures, Cast Iron Fronts and Windows, Cast and Wrought Iron Railings, Bronze Work and Miscellaneous Iron Work of every description.

Facilities

We have a modern plant for handling a capacity production of from $800,000.00 to $1,000,000.00 per year.



FRAGMENTS OF SHOP DRAWINGS SHOWING RECENT WORK EXECUTED BY THE ATLAS IRON & STEEL COMPANY

THE BALDWIN BRASS WORKS

Architectural and Ornamental Bronze and Steel

TELEPHONE
HARRISON 4880

407-413 South Clinton Street
CHICAGO, ILL.

Products

BRASS, BRONZE and STEEL PRODUCTS for banks, cafeterias, churches, mausoleums, offices and public buildings:

Altar Railings
Balcony Railings
Bank and Counter Screens
Bank and Office Wickets
Bank and Office Railings
Brass and Bronze Railings
Brass and Bronze Fittings
Brass, Bronze and Nickel Tubing
Bronze Entrance Doors
Bronze Mausoleum Doors
Bronze Lamps
Bronze Bulletin Boards
Bronze Tablets
Cafeteria Railing
Cafeteria Counter Protection
Cafeteria Display Stands
Coat and Hat Racks
Door Sills
Door Bars
Elevator Enclosures
Foot Rails
Garment Racks
Hand Rails
Lamp Standards
Mausoleum Railing
Mausoleum Gates
Memorial Tablets
Metal Name Plates
Metal Signs
Ornamental Metal Work
Pipe Fittings
Pipe Railings
Safety Treads
Stair Nosing
Stair Railing
Swimming Pool Ladders
Thresholds
Vault Doors
Window Guards
Wire Guards
Wire Work
Wrought Iron Work

INTERIOR OF BROADWAY THEATER, SUPERIOR, WIS., SHOWING BOXES AND BALCONY BRASS RAILINGS

FROM ACTUAL PHOTOGRAPH OF BANK FIXTURES INSTALLED

Facilities

We have good facilities for handling architectural iron, brass, bronze and steel work, and carry a large stock of raw material for immediate use in the execution of short time contracts.

THE BARKAY CO., INC.

Ornamental Bronze and Brass

JAMESTOWN, N. Y.

Products

CAST BRONZE BUILDING SIGNS; MEMORIAL TABLETS; HONOR ROLLS and OFFICE SIGNS.

Also Brass and Bronze Saddles and Thresholds.

Manufacturing Facilities

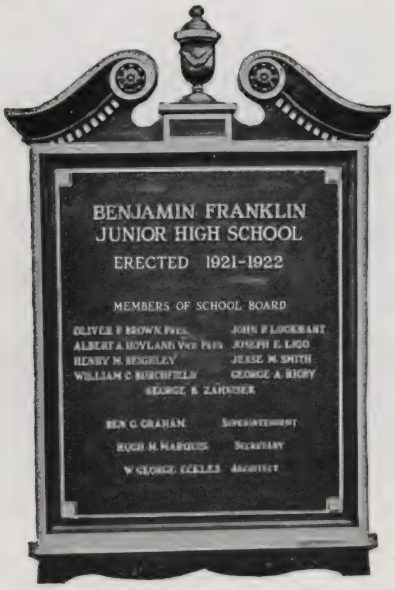
Equipped to furnish anything in signs or tablets as well as special hardware and small novelties.

Estimates and Designs

Estimates and designs will be furnished on request without obligation.

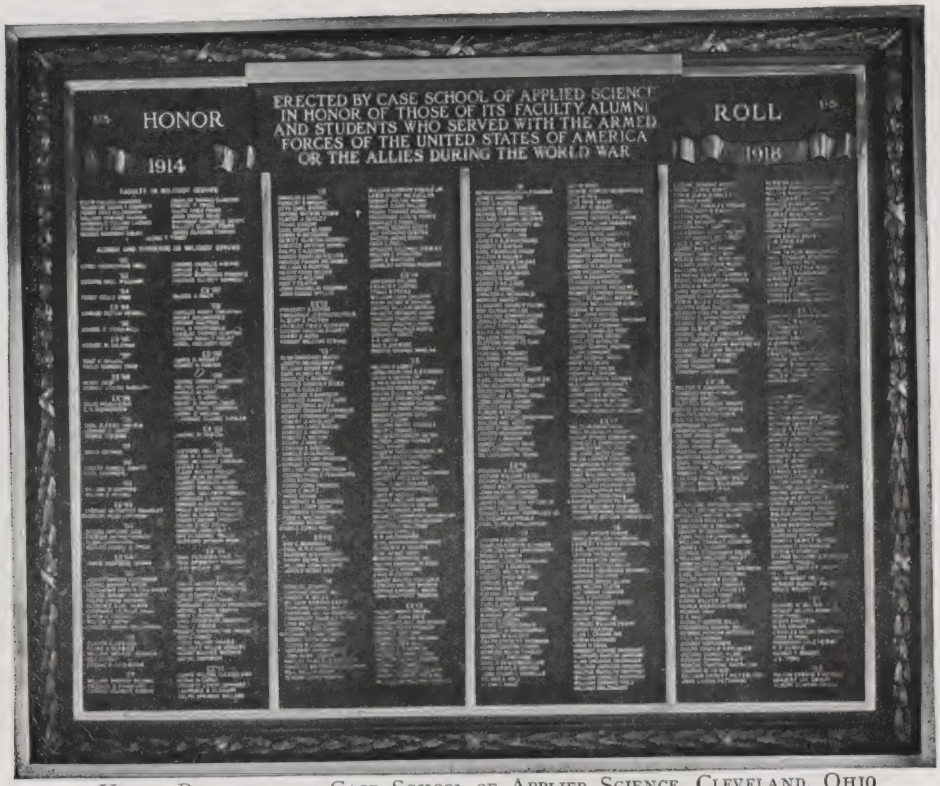
References

National Chautauqua County Bank, Jamestown, N. Y.
The Barshal Steel Equipment Co., Cleveland, Ohio.



BRONZE TABLET FOR SCHOOL BUILDING

HONOR ROLL FOR LODGE OF ELKS



HONOR ROLL FOR THE CASE SCHOOL OF APPLIED SCIENCE, CLEVELAND, OHIO
7 ft. long by 6 ft. high. Weight, 900 lbs.

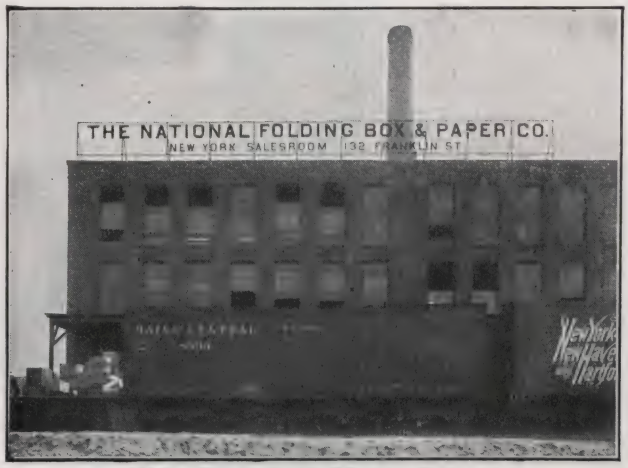
CHENEY BIGELOW WIRE WORKS

SPRINGFIELD, MASS.

Products

ORNAMENTAL WIRE WORK:

Window Guards; Folding Gates; Elevator Enclosures and Cabs; Wire Signs; Bank, Office, Heating and Ventilating Grilles; Bank and Office Screens; Brass Railings; Fire Fenders; Belt and Machinery Guards; Stockroom Partitions; Wire Partitions for all purposes.



WIRE SIGN WITH METAL LETTERS

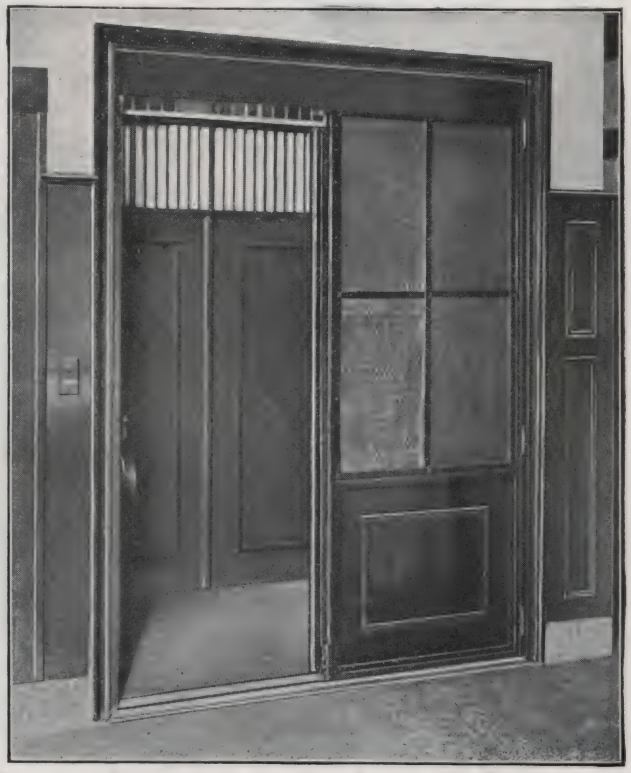
DOUBLE BOSTWICK GATE WITH STIFFENING BARS AND LIFTING BOTTOM TRACKS

DOUBLE LAZYLEVER GATE WITH LOCK BAR

Designs, Estimates, etc.

Requests for information, designs or estimates will receive prompt attention.

DOUBLE ELEVATOR ENCLOSURE, SINGLE SLIDING DOOR AND SWING FRONTS, FISK RUBBER CO., CHICOPEE FALLS, MASS.



ELEVATOR ENCLOSURE AND CAB, SINGLE SLIDING DOOR AND SWING FRONT, VICTORIA HOTEL, SPRINGFIELD, MASS.

ESTABLISHED 1864

BUREAU BROTHERS

Founders of Architectural and Statuary Bronze and Brass

23d and Westmoreland Streets

PHILADELPHIA, PA.

Products

BRONZE WORK, including Statuary, Bronze and Brass Castings; Architectural Work; Memorial and Inscription Tablets; Mausoleum Doors and Fittings; Balcony Railings; Fountains; Lamp Standards; Grilles and Gates.

Everything in the line of Castings.

Memorial and Inscription Tablets

There is an increasing demand for Bureau memorial and inscription tablets. Our own designs are the result of the efforts of the best artists.

Orders for these, however, are filled from special designs as well as from designs by architects, or from a large stock of patterns and type.

Facilities

Our manufacturing facilities are of the best, enabling the filling of orders of any size. There is no territory limitation.

Illustrations

The accompanying illustrations will give an idea of the character of work executed by this company.

FLAGPOLE BASE
Designed by HENRY BACON, Architect, New York, N. Y.

MAUSOLEUM DOOR
Designed by PRESBREY-LEELAND, New York, N. Y.

BRONZE LANTERN

BRONZE PANEL
Designed by DR. TAIT MCKENZIE, Sculptor

CHICAGO ARCHITECTURAL BRONZE CO.

TELEPHONE
RAVENSWOOD 8945

4740-4742 North Clark Street
CHICAGO, ILL.

Products

Manufacturers of high grade ARCHITECTURAL BRONZE WORK, including:

Bas-relief and Statuary.
Bronze Entrance Doors and Grilles.
Bronze Lamps.
Bank Counter Screens, Grilles, Wickets and Gates.
Memorial Bronze Tablets and Honor Rolls.
Cast Bronze Signs and Desk Name Plates.
Brass and Bronze Railings.
Thresholds and Kick Plates.
Cast Bronze Letters.
Mausoleum Doors and Equipment.

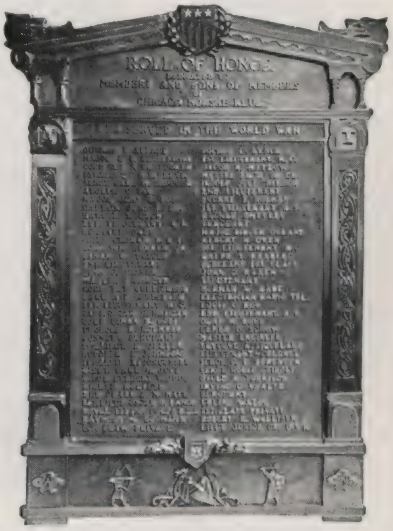
Facilities

The shops of the CHICAGO ARCHITECTURAL BRONZE Co. are equipped for the exclusive manufacturing of high grade bronze work, from the plainest to the most ornate.

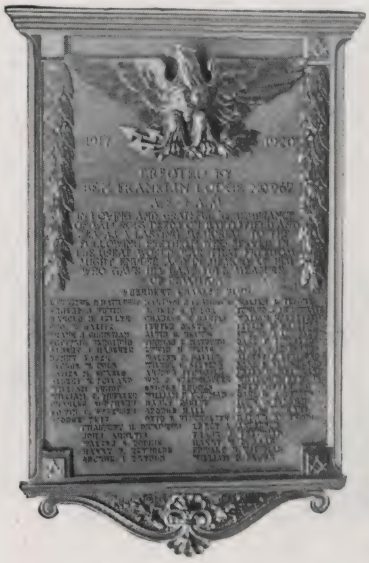
Competent designers and sculptors are on the staff. Skilled chasers give exceptional care to finishing.

MEMORIAL BRONZE TABLET

BRONZE BUST



BRONZE HONOR ROLL TABLET



HONOR ROLL TABLET OF BRONZE

BRONZE LAMP STANDARD

BRACKET LAMP IN BRONZE

ENTRANCE DOORS OF BRONZE

ESTABLISHED 1844

THE CINCINNATI MFG. CO.

Ornamental Bronze and Iron Work

MAIN OFFICE AND FACTORY

Corner Evans and Gest Streets
CINCINNATI, OHIO

Products

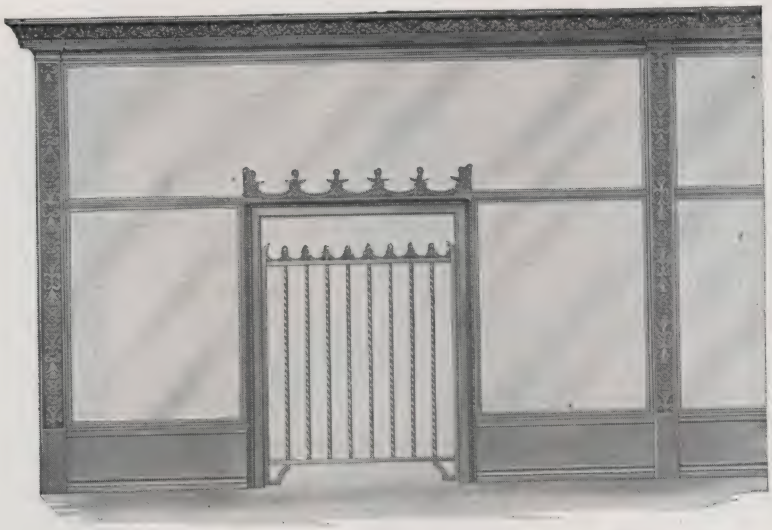
High grade ARCHITECTURAL and ORNAMENTAL WORK in BRONZE, BRASS and IRON, including:

Metal Work for Banks; Mausoleum Bronze; Memorial Tablets and Bronze Signs; Elevator Enclosures and Cars; Wire and Iron Work; Railings; Wickets and Grilles; Check Desks; Tubular Railings; Tellers' Cages; Window Guards; Machinery Guards; Collapsing Gates.

For Kalamein and Hollow Metal Doors, see page 674.

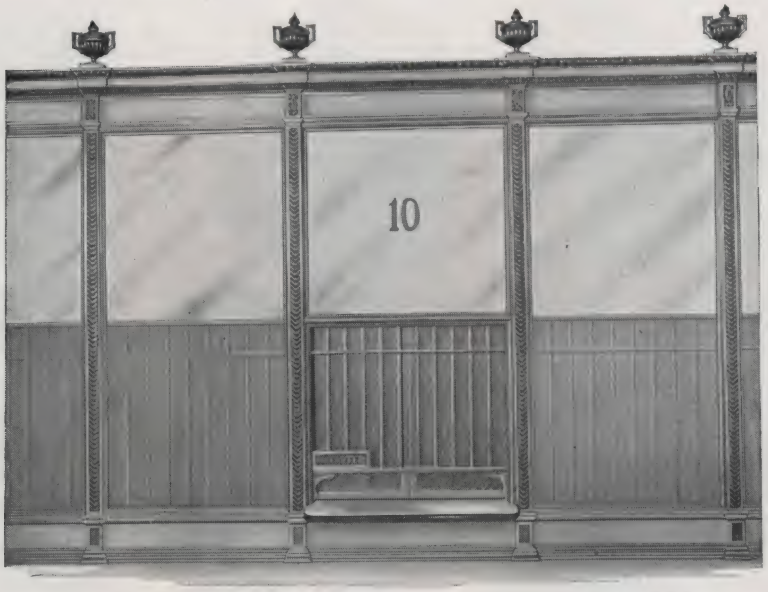
Bank Work

Catalogue No. 50, illustrating some of the work executed by this company from architects' drawings and our own designs, and illustrating some stock specialties, sent on request.



BRONZE AND GLASS COUNTER SCREEN, GUARANTEE TITLE AND TRUST CO., COLUMBUS, OHIO

FRANK L. PACKARD, Architect — Executed by THE CINCINNATI MFG. CO.



BRONZE AND GLASS COUNTER SCREEN, SAVINGS DEPARTMENT, UNION SAVINGS BANK & TRUST CO., CINCINNATI, OHIO

WERNER & ADKINS, Architects — Executed by THE CINCINNATI MFG. CO.

Hinged shutters behind wickets act as money guards when open.

Continued on next page

Mausoleum and Memorial Bronze

Designs modeled and cast. Work executed includes mausoleum doors, window guards, gates, catacomb handles and rosettes, tee handles, floor lifts, ceiling hangers, frames for glass panels, vent grilles, etc.

Memorial and honor roll tablets, insignia, wreaths, urns and vases.

Catalogue No. 52 sent on request.

Bronze Palm Leaves with Wreath

Cast Bronze Urn

No. 150. Bronze Mausoleum Window Grille

No. 786. Bronze Mausoleum Doors

No. 914. Cast Bronze Tablet

Continued on next page

Elevator Enclosures and Cars

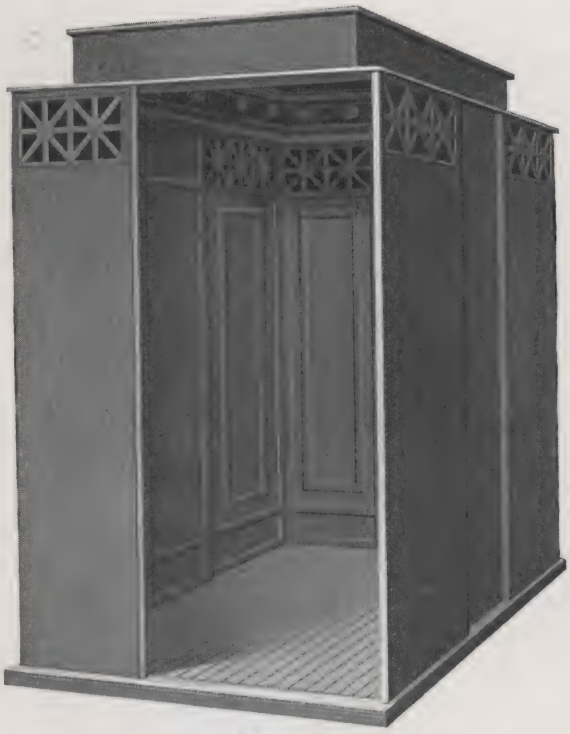
Elevator enclosures in grille designs or with wire glass panels, made in kalamein or hollow metal construction, with collapsing gates. Made in any wood finish desired.

Elevator cars to match, made of Armco polished furniture steel, finished in baked enamel in any wood finish desired.

Catalogue No. 54 sent on request.

Elevator Enclosure—Push Button Type with Collapsing Gates

Elevator Doors—Two-thirds Opening Sliding Doors



No. C-152. Elevator Car

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

INFORMATION CONCERNING COPPER, BRASS, AND COPPER PRODUCTS

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Hardware	1276–1277	Screen Cloth	1171
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Range Boilers	1538	Skylights	964
Roofing and Flashing	928– 935	Store Fronts	1010
Sash Chain	1187	Ventilators	990

This Association will be glad to furnish any information desired concerning these or any other copper products.

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Manufacturers of brass, copper and bronze sheets; brass and bronze rods; brass, copper and bronze tubes; brass and copper pipe; brass wire; yellow and red ingots; automobile, bicycle, motorcycle and pressure pumps; oil and grease guns, automobile accessories; plumbing goods; stampings; screw machine products; specialties, etc.

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(Owned by the Chase Companies, Inc.)
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Manufacturers of brass, bronze, nickel silver and copper in sheet, wire, rod and extruded shapes; seamless and brazed tubing.

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95 Broad Street, Boston, Mass.
510 Arch Street, Philadelphia, Pa.
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Dealers in seamless brass and copper tubes; seamless brass condenser tube, seamless brass and copper pipe, iron pipe sizes, high and low brass in sheets, rods, rolls, wire; copper in sheets, rolls, rods, wire; Tobin bronze rods, sheets, tubes; copper rivets and burs; yellow metal in sheets, rods, nails; brazed brass and bronze tube; copper nails (wire or cut) and tacks; copper bar, round, rectangular; copper leader, gutter, etc.; channel and angle brass; soldering coppers; architectural bronze in sheets, rolls, rods, wire; brass and iron escutcheon pins; iron lined brass tube; nickel silver in sheets, rolls, rods, wire; phosphor bronze in sheets, wire, rod, rope; copper anodes; Muntz metal bolts and nuts; strainer cloth and bronze mosquito netting; brass and copper wire cloth; brass and iron wood and machine screws; brass and bronze railings and fittings; brass and iron jack and safety chain; brass fittings, iron pipe sizes; brass spelter solder—one-half and one-half solder; plumbing material.

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Manufacturers of sheet and roll copper, all thicknesses and finishes, cut to any shape; copper conductor pipe; eaves trough; elbows and shoes; conductor straps; copper miters; ridging; strainers; soldering coppers; boiler tube ferrules; crimped copper; copper strainers; copper gaskets, plain and corrugated; gutter hangers; copper nails; copper spikes; copper rivets and washers, sawn copper bars.

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Manufacturers of sheet brass; sheet copper; and copper and brass in coils; brass rod; brass wire; brazed brass tube; extruded metal shapes.

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Manufacturers of copper anodes; plates; sheets; strips; boiler and kettle bottoms; circles; segments; pattern sheets; soft and cold rolled; plain, tinned and polished. Copper in rolls; copper conductor pipe; eaves trough; gutters; elbows; shoes and miters.

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MAIN OFFICE: Park Street, Taunton, Mass.

Manufacturers of high and low brass; gilding; bronze and all percentages of nickel silver in rolls and sheets only.

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MAIN OFFICE: Dominick & Bouck Streets, Rome, N. Y.

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Finucane & Macfie, 350 Broadway, New York, N. Y.
M. K. Williams, Mgr., 115 N. Market St., Chicago, Ill.
John H. Heimbuecher Metals Co., 514 N. 3rd Street, St. Louis, Mo.
Irvine Brass & Copper Co., 117 N. 2nd Street, Minneapolis, Minn.
Osgood & Howell, Wells-Fargo Bldg., San Francisco, Cal.

Manufacturers of brass, bronze and copper in sheets, rods, tubes, rivets, shapes, etc., including angles, channels, commutator bars, bus bar, and extruded shapes.

SCOVILL MANUFACTURING CO.

MAIN OFFICE: Waterbury, Conn.

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224 West Lake Street, Chicago, Ill.
280 Broadway, New York, N. Y.
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959 Leader News Bldg., Cleveland, Ohio.
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Manufacturers of brass in sheets, wire and tubing; brass goods, finished or partly finished, of every description.

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Manufacturers of sheet copper, roll copper, commercial brass, naval brass, manganese bronze in all widths and thicknesses and all sizes governed by thickness, up to 110 in. in width; copper, Muntz metal, naval brass, manganese bronze and leaded brass rods of all sizes produced in accordance with specifications of the U. S. Navy Dept.; copper, manganese bronze, naval brass, Muntz metal, commercial brass nails of all sizes; soldering coppers of standard and special form.

MEMBERS OF THIS ASSOCIATION WILL BE GLAD TO FURNISH INFORMATION CONCERNING THEIR PRODUCTS

ESTABLISHED 1878

CROWN IRON WORKS COMPANY

Manufacturers of Ornamental Iron and Bronze Work; Fabricators of Structural Steel

MINNEAPOLIS, MINN.

Products

ORNAMENTAL IRON, BRASS or BRONZE WORK.
Also Fabricated Structural Steel.

Facilities

Our plant consists of modern equipped shops and departments; such as modelling, pattern shop, foundry, structural shop, machine and finishing shops, thus enabling us to produce structural steel for large and small buildings, as well as the very finest of ornamental work.

Territory

We are prepared to furnish and erect our work west of the Mississippi River, also including Michigan and Wisconsin.

Service

The Engineering and Estimating Departments are always at the service of architects and contractors.

Scope

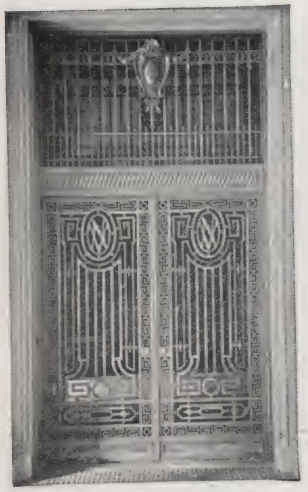
Below is to be found a list which indicates the general scope of products which we are prepared to furnish:

Area gratings
Automobile turntables
Bronze tablets
Coalhole covers
Elevator enclosures and cabs
Fire escapes
Folding and ornamental iron gates
Jail equipment
Joist and wall hangers
Marquises
Metal ladders
Ornamental iron and bronze lamps and brackets
Ornamental iron fences
Sheet steel shutters
Sidewalk, ash pit entrance and elevator doors
Steel flag poles
Steel lockers
Steel stairs
Steel tie rods
Steel transom bars
Wall anchors
Wheel guards
Wire window guards
All kinds of fabricated structural steel.

References

Forty-four years of successful business experience are back of us and we have done satisfactory work for nearly every architect in this territory and for many of the leading architects in the east. Below is given a few of the many recent buildings for which we have furnished ornamental work and any number of references will be furnished on request.

Lincoln National Bank, Minneapolis, Minn., Long, Lamoreaux & Thorshov, Architects
Hibbing High School, Hibbing, Minn., W. T. Bray, Architect
Valley National Bank, Des Moines, Iowa, Proudfoot, Bird & Rawson, Architects
Mines Building, Music Building, Engineering Building, Millard Hall and Anatomy Building of the University of Minnesota, C. H. Johnston, Architect
Woodbury County Courthouse, Sioux City, Iowa, William L. Steele and Purcell & Elmslie, Associated Architects
Chemistry Building of the University of Nebraska, Coolidge & Hodgdon, Architects
World-Herald Building, Omaha, Neb., Thos. R. Kimball, Architect



ELEVATOR DOORS

LAMP

LAMP STANDARD

CORNER SECTION OF ORNAMENTAL GRILLE

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Artisans in Wrought Iron

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ARCHITECTURAL and ORNAMENTAL HAND FORGED and LEAF-HAMMERED WROUGHT IRON WORK of *taste and character* for the best class of residences, churches, banks, government and private buildings.

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Hand forged iron entrances, marquises, stair rails, dining room and conservatory grille doors, grilles, driveway gates, fences, console tables with mirror frame, flower tables, andirons, lanterns and other luminaires.

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Hand forged iron altar rails, chapel screens, lecterns, fences, ornamental hinge plates, special hardware, weathervanes and crosses, lanterns and other luminaires.

For Banks

Hand forged iron bank screens, check desks, entrance doors, gallery railings, vault grilles, elevator doors, clock dials and hands, ornamental window guards, lanterns and other luminaires.

For Government Buildings

Hand forged iron entrances, screen enclosures, stair rails, elevator doors, ornamental window guards, flagpole holders, lanterns and other luminaires.

Workmanship

All our work is executed in the spirit of the iron masters of the middle ages, as they reached their climax in art, and in harmony with present day conception of their work.

Prices

Prices are in consonance with our products.

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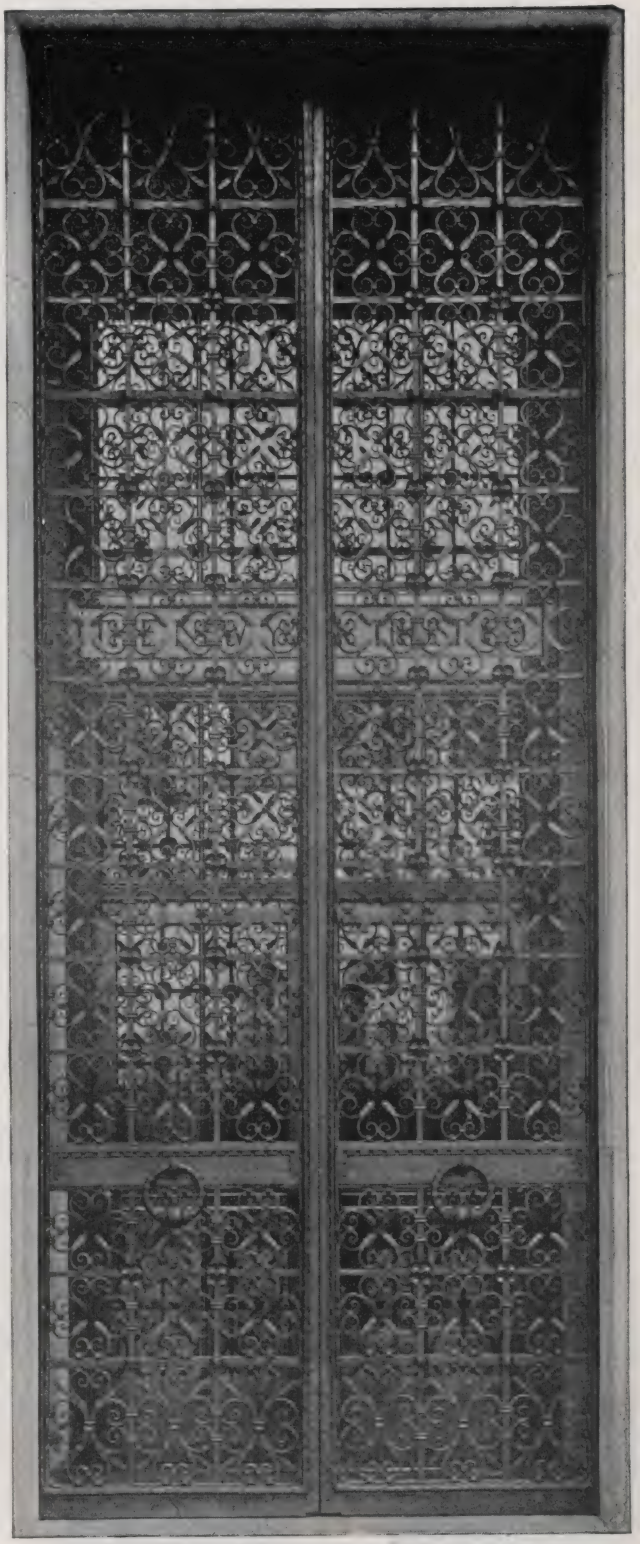
This concern is prepared to furnish estimates from architect's sketches, drawings and specifications, and, if requested, will furnish sketches of their own, with price notations.

Co-operative Suggestions

Architects are invited to submit to us all problems involving fine wrought iron work. Our facilities are offered in working out their designs, and interpreting them in wrought iron.

Through an appreciative handling of the material, work that has distinction and character can be produced by us at moderate cost.



HAND FORGED WROUGHT IRON ENTRANCE GATES
New York Trust Co., 100 Broadway, New York City
WALKER & GILLETTE, Architects

DETROIT MAUSOLEUM EQUIPMENT WORKS

CHARLES BOVENSIEP, PROPRIETOR

Designers and Manufacturers of U. S. Standard Bronze Doors and Bronze Equipment for Mausoleums; Bronze Tablets and Honor Rolls

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CAST BRONZE TABLETS and HONOR ROLLS.

CAST BRONZE LETTERS for Building Exteriors in any style, size or shape.

Also manufacturers of Window Grilles and Frames for Glass; Catacomb Handles and Rosettes; Ceiling Hangers; Ventilators; Gates and all Bronze Equipment used in Mausoleum Construction; Decorative Bronze Work of all kinds; Bas-reliefs.

Bronze Mausoleum Doors

Construction—Doors are all of the "built-up" type construction. Standard thickness is 1 in. although they can also be made 1⅛ in., 1¼ in., 1⅜ in., or thicker.

Bronze sheets not lighter than No. 14 gauge are riveted with $\frac{3}{16}$-in. bronze rivets placed 3 in. on centers to each side of a substantial core or framing of solid bronze. Rivet heads are perfectly countersunk on both sides and hand finished smooth with door surface.

Equipment—Cast bronze door frames or jambs are used occasionally, but doors are usually hung direct to granite jambs. Arranged to swing inward or outward as may be required. Hinges are of heavy cast bronze of the pivotal type.

Cast bronze threshold at bottom. Slam bar over center joint. Slide bolts at top and bottom of left-hand door. Heavy handle on each door.

Rear of grille openings is fitted with plate glass shutters fitted with hinges and turnbutton lockers. A device at bottom of shutters holds them securely at any angle when opened for ventilation.

Lock is of special heavy type, all-bronze, five tumblers, operating with flat german silver keys. Three keys are furnished.

All screws, bolts and expansion jackets are furnished by us.

Finish—Doors are usually finished in a light statuary bronze finish. The door stiles and all flat parts are hand rubbed with fine emery and pumice to a soft satin finish. The cast ornate parts are given a sanded finish with crevices and recessed portions in a darker tone. All outlines are hand tooled clean and sharp.

Workmanship—Doors are constructed by carefully trained skilled mechanics in a thorough, painstaking manner. Miters, joints, and all connections are neat and accurate. Applied ornaments are all secured from rear of door or "blind screwed."

Guarantee—These doors are constructed of best U. S. Standard bronze. They are absolutely rigid, level and true, and beautifully finished. They are guaranteed to endure practically for all time.

All work is carefully boxed to insure safe delivery.

Service—All work is made to order, in any size or shape. Architects' special designs and ideas will be carefully followed. The usual time required for execution is 6 to 8 weeks.

Our many years' experience in this field is at your service.

Catalogue—On application.

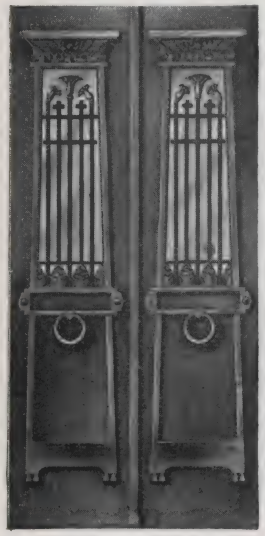

Illustration No. S 705

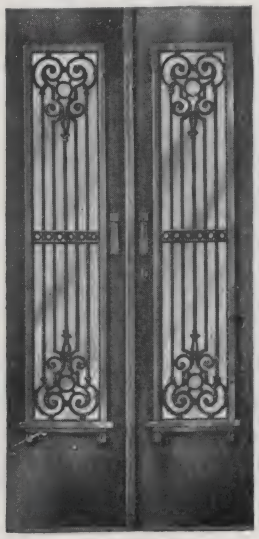

Illustration No. S 706

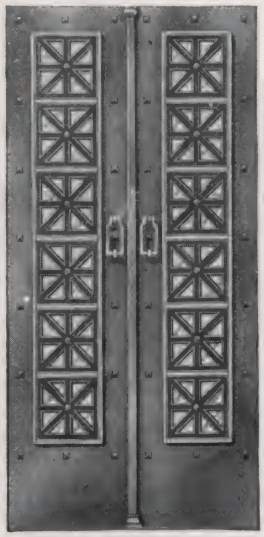

Illustration No. S 707

Illustration No. S 708

U. S. STANDARD BRONZE DOORS FOR MAUSOLEUMS

Continued on next page

Bronze Tablets

In making up our models for bronze tablets, we generally use our stock style lettering, shown below. When architects' full size details for lettering on tablets do not conform to stock styles, special patterns must be made, increasing the cost of the tablet. All tablets are made to order in any size or shape.

General Specifications for Architects, Applying to Our U. S. Standard Cast Bronze Tablets—Tablets to be cast in one piece of genuine U. S. Standard bronze, averaging not less than $\frac{3}{16}$-in. thickness in body. Lettering to be of appropriate size and arrangement, heavily raised. Face and edge of border and face of lettering to be finished in fine satin hand burnish. Background to be finely pebbled surface and finished in dark statuary bronze. All outlines of border and all lettering to be hand tooled clean and sharp.

Furnish bronze expansion screws with non-corroding expansion jackets for attaching tablet to wall.

Head of screws to be covered with neat bronze rosette with threaded stem entering head of screw.

Illustration No. S. 4360
TYPICAL DESIGN OF BRONZE TABLET FOR PUBLIC BUILDING, 23x32 IN.
Made in any shape or size

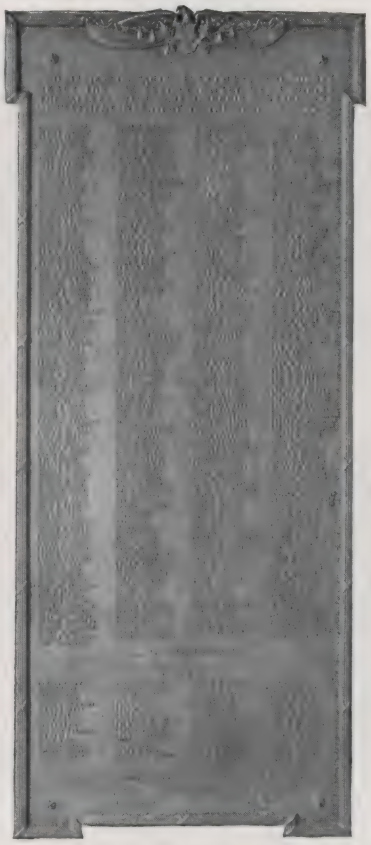

Illustration No. S. 500
CAST BRONZE HONOR ROLL

Illustration No. S. 501
SPECIAL DESIGN OF BRONZE TABLET FOR WHOLESALE HOUSE, WITH TRADE-MARK IN BAS-RELIEF, 30x38 IN.
Raised letters

Illustration No. S. 462

CAST BRONZE LETTERS FOR BUILDINGS

Usual architectural style. Made of cast bronze in any size required. Usually finished in fine sanded statuary bronze. Anchors or pins on rear for attaching to stone, brick, tile, etc. Made to order according to architects or our own details

ESTABLISHED 1911 INCORPORATED 1915

ELLISON BRASS MANUFACTURING CO.

Ornamental and Architectural Brass, Bronze, Iron and Aluminum Work

JAMESTOWN, N. Y.

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ORNAMENTAL and ARCHITECTURAL BRASS, BRONZE, ALUMINUM and IRON WORK for banks, office buildings, hotels, court houses and city buildings, churches, schools, theaters, residences, etc., including Entrance, Vestibule and Inside Doors in Cast or Hollow Metal Bronze; Bank Screens and Check Desks; Door and Window Grilles; Lamp Standards; Elevator Doors and Frames; Railings; Register Faces; Thresholds; Mausoleum Doors, Windows, Crypts, and Fittings; Memorial Tablets; Monumental Bronze Work; Special Hardware.

Facilities

Designing and drafting department.

Pattern department including modeling, plaster, wood and metal patterns.

Foundry with complete equipment; 17,000 sq. ft. floor space.

Machine department, special hardware department, fitting department and finishing department; 22,000 sq. ft. floor space.

Each department is equipped with up-to-date facilities. Entire plant devoted exclusively to art and architectural metal work.

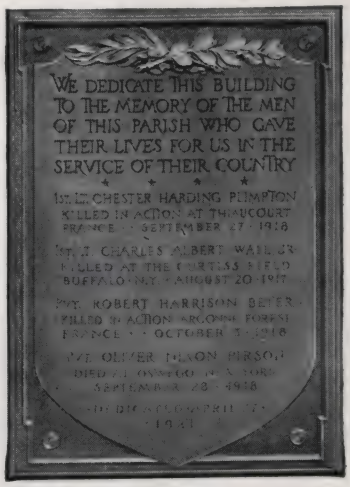
FLAG CASE AND RAILING FOR STATE HOUSE, BOSTON, MASS.
WILLIAM CHAPMAN, Architect

BRONZE STATUE, 12 FT. HIGH, BRADDOCK, PA.
FRANK VITTOR, Sculptor

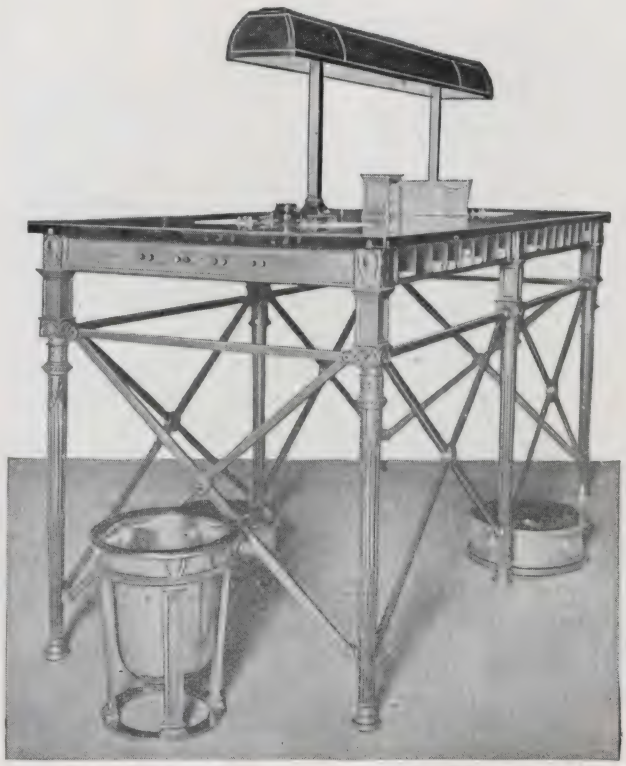
Continued on next page

Grille Door, Weld County Courthouse, Greeley, Colo.
Wm. N. Bowman, Architect

Plaque—4 ft. 2 in. in Diameter, Marine Trust Co., Buffalo, N. Y.
J. Harold Cook, Architect



Tablet for Church of Ascension, Buffalo, N. Y.
Edward B. Green & Sons, Architects



Check Desk, Citizens Union Trust Co., Cleveland, Ohio
Graham, Anderson, Probst & White, Architects

Mausoleum Doors, Memorials Art Co., Buffalo, N. Y.

ESTABLISHED 1858

J. W. FISKE IRON WORKS

Ornamental Iron, Brass, Bronze, Wire and Zinc Work

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ORNAMENTAL METAL WORK and FENCING as follows: Ornamental Entrance Doors, Window Guards, Lamps and Lamp Standards; Metal Stairs; Memorial Tablets; Fountains; Iron Railings and Entrance Gates; Woven Wire and Climbproof Chain Link Fencing; Sanitary Stable and Barn Equipment.

Also, Brass and Bronze Railings; Andirons and Fire Sets; Fire Escapes; Flagpole Bases; Balls and Trucks; Folding Gates; Leader Shoes; Marquises; Garden and Park Furniture; Sundials; Tree Guards; Wire Partitions.

Fiske Quality

The quality of Fiske products is best evidenced by installations for the United States Government, states, cities and leading commercial organizations, and upon many of America's largest private estates.

Co-operative Service

The J. W. FISKE IRON WORKS will submit estimates for products either delivered or erected complete. A well organized engineering staff is maintained, and contracts for designing and erection complete are made when desired. Co-operation with the architect, contractor or owner in executing unusual specifications is a specialty.

Where material is delivered only, instructions and drawings will be furnished to enable local mechanics to erect the work. Sketches and designs will be furnished on request, and full information as to sizes and weights will be given.

Entrance Gates, Fencing, etc.

This company will carry out any design in ornamental entrance gates, iron fencing, window guards, metal stairs and similar work, or will prepare and submit designs for such work.

ILLUSTRATIONS OF WORK FINISHED AND INSTALLED BY J. W. FISKE IRON WORKS

No. 1—Entrance Gate, South Kortright, N. Y.
No. 2—Entrance Gate, Oakdale, L. I., ERNEST FLAGG, Architect
No. 3—Entrance Gate, Montclair, N. J.
No. 4—Chain Link Fence, Paterson Parchment Paper Co., Passaic, N. J.
No. 5—Bronze Memorial Tablet
No. 6—Interior Stable, WM. ZEIGLER, JR., Norton, Conn., H. P. KNOWLES, Architect

Continued on next page

"Set-in-concrete" Posts

All Fiske fence posts are set in concrete footings and this construction is strongly recommended by this company. This method keeps the posts from being thrown out of alignment by frost, and prevents them from rusting off at the ground line.

Chain Link Fencing

All Fiske chain link woven wire fencing is extra heavy galvanized by the hot dip spelter process. This is the heaviest and most durable type of wire fence made. Fiske woven steel wire fabric is made in widths from 60 to 96 in. and when erected in connection with Fiske standard "set-in-concrete" posts, provides a fence from 5 ft. 2 in. to 8 ft. 2 in. high. This height can be increased to 10 ft. with diagonal arms and 3 strands of barbed wire.

Foundry Work

This company is prepared to undertake any ornamental casting in iron, brass or bronze according to submitted designs or models, or from designs originated by its own organization.

Sanitary Stable and Barn Fittings

The J. W. Fiske Iron Works make a specialty of complete sanitary fittings for stables, cow barns, etc., and are pleased to cooperate with architects in writing specifications.

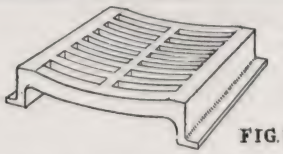


FIG. 159A K

HIGHWAY CATCH BASIN FRAME & GRATING
(Very Heavy)
24" long, 22½" wide, 5½" deep,
Grating only, 20½" × 20" 2½" thick in center

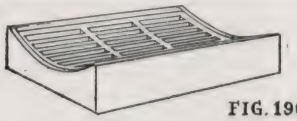


FIG. 196E K

LIGHT GUTTER BASIN & GRATE
For lawns & carriage drives, not for street use.
18" wide × 24" long × 5" deep
Grating only, 16" × 22"

HEAVY GUTTER BASIN & GRATE
For roadways, streets, parks, cemeteries etc.
No. 2 - 18" wide × 24" long × 5" deep
Grating only, 16" × 22"
No. 1 - 9" × 15" × 3" for use in draining small areas. The outlet is so designed that it can be used on 4", 6", 8", or 10" pipe

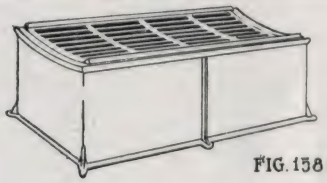


FIG. 158 K

ROAD BOX
For public or private roadways, etc.
No. 1 - Top: 25" long, 14½" wide, 10" deep
Grating only 23" long, 13¾" wide
No. 1A - Top: 25" long, 14½" wide, 4" deep
No. 2 - Top: 32" long, 14½" wide, 4" deep

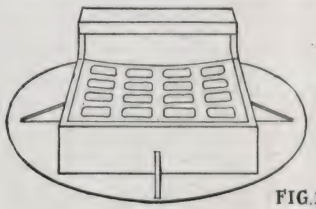


FIG. 162A K

CATCH BASIN INLET
Top 23" × 32", bottom flange 42" diamater. Grating is concave at rear

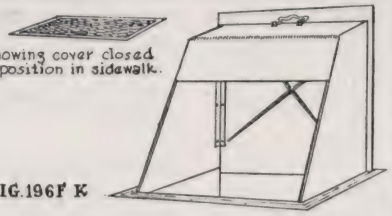
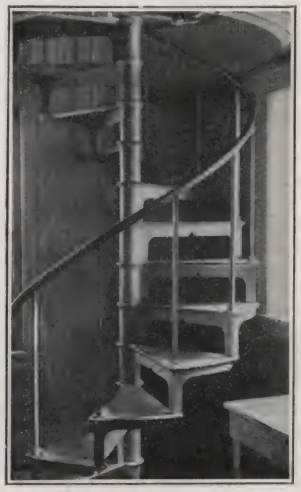


FIG. 196F K

SAFETY COAL HOLE COVER & FRAME

	Cover	Frame
No. 1 -	18" × 18"	23" × 23"
No. 2 -	22" × 22"	27" × 27"
No. 3 -	30" × 30"	35" × 34"



SPIRAL STAIRS
Furnished for all floor heights with following diameters: 4'-0", 4'-6", 5'-0", 5'-6", 6'-0", 7'-0"

FIG. 201C K

CAST IRON GRATING
For concrete or iron gutter Width - 5¾"

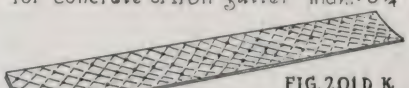


FIG. 201D K

GUTTER COVER For concrete gutter	Wide	Thick	Wide	Thick
	3½"	⅜"	7"	½"
	4	⅜"	8"	½"
	5	½"	9"	½"
	6	½"	9"	⅝"

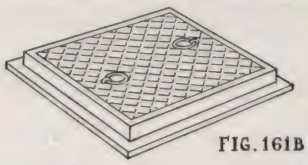


FIG. 161B K

MANHOLE FRAME & COVER, FOR CONCRETE.

	Top of frame	Depth	Cover
No. 1	12" × 12"	3"	10¾" × 10¾"
No. 2	18" × 18"	3"	16⅜" × 16⅜"
No. 3	26" × 26"	3"	24⅜" × 24⅜"
No. 4	32" × 26"	3"	30⅜" × 24⅜"

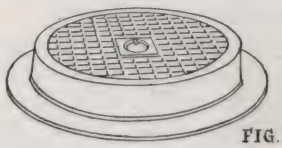


FIG. 173A K

MANHOLE FRAME & COVER

Opening	Depth	Diam. on bottom	Cover
20" (light pattern)	4"	26½"	20½"
20" (deep pattern)	6½"	26¾"	20½"
20" (heavy pattern)	4¾"	27"	20½"
24" (light pattern)	6"	31½"	24¼"
24" (heavy pattern)	6"	31½"	24¼"

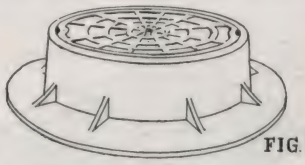


FIG. 163 K

MANHOLE FRAME & COVER
Diam. of top - 25"; Diam. of bottom flange - 36"; Diam. of cover, 22½"

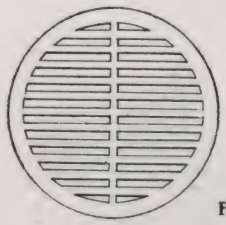


FIG. 173B K

GRATING
To fit in bell ends of soil pipe

Size of pipe	Grating	Size of pipe	Grating
8"	10"	18"	20⅝"
10"	12"	20"	23¼"
12"	14¾"	24"	27¾"
15"	17¾"		

SCS A FEW OF J. W. FISKE IRON WORKS SPECIALTIES AUG. 1922

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Inquiries and plans are solicited from architects, and estimates, either on special work from their detail or stock designs, will be submitted.

Architects' details will be followed with absolute accuracy and photographs of the model furnished before proceeding with the work.

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Statuary is manufactured by this company from sheet bronze, copper and zinc. Statuary of any description is reproduced, from either sculptor's model or architect's detail, in sheet metal, and guaranteed to be correct in detail and workmanship. Photographs of the full sized models will be submitted before the work is commenced.

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COPPER LANTERN, DESIGN C447
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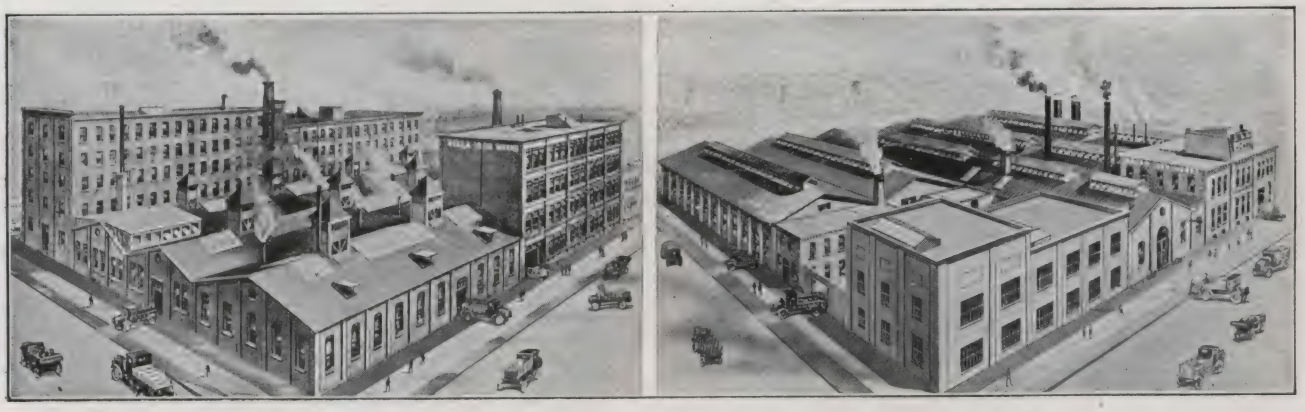
Hibernia Bank & Trust, New Orleans, La.	Favrot & Livaudais, Ltd.
Cotton Exchange, New Orleans, La.	Favrot & Livaudais, Ltd.
Whitney-Central Bank, New Orleans, La.	Emile Weil
Canal Commercial Trust Co., New Orleans, La.	Emile Weil
Federal (U. S. Government) Honolulu, T. H.	York & Sawyer
Administration Building, Olympia, Washington	Wilder & White
National City Bank, 42nd Street, New York, N. Y.	McKim, Mead & White



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This company designs and manufactures bronze tablets, and gates and entrance doors in iron or bronze. The designing department is fully equipped to make suggestions for these memorials to commemorate those who have been in the service.

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WM. H. JACKSON COMPANY has designed, patented and perfected an absolutely airtight and watertight window, both casement and double hung, that meets the most exacting demands of architects and builders. Its use eliminates weatherstrips and all devices of complicated hardware.

It is simple in construction, strongly built, easily installed, and can not get out of order.

Made in bronze and iron.

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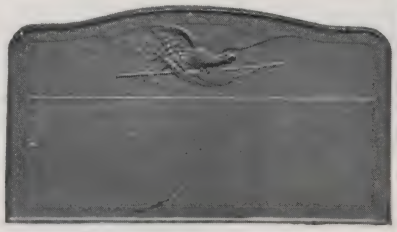
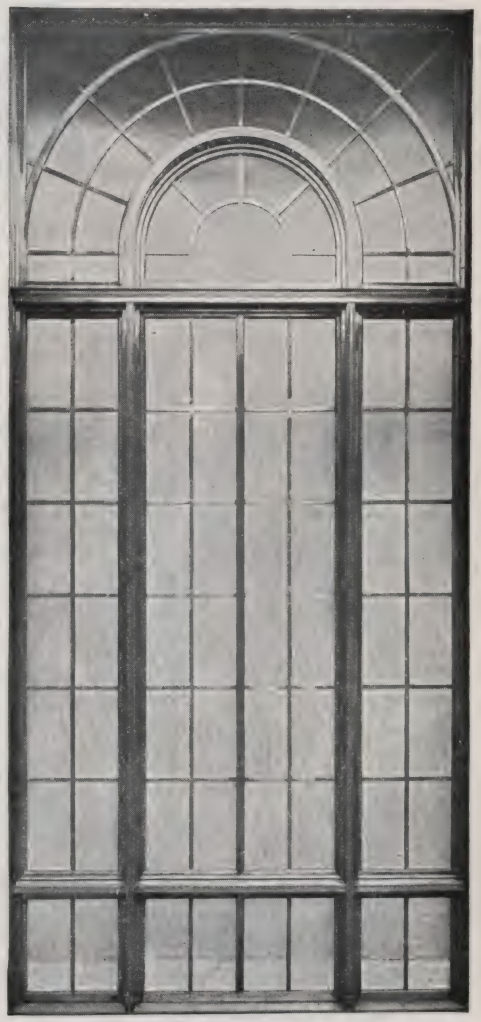
All modern machinery and latest appliances for all special finishes and colors.

TYPE F. DOUBLE HUNG WINDOW
6x13 ft.
600 of these bronze air and watertight windows installed in the Federal Reserve Bank, Boston, Mass.



MEMORIAL TABLET

TYPE H. DOUBLE HUNG WINDOW
5 ft. x 8 ft. 9 in.



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10 ft. 2 in. x 21 ft. 10 in.
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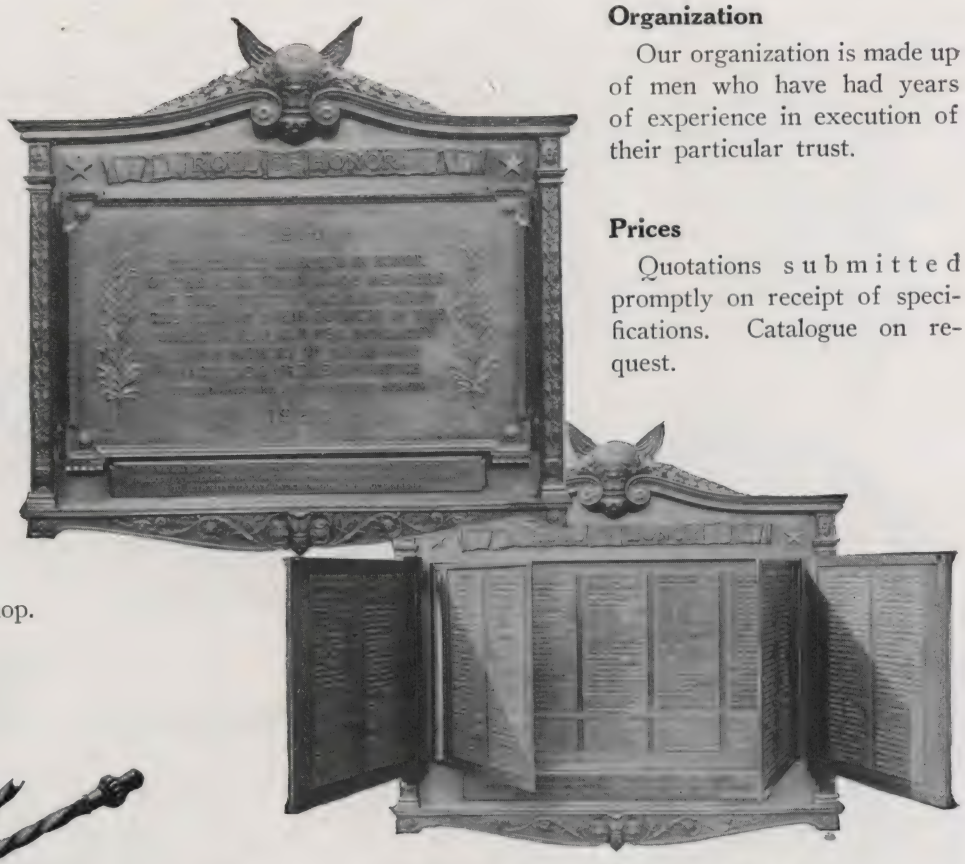

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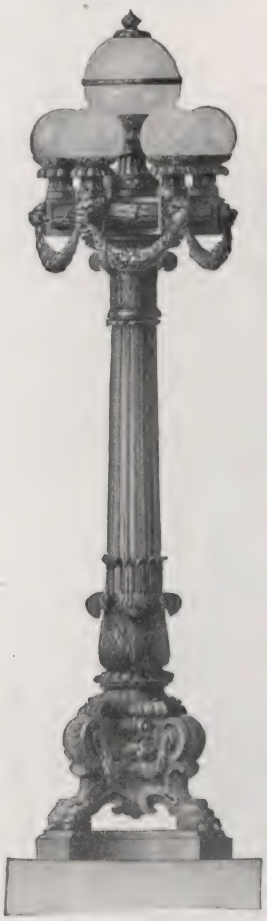
GATE POST AND LANTERN



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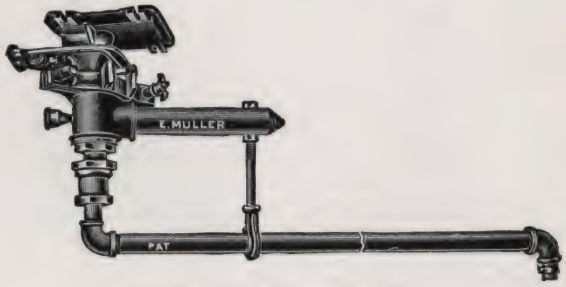

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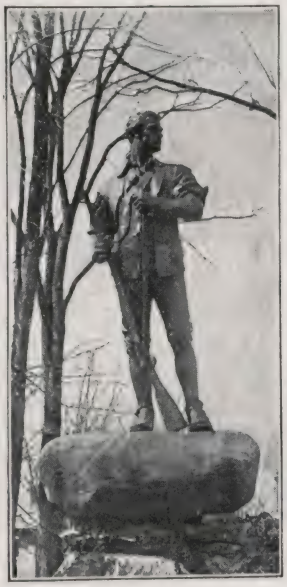
7-FT. BRONZE GREEK FIGURE, PLACED AT CLEVELAND, OHIO

Continued on next page

11-FT. STATUE OF ABRAHAM LINCOLN, SPRINGFIELD, ILL.

7-FT. PANEL—MEMORY—HOLLYWOOD CEMETERY, RICHMOND, VA.



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KENTON COUNTY, KENTUCKY, MEMORIAL
6 ft. 6 in.x11 ft. 6 in.

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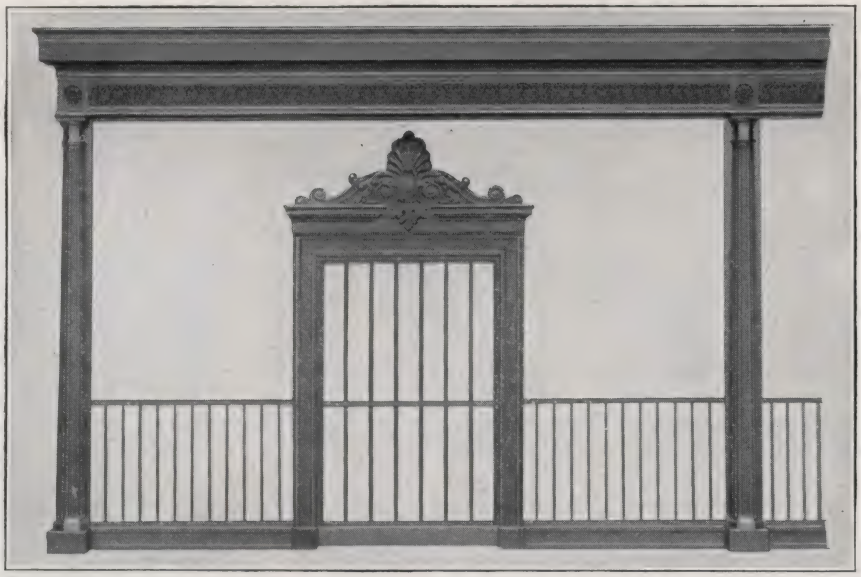
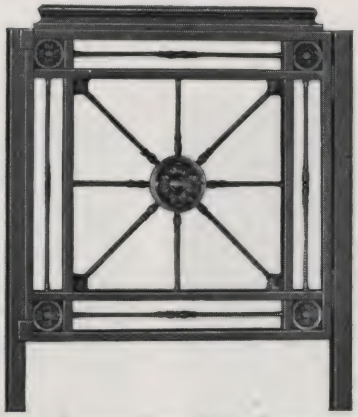


Bronze Bank Screen for the Philadelphia Metal Furniture Company, Philadelphia, Pa.

Bronze Low Rail Gate



Bronze Low Rail Gate

Bronze Counter Screen for the Gem City Building & Loan Association, Dayton, Ohio
Schenck & Williams, Architects

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Holland Banking Co., Springfield, Mo.
Hamilton County Courthouse, Cincinnati, Ohio
Public Hall Building, Cleveland, Ohio
Union Trust Co. (Lorain and Pasadena Branches), Cleveland, Ohio
Columbia Trust Co., New York, N. Y.
Midwood Trust Co., Brooklyn, N. Y.
Second National Bank, Philadelphia, Pa.
Colonial Trust Co., Trenton, N. J.
Anchor Savings Bank, Pittsburgh, Pa.
Colonial Trust Co., Reading, Pa.

MOYNAHAN & DUCHENE, INC.

Ornamental and Architectural Metal Products

2658-2662 Porter Street
DETROIT, MICH.

Products

Manufacturers of ORNAMENTAL and ARCHITECTURAL BRONZE, BRASS, IRON, STEEL and WIRE PRODUCTS, including:

TRADE-MARK

Bank Counter Screens and Cages, Balconies and Balcony Rails, Entrance Doors, Marquises, Mausoleum Doors and Equipment, Memorial and Commercial Tablets, Ornamental Gates and Fences, Stairs and Stair Rails, Tubular Railings, Window and Door Guards.

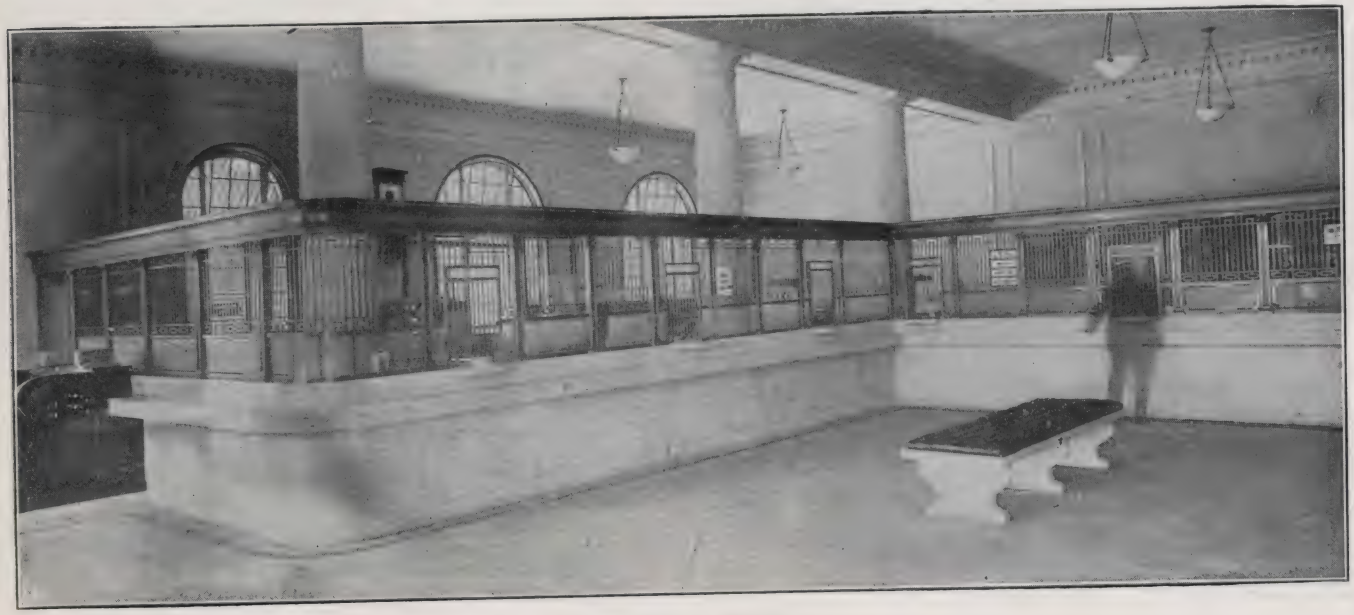
Service

Our designing, engineering and estimating departments are available for service at all times.

ENTRANCE DOORS

MEMORIAL TABLET

COMMERCIAL TABLET



BANK COUNTER SCREEN

FOUNDED 1882

NEWMAN MANUFACTURING CO.

Architectural and Ornamental Brass, Bronze, Steel and Iron

416-418 Elm Street
CINCINNATI, OHIO

CHICAGO, ILL., 68 West Washington Street

Products

ARCHITECTURAL and ORNAMENTAL METAL WORK of every description, including Cast, Extruded and Built-up Fixtures for banks, theaters, churches, public buildings, etc., of Brass, Bronze, Electro-plated Steel and Wrought Iron, comprising: METAL DOORS; BRASS and BRONZE DOOR HARDWARE; RAILINGS; TABLETS and SIGNS; GRILLES and WICKETS; MARQUISES; THRESHOLDS, etc.

Also the following:

Altar Railings
Balconies
Balustrades
Bank Fixtures
Bank Partitions
Bank Railings
Bank Screens
Bathroom Fixtures
Brackets
Bulletin Boards
Cages
Cafeteria Fixtures
Canopies
Cornices
Desks
Doors (Solid, Hollow and Kalamein)
Door and Window Guards
Door Pulls
Elevator Cabs, Doors, Gates
Enclosures
Entrances
Fences and Gates
Foot Rails
Frames for Theaters
Gates (Collapsible, etc.)
Hand Rails
Iron Fencing
Kick Plates
Lamps and Lamp Standards
Lavatory Stall Trimmings, Hardware, etc.
Letters (Brass and Bronze)
Lighting Fixtures (to order)
Mausoleum Doors, Gates and Vent Grilles
Memorial Tablets
Mirror Frames
Mouldings
Name Plates
Newels
Nosings, Edgings and Stair Plates
Office Partitions
Partitions (all kinds)
Pilasters
Pipe Fittings
Plates (Name, Stair, etc.)
Pool Ladders
Posts
Poster and Photo Frames
Push and Pull Plates and Bars
Railings (Brass, Bronze and Iron Pipe)
Registers (all kinds)
Rope Rails
Safety Treads
Sidewalk Gratings
Sills
Slide Poles
Stairs
Stair Rails
Standards
Ticket Booths
Ticket Choppers
Treads
Turnstiles
Vault Doors
Ventilators (all kinds)
Wickets
Windows
Wire Guards
Woven Wire Work

Manufacturing Facilities

Operate own foundry and have an efficient corps of skilled workmen always available. Carry an enormous stock of tubing, sheets, bars, etc., at all times.

Specialize in railings, doors, grille work and bronze tablets. Contracts for made-to-order fixtures solicited.

Estimates

Prompt service rendered on all special estimates covering metallic work and fixtures.

Architectural Service

Anxious to properly co-operate with architects in the preparation of preliminary estimates of cost, sketches, etc. Maintain a drafting department for the purpose.

Catalogues

These comprehensive catalogues are available:

(1) Brass and Bronze Door Hardware
(2) Lavatory Stall Hardware
(3) Brass and Bronze Signs
(4) Theater Frames and Fixtures
(5) General (Ornamental Work)
(6) Bulletins and Directories

Recent Installations

BANKS

Dayton Savings & Trust Co., Dayton, Ohio
Ames National Bank, Ames, Iowa
Franklin Trust Co., Philadelphia, Pa.
Fulton National Bank, Atlanta, Ga.
Peoples Savings Bank, Vinton, Iowa
Metropolitan Trust Co., Philadelphia, Pa.
Fourth National & First Savings Bank, Nashville, Tenn.
Pearl-Market Bank, Cincinnati, Ohio
Broad Street Bank, Philadelphia, Pa.
American Exchange National Bank, Greenboro, N. C.
First National Bank of Porto Rico
Farmers National Bank, Pella, Iowa
First National Bank, Freeport, Ill.
Security Bank & Trust Co., Portsmouth, Ohio
Dallas Savings & Trust Co., Dallas, Tex.
Citizens Savings Bank, Lima, Ohio

THEATERS

New Stanley Theater, Philadelphia, Pa.
Palace Theater, Cincinnati, Ohio
Walnut Theater, Cincinnati, Ohio
Howard Theater, Atlanta, Ga.
American Theater, Terre Haute, Ind.
Rialto Theater, Omaha, Nebr.
Ascher Bros. Circuit (15 theaters)
Lubliner & Trinz Circuit (10 theaters)
Grand Victory Theater, Detroit, Mich.
Fine Arts Theater, Detroit, Mich.
Loew's Theaters, New York, N. Y.; Washington, D. C.; Memphis, Tenn.; Indianapolis, Ind. and St. Louis, Mo.
Tudor Theater, New Orleans, La.
Balaban & Katz Circuit (4 theaters)
Jones, Linick & Schaefer Circuit (6 theaters)
Schoenstadt & Sons Circuit (3 theaters)

HOTELS

Drake Hotel, Chicago, Ill.
Hotel Cleveland, Cleveland, Ohio
Havlin Hotel, Cincinnati, Ohio
Somerset Hotel, Chicago, Ill.

MISCELLANEOUS

St. Coleman's Church, Cleveland, Ohio
Ashtabula High School, Ashtabula, Ohio
Water Board Building, New Orleans, La.
Britling System of Cafeterias, Atlanta, Ga.
United States Post Offices at Columbia, S. C.; El Paso, Tex.; Huntington, W. Va.; Chadron, Nebr.; Rockville, Conn.

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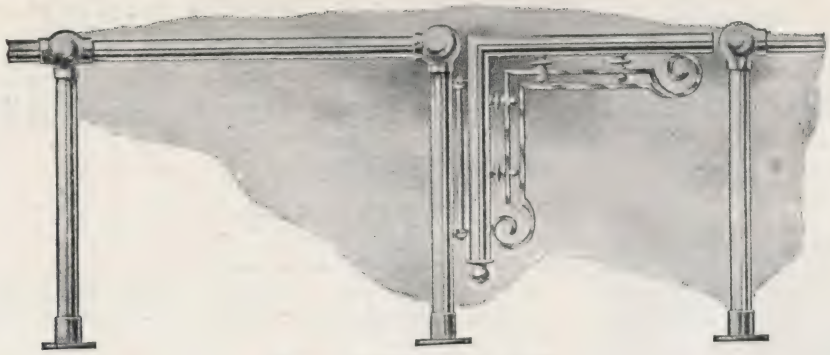


BRASS RAILING AND GATE

Brass Railings

NEWMAN MANUFACTURING CO. has specialized in the manufacture of brass railings for the past forty years. An enormous stock of seamless tubing of genuine brass is carried for this purpose. Plain cast fittings and those special ornaments, etc., in greatest demand are stocked in the rough. Quick shipment is a strong feature of Newman Service.

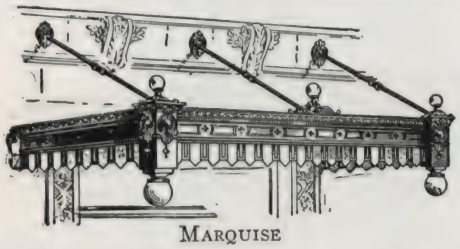
Square tubes and fittings in all standard sizes may be secured at short notice. Brass railings may be had in the usual polished (lacquered) brass finish, or in these non-polish effects: Statuary bronze, brass oxidized, brushed brass, oxidized copper, nickel plate, verdi-green and German silver.

Railings of this type can also be furnished in genuine polished bronze. Single-acting and double-acting gates, both square and with cast ornaments, may be had.

Unless otherwise specified railings are shipped ready for erection. The posts or standards are completely assembled. The tubing is cut to size and guaranteed to fit perfectly.

Marquises

Twenty-eight designs are featured. Some are arranged for use as sidewalk canopies. Wiring for electric lights is included in the cost whenever desired.

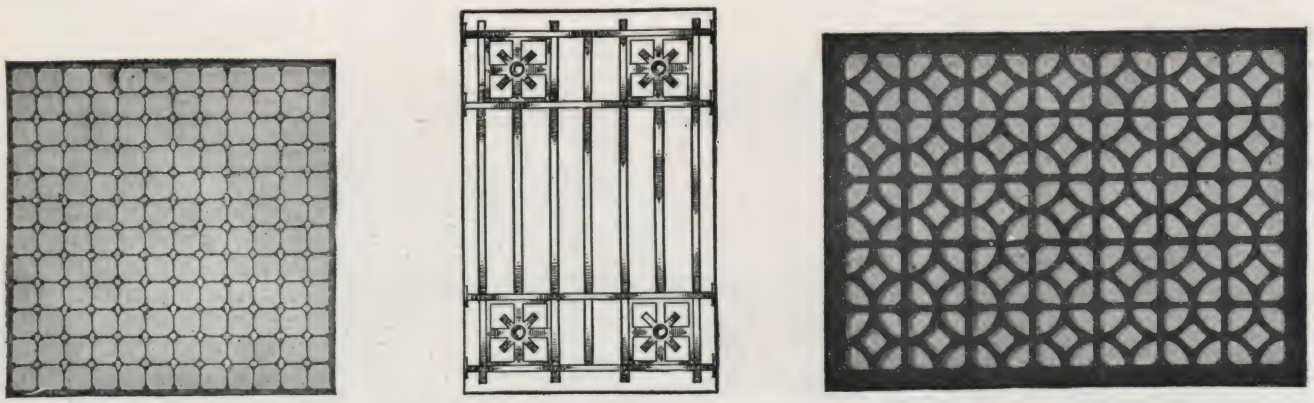


MARQUISE

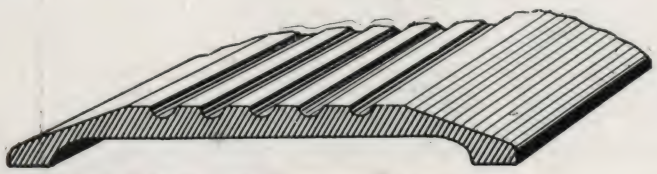
There is a type for every building. All are constructed of galvanized steel with cast zinc ornaments. Roofs may be either wire-glass or solid metal. Supports are round link chains or rods with turnbuckles. Pendants are supplied complete with frosted or art glass panels. Globes are not included.

Special designs in both galvanized steel and genuine copper are obtainable. Sketches will be furnished gratis on request.

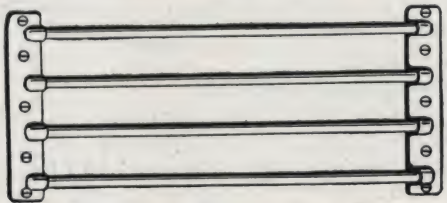
Write for price list covering the 28 standard styles.



WIRE MESH, GENUINE BRASS, BRONZE AND ELECTRO-PLATED IRON, PERFORATED STEEL AND WROUGHT IRON GRILLES



CAST, FORMED AND EXTRUDED THRESHOLDS



BRASS AND BRONZE DOOR BARS

Continued on next page

Bronze Doors and Grille Gates, Franklin Trust Co., Philadelphia, Pa.

Grilles in Post Office, El Paso, Tex.

Grille Work, Ames National Bank, Ames, Iowa

Bronze Entrance, Metropolitan Trust Co., Philadelphia, Pa.

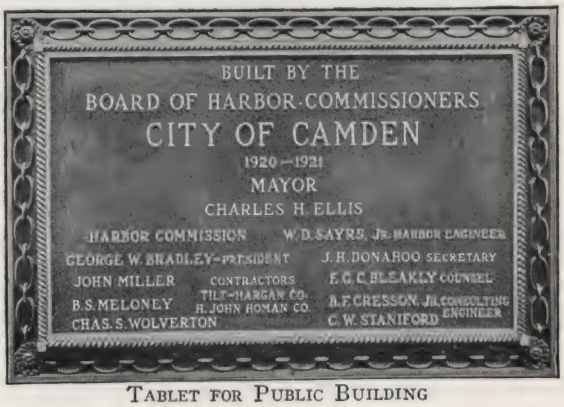
FOUR TYPICAL NEWMAN INSTALLATIONS

Bronze Tablets

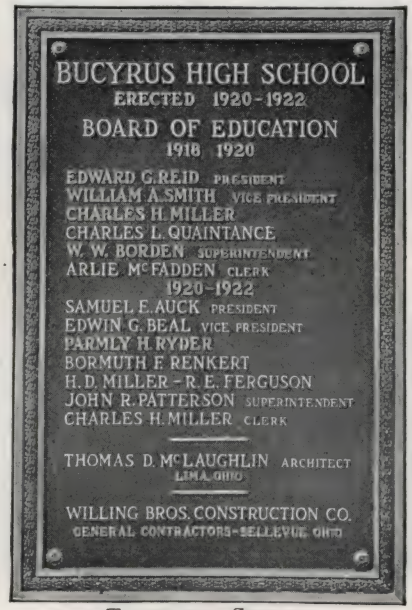
Tablets of genuine brass or U. S. Standard bronze. Cast in their own foundry and hand-tooled by their own corps of artisans.

Any size or shape can be furnished. Backgrounds are stippled and oxidized in brown or verdi-green for contrast. Rosettes and expansion shields for attaching to stone are always included.

The House of Newman makes a specialty of elaborate cast bronze memorials.



TABLET FOR PUBLIC BUILDING



TABLET FOR SCHOOL

PENN BRASS & BRONZE WORKS

HENRY J. LANDOLT'S SONS

Manufacturers of Architectural Brass and Bronze Work

105-117 Dobbin Street
BROOKLYN, N. Y.

Products

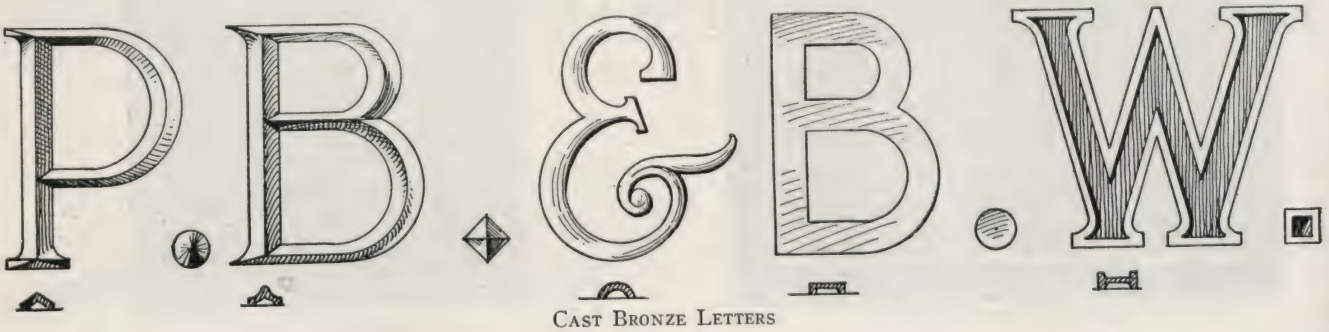
ORNAMENTAL BRONZE and BRASS WORK of every description, for private and public buildings:

Doors, Entrances, Balustrades, Newels, Stair Rails, Interlocking Windows, Grilles, Theater Railings, etc.; Cast Bronze Letters, Numerals and Signs for buildings.

Gates, Folding Gates, Marquises, Mausoleum Doors and Supplies, Bank Enclosures, Counter Screens, Check Desks, Elevator Enclosures, Fences, Balconies, Lamp Standards, Brackets, Tablets, Push Plates, Kick Plates, Brass and Bronze Saddles, Door and Window Guards, Special Hardware, Special Castings (all Alloys), etc.

STAIRCASE AND GRILLES FOR THE EDISON SHOP, HESTER STREET, NEW YORK, N. Y.
W. WHITEHILL, Architect

LAMP FOR THE WASHINGTON MEMORIAL BRIDGE, WILMINGTON, DEL.
VANCE TORBERT, Architect



CAST BRONZE LETTERS

Continued on next page

Facilities

This company operates its own fully equipped foundry, pattern, modeling and finishing shops, and this, together with its corps of skilled artisans under expert supervision, insures prompt and efficient delivery of work of the highest quality.

Also, special facilities for furnishing all kinds of brass and bronze railings, having on hand many varieties of patterns for fittings, etc., and carrying in stock material for prompt delivery.

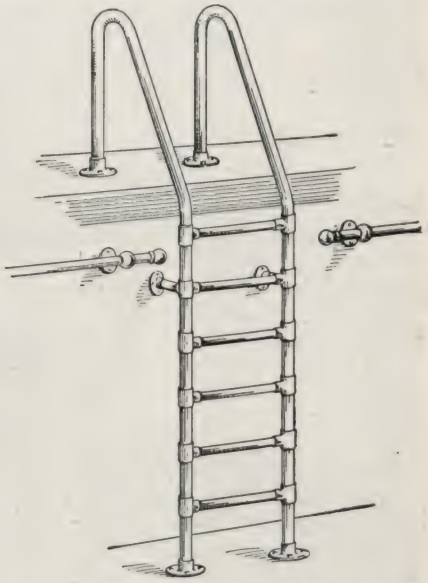
Contracts of any magnitude are successfully executed. Architects and others placing contracts with this company will find that it has established for itself an enviable reputation for handsome execution of work to clean, sharp detail, in any style or period.

Co-operative Service

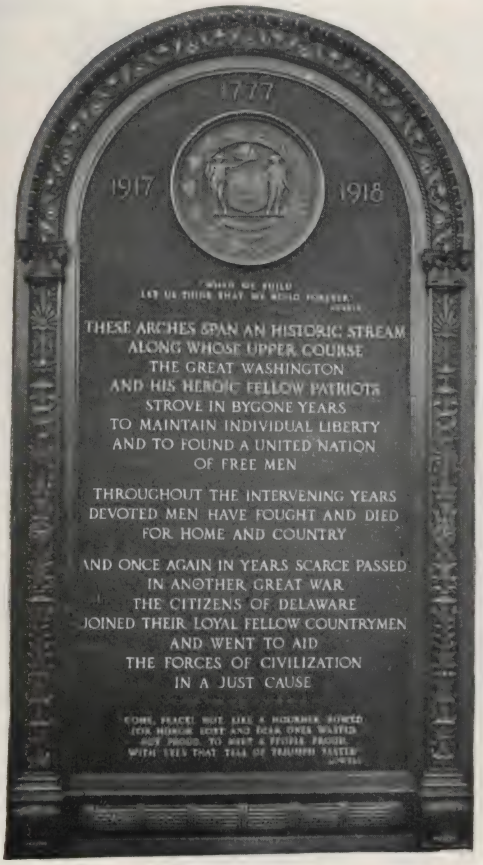
Estimates will be furnished in accordance with architects' designs, or special designs will be carefully executed and submitted by the company's staff of expert draftsmen.

Requests for information or suggestions are given prompt attention, and correspondence is invited.

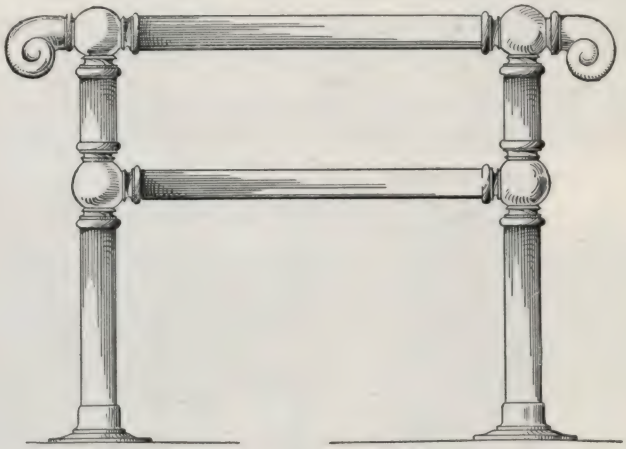
Counter Screen, Fulton Savings Bank, Brooklyn, N. Y.
Voss & Lauritzen, Architects



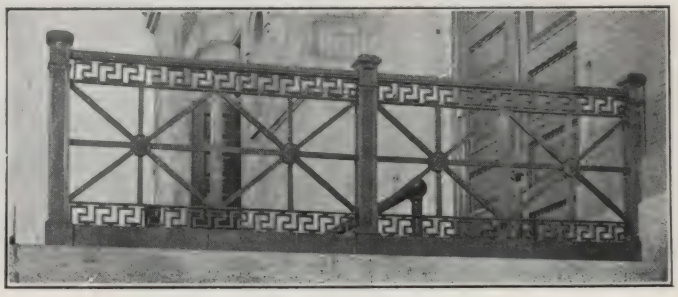
Brass or Bronze Ladder for Swimming Pools



One of Four Tablets, Wilmington (Del.) Bridge
Vance W. Torbet, Architect



Brass or Bronze Railings



Cast Bronze Rails

JOHN POLACHEK BRONZE & IRON CO.

Distinctive Metal Work

476-494 Hancock Street, 575-591 Boulevard
LONG ISLAND CITY, N. Y.

Products

ARCHITECTURAL and ORNAMENTAL BRONZE, BRASS, GERMAN SILVER and IRON WORK:

Banking Fixtures, Counter Screens, Check Desks, Railings, Balustrades, Stairs, Gates, Doors, Elevator Fronts, Grilles, Screens, Windows, Store Fronts, Fences, Driveway Gates, Marquises, Lanterns, Lamp Standards, Lighting Fixtures, Tablets, Signs, Letters, Honor Rolls, Memorials, Mausoleum Work, Church Work, Statuary, Castings in Bronze, Brass and German Silver.

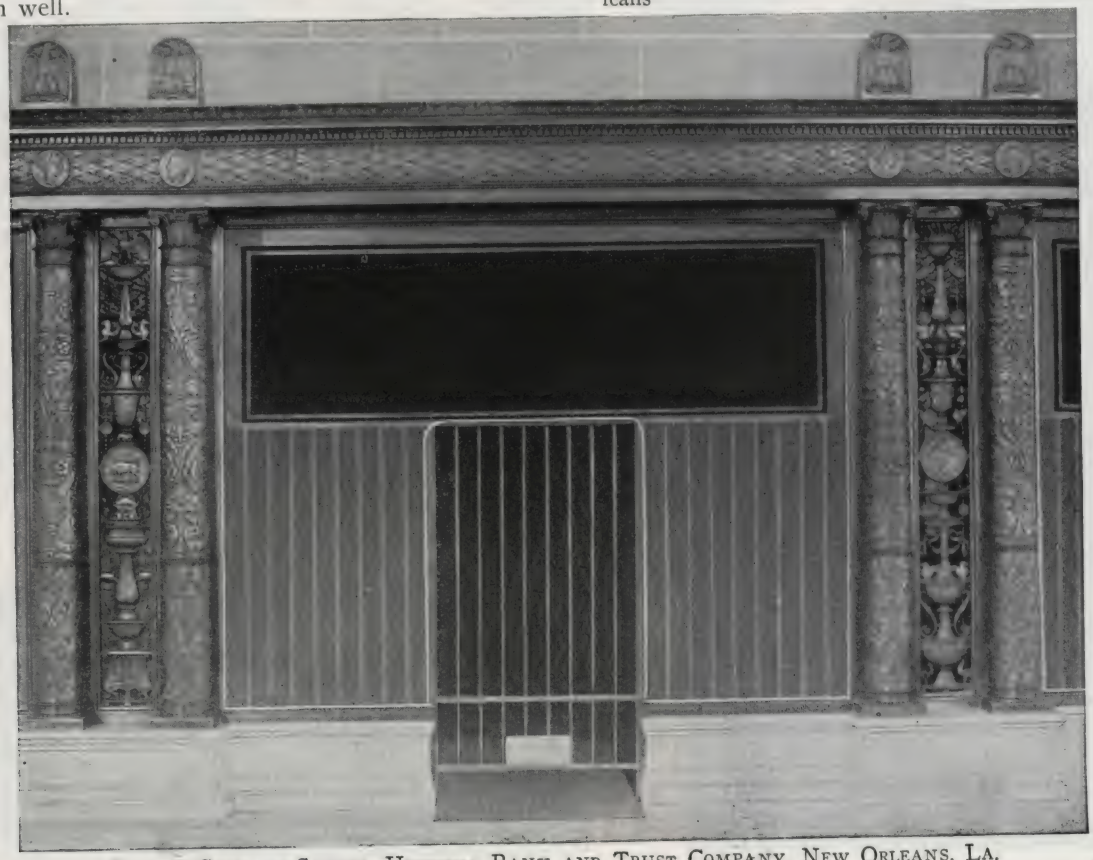
Service

In 1910 JOHN POLACHEK BRONZE & IRON CO. was founded. A real appreciation of the necessity of interpreting the architect's ideas correctly and an understanding of the practical needs of the modern building, dictated firm's policy. To execute the best possible metal work, without consideration of cost—that thought behind the artistic creations of the master craftsmen of the old world—has been uppermost with it always. That this policy is right can best be judged by the reputation JOHN POLACHEK BRONZE & IRON CO. enjoys, the many important contracts that are constantly being entrusted to it and the growth of its shops and foundries.

Our large plant, equipped with every modern facility for the production of architectural bronze work and manned by a force of skilled craftsmen, ably directed, is at the disposal of architects and others, and prepared to serve them well.

A Few Recent Contracts

BUILDING AND LOCATION	ARCHITECT
Federal Reserve Bank, Minneapolis	Cass Gilbert
Scott Water Fountain, Detroit	Cass Gilbert
Interzone Corp. Building, New York	Cass Gilbert
First Division Memorial, Washington	Cass Gilbert
First National Bank, Colorado Springs	Weary & Alford Co.
Woodlawn Bank & Trust Co., Chicago	Weary & Alford Co.
Harris, Forbes & Co., Boston	Lockwood, Greene & Co.
New York Tribune Building	Lockwood, Greene & Co.
Chamber of Commerce, Boston	Parker, Thomas & Rice
Flagg Estate Trust Building, Boston	Parker, Thomas & Rice
Thorndike Building, Boston	Severance & Van Alen
National Academy of Sciences, Washington	Bertram G. Goodhue
St. Matthew's Church, Washington	C. Grant LaFarge
New York Cotton Exchange	Donn Barber
Hartford Connecticut Trust Co.	Benjamin W. Morris
New York Traffic Signal Towers	J. H. Freedlander
Hackensack Trust Co., Hackensack	Crow, Lewis & Wick
Park Square Building, Boston	Densmore & LeClear
New York University, New York	William S. Gregory
Manhattan College, New York	James W. O'Connor
Franklin Simon & Co., New York	Necarsulmer & Lehlbach
City Centre Building, Philadelphia	Rouse & Goldstone
Lincoln Savings Bank, Brooklyn	Th. H. Engelhardt
Graham Residence, Chicago	French Co., Designers
National Deposit Bank, Brownsville	E. F. Strassle
N. Y. Title & Mortgage Co., Brooklyn	Horace S. Luckman
Union Trust Co., Pittsburgh	Graham, Anderson, Probst & White
Hibernia Bank & Trust Co., New Orleans	Favrot & Livaudais A. C. Bossom, Associate



BRONZE COUNTER SCREEN, HIBERNIA BANK AND TRUST COMPANY, NEW ORLEANS, LA.
FAVROT & LIVAUDAIS, Architects
A. C. BOSSOM, Consulting Architect on Banking Equipment
Executed by
JOHN POLACHEK BRONZE & IRON CO.

SIMPSON-FRISCH COMPANY

High Grade Ornamental Iron Work

TELEPHONE
HAYMARKET 1770

1401-1413 Wabansia Avenue
CHICAGO, ILL.

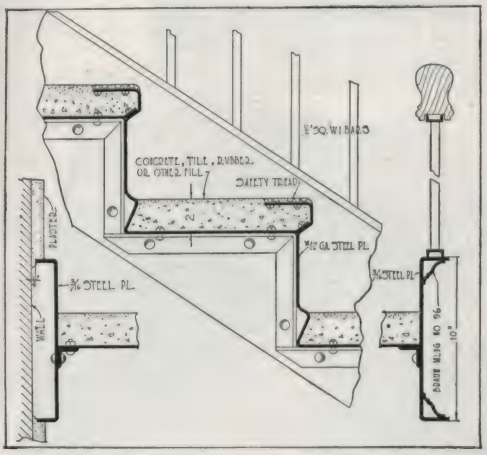
Products

Manufacturers of ORNAMENTAL IRON WORK, including:

Entrance Doors.
Entrance Gates.
Marquises.
Balconies and Balcony Railings.
Elevator Doors and Enclosures.
Grilles.
Store Fronts.
Window and Door Guards.
Stairs and Stair Railings.
Folding Gates.
Bank and Counter Screens.
Fences and Gates.
Miscellaneous Iron Work for Buildings.
Hand Forged Iron Work.

Standard Steel Stairs

In the construction of these stairs the riser is continued to form a seat to which is fastened Mason or other style safety tread. This method of fastening prevents safety treads from working loose. They are bolted on when stairs are made.



DETAIL OF STANDARD STEEL STAIRS
1-in. Scale

APARTMENT ENTRANCE, 230 EAST WALTON PLACE, CHICAGO
FUGARD & KNAPP, Architects

BALUSTRADE, HOTZ RESIDENCE, CHICAGO
FREDERICK W. PERKINS, Architect

THE SMYSER-ROYER COMPANY

Ornamental and Architectural Iron Work

MAIN OFFICE AND WORKS

YORK, PA.

PHILADELPHIA, PA., Sales Office and Studios,1 609 Sansom Street
BALTIMORE, MD., Jas. P. Lynch, Representative, 217 West Madison Street

Products

Ornamental and Architectural Metal Work for Buildings, including Stairs, Store Fronts, Entrances, Elevator Enclosures, Window Frames, Marquises, Railings, Fences and Grilles.

Facilities

Complete drafting and engineering departments. Designing studio. Pattern shops. Two foundries. Extensive machine and fitting shops. Estimates promptly furnished from architects' plans and drawings submitted for unusual needs.

Exterior Lighting Fixtures

Smyser-Royer line of exterior lighting fixtures include over 200 different designs of lamp standards, lantern and brackets suitable for every possible need.

TRADE-MARK

LANTERN

Catalogues

The Smyser-Royer Company issues the following, which will be furnished on request:

Booklet S—Spiral Stairs

Catalogue H—Complete line of lamp standards, brackets and lanterns.

References

A few of the many large buildings for which we have furnished the ornamental iron work are:

John Hancock Building, Boston, Mass.
Curtis Building, Philadelphia, Pa.
Ambassador Hotel, Atlantic City, N. J.
Du Pont Building, Wilmington, Del.
Carnegie Institute, Washington, D. C.

Fig. 1

Fig. 2

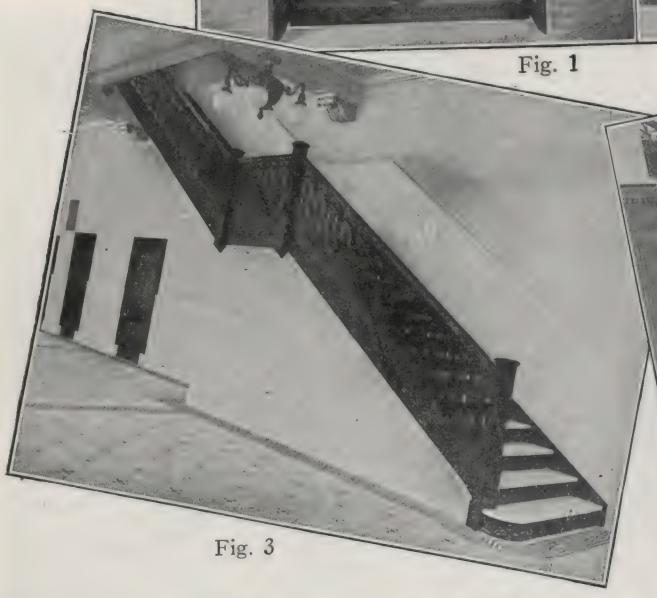


Fig. 3

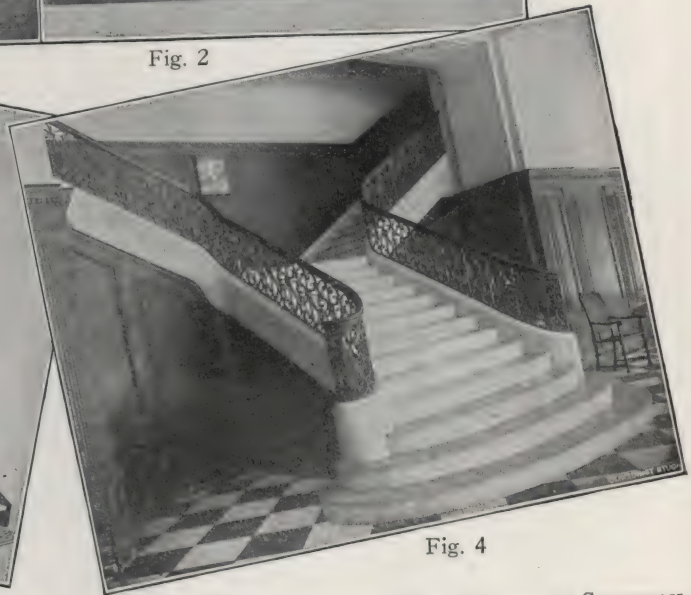


Fig. 4

Fig. 1. Entrance Doors in Residence of E. J. Buckner, Wilmington, Del.
Fig. 2. Cast Iron Entrance, 1441 Chestnut Street, Philadelphia, Pa.

Fig. 3. A Typical Smyser-Royer Company Stairway
Fig. 4. Wrought Iron Stair Railing, Ford Building, Washington, D. C.

TIFFANY STUDIOS

Ornamental Bronze and Iron, Lighting Fixtures, Interior Decorations, Fine Furniture, Oriental Rugs

385 Madison Avenue
NEW YORK, N. Y.

Products and Service

ORNAMENTAL BRONZE and IRON WORK; LIGHTING FIXTURES; LAMP SHADES, DOMES and GLOBES; INTERIOR DECORATIONS and FURNISHINGS; FINE FURNITURE; ORIENTAL RUGS.

CONTRACTORS for Interior Finish, Decorations and Furnishings.

Ornamental Bronze and Iron Work

A completely equipped factory and an organization of expert artisans places this company in a position to execute the requirements of architects and sculptors in ornamental bronze and iron work. This includes doors, gates and archways, marquises, bank screens, check desks, tablets, clocks, stair railings, elevator fronts and cars, statuary bronze, etc.

Lighting Fixtures

Lighting fixtures, for banks, hotels, public buildings and private residences, include chandeliers, electroliers, wall brackets, standards, entrance torcheres, etc., designed to suit varied conditions.

Interior Decorations and Furnishings

TIFFANY STUDIOS are equipped to submit suggestions and complete schemes for period decorations including lighting effects, wall hangings, draperies and fresco work. A very fine collection of furniture and antique and modern oriental rugs are on exhibition at the Studios.

BRONZE ENTRANCE DOORS, STRAUSS BUILDING, FIFTH AVENUE, NEW YORK, N. Y.
WARREN & WETMORE, Architects

Fine Furniture

Reproductions of English, Italian and French originals.

Oriental Rugs

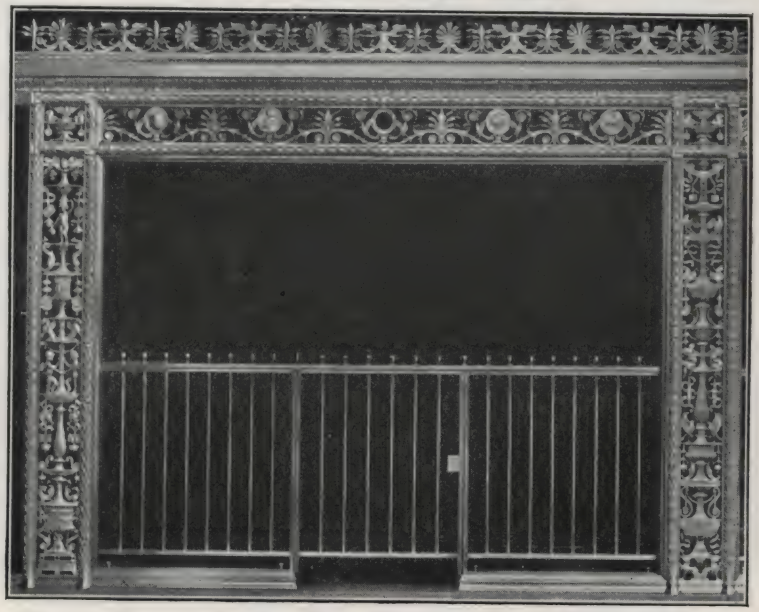
A large collection of unusual specimens, antique and modern. Also fine antique tapestries.

Estimates and Contracts

This company undertakes contracts for the complete interior finish, decorations and furnishings of banks, hotels, churches, residences, etc. Estimates from architects' drawings will be promptly submitted on all interior equipment.

Prices

An opportunity is solicited to estimate, in proof that our prices are as reasonable as is consistent with high class and artistic work.



BRONZE COUNTER SCREEN, FIRST NATIONAL BANK, DETROIT, MICH.
ALBERT KAHN, Architect

F. P. SMITH WIRE AND IRON WORKS

ESTABLISHED 1884

Manufacturers of Ornamental Iron and Bronze Work

CHICAGO, ILL.

GENERAL OFFICES, SHOPS, FOUNDRY AND WAREHOUSE: CLYBOURN, FULLERTON AND ASHLAND AVENUES, AND CHESTER STREET—TELEPHONE, LINCOLN 7000

Private Exchange all Departments

Products

Manufacturers of ORNAMENTAL IRON, BRONZE, BRASS and WIRE WORK of High Grade:

Area Gratings
Balustrades
Bars: Corner Post, Transom
Castings: Iron, Brass, Bronze
Cemetery Vault Doors, Tablets (Bronze)
Coalhole Covers
Doors: Entrance, Sidewalk
Elevator Enclosures, Cabs, Gates, Doors
Entrances: Iron and Bronze
Fences: Iron, Wire, Wire Netting
Fire Escapes
Flagpoles: Steel
Fronts: Store, Building
Gates: Iron, Wire and Folding
Grille Work
Guards: Iron and Wire—Window, Stall, Wheel, Machinery, Skylight
Hangers: Joist, Wall, I-beam
Hitching Posts
Jail Work
Lamp Brackets
Lamps: Iron
Lawn Furniture, Settees, Chairs, etc.
Lockers: Wire, Iron
Marquises
Metal Ladders
Partitions, Wire
Pipe Railing
Porte-cochères
Post Caps
Railings: Bank, Theater, Iron, Brass, Wire, Pipe
Roof Crestings
Shutters
Stable Fixtures: Hay Racks, Feed Boxes, Water Troughs, Stall Posts, Gutters, Cesspools, Harness Brackets, Box Stall Hinges and Latches, Floors and Pans, Oats Cleaners
Stairs, Iron
Stairs, Pre-Cast Concrete Tread and Riser, Licensed under Babcock-Davis Co.'s Patent.
Standpipes for fire escapes
Tower Ornaments
Vases, Iron
Wall Ties
Weathervanes
Wickets
Wire: Lath, Signs, Netting
Wire Cloth: Steel, Galvanized Iron, Brass, Copper

Catalogues

Send for our No. 90 General Catalogue.

TYPICAL FIRST FLOOR BRONZE ELEVATOR ENCLOSURE, KAHL OFFICE AND THEATER BUILDING, DAVENPORT, IA.
C. W. and GEO. L. RAPP, Architects

FENCE, GATES AND LAMPS, JOHN R. THOMPSON RESIDENCE, CHICAGO, ILL.
H. R. WILSON, Architect

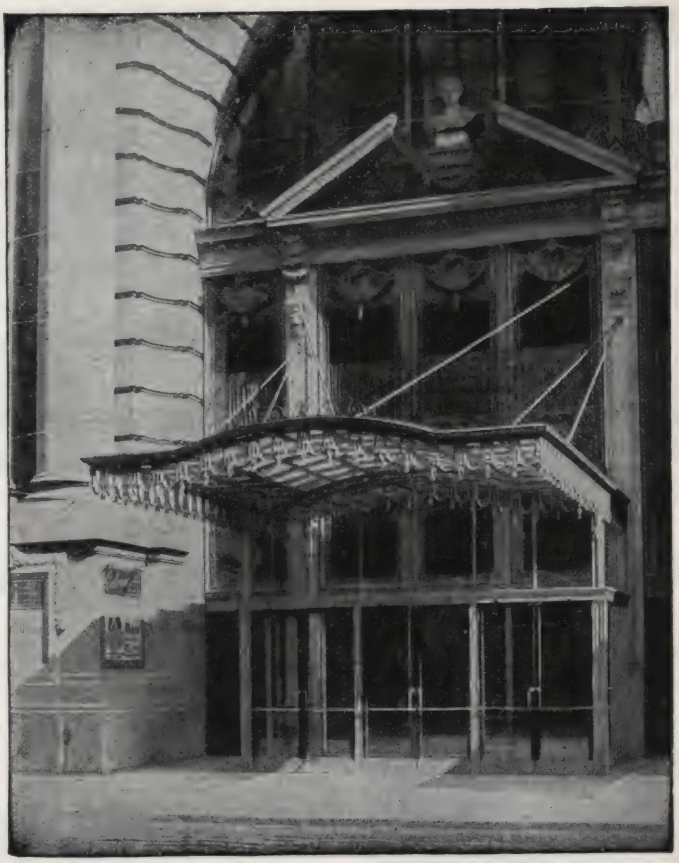
Continued on next page

References

Following is a partial list of buildings in which representative installations of our work have been made:

BUILDING, LOCATION AND ARCHITECT

Monroe Building, Chicago, Ill., Holabird & Roche
National Life Insurance Co., Chicago, Ill., Jenney, Mundie & Jensen
Transportation Building, Chicago, Ill., Wm. Strippelman
Advertising Building, Chicago, Ill., W. C. Zimmerman
Borland Building, Chicago, Ill., Charles S. Frost
Webster Building, Chicago, Ill., A. S. Alschuler
Chicago Savings Bank, Chicago, Ill., Holabird & Roche
Farmers' Security Bank Building, South Bend, Ind., Perkins, Fellows & Hamilton
Crane Company Office Building, Chicago, Ill., Holabird & Roche
McKay Building, Chicago, Ill., Huehl, Schmidt & Holmes
Sharpe Building, Kansas City, Mo., H. R. Wilson
Overland Stores Building, Kansas City, Mo., Mills, Rhines, Bellman & Nordhoff
Stewart Building, Houston, Tex., Jonas & Rue
Cosden Building, Tulsa, Okla., Henry F. Hoit
Rand-McNally Co. Building, Chicago, Ill., Holabird & Roche
Harper Memorial Building, University of Chicago, Chicago, Ill., Shepley, Rutan & Coolidge
Sisters of Providence, College and Music Building, St. Mary's, Ind., D. A. Bohlen & Son
Seminary Building, Archdiocese of Chicago, Z. T. Davis
U. S. Post Office Buildings (over 45), James Knox Taylor
U. S. Naval Training Station (15 buildings), Lake Bluff, Ill., Jarvis Hunt
City of Chicago Police Stations, Fire Engine Houses, Chicago, Ill., Chas. W. Kallal
School Buildings—A large number for Board of Education, Chicago, Ill., D. H. Perkins and A. F. Hussander
Iowa State College, Central Building, Ames, Iowa, Proudfoot & Bird
Y. W. C. A. and Y. M. C. A., Nashville, Tenn., Shattuck & Hussey
Y. M. C. A. College Building, Chicago, Ill., Emery S. Hall
Annie W. Durand Hospital, Chicago, Ill., Charles S. Frost
Lying-in Hospital, Chicago, Ill., Richard E. Schmidt, Garden & Martin
Henry Ford Hospital, Detroit, Mich., Albert Wood
Commonwealth-Edison Co. (5 buildings), Chicago, Ill. Shepley, Rutan & Coolidge
Commonwealth-Edison Co., N. W. Station, Chicago, Ill., Holabird & Roche
Montgomery Ward & Co., Chicago, Ill., Richard E. Schmidt, Garden & Martin
Popular Mechanics Company Building, Chicago, Ill., Marshall & Fox
Masonic Temple, Davenport, Iowa, Clausen & Kruse
Banco de San Luis Potosi, San Luis Potosi, Mex., Henri E. M. Guindon
Kahl Building, Davenport, Iowa, Rapp & Rapp
Fifth Avenue Trust & Savings Bank, Moline, Ill., Whitzitt & Schulzke
Sisson Apartment Building, Chicago, Ill., H. R. Wilson & Co.
B. A. Eckhart Residence, Chicago, Ill., Marshall & Fox
Goetz Apartment Building, Chicago, Ill., P. J. Weber
Chas. Lange Building, Chicago, Ill., Clarence Hatzfeld
Bancroft Hotel, Saginaw, Mich., Richard E. Schmidt, Garden & Martin
Hotel Sherman, Chicago, Ill., Holabird & Roche
Fort Dearborn Hotel, Chicago, Ill., Holabird & Roche
Severin Hotel, Indianapolis, Ind., Vonnegut & Bohne
Blackhawk Hotel, Davenport, Iowa, Temple & Burrows
Blackstone Hotel and Theater, Chicago, Ill., Marshall & Fox
Illinois Theater, Chicago, Ill., Wilson & Marshall
Star and Garter Theater, Chicago, Ill., Dodge & Morrison
Shubert Theater, St. Paul, Minn., Marshall & Fox
Hippodrome Building, Cleveland, Ohio, Knox & Elliott
Woods Theater and Office Building, Chicago, Ill., Marshall & Fox
State & Lake Theater, Chicago, Ill., C. W. & Geo. L. Rapp
Chicago National League Ball Park, Chicago, Ill., Davis & Davis
Apollo Theater, Chicago, Ill., Holabird & Roche
James Theater and Office Building, Columbus, Ohio, C. Howard Crane
Keith's Theater, Cleveland, Ohio, C. W. & Geo. L. Rapp
Selwyn-Harris Theater Buildings, Chicago, Ill., C. Howard Crane and Kenneth Franzheim



MARQUISE AND VESTIBULE FOR COLONIAL THEATER, CHICAGO, ILL.
MARSHALL & FOX, Architects

MAIN THEATER STAIRS, KAHL OFFICE AND THEATER BUILDING, DAVENPORT, IOWA
C. W. and GEO. L. RAPP, Architects

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ORNAMENTAL IRON and BRONZE WORK, including Ornamental Grilles, Railings, Entrance Doors and Gates, Fencing, Stairs, Elevator Enclosures, Bank Screens; Spiral Stairs, Fire Escapes, Pipe Railings, Folding Gates, Iron Shutters, etc.

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PRESSED STEEL LUMBER.

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TAYLOR & DEAN are extensive manufacturers, distributers and erectors of the above mentioned products. Eighty years' experience in this line makes them well qualified to handle, in an expert manner, any work of this character.

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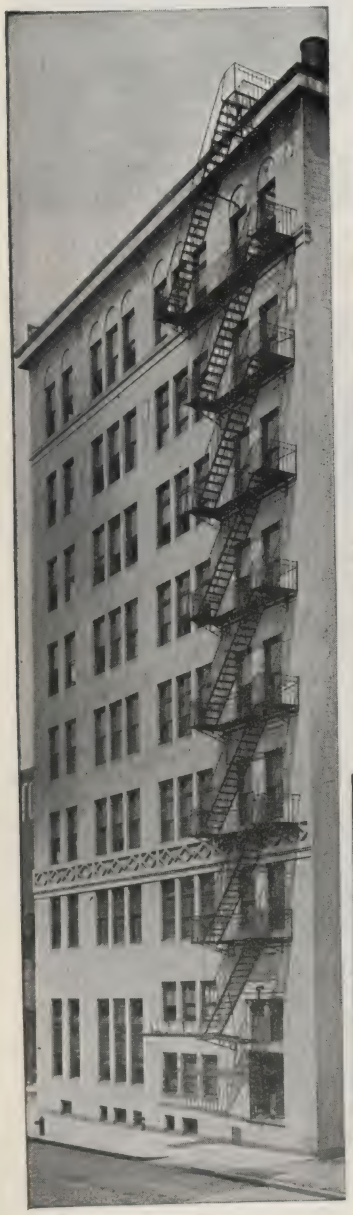
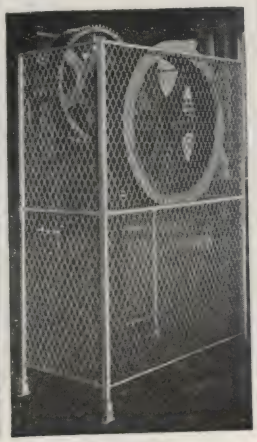
An engineering department is maintained, which is at the service of architects for supplying complete information on design and uses of any TAYLOR & DEAN products.

Estimates and information are freely given.

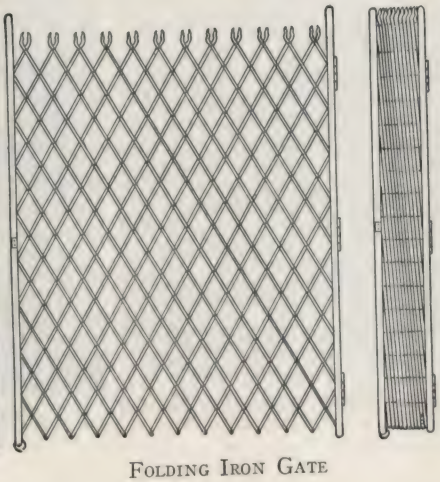


FIRE ESCAPE

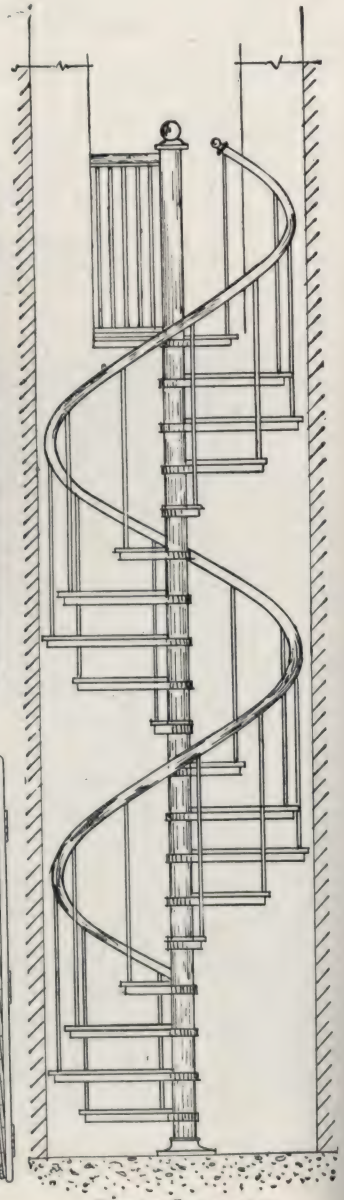
ORNAMENTAL IRON GATE



MACHINERY GUARD



FOLDING IRON GATE



SPIRAL STAIRWAY.

Continued on next page

Ornamental Metal Work

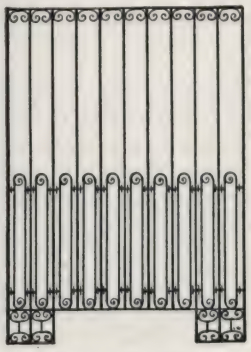
Taylor & Dean are equipped to manufacture all types of ornamental metal work in iron, steel, bronze and other metals. The plating department is second to none for this class of work.

Wire Work

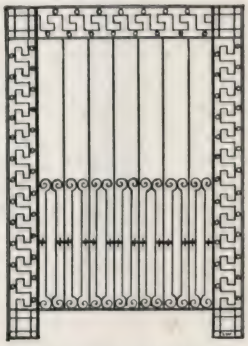
An extensive line of wire work of every description is supplied, including fencing, tennis court enclosures, machinery and gear wheel guards, tool room enclosures, partitions, window guards, etc.

Fire Escapes

Taylor & Dean fabricate and erect approved fire escapes of all types. All work is guaranteed to meet the requirements of public officials having jurisdiction.

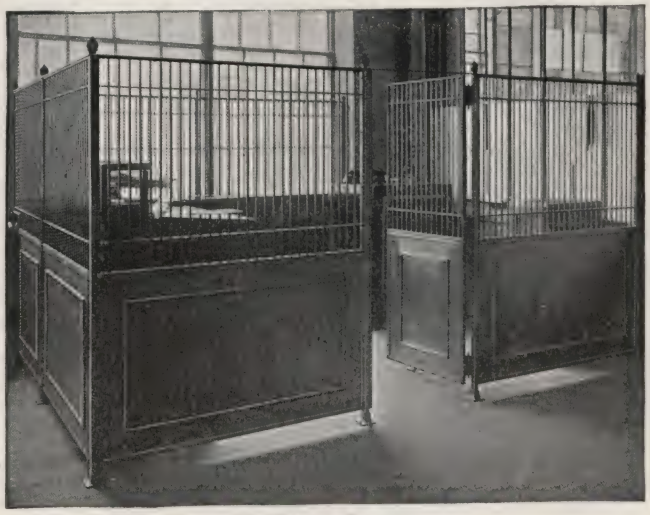


Grille No. 44



Grille No. 43

Ornamental Iron Fence



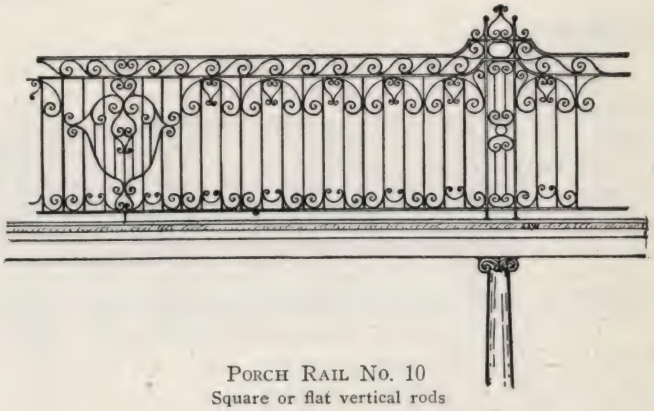
Bank Screen

Spiral Stairways

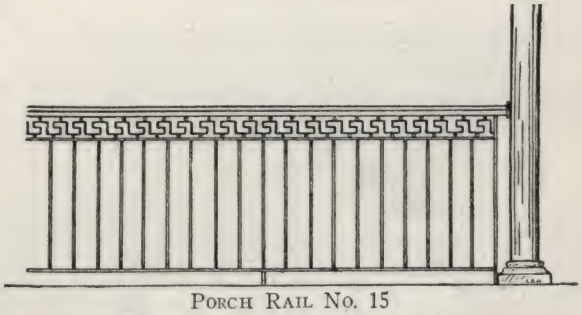
Taylor & Dean spiral stairways are recommended for durability and economy of space and cost.

Pressed Steel Lumber

Pressed steel lumber, consisting of steel joists, studs and metal lath, produces a substantial and fire resistant construction. It is light in weight, the average weight being approximately 38 lbs. per sq. ft. It is low in cost and very simple to erect. Especially well suited for all types of light occupancy buildings such as schools, office buildings, apartments, dwellings, etc.



Porch Rail No. 10
Square or flat vertical rods



Porch Rail No. 15
Made with round, square or flat rods

Ornamental Entrance Grille

THE W. S. TYLER COMPANY

Fireproof Elevator Enclosures and Cars

CLEVELAND, OHIO

BRANCH OFFICES

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BOSTON, MASS., 68 Devonshire Street

CHICAGO, ILL., 555 McCormick Building

Products

FIREPROOF ELEVATOR ENCLOSURES and CARS.

Designers, founders and manufacturers of Ornamental and Architectural Iron and Bronze, including: Stairs, Store Fronts, Marquises, Counter Screens, Bronze Tablets, Lamp Standards and Brackets, Window Guards and Grilles, Wire and Sheet Steel Partitions, Fencing, Self-closing Folding Gates, Bronze and Iron Entrance Doors, Mausoleum Doors.

New Book on Fireproof Elevator Enclosures and Cars

With the purpose of giving to architects and builders essential information covering details of construction, THE W. S. TYLER COMPANY has prepared a book entitled "Fireproof Elevator Enclosures and Cars," in which the subject has been completely covered in a way which has not been attempted heretofore. The book is divided into sections:

No. 1 illustrates elevator enclosure layouts to suit various conditions.

No. 2 illustrates designs of door panels.

No. 3 illustrates designs of transom panels.

No. 4 illustrates jambs.

No. 5 illustrates trim, etc.

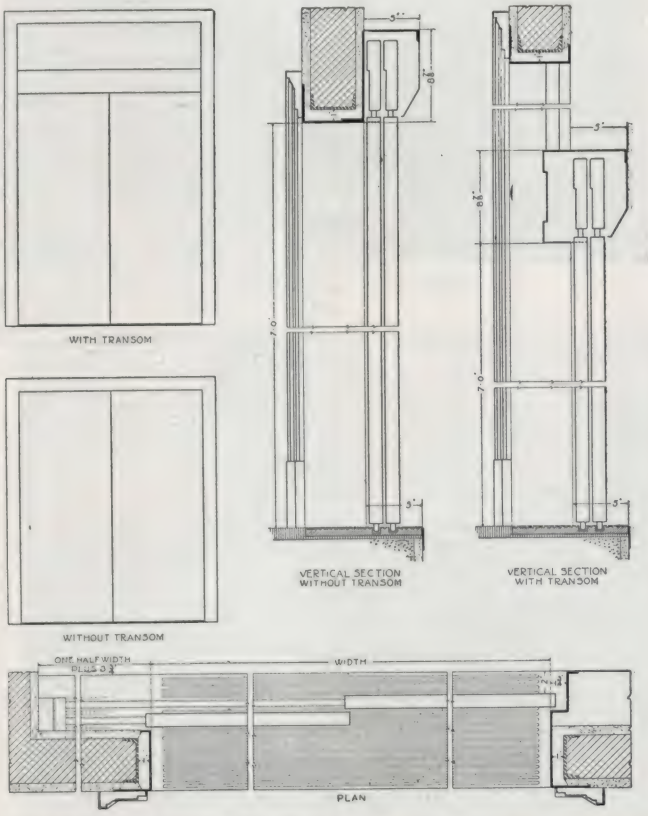
These all are shown in such a manner that the designs are interchangeable.

When determining the ideal elevator enclosure, the layout is first decided upon. Then selections are made from an assortment of designs of panels, transoms, frieze rails and the component parts of the enclosure. Measurements are given throughout, giving clearances and space necessary; also the sizes of the various items.

The second part of the book contains designs of passenger elevator cars. A wide range is covered from the elaborate to the more simple.

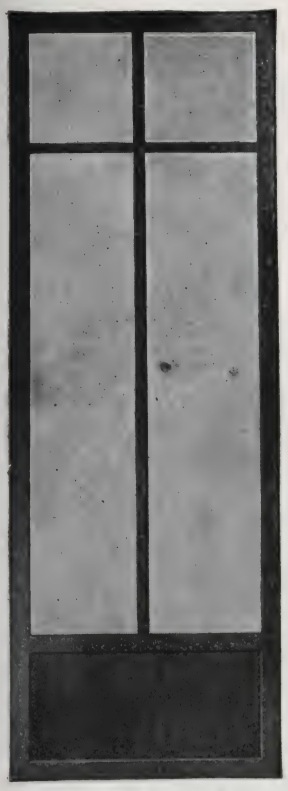
This book will be mailed to those directly interested in the installation or alteration of elevator enclosures or cars.

ENCLOSURE DESIGN NO. 1



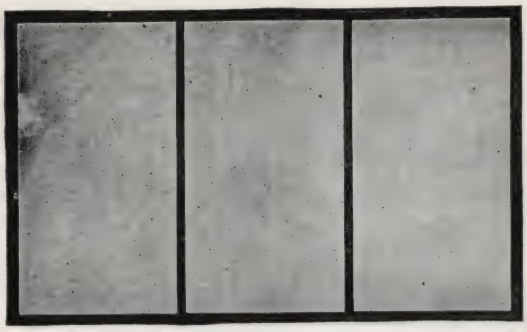
DESIGN K2. TWO-PANEL FRONT, TWO-SPEED DOORS

Continued on next page

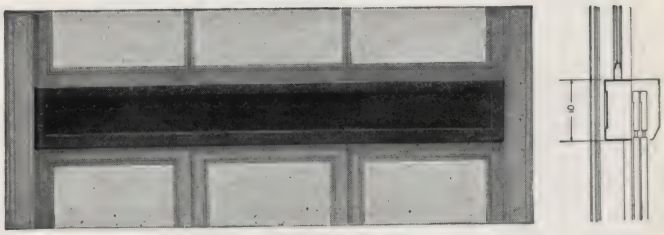


Door Panel Design D.4

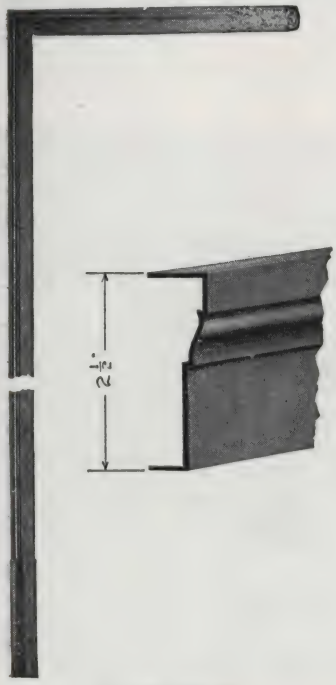
Jamb Design J.1



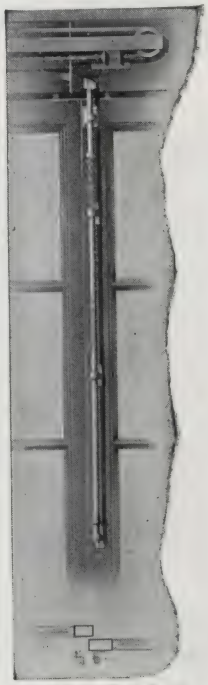
Transom Design T.P.1



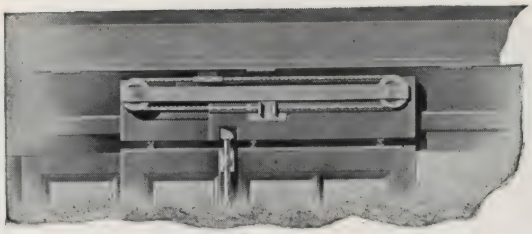
Frieze Design F.4



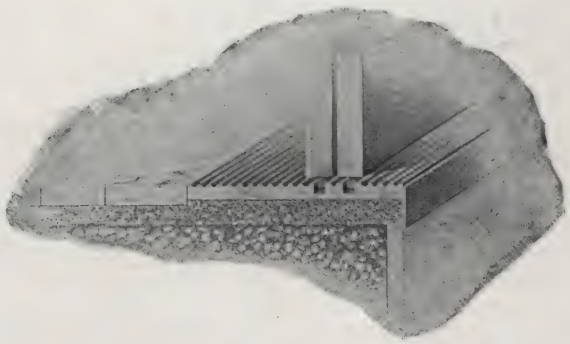
Trim Design T.4



Pull Down Bar Lock



Hangers and Operating Mechanism, Two-speed Doors



Sill Design S.1

Selections of Unit Designs and Constructions from Various Sections of the Tyler Book, "Fireproof Elevator Enclosures and Cars," Which, When Assembled, Constitute Enclosure Design No. 1, Illustrated on Preceding Page

A. F. WAGNER ARCHITECTURAL IRON WORKS

Structural, Architectural and Ornamental Iron Work

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Manufacturers of STRUCTURAL, ARCHITECTURAL and ORNAMENTAL IRON WORK:

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Concrete Cement Lights
Concrete Reinforcement
Corner Posts and Transom Bars
Crestings
Elevator Enclosures, Cars, Gates, Doors
Entrance Doors
Fencing
Finials
Fire Escapes
Flagpoles
Gates
Gratings
Hardware for all Fire Doors
Iron, Brass and Bronze Castings
Jail Work
Joist and Wall Hangers
Kalamein Doors and Frames
Lamps and Lamp Brackets
Lockers
Marquises
Metal Ladders
Porte-cochères
Post Caps
Safety Treads
Shutters
Sidewalk Lights
Stable Fixtures
Stairs
Standpipes for fire escapes
Steel Lumber
Steel Rolling Doors and Shutters
Store Fronts
Structural Steel
Tablets
Tie Rods
Tin Clad Fire Doors
Trap Doors
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Window Guards
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On receipt of plans and specifications, this company will furnish estimates, and is prepared to take contracts for iron and steel work for entire buildings.

Details of architects will be followed with absolute accuracy.

Recommendations and designs gladly given by our engineering staff for special or unusual needs.

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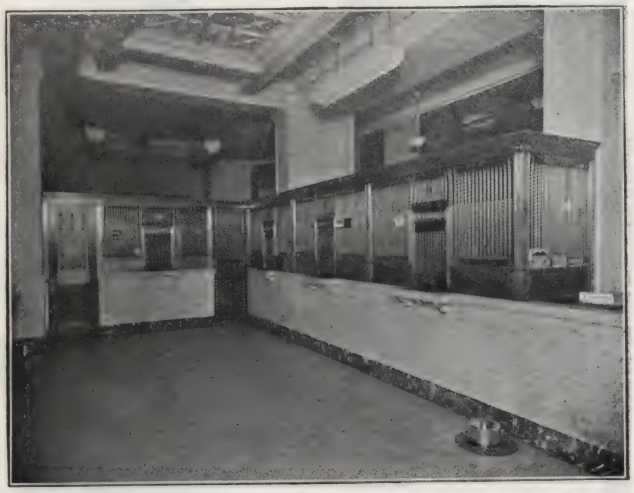
The plant is situated on the Milwaukee River, adjoining the Chestnut Street yards of the St. Paul Railroad, covering a ground area of 150x154 ft.

The new main factory building is two stories high, of most modern construction, and well equipped to handle all our special lines.



BRONZE COUNTER GRILLES INSTALLED IN UNION BANK, MILWAUKEE, WIS.

STAIRWAY INSTALLED IN MERRILL THEATER BUILDING, MILWAUKEE, WIS.

The A. F. WAGNER ARCHITECTURAL IRON WORKS is generally recognized as the oldest steel and iron works in the state of Wisconsin, having been established in 1855.

Wagner service, ability and reputation are well recognized in the iron and steel industry throughout the country.

Continued on next page

Main Entrance, Union Bank, Milwaukee, Wis.

Ornamental Grille

Jail Work Installed Complete at Milwaukee County House of Correction
Also furnished for the east main cell wing of the U. S. Penitentiary, Atlanta, Ga.

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SUCCESSOR TO CLINTON-WRIGHT WIRE COMPANY

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TULSA, OKLA., 861 Mayo Building
SAN FRANCISCO, CAL., 111 Townsend Street
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RUSTPROOF FENCING.

Wire Partitions, Tool Room Enclosures, Machinery Guards; Wire Rope, Stable Fittings, Clothes Lines, Picture Cord, Coal and Sand Screens, Foundry Riddles.

For Electrically Welded Wire Fabric for Concrete Reinforcement, see pages 44-47; for Wire Lath and Welded Sheathing, see pages 280-287; for Perforated Metal Grilles, see page 1773.

Ornamental Metal and Wire Work

This company manufactures a large variety of ornamental metal and wire work in iron, steel, brass, copper, bronze and aluminum, including: elevator cabs and enclosures; staircases and railings; iron, brass and bronze bank railings; ornamental iron gates for drives, factory, bank or public building entrances; marquises; ornamental wickets; counter railings; desk and floor railings; window guards; stable fixtures; factory signs; fire escapes; tool and stock room partitions; machinery guards; spark guards and screens.

These products are furnished in various finishes—polished brass, polished steel, antique brass, antique copper, oxidized brass, oxidized copper, nickelplate, dull black iron, aluminum, or any finish designed to harmonize with special interior decorations.

Excelsior Rustproof Wire Fences

Construction—Excelsior rustproof fences are the result of long experience in drawing, fabricating and galvanizing wire. By our process the fence is first made up from bright steel wires cleaned in a solution of acid. After removal from the acid bath, the fabric is drawn through a hot bath of pure molten spelter, which deposits on the metal a thick coating of pure zinc. This method of galvanizing is known as the galvanized after process. The result is a fence which is solidly held together in every part, and which is impervious to the elements.

Types—Excelsior rustproof wire fences made in the following types, in heights up to and including 8 ft.—chain link, ornamental, farm and railroad—will outwear any other wire fence of their type. The cost of maintenance is practically nil.

Chain Link—Used principally for factory enclosures, combining maximum strength and durability with minimum cost. It makes ideal tennis court enclosures and back stops.

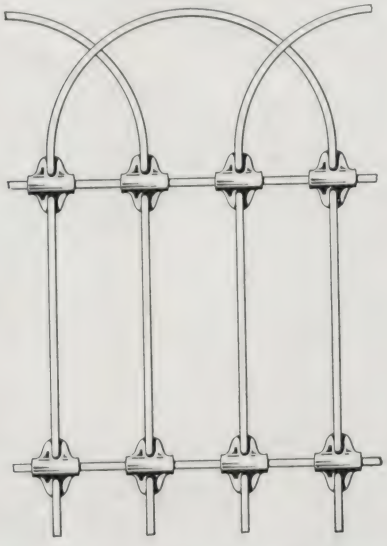
Ornamental Type—Constructed of heavy gauge wires held with patented steel clamps. It is the strongest and most durable ornamental wire fence made, ideal for residences, parks, playgrounds and factories, where an attractive as well as protective fence is desired.

Farm and Railroad—Constructed in the same manner as the ornamental. It is used extensively for sheep and cattle enclosures, game preserves, reservoirs, railroad right-of-way, and in general wherever a fence of large mesh can be used.

Erection—We maintain a large force of competent fence erectors and will be pleased to furnish proposals on fencing erected complete in place.

ORNAMENTAL IRON GATE

ELEVATOR FRONT NO. 504
FROST & CHAMBERLAIN, Architects



TOP SECTION EXCELSIOR ORNAMENTAL WIRE FENCE
One-fourth size

JNO. WILLIAMS, INC.

Manufacturers of Ornamental Bronze and Iron Work for Buildings

TELEPHONE
CHELSEA 4610

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ORNAMENTAL BRONZE and IRON WORK, including:

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Door and Window Grilles
Stair and Tube Railings
Lamp Standards
Bank Fittings, Screens and Enclosures
Wire Mesh Work
Elevator Enclosures
Mausoleum Doors and Fittings
Memorial Tablets
Honor Roll Tablets
Bronze Signs and Letters
Fine Bronze Castings
Statues, Figures and Portraits
Busts and Medallions
Monumental Bronze Work
Fountains and Sundials
Iron Driveway Gates
Fencing and Grille Work

CAST BRONZE TABLET DESIGN NO. 298
Size 22 in. wide x 10 in. high

CAST BRONZE TABLET NO. 886
Size, 24 in. x 48 in.

"REPUBLIC" JACKSON PARK, CHICAGO, ILL.
DANIEL CHESTER FRENCH, Sculptor
Height 24 ft.

WROUGHT AND CAST IRON ENTRANCE DOORS, SENOR MARCO CARVAJAL RESIDENCE, HABANA, CUBA
CARRERE & HASTINGS, Architects
SHREVE, LAMB & BLAKE, Associated

BANKING ROOM, KANAWHA BANKING & TRUST CO., CHARLESTON, W. VA.
DENNISON & HIRONS, Architects
Bronze work by
JNO. WILLIAMS, INC., BRONZE FOUNDRY, New York

CAST BRONZE LAMP STANDARD, ST. LOUIS MUSEUM OF ART, ST. LOUIS, MO.
CASS GILBERT, Architect

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Ornamental Bronze and Iron Work for Buildings

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OFFICE AND WORKS
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Products

Manufacturers of ORNAMENTAL BRONZE and IRON WORK, for buildings, which includes;

Building Entrances; Bronze Doors; Bank Metal Work; Bulletin Boards; Cast and Wrought Iron Canopies; Elevator Cabs; Bronze Desks; Sidewalk Doors; Area Gratings; Boiler Room Gratings; Elevator Enclosures; Stable Fixtures; Electroplated Work, Iron and Wire Fencing; Bronze, Iron and Wire Gates; Collapsible Gates; Iron Gratings; Iron and Wire Window Guards; Wheel Guards; Ornamental Hinges; Swimming Pool Ladders; Wrought Iron Ladders; Lamp Standards and Brackets; Iron, Brass and Bronze Lanterns; Lawn Furniture; Bronze, Cast Iron and Wrought Iron Marquises; Woven Wire Partitions; Toilet Stall Partitions; Kick Plates; Flagpoles; Pipe Railings; Brass and Bronze Railings; Balcony Railings; Hand Railings and Brackets; Wire Screens; Wire Signs; Steel Shutters; Wire Specialties; Bronze Tablets; Thresholds; Crematory Urns; Crematory Retorts; Mausoleum Doors and Fittings.

Cast Iron, Wrought Steel and Sheet Steel Stairs; Fire Escapes; Grilles and Wickets of all descriptions.

Founders and Contractors.

Facilities

This company is one of the pioneers in the development of the ornamental iron and bronze industry in the Central West, having been established in 1884 and devoting its efforts entirely and exclusively for the past 38 years to this particular branch of the building industry. The organization is well balanced and experienced, composed of men long associated with the company and directly responsible for its present development.

In addition to the manufacture of the products above mentioned, the company contracts for the furnishing and erecting, complete everywhere in the United States and Canada, of all the ornamental iron and bronze required in any particular building structure. Its central location in Milwaukee places it within convenient distance of the leading building centers and insures an ample supply of competent and reliable craftsmen.

The company is well financed, owns its own property, complete with power plant, side track and modern fireproof buildings, constructed and equipped to meet the particular needs of the ornamental iron and bronze industry. The company is entirely self-contained, and therefore in a strong position to control costs and deliveries.

All brass, bronze and gray iron castings are made in its own foundry, which is devoted exclusively to the production of high grade ornamental castings. Complete stocks of wrought shapes are kept on hand, and delays incident to fuel shortages are provided against, the company developing its own light, heat and power.

The complete nature of the institution enables it to make products economically in a wide range of designs and materials in accordance with architects' special requirements. In the matter of metal finishes, any treatment desired can be secured whether painted, enameled, electroplated or galvanized.

BRONZE ENTRANCE, COLORADO STATE OFFICE BUILDING, DENVER, COLO.
WM. N. BOWMAN & CO., Architects

Estimates, etc.

For estimates, etc., send sketches, drawings and specifications to our address at Milwaukee.

Write for descriptive literature covering any particular product required. The company is represented by competent sales representatives in the leading building centers of the west.

References

Names of satisfied customers in each vicinity throughout the United States will be mailed on request.

Refer to Dun's and Bradstreet's commercial reports for information regarding finances, etc.

AMERICAN FENCE CONSTRUCTION CO.

Woven Wire Fences and Iron Railings

TELEPHONE
FITZROY 0680, 0681

130-132 West 34th Street
NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

ENTRANCE GATES of Ornamental Iron; IRON and WIRE FENCES of all kinds for city or country, TENNIS COURT ENCLOSURES, POULTRY and KENNEL RUNS; HEAVY NON-CLIMBABLE FENCES for mills and factories.

Also Arches, Grape Arbors, Tree Guards, Window Guards, Interior Wire Partitions, Machinery Guards, Flying Cages.

AFCO
TRADE-MARK

Co-operative Service

In the preparation of specifications covering special fence construction, it is important to avoid the selection of special sizes of materials that are not readily available in the market.

Our engineering department is at all times ready to confer with architects and engineers concerning the selection of materials.

To supplement the work of this department, the services of our district representatives are available at many points throughout the Eastern, Central and Southern States, without charge.

If desired, blue prints of stock designs, with dimensions, similar to No. S-6493 illustrated on the following page, will be submitted. Designs of this character are suitable for many purposes, and will also be found helpful in the creation of special designs. When writing for estimates, it is important that a diagram be included, showing lengths of each line of fence, also width and location of each gate.

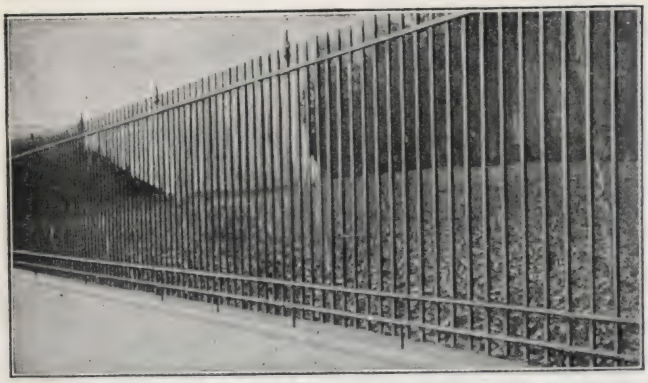
Erection

In the Construction Department, a staff of men experienced in the erection of the most difficult types of fence work insures the proper execution of all contracts.

Fencing is shipped to and erected in all parts of the United States and Canada. When erection by this company is not desired, shipments of materials are accompanied with instruction drawings, showing proper method of erecting.

WROUGHT IRON GATES AT LONG BRANCH, N. J., MADE AND ERECTED BY AMERICAN FENCE CONSTRUCTION CO. FROM ARCHITECT'S DESIGN

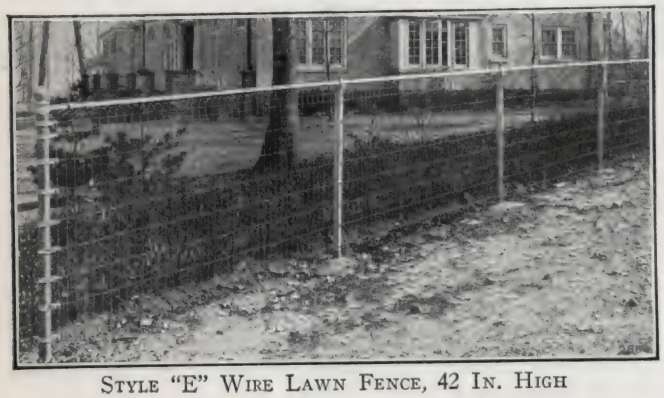
Continued on next page



S6493. Wrought Iron Railing, 7 Ft. High
Pickets, ¾ in. square on 6-in. centers. Rails, 2x½ in. solid. Regular picket line posts. "Jockey Club" spear heads

Railing S6493 | Post 16A Railing S6491 | Post G574 Railing S574

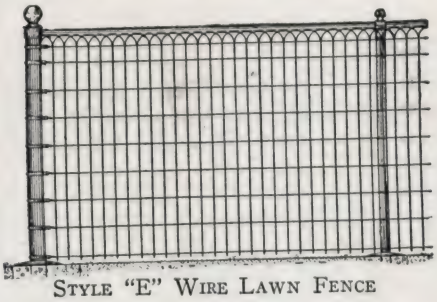
Three of the many designs of railings manufactured by this organization. Their sturdy construction and dignified appearance will suggest many varied uses for these posts and railings



Style "E" Wire Lawn Fence, 42 In. High

Afco Wire Lawn Fences

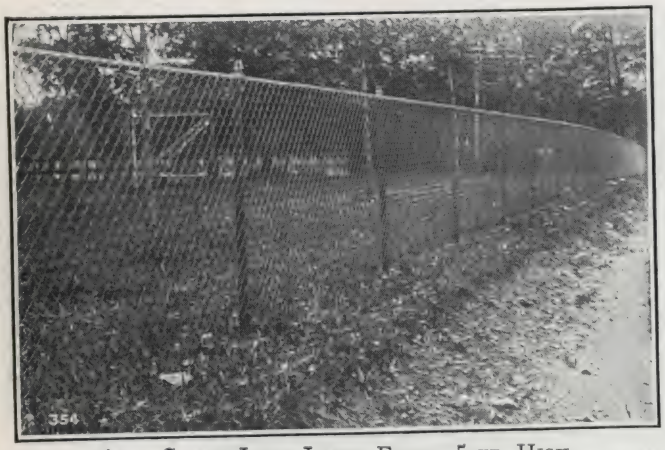
Style "E"—Heights 2½ to 6 ft. Crimped picket wires of No. 9 galvanized hard steel, spaced either 1⅞ or 2⅞ in. apart. End and corner posts heavy tubular section, size regulated by height of fence. Line posts 1¾-in. tee section, anchored with drive plate anchors. Top rail 1⅜-in. outside diameter.



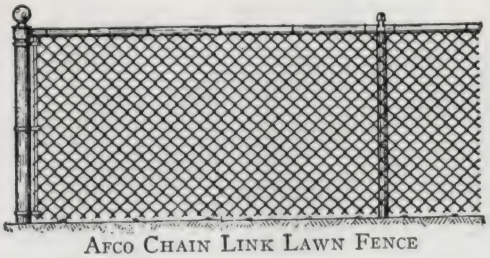
Style "E" Wire Lawn Fence

Single or double gates, with heavy tubular frames covered with fabric to match the fence, can be furnished in any width. Regular stock sizes are 3, 3½ or 4 ft. single; 8, 10 or 12 ft. double.

Chain Link Lawn—This is the heaviest, the most durable wire fence constructed. Heights, 3 to 10 ft. Standard mesh 1½ or 2 in., made of No. 9 galvanized wire. Extra heavy mesh 2 in. of No. 6 wire can be furnished. End and corner posts heavy tubular section, size regulated by height of fence. Line posts 1¾-in. tee section, anchored with drive plate anchors. Top rail 1⅜-in. outside diameter.



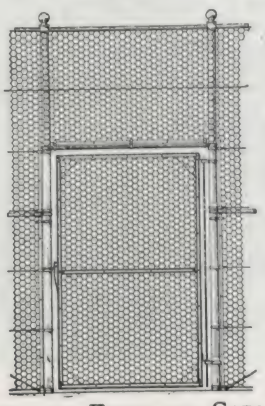
Afco Chain Link Lawn Fence. 5 ft. High
View showing protection afforded private estate boundary line



Afco Chain Link Lawn Fence

This fence can be provided with barbed wire overhang, as shown on following page.

Tennis Fence 10 Ft. High Enclosing Club Courts
Fences furnished in the form of back stops with wings, or as complete enclosures. Usually 10 ft. high

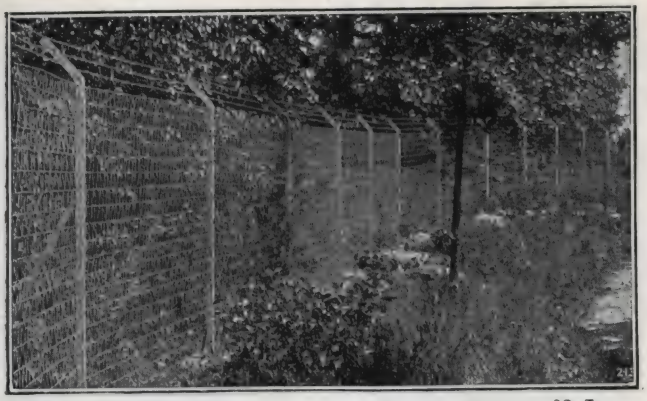


Tennis Fence and Gate

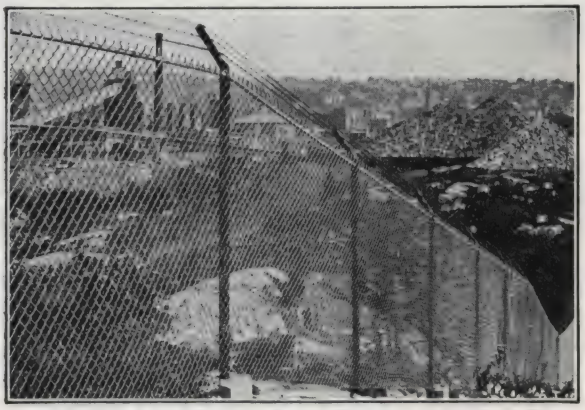
Tennis Court Enclosures

Heights 8 to 12 ft. Standard fabric Afco chain link 1½-in. mesh of No. 12 galvanized wire, or G.&B. hexagon netting 2-in. mesh of No. 15 wire, galvanized after weaving, and reinforced with No. 9 back supporting wires, spaced 2 ft. apart. End and corner posts 2½-in. outside diameter, line posts 2-in. outside diameter standard wrought pipe, spaced 10 ft. apart, galvanized or painted, set 3 ft. below grade in concrete.

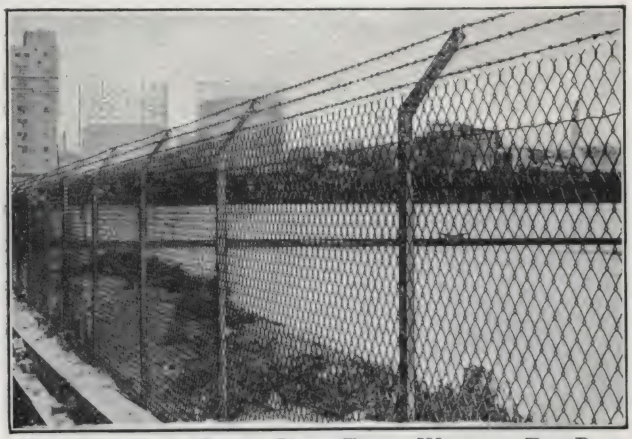
Continued on next page



AFCO VEE-MESH NON-CLIMBABLE FENCE, HEIGHT, 99 IN.



No. 1103. AFCO CHAIN LINK FENCE WITH TOP RAIL



No. 1003. AFCO CHAIN LINK FENCE WITHOUT TOP RAIL

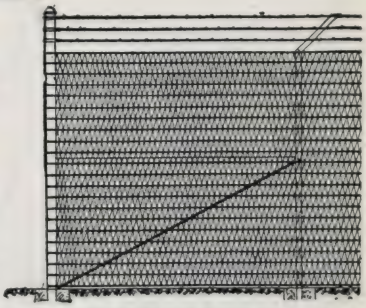
No. 152. AFCO WROUGHT IRON FENCE, 7 FT. HIGH

Pickets ¾, ⅞ or 1 in. square. Rails 2x2x¼-in. angle or 2x1x⅜-in. channels. Line posts 3-in. I-beam, 5½-lb. section for heights up to 6 ft., 7½-lb. for greater heights. No back bracing required with these posts. Posts set into concrete not less than 3 ft. below grade

Non-climbable Wire Fence

Afco Vee-Mesh—Height, 75, 84, 91 or 99 in. Mesh, 2-in. vee-shaped with 2-strand lateral cables spaced 4 in. apart. All No. 12½ galvanized wire.

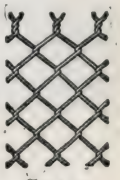
Line posts high carbon steel angles with integral barbed wire arm of 15-in. overhang spaced 10 ft. apart. For 75- and 84-in. heights, 1½x1½x¼-in. section; for 91- and 99-in. heights, 2x2x¼-in. section.



AFCO VEE-MESH NON-CLIMBABLE FENCE

Chain Link Factory Fences

The adjoining illustrations show the two leading types for factory protection. Special Factory Fence Catalogue No. 21-F, also SWEET'S ENGINEERING CATALOGUE, amplifies the following descriptive matter and illustrates this entire line in a most complete manner.



CHAIN LINK FABRIC

Fence Details—

(1) Integral barbed wire arm can not work loose

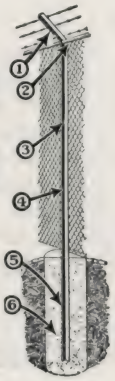
(2) top rail through post, a solid unit after fabrication

(3) galvanized

(4) open section easily painted

(5) can not corrode below ground

(6) concrete footing, best for permanent alignment.



STEEL ANGLE POST

Post No. "35-P" for Gates 18 ft. Wide or Over

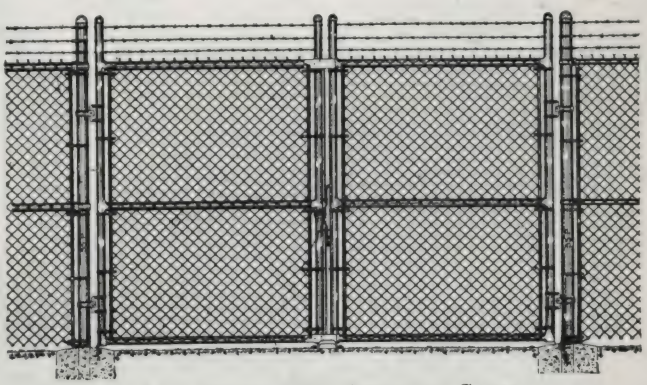
Post No. "25-P" for Ends, Corners, and Gates up to 16 ft.

Line Post No. "24-L"

Top Rail No. "I-P"

DETAILS OF CHAIN LINK FENCE

Afco Chain Link Swinging Gates



AFCO CHAIN LINK SWINGING GATES

Frames are 1⅝-in. tubular, all joints acetylene-welded. Adjustable hinges to allow for full swing. Locking device and center stop. Standard sizes: single, 4, 6, 8 and 10 ft.; double, 12, 14, 16, 18 and 20 ft.

Counter-balanced sliding gates or sliding gates with overhead track can be provided where space is restricted

Wrought Iron Factory Fences

The adjoining illustration shows one of the leading types of wrought iron factory fence designed by this company.

Afco factory fence catalogue showing various other designs, also methods of installation, and containing much valuable information, will be sent on request.

ANCHOR POST IRON WORKS

Manufacturers of Wire Fences, Iron Railings and Entrance Gates

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CORTLANDT 4886-7-8-9

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NEW YORK, N. Y.

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CLEVELAND, OHIO, Guardian Building
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CINCINNATI, OHIO, 141 Fourth Street

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SAN FRANCISCO, CAL.

Products

ORNAMENTAL IRON ENTRANCE GATES; ANCHOR-WELD RAILINGS and FENCES.

WIRE and IRON FENCES of all kinds and in any height, for country places, parks, playgrounds, institutions, factories, mills, railroads and water companies; UNCLIMBABLE FENCES.

TENNIS COURT and ATHLETIC GROUND ENCLOSURES; KENNEL YARD, POULTRY RUN and STOCK PADDOCK FENCES; expert designing and construction of Special Wire Enclosures for game, game birds, ornamental birds, etc.; IRON and WIRE ARBORS, ARCHES, TRELLISES and ESPALIERS.

Also manufacturers of Lamps; Doors and Grilles; Enclosures for clothes drying yards; Iron and Wire Window Guards; Tree, Lawn and Flower Bed Guards; Galvanized Anchor Posts, Clothes Posts, Sign Posts, and Tennis Net Posts.

TRADE-MARK

Estimates, Price Lists and Catalogues

This company will give estimates for its products, delivered and set complete in any part of the country. In writing for estimates send, if possible, a diagram giving dimensions, location of gates, ends and corners. A large force of experienced men is employed, who have been trained particularly to erect our work. Where material only is supplied, full instructions and drawings are furnished, so that fences and gates can be placed in position by local mechanics. Catalogues with complete price lists obtained on application. Sample sections of railings, fences with posts, gates, etc., may be seen at offices and salesrooms.

Co-operative Service; Facilities

The ANCHOR POST IRON WORKS is ready at all times to furnish architect, contractor, or owner, with sketches, designs and full information as to sizes and weights of material. If desired, surveys for grades and measurements will be made and entire charge taken of the work.

Shops, at Garwood, N. J., on the Central Railroad of New Jersey, and at Cleveland, Ohio, have every facility for handling large and small contracts at the lowest possible cost.

GATES AND LODGE AT ENTRANCE TO THE PROPERTY OF WILLIAM P. HAMILTON, STERLINGTON, N. Y.
From Design by ALFRED HOPKINS, Architect

Continued on next page

Garden Gate on Private Estate

Anchor-Weld Railing, Type RA-3
Surrounding plant of Hartford Times, Hartford, Conn.

Iron Railings and Entrance Gates

Long experience in this branch of ironwork enables this company to manufacture railings and entrance gates properly proportioned and designed, and correctly made in all mechanical details. The railings and gates may be of special or stock design, and can be furnished in heights from 3 ft. up to 8 ft. and of any size picket desired from ½ in. to ¾ in., round or square.

Electrically Welded Railings and Gates

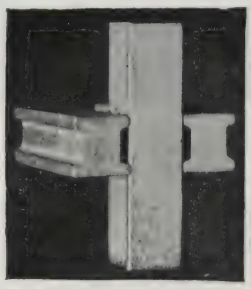
Anchor Post Iron Works has secured the right of manufacture by electric welding, and has installed the necessary machinery to make railings and gates from 3 to 8 ft. in height, and using ½-, ⅝-, or ¾-in. grooved square members. This process is known as Anchor-Weld. A special open hearth grooved square rod is used for pickets and rails. The rails consist of two rods, each the full length of a panel, welded to both sides of, and at right angles to, the pickets.

The strength of this construction is enormous. Not only are panels manufactured in 10-ft. lengths, but the center supporting leg is dispensed with entirely. Anchor-Weld railings can not sag between posts, even when supporting additional weight of several hundred pounds, and pickets can not become loose and fall. Double top and bottom rails support panels against lateral strain. A gate made in this way requires no diagonal braces, but remains rigid and true year after year.

Character of design is lent these railings because of the special grooved square rods used.

Elaboration is possible: circles, scrolls, ellipses, and other special features may be introduced, double top or bottom rails may be used, and highly ornamental iron posts supplied; or brick, stone, concrete, or cast iron columns may be employed.

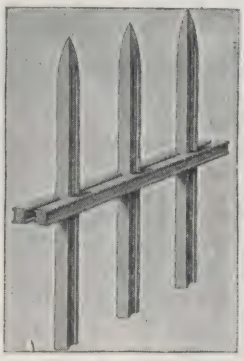
This Anchor-Weld railing offers the architect and builder a leeway in choice of design and size of fence, and weight of material, with the definite assurance that strength and service are not sacrificed thereby.



Grooved Square Rods of Open Hearth Steel

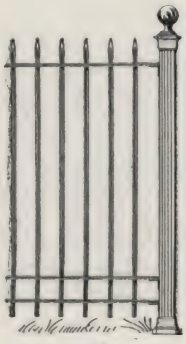
Electrically Welded Under Tons of Pressure

Forming One Solid Piece at Each Intersection

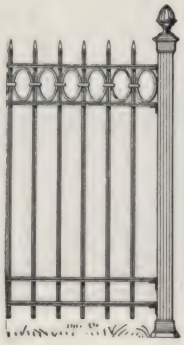


Perfect Union of Pickets and Rails

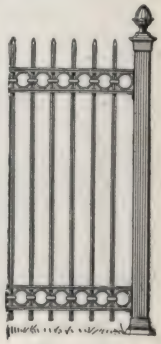
Double Gate, Type GD2-1
⅝-in. grooved square pickets



RA1



RD2 Oval



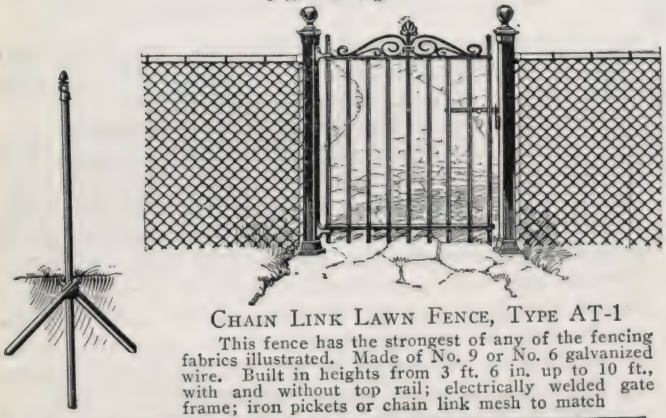
RD3 Ring

A number of other designs of both railings and gates are shown in our catalogue

Continued on next page

CHAIN LINK LAWN FENCE, TYPE AT-1

3 ft. 6 in. high

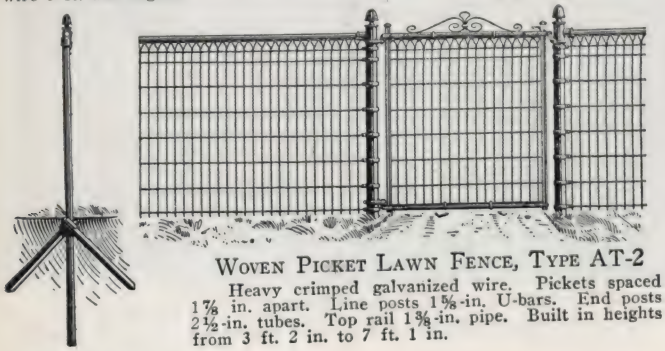


CHAIN LINK LAWN FENCE, TYPE AT-1

This fence has the strongest of any of the fencing fabrics illustrated. Made of No. 9 or No. 6 galvanized wire. Built in heights from 3 ft. 6 in. up to 10 ft., with and without top rail; electrically welded gate frame; iron pickets or chain link mesh to match

WOVEN PICKET LAWN FENCE, TYPE AT-2

3 ft. 2 in. to 7 ft. 1 in. high. Can be furnished with arms and barbed wire 5 ft. and higher



WOVEN PICKET LAWN FENCE, TYPE AT-2

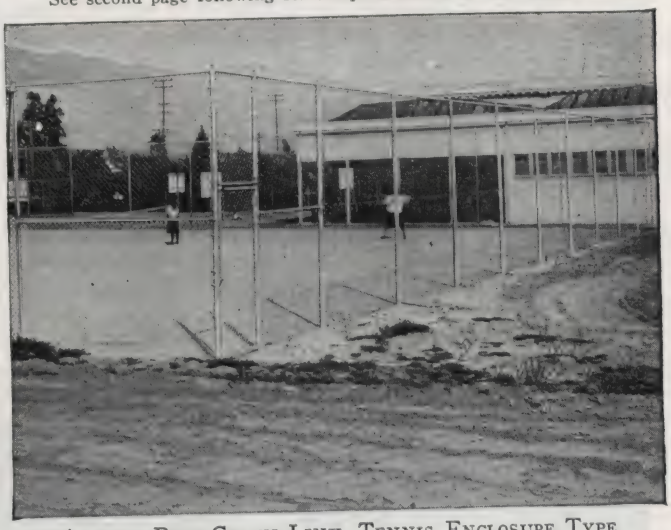
Heavy crimped galvanized wire. Pickets spaced 1⅞ in. apart. Line posts 1⅝-in. U-bars. End posts 2½-in. tubes. Top rail 1⅜-in. pipe. Built in heights from 3 ft. 2 in. to 7 ft. 1 in.

ANCHOR POST CHAIN LINK WOVEN STEEL FENCE, TYPE COA-1

The heaviest and strongest wire fence obtainable. When used as a support for flowering vines, it adds attractiveness as well as security to the home grounds.

Built up to 10 ft. in height with or without top rail and with or without arms and barbed wire.

See second page following for complete details of this fence



ANCHOR POST CHAIN LINK, TENNIS ENCLOSURE TYPE

Installed on grounds of high school, Pasadena, Cal. Built up to 12 ft. high, with adequate bracing of corners and firm anchorage. Narrow entrance gates comprised in enclosure proper

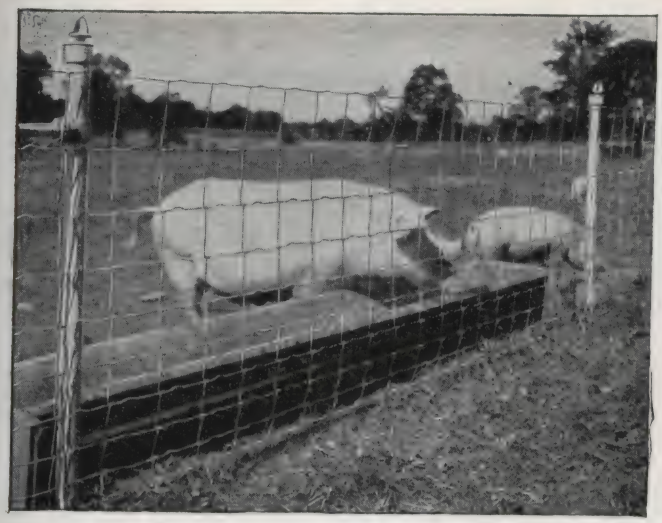
ANCHOR POST ENCLOSURE OF CHAIN LINK WOVEN STEEL

Municipal Playground, Jersey City, N. J.

Being used with complete satisfaction on many public playgrounds. The chain link fabric is woven in such a manner that it provides no foothold for climbing children; it also acts as a stop for baseballs or playthings used in children's games.

See second page following for complete details of this fence

Continued on next page



SQUARE MESH FARM AND PASTURE FENCE, TYPE BO-5

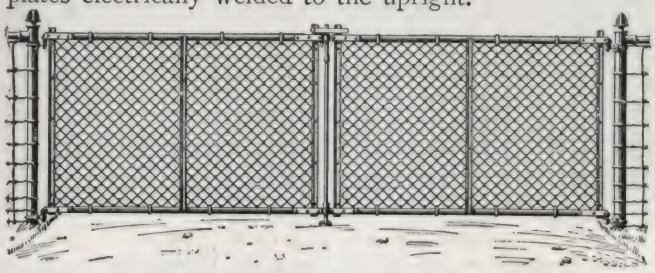
Similar to the kind used to enclose cattle pastures, except that it is only 4 ft. in height, and is without arms or barbed wire

Anchor Posts

Anchor posts are U-bars of high carbon steel heavily galvanized. Posts are driven into the ground and held rigidly erect by two anchor stakes driven through slots clamped to opposite sides of the posts.

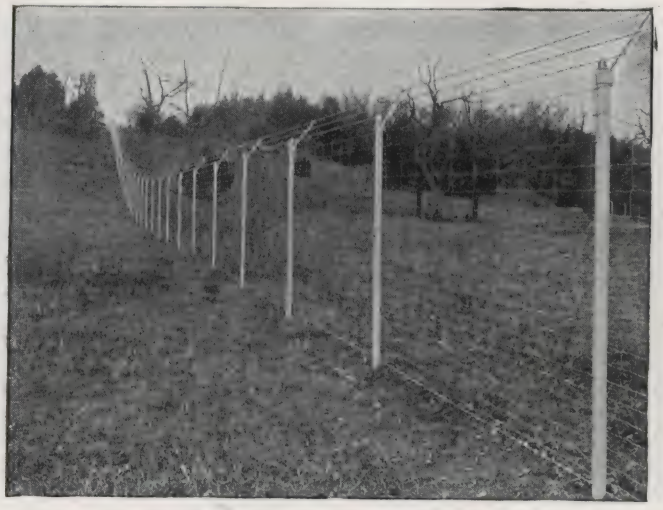
Anchor Post Electric-Weld Farm Gates

Great strength is secured for Anchor Post welded farm gates by joining the top and bottom rails to double uprights of steel channel, by means of channel corner plates electrically welded to the upright.



DOUBLE FARM GATE, TYPE "J"

Made in the following widths: 12 ft. 1 in., 13 ft. 10½ in., 15 ft. 10½ in. Other types to suit any width opening



SQUARE MESH FENCE WITH HEAVY NO. 9 WIRE, TYPE COA-5

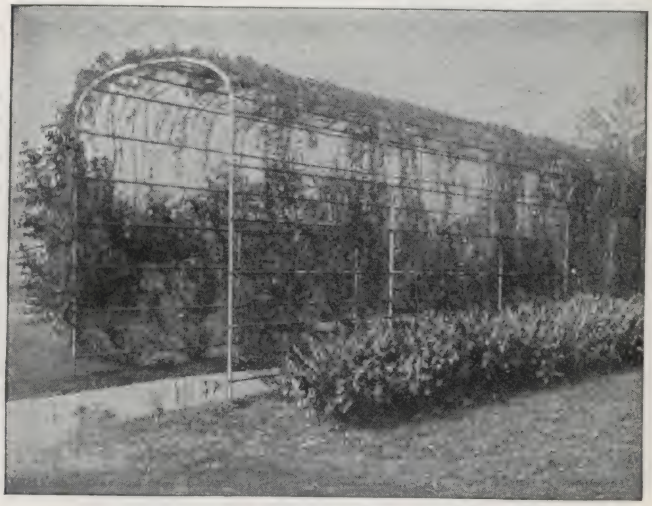
Designed for cattle pastures, paddocks and large game preserves

CHAIN LINK KENNEL ENCLOSURE, TYPE BT-1

This kennel enclosure offers a clean runway, ample room for exercise and absolutely guards the dogs against escape, injury or theft.
5 ft. high, with or without covered top

CHICKEN RUN ENCLOSURE, TYPE BT-4

These poultry fences are not only better looking, but will last two or three times as long as those built with wood framework. Ratproofing the outside of the enclosure is always advisable. A fine wire cloth is buried in the ground in such a way that rats can not burrow under it; a slight charge is made for this addition.
Specifications for any size enclosure can be furnished on application



VINE ARBOR, MADISON, N. J.

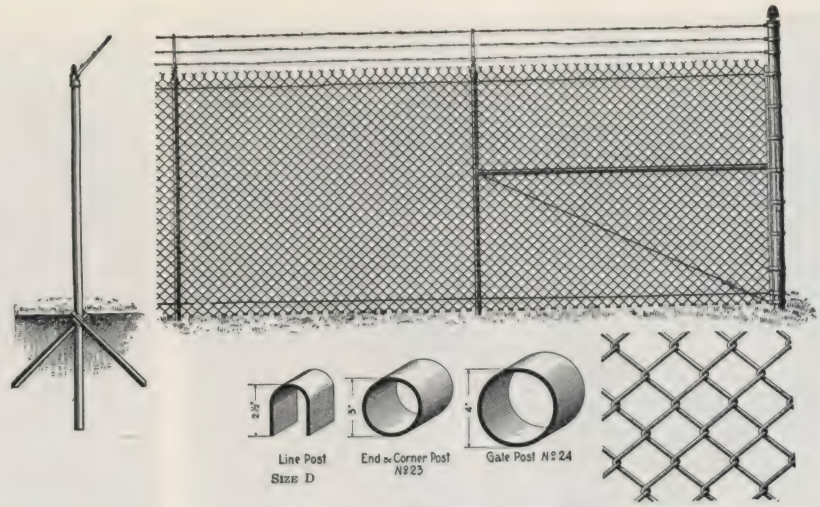
Height, 10 ft.; width, 8 ft. Made with flat arches connected with round rods; made any length, height or width desired; either galvanized or painted

Continued on next page

Chain Link Woven Steel Fences

Chain link woven steel is of the best quality galvanized steel wire of No. 9 or No. 6 gauge, No. 6 being the size most used. Made in any width up to 10 ft. The mesh is so small it affords no foothold for fence climbers; and as an additional protection 3 or more strands of barbed wire are fastened to inwardly inclined arms attached to the tops of posts.

Fence is furnished with or without top rail of galvanized pipe. Posts and all fence parts are galvanized by hot dip spelter process. Under conditions where protection is of utmost importance, these fences are made 10 ft. in height, and diagonal arms and barbed wire are attached to both front and back of posts; the spread across the top is about 2 ft. The gates are as unclimbable as the fence.



CHAIN LINK WOVEN STEEL FENCE

Fabric	Chain link woven steel wire, No. 6 gauge
Line Posts	Galvanized Anchor Posts, size D, 2½-in. steel U-bar, set on 10-ft. centers
End and corner posts	3-in. steel pipe
Gate posts	4-in. steel pipe

"DREADNAUGHT STOCKADE" CHAIN LINK WOVEN STEEL FACTORY FENCE, TYPE DOA-1

Height, 8 ft., surrounding the plant of Colonial Salt Co., Akron, Ohio

DOUBLE CHAIN LINK GATE, TYPE G

Installed at plant of Fox Motors Co., Philadelphia, Pa.

Single gates of this general design are made for openings from 4 to 20 ft.; double gates, for openings 8 to 40 ft.

TRIANGULAR MESH FENCE, TYPE COA-3

Erected for the New York, Westchester & Boston Railroad. It is 90,000 ft. in length, 67,000 ft. of it being 5 ft. high, part of which is shown above, and 23,000 ft. is 8 ft. high

ANCHOR-WELD RAILING, TYPE RA-3

Surrounding plant of Stollwerck Chocolate Co., Stamford, Conn.

CYCLONE FENCE COMPANY

Manufacturers of Fencing and Gates in Wire and Iron

GENERAL OFFICES

WAUKEGAN, ILL.

FACTORIES: WAUKEGAN, ILL.; CLEVELAND, OHIO; FORT WORTH, TEX.

DISTRICT OFFICES

EASTERN DIVISION, NEW YORK, N. Y.
SOUTHERN DIVISION, ATLANTA, GA.
MID-WESTERN DIVISION, WAUKEGAN, ILL.; CLEVELAND, OHIO; DETROIT, MICH.

WESTERN DISTRIBUTERS

OAKLAND, SAN FRANCISCO, LOS ANGELES, CAL., STANDARD FENCE CO.
PORTLAND, ORE., NORTHWEST FENCE & WIRE WORKS

Products

WIRE FENCES and GATES of all kinds for all purposes, of Non-climbable Chain Link, Ornamental Woven Wire or Woven Wire Mesh.

WIRE ENCLOSURES: Tennis Court, Animal and Bird Cages, Kennels, Poultry Yards, etc.

WIRE PARTITIONS, WINDOW GUARDS, etc.

WIRE SIGNS.

ORNAMENTAL IRON FENCING and GATES.

FOLDING GATES.

TRADE-MARK

Figures are taken from full standard weight schedule adopted by manufacturers. The permissible variation is 5% either way.

We recommend that all posts be set in concrete.

Fencing furnished with galvanized fabric and painted framework, or all heavily galvanized.

Advisory and Construction Service

Architects, landscape architects, engineers and contractors are invited to utilize the facilities of the CYCLONE FENCE COMPANY for rendering co-operative assistance on all fencing problems. This service is gratis. On request, blue prints and designs of proposed fence will be submitted; also, full information concerning construction and materials used.

When desired, we furnish expert construction superintendent at nominal charge to supervise erection of fence anywhere, or, if preferred, we erect fence complete.

Cyclone Standard Construction

Specifies full standard weight tubular steel with weight per lineal foot for posts and rail.

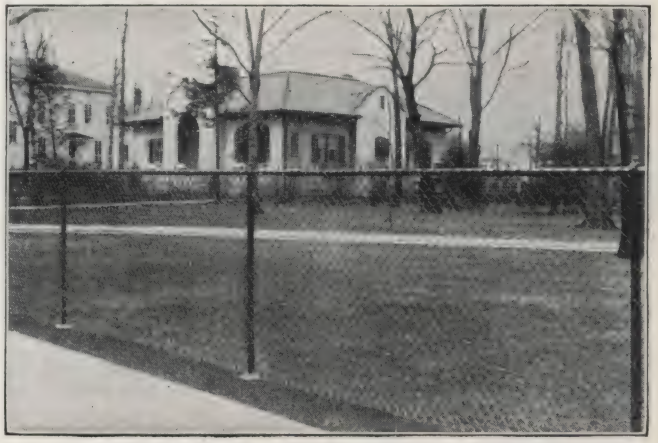


PHOTO NO. 362. SAFEGUARD CHAIN LINK FENCE

Height, 4 to 11 ft. Posts, tubular steel. End, corner, and walk gate posts, 3-in. outside diameter; weight, 5.79 lbs. per ft. Drive gate posts, 3½-in. outside diameter; weight, 7.58 lbs. per ft. Line posts, spaced 10 ft. apart 2½-in. outside diameter; weight, 3.65 lbs. per ft. Top rail, 1⅝-in. outside diameter; weight, 2.27 lbs. per ft. Fabric, No. 6 or No. 9 gauge, heavily galvanized wire, 2-in. chain link mesh. No. 9 wire woven also in a 1½-in. mesh

PHOTO NO. 184. CYCLONE CHAIN LINK FENCE FOR PUBLIC AND PRIVATE PARKS

Affords dependable protection and imparts a very artistic effect to grounds enclosed. Does not obscure beauty of the landscape.

This type of fence protects many notable parks throughout the country

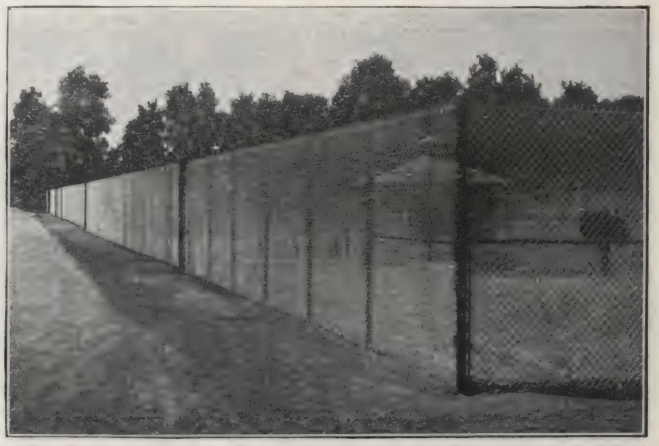


PHOTO NO. 173. CYCLONE ENCLOSURES FOR BIRD OR ANIMAL CAGES

Provide ideal quarters for birds, animals, and pedigreed stock. Permit free circulation of air. Do not obstruct vision or sunshine, and are sanitary.

Built in wire or iron to withstand hard usage

Continued on next page

PHOTO NO. 204. MAJESTIC CHAIN LINK COMPLETE FENCE

Standard heights, 36, 42, 48, 54, 60 or 72 in. Posts, tubular steel. End, corner and walk gate posts, 2½-in. outside diameter. Line posts, spaced approximately 8 ft. apart, made of 2 tubular steel uprights 1⅜-in. outside diameter. Rail, 1⅜-in. outside diameter. Fabric, No. 9 gauge, heavily galvanized wire, woven in a 1½- or 2-in. chain link mesh

PHOTO NO. 206. IMPERIAL ORNAMENTAL COMPLETE FENCE

Standard heights, 36, 42, 48, or 54 in. Posts, tubular steel. End, corner and walk gate posts, 2-in. outside diameter. Line posts, spaced approximately 8 ft. apart, made of 2 tubular steel uprights 1⅜-in. outside diameter. Rail, 1⅜-in. outside diameter. Fabric, style "F." Pickets of fabric spaced 3 in. apart at top, 1⅜-in. at bottom

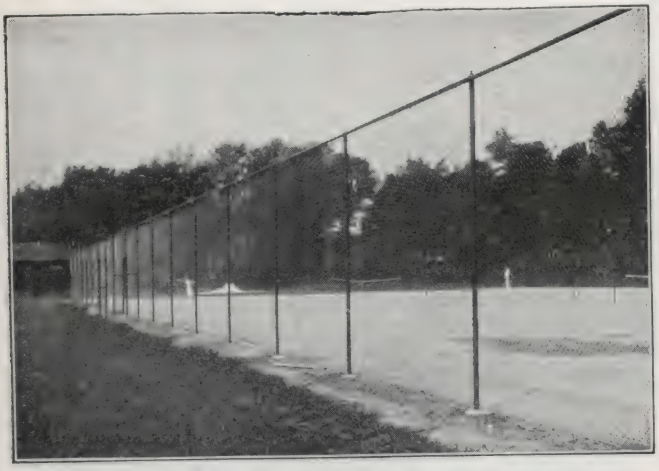


PHOTO NO. 140. CYCLONE TENNIS COURT ENCLOSURES AND BACKSTOPS

Standard heights, 10 and 12 ft. Posts, full weight tubular steel. Fabric, made of heavy No. 12 gauge, galvanized steel wire woven in a 1½-in. chain link mesh.

Cyclone tennis court enclosures will last for years; never lose their trim, neat appearance.

Special tennis court enclosures built to order

PHOTO NO. 52. SOLID PICKET IRON FENCING

Pickets, ½- and ⅝-in. square or round, set on 4-in. centers. ¾-in. pickets, square or round, set on 5-in. centers. (Other sizes if desired.) Rails, for ½-in. and ⅝-in. pickets, 1½x1½x⅛-in. angles. Rails for ¾-in. pickets, 2x2x$\frac{3}{16}$-in. angles. Line posts, 3-in. I-beam with sheared top. A wrought iron panel support is furnished for center of each panel. Standard length of panels, 8 ft.

Corner, end and gate posts furnished in various patterns

PHOTO NO. 205. COLONIAL ORNAMENTAL COMPLETE FENCE

Standard heights, 36, 42, 48, or 54 in. Posts, tubular steel. End, corner and walk gate posts, 2-in. outside diameter. Line posts, spaced approximately 8 ft. apart, 2-in. outside diameter. Rail, 1⅜-in. outside diameter. Fabric, style "F." Pickets of fabric spaced 3 in. apart at top, 1⅜ in. apart at bottom

PHOTO NO. 39. SOLID PICKET IRON FENCING

Pickets, ½ in. square, set on 4-in. centers; ⅝ and ¾ in. square, set on 5-in. centers. Rails, 1¼x½-in. 3-rib channel for ½ in. square pockets; 1½x½ in. 3-rib channel for ⅝ in. square pickets; 2x⅝ in. 3-rib channel for ¾ in. square pickets.

Corner, end and gate posts furnished in various patterns

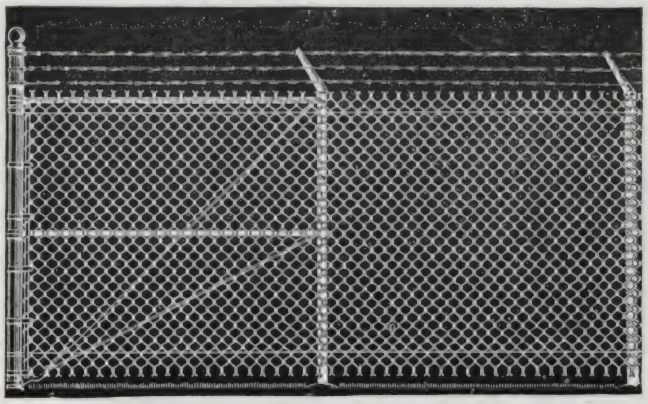
Continued on next page

PHOTO NO. 177. CHAIN LINK INVINCIBLE FENCE

Standard height, 7 ft. Built in heights from 6 to 11 ft. Posts, tubular steel. End, corner and walk gate posts, 3-in. outside diameter; weight, 5.79 lbs. per ft. Posts for single swing drive gates up to but not including 10-ft. opening, also double swing drive gates up to but not including 20-ft. opening, 3½-in. outside diameter; weight, 7.58 lbs. per lin. ft. Posts for single swing drive gates 10 ft. and over, also double swing drive gates 20 ft. and over, and slide gates of all opening sizes, 4-in. outside diameter; weight, 9.1 lbs. per lin. ft. Line posts, spaced 10 ft. apart, 2½-in. outside diameter; weight, 3.65 lbs. per ft. Top rail, 1⅝-in. outside diameter; weight, 2.27 lbs. per ft. Extension arms carry three 4-point barb wires 12 in. in or out from fence line. Fabric, No. 6 or No. 9 gauge, heavily galvanized steel wire woven in a 2-in. chain link mesh. No. 9 wire woven also in a 1½-in. chain link mesh

PHOTO NO. 103. CHAIN LINK NON-CLIMBABLE FENCE

Standard height, 7 ft. Built in heights from 7 to 11 ft. Posts, same specifications as posts used for Invincible fence. Extension arms carry five 4-point barb wires 9½ in. in and out from fence line. Fabric, No. 6 or No. 9 gauge, heavily galvanized steel wire woven in a 2-in. chain link mesh. No. 9 wire woven also in a 1½-in. chain link mesh



CHAIN LINK RELIANCE NO. 1 FENCE

Height, 7 ft. End, corner and walk gate posts tubular steel, 3-in. outside diameter; weight, 5.79 lbs. per lin. ft. Posts for swing drive gates, tubular steel, 3½-in. outside diameter; weight, 7.58 lbs. per lin. ft. Posts for sliding gates, tubular steel, 4-in. outside diameter; weight, 9.1 lbs. per lin. ft. Line posts, spaced 12 ft. apart, high carbon steel, U-bar 2⅛ in. wide for 6- and 7-ft. fence; weight, 2.5 lbs. per ft. For 8-ft. fence, U-bar line posts are 2⅛ in. wide; weight, 3.82 lbs. per ft. Post tops same as used on invincible fence. Fabric, No. 9 gauge, heavily galvanized steel wire, 2-in. chain link mesh

Gates

Made in any height for any opening size, single or double drive, to match fence; also made in special designs. Swinging gates arranged to swing either way, to lock from either side. When desired, roller bearing sliding gates furnished to run on overhead enclosed steel track.

Prices, Information Required, etc.

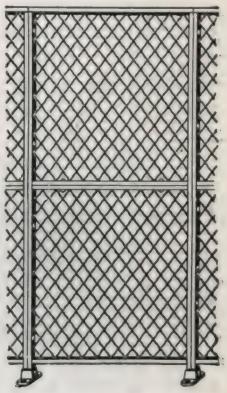
Prices on fence job erected complete, or services of construction superintendent, quoted on application.

When writing, send a diagram or blue print of proposed fence lines, giving measurements of each stretch and total measurements. Make an "O" where corner, end or gate posts are to be placed. State whether single or double drive gates are wanted, and give opening size.

Quotation on complete job will follow by return mail.

Wire Work of all Kinds

(Built-in-Sections) Partitions—Built in standard size sections 4 ft. wide x 8 ft. high. Frames are 1-in. channel iron. Fabric is No. 10 gauge wire woven in 1½-in. diamond mesh. Furnished with either swinging or sliding gates. Handholes or wickets provided where needed. Floor flanges furnished for either wood or concrete floors. Sections are interchangeable, movable; can be taken out and used elsewhere—no refitting—no loss. Quick changes in departments can be made at any time.



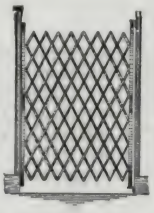
PARTITION SECTION

Send blue print or layout of partition work wanted.

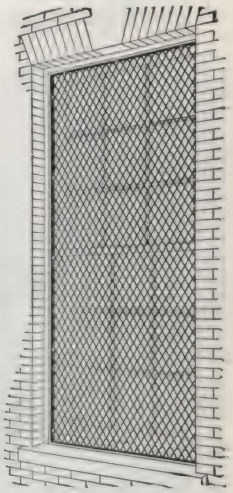
Window and Skylight Guards—Frames are 1-in., ¾-in. channel, or ⅜-in. round iron. Fabric is No. 10 gauge wire woven in 1½-in. diamond mesh.

Channel iron frames fit into openings. Round iron frames usually allow ¾ in. on all sides for lap. Special guards built with either channel or round iron frames, using size of wire and mesh desired.

Folding Gates — Built for any width or height. Take up minimum space. Fold out of the way.



FOLDING GATE



DIAMOND MESH WINDOW GUARD

Woven Wire Signs—Built in any size with heavy channel iron frames. Letters of heavy galvanized sheet steel. All signs are constructed to withstand weather conditions and give permanent service. State length and height of sign wanted, also name to be displayed.

WOVEN WIRE SIGN

CINCINNATI IRON FENCE COMPANY

Manufacturers of Ornamental Iron and Wire Work

3330 Spring Grove Avenue
CINCINNATI, OHIO

Products

ORNAMENTAL IRON and WIRE WORK of every description.

STEEL and IRON FENCING suitable for residences, factories, cemeteries, school grounds, parks, etc.; ENTRANCE GATES; FOLDING GATES; DOOR and WINDOW GUARDS; PIPE RAILINGS; GRATINGS; SIDEWALK DOORS; IRON SHUTTERS; WIRE PARTITIONS, etc.

Prestige Behind Cincinnati Products

Some of the finest examples of fence and iron work erected in the United States are the products of this company. This work is the result of many years' experience in design, construction and erection, together with our fixed policy of applying the best workmanship to the best materials.

Designs and estimates submitted on request.

Outstanding Features of Cincinnati Fencing

Design and Construction—The dominant features of Cincinnati fencing are their rugged strength coupled with attractive design. Made standard or to special specifications to suit requirements.

Rails—Much heavier than are usually found in other fences, made of channel, angle or flat sections.

Pickets—Square, round, flat or angle; suitable thickness; pointed, or tipped with malleable iron heads.

Posts—Made in large variety of sizes and styles to harmonize with the architectural surroundings.

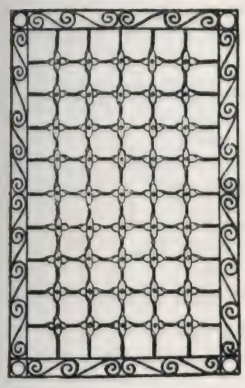
ORNAMENTAL IRON GATES FOR RESIDENCE

ORNAMENTAL IRON FENCE AND GATES FOR RESIDENCE

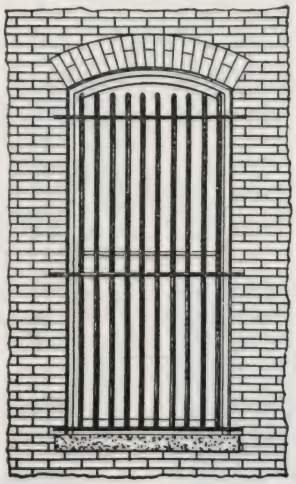
Continued on next page

Iron and Wire Work for a Wide Range of Utility

Cincinnati iron and wire specialties are used extensively where the requirements call for a dependable product. They are made by skilled mechanics in a plant fully equipped with every modern appliance for the production of first quality work.

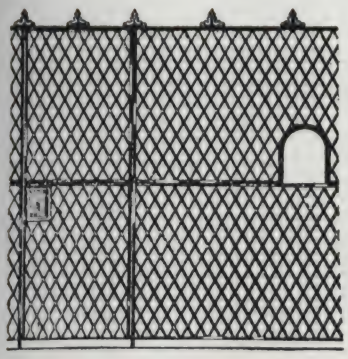


Heavy Twist and Riveted Panel Door Grille

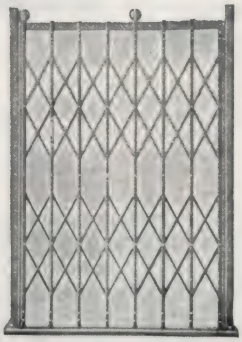


Iron Window Guard

Ornamental Iron Window Guard

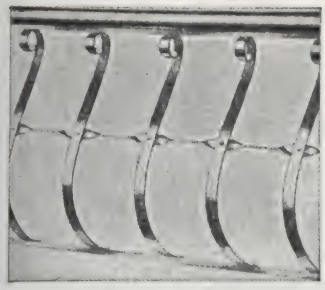


Wire Partition with Door and Wicket

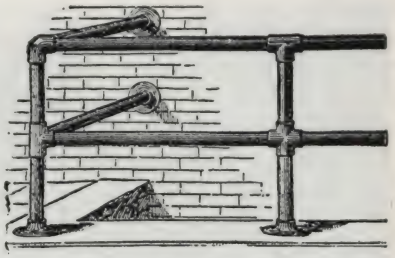


Bostwick and Lattice Type Folding Gates

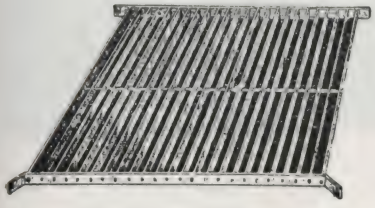
Iron Shutters with Single Lock



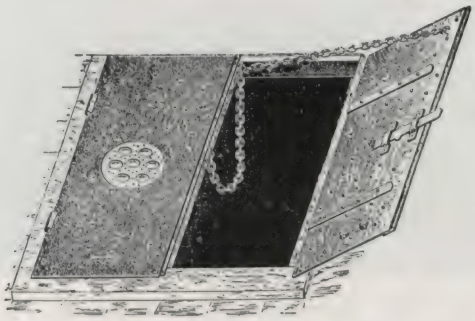
Balcony or Stair Railing



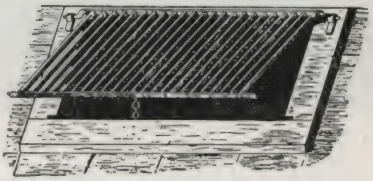
Pipe Railings for Areas and Stair



Sidewalk Grating



Iron Cellar Door, Non-slip Surface and One Light



Cellar Grating

PAGE FENCE AND WIRE PRODUCTS ASSOCIATION

Wire Link Protection Fences, Gates and Partitions

215 North Michigan Avenue
CHICAGO, ILL.

Comprising the Following Organizations that Specialize in the Construction and Erection of Page Wire Link Enclosures

BINGHAMTON, N. Y., Titchener Iron Works, Inc.
BIRMINGHAM, ALA., Young & Vann Supply Co.
BOSTON, MASS., Gates & Wadleigh
CHARLOTTE, N. C., General Equipment Co.
CHICAGO, ILL., Page Steel and Wire Co.
CINCINNATI, OHIO, The Davis & Siehl Co.
DALLAS, TEX., Columbia Fence & Wire Co.
DETROIT, MICH., Barnes Wire Fence Co.
KANSAS CITY, MO., Kansas City Wire & Iron Works
LAFAYETTE, IND., Indiana Fence & Supply Co.
LINCOLN, NEBR., Westover Building Metals Co.
LOS ANGELES, CAL., Southern California Fence Construction Co.
MEMPHIS, TENN., Tri-State Iron Works
NEW HAVEN, CONN., John P. Smith Co.
NEW ORLEANS, LA., Woodward, Wight & Co., Ltd.
NEW YORK, N. Y., Brook Iron Works, Inc.
OSCEOLA, IND., H. P. Hoffman
PHILADELPHIA, PA., Horace T. Potts & Co.
PITTSBURGH, PA., Stewart-Holland Co., Inc.
RENSSELAER, N. Y., W. J. La Grange
SPRINGFIELD, MASS., Swaine Bros. Iron Works
ST. LOUIS, MO., Sears & Piou
TULSA, OKLA., Hudson Wire & Iron Co.

Products

Wire-Link Fencing for protection and ornamental purposes of every description.

Fencing and Entrance Gates of Steel or Armco Ingot Iron for residences, estates, country clubs, etc.

Industrial Fencing for factories, mills, refineries, railroads, power stations, mines, yards, etc.

Fencing for city, state, and national institutions, including schools, parks, playgrounds, prisons, hospitals, etc.

Enclosures for athletic fields, tennis courts, baseball grounds, race tracks, fair grounds, amusement parks, aviation fields, automobile parking enclosures, etc.

Page Panel Partitions, made of Page Wire-Link Fabric for factories, offices, warehouses, stock rooms, etc.

Also manufacturers of Page Wire Link Specialties: Window and Skylight Guards, Waste Burners, Display Signs, etc.

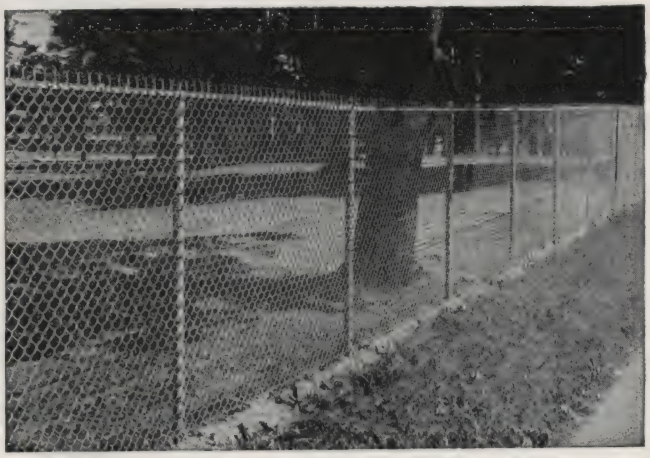
The first wire fence ever made was designed by J. Wallace Page in 1885. For nearly 40 years Page fences have been standards of good fence design

Page is the only fence that can be made of Armco Ingot iron, thus furnishing to fence users an iron of unequalled purity and rust resistance

TRADE-MARKS

Page, the First Wire Fence Made—1885

The wire fence industry was initiated by J. Wallace Page, who manufactured the first fence made of wire fabric in 1885. Page products are made from wire rolled in the Page mills, an assurance to the architect of uniformity in the product that he specifies.



Page Reliable Wire-Link Lawn Fence Enclosing a City Park

60 in. high, with 2-in. mesh, No. 9 gage

The strongest type of lawn fencing made. Furnished in either steel or Armco Ingot iron, in heights of 36, 42, 48 and 60 in. Fabric may be 1½- or 2-in. mesh, No. 6 or No. 9 wire, heavily galvanized. Each picket is interlocked, preventing spreading of wires. It is non-climbable. Gates furnished in widths (measured between posts) of 3, 3½, 4, 6, 8 and 10 ft.

Page Style 3-TR Protection Fence Enclosing an Estate

Fence is 7 ft. high made of 2-in. mesh, No. 9 gage Wire-Link, with all posts and fittings galvanized. Posts are 2⅜-in. diameter, spaced 10 ft. apart and set 3 ft. below grade into concrete footings. Style 25 Armco arm is used, carrying 3 barbed wires. Top rail is 1⅝-in. diameter, joined with expansion sleeves, permitting contraction and expansion

Continued on next page

Design and Erection Service by an Expert Fence Company in Your Own Locality

In each district of the United States and Canada the design and erection of Page fencing is in the hands of a responsible firm of fence engineers, that specialize in fence construction.

This assures expert performance of the work all the way through, and gives the advantage of consultation with men of long experience in the erection of fences.

Estimates will be gladly furnished on receipt of rough sketches of the proposed work, or complete detailed designs will be drawn up, if desired, and estimates supplied.

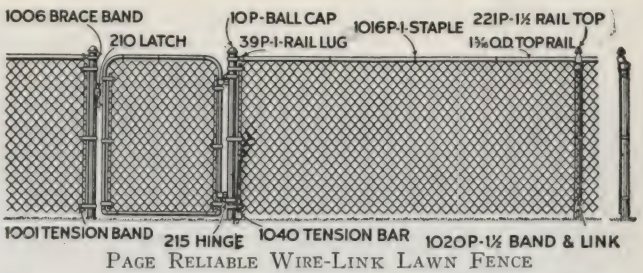
The Only Fence of Armco Ingot Iron

Through an exclusive arrangement with the American Rolling Mill Co., Page fences are the only fences that may be secured of Armco Ingot iron, the purest commercial iron made. Architects familiar with Armco Ingot iron, and with the reputation of Page fences, will appreciate that a Page Wire-Link fence made of Armco Ingot iron represents the highest point obtainable in property protection.

PAGE RELIABLE WIRE-LINK FENCE ENCLOSING A RESIDENCE

6 ft. high, made of 2-in. mesh, No. 9 wire. Fabric is set above concrete coping, giving attractive finished appearance to base

Especially adapted to residences, country clubs, parks, etc. Furnished with either a top rail, as shown, or with heavy lateral wire, top and bottom. Fence is unclimbable, and barbs at top of fabric give additional protection against intrusion. Line posts are tubular construction, 1.9-in. outside diameter, spaced 8 ft. apart, of sufficient length to set 2½ ft. below grade line. End, corner and gate posts are 2⅜-in. outside diameter, set 3 ft. below grade line

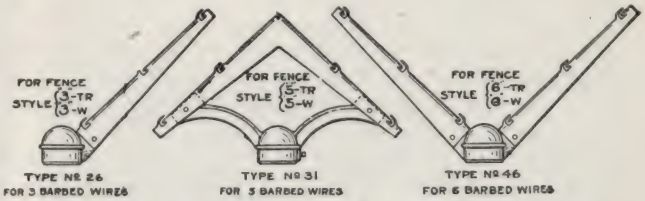


PAGE RELIABLE WIRE-LINK LAWN FENCE

Because of fine appearance, strength and unusual durability, together with appreciable saving in cost, Page Wire-Link fence is fast replacing the old wire fence for enclosures where the utmost in appearance and protection are desired. Made in heights of 36 to 60 in., of fabric 2-in. mesh, No. 9 galvanized wire, steel or Armco Ingot iron

HALF SIZE ILLUSTRATION OF PAGE PROTECTION FABRIC NO. 6 WIRE 2-IN. MESH

This fabric is made in any mesh from ½ in. to 4 in., and in any size of wire from No. 4 to No. 16 inclusive, in either steel or Armco Ingot iron. Perhaps the most satisfactory weave for nearly all ordinary fence purposes is a 2-in. mesh made from either No. 9 or No. 6 wire



STYLES OF CORNER ARMS FOR CARRYING BARBED WIRE

The three styles may be used in connection with any type of Page Reliable fence or Page Protection fence illustrated in these pages. In asking for estimates please specify gage of wire, mesh, height of fence, length, style of arm, and preferably send rough plan of property

PAGE STYLE 3-TR PROTECTION FENCE ENCLOSING SWIMMING POOL

This is the swimming pool at Klamm Park, Kansas City, Kans. The pool is an oval, and Page fence perfectly conforms to the curves. Fence is 7 ft. high of 2-in. mesh, No. 9 gage Wire-Link, with all posts and fittings galvanized. Posts are 2⅜-in. diameter, spaced 10 ft. apart and set 3 ft. below grade into concrete footings. Style 25 Armco arm is used, carrying 3 barbed wires. Top rail is 1⅝-in. diameter, joined with expansion sleeves, permitting contraction and expansion

Continued on next page

PAGE PROTECTION TENNIS COURT ENCLOSURE

A portion of one of the Page Protection tennis court enclosures erected in Hamilton Park, Chicago, Ill., by the Park Commissioners. This is one of the largest groups of park tennis courts in the country. Fabric is Page Wire-Link, 1½-in. mesh, No. 12 wire, and may be had in either steel or Armco Ingot iron. It withstands the severest impact of balls driven against it, and is the most satisfactory enclosure where permanence and durability are demanded. Standard height 10 ft. Other heights may be furnished

Page Gates, Posts and Fittings

Posts—Page standard metal posts are of tubular construction, giving high resilience and preventing deformation. Page tubular posts are set in solid concrete, and hold firmly whatever the soil.

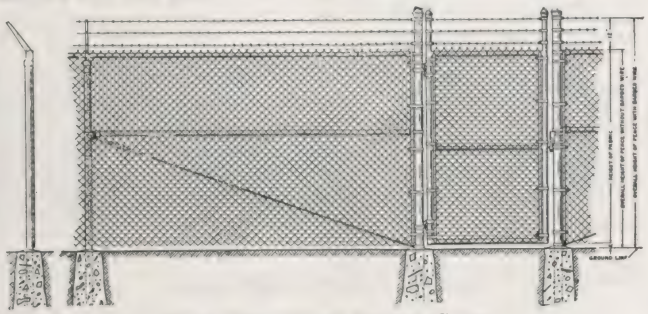
Concrete posts may also be supplied with Page fences. These posts are properly reinforced and thoroughly seasoned. They are equipped with Armco Ingot iron staples for supporting the fabric, and thus insure against corrosion of the supporting metal. Concrete posts can be furnished in any sizes, for any type of Page Protection fences.

Gates—Page Allweld gates are made either swinging or sliding. They have tubular steel posts of considerably larger diameter than the ordinary gate, and with heavy bracing. The frames are welded so that they will always maintain proper alignment. Page gates for industrial fencing use special offset hinges, which allow the gates to open flat against the fence where desired.

Page Fittings—All cast fittings are made of malleable iron galvanized or painted. Where barbed wire is used, the pressed metal part is of Armco Ingot iron, hot galvanized after fabricating. This is an exclusive feature of Page fencing. Three types of arms are made: for 3, 5 and 6 barbed wires. The design of these arms allows the use either of a top rail or tension wire.

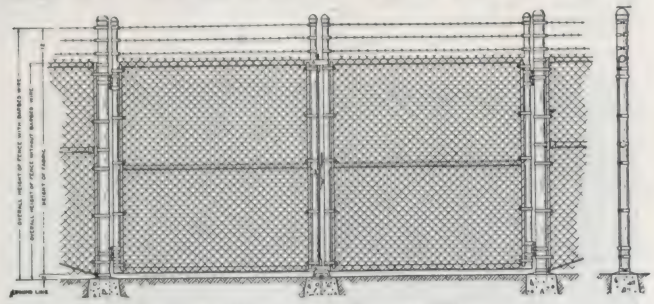
PAGE PROTECTION FENCE ENCLOSING AN ESTATE

Page fence perfectly conforms to curves. Note the lateral and diagonal bracing of the corner post and the large size post—a feature of Page fence construction. Fence is 7 ft. high over all, made of 2-in. mesh, No. 9 gage wire link, with all posts and fittings galvanized. Style 26 arm is used carrying 3 barbed wires. Top rail is 1⅝-in. diameter, joined with expansion sleeves, permitting expansion and contraction



PAGE WIRE-LINK SINGLE GATE

Construction for single gate having opening of 4, 6, 7, 9 and 12 ft. Single gates with 9- and 12-ft. openings are furnished with one additional upright brace. Gates may be had without barbed wire



PAGE WIRE-LINK DOUBLE GATE

Construction for double gate having opening 8, 12, 14, 18 and 24 ft. Double gates with 18- and 24-ft. openings are furnished with one additional upright brace in each wing. Gates may be had without barbed wire

Page Wire-Link Panel Partitions

Page panel partitions provide an attractive and efficient means for closing off departments, tool rooms, stock rooms, etc. These partitions do not obstruct the light, they permit easy access to departments and do not interfere with the view of whole floors or departments.

PAGE WIRE-LINK PANEL PARTITIONS, MADE IN STANDARDIZED SECTIONS

A section of partition used in plant of Ilg Electric Ventilating Co., Chicago, Ill.

Partition made of standard panels 4x8 ft. Frames are 1x½x3⅛-in. steel channels, mortised and tenoned, cross braced with ⅜-in. round bars, laced through wire fabric filler. Fabric is Page Protection No. 10 gage, hot spelter galvanized wire, 1½-in. mesh. Doors are either swinging or sliding, and are interchangeable with regular panels. Wickets are standard or applied to suit conditions. Interchangeability of parts allows for quick, easy installation and removal where necessary to accommodate growth of departments, etc.

Continued on next page

Page Protection Fence for Industrial Buildings

Page factory fences are made either of steel wire or Armco Ingot iron wire, and are supplied in styles and sizes to cover every protection purpose. Size of wire varies from No. 4 to No. 10, in various meshes, and in any height up to 12 ft. Posts are of tubular steel or of concrete, gates are either sliding or swinging, single or double, in widths from 4 to 24 ft. Barbed wire arms are of Armco Ingot iron, having either 3, 5 or 6 barbed wires. The design of these arms allows the use of a top rail or tension wire.

PAGE PROTECTION FENCE GUARDING MUNICIPAL PROPERTY

6-ft. wire link fence, 2-in. mesh, No. 9 wire, at Turner & Davison Storage Yard, Department of Sewers, City of Detroit, Mich.

PAGE WIRE-LINK PROTECTION FENCE WITH REINFORCED CONCRETE POSTS

Part of installation at Edison Electric Appliance Co. plant, Chicago, Ill. Height of fence, 9 ft. Fabric, 2-in. mesh, No. 6 wire. Posts fitted with Armco staples to provide rust resistant connection for fabric. This makes an attractive job for industrial and other purposes

PAGE WIRE-LINK FENCE FOR FACTORY PROTECTION

2-in. mesh, No. 6 wire fence, 8 ft. high over all set on brick wall coping. Arm that carries the 3 strands of barbed wire is of Armco Ingot iron. Notice how this fence allows use of factory yard for storage purposes, thus greatly increasing effective area of the plant. The fence is unclimbable, assuring positive protection against intrusion, and at the same time the open mesh offers no obstruction to light and air entering factory grounds

PAGE WIRE-LINK INDUSTRIAL FENCE EQUIPPED WITH FIVE BARBED WIRE STRANDS

Part of about five miles of fencing guarding one of plants of Ford Motor Co.

This type of fence, with posts set in concrete, and top rail to give added strength, will last indefinitely

10,000-FT. FACTORY FENCE INSTALLATION FOR LA CLEDE-CHRISTY CLAY PRODUCTS CO. OF ST. LOUIS

Fence is Page standard 3-TR, 7 ft. high over all, 2-in. mesh, No. 9 gage. Standard 18-ft. railway gate has disappearing center gate stop, a feature of all Page railroad gates. This installation is particularly interesting because of the roughness of the terrain, and shows how the fence may be adapted to unusual conditions

W. A. SNOW IRON WORKS, INC.

32 Portland Street
BOSTON, MASS.
FACTORIES: CHELSEA, MASS.

Products

Ornamental Iron and Bronze Works:
Wrought Iron and Woven Wire Fencing.
Artistic Entrance and Cemetery Gates.
Stairs.
Railings.
Marquises.
Gates.
Fences.

Also Balconies, Grilles, Tennis Court Enclosures and Rose Arbors, Folding Gates and Wire Guards, Sanitary Horse and Cow Barn Fittings, Antique Garden Furniture.

Plate 2041. Wrought Iron Railing with Stairs, Public Library, Attleboro, Mass.
W. H. & Henry McLean, Architects

Plate 2040. Marquise, Residence of William H. Moore, Prides Crossing, Mass.
Little & Browne, Architects

Plate 2018. Entrance Gates, Estate of Francis Skinner, Dedham, Mass.
Guy Lowell, Architect
Width between piers, 16 ft.; height at center, 16 ft.

Plate 2012. Iron Railing, Estate of Larz Anderson, Brookline, Mass.
Height, 8 ft. 6 in. Panel posts, 20 in. wide, placed 14-ft. apart

Plate 2009. Wrought Iron Fence, Cathedral of Holy Cross, Boston, Mass.

Continued on next page

Estimates

The W. A. Snow Iron Works, Inc., is always pleased to furnish estimates for work erected complete, all of which is done by experienced men.

Special sketches and drawings are made to meet special requirements and drawings of appropriate design are submitted at short notice.

If desired, this company can furnish, survey and do the entire work complete.

Catalogues

Catalogues of any of the work done by W. A. Snow Iron Works, Inc., sent on application.

Installations

Ornamental Iron Work

State House, Commonwealth of Massachusetts, Boston, Mass.
Henry Clay Frick House, Prides Crossing, Mass.
Widener Memorial Library, Harvard College, Cambridge, Mass.
Harvard Music Building, Harvard College, Cambridge, Mass.
Massachusetts State Normal School, Framingham, Mass.
Phillips Exeter Academy, Exeter, N. H.
Forsyth Dental Infirmary, Boston, Mass.
Bangor Real Estate Trust Co., Bangor, Me.
Lyman F. Gordon House, Worcester, Mass.
Larz Anderson House, Brookline, Mass.
Gillette Safety Razor Building, South Boston, Mass.
General Storage Warehouse, Charlestown Navy Yard, Charlestown, Mass.
John Hancock Life Insurance Co. Building, Back Bay, Boston, Mass.
Federal Reserve Bank, Boston, Mass.
First National Bank, Boston, Mass.
Philadelphia Electric Co., Philadelphia, Pa.

"Unclimbable Chain Link Fence"

U. S. Government Armor Plant, Charleston, W. Va.. 6,500 ft.
U. S. Government Storage Depot, Boston, Mass..... 2,000 ft.
City of Boston, Mass. .....20,000 ft.
City of Cambridge, Mass. ..... 7,000 ft.

Fences for Public Works

Metropolitan Park Commission of Massachusetts, 20,000 ft. of heavy iron railing
City of Boston Park and Recreation, 15,000 ft. of heavy iron railing
City of Auburn, Me., Water Works, 750 ft. of iron fence
City of Revere, Mass., Water Works, 900 ft. of iron fence
Watertown Arsenal, U. S. Government, Watertown, Mass.
Town of Westfield, Mass., 1,000 ft. iron bridge railing

Fences for Cemeteries

Forest Hills Cemetery, Jamaica Plain, Mass., 8,000 ft. heavy iron railing
Harmony Grove Cemetery, Salem, Mass., 7,000 ft. fence and entrance gates
Forest Glade Cemetery, Somersworth, N. H., 4,500 ft. heavy iron fence
Wildwood Cemetery, Winchester, Mass., 1,000 ft. chain link fence
Mt. Auburn Cemetery, Cambridge, Mass., 1,400 ft. of ornamental wrought iron fencing

Fences for Factories

Edison Electric Illuminating Co., Massachusetts Avenue, Boston, Mass., 3,500 ft. wrought iron fence
United Drug Co., Boston, Mass., 1,200 ft. of iron fence and gates
Fairbanks Scale Co., St. Johnsbury, Vt., 4,000 ft. of chain link fence with barbed wire attachments
Holtzer-Cabot Electric Co., Boston, Mass., 3,000 ft. of iron fence
Bates Mfg. Co., Lewiston, Me., 1,200 ft. of chain link fence
Sharp Mills, New Bedford, Mass., 2,000 ft. of heavy iron fence
Winchester Repeating Arms Co., New Haven, Conn., 1,500 ft. ornamental iron fence
Bryant Electric Co., Bridgeport, Conn., 1,000 ft. ornamental fence
Plume & Atwood Mfg. Co., Waterbury, Conn., 500 ft. heavy chain link fence

Plate 2039. "Unclimbable Chain Link Fence"
Standard protective fence adopted by U. S. Government

Plate 2034. Entrance Gates, Edison Electric Illuminating Co.
Bigelow & Wadsworth, Architects
Width between piers, 18 ft.; height, 8 ft. 6 in.

Plate 2017. Railing, Forest Hills Cemetery, Jamaica Plain, Mass.
Height, 7 ft. from grade. Pickets, ¾ in. square made in 9-ft. sections. Panel posts, 12 in. wide and 40 ft. apart. Length of fence, 8000 ft.

THE STEWART IRON WORKS COMPANY, INC.

Manufacturers of Artistic Iron Fences and Gates

780 Stewart Block
CINCINNATI, OHIO

Products

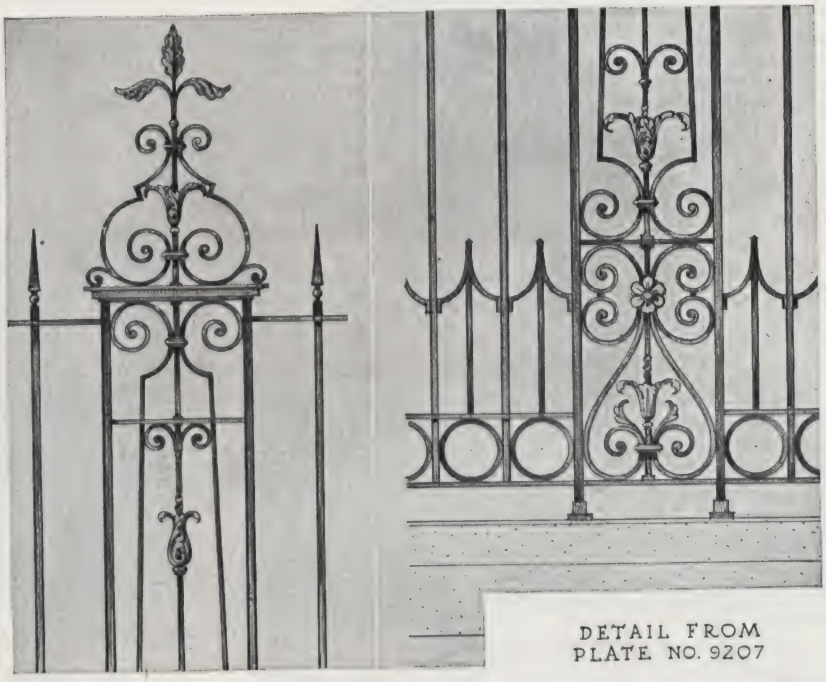
PLAIN and ORNAMENTAL IRON GATEWAYS and FENCES.

Also IRON RAILINGS, Iron Grilles, Bronze and Iron Lanterns and Lamp Standards, Lawn Furniture, General Ornamental Iron and Wire Work, Folding Gates and Window Guards in wire or iron.

Facilities

A factory containing 350,000 sq. ft. of floor space and covering an area of 8 acres; an equipment of the most modern machinery; an experience of more than 30 years; a complete organization of specialists in engineering and landscape architecture, and a large force of skilled mechanics and draughtsmen.

PLATE NO. 9207
ORNAMENTAL IRON FENCE



DETAIL FROM
PLATE NO. 9207

DETAIL FROM
PLATE NO. 8227

PLATE NO. 8227
ORNAMENTAL IRON ENTRANCE GATE

ORNAMENTAL WROUGHT IRON FENCE AND ENTRANCE GATES

Continued on next page

This equipment insures the highest standard of work and enables THE STEWART IRON WORKS COMPANY to give prompt service at proper prices.

Specialties

This company specializes in high grade ornamental iron fences and entrance gates, built either from designs of its own draughtsmen or from drawings and specifications submitted by customers or their architects.

Particular study has been given to correct designs, proportion and construction for enclosures and entrances of country houses and estates, as well as for the simpler or more pretentious town house.

Special attention has been paid to correct enclosures of yards in rear of city and suburban dwellings, and the often overlooked advantages of simple and artistic fences for these enclosures that provide security from intrusion, and eliminate the feeling of confinement produced by solid or wooden fences; that give the best results by greatest use of available daylight; that produce no dark, damp and germ growing corners for dangerous concealment of rubbish; that make community gardens in rear of city dwellings where cold, dark, fire inviting and dangerous wood box stalls too often exist.

Specializing in this field has particularly qualified this firm to produce a high standard of product, to suggest wisely as to the types best adapted to particular conditions, and to aid in the most satisfactory and economical solution of fencing problems.

All types of plain and ornamental fences and gates, light or heavy, for factories, etc.

Designs

The illustrations shown herewith are reductions from a few of the many designs shown in the company's catalogues, which are sent to architects and prospective purchasers for the selection of fence and gates suitable to each individual's particular purpose. If interested in the plain stock designs, get their catalogue No. 50-A; if special ornamental designs, get "Book of Designs B."

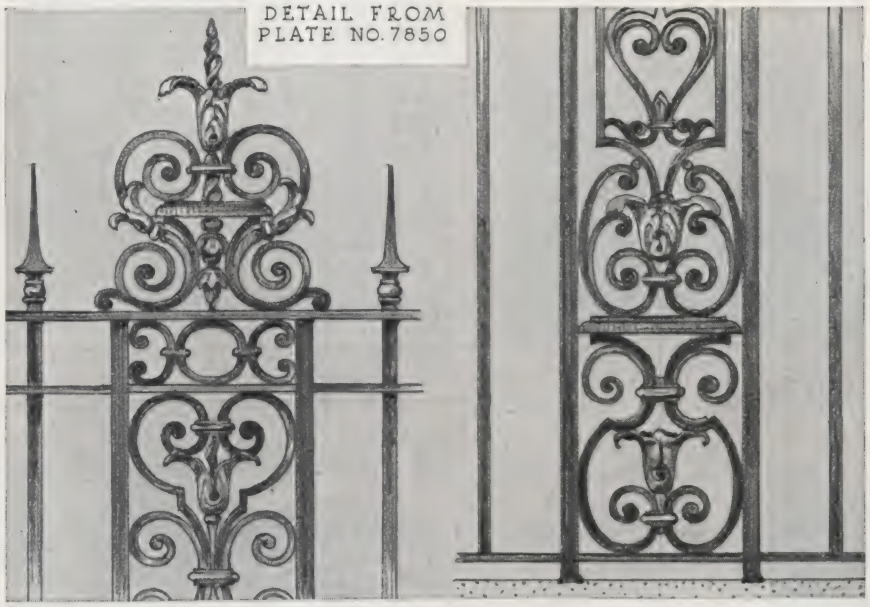
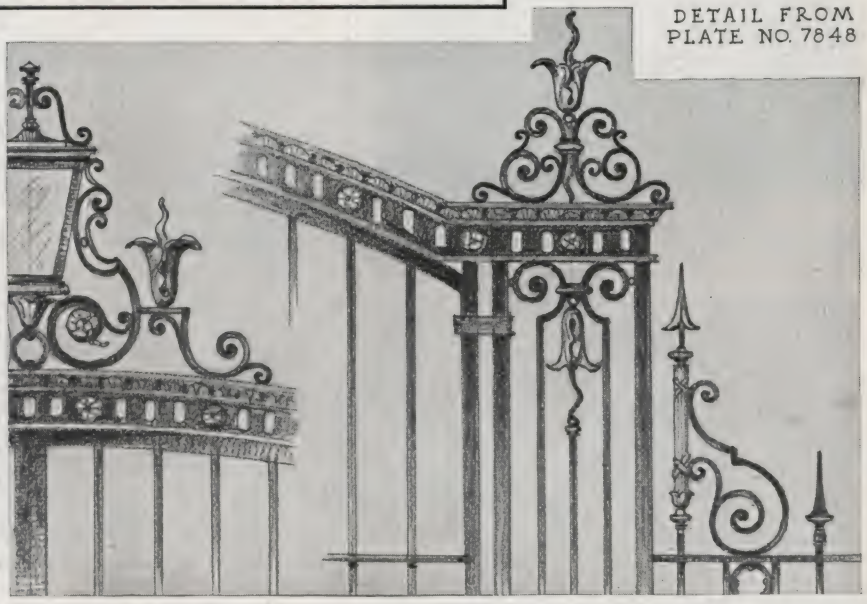


PLATE NO. 7850
ORNAMENTAL IRON FENCE

PLATE NO. 7848
ORNAMENTAL IRON GATE



ORNAMENTAL WROUGHT IRON FENCE AND GATES

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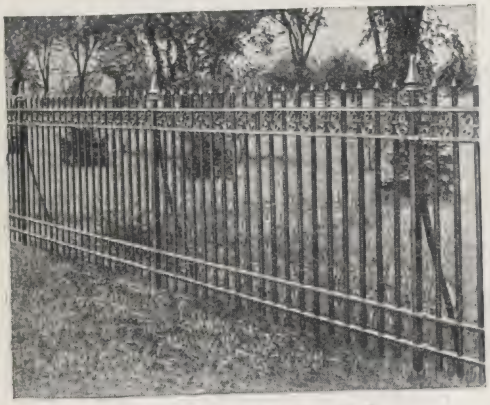
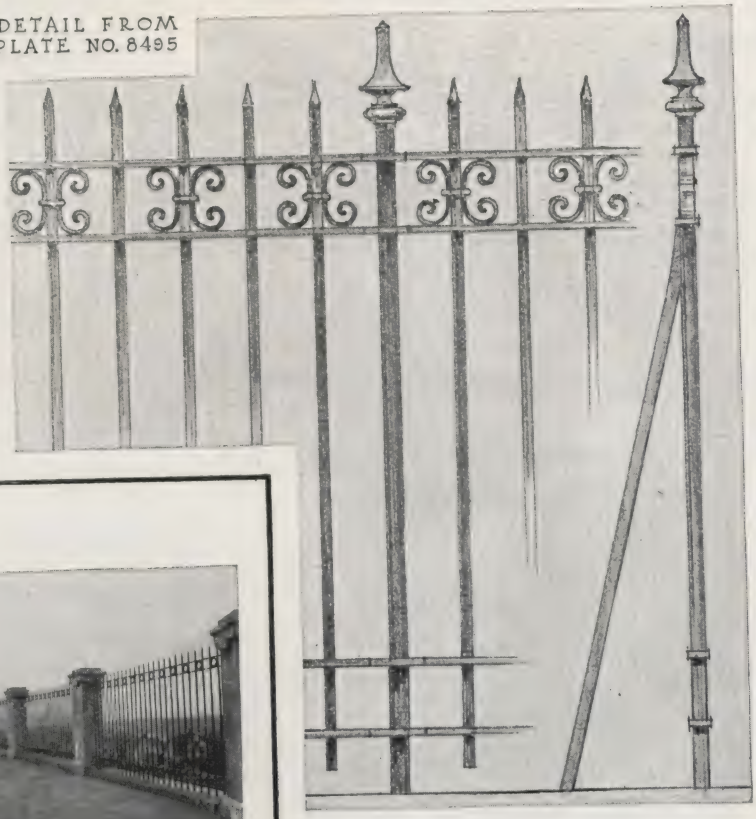


PLATE NO. 8495
ORNAMENTAL IRON FENCE

DETAIL FROM
PLATE NO. 8495



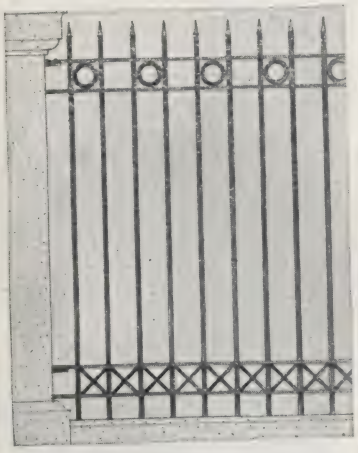
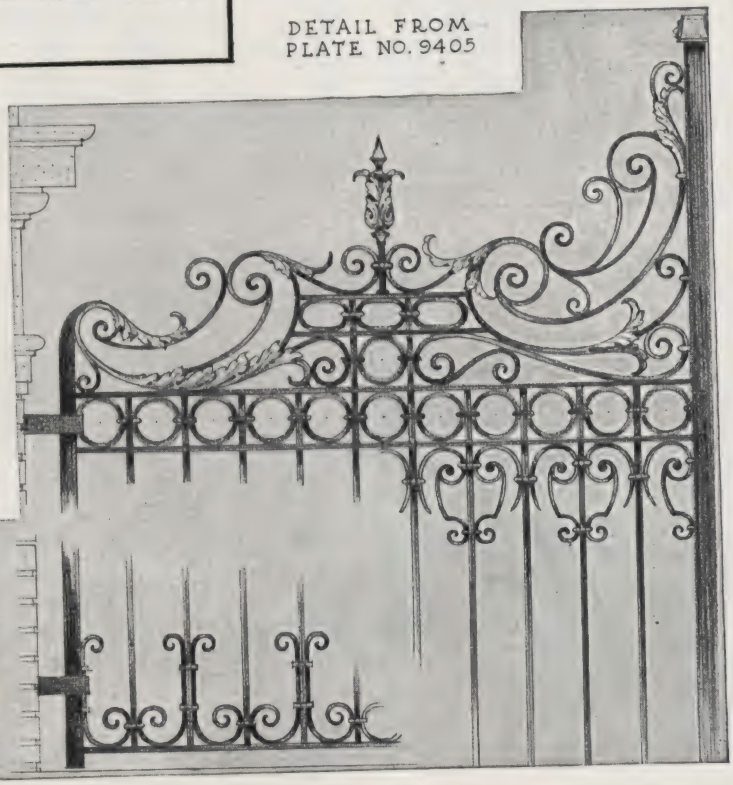


PLATE NO. 8985
ORNAMENTAL IRON FENCE

PLATE NO. 9405
ORNAMENTAL IRON ENTRANCE GATE

DETAIL FROM
PLATE NO. 9405



ORNAMENTAL WROUGHT IRON FENCE AND ENTRANCE GATES

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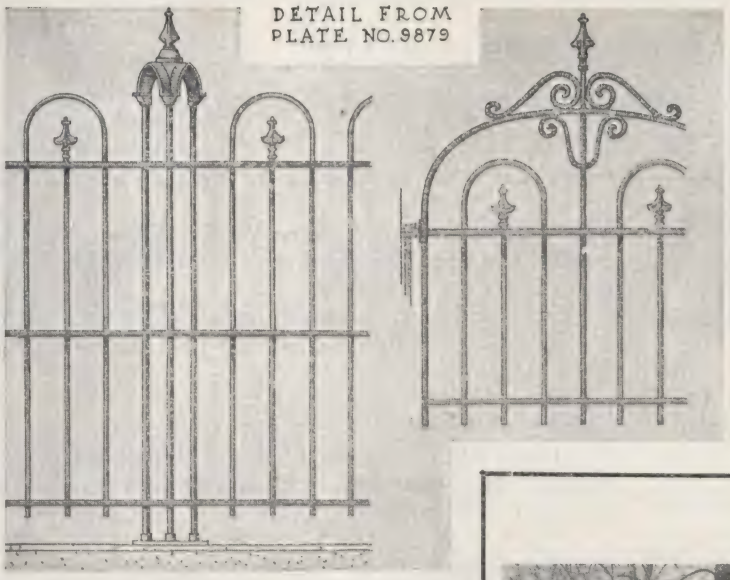
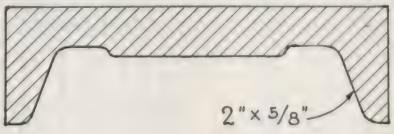


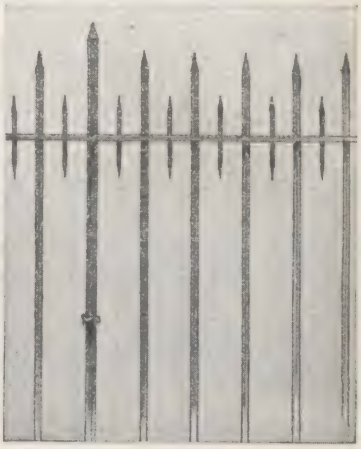
PLATE NO. 9879
ORNAMENTAL IRON FENCE



NOTE:-
This type of channel is preferable in all cases, but other types are used when specified Our standard patented channels are $1\frac{1}{4}$" x $\frac{1}{2}$", $1\frac{1}{2}$" x $\frac{1}{2}$" and 2" x $\frac{5}{8}$"

DETAIL OF PATENTED THREE-RIB CHANNEL

PLATE NO. 6603
ORNAMENTAL IRON FENCE



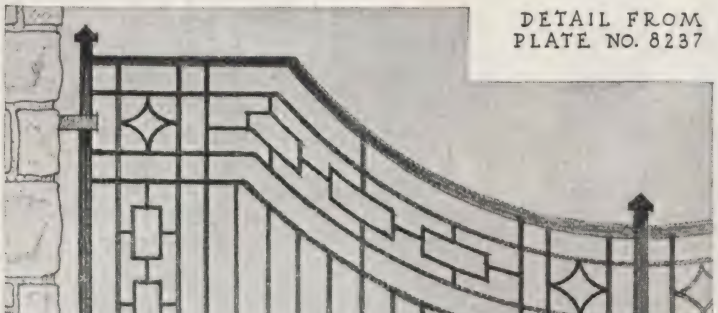
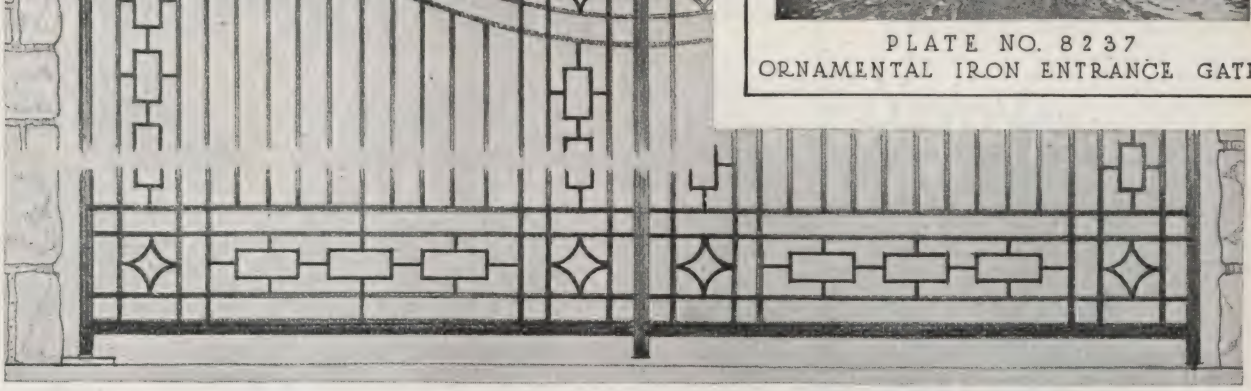


PLATE NO. 8237
ORNAMENTAL IRON ENTRANCE GATE



ORNAMENTAL WROUGHT IRON FENCE AND ENTRANCE GATES

WILLIAM R. PITT COMPOSITE IRON WORKS

548 West 27th Street

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Manufacturers of FOLDING GATES and GUARDS for every purpose:
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"Pitt" Composite Folding Gates
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WROUGHT IRON, BRASS OR BRONZE WORK:
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Folding Gates and Guards a Specialty

This company is the original manufacturer of the "Bostwick" gate, and the originators of most of the standard folding gates, developing their uses through specialization.

This department is therefore, by training, experience and facilities, prepared to meet the demands of architects, builders and the iron trade.

"Pitt" gates are internationally famous for their quality, and are found in every state and many foreign countries.

The initial cost is not high. They are strong, durable and easy working and take up very little space when not in use.

Quality of Work

Every "Pitt" product is of the highest grade workmanship and materials, economically produced under modern conditions.

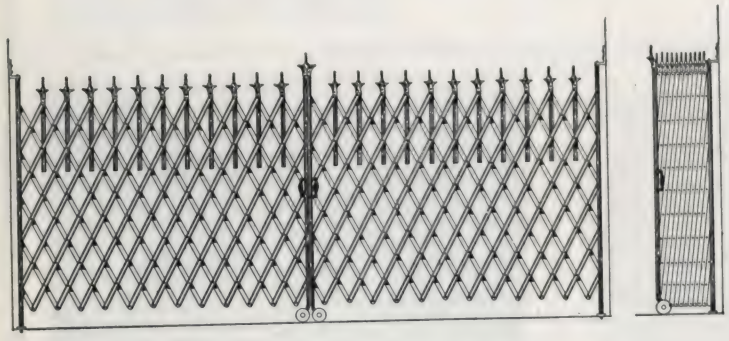
Specifications

Copy the number and description of gate desired from the illustrations on this and the page following, or submit requirements for our advice and special blue prints or designs.

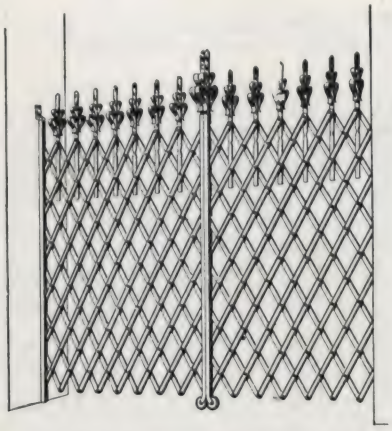
Estimates

Folding Gates—*Send plans and specifications, or a sketch showing width and height, and where gate is to set. State purpose for which gate is intended.*

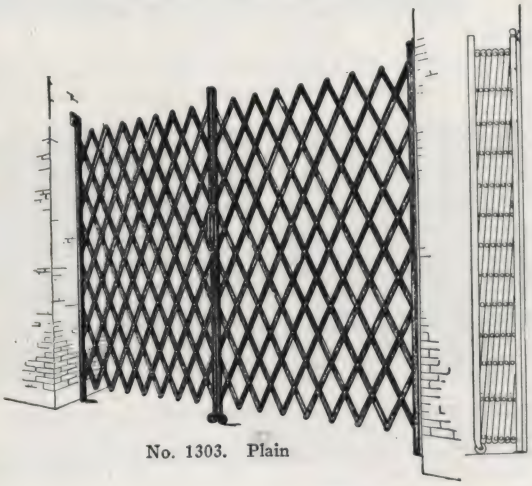
Ornamental Iron Work—Send plans and specifications, or sketch, stating requirements.



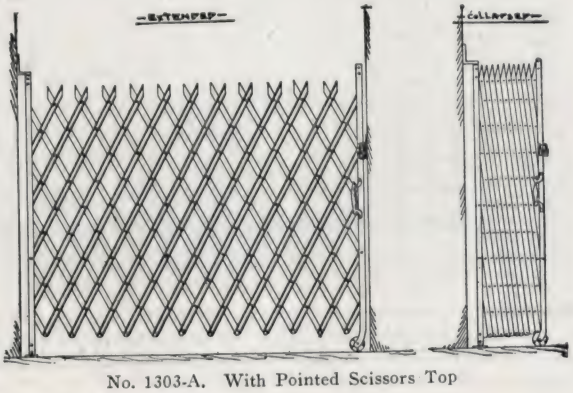
No. 1254-A. With Wrought Pickets



No. 1246. With Ornamental Pickets and Ball Rivets



No. 1303. Plain



No. 1303-A. With Pointed Scissors Top

"PITT" LAZY TONG FOLDING GATES FOR ENTRANCES, ETC.

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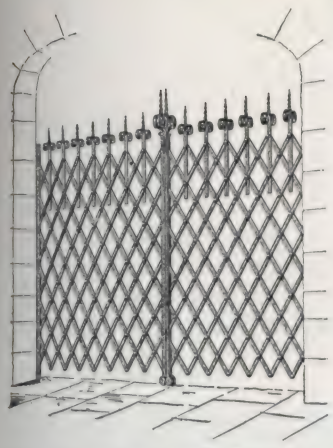
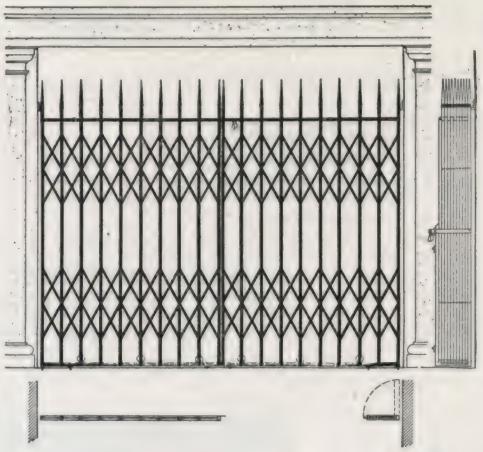
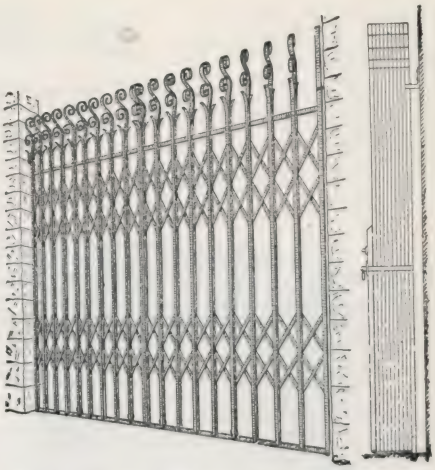


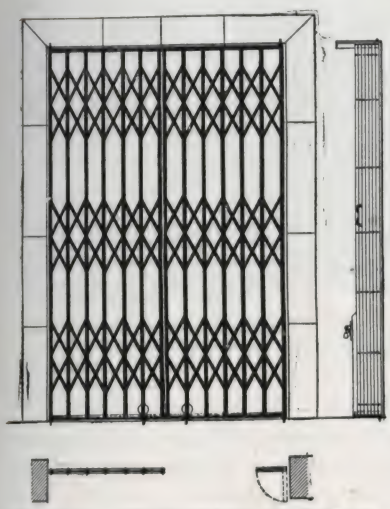
No. 1254. "Pitt" Gate. With Ornamental Wrought Pickets



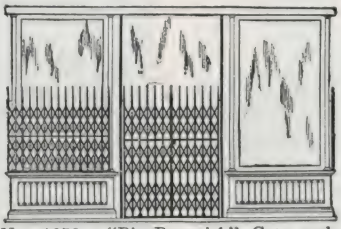
No. 1262-A. "Pitt-Bostwick" Gate with Cast Spear Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



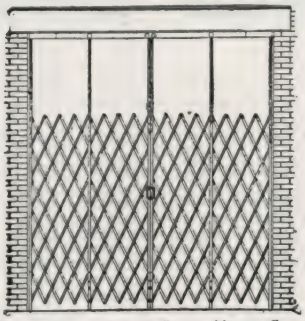
No. 1260. "Pitt-Bostwick" Gate with Ornamental Wrought Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



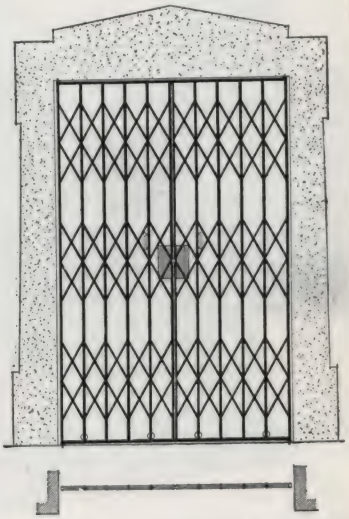
No. 1284. "Pitt-Bostwick" Vestibule or Window Gate with Stationary Top and Hinged Lifting Bottom Tracks



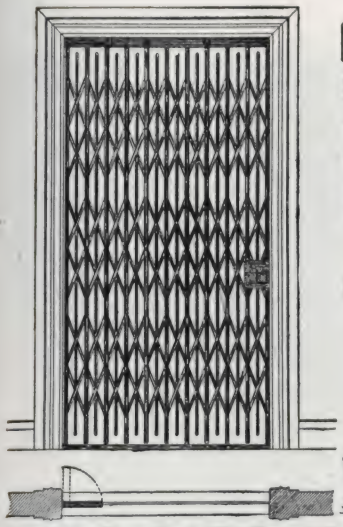
No. 1273. "Pitt-Bostwick" Gate and Window Guard for Store Front



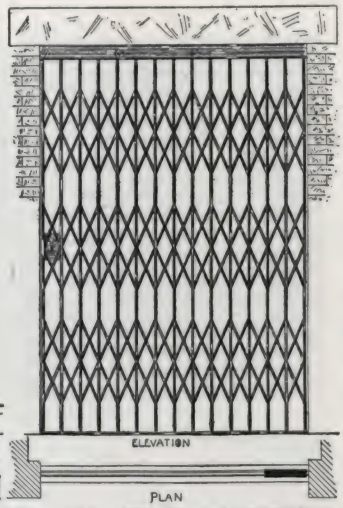
No. 1302. "Pitt" Lazy Tong Gate for Driveway Entrances



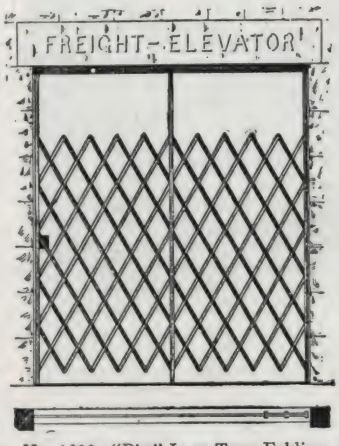
No. 1267-A. "Pitt-Bostwick" Guard for Window with Stationary Tracks Top and Bottom



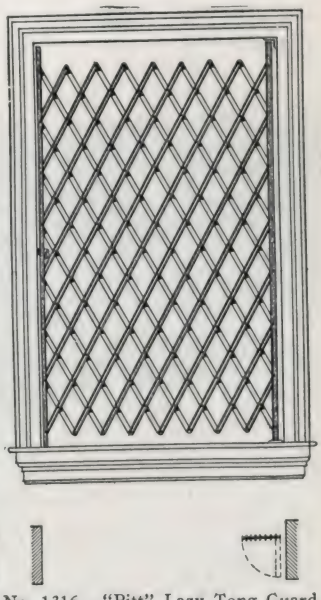
No. 1245. Close Mesh "Pitt-Bostwick" Elevator Gate for Shaft Openings



No. 1261. "Pitt-Bostwick" Folding Elevator Gate



No. 1300. "Pitt" Lazy Tong Folding Elevator Gate



No. 1316. "Pitt" Lazy Tong Guard for Windows. No Tracks

THESE ILLUSTRATIONS SHOW STANDARD TYPES OF FOLDING GATES
Special designs submitted on request

WAYNE IRON WORKS

819 Commercial Trust Building

PHILADELPHIA, PA.

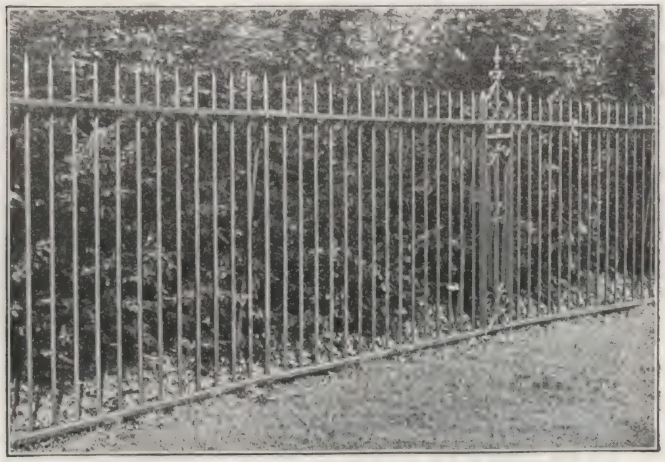
FACTORY: WAYNE, PA.

Products

WROUGHT IRON ENTRANCE GATES.
WROUGHT IRON PICKET FENCE and POSTS.
WAYNE SECTIONAL GRANDSTAND.

Also manufacturers of Tennis Court Enclosures, Poultry Yards, Dog Kennels, Base Ball Backstops, Railroad Intertrack Fence, Bridge Railings, Pipe Railings, and Machinery Guards.

ENTRANCE GATE TO ARDROSSAN
Estate of Robert L. Montgomery, Ithan, Pa.



WROUGHT IRON PICKET FENCE AND POSTS
Estate of Chas. E. Mather, Rose Lane, Haverford, Pa.

Wayne Sectional Grandstand

The Wayne sectional grandstand is adaptable to any conditions. It can be set up as long or as high as surrounding conditions warrant.

Very durable, being constructed entirely of steel, except the board seats. There is nothing to wear out.

Made in standard interchangeable sections which fit together like a sectional bookcase.

The sections fold flat for storage. No tools required to erect them. No bolts, screws, nails or pins used in erection. Dismantling causes no waste or lost material.

Approved by the Bureau of Building Inspection of Philadelphia.

The Wayne sectional grandstand is in constant use by many schools and cities.

WAYNE SECTIONAL GRANDSTAND SEATING 1000 PERSONS, CITY HALL, PHILADELPHIA, PA.

This grandstand was erected in one working day by a foreman and 8 unskilled laborers. The material shown in the cut at the left made the completely erected grandstand shown at the right

EARL W. PETERSON, PRESIDENT AND TREASURER

CENTRAL METALLIC DOOR CO.

Manufacturers of Hollow Metal Doors and Trim

TELEPHONE
CENTRAL 8668

30 West Austin Avenue
CHICAGO, ILL.

Products

STANDARD HOLLOW METAL DOORS, approved by the Underwriters' Laboratories, Inc.; INTERIOR METAL TRIM.

Also Metal Partitions.

Door Construction

Doors are made of No. 18 gauge material, fitted with accurately drawn metal moulding of same gauge, so interlocked with other members as to secure maximum rigidity and strength.

Mouldings are accurately mitered and fitted, and all joints welded by the acetylene process, insuring a perfectly finished product. Glass panels are fitted with removable metal glass stops. Proper reinforcements are applied for fastening, finishing and operating hardware.

Door Types

The CENTRAL METALLIC DOOR CO. has facilities for manufacturing all standard types of doors, and special doors, including entrances, vestibules, elevator enclosures, etc. Panel designs, glass or metal, furnished as desired.

Frames and Trim

Jamb casings of No. 18 gauge metal for mounting over wood bucks are furnished with doors where required.

The company is also prepared to manufacture steel subframes of No. 12 gauge material, and special one-piece frames for walls of any construction or thickness.

Finishing trim of up-to-date designs furnished as required for door opening, borrowed lights, and interior partitions.

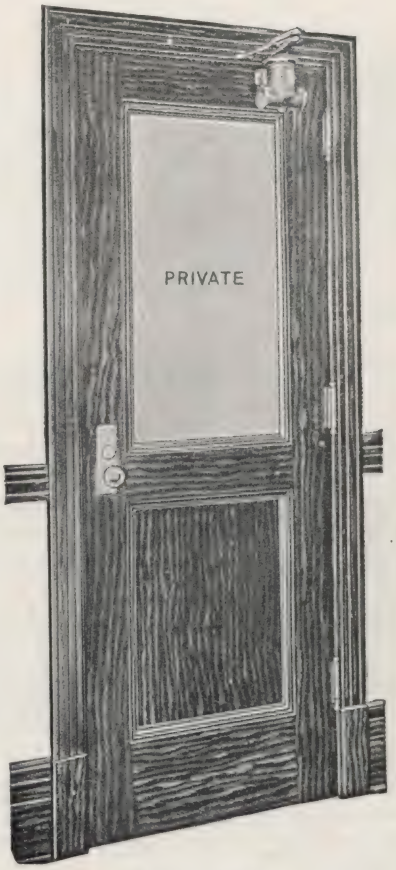
Finish

Finishes, imitating all woods and metal in natural colors, are applied.

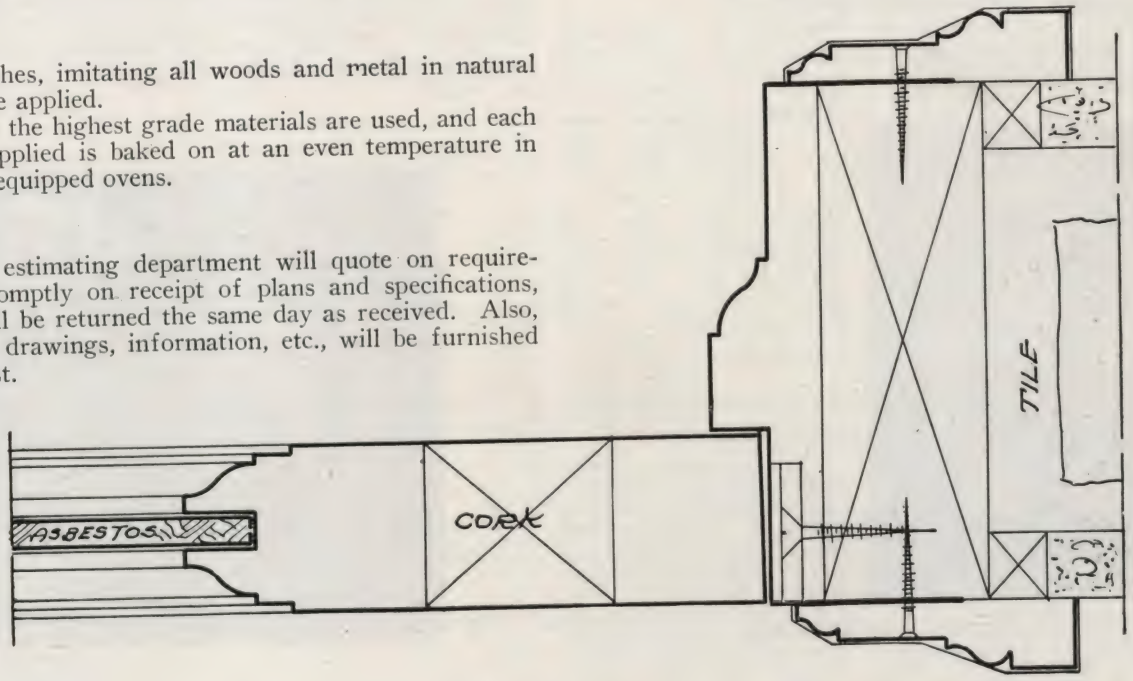
Only the highest grade materials are used, and each coat as applied is baked on at an even temperature in specially equipped ovens.

Service

The estimating department will quote on requirements promptly on receipt of plans and specifications, which will be returned the same day as received. Also, all detail drawings, information, etc., will be furnished on request.



METAL DOOR
Approved by Underwriters' Laboratories, Inc.



PLAN OF JAMB

ART METAL CONSTRUCTION COMPANY

Hollow Metal Doors and Trim

HOME OFFICE AND FACTORIES

JAMESTOWN, N. Y.

For Branch Offices, see page ....

Products

HOLLOW METAL DOORS AND TRIM.

For Bank Furniture and Fixtures, Cages, Counters, Screens, Desks, Doors, Filing Cabinets and Devices, Bookstacks, Library Fixtures, Grilles, Omnibuses, Partitions, Steel Safes (Underwriters' Laboratories' Class "A" or "B" Labels), Screens, Shelving, Stairways, Tables, Trim, Vault Fittings, etc., see pages 2032-2035.

TRADE-MARK

Eighteen years of hard usage in the daily crush of a big department store and never a cent for maintenance. That was the way Art Metal was built in the days when we were pioneering in the production of hollow metal. The same rugged strength and permanence, refined by years of experience and skill, mark the hollow metal we offer today.

Art Metal—the Originator of Hollow Metal

Two decades ago the ART METAL CONSTRUCTION COMPANY originated the system of hollow metal doors and trim which have become the standard of the building world. Today Art Metal hollow metal still leads in the development of steel for interior building purposes.

Construction—Art Metal Hollow Doors are made of the highest grade furniture steel specified as full pickled, full cold rolled, reannealed, patent leveled, resquared and oiled. Insulating material in stiles and rails insure elimination of noise in the operation of the doors. Stiles and rails are joined together by continuous acetylene-weld and heavy steel reinforcing plates are placed on the inside of doors where hardware is to be attached.

Hardware Samples

We have a complete assortment of hardware samples put out by the leading manufacturers and no delay in manufacturing material can arise from the non-arrival of templates.

Underwriters' Laboratories Labels

We can supply doors for any purpose which have passed the tests and carry the labels of the Underwriters' Laboratories, Inc.

ART METAL DOORS

One of a hundred pairs of Art Metal hollow metal doors that have served McCreery & Co., 18 years and still are in perfect condition

Art Metal Doors Score 100% on 18-year Test

A complete installation of 100 steel and glass elevator doors was made by Art Metal 18 years ago in the store of McCreery & Co., of Pittsburgh. Recently we received a letter from the McCreery Co., from which we quote:

"It is just eighteen years since you installed 100 pairs of steel doors, finished mahogany. In looking over our records we find that they have given us the best of service and have not cost a cent for maintenance, in all this time. They are still in use and from their present condition—will be for a good many years to come."

Large Insurance Company Art-Metallizes New Building

The ART METAL CONSTRUCTION COMPANY is equipped to handle the largest installations of hollow metal. We have recently completed the installation in the magnificent new building of the John Hancock Mutual Life Insurance Co. in Boston.

This installation includes 500 door openings, many of which were double doors; 18,000 ft. of picture mouldings; 500 ft. window trim; and 4800 lineal ft. of partition work, including low and high partitions and high sash. Erected by Art Metal experts the work stands as a fine example not only of the use of steel for the interior trim of a permanent office building, but of the co-operation we can offer to the architects who request it.

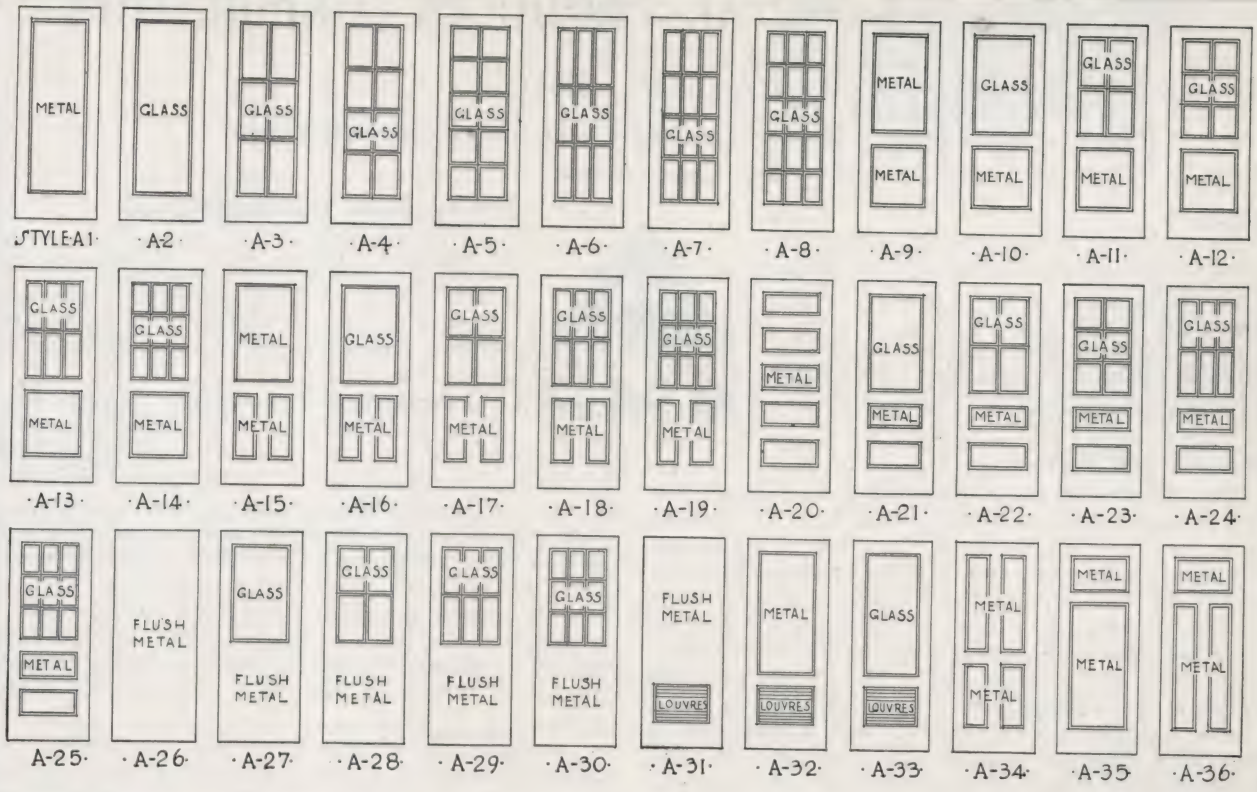
Service to Architects

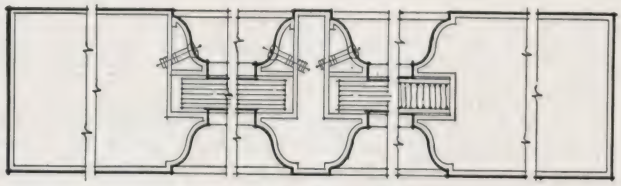
We are prepared to offer expert engineering and drafting service on any building that you may be working on. All that is necessary is to send us plans and a general idea of the treatment of details that you desire. All details of manufacture and erection will then be handled by Art Metal experts requiring a minimum of supervision on your part.

ART METAL PARTITIONS

A glimpse in the Art Metal equipped new building of the John Hancock Mutual Life Insurance Co.

Continued on next page





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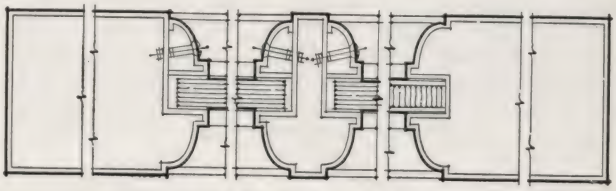

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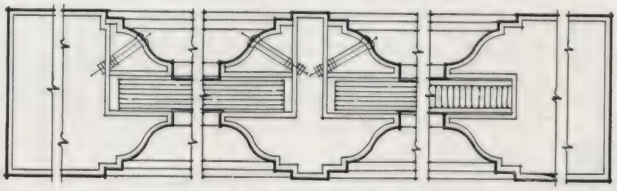

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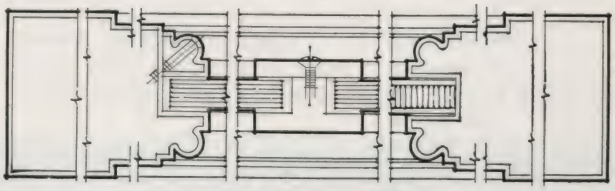

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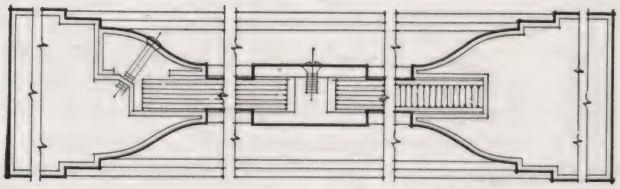

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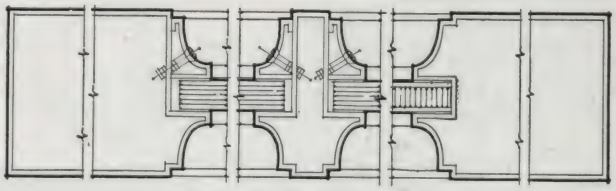

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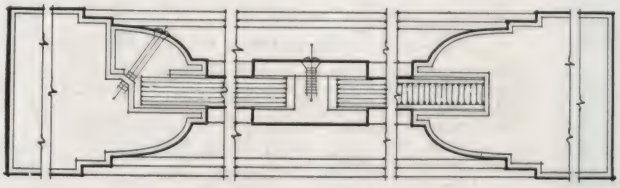
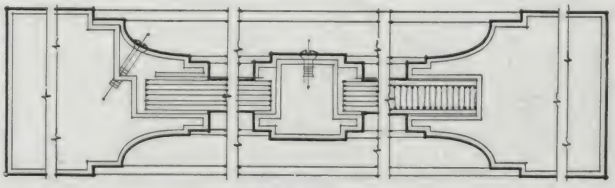


TYPE 53



TYPE 57

Art Metal

STANDARD DETAILS
ART METAL CONSTRUCTION CO

DRAWING NO. 1
SCALE 0 1/4 1/2
DATE JULY 22

THE CENTRAL METAL PRODUCTS CORPORATION

EXECUTIVE OFFICE
CANTON, OHIO

DISTRICT OFFICES OR SALES REPRESENTATIVES IN ALL IMPORTANT CITIES

Products

HOLLOW METAL DOORS; ELEVATOR ENCLOSURES and DOORS; INTERIOR METAL TRIM; COMBINATION BASE with ELECTRIC WIRE CONDUIT.

Also manufacturers of Booths, Interchangeable Office Partitions, Stair Enclosures, and Rolled, Cold Drawn and Pressed Shapes.

TRADE MARK CMP

Experience and Service

The experience of this company is co-extensive with the development of fireproof building construction, and its services have been and are now used by the principal architects and contractors in connection with many of the most important buildings in the country. Expert designers, detail men, estimators and erectors are available for co-operation with architects and contractors from plans to finished work. Much progress has been made in simplifying designs and standardizing products, methods of construction and installation of hollow metal doors and architectural metal trim. Recommendations on the best practice and fully detailed specifications for standard or special construction and erection are supplied to architects and contractors before fabrication without charge. With modern equipment, efficient operation and favorable arrangement for the supply of raw materials, this corporation is able to serve its customers satisfactorily after contracts are awarded.

Application

C.M.P. products are used in office buildings, lofts, museums, theaters, hospitals, banks, hotels, apartment houses, courthouses, post offices, residences, clubs, schools, stations, ships and railroad passenger cars. Special products have a broad miscellaneous application.

ELEVATOR ENCLOSURES AND DOORS, JOHN TAYLOR STORE, KANSAS CITY, MO.
HOLABIRD & ROCHE, Architects
SELDEN BRECK CONSTRUCTION CO., Contractors

Hollow Metal Doors and Trim

Advantages—The first objective of hollow metal doors and metal trim is fireproofing, after which come adaptability, permanency, beauty, flexibility of treatment, minimum maintenance and insurance expense, sanitation and lowest final cost.

Construction — C.M.P. hollow metal doors and trim are fabricated from a special grade of smooth sheet steel obtained from mills that have had a long experience in rolling sheets for this class of work. The forming and assembling operations are carried on with great accuracy, and reinforcements are made for the application of hardware. All hardware is fitted at the factory without extra charge. Cork inserts in the door stiles and sheet asbestos in the panels prevent vibration, deaden sounds and eliminate metallic qualities. Careful welding makes the finished door practically one piece of accurately formed steel.

Design—While standardization is desirable for reasons of economy, C.M.P. hollow steel doors and trim offer the utmost flexibility in design. By proper dimensioning and the application of an extensive variety of mouldings and inlay effects, with or without glass, C.M.P. doors readily yield any architectural results that may be desired.

Finish—We recommend a finish consisting of a thorough cleaning, priming with rust resisting enamel baked on, 6 subsequent coats each baked separately, color coat, graining to match architect's samples or specifications, and finally 2 coats of varnish, each to be thoroughly rubbed after baking. We guarantee perfect reproductions of selected woods, and while we have standard color schemes, we will match plain color samples furnished by the architect or decorator. To secure the best results all work should be finished at the factory.

Suggestions for Specifications—We will furnish suggestions for complete specifications and will co-operate with architects in every possible way.

Information Required for Preparing Estimates—*Style*—If door is one of our standard types, give number shown in this catalogue. Make sketch of special types.

Types of Sections—If one of our standard types, give number shown in this catalogue. Make sketch of special types and show section and elevation of special features.

Wall—Give thickness of finished wall and state whether brick, terra cotta, block, or wire lath. State thickness of plaster.

Buck—State kind of buck required and dimension of same and state who is to furnish. We furnish when required, hot rolled channel bucks, pressed steel channel bucks, combination buck and jamb.

Jambs—Give dimensions, kind desired, whether standard or paneled, combination buck, jamb and trim, combination buck and jamb or sanitary jamb.

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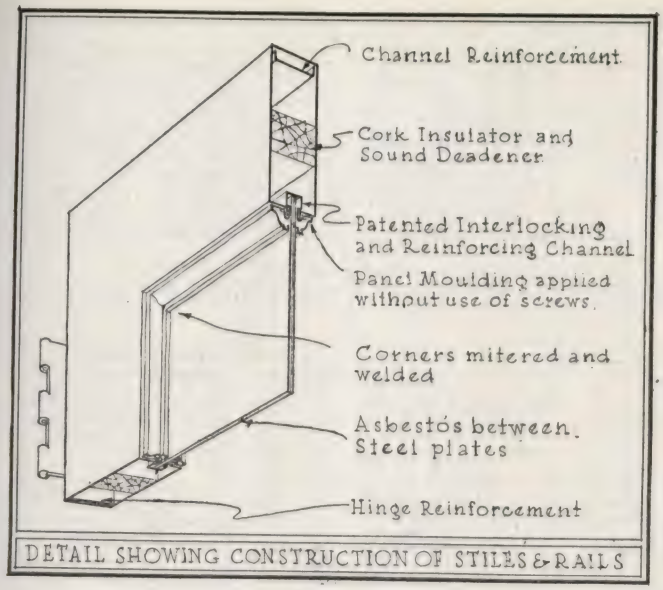


DETAIL SHOWING CONSTRUCTION OF STILES & RAILS

Trim—Give number of moulding selected, or if special show sketch of profile. State whether opening requires casing or scribe moulding, one or two sides.

Window Trim—For exterior windows state what trim is composed of; whether stool and apron, stop bead for sash, subjamb, trim and mullion face, or transom bar face is desired.

Interior Partition Sash—Are bucks to be furnished with jambs and sash, or stop bead against glass without sash, trim all around or stool and apron on bottom, jamb and scribe two sides, sanitary jamb and stops. Give complete description and sectional sketch if necessary with dimensions.

Chair Rail, Base, Picture and Wire Moulding—Give our moulding number or show profile desired, giving dimensions, method of fastening to walls, kind of ground and who is to furnish same. In addition to the number of lineal feet state how many miters will be required. Be sure to ascertain if mouldings will be required around free standing columns.

Finish—We must be informed as to finish desired. Full baked enamel finish should be used as very little saving is accomplished when semibaked finish is furnished and work finished on job is not as durable, nor does it appear so well as our full baked enamel. Our materials are finished by the most skilled artists in plain colors or grained.

We assure perfect reproductions of selected woods.

Underwriters' Requirements—Exterior fire escape doors, corridor and communicating doors, doors of vertical shafts, stairways, pipe shafts, and fire wall doors are made in full conformity with underwriter's requirements and full specifications on these products will be sent on request.

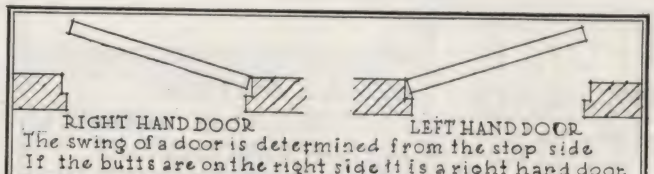


DIAGRAM SHOWING STANDARD SWING OF DOORS

Conduo Base

The only article of its kind, combining sanitary metal base conduits for light and low tension wires; immediate extension of additional outlets eliminating fishing for wires or having wires exposed.

Conduo Base will save its original cost by the elimination of additional conduits in the original installation together with the elimination of the cost of extension required by tenants where Conduo Base is not installed.

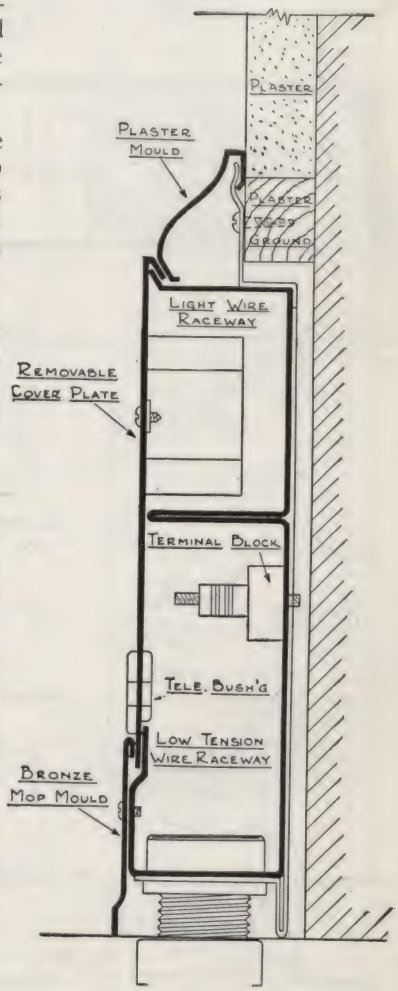
Conduo Base provides a safe fireproof and concealed raceway for all wire required in the modern office building.

Conduo Base enables the owner to make tenant changes immediately and with minimum amount of expense and in no way damages or mars the interior finish of his building.

Conduo Base reduces the cost of outlet boxes, conduits and wires, at the same time gives more flexible changes for every occupant of the building.

Conduo Base eliminates the unsightly exposed wires tacked along walls and over door openings to meet tenants' demands.

Conduo Base has the indorsement of the leading architects, electricians and the Underwriters' Laboratories, Inc.



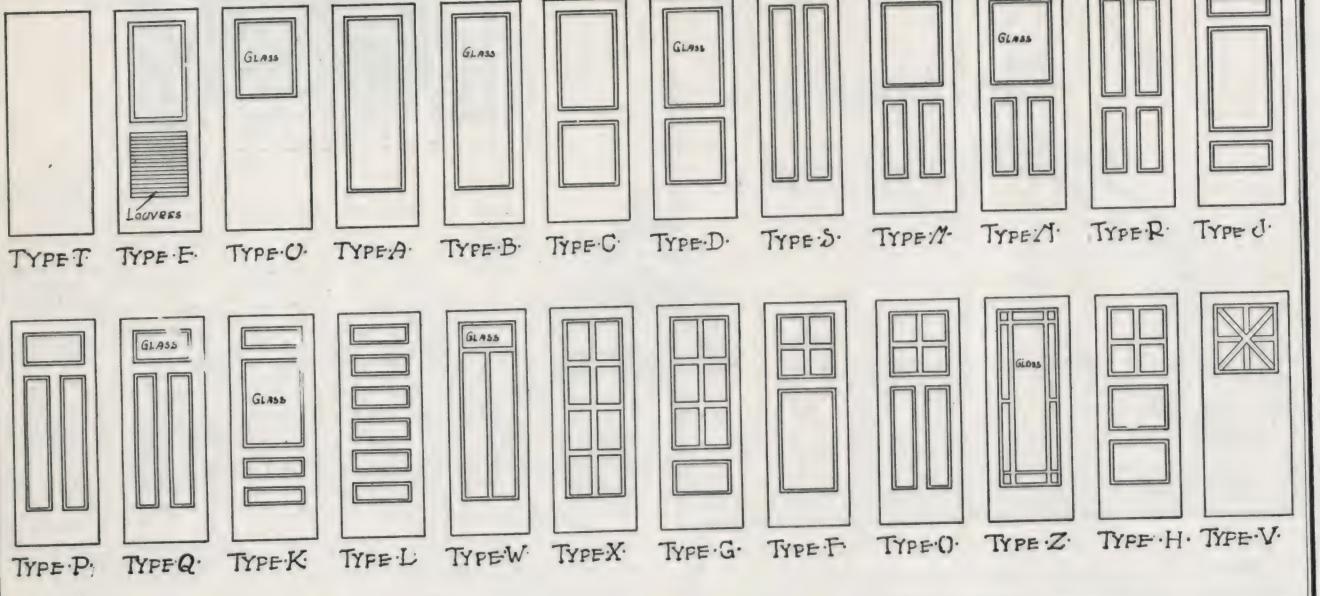
SHOWING A SECTION THROUGH CONDUO BASE
Conduo Base is uniformly 8 in. high

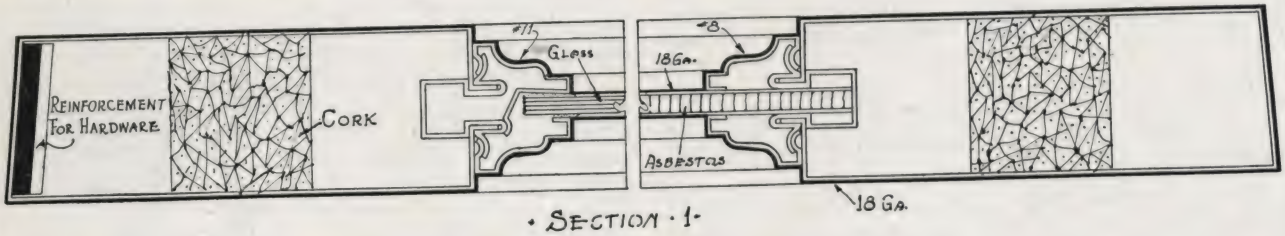
Write us for Conduo Base folder giving complete details of how to incorporate Conduo Base in your specifications. Also how to economize on your electrical wiring specifications.

Complete installation of Conduo Base in the Geo. D. Harter Bank and Office Building, Canton, Ohio.

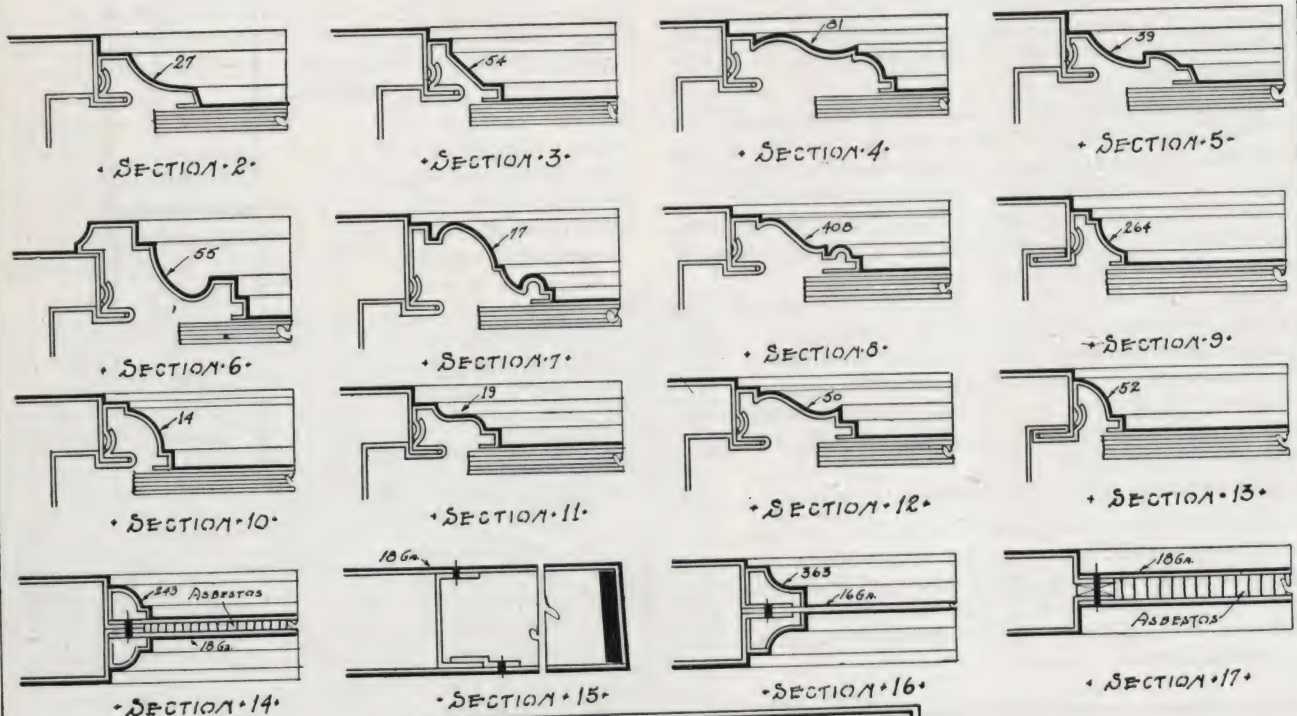
Specify Conduo Base. Write for folder, Form No. 5500.

Continued on next page





• SECTION • 1 •



• SECTION • 2 •
• SECTION • 3 •
• SECTION • 4 •
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• SECTION • 6 •
• SECTION • 7 •
• SECTION • 8 •
• SECTION • 9 •
• SECTION • 10 •
• SECTION • 11 •
• SECTION • 12 •
• SECTION • 13 •
• SECTION • 14 •
• SECTION • 15 •
• SECTION • 16 •
• SECTION • 17 •

THE CENTRAL METAL PRODUCTS CORPORATION

STANDARD + C.M.P. DOOR + TYPES + AND CONSTRUCTIONS

DETAILS 3" = 1 FOOT.
SHEET #1.
DATE — JUNE 1921.

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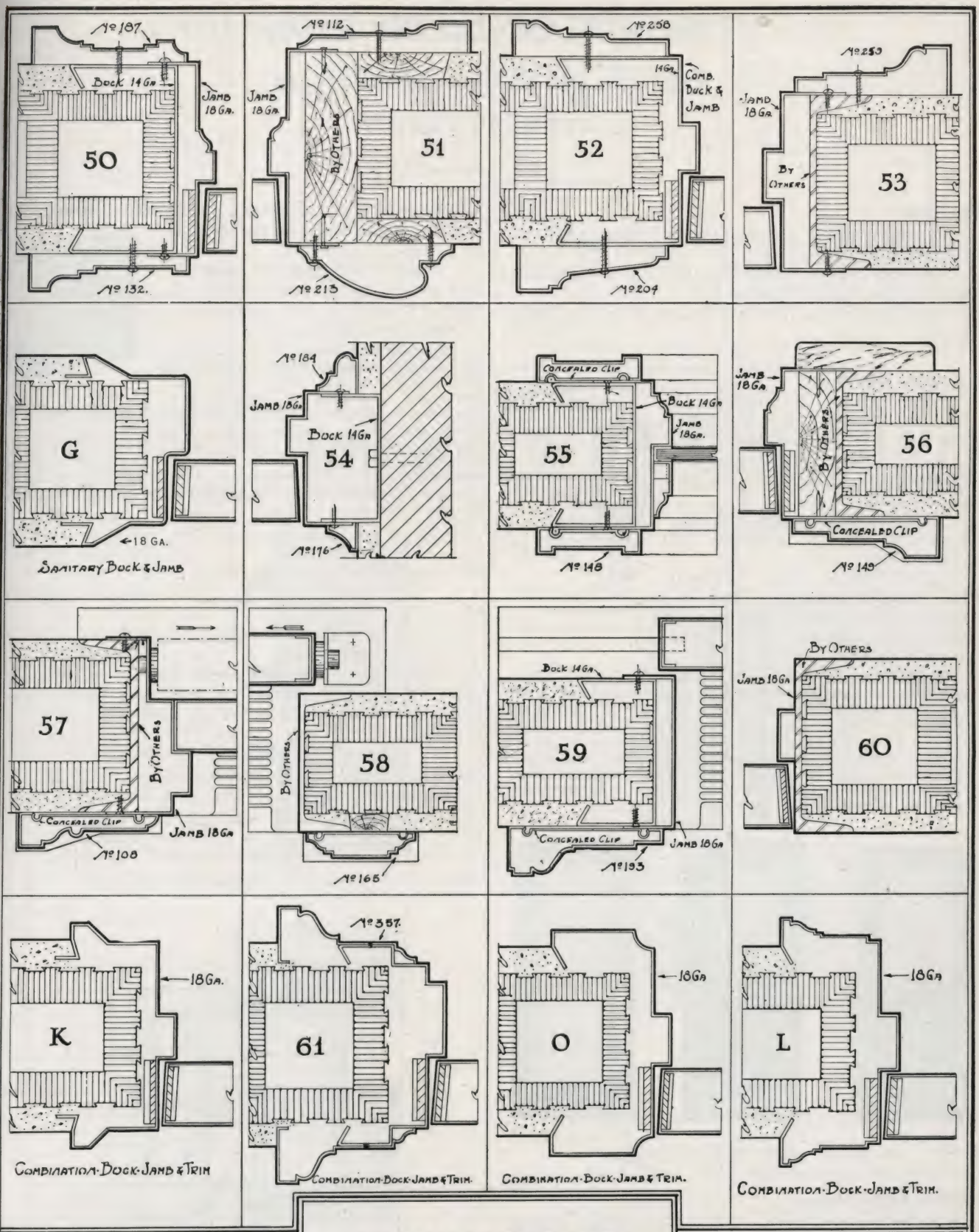
№187
Dock 14 Ga
Jamb 18 Ga.
50
№132.
№112
Jamb 18 Ga.
By Others
51
№213
№258
14 Ga.
Comb. Duck & Jamb
52
№209
№253
Jamb 18 Ga.
By Others
53
G
←18 GA.
Sanitary Dock & Jamb
№184
Jamb 18 Ga.
Dock 14 Ga.
54
№176
Concealed Clip
Dock 14 Ga.
Jamb 18 Ga.
55
№148
Jamb 18 Ga.
By Others
56
Concealed Clip
№149
57
By Others
Concealed Clip
Jamb 18 Ga.
№108
By Others
58
№165
Dock 14 Ga.
59
Concealed Clip
Jamb 18 Ga.
№193
By Others
Jamb 18 Ga.
60
K
←18 Ga.
Combination-Dock-Jamb & Trim
№357
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THE CENTRAL METAL PRODUCTS CORPORATION
STANDARD C.M.P. JAMB CONSTRUCTIONS
DETAILS 3"=1 FOOT.
SHEET 2
DATE—JUNE 1921.

THE CINCINNATI MFG. CO.

Kalamein and Hollow Metal Doors

CINCINNATI, OHIO

Products

HOLLOW METAL and KALAMEIN DOORS and TRIM, all types and designs.

HOLLOW METAL DOORS, bearing Underwriters' Laboratories, Inc., label of approval.

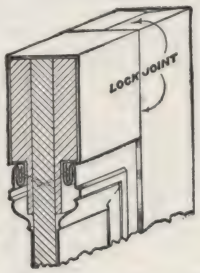
For Ornamental Iron and Bronze Work, see pages 958-600.

Kalamein Doors

These doors are constructed with a wood core over which sheet metal is applied. This kalamein will not warp or bulge, as expansion and contraction are allowed for in a special lock seam.

They can be furnished in a variety of stock designs. Catalogue sent on application.

In addition to doors, kalamein trim, mouldings, muntin bars, astragals, and stop strips are manufactured by this company in either stock or special designs.



DETAIL OF CONSTRUCTION FOR KALAMEIN DOOR

Specification Data—Core of thoroughly kiln dried lumber, tongue and groove joined, and clinch nailed. Stamp panels and rails in separate pieces, of metal specified. All joints are blind nailed and lock seamed securing covering to core in a manner which allows for expansion and contraction of metal. Doors exposed to weather covered with galvanized steel or sheet copper. Interior doors covered with Armco steel, bronze or copper. Steel doors finished with one coat gray priming paint, or baked enamel in imitation of wood, to be specified.

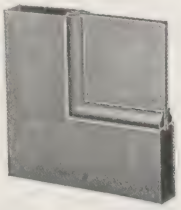
Style B Style E Style F

KALAMEIN DOORS, WITH GLASS PANELS

Hollow Metal Doors

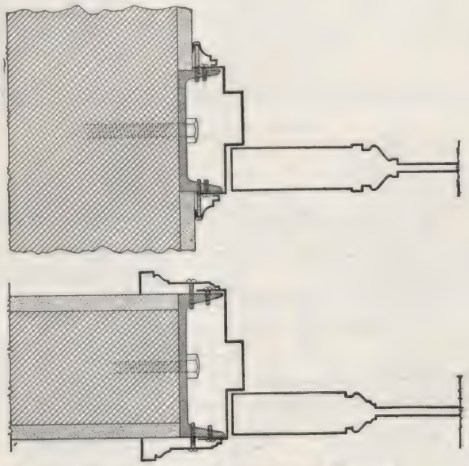
Made to architect's designs in special finishes permitting a wide range of individual expressions, or in stock patterns and standard finishes. Thoroughly insulated throughout to insure an efficient fire retardant and to prevent metallic sound. The construction obviates necessity of installing jamb during erection of walls, and permits hanging and adjusting of doors independently of frames. The Underwriters' Laboratories, Inc., have tested and approved these doors and their label is affixed to them, for all classes of openings.

Complete information should be given when asking for estimates, as they are based on the requirements of each particular installation.

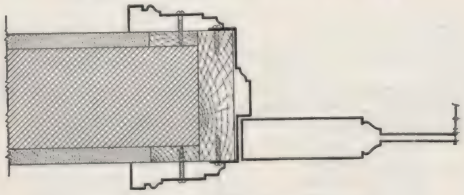


CORNER SECTION HOLLOW METAL DOOR

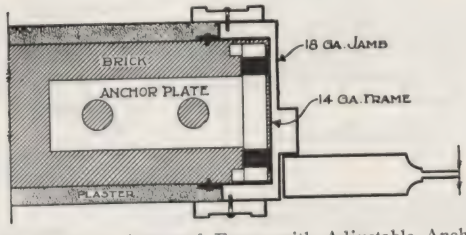
Specification Data—Doors of highest grade No. 18 gauge Armco open hearth steel specially treated. All surfaces true, level, and free from all imperfections. Parts interlocked and welded with invisible seams and joints. Insulate stiles, rails, and panels throughout with asbestos. Apply baked enamel finish in imitation of wood specified. Frames of No. 14 gauge steel, welded at joints to form one piece. Attach to walls by means of adjustable anchor plates. Jambs, furnished in separate pieces, fit over frames.



Applications to Channel Iron Frames



Application to Wooden Frames



Application to Cinmanco Approved Frame with Adjustable Anchor Plates

SECTION THROUGH DOOR JAMBS SHOWING APPROVED BUCK JAMB AND CASING CONSTRUCTIONS FOR HOLLOW METAL DOORS

Catalogue

Catalogue No. 53 sent on request.

DAHLSTROM METALLIC DOOR COMPANY

EXECUTIVE OFFICES AND FACTORIES
JAMESTOWN, N. Y.

CABLE ADDRESS
"DAHLSTROM, JAMESTOWN"

BRANCH OFFICES
NEW YORK, N. Y. CHICAGO, ILL. DETROIT, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES

Products

HOLLOW METAL DOORS and TRIM.
METAL ELEVATOR DOORS and ENCLOSURES.
CONDUO BASE.

Also manufacturers of Adjustable Steel Partitions, Metal Door and Window Sash, Bucks and Frames, Hose Cabinets, Switch Box Panels, and Elevator Cabs.

Hollow Metal Doors and Trim

Construction—The fact that Dahlstrom hollow metal doors and trim are steel without a combustible core is evidence enough that they are fire retarding. There is no portion of the door which can burn.

All joints are welded, reinforcements are welded to the door proper and the door is designed for rigidity, stability and elegance.

Eighteen years of service has demonstrated its practical success.

Door frames are fabricated from No. 10 to 14 gauge metal, according to size and service of opening.

Finish—All surfaces are carefully cleaned and protected both inside and outside with suitable paint and each coat of paint or enamel is carefully baked and properly treated to secure that superior finish for which Dahlstrom products are known, whether in plain colors or in reproduction of the grain of rare woods.

Metal Elevator Enclosures—Through the many years of experience in the manufacture of hollow metal doors and trim, elevator shaft doors and trim have been one of the most called-for single types. This has given us an opportunity to put much time into the study of various shaft conditions, thus permitting logical suggestions as to the proper enclosure to be used for these different conditions.

TYPICAL 3-LEAF 2-SPEED DAHLSTROM SHAFT DOOR

Metal Elevator Doors—Material used is No. 18 gauge cold rolled open hearth steel.

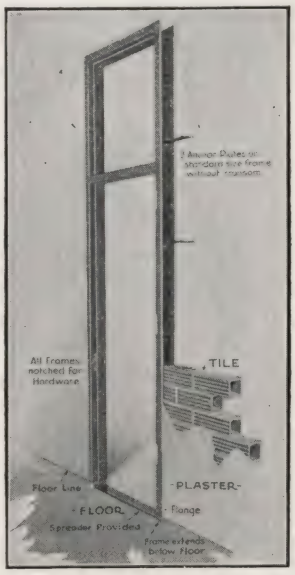
All joints made solid and invisible by welding, making the several parts of the steel door homogeneous throughout.

Asbestos or other fireproof material is placed between the two steel plates forming panels.

No wood used in any part. All surfaces dressed evenly, leaving no visible joints.

Uni-tre Door Frames—Dahlstrom Uni-tre metal frames were designed to be fireproof sanitary door frames which would replace built-up frames, thereby reducing installation costs to a minimum.

This frame is so constructed that when complete, it is one piece of metal instead of the several in the older type frame. Corner joints are welded. The elimination of cracks serves to make it far more sanitary than a wood or built-up metal frame.



DAHLSTROM UNI-TRE METAL FRAME WITH TRANSOM

Uni-tre frames are notched and reinforced for hardware at the factory. They are also reinforced at points where greater strains occur.

Anchors are furnished sufficient to securely tie the frame to the wall.

Uni-tre frames are shipped with prime on ground coat of finish.

When received on the job, it is only necessary to line up, set and brace the Uni-tre frames.

The walls, finished floors and ceilings are built up around them. Uni-tre frames can be set in place as soon as the floor arches are in.

Continued on next page

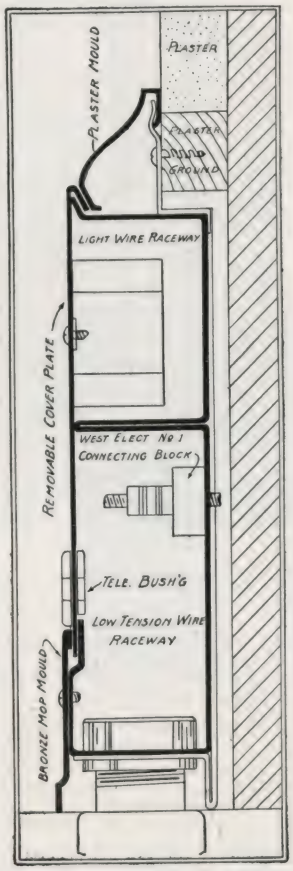
Hardware—To facilitate quick delivery and avoid undue delay, hundreds of samples of standardized hardware have been obtained from different manufacturers so that all ordinary demands for samples can be met. Thus a suitable model is almost sure to be found in the sample room of this company, from which the hollow metal work can be fitted and time saved.

Three-Point Lock—One of the requirements of the Board of Fire Underwriters is that swinging fire doors for stair halls and similar locations must be locked at not less than 3 points, to prevent the doors from warping away from the frames in case of fire, which would allow the flames to pass through. The multiple gravity latch is another Dahlstrom perfected product of unusual merit, entirely contained within the hollow metal doors. This locking device is approved by the Underwriters' Laboratories, Inc., and a booklet with full description will be sent on request.

Panic Bar and Checking Device—An improved panic bar can be furnished in connection with the 3-point locking device; also a checking device for use on automatically closing double doors to prevent the service door from closing until the opposite door is in place in the opening. Both of these devices are Dahlstrom developments.

Conduo Metal Base

Conduo metal base is a combination metal base and electric conduit for high and low tension wires and a continuous electric outlet box.



QUARTER SIZE CROSS SECTION DETAIL OF CONDUO-BASE SHOWING HIGH TENSION RECEPTACLE AND LOW TENSION BUSHING IN PLACE

As a metal base, it is handsome, sanitary, finished to match any wood, marble or metal and is provided with a natural bronze mop-mould to prevent constant rubbing off of finish of base when floors are mopped.

As an electrical device, it provides two large concealed raceways for high and low tension wires.

These raceways are easily accessible by simply removing the base front.

It is so designed as to make it possible to place a number of electric receptacles and low tension current outlets along any point of the base, and at any time desired, with extreme ease. Instead of extending numerous conduits to a number of prefixed base outlets, none of which may suit each tenant's requirements, by installing Conduo base and extending in the floor-fill one low tension wiring conduit from main wiring shaft to any convenient point in Conduo base and extending ½-in. conduit from wall switch box to Conduo base, any number of high and low tension wires can be extended at any time in the Conduo base raceways and any number of outlets for fans, desk lights, dictaphone motors, telephones, intercommunicating telephones, district telegraph call bells, buzzers, etc., can be installed and connected at any desired points whenever wanted.

Conduo base will pay for its cost in the saving it makes by eliminating extensive conduits and wiring for prefixed base outlets and by eliminating changes of wiring for each tenant.

Conduo base is a real, scientific solution of the modern building wiring problem. Changes required in the office can be effected quickly.

There is no damage to the walls and floors, as the wires are all carried in the base. It is an easy, simple, clean matter to remove the face of the base, pick out the required wires, make the connections and notch the face for the receptacle. The face of the base is then reattached and the work is completed. The Conduo method is the only way to provide convenient outlets, conveniently located, no matter what the tenant's requirements may be.

Conduo Base Eliminates—(1) Guesswork as to each future tenant's electric outlet requirements.

(2) The necessity of predetermining the exact position of outlets before the offices are rented.

(3) The cost of extensive conduits and wires, outlet boxes, etc., of all prefixed outlets.

(4) The cost of large wire moulds for low tension wires.

(5) The unsightly exposed wires tacked along all wall trim and hanging in a maze of network.

(6) The cost of constant changes for each new tenant's requirements and the cost of cutting and patching of floors and walls for each change.

Conduo Base Provides:—(1) A safe, fireproof and concealed raceway for all wires needed in a modern building.

(2) All the outlets each tenant wants, just when and where he wants them with minimum cost and without marring the building.

Classification of Finishes

In order to make it clearly understood that the kind of finish required will affect prices, a list of standard classifications is given below.

Class A—Plain colors, such as No. 10 dark green, No. 11 dark olive, No. 15 maroon, No. 17 chocolate, No. 19 black, No. 30 sea green, No. 33 dark brown.

Class B—Plain colors, such as No. 13 white, No. 18 light gray, also cream, light blue, and any light color except carmine.

Continued on next page

Class C—Stippled enamel, such as No. 24 copper verde antique, No. 26 bronze verde antique, No. 28 light olive, No. 29 slate, and No. 32 dark tan.

Class D—Grained finishes, such as No. 1 light mahogany, No. 2 tuna mahogany, No. 3 dark mahogany, No. 8 dark birch and cherry.

Class E—Grained finishes, such as No. 4 medium oak, No. 5 light oak, No. 6 dark oak, No. 7 circassian walnut, No. 9 light ash, No. 31 dark circassian walnut, pine and straight oak.

Class G—Grained finishes, such as fumed oak, silver oak, crotch mahogany, birdseye maple. Australian mahogany, marble, teak, also rough stippled and dull black.

Slight variations of all shades are permissible.

Tests and Approval

The National Board of Fire Underwriters of Chicago have tested and approved these products, and their labels of inspection are furnished when desired.

The Building Departments of the larger cities in the United States have also given their approval.

Quality and Cost

Dahlstrom products are well known for their superior quality, only first class materials and expert workmanship entering into their manufacture.

A semblance of Dahlstrom products can be produced at a lower cost, but the inferiority of the cheaper grade to the Dahlstrom make is marked.

Specifications

Complete specifications of hollow metal work consist of 25 or more sub-divisions. By indicating the class of work under consideration, an architect will receive, on request, complete specifications covering the different parts, including finish. This company is ready to offer suggestions for specifications covering any special feature desired.

The following condensed specifications may be used when a short form is sufficient:

Construction—Provide fireproof doors, partition sash, interior trim to exterior windows, metal partitions, picture mouldings and other metal trim as indicated on drawings. All work shall be of hollow steel construction built according to the standard practice of the DAHLSTROM METALLIC DOOR COMPANY, with standard mouldings of design selected by the architect; all to be of the best quality cold rolled, open hearth steel plates.

Insulation—Panels to be doubled and insulated with suitable material between, making a resilient filling that is a non-conductor of heat; insert and properly fasten in the hollow stiles, strips of cork of suitable width for the purpose of reducing the metallic ring.

Paneling—Make proper formation of panels as per details, by applying moulded cross rails securely welded to stiles. All joints to be made entirely invisible.

Reinforcing—Doors and trim to be reinforced for all hardware as required and at all vital points, to obtain perfect alignment and rigidity.

Sash Doors—Doors with glass panels and doors with muntin lights shall be constructed in such manner that the glass can be easily set, and that proper allowance is made for the thickness of the glass. Detachable glass stop mouldings shall be provided for holding the glass in place. Doors of this design must be so constructed and reinforced that proper rigidity is obtained and all joints and seams are to be process-welded and surface-finished.

Jambs and Casings—All doors and sash to have steel jambs and casings made from cold-rolled steel and of a design as approved by the architect. Except where impractical because of size inconvenient for shipping, all mitred joints are to be process-welded the full length to insure a smooth and unbroken surface.

Transoms, Stops, Etc.—Provide hollow steel sash, transom bars and stops for all sash and fanlight openings indicated on plans.

Partitions—All partitions shown on the drawings to be of steel except where other metal is indicated, and shall be constructed in such a manner that a rigid, substantial, and easily erected unit is obtained. The construction should also be such that it follows the design shown, or one which will be approved by the architect. All partitions are to be properly reinforced and strengthened according to the requirements of the design and the purpose for which the partition is to be used.

Hardware—The hardware, glass, and glazing are not a part of the hollow metal door contract. Proper reinforcements in the hollow metal work are to be provided for all hardware, and the hollow metal door contractor is to be furnished with such hardware or templates as he may require for the prosecution of his work. Also he is to apply such finished hardware as will not interfere with the safe crating or shipment of the material, which hardware is to be delivered f.o.b. his factory. In case this contractor installs the work in the building, all hardware is to be applied to such work as the hollow metal man furnishes.

Bucks—All wood bucks and grounds are included in the general contractor's contract and are not a part of this contract. Uni-tre frames, rough bucks, or structural steel bucks are to be furnished and erected by this contractor where specified on the drawings.

Details—The contractor for this work shall furnish all necessary drawings showing design, construction and sizes, and these blue prints shall be approved by the architect before the material is fabricated.

Finish—The contractor for this work shall submit, when requested such models or samples as may be required to serve as standards for the finish, design, and construction of the work to be furnished under this contract.

Facilities for inspecting the work before shipment, shall be given to the architect or his representative, if architect specifically request that such inspection is desired.

In finishing the work, the metal is to be thoroughly cleaned from all grease, oil, surface defects, or foreign substances before any of the enameling coats are applied. The material is to be coated at least six times, each coat to be baked to a proper heat and for a sufficient time to insure best results. The color of finish is to be as selected by the architect, either a plain color, stippled finish, or grained to match adjoining metal or wood work. All graining coats are to be protected by not less than two coats of varnish, the last coat to be rubbed to an egg-shell gloss finish at the factory before shipment is made.

Conduo-Base—Furnish and install metal "Conduo-Base" in all rooms and spaces, throughout the building, where base of other materials is not shown or specified. Base shall be "Conduo-Base" as manufactured by the DAHLSTROM METALLIC DOOR COMPANY, Jamestown, N. Y. It shall be standard type, 8 in. high, provided with two concealed electric wire raceways, 2-in. adjustable bronze mop mould, removable cover plate and plaster mould.

All exposed surfaces shall have baked-enamel finish as specified, except bronze mop mould which shall be natural bronze unlacquered. All concealed parts shall have baked-on-enamel finish.

*A Few Representative Buildings Equipped with Dahlstrom Hollow Metal Doors and Trim

Cunard Building, New York, N. Y., B. W. Morris
Munson Building, New York, N. Y., Kenneth W. Murchison
Mt. Sinai Hospital, New York, N. Y., Arnold W. Brunner
Mail Service Building, New York, N. Y., Warren & Wetmore
Hanna Building, Cleveland, Ohio, Charles A. Platt
Federal Reserve Bank, Richmond, Va., Sill, Buckler & Fenhagen
Cleveland Discount Building, Cleveland, Ohio, Walker & Weeks
Bank of Italy, San Francisco, Cal., Bliss & Faville
Consolidated Gas Co. Building, New York, N. Y., W. Hunter
Mt. Sinai Hospital, Milwaukee, Wis., E. Brielmaier & Sons Co.
Pacific Telephone Building, Seattle, Wash., E. V. Colby
Hutchinson High School, Buffalo, N. Y., H. Osgood Holland
Grant Telephone Exchange, Pittsburgh, Pa., Alden & Harlow
Dixie Terminal (South Wing), Cincinnati, Ohio, Garber & Harlow
Robert Dollar S. S. Co. Building, Shanghai, China, Murphy, McGill & Hamlin
Guardian Bank Building, Cleveland, Ohio, Walker & Weeks
Bell Telephone Building, Cincinnati, Ohio, Harry Hake and Chas. Kuck.

*Name of architect follows location of building.

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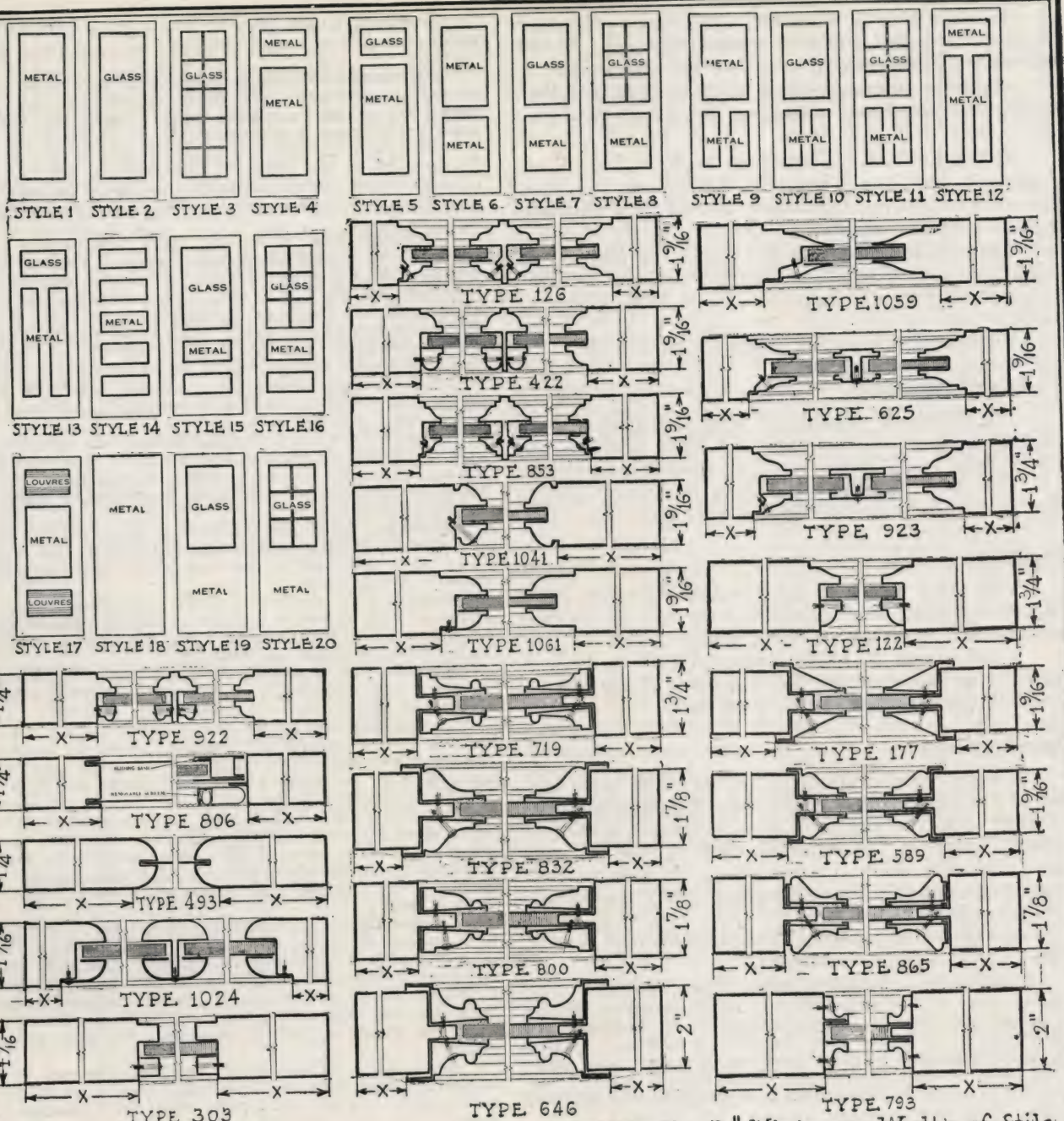


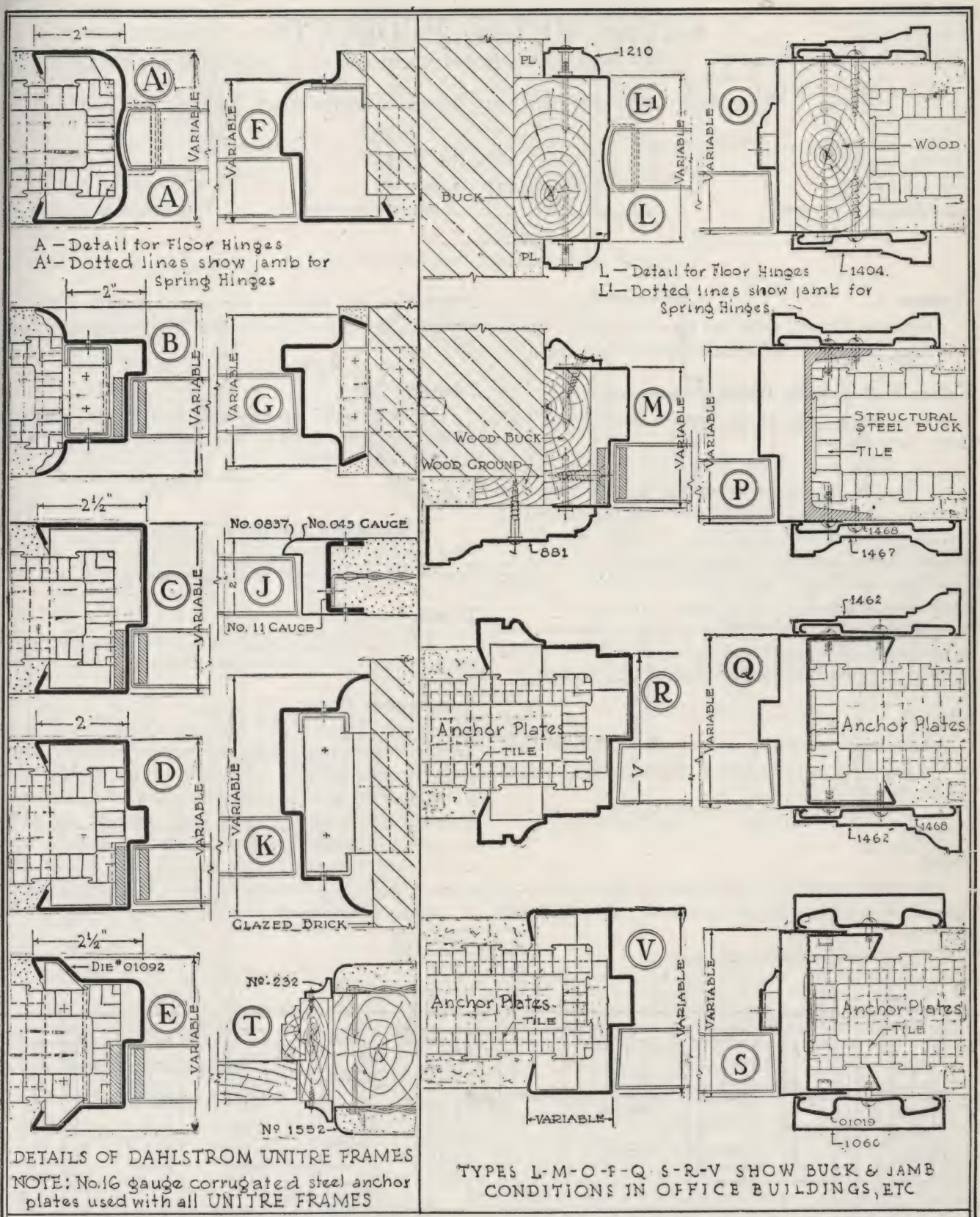
NOTE- X = 3" Minimum Width of Stile

SUGGESTIONS FOR ORDERING

In ordering doors specify style and type thus: Style 5, Type 126. Send floor plan and sketch showing swing of doors and always note outside of room. Door sizes given should be for net width of opening in jamb and height from finished floor. Give actual height of thresholds. State kind of glass if desired, finished thickness of partitions and walls, whether buckwork in building is wood, pressed steel or channel iron or a combination of both or reinforced concrete construction. If casings or staff mouldings are desired state whether for one or both sides of door also width and whether with or without plinths. If we are to furnish hardware state kind of locks etc. desired. If hardware is by others ship to factory complete line of samples of same. List of all hardware per door should be attached to order. Give complete instruction as to its application, stating whether cylinders are on hinge or stop side also location of handles, push plates, push bars, door stops, etc. Early delivery of our material depends largely on prompt receipt of this information.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD DETAILS OF DAHLSTROM HOLLOW METAL DOORS	SCALE — 3" EQUALS 1'-0" DATE-AUG.'20	DR.WG 1

Continued on next page



DETAILS OF DAHLSTROM UNITRE FRAMES

NOTE: No. 16 gauge corrugated steel anchor plates used with all UNITRE FRAMES

TYPES L-M-O-P-Q-S-R-V SHOW BUCK & JAMB CONDITIONS IN OFFICE BUILDINGS, ETC

USE TYPE LETTERS WHEN REFERRING TO SECTIONS SHOWN ON THIS SHEET

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF DAHLSTROM HOLLOW METAL DOORS AND TRIM	SCALE 3" EQUALS 1' DATE-AUG. 20	DR. WG. 2

W. J. GROSS A. R. GROSS

GROSS METAL PRODUCTS

HOLLOW METAL DEPARTMENT OF MINNESOTA ROOFING & CORNICE WORKS

Manufacturers of Hollow Metal Doors and Trim

133-137 Twelfth Street
ST. PAUL, MINN.

Products

HOLLOW METAL DOORS and FRAMES; METAL TRIM. Also Toilet and Shower Partitions; Cabinets.

Vulcan Hollow Metal Doors, Frames and Trim

Made exclusively of finest grade alloyed furniture steel, silver finished.

All doors and frames have oxy-acetylene welded joints, leaving doors perfectly true without waves or buckles. All rails and stiles of doors are constructed of No. 18 gauge material, panels No. 20 gauge with ¼ in. asbestos board cemented between the sheets.

Doors and frames are reinforced for butts in their continuous lengths.

All moulding is screwed in place by means of oval headed machine screws. All hardware is fitted at the factory, but furnished by contractor.

Frames

All frames unless otherwise specified are constructed of No. 14 gauge furniture steel, welded and reinforced for hardware.

Anchors are furnished with all frames.

Finish

All doors and door frames may be finished in any desired color or grained to imitate any desired wood. All finishes are baked in our plant. Unless otherwise specified, doors and frames are given a baked primer only.

Sanitary

Hollow metal frames are particularly desirable where the atmosphere is laden with moisture, also in hospitals and schools.

Labels

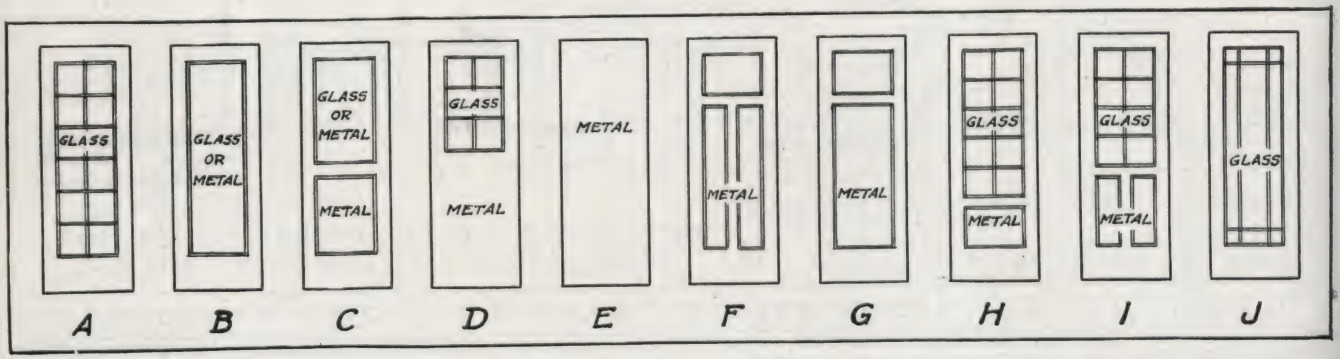
Vulcan hollow doors, door frames and trim bear the label of the Underwriters' Laboratories, Inc., and are inspected and approved by them where so specified.

Details

Typical details of doors and frames are shown on opposite page. Any desired shape can be made.

Comparative Cost

Where hollow metal frames are installed, it costs but very little more than an oak frame with trim. After these frames are set, the contractor has finished his work, until the doors are hung in place. When a wood frame is used: first, a wood buck must be set while masonry proceeds; then after plastering is completed, the finished frames must be set, plumbed, leveled and blocked, the casings and plinths set. Most of this labor is eliminated with metal frames.



VARIOUS TYPES OF GROSS HOLLOW METAL DOORS

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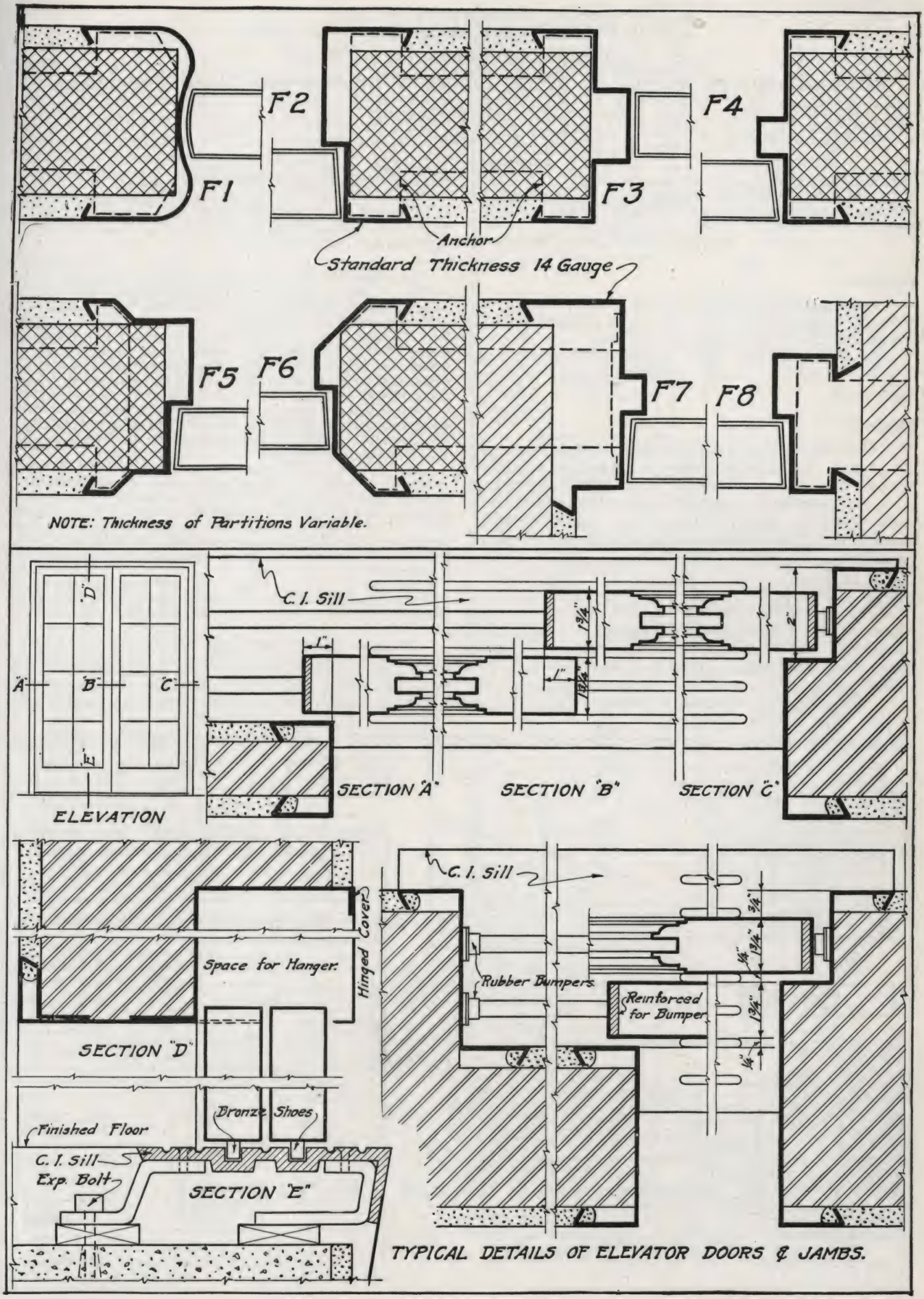

F1
F2
F3
F4
Anchor
Standard Thickness 14 Gauge
F5
F6
F7
F8
NOTE: Thickness of Partitions Variable.
"A"
"B"
"C"
"D"
"E"
ELEVATION
C. I. Sill
1"
1"
1¾"
1¾"
2"
SECTION "A"
SECTION "B"
SECTION "C"
Space for Hanger.
Hinged Cover
SECTION "D"
Bronze Shoes
Finished Floor
C. I. Sill
Exp. Bolt
SECTION "E"
C. I. Sill
¾"
¼"
1¾"
Rubber Bumpers
Reinforced for Bumper
1¾"
¼"
TYPICAL DETAILS OF ELEVATOR DOORS & JAMBS.

LAWTON-STEPHENS CO., INC.

SUCCESSORS TO GRINDEN ART METAL CO.

Manufacturers of Hollow Metal Doors, Windows and Metal Specialties

427 Marcy Avenue
BROOKLYN, N. Y.

TELEPHONE
WILLIAMSBURG 4813

REPRESENTATIVES

ATLANTA, GA., LUKE SEAWELL, 422 Austell Building
BALTIMORE, MD., WILLIAM E. GAMBRILL, 1404 Lexington Building
BOSTON, MASS., SEELEY & LAWSON, 73 Tremont Street
HARTFORD, CONN., G. F. SMART & CO., 80 Pearl Street
PHILADELPHIA, PA., F. R. SMITH, Widener Building
RICHMOND, VA., J. S. ARCHER, 203 Real Estate Exchange Building
SYRACUSE, N. Y., ROESCH ENGINEERING CORP., Gurney Building
MONTREAL, QUE., HERRIOT K. FERGUSON, 908 New Birks Building
LONDON, ENGLAND, RAILWAY SUPPLIES CO., LTD., 68 Victoria Street

Products

Labeled and unlabeled HOLLOW METAL WINDOWS; HOLLOW STEEL DOORS; STEEL JAMBS, TRIM and BUCKS; STEEL TELEPHONE and TICKET BOOTHS.

Also, Cold Drawn Metal Mouldings; Drawn Steel Corridor Sash and Frames; Enameled Steel Shelving Equipment.

Services

This firm invites architects to use its service. It will supply complete information regarding approved methods and best practices, including details, specifications, and a detailed estimate of cost of the contemplated work. It will submit for approval complete details showing the construction, assembling, and detailed measurements; also selection of hardware.

Doors

The LAWTON-STEPHENS CO., INC., has an enviable reputation for high quality and variety of doors, constructed of No. 18 gauge furniture steel with sharply drawn steel mouldings. Joints are accurately mitered, welded and ground to a smooth finish—the highest type of construction. Finished with priming coat or baked enamel, plain color or grained.

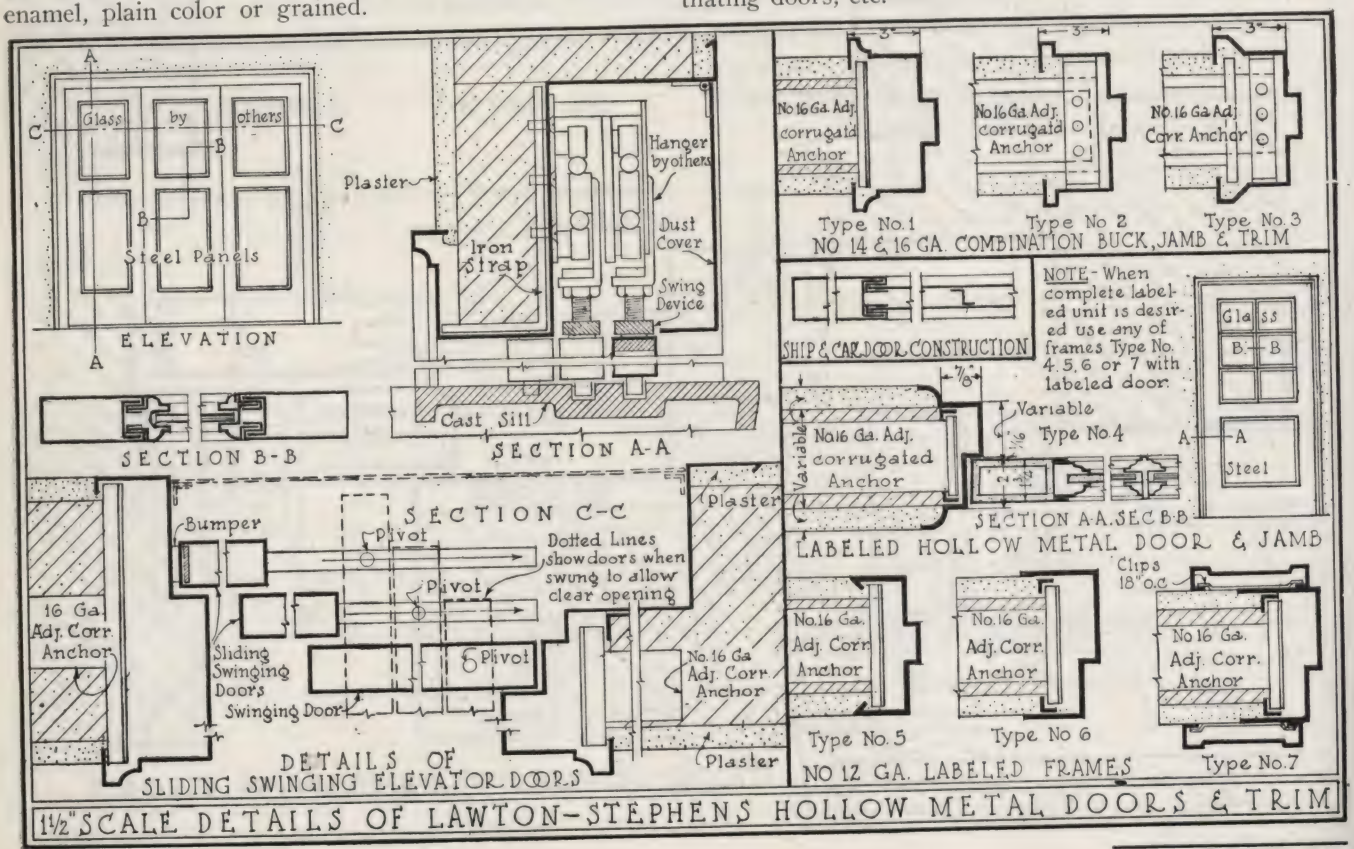
Specifications for Hollow Steel Doors—Doors to be 1¾ in. thick, stiles and rails of No. 18 gauge furniture steel or ingot iron, all sheets full cold rolled, free from all blemishes, and stretcher-leveled for smoothness. Mouldings to be cold drawn No. 20 gauge steel; arrises to be sharp and clear; panels, two sheets of No. 18 gauge steel, with asbestos board glued on. (Glue used on Lawton-Stephens doors is specially prepared, and guaranteed as to its neutralizing effect on asbestos—absolutely non-corrosive.)

Doors to have cork insert in stiles and rails to act as deadener; doors requiring label service will have stiles and rails lined with asbestos, similar to panels, to meet the requirements of the Board of Fire Underwriters.

Jambs to be No. 18 gauge steel; trim either No. 18 or 20 gauge, to be applied to wood bucks when an enamel finish is desired. Combination buck, jamb and pressed trim can be furnished of No. 14 or 16 gauge steel; in case of heavier material, No. 12 gauge, combination buck and jamb can be furnished with No. 18 or 20 gauge moulded trim applied with concealed clips. Combination jambs furnished in prime coat finish baked on.

Doors, jamb and trim may be had in any color enamel, grained to imitate wood, or metal finishes.

Types—This company manufactures folding doors for telephone booths; doors for battleships, subway, passenger, parlor and baggage cars, apartment houses, hospitals, office and loft buildings; louver ventilating doors, etc.



Continued on next page

Windows

Underwriters' labeled windows, No. 24 gauge galvanized iron or 20-oz. cold rolled copper; pivoted, hinged, or double hung. Also labeled double hung hollow metal windows, No. 16 gauge iron or 32-oz. cold rolled copper or bronze. The heavier windows wear better; are noiseless; and are spot-welded instead of riveted, resulting in a more attractive appearance, greater rigidity, and closer weathering contact.

Specification for Heavy Gauge No. 10 Double Hung Windows—*Style*—Windows shall be double hung with sash counterbalanced by cast iron weights.

Material—Frames and sash to be No. 16 gauge galvanized iron, with exception of muntin bars (where required) and closure strips for sash and at head and sill, which shall be No. 24 gauge iron; pulley stiles to be No. 18 gauge iron.

Frame Construction—Sills and head shall be one piece of metal with exception of closure strips. Jambs one piece, except pulley stiles, which shall be made removable from head to sill. Fins for building into masonry to extend entire length of jambs, and frames to have moulded staff bead.

Sash Construction—All top and bottom rails and stiles to be constructed of one piece of metal with exception of closure strip on bottom rail. Meeting rails to be made of continuous pieces of metal spot-welded and riveted or locked together, and all assembled in workmanlike manner.

Muntins—Underwriters' labeled windows shall be divided by No. 24 gauge iron muntins into lights not exceeding 720 sq. in. Muntin caps to be held in place by machine screws threaded into tapped steel plates not over 12 in. on center.

Single Light Sash Used for Moderate Fire Exposure or Street Front Openings—Shall have drawn steel glazing beads properly mitered and secured in position by oval head machine screws tapped into sash members.

Weathering—Both flanges of sash stiles shall be covered with zinc, securely interlocked in position to insure easy operation, extending into grooves in pulley stiles, forming double weathering feature. Top rail, upper sash, to have flange engaging with groove entire width of head. Inside flange of lower rail, bottom sash, to close into groove; outer flange of sash to fit closely over rounded face of raised water stop extending entirely across sill. Meeting rails interlocking.

Hardware—Supplied by metal window contractor; malleable iron roller bearing pulleys; sherardized steel chain; according to manufacturer's schedule; cast iron weights; closed grommet pull-down socket; underwriters' malleable iron bronze plated sash fast; bar lifts, Ives manufacture.

Painting—Frames and sash shall be painted before delivery with 1 coat of galvanized iron primer.

Manufacture—Windows shall be H. G. No. 10 type, manufactured by Lawton-Stephens Co., Inc., Brooklyn, N. Y.; shall bear maker's label, and, where underwriters' approval is called for, National Board of Fire Underwriters' label.

Telephone and Ticket Booths; Newsstands

Where fireproof construction is required, this company manufactures ornamental metal booths, to suit requirements.

References, with Names of Architects or Engineers

Metal Windows, Light Gauge

Fletcher Castoria Building, New York, N. Y., Helmle & Corbett
Mail Service Building, New York, N. Y., Warren & Wetmore
Domestic Science Building, Scranton, Pa., W. S. Lowndes
Western Union Building, Philadelphia, Pa., Stone & Webster

Metal Windows, Heavy Gauge

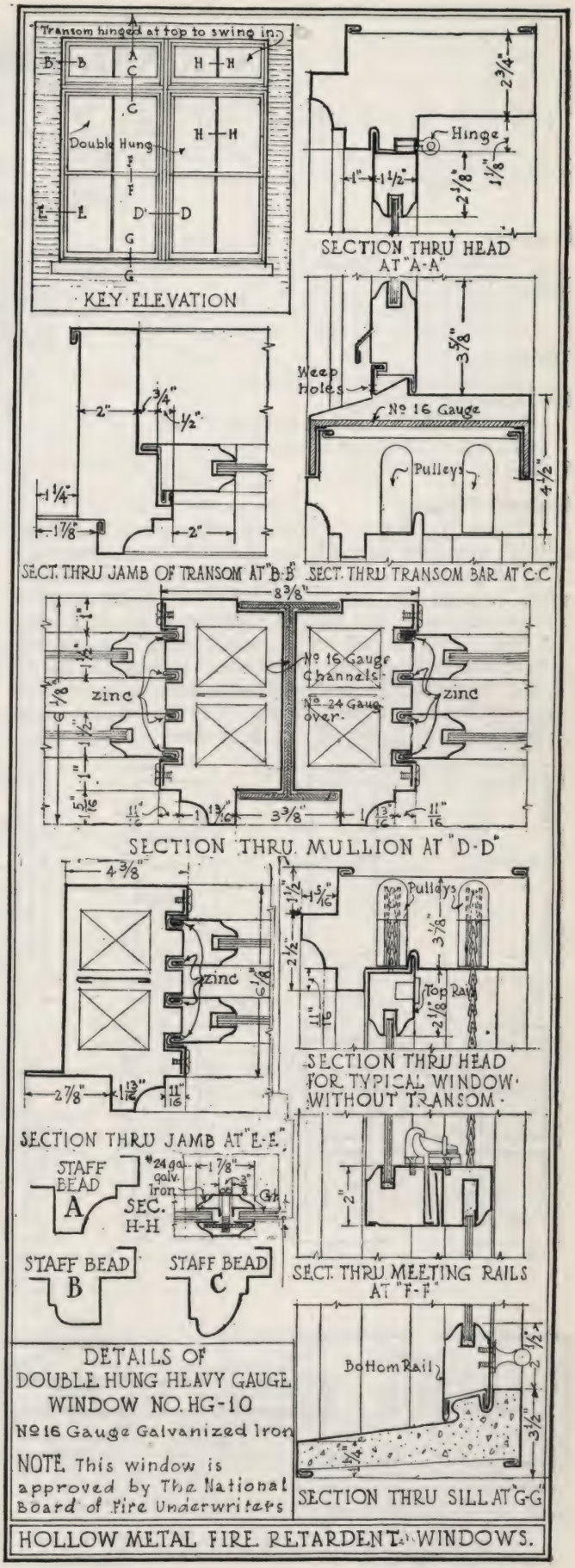
Phoenix Mutual Building, Hartford, Conn., Benj. W. Morris
Telephone Exchange, Milton, Mass., Parker, Thomas & Rice
K. of C. Headquarters, New Haven, Conn., W. P. Guggolz
Orient Insurance Company, Hartford, Conn., W. F. Brooks

Hollow Steel Doors, Baked Enamel Finish

St. James Building, New York, N. Y., D. Everett Waid
Telephone Exchange, 73rd Street, New York, N. Y., McKenzie, Voorhees & Gmelin
Fulton Theater, Jersey City, N. J., William Ziegler
Washington Heights Educational Buildings, New York, N. Y., McKim, Mead & White

Pressed Steel Door Bucks, Nos. 10 to 16 Gauge Material

Western Electric Building, 395 Hudson Street, New York, N. Y., McKenzie, Voorhees & Gmelin
Garment Center Building, New York, N. Y., Walter Mason
Alexander Hamilton Institute, New York, N. Y., McKim, Meade & White
N. Y. Edison Company, New York, N. Y., William Whitehill



E. BLAINE THELIN, PRESIDENT AND TREASURER

FERNANDO J. LEBEAU, MANAGER

NATIONAL STEEL DOOR CO.

ESTABLISHED 1910

Hollow Metal Doors and Trim, Hollow Bronze Doors, Solid Steel Windows

TELEPHONE
CENTRAL 8668

30 West Austin Avenue
CHICAGO, ILL.

Products

"NATIONAL" STANDARDIZED HOLLOW METAL DOORS, JAMBS and TRIM.

"NATIONAL" SANITARY DOOR FRAMES.

"NATIONAL" STEEL ELEVATOR ENTRANCES.

"NATIONAL" STEEL "DURABLE" DOORS for industrial buildings.

"NATIONAL" HOLLOW BRONZE DOORS.

"NATIONAL" SOLID STEEL DOUBLE HUNG WINDOWS for all purposes.

TRADE-MARK

General Purpose

Metal for doors, frames, windows, interior trim, etc., is recognized as eminently desirable for incombustibility, durability, beauty of finish and sanitation. These pages present the results of years of effort toward standardization in this field in order to secure economy, and they portray a full list of sizes, shapes and designs, sufficient in their various combinations to meet the needs of any modern office building, hotel, hospital, school or other high grade finished building. Full size details of any of the products shown will be furnished on application.

Hollow Metal Doors

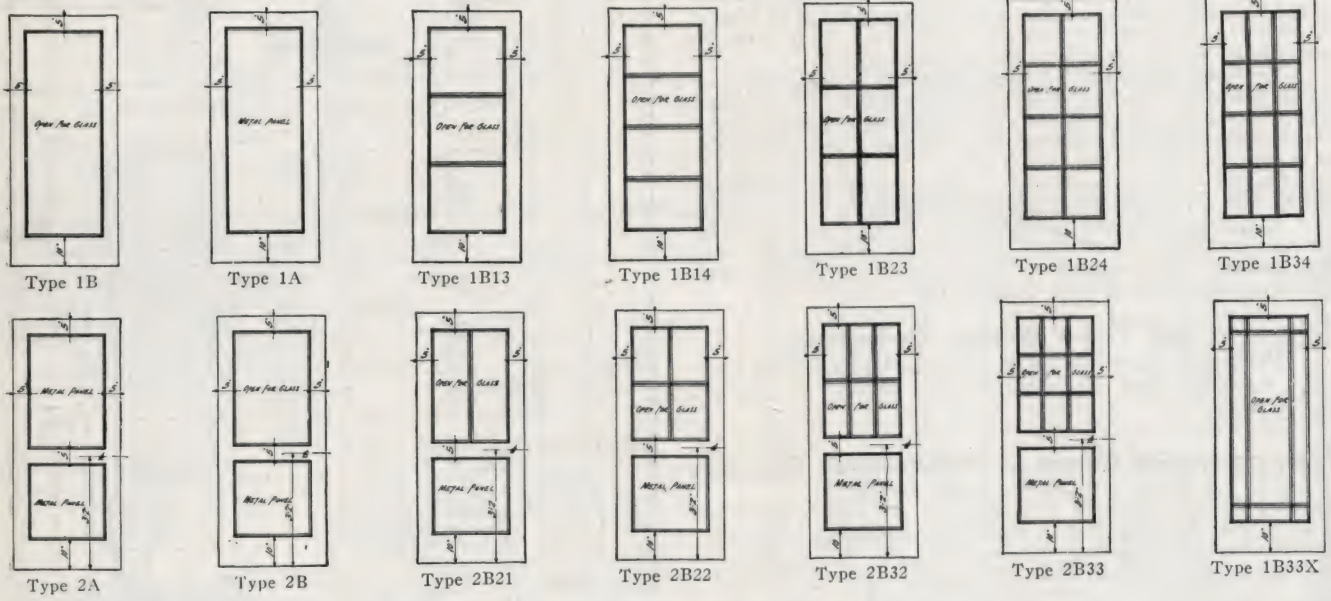
Construction—"National" standardized hollow metal doors are constructed of No. 18 gauge furniture steel of highest quality.

Stiles, top rail and center rails are tubular shaped, 5 in. wide by 1⅝ in. thick. Bottom rail is 10 in. high by 1⅝ in. thick. Doors are mortised, reinforced, drilled and tapped from templates to receive hardware. Joints between stiles and rails are acetylene-welded and ground smooth. The hollow chambers of stiles and rails are insulated with cork.

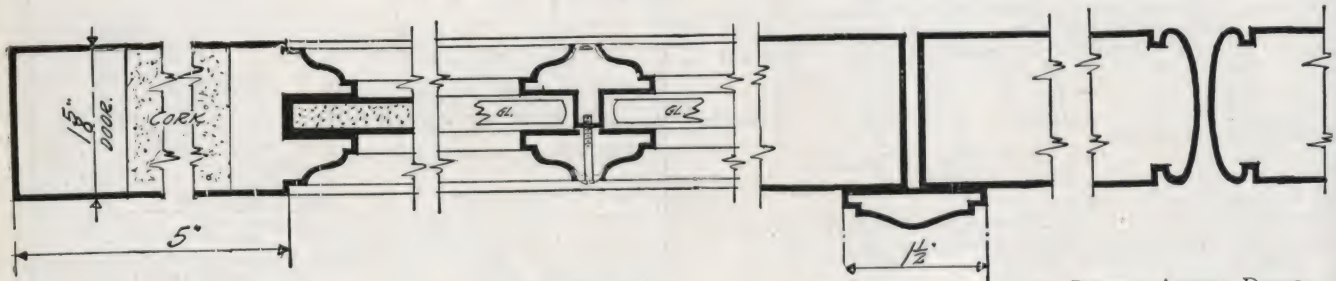
Panels are double thick with ¼ in. asbestos filler between sheets.

Panel moulding, muntin bars and astragals are cold drawn to contour, neatly mitered and fitted, and securely held in place.

Standard Sizes and Designs—The design of doors shown below can be used as singles or pairs, single acting or double acting, swinging or sliding, in widths from 2 ft. to 4 ft. in multiples of 2 inch, and 7 ft. in height. Dimensions are taken from jamb to jamb in width, and



"NATIONAL" STANDARDIZED HOLLOW METAL DOORS



STILE AND TOP RAIL
One-half full size

MUNTIN BAR
One-half full size

MEETING STILES WITH ASTRAGALS
One-half full size

DOUBLE ACTING DOORS
One-half full size
(For jamb width add 1 in. for single; 2 in. for pairs)

Continued on next page

from sill to head of jamb in height; allowance for clearance is made in door size.

Special Sizes and Designs—If necessary to meet special conditions, other panel designs and sizes can be furnished.

Standard Shop Painting—After doors are assembled ready for painting, they are thoroughly cleaned of oil or grease and a good primer is applied and baked on at proper temperature. Then all weld and tool marks are filled, and filler baked and ground smooth, leaving a perfectly smooth surface, free from waves and marks. A ground color, as selected, is then applied and baked to a high temperature. The best grade of paint is used throughout.

Baked Enamel Finish (Plain Color, Stippled or Grained)—"National" steel baked enamel finish is of the highest quality. After the standard primer and filler is applied as described above, with a ground coat of color as selected, stippling or graining is applied. Two coats of the best grade of varnish, thoroughly baked on, are used to protect the undercoating. The final coat is rubbed to an eggshell gloss.

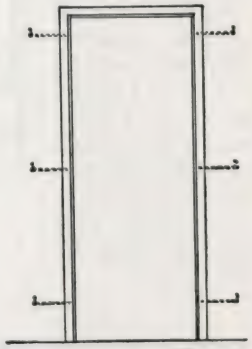
Hardware—Any type of standard hardware can be used that will fit to the dimensions of stiles and rails (note particularly that lock stiles are not beveled). It is recommended that 4½x4½ in. butts be used.

Hardware should be made to template and samples must be furnished before doors are manufactured.

Underwriters' Labels—The label of the Underwriters' Laboratories, Inc., can be furnished when required.

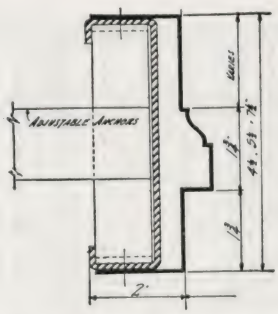
Jambs and Bucks

"National" hollow metal jambs are made of No. 18 gauge steel, cold drawn to shape with sharp contours. Sides and head are separate pieces arranged to mount over steel or wood bucks. Jambs are mortised, reinforced, drilled and tapped from template to receive hardware. Standard shop painting or baked enamel finish, same as for doors, can be furnished on this type of jamb.

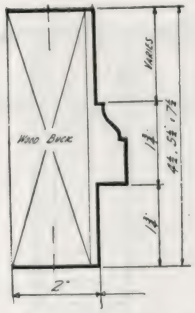


Elevation of Frame, Type No. 18x12B
Showing No. 12 Gauge Buck and Anchors

"National" steel bucks of No. 12 gauge steel, with adjustable anchors for building into masonry, can be furnished for this type of jamb or wood bucks can be used as shown below.



Frame, Type No. 18x12B
Showing No. 12 Gauge Steel Buck and Anchor
One-quarter full size



Frame, Type No. 18xWB
Showing Wood Buck
One-quarter full size

This type of door frame is suitable for 3-, 4-, or 6-in. tile walls with the use of any standard casing on both sides of wall; or with heavy masonry walls of any thickness, using casing on one side and scribe mould on one side or scribe mould on both sides (see trim sections on next page).

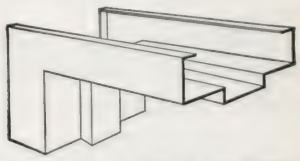
Underwriters' Label—(On type No. 18x12B). For single doors not exceeding 4x10 ft. and pairs not exceeding 8x10 ft.

Combination Buck and Jamb

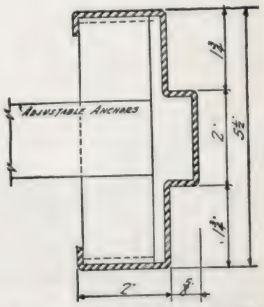
"National" jamb type No. 14x5½ frame is made of No. 14 gauge steel, with adjustable anchors for building into masonry; joints of sides and head are acetylene-welded, with channel brace across bottom to hold proper width. Mortising, reinforcing, drilling and tapping for hardware is done from templates.

Standard shop painting only is furnished on this type of frame, as it is designed for building into walls during progress of building.

This type of frame is suitable for 4-in. tile or any thickness of masonry wall with or without casing or scribe mould.



Perspective View of Type No. 14x5½ Frame

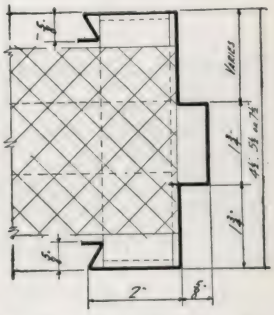


Frame, Type No. 14x5½, Combination Buck and Jamb
One-quarter full size

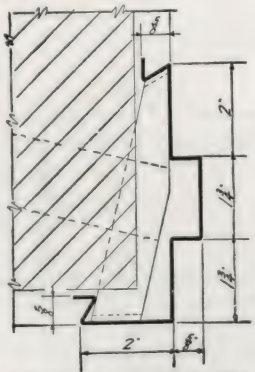
Sanitary Door Frames

For hospitals, schools, dormitories, etc., "National" sanitary door frames are exceptionally suitable.

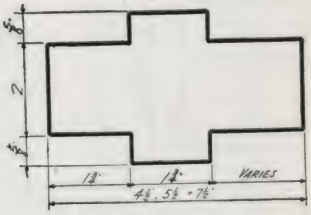
This type of frame is made of No. 16 gauge furniture steel with joints acetylene-welded and ground smooth, furnished complete with necessary adjustable anchors for building into masonry. Mortising, reinforcing, drilling and tapping for hardware is done from templates. "National" standard shop painting is furnished on this type of frame.



Frame for Use in 3-, 4-, or 6-in. Partitions
One-quarter full size



Frame for Use in Masonry Walls of Any Thickness
One-quarter full size



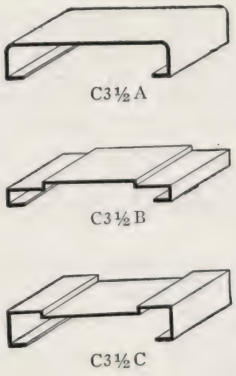
Transom Bar
One-quarter full size

Continued on next page

Trim

"National" drawn steel trim for casings, scribe mould, chair rail, picture mould, wire mould and base is made of cold rolled steel sharply drawn to contour. Door casings are miters with joints acetylene-welded and ground smooth. Concealed fasteners can be furnished when desired.

Standard shop painting or baked enamel finish is furnished.

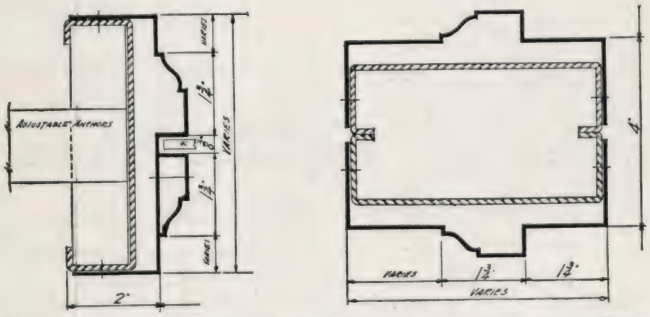


TRIM SECTIONS
One-quarter full size

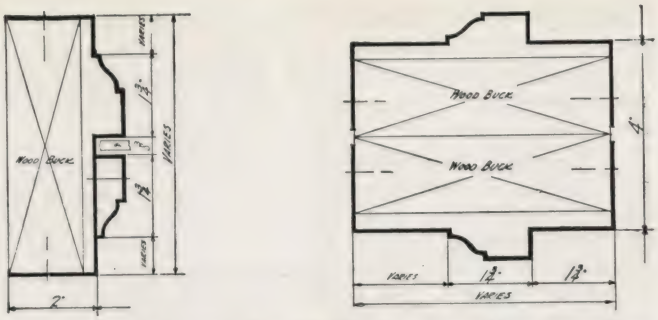
Transoms, Borrowed Lights and Sidelights

Sections shown on this page are designed for use in combination with door frame, types No. 18x12B, No. 18xWB and No. 14x5½ respectively.

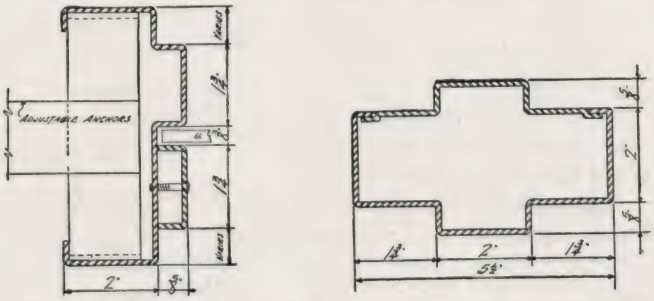
With these sections, necessary combination for any requirements can be worked out. Sizes and arrangements are optional. Notice suggested arrangements on this page.



FRAME AND TRANSOM BAR OR MULLION FOR USE WITH DOOR FRAME NO. 18x12B
One-quarter full size



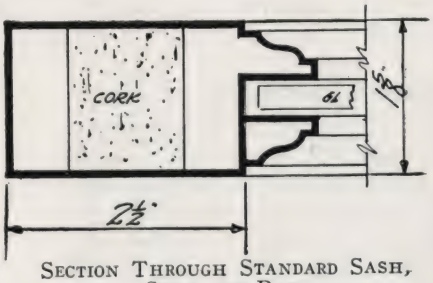
FRAME AND TRANSOM BAR OR MULLION FOR USE WITH DOOR FRAME NO. 18xWB
One-quarter full size



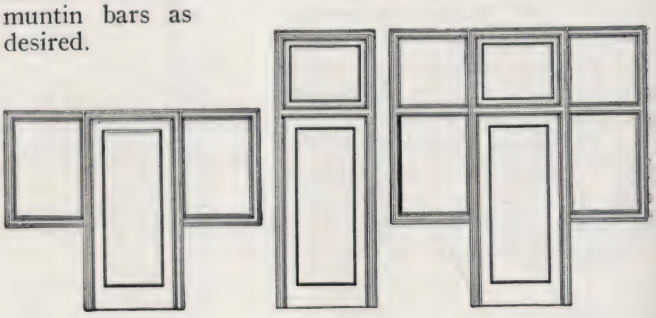
FRAME AND TRANSOM BAR OR MULLION FOR USE WITH DOOR FRAME NO. 14x5½
One-quarter full size

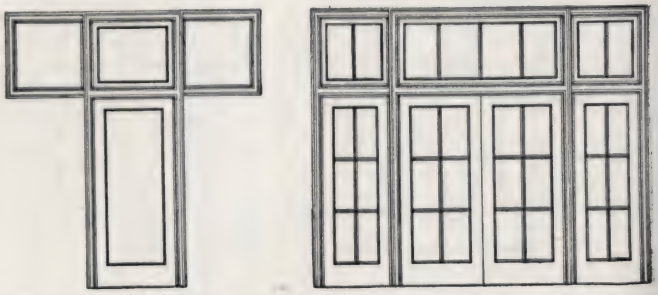
Sash

Stationary or hinged sash are provided of similar construction to doors as to materials, workmanship and finish. Sash are made in any width or height and divided with muntin bars as desired.



SECTION THROUGH STANDARD SASH, STILE AND RAIL
One-half full size





TYPICAL SUGGESTIONS FOR ARRANGEMENTS OF DOORS, TRANSOMS, SIDELIGHTS, ETC.
Showing the wide adaptability of "National" hollow steel standards for use in any building

Continued on next page

Elevator Entrances

General—"National" Hollow metal elevator entrances are designed to be furnished as a complete and harmonious unit for the building.

Doors—Built of No. 14 gauge steel, with stiles, top rails and center rails 2½, 3 or 3½ in. wide x 1⅝ in. thick; bottom rails 10x1⅝ in. high, heavily reinforced to receive hardware and solidly filled with cork to deaden metallic ring.

Jambs—Built of No. 18 gauge steel arranged for mounting over structural steel bucks.

Hanger Covers—Made of No. 18 gauge steel hinged and formed to protect hangers for width of shaft.

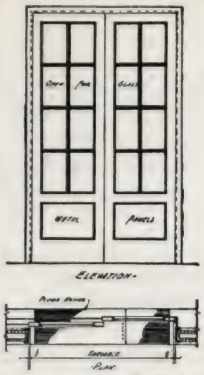
Trim and Finish—Furnished same as for standard swinging doors (see opposite page).

Bucks—Made of structural channel iron with struts anchored to floor and ceiling and of width to fit adjacent partitions.

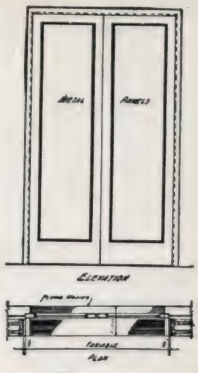
Sills—May be made of cast iron or bronze as desired, designed to fit wall and shaft conditions, properly aligned and anchored to structure and with grooves accurately machined.

Hardware—Any type of tracks, hangers, locks or closing and operating devices may be used.

Glass and Glazing—Should be provided by the glass contractor.

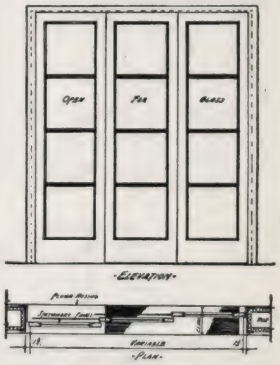


TWO-SPEED DOORS

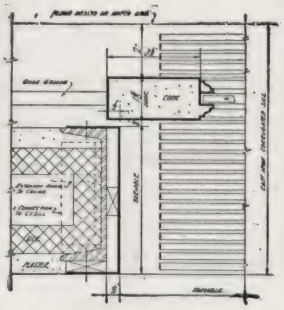


CENTER PARTING DOORS

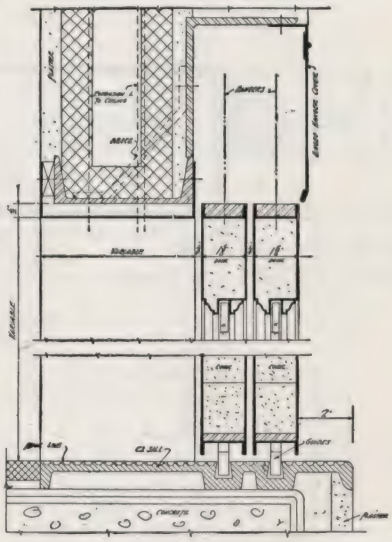
SINGLE SLIDING DOOR



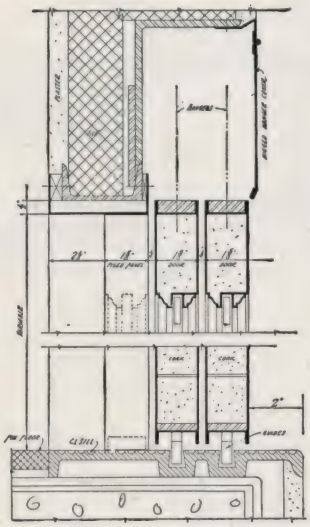
TWO-SPEED DOORS WITH FIXED PANEL



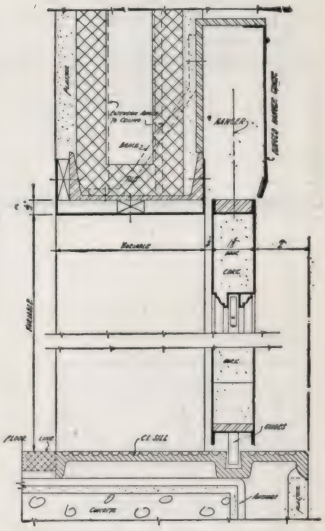
TYPICAL JAMB



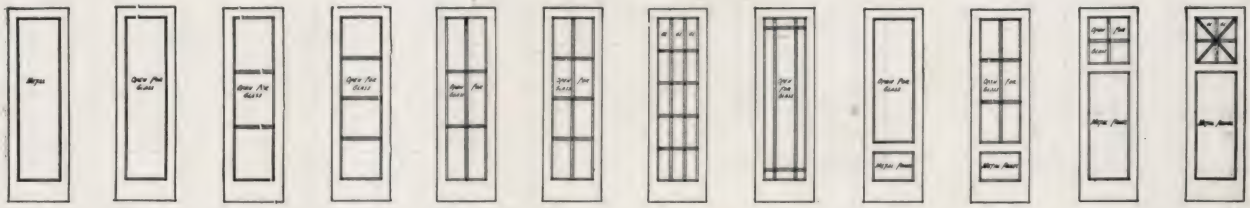
HEAD AND SILL, TWO-SPEED DOORS



HEAD AND SILL, TWO-SPEED DOORS WITH FIXED PANEL



HEAD AND SILL, SINGLE SLIDING OR CENTER PARTING DOORS



Type L1A | Type L1B | Type L1B13 | Type L1B14 | Type L1B23 | Type L1B24 | Type L1B35 | Type L1B33X | Type L2B | Type L2B23 | Type L2B22 | Type L2BX

"NATIONAL" HOLLOW METAL ELEVATOR ENTRANCES

Continued on next page

"National" Steel "Durable" Doors and Frames for Industrial Buildings

General — "Durable" doors and frames are superior to wood in every function, insuring rigid strength, resistance to fire and freedom from warping. These doors provide low initial cost, economical maintenance and high re-use value for factory, warehouse, garage, freight and power houses, or any other industrial building.

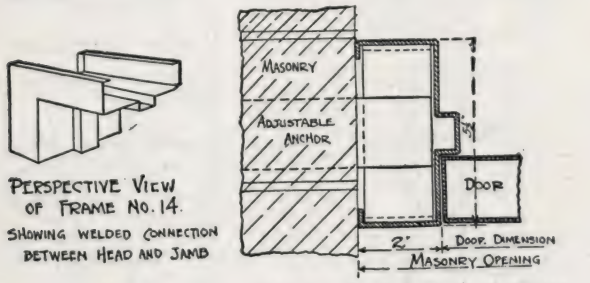
Types—Furnished to operate singly or in pairs as swinging, sliding, folding, compound, jack knife, counterbalanced, etc. Stock sizes are shown below. Any other size or paneling can be made special. *Use stock sizes whenever possible.*

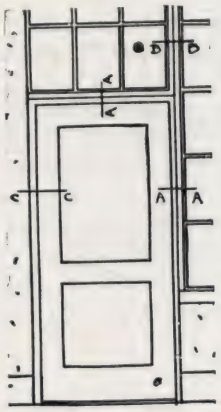
Construction—Doors are made of Nos. 12 and 14 gauge steel of finest quality. Stiles, top and center rails are tubular shaped, 5 in. wide x 1¾ in. thick, with joints acetylene-welded and ground smooth; bottom rails are 10 in. high x 1¾ in. thick. Panels are electrically welded to stiles and rails. For pairs, one leaf is furnished with astragal $\frac{3}{16}$x1½ in., full height of door. Cork insulation is inserted in hollow chambers of stiles and rails.

Painting—Interiors of stiles and rails are painted with red lead and oil before assembly. Finished doors are given full coat of gray paint, well brushed and baked on.

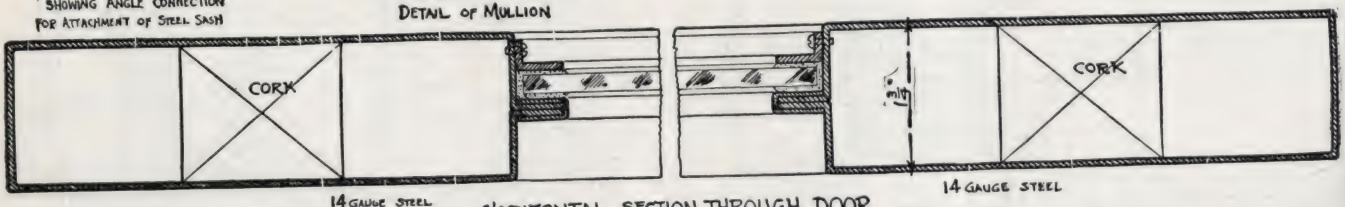
Hardware — Drilling, tapping and attachment of hardware is done in the factory. Surface hardware is preferable, but any type of surface or mortised hardware may be used. *All hardware must be packed with machine screws.*

Frames—Types No. 14x5½ and No. 14SS—Frames are built of same steel as doors, with corners full acetylene-welded, drilled, tapped, and reinforced for hardware and finished same as doors. Adjustable masonry anchors are made of No. 14 gauge steel.



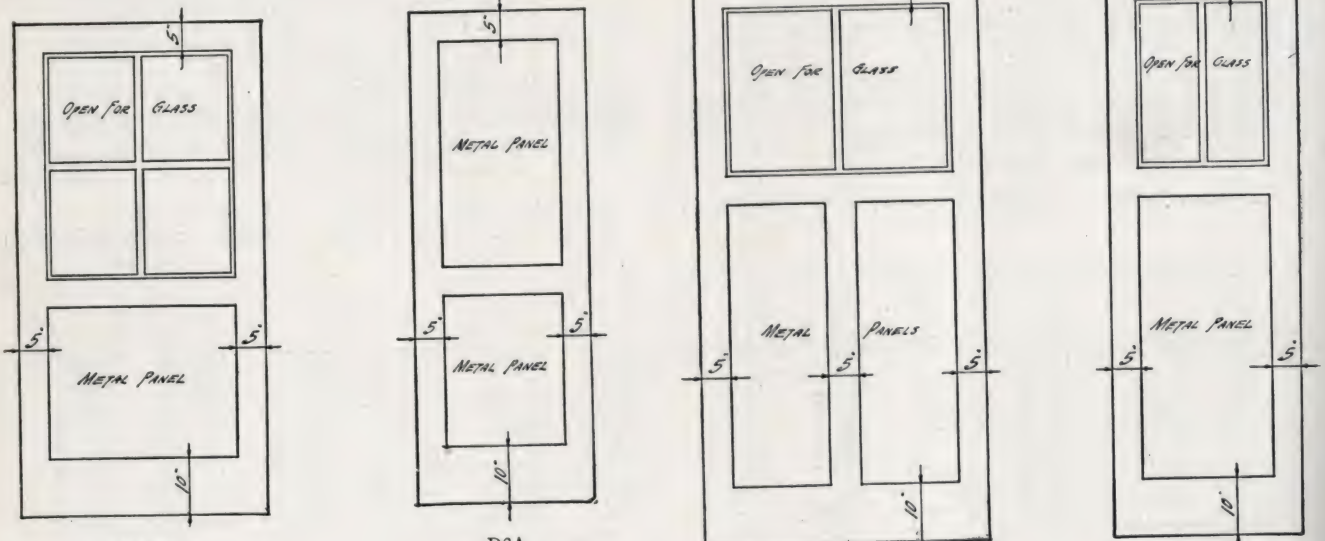


Elevation



HORIZONTAL SECTION THROUGH DOOR

TYPICAL DETAILS OF "DURABLE" DOORS AND FRAMES



D2B22
2 ft. 8 in. x 7 ft.
3 ft. 0 in. x 7 ft.
3 ft. 4 in. x 7 ft.

D2A
2 ft. 8 in. x 7 ft.
3 ft. 0 in. x 7 ft.
3 ft. 4 in. x 7 ft.

D3B21
4x8 ft.

D2B21
2 ft. 8 in. x 8 ft.

"DURABLE" DOOR TYPES AND SIZES CARRIED IN STOCK

Continued on next page

Hollow Drawn Bronze Doors

General—The accepted beauty, strength and dignity supplied by the use of bronze for certain classes of door openings have been adapted by this company along new and successful lines. "National" drawn bronze doors are designed and built to provide the utmost in beauty and, at the same time, eliminate excess weight and unnecessary costs.

These doors for entrances to banks, theaters, hotels, office buildings, monumental buildings, other fine structures and first floor elevator fronts are especially suitable.

Construction—Stiles, rails and mouldings are designed to suit requirements of the building. Stiles and rails are made of finest grade of drawn bronze tubing not less than No. 14 gauge, B. & S., 3 to 5 in. wide and 1½ in. thick. All joints and points of hardware attachment are substantially reinforced with solid bronze plates and bars carefully fitted together. No steel or metal other than bronze is used anywhere in construction of the doors.

Panel mouldings are accurately drawn to designed shapes with uniformly sharp and exact contours throughout. All miters, copes and joints are carefully ground to a smooth surface, and all cracks and tool marks are carefully removed.

Finish—When completed, entire surface of doors is thoroughly cleaned and sanded to a bright finish. Doors are then lacquered to prevent tarnishing, or are plated in the specified bronze finish desired by the architect.

Frames—Frames for bronze doors are made of the same materials as doors, designed to fit the wall conditions of their location, and according to contour required by hardware and operation of doors. Frames are carefully reinforced at joints, and at points of hardware attachment. All reinforcement is made of bronze same as for doors. Frames are finished in similar manner to doors.

Transoms—Fixed or hinged transom sash are constructed of any size required, built similar to doors, and may be divided with drawn bronze mouldings and muntin bars to suit design required for the opening.

Steel Frames—Bronze doors may be fitted to pressed steel or cast iron frames as desired.

Hardware—Any design of hinges, locks, push and pull plates, push and pull bars, etc., may be used.

"National" Solid Steel Double Hung Windows

General—"National" solid steel double hung windows are designed to meet a far reaching demand for a high class double hung steel window at an economical price; one which will operate smoothly, be neat and attractive in appearance, avoid the combustibility of wood as well as the rattle and ugliness of sheet metal windows.

Construction—Frames, head and sill are constructed of No. 14 gauge U. S. standard steel of finest quality. They are uniformly formed and rolled to contour required. Connections between jambs and head and sill are entirely acetylene-welded and substantially braced with angle reinforcements to hold frame in perfect alignment.

Sash—Double sliding sash are made of solid, hot rolled steel sections of neat contour, with mortised and tenoned joints, substantially welded together and resquared so that sliding units engage with frame in perfectly smooth manner.

Glazing—Glazing is done from the outside of the windows to provide the maximum of neatness in appearance on the room sides of the sash.

Weathering—Windows are designed to eliminate separate strips for weathering. The sliding sash engage with frames in such a manner that, without reducing ease and freedom of operation, a complete barrier is formed against wind and rain.

Hardware—Standard roller bearing pulleys are provided, 2¼ in. in diameter, fitted into malleable iron housings; also, American Chain Company's No. 130 or equal chain, which is tested and approved by the Underwriters' Laboratories, Inc., for the load to be carried. Counterweights are of cast iron, sectional type, hooked in series to permit accurate balancing of the sliding sash.

Finish—On completion, all surfaces of frames and sash are ground smooth to remove all tool and weld marks before paint is applied. A full priming coat of red lead and oil is then carefully brushed on and baked.

Full Size Details—Full size details and other information will be furnished to architects on application.

J. C. McFARLAND COMPANY

Metal Doors and Windows

LAPORTE, IND.

FACTORIES: LAPORTE, IND., AND CHICAGO, ILL.

NEW YORK OFFICE, 103 Park Avenue

Products

Manufacturers of HOLLOW METAL FIREPROOF DOORS and TRIM; FIREPROOF METAL WINDOWS.

Hollow Metal Doors and Interior Trim

The McFarland door is constructed entirely of No. 18-gauge full finished sheets, ordinarily termed metallic furniture stock, which is given a special process of pickling, annealing and leveling. The stiles are formed in one piece, and the rails in two pieces, interlocking with continuous channel. This interlocking channel is drawn and attached so as to become a reinforcing member. Both the top and bottom rails are reinforced with channels, both vertically and horizontally. The panel construction consists of No. 18-gauge steel with an insert of asbestos and felt between the two sheets of steel.

The panel moulding and panel channels are drawn in one piece. The miters are milled so as to fit perfectly, and then pressed on to the panel.

Miters of the panel moulding are continuously welded on the underside, which practically forms a door construction in itself.

Stiles and rails are snapped to the panel construction and all joints between stiles and rails are thoroughly welded so as to procure a maximum of stiffness and rigidity.

Doors are notched and reinforced in manner required for hardware application.

No. 18-gauge steel is used throughout the construction of jambs and trim.

Finish—All surfaces are thoroughly cleaned. The door then is submerged in a vat of rustproof paint; all sections of the door being communicative, same is permitted to fill with paint, and then drawn out and drained. This provides a foundation for the finish coats, either in plain colors or metallic or wood imitations, each coat or color being baked separately.

Underwriters' Triple Lock—Is made of malleable iron, constructed to slip in through top of door, all concealed except bolts. For single or double doors, with door checks, self-closing and automatic locking without use of spring. For double doors there is an interference device which prevents the wrong door closing first. Operated with regular knobs from either side. Can be provided with cylinder locks to operate from outside.

Labels—J. C. MCFARLAND COMPANY metal doors bear the label of the Underwriters' Laboratories, Inc., and are inspected and approved by them.

Hollow Metal Windows

This company makes hollow metal windows in all types; double hung, pivoted, casement hinged, reversible and for all other requirements, bearing the label of the Underwriters' Laboratories, Inc., or unlabeled.

Hollow Galvanized Iron Underwriters' Sash—This type is not only approved by, and bears the label of, the Underwriters' Laboratories, Inc., but also bears their casualty label, which gives their approval as a safety window.

Reference

Practically any prominent architect or contractor. This company has just completed the hollow metal work on the second largest office building in the world, and is now manufacturing the hollow metal interior for the third largest office building in the world.

This company has in process the four following buildings:

General Motors Office Building, Detroit, Mich.
Union Truck Co., Cleveland, Ohio
Pershing Square Building, New York, N. Y.
Cotton Building, New York, N. Y.

in which there are over 10,000 doors.

THE RIESTER & THESMACHER COMPANY

Manufacturers of Fireproof Doors and Partitions

1512-1526 West 25th Street

CLEVELAND, OHIO

Products

R & T Hollow Metal Fireproof Doors; R & T Hollow Metal Fireproof Partitions.

For Steel Treads and Risers, see page 543.

R & T Fireproof Doors

Description—R & T fireproof doors, of hollow metal construction, are built of No. 18 gage cold rolled sheet steel stretcher leveled, with jambs, and casing of same weight metal. The R & T interlocking joint, electrically welded, makes door one continuous piece of metal. This, together with generous use of interior reinforcing members, doubly insures doors for rigidity.

Before forming, metal is cut to allow for hardware which is to be installed. Different members are then formed to required shape by large 65,000-lb. presses, after which the reinforcements for hardware are electrically welded to the different members. All surfaces are then carefully treated and scoured to remove every trace of scale, rust, grease or oil. Doors are next dipped in paint, assembled and enameled.

Types of Doors—The following types of R & T fireproof doors are those in most general use. Each type may be made to fit any style of opening:

D A Single inclined slide
D B Single level slide
D C Double inclined slide
D D Double level slide
D E Single swing
D F Double swing

Merit—R & T hollow metal fireproof doors meet approval of National Board of Fire Underwriters and bear their label when specified, as doors are made under supervision of their inspectors at the factory.

Test—Very briefly stated, the test made on these R & T doors was as follows:

An hour's exposure to a steady jet of flame, the temperature in the furnace rising to 2000° Fahr., followed by a ⅞-in. stream of water at 60 lbs. pressure. At the end of the test the door was intact.

Details of this test will be mailed on request.

Installation—R & T hollow metal doors can be installed either by a contractor or by this company's installation force, if the contract is large enough to warrant it. Orders are promptly filled to specifications, the date of delivery being practically guaranteed.

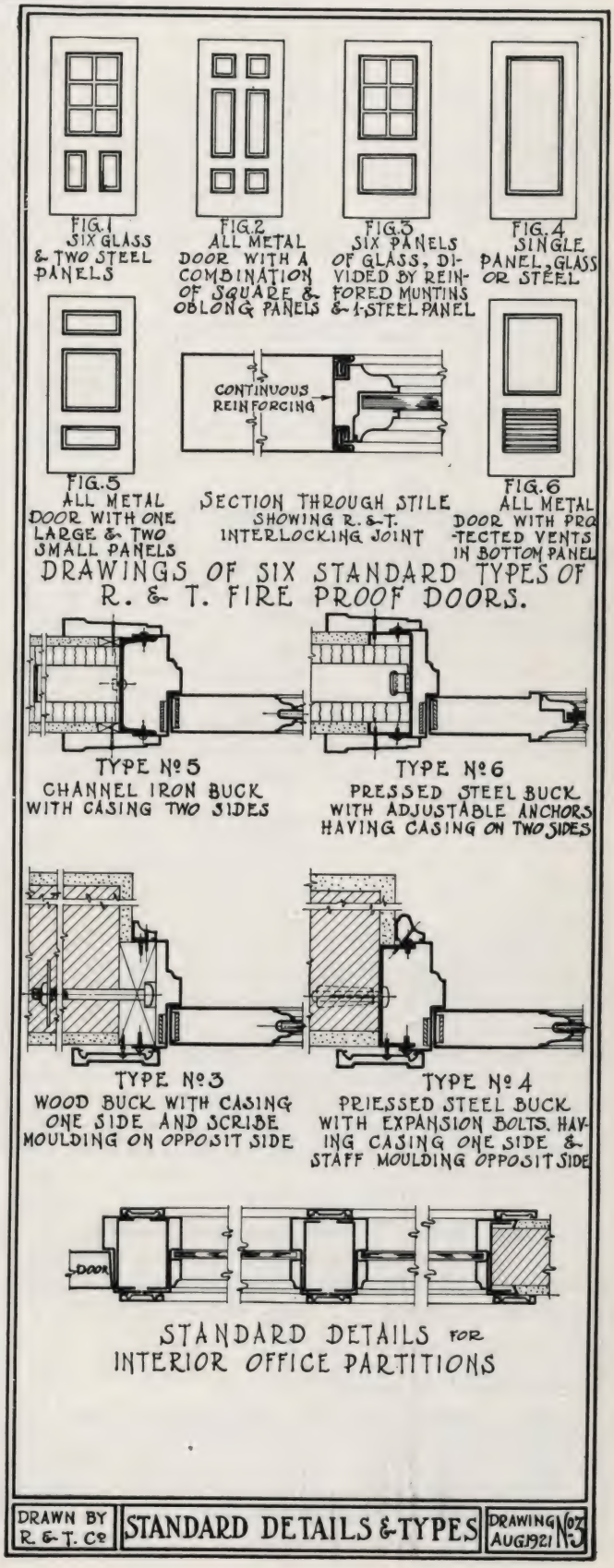
Estimates—With the following data, the draughtsmen and engineering force of this company will be glad to estimate the cost of the work desired:

Number of openings, type of door desired, kind of glass (if glass is used), and blue print or drawings showing dimensions and style of opening. If latter are not available, the following measurements are sufficient: (1) Height of opening from floor to lintel; (2) height of lintel; (3) width of opening; (4) thickness of wall; (5) headroom above opening; (6) hinges at right or left when facing door; (7) with hinge at left, should door swing from or toward you.

R & T Fireproof Partitions

This company constructs, to architects' drawings, R & T hollow metal fireproof partitions. This work is, of course, entirely to detail. Wired glass panels may be used, if desired. Especially adapted for use in office buildings, school construction, hospitals, hotels, public buildings and in many industrial structures.

The R & T partitions, used with the R & T fireproof doors and windows, spell safety in case of fire.



VARIETY FIRE DOOR CO.

Manufacturers of Hollow Metal and Metal Covered Doors

Sacramento and Carroll Avenues
CHICAGO, ILL.

AGENCIES

BALTIMORE, MD.
BIRMINGHAM, ALA.
BOSTON, MASS.
CLEVELAND, OHIO
DALLAS, TEX.
DAVENPORT, IOWA
DENVER, COLO.
EL PASO, TEX.
HELENA, MONT.
HOUSTON, TEX.
INDIANAPOLIS, IND.
JACKSONVILLE, FLA.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
OKLAHOMA CITY, OKLA.
OMAHA, NEBR.
PHILADELPHIA, PA.
PITTSBURG, PA.
RICHMOND, VA.
SALT LAKE CITY, UTAH
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SPOKANE, WASH.
TACOMA, WASH.
DETROIT, MICH.
MILWAUKEE, WIS
PORTLAND, ORE.

Products

HOLLOW METAL FIREPROOF DOORS.
METAL COVERED FIREPROOF DOORS.
METAL and METAL COVERED TRIM and FRAMES.

For Counterbalanced Freight Elevator Doors, Cross Horizontal Folding Doors, Saino Fire Doors, Rolling Steel Doors and Shutters, see pages 750-762.

Art Metal Hollow Metal Fireproof Doors

For use in office buildings, theaters, hotels, hospitals, public buildings, stores, residences, etc.

Construction—Doors are made of No. 20 furniture steel. Panels are insulated to retard the transmission of heat from one side to the other by compressed asbestos board, $\frac{3}{16}$ in. thick, placed between plates forming panels. The entire interior surface of stiles and rails is lined with ⅛-in. asbestos held in place by means of steel spring to sections throughout their entire length to deaden metallic sound or retard the transmission of heat.

All seams are interlocking and all joints process welded at miters so as to make them invisible. The rails are reinforced with steel stiffeners secured and welded to them and extending the full width of the door.

Steel reinforcement is provided for hardware.

Finish—These doors can be furnished in any color or to imitate any wood or other material.

Kal-O-Mine Metal Covered Fireproof Doors

Made both labeled and non-labeled. Stiles and rails are drawn in a perfectly straight line with sharp corners. Finished mouldings are made of cold drawn furniture metal and attached to the stiles and rails with patent lock strips.

Metal and Metal Covered Trim and Frames

Designed for office buildings, theaters, hotels, hospitals, public buildings, stores, residences, etc. Trim and mouldings are made in a large number of styles and shapes.

Underwriters' Approval

Doors, frames, trim and hardware have been approved by the Underwriters' Laboratories, Inc., of the National Board of Fire Underwriters, after thorough examination and tests. They are regularly inspected and labeled at our factory for openings in stair and elevator shafts, corridors, partitions and exterior walls.

Specifications, Hollow Metal Doors

(1) Hollow Metal Fireproof Doors—All door openings where so indicated on the drawings shall be hung with Art Metal Hollow Metal Fireproof Doors [Kal-O-Mine Metal Covered Doors] as manufactured by the VARIETY FIRE DOOR CO., Sacramento and Carroll Avenues, Chicago, Ill.

(2) Work to be Furnished by the Manufacturer—The VARIETY FIRE DOOR CO. shall furnish, freight allowed to freight station nearest building site, the following material: (a) Art Metal Hollow Metal Fireproof Doors [Kal-O-Mine Metal Covered Doors] for all openings as required by the drawings; (b) all doors to be properly crated for shipment.

(3) Sizes—All doors shall be....in. thick and of sizes as indicated by the drawings.

(4) Finish—All doors shall be finished as follows: [describe finish desired for the various doors]. Samples of finish to be submitted for the architect's approval.

(5) Hardware—All hardware intended to be attached to doors shall be furnished, carrying charges prepaid, by the hardware contractor at the factory of the manufacturer. This hardware shall be fitted to the doors by the manufacturer after the doors have been finished and before shipment.

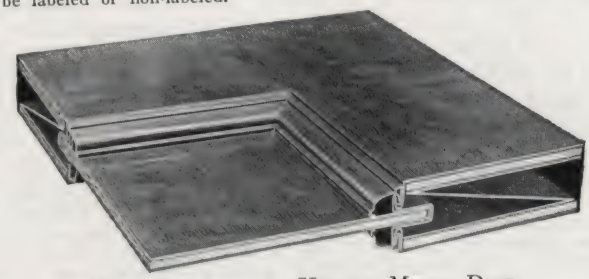
(6) Glazing—Doors, when so indicated on the drawings, shall be arranged for glazing by the manufacturer; glazing to be done by others.

(7) Hanging—Doors shall be hung by the .....contractor.

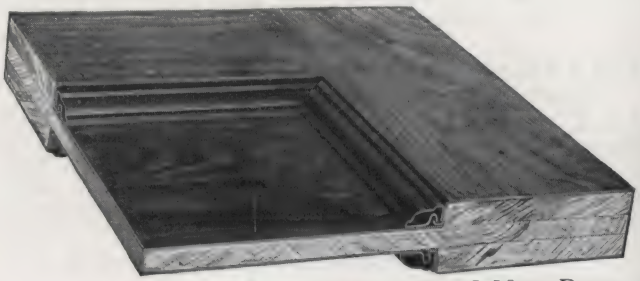
(8) Shop Drawings—The manufacturer shall furnish shop drawings in duplicate for the architect's approval.

(9) Underwriters' Approval—All doors described under the heading of hollow metal fireproof doors shall bear the Underwriters' Laboratories, Inc. label for the service for which they are intended.

Note: In specifying Kal-O-Mine doors, mention whether they are to be labeled or non-labeled.



DETAIL OF LABELED HOLLOW METAL DOOR



DETAIL OF LABELED ASBESTOS LINED KAL-O-MINE DOOR

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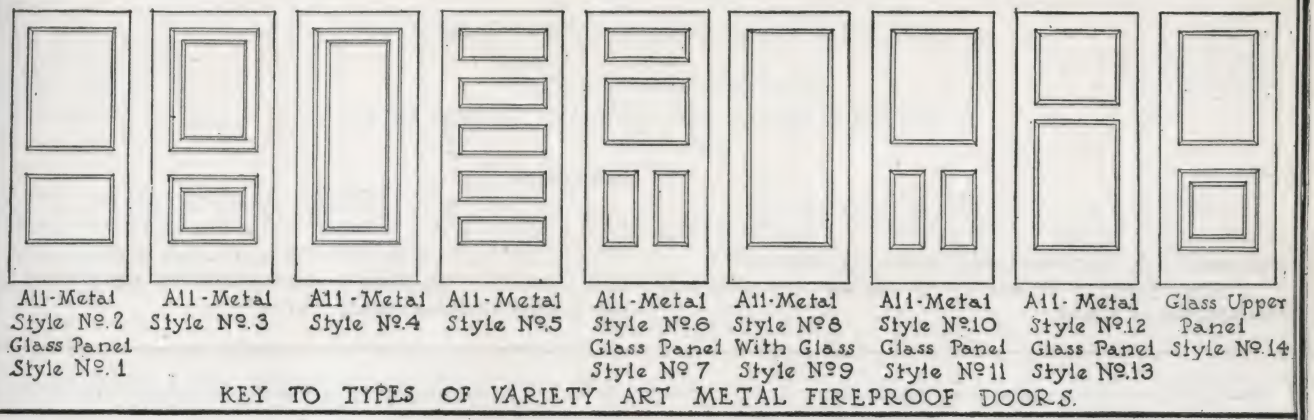
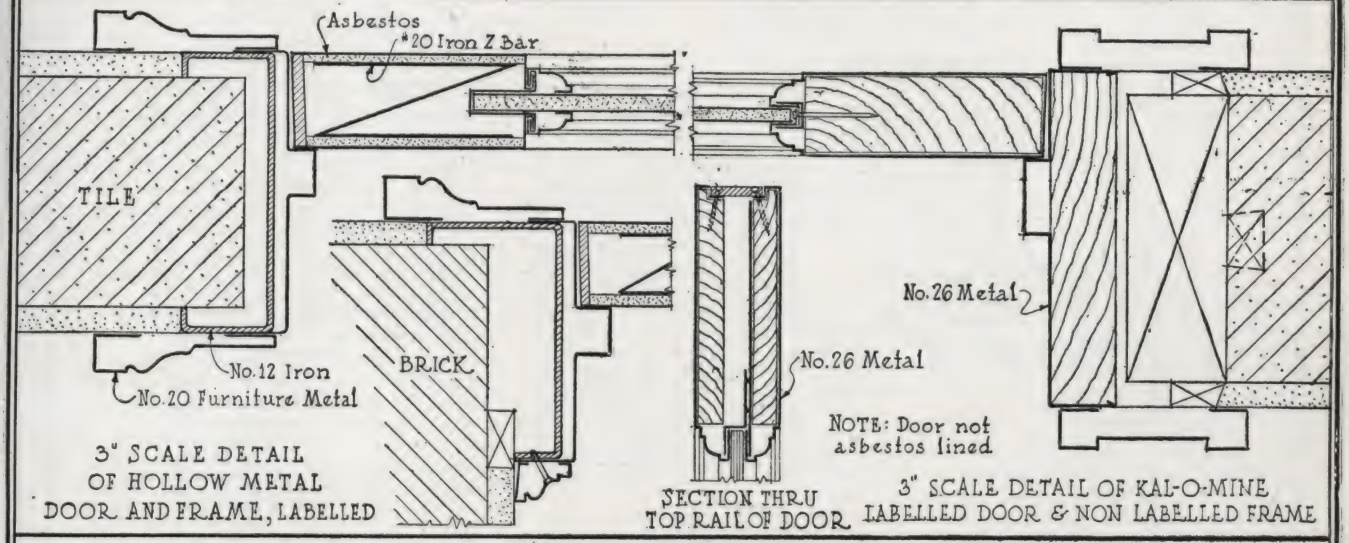


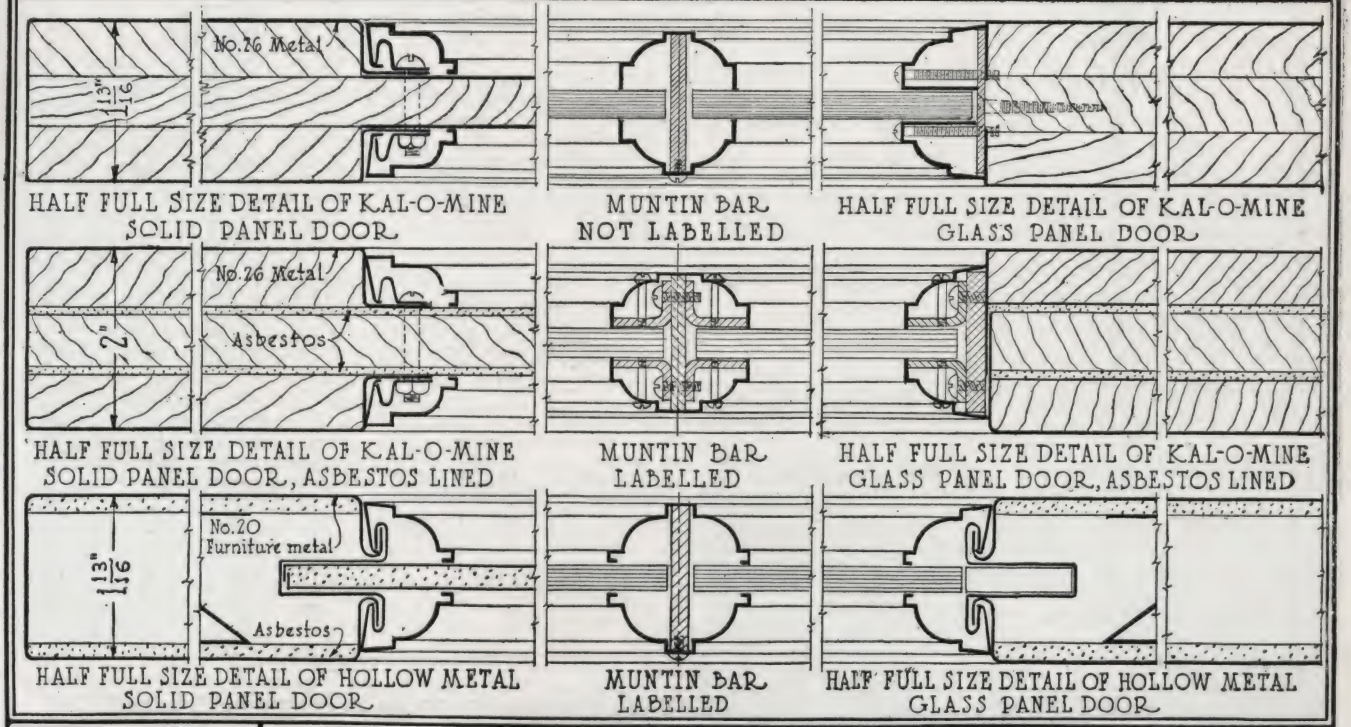
KEY TO TYPES OF VARIETY ART METAL FIREPROOF DOORS.



3" SCALE DETAIL OF HOLLOW METAL DOOR AND FRAME, LABELLED

SECTION THRU TOP RAIL OF DOOR

3" SCALE DETAIL OF KAL-O-MINE LABELLED DOOR & NON LABELLED FRAME



HALF FULL SIZE DETAIL OF KAL-O-MINE SOLID PANEL DOOR

MUNTIN BAR NOT LABELLED

HALF FULL SIZE DETAIL OF KAL-O-MINE GLASS PANEL DOOR

HALF FULL SIZE DETAIL OF KAL-O-MINE SOLID PANEL DOOR, ASBESTOS LINED

MUNTIN BAR LABELLED

HALF FULL SIZE DETAIL OF KAL-O-MINE GLASS PANEL DOOR, ASBESTOS LINED

HALF FULL SIZE DETAIL OF HOLLOW METAL SOLID PANEL DOOR

MUNTIN BAR LABELLED

HALF FULL SIZE DETAIL OF HOLLOW METAL GLASS PANEL DOOR

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DETAILS OF VARIETY ART METAL FIREPROOF DOORS AND TRIM	SCALE-½"&3" EQUALS-1'-0" DATE-AUG.20	DRWG K1

SOLAR-STURGES MFG. COMPANY

ARCHITECTURAL HOLLOW METAL DIVISION

COLUMBUS, OHIO

EXECUTIVE OFFICES
CHICAGO, ILL.

FACTORIES
CHICAGO, ILL.
COLUMBUS, OHIO

BRANCH OFFICES AND AGENCIES IN PRINCIPAL CITIES

Products

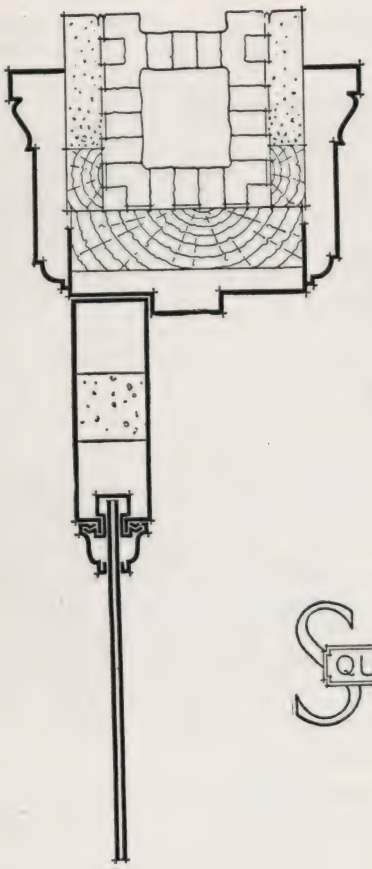
HOLLOW STEEL DOORS, FRAMES and TRIM.

Also Steel Smoke Screens, Partitions, Elevator Enclosures and Architectural Running Members.

Also Special Drawing, Forming and Manufacture of Shapes in Steel.

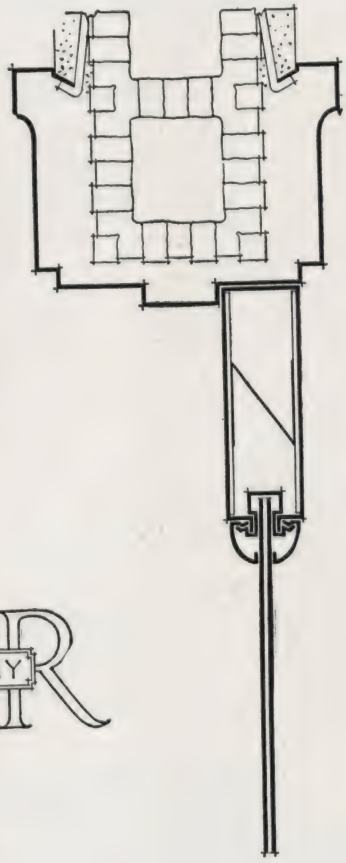
Catalogue

Our catalogue embodies standard types of various units, covering a complete range for building requirements. It is loose leaf, letter size, and is being amplified from time to time to keep pace with the growth of the hollow metal industry.



NOTE

WE ſTOCK ALL PARTſ FOR ſWING DOORſ 7'-0" HIGH & ſLIDING DOORſ 7'-0½" HIGH IN WIDTHſ RANGING FROM 1'-4" TO 4'-0" ADVANCING BY EVEN INCHES TO 2'-0" & EVEN TWO INCHES TO 4'-0". ſTANDARD ſTILE & TOP RAIL WIDTHſ ARE 3", 3½", 5" & 5½"; BOTTOM RAIL 1' 10" HIGH. DOOR THICKNESSES ARE 1⅜" & 1¾". THE OVER-ALL HEIGHT OF ſLIDING DOORſ ALLOWſ FOR ½" LAP AT TOP. DOOR ſIZESſ GIVEN ARE NEAT OVER-ALL ſIZESſ OF DOORſ-NOT OPENINGſ



SOLAR

QUALITY · SERVICE · ECONOMY

ſTANDARD HOLLOW ſTEEL DOOR, FRAME AND TRIM ſET ON WOOD BVCKſ. ſEE CATALOGVE FOR ſCOPE OF PROFILESſ AND HANDLING OF VARIOVſ CONDITIONſ

ſTANDARDIZATION INſVRESſ IMMEDIATE ſERVICE & ECONOMY IN MANVFACTVRE

ſTANDARD HOLLOW ſTEEL DOOR WITH COMBINATION BVCK AND FRAME. ſEE CATALOGVE FOR ſCOPE OF PROFILESſ AND HANDLING OF VARIOVſ CONDITIONſ

ſCALE 0 1 2 3 4	CABINET AND BVILT-IN TYPESſ OF ſWING DOOR FRAMESſ	ſHEET 1-ſC

BETZ BROS., INC.

Metal Covered Doors and Steel Toilet Partitions

FACTORY AND OFFICE

TELEPHONE
BERGEN 4924

James Avenue and Howell Street

JERSEY CITY, N. J.

REPRESENTED IN ALL PRINCIPAL CITIES

Products

METAL COVERED DOORS in Bronze, Copper, Kalamein, Galvanized Iron and Furniture Steel over wood.

STEELBILT SANITARY TOILET PARTITIONS.

Also manufacturers of Metal Covered Windows and Interior Trim; Underwriters' Fire Doors.

Brief Specification for a Steelbilt Door with Pressed Steel Buck

Specifications for a Steelbilt door with stiles and rails to be cover with No. 22 gage patent level furniture steel.

"Joints at stiles and rails to be special spot oxy-acetylene welded. Surface of doors to be thoroughly cleaned of oil and other impurities before applying baked enamel finish.*

Steelbilt buck to be made up of No. 16 gage single pickeled, 3-pass, cold rolled, box annealed and oiled steel of selected stock, free of scale and other imperfections, bent up in one piece, the trim forming integral parts of jamb and to be all in one piece.

Miters at corners to be welded by a special spot oxy-acetylene welding process, so as to make the entire frame one solid mass. Door to be neatly cut where hardware is to be applied and 1/8 in. thick reinforcements to be applied by special welding process.

Bucks to be sent to building with prime coat of baked enamel finish of color suitable to receive finishing coats which are to be later applied at building to suit color selected."

* Baked enamel finish for Steelbilt doors in a special process, the degree of heat varying from 200° to 280° Fahr. as required for special finishes. Finish can be of the various imitations of mahogany, circassian walnut or any other grained surfaces or it can be any one of our standard flat colors such as olive green, English brown, maroon or any of the various metal finishes such as verde-antique, stipple bronze or to match architect's sample.

STEELBILT DOOR WITH PRESSED STEEL METAL BUCK

References—

First National Bank, Exchange Place, Jersey City, N. J.
Bankers Trust Co., 57th St., and Madison Ave., New York, N. Y.
Excelsior Bank, 57th St. and Broadway, New York, N. Y.
Children's Building, 104th St. and 5th Ave., New York, N. Y.
New Jersey Trust Co., Bergen and Sip Aves., Jersey City, N. J.
Produce Exchange, 2 Broadway, New York, N. Y.
Combustion Engineering Building, Broad St., New York, N. Y.
State Theater, Boulevard, Jersey City, N. J.
Twin Theater, Fourth St., Union Hill, N. J.
Washington Life Building, 141 Broadway, New York, N. Y.

"Steelbilt" Sanitary Toilet Partitions

Specifications—*Partitions*—Made of steel with all parts electrically or oxy-acetylene welded. Practically indestructible. All surfaces where dust or dirt might collect have been eliminated. Made of heavy gage patent level steel, with stiles, rails and panels electrically welded together forming a unit. Post is formed with a lug at each end; bottom lug fits into a cast base which fastens to the floor, top fits into a cast cap, both of which allow for vertical adjustment (to correct unevenness of floor). Rear end of partition fits over and is bolted to a tee shape member, which is fastened to wall with expansion bolts, and is arranged for vertical and lateral adjustments to meet variable wall conditions.

BETZ Steelbilt TRADE MARK TOILET PARTITIONS

Doors—Stiles and rails are heavy gage drawn steel and are mitered and oxy-acetylene welded at corners, being electrically welded to panel. Joints are ground down to a smooth surface. When required, we can furnish doors only (separate from partitions) where partitions are of another material.

Caps and Bases—Castings for caps and bases neatly fitted. Caps made to receive 1-in. diameter pipe, which passes through same and serves as bracing for partitions. Base is made of a special composition non-corrosive metal and is fastened to floor through center in a concealed manner with expansion bolts.

Hardware—Special hinge, 2 rubber bumpers, 1 door pull and 1 latch for each compartment.

Finish—Furnished with 1 prime coat applied, or either one of the standard finishes such as olive green, maroon or English brown. Finish coats are baked on. Our standard olive green enamel finish is recommended where service and durability is a special requirement. Where required, we can furnish and quote prices on special finishes such as grained mahogany, oak or any other grained imitation of wood or special metal finish.

Erection—Partitions and doors are delivered ready for erection. We will erect partitions or they can be erected by customer's mechanic. They are easily erected and do not require specially trained men.

PARTITIONS AND DOORS IN STOCK

Partition		Partition		Door	
Width, ft. in.	Height, ft. in.	Width, ft. in.	Height, ft. in.	Width, ft. in.	Height, ft. in.
3—6	5—6	3—6	6—0	2— 8	4—6
4—0	from top of	4—0	from top of	2—10	
4—6	partition	4—6	partition	2— 8	5—0
5—0	to floor	5—0	to floor	2—10	

Above are sizes in stock, but standard sizes other than those mentioned can be furnished. Also special sizes and requirements, to suit conditions.

INSTALLATION "STEELBILT" TOILET PARTITIONS

THE CAMPBELL PRODUCTS CORPORATION

Manufacturers of Garage and Warehouse Doors

MINNEAPOLIS, MINN.

Products

Manufacturers of CAMPBELL FOUR-FOLD GARAGE or WAREHOUSE DOORS, in wood, metal covered and ornamental; STEEL and WOOD DOOR FRAMES; GARAGE DOOR HARDWARE; CAMPBELL POWER OPERATORS.

Service

The CAMPBELL PRODUCTS CORPORATION Engineering Department will gladly give any assistance in preparing plans and specifications.

Detailed drawings of doors, frames, hardware, etc., and special conditions of installations, will be furnished on request if architects will indicate their ideas.

Installation

After our steel frames have been built in, it ordinarily takes two men about a day to erect the doors and hang the power operator from the ceiling. There are only four bolts used to hold this operator. The steel frame, doors, hardware, and the power operator are all fitted together as a unit which eliminates practically all of the field labor. It is only necessary to drill four holes in the ceiling joist or slab to complete the erection of our equipment.

Erection plans and instructions are given with each shipment.

STANDARD CAMPBELL DOOR, STEEL FRAME AND HARDWARE

Campbell Doors

Campbell doors are made four-fold. They are made in wood, metal covered or ornamental.

Our standard stock sizes for doors and steel frames are:

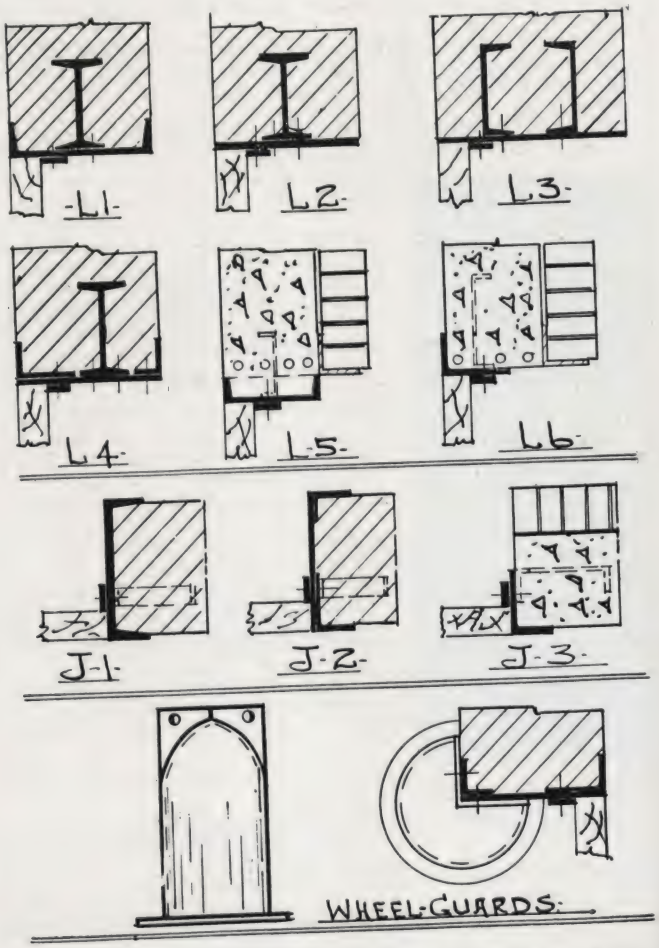
10 ft. x 10 ft. x 2¼ in.
11 ft. x 11 ft. x 2¼ in.
12 ft. x 12 ft. x 2⅝ in.

Stock sizes of doors are primed and painted and are air-dried from four to six months after leaving mill. They are made of pine, three-ply thick, glued and screwed and are as near proof against twisting as it is possible to make them. They do not come glazed.

The above are the sizes we recommend although we do make doors to fit any size opening.

Our doors are principally made for use in service garages, warehouses, creameries and bakeries.

We also manufacture four-fold doors of diamond mesh with steel frames. This type of door works very nicely with our power operator and is principally for use in the warmer climates where no other type of door is



DIFFERENT TYPES OF LINTELS, JAMBS, AND WHEEL GUARDS USED IN CAMPBELL STEEL FRAMES

Continued on next page

needed. Our power operator automatically locks these doors same as the wood doors.

Steel Frames

We manufacture any type of steel door frame with lintels to suit the load to be carried. Wheel guards are furnished with the steel frame if desired. For the installation of the hardware and operator, 12 inches are required over the bottom of the lintel; 12 inches are also required on either side of the opening to fold the doors back of the jamb. All frames have Campbell adjustable hinges built in them.

Wood frames are also furnished in place of steel if desired.

Hardware

Our hardware, tracks and hangers are all specially made to fit garage and warehouse types of doors. The hinges swing the doors entirely back of the jambs, leaving the entire door opening clear. The hinges swing on a cold-rolled shaft. Between all hinges is a brass washer which makes for the easy operation of the doors and prevents the rusting together of parts. The hardware is attached to the steel frame with cap screws and is made adjustable so that at any time should the doors require adjustment it can be taken care of very easily.

Campbell Power Operator

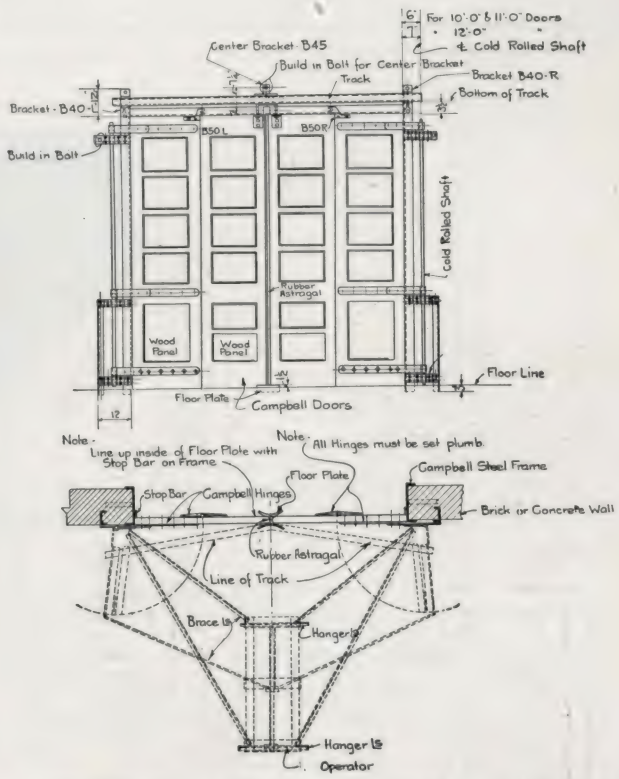
The Campbell power operator works by compressed air, being connected with any air pipe in the garage or directly with the air tank. The pressure reducing valve reduces the full tank pressure to the desired pressure for operating the doors. The pressure required to operate the average doors is from 10 to 25 lbs. depending on type, weight and condition of doors. The amount of air required to operate the door is so slight that the ordinary pressure gauge does not record it.

The door is opened or closed by touching a button which unlocks the door and at the same time opens the air valve which starts the door in motion, the operation of the door being controlled mechanically. There is a 5-in. adjustable air cushion at one end of the cylinder which cushions the door the last few inches of its travel either in opening or closing. The operation of the doors is very smooth and practically noiseless, making it an ideal operator for a garage in an apartment building or any place where the noise of gear driven operators is objectionable.

The operator is very strongly built and with proper oiling should last indefinitely. The cylinder is made of half hard seamless brass drawn tubing with ⅛ in. walls. Our operator and hardware can easily be applied to any four-fold doors already installed.

To any one desiring information regarding the merits of Campbell power doors and operators we will gladly furnish references.

Complete Equipment Showing Campbell Doors, Frame, Hardware and Operator



Elevation of Campbell Doors, Frames and Hardware
Dotted lines in plan shows position of Campbell power operator and doors open

ESTABLISHED 1893

A. C. CHESLEY CO.

Manufacturers of Standardized Fireproof Metal Covered Doors

MAIN OFFICE AND FACTORY
704 East 133rd Street
NEW YORK, N. Y.

TELEPHONE
MELROSE 2452, 2453

BRANCH OFFICES
DETROIT, MICH., 1023 Detroit Savings Bank Building
BOSTON, MASS., 46 Cornhill
OAKLAND, CAL., DARLING METAL & PIPE CO., 18th and Willow Streets
WASHINGTON, D. C., Pope Building

Products

CHESLEY STANDARDIZED FIREPROOF METAL COVERED DOORS, DOOR TRIM and DOOR FRAMES.

Also Metal Covered Work of the Highest Quality in Bronze, Brass, Copper, Long Terne (Kalamein) and Galvanized Iron; Tin Clad Fire Doors; Hollow Metal Windows.

Chesley Standardized Fireproof Doors

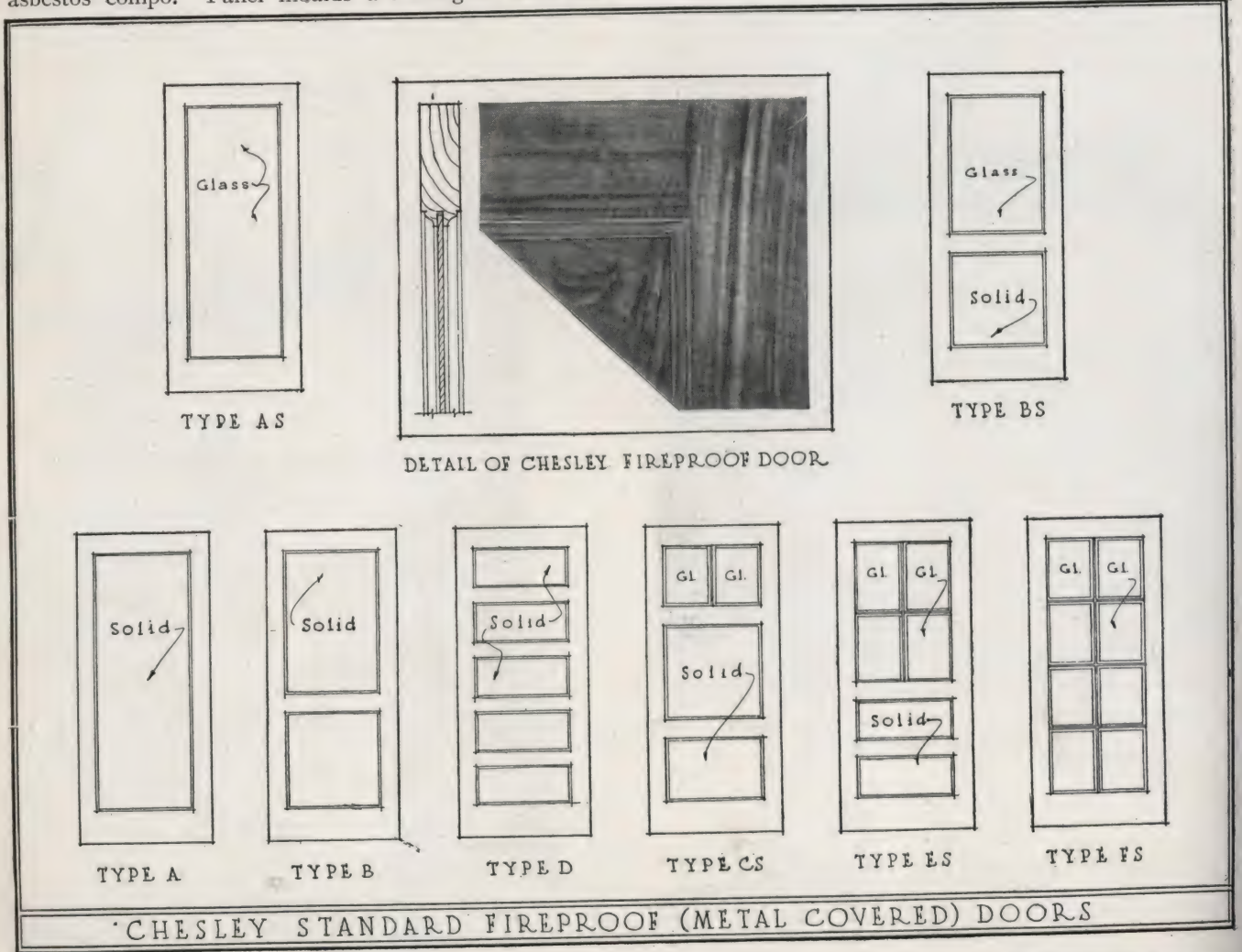
Shipped from Stock—These doors are produced in large quantities, thus cutting cost to a minimum. Large stocks are carried in various distributing points throughout the country, giving the advantage of *immediate delivery.*

Standardized—Chesley fireproof doors are standardized as to construction, sizes and styles.

Construction—Cores are made of well seasoned, kiln dried white pine with stiles and rails mortised and tenoned and glued together. Solid panels are lined with asbestos compo. Panel moulds are integral with the stiles and rails. All joints are *lock* joints with no bolts, rivets or screws (excepting for muntins) used in the construction. Every part of the wood core is covered, and there is no possibility of water or moisture getting into contact with the wood to cause swelling. In glazed construction the glazing strips are placed on the interior with the integral mouldings on the exterior, thus preventing mouldings becoming loose due to exposure. Joints between stiles and rails are *lock* joints with the surface joint soldered and smoothed off, producing practically an invisible connection (see detail showing the superiority of the Chesley lock joint over the ordinary method of construction). The mouldings are clean cut, producing a neat, light, strong door.

Uses and Approval—Chesley doors are for use wherever fireproof doors are required for the following locations: From corridors to rooms; staircase enclosures; elevator shafts. When required the Underwriters' Laboratory, Inc. label can be furnished.

These doors have been extensively used in office



CHESLEY STANDARD FIREPROOF (METAL COVERED) DOORS

Continued on next page

buildings, apartment houses, hospitals, schools, industrial plants, etc.

Appearance—In appearance, Chesley doors when painted or grained differ hardly at all from wood doors but afford the absolute fire protection of solid steel doors. Cost less than one-third more than the common wood door and from 50% to 100% less than hollow metal doors.

Types—Made in 8 standard types (see illustrations). Detached astragals which can be easily applied at the job are furnished for double doors (see detail).

Sizes—Made in 8 standard sizes as indicated in the following table. The dimensions given are the actual out and out sizes of the door. *Allowance should be made for saddles in setting door frames.*

Door size 2 ft. 6 in. x 7 ft. x 1¾ in.
Door size 2 ft. 8 in. x 7 ft. x 1¾ in.
Door size 2 ft. 10 in. x 7 ft. x 1¾ in.
Door size 3 ft. 0 in. x 7 ft. x 1¾ in.
Door size 3 ft. 2 in. x 7 ft. x 1¾ in.
Door size 3 ft. 4 in. x 7 ft. x 1¾ in.
Door size 3 ft. 6 in. x 7 ft. x 1¾ in.
Door size 3 ft. 8 in. x 7 ft. x 1¾ in.

Material of Covering—Chesley doors are covered with No. 26 gauge long terne plate (commonly known as kalamein iron) or with No. 26 gauge galvanized iron. Galvanized iron work is recommended for exterior work only.

Hardware and Glazing—Any type of hardware can be easily fitted at the job by any competent carpenter. Where ordered, hardware can be furnished and applied at the factory.

No glass is furnished by the Chesley Co. Any type of glass can, of course, be easily set at the job.

Priming—Chesley doors (also stock trim and door frames) are primed at the factory with the best quality metallic priming coat.

Standardized Metal Covered Trim and Door Frames

Chesley standardized metal covered trim is made ⅞ in. thick by 3 in. wide with rounded edges (see detail). It has mitered heads, built up at factory, and is of dimensions to accurately fit Chesley doors.

Chesley standardized metal covered door frames are solid rabbeted frames, 1¾ in. thick by 5¾ in. wide and dimensions to accurately fit Chesley doors. ¾ in. quarter-round cover moulds are furnished for plaster or masonry jambs where required.

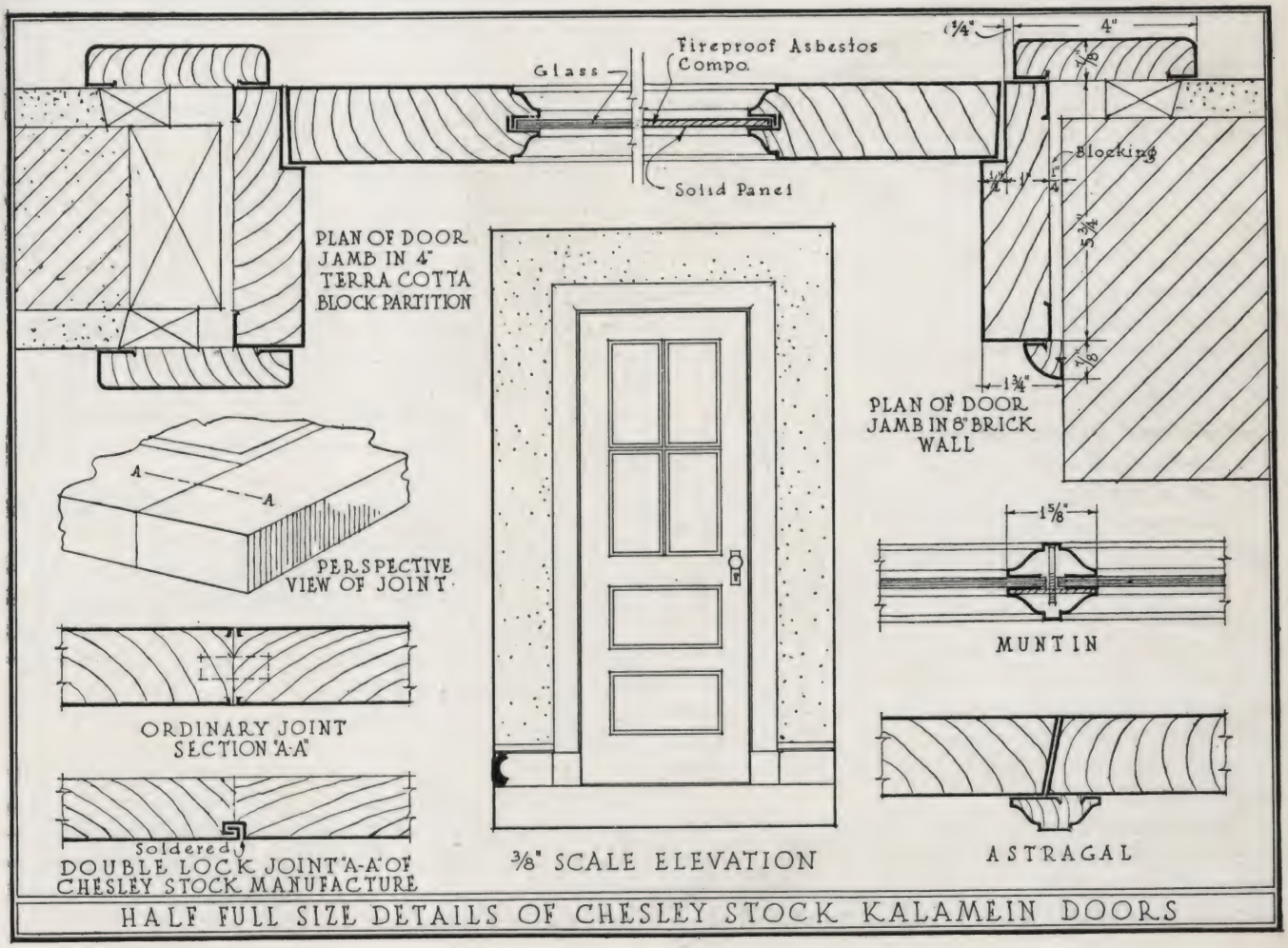
Trim and frames are also made to suit any condition according to architect's details.

Stock trim is not furnished with plinths. Plinths can be furnished at small extra charge.

Specifications

Fireproof Doors—All fireproof doors throughout (mention location) (or marked "FP" on drawings) shall be metal covered doors as manufactured by A. C. Chesley Co., 704 East 133rd Street, New York, N. Y., of dimensions indicated on the drawings. (Architect should refer to table for stock sizes.) Doors marked "GL" on drawings shall be Type (mention type). Solid doors shall be Type (mention type). Interior doors shall be covered with long terne plate. Exterior doors shall be covered with galvanized iron. Doors to be hung by and all hardware to be furnished and fitted by the (carpenter contractor). All glazing and painting, excepting priming coat, to be done by the (painting and glazing contractor).

Metal Covered Trim and Door Frames—All fireproof doors to have Chesley metal covered, stock trim and door frames consisting of ⅞x4-in. trim on each side (or trim on one side and ¾-in. cover mould on the other side) and 1¾x5¾-in. metal covered door frames.



COBURN TROLLEY TRACK MFG. CO.

Metal Covered Doors and Finish

HOLYOKE, MASS.

WAREROOMS

NEW YORK, N. Y., 44-46 Duane Street
PHILADELPHIA, PA., 422 Commerce Street
CLEVELAND, OHIO, 1009 Oregon Avenue
CHICAGO ILL., 220 North Wabash Avenue
BOSTON, MASS., 108 Broad Street

Products

Manufacturers of METAL COVERED DOORS and FINISH for general interior use; METAL COVERED DUMBWAITER DOORS.

Also Bronze and Copper Entrances.

For Tin Clad Fire Doors and Shutters, see pages 723-727; for Sliding Door Hardware, see pages 1228-1232.

Facilities and Shipping

This company is prepared to handle orders of any size for all parts of the country. A large modern plant, with direct rail connection, insures the fabrication and delivery of all work promptly and in a satisfactory manner.

Metal Covered Doors and Trim

Coburn metal covered doors are furnished both labeled and unlabeled for use in office buildings, hospitals, public buildings, hotels, theaters, stores, residences, etc. These include stair, elevator, fire escape, tower, corridor and partition doors for general interior work and entrance doors in copper, bronze, and brass.

Coburn standard doors are made with kiln dried white pine cores; rails are tenoned into stiles; panels are grooved into stiles and rails. Cores are covered with kalamein or galvanized iron, bronze, copper or brass.

For standard details and application of labeled and unlabeled doors showing mouldings and panels, see drawing No. K1.

Underwriters' Labeled Kalamein Doors

Coburn underwriters' labeled kalamein doors when installed as specified below for the purposes indicated, will give maximum protection and procure minimum rates for the insuring of the building and its contents.

Standard Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 72 in. wide. Panels to be solid. Hung on angle iron frames for brick walls and channel frames for tile walls or for metal lath and plaster partitions, with strap hinges and latches or butts and lock sets. Doors to stairs should be made self-closing. Doors may be hung on metal covered jambs.

Fire Escape and Tower Doors—Labeled for same size openings as stair and elevator doors and can include glass panels not exceeding 5 sq. ft. in area. May be hung in the same manner as stair and elevator doors.

Corridor and Partition Doors—Labeled to receive 9 sq. ft. of wire glass. No limit specified as to size of door.

Specifications for Kalamein and Metal Covered Work

The following specifications are applied to the manufacture of all Coburn metal covered work and comply strictly with the most approved methods of construction for labeled and unlabeled doors and trim.

Cores—All woodwork used in the manufacture of door and window frames, jambs, doors, sash and trim to be seasoned, clear, kiln dried white pine. Stiles more than 6 in. wide to be built up of strips glued together. All door and sash members to be mortised and tenoned together.

Trim—Trim for doors to be mitered and assembled, but to be shipped knocked down and fitted in the field so that any irregularities may be taken up at the job.

Metal—All covering to be of 16-oz. copper, bronze or brass, or of No. 26 kalamein or galvanized iron.

Covering of Cores—*Unlabeled Doors*—The metal is to be applied directly over the cores. All metal must fit closely to the wood cores. All surfaces and edges are to be straight and true; mouldings to be as per details. Bench marks are to be avoided as much as possible and cut ends at miters are to be covered with the same metal as used on mouldings. Thickness of door is 1¾ in.

Labeled Doors—Are to be covered in the same manner as the unlabeled doors except that stiles, rails and panels are to be first covered with asbestos before the metal is applied. Thickness of door is 1⅞ in.

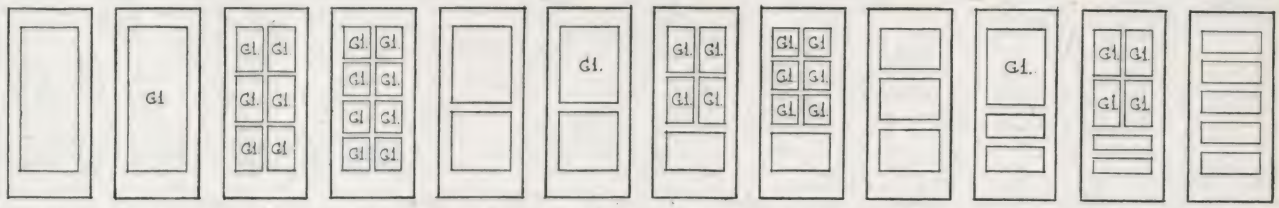
All joints of metal to be locked and soldered so that no moisture can gain entrance to the cores.

Finishing—After metal work is erected, all surfaces of copper, bronze or brass must be cleaned and a coat of lacquer applied. Kalamein and galvanized iron surfaces must be cleaned and one heavy coat of grey lead and oil paint applied.

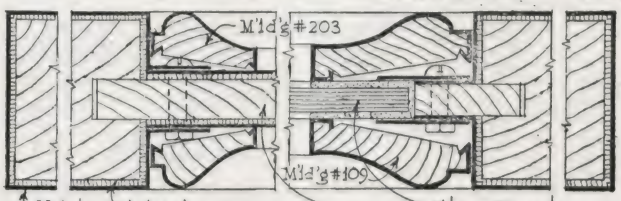
Hardware

Hardware is not included in quotation, except on request with full information and specifications. Where desired, complete sets of approved hardware can be furnished, in which case information as to number of butts to each door and location of all hardware to be applied to doors should be given.

Continued on next page

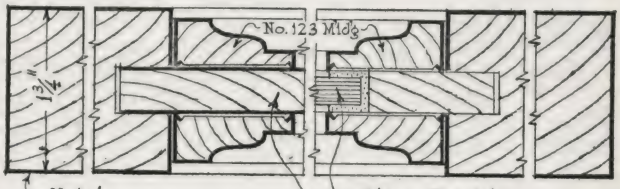


STANDARD KALAMEIN DOORS.



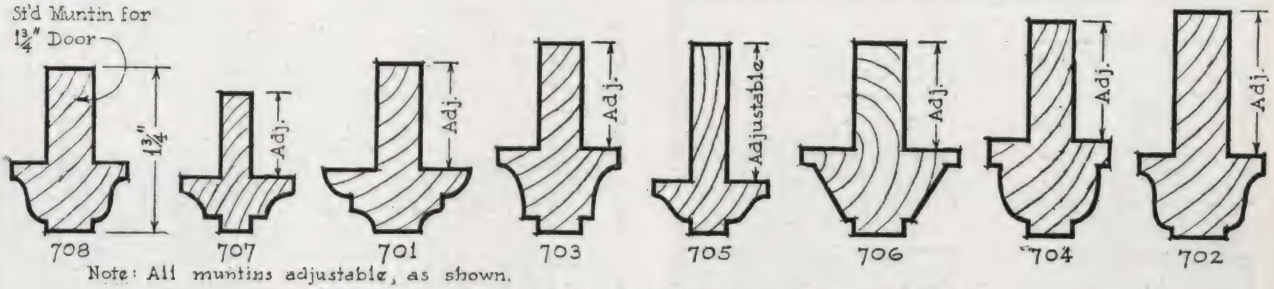
Metal and Asbestos Covered Panel

ONE-HALF FULL SIZE DETAILS OF UNDERWRITERS' LABELED DOOR.



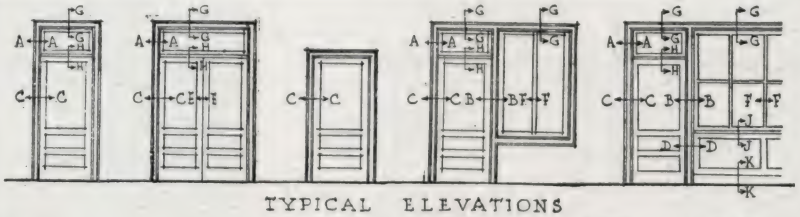
Metal Covered Wood Panel

ONE-HALF FULL SIZE DETAILS OF UNLABELED METAL-COVERED DOOR

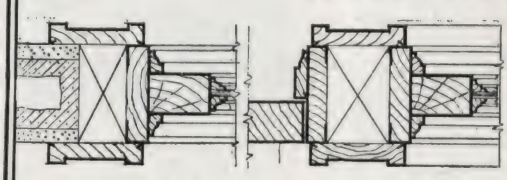


Note: All muntins adjustable, as shown.

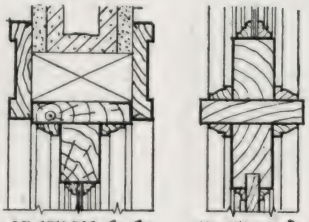
ONE-HALF FULL SIZE STANDARD MUNTIN BARS.



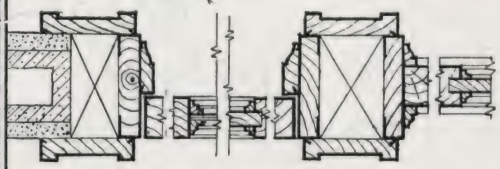
TYPICAL ELEVATIONS



SECTION A-A SECTION B-B

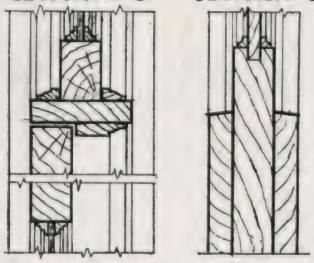


SECTION G-G SECTION J-J



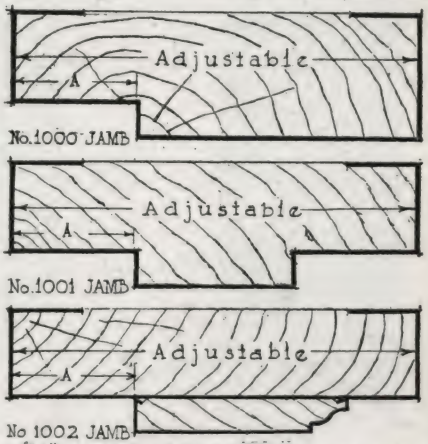
SECTION C-C SECTION D-D

SECTION E-E SECTION F-F



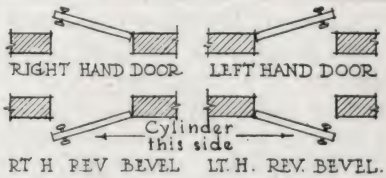
SECTION H-H SECTION K-K

1½" SCALE DETAILS OF STANDARD KALAMEIN DOOR AND SASH.



"A" is 2" for St'd Labeled Doors, & is 1⅞" for St'd Unlabeled Doors. This dimension can be varied for special heavy doors.

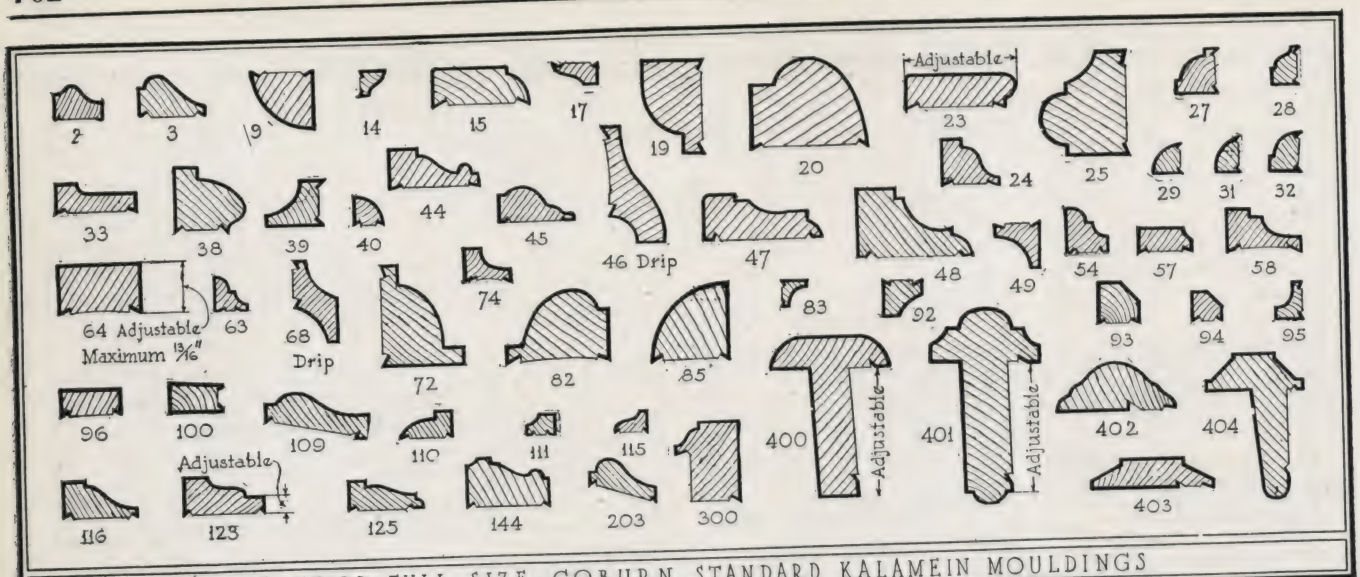
ONE-HALF FULL SIZE DETAILS OF STANDARD JAMBS.



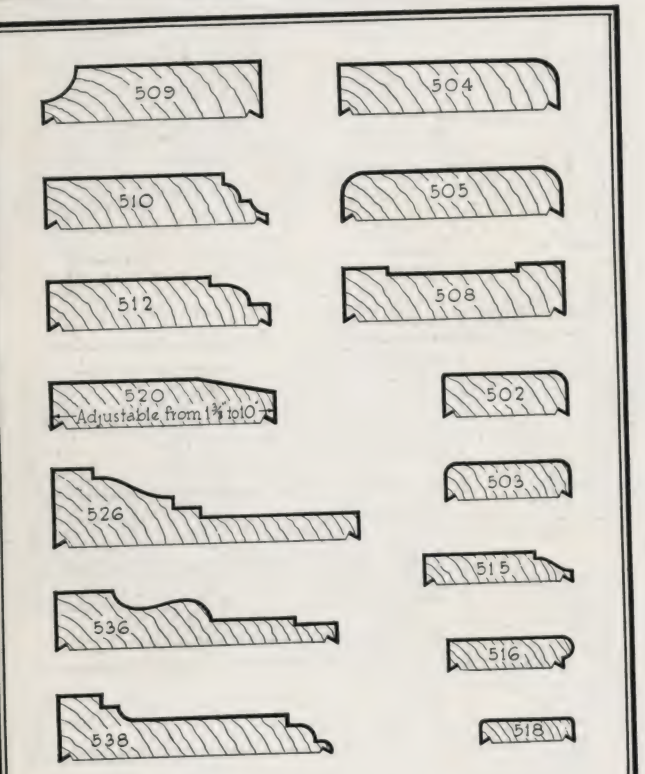
DESIGNATIONS OF DOOR-SWINGS.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF TYPICAL COBURN METAL COVERED DOORS AND SASH.	SCALE 1½" & 6" EQUALS 1'-0" DATE, MAY 21	DRWG K-1

Continued on next page

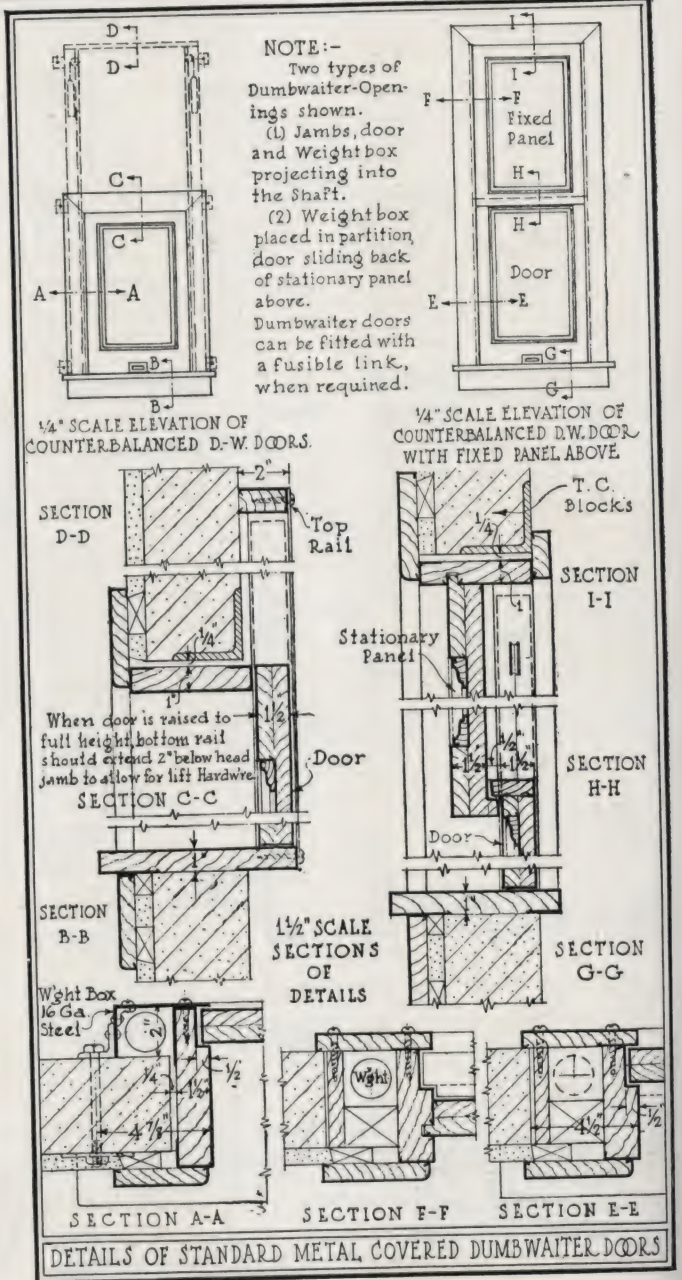


ONE THIRD FULL SIZE COBURN STANDARD KALAMEIN MOULDINGS



NOTE:- Widths of these sections are adjustable except Nos 536 and 538

ONE THIRD FULL SIZE STANDARD KALAMEIN TRIM



DETAILS OF STANDARD METAL COVERED DUMBWAITER DOORS

Metal Covered Dumbwaiter Doors

Coburn kalamein dumbwaiter doors are made to fit two conditions of openings: (1) Where jambs, door and weight box project into the shaft; (2) where door slides back of a stationary panel above with weight box placed in partition. The accompanying drawing shows details of both types.

These doors are constructed in a similar manner and of the same materials as the stair and elevator doors previously described, being made both labeled and unlabeled. They can be furnished to be hung with sash weights, chain and sash pulleys, and with fusible link if required, or with sash balances as desired.

THE COMPOUND AND PYRONO DOOR CO.

SUCCESSORS TO THE COMPOUND DOOR CO., ST. JOSEPH, MICH., AND THE PYRONO PROCESS CO., COLUMBUS, OHIO

ST. JOSEPH, MICH.

AGENCIES

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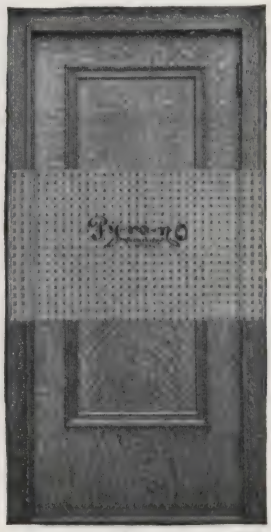
Products

PYRONO FIREPROOF DOORS and TRIM for openings to stairways, passenger and service elevators, vertical shafts, corridor and room partitions; in office buildings, hotels, hospitals, apartments, schools, dormitories, etc.

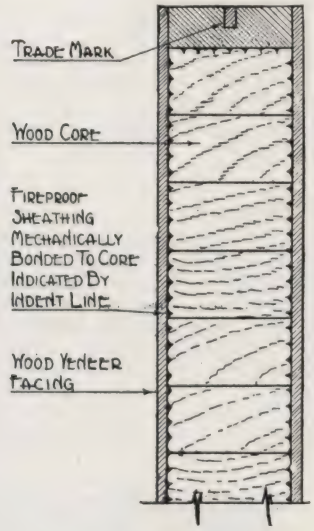
SPECIAL COMPOUND VENEERED DOORS of all kinds and for all purposes of high grade work.

Pyrono Fireproof Doors and Trim

Process of Construction—The PYRONO process is a well-known mechanical method of fireproofing wood cores in the manufacture of interior finish. Cores are first covered with a fireproof sheathing made of pure asbestos, which, by heavy pressure at numerous points, is indented into the core wood. The fireproof sheathing in permanent contact with the core, excludes oxygen



PYRONO DOOR



DETAIL OF PYRONO DOOR

essential to combustion, preventing ignition, and at the same time permitting, through small openings at the base of the indents, the escape of gases developed from the core wood under high temperatures.

Over the indented asbestos sheathing are laid wood veneers which in gluing are brought into direct contact with the core through the indents, which may be seen in the illustration, wherein a portion of the veneer is omitted, exposing to view the indented sheathing magnified. These face veneers are furnished in any cabinet woods desired.

Designs—PYRONO products are made in accordance with architect's designs, and also according to factory designs provided for all common uses, prints of which will be furnished on application.

Installation—PYRONO doors and trim are installed by carpenters, and hardware is applied just as for wood doors. PYRONO should therefore be included in the specifications for carpenter work.

Special Compound Veneered Doors

Process of Construction—Architects' attention is especially directed to the COMPOUND veneered construction for stiles and rails. Cores are built up of thoroughly kiln dried pine or chestnut. Stile and rail veneers are sawed ¼ in. thick.

Both cores and veneers are then prepared for gluing, being machined with tongue and groove process to form perfectly tight joints when glued, and presenting a gluing surface practically 100% greater than with veneers glued flat. The illustration shows this construction in a sectional detail of a COMPOUND veneered door stile.

All features of construction, including the manufacture of panels, machining and assembling, follow the best practice designed for quality results.

SPECIAL COMPOUND VENEERED DOOR

DETAIL OF SPECIAL COMPOUND VENEERED DOOR

In addition to COMPOUND veneered panel and sash doors, flush veneered doors are manufactured by us on a large scale—all designed for special work.

Details—In special work architects' details are faithfully followed, and whenever desired we will gladly co-operate in suggesting practical methods of construction.

Recent Installations of Compound Doors

Memorial Quadrangle, Yale University, New Haven, Conn.
Hotel Bellevue-Stratford, Philadelphia, Pa.
City Club, Boston, Mass.
Conway Building, Chicago, Ill.
City Hospital, Buffalo, N. Y.
Fifth Avenue Hospital, New York, N. Y.
Dime Savings Bank Building, Detroit, Mich.

Supervision

Individual attention is given all features of every order throughout manufacture, thus assuring that supervision of details and construction that is so essential in interpreting architects' desires in high grade work.

EMPIRE FIREPROOF DOOR CO.

EMPIRE KALAMEIN CO., INC., SUBSIDIARY

Metal Covered Doors, Windows and Trim

435 Southern Boulevard

NEW YORK, N. Y.

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DALLAS, TEX.
EL PASO, TEX.
NORFOLK, VA.
SEATTLE, WASH.
SPOKANE, WASH.
TACOMA, WASH.
SALT LAKE CITY, UTAH

Products

METAL COVERED DOORS, WINDOWS, DOOR FRAMES and TRIM, ELEVATOR FRONTS, SMOKE SCREENS and PARTITIONS.

Also manufacturers Underwriters' Labeled Tin Clad Fire Doors.

METAL COVERED EMPIRE DOORS & WINDOWS
KALAMEIN PRODUCTS
TRADE-MARK Registered

"Empire Commercial" Metal Covered Doors

Through ten years of specialization in the manufacture of metal covered work, we have evolved a product in which we take just pride—the "Empire Commercial" metal covered door, suitable for any class of fireproof work.

Details—*Cores*—Sound kiln dried white pine milled in one piece, sanded and finished accurately, for cores of stiles and rails.

Covering—Long terne or galvanized, Nos. 26 and 28 gauge. Drawn on through steel dies; sharp angles and arrises; tight and free from waves and buckles.

Panels—⅜-in. thick, built up of a special fiber board meeting requirements of city and state building departments, with No. 28 gauge sheets on both sides glued tight under flat press.

Assembly—Doors are mortised and tenoned, wedged and glued. Seams soldered and scraped, producing a perfect and smooth surface. Under ordinary use seams are guaranteed not to split.

Finish—All material receives 1 coat of special metallic primer.

Underwriters' Labeled Doors—Type A, B, C, D, E. F, R, T, U and V can be furnished with underwriters' labels to meet requirements for stair enclosures, exterior fire escapes and corridor partitions.

Empire Metal Covered Windows

Double hung or casement type windows are made in our standard design, or they will be manufactured to meet special conditions. The construction follows, in general, the strictest standard requirements. Great care is taken to secure tight seams and joints to counteract the natural effects of exposure.

Empire Integro Window—Details are the same as described for the standard window, with addition of special interlocking features which combine to produce all the effect of a weatherstripped window.

Empire Metal Covered Smoke Screens and Partitions

For enclosing stair halls, corridors and subdividing office space. We manufacture in any design and size.

Empire Metal Covered Elevator Fronts

Years of use have proved these practical and substantial in every respect. In addition to their lightness and easy operating features, they are an effective fire retardant.

Empire Metal Covered Work in Copper or Bronze

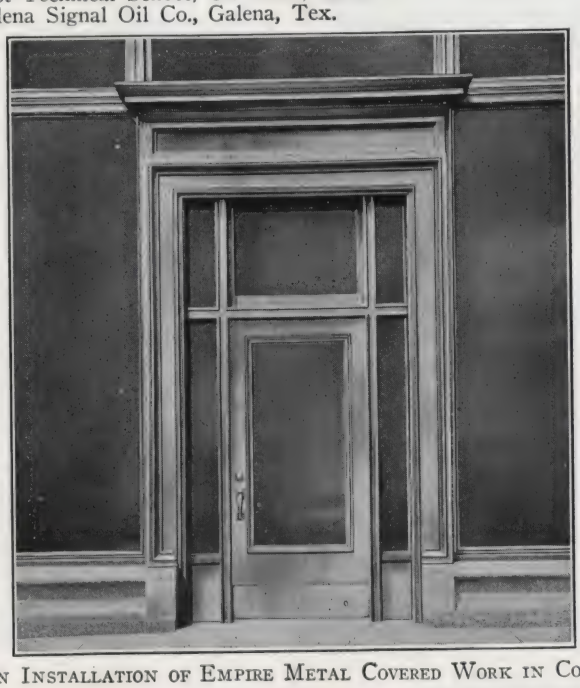
We especially recommend metal covered bronze or copper as a substitute for more costly materials (such as rolled or cast bronze) where price is a factor. Details, except for covering, are the same as described for "Empire Commercial" doors. On account of its long service there need be no hesitation in using it where durability is desired.

Empire Service

The company is always ready to co-operate with the architectural profession. We are ready at all times to furnish suggestive details or technical information in relation to our products.

References

Colfax Power Station, Springdale, Pa.
Hanna Office and Theater Annex, Cleveland, Ohio.
New Stanley Theater, Philadelphia, Pa.
Loew's State Theater, Indianapolis, Ind.
Denver Post Building, Denver, Colo.
W. U. Rust Investment Co. Building, Tacoma, Wash.
Loew's Warehouse, Buffalo, N. Y.
Imperial Tobacco Co., Norfolk, Va.
Liberty Trust Co., Cumberland, Md.
Mercantile Trust Co., Baltimore, Md.
East Technical School, Cleveland, Ohio.
Galena Signal Oil Co., Galena, Tex.



AN INSTALLATION OF EMPIRE METAL COVERED WORK IN COPPER

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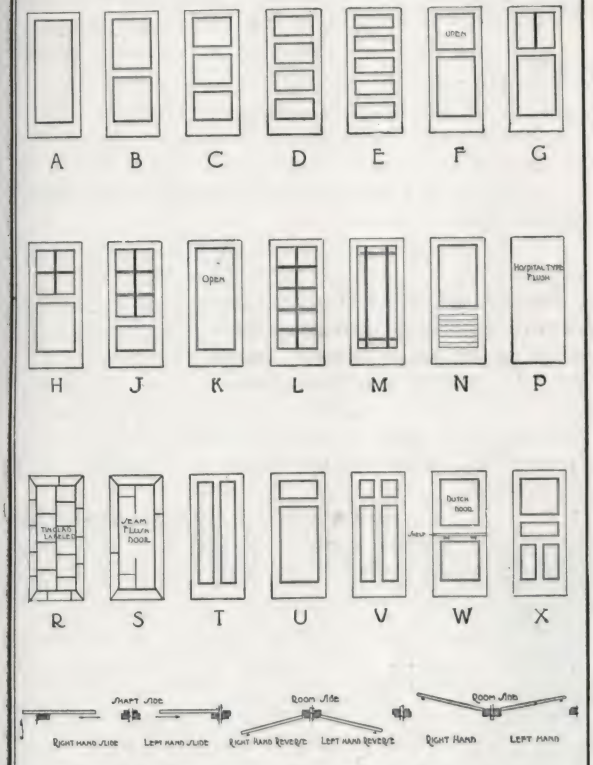
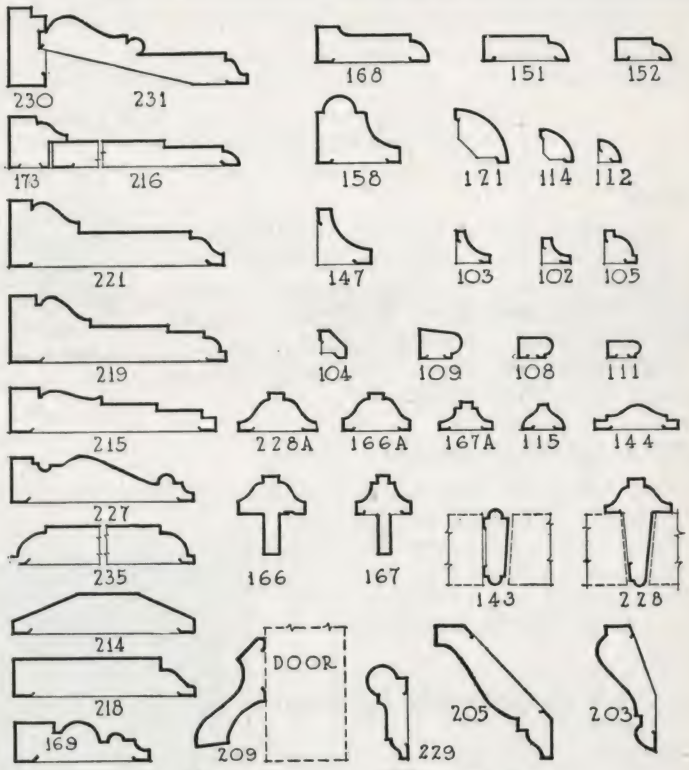


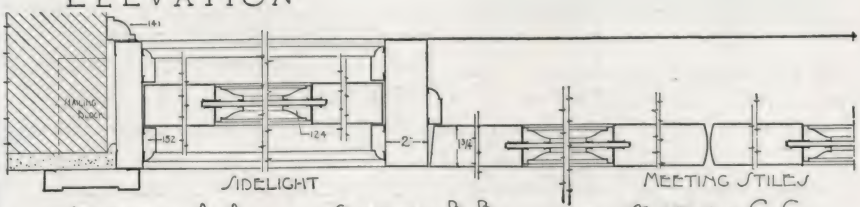
STANDARD DOORS



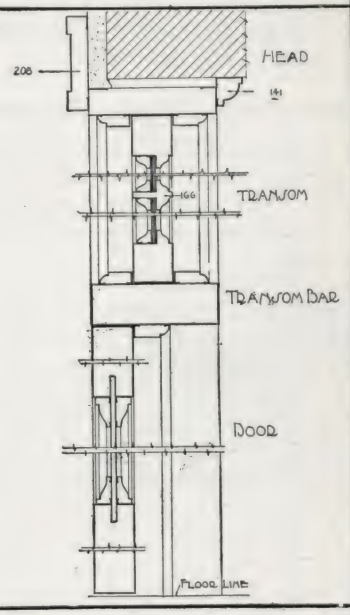
STOCK TRIM

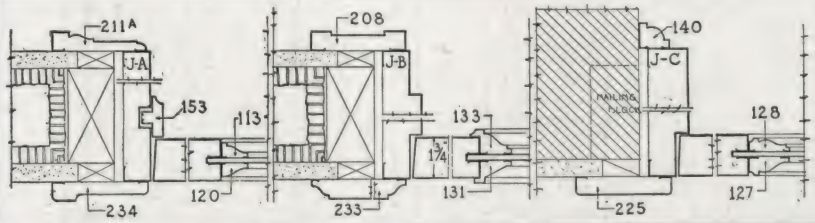
STANDARD SMOKE SCREEN

ELEVATION



SECTION A A SECTION B B SECTION C C





STANDARD JAMB SECTIONS

DRAWN BY EMPIRE FIREPROOF DOOR CO..	STANDARD DETAILS EMPIRE FIREPROOF DOOR CO.,	SCALE 1½" & 3" EQUALS 1 FT. DATE JUNE '21	DR'WG. 1

E. H. FRIEDRICH COMPANY

Manufacturers of Metal Covered Doors, Windows, Partitions and Trim

HOLYOKE, MASS.

CONNECTICUT REPRESENTATIVE, A. K. KIRSCHNER CO., Plymouth Building, New Haven, Conn.
BOSTON REPRESENTATIVE, W. J. GROSVENOR & CO., 8 Beacon Street, Boston, Mass.

Products

High grade METAL COVERED WOODWORK for fireproof and sanitary purposes, including Doors and Trim, Windows, Partitions, etc., in Kalamein, Copper, Bronze and Steel, FIREPROOF HOLLOW METAL WINDOWS with underwriters' label.

Also manufacturers of a general line of Building Sheet Metal Work.

TRADE-MARK

Facilities and Workmanship

Our factory is especially well equipped to produce any design in high grade metal covered woodwork or hollow metal windows suitable for buildings such as banks, public office and school buildings. This work can be executed promptly and efficiently.

High Grade Metal Covered Entrance Doors

The manufacturing of highest grade metal covered entrance doors is our specialty.

They are made in copper, commercial bronze or brass.

Metal Covered Door Construction

Metal covered doors are made in kalamein iron of No. 26 to No. 20 gauge lead coated sheets and in No. 20 to No. 26 gauge copper or commercial bronze.

The wood used is best grade white pine, free from knots, dry rot or sap, thoroughly seasoned and air dried before going through factory.

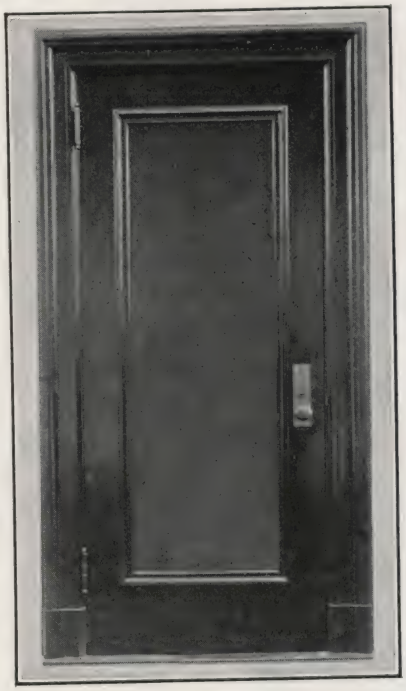
The stiles and rails are properly mortised and tenoned and screwed together; not nailed.

Panels are built up and covered with metal both sides.

Mouldings are drawn true and clean to design, neatly mitered and screwed in place.

The metal for all doors is glued to the woodwork under heavy pressure which eliminates any buckles or dents showing up in the doors. The metal on stiles and rails is butted and turned down into the wood and joints soldered and scraped smooth. Standard thickness for metal covered doors is 1¾ in. An asbestos lining between metal and wood is supplied if required.

The types of typical doors are shown below. These are suggested stock doors but may be varied to suit any detail.



A FRIEDRICH METAL COVERED DOOR
Hardware applied at factory

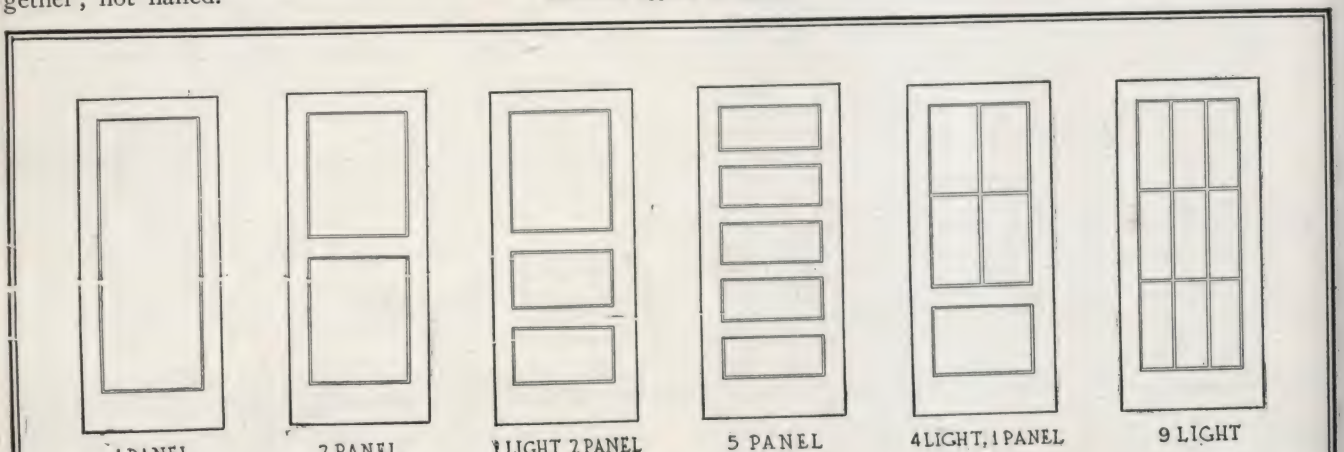
Finish

All bronze and copper work is properly cleaned with acid and waxed before it leaves the factory to prevent corrosion, or finished to comply with architect's requirements.

Kalamein and steel products are cleaned and painted with one coat of special metal primer.

Hardware

The hardware for kalamein work is usually supplied by the general contractor and matches the other hardware in the building. It is suggested that hardware samples be sent to this factory before doors are shipped. They can then be fitted at very little cost and a good job is assured. This method is always recommended.



DETAILS SHOWING STOCK KALAMEIN DOOR DESIGNS

Continued on next page

Glazing

The glazing of doors or sash is optional with the contractor but glass can be supplied if required.

Metal Covered Mouldings

In order to economize in designing metal covered work, a number of standard stock mouldings for panels, trims, etc., have been shown at the scale of 3 in. to the foot. By using these mouldings the cost of special dies is saved.

Kalamein Elevator Doors

We make a specialty of metal covered elevator doors in kalamein, copper or bronze.

These are furnished in three types: swing, slide, or combination slide and swing, and in any design. Mouldings to be standard to fit our dies.

Doors can be furnished complete with hardware.

Hollow Metal Windows

A complete line of hollow metal windows, underwriters' label, of all types is manufactured by this company. This includes counterbalanced, stationary, pivoted, and combinations of these types.

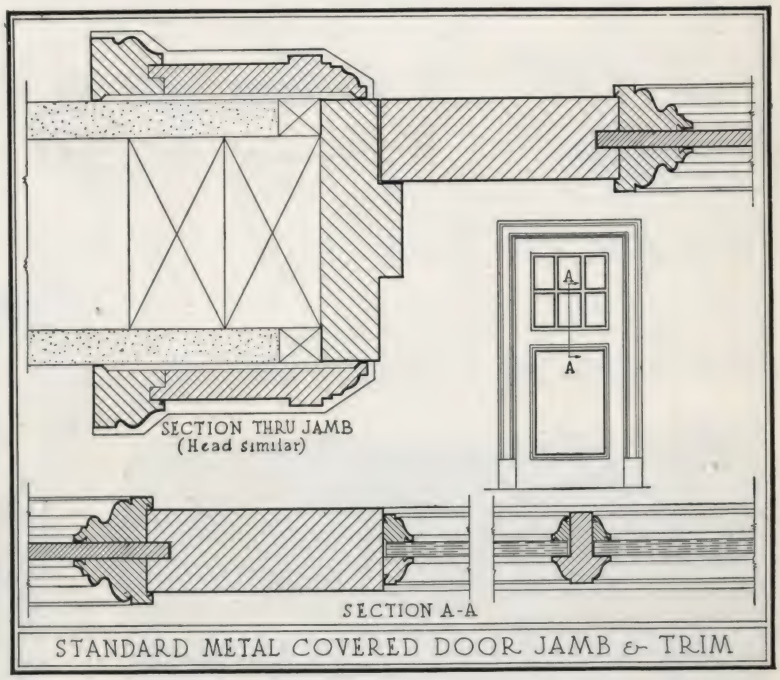
All windows are made with cutting and forming dies which insure the fitting of every member when assembled and perfect operating window. Made in standard No. 24 gauge, also Heavy Type No. 20 gauge.

Specifications and details sent on request.

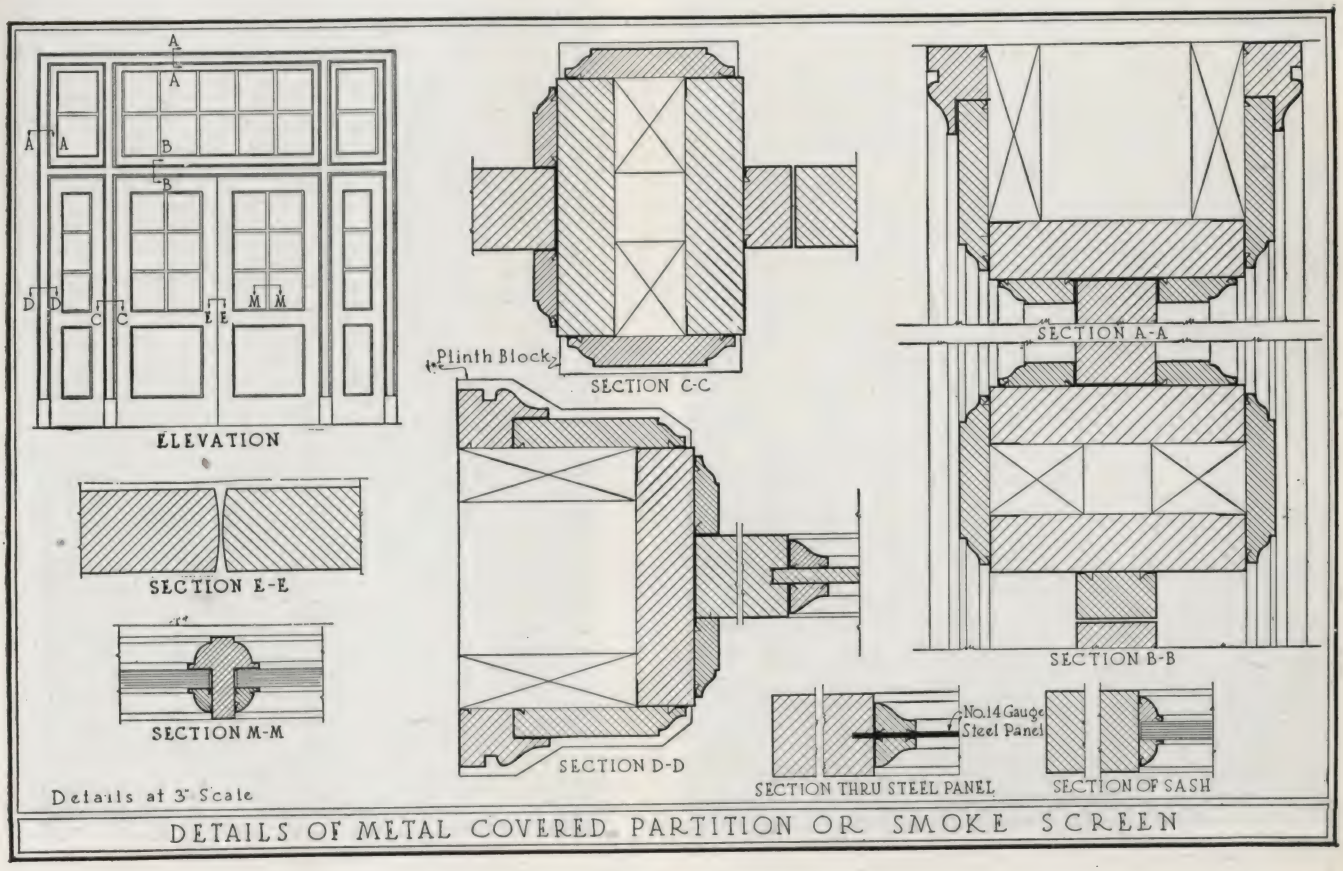
Sheet Metal Work

Our factory has a modern equipment for the manufacture and erection of all kinds of building sheet metal work.

This includes skylights; architectural sheet metal work such as marquises, and ornamental fronts for buildings.



STANDARD METAL COVERED DOOR JAMB & TRIM



DETAILS OF METAL COVERED PARTITION OR SMOKE SCREEN

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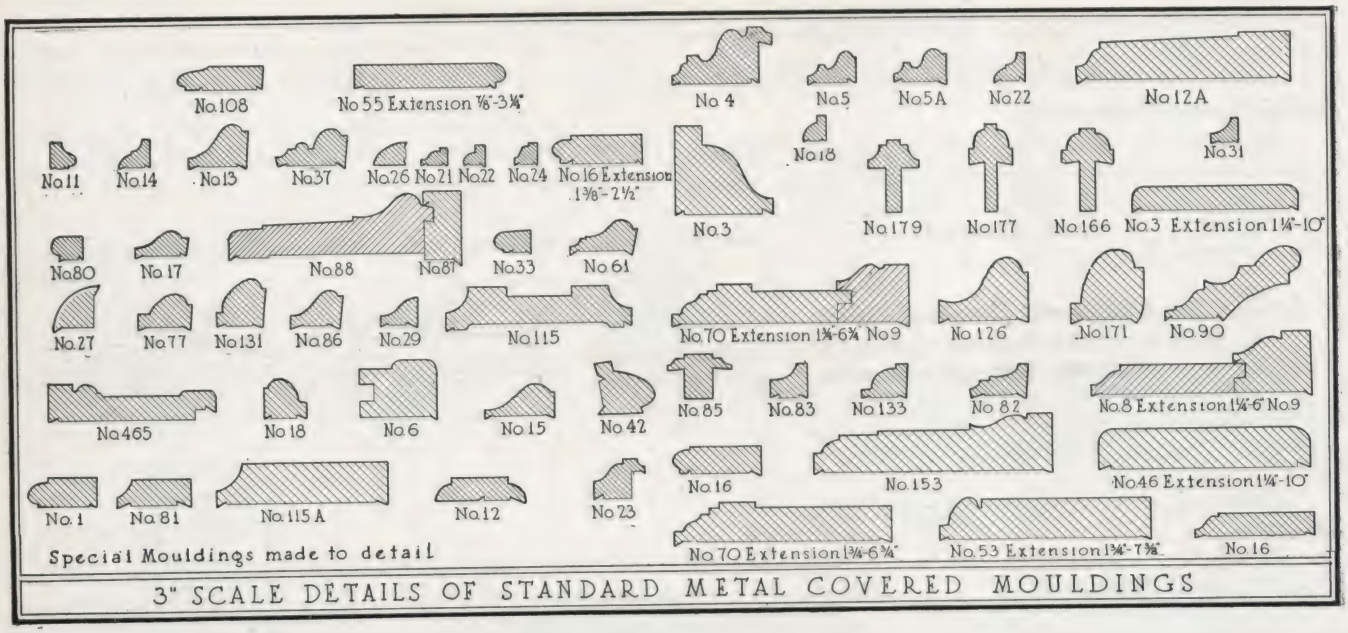


3" SCALE DETAILS OF STANDARD METAL COVERED MOULDINGS

FRONT ENTRANCE DOOR MADE IN KALAMEIN COPPER OR BRONZE

BRONZE COVERED ENTRANCE DOOR FOR HIGH CLASS WORK

PENN METAL COMPANY

Manufacturers of Fire Resistive Doors and Windows

65 Franklin Street
BOSTON, MASS.

SALES OFFICES

PHILADELPHIA, PA., 25th and Wharton Streets — PORTLAND, ME., 95 Exchange Street

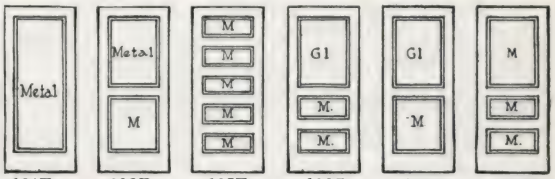
EXPORT OFFICE, Corner of First and Washington Streets, JERSEY CITY, N. J.

Products

PENCO METAL COVERED DOORS, FRAMES, TRIM, WINDOWS, ENTRANCES and PARTITIONS; TIN CLAD FIRE DOORS; STANDARD ROLLED STEEL BUCK, FRAME and TRIM UNITS.

For Metal Lath and Lathing Accessories, see page 265; for Steel Shelving and Lockers, see page 2065.

TRADE-MARK



101P 102P 105P 103G 102G 103P

STANDARD STYLES OF PENCO KALAMEIN DOORS

Penco Metal Covered Doors, Frames and Trim

Made by drawing sheet metal through steel dies over a wood core of clear white pine. This process practically welds the metal covering to its core, eliminates all buckles and brings out all moulding members in clear relief. Made in kalamein iron, galvanized steel, Hampton metal, copper and low brass, in sections tongued, grooved and pinned together, and finished with a priming coat of gray paint.

No. 102P. PENCO METAL COVERED DOOR

Stock sizes (door size); 2 ft. 8 in.x6 ft. 8 in., 2 ft. 10 in.x7 ft., 3 ft.x7 ft.

Sizes and styles in kalamein iron as illustrated are carried in stock for immediate shipment. Special styles and sizes furnished on short notice.

Penco Metal Covered Windows

Penco windows are superior owing to their simple construction, ease of operation, fire retarding qualities, and the unusually high standard maintained in regard to the materials used in their construction. They combine safety, economy, durability and weatherproofness.

Made for all classes of buildings in all required types and sizes, either from our own or architects' details and to conform with requirements of the National Board of Fire Underwriters. Furnished glazed or unglazed, with or without hardware, as required.

Penco Metal Covered Entrances

Penco bronze or copper covered entrances are made in accordance with architects' details to meet every requirement. They are a striking feature of many prominent public and private buildings and have all the advantages and the appearance of cast metal doors without the extreme weight or cost.

Penco Tin Clad Fire Doors and Shutters

Penco tin clad fire doors and shutters are made in any style and size to meet either standard or unusual and special conditions. Doors are furnished with or without hardware, either f. o. b. cars Boston, or installed complete at the option of the purchaser.

Penco Metal Covered Partitions

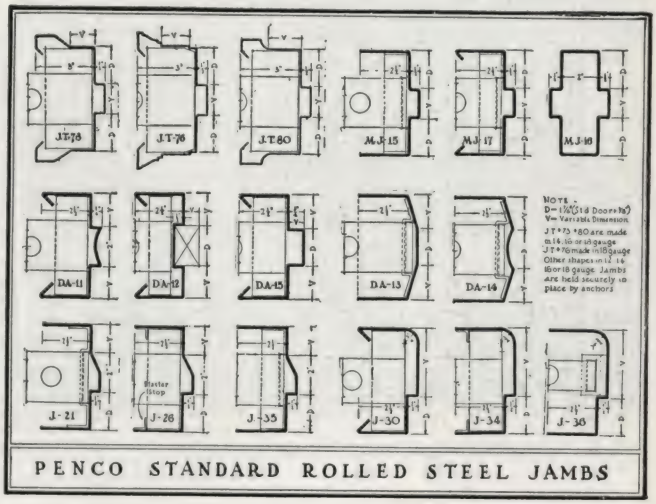
Kalamein iron, brass, copper or bronze covered, constructed from architects' details. Extensively used as office partitions, stair case and elevator enclosures, etc. To eliminate the cost of special dies, it is recommended that Penco standard moulding be used, many designs of which are available and details of which may be had on request.

Penco Standard Rolled Steel Buck, Frame and Trim Units

These door frames and trim units are made of heavy sections, formed from cold rolled sheet steel. The weight of the metal used varies from Nos. 12 to 18 gauge, according to the conditions to be met.

The miters are process welded. Anchor plates, welded to the frame, are provided to extend into the masonry joints, thus providing a perfectly rigid integral combination of buck, frame and trim.

Made in variable sizes to meet practically any condition. Finished with priming coat of gray paint before leaving factory.



PENCO STANDARD ROLLED STEEL JAMBS

ESTABLISHED 1876

HERRMANN & GRACE CO.

Manufacturers of Hollow Metal Windows, Fireproof Doors and Waste Chutes

671-689 Bergen Street

BROOKLYN, N. Y.

Products

UNDERWRITERS' HOLLOW METAL WINDOWS, METAL COVERED DOORS and PRESSED STEEL BUCKS; ACME WASTE CHUTES.

Underwriters' Hollow Metal Windows

Made double hung, pivoted and casement of No. 24 gauge galvanized iron, genuine ingot iron or Toncan metal. Where an exceptionally high class window construction is desired, 20-oz. cold rolled copper is recommended.

Labeled double hung hollow metal windows can also be furnished in No. 16 gauge steel or iron.

Drawings and specifications sent on request.

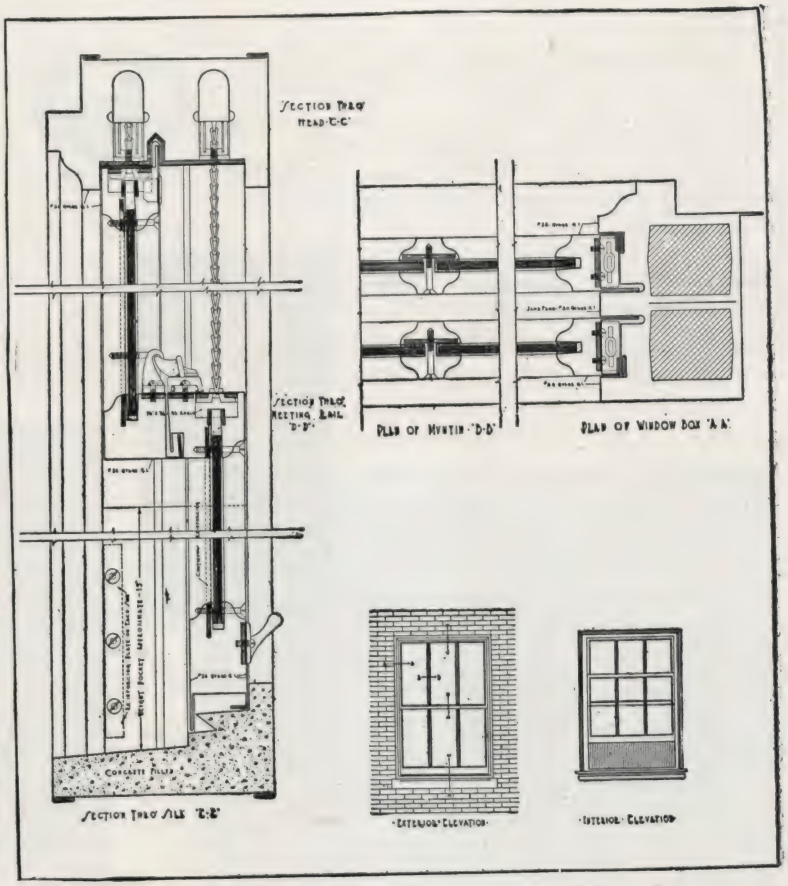
Acme Waste Chute

Acme waste chutes provide a method for rapidly and conveniently disposing of waste paper and rubbish in stores, offices and manufacturing plants.

They are fireproof, foolproof, prevent the accumulation of waste paper, and send it directly to the baling room. They are easily installed and are so constructed as to eliminate back draft when in operation.

Over 400 Acme waste chutes have been installed in various buildings in the United States, including 82 in the new garment center Capital Building, New York, N. Y. Also:

National Cloak & Suit Co., New York, N. Y., and Kansas City, Mo.
Hill Publishing Co., New York, N. Y.
Heywood & Strasser, New York, N. Y.
Einstein-Wolff Building, New York, N. Y.
Malley Stores, New Haven, Conn.
Hutzler Bros Baltimore, Md.
Louis Fox Stores, Fort Wayne, Ind.



TYPE "A" DOUBLE HUNG HOLLOW METAL WINDOW

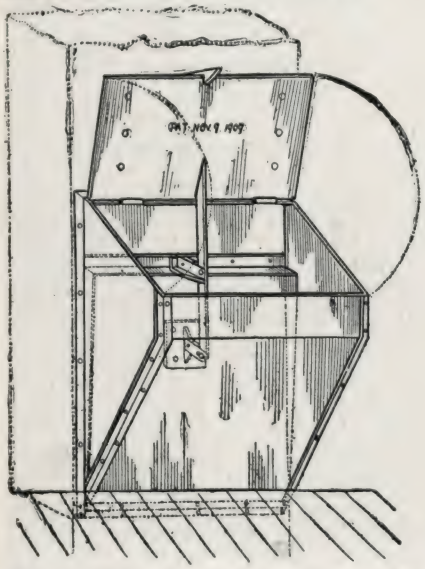


FIG. 1. Outer Door Open, Inner Door Locked

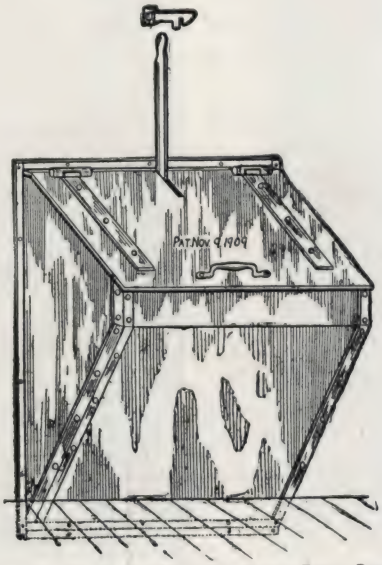


FIG. 2. Outer Door Closed, Inner Door Open

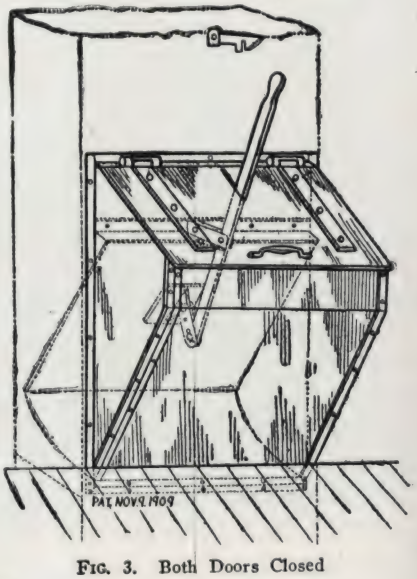


FIG. 3. Both Doors Closed

SHOWING OPERATION OF THE ACME WASTE CHUTE

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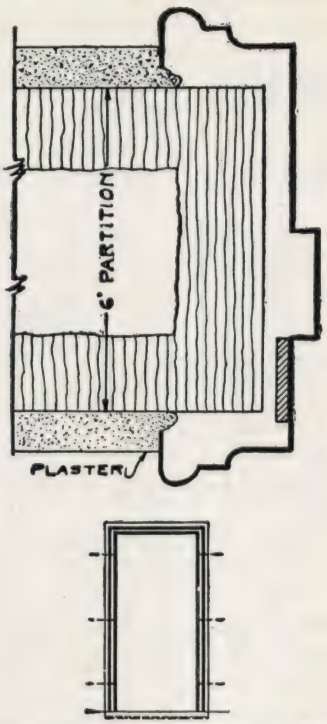
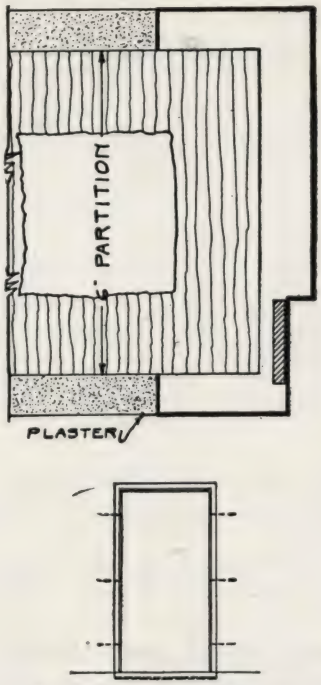


COMBINATION STEEL BUCK AND TRIM



STEEL BUCK FOR HOSPITAL

Pressed Steel Bucks

Herrmann & Grace pressed steel bucks are easily installed at the building and are unequalled for durability, economy and appearance. They are made in various types in Nos. 14, 16 and 18 gauge steel.

Fireproof Doors

Herrmann & Grace doors have been tested and approved by the Underwriters' Laboratories at Chicago and bear their labels, which insures the best of workmanship and materials. They have been installed in many of the highest class buildings in the country, and have given unqualified satisfaction.

These doors are made with kiln dried white pine cores and can be furnished covered with kalamein or galvanized iron, bronze, copper or brass. They include stair, elevator, fire escape, corridor and partition doors for interiors and copper, bronze and brass covered entrance doors. Also labeled tin clad doors for factories, warehouses, etc.

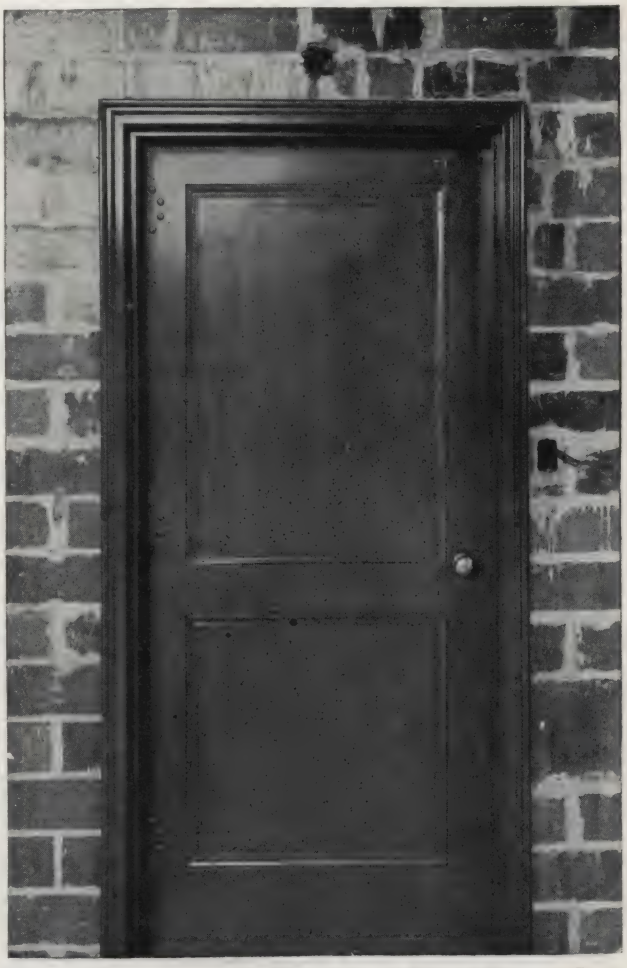
Specifications sent on request.

Following is a list of recent installations of Herrmann & Grace fireproof doors:

Allerton House, 55th Street and Madison Avenue, New York, N. Y.
University Club, 8 West 55th Street, New York, N. Y.
East River Savings Institute, 295 Broadway, New York, N. Y.
Brooklyn Trust Co., Pierpont, Clinton and Montague Streets, Brooklyn, N. Y.
American Exchange Bank, Broadway and Cedar Streets, New York, N. Y.
Macy Building, 34th Street and Broadway, New York, N. Y.
Brooklyn Union Gas Co., 172-178 Remsen Street, Brooklyn, N. Y.
Bush Building, 131-133 West 41st Street, New York, N. Y.
Hotel Bossert, Hicks and Remsen Streets, Brooklyn, N. Y.
Bancroft Hotel, Worcester, Mass.
First National Bank, Wall Street and Broadway, New York, N. Y.
Arbuckle-Beecher Memorial Building, Orange and Hicks Streets, Brooklyn, N. Y.
Globe Theater, 46th Street and Broadway, New York, N. Y.
Title Guarantee & Trust Co., 176 Broadway, New York, N. Y.
Midwood Trust Co., Flatbush Avenue and Dorchester Road, Brooklyn, N. Y.

Facilities

This company's large modern factory, fully equipped with the latest machinery, guarantees prompt attention to all orders entrusted to it.



TYPICAL INSTALLATION OF HERRMANN & GRACE PRESSED STEEL BUCKS AND UNDERWRITERS' LABELED METAL COVERED DOOR

HOWELL, FIELD & GODDARD, INC.

Metal Covered Doors, Windows, Steel Bucks and Trim; Asphalt Shingles

Review Avenue, Young and Gilbert Streets
LONG ISLAND CITY, N. Y.

Telephones: Office and Factory, Hunters Point 1901 and 1902

Products

STANDWELL METAL COVERED DOORS.
ALL-STEEL COMBINATION BUCKS, JAMBS and TRIM, plain or moulded.
ELEVATOR FRONTS, all steel and metal covered.
ALL-STEEL BUCKS and METAL COVERED JAMBS.

Standwell Metal Covered Doors (Patented)

In the Standwell construction, the metal covering is of Nos. 22 and 24 gage selected steel, made in tubular form entirely covering the wood cores. The metal is joined together and to the panels by welding, making the basic construction of the door one piece, which insures effective fire retardation.

The joints between stiles and rails are locked by a patented process (section AA below). This method makes the strongest joint possible to produce, also insuring that the metal surfaces of stiles and rails are flush and smooth without the use of a plastic filler. The joints, being filled with solder in the process, are polished over and are practically invisible.

The white pine cores used in the Standwell door serve a double purpose: making an absolute sound deadener (there being no metallic rattle to a Standwell door), also preventing any warping if door is subjected to fire. It also makes the application of hardware a simple matter, as templates are not required in advance as on all-steel doors.

Standwell doors are particularly suited for vertical shaft protection such as stairs and elevators where underwriters' labels are required.

Doors of types 1, 3 and 4, will be carried in stock for immediate delivery in sizes as shown by schedule.

When ordering by schedule, note that jamb opening size is between jambs and from head jamb to finished floor. Allowance on finished door size is made for joint and for saddle.

Architects can, by using Standwell doors of sizes and designs shown, make a distinct saving for their clients, and owing to the H. F. G. standardized methods of manufacture be assured always of a uniform high quality and quick delivery.

STANDWELL DOOR SIZES FOR SWING DOORS

WIDTHS

Single Doors				Pairs of Doors			
Jamb opening, ft.	in.	Finished door, ft.	in.	Jamb opening, ft.	in.	Each finished door, ft.	in.
*2	6	2	5 13/16	*5	0	2	5 13/16
2	7	2	6 13/16	5	2	2	6 13/16
*2	8	2	7 13/16	*5	4	2	7 13/16
2	9	2	8 13/16	5	6	2	8 13/16
*2	10	2	9 13/16	*5	8	2	9 13/16
2	11	2	10 13/16	5	10	2	10 13/16
*3	0	2	11 13/16	*6	0	2	11 13/16
3	1	3	0 13/16	6	2	3	0 13/16
*3	2	3	1 13/16	*6	4	3	1 13/16
3	3	3	2 13/16	6	6	3	2 13/16
*3	4	3	3 13/16	*6	8	3	3 13/16
3	5	3	4 13/16	6	10	3	4 13/16
*3	6	3	5 13/16	*7	0	3	5 13/16
3	7	3	6 13/16	7	2	3	6 13/16
3	8	3	7 13/16	7	4	3	7 13/16

HEIGHTS

Jamb opening, ft.	in.	Finished door, ft.	in.	Jamb opening, ft.	in.	Finished door, ft.	in.
6	8	6	7 5/16	7	2	7	1 5/16
6	9	6	8 5/16	7	3	7	2 5/16
*6	10	6	9 5/16	7	4	7	3 5/16
6	11	6	10 5/16	7	5	7	4 5/16
*7	0	6	11 5/16	7	6	7	5 5/16
7	1	7	0 5/16				

*Carried in stock.

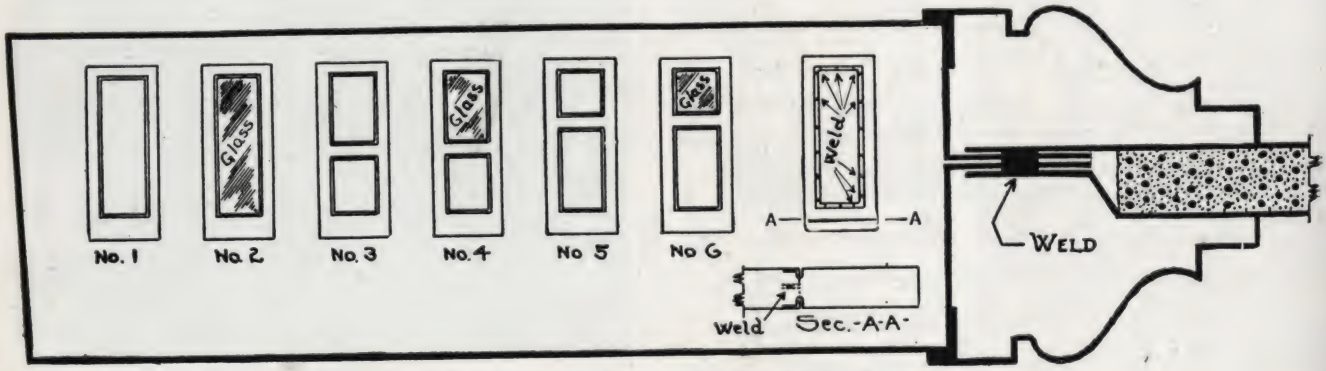


FIG. 1. STANDARD DESIGNS FOR STANDWELL DOORS

Continued on next page

All-steel Combined Bucks, Jambs and Trim

Bucks of this type, as shown in Figs. 2 to 13 can not be excelled for beauty, strength, durability or economy. They are easily installed at the building, and eliminate the necessity of using rough bucks, separate jambs and plaster grounds.

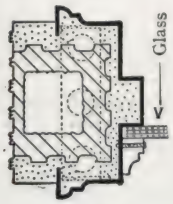


FIG. 2 SPECIAL MOULDED STEEL CORRIDOR SASH BUCK

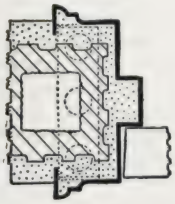


FIG. 3 SPECIAL MOULDED STEEL DOOR BUCK

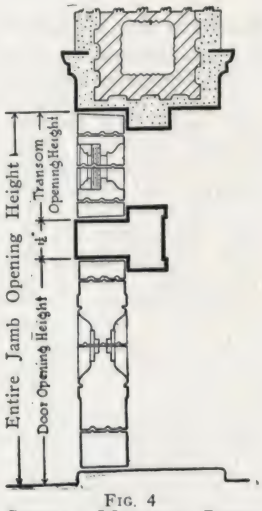


FIG. 4 SPECIAL MOULDED STEEL DOOR BUCK AND TRANSOM

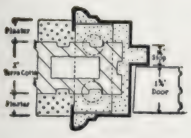


FIG. 5 BUCK FOR 2-IN. TERRA COTTA WALLS

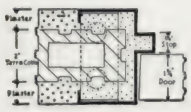


FIG. 6 BUCK WITH PLAIN TRIM FOR 2-IN. TERRA COTTA WALLS

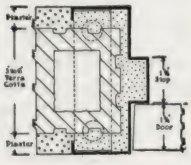


FIG. 7 BUCK WITH PLAIN TRIM FOR 3- TO 8-IN. TERRA COTTA WALLS

FIG. 8 PLAIN TRIM BUCK FOR 2-IN. PLASTER WALL; 1⅜-IN. DOOR

FIG. 9 PLAIN TRIM BUCK FOR 2-IN. PLASTER WALL; 1¾-IN. DOOR

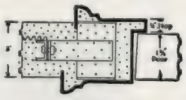


FIG. 10 MOULDED TRIM BUCK FOR 2-IN. PLASTER WALL; 1¾-IN. DOOR

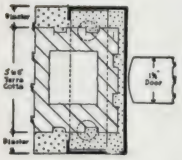


FIG. 11 ROUGH BUCK FOR TRIMMED OR 2- TO 8-IN. TERRA COTTA WALLS

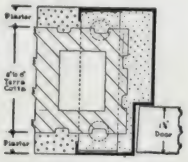


FIG. 12 PLAIN TRIM BUCK WITH SINGLE RABBET FOR 2- TO 8-IN. TERRA COTTA WALLS

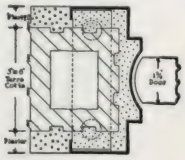


FIG. 13 PLAIN TRIM BUCK FOR DOUBLE-ACTION DOORS

Note: Figs. 11-12-13 made with trim same as Fig. 2, if desired

Buck Sizes

All-steel and Acme bucks also metal covered jambs are made to jamb opening sizes as shown on Standwell door schedule.

Complete Elevator Fronts

All-steel combination elevator bucks and complete elevator fronts, including saddles, bucks, doors and hardware, furnished and erected.

Send for complete information and specifications.

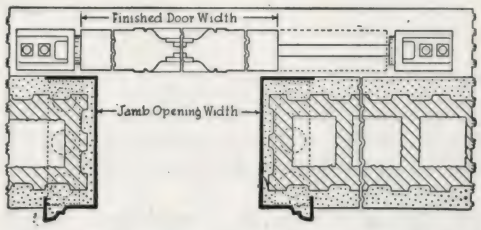


FIG. 14. SPECIAL MOULDED STEEL BUCK FOR SINGLE SLIDING ELEVATOR DOOR

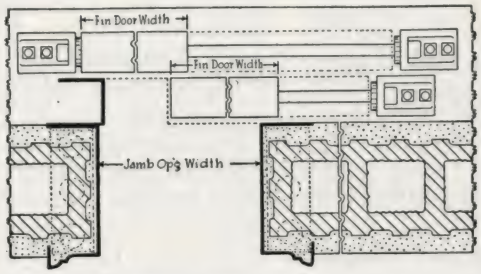


FIG. 15. SPECIAL MOULDED STEEL BUCK FOR TWO-SPEED ELEVATOR DOORS

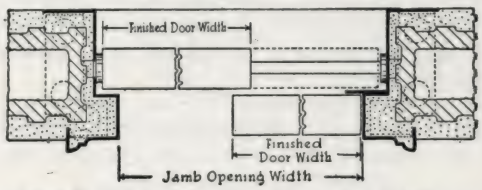


FIG. 16. SPECIAL MOULDED STEEL BUCK FOR SLIDE AND SWING OR SLIDE AND STATIONARY ELEVATOR DOORS

Noteworthy H. F. G. Door and Buck Installations

Astor Court Apartments, Broadway and 89th Street, New York City, Chas. A. Platt, Architect
23-story Office Building, Court and Remsen Streets, Brooklyn, N. Y., Starrett & Van Vleck, Architects
Astor Trust Company, Fifth Avenue and 42nd Street, New York City, Montague Flagg, 2nd, Architect
Arnold Constable Building, Fifth Avenue and 40th Street, New York City, James T. Bartley, Architect
William Penn Hotel, Pittsburgh, Pa., Janssen & Abbott, Architects
Hotel Traymore, Atlantic City, N. J., Price and McLanahan, Architects
20-story Office Building, 18 East 41st Street, New York City, George and Edward Blum, Architects
16-story Office Building, 38th Street and Madison Avenue, New York City, Jardine, Hill & Murdock, Architects
20-story Hotel Pennsylvania, Seventh Avenue and West 33rd Street, New York City, McKim, Mead & White, Architects
23-story Office and Loft Building, 40th Street and Madison Avenue, New York City, Starrett & Van Vleck, Architects
20-story Gotham National Bank, 59th Street and Columbus Circle, New York City, Summerfeld & Steckler, Architects
23-story Loft Building for Garment Center Realty Co., 37th Street and Seventh Avenue, New York City, Walter G. Mason, Architect
17-story Loft Building for Garment Center Realty Co., 38th Street and Seventh Avenue, New York City, Walter G. Mason, Architect
21-story Canadian Pacific Building, 43rd Street and Madison Avenue, New York City, Starrett & Van Vleck, Architects
22-story Liggett-Winchester-Ley Building, 42nd Street and Madison Avenue, New York City, Carrère & Hastings, Architects
25-story Fisk Building, 57th Street and Broadway, New York City, Carrère & Hastings, Architects

NEWARK CORNICE AND SKYLIGHT WORKS

Manufacturers of Sheet Metal Work

9-15 Seventeenth Avenue
NEWARK, N. J.

TELEPHONE
NEWARK, WAVERLY 3461

Products

High grade SHEET METAL WORK, including KALAMEIN DOORS, SASH, TRIM and MOULDINGS; HOLLOW METAL WINDOWS; UNDERWRITERS' FIRE DOORS; PUTTYLESS SKYLIGHTS.

Also, Metal Covered Partitions, Metal Store Fronts, Ornamental Marquises, Cornices, Roofs, Ventilators, and other types of Architectural Sheet Metal Work.

Quality and Underwriters' Indorsement

In the construction of its products, this organization has adopted highest standards of construction, which are as a rule, and especially when so required, entirely in accordance with the requirements of the National Board of Fire Underwriters.

Service and Facilities

This organization is prepared to install any of its products in any part of the United States when size of contract warrants. The grade of work solicited demands the employment of only highly skilled workers and a shop equipment of latest and most efficient machinery and tools.

The service department invites consultation during and after the preparation of plans and will gladly send suggestive working drawings, detail sheets of mouldings, and any other information required.

Kalamein Work

The following suggested specifications will indicate the methods practised by this concern in the manufacture of its kalamein work. Contracts of any size or difficulty can be handled by its efficient force. Hardware will be applied or provision made for it. Fire doors—swinging, sliding, or hung—can be equipped with any type of control.

Specifications for Kalamein Work

Material—All woodwork used in the manufacture of door and window frames, jambs, doors, sash and trim to be of seasoned clear kiln dried white pine. Stiles more than 6 in. wide must be built up of strips and glued together.

All metal to be of 16-oz. copper [or commercial bronze, low brass, No. 28 kalamein iron or galvanized iron].

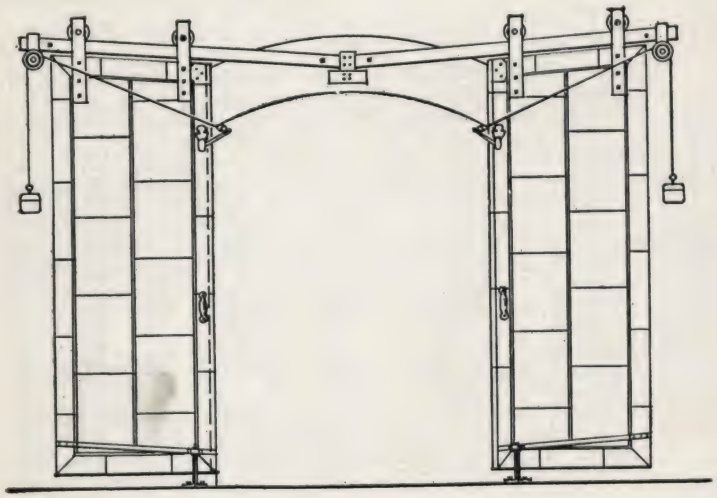
Covering—All woodwork must be covered by machine, except on panels (whether of wood or asbestos) metal must be glued on. All metal must fit closely to wood cores, the surfaces to be straight and true without blisters, cracks or rough edges; edges to be straight and true; mouldings to be as per details, with sharp, square corners, showing true lines. Special care must be taken in assembling to avoid bench marks as much as possible and to get a true fit at the miters, cut ends at miters to be covered with same metal as used for mouldings.

Assembling—All members of doors, sash, etc., must be mortised and tenoned, and put together with hardwood wedges, or doweled with hardwood dowels and special gluing process.

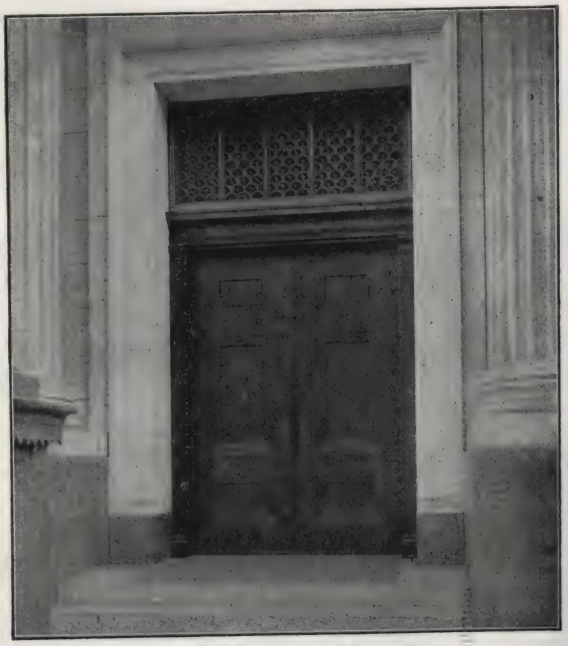
All trim, where practical, shall be mitered and put together at shop, all joints and miters thoroughly brazed and each cleated with metal clips. Trims and mouldings, wherever possible, must be back screwed, thus avoiding defacing surface by nails or screws.

Exterior Work—On all work exposed to weather, joints of metal covering must be underlaid with a strip of metal, same as covering, and after assembling all joints must be properly brazed; and all joints where water, snow, or sleet has a chance to lodge or that are subjected to steam or moisture to any extent, must be completely filled with solder and brazed so that no moisture can gain entrance to cores.

Cleaning—After kalamein work is erected, all surfaces of copper, commercial bronze or low brass must be thoroughly cleaned of solder or other foreign matter and a coat of lacquer applied. Galvanized or kalamein iron surfaces must be painted with 1 heavy coat of Sherwin-Williams paint, known as galvanized iron primer, or other paint equally approved. Before painting is done, however, metal must be thoroughly cleaned with benzine and bran, of grease or other foreign matters to prepare surface for a good adhesion of paint to surface.



SLIDING FIRE DOORS ON INCLINED TRACKS
Used when there is not enough room to slide a single door in one direction



MAIN ENTRANCE, WEST SIDE TRUST CO. BUILDING, NEWARK, N. J.
CROW, LEWIS & WICKENHOEFER, Architects

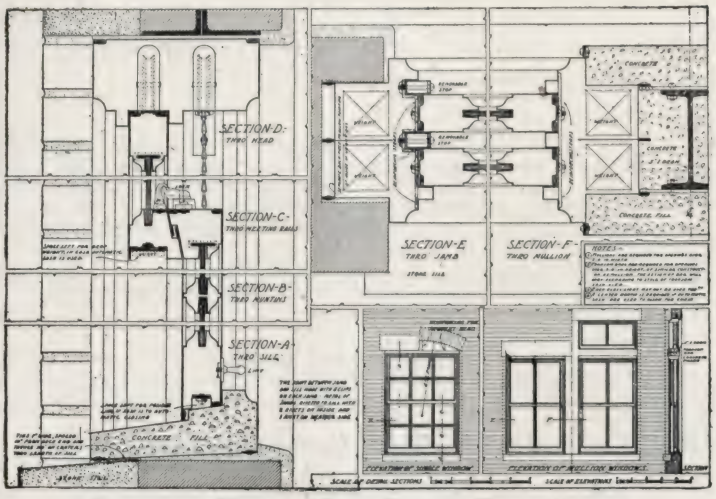
Continued on next page

Applying Hardware—Special care must be taken to apply hardware; it must be done by men experienced in kalamein work. Metal work must be cut to allow a clinch around butts or any other hardware where it is necessary to let same into finished work, so that no wood may be exposed and no moisture have a chance to penetrate to wood core.

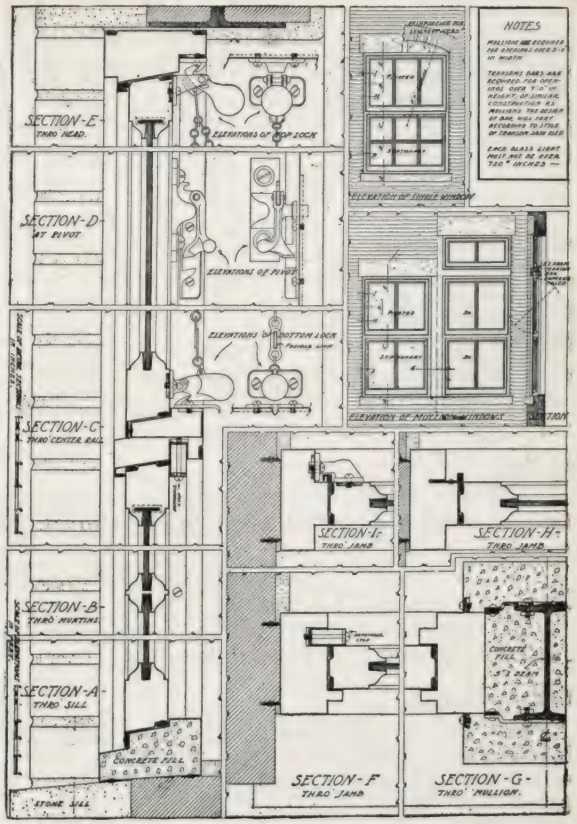
Windows

The accompanying cuts illustrate two types of windows made by this company.

They have stood the test of severe service and have been found eminently successful. Pivoting sash are, when desired, supplied with fusing link control, so sash can close automatically in case of fire.



DETAILS OF HOLLOW METAL DOUBLE HUNG WINDOW
Examined and labeled by Underwriters' Laboratories, Inc.



DETAILS OF HOLLOW METAL WINDOW; UPPER SASH PIVOTING, LOWER SASH STATIONARY
Examined and labeled by Underwriters' Laboratories, Inc.

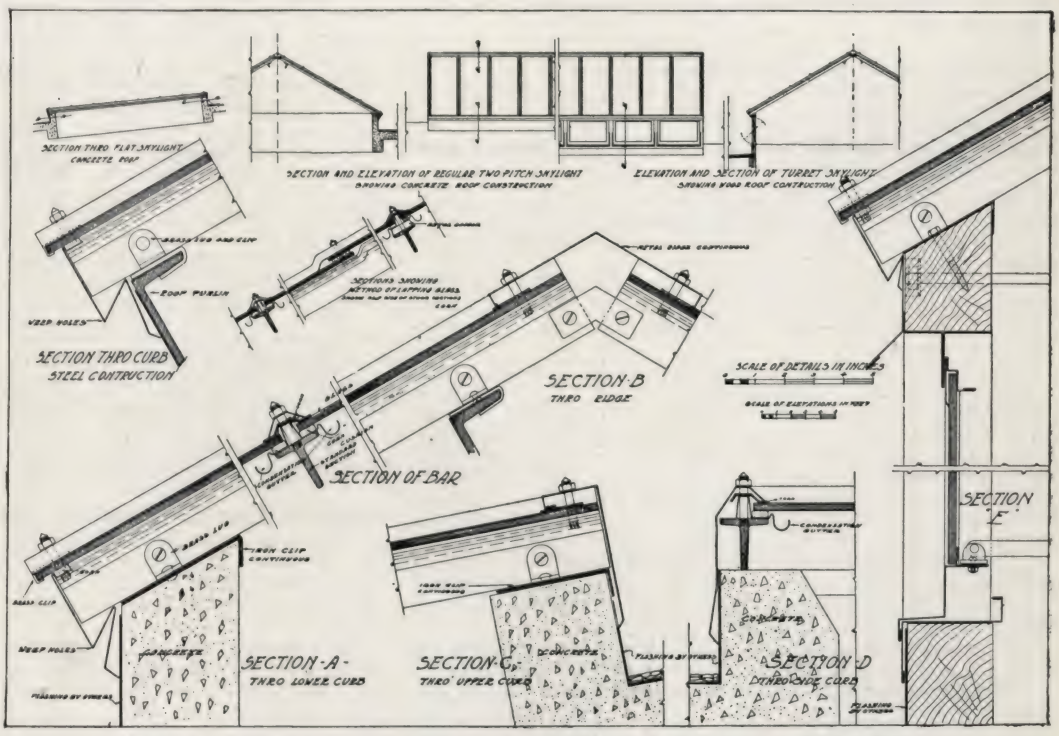
Puttyless Skylights

The accompanying details of a puttyless skylight show the direct and scientific basis of the system.

Briefly, it is a simple application of a spring bronze clip construction to structural steel spanning members. This clip construction, with its specially prepared cork cushions (see illustration), provides a firm yet flexible hold for the glass. It has sufficient give to allow for any vibration or expansion and contraction the construction may be subjected to, and thus reduces the danger of glass breakage to a minimum, and provides an economical construction which is permanently stormproof and dustproof.

This system is adaptable to any form of skylight construction with no intermediate supports up to 8-ft. spans. It requires practically no attention once it is installed.

For specially large openings, calculations for necessary intermediate supports will be made by this company, when desired.



DETAILS, SHOWING CONSTRUCTION AND APPLICATION OF PUTTYLESS SKYLIGHT

RELIANCE FIREPROOF DOOR CO.

Manufacturers of Drawn Metal Covered Doors, Windows, Partitions, Trim, and Fire Retardant Specialties

73 to 103 Dobbin Street and 80 to 110 Banker Street

BROOKLYN, N. Y.

REPRESENTATIVES

PHILADELPHIA, PA., F. J. Wilson, Otis Building
WASHINGTON, D. C., Fireproof Products Co., Woodward Building
BOSTON, MASS., Seeley & Lawson, 73 Tremont Street
ROCHESTER, N. Y., Building Specialties Co., 61 Mill Street
NEW ORLEANS, LA., Ernest R. Bartholomew, Maison Blanche Annex
RICHMOND, VA., Edward Ragland, P. O. Box, 1151
ATLANTA, GA., S. R. Hewett, National City Building
WILSON, N. C., Builders Material Co., 111 Nash Street
CINCINNATI, OHIO, Builders Material Co., 600 Lincoln Building
CHICAGO, ILL., John A. Boland, Jr., Wrigley Building
ST. LOUIS, MO., H. C. Uulenhaut, Railway Exchange Building
FT. WORTH, TEX., Collinsville Mfg. Co., 1009 East Front Street
OKLAHOMA CITY, OKLA., Bissell Builders Supply Co., Colcord Building
BILLINGS, MONT., F. W. Richardson, Electric Building
DENVER, COLO., Builders Service Bureau, 1729 Champa Street
LOS ANGELES, CAL., Maritzen-Kuns, 226 West 9th Street

Products

Drawn Metal Covered Doors, Windows, Partitions and Trim; Furniture Steel Doors and Frames; Bronze Storefronts.

Also Extruded Bronze Windows, Doors and Bank Screens; All-steel Windows.

All products constructed under the supervision of the National Board of Fire Underwriters.

Metals Used

Bronze from Nos. 16 to 23 gauge. Copper from No. 14 gauge to 24 oz. to the sq. ft. Furniture steel Nos. 12 to 22 gauge. Extruded bronze, .125.

Facilities

The new and modern manufacturing plant, containing 50,000 sq. ft. of working space and 25,000 sq. ft. of storage space is equipped with the latest and most improved wood and metal working machinery, most of which has been specially designed to meet every requirement of producing only the highest standards of quality in all-metal fireproof products. All orders, large or small, can be promptly executed.

Prices furnished on receipt of schedule covering the following data (unless plans and specifications are furnished to us):

Doors: Size and style of each.
Jambs: Width and thickness required.
Casings: Moulded or flat; state width and whether one or both sides of opening.

Specifications for Metal Covered Doors, Jambs and Trim

Metal Covering—All wood forming parts of doors, jambs and trim to be covered with metal as follows:

If Kalamein Iron Covered—Doors and jambs, Nos. 22 to 26 gauge and trim No. 26 gauge.

If Furniture Steel Covered—Doors and jambs Nos. 20 to 24 gauge and trim No. 26 gauge.

If Copper Covered—Doors and jambs, 16 to 20 oz.; mouldings and trim, 14 oz.

If Bronze Covered—Doors and jambs, Nos. 16 to 20 gauge; mouldings and trim, No. 23 gauge.

Cores—All wood in doors, jambs and trim shall be clear white pine and shall be thoroughly seasoned, kiln dried and free from shakes, sap, loose or large knots, or any defects impairing strength or durability. Doors to be made, 1⅛, 1¼, 1⅜, 1⅜, 2¼ in. or heavier if required. If doors are either 1⅜ or 2¼ in. thick, stiles, top and cross rails are to be 5 in. wide and bottom rail is to be 10 in. high.

Jambs to be made 1⅜ or 1¾ in. thick, by width shown on drawings if rabbeted, or ⅞ or 1⅛ in. with loose stop applied.

Trim either ⅝ or ⅞ in. thick, plain or moulded of width shown on drawings, or made up special if required.

Painting—All kalamein or galvanized iron material to receive a priming coat of paint in our shop before delivery.

Underwriters' Labels—Underwriters' labels can be secured for doors leading to elevator shafts, stairways, corridors and partitions, fire escapes and fire tower openings, which, when installed in accordance with the following specifications, will procure minimum insurance rate for building and contents.

Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 72 in. wide; made with solid panels hung on channel iron or combination steel frames with 5x5-in. full surface butts, mortise cylinder locks with ¾-in. throw bolt; stair doors should be made self-closing either by coil spring or door check.

Fire Escape and Tower Doors—Labeled for the same size openings as stair and elevator doors, and can be constructed to receive wire glass, not exceeding 5 sq. ft.; hung in the same manner as stair doors.

Corridor and Partition Doors—Constructed to receive 8 sq. ft. of wire glass and bearing the underwriters' label; may be hung to metal covered jambs when stair and elevator doors are labeled.

Specifications for Metal Covered Frames and Sash

Metal Covering—All wood forming parts of window frames and sash to be covered with metal. Each member covered with metal is to be drawn through steel dies before assembling and all mouldings and edges are to be sharp and true as detailed.

If Kalamein Iron Covered—No 28 gauge for glass mouldings; No. 26 gauge for all other parts of frame and sash, except sill which will be No. 24 gauge.

If Copper Covered—14 oz. for glass mouldings; 16 oz. for all other parts of frame and sash, except sill which will be 20 oz.

If Bronze Covered—No. 27 gauge for glass mouldings; No. 24 gauge for all other parts of frame and sash, except sills, which will be No. 22 gauge.

Wood Cores—Cores of all window frames and sash shall be thoroughly seasoned dry white pine, free from loose or large knots. Cores shall be milled and constructed in the best manner, built up in strict accordance with the details, all mouldings shown on drawings being accurately followed.

Members of Window Frames—Unless otherwise shown on drawings, sizes of different members shall be as follows:

Sills, 2⅜ in. in thickness; pulley stiles and outside casings, 1⅛ in.; inside casings, ⅞ in.; back linings, ¾ in.; parting strips ¾ in. x 1⅛ in.; staff beads, sizes vary. Sills shall be double rabbeted. Inside stops shall be ½ in. by width desired. Sections of pulley stiles to be removable to give access to weights.

Frames for double hung sash to be box frames provided with weight separators. Sills to be plowed out on underside and provided with ⅛x2 in. galvanized iron water bar.

Note: All of our windows are equipped with our integral weatherstrips, which are made part of the construction.

Members of Sash—Unless otherwise shown on drawings, sizes shall be as follows: Stiles and top rails, 1⅜x2⅜ in. Bottom rails, 1⅜x3¾ in. Meeting rails, 1¾ in. thick. Rails shall be coped to stiles and screwed together with 5-in. screws for sash up to 4 ft. wide and with 6-in. screws for sash over 4 ft. Joints to be well filled with solder and filed smooth.

Specifications for Furniture Steel Door Frames

Frames to be made of furniture steel of not lighter than No. 16 gauge U. S. Standard with all miters and joints to be welded and made smooth. Reinforcement for application of necessary hardware to be electrically welded and of proper size to insure rigid construction. Wall anchors to be provided and spaced approximately 2 ft. apart to insure rigidity. Each frame to be provided with spreaders for parallel alignment. Templates for all hardware will be furnished in reasonable time prior to the manufacture of these frames.

All frames to receive one shop coat of the best metallic primer and applied in a first-class workmanlike manner to insure a complete covering on all surfaces, inside and outside.

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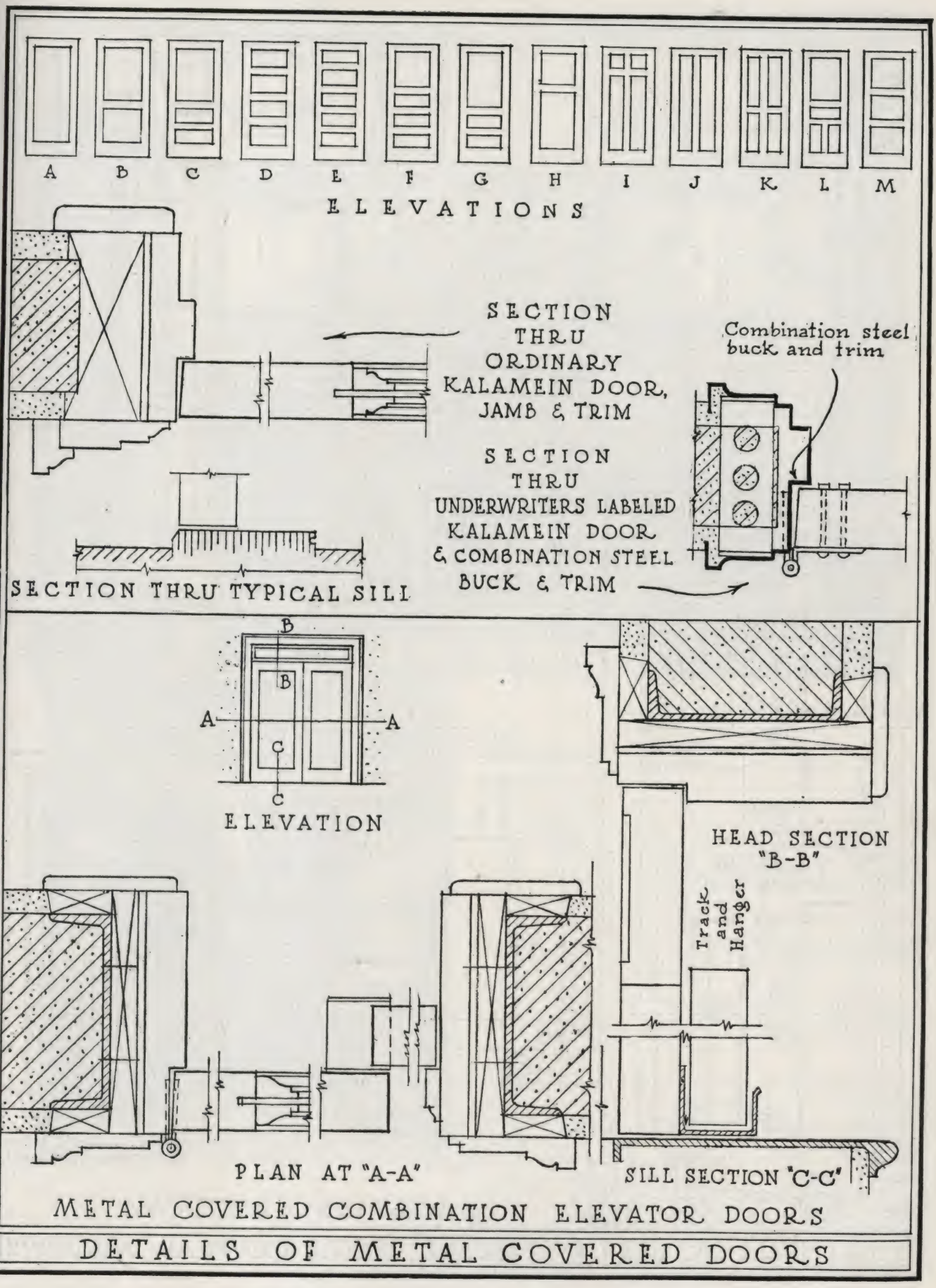

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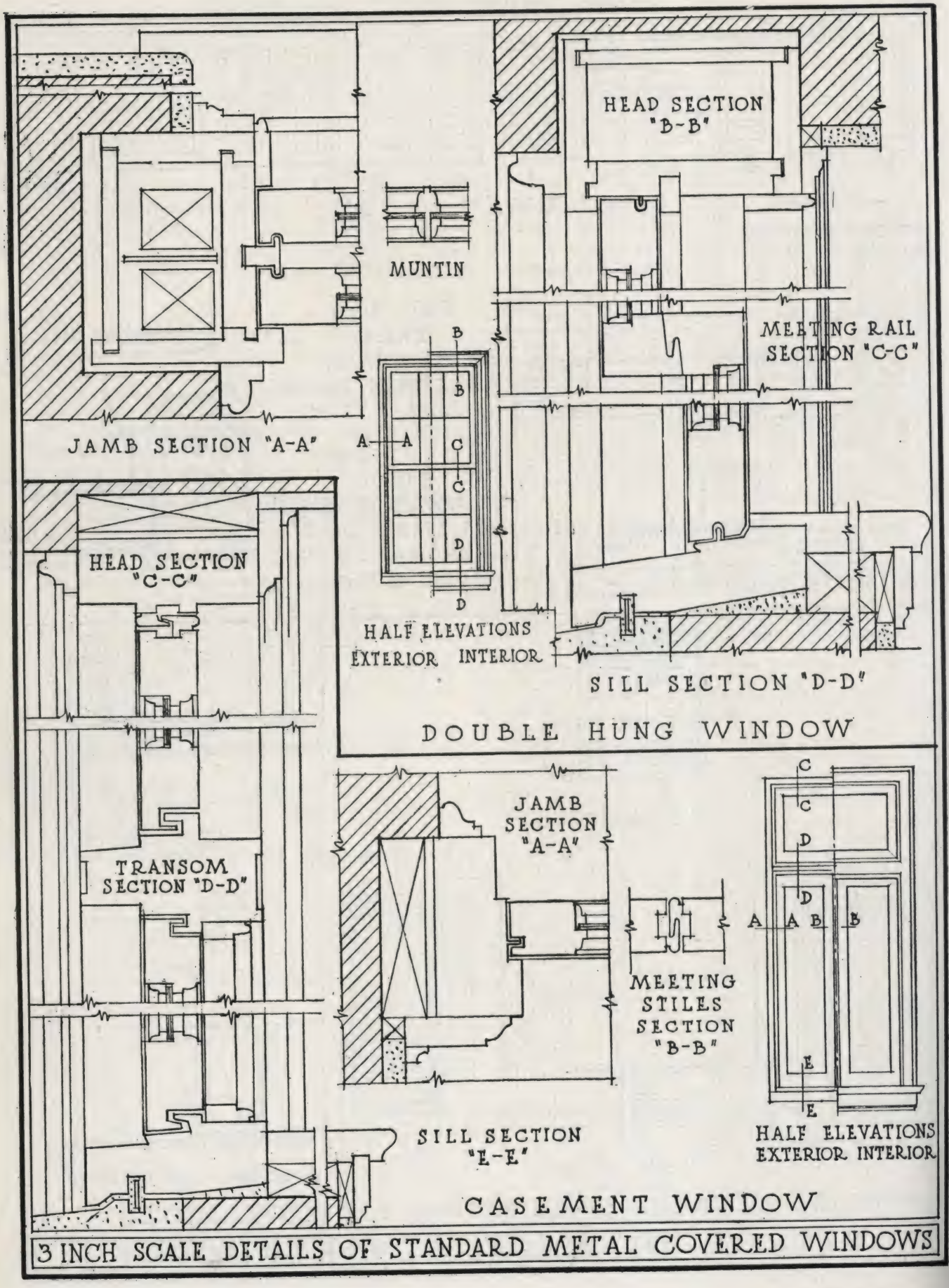


3 INCH SCALE DETAILS OF STANDARD METAL COVERED WINDOWS

Continued on next page

A New J. & T. Cousins Shoe Store Front, Philadelphia, Pa.

A New Geuting's Shoe Store Front, Philadelphia, Pa.

Reliance Bronze Storefronts

The use of unsightly wooden storefronts is rapidly giving way to solid metal. Reliance bronze storefronts have so many advantages over ordinary storefronts that architects and builders everywhere prefer them. The fire retarding advantages, the absence of upkeep cost and the permanence of the Reliance bronze storefronts make them the most attractive and economical installation for any kind of business.

The owners of the attractive shoe stores illustrated on this page are absolutely assured that their large show windows will give a lifetime of satisfactory service.

RELIANCE BRONZE STORE FRONTS
TRADE-MARK

The resilient ¾-in. rubber channel with Reliance special bronze mouldings provides the necessary "give-and-take" to offset the vibration found in all large windows.

This patented rubber grip is an exclusive feature that makes Reliance bronze storefronts of this type stormproof against breakage of glass by wind pressure.

Architects as well as contractors who have come in contact with Reliance fireproof products, whether they be metal covered doors, windows, partitions or trim, know that all are tributes to mechanical genius of superior workmanship, craftsmanship and quality.

THORP FIRE PROOF DOOR CO.

"Thorp-Richardson" Doors and Finish; Bronze and Copper Entrances

1600-1616 Central Avenue
MINNEAPOLIS, MINN.
REPRESENTATIVES IN FIFTY PRINCIPAL CITIES

Products

Manufacturers of "THORP-RICHARDSON" FIREPROOF DOORS and FINISH for all classes of fireproof buildings, public and private; also, BRONZE and COPPER ENTRANCES.

In General

The THORP FIRE PROOF DOOR CO. is the pioneer in this line of work, and all effort and energy are devoted to this work alone. The Thorp Finish has been developed to the point where the architect can safely specify for any purpose.

Thorp Doors make each room, floor or apartment a separate fireproof unit. Stairways and elevator shafts are also guarded by the Thorp Finish, and if consistently used, there can be no spread of fire beyond the rooms or unit in which the fire originates.

Construction

Thorp Doors are made on the basis of the underwriters' standard: A 3-ply built-up pine core, asbestos lined and metal covered. By special processes all metal is locked or welded, and the two sheets are locked together on all *four* edges of the door. No dependence is placed on a mortise-and-tenon joint or lag screws to hold the door or parts together, and the metal covering on each side is so made as to be one sheet.

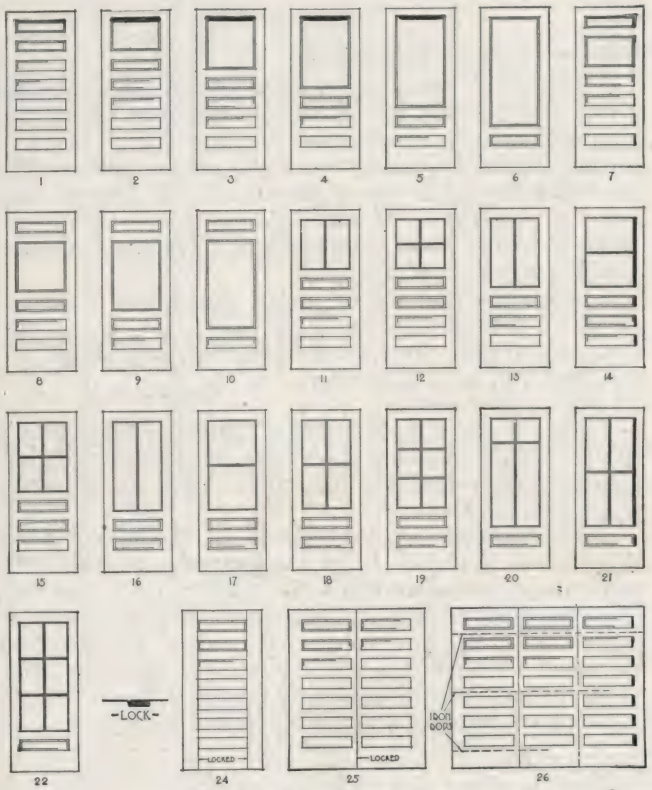
Thorp Standard Detail Doors are covered with single sheets of No. 24 gauge metal, panels sunk by hydraulic pressure with single sheet to each side.

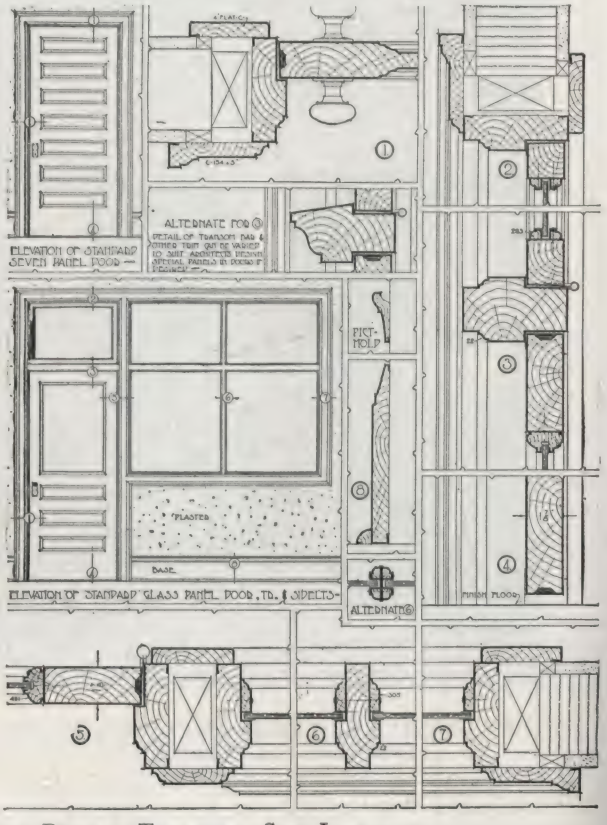
Thorp Special Detail Doors, to the architect's design, are made of Nos. 24 or 20 gauge metal, with mouldings as an integral part of stiles; rails and panels assembled with flush welded joints.

Any of the natural wood finishes are carefully followed as to grain and shade; or the white enamel for hospitals. A very popular finish is our standard old copper duplex plate on special steel.

Entrance Doors

Thorp Doors in bronze and copper make the most handsome, durable and economical entrances. Either No. 18 gauge or 18-oz. metal is used, and the entrances may be as elaborate and ornamental as desired.



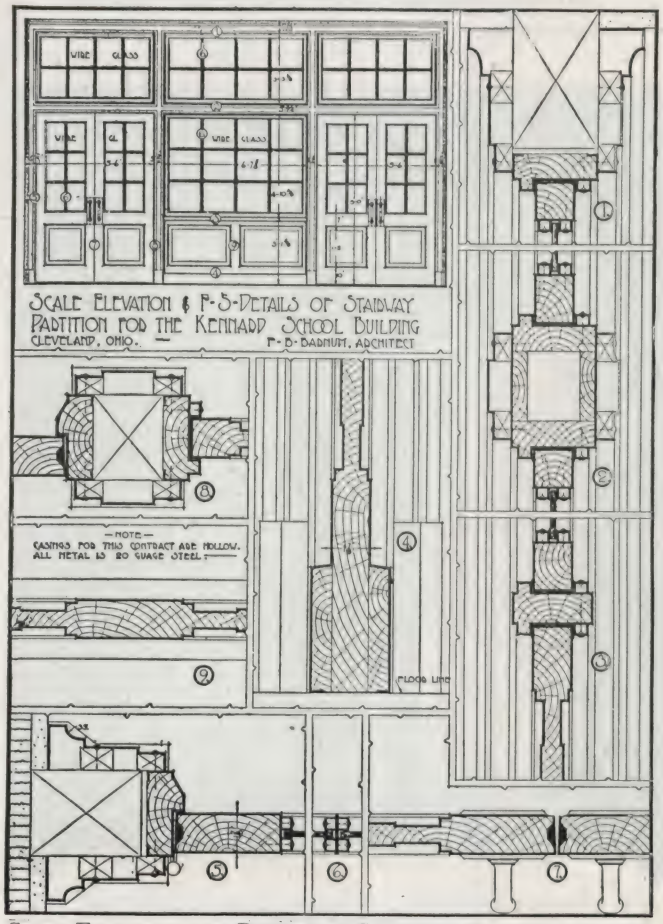


DETAILS OF THORP STANDARD DETAIL DOORS, GLASS PANELS, TRANSOMS, SIDE LIGHTS
Thorp Detail Doors made to any design

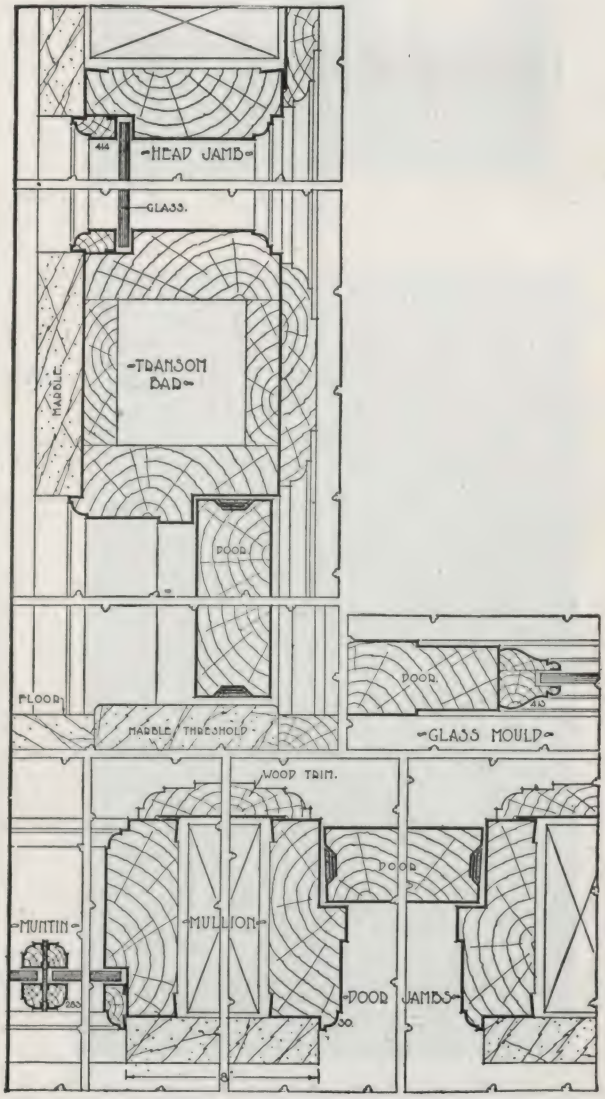
Continued on next page

JEFFERSON COUNTY SAVINGS BANK, BIRMINGHAM, ALA.
WM. C. WESTON, Architect

A CORRIDOR IN JEFFERSON COUNTY SAVINGS BANK, SHOWING DOORS

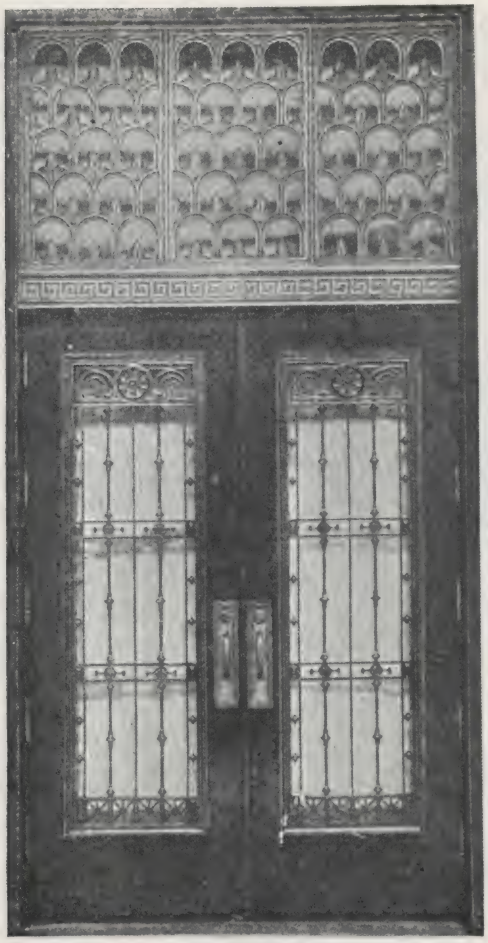


SCALE ELEVATION AND DETAILS OF STAIRWAY PARTITION FOR THE KENNARD SCHOOL BUILDING, CLEVELAND, OHIO

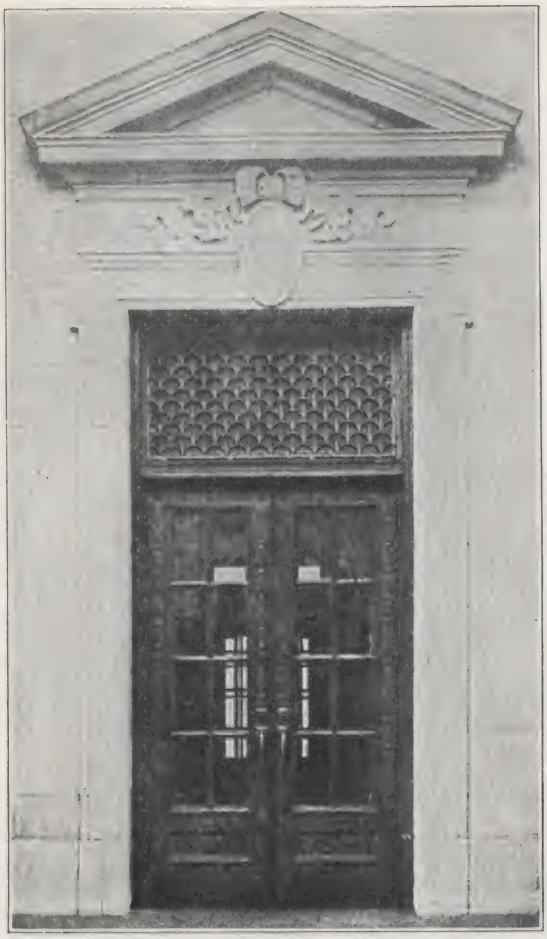


DETAILS OF CORRIDOR DOORS AND PARTITIONS, JEFFERSON COUNTY SAVINGS BANK

Continued on next page



German-American National Bank, Pekin, Ill.
Hewitt & Emerson, Architects



Gateway, Park Building, Minneapolis, Minn.
Hewitt & Brown, Architects

Entrance, U. S. Post Office, Frankfort, Ind.

Bronze Entrance, Exchange National Bank,
Little Rock, Ark.
Chas. L. Thompson, Architect

COBURN TROLLEY TRACK MFG. CO.

Standard Tin Clad Fire Doors and Shutters

HOLYOKE, MASS.

WAREROOMS

NEW YORK, N. Y., 44-46 Duane Street — BOSTON, MASS., 108 Broad Street — CHICAGO, ILL., 220 North Wabash Avenue
PHILADELPHIA, PA., 422 Commerce Street — CLEVELAND, OHIO, 1009 Oregon Avenue

Products

A complete line of STANDARD LABELED and UNLABELED TWO-PLY and THREE-PLY, DOUBLE and SINGLE LOCK JOINT TIN CLAD FIRE DOORS and SHUTTERS.

Also manufacturers of Overhead Track Conveying Systems, Swing Fire Door Iron Jamb Frames, Fire Door Fusible Link Fixtures, Rolling Ladders for high shelving.

For Standard Metal Covered Doors and Trim, see pages 700-702; for Sliding Door Hardware, see pages 1229-1232.

Advice of Local Inspection Department

On account of the different requirements for both fire doors and shutters in various localities, it is recommended that the insurance inspection department having jurisdiction be consulted before fire doors or shutters are specified or provided for.

Standard Tin Clad Fire Doors and Shutters

This company manufactures all of the standard types of labeled and unlabeled tin clad doors and shutters for the various conditions required by the insurance and building authorities. These are carefully constructed and reinforced by many mechanical and other improvements made possible by years of research and specialization in this industry, as well as by the facilities afforded by a large and well equipped plant.

Labeled Doors

Manufactured, inspected and labeled under the supervision of the Underwriters' Laboratories, Inc.

Construction—Three-ply (2½ in. thick), two-ply (1¾ in. thick). Both are covered with 14x20-in. I. C. 113-lb. tin plates with double lock joints.

Styles for Various Conditions—Standard fireproof doors are made in various styles to suit the following requirements:

For incline slide, single door, see National Style "A," Cincinnati Standard, Philadelphia Standard; for level slide, single door, see Standard Style "C"; for incline slide, double door, see Labeled Style "B." All of these styles are illustrated on Sheet A 1, on following page.

Unlabeled Doors and Shutters

Construction—Same as for labeled doors except for covering which is 14x20 in., 108-lb. tin plates with single lock joints.

Sliding Doors—For incline slide, single door, see Regular Style "A"; same except for limited headroom, see Style "E"; for level slide, single door, see Regular Style "C"; same except for limited headroom, see Style "D"; for double doors, see Regular Style "B" (incline slide) and Style "CC" (level slide). These styles illustrated on Sheets A 1 and A 2, on the two following pages.

Counterbalanced Doors—Made in various types of single and double vertical slide as illustrated on the fourth page following. Hardware not labeled. Doors labeled or unlabeled.

Swinging Doors and Shutters—For single swing, see Style "N" (also furnished labeled) and Style "R"; for double swing, see Styles "NN" and "RR"; for shutters see Style "SB" (shutters are also furnished with square tops to fit masonry). All these styles illustrated on third page following.

Information Necessary for Ordering

Drawings, on which quotations are based, should give the clear width and height of the opening and headroom over and the thickness of the wall. For minimum headroom required refer to Sheet A 2, second page following.

Drawings or data should also state amount of clear room at sides of openings. This data is especially required in case of sliding doors.

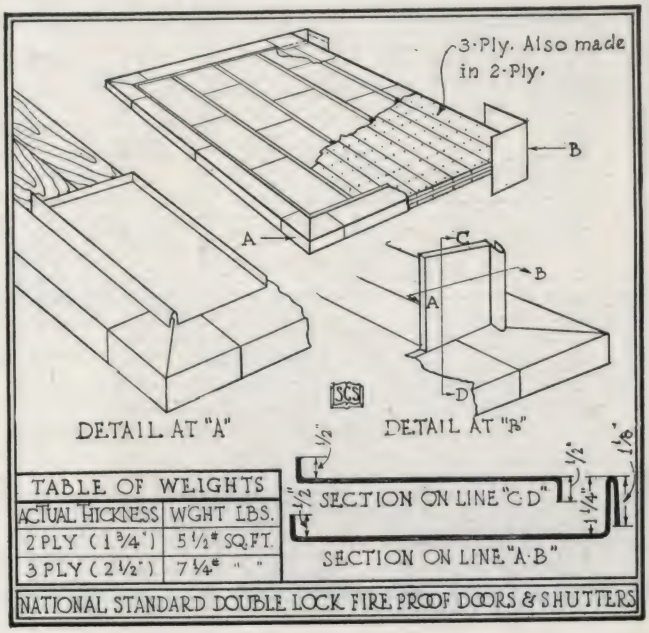
When ordering swing doors, give size of openings, head and side room, material of walls, and whether doors are to be flush or overlap.

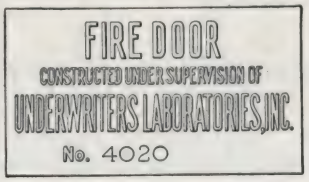
In the case of single swing doors, give hand of same when hardware is required.

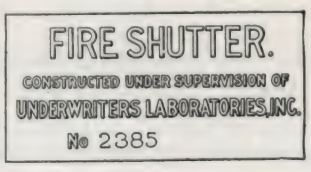
Always specify whether doors are to be two-ply (1¾ in.) or three-ply (2½ in.)

Fixtures

A complete line of standard size approved fixtures, fittings, frames, etc., manufactured by this company, is available for all types and styles of doors.

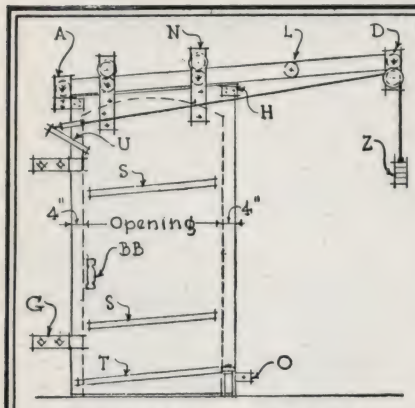




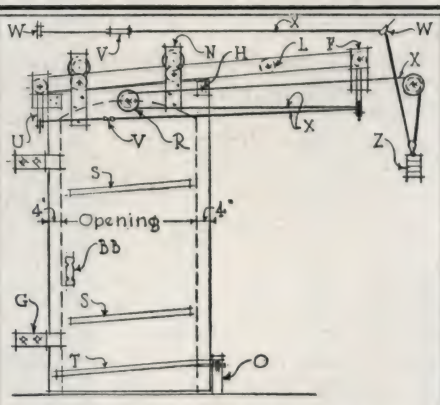


UNDERWRITERS' LABELS

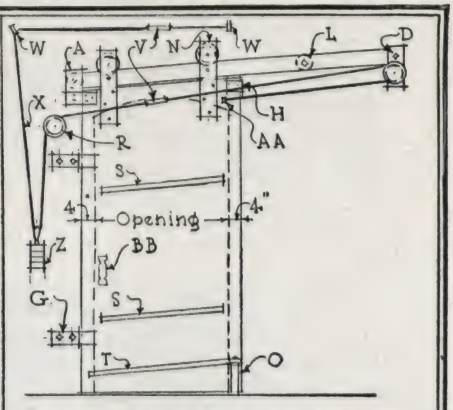
Continued on next page



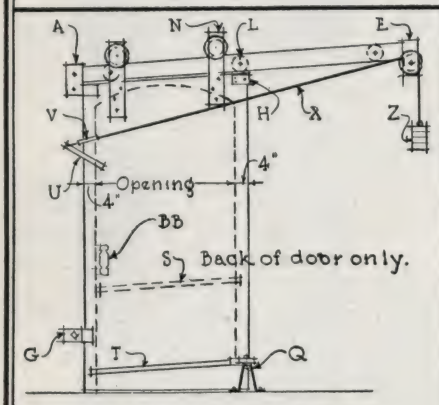
NATIONAL STYLE "A"
INCLINE SLIDE
INSPECTED & LABELLED



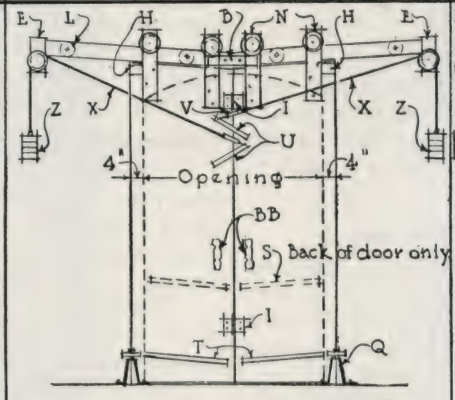
CINCINNATI STANDARD
INCLINE SLIDE
INSPECTED & LABELLED



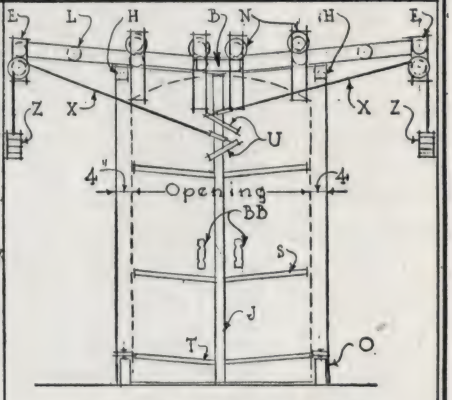
PHILADELPHIA STANDARD
INCLINE SLIDE
INSPECTED & LABELLED



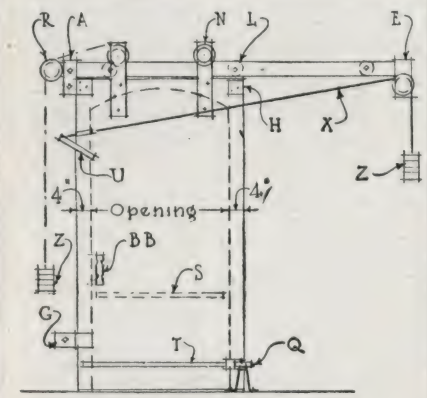
REGULAR STYLE "A"
INCLINE SLIDE
NOT LABELLED



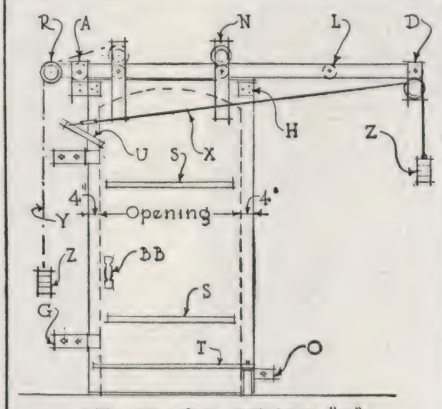
REGULAR STYLE "B"
INCLINE SLIDE
NOT LABELLED



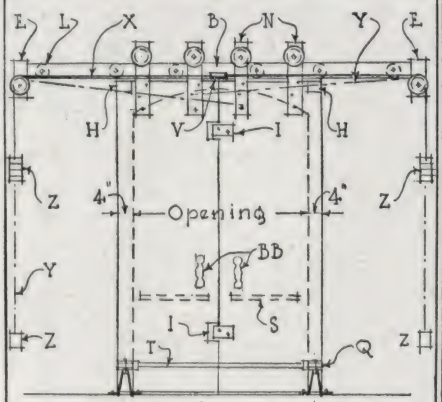
LABELED STYLE "B"
INCLINE SLIDE
INSPECTED & LABELED



REGULAR STYLE "C"
LEVEL SLIDE
NOT LABELED



STANDARD STYLE "C"
LEVEL SLIDE
LABELED



REGULAR STYLE "CC"
LEVEL SLIDE
NOT LABELED

LEGEND —

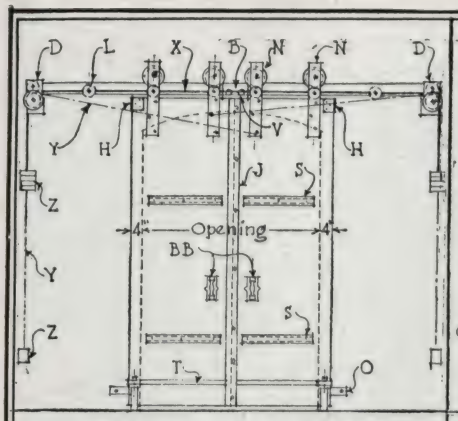
A-Top Binder and Bumper Shoe.
B-Center Stop.
C-"D" Bracket and Stop.
D-Stop and Pulley.
E-Adjustable Rear Stop & Pulley.
F-Rear Stop.
G-Bottom Binder.
H-Bumper Shoes.
I-Shoe and Guide.
J-Astragal
K-Track 3½"x⅜" R.E.
L-Cast Iron Bracket.
M-Wrought Iron Bracket.
N-Hanger.
O-№4 Guide Roll.
Q-№1 Guide Roll.
R-Chain or Rope Pulley bolted on Track, Wall, or Door.
S-Half Oval & flat Chafe Strips bolted together thru Door.
T-Flat Chafe Strips screwed on.
U-Link Arm and Fusible Link.
V-Fusible Link.
W-Expanded Eye with or without Ring
X-Rope.
Y-Chain.
Z-Weight.
A-A-Screw Eye.
B-B-Flush or Raised Handles bolted together thru Door.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

COBURN AUTOMATIC SLIDING SINGLE AND DOUBLE FIRE DOORS

SHEET NO. A1
SCALE 3/16 EQUALS 1'-0"

Continued on next page



STANDARD STYLE "CC"
LEVEL SLIDE
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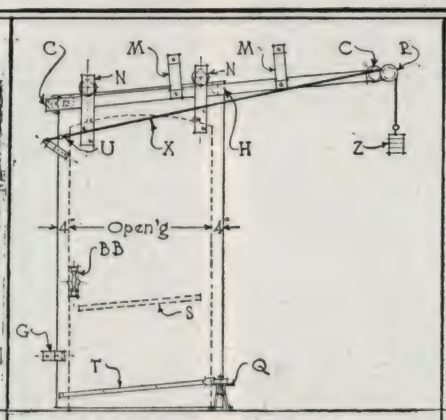
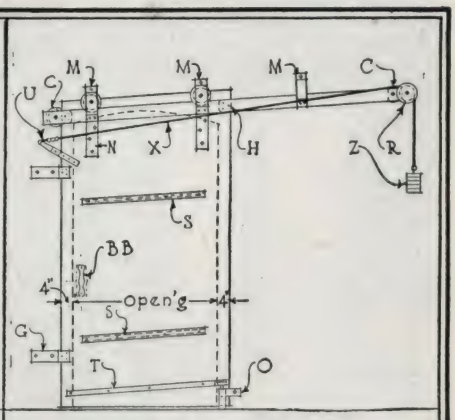


REGULAR STYLE "E"
INCLINE SLIDE
NOT LABELLED



STANDARD STYLE "E"
INCLINE SLIDE
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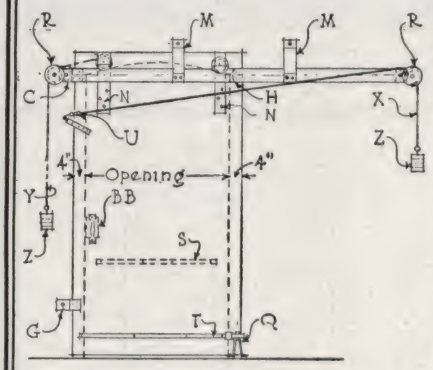

REGULAR STYLE "D"
LEVEL SLIDE
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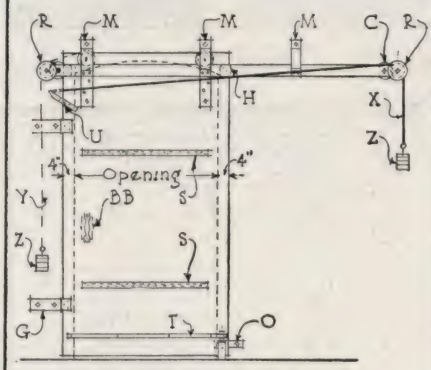


STANDARD STYLE "D"
LEVEL SLIDE
NOT LABELLED

HEADROOM REQUIRED FOR GRAVITY SLIDE SINGLE DOORS STYLE "A"

ARCHED TOP OPENINGS		FLAT TOP OPENINGS	
Width of Opening	Headroom Required	Width of Opening	Headroom Required
3'-0"	1'-5"	3'-0"	1'-6"
4-0	1-6	4-0	1-7 3/8
5-0	1-7	5-0	1-8 3/4
6-0	1-8	6-0	1-10 1/8
7-0	1-9	7-0	1-11 1/2
8-0	1-10	8-0	2-1
9-0	1-11	9-0	2-2 1/4
10-0	2-0	10-0	2-3
11-0	2-1	11-0	2-5
12-0	2-0	12-0	2-6 3/8

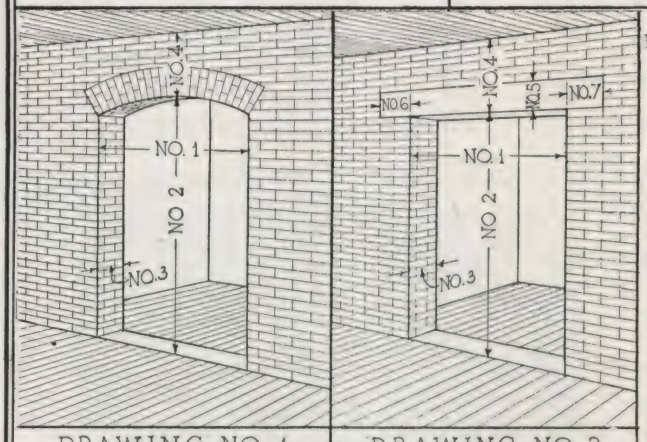
Headroom required for Gravity Slide Doors. Style "Sure Closer" same as Style "A".

Headroom required for Gravity Slide Doors Style No 5 same as Style "A".

Headroom required for Gravity Slide Doors: Style No 6 same as Style "A".

Headroom required for Level Slide Doors. Design "C": 1'-2"

Headroom required for Level Slide Doors Design "D": 6"



DRAWING NO. 1 DRAWING NO 2

NO. 1 Width of Opening
" 2 Height of Opening.
" 3 Thickness of Wall
" 4 Headroom
" 5 Height of Lintel
" 6 Extension of Lintel to the Left
" 7 Extension of Lintel to the Right

SCS

HEADROOM REQUIRED FOR GRAVITY SLIDE SINGLE DOORS STYLE "E"

ARCHED TOP OPENINGS		FLAT TOP OPENINGS	
Width of Opening	Headroom Required	Width of Opening	Headroom Required
3'-0"	7 1/4"	3'-0"	8 1/4"
4-0	9	4-0	10 1/2
4-6	10 1/2	4-6	12
5-0	10 1/2	5-0	12
6-0	11	6-0	12 3/4
7-0	13	7-0	14 3/4
8-0	13 3/4	8-0	15 1/2
9-0	15	9-0	16 1/2
10-0	16	10-0	19 1/2

DIMENSIONS REQUIRED FOR SLIDE DOORS AND HARDWARE.

NOTES. For single door, top binder should take impact as door closes For double doors, center stop should take impact as door closes All hardware screws and bolts necessary to erect these doors are furnished except wall bolts which are supplied only when specified

For legend see Sheet No A1

HEADROOM REQUIRED FOR GRAVITY DOUBLE SLIDE DOORS

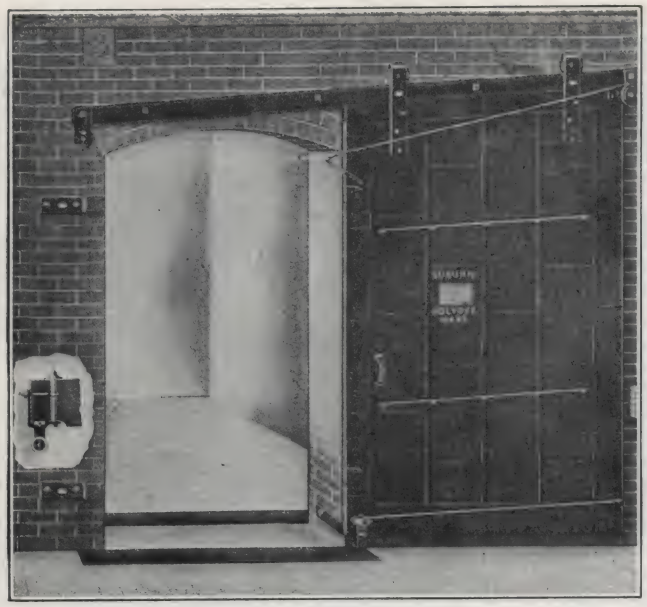
Width of Opening	Headroom Required	Width of Opening	Headroom Required
4'-0"	16 1/2"	9'-0"	18 3/8
5-0	16 7/8	10-0	18 3/4
6-0	17 1/4	11-0	19 1/8
7-0	17 5/8	12-0	19 1/2
8-0	18		

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

COBURN AUTOMATIC SLIDING SINGLE AND DOUBLE FIRE DOORS.

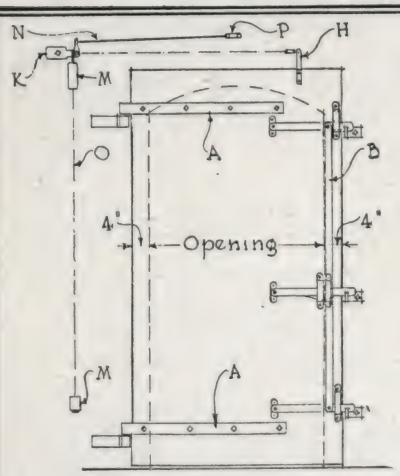
SHEET NO. A2
SCALE 3/16" EQUALS 1'-0"

Continued on next page

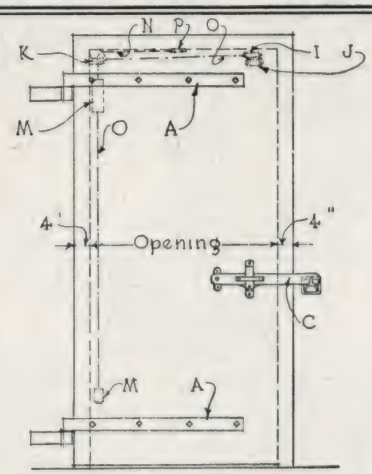


Style A
COBURN INCLINE SLIDE FIRE DOOR

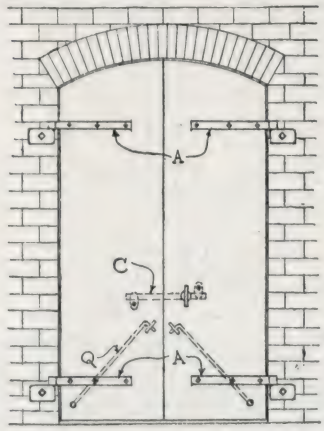
Style B
COBURN DOUBLE INCLINE SLIDE FIRE DOOR



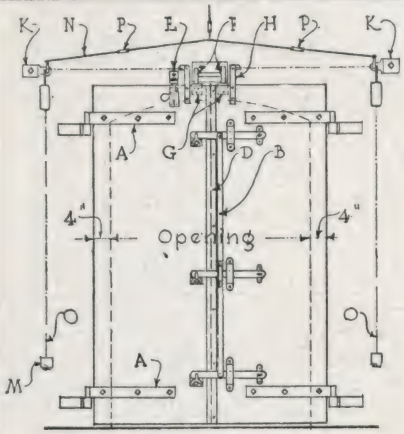
REGULAR STYLE 'N' FIXTURES



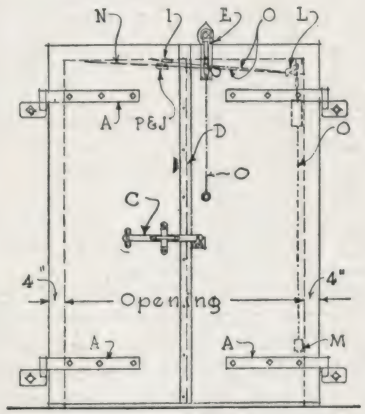
REGULAR STYLE "R"



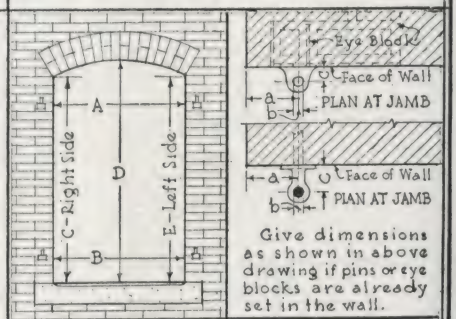
REGULAR "SB" SHUTTER



REGULAR STYLE "NN" FIXTURES



REGULAR STYLE "RR"



Give dimensions as shown in above drawing if pins or eye blocks are already set in the wall.

NOTE. Follow designation of right and left side as shown on drawing. Right and left being taken facing opening from a position on side of wall away from door or shutter.

Give swing of door as right or left according as butts are on right or left side as defined above.

DIMENSIONS REQUIRED FOR SWING DOORS, SHUTTERS & HARDWARE

LEGEND: A- Hinges
B- Triple Latch
C- Single Latch
D- Astragal
E- Gravity Bolt with Catch
F- Automatic Device for regulating closing of Doors
G- Bumper Shoes
H- Chain Arm.
I- Exp. Eye Bolt and Swivel Pulley.
J- Chain Holder
K- Weight Bracket with Lever Arm.
L- Automatic Bracket.
M- Weight.
N- Copper Wire.
O- Chain.
P- Fusible Link.
Q- Shutter Hook.

SCS

COBURN FIRE SHUTTERS AND AUTOMATIC SWINGING SINGLE AND DOUBLE FIRE DOORS.

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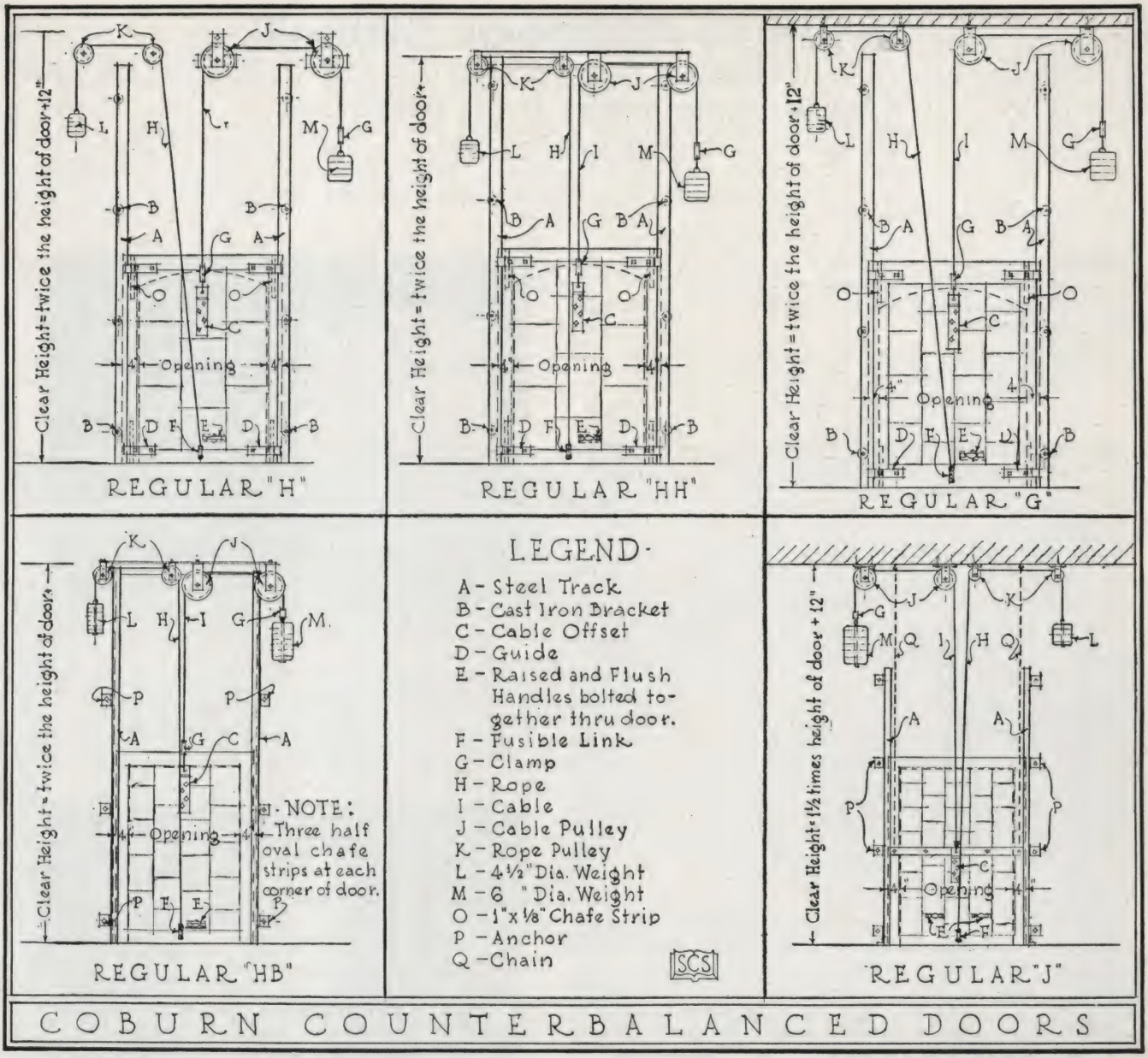
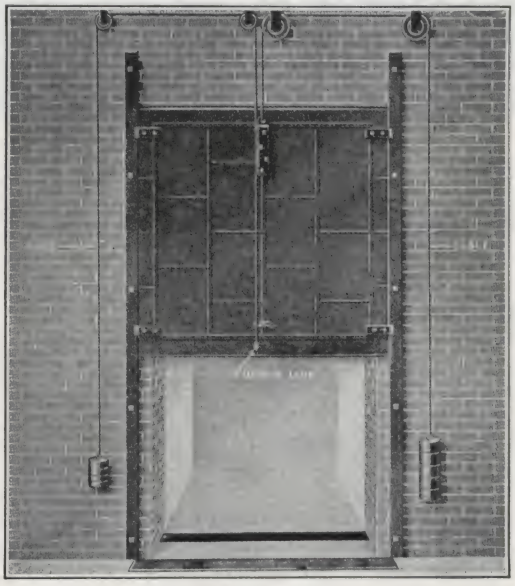




Style G
COBURN VERTICAL SLIDE FIRE DOOR

Style J
COBURN DOUBLE VERTICAL SLIDE FIRE DOOR

RICHMOND FIREPROOF DOOR CO.

SUCCESSORS OF RICHMOND SAFETY GATE CO.

Manufacturers of Fire Doors and Shutters

RICHMOND, IND.

For nearest Branch Office communicate with Home Office

Products

STANDARD TIN CLAD DOORS and SHUTTERS.

COUNTERBALANCED and VERTICAL TELESCOPING ELEVATOR DOORS.

HORIZONTAL FOLDING WAREHOUSE DOORS.

SLIDING and SWING DOORS and FIXTURES.

KALAMEIN or METAL COVERED DOORS and TRIM.

Also, Underwriters' Iron Fire Doors, Horizontal Trolley and Vertical Slide Warehouse Doors, Door and Shutter Hardware, Angle and Channel Frames, Light Structural Work, etc.

Installation

Products are sold f.o.b. Richmond, Ind., in which case complete erection instructions are furnished and when desired a competent foreman is supplied at a minimum rate, or a contract is entered into for the products and their installation complete. Fire doors are sold with or without fixtures.

Special Conditions

Doors, fixtures and operating devices can always be arranged or supplied to meet unusual conditions. The conditions shown in this company's catalogues are desirable but not necessarily invariable, and the Engineering Department is available to architects and others in the solution of problems in this line.

Approval

Richmond fire doors and fixtures are made in strict accordance with the latest rules and requirements of insurance authorities. Several types of doors and fixtures are labeled under the supervision of the Underwriters' Laboratories, Inc., and are sold with the guarantee that they will be fully approved by the local and state inspection bureaus.

Standard Tin Clad Doors and Shutters

Every National standard fire door and fire shutter made by us is constructed and covered in accordance with the rules and requirements of the National Board of Fire Underwriters and inspected and labeled under the supervision of the Underwriters' Laboratories, Inc.

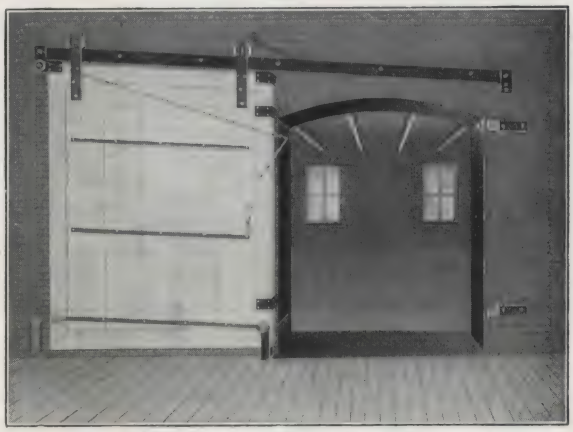
A finished door measures 2⅝ in., including tin, and a finished shutter 1¾ in.; 4 in. is considered standard lap each side of the opening.

Sliding Doors and Fixtures

The type of fixtures herewith illustrated is in many respects the simplest yet most reliable on the market. The door is counterbalanced and held in any desired position. The automatic closing device may be modified to comply with local insurance requirements. Doors and hardware are regularly inspected and labeled under the direction of the Underwriters' Laboratories, Inc.

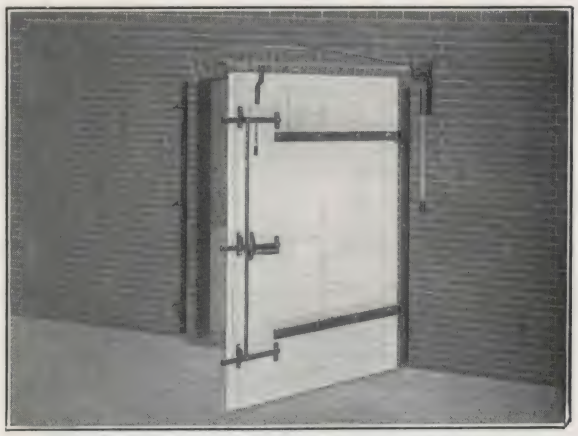
Swing Doors and Fixtures

Doors and fixtures of this type are recommended when sliding doors can not be used. Automatic closing attachment should be used on all doors used frequently; device shown is positive in action and thoroughly reliable.



No. 200. SLIDING DOORS AND FIXTURES

Doors and hardware are regularly inspected under direction of the Underwriters' Laboratories, Inc.



No. 120. SINGLE SWING DOOR AND FIXTURES

Other Types of Fire Doors

The several types of standard fire doors commonly furnished include single and double slide, single and double swing, vertical slide, etc.

Standard Fire Shutters

Constructed the same as standard fire doors but are two-ply. They are made to swing or slide as described and are specially constructed where necessary.

Richmond Folding Doors

Construction—Wood doors are constructed from selected white pine or spruce practically free from knots, finished to 2½ in. in thickness. Stiles and rails are mortised, tenoned with dowel binders. These doors can be made to suit any architectural design when required.

Continued on next page

Metal covered doors have a three-thickness white pine wood core. The covering may be with underwriters' terne or flat sheets to show a panel design.

The hardware is malleable iron and of rugged construction.

Doors are easily operated by means of a hand chain in connection with a geared hoist.

These doors are also constructed to be hung on the exterior of the opening with operating mechanism on the interior.

Installation—The tables indicate the minimum overhead clearance required between the lintel or opening head to the nearest overhead obstruction. Opening sizes are given in table.

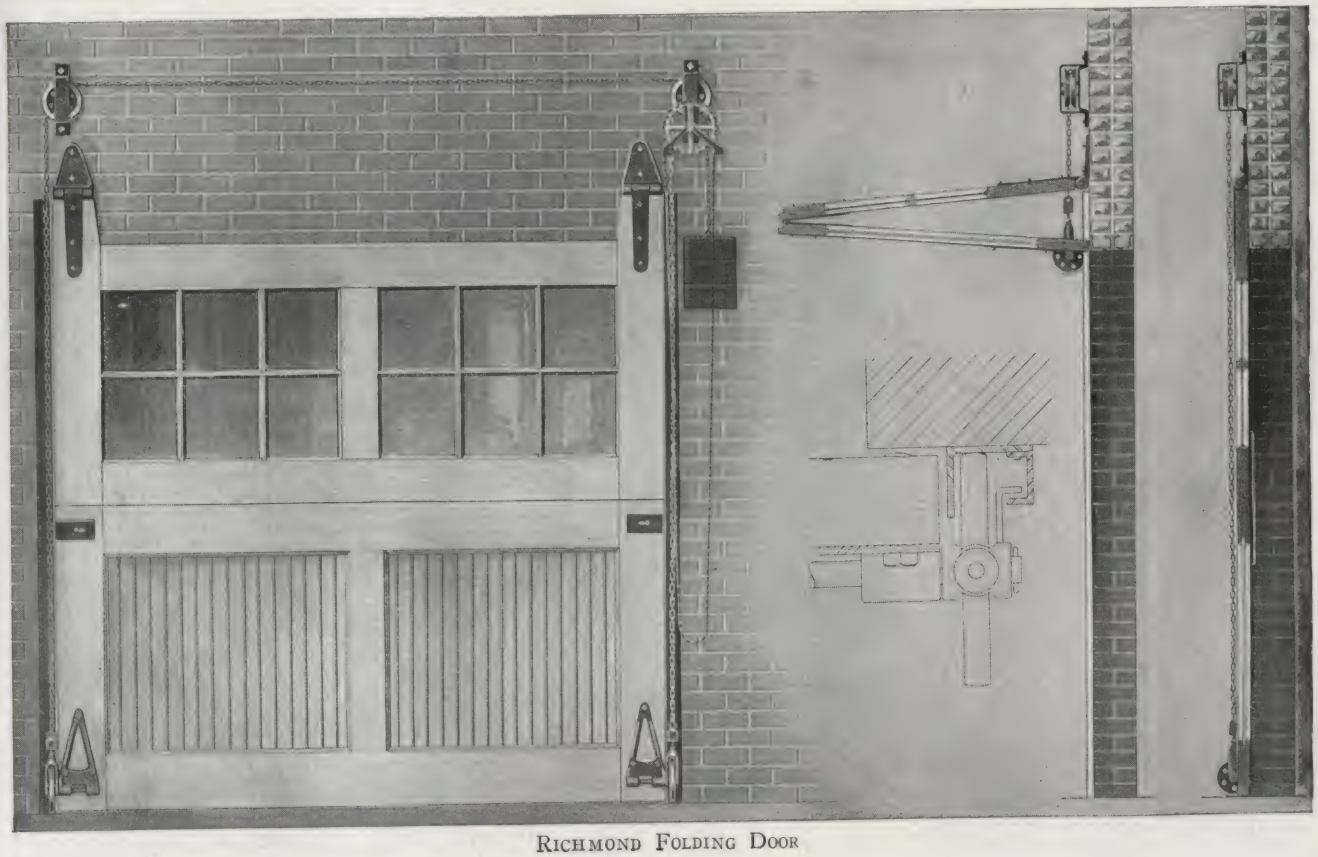
5 in. on one side and 15 in. on the other side are the minimum return spaces required. These spaces may occur on either side, but one side must be at least 5 in. and the other 15 in.

The lintel or head of the openings should be flush with the face of the wall.

Special Conditions—(1) Where the overhead clearance is insufficient a pocket may be provided in the floor to allow the counterweight to travel below the floor line, thus giving a clear opening. 20 in. from lintel to nearest overhead obstruction is the minimum space for this arrangement. The return spaces are the same as for regular door.

(2) If the above arrangement is impractical, the counterweight may be compounded, i. e., using twice the amount of weight compounded with an idle pulley, the cable threaded through this pulley to a dead end fastening on the wall. 5 in. and 20 in. are the minimum return spaces.

For Estimates—Give size of openings, available space on each side and above lintel of openings with the thickness and construction of the wall.



Richmond Folding Door

Schedule of Overhead Clearance "C"

"B"	"A" 7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'
8'	2'-5"	2'-6"	2'-7"	2'-8"	2'-9"	2'-10"	2'-11"	3'-1"	3'-2"	3'-3"	3'-4"
9'	2'-6"	2'-7"	2'-8"	2'-9"	2'-11"	3'-0"	3'-1"	3'-2"	3'-3"	3'-5"	3'-6"
10'	2'-7"	2'-8"	2'-9"	2'-11"	3'-0"	3'-1"	3'-3"	3'-5"	3'-6"	3'-7"	3'-8"
11'	2'-8"	2'-9"	2'-11"	3'-0"	3'-1"	3'-3"	3'-5"	3'-7"	3'-8"	3'-9"	3'-10"
12'	2'-8"	2'-9"	2'-11"	3'-1"	3'-3"	3'-4"	3'-7"	3'-7"	3'-9"	3'-11"	4'-0"
13'	2'-9"	2'-11"	3'-1"	3'-3"	3'-5"	3'-7"	3'-8"	3'-9"	4'-1"	4'-2"	4'-3"
14'	2'-11"	3'-1"	3'-2"	3'-5"	3'-7"	3'-8"	3'-11"	4'-1"	4'-2"	4'-3"	4'-5"
15'	2'-11"	3'-1"	3'-3"	3'-5"	3'-7"	3'-9"	4'-1"	4'-2"	4'-3"	4'-5"	4'-8"
16'	3'-1"	3'-3"	3'-5"	3'-7"	3'-9"	3'-11"	4'-3"	4'-4"	4'-5"	4'-7"	4'-11"

For Wood Doors
"A," height, and "B," width, of opening

Schedule of Overhead Clearance "C"

"B"	"A" 7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'
8'	2'-11"	3'-1"	3'-3"	3'-7"	3'-9"	3'-11"	4'-1"	4'-3"	4'-5"	4'-7"	4'-11"
9'	3'-1"	3'-3"	3'-7"	3'-9"	3'-11"	4'-1"	4'-5"	4'-7"	4'-9"	4'-11"	5'-3"
10'	3'-3"	3'-7"	3'-9"	3'-11"	4'-1"	4'-3"	4'-7"	4'-11"	5'-1"	5'-3"	5'-7"
11'	3'-5"	3'-7"	3'-11"	4'-3"	4'-5"	4'-7"	4'-11"	5'-1"	5'-5"	5'-7"	5'-11"
12'	3'-7"	3'-11"	4'-1"	4'-5"	4'-7"	4'-9"	5'-1"	5'-5"	5'-9"	6'-1"	6'-5"
13'	3'-9"	4'-1"	4'-3"	4'-7"	4'-11"	5'-3"	5'-5"	5'-9"	6'-1"	6'-5"	6'-9"
14'	3'-11"	4'-3"	4'-7"	4'-11"	5'-1"	5'-7"	5'-9"	6'-1"	6'-5"	6'-9"	7'-1"
15'	4'-1"	4'-5"	4'-9"	5'-1"	5'-5"	5'-9"	6'-1"	6'-5"	6'-9"	7'-1"	7'-5"
16'	4'-3"	4'-7"	4'-11"	5'-5"	5'-7"	6'-1"	6'-7"	6'-9"	7'-3"	7'-7"	7'-11"

For Metal Covered Doors
"A," height, and "B," width, of opening

Continued on next page

Counterbalanced Elevator Doors

Richmond counterbalanced doors are mounted on the inside of the elevator shaft, and are made in two sections divided in the center. The guides are of angles bolted to wall. The door sections are of corrugated iron surrounded by and riveted to angle frames. The two door sections are connected by means of heavy cable chain and rods. The chain travels over roller bearing sheaves riveted to the guide angles.

Counterbalanced doors are designed for manual operation from the car, but when desired a self-closing attachment is provided.

Richmond counterbalanced doors are inspected and labeled under the direction of the Underwriters' Laboratories, Inc.

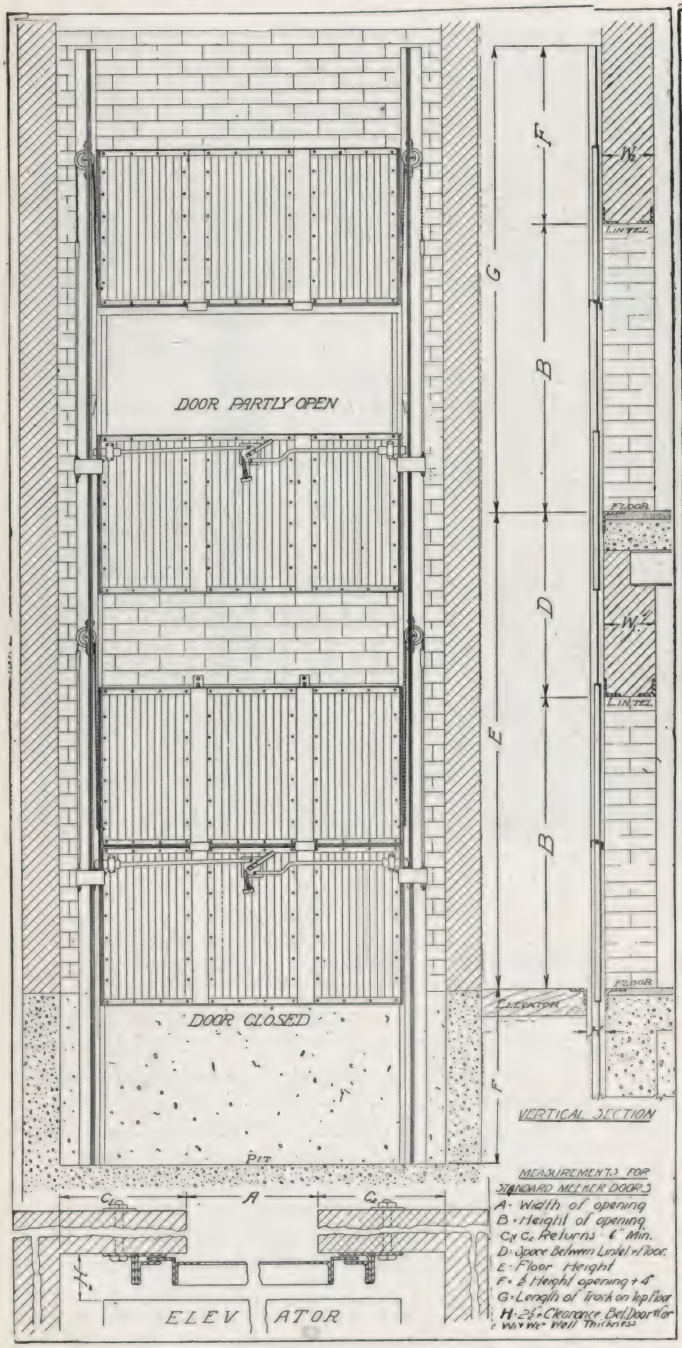
Detail blue prints on request.

Vertical Telescoping Elevator Doors

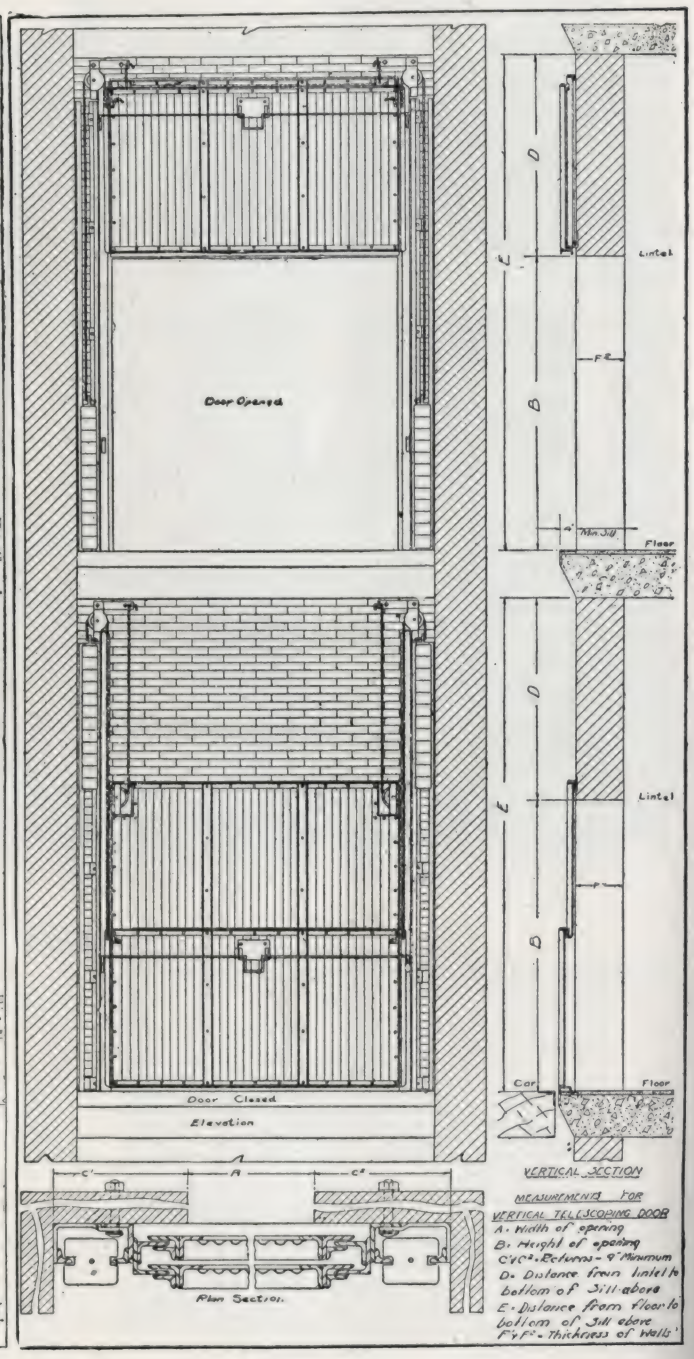
Usually installed on the inside of hatchway, and made in two sections, both sliding vertically. The bottom section travels at twice the speed of the upper section. The doors are made of corrugated sheets with angle iron frame. Doors slide on double angle track bolted to walls and are supported by means of chain or cable operating over roller bearing sheaves fastened to track and upper section of door.

To meet all requirements for safety and protection, suitable automatic closing attachments are provided. The distance from floor to floor should be one-half more than height of opening plus 6 in.

Richmond vertical telescoping doors are inspected and labeled under the direction of the Underwriters' Laboratories, Inc. Detail blue prints mailed on request.



Details of Counterbalanced Elevator Door



Details of Vertical Telescoping Elevator Door

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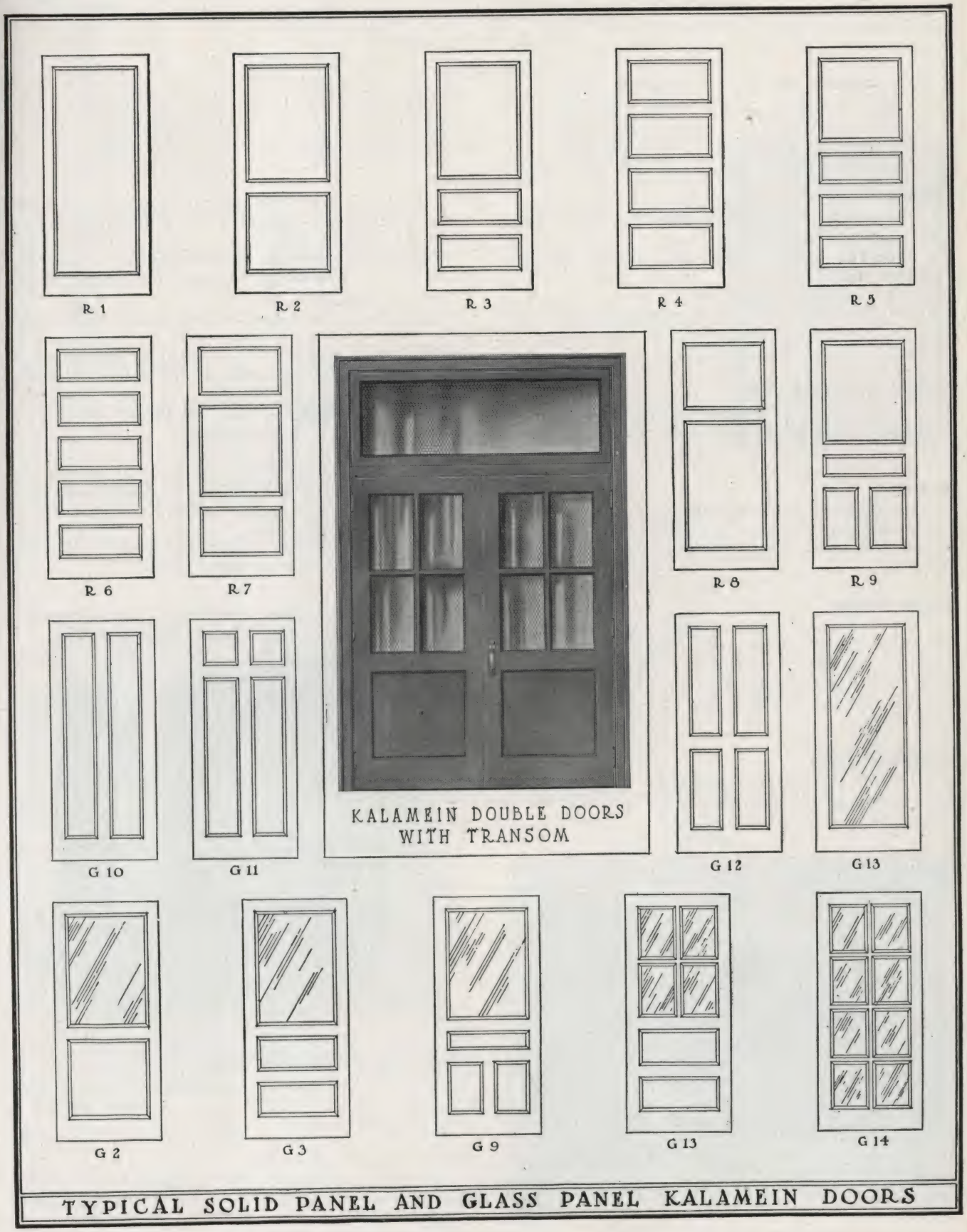
Kalamein or Metal Covered Doors and Trim

We are prepared to furnish any required equipment of kalamein or metal covered doors and trim. Our modern facilities enable us to efficiently handle special types of work. Our engineering department is always at the service of those interested in fireproof door products and we are at all times glad to assist in handling any unusual problems which may be presented.

Our complete general catalogue, also detail drawing will be promptly mailed on request.



TYPICAL SOLID PANEL AND GLASS PANEL KALAMEIN DOORS

SECURITY FIRE DOOR CO.

Manufacturers of Tin Clad Fire Doors and Fireproof Freight Elevator Doors

815-817 South 14th Street
ST. LOUIS, MO.

AGENCIES

BALTIMORE, MD.	DAYTON, OHIO	LOS ANGELES, CAL.	OMAHA, NEBR.
BOSTON, MASS.	DENVER, COLO.	LOUISVILLE, KY.	PHILADELPHIA, PA.
CEDAR RAPIDS, IOWA	DES MOINES, IOWA	MEMPHIS, TENN.	PITTSBURGH, PA.
CINCINNATI, OHIO	DETROIT, MICH.	MILWAUKEE, WIS.	PORTLAND, ORE.
CLEVELAND, OHIO	DULUTH, MINN.	MINNEAPOLIS, MINN.	ST, PAUL, MINN.
COLUMBUS, OHIO	LITTLE ROCK, ARK.	NASHVILLE, TENN.	SAN FRANCISCO, CAL.

Products

"Horifold" Warehouse, Freight House Shipping Platform and Garage Door.

"Sec-Tel" Corrugated Two-section Slide-up Freight Elevator Door.

"Seco" Corrugated, Tin Clad and Kalamein Counterbalanced Freight Elevator Door.

Also Underwriters' Labeled Tin Clad Sliding and Swinging Doors.

Underwriters' Approval

All "Sec-Tel" and "Seco" freight elevator doors are inspected and labeled by Underwriters' Laboratories, Inc.

Service

Let us assist in solving your door problems. Our engineering department is at your service and will cooperate with architects, engineers and contractors. Write for details.

Safety Devices

We recommend for use with our "Sec-Tel" and "Seco" doors, our *safety electric interlocking switches*, which prevent the operation of the elevator car until all doors in the shaft are closed.

Semiautomatic devices can also be furnished on small doors.

"Horifold" Door

The "Horifold" is a horizontal folding-up door and can be made of wood, corrugated steel, tin clad, or paneled wood metal covered sections.

"Horifold" Door Partly Open

"Horifold" doors are of rigid construction, operate with ease, and are unexcelled for withstanding severe weather conditions.

"Horifold" doors are specially adapted for shipping platforms of warehouses, factory buildings, freight houses and garages.

"Horifold" doors can be arranged to fold out, forming a canopy over the opening.

"Horifold" doors can be arranged for glass in upper half to admit light, and with a wicket door in lower section.

Write for detail drawings and further data.

"Sec-Tel" Door

The "Sec-Tel" door is a two-section slide-up or vertical telescoping elevator door. "Sec-Tel" doors permit the use of the permanent building sill for trucking over on to the elevator car.

Use of roller bearing sheaves and special antifriction door guides assure ease of operation.

"Sec-Tel" Door

Advantages of "Sec-Tel" Door

The "Sec-Tel" door is a combination fire door and safety gate, and no safety gate is required when the "Sec-Tel" door is used.

The "Sec-Tel" door is made in two sections which slide up above the lintel out of the way.

The use of "Sec-Tel" doors reduces fire and accident insurance. "Sec-Tel" doors are of simple but rigid construction and will stand up under constant use.

They are built for service.

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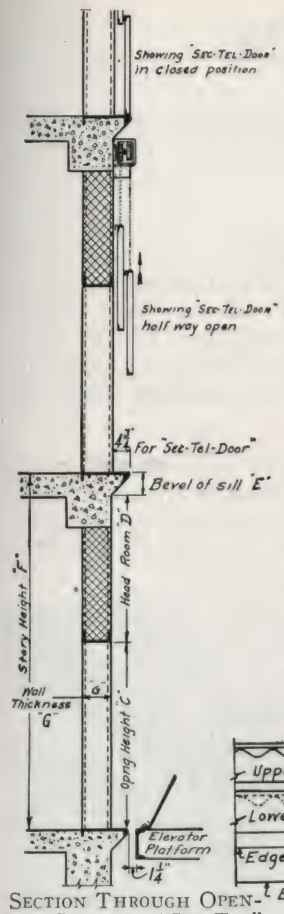
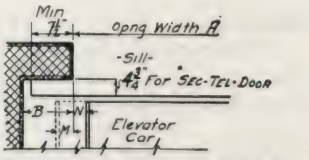


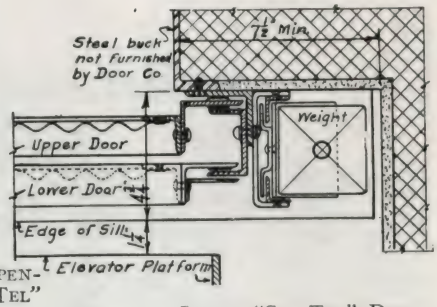
SECTION THROUGH OPENING SHOWING "SEC-TEL" DOOR

SCHEDULE OF OPENING HEIGHTS
"SEC-TEL" DOORS
For Various Floor Heights Allowing 4 in. for Bevel of Sill

Opening height "C" ft.	in.	Minimum headroom "D" ft.	in.	Story height "E" ft.	in.
6–	0	3–	5	9–	9
6–	6	3–	8	10–	6
6–	8	3–	9	10–	9
6–	10	3–	10	11–	0
7–	0	3–	11	11–	3
7–	6	4–	2	12–	0
8–	0	4–	5	12–	9
8–	6	4–	8	13–	6
9–	0	4–	11	14–	3
9–	6	5–	2	15–	0
10–	0	5–	5	15–	9



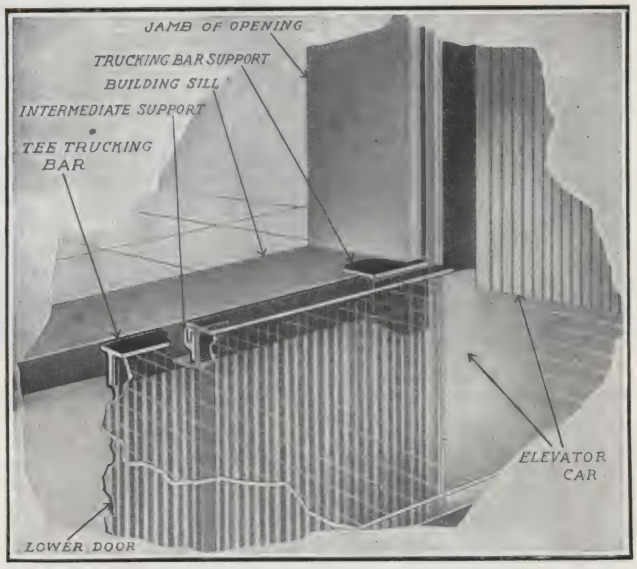
PLAN OF SHAFT AT JAMB



PLAN AT JAMB—"SEC-TEL" DOOR

"Seco" Door

A counterbalanced elevator door, with either corrugated, tin clad or kalamein sections.



CORRUGATED "SECO" DOOR WITH TEE TRUCKING BAR
Open lower door providing trucking surface between building sill and elevator car

"Seco" doors are equipped with heavy steel trucking bars on top of the lower half and with special trucking bar supports to take load off guides and chains when door is open for trucking over.

Advantages of "Seco" Door

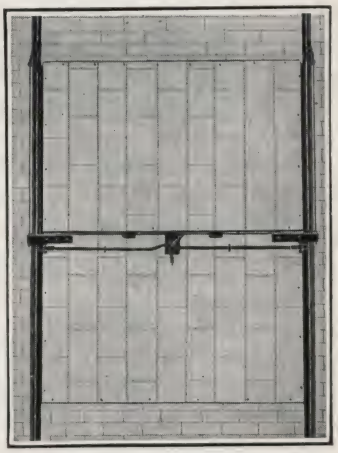
"Seco" door is an improved counterbalanced freight elevator door which is the result of fifteen years of careful study and experience.

The *Tee Trucking Bar* on our corrugated "Seco" door is the acme of perfection.

"Seco" doors are constructed to prevent deflection into shaft from trucks passing over same.

All "Seco" doors are provided with self-aligning sill stops.

"Seco" doors are designed for rough usage.



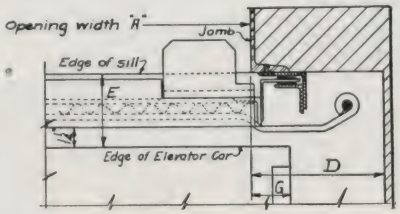
TIN CLAD "SECO" DOOR

Pass Type "Seco" Door

For low story heights, the underwriters in many cases permit the use of pass type doors which can be furnished for openings only 18 in. less in height than the story height.

SCHEDULE OF OPENING HEIGHTS
"SECO" DOORS
For Various Floor Heights

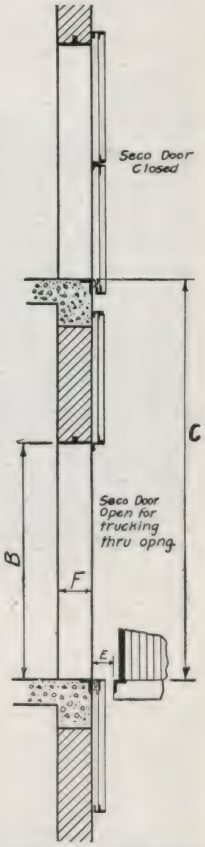
Opening height "B" ft.	in.	Regular, tin clad and corrugated, ft.	in.	Minimum for pass type, ft.	in.
6–	0	9–	7	7–	6
6–	6	10–	4	8–	0
6–	8	10–	7	8–	2
6–	10	10–	10	8–	4
7–	0	11–	1	8–	6
7–	6	11–	10	9–	0
8–	0	12–	7	9–	6
8–	6	13–	4	10–	0
9–	0	14–	1	10–	6
9–	6	14–	10	11–	0
10–	0	15–	7	11–	6



PLAN OF SHAFT AT JAMB—"SECO" DOOR

CLEARANCE REQUIRED FOR "SECO" DOOR

CORRUGATED "SECO" DOOR.	D, in.	E, in.
Not automatic-regular	6	4¼
Semi-automatic regular	7	4¼
Pass type	7	5½
TIN CLAD "SECO" DOOR.	**D, in.**	**E, in.**
Not automatic-regular	7	4½
Semi-automatic regular	7½	4½
Pass type	7½	6½



SECTION THROUGH OPENING SHOWING "SECO" DOOR

ESTABLISHED 1895

F. L. SAINO MANUFACTURING CO., INC.

Manufacturers of Fire Doors

MAIN OFFICE AND FACTORY
70 West Colorado Avenue
MEMPHIS, TENN.

Products

Originators and sole manufacturers of the patented "SAINOMETL" FIRE DOORS and SHUTTERS. (Latest invention of Felix L. Saino, originator of the All-metal Fire Door.)

Sainometl FIRE DOORS AND SHUTTERS
TRADE-MARK
Registered

Underwriters' Approval

"Sainometl" fire doors and shutters are approved and labeled by the Underwriters' Laboratories, Inc., of the National Board of Fire Underwriters, and are accepted and recommended by national, state and municipal authorities.

Types

Single Sliding—Automatic or non-automatic. Level or inclined track.

Double Sliding—Automatic or non-automatic. Level or inclined track.

Single Swinging—Flush or overlap. Automatic or non-automatic.

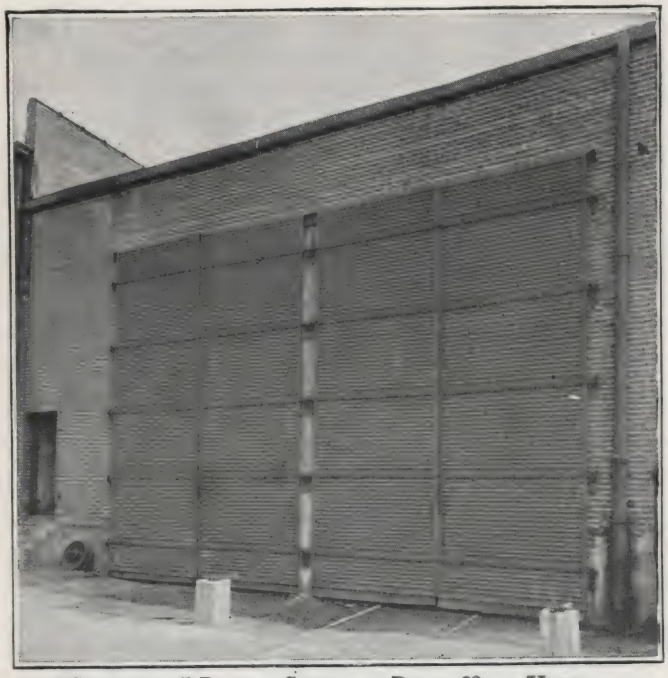
Double Swinging—Flush or overlap. Automatic or non-automatic.

Vertical Sliding.

Special—Irregular shaped or special doors; recessed doors for monorail or overhead trolley.

Advantages

"Sainometl" fire doors are of rigid all-steel construction. They are lowest in maintenance cost and afford the highest degree of protection to both life and property. They save the enormous rust and dry rot cost common to other fire doors and shutters.



"SAINOMETL" DOUBLE SWINGING DOORS 28 FT. HIGH
Installed in Pidgeon-Thomas Iron Co., Memphis, Tenn.

"SAINOMETL" AUTOMATIC SLIDING DOOR
Recessed for overhead trolley. Installed in the Savannah Warehouse & Compress Co., Savannah, Ga.

"SAINOMETL" SHUTTER-TYPE DOORS (FOR OUTSIDE OPENINGS)
Installed in the Greenville Cotton Compress Co., Greenville, Miss. Over 200 "Sainometl" doors installed in this company's buildings

BABCOCK-DAVIS CORPORATION

Manufacturers of Counterbalanced Elevator Doors with Safety Gate

474 Dorchester Avenue

BOSTON, MASS.

Products and Services

BABCOCK-DAVIS COUNTERBALANCED ELEVATOR FIRE DOOR with TRUCKABLE SEATING THRESHOLD and SAFETY GATE. (Patent pending.)

For Pre-Cast Concrete Stairs and Ornamental Iron Work see pages 550-551.

Our Engineers invite consultation during preparation of plans and will gladly send working drawings to fit your requirements.

Babcock-Davis Counterbalance Door

Babcock-Davis counterbalance door with truckable bevel seating threshold and safety gate is manufactured only by this company and is approved and recommended by safety and insurance engineers. (Patent pending.)

Operation—The counterbalance doors open vertically from the center. The two halves being equally balanced are operated quickly and easily by a chain over pulleys in a small space between floor threshold and shock threshold. Our safety gates fit in a pocket that makes well practically flush (see illustration).

Features—Load from car does not land on door. Shock is taken by shock threshold (see illustration).

The only counterbalanced door to which a safety gate may be applied and fire door held open by fusible link—operate the light safety gate and save abuse of expensive fire doors.

Bevel threshold forms a positive seat between well support and floor of building. No dirt can lie on bevel part of threshold and prevent its seating. Impossible for door to fall in well.

Flush well—no objectionable projections.

Doors may be made of any material desired. As no blow or strain comes on doors they do not sag and break. Doors are manually operated. Electric interlocking device preventing car leaving floor until door is closed may be applied.

Babcock-Davis Safety Gate—This safety gate of steel and wire, full automatic or not, as desired, may be installed with our door. This allows elevator doors to be kept open with absolute safety if desired.

Underwriters' Approval

Fireproof doors are made under the supervision of the Underwriters' Laboratories, Inc., and, when specified, bear their label.

Material Furnished

BABCOCK-DAVIS CORPORATION will furnish doors complete, with operating mechanism and hardware, thresholds, gates, steel guides for same, construction door buck and building threshold.

Specification Form

To all openings in freight elevator furnish and install Babcock-Davis Counterbalanced Door with Truckable Bevel Seating Threshold and Safety Gate, as made and patented by BABCOCK-DAVIS CORPORATION, 474 Dorchester avenue, Boston, Mass.

These sills to be made of steel or cast iron and machined to a perfect fit between the sill on the floor and the sill that is fastened to the I-beam on the well side.

Door will run in iron guides fastened to the door buck running continuous from the bottom of the elevator pit to a point 5 ft. above the top of the door at top floor.

BABCOCK-DAVIS CORPORATION will furnish the door buck and threshold. The gates will be made of wire in channel frames and run in guides made of I-beams securely fastened to well threshold at floor level and to underside of well beam at the floor above.

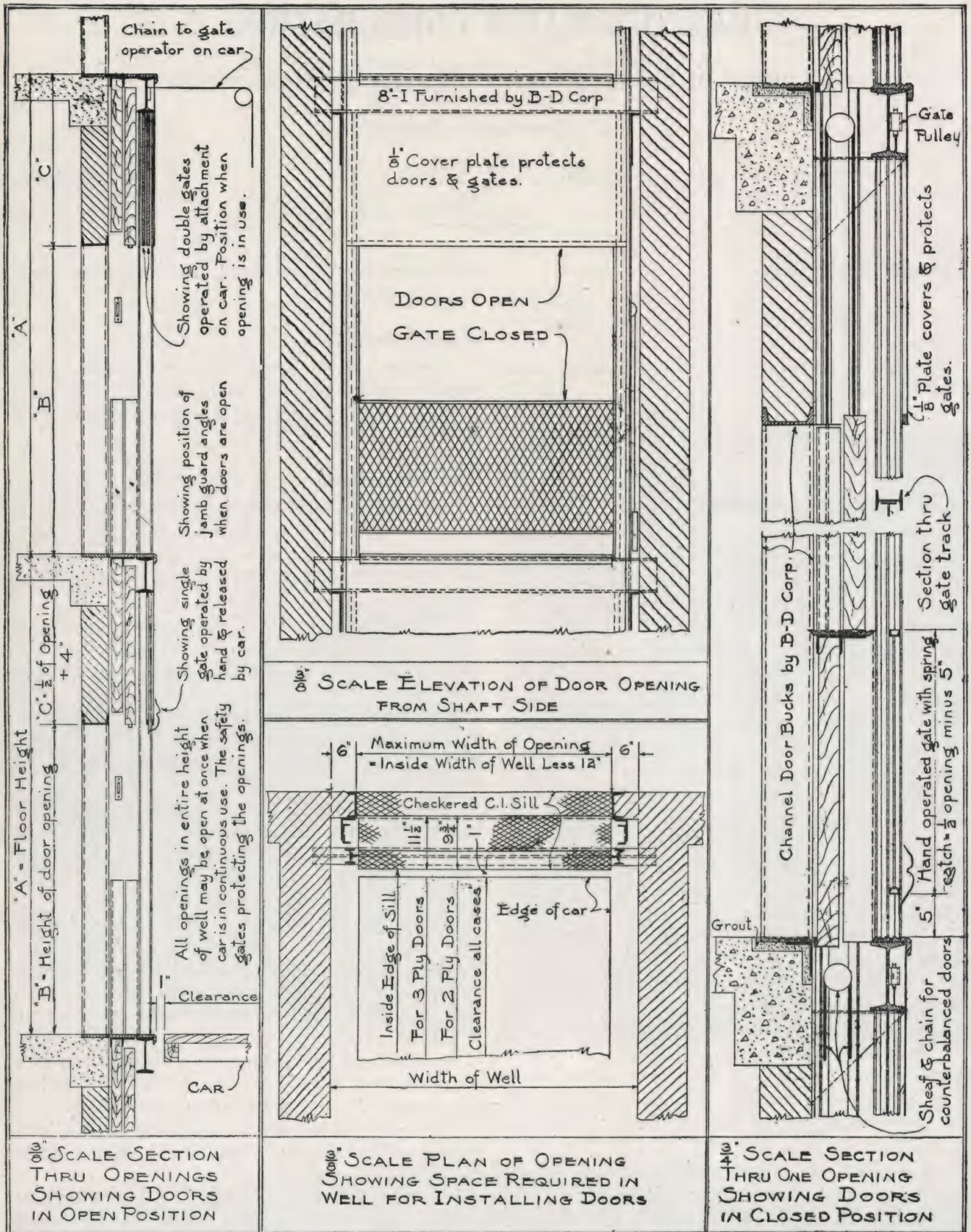
Gates and door will be provided with ball bearing roller so the chain will travel with the least possible resistance. The entire opening above the door will be covered with a plate and reinforced with a bar of iron at its lower edge to keep it straight and forming a flush well.

These doors are to be made of ..... (state kind of door desired), bearing the underwriters' label on same and guaranteed to be free from defect in material or workmanship for one year from date of installing.

Doors are to be manually operating and the basement door is to be provided with a key so same can be opened from the floor.

It is the intention that BABCOCK-DAVIS CORPORATION will provide everything that pertains to these openings, including door buck, floor threshold, doors, door threshold, well beam, well threshold, gate, well covers, operating device, ball bearing rollers, cables, bolts, screws, and shop coat of paint.

Continued on next page



DETAILS OF BABCOCK - DAVIS COUNTERBALANCED DOORS

PATENTS - PENDING

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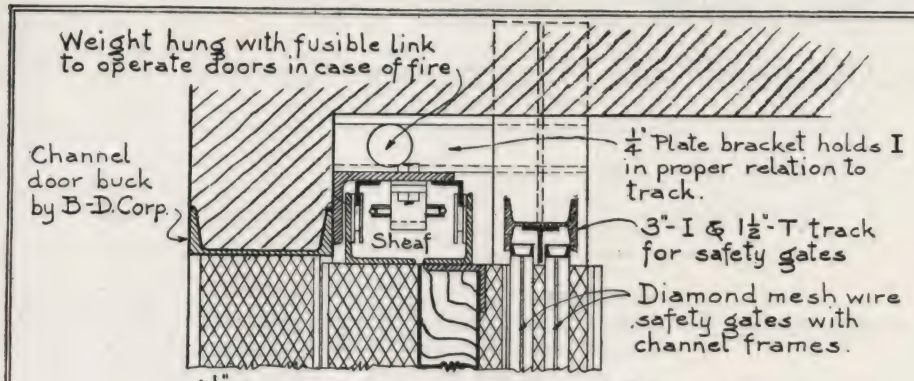
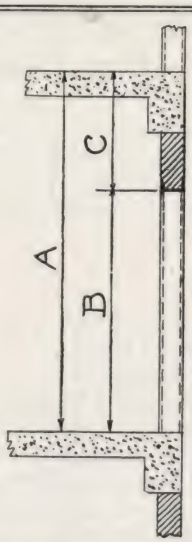
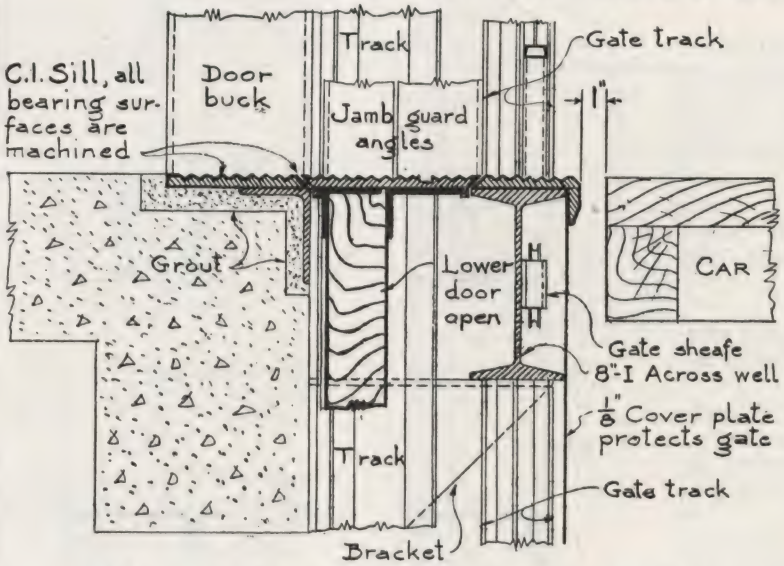


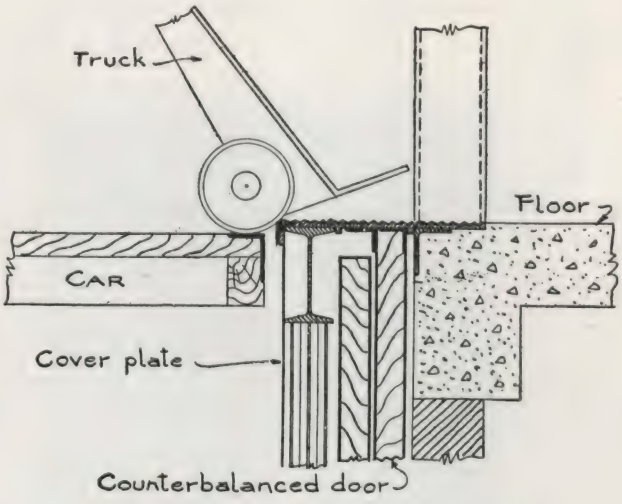
1½" Scale Section Thru Jamb & Track



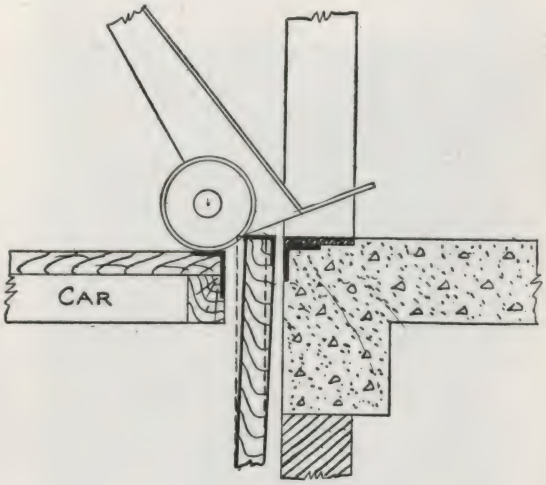


1½" Scale Section Thru C.I. Sill & 8"-I Support

Schedule of Heights		
A	B	C
10'-10"	7'-0"	3'-10
11'-2½"	7'-3"	3'-11½"
11'-7"	7'-6"	4'-1"
11'-11½"	7'-9"	4'-2½"
12'-4"	8'-0"	4'-4"
12'-8½"	8'-3"	4'-5½"
13'-1"	8'-6"	4'-7"
13'-5½"	8'-9"	4'-8½"
13'-10"	9'-0"	4'-10"



Babcock-Davis Counterbalanced Door Always Protected.



Other Counterbalanced Doors Having No Protection

DETAILS OF BABCOCK - DAVIS COUNTERBALANCED DOORS

PATENTS - PENDING

GUARANTY IRON & STEEL CO.

Fire Doors, Ornamental and Miscellaneous Iron

GENERAL OFFICE AND WORKS

3845-3855 West Lake Street

CHICAGO, ILL.

Products

FREIGHT ELEVATOR DOORS; PASSENGER ELEVATOR DOORS; Iron, Bronze or Wire.

HORIZONTAL FOLDING DOORS; CANOPY DOORS.

FIRE DOORS, Tin Clad, Steel or Art Metal.

Also manufacturers of the following:

Wire Products, including Elevator Enclosures; Window and Door Guards; Elevator Sheave Guards; Machine Guards; or anything in the wire line.

Ornamental Iron Products, including Iron Stairs; Railings, pipe or ornamental; Store Fronts; Balconies, or anything in the ornamental iron line.

Meeker Doors, Hollow Metal Doors, Iron Shutters, Rolling Shutters, Slide-up Doors, Warehouse Doors, Fire Wall Doors, Wire Enclosures, and Elevator Cabs.

Freight Elevator Doors

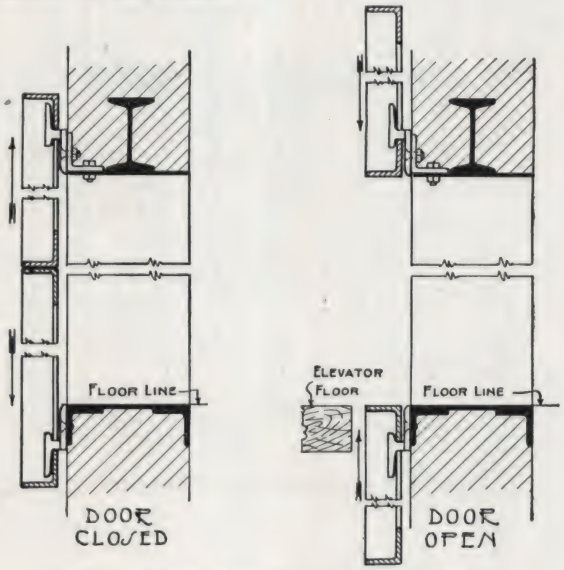
The numerous features and advantages of this company's counterbalanced elevator door immediately appeal to both architect and owner.

It is labeled by the National Board of Fire Underwriters, carrying with it a full rating of insurance.

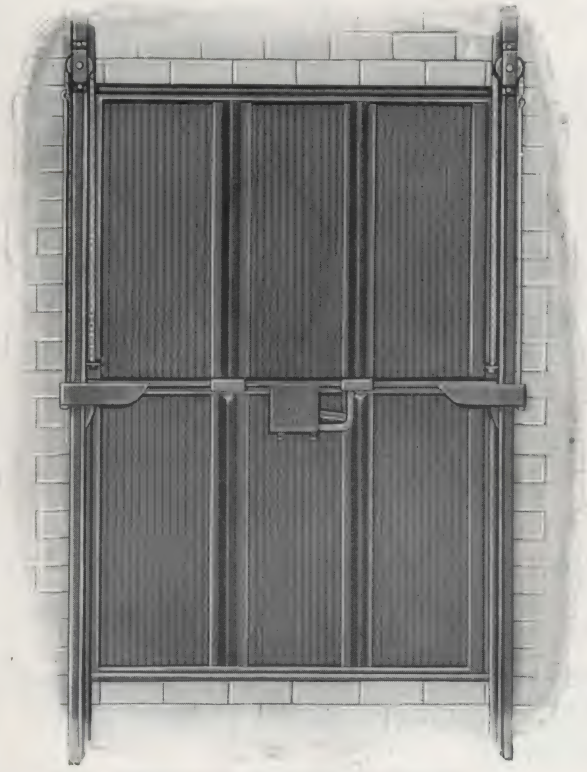
A special feature of this door is the trucking device, which permits a truck of any size or load to pass over without disturbing the door in the least.

Note the binders at the top and bottom which bind the doors, when open or closed, against the wall and prevent them being forced out of the guides and into the shaft. This feature is patented and can only be found on doors manufactured by the GUARANTY IRON & STEEL Co. and bearing their label. Any others are infringements and liable to prosecution.

All work is first inspected at the shop and then sent to the job to be put up in a first class manner. The illustrations below will give an idea of the lightness and durability of this door.



CROSS SECTION DETAILS OF ELEVATOR DOOR



ELEVATOR DOOR—SHAFT SIDE

ELEVATOR DOOR—FLOOR SIDE

Continued on next page

Staggered Counterbalanced Freight Elevator Doors

These doors are used where maximum height of opening is required. Make a clear opening as high as the ceiling of story, if necessary.

A minimum distance of 9 in. between head of opening and sill of opening above is all that is required for this type of door.

Advantages are:

Improved trucking sill.

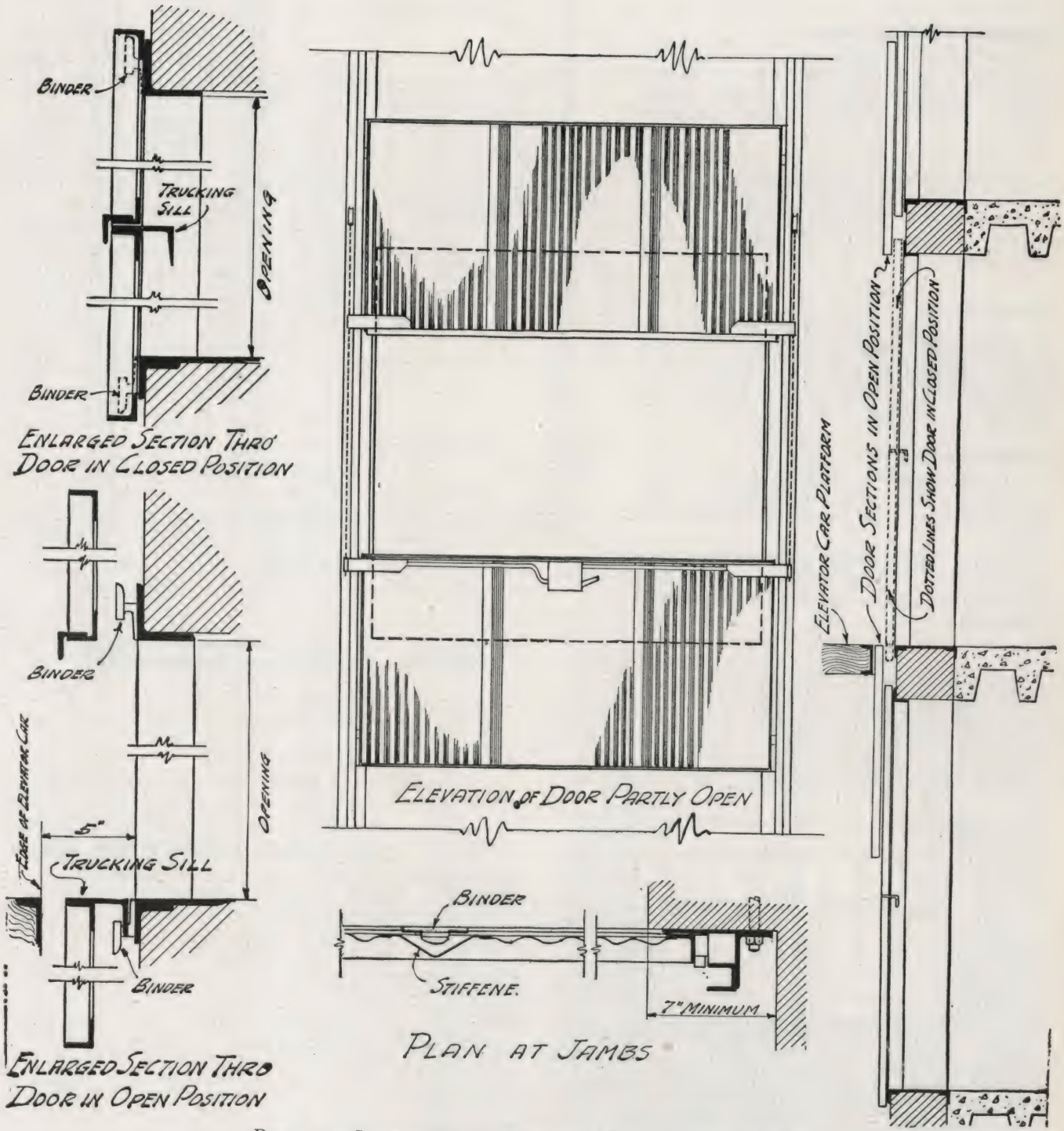
Stiffened ribs and heavy frame.

Closes tightly against frame and is held in place by binders.

Ease of operation.

Reduced insurance.

This door is made of label construction and meets with the approval of the National Board of Underwriters. Also, the heavy construction makes the door more durable than the ordinary Meeker type of door.



DETAILS OF STAGGERED COUNTERBALANCED FREIGHT ELEVATOR DOOR

Continued on next page

Passenger Elevator Doors

Passenger elevator doors of iron, bronze or wire are manufactured and all requirements, whether they are elaborate or simple, will be supplied.

Fire Doors

The Fire Door Department is equipped to turn out tin clad doors, steel doors or art metal doors, complying with all rules of the National Board of Underwriters for all conditions.

Horizontal Folding Doors

Adapted for shipping and receiving platforms and exterior openings where it is not feasible to install sliding or swinging doors. They can be built with glass panels to admit light.

These doors fold up under the ceiling and make every inch of space available for merchandise. They are built of wood, or iron, or wood covered with tin or iron, and conform to all rules of the National Board of Underwriters.

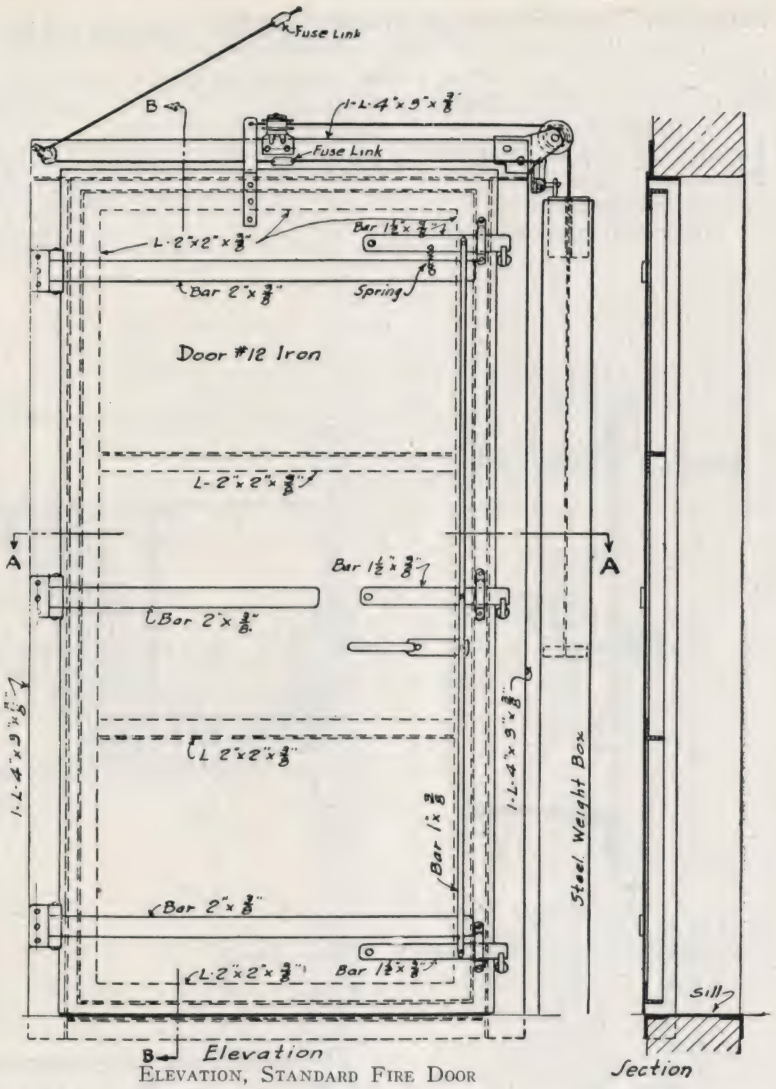
Canopy Doors

These doors are used where folding doors or rolling shutters are not practical. This type of door is made of iron, steel, or wood, and operates similar to folding doors. Carries the label of the National Board of Underwriters.

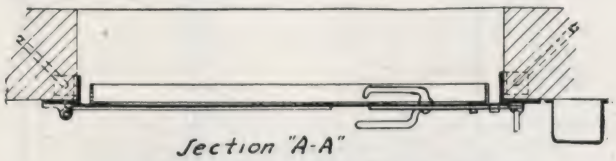
Co-operative Service

Inquiries will be gladly received and the Estimating Department will furnish estimates and sketches for all requirements on short notice.

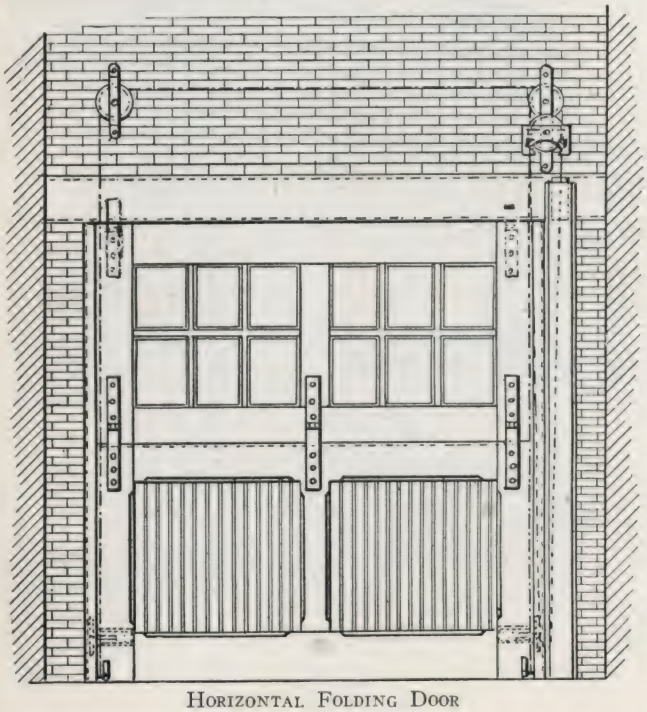
While this company is not the largest manufacturer of fire doors in the world, their reputation for service and courteous treatment is second to none.



ELEVATION, STANDARD FIRE DOOR



SECTION, STANDARD FIRE DOOR



HORIZONTAL FOLDING DOOR

References

Following are a few of many buildings equipped; list of others furnished in any locality.

United States Government Cold Storage Building, Chicago, Ill.
United States Government Quartermaster's Buildings, Units A, G and C, Chicago, Ill.
Chicago Junction Terminal Building, Chicago, Ill.
Montgomery Ward & Co. Building, Chicago, Ill.
Sears, Roebuck & Co. Building, Chicago, Ill.
Palace Theater, Cincinnati, Ohio
South Shore Country Club, Chicago, Ill.
Lyon & Healy Building, Chicago, Ill.
Capitol Building, Springfield, Ill.
Y. M. C. A., Beloit, Wis.
Capitol Building, Madison, Wis.
Stillman Residence, Fort Wayne, Ind.
Gould Residence, Indianapolis, Ind.
Swift & Co., Warehouse 33, Chicago, Ill.
Packard Motor Co., Chicago, Ill.
Ritz Apartments, Chicago, Ill.
Soden Building, Chicago, Ill.
Kelly Building, Chicago, Ill.
Gregory Building, Hammond, Ill.
Central Park Theater, Chicago, Ill.
Y. M. C. A., Ottumwa, Iowa
Art Crafts Building, Chicago, Ill.

HOWES M'F'G CO.

Doors and Flag Pole Fittings

263 Northampton Street
BOSTON, MASS.

FLAG FIXTURE REPRESENTATIVE, L. PH. BOLANDER & SON, SAN FRANCISCO, CAL.

Products

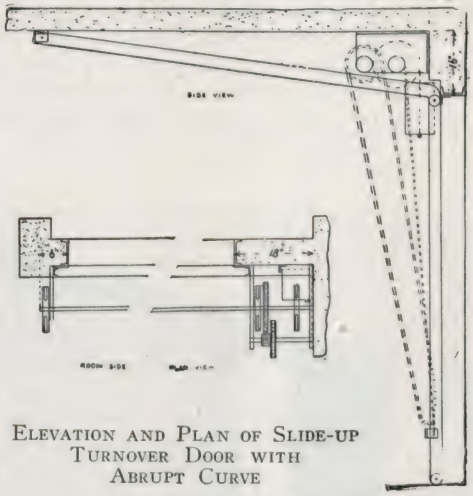
SLIDE-UP TURNOVER DOORS for Factories, Warehouses, Garages, etc. GARAGE and WAREHOUSE ELECTRIC DOOR OPERATORS. SPECIAL FLAG POLE FITTINGS, including NON-TANGLE FLAG ROD and WEATHERPROOF ROTATING TRUCK.

Also Standard Garage and Warehouse Doors, and Hardware for same.

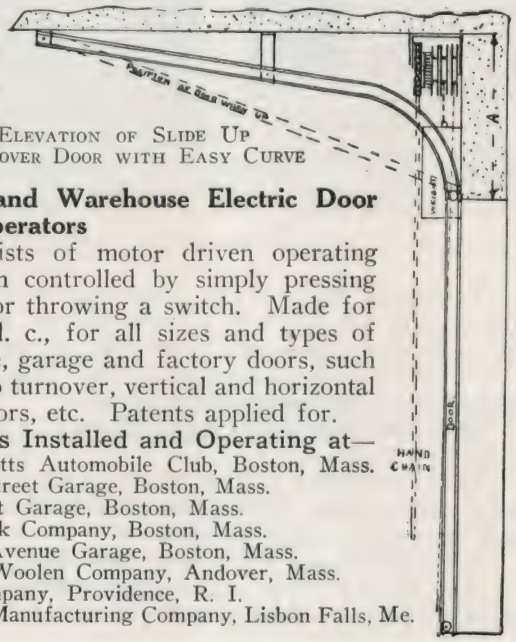
Slide-up Turnover Doors

With Abrupt Curve—This door when open is on the ceiling, out of the way. Specially suitable where only small clearances can be allowed. Fire doors of this type are equipped with a fusible link, making them self-closing in case of fire. Arranged for operation by hand chain. Door is counterbalanced.

With Easy Curve—Door is counterbalanced and operates as easily as a straight slide-up door when clearance above door is ⅓ of door opening height. Arranged for hand or electrical operation. Can also be equipped with fusible link for use as fire door.



ELEVATION AND PLAN OF SLIDE-UP TURNOVER DOOR WITH ABRUPT CURVE



ELEVATION OF SLIDE UP TURNOVER DOOR WITH EASY CURVE

Garage and Warehouse Electric Door Operators

Consists of motor driven operating mechanism controlled by simply pressing a button or throwing a switch. Made for a. c. or d. c., for all sizes and types of warehouse, garage and factory doors, such as slide up turnover, vertical and horizontal sliding doors, etc. Patents applied for.

Doors Installed and Operating at—

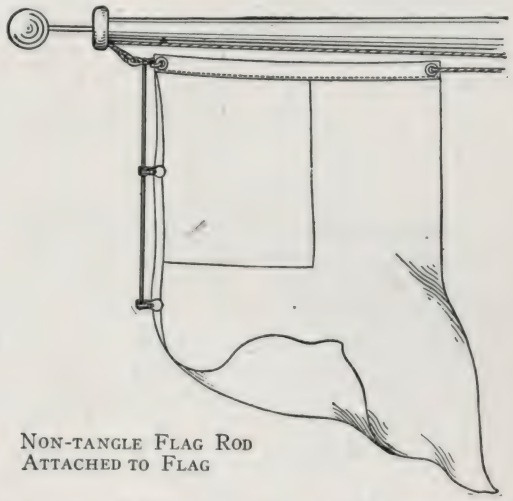
Massachusetts Automobile Club, Boston, Mass.
Portland Street Garage, Boston, Mass.
Eliot Street Garage, Boston, Mass.
Noyes-Buick Company, Boston, Mass.
Westland Avenue Garage, Boston, Mass.
American Woolen Company, Andover, Mass.
Outlet Company, Providence, R. I.
Worumbo Manufacturing Company, Lisbon Falls, Me.

NON-TANGLE FLAG ROD

Special Flag Pole Fittings

Non-tangle Flag Rod (Patented)—For use with horizontal flag poles. Consists of a light metal rod having a ring and hook at one end and a swivel clamp at the other end. Longer rods have intermediate swivel clamps. Attached to flag as illustrated below. Prevents flag from tangling in any wind. Flags last much longer and always present a proper appearance when flown.

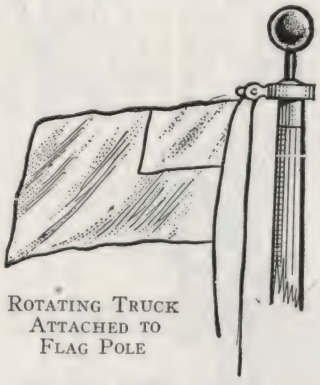
Made of brass or galvanized iron in various lengths to suit any size flag. Prices on application.



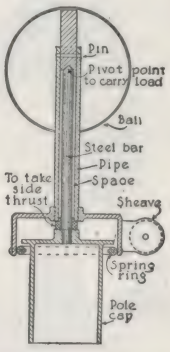
NON-TANGLE FLAG ROD ATTACHED TO FLAG

Weatherproof Rotating Truck (Patented)—For use on upright wooden or metal flag poles. Permits flag to swing around pole at slightest change in direction of wind, thus preventing flag from tangling. Furnished with automatic spring cleat which eases tension in halyards when flag rotates.

Made of brass or galvanized iron in various sizes for poles with top diameter from 2 to 6 in.



ROTATING TRUCK ATTACHED TO FLAG POLE



DETAIL OF ROTATING TRUCK

Flagpole Fittings Installed—

Treasury Building, Washington, D. C.
Post Office Building, Washington, D. C.
Emigration Service Station, New York, N. Y.
City of New York Fire Ins. Building, New York, N. Y.
Boston City Club, Boston, Mass.
Courthouse, Boston, Mass.
Bunker Hill Monument, Charlestown, Mass.
First National Bank, Chicago, Ill.
Blackstone Hotel, Chicago, Ill.

THE PEELLE COMPANY

Manufacturers of Elevator and Warehouse Fireproof Doors

TELEPHONE
STAGG 365, 366, 367

Stewart Avenue, Harrison Place near Flushing Avenue
BROOKLYN, N. Y.

BRANCHES
BOSTON, 18 Tremont Street—Telephone, Fort Hill 747
CHICAGO, 175 Jackson Boulevard—Telephone, Wabash 2020
CLEVELAND, Caxton Building—Telephone, Main 4053

AGENCIES IN ALL PROMINENT CITIES IN THE UNITED STATES AND CANADA

Products

PEELLE COUNTERBALANCE TRUCKABLE FIREPROOF ELEVATOR DOOR; TEL-CO-DOR; CANOPY FOLDING DOOR; INTERLOCKING SYSTEMS; ELECTRIC AUTOMATIC OPERATING DEVICES.

Also Self-closing Fireproof Dumbwaiter Doors.

Services

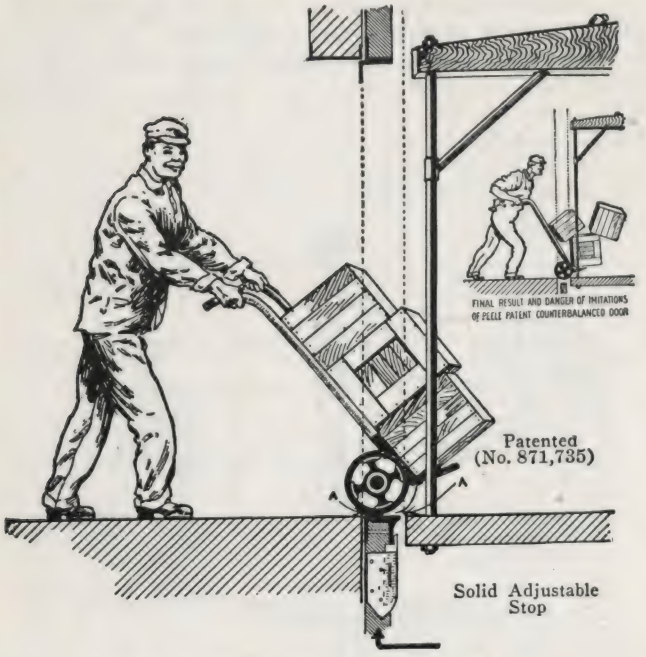
THE PEELLE COMPANY Engineers are prepared to assist clients in selecting the proper and most economical equipment to suit special conditions and requirements.

Peelle Counterbalance Truckable Door (Patented)

Manufactured exclusively by this company, this door is constructed under the direct supervision of the Underwriters' Laboratories, Inc., and bears their label, and is approved and highly recommended by the Building Departments and State Labor Bureaus.

Peelle counterbalance doors open up and down from the center; and as each part has to travel only half the opening, the clear opening is given instantly. The two halves balance one another, and are operated by heavy flexible chains running over double radial ball bearing pulleys, making their operation very easy.

Peelle doors can have any type of panels, either wood, metal covered, or all-metal, as specified. The panels are set and bolted into rigid angle and T-iron frames. The upper edge of the lower panel is reinforced so that when the Peelle door is open, it presents a solid sill between the building floor and the elevator car (see illustration).

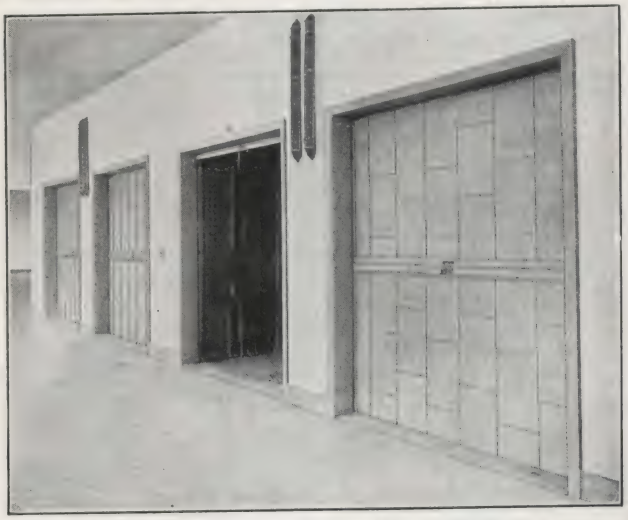


PEELLE TRUCKABLE ELEVATOR DOOR

Note special adjustable stop which firmly binds door, when open, to building sill. This is the only counterbalance door that fills gap between car and building floor firmly and perfectly flush with building sill. Peelle corrugated steel elevator door has additional similar binding and supporting devices at center or at more frequent intervals, according to size of door and amount of trucking it is to be subjected to. Running chains are not used in the support of Peelle doors, when open. The Peelle patented truckable feature has been infringed, and users should beware of imitations

Construction Specifications of Peelle Counterbalance Truckable Doors

Hanger bar at upper surface of lower panel on all Peelle counterbalance doors is reinforced and extends beyond panel frame, to rest on solid adjustable stops riveted to wall rails. This removes all weight from turnbuckles and chains when door is open and in use. Hanger bar which forms the trucking sill can be made to carry any specified load.



STANDARD TIN COVERED PEELLE COUNTERBALANCE DOORS

Panels are made of two thicknesses of white pine covered with best grade I. C. terne tin, set and bolted into angle iron frames with reinforced corners.

This door is always used unless floor heights are too low or when a kalamein panel is desired.

Made under the direct supervision of Underwriters' Laboratories, Inc.

Doors exceeding 8 ft. in width or 10 ft. in height can, in no case, bear the underwriters' label, but can be made according to label specification.

See following page for space requirements.

Any of the Peelle safety appliances or electrical equipment can be furnished with this door.

Continued on next page

Peelle Kalamein Covered Counterbalance Truckable Doors for Exterior Openings

Panels are made of two thicknesses of white pine, covered with smooth kalamein iron tightly drawn, set and bolted into angle iron frames with reinforced corners. Design can be made to harmonize with architecture of building or with interior trim. Maximum amount of glass allowed by most departments is 720 sq. in., but exterior doors may frequently have more. The Underwriters' Laboratories, Inc., label furnished on plain paneled doors within size limits. No label furnished on glass-paneled doors.

KALAMEIN COVERED COUNTERBALANCE TRUCKABLE DOORS FOR EXTERIOR OPENINGS

SHAFT CONSTRUCTION DATA, COUNTERBALANCE DOORS—Channel jambs should be provided. Hollow tile or other light wall construction should have channel jambs from door to ceiling. All sills, jambs and lintels to be built flush and plumb. Openings must be built in vertical alignment. Jambs, sills, stationary lintels or trim not furnished by THE PEELLE COMPANY.

MINIMUM FLOOR HEIGHTS FOR PEELLE DOORS

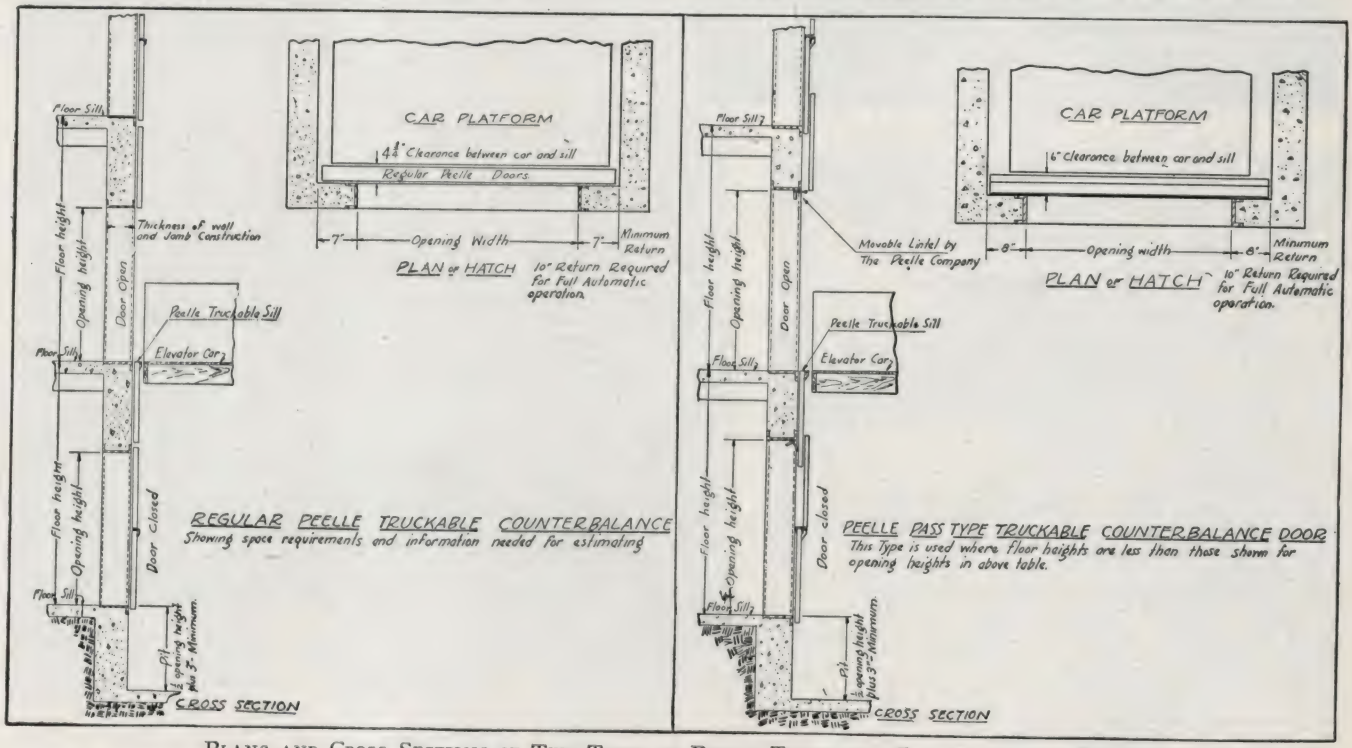
Height of opening	Finished floor to finished floor	Height of opening	Finished floor to finished floor
5′ 9″	9′ 5½″	7′ 6″	12′ 1″
6′ 0″	9′ 10″	7′ 9″	12′ 5½″
6′ 3″	10′ 2½″	8′ 0″	12′ 10″
6′ 6″	10′ 7″	8′ 3″	13′ 2½″
6′ 9″	10′ 11″	8′ 6″	13′ 7″
7′ 0″	11′ 4″	8′ 9″	13′ 11½″
7′ 3″	11′ 8½″	9′ 0″	14′ 8½″

Above table is for labeled doors. Deduct 4 in. for unlabeled. Pass type doors can be used where floor heights are too low.

Peelle Corrugated Steel Counterbalance Truckable Door (Patented)

Note dovetail binder shoe fastened to sill and lintel. The T-Bar traveling rail, which is also a brace for the door, travels in dovetail binder. Door is held securely to wall in open, closed, or partly opened position by this feature. This prevents buckling resulting from rough treatment. T-Bar traveling rails are placed 3 ft. apart; they assist when the door is open in supporting the trucking feature. Panels are of No. 18 gauge corrugated steel sheets. The Underwriters' Laboratories, Inc., label is furnished with this door within size limits.

CORRUGATED STEEL COUNTERBALANCE TRUCKABLE DOOR



PLANS AND CROSS SECTIONS OF TWO TYPES OF PEELLE TRUCKABLE COUNTERBALANCE DOORS

Continued on next page

Any of the Peelle safety appliances or electrical equipment can be furnished with this door.

Peelle Electric Full Automatic Doors

Peelle doors may be equipped with a motor driven device, located in the penthouse, which opens and closes the doors by operating a switch in the elevator cab (see cut).

The switch is so arranged that if the operator removes his hand, opening or closing of the doors stops instantly.

All doors are inoperative except at the specific landing where the car is located.

In case of emergency, a lever is pulled which disconnects the doors from the machine. The doors may then be manually operated.

Installations—Peelle full automatic doors have been installed in the following buildings:

U. S. Fleet Supply Base, Brooklyn, N. Y.
Mail Service and Loft Building, Grand Central Terminal, New York, N. Y.
Northeast Electric Co., Rochester, N. Y.
Arlington Mills, Lawrence, Mass.
U. S. Aluminum Co., Edgewater, N. J., and Toronto, Can.
Chevrolet Motor Car Co., Tarrytown, N. Y.
Bausch & Lomb, Rochester, N. Y.
Naval Operating Base, Hampton Roads, Va.
Pictorial Review, New York, N. Y.
Morse Dry Dock Co., Brooklyn, N. Y.
U. S. Navy Yard, Brooklyn, N. Y.
Cadillac Motor Co., Detroit, Mich.

Bush Terminal Buildings, Brooklyn, N. Y.

Largest industrial buildings in the United States. Over 1500 Peelle truckable doors Type R-6 are installed in these buildings alone.
The Peelle doors in the latest building are being equipped with the Peelle electro-mechanical interlocks, which are approved by all state, city and fire departments

References, Peelle Elevator Doors

The following are a few buildings in which the freight elevators are equipped with Peelle doors.

In a few of these, doors had been installed to try and imitate the Peelle door and were removed, on account of not giving satisfaction, and the original Peelle doors installed in their place.

*Hoboken Terminal Buildings, Hoboken, N. J.
*Austin Nichols Grocery Warehouse, Brooklyn, N. Y.
*Robert Gair Concrete Buildings, Brooklyn, N. Y.
*Woolworth Office Building, New York, N. Y.
*Herald Square Loft Building, New York, N. Y.
*Equitable Office Building, New York, N. Y.
*Auerbach Candy Warehouse, New York, N. Y.
John Wanamaker Department Stores, New York, N. Y.
Hill Publishing Co., New York, N. Y.
Albemarle Building, New York, N. Y.
Burton Bros. Warehouse, New York, N. Y.
Mail Service and Loft Building, New York, N. Y.
Lord & Taylor Department Store, New York, N. Y.

Peelle Full Automatic Door Illustrating Method of Closing by Pushing Switch

*Warner Corset Factories, Bridgeport, Conn.
Standard Oil Co., numerous cities
U. S. Government Buildings, Denver, Boston, Washington, Philadelphia, and numerous other cities
Osgood Bradley Building, Worcester, Mass.
American Cigar Co., Hartford, Conn.
Winchester Repeating Arms Co., New Haven, Conn.
United States Tire Co., New York, N. Y., and Boston, Mass.
General Electric Co. Factories, numerous cities
American Can Co. Factories, numerous cities
Otis Elevator Co., numerous cities
American Ever Ready Co. Building, Long Island City, N. Y.
*Loose-Wiles Biscuit Building, Long Island City, N. Y.
Great Atlantic & Pacific Tea Co., New York, N. Y., and Jersey City, N. J.
Hyatt Roller Bearing Co. Buildings, Harrison, N. J.
United Grocery Warehouse, Jacksonville, Fla.
A. Booth & Co., St. Paul, Minn.
Canadian Pacific Railroad Co., numerous cities in Canada
Smaltz Building, Philadelphia, Pa.
Victor Talking Machine Co., Camden, N. J.
Baltimore Tobacco Warehouse, Baltimore, Md.
Joseph Bancroft & Sons Co., Wilmington, Del.
Southern Railway Freight House, Atlanta, Ga.
Krippendorf-Dittman Shoe Factory, Cincinnati, Ohio
Union Storage Warehouse, Dayton, Ohio
Dennis Kelly Wholesale Grocery, Columbus, Ohio
Standard Mfg. Co., Erie, Pa.
Sears, Roebuck & Co.'s Warehouse, Seattle, Wash., and Chicago, Ill.
Stripling Department Store, Fort Worth, Tex.
Buffalo, Rochester & Pittsburgh Railway Co. Warehouse, Rochester, N. Y.
Kaufmann & Baer Department Store, Pittsburgh, Pa.
J. N. Adam Co. Buildings, Buffalo, N. Y.
Robinson-Locke Building, Toledo, Ohio
Kahn Tailoring Co., Indianapolis, Ind.
Fleet Supply Base, Brooklyn, N. Y.
*Bingham Hardware Co., Cleveland, Ohio
Federal Warehouse, Peoria, Ill.
Pacific Coast Shredded Wheat Co., San Francisco, Cal.
Baltimore & Ohio R.R. Warehouses, New York, N. Y.
Kraus Garage, New York, N. Y.
Patterson & Sargent Building, Long Island City, N. Y.
Connelly Building, Rochester, N. Y.
B. F. Goodrich Tire & Rubber Co., Akron, Ohio
Simon Zinn, New York, N. Y.
Export Leaf Tobacco Co., Richmond, Va.

*Largest or highest buildings of their kind in the world.

Continued on next page

Peelle Tel-Co-Dor

The Tel-Co-Dor is used for protecting exterior openings in warehouses, and openings in fire walls, also for freight elevator shaft openings where it is not possible for the door to slide up and down.

PEELLE TEL-CO-DOR INSTALLED IN BUILDING OF THE AMERICAN GAS AND ACCUMULATOR CO., ELIZABETH, N. J.

Can be made with all types of panels, reinforced with Peelle patented T-bar traveling rails, and dovetail binder shoes.

Made in two sections, which telescope in opening, the lower section traveling twice as fast as the upper, both sections reaching the lintel at the same time.

The label of the National Board of Fire Underwriters is furnished with this door. Also approved by the Mutual Insurance Companies.

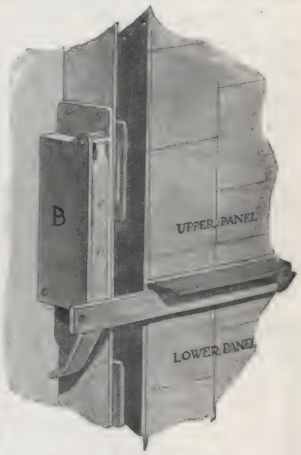
A 4¾-in. sill is required for installing in freight elevator shaft, and 8-in. return on both sides in all cases.

Peelle Electric Interlock

The position of the interlock on the rails of the Peelle counterbalance door is shown here. The mechanism is entirely enclosed and protected from dirt and dust.

Doors equipped with electric interlocks and manually operated. The function of the interlock is to render the car inoperative unless all doors are first closed and locked.

An emergency switch in glass covered box can be installed in the elevator car, to operate the car with doors open in case of fire or other emergency.



PEELLE ELECTRIC INTERLOCK

Elevator cars not having a full magnetic control are equipped with the Peelle mechanical interlock, making it possible to interlock any type or make of car.

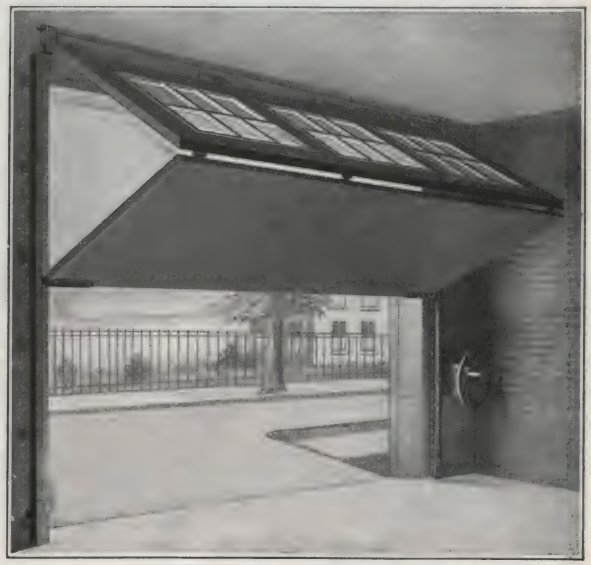
Peelle interlocks are approved by all State Departments and other boards having jurisdiction.

Peelle Folding Canopy Door

Installed on either inside or outside of opening and can be operated by means of chain hoist and counterweights, electric full automatic machine, or hand winch hoist; patented safety appliance prevents door from falling should a cable break. Panels made to any specification of design or construction.

Doors require 5-ft. clear space from lintel to nearest overhead obstruction with a 2 ft. 6-in return (4 ft. for electric full automatic) on operating side and 6 in. on the other. Doors in excess of 180 sq. ft. are equipped with counterweights and require only 3 ft. clear space from lintel to nearest overhead obstruction.

PEELLE CANOPY FOLDING DOOR (OUTSIDE)
As installed in Dillman's garage. Can be made with any type of panels desired. A very desirable garage and warehouse exterior door



PEELLE FOLDING CANOPY DOOR
Winch type, partly open

Continued on next page

Peelle Self-sealing Pass Type Doors

The Peelle Self-sealing pass type counterbalanced freight elevator doors are the only pass type doors awarded the label and certificate of the Underwriters' Laboratories.

Formerly, in buildings where story heights were insufficient to permit the installation of the regulation Underwriters' labeled Peelle elevator doors, only pass type doors without the Underwriters' label could be used.

Lowers Insurance Rate—These doors eliminate extra tax and retain all of the advantages of regulation Peelle Doors.

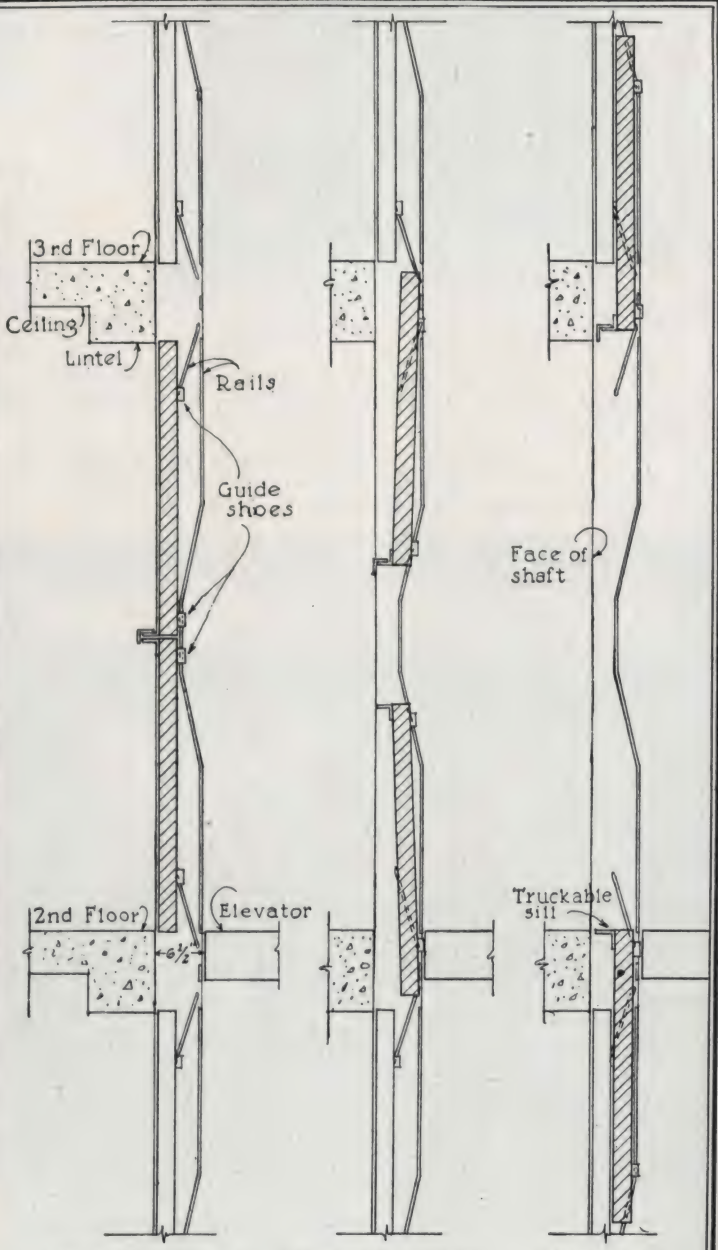
Henceforth, a building equipped with the new Peelle self-sealing pass type counterbalanced doors will not only receive the benefit of lower insurance rates, but will also save the extra tax which is levied by all insurance companies on every pass type door not approved by the Underwriters' Laboratories.

Self-sealing and Smokeproof—When this door is in a closed position, the angle iron frame of each half of the door comes into true contact with door jamb, completely sealing the opening, even against the passage of smoke.

Where a smokeproof, airtight door is desired, Peelle pass type self-sealing counterbalanced doors should be included in the specifications.

In addition to the many advantages afforded by Peelle pass type doors (pictured and described on the following page) they possess the same exclusive truckable feature, ease of operation and other advantages of the regular Peelle counterbalanced doors.

ELEVATION OF DOOR FROM ELEVATOR SIDE



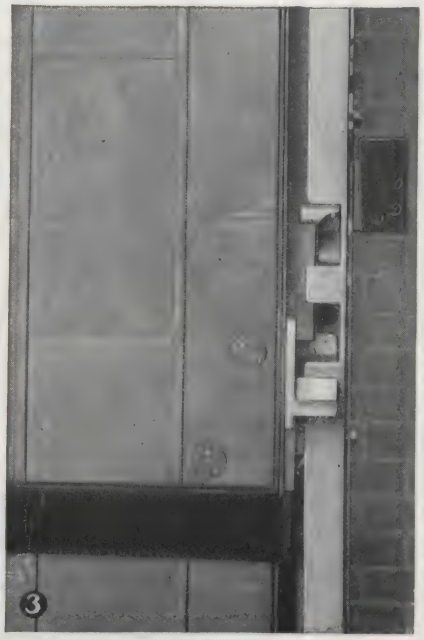
SHOWING DOOR CLOSED | SHOWING DOOR PARTLY OPEN | SHOWING DOOR OPEN

DETAILS SHOWING OPERATION OF PEELE SELF-SEALING PASS TYPE DOOR

Continued on next page

Isometric View from Elevator Side of Lower Half of Rails Showing Door in Closed Position

Isometric View from Elevator Side, of Lower Half of Rail Showing Door Partly Open



Isometric View of Lower Half of Rail Showing Guide Shoe Engaging Outer Rail

View of Offsetting Guide Rails at Center of Door

FOUR UNDERWRITERS' LABELED PASS TYPE DOOR RAILS SHOWING METHOD OF OPERATION

ST. LOUIS FIRE DOOR CO.

Manufacturers of Freight Elevator, Warehouse and Fire Doors

GENERAL OFFICES AND FACTORY
1134-1142 South Sixth Street
ST. LOUIS, MO.
REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

"WAL-EL-DOR," TELESCOPING, FIREPROOF, FREIGHT ELEVATOR DOOR.

"CO-BAL-DOR," COUNTERBALANCED, TRUCKABLE, FIREPROOF, FREIGHT ELEVATOR DOOR.

"TI-CO-DOR," TIN CLAD, COUNTERBALANCED, TRUCKABLE, FIREPROOF, FREIGHT ELEVATOR DOOR.

"ALSTEEL-DOR," ASBESTOS LINED, CORRUGATED, SLIDING and SWINGING, FIRE DOOR.

"FOLD-UP-DOR," HORIZONTAL FOLDING DOOR for warehouses, shipping platforms, freight houses and garages.

Underwriters' Approval

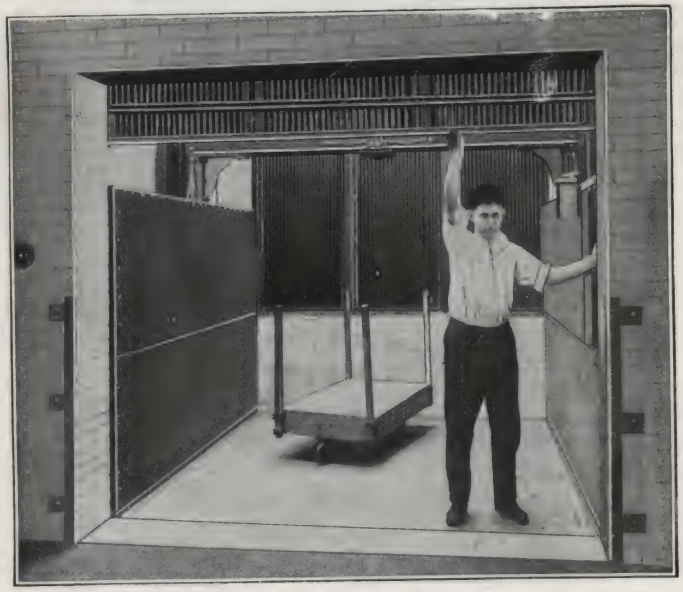
Our product is manufactured according to the specifications of, and labeled by the National Board of Fire Underwriters for sizes permitted.

All of our elevator doors, including pass type counterbalanced doors, are labeled for openings up to and including 8 ft. wide by 10 ft. high.

"Wal-El-Dor" (Patented)

A vertical telescoping, fireproof, freight elevator door, divided horizontally into two sections, both halves sliding up above the lintel, permitting the use of a solid and rigid sill projecting 4½ in. into the shaft for trucking on and off the elevator car. The standard construction of this type of door is of 1¼-in. corrugated No. 20 gauge black sheets, riveted into the angle iron frames in both of the upper and lower door sections.

As both halves of Wal-El-Dor slide up, it is entirely out of the way and therefore trucks can not bump into or injure them. The sill which is a part of the building construction projects into the shaft, taking up the space between the shaft wall and the elevator platform, giving perfect trucking facilities. Write for further information.



"WAL-EL-DOR" PARTLY OPEN
Frames and sills not furnished with doors

Tin Clad "Wal-El-Dor"

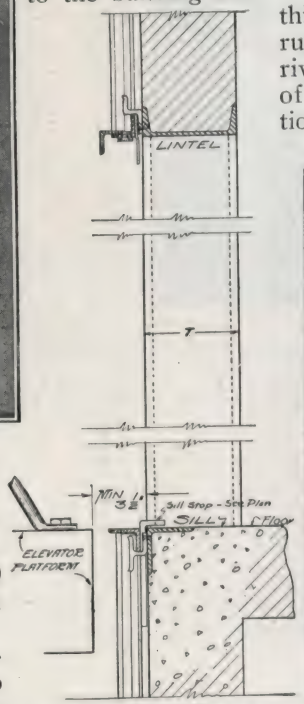
Is the same type as the standard "Wal-El-Dor," and has the same features excepting that the upper and lower door sections are constructed of two 2-ply wood cores, covered with I. C. terne tin, which are bolted into the angle iron frames, of the upper and lower door sections.

Kalamein "Wal-El-Dor"

Is the same type as the standard "Wal-El-Dor," and has the same features excepting that the upper and lower door sections are constructed of two 2-ply wood cores covered on the shaft side with I. C. terne tin and covered with kalamein iron and trim on the room side. This construction presents a very attractive appearance and is used extensively in stores, offices, bank buildings, hospitals, etc.

"Co-Bal-Dor" (Patented)

A counterbalanced, truckable, fireproof, freight elevator door, divided horizontally into two sections, one half sliding up above the lintel, and the other half down below the sill. With this type of door, trucking is done over the top of the lower door section, which is equipped with an extra heavy trucking angle, so arranged, that the heavy loads of trucks passing over the door is taken off of the door guides and chains, and transferred directly to the building sill. The standard construction of this type door is of 1¼-in. corrugated No. 20 gauge black sheets riveted into the angle iron frames of the upper and lower door sections.



"CO-BAL-DOR" DETAIL
Showing door open with car at sill

"CO-BAL-DOR"
Partly open

Continued on next page

UNDERWRITERS' LABELED "TI-CO-DOR," OPENED AND CLOSED

"Ti-Co-Dor" (Patented)

Is of the same type as the "Co-Bal-Dor," and has the same features excepting that the upper and lower door sections are constructed of two 2-ply wood cores covered with I. C. terne tin, which are bolted into the angle iron frames, of the upper and lower door sections.

Kalamein "Ti-Co-Dor"

Is the same type as the "Co-Bal-Dor," and has the same features excepting that the upper and lower door sections are constructed of two 2-ply wood cores covered on the shaft side with I. C. terne tin with kalamein iron and trim on the room side. This construction also presents a very attractive appearance and is used extensively in stores, offices, bank buildings, hospitals, etc.

Semiautomatic Device

The function of the semiautomatic device is to hold the door in the open position, until the elevator car leaves the floor line in either direction, after which the door closes automatically.

Interlocking Electric Safety Switch

The function of the interlocking electric safety switch is to make the elevator car inoperative when any door in the shaft is not closed and locked. This is strongly recommended for all types of elevator doors.

Note—The semiautomatic device or the interlocking electric safety switch is extra equipment for either "Wal-El-Dor," "Co-Bal-Dor." Please note that only one of these devices can be installed, as they will not operate in conjunction with one another.

"Alsteel-Dor" (Patented)

Constructed of two thicknesses of corrugated, galvanized iron sheets with one thickness of $\frac{1}{16}$-in. asbestos lining between the sheets, all of which is securely riveted into angle iron frames. The corrugated sheets on one side are placed vertically, and on the opposite side horizontally. At regular intervals over the surface of the door, the corrugated sheets are riveted together where the corrugations touch. This construction is far superior to the ordinary tin clad fire door, being practically indestructible, and, with the air chambers and asbestos lining, offers a maximum amount of resistance to fire.

There is practically no deterioration in this type door, as it contains no wood or other material subject to combustion, dry rot, or decay.

This type of door is labeled by the National Board of Fire Underwriters for division wall, vertical shaft and exterior openings.

"Fold-Up-Dor" (Patented)

Divided horizontally into two sections, both halves folding up between the lintel and ceiling, (or beams), being entirely out of the way when opened, permitting the use of full size of the opening.

The standard construction of this type door is $2\frac{1}{4}$-in. thick white pine stiles and rails with $\frac{7}{8}$-in. M. & B. partition material in the panels of both the upper and lower door sections.

The upper door section may be constructed with solid panels or arranged for glass.

A wicket door may be arranged in either panel of the lower door section to permit passage through the door without having to open the "Fold-Up-Dor" itself.

This type door may be of tin clad or kalamein construction, also of black or galvanized, flat or corrugated iron riveted into angle frames.

"FOLD-UP-DOR" OPENED AND CLOSED

Compound Vertical "Slide-Up-Dor"

This type of door is being used very extensively by some of the largest railroad companies in their freight terminals, with phenomenal success.

Compound Vertical "Slide-Up-Dors" may be arranged with flat or corrugated, black or galvanized, sheets in the upper and lower door sections, or with the upper section arranged with steel sash for glass.

The general construction and operation on this door is similar to the "Wal-El-Dor" with the exception that the door is opened and closed by hand by means of an endless hand chain hoist.

The Compound Vertical "Slide-Up-Dor" has decided advantages over rolling steel doors and is less expensive. Write for further information, details and specifications.

VARIETY FIRE DOOR CO.

Manufacturers of All Kinds of Fireproof Doors

Sacramento and Carroll Avenues
CHICAGO, ILL.

AGENCIES:

BALTIMORE, MD.
BIRMINGHAM, ALA.
BOSTON, MASS.
CLEVELAND, OHIO
DALLAS, TEX.
DAVENPORT, IOWA
DENVER, COLO.
EL PASO, TEX.
HELENA, MONT.
HOUSTON, TEX.
INDIANAPOLIS, IND.
JACKSONVILLE, FLA.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
OKLAHOMA CITY, OKLA.
OMAHA, NEBR.
PHILADELPHIA, PA.
PITTSBURGH, PA.
RICHMOND, VA.
SALT LAKE CITY, UTAH
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SPOKANE, WASH.
TACOMA, WASH.
DETROIT, MICH.
MILWAUKEE, WIS.
PORTLAND, ORE.

Products

VAMANCO and VARCLAD COUNTERBALANCED FREIGHT ELEVATOR DOORS.

CROSS HORIZONTAL FOLDING DOORS.

VARIETY STEEL ROLLING DOORS and SHUTTERS.

SAINO FIRE DOORS and SHUTTERS.

Also manufacturers of Tin Clad Fire Doors (all kinds).

For Metal Trim, Metal Clad and Hollow Metal Doors see pages 692-693.

Vamanco Counterbalanced Freight Elevator Doors (Patented)

Recommended for openings in freight elevator shafts. Made in four types:

(1) Vamanco, all-steel corrugated panels.
(2) Vamanco Drawn, drawn metal panels.
(3) Varclad, tin clad panels.
(4) Varclad Kal-O-Mine, Kalamein panels.

These four types differ only in the construction of panels inside of the angle iron frames. Vamanco are the most generally used on account of their lightness, fire resisting qualities and extremely low cost.

Construction—The door is mounted on the inside of the elevator shaft and is made in two equal sections of No. 22 U. S. gage corrugated steel, reinforced at center and riveted to strong steel angle frames. The two sections are connected by strong flexible chains which travel over ball bearing sheaves housed in heavy wrought steel brackets. Wearing parts are extra heavy. All fitttings strong and well made, all parts well riveted together.

It is the first steel door of its type to bear the underwriters' label.

Operation—The door is opened manually. The two sections slide, one up and the other down, in steel angle guides mounted at side of door opening. Each section being equal in size and weight makes the door self-counterbalancing. The force required to open the door need be only enough to overcome the friction of the moving parts.

Latch—The latch is placed on the inside of the lower half of the door within easy reach of the operator. In closing the door the lock operates automatically, engaging itself in the guides as the door closes. The position of the latch makes it impossible to open the door from outside the elevator shaft, thus making accidents impossible.

A special lock is provided at lower or other designated opening to provide access to shaft when all doors are closed.

Trucking Device—Vamanco doors are furnished with full truckable sills, so designed that no load passing over the door is sustained by any part of the operating mechanism of the doors, but is supported entirely by the sill of the building. Sills are of two types, light and heavy duty.

Automatic Closing Device—The door can be equipped with a simple device operated by the car which will automatically close the door as the car leaves the floor, insuring a closed shaft at all times.

This device is furnished only when specially specified.

Electric Interlock—Doors can be equipped with an electric interlock ("Varlock") which will prevent the car from being operated unless all doors in shaft are shut and locked.

Underwriters' Approval—The National Board of Fire Underwriters has approved this door for elevator shaft openings not exceeding 8 ft. in width and 10 ft. in height.

Advantages—*Low Insurance*—It obtains the lowest rate of insurance.

Low Cost—Price is less than many of the other kinds of elevator doors.

Ease of Operation—Door is readily opened and closed, not only on account of its lightness in weight, but because the door is a counterbalance in itself.

Low Cost of Maintenance—All parts are simply made, accessible, and interchangeable. In case of accident, repairs can be easily made by any good mechanic.

High Standard of Manufacture—Each door is carefully built under the strict specifications of the Underwriters' Laboratories, Inc. It is examined by one of their inspectors before labels are attached, thus insuring a high grade product.

Increased Security—When closed, the door is locked and clamped to the opening. It does not depend on any of its operating parts for support. The sides are held in heavy grooves and the top and bottom are secured to the wall by special binders.

Durability—Made entirely of steel, it will resist the impact of heavy bodies, yet being light, the wear and tear are reduced to a minimum.

Installation—Vamanco counterbalanced freight elevator doors are delivered crated, ready to erect. They can be erected by any skilled worker. This company prefers, however, to erect its own work and then assume all responsibility.

Drawings, full directions and all necessary parts for fitting are furnished with each shipment.

Priming—All parts are given a heavy priming coat of metallic paint by this company before leaving the

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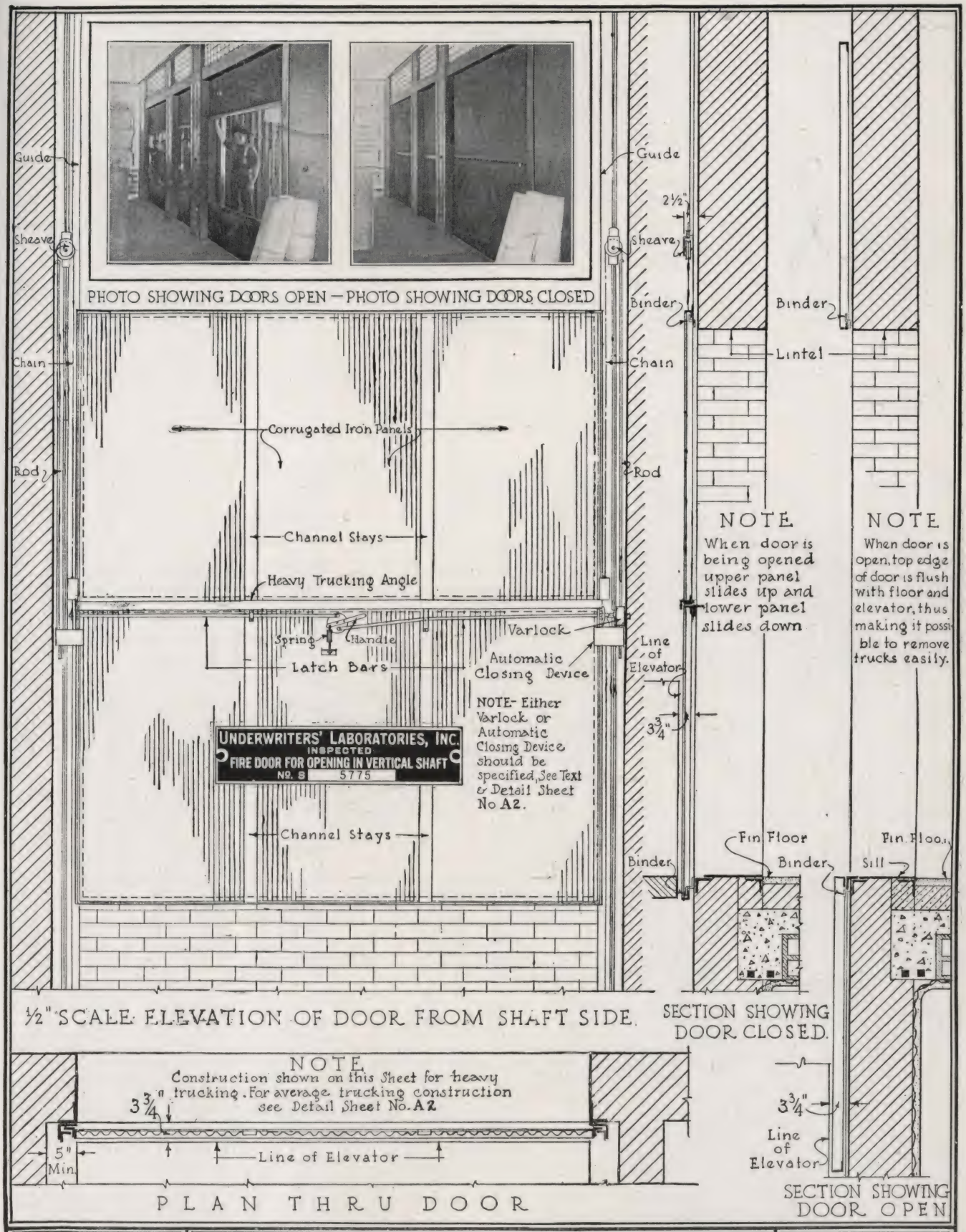
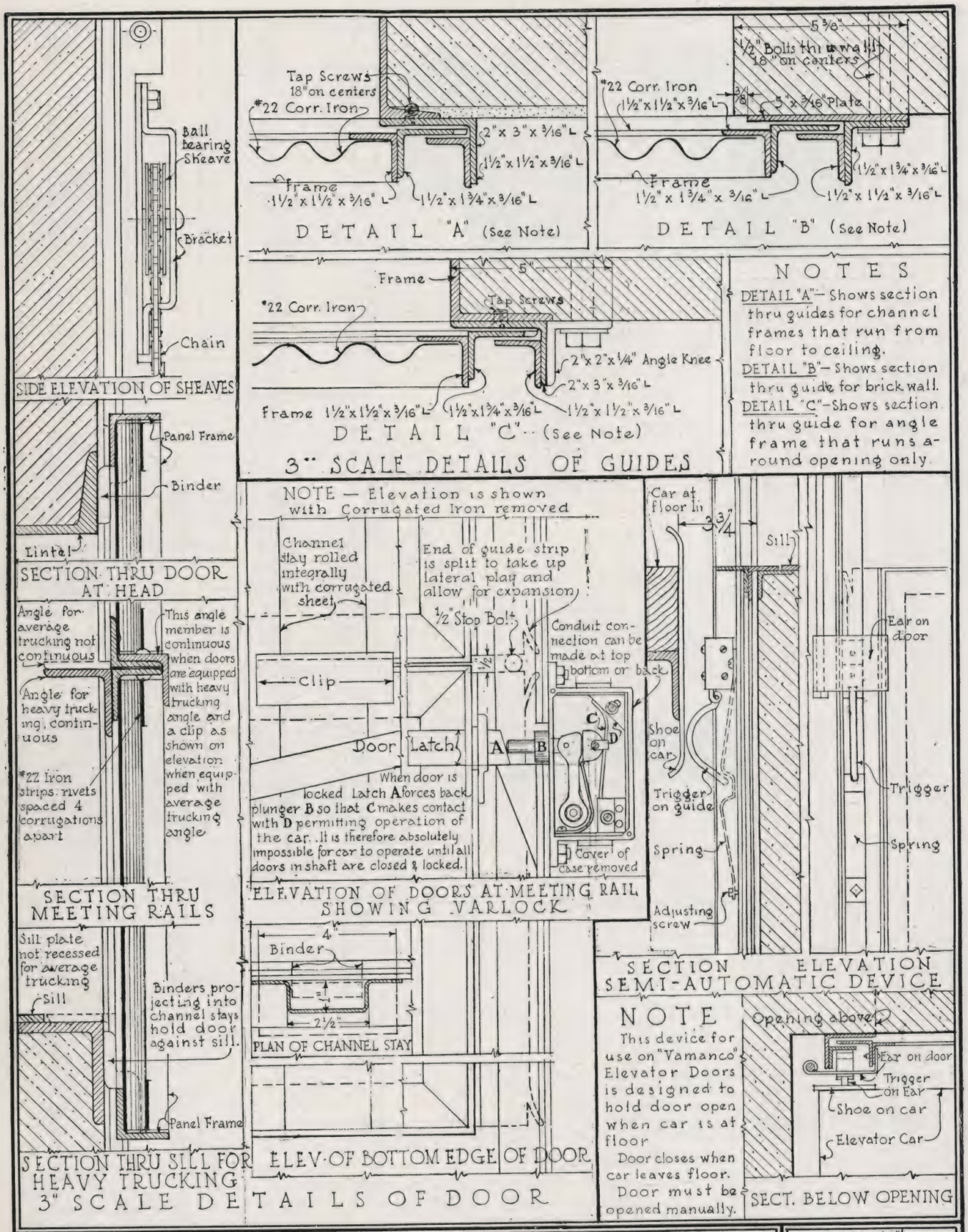


DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF "VAMANCO" ELEVATOR DOOR	SCALE ½" EQUALS 1'-0" DATE-JULY-20	DRWG A1

Continued on next page



DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

CONSTRUCTION DETAILS OF "VAMANCO" COUNTERBALANCED FREIGHT ELEVATOR DOORS

SCALE 3"&1 1/2" EQUALS 1'-0" DATE-JULY.'20 DRW'G A2

Continued on next page

Vamanco Counterbalanced Freight Elevator Doors (Continued)

factory. Should additional coats of paint be required after erection this work should be specified to be done by painting contractor.

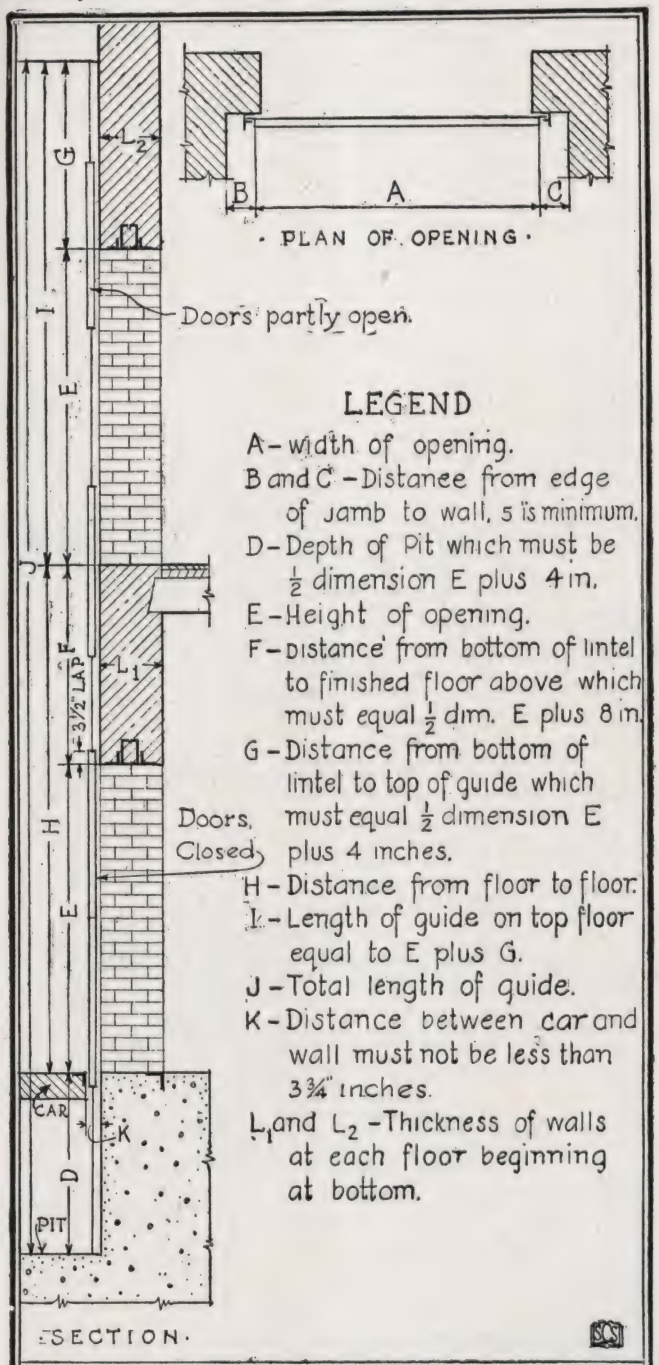


TABLE SHOWING DIMENSIONS OF DOORS

HEIGHT OF DOOR OPENINGS	DISTANCE FLOORLINE TO FLOORLINE	HEIGHT OF DOOR OPENINGS	DISTANCE FLOORLINE TO FLOORLINE
5 ft. 0 in.	8 ft. 2 in.	7 ft. 0 in.	11 ft. 2 in.
5 " 3 "	8 " 6½ "	7 " 3 "	11 " 6½ "
5 " 6 "	8 " 11 "	7 " 6 "	11 " 11 "
5 " 9 "	9 " 3½ "	7 " 9 "	12 " 3½ "
6 " 0 "	9 " 8 "	8 " 0 "	12 " 8 "
6 " 3 "	10 " 0½ "	8 " 3 "	13 " 0½ "
6 " 6 "	10 " 5 "	8 " 6 "	13 " 5 "
6 " 9 "	10 " 9½ "	8 " 9 "	13 " 9½ "
		9 " 0 "	14 " 2 "

MEASUREMENTS REQUIRED WHEN ORDERING "VAMANCO" COUNTERBALANCED FR'GT ELEVATOR DOORS

Information Required When Ordering—Give measurements required by accompanying diagram. Give wall, sill, and lintel construction.

State whether doors are to be equipped with automatic closing device, or "Varlock."

State whether this company is to erect. State whether this company is to apply finishing coats of paint.

Preparation of Openings—It is not necessary that substantial brick or concrete openings should be provided with steel wall frames, but the jambs should be protected with guards of some kind. These should be well anchored in the wall and extend up 4 or 5 ft. from the floor.

Constructions for cases where it is advisable to use wall frames are shown on sheet A3 on following page.

Sills—Some form of fireproof sill must be used, sufficiently strong and well anchored in place. The sills shown on sheet A3 have been approved by the Underwriters' Laboratories, Inc., of the National Board of Fire Underwriters.

Specifications Vamanco Counterbalanced Freight Elevator Doors

(1) Freight Elevator Doors—All door openings to freight elevator, except pent house doors, shall be counterbalanced doors as manufactured by Variety Fire Door Co., Sacramento and Carroll Avenues, Chicago, Ill., and shall be their type known as (mention whether Vamanco, Vamanco Drawn, Varclad or Varclad Kal-O-Mine is desired).

(2) Work Furnished by Manufacturer—Variety Fire Door Co. shall furnish, freight allowed to freight station nearest building site: (a) all doors complete with guides, ball bearing sheaves, bar locks, truckable sills, bolts, anchors and all necessary hardware to properly secure doors to walls of shaft; (b) drawings and full directions required for erection; (c) all parts to receive priming coat of metallic paint at factory.

(3) Underwriters' Label—All doors shall be approved and labeled by Underwriters' Laboratories, Inc. for "Fire Door for Vertical Shaft."

(4) Special Lock—Special lock shall be provided at (ground) floor to permit access to elevator shaft when all doors are closed.

(5) Operation—Doors to be manually opened and closed. (a) If electric interlocks are desired add: Each door to be provided with a Varlock operated by bar locks so that when door is *unlocked* the current will be cut off from car and it will be impossible to run the car until all doors are closed and locked.

(b) If semiautomatic operation is required add: Doors to close automatically when car leaves the floor in either direction, but to be opened manually.

(c) If full automatic operation is desired add: Door contractor to furnish mechanical operating device to open and close doors automatically by simply pressing button when car is at landing. This device to be full circuit type and to contain interlocks cutting current from car when door is unlocked.

(6) Truckable Sills—All doors shall be provided with Variety Fire Door Co.'s special design truckable sills (state if for heavy or light duty) so that no part of load passing over doors will be sustained by door mechanism or guides, but will be carried entirely by sill of building.

(7) Clearance—There shall be not more than 1½-in. clearance between door and elevator car at all floors. In case there is any inequality of construction of shaft that will not allow this, the architect will decide whether to cut the masonry or put extension on doors to make correction of same, which is to be charged to contractor who built the shaft.

(8) Erection—The ..... [contractor] [manufacturer] shall erect the entire equipment in a substantial manner and shall leave the installation in perfect working order.

(9) Painting—The ..... [contractor] shall apply 2 coats lead and oil paint to all parts exposed to view, in colors as selected by the architect.

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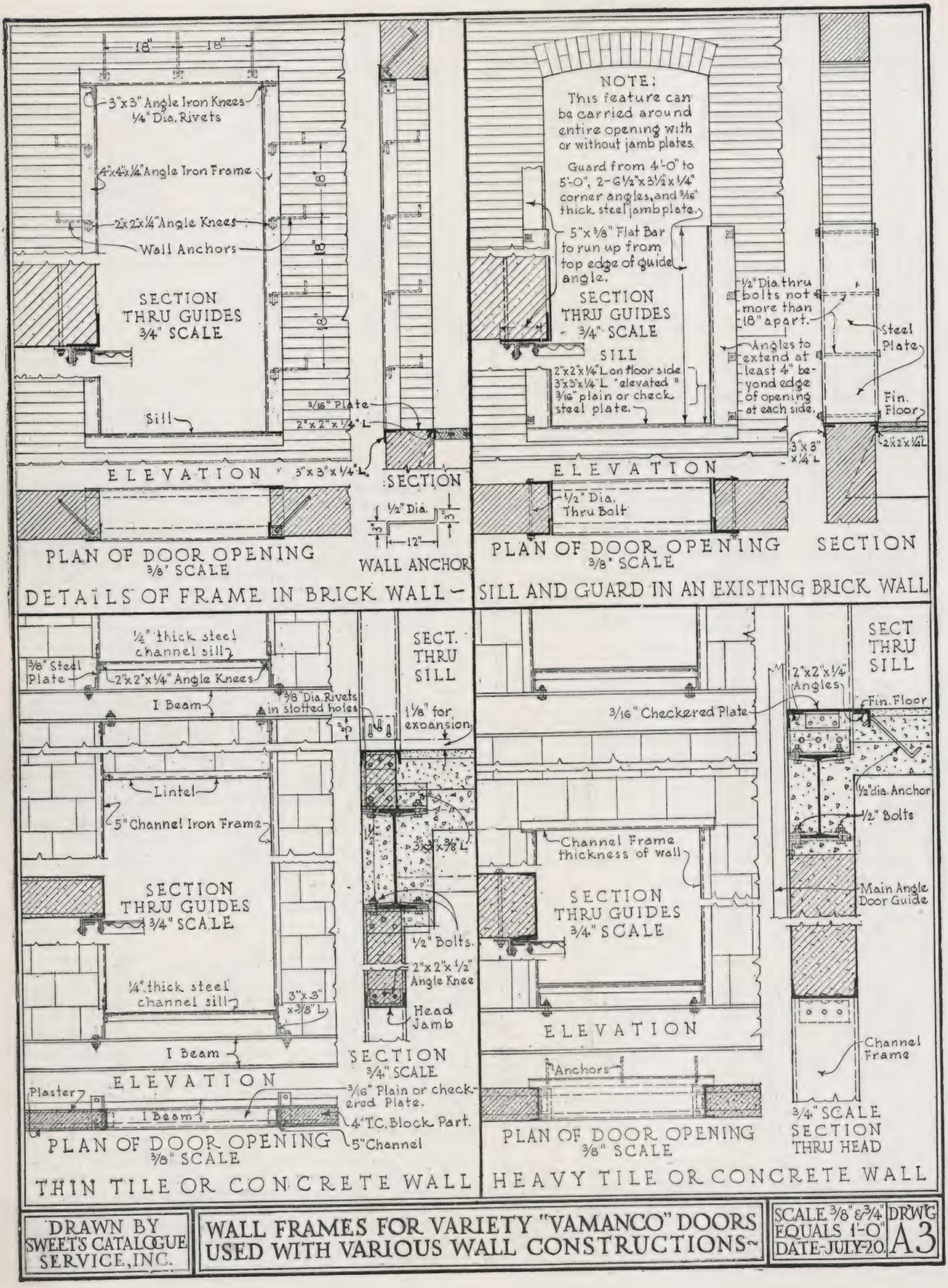


DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	WALL FRAMES FOR VARIETY "VAMANCO" DOORS USED WITH VARIOUS WALL CONSTRUCTIONS~	SCALE 3/8" & 3/4" EQUALS 1'-0" DATE-JULY-20. DRWG A3

Continued on next page

Cross Horizontal Folding Doors

For use in garages, railway and freight houses, car shops, warehouses, docks, powerhouses, etc.

Advantages—Simple; easily operated. Made of any material or combination of materials. Practically no limit as to size. Glass installed in upper panel, taking place of transom. Entire mechanism in full view. Can be repaired by any mechanic. Cost of maintenance practically nothing. Occupy no valuable space, either opened or closed.

Construction—Doors are of wood; wood, metal covered, or steel, as desired. Wood doors have Norway pine stiles and rails, with white pine panels, thoroughly kiln dried.

Operation—The cross horizontal folding door is hung to the wall at the top ends of continuous stiles by offset or other substantial hinges. Part-way down, between these supports and the floor line, it is divided horizontally into two parts connected by strap hinges. At the lower corners of door, on outside edges, a shoe casting is affixed, upon the axle of which revolve specially devised roller wheels. The tracks for these wheels are heavy angle iron, securely bolted to wall, and make a deep rabbet, into which the door closes.

Details—See Sheets B1 and B2 on the following pages for details of various standard types manufactured.

Types—Those with affix "A" have glazed upper panels. Types without affix "A" have solid wood panels. All types can be made with glazed upper panels. Wicket doors can be furnished in lower panels when desired.

Variety counterbalance shaft can be furnished where headroom is not sufficient for counterweights.

Nos. 500-500A—Sizes up to 7x8 ft., manually operated.

Nos. 505-505A—Sizes up to 10x10 ft. have gear hoisting device.

Nos. 510-510A—Sizes up to 14x14 ft. have gear hoisting device; bottom rail reinforced with truss rod; three top hinges.

Nos. 515-515A—Sizes exceeding 14x14 ft. have gear hoisting device; bottom and meeting rails reinforced with truss rods; four top hinges.

HEAD ROOM AND SIDE ROOM REQUIRED*

Height in feet	Fixture number	Fixture numbers Width in feet: No. 2 — 7	8	9	10	11	12	No. 3 — 13	14	15	16	17	18	No. 4 — 19	20
No. 2	7	3′ 0″	3′ 3″	3′ 6″	3′ 9″	4′ 0″	4′ 5″	3′ 8″	3′10″	3′11″	4′ 1″	4′ 3″	4′ 5″	3′ 9″	3′10″
	8	3′ 3″	3′ 6″	3′10″	4′ 2″	4′ 4″	3′ 9″	3′11″	4′ 1″	4′ 3″	4′ 6″	4′ 7″	3′11″	4′ 0″	4′ 1″
	9	3′ 6″	3′10″	4′ 2″	4′ 6″	3′10″	4′ 0″	4′ 3″	4′ 5″	4′ 6″	4′ 9″	4′ 1″	4′ 2″	4′ 3″	4′ 5″
	10	3′ 9″	4′ 2″	4′ 6″	3′10″	4′ 1″	4′ 3″	4′ 6″	4′ 8″	4′11″	4′ 2″	4′ 3″	4′ 5″	4′ 6″	4′ 8″
	11	4′ 0″	4′ 4″	3′10″	4′ 1″	4′ 3″	4′ 6″	4′ 9″	5′ 0″	4′ 3″	4′ 4″	4′ 6″	4′ 7″	4′ 9″	4′11″
	12	4′ 3″	3′ 9″	4′ 0″	4′ 3″	4′ 6″	4′ 9″	5′ 1″	4′ 3″	4′ 5″	4′ 7″	4′ 9″	4′11″	5′ 1″	5′ 3″
No. 3	13	3′ 8″	3′11″	4′ 3″	4′ 6″	4′ 9″	5′ 1″	4′ 3″	4′ 5″	4′ 8″	4′10″	5′ 0″	5′ 2″	5′ 3″	5′ 6″
	14	3′10″	4′ 1″	4′ 5″	4′ 8″	5′ 0″	4′ 3″	4′ 5″	4′ 8″	4′10″	5′ 0″	5′ 2″	5′ 4″	5′ 6″	5′ 9″
	15	3′11″	4′ 3″	4′ 6″	4′11″	4′ 3″	4′ 5″	4′ 8″	4′10″	5′ 0″	5′ 3″	5′ 5″	5′ 7″	5′10″	6′ 1″
	16	4′ 1″	4′ 6″	4′ 9″	4′ 2″	4′ 4″	4′ 7″	4′10″	5′ 0″	5′ 3″	5′ 5″	5′ 7″	5′10″	6′ 1″	6′ 4″
	17	4′ 3″	4′ 7″	4′ 1″	4′ 3″	4′ 6″	4′ 9″	5′ 0″	5′ 3″	5′ 5″	5′ 7″	5′10″	6′ 1″	6′ 4″	6′ 7″
	18	4′ 5″	3′11″	4′ 2″	4′ 5″	4′ 7″	4′11″	5′ 2″	5′ 4″	5′ 7″	5′10″	6′ 1″	6′ 4″	6′ 7″	6′10″
No. 4	19	3′ 9″	4′ 0″	4′ 3″	4′ 6″	4′ 9″	5′ 1″	5′ 3″	5′ 6″	5′10″	6′ 1″	6′ 4″	6′ 7″	6′10″	7′ 1″
	20	3′10″	4′ 1″	4′ 5″	4′ 8″	4′11″	5′ 3″	5′ 6″	5′ 9″	6′ 1″	6′ 4″	6′ 7″	6′10″	7′ 1″	7′ 4″

Table of side room

Hoist No.	Hoist side	Other side
2	1′ 0″	0′ 5″
3	1′ 3¼″	0′ 5″
4	1′ 5¼″	0′ 5″

*Table gives head room, size of fixtures and side room for any opening when width and height are given.

EXAMPLE—Height of opening 16 ft.; width 12 ft.; find size of hoist, hardware and side room required. Locate 16 ft. height follow through to 12 ft. width; and find 4 ft. 7 in. head room. It will be seen that this requires a No. 4 hoist. To find side room, look at table on eft. A No.4 hoist requires 1ft. 5¼ in. side room.

(2) Work to be Furnished by Manufacturer—The VARIETY FIRE DOOR CO. shall furnish, freight allowed to freight station nearest the site of the building, the following material: (a) Type No. .... Variety Cross Horizontal Folding Doors [Variety Canopy Cross Horizontal Doors] of standard wood [tin clad] [corrugated iron] construction, including all hardware, guides, hoisting device, etc., complete; (b) all bolts, anchors or other parts required to properly secure and fit the doors to the walls of the building; (c) drawings and full directions required for erection; (d) all wood parts to be primed with 1 good coat of lead and oil paint and all metal parts with 1 good coat of metallic paint; (e) all parts to be properly crated for shipment.

(3) Glazing—Upper panels shall be glazed with "AA" double thick window glass (¼ in. thick rough wire glass) by glazing contractor.

(4) Wicket Door—Wicket door shall be provided in lower panel of door opening No. ....; to be equipped with all necessary hardware, including strong cylinder lock.

(5) Erection—The ..... [contractor] [manufacturer] shall do all carting from the railway station and shall erect the entire equipment in a substantial manner and on completion shall leave the installation in perfect working order.

(6) Cutting—The ..... [contractor] [manufacturer] shall do all cutting, drilling and tapping required to properly erect this equipment.

(7) Finish Painting—The ..... [contractor] shall apply 2 coats lead and oil paint after erection to all parts exposed to view. Final coat to be tinted in color to be selected by the architect.

Canopy Cross Horizontal Folding Doors

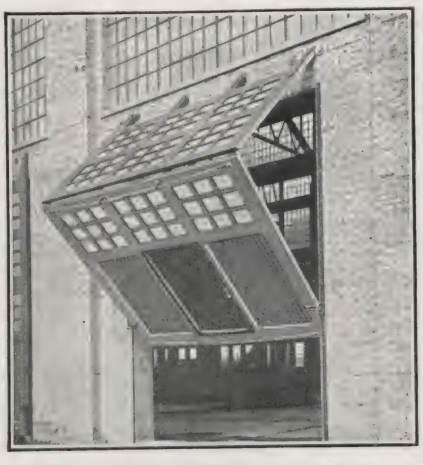
Similar to the cross horizontal folding door, except that the door is placed on the opposite side from the operating mechanism. Especially designed for garages, markets, etc., where a canopy is desired on the outside of the building.

Types—*Nos. 520-520A*—Door hung on outside face of wall with operating device on inside face of wall.

Nos. 525-525A—Door hung between the jambs of the opening with operating device on inside face of wall.

Specifications Cross Horizontal Folding Doors

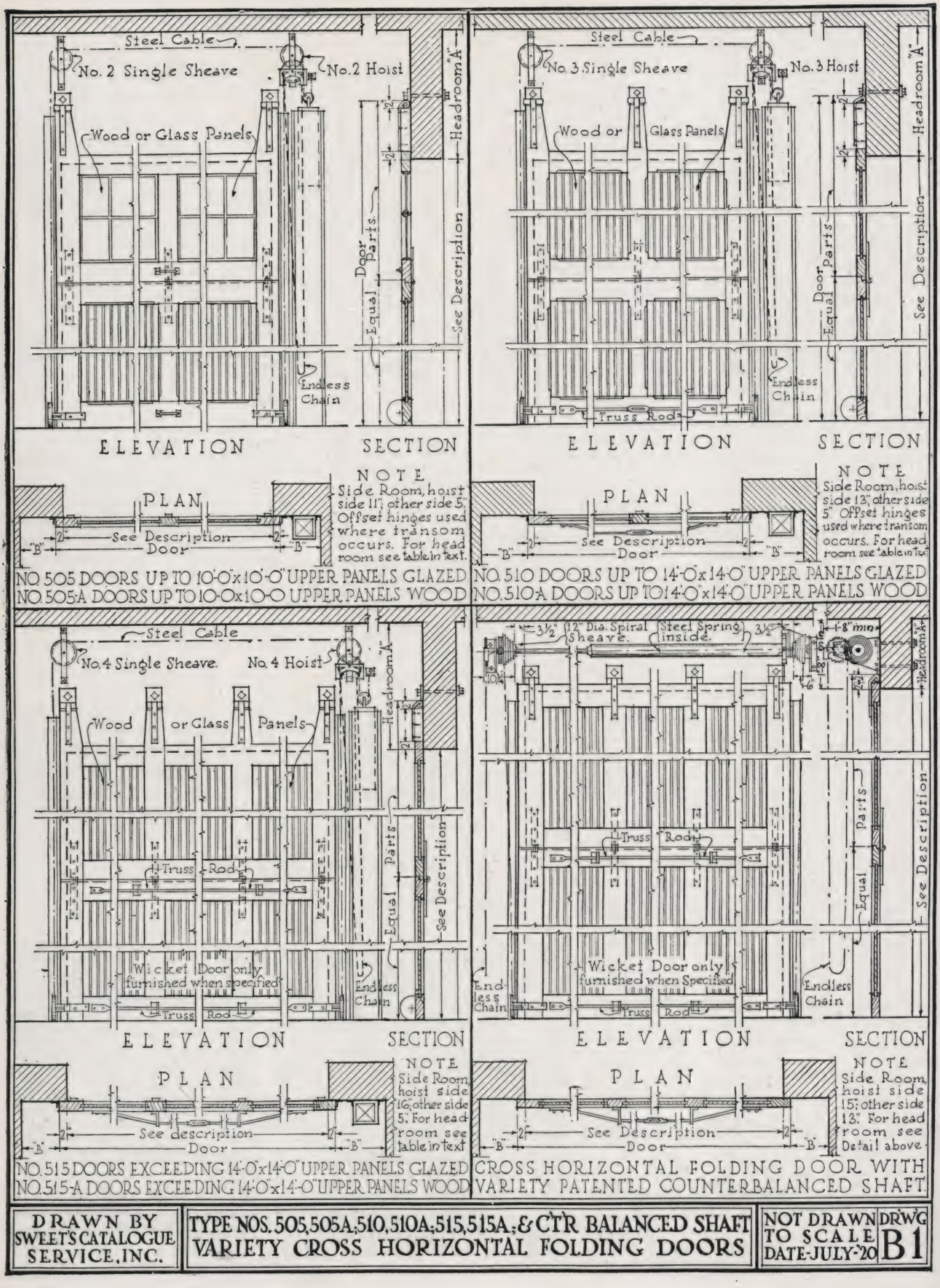
(1) Horizontal Folding Doors—All door openings (where indicated on drawings) (marked horizontal folding door) shall be equipped with Type No. .... Variety Cross Horizontal Folding Doors [Variety Canopy Cross Horizontal Doors] of standard wood [tin clad] [corrugated iron] construction, as manufactured by the VARIETY FIRE DOOR CO., Sacramento and Carroll Avenues, Chicago, Ill.



CANOPY CROSS HORIZONTAL FOLDING DOORS PARTLY OPEN

CANOPY CROSS HORIZONTAL FOLDING DOORS CLOSED

Continued on next page



DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	TYPE NOS. 505, 505A, 510, 510A, 515, 515A, & CTR BALANCED SHAFT VARIETY CROSS HORIZONTAL FOLDING DOORS	NOT DRAWN TO SCALE DATE-JULY-20 DRWG B1

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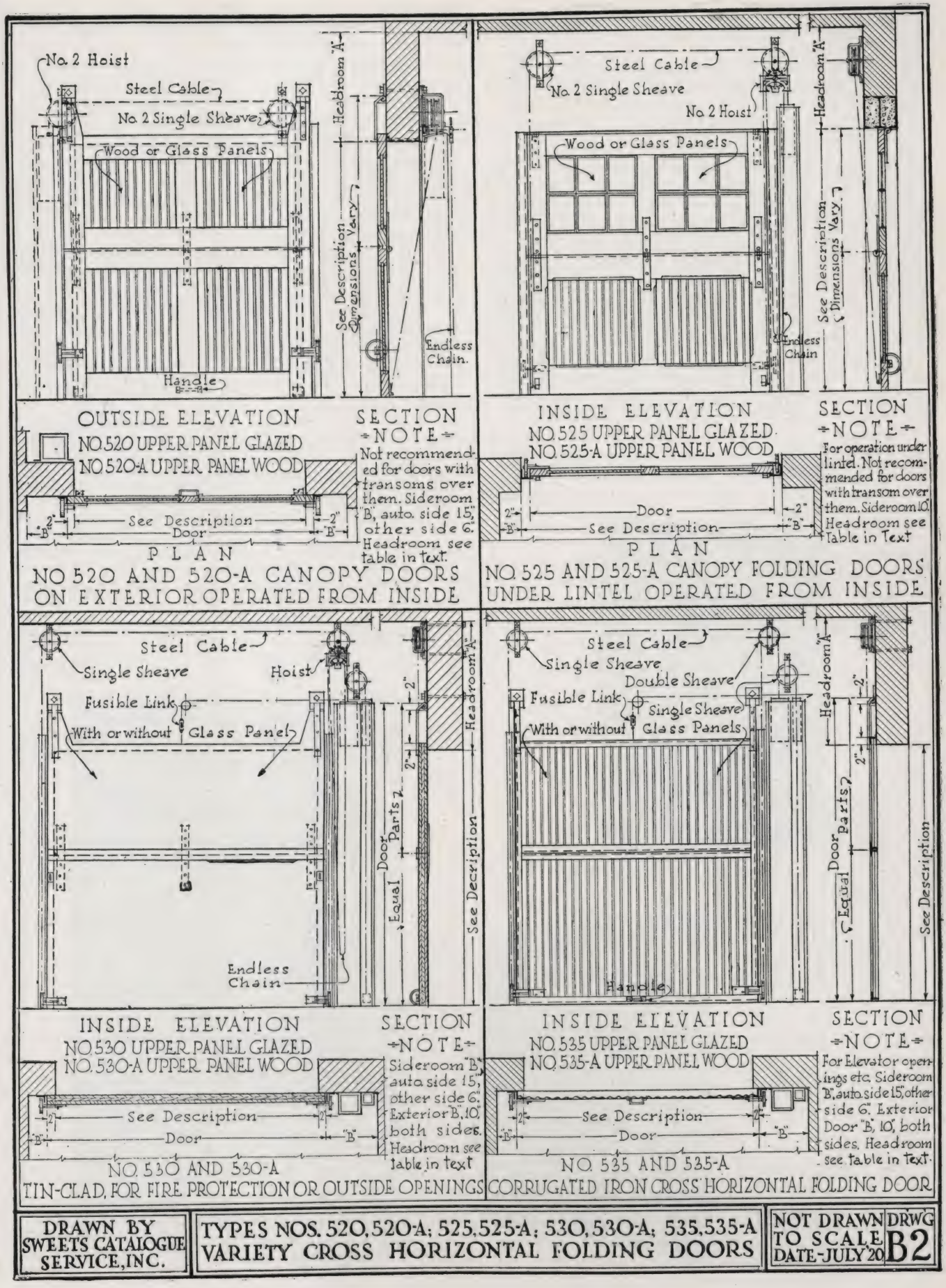


DRAWN BY SWEETS CATALOGUE SERVICE, INC.	TYPES NOS. 520, 520-A; 525, 525-A; 530, 530-A; 535, 535-A VARIETY CROSS HORIZONTAL FOLDING DOORS	NOT DRAWN TO SCALE DATE-JULY 20 DRWG B2

Continued on next page

Variety Steel Rolling Doors and Shutters

Variety steel rolling doors and shutters are made entirely of steel. They are composed of steel interlocking slats that coil above opening, being counterbalanced by springs. Ends of slats travel up and down in grooves bolted at each side of opening.

Installation—Doors are placed to coil above the opening or under the lintel.

Operation—Doors may be operated by hoist, gearing, or simply by hand, to suit any conditions. If used as fire doors they can be equipped with automatic closing device, when specified.

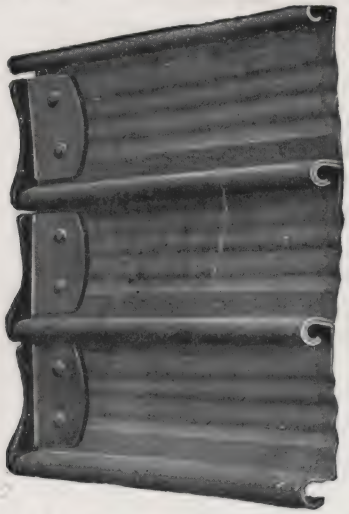
Advantages—These doors are classed among the best fire retardants for window, door, partition, elevator shaft, and fire wall openings. They are neat in appearance, occupy very little room, and if properly cared for will last for years. Doors are easily erected. Blue prints and instructions are sent with each shipment.

Approval—Variety doors and shutters are included in the approval list issued by the National Board of Fire Underwriters, and are regularly inspected and labeled by the Underwriters' Laboratories, Inc.

Illustrations—The illustrations, here and on following page, show only a few of many installations and constructions.

Slats—Slats are rolled channel shaped, affording greatest strength with least material; have a close, tight joint practically proof against smoke, fire and weather. Ends of slat are reinforced with end lock, which prevents longitudinal separation, takes the wear and reduces friction in grooves. Either side of slat sheds water.

No. 2 slats constructed of No. 20 or No. 22 gage steel, either galvanized or black, and No. 4, a much heavier slat, of No. 16 or No. 18 gage steel.



No. 2 Interlocking Slat, Flanged Side
Two-fifths full size

No. 2 Interlocking Slat, Smooth Side
Two-fifths full size

Painting and Galvanizing—All steel curtains are galvanized; all other parts receive priming coat of metallic paint before leaving factory.

Erection—Variety steel rolling doors and shutters can be installed by workmen of ordinary skill in the various building trades. Full directions and all necessary parts for fitting are furnished with each order.

Standard Types of Construction—*No. 33*—Manual operation. Mounted on face of wall. Labeled for openings not exceeding 80 sq. ft. with No. 16 gage curtains where openings occur in walls dividing two risks. With No. 20 gage curtains for vertical shafts, or corridor or room partitions.

No. 33-33—Same as No. 33 but mounted on both sides of wall. Labeled for openings in fire wall dividing two risks.

No. 33-2—Single door, manual operation, mounted between jambs, coiling under lintel. Labeled as described for No. 33.

No. 33-3—Double doors of same construction as 33-2. Labeled for openings in fire wall dividing two risks.

No. 25—Non-labeled, manual operation, mounted on face of wall. Can be labeled for exterior openings.

No. 20—Chain operation. Mounted on face of wall with operating device placed on same side of wall as curtain. Labeled for exterior openings.

No. 34—Gear operation. Mounted on face of wall with operating device operated on side opposite to curtain. Labeled for exterior openings not less than 16 ft. from nearest fire risk.

No. 60—Manual operation. Labeled for exterior windows.

No. 60H—Chain hoist operation. Labeled for exterior windows.

No. 65—Same as 60 and 60H but has testing device.

No. 33 Door Mounted on Face of Wall, Coiling Above Opening, Manual Operation
Equipped with fuse link automatic closing device

Continued on next page

Specifications for Steel Rolling Doors and Shutters

(1) Steel Rolling Doors and Shutters—All door (and window) openings (where indicated on drawings) (marked rolling doors or shutters) shall be equipped with Type No. ...., Variety Steel Rolling Doors [or Shutters] of standard steel construction as manufactured by the Variety Fire Door Co., Sacramento and Carroll Avenues, Chicago, Ill.

(2) Work to be Furnished by Manufacturer—The Variety Fire Door Co., shall furnish, freight allowed to freight station nearest to building site, the following material: (a) Type No. .... Variety Rolling Steel Doors [or Shutters] or standard steel construction including curtain, hood, guides, [hoisting device] [automatic closing device], etc. complete; (b) all bolts, anchors, or other parts required to properly secure and fit the equipment to the walls of the building; (c) drawings and full directions required for erection; (d) all steel curtains to be galvanized and all parts primed with 1 coat of metallic paint; (e) all parts to be properly crated for shipment.

(3) Curtains—Curtains shall be Construction No. .... constructed of No. .... gage steel.

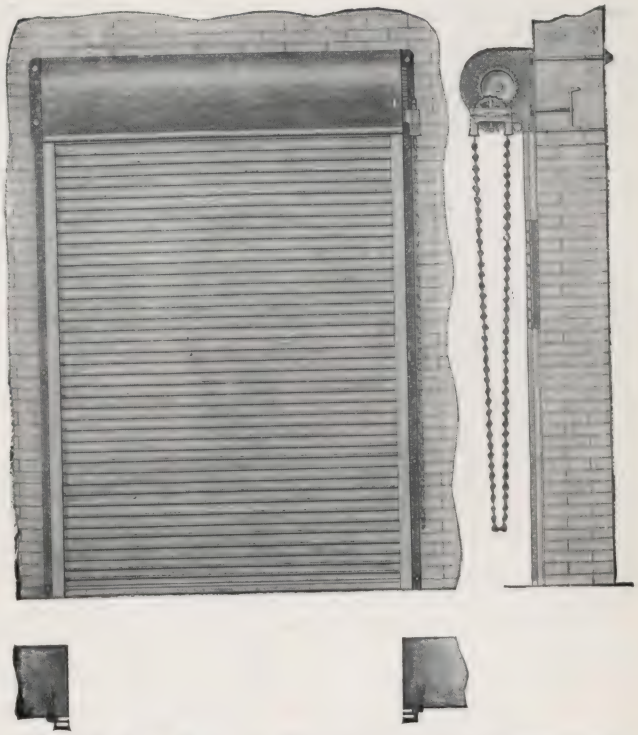
(4) Underwriters' Approval—Where so indicated on the drawings, the doors shall be equipped with fusible link and automatic closing device and shall bear the label of the Underwriters' Laboratories, Inc. for door openings in.....

(5) Wicket Doors—Wicket Doors, including all necessary hardware, shall be provided in openings where so indicated on drawings.

(6) Erection—The ..... [contractor] [manufacturer] shall do all carting from the railway station and shall erect the entire equipment in a substantial manner and upon completion shall leave the installation in perfect working order.

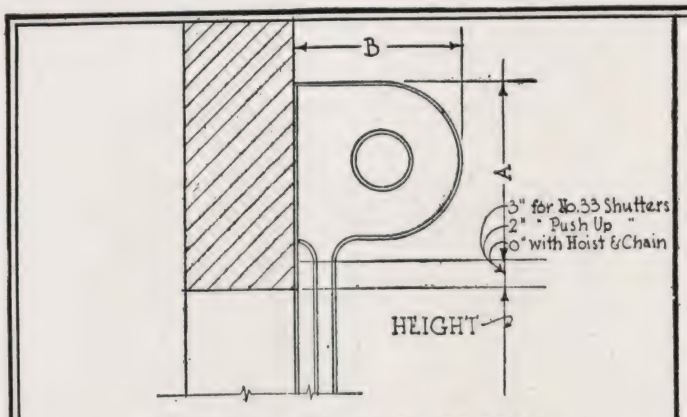
(7) Cutting—The ..... [contractor] [manufacturer] shall do all cutting, drilling and tapping required to properly erect this equipment.

(8) Finish Painting—The ..... [contractor] shall apply 2 coats of lead and oil paint to all parts exposed to view after erection. Final coat to be tinted in color to be selected by the architect.

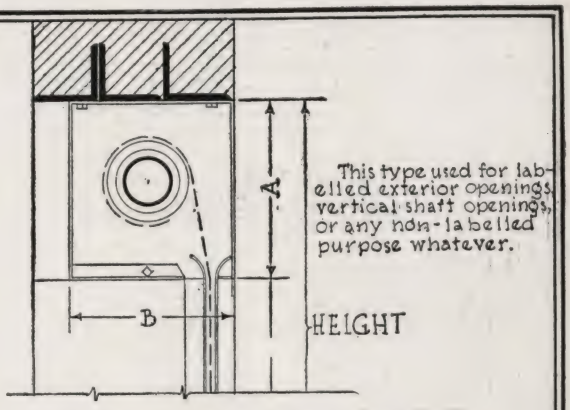


No. 20 Door Showing Elevation, also Side View of Chain Hoist

This construction is for use on small and large openings where automatic underwriters' doors are not required, being generally used on shipping platform openings in freight houses, garage entrances and outside openings



SHUTTER ON FACE OF WALL.



SHUTTER UNDER THE LINTEL

AUTOMATIC NO.33 SHUTTERS			NOT AUTOMATIC 20 & 22 GAUGE		NOT AUTOMATIC 16 & 18 GAUGE	
HEIGHT	A	B	A	B	A	B
5'-0"	12¼"	10¾"	11¼"	10¼"	12¼"	11¼"
6'-0"	13¼"	11¾"	11¾"	10¾"	13¼"	12¼"
7'-0"	14½"	12¾"	12¼"	11¼"	14½"	13¼"
8'-0"	15"	13½"	13¼"	12¼"	15"	13¾"
9'-0"	15"	13½"	14½"	13¼"	16"	14¾"
10'-0"	15½"	14¼"	15"	13¾"	16½"	15¼"
12'-0"	16"	14¾"	15½"	14¼"	17½"	16¾"
14'-0"	17"	15¾"	16½"	15¼"	18"	16¾"
16'-0"	17½"	16¼"	17"	15¾"	19"	17¼"
18'-0"	18"	16¾"	18"	17¾"	19½"	18"
20'-0"	19"	17¾"	19"	17¾"	20¼"	18¾"

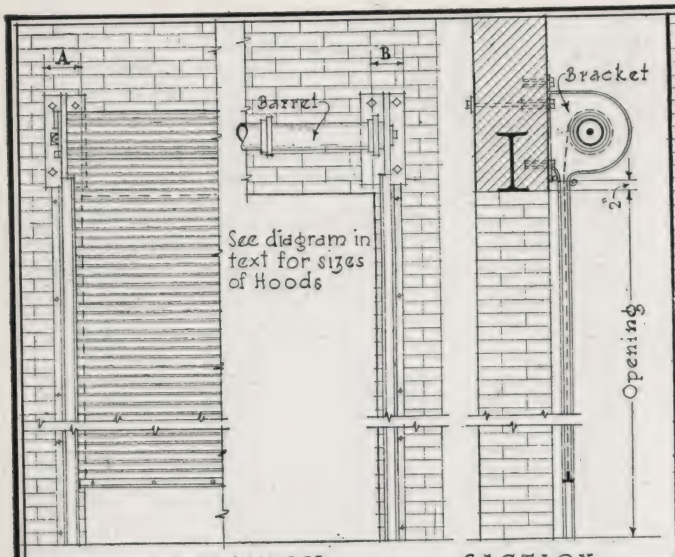
DIMENSIONS OF HOODS FOR VARIOUS HEIGHTS OF OPENINGS. SHUTTER ON FACE OF WALL

AUTOMATIC NO.33 SHUTTERS			NOT AUTOMATIC 20 & 22 GAUGE		NOT AUTOMATIC 16 & 18 GAUGE	
HEIGHT	A	B	A	B	A	B
6'-0"	13¾"	12¾"	13"	12¼"	14¼"	13¼"
7'-0"	14¼"	13¼"	13¾"	12¾"	14¼"	13¼"
8'-0"	14¾"	13¾"	13¾"	12¾"	14¾"	13¾"
9'-0"	14¾"	13¾"	14¼"	13¼"	15¾"	14¾"
10'-0"	15¼"	14¼"	14¼"	13¼"	15¾"	14¾"
12'-0"	15¾"	14¾"	15¼"	14¼"	17"	15¾"
14'-0"	17"	15¾"	16¼"	15¼"	18"	16¾"
16'-0"	17½"	16¼"	18"	16¾"	19"	17¾"
			18½"	17¼"	20"	18¾"

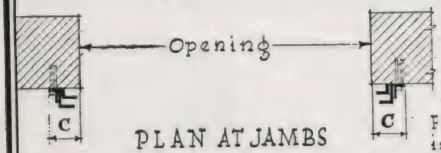
DIMENSIONS OF HOODS FOR VARIOUS HEIGHTS OF OPENINGS. SHUTTER UNDER THE LINTEL

SCS DIMENSIONS OF HOODS OF VARIETY ROLLING STEEL SHUTTERS

Continued on next page



ELEVATION SECTION



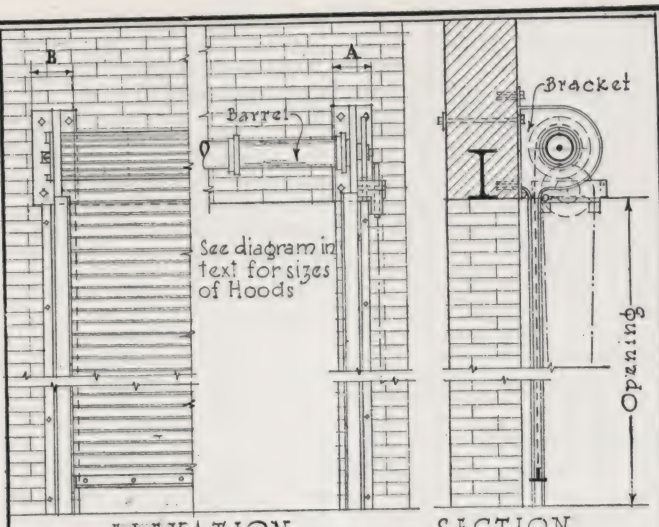
PLAN AT JAMBS

ROLLING STEEL SHUTTER PUSH-UP TYPE

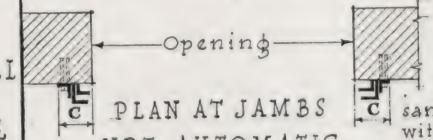
For any small opening to permit manual operation; used with Underwriters Label on an exterior opening not less than 16 ft. from nearest fire risk.

OPENING WIDTH	A	B	C
Up to 6'-6"	5½"	5½"	4"
6'-6" to 8'-0"	6"	6"	4½"

DETAIL OF CONSTRUCTION #60 LABELED & #25 NON-LABELED



ELEVATION SECTION



PLAN AT JAMBS

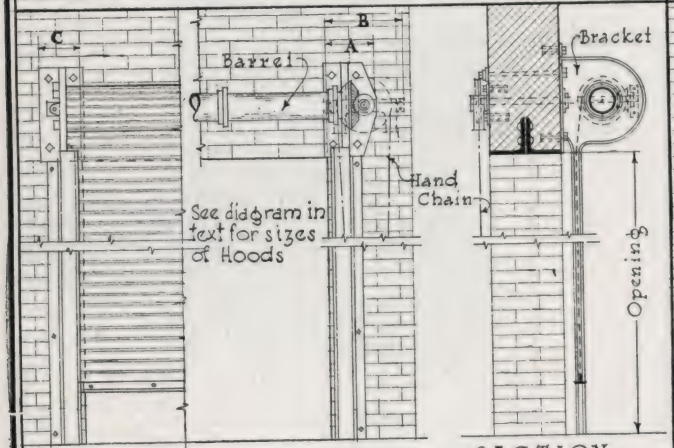
ROLLING STEEL SHUTTER

Requires hoist operation. Barrel and hoist on same side of opening. Used with Underwriters' Label on an exterior opening not less than 16 ft. from nearest fire risk. Dimensions variable for special cases.

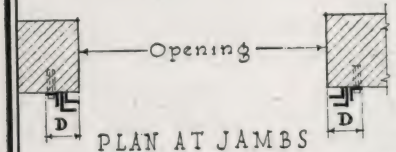
NOT AUTOMATIC

#20 SHUTTERS CHAIN HOIST	HOIST SIDE A	OPPOS. SIDE B	C
80 to 100 sq. ft.	8"	7"	4¾"
100 to 200 sq. ft.	9"	7"	5¼"
200 to 400 sq. ft.	9"	7"	6"

DETAIL OF CONSTRUCTION #60H LABELED & #20 NON-LABELED



ELEVATION SECTION



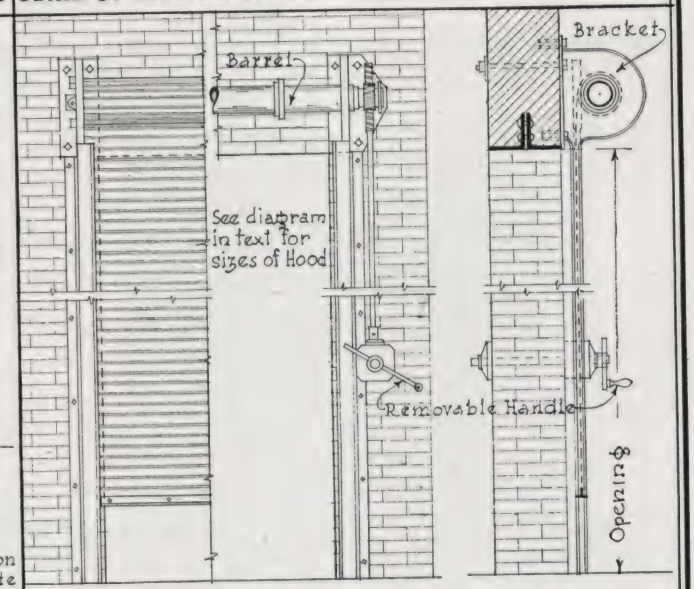
PLAN AT JAMBS

ROLLING STEEL SHUTTER

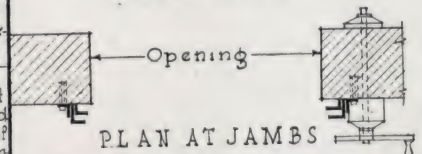
Requires hoist operation Operated from opposite side of shutter. Used with Underwriters' Label on an exterior opening not less than 16 ft. from nearest fire risk.

#34 SHUTTERS CHAIN HOIST	SHUTTER SIDE A	HOIST SIDE B	OPPOS SIDE C	D	NOTE
Up to 120 sq. ft.	9"	13"	7"	4¾"	Hoist shaft may be placed below lintel if lintel construction interferes
120 to 144 sq. ft.	10½"	15"	7"	5½"	
144 sq. ft. & up	SPECIAL - WRITE FACTORY FOR INFORMATION				

DETAIL OF CONSTRUCTION #34 NON-LABELED



ELEVATION SECTION



PLAN AT JAMBS

-NOTE-

Shutter can be operated from one side or both.

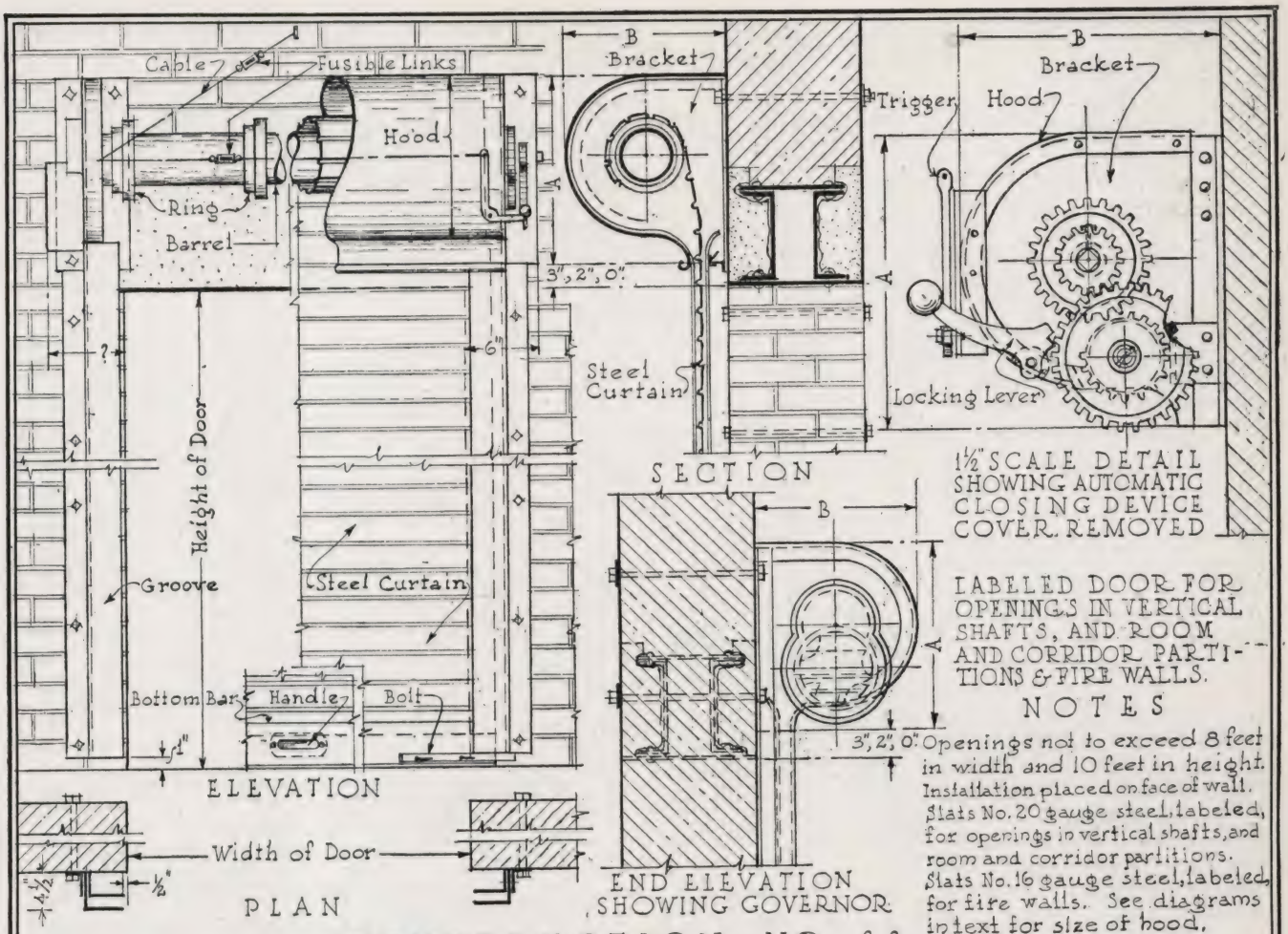
OPERATION BY GEAR AND CRANK

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

STANDARD TYPES OF LABELED & NON-LABELED VARIETY ROLLING STEEL SHUTTERS

SCALE 3/8" EQUALS 1'-0" DATE-JULY-20 DRWG C1

Continued on next page

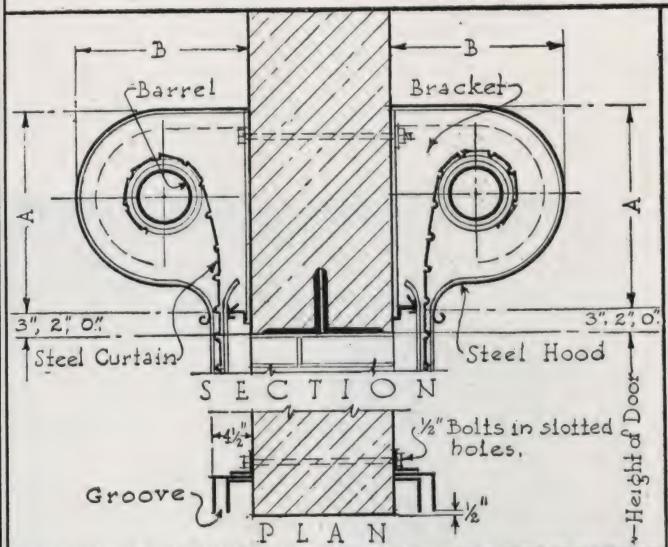


CONSTRUCTION NO. 33

LABELED DOOR FOR OPENINGS IN VERTICAL SHAFTS, AND ROOM AND CORRIDOR PARTITIONS & FIRE WALLS.

NOTES

Openings not to exceed 8 feet in width and 10 feet in height. Installation placed on face of wall. Slats No. 20 gauge steel, labeled, for openings in vertical shafts, and room and corridor partitions. Slats No. 16 gauge steel, labeled, for fire walls. See diagrams in text for size of hood.

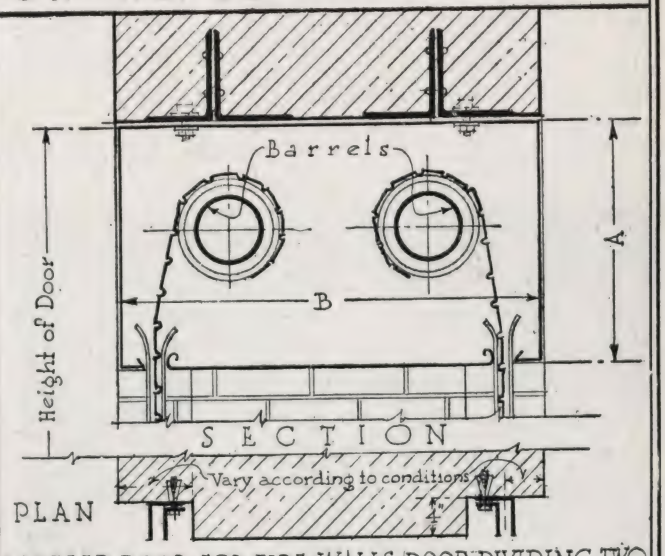


LABELED DOORS FOR FIRE WALLS. DOOR DIVIDING TWO RISKS, DOOR REQUIRED ON EACH SIDE OF WALL

NOTE

Door not to exceed 12 feet in width or height

CONSTRUCTION NO. 33-33



LABELED DOOR FOR FIRE WALLS, DOOR DIVIDING TWO RISKS. DOOR UNDER LINTEL AND BETWEEN THE JAMBS

NOTE

Door not to exceed 12 feet in width or height

CONSTRUCTION 33-3

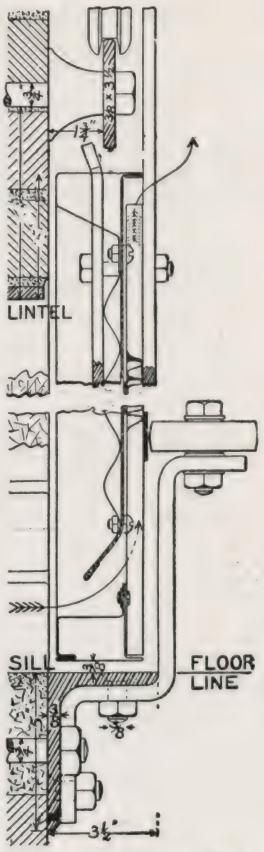
DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	VARIETY UNDERWRITERS LABELED ROLLING STEEL SHUTTERS	SCALE ¾ & 1½ EQUALS 1'-0" DATE-JULY-20	DRWG C2

Continued on next page

Saino Fire Doors and Shutters

Saino fire doors are approved and labeled by the National Board of Fire Underwriters and Factory Mutuals for maximum sized openings. They receive double credit in insurance rates in Cook County, Ill. (including Chicago), over tin clad fire doors and No. 12 iron fire doors. This is evidence of Saino superiority. The doors are adaptable for use wherever tin clad or steel fire doors answer the fire underwriters' requirements.

Construction—Saino fire doors are constructed of two walls of cross laid (corrugations running vertically on one side and horizontally on the other) No. 22 U. S. gage corrugated galvanized steel, *with air chambers and asbestos between.* (See details.) Patented telescopic channels and joints provide for expansion and contraction. Vertical edges are reinforced with wrought iron bars bolted and riveted to the corrugated wall, forming a rigid construction. Top and bottom rails are formed of No. 24 gage galvanized steel strongly assembled.



DETAIL OF SAINO FIRE DOOR

Arrows indicate cold air circulation. Definite provision for air intake is made across bottom of door on wall side. Asbestos is on inside of wall face of door. Thus the door has the advantage of expansion joints, insulation, and non-conducting air currents to prevent transmission of heat

Advantages—Contain no wood or other material subject to combustion, dry rot or decay; are lighter than any other standard fire door, weighing only 5 lbs. per sq. ft.; are durable and will not require repairs; all structural parts are visible; initial cost is not more than that of other standard fire doors and cost of maintenance is done away with.

Types—Saino fire doors are made in any type in which other standard fire doors are made, the principal types being: inclined track, sliding single doors with one or two fusible links; inclined track, sliding double doors, with one fusible link; level track, with single or double doors (only 14-in. headroom required, but not labeled); drop-bracket level track, with single or double doors (only 5-in. headroom required, but not labeled); single and double swinging; vertical sliding, etc.

Hardware—Complete set of Saino hardware, approved by the Underwriters' Laboratories, Inc., is furnished with each Saino installation. Saino doors will not operate with ordinary tin clad door hardware.

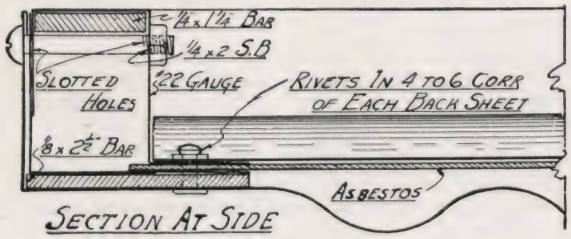
To Specify or Order—*Saino Fire Doors and Shutters.*

All fire doors [shutters] shall be Saino Fire Doors [shutters] including all hardware as manufactured by the VARIETY FIRE DOOR CO., Sacramento and Carroll Avenues, Chicago, Ill.

All fire doors shall bear the label of the Underwriters' Laboratories, Inc. (unless otherwise specified), and shall be guaranteed to meet all requirements, for the service for which they are intended, of the National Board of Fire Underwriters or their authorized inspector.

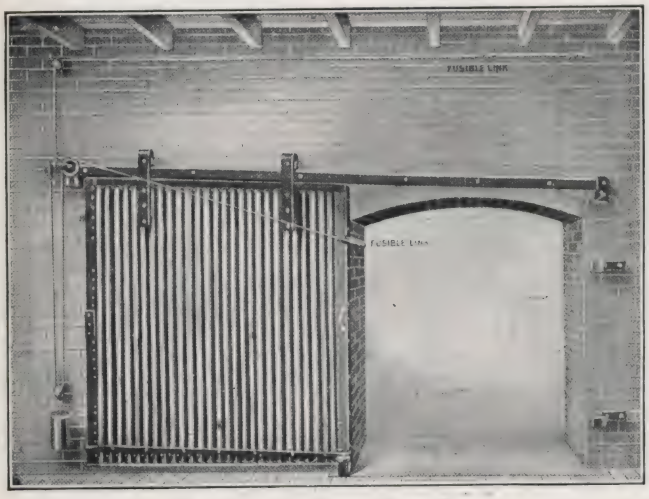
Type of door to be inclined track, single sliding door with one [or two] fusible link [or mention other type.]

Height of center of opening ..... ft.; width ..... ft.; thickness of wall ..... in.; distance from top of opening to nearest obstruction ..... in.; distance from edge of opening to wall or other obstruction ..... ft.

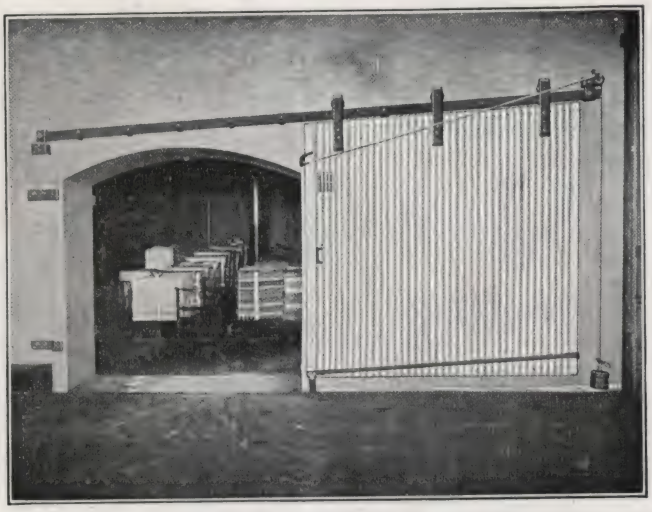


DETAIL SAINO FIRE DOOR

Full Information—Full information and references sent on request.



TYPE NO. 33 SAINO FIRE DOOR
Inclined track, single sliding door left hand



TYPE NO. 79 SAINO FIRE DOOR
Inclined track, single sliding door right hand

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

Manufacturers of Rolling Steel and Wood Doors and Shutters

GENERAL OFFICES

24 East 36th Street
NEW YORK, N. Y.

TELEPHONE
VANDERBILT 9636, 9637

CABLE
"LYDIAN, NEW YORK"

OFFICES

ATLANTA, J. M. VAN HARLINGEN
BALTIMORE, THE J. G. WILSON CORPORATION
BILLINGS, F. W. RICHARDSON
BOSTON, E. A. BAKER
BUFFALO, THE J. G. WILSON CORPORATION
CHARLOTTE, T. L. TALBERT
CHICAGO, H. B. DODGE & CO.
CINCINNATI, CINCINNATI BUILDERS SUPPLY CO.
CLEVELAND, R. L. QUEISSER CO.
COLUMBUS, BUILDING PRODUCTS CO.
DALLAS, THE J. G. WILSON CORPORATION
DAYTON, BUILDING PRODUCTS CO.
DENVER, COLORADO BUILDERS SUPPLY CO.
FT. WORTH, H. L. AGEE
HONOLULU, GRACE BROS.
HOUSTON, F. B. WALCOTT
KANSAS CITY, J. P. SPRAGUE CO.
LOS ANGELES, THE J. G. WILSON CORPORATION
MINNEAPOLIS, JOHNSON, JACKSON & CORNING CO.
NEW ORLEANS, THE J. G. WILSON CORPORATION
NORFOLK, W. L. ROCKE
PHILADELPHIA, THE J. G. WILSON CORPORATION
PHOENIX, WALTER DUBREE
PITTSBURGH, H. H. CHARLES
PORTLAND, F. W. FARRINGTON & CO.
PUEBLO, M. R. SCHWER & CO.
RICHMOND, J. S. ARCHER
ROCHESTER, BUILDING SPECIALTIES CO.
SALT LAKE CITY, HAWLEY, RICHARDSON & WILLIAMS CO.
SAN ANTONIO, WM. S. SENG
SAN DIEGO, THEO. F. SNYDER
SAN FRANCISCO, WATERHOUSE-WILCOX CO.
SCRANTON, LABAR, PARSONS & PIERCE
SEATTLE, S. W. R. DALLY
ST. LOUIS, THE J. G. WILSON CORPORATION
SPOKANE, R. H. HOSKINS
SYRACUSE, H. L. WATERMAN
TOLEDO, BUILDING PRODUCTS CO.
WASHINGTON, D. C., THE J. G. WILSON CORPORATION
WILKES BARRE, LABAR, PARSONS & PIERCE

Products

ROLLING STEEL DOORS and SHUTTERS, labeled and service.

ROLLING WOOD DOORS and SHUTTERS.

HORIZONTAL FOLDING DOORS (Steel or Wood).

DISAPPEARING GARAGE DOORS.

For Sectionfold and Rolling Partitions and Wardrobes, see pages 1094-1099; for Blinds and Awnings, see pages 1086-1089.

The J. G. Wilson Corporation

THE J. G. WILSON CORPORATION was founded in 1876, or forty-six years ago and has had a longer experience than any other concern manufacturing similar products.

There is scarcely a city or town in the United States without Wilson installations, and Wilson products are shipped all over the world.

Why Wilson Rolling Steel Doors Are Desirable

Wilson rolling steel doors are economical, durable and convenient. They require less space than any other type of door and do not interfere with piping or windows, and may be concealed if desired. The coils are overhead, out of the way. Wilson rolling steel doors are the most substantial doors of this type made. They resist fire and discourage theft.

They can be operated as quickly as any other type of door and are very easy and economical to maintain.

All Wilson products are sold under a service guarantee.

Where Wilson Rolling Steel Doors Are Used

Wilson rolling steel doors and shutters are designed to meet all classes of service; first, the effective closure of openings against weather and intrusion, second, the closure of openings where fire doors are required.

The following list of installations gives a very good idea of the many places where Wilson doors are most satisfactory:

Air intakes
Art galleries
Bakeries
Banks
Boats
Boiler fronts
Car barns
Commercial buildings
Core ovens
Corridors
Courthouses
Craneways
Door openings
Driveways
Elevator shafts
Factories
Fire walls
Foundries
Freight sheds
Garages
Grain elevators
Gymnasiums
Hangars
Hotels
Loft buildings
Manufacturing Plants
Newsstands
Office buildings
Passenger stations
Piers
Residences
Schools
Searchlights
Skylights
Stairways
Stores
Ticket cases
Warehouses
Windows

Wilson Interlocking Slat Curtain

The Wilson curtain, that part of the door closing the opening, is formed of a series of interlocking steel slats, electro-galvanized (or copper bearing).

They are galvanized by the modern electro-galvanizing process which insures a uniform coating and permanent adhesion of spelter to the steel, even under distortion. Electro-galvanizing is responsible for the extraordinary resistance of the Wilson slat to corrosion and is the reason why one seldom sees new slats in an old Wilson rolling steel door.

These slats are restrained from side slip by patented malleable iron shields riveted to the ends of alternate slats. These shields form a wearing surface for the curtain as it operates in the groove, and protect ends of slats from abrasion.

The Wilson curtain is so designed that the weight is symmetrical about the center line. This balanced design reduces friction and is one of the important reasons for the easy operation of the Wilson door. All Wilson curtains present practically the same appearance from both sides of the opening. The angle bar at the top of the Wilson curtain prevents it from tearing free from the shaft.

Wilson interlocking slats are made in the 3 following types:

Continued on next page

"Big 4" Interlocking Slat

"Big 4" Interlocking Slat—This slat has the advantage of deep corrugations which materially increase the rigidity and strength of the curtain. The shape of slat is so designed as to protect the interlock from abrasion on both sides of the opening. The "Big 4" type is especially recommended for large openings because of its lateral strength and durability. This slat will resist unusually severe winds when Wilson safety anchors are used. Made in Nos. 22, 20, 18 and 16 U. S. standard gauges.

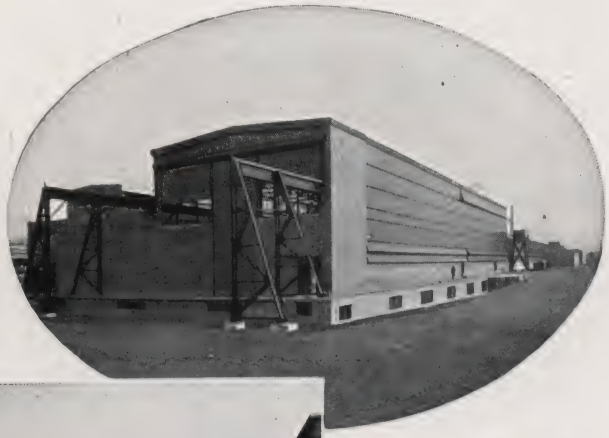
"Little 4" Interlocking Slat—Similar to the "Big 4" slat in appearance, but the depth of corrugation is slightly less. Used in small doors for openings where coil space must be made as small as possible and for underwriters' labeled exterior wall openings. Made in Nos. 22 and 20 U. S. standard gauges.

No. 2 Interlocking Slat—Especially designed for use on underwriters' labeled fire doors. Made in Nos. 20, 18 and 16 U. S. standard gauges. Curtains of the underwriter type are equipped with fire stops on edges of slats, baffle plates in the hood and automatic devices which make them close in case of fire.

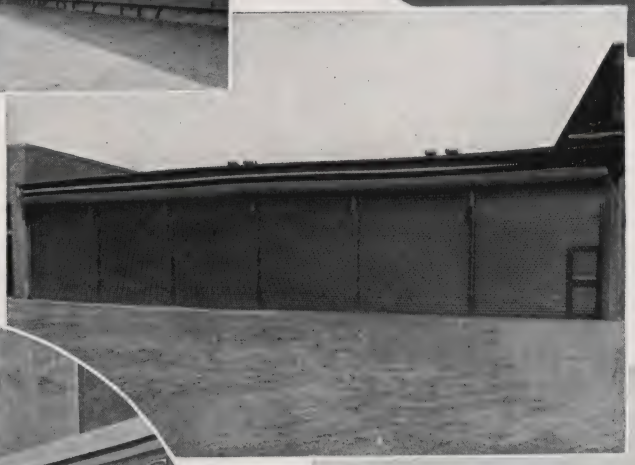
No. 2 Interlocking Slat

Safety Anchors—Wilson patented safety anchors may be used on small openings and are always used on doors over 14 ft. wide. They fit into specially constructed rabbeted grooves and prevent curtain from blowing out

Freight Station, Callowhill Street, Philadelphia, Pa., Philadelphia & Reading R. R.



Factory, Dunlop Tire & Rubber Company, Buffalo, N. Y.



Garage, Texas Oil Company, Chicago, Ill.

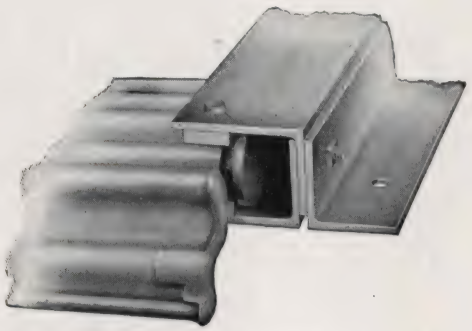
Los Angeles Wholesale Terminal Warehouse, Los Angeles, Cal.

Pier No. 33, San Francisco, Cal.

Typical Installations of Wilson Rolling Steel Doors

Continued on next page

of grooves when subjected to heavy wind pressure. No door subjected to severe wind or particularly hard service should be without safety anchors. This is a distinctive Wilson feature.



SAFETY ANCHOR

Wilson Shaft Construction

The Wilson shaft supporting the curtain is made of standard weight, commercial black iron pipe, the diameter and thickness depending on weight to be carried. Shaft is attached to bracket by means of malleable iron journals. Wilson self-lubricating bearings are insurance against friction or neglected maintenance. Inside the shaft are helical springs adjusted to counterbalance weight of curtain. The proper design of these springs is fundamental for the proper operation of the door. Each Wilson door is provided with counterbalancing springs made under the supervision of Wilson engineers and tested to meet the exact requirements of that particular door. The care taken in the design and manufacture of Wilson springs is largely responsible for the continued easy operation of Wilson doors after many years' use.

Operation of Wilson Rolling Steel Doors

Wilson rolling steel doors may be operated from either one or both sides of opening. Small doors are usually raised and lowered by handles on the bottom bar, and large doors are usually operated by chain gear, crank gear, or motor.

Self-coiling Operation—Wilson Nos. 1441 and 1794 are operated by hand by means of handles on bottom bar of door. This type is usually best for openings 8x10 ft. or less, and for curtains weighing less than 600 lbs.

Chain or Crank Operation—Should be used for curtains weighing from 600 to 1700 lbs. and for doors larger than the limitations of self-coiling operation. Wilson Nos. 2800 and 2900 are operated by means of chain and gear. Wilson No. 3375 is operated by crank gear. Various types of simple and compound gears are used as required for each individual door. All gears are 4-pitch and all journals cold rolled steel. Every part is easily accessible for repairs or lubrication, another point of Wilson superiority.

Motor Operation—Usually used on doors over 14 ft. in width, or containing more than 200 sq. ft., or weighing more than 2000 lbs. Motors of standard make and suitable type are supplied according to the particular requirements of the installation. Motors are directly connected to reduction gears by flexible couplings. Transmission of power from reduction gear to door shaft is accomplished by means of roller chains, eliminating the trouble due to possible inaccurate alignment of direct gearing.

Wilson motor operated doors are controlled by means of enclosed reversing switches. Where limit control is desired, push buttons and reversing switches of the contact type are used. Travel of door is governed by worm limit switches in conjunction with solenoid brakes. Doors electrically controlled may be operated independently or in groups. Emergency hand operation supplied with all motor units.

Hinged Wicket Doors

Standard size, 2x5 ft. May be placed in any door, preferably at the side. Designed so that the wicket with its frame can be swung back out of the way before raising the curtain.

Wilson Rolling Steel Fire Doors (Labeled)

Exceptionally durable and equipped with special fire protective devices. Close automatically in case of fire and are approved and labeled by the Underwriters' Laboratories, Inc. for the following services:

Vertical Shafts, Corridors and Room Partitions—Area of opening not to exceed 80 sq. ft.; neither width nor height of opening to exceed 12 ft. Curtains may be hung on face of wall or between jambs, self-coiling or crank operation, and are automatic closing in case of fire. Specify Wilson type Nos. 21 to 26 inclusive, interlocking slat No. 2, No. 20 gauge.

Fire Walls—Area of opening not to exceed 80 sq. ft.; neither width nor height to exceed 12 ft. Two doors are required and may be hung on face of wall or between jambs, self-coiling or crank operation, and close automatically in case of fire. Specify Wilson type Nos. 31 to 35 inclusive, interlocking slat No. 2, No. 16 gauge.

Exterior Walls—Area of opening not to exceed 100 sq. ft.; neither width nor height to exceed 12 ft. Curtain may be hung on face of wall or between jambs, self-coiling, chain or crank operation, and, where permitted, may be automatic closing in case of fire. Specify Wilson type Nos. 41 to 49 inclusive, interlocking slat "Little 4," No. 22 gauge.

Automatic Closing Device—Wilson automatic closing fire doors are easily reset after being released. Doors over 10 ft. high or weighing more than 400 lbs. are equipped with an automatic centrifugal brake to retard speed of closing and prevent damage by impact. THE J. G. WILSON CORPORATION also manufactures doors according to underwriters' specifications for openings too large to be labeled. In such cases they provide a certificate of inspection from the Underwriters' Laboratories, Inc.

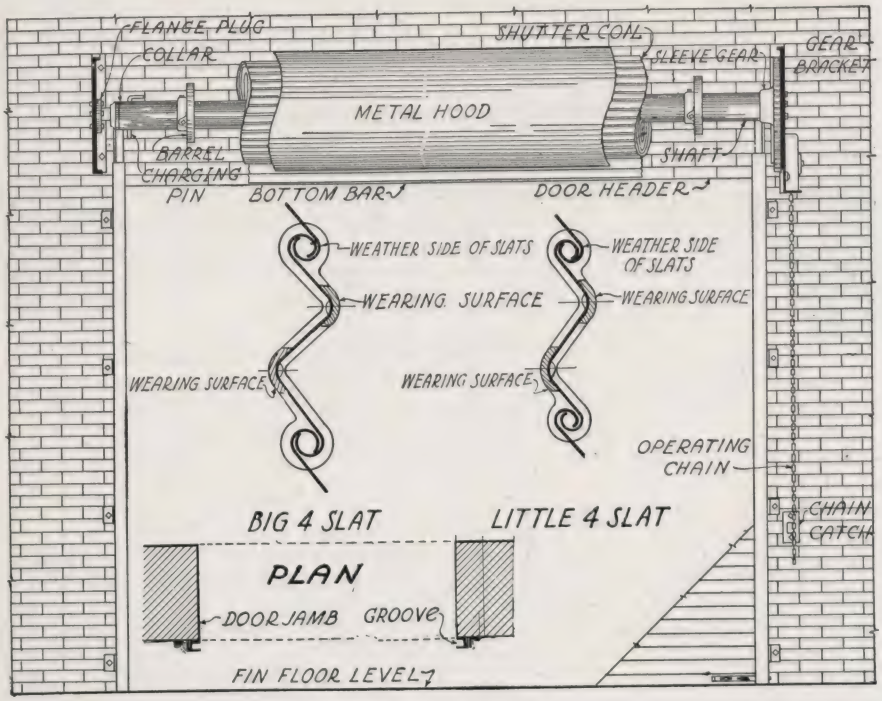
Installation

THE J. G. WILSON CORPORATION has a corps of experienced erectors, equipped to properly install Wilson doors in the least possible time. Erection is a service which is generally supplied, even though Wilson doors can easily be installed by a competent mechanic. All Wilson doors should operate properly at all times, and the service of Wilson erectors is always available to this end.

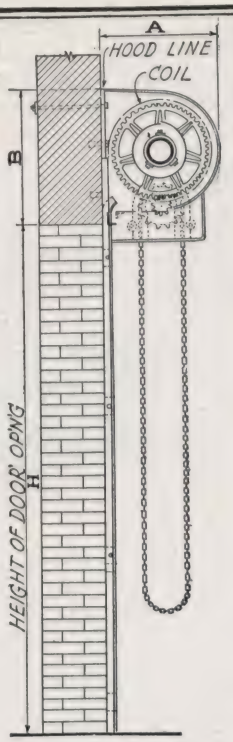
Wilson Engineering Service

Wilson engineers are not only specialists in door and window closures, but have had years of experience as an organization, and have acquired the ability to overcome the most difficult conditions of design and construction. The service of this organization of specialists is always available to architects or engineers. THE J. G. WILSON CORPORATION assumes complete responsibility for its products. Catalogue, details and prices forwarded on request.

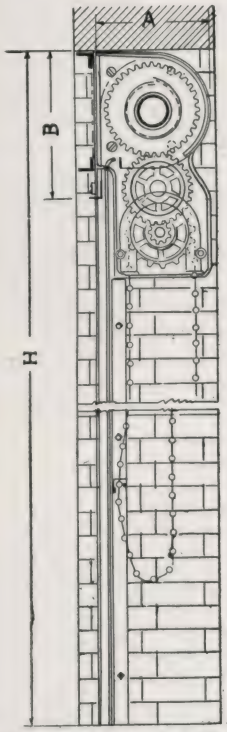
Continued on next page



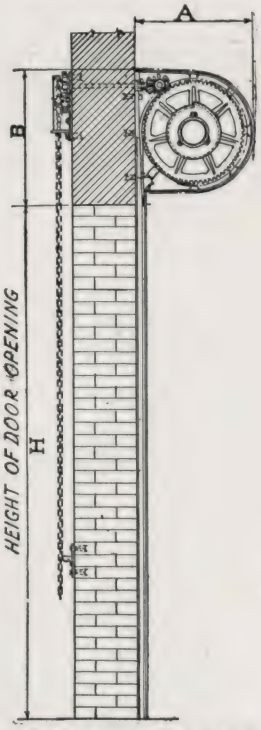
ELEVATION
WILSON NO. 2800



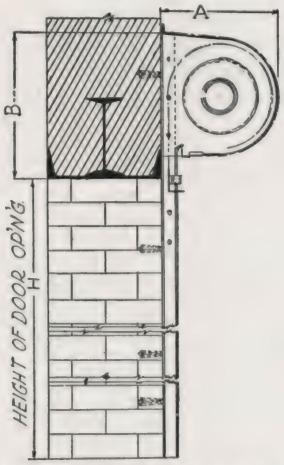
WILSON NO. 2800
CHAIN GEAR FACE OF WALL



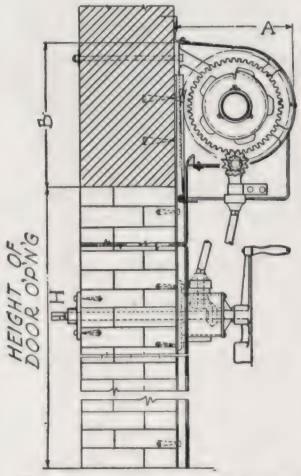
WILSON NO. 2900
CHAIN GEAR-BETWEEN JAMBS



WILSON NO. 3368
CHAIN GEAR-THRU WALL



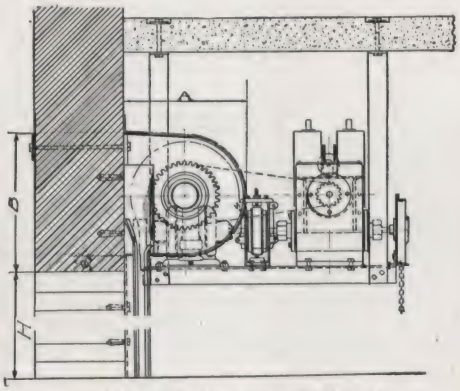
WILSON NO. 1794
SELF COILING-FACE OF WALL



WILSON NO. 3375
CRANK GEAR-FACE OF WALL

SCHEDULE
CLEAR SPACE REQUIRED FOR MECHANISM ABOVE DOOR HEADER

H	B	A	H	B	A	H	B	A	H	B	A
6'-0"	18"	15 1/2"	13'-0"	23"	20 1/2"	20'-0"	26"	23 1/2"	27'-0"	29"	26 1/2"
7'-0"	18"	15 1/2"	14'-0"	23"	20 1/2"	21'-0"	26"	23 1/2"	28'-0"	31"	28 1/2"
8'-0"	19"	16 1/2"	15'-0"	23"	20 1/2"	22'-0"	28"	25 1/2"	29'-0"	31"	28 1/2"
9'-0"	19"	16 1/2"	16'-0"	24"	21 1/2"	23'-0"	28"	26 1/2"	30'-0"	31"	28 1/2"
10'-0"	20"	17 1/2"	17'-0"	25"	22 1/2"	24'-0"	29"	26 1/2"			
11'-0"	20"	17 1/2"	18'-0"	25"	22 1/2"	25'-0"	29"	26 1/2"			
12'-0"	21"	18 1/2"	19'-0"	25"	22 1/2"	26'-0"	29"	26 1/2"			



WILSON NO. 3323
MOTOR OPERATED

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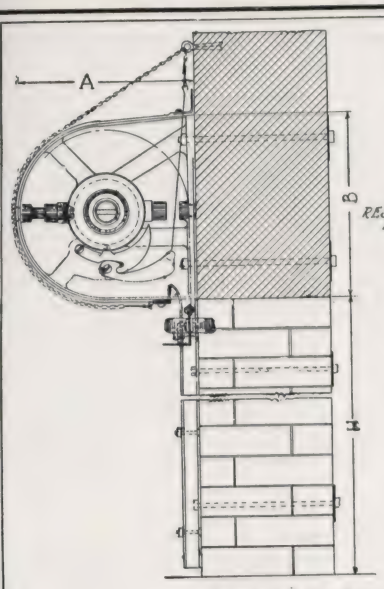
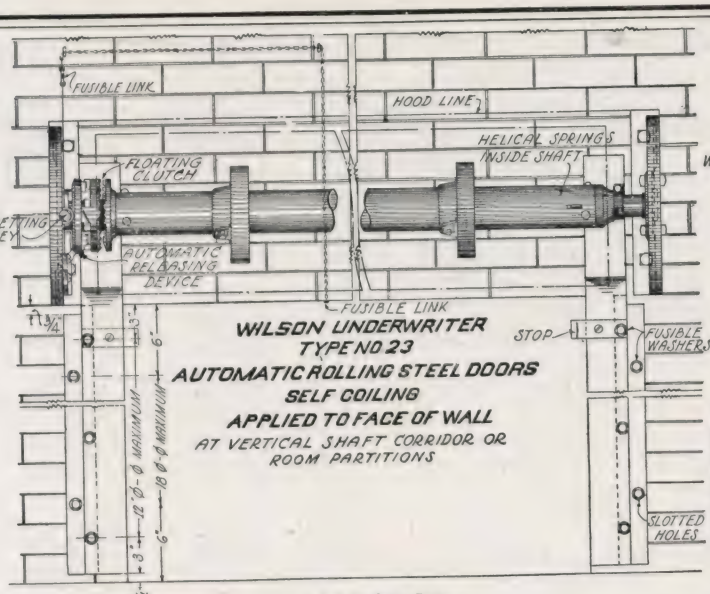


SECTION D-D



ELEVATION

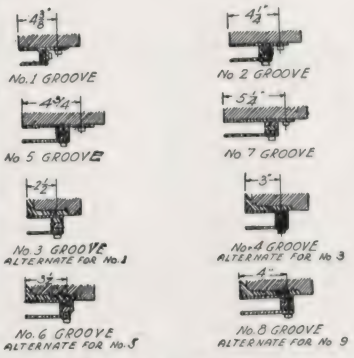
No. 2 SLAT WITH FIRE STOP

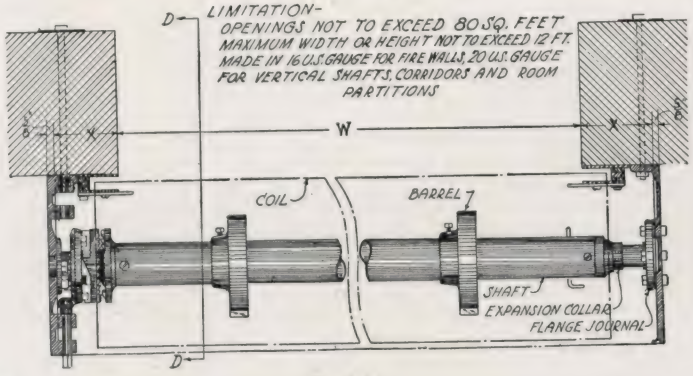
CLEARANCES

OPNG. WIDTHS W	X	GROOVE NO.	ALT. GROOVE NO.
6'-0"	4 3/8	1	2
8'-0"	4 3/8	3	4
10'-0"	4 7/8	5	6
12'-0"	5 3/8	7	8

MINIMUM OPENING HEIGHTS

OPENING HEIGHT H	A	B
6'-3"	14	14 1/2
8'-0"	15	15 1/2
8'-6"	16	16 1/2
9'-8"	17	17 1/2
11'-6"	18	18 1/2
14'-0"	19	19 1/2





PLAN

WILSON NO. 3350

WILSON·UNDERWRITER APPROVED·ROLLING·STEEL·DOORS·AND·SHUTTERS·

WILSON'S TYPE	APPLICABLE TO	SIZE LIMITATIONS OF OPENINGS	SINGLE OR DOUBLE	AUTOMATIC	OPERATIVE FROM	OPERATIVE BY	DRAWING NUMBERS FACE OF WALL APPLICATION	DRAWING NUMBERS APPLICATION BETWEEN JAMBS DOOR IN REVEAL	DRAWING NUMBERS APPLICATION BETWEEN JAMBS NO REVEAL
NO. 21	VERTICAL SHAFTS, ROOM PARTITIONS AND CORRIDORS	80 SQ. FT. { WIDTH OR HEIGHT NOT TO EXCEED 12'-0"	SINGLE	NO	EITHER SIDE	HANDLES	3386	—	—
" 22	" " "	" "	"	NO	" "	"	—	$ 3414	3387
" 23	" " "	" "	"	YES	" "	"	3350	—	—
" 24	" " "	" "	"	YES	" "	"	—	$ 3388	3422
" 25	" " "	" "	"	YES	ONE OR BOTH	CRANK	3389	—	—
" 26	" " "	" "	"	YES	" "	"	—	$ 3390	3416
" 31	FIRE WALLS	" "	DOUBLE	YES	EITHER SIDE	HANDLES	3391	—	—
" 32	" " "	" "	"	YES	" "	"	—	$ 3392	—
" 33	" " "	" "	"	YES	" "	"	—	$ 3393	—
" 34	" " "	" "	"	YES	ONE OR BOTH	CRANK	3394	—	—
" 35	" " "	" "	"	YES	" "	"	—	—	—
" 41	EXTERIOR WALLS	100 SQ. FT. { WIDTH OR HEIGHT NOT TO EXCEED 12'-0"	SINGLE	NO	EITHER SIDE	HANDLES	3364	—	—
" 42	" " "	" "	"	NO	" "	"	—	$ 3396	3417
" 43	" " "	" "	"	YES	" "	"	3354	* —	—
" 44	" " "	" "	"	YES	" "	"	—	⊕ 3351	3419
" 45	" " "	" "	"	NO	ONE OR BOTH	CRANK	3429	—	—
" 46	" " "	" "	"	NO	" "	"	—	—	—
" 47	" " "	" "	"	YES	" "	"	3363	—	—
" 48	" " "	" "	"	YES	" "	"	—	$ 3347	—
" 49	" " "	" "	"	NO	ONE SIDE ONLY	CHAIN	3399	—	—

* BRACKETS ONLY IN REVEAL
$ BRACKETS AND GROOVES IN REVEAL
⊕ SHUTTERS APPLIED TO WINDOWS ONLY

REMARKS
TYPES #21 TO #26 INCLUSIVE APPLICABLE TO ROOM PARTITIONS, CORRIDORS AND BRIDGE OPENINGS WHEN SPACE BETWEEN DOORS IS OVER 5'-0" – BAFFLES NOT REQUIRED ON EXTERIOR OPENINGS

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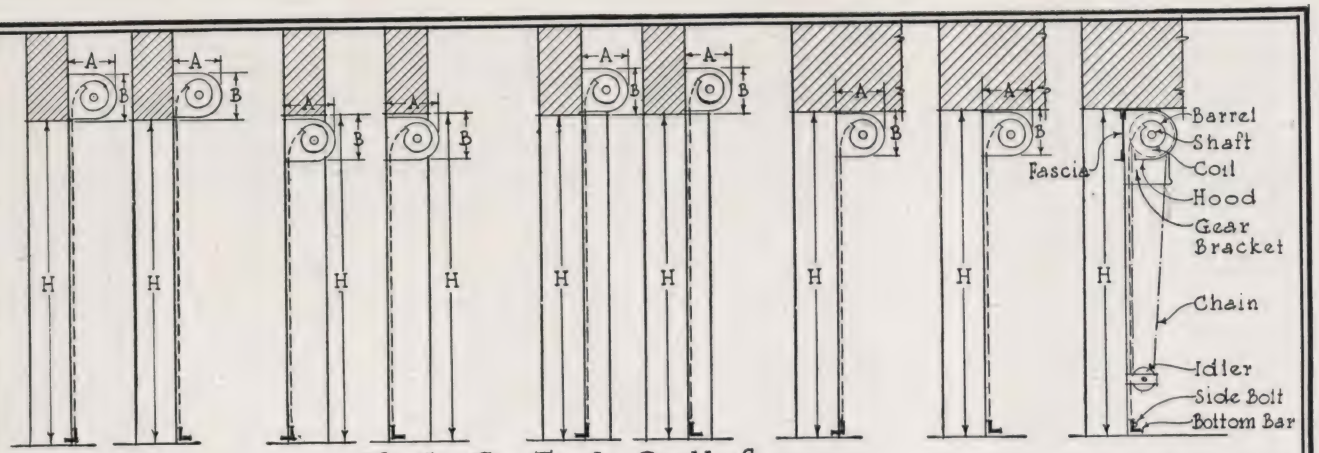
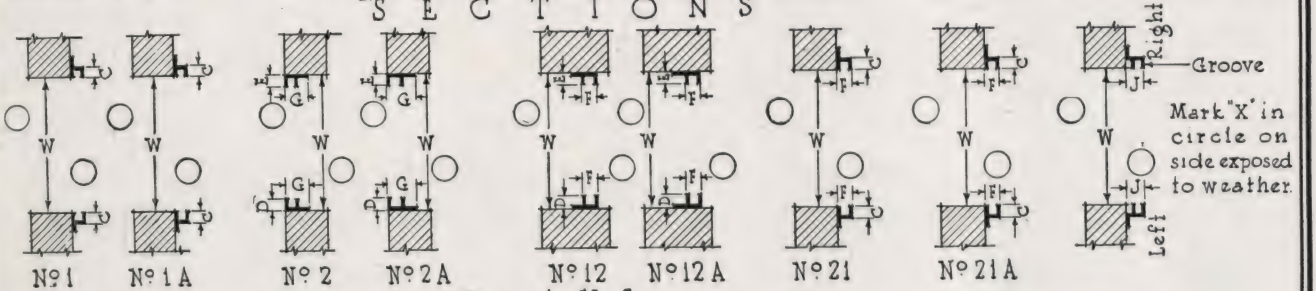


SECTIONS



PLANS

DIAGRAMS SHOWING DIFFERENT LOCATIONS FOR ROLLER AND GROOVES WITH SELF COILING CHAIN GEARED AND WORM GEARED ROLLING STEEL SHUTTERS

STANDARD DIMENSIONS IN INCHES OF VARIOUS SIZES OF "WILSON" ROLLING DOORS & SHUTTERS

HEIGHT IN FEET	WIDTH 3'-0" TO 6'-0"													WIDTH 6'-0" TO 12'-0"													WIDTH 12'-0" TO 15'-0"							WIDTH 15'-0" TO 20'-0"						
	OPERATED DIRECT BY HAND							OPERATED BY GEAR							OPERATED DIRECT BY HAND							OPERATED BY GEAR							OPERATED BY GEAR							OPERATED BY GEAR						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
	"BIG 4" INTERLOCKING SLAT ROLLING STEEL DOORS																																								
6	13	16	2	1¾	1¾	1½	3								13	16	2½	2½	2½	2½	1½	3																			
8	14	17	2	1¾	1¾	1½	3								14	17	2½	2½	2½	2½	1½	3																			
10	15	18	2	1¾	1¾	1½	3								15	18	2½	2½	2½	2½	1½	3	16	19	2½	4	4	1½	3½											
12	17	20	2	1¾	1¾	1½	3	17	20	2	4	4	1½	3½	17	20	2½	2½	2½	2½	1½	3	17	20	2½	5	5	1½	3½											
14	18	21	2	1¾	1¾	1½	3	18	21	2	4	4	1½	3½									18	21	2½	5	5	1½	3½											
16								20	23	2	4	4	1½	3½									20	23	2½	5	5	1½	3½											
18								21	24	2	4	4	1½	3½									21	24	2½	5	5	1½	3½											
	"LITTLE 4" INTERLOCKING SLAT ROLLING STEEL DOORS																																								
6	14	17	2½	2½	2½	1⅜	3								14	17	2½	2½	2½	2½	1⅜	3								15	18	3⅜	5	5	2⅜	4½	15	18	3⅜	5	5	2⅜	4½
8	15	18	2½	2½	2½	1⅜	3								15	18	2½	2½	2½	2½	1⅜	3								16	19	3⅜	5	5	2⅜	4½	16	19	3⅜	5	5	2⅜	4½
10	16	19	2½	2½	2½	1⅜	3								16	19	2½	2½	2½	2½	1⅜	3	16	19	2½	4	4	1⅜	3½	16	19	2½	4	4	1⅜	3½	17	20	3⅜	5	5	2⅜	4½
12	17	20	2½	2½	2½	1⅜	3	17	20	2½	5	5	1⅜	3½	17	20	2½	2½	2½	2½	1⅜	3	17	20	2½	5	5	1⅜	3½	17	20	2½	5	5	1⅜	3½	18	21	3⅜	5	5	2⅜	4½
14	18	21	2½	2½	2½	1⅜	3	18	21	2½	5	5	1⅜	3½									18	21	2½	5	5	1⅜	3½	18	21	2½	5	5	1⅜	3½	20	23	3⅜	5	5	2⅜	4½
16								21	24	2½	5	5	1⅜	3½									21	24	2½	5	5	1⅜	3½	21	24	2½	5	5	1⅜	3½	21	24	3⅜	5	5	2⅜	4½
18								22	25	2½	5	5	1⅜	3½									22	25	2½	5	5	1⅜	3½	22	25	2½	5	5	1⅜	3½	22	25	3⅜	5	5	2⅜	4½
	No. 2 INTERLOCKING SLAT (AND WITH FIRE STOPS) ROLLING STEEL DOORS																																								
6	14	16½	2¼	2½	2½	1½	3								14	16½	4	3½	3½	1½	3½									14	17	4	6	6	1½	4							
8	16	18½	2¼	2½	2½	1½	3								16	18½	4	3½	3½	1½	3½									16	19	4	6	6	1½	4							
10	17	19¼	2¼	2½	2½	1½	3								17	19¼	4	3½	3½	1½	3½									17	20	4	6	6	1½	4							
12	18	20¼	2¼	2½	2½	1½	3	18	21	2½	5	5	1½	3½	18	20¼	4	3½	3½	1½	3½		17	20	4	6	6	1½	4	18	21	4	6	6	1½	4							
14	18	20¼	2¼	2½	2½	1½	3	18	21	2½	5	5	1½	3½									18	21	4	6	6	1½	4	18	21	4	6	6	1½	4							
16								20	23	2½	5	5	1½	3½									20	23	4	6	6	1½	4	20	23	4	6	6	1½	4							
18								21	24	2½	5	5	1½	3½									21	24	4	6	6	1½	4	21	24	4	6	6	1½	4							
	ROLLING WOOD DOORS																																								
6	15	23	3¾	2¼	2¼	4	4¼																							16	24	3¾	2¼	4	4	4¼							
8	16	24	3¾	2¼	2¼	4	4¼																							17	25	3¾	2¼	4	4	4¼							
10	17		3¾	2¼	2¼	4	4¼																							18	26	3¾	2¼	4	4	4¼							
12	18	26	3¾	2¼	2¼	4	4¼	18	26	3¾	2¼	4	4	4¼									18	26	3¾	2¼	4	4	4¼	19	27	3¾	2¼	4	4	4¼							
14	19	27	3¾	2¼	2¼	4	4¼	19	27	3¾	2¼	4	4	4¼									19	27	3¾	2¼	4	4	4¼	19	27	3¾	2¼	4	4	4¼							
16								22	30	3¾	2¼	4	4	4¼									22	30	3¾	2¼	4	4	4¼	22	30	3¾	2¼	4	4	4¼							
18								23	31	3¾	2¼	4	4	4¼									23	31	3¾	2¼	4	4	4¼	23	31	3¾	2¼	4	4	4¼							
	SALAMANDER ROLLING DOORS																																								
6	13	15½	2¼	2¼	2¼	1¾	3¼																							13	15½	2¼	2¼	6	4	4¼	13	15½	2¼	2¼	6	4	4¼
8	14	16½	2¼	2¼	2¼	1¾	3¼																							14	16½	2¼	2¼	6	4	4¼	14	16½	2¼	2¼	6	4	4¼
10	15	17½	2¼	2¼	2¼	1¾	3¼																15	17½	2¼	2¼	6	1¾	3¾	15	17½	2¼	2¼	6	4	4¼	15	17½	2¼	2¼	6	4	4¼
12	18	20½	2¼	2¼	2¼	1¾	3¼	18	20½	2¼	2¼	6	1¾	3¾									18	20½	2¼	2¼	6	1¾	3¾	18	20½	2¼	2¼	6	4	4¼	18	20½	2¼	2¼	6	4	4¼
14	20	22½	2¼	2¼	2¼	1¾	3¼	20	22½	2¼	2¼	6	1¾	3¾									20	22½	2¼	2¼	6	1¾	3¾	20	22½	2¼	2¼	6	4	4¼	20	22½	2¼	2¼	6	4	4¼
16								22	24½	2¼	2¼	6	1¾	3¾									22	24½	2¼	2¼	6	1¾	3¾	22	24½	2¼	2¼	6	4	4¼	22	24½	2¼	2¼	6	4	4¼
18								23	25¼	2¼	2¼	6	1¾	3¾									23	25¼	2¼	2¼	6	1¾	3¾	23	25¼	2¼	2¼	6	4	4¼	23	25¼	2¼	2¼	6	4	4¼

DIMENSIONS GIVEN IN THIS TABLE ARE RECOMMENDED STANDARD SIZES SUBJECT TO MODIFICATION

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

WILSON ROLLING DOORS OR SHUTTERS LOCATION DIAGRAMS & STANDARD DIMENSIONS

SHEET NO. A2 NOT DRAWN TO SCALE

Continued on next page

Wilson Rolling Wood Doors and Shutters

Especially made to withstand the corrosive fumes so destructive to iron and steel. Recommended for roundhouses, powerhouses, chemical plants, etc., where corrosive fumes are generated, also for use on wood constructed warehouses, refrigerating plants, etc.

These doors are made of wood slats 2 in. wide and about 1⅛ in. thick, fitted together with rule joints, edge to edge, and threaded on bronze bands running from top to bottom about 18 in. apart. Each band is riveted to top slat and attached at bottom to a strong spiral spring anchor of phosphor bronze. This construction allows for shrinking and swelling of door due to atmospheric changes.

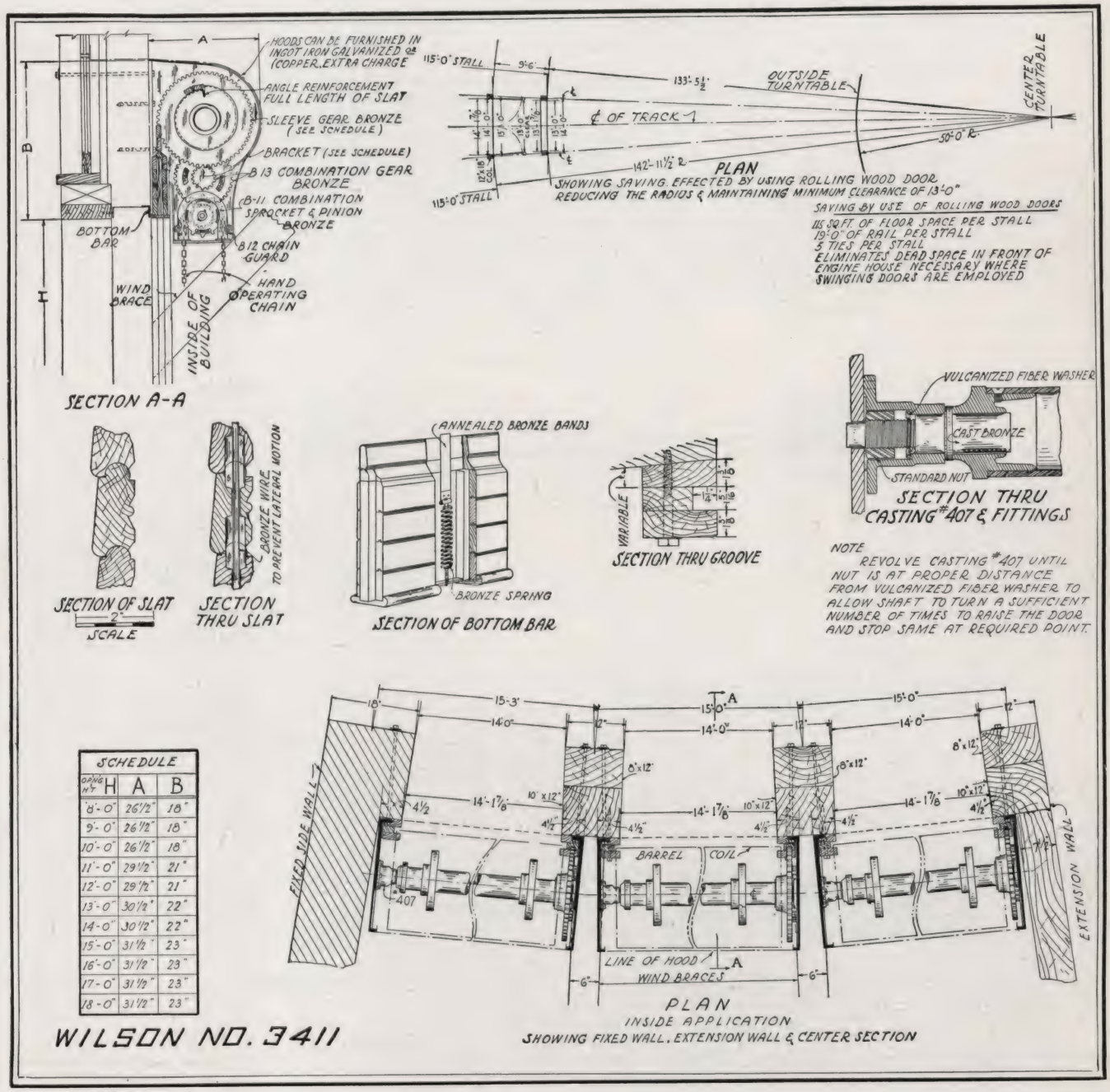
When door is 5 ft. from the lintel it will proceed automatically from this point until it reaches the lintel. This prevents the door being pulled up short of the lintel and becoming damaged by an engine striking it.

The doors are treated with carbolineum, reducing to a minimum any expansion or contraction, and acting as a preservative.

Wilson Rolling Wood Doors on Roundhouse

Wilson chain gear operates the door quickly and easily. It requires less than one minute to open or close the opening.

These doors save at least 108 sq. ft. of floor space per stall, 14 ft. of rail per stall, 4 ties per stall. Note plans below. No dead space in front of the engine house as is necessary where swinging doors are used. Catalogue, details and prices forwarded on request.



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Other Types of Industrial Doors

Horizontal Folding Type—Usually used for piers, warehouses, freight sheds, etc., and where the admission of light is a factor.

Chain operated (see details); also by motor, if required.

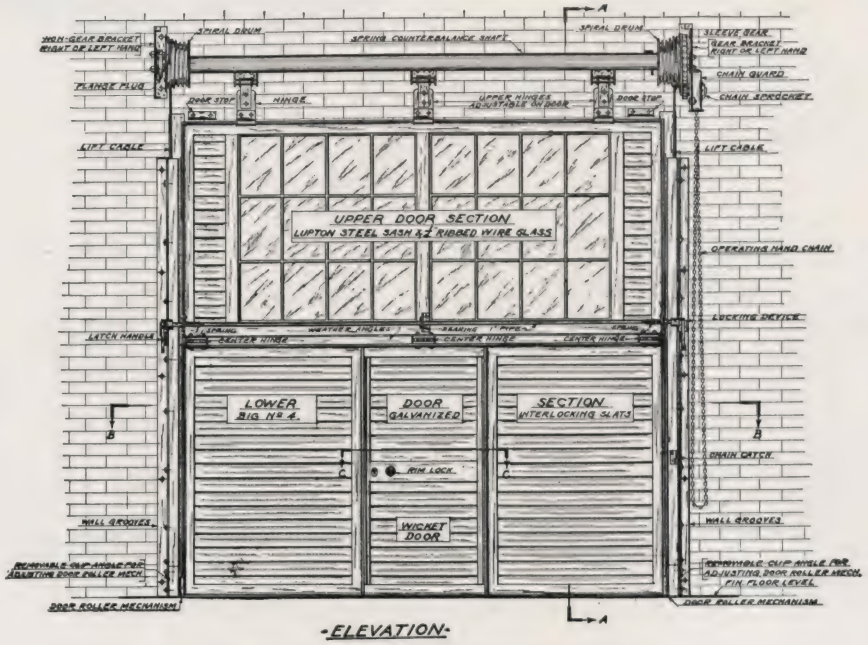
Equipped with wicket door where necessary.

Made of steel or wood, with or without glass.

Doors up to 12x12 ft., inclusive, to have 2½-in. T-iron frame.

Doors from 12x12 ft. to 20x20 ft. to have 4-in. T-iron frame.

Specifications—Furnish and install Wilson's horizontal folding door made of steel (or wood), as per details (or manufacturer's standard construction). To be hand (or motor) operated, in accordance with Wilson's type No. 3358 (3359).



-SCHEDULE-

H	8'-0	9'-0	10'-0	11'-0	12'-0	13'-0	14'-0	15'-0	16'-0	17'-0	18'-0	19'-0	20'-0
A	2'-9½	2'-10½	2'-11	2'-11½	3'-0½	3'-1½	3'-2½	3'-3	3'-3½	3'-4½	3'-5½	3'-6½	3'-7½
C	11⅞	12⅜	13	13½	14⅜	15⅛	16⅛	17⅛	17⅞	18⅞	19⅞	20⅞	21⅞

SPECIAL NOTE:
DOORS MAY BE CONSTRUCTED OF WOOD INSTEAD OF STEEL FOR OPENINGS UP TO 12'-0" WIDE x 16'-0 HIGH.
UPPER DOOR SECTION MAY BE FURNISHED WITH CORRUGATED STEEL INSTEAD OF GLASS AND SASH IF DESIRED.
DOORS MAY BE FURNISHED WITH OR WITHOUT WICKET DOOR.
DOORS UP TO 12'-0"x12'-0" INCLUSIVE TO HAVE 2½" T IRON FRAME.
DOORS FROM 12'-0x12'-0 TO 20'-0"x20'-0" TO HAVE 4" T IRON FRAME.

No. 3358. Wilson Steel Horizontal Folding Door, Hand Chain Operation

Continued on next page

Disappearing Garage Doors (2 doors to 1 opening)—Doors slide back on both sides of opening, out of the way.

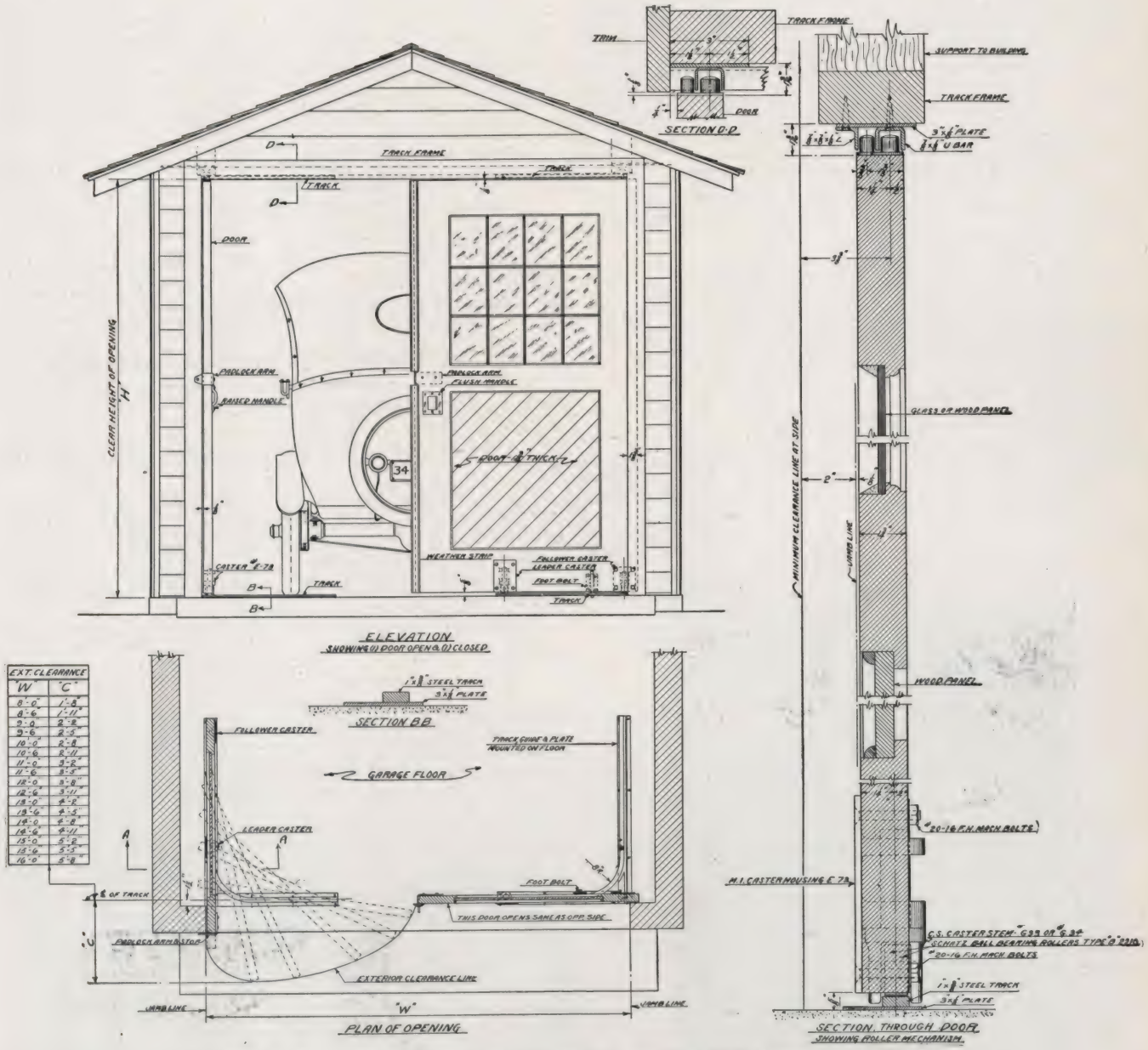
Do not swing or take up valuable space inside or outside of garage.

No slot on floor to fill with dirt from cars going in or out.

Usually made of wood 1¾ in. thick with upper part glazed (see detail No. 3445).

Can not blow open or shut, thus preventing accidents.

Specifications—Furnish and install Wilson's disappearing garage doors made up as per details and in accordance with Wilson's drawing No. 3445.



No. 3445. Wilson Disappearing Garage Doors Showing Two Doors to an Opening

CORNELL IRON WORKS

Steel Rolling Shutters and Doors; Underwriters' Labeled Fire Doors and Shutters

TELEPHONES
CHELSEA 1423, 1424, 0550

26th Street and 11th Avenue
NEW YORK, N. Y.

REPRESENTATIVES IN THE PRINCIPAL CITIES

Products

CORNELL IMPROVED INTERLOCKING SLAT and DEEP CORRUGATED TYPES of STEEL ROLLING SHUTTERS and DOORS, hand, chain, or motor operated, for residences, office buildings, garages, wharves and piers, warehouses, elevator shafts, store fronts, craneway openings, etc.

UNDERWRITERS' LABELED FIRE DOORS and SHUTTERS.

Description

Cornell steel rolling doors are designed for the closure of all types of openings. They offer fire and burglar protection, combined with neat appearance and economy of space.

The curtains slide in vertical side guides, and coil around a horizontal shaft above the opening.

The weight of the curtain is counterbalanced by springs in, or on, the shaft, which permit it to remain stationary in any position.

Experience

The CORNELL IRON WORKS is the oldest rolling door manufacturer in the United States. Cornell doors have been in use for 50 years and more.

See our catalogue.

CORNELL IMPROVED INTERLOCKING STEEL SLAT DOOR

Operation

There are four typical methods of operation:

Self-coiling Type—Standard for openings up to 8 by 10 ft. Push up and pull down by handles on the bottom bar. The quickest acting construction possible.

Hand Chain and Gearing Type—Standard for larger openings. Shaft revolved by endless hand chain acting through single or compound gearing on an overhead gear bracket.

Motor Drive Type—Standard for the largest openings up to 40 ft. in width.

Automatic Closing Type—Controlled by fusible link melting at 150° Fahr.

Special Cases—Worm and bevel gear drives, operating from either side of openings, with hand crank or chain, are provided for special cases.

Cornell Improved Interlocking Steel Slat Curtains

Designed to give unusual rigidity against wind pressure, having a depth at the crown of 7/8 in. The appearance is attractive from either side, as the curtain is made up of a series of cold rolled steel mouldings with deep relief.

The joint of the slat is so designed that there is practically no lost motion, which means that the curtain will not bulge, and a self-coiling or push-up door will operate without objectionable play between each slat.

The end locks are made of malleable iron, designed for maximum wear and strength.

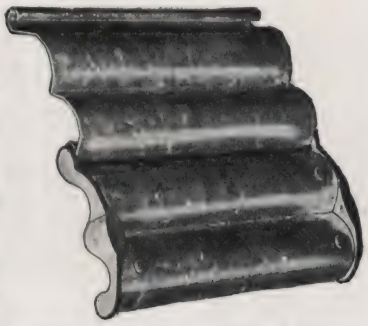
Furnished in gauges from No. 16 to 22, cold rolled and galvanized.

Non-corroding Curtains—Of cold drawn bronze, or aluminum, interlocking slats.

An original Cornell product. Require no painting. Of great service in resisting coal gas, acid fumes; severe salt water exposure, etc.

Give a very handsome finish at comparatively small extra cost.

SECTION THROUGH SLAT CURTAIN SHOWING PROFILE OF SLATS



FRONT VIEW OF SLATS SHOWING MALLEABLE IRON END LOCKS

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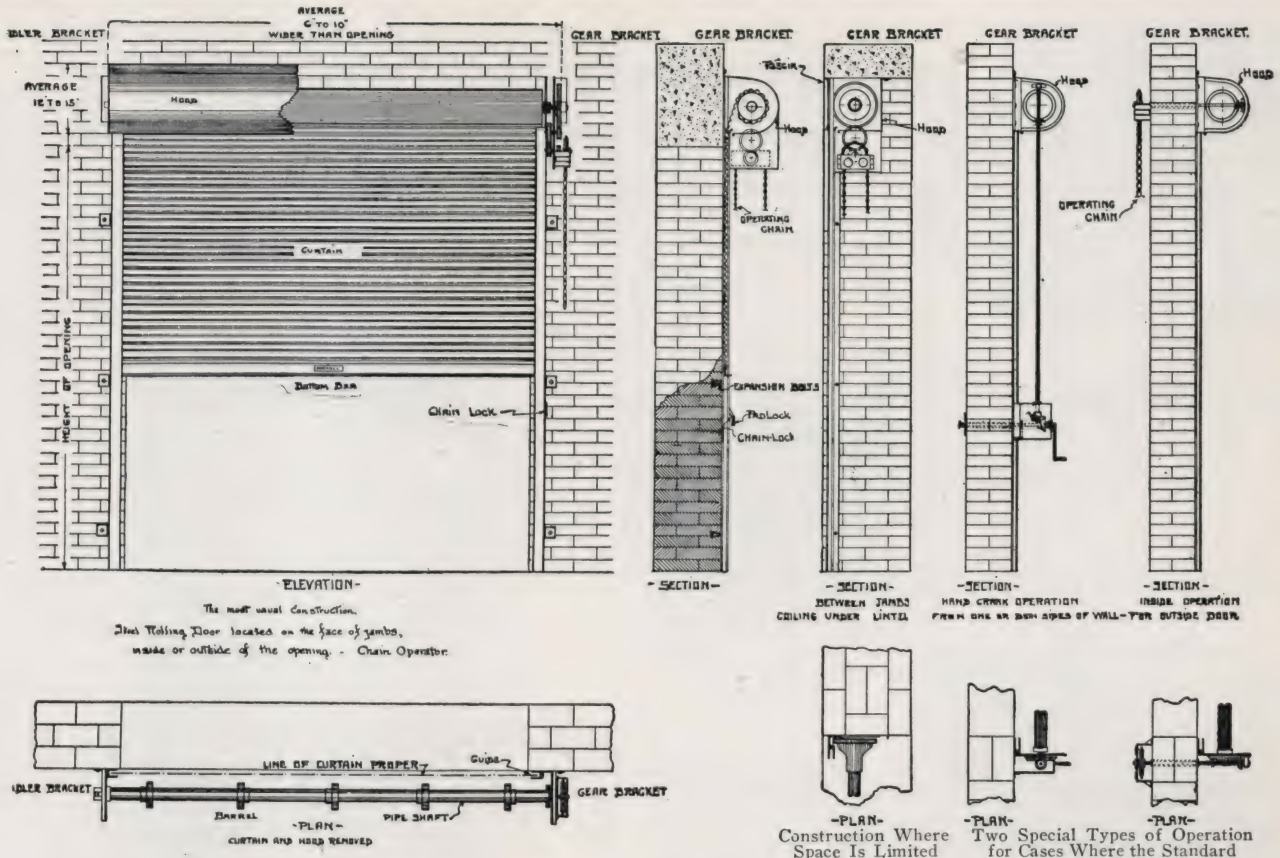


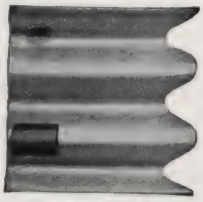
Construction Where Space Is Limited from Lintel to Ceiling

Two Special Types of Operation for Cases Where the Standard Straight Chain Is Impracticable

DETAILS OF CONSTRUCTION OF CORNELL ROLLING STEEL DOORS

Cornell Deep Corrugated Steel Curtains

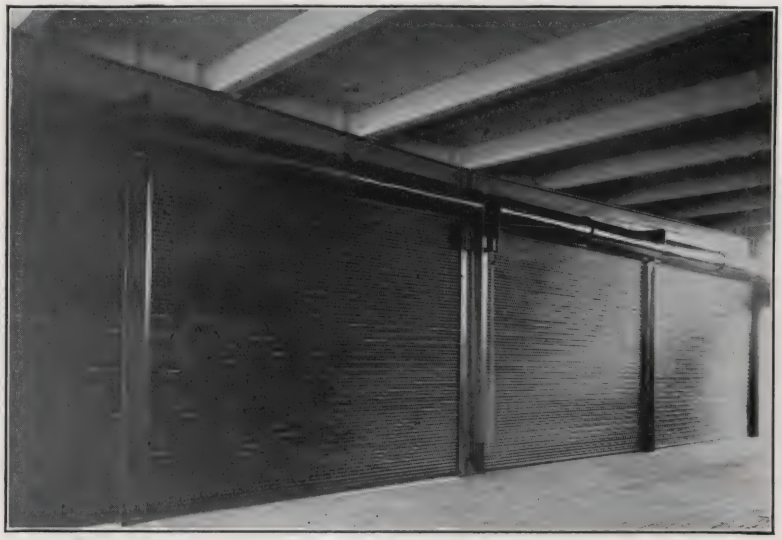
A continuous sheet of deeply corrugated, special shaped, galvanized, resilient steel. The edges are protected by malleable iron shields which take up any wear in the side guides. Easily repaired when injured. Not difficult to erect. Will last a lifetime if properly cared for. More economical than slat curtains. Lighter, since no extra metal is needed to make joints. A widely used type and very successful when manufactured by an experienced and skilled organization.



VIEW OF DEEP CORRUGATED CURTAIN

Underwriters' Labeled Fire Doors and Shutters

These are constructed like our commercial type, excepting for certain special features which are required by the Underwriters' Laboratories. These doors and shutters are approved and labeled by the Underwriters' Laboratories, Inc.



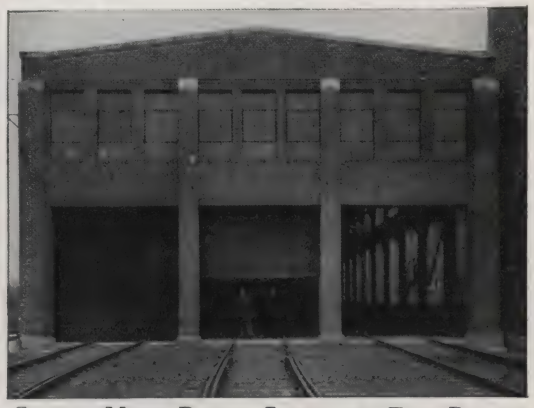
CORNELL WIDE SLAT DOORS, WITH HINGED MULLIONS, AT NEW STATE PIER, PORTLAND, ME.

FAY, SPOFFORD & THORNDIKE, Boston, Mass., Engineers

Over 50 large Cornell doors here. Four bottom slats of each door of bronze, an original Cornell feature

Catalogue

Catalogue will be sent free to any one whose letterhead or position would indicate a legitimate use.



CORNELL MOTOR DRIVEN CORRUGATED TYPE ROLLING DOORS, BUILT FOR CAR INSPECTION SHOPS, RAPID TRANSIT COMMISSION, PHILADELPHIA, PA.

ESTABLISHED 1900 INCORPORATED 1906

GEO. W. JOHNSON MFG. CO.

Manufacturers of Standard Underwriters' Labeled Fire Doors and Utility Doors

1210-1212 South Eighth Street
ST. LOUIS, MO.

209-211 West 17th Street
KANSAS CITY, MO.

Products

STEEL ROLLING FIRE DOORS and SHUTTERS.

STEEL COIL SERVICE DOORS for warehouses, piers and industrial buildings.

COUNTERBALANCED ELEVATOR TRUCKOVER DOORS.

STEEL AIR-SPACE FIRE DOORS and SHUTTERS.

METAL COVERED DOORS.

VERTICAL SLIDING COUNTERBALANCED TELESCOPE DOORS.

BAKERY PROOF-ROOMS, DOORS, FRAMES and SPECIAL PROOF-ROOM DOOR LATCHES.

DUFOLD or JACK-KNIFE DOORS.

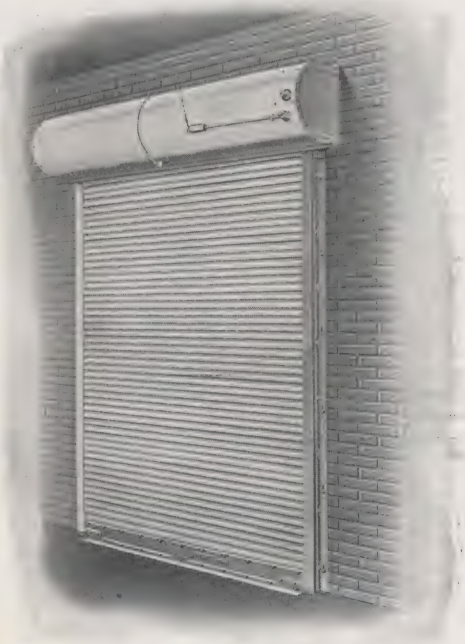
BOILER PLATE DOORS.

Also manufacturers of Tin Clad Fire Doors, Steel Panel Doors, Pressed Metal Labeled Door Frames.

Service

Our engineering department will be pleased to cooperate in working out details and furnishing recommendations for the treatment of special conditions, and is ready at all times to render this assistance which the experience of over twenty years in the treatment of openings in buildings of all types has made possible.

Complete literature descriptive of any of the above types will gladly be furnished on request.

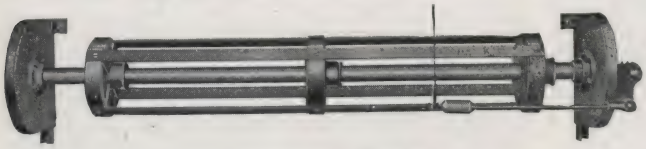


"JOHNSON" NO. 240 STEEL ROLLING DOOR

Steel Rolling Fire Doors and Shutters

"Johnson" doors and shutters are built in strict accordance to the requirements of the Underwriters' Laboratories, Inc., are inspected by them at our factory, and bear their labels of approval for all positions in the building.

The drums of "Johnson" doors are *full-floating, roller bearing* on a center pipe shaft composed of two heavy gauge pipes, one inside of the other; the counterbalancing mechanism consists of a *series of high quality motor springs* distributed along the shaft in spring cases; and the cases are rigidly *trussed* together the full width of the drum by four flat steel bars.



"JOHNSON" DRUM

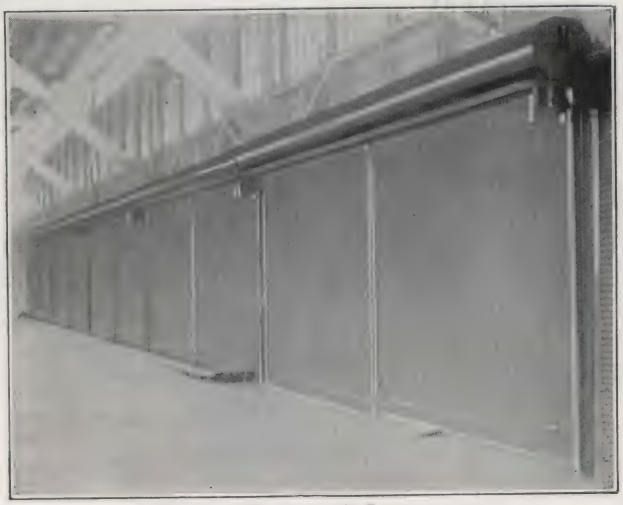
The curtains of these doors are built of interlocking slats formed from rust resisting, low carbon steel, and of our corrugated curtain stock rolled from special analysis steel billets and heavily galvanized and deeply corrugated.

Gauges of curtains vary to meet the requirements of the Underwriters' Laboratories, Inc.

Both types of curtains are supplied along their edges with malleable iron endlocks or edge guards which protect the curtains from wear in the guides and stop the passage of flame and smoke. "Johnson" corrugated curtains are preferred by many for their rigidity and speed of operation.

Steel Coil Service Doors

Doors of this type are designed for use in freight and warehouses, factory and mercantile buildings, on piers, garages, core ovens, dry kilns, etc., where the surrounding conditions do not require doors bearing the label. These doors are designed for dependable service combined with rapidity and ease of operation; they are equal in quality of construction to the labeled doors and are equipped with *full-floating roller bearing drums, multiple spring counterbalanced, and rigidly trussed.* Curtains of either our standard corrugated curtain stock or slats.



A TYPICAL "JOHNSON" INSTALLATION

Continued on next page

Type Specification Numbers of "Johnson" Doors

Labeled Steel Rolling Fire Doors and Shutters—

Fire Wall

240—Automatic; face of wall; slat curtain.
250—Automatic; between jamb; slat curtain.

Vertical Shaft and Corridor and Room Partition

230—Automatic; face of wall; slat curtain.
280—Automatic; chain operated; face of wall; slat curtain.
290—Automatic; chain operated; between jamb; slat curtain.

Exterior Wall

Manually Operated; Non-automatic

120—Door or shutter; face of wall; corrugated curtain.
210—Door or shutter; face or wall; slat curtain.
130—Door or shutter; between jamb; corrugated curtain.
220—Door or shutter; between jamb; slat curtain.

Manually Operated; Automatic

125—Door; face of wall; slat curtain.
190—Window shutter; face of wall; slat curtain.

Chain Operated; Non-automatic

140—Door or shutter; face of wall; corrugated curtain.
260—Door or shutter; face of wall; slat curtain.
150—Door or shutter; between jamb; corrugated curtain.
270—Door or shutter; between jamb; slat curtain.

Chain Operated; Automatic

160—Face of wall door; slat curtain.
200—Window shutter; face of wall; slat curtain.
170—Between jamb door; slat curtain.

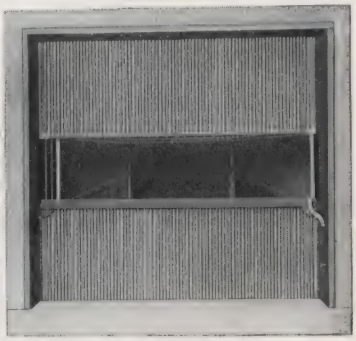
Crank Operated; Non-automatic

180—Door or shutter; face of wall; corrugated curtain.
300—Door or shutter; face of wall; slat curtain.

Steel Coil Service Doors—

100—Push-up manually operated; for openings of ordinary size.
110—Chain operated.
110G—Crank, shafting and gear operated.
100A and 110A—Push-up and chain operated doors with fuse link automatic release.
100 C. O. and 110 C. O.—Push-up and chain operated core oven and dry kiln doors.

Counterbalanced Elevator Truckover Doors, Underwriters' Labeled



Truckover Door

The most practical elevator door on the market, serving the purpose of fire door, safety gate and draft cut-off. The patented, pivoted trucking bar bridges the gap between car platform and sill and adjusts itself to slight differences in their level, making trucking easy. Interlocking guides and very substantial construction are other outstanding features of the quality of this door. Being perfectly counterbalanced, no springs or weights are required and doors can be equipped with mechanical operators or electric contact.

Steel Air-space Fire Doors and Shutters, Underwriters' Labeled

Air-space Door

Built entirely of steel, and of rigid, well reinforced construction, "Johnson" steel Air-space doors are practically indestructible. They are the latest improved fire door of this type on the market.

Metal Covered Doors

Designed for use on openings where durable, weatherproof doors of neat design and moderate cost are desired. They are built in several styles and can be fitted with steel sash in upper panels.

Metal Covered Door

Telescope Door

Vertical Sliding Counterbalanced Telescope Doors

A door operating both halves up, built entirely of steel and of rigid construction. For use on elevator openings with projecting sills, and dock openings in freight sheds, piers, warehouses and factory and mercantile buildings.

Boiler Plate Doors

Designed for heavy duty purposes and used extensively in packing plants, etc.

Boiler Plate Door

Bakery Proof-rooms, Doors, Frames and Special Door Latches

Complete steel framing, doors, and special, patented latches for steamboxes or proof-rooms in bakeries.

Proof-room Door

Dufold or Jackknife Doors

For exterior openings on freight and ware houses and docks where doors of horizontally folding type are desired.

Dufold Door

THE KINNEAR MANUFACTURING CO.

Exclusively Door Manufacturers

820-870 Field Avenue
COLUMBUS, OHIO

BRANCH OFFICES

BOSTON, MASS., 294 Washington Street
NEW YORK, N. Y., 1182 Broadway
PHILADELPHIA, PA., 503 Wesley Building
WASHINGTON, D. C., 929 Southern Building
PITTSBURGH, PA., 617 Oliver Building
CLEVELAND, OHIO, 409 Union Building
DETROIT, MICH., 709 Ford Building
CHICAGO, ILL., 1860 C. & C. Bank Building
KANSAS CITY, MO., 503 Railway Exchange
SAN FRANCISCO, CAL., 515 Market Street

AGENTS IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.
FIRE DOORS and SHUTTERS.
WOOD ROLLING DOORS for Roundhouses.
WOOD ROLLING INTERIOR PARTITIONS.
WOOD BIFOLDING DOORS.
STEEL BIFOLDING DOORS.
VERTICAL SLIDING DOORS.
STEEL ROLLING DOORS and SHUTTERS for service purposes.

KINNEAR ROLLING DOORS
TRADE-MARK

Types

Kinnear steel rolling doors and shutters are manufactured and sold under two distinct classifications, viz., Service and Labeled Types. Service doors are designed entirely for such openings as do not require underwriters' label and where insurance rates are not a consideration.

Construction of Steel Rolling Doors

Kinnear steel rolling doors are constructed of the highest class of materials by mechanics especially trained in the exclusive manufacture of doors.

Curtain proper on all Kinnear doors is made of open hearth interlocking steel slats galvanized and equipped with malleable iron endlocks. Curtain is coiled upon barrel journalled in heavy cast iron brackets and travels in steel guides mounted at sides of openings.

Curtain is counterbalanced by means of helical springs which are enclosed in barrel.

Galvanized hood of steel of suitable design is supplied with each door.

Method of Installing Rolling Doors

Service doors in general are mounted on face of wall with brackets and coil entirely above the bottom of lintel and with inside face of guides flush with face of brick or concrete jamb.

Where headroom is limited and door can not be mounted on face of wall, it can be mounted in the opening, in which case the brackets and coil would be mounted directly under lintel and guides would be located on the jamb.

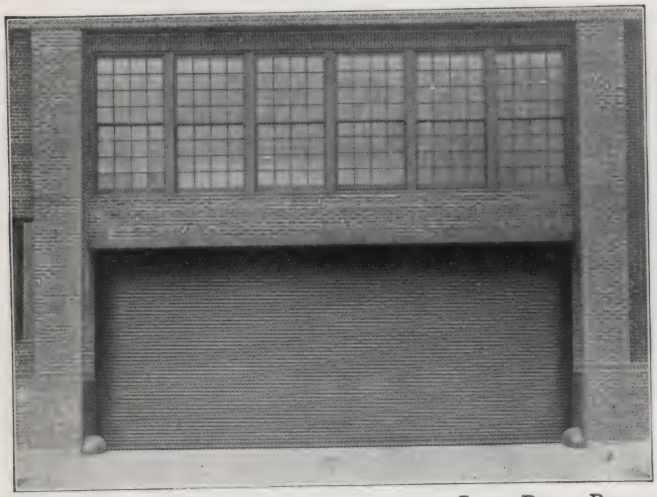
Operation of Rolling Doors

Doors may be operated as follows:

Push-up type of doors for openings not exceeding 100 sq. ft. can be operated in the same manner as window shade, being perfectly counterbalanced and same can be opened from either side.

Doors can be operated by means of reduction gearing and endless chain, or by means of crank, shafting and gear.

Where motor operation is desired, it is necessary to have complete description of current and drawing showing clearances and general conditions.



STEEL ROLLING DOOR IN DRIVEWAY OF THE COLOR PRESS BUILDING, CHICAGO TRIBUNE, CHICAGO, ILL.

BIFOLDING NO. 3 DOORS CLOSING THE FIRST FLOOR OF THE BOSTON ARMY SUPPLY BASE—130 IN ALL

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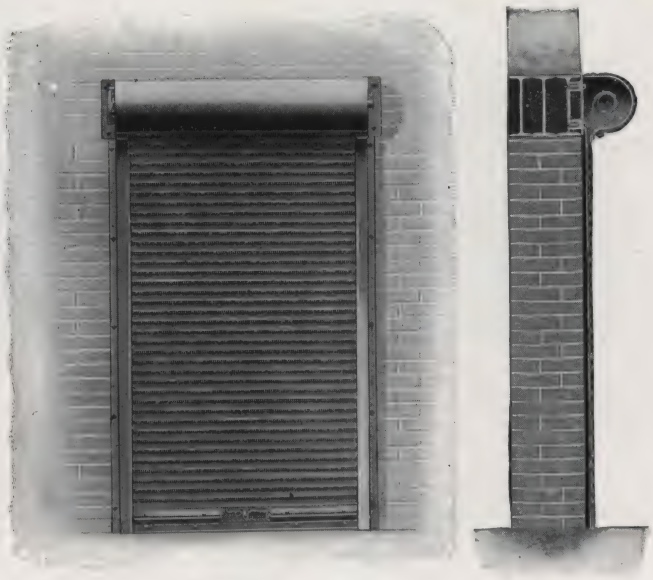
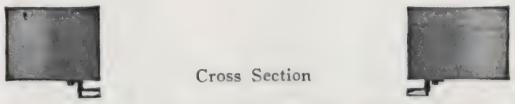


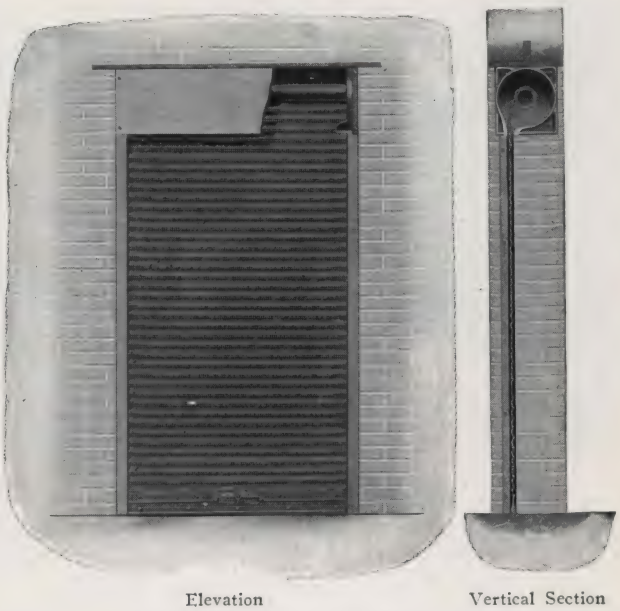
Elevation Vertical Section



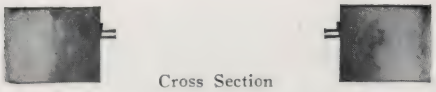
Cross Section

CONSTRUCTION No. F. M. 10

Mounted on face of wall; counterbalanced by springs. Operated manually by handle in bottom bar of curtain. When door is placed on exterior face of wall, hood is inclined to shed water



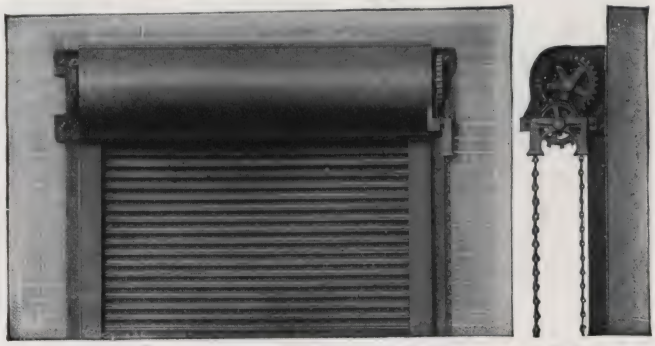
Elevation Vertical Section



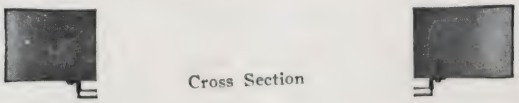
Cross Section

CONSTRUCTION No. B. M. 10

Mounted in opening; counterbalanced by springs. Manually operated by handle in bottom bar of curtain. Hoods can be paneled to meet special requirements.



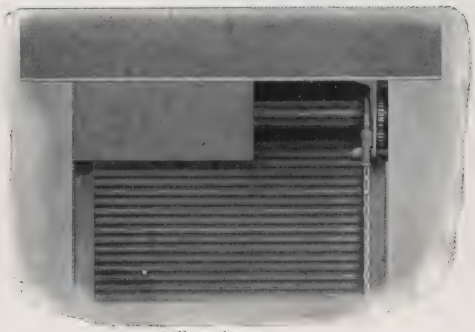
Elevation End View



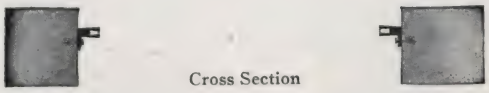
Cross Section

CONSTRUCTION No. F. H. 20

Mounted on face of wall; counterbalanced by springs. Operated by means of endless chain, sprocket and gear.



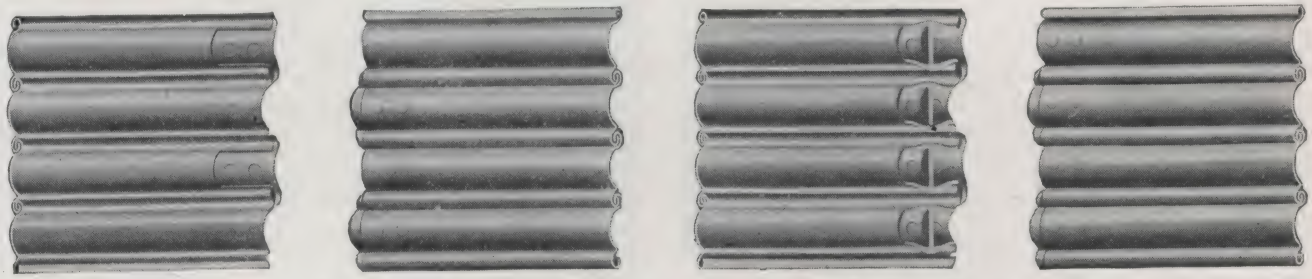
Elevation Vertical Section



Cross Section

CONSTRUCTION No. B. H. 20

Mounted in opening; counterbalanced by springs. Operated by means of endless chain, sprocket and gear



CONCAVE AND CONVEX SIDES OF INTERLOCKING STEEL SLAT No. 2

Illustrations to the left show slat No. 2 fitted with alternate endlocks; those to the right, fitted with continuous endlocks. Slat No. 2 is 1⅞ in. wide on centers; depth of crown, ½ in. Made in gages Nos. 24, 22, 20, 18 and 16.

Especially adaptable to shutters equipped with mechanical operating device.

In cases of extremely wide openings, Kinnear No. 4 slat is used. This type of slat is larger than the No. 2 slat

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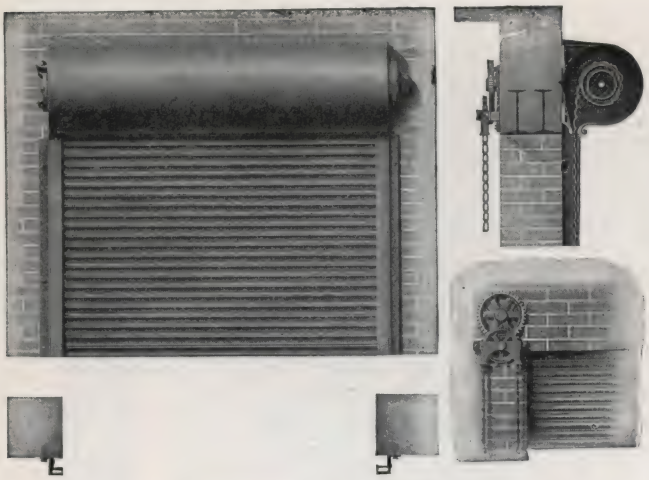
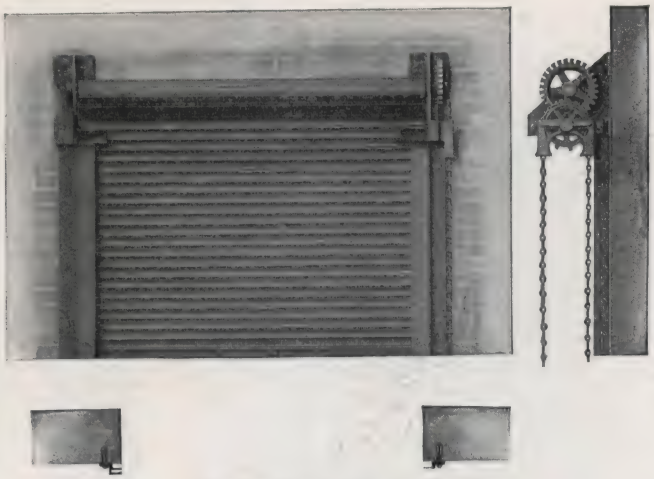


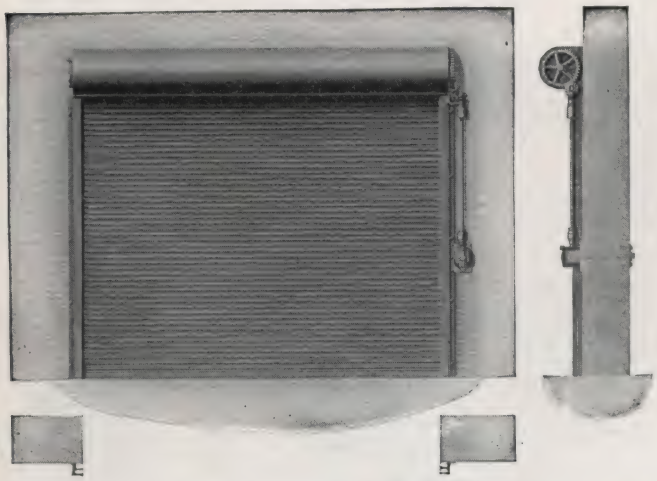
CONSTRUCTION No. F. H. 61

Door mounted on exterior face of wall. Operated from within building by means of endless chain, sprocket and gear, and by shaft extending through the wall



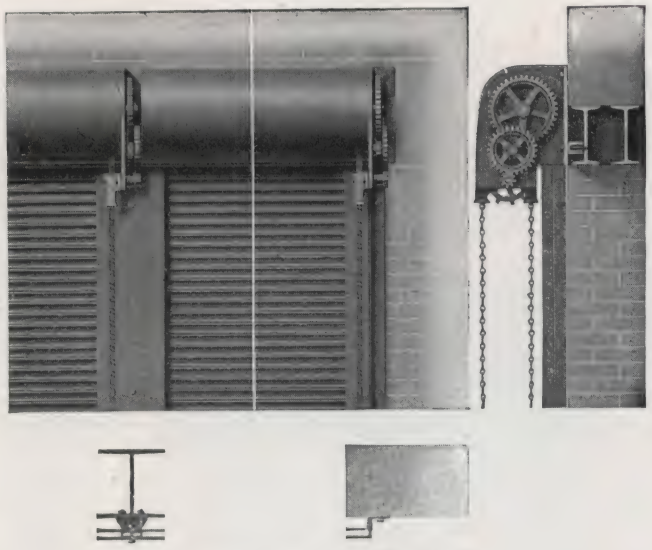
CONSTRUCTION No. F. H. 30

Mounted on interior face of wall; not furnished with hood. Open type of bracket facilitates erection. After brackets are in place, curtain barrel can be dropped into bearings. Closed brackets necessitate erection of both brackets and barrel together



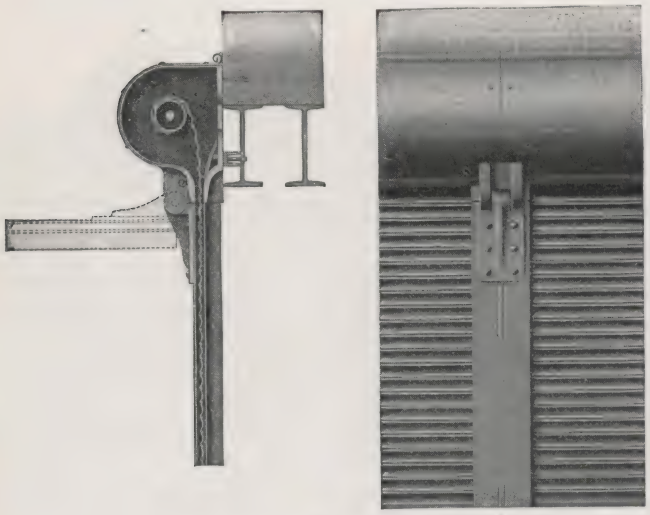
CONSTRUCTION No. F. C. 20

Mounted on face of wall. Operated by means of crank, imparting movement to the curtain barrel through shaft and suitable gear. Can be made to operate from either inside or outside of building, or both.
Operation from one side only is standard arrangement



CONSTRUCTION No. F. H. 23

Modification of construction No. F. H. 20. A compact design well adapted to large openings, separated by narrow post



INTERMEDIATE MOVABLE POSTS

Wide openings can be frequently more economically closed by a number of small doors, than by a single large one, using, between doors, movable posts hinged to brackets. After doors are open, posts are swung up out of the way by ropes and pulleys

INTERIOR OF PIER 32, SAN FRANCISCO

Steel rolling doors arranged with movable intermediate posts shown above, making entire opening available

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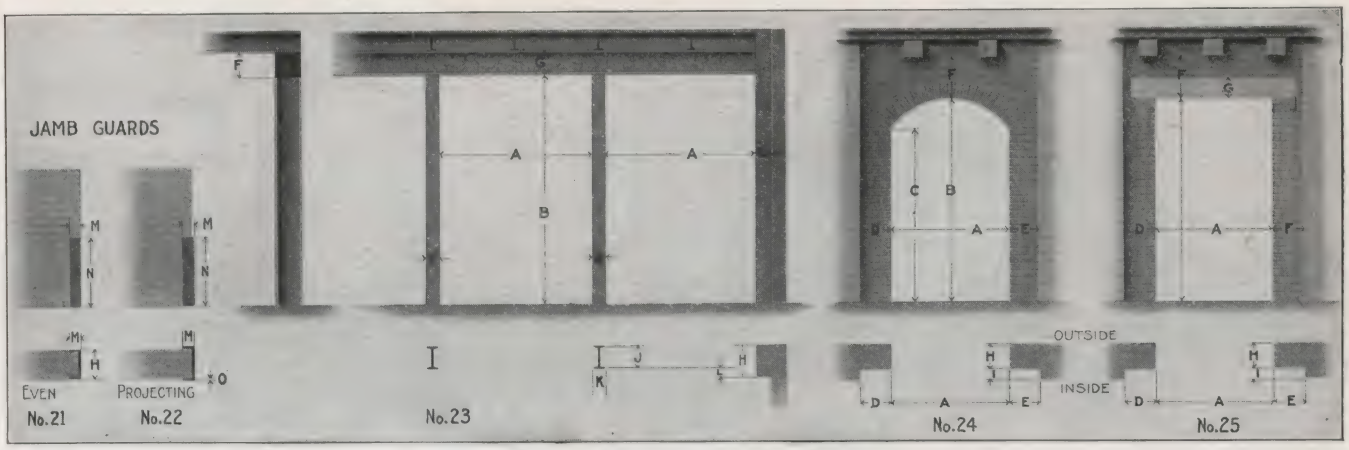
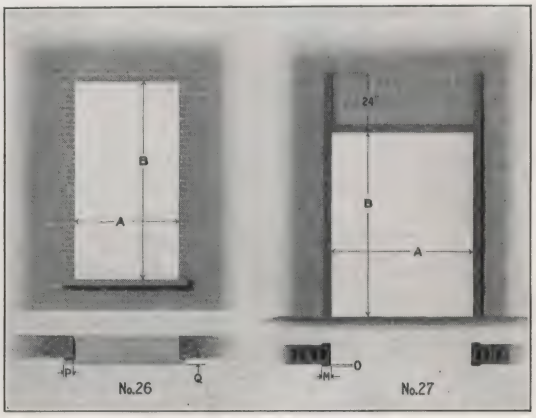


OPENINGS FOR KINNEAR ROLLING SHUTTERS

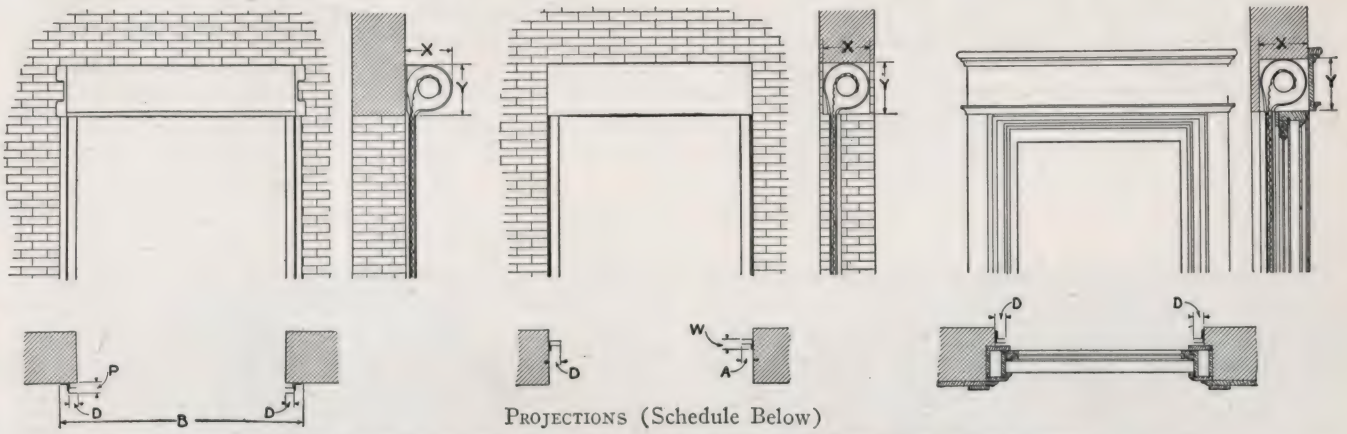


OPENINGS FOR KINNEAR ROLLING SHUTTERS

Information and Measurements Required

Illustrations show essential measurements. In giving information, describe lintel, shapes and sizes of parts composing it, accompanying same with sketch showing cross section. Essential measurements are as follows:

A—Width; if door is mounted in opening, give width at top and bottom.
B and C—Height of opening.
D and E—Projection in close proximity to opening.
F—Clearance between top of opening and floor beams, or ceiling.
G—Height of lintel.
H—Thickness of wall.
I—Projection of some part of wall near opening.
J—Depth of column; give shape and sizes of parts composing column.
K—Width of column.
L—Distance from column to inner face of wall.
M—Lap of guard.
N—Height of guard.
O—Projection of guard.
P—Lap of guard.
Q—Projection of sill.



PROJECTIONS (Schedule Below)

Above are indicated the salient dimensions of usual sizes of standard service types of Kinnear steel rolling shutters.
View to the left shows shutter placed on face of wall; central view shows shutter placed between jambs, and that to the right shows curtain with concealed coil. The following dimensions are for shutters of height and width indicated:

Height ft.	Width 3 to 7 ft. Groove depth "D", 2 in.					Width 7 to 11 ft. Groove depth "D", 2½ in.					Width 11 to 14 ft. Groove depth "D", 3 in.					Width 14 to 20 ft. Groove depth "D", 3½ in.				
	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.
6	12¾	14	2¾	4	3	13½	15	2¾	4½	3½										
8	14¼	16	2¾	4	3	16½	18	2¾	4½	3½										
10	15¼	17	2¾	4	3	17½	19	2¾	4½	3½										
12	17½	19	2¾	4	3															
6	11	13	2½	4	3	11	13	2½	4½	3½	12¾	14	2½	5	4	15	17	3½	8	4½
8	11	13	2½	4	3	11¼	13	2½	4½	3½	12¾	14	3½	5	4	15	17	3½	8	4½
10	11¾	13½	3½	4	3	11¾	13½	3½	4½	3½	13½	15	3½	5	4	15½	18	4	8	4½
12	13½	15	3½	4	3	13½	16	3½	4½	3½	13½	16	3½	7	4	17	19	4	8	4½
14	14¼	16	3½	4	3	14¼	16½	3½	4½	3½	15¼	17	3½	7	4	17½	19	4	8	4½
16	15¼	17	3½	4	3	15¼	17	3½	7	3½	16¼	18	4	7	4	20	22	4	8	4½
18	15¼	17	3½	4	3	15½	18	3½	7	3½	17	19	4	7	4	22	24	4	8	4½

Sizes above division line apply to shutters operated by handle in bottom of curtain. Those below division line apply to shutters operated by endless chain or crank and bevel gear. Dimension "P" applies only to face of wall constructions. Dimension "W" only to "between jamb" constructions. Dimension "D" in the between jamb section applies only to manually operated shutters. Use projection "A" for both sides where chain operation is used. Dimension "B" should always be at least 8 in. wider than width of door opening for moderate sized shutters, and for very large shutters 10 or 12 in. and more if possible. We do not recommend manually operated construction for curtains of larger area than approximately 100 sq. ft.; chain hoist should be used on larger sizes. Above does not apply to automatic construction; for clearance on automatic or any other special construction. Any unusual sizes, direct correspondence is advisable.

Continued on next page

UNDERWRITERS' LABELS

Fire Doors and Shutters

Constructed under the supervision of the Underwriters' Laboratories, Inc., and labeled as above.

Important Features—Kinnear fire doors and shutters are specially designed for fire protection.

Details of construction have been carefully developed. The following are some of the important features:

(1) An auxiliary or inner hood is automatically dropped and closes the space between the barrel and outer hood, thereby preventing the passage of flame over the barrel.

(2) Special endlocks closing the concaved ends of slats and preventing the passage of flame around the edge of the curtain.

(3) Fusible washers employed in the construction of grooves which melt and allow the members composing the grooves to expand without buckling.

(4) Non-corrodible metal used for bearings and contact points of the automatic release.

(5) Single line contact bearings in releasing levers.

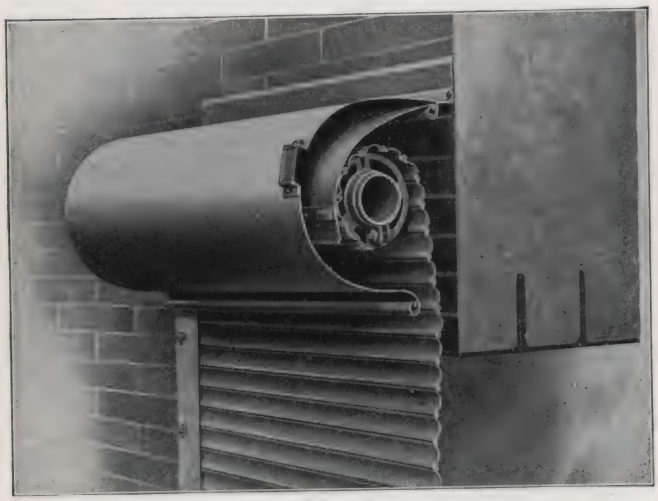
(6) Provision made for expansion of parts for all temperatures up to 2000° Fahr.

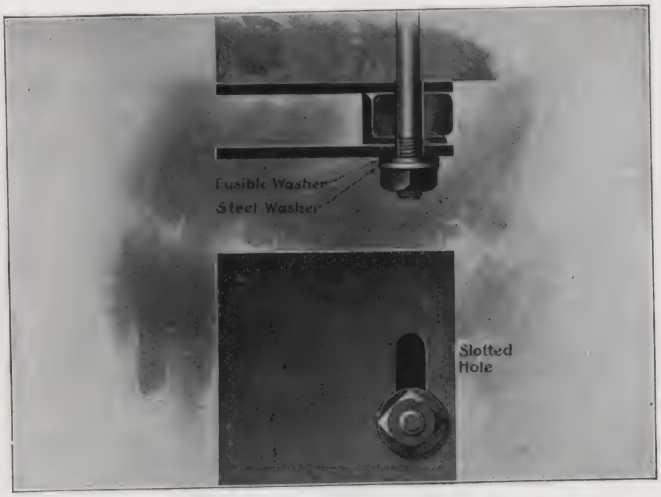
(7) Disposition of fusible links, insuring prompt closing.

(8) The enclosure of automatic release, protecting it from the weather.

Special Equipment—We are prepared to furnish governors controlling the speed of curtain in automatic closure.

Catalogues—General Catalogue No. 51 and the special Fire Door Catalogue No. 53 illustrate many additional types and their applications. These doors are designed to obtain easy operation in normal service, and are easily opened and reset by a single person after automatic closure.





SALIENT FEATURES OF KINNEAR FIRE DOORS AND SHUTTERS

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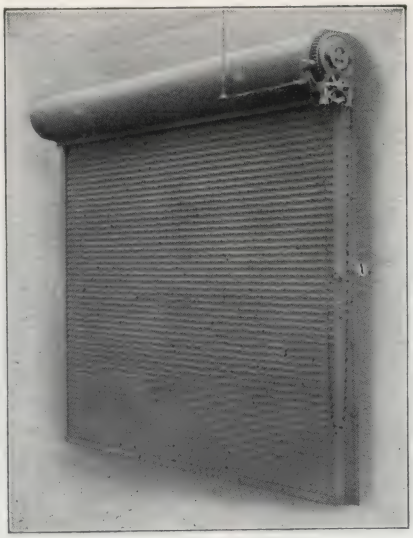
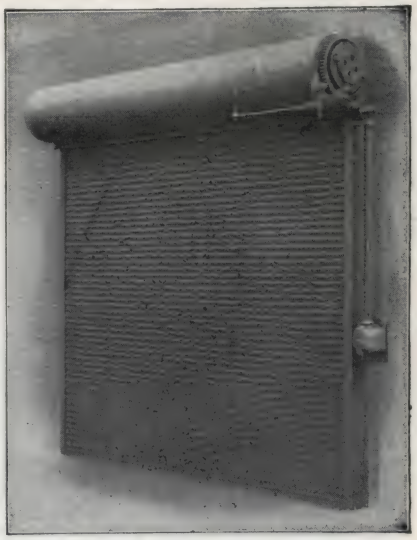
Manual Operation



Chain Operation



Crank and Shaft Operation

A Few Types of Akbar Construction

Salient Features of Akbar Construction, a Distinctive Kinnear Product

(1) The automatic closing of this type of door is insured by a powerful starting force which diminishes as door is set in motion.

(2) A special safety device is provided on each door which controls drop of door in automatic closure and which eliminates every element of danger, as well as the violent impact on most every other type.

(3) Can be opened and reset without difficulty after automatic closure.

(4) Are available for service purposes at all times and will close automatically from any open position.

Types—Akbar doors are made in the following types:

Akbar No. 1, manual operation
Akbar No. 2, chain operation.
Akbar No. 3, crank operation.

The above three types are labeled for openings in vertical shafts, partition walls, bridge and tunnel entrances where openings do not exceed 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 4, manual operation
Akbar No. 6, chain operation
Akbar No. 7, crank operation
Akbar No. 8, crank operation

The above four types are labeled for openings in fire walls not in excess of 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 9, chain operation
Akbar No. 10, crank operation

The above two types are labeled for openings in exterior walls for openings not in excess of 100 sq. ft., and where width or height are not in excess of 12 ft.

Other types similar to Akbar manual operation are available for exterior openings.

Salient Features of Superior No. 1 and No. 2 Constructions

Labeled for exterior window openings not in excess of 100 sq. ft., neither dimension exceeding 12 ft.

Normally remains in open position, closing automatically by means of fusible link.

Actuated by a powerful starting force which diminishes as shutters are set in motion.

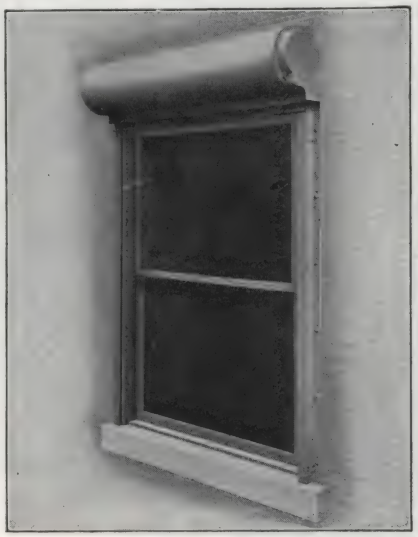
Equipped with *safety device* which controls drop of door in automatic closure, eliminating all danger, as well as impact on sill.

Equipped with testing device by which periodical tests can be made as often as desired.

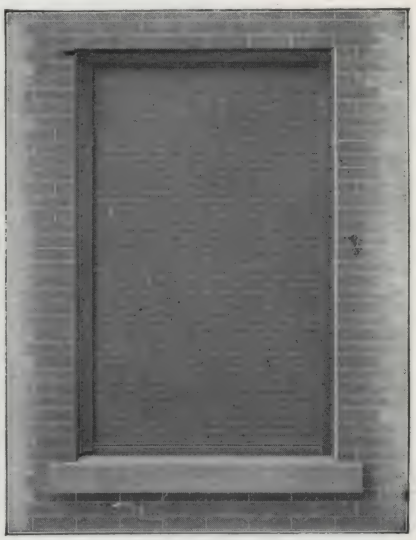
Can be raised after automatic closure with least possible difficulty.

After lever is reset, can be pushed and locked in any open position without adjustment.

Superior No. 1 to be mounted on face of wall.
Superior No. 2 to be mounted in opening.



Superior No. 1



Superior No. 2

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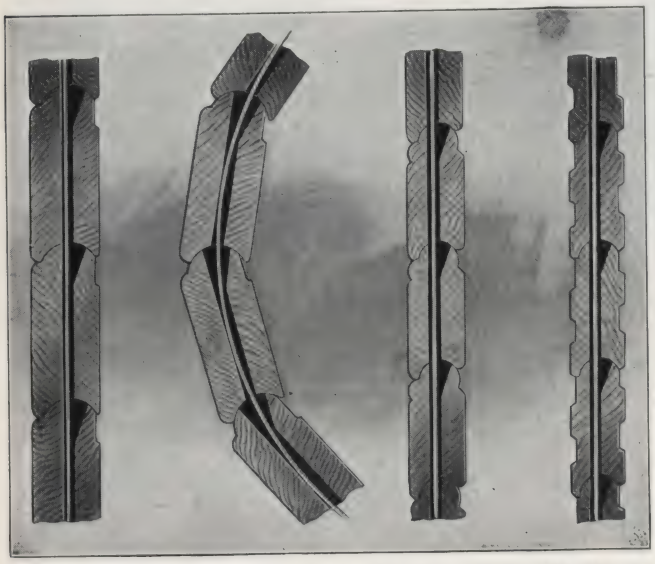
Wood Rolling Doors and Partitions

For Roundhouses—Wood rolling doors are particularly desirable in cases where chemical action is liable to deteriorate steel. This is particularly true in roundhouses and chemical plants.

These doors are constructed of wood slats assembled on phosphor bronze ribbons placed at proper intervals. Slats are made of cypress and treated with a coat of wood preservative.

Slat No. 27 is used on exterior doors.



No. 27 No. 27 No. 26 No. 24

SECTIONS OF WOOD SLATS

For Schools, Churches, etc.—Curtains are composed of slats assembled on phosphor bronze ribbons.

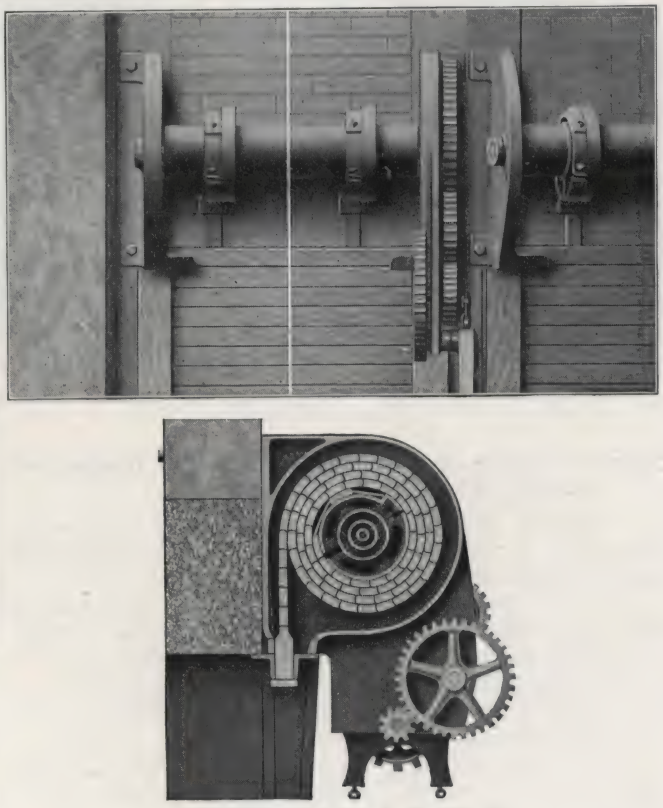
Made in long leaf yellow pine, cypress, quarter sawed oak and birch.

In ordering, specify and send sample of finish desired.

Slats Nos. 24 and 26 are for interior work; slat No. 27 for exterior work.

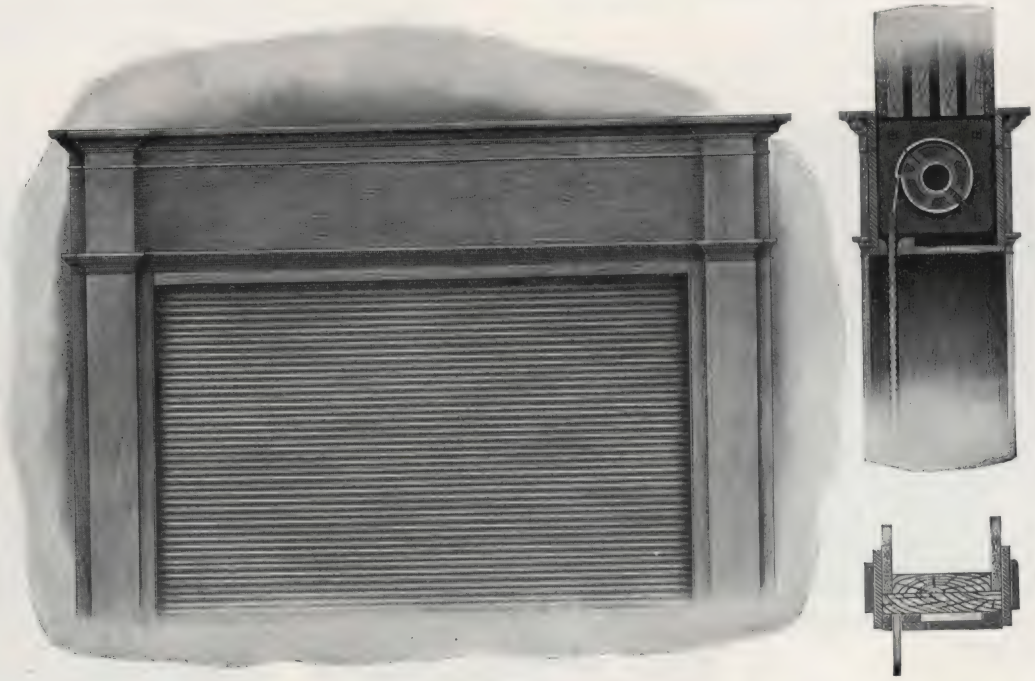
Illustration shows cross section through slats.

The opening through which the ribbon passes is so shaped that, during flexure of the curtain, there is no change in the relative length of the slats or curtain; nor is there any danger of pinching the ribbon.



CONSTRUCTION No. F. H. W. 22

Designed especially for roundhouses. Doors mounted on face of wall above opening; travel in grooves at sides. Counterbalanced by springs; operated by means of endless chain and reduction gear



CONSTRUCTION No. W. B. M. 10

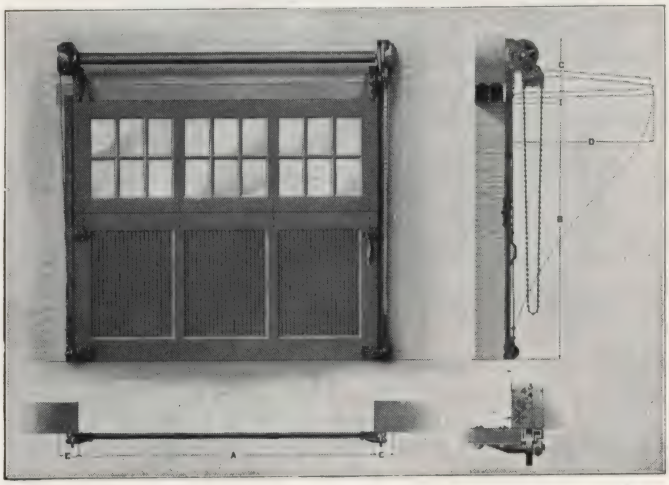
Application of wood rolling door for interior partition. Coil is concealed under lintel; operated by means of handle in bottom of rail. Mechanical operating devices are arranged for large doors. Can be concealed within the casing. Casing and grooves are not supplied, but should be included in general carpenter work.

Continued on next page

Bifolding Doors, Wood or Steel

In cases where light is desired through doors, the bifolding type lends itself readily to such condition. These doors may be constructed either of wood or steel, and are of two sections hinged at the center and pivoted at top of opening. The upper panel may be fitted with sash, giving a glass area of about two-thirds the total area of the panel.

Bifold No. 5—This is without doubt the most practical bifolding door now on the market, requiring less clearance at both head and sides of opening than do most other types.



BIFOLD NO. 5

CLEARANCES REQUIRED FOR BIFOLD NO. 5

Height	6′ 0″	7′ 0″	8′ 0″	9′ 0″	10′ 0″	11′ 0″	12′ 0″	13′ 0″	14′ 0″	15′ 0″
B	26½″	26½″	26½″	26½″	28½″	31″	33″	35″	35″	37″
C	3′ 10″	4′ 4″	4′ 10″	5′ 4″	5′ 11″	6′ 6″	7′ 1″	7′ 8″	8′ 2″	8′ 9″
D	8″	8″	8″	8″	8″	10″	10″	10″	10″	10″
E										

Dimension A should not exceed 18 ft; dimension B should not exceed 15 ft.

Kinnear Bifold No. 5 is designed with a spring counterbalance, eliminating the heavy counterweights usually used on this type of door. Steel cables connect the door to the counterbalancing device at the top of the opening. Bottom panel is fitted with rollers which travel in guides attached to wall and transmit the thrust.

The simplicity and sturdiness of the mechanism reduces maintenance to a negligible factor and renders quick and easy operation. Less side clearance is required as there are no counterweights. Send us a sketch showing conditions as they actually exist and we will show how this flexible construction adapts itself to other than standard conditions.

Kinnear panels are fabricated in our own factory from extra heavy materials and are built on a purely quality basis. Write for prices and catalogue.

Bifold No. 3—Designed for large openings. Panels are built in two sections. Upper section may carry glass if desired.

In operating, the lower section rises to half the height of opening. The door then breaks, and both sections move simultaneously, the lower edge vertically, the upper edge horizontally, on suspended tracks to a position above the opening.

Panels are entirely counterweighted and operated by means of reduction gearing and endless chain.

This type of door was used in the Boston, Brooklyn, and Charleston army bases by the United States government.

Panels can be constructed either of wood or steel.

BIFOLD NO. 3 IN OPEN POSITION

Vertical Sliding Doors

This type of door is particularly suitable for freight houses, piers and warehouses where light is essential through doors.

The door comprises two or more sections consisting of trussed frame covered with corrugated iron, hung independently with chains connected with counterbalance weights. Operated by means of endless chain and suitable reduction gearing.

Where doors are mounted on steel columns, guides and weight boxes should be incorporated as a part of the column, and should be supplied by the steel contractor, according to details supplied by our Engineering Department.

This type can also be supplied to be mounted on the face of the wall, in which case we furnish weight box and guides as part of the equipment.

It is advisable to procure definite information from the factory in connection with the above type of door.

VERTICAL SLIDING DOORS
Installed in Santa Fe freight shed

Continued on next page

Kinnear Power Units

THE KINNEAR MANUFACTURING CO., to meet a constantly growing demand for power operation in connection with Kinnear steel rolling doors when applied to openings of extreme sizes, and where frequent operation is required, have developed three distinct types of power units. While fundamentally the same in operation, the three types afford the opportunity of selecting a type most suitable for the condition in hand.

Kinnear power units are available for small openings on garages or mercantile establishments where frequent operation is desired, and on large railroad openings or crane openings where manual operation would be very difficult or entirely impossible.

Motor operation necessitates a door properly designed and carefully built. Kinnear doors, because of their sturdy character, lend themselves especially to motor operation.

We supply our doors and power units as a complete unit, assuming full responsibility not only for the quality of the material employed, but also for the workmanship, and for the erection and proper working of same where Kinnear erectors put up the work in the field.

Construction of Kinnear Power Units

Each power unit comprises motor, limit switches, reduction gear, manual (or emergency) operating mechanism, automatic starter, reversing and service switches; also a magnetic brake which is an integral part of the unit.

Limit Switches—Of our own design and manufacture and susceptible of precise adjustment.

Control the travel of the curtain, stopping it at the proper time; also actuate the magnetic brake and the automatic starter which breaks the circuit, stopping the motor.

Reduction Gear—Suitable reduction gearing enclosed in heavy cast iron housing. Cast iron and steel cut teeth, running in oil bath, the spray lubricating all bearings.

Bearings—All heavy bearings are bushed with bronze. Light bearings are babbitted.

Service Switches—Enclosed type of knife switches externally operated, safety type, are supplied as our standard equipment.

Kinnear Power Unit No. 1

This unit is designed for excessive loads and is so constructed that either power or manual operation is secured through the same gear. Either method may be employed without the shifting of clutches. The emergency chain is always in position to be used in absence of power.

Designed for extremely large openings.

Kinnear Power Unit No. 2

This type is designed for average sized openings.

In general it is similar to power unit No. 1, except that it is smaller and, further, that this type is essentially a power drive; manual operation is intended for emergency only. The emergency chain can be placed on sprocket in case of emergency, but when motor is employed, the chain should be removed.

Kinnear Power Unit No. 3

This unit is small and very compact and can be supplied in two designs, one mounted on bracket and the other to be mounted on wall or steel members.

It is designed for small openings in garages and buildings of a similar character.

Accessories

Wire, wiring, fuses or conduit are never included in our equipment and must be supplied and installed by others.

Necessary Information

In order to quote intelligently on motor operated doors, we must have the number and sizes of doors. Also a complete description of the current and the number of times the doors will be opened and closed each day.

Kinnear Motor Operated Doors—Practical and Efficient

Motor operation in connection with Kinnear steel rolling doors has grown in popularity for the very good reason that our power units are so designed that they are practically foolproof. They represent the finished product after years of experimental work by capable engineers and are sold with an absolute guarantee that if correctly installed and properly maintained, they will render a service 100% efficient.

One power unit will operate one door or a group of doors as a unit. Where hinged posts are used in dividing large openings, power units can also be used in operating them. Through interlocking switch and automatic locking devices, the entire side of a building may be opened up from any point desired by means of switches.

Push button control is available for individual doors, or for a group of doors operated as a unit. However, where doors and posts are both to be electrically operated we recommend the enclosed type of knife switches externally operated. Push button control is particularly suitable for garages where doors are operated frequently as the stations can be placed in office, or at any other suitable point, and be operated by any class of help, being as nearly foolproof as it is possible to make it. There is no chance of making a mistake; each operation follows in its logical sequence.

The doors under ordinary conditions will operate at the rate of 1 ft. per second.

In General

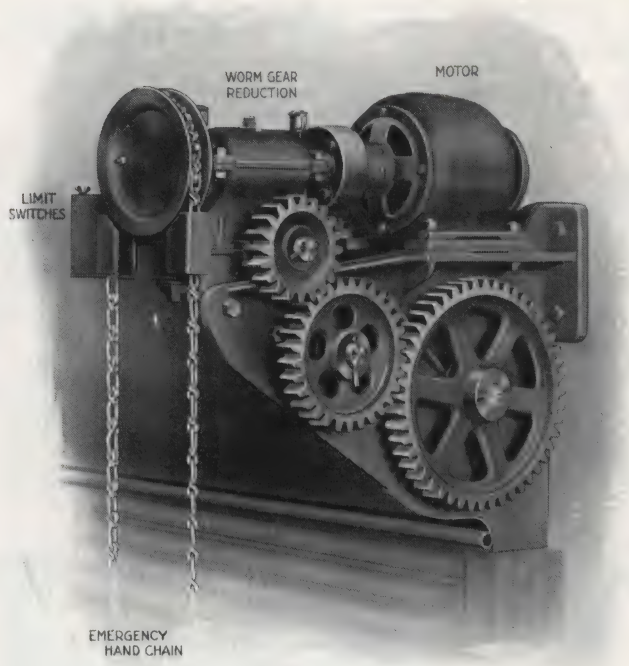
Kinnear power units are the result of years of painstaking effort, are compact, sturdy, and are long past the experimental stage.

Kinnear motor operated doors are in general use everywhere and are great time savers on large openings.

If you have door problems it will give us pleasure to help develop them.

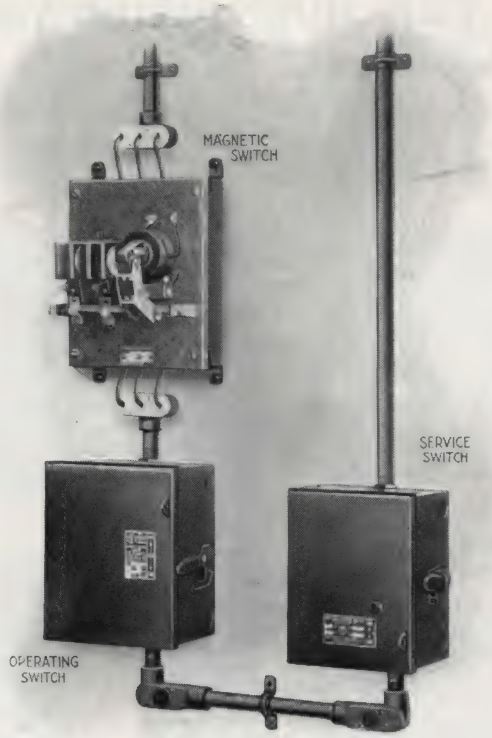
Write for detailed information.

Continued on next page



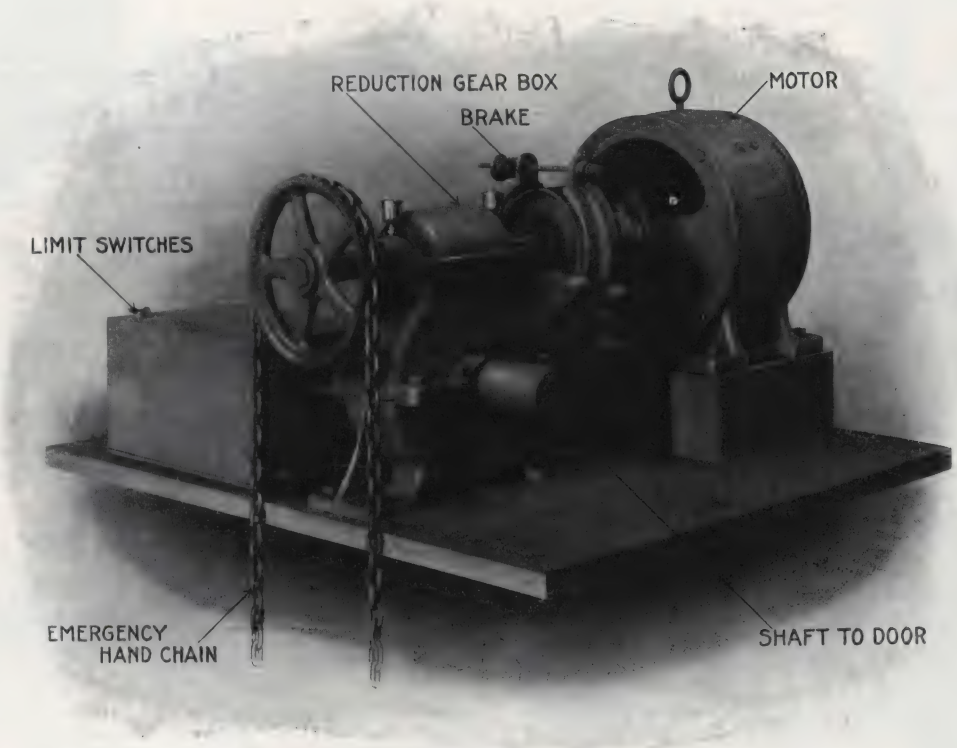
KINNEAR POWER UNIT NO. 3

Can be supplied as shown, mounted on wall, being flexible enough and compact enough to be used almost anywhere



ENCLOSED TYPE OF SWITCHES

Supplied as part of Kinnear equipment



KINNEAR POWER UNIT NO. 2

For large openings. Rugged, compact and complete; out of sight and out of the way. A silent servant ever ready to respond to the touch

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Labeled Metal Doors, Hollow Metal Windows and Other Sheet Metal Building Material

CINCINNATI, OHIO

Products

Manufacturers of "Mecco" Steel Rolling Doors and Shutters; "Mecco" Fireproof Kalamein Doors; "Mecco" Fireproof Metal Windows (patented); Marquises; "Mecco" Shingles, tin, galvanized or copper; "Mecco" Spanish Metal Tile.

Also, Tin Clad Doors, Shutters, Smoke Screens, Metal Ceilings, Cornices, Finals, Gutters, Painted and Galvanized Roofing, Siding and Corrugated Sheets, Skylights, "Mecco" Roof Ventilators (patented), and Garages.

TRADE-MARK

Underwriters' Approval

This company manufactures steel rolling doors, metal windows, kalamein and tin clad doors approved by the National Board of Fire Underwriters and bearing their labels.

Service

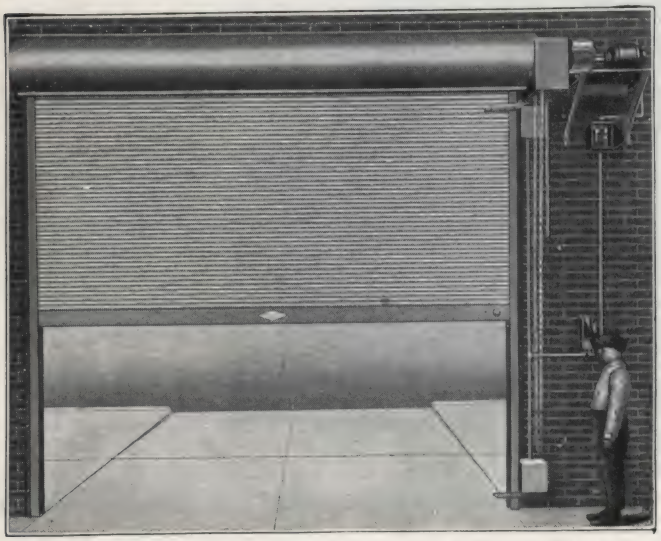
"Mecco" engineers and estimators will assist you cheerfully to solve fireproof door or window problems.

"Mecco" Steel Rolling Doors

Service Type—Doors of this type are designed for the effective closure of openings against weather and intrusion, where it is desirable to have a service door occupying a minimum amount of space.

TYPES OF SERVICE DOORS

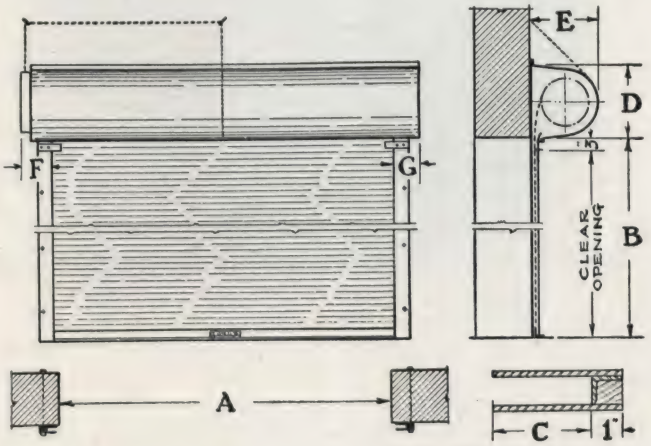
No.	Type of Operation	Wall Mounting
2	Manual	Face of wall
2-A	Manual automatic	Face of wall
4	Manual	Within opening
4-A	Manual automatic	Within opening
6	Chain	Face of wall
6-A	Chain automatic	Face of wall
8	Chain	Within opening
8-A	Chain automatic	Within opening
12	Crank	Face of wall
12-A	Crank automatic	Face of wall



A "Mecco" Motor Operated Door in the Public Garage, Louisville, Ky.

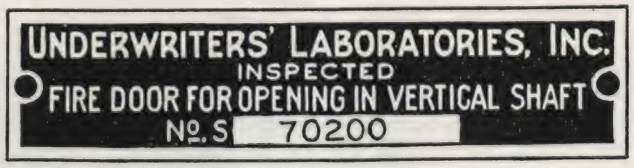
No. 100 Labeled Type—This door is constructed primarily as a fire retardant and is labeled by the National Board of Fire Underwriters as such. It incorporates, however, all the desirable features of our closure doors.

It is designed for face of wall erection and is labeled for: "fire walls," "vertical shaft" and "corridor or room partitions."



Dimension Diagrams, "Mecco" No. 100 Door

A—width, ft.	C, in.	F, in.	G, in.	B—height, ft.	D in.	E, in.
0 to 6	2	6½	5½	0 to 5	14	12½
6 to 8	2½	7	6	5 to 7	16	14½
8 to 10	3	7½	6½	7 to 10	18	16½
10 to 12	3½	8	7	10 to 12	20	18½



Underwriters Label

This label on "Mecco" doors is evidence that you are getting the best in fire protection and construction that the market affords

Underwriters' Requirements—For the convenience of engineers and architects we are giving a skeleton specification of the requirements of the National Board of Underwriters for rolling steel doors. These doors are all automatic closing and the specifications governing square foot area, gauge of curtain, etc., must be adhered to.

Maximum area of labeled doors permitted by the underwriters for interior openings is 80 sq. ft. Maximum width or height is 12 ft.

Metal in curtain for "vertical shaft," "corridor or room partitions" must be No. 20 gauge galvanized.

For "fire walls" metal in curtain must be No. 16 gauge galvanized.

One door is required for opening in "vertical shaft" or "corridor or room partitions."

Two doors are required for opening in "fire walls."

Slat Construction—The attention of engineers and architects is especially directed to the center member of the slat. Any pressure, wind or otherwise, exerted against the door is effectively resisted by this formed Z-bar.

The ends of the slats are thoroughly protected by malleable iron castings riveted to the end of the slats.

Slat Construction "Mecco" Steel Rolling Doors

Continued on next page

Erection—"Mecco" rolling doors are exceptional in that they can be erected with ease by ordinary mechanics. We furnish full instructions.

Operation—Three methods are employed to operate "Mecco" steel rolling door:

Manual—By means of handle at bottom of door.

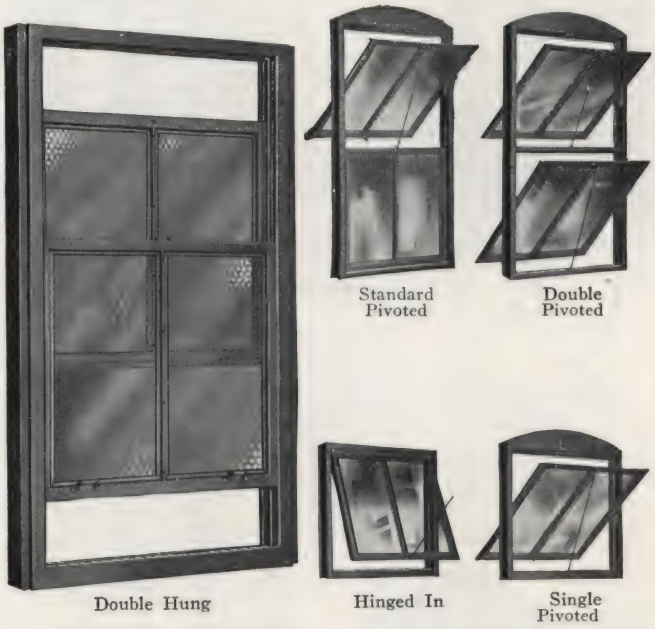
Mechanical—By means of endless chain, sprocket and gear; or crank, shaft and gear.

Power—By means of electric motors.

"Mecco" Hollow Metal Windows

We manufacture a complete line of windows of every type, labeled by the National Board of Underwriters.

Special Features—Our double hung windows are designed primarily for high class office and similar buildings. An adjustable feature (patented) between the frame and sash makes it possible to operate the sash perfectly and yet be sufficiently tight to be absolutely weatherproof.



"Mecco" Hollow Metal Windows

Marquise

A "Mecco" marquise is artistic and attractive in design and is a distinct ornament to any building. Architects should send for designs and incorporate them in their plans.

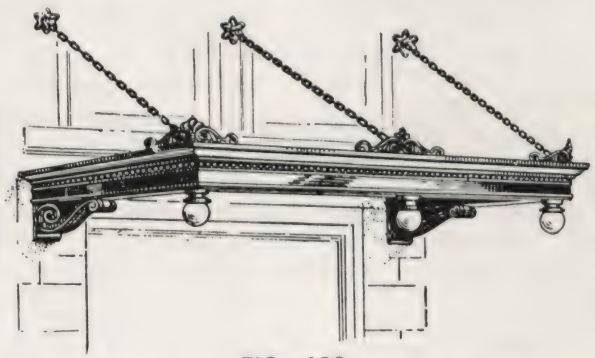


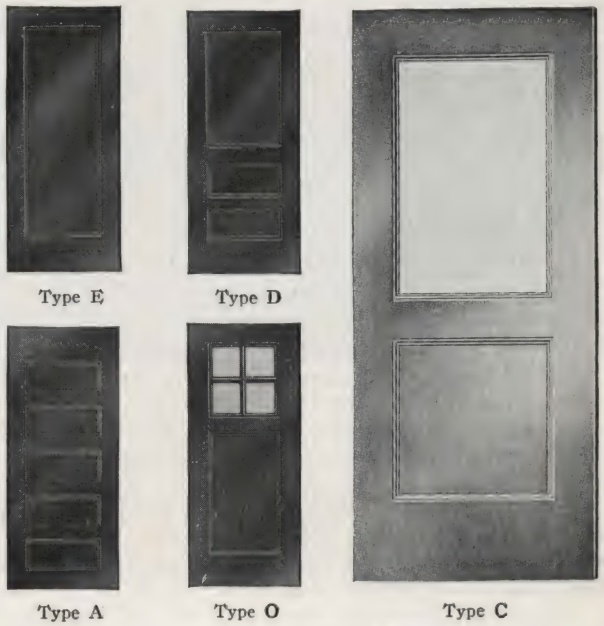
FIG. 420

Marquise

"Mecco" Kalamein Doors

Made in both labeled and unlabeled construction. Standard or special designs. Doors have wood cores covered with steel or copper as desired.

They can be furnished with metal covered wood or steel frames, the latter either hollow or solid. Furnished with prime or any desired baked grained finish.



"Mecco" Kalamein Doors

"Mecco" Spanish Tile

This roofing is an exact reproduction of the terra cotta clay tile at a greatly reduced cost. Considerable saving is effected in the cost of the roof structure as the weight of "Mecco" Spanish tile is but one-tenth of that of the clay tile. They are not affected by weather conditions and are adapted to all climates. Made in painted tin, galvanized steel, and copper.

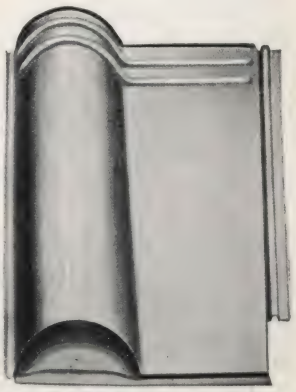


Fig. No. 232—Spanish Tile

"Mecco" Metal Shingles

Artistic and durable, fire proof and lightning proof. Made in painted tin and galvanized steel. Stock size 10x14 in.

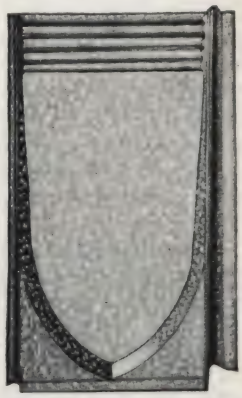


Fig. No. 58—Ideal Shingle

VAN KANNEL REVOLVING DOOR CO.

TELEPHONE
CIRCLE 1876, 1877 AND 1878

250 West 54th Street
NEW YORK, N. Y.

BRANCH OFFICES

ALBANY, N. Y., 58½ S. Pearl Street
ATLANTA, GA., Candler Building
BIRMINGHAM, ALA., 1011 Empire Building
BOSTON, MASS., 1042 Little Building
BUFFALO, N. Y., 705 Mutual Life Building
CANTON, OHIO
CHARLESTON, W. VA., 209 Hale Street
CHICAGO, ILL., 1119 Chamber of Commerce
CINCINNATI, OHIO, 534 Main Street
CLEVELAND, OHIO, Schofield Building
COLUMBIA, S. C., L. & E. Bank Building
COLUMBUS, OHIO, 51 Columbia Building
DALLAS, TEX., 605 Slaughter Building
DENVER, COLO., 1740 Champa Street
DES MOINES, IOWA, Arts Building
DETROIT, MICH., 400 Penobscot Building
EL PASO, TEX., NEFF STILES CO.
ERIE, PA.
HARRISBURG, PA.
INDIANAPOLIS, IND., 1130 Hume-Mansur Building
KANSAS CITY, MO., 401 Mutual Building
KNOXVILLE, TENN., P. O. Box 350
LOS ANGELES, CAL., 331 E. 4th Street
LOUISVILLE, KY., 114 So. 4th Street
NASHVILLE, TENN., 1025 Hamilton Street
NEW ORLEANS, LA., 308 Tchoupitoulas Street
NORFOLK, VA., Monticello Arcade Building
OMAHA, NEBR., 707 So. 27th Street
PHILADELPHIA, PA., 305 Otis Building
PITTSBURGH, PA., 413 Fourth Avenue
PORTLAND, ME., 31½ Exchange Street
PORTLAND, OREGON, Blake-McFall Building
RALEIGH, N. C., 313 S. Wilmington Street
RICHMOND, VA., 203 Real Estate Exchange Building
ST. LOUIS, MO., Century Building
ST. PAUL, MINN., 615 Ryan Annex
SALT LAKE CITY, UTAH, 204 Dooly Building
SAN ANTONIO, TEX., 1219 City National Bank Building
SAN FRANCISCO, CAL., 523 Market Street
SEATTLE, WASH., 508 Westlake Avenue
SPRINGFIELD, ILL., 219 So. 4th Street
WASHINGTON, D. C., 232 Woodward Building
WILKES-BARRE, PA., Miners Bank Building
WINNIPEG, CAN., 402 Builders Exchange Building

Products

Manufacturers of three distinct types of REVOLVING DOORS, known under the following terms: AUTOMATIC COLLAPSIBLE, PANICPROOF TYPE; STANDARD "C" RIGID BRACE ARM TYPE; STANDARD "N" RIGID BRACE ARM TYPE.

VAN KANNEL REVOLVING DOORS are manufactured in various styles, using the above types. The styles of doors are as follows: 3-Wing Revolving Door; 4-Wing Revolving Door and 6-Wing Revolving Door.

BUILDING DIRECTORIES and BULLETIN BOARDS.

Also manufacturers of Van Kannel Revolving Pantry Windows (Patented).

For Van Kannel Automatic Exit Devices, see page 1322.

Original Patentee

This company is the pioneer manufacturer and original patentee of revolving doors; its patents cover every practical improvement and substantial feature.

Architects may spare their clients expense and embarrassment from patent litigation by specifying Van Kannel doors.

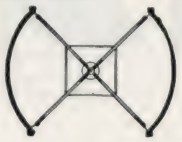
Van Kannel Revolving Doors

Automatic Collapsible Panicproof Type—This type of door has 3, 4, or 6 wings hung independently of each other on a central shaft of metal and the wings are held together by flexible cables. This type of door is rapidly superseding the old rigid brace arm type, owing to its feature of absolute safety at all times and under all conditions. Its safety feature lies in the fact that the revolving wings are so arranged that by the application of pressure to any part of the revolving structure, slightly more than is necessary to revolve the door, the revolving wings will instantly and automatically collapse and fold outwardly in the line of egress, leaving a free, unobstructed passageway.

AUTOMATIC COLLAPSIBLE PANICPROOF DOOR
Collapsed position. Wings folded in line of egress in case of fire or panic

Specifications—These specifications cover only the automatic collapsible panicproof type, which is the most modern type and should be used wherever revolving doors are desired.

Provide and install, where shown on drawings, revolving doors of the automatic collapsible panicproof type, manufactured by the VAN KANNEL REVOLVING DOOR CO. Revolving wings to be hung independently of each other on a central shaft, and held in a radial position by means of flexible bronze cables, and to be so arranged that, by application of unusual pressure to any part or parts of any 2 of the revolving wings, wings will automatically collapse and fold flat on each other in an outward position. Revolving wings to be hung from a self-oiling ball bearing located above ceiling in a removable carriage, and be so arranged that they may be released from the central position to one side of opening. All hardware to be solid bronze. Glazing to be American polished plate. The revolving door contractor to furnish the revolving wings, circular walls, ceilings and cornice.



Wings in Revolving Position, Excluding Wind, Snow, Dust and Noise

Locked Position. Locking Bolts Operative from Either Side of Vestibule

Side Full Open Position. Wings Folded Within Vestibule Walls

Special Full Open Position, Utilizing Exit Space for Summer Use

Central Open Position. Commonly Used in Summer for Dividing Traffic

DIAGRAMS OF VARIOUS POSITIONS OF WINGS

Rigid Brace Arm Type, Styles "C" and "N"—These two types consist of either 3, 4 or 6 wings, held together in their radial position by rigid braces; the wings are collapsed only by means of pressing a spring when it is desired to have the doors open in the middle, or pushed to one side for a wide open passageway. These types, although collapsible as to the folding of the wings, are not automatically so, as in the case of the automatic collapsible panicproof type of door previously described.

Hinged Wall Construction—The hinged wall construction may be used wherever greater exit space is desired. The hinged sections flex back automatically, and when used in connection with the automatic collapsible revolving wings represent the most perfect type of revolving door.

HINGED WALL CONSTRUCTION
Full open position. The position used for a wide open passageway and for moving in freight or for summer-time use

3-Wing Revolving Door—The 3-wing revolving door is especially adapted for entrances that are too

Continued on next page

small to accommodate a 4-wing door at least 6 ft. in diameter. It is being used to a great extent in entrances to toilet rooms in schools, institutions and public buildings and the company has installed 34 of these doors for the new Prudential building, Newark, N. J. Approximately 5 ft. diameter.

Materials—Materials used for entire construction are any kind of hardwood, bronze or steel on a metal frame or wood core covered with various gages of metals in either copper, steel or bronze, using the following gages—Nos. 24, 20, 16.

Revolving door vestibules may be made of other materials such as marble, tile or cement as the requirements may be needed in order to carry out architectural treatments.

Designs 1192-1 and 1192-2
1192-1 as shown
1192-2 same with glass panels in walls

Designs 1192-3 and 1192-4
1192-3 as shown
1192-4 same with glass panels in walls

Van Kannel Revolving Door Co. Stock Designs

A	B	C
6′ 0″	24½″	28¼″
6′ 6″	26⅝″	30⅜″
7′ 0″	28¾″	32½″
7′ 6″	30¾″	34⅝″
8′ 0″	32⅞″	36¾″

Dimension Diagram

Stock Designs — Several stock designs are carried on hand in plain and quartered oak, birch and mahogany, on which practically immediate delivery can be quoted.

Better Entrances—In every field of activity in practically every industry, the truth is known that Van Kannel doors provide better entrances.

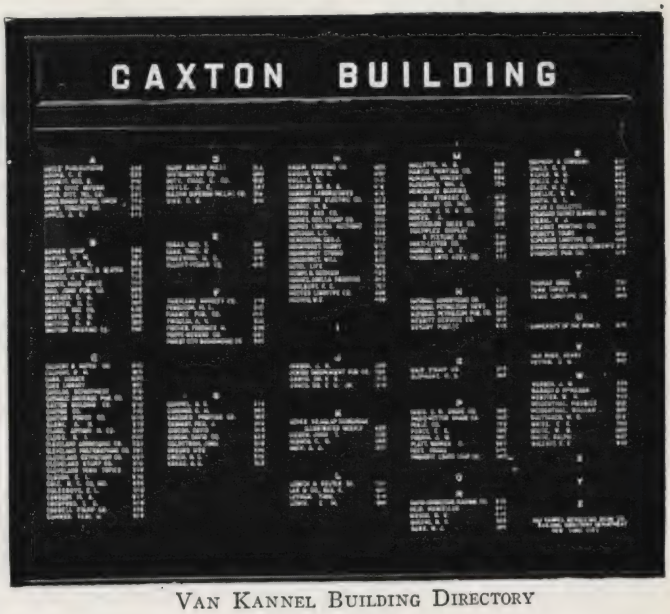
Installation of Van Kannel Revolving Doors

Building Directories and Bulletin Boards

Van Kannel directories and bulletin boards are made up of removable strips of white letters on a black background, making a uniform arrangement, perfect in alignment and properly spaced.

In making changes, it is only necessary to remove the section frame by the use of a key, leaving all name strips in place, so that one is always working from the front, making it impossible for any alphabetical mistakes.

This process of changing is the simplest construction on the market, and it is the only directory which permits changes to be made with one operation, and allows the directory board to be in full use during the time the changes are being made.



Van Kannel Building Directory

Sections 7½x16 In.

No. of sections	2	3	4	5	6	7	8
Capacity No. 1*	80	140	200	260	320	380	440
Capacity No. 2*	50	90	130	170	210	240	280

Sections 7½x32 In.

No. of sections	2	3	4	5	6	7	8
Capacity No. 1*	110	180	260	330	400	480	510
Capacity No. 2*	75	125	175	225	275	320	350

*No. 1 Strip is ⅜ in. wide.
*No. 2 Strip is 1/16 in. wide.
Tables figure capacity. Alphabet space allowed in addition.

Frame Designs—Van Kannel frames are manufactured to meet every architectural requirement as to design and space in order to comply with the various ornamental treatments as desired.

Frames are made in bronze, steel and wood.

Finish—Bronze frames are finished to meet specified requirements.

Steel frames are finished by sand blast process, with baked enamel finish in any color to match requirements, and on account of this expensive finish it needs no refinishing after installation.

Sections—The sections are made of cold rolled steel in the following standard sizes: 7½x22 in.; 7½x26 in., and 7½x32 in. (special sizes when required).

The sections are fitted with glass, plain or beveled, as desired.

Removable Strips—Removable strips are made of dull black paper and white letters.

Stock Designs—The company carries on hand several stock designs in plain oak, mahogany, steel and bronze, on which it can quote for practically immediate delivery.

References—
Singer Building, New York, N. Y.
Wall Exchange Building, New York, N. Y.
Central Building, New York, N. Y.
Union Arcade, Pittsburgh, Pa.
Vinton Building, Detroit, Mich.
Spitzer Building, Toledo, Ohio
Union Trust Co., South Bend, Ind.
American National Bank, San Diego, Cal.
And many others.

REVOLVING DOORS, INC.

TELEPHONE
CHELSEA 4610

556 West 27th Street
NEW YORK, N. Y.

OFFICERS

A. H. BURGESS, PRESIDENT — J. F. SCHWAB, VICE-PRESIDENT AND SECRETARY — J. H. VALENTINE, TREASURER

DIRECTORS

A. H. BURGESS and W. D. MITCHELL (Directors of Jno. Williams, Inc.), and JOHN E. CARLSON (Manhattan Wood Working Co.)

Products and Services

REVOLVING DOORS of every description and of any desired material.

Specialists in all Mechanical Devices as applied to Revolving Doors. Complete installations contracted for anywhere in the United States and Canada.

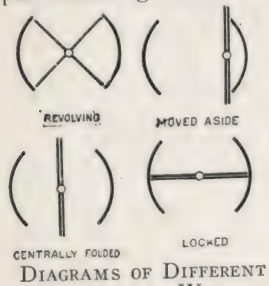
This company supplies Fixtures for Revolving Doors to manufacturers of cabinet work, kalamein work, hollow steel and architectural bronze work, together with construction details and, if desired, assembling and erecting labor.

Automatic Panicproof Revolving Door

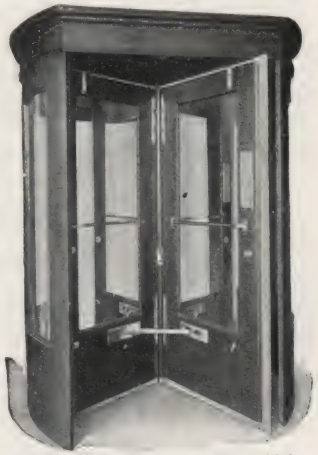
Wings are suspended from a universal ball bearing located in a dustproof oil chamber mounted on a carriage running on tracks. The wings can be folded centrally and moved to one side in the usual manner.

Each wing is hung to the center post with spring hinges, which hold it under spring control when the braces are detached, preventing slamming of the wings against each other and breaking the glass, which happens in other panicproof revolving doors.

The Slip-Bar—The braces which hold the wings in rotating position are the vital feature of a panicproof door. This company uses neither cables nor chains, but manufactures the only slip-bar brace that pushes or pulls out under undue pressure. Brace is positive in action, durable, and conforms to all building and fire department regulations.



DIAGRAMS OF DIFFERENT POSITIONS OF WINGS



STANDARD DESIGN NO. 106, PANICPROOF SLIP-BAR CONSTRUCTION

Adapted to slight architectural changes. Any material; any wood or hardware finish; kick plates and key locking bolts when desired

Some Recent Installations

The following is a list of some recent installations with the names of the architects and contractors who were connected with the work:

NEW YORK CITY

Stanford White Memorial—Library Building, New York University, McKim, Mead & White, Architects

Guaranty Trust Co., Fifth Avenue and 44th Street (2 doors), Cross & Cross, Architects

Bowling Green Building, 9 Broadway (2 doors)

Excelsior Savings Bank, 221 West 57th Street, Randolph H. Almiroty, Architect; James M. Simpson Co., Inc., Contractors

American Telephone & Telegraph Building, Broadway and Fulton Street (5 doors), Welles Bosworth, Architect; Marc Eidlitz & Son, Contractors. Installed for Norman-Seton, Inc.

New York Stock Exchange, Broad and Wall Streets (2 doors), Trowbridge & Livingston, Architects; Marc Eidlitz & Son, Contractors

Standard Oil Building, New & Beaver Streets, Carrere & Hastings, Shreve, Lamb & Blake, Architects; Charles T. Wills, Inc., Contractors

Office Building 114 East 23rd Street, James S. Hunter, Equipment Engineer. Installed for Tiffany Studios

East Brooklyn Savings Bank, Bedford and DeKalb Avenues, Brooklyn, Koch & Wagner, Architects. Installed for Hecla Iron Works

The State Bank, Van Siclen and Blake Avenues, Brooklyn, Herbert R. Mainzer, Architect; Wills, Egelhof Co., Inc., Contractors

Fulton Savings Bank, 375 Fulton Street, Brooklyn, Voss & Lauritzen, Architects; Caye Construction Co., Contractors

Union Exchange National Bank, Fifth Avenue and 30th Street, York & Sawyer, Architects; Geo. Backer Construction Co., Contractors

Broad Exchange Building, 25 Broad Street (7 doors)

Municipal Building (9 doors), Department of Plant and Structures

OTHER LOCALITIES

Asbury Park & Ocean Grove Bank, Asbury Park, N. J., I. R. Taylor & Co., Contractors

Prunty Building, Clarksburg, W. Va., Edward J. Wood & Son, Architects

Eastman School of Music, Rochester, N. Y., McKim, Mead & White, and Gordon & Kaelber, Architects; Hopeman Bros., Lumber & Manufacturing Co., Contractors

Public Bathhouse, Clifton Avenue, Newark, N. J., James S. Pigott, Architect; Frank Briscoe Co., Contractors

Trust Company of New Jersey, Sip and Bergen Avenues, Jersey City, N. J., Clinton & Russell, Architects; Hegeman-Harris Co., Inc., Contractors

Grace Dodge Hostel, Washington, D. C., Duncan Candler, Architect; William Crawford, Contractor

Hartford Fire Insurance Co., Hartford, Conn., Edwin Sherrill Dodge, and Parker, Thomas & Rice, Architects; Marc Eidlitz & Son, Contractors

Malden Savings Bank, Malden, Mass., Monks & Johnson, Architects; Gascoigne & Linenthal, Contractors

Ritz Carlton Hotel, Atlantic City, N. J., Warren & Wetmore, Architects; Thompson-Starrett Co., Contractors

Standard Oil Building, Albany, N. Y., H. D. Best Co., Builders & Engineers.

Bank of Buffalo, Buffalo, N. Y., McKim, Mead & White, Architects; John W. Cowper Co., Contractors

Hotel Grunewald, New Orleans, La., Toledano, Wogan & Bernard, Architects; George J. Glover, Contractor

BRONZE REVOLVING DOOR, CHEMUNG CANAL TRUST CO., ELMIRA, N. Y.

DENNISON & HIRONS, Architects
Ornamental work done by Jno. Williams, Inc.

CAMPBELL METAL WINDOW CORPORATION

8 West 40th Street
NEW YORK, N. Y.

BALTIMORE, MD., Scott and McHenry Streets — ALBANY, N. Y., 405 North Pearl Street

Products

CAMPBELL SOLID METAL WINDOWS: Double Hung and Casement.

Campbell Solid Metal Windows

The CAMPBELL METAL WINDOW CORPORATION is the successor to the Campbell Architectural Iron Co., Inc., established in 1889 by Harry E. Campbell, which has furnished metal windows, ornamental iron and bronze in many buildings throughout the United States.

The Campbell window meets all the requirements of modern buildings in durability, ease of operation and weathertightness.

Campbell window details are patented in the United States, England and Canada.

Model No. 88 Double Hung Window—All parts of the sash and frame, as indicated on detail drawings, are formed of No. 12 gage blue annealed steel, the balance of No. 16 gage. Sills and stools are an integral gray iron casting, inside edge of stool finished with a moulded nosing as detailed. Pulley housings are of cast iron. Sash weights are single-unit castings. Chains are of steel, hot galvanized, with galvanized connectors to sash and weights. Rubbing strips on each jamb at ends of meeting rails are of bronze. Screws are standard machine No. 10-24 steel with heads as detailed.

Installations

BUILDING AND LOCATION	NUMBER OF WINDOWS
Hotel Pennsylvania, New York, N. Y.	3340
Hanna Building and Annex, Cleveland, Ohio	1751
Travelers Insurance Co., Building, Hartford, Conn.	1032
National Association Building, New York, N. Y.	1218
Standard Oil Co. Building, Baltimore, Md.	930
Fisk Building, New York, N. Y.	1378
Ambassador Hotel, New York, N. Y.	868
Barrett Building, New York, N. Y.	987
Borden Building, New York, N. Y.	864
Hartford Connecticut Trust Co. Building, Hartford.	520
Cunard Building, New York, N. Y.	2344
Harkness Memorial Quadrangle, Yale University, New Haven, Conn.	3431
Munson Building, New York, N. Y.	1142
Three Hundred Park Avenue, New York, N. Y.	1578
Canadian Pacific Building, New York, N. Y.	2077
Liggett Building, New York, N. Y.	917
Cleveland Discount Building, Cleveland, Ohio	713
New York Stock Exchange Addition, New York, N. Y.	570
New York Standard Oil Addition, New York, N. Y.	862
Hotel Plaza Addition, New York, N. Y.	712
Keith Theater Building, Cleveland, Ohio	1081
Hotel Statler, Buffalo, N. Y.	1708
Bar Association Building, New York, N. Y.	607
New York Cotton Exchange, New York, N. Y.	681
Pershing Square Building, New York, N. Y.	1150
Park Square Building, Boston, Mass.	1368
Business Men's Club, Cincinnati, Ohio	365
First National Bank, Boston, Mass.	743
Macy Addition, New York, N. Y.	573
Agricultural Building, Raleigh, N. C.	199
Genesee Building, Buffalo, N. Y.	576
Claman Hotel, New York, N. Y.	1436
Federal Reserve Bank, Minneapolis, Minn.	102
Maiden Lane & William Street Building, New York.	615
Atlas National Bank, Cincinnati, Ohio	231
Dodge Building, New York, N. Y.	390
Union Trust Building, Cleveland, Ohio	3845

Assembly bolts are ⅜-in. diameter steel, hook heads, square nuts.

Model No. 87 Double Hung Window—Materials entering into the construction of Model No. 87 are essentially the same as described for Model No. 88, with the exception that the sash members are made of No. 14 gage steel and parts of the frame (as indicated on detail drawing) are formed of No. 20 gage blue annealed steel; staff bead of No. 12 gage steel. Sills are of No. 12 gage drawn steel, galvanized after fabricating.

Assembly—Sash frames have mitered and welded corners. Glazing strips are mounted with screws on interior. Members forming jambs and head boxes are welded together. Hook bolts are used to assemble the frames which are shipped with sash, pulleys and chains installed.

Finish—The parts of boxes and sash in sliding contact are heavily galvanized after fabrication. All parts of the windows receive a coat of best quality paint before assembly.

Hardware—All finish hardware is solid bronze, polished and unlacquered.

Labels—When required, windows are made in accordance with the regulations of the National Board of Fire Underwriters and bear their label.

Bronze Windows

All types are made in bronze if desired.

ARCHITECT	BUILDER
McKim, Mead & White	George A. Fuller Co.
Charles A. Platt	John Gill & Sons
Donn Barber	Marc Eidlitz & Son, Inc.
Starrett & Van Vleck	Fred T. Ley & Co.
Clyde N. Friz	J. Henry Miller, Inc.
Carrère & Hastings and Shreve, Lamb & Blake, Associated	Fred T. Ley & Co.
Warren & Wetmore	Thompson-Starrett Co.
Warren & Wetmore	George A. Fuller Co.
Buchman & Kahn	Cauldwell-Wingate Co.
Benjamin W. Morris	Marc Eidlitz & Son, Inc.
Benjamin W. Morris, Carrère & Hastings and Shreve, Lamb & Blake, Associated	Todd, Irons & Robertson
James Gamble Rogers	Marc Eidlitz & Son, Inc.
Kenneth Murchison	George A. Fuller Co.
Warren & Wetmore	Thompson-Starrett Co.
A. D. Pickering and Starrett & Van Vleck	Wm. J. Taylor & Co.
Carrère & Hastings and Shreve, Lamb & Blake, Associated	Fred T. Ley & Co.
Walker & Weeks	Graig-Curtiss Co.
Trowbridge & Livingston	Marc Eidlitz & Son, Inc.
Carrère & Hastings and Shreve, Lamb & Blake, Associated	Charles T. Wills, Inc.
Warren & Wetmore	George A. Fuller Co.
C. W. & Geo. L. Rapp	The Lundoff-Bicknell Co.
Geo. B. Post & Sons	Hotels Statler Co., Inc.
Severance & Van Allen	Charles L. Fraser
Donn Barber	George A. Fuller Co.
York & Sawyer and John Sloan	Charles T. Willis, Inc.
Densmore & LeClear	W. A. & H. A. Root
Garber & Woodward	J & F. Harig Co.
York & Sawyer	Stone & Webster
Robert D. Kohn	Marc Eidlitz & Son, Inc.
H. A. Underwood and Nelson & Cooper	J. E. Beaman
Edw. B. Green & Sons	Turner Construction Co.
Gronenberg & Leuchtag	Henry Claman
Cass Gilbert	C. F. Haglin & Sons
Cass Gilbert	Thompson-Starrett Co.
Tietig & Lee	Wm. Harig Co.
Shape, Breddy & Peterkin	Chas. L. Fraser
Graham Anderson Probst & White.	Thompson-Starrett Co.

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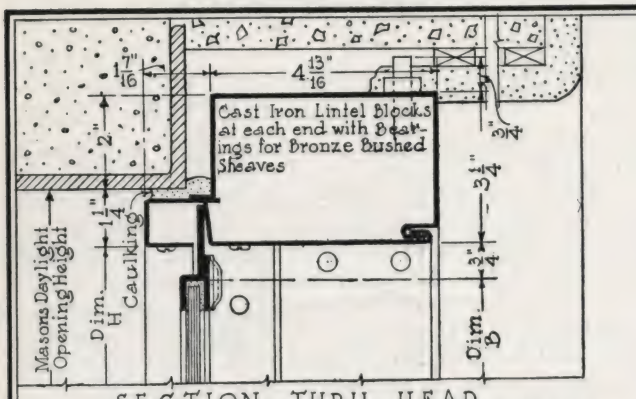
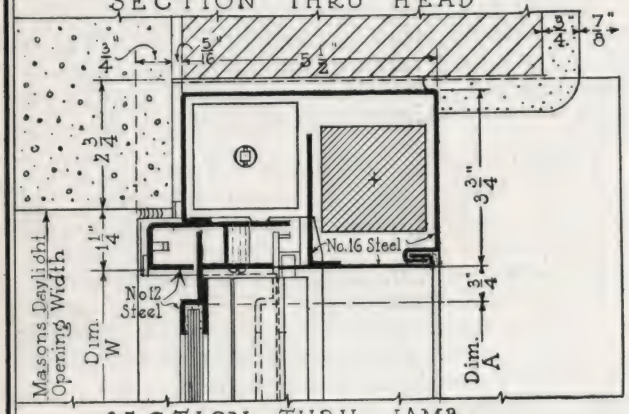
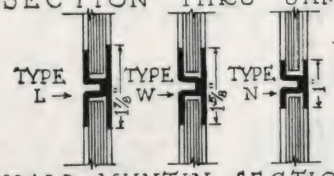


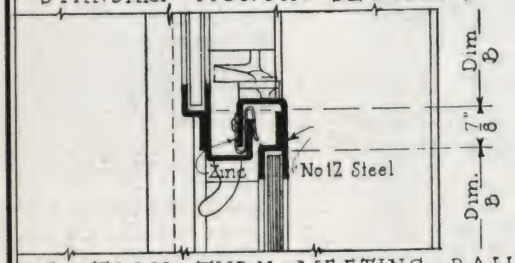
SECTION THRU HEAD



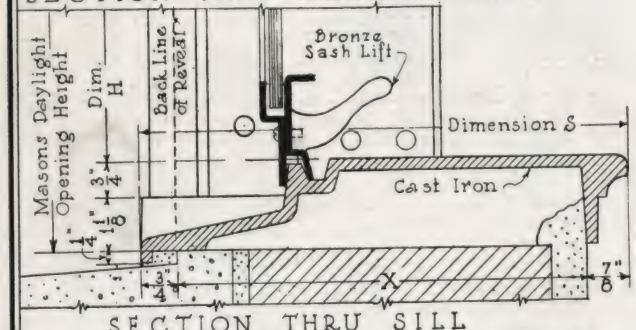
SECTION THRU JAMB



STANDARD MUNTIN SECTIONS

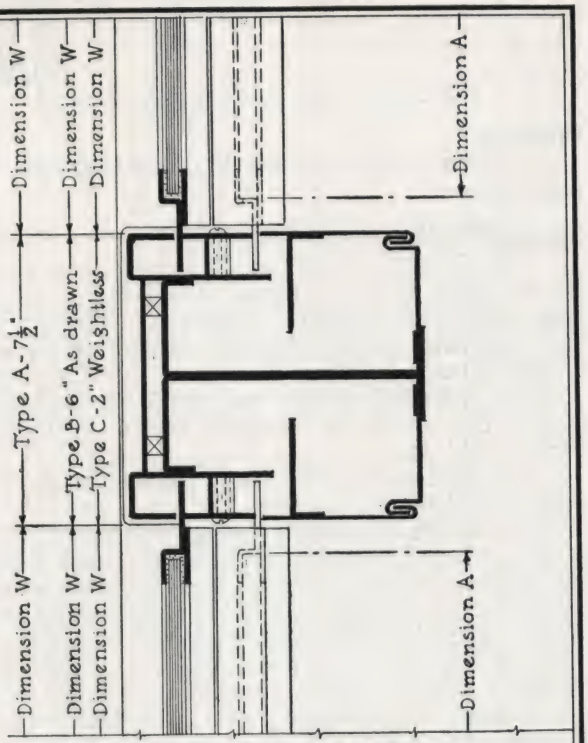


SECTION THRU MEETING RAILS



SECTION THRU SILL

NOTE- When ordering windows dimension X should be given as Cast Iron Stool is made in Widths to suit different conditions.



SECTION THRU STANDARD MULLION TYPES A, B & C

NEW YORK STANDARD OIL BUILDING, N.Y.C.

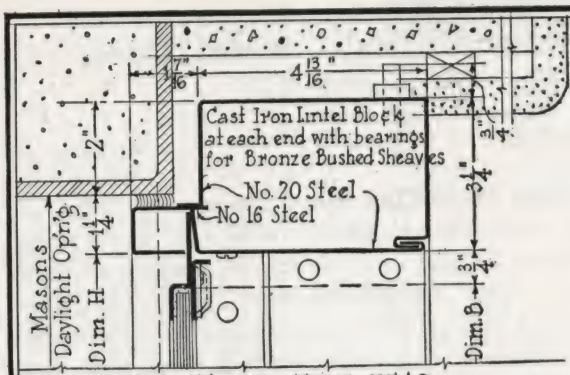
862 Campbell Metal Windows

CARRÈRE & HASTINGS, AND SHREVE LAMB & BLAKE, Asso. Archts.

CHARLES T. WILLS, INC Builder

DRAWN BY SWEETS CATALOGUE SERVICE INC.	STANDARD DETAILS OF CAMPBELL SOLID METAL WINDOW DOUBLE HUNG MODEL No 88	SCALE 3" EQUALS 1'-0" DATE JUN '22	DRWG 1

Continued on next page



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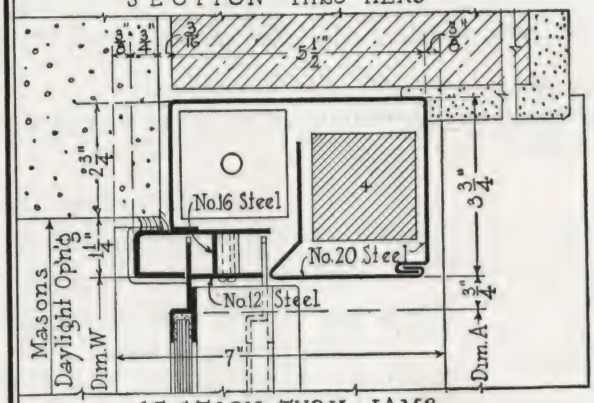
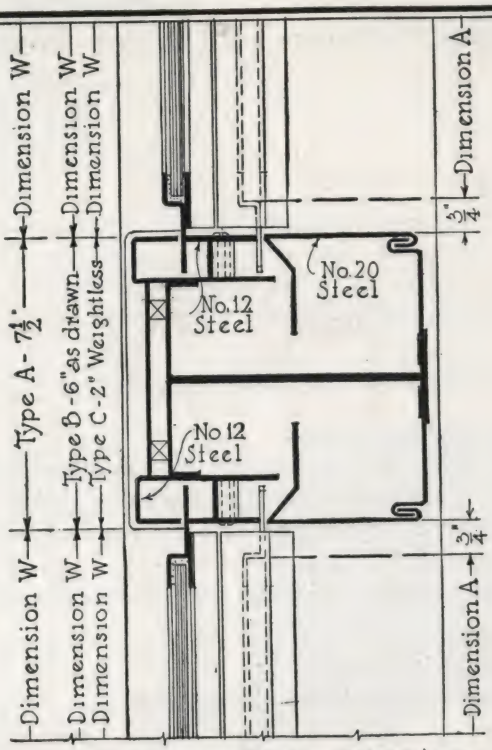
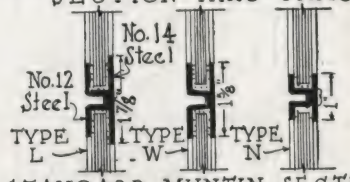


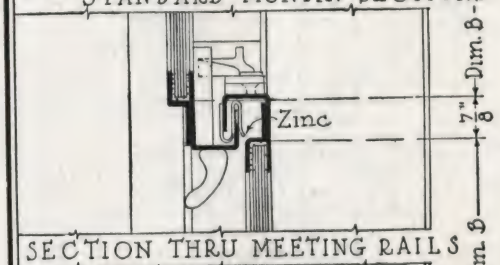
SECTION THRU JAMB



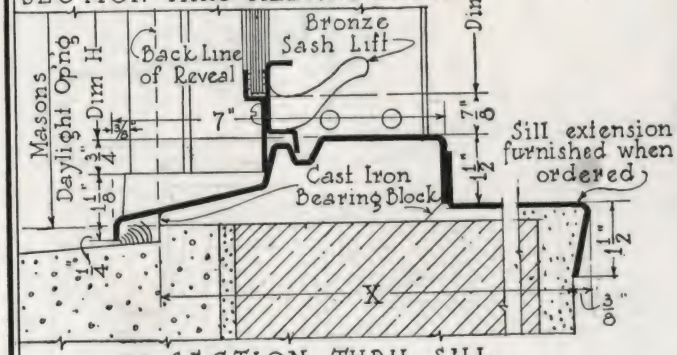
SECTION THRU STANDARD MULLION TYPE A & B



STANDARD MUNTIN SECTIONS



SECTION THRU MEETING RAILS



SECTION THRU SILL

NOTE- When ordering windows dimension X should be given as sill extension is made in widths to suit different conditions.

UNION TRUST BUILDING, CLEVELAND, OHIO
3845 Campbell Metal Windows
GRAHAM, ANDERSON, PROBST & WHITE, Archts.
THOMPSON-STARRETT CO. Builder

DRAWN BY SWEETS CATALOGUE SERVICE INC.	STANDARD DETAILS OF CAMPBELL SOLID METAL WINDOW DOUBLE HUNG MODEL No. 87	SCALE EQUALS 1-0 DATE JUN. 22.	DRWG 2

THOMAS LEE & SON CO.

Manufacturers of Hollow Metallic Windows and Metal Covered Doors

OFFICE AND FACTORY
118-132 West Second Street
CINCINNATI, OHIO

Products

LEE LABELED APPROVED HOLLOW METALLIC WINDOWS.

LEE METAL CLAD WOOD DOORS.

Also manufacturers of Labeled Tin Clad Fire Doors.

For Dampered Ventilators, see page 998.

Facilities and Experience

Not only does this company possess extensive factory space and the best of modern machinery, but all connected with the establishment have had years of practical experience.

Prompt shipment of goods is guaranteed to any part of the United States.

Lee Labeled Windows

Advantages and Superiority—The Lee windows are superior, owing to their simple construction, strength, perfect operation of sash, and general good appearance.

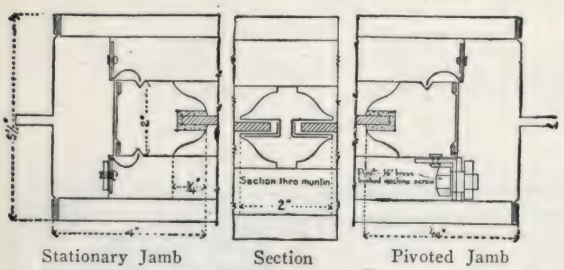
All sash, whether stationary, pivoted or double hung, can be easily set in or taken out of frames. Sash can be glazed by removing outside section and glazing strip of the top rail. No bolts are used in constructing the frame and sash of double hung type.

Adaptability—Lee metal windows are adapted for use in office buildings, hotels, theaters, factories, or any building in which the window openings must be protected.

Official Approval—All labeled windows must be made to conform to the sample that has been tested and approved by the National Board of Fire Underwriters.

The following styles of Lee hollow metallic windows are inspected and labeled by the National Board of Fire Underwriters before leaving the factory:

Double hung; top stationary, bottom sliding; single pivoted; double pivoted; stationary; upper pivoted, lower stationary; lower pivoted, upper stationary; hinged at top.



Stationary Jamb Section Pivoted Jamb

HORIZONTAL AND VERTICAL SECTIONS OF UPPER PIVOTED, LOWER STATIONARY WINDOW

Lee Labeled Metal Clad Wood Doors

Lee Underwriters' labeled metal clad wood doors are approved for use in corridors, fire escapes or room partitions. They are constructed of white pine, with asbestos core and galvanized steel covering. Furnished with or without labeled steel frames or wood metal clad frames and trim.

Made with metal or wire glass panels.

Guarantee

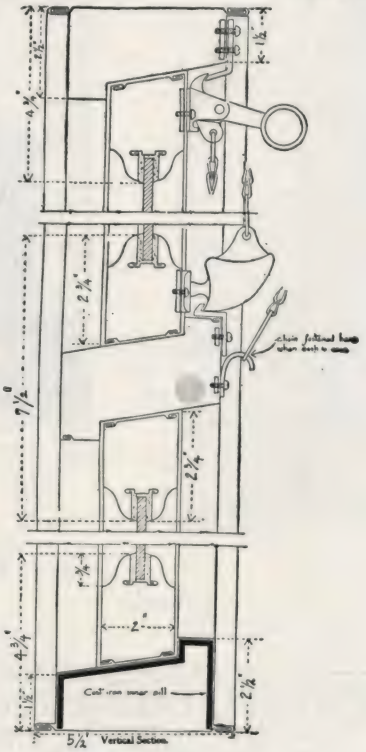
All products are guaranteed to be first class in every respect.

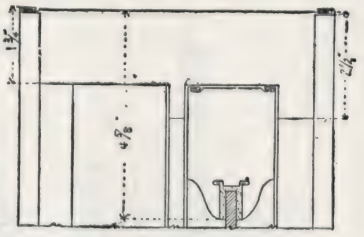
Prices

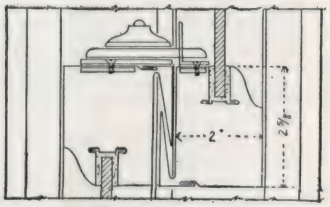
Prices will be quoted on receipt of plans and specifications or a list giving number and sizes of windows and doors wanted.

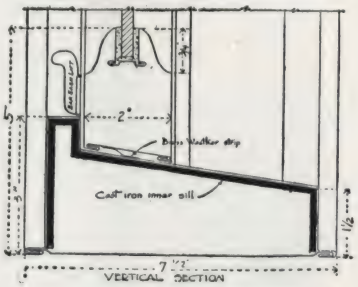
Specifications

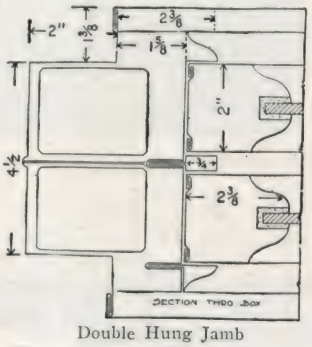
Printed directions, showing how to specify these windows and doors and how to provide for them in plans, will be sent to architects on request.











Double Hung Jamb

VERTICAL AND HORIZONTAL SECTIONS DOUBLE HUNG WINDOW

THE SYKES COMPANY

Art Metal Fireproof Windows, Doors and Trim

TELEPHONE
CANAL 0810

930 West 19th Place
CHICAGO, ILL.

Products

CORRUGATED STEEL ROOFING and SIDING; CORRUGATED WIRE GLASS; CORRUGATED ZINC ROOFING; SYKES SIPHON VENTILATORS; HOLLOW METAL FIREPROOF DOORS, FRAMES and TRIM; COMBINATION BUCK and JAMB; ROLLED STEEL WINDOWS; HOLLOW METAL WINDOWS; STEEL MOULDINGS; "WILSON REVERSO" WINDOW.

Also Casement, Pivoted, Standard Pivoted, and Stationary Windows; Sheet Metal Work; Slate and Tile Roofing; Fireproof Tin Clad Doors; Skylights.

Underwriters' Labels

When required, all doors and windows will bear label of Underwriters' Laboratories, Inc.

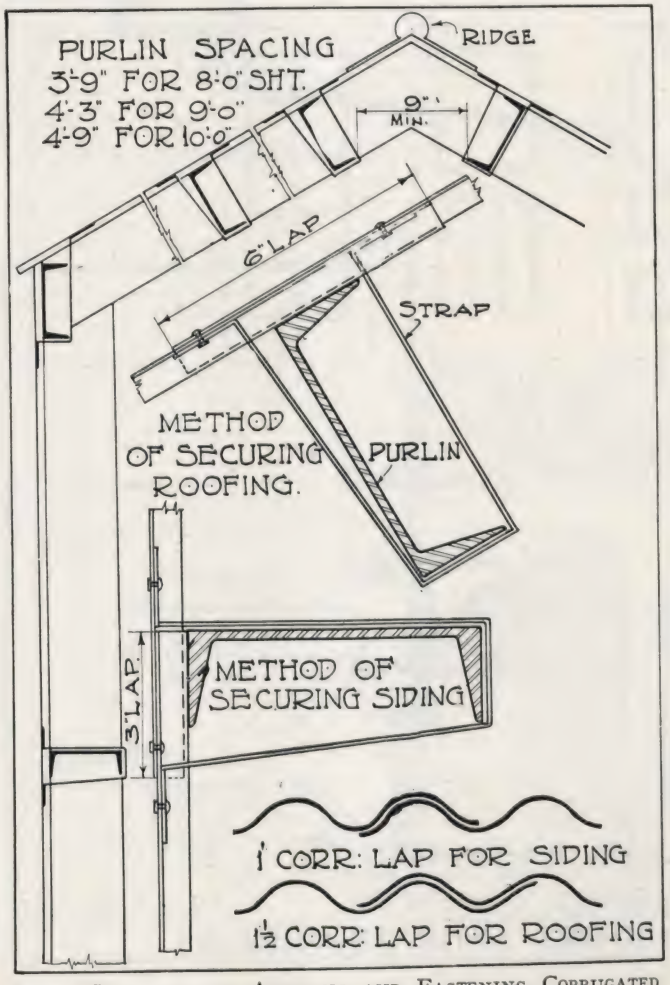
Corrugated Steel Roofing and Siding

Two sizes of corrugated sheets are made: 2½-in. and 1¼-in., center to center of corrugation.

We recommend 1½ corrugations side lap and 6-in. end lap for roof one-quarter pitch or more; for roofs much less than one-quarter pitch, 2½ corrugations side lap and 8-in. end lap should be given.

Roofs flat as 2-in. incline to 1 ft. should have standing seams instead of side lap.

One corrugation side lap and 3-in. end lap, is general practice for vertical surfaces.



SYKES STANDARDS OF APPLYING AND FASTENING CORRUGATED STEEL TO STRUCTURAL STEEL BUILDINGS

Corrugated Wire Glass

Made in two sizes to match corrugated zinc roofing and corrugated iron, and can be used in connection with either or both.

Corrugated glass can be used economically for entire sides of buildings or for an entire roof, for skylights and marquises.

CORRUGATED WIRE GLASS

For description and details, see pages of the Pennsylvania Wire Glass Co.

Corrugated Zinc Roofing

Corrugated zinc for roofing and flat zinc for flashing is a non-corrosive and indestructible material.

Application of zinc for roofing or flashing requires special treatment owing to its peculiar nature. There is an expansion of ¼ in. in 8 ft. with a variation of temperature of 140°.

Our Engineering Department is at the service of customers. Send drawings or type of the general construction and we shall be pleased to write up specifications covering the particular case.

Write for booklet on "Working of Zinc," or for any special information.

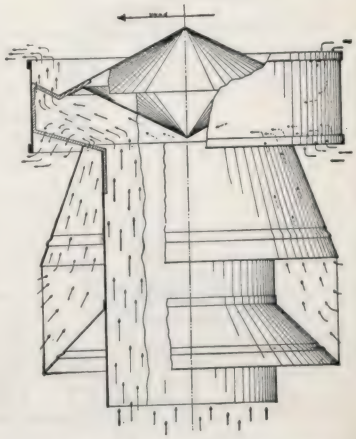
RECOMMENDED SPACING FOR PURLINS

Gage No.	11	12	13	14	15
Thickness, in	.024	.028	.032	.036	.040
Purlins spacing, in.	33	42	48	52	60

Sykes Siphon Ventilator

A ventilator of great efficiency, high capacity, and it has no perceptible downdraft, verified by test made by Armour Institute of Technology.

The Sykes siphon ventilator on account of its great exhaust power in downward currents of air, is particularly adapted for low buildings between or adjacent to higher buildings.



SYKES SIPHON VENTILATOR

Continued on next page

Hollow Metal Doors and Trim

Doors are made of furniture steel, each piece interlocked and welded, and made perfectly rigid. Special formed steel bucks are anchored to masonry with adjustable hangers, allowing finished jambs and trim to be accurately set. Trim is fastened with invisible fasteners, thus eliminating all surface screws.

All hardware is fitted to doors accurately and fastened to reinforcements which are welded in place. Hardware when furnished by owners or hardware contractors must be delivered to our factory made to template and packed with machine screws.

Triple Lock—We manufacture and equip doors with our special three-point or triple lock when specially called for. This lock is concealed inside of jamb; very effective, positive and easy of operation, making a positive fire stop. Our triple lock is suitable for either single or double doors.

Combination Jamb and Buck—We make a specialty of these of heavy gage material with mouldings or trim in one member, miters welded.

Finish—Doors are finished with a baked-on enamel process, grained to produce effects of any kind of wood or metal.

Double Hung Windows, Rolled Steel

Our rolled steel double hung window has been designed to meet the demands for a high grade window with all qualities such as neatness in appearance; small sections, giving the maximum amount of glass area; sash member rolled in one piece, thus eliminating any loose members such as glass mould.

The glazing is done through the top rail of each sash.

Particular attention is called to the absolute weatherproofing feature. By referring to detail (see following page) the construction of frame and sash will readily show all of these features.

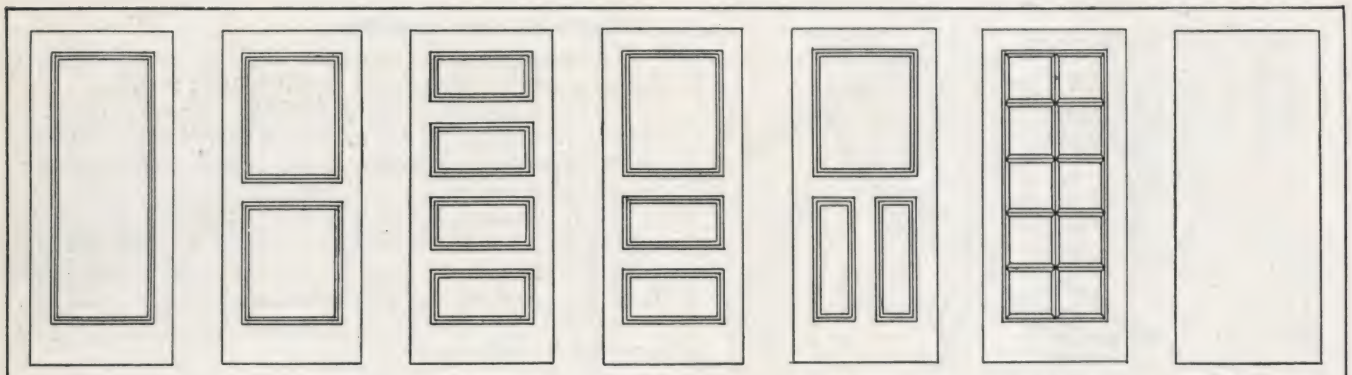
This window is suitable for any type of high class buildings such as office and bank buildings, courthouses, hotels, schools, etc.

Hollow Metal Windows, No. 24 Gage

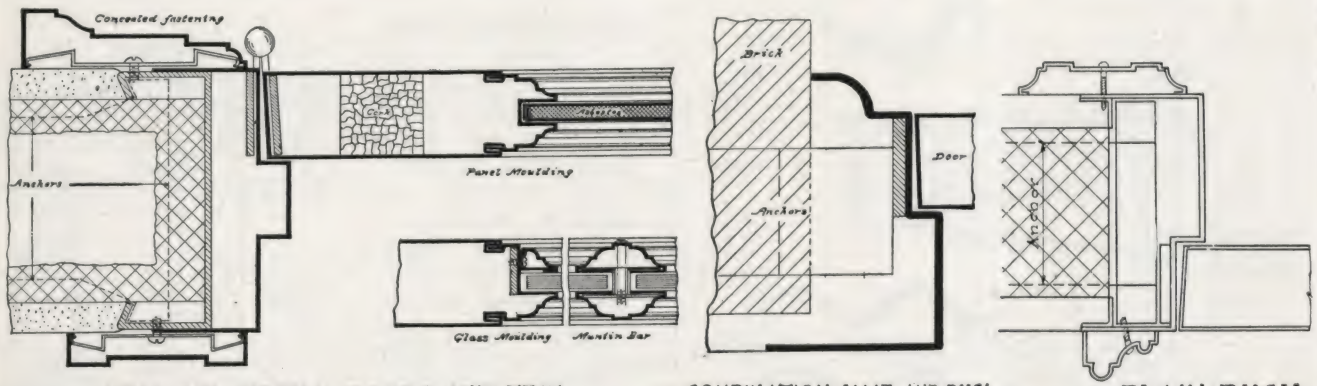
All types of the hollow galvanized windows, including double hung, casement, pivoted, standard pivoted and stationary, are manufactured in No. 24 gage galvanized.

Mouldings

We manufacture a large variety of drawn steel mouldings of Nos. 18 and 20 gage furniture steel, also cold rolled steel sections of Nos. 10 and 12 gage. Send us the requirements and we will give quotation on making up rolls for any special sections, either for drawing or rolling.



SOME STANDARD DESIGNS
IF GLASS IS REQUIRED ADD SUFFIX G.



HOLLOW METAL DOORS AND TRIM — COMBINATION JAMB AND BUCK — PLAIN BUCK

DETAILS OF HOLLOW METAL DOORS, TRIM AND BUCKS

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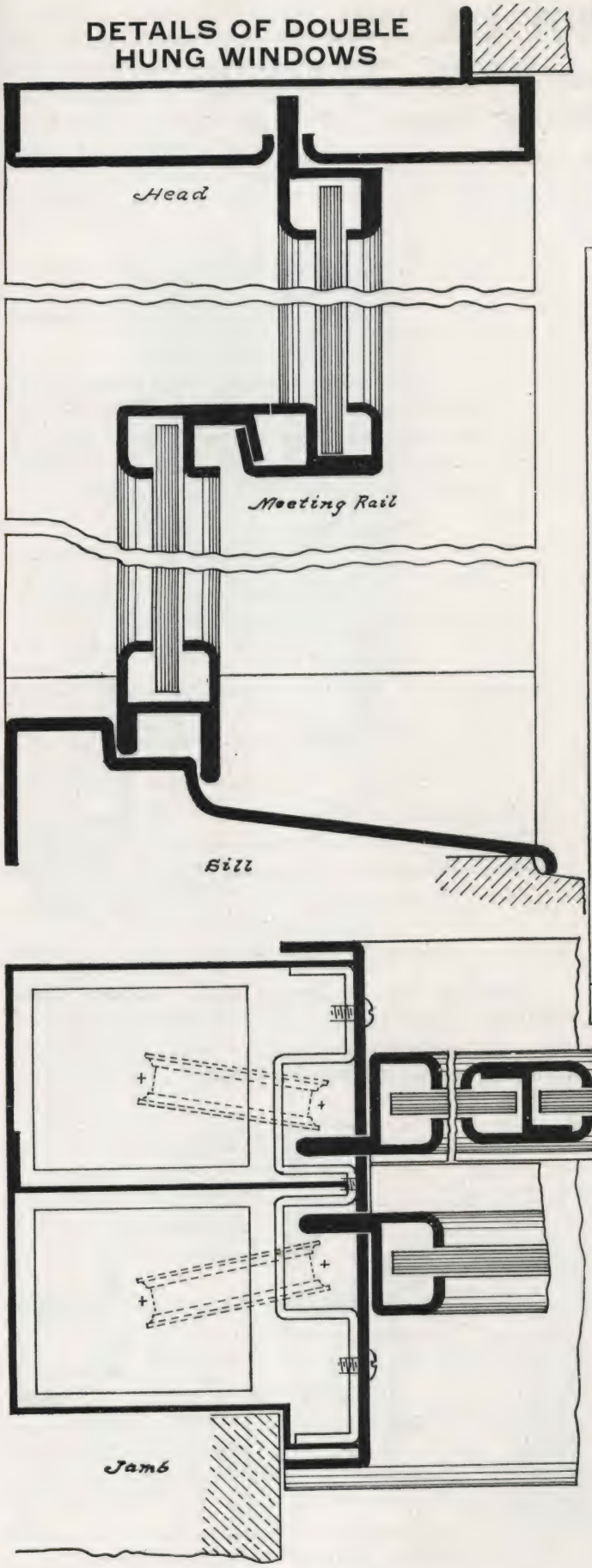
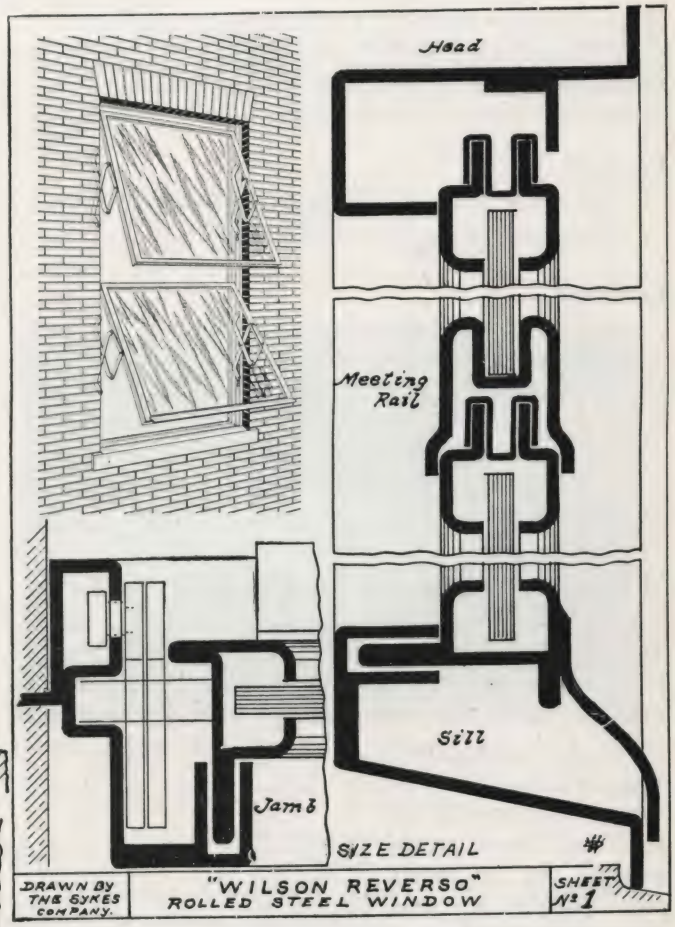


DETAILS DOUBLE HUNG, ROLLED STEEL SASH
Half-size

Details of "Wilson Reverso" Window

The "Wilson Reverso" is a patented window in which both sash are completely reversible, thus allowing all glass to be cleaned from the inside of the building. The "Wilson Reverso" is a one-plane window with either 1, 2 or 3 sash.

It is particularly designed and suitable for office or bank buildings, hotels, hospitals, schools, apartment buildings, etc.



Advantages—
Ventilation 1% to 100%.
Upward ventilation without draught.
When reversed, opening completely closed.
Both sides of glass easily cleaned from inside.
Elimination of pulleys, weights, and chains.
Saving of window cleaning devices.
Saving of life insurance on window cleaners.
No part of sash inside stop line.
Shades on sash produce ideal awnings.
Makes inside window screens practical.
Prevents storm entering when sash is open.
Noiseless and free from rattling.
Positive and easy in operation.
Absolutely weatherproof.
Each sash operates independently.
Reglazing easily done from inside.

Hardware—Operating hardware consists of special arms made on the "lazy-tong" principle which support the sash in any position and allow each sash to be completely reversed.

Types—The "Wilson Reverso" windows are made in rolled steel sash, hollow galvanized, Nos. 16 and 24 gages.

S. H. POMEROY CO., INC.

Hollow Metal Fire Retardant Windows and Partitions

FACTORY AND GENERAL OFFICES
282-296 East 134th Street
NEW YORK, N. Y.

LOCAL REPRESENTATIVES
BOSTON, MASS., E. D. CHANDLER, 25 Huntington Avenue
BUFFALO, N. Y., W. E. GARDINER, 403 Lafayette Square Building
CLEVELAND, OHIO, LOEB-WALTERS CO., 1110 Walnut Avenue
DETROIT, MICH., J. W. ROLLINSON, 203 Owen Building
HARTFORD, CONN., J. C. BIDWELL & Co., 1293 Main Street
NORFOLK, VA., W. L. ROCKE, 521 Law Building
PHILADELPHIA, PA., THOS. S. GASSNER CO., 4545 Wayne Avenue
RICHMOND, VA., JAMES S. ARCHER, 203 Real Estate Exchange Building
WASHINGTON, D. C., and BALTIMORE, MD., A. B. GILBERT, 819 District National Bank Building

Products

POMEROY SOLID and HOLLOW METAL WINDOWS.
POMEROY SOLID STEEL PARTITIONS.

Facilities

For more than twenty years fire retardant windows, and later fire retardant partitions, have been the exclusive specialty of the Pomeroy Co., and its factory equipment and methods of production are the outgrowth of this long concentration on one particular line. The factory has the most up-to-date machinery—much of it especially made for Pomeroy service.

A Pomeroy Window for Every Class of Service

The Pomeroy line includes more than 30 standardized window types—more than are offered by any other one window maker. This enables the company to meet practically all conditions with some standard construction of proved merit. Architects and owners, therefore, are not forced to accept some new or untried or experimental window, or to adopt some compromise type.

There is a standard Pomeroy window for every class of window service.

The Pomeroy solid steel partition for interior fire retardant subdivision is the logical outgrowth of Pomeroy experience and facilities.

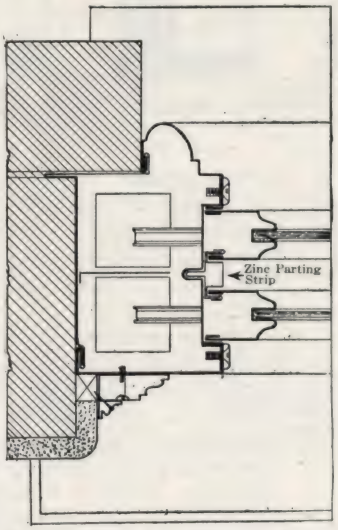


FIG. 1. DETAIL OF POMEROY NO. 16 HEAVY GAUGE DOUBLE HUNG HOLLOW METAL WINDOW
Made in No. 16 gauge galvanized iron

Pomeroy No. 16 Double Hung Hollow Metal Window — Constructed of No. 16 gauge galvanized iron, especially weatherstripped with zinc as a part of the design. Recommended for the better type of buildings.

For details, see Fig. 1.

Pomeroy Type A Solid Metal Double Hung Window—Frame constructed of Nos. 12, 16 and 18 and sash of No. 14 gauge galvanized iron. Running surfaces of sash rails covered with zinc. Double point of contact, one exterior and one interior between sash and frame. Maximum light. Recommended for buildings where the utmost in quality and service is sought.

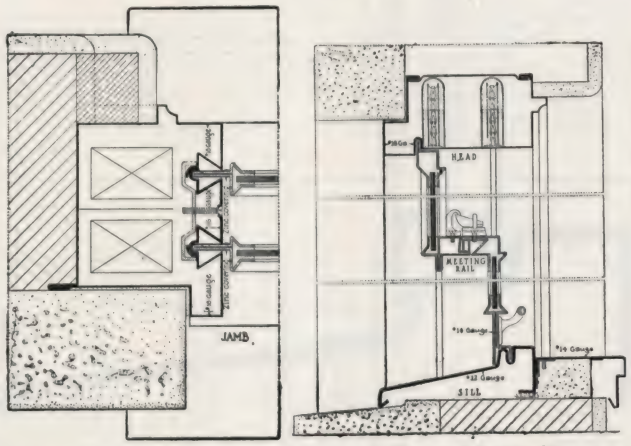


FIG. 2. DETAIL OF POMEROY TYPE A SOLID METAL DOUBLE HUNG WINDOW
Showing section through jamb, head, meeting rail and sill. The latest maximum-lighting window

Pomeroy No. 60 Double Hung Hollow Metal Window—Constructed of No. 24 gauge galvanized iron. It is suitable for all services where high window efficiency and dependable fire protection are wanted at moderate cost.

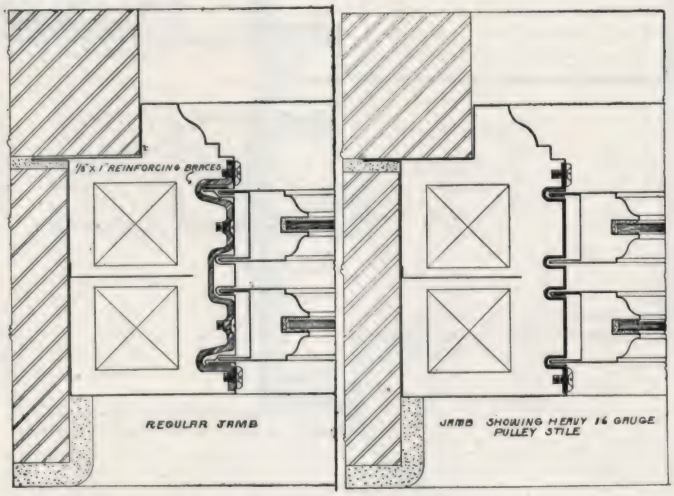


FIG. 3. DETAILS OF POMEROY NO. 60 HOLLOW METAL FIRE RETARDANT WINDOW
Section through jamb and sash, showing two standard types of jamb construction; double weathering feature illustrated

Continued on next page

Pomeroy Austral Window—Constructed of No. 24 gauge galvanized iron. Offers the most varied, and, at the same time, the maximum amount of ventilation.

The sashes are balanced on arms, eliminating the cost of pulleys, weights and chains. The sashes are reversible for cleaning.

It is a window which has rapidly come into prominence and is suitable for all classes of buildings.

FIG. 4. POMEROY AUSTRAL HOLLOW METAL FIRE RETARDANT WINDOW
Showing window partially opened for ventilation

Underwriters' Approval

Following are some of the standard Pomeroy windows which have been approved by the National Board of Fire Underwriters' Laboratories, and bear their label:

Double hung and counterbalanced (three types).
Double hung with pivoted transom.
Double hung with hinged transom.
Twin double hung.
Stationary, twin stationary.
Casement.
Top hinged upper and stationary lower.
Pivoted upper sash.
Pivoted lower sash.
Three pivoted sash.
Two upper sash pivoted with stationary lower.
Special mullion window.
Twin pivoted sash.
Tilting sash.

Distinctive Features of Pomeroy Metal Windows

Standard material: the best grade of heavily galvanized steel—though copper, bronze, and Toncan iron are used in certain windows on order.

Methods of handling which maintain the zinc coating unbroken, preventing corrosion.

All cutting and punching by costly special dies.

Specialized, intensified factory methods and processes.

Experienced factory organization of long standing.

Improved hardware.

Maximum fire resistant capacity.

Exceptional weathering qualities, excluding dust and wind.

Easy operation maintained indefinitely by accurate workmanship and sustained adjustments.

Prompt deliveries resulting from unequaled factory facilities and ample stocks of raw materials.

Pomeroy windows and partitions are manufactured —not built. Hand labor is minimized, hand fitting eliminated, skilled specialists used on each operation of assembling. No other windows are made under such a system.

Pomeroy Solid Steel Partitions

Embody the most finished design and construction, and are simple, neat, substantial and economical.

FIG. 5. POMEROY PRESSED STEEL FIRE RETARDANT PARTITIONS
Installed in New York office building. Made in sectional construction and in a variety of styles and combinations

Prices

The Pomeroy policy demands standards of quality which necessitate a strict adherence to a price that will cover the most sound, substantial and efficient construction—this price itself being a guarantee of permanent satisfaction to architect, owner, agent and tenant of a Pomeroy equipped building.

Pomeroy products are not made to meet a price, but to set a standard of service—that standard being one which can be maintained only by specialization on one line of manufacture.

Special Service

Over twenty years of specialization is the basis of Pomeroy service offered architects confronted with window problems.

This service is free and cheerfully offered. The company welcomes an opportunity to co-operate with architects in any way—either in adapting the standard Pomeroy types to specific conditions, or in working out new types for any purpose.

VOIGTMANN & COMPANY

Manufacturers of Metal Windows

TELEPHONE
SUPERIOR 1305.

445-459 West Erie Street

CHICAGO, ILL.

Products

METAL WINDOWS, all types; WINDOW MULLIONS.

Also approved Fusible Links, Special Metal Designs.

Official Approval

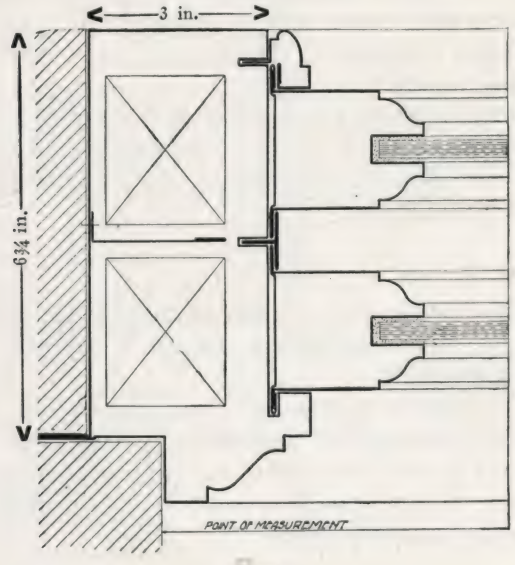
As a result of tests held at the laboratory of the National Board of Fire Underwriters at Chicago, all types of Voigtmann windows have been approved and reports covering these approvals have been filed with each state and city underwriters' association.

24 Gage Double Hung Window

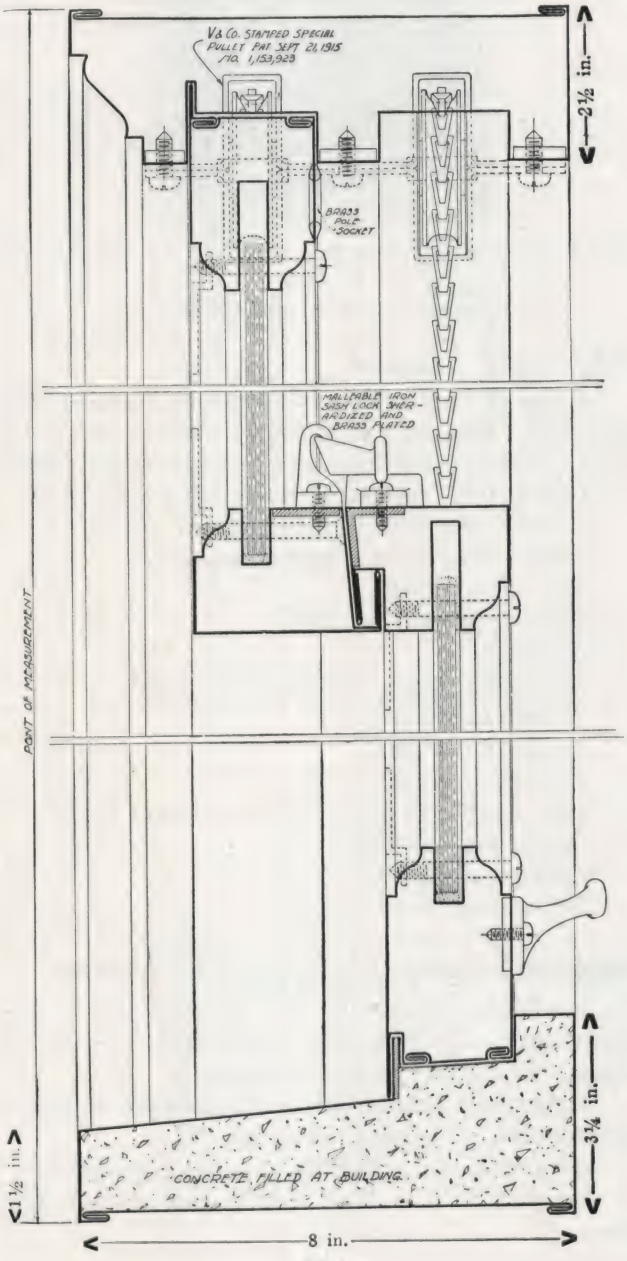
VOIGTMANN & COMPANY'S experience as designers and manufacturers of hollow metal windows, extending over a period of 30 years, has resulted in the perfection and development of this high grade, weatherstripped double hung window.

The continuous slots and fins, at the outer surface of sash rails and stiles, prevent wind and dust from getting past the outer surfaces of the sashes. The sashes slide on offset sash stiles and do not rub against the frame throughout their full thickness. This gives a perfect mechanical connection and makes for ease of operation as well as perfect weathering.

Sashes that are weatherstripped and operate easily are of extreme importance and should be given first consideration. By designing and incorporating these special features and by cutting all miters with dies and using jigs in the assembling of frames and sashes, to insure correct rectangularity and exactness of size, this company is able to produce a window that meets these requirements.



Plan



Section

DETAILS OF THE VOIGTMANN 24 GAGE DOUBLE HUNG WINDOW

Continued on next page

Special tight coated soft galvanized stock is used for all window parts, and special attention is given to the forming operations which prevent a fracture of the iron and its coating.

Hollow air chamber construction throughout, made of 24 gage galvanized sheet steel, iron or copper. Heavier gages of material furnished on special order.

Unless otherwise specified this company furnishes ¼-in. ribbed wire glass, cut to size and shipped separately.

Before shipment each window is given a priming coat of red lead paint.

Hardware—Standard equipment in accordance with underwriters' requirements:

Ives "Crescent" sash lock, made of malleable iron, and brass plated. VOIGTMANN & COMPANY'S special tandem pulley (patented); heavy steel sash chain sherardized. VOIGTMANN & COMPANY'S special bar sash lifts, for metal windows, made of cast iron and brass plated. Pole socket, made of brass and spun in the top sash rail. Sash weights of cast iron 2¼x2¼ in.

Weights, finish hardware and chains are always shipped separately.

Hanging of Weights—The hanging of weights is extremely simple and is accomplished by removing the sash guides which release the sash. The weight pocket cap is located at the lower part of the jamb, a little above the sill.

Care should be taken that chains are not kinked or twisted and are securely attached to the sash weights by means of "S" hooks furnished.

Complete instructions for the hanging of weights are furnished at the time of shipment.

Glazing—Glazing instructions are also furnished at time of shipment along with complete glass list.

All sashes are glazed from the inside by means of removable muntin caps; where sashes are glazed with single lights removable glazing strips are used.

Voigtmann 14 Gage Double Hung Metal Window

Realizing the need for better, heavier and more serviceable metal windows in modern buildings, VOIGTMANN & COMPANY have developed this distinctive double hung window made of 14 gage galvanized ingot iron throughout.

In producing this window which has been tested and approved by the Underwriters' Laboratories, Inc., importance of weathertightness and ease of operation have been given first attention, combining at the same time correct architectural appearance.

It is a window for use throughout the building, not only as a fire retardant, but primarily as a window of a high degree of sound mechanical construction in 14 gage iron.

An examination of the detail will show these features very clearly. The scheme of weatherstripping is further advanced by having the weather stops adjustable so that they can be placed in their actual correct position with relation to the sash.

All frame and sash members throughout are made of 14 gage galvanized ingot iron of special tight coated prime stock. All members are of such shape that the forming dies will porduce the bends without in any way flaking or disrupting the galvanizing.

All joints are gas-welded and retinned. In addition the joints between the jamb and the sill are soldered as an extra precaution against water entering the frame at this point.

Before shipment each window is given a priming coat of red lead paint.

Hardware—Standard equipment is as follows:

Two Voigtmann bar sash lifts (Ives manufacture), cast iron; one Ives sash lock, malleable iron (locks and lifts finished to match other hardware in the building); one Ives bronze bar pull to be attached to lower rail of upper sash; one pole socket. P. & F. Corbin ball bearing pulleys No. 2609R; heavy sherardized steel sash chain. Sash weights, cast iron, 2x3 in.

Hardware to match the design used in other parts of the building can be furnished where required.

The necessary drilled and tapped holes are provided to receive sash locks and lifts, these fittings being shipped separately and attached at the building.

Weights and chains are always shipped separately.

Hanging of Weights—The hanging of the weights is accomplished by removing the sash guides which release the sash. The weight pockets are located in the lower part of the jamb a little above the sill. Care should be taken that the chains do not get kinked or twisted and are securely attached to the sash and to the sash weights by means of attachments which are furnished.

Complete instructions for hanging the weights are furnished at the time of shipment.

Glazing—These instructions are also furnished at the time of shipment along with complete glass list.

All sash are glazed from the inside by means of removable glazing caps.

Specifications—*Type*—Windows to be Voigtmann 14 gage double hung metal windows.

Construction—All frame and sash members throughout shall be made of 14 gage galvanized ingot iron. All connections and miters between the members shall be acetylene gas-welded and retinned.

The jambs, heads and sills shall be constructed so there will be no openings or holes entering into the hollow chambers that would permit moisture to enter and start corrosion from the inside. Sills must be reinforced with a subsill of 14 gage galvanized sheet iron. Provide walling-in flanges on the jambs and water bars in the sills.

The sash shall be mounted in the frames between double weather stops; these weather stops must be adjustable so that they may be placed in the closest relative position with respect to the sashes.

Hardware—Each window shall be provided with the following hardware properly fitted at the factory. Pulleys will be mounted into the frames before shipment is made. Balance of hardware to be attached at the building by machine screws, the necessary holes being drilled and tapped at the factory. Pulleys must be removable and so mounted that the wheels and chains will be concealed. All reinforcing plates for attachment of hardware shall be galvanized.

Hardware Schedule: 2 Voigtmann bar sash lifts (Ives manufacture) finished to match other hardware in the building.

Continued on next page

1 Ives sash lock—malleable iron finished to match other hardware in the building.

1 bar pull to be attached to lower rail of upper sash.

1 pole socket.

4 Corbin ball bearing pulleys No. 2609R galvanized cast iron wheels.

Sherardized sash chain equal to American Chain Company's No. 250.

Sash shall be balanced on cast iron sectional weights 2x3 in.

Glazing—Sashes shall be provided with removable glazing stops.

Paint—Before shipment all frames and sashes shall be given 1 coat of pure red lead and oil sprayed on to completely cover all surfaces.

Underwriters' Approval—All windows to be approved by the underwriters' laboratories and bear their labels.

Important—VOIGTMANN & COMPANY call your particular attention to the following paragraph:

Weight or Gage of Stock—A metal window does not offer any more resistance to corrosion than the weight of the lightest steel entering into its construction.

The full benefits of heavier gages of steel are not secured when designing a metal window having some of its parts formed of lighter weight materials than others. The frames are subject to more severe rust action than are the sashes especially at sill and where the frames are in contact with masonry and mortar.

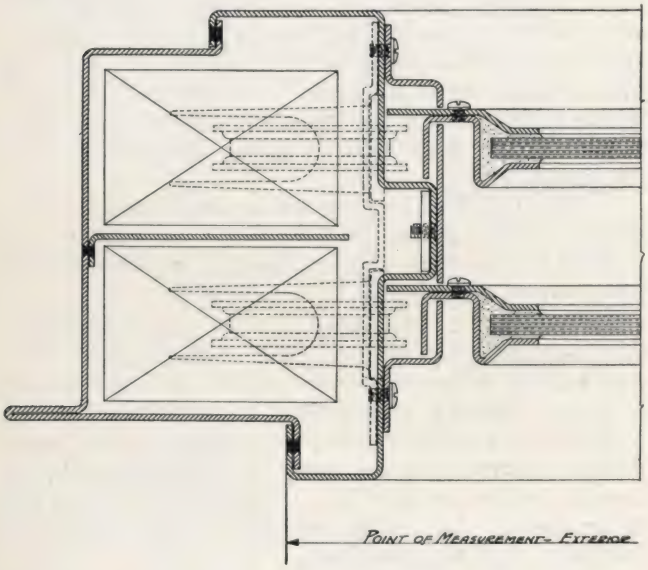
Our window is made of 14 gage galvanized ingot iron throughout.

Standard Pivoted Window

The lower sash is stationary, being built as a part of the frame.

The upper sash is pivoted on ⅜-in. trunnions and is so arranged that it can be revolved for cleaning, but is provided with a stop which in action prevents the sash being tilted too far to prevent its positive closing in case of fire.

Pivots and plates are made of cold rolled strip steel; the holes in which the trunnions revolve are heavily bushed with brass to prevent the possibility of



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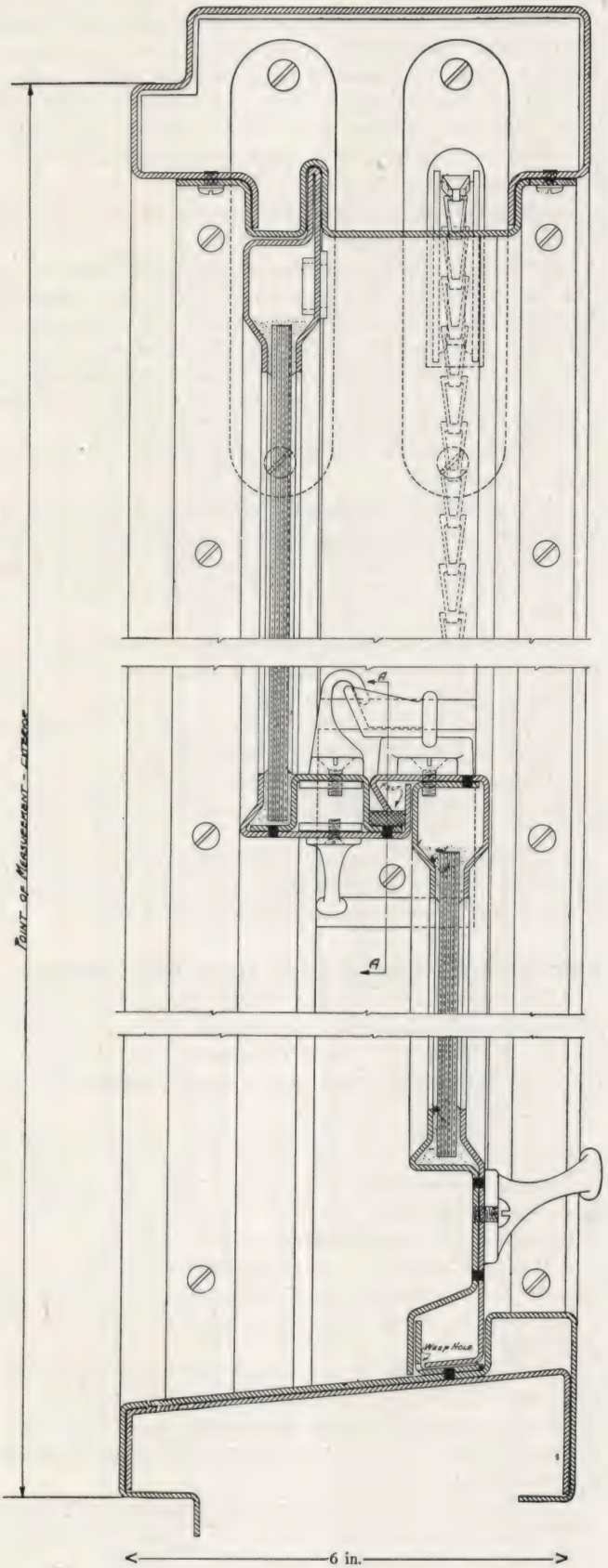


Section

DETAILS OF VOIGTMANN 14 GAGE DOUBLE HUNG METAL WINDOW

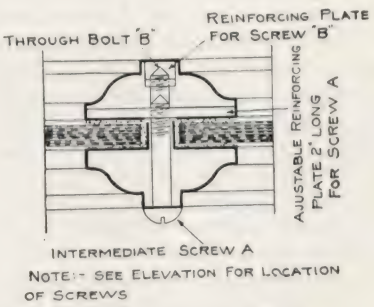
Continued on next page

rust interfering with their perfect working. Both pivots and plates are attached to the sash rails and frame sides by button-head screws that are screwed into heavy plate steel reinforcements within the sash and frame. The pivots are adjustable, thus allowing a very nice location of the sash in the frame opening.

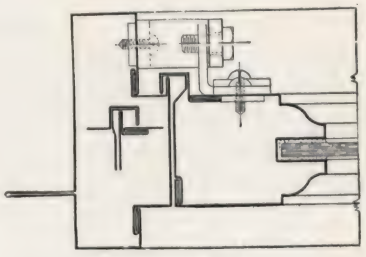
The sash is so hung that about 60% of its weight is below the point of revolution. When open, it is held in position by a chain that runs through an eye attached to the upper lock and then passes down to the lower lock to which it is attached by a fusible link that will melt at 165° Fahr., releasing the sash, which will swing shut and lock. Sash can be held open in any position.

Locks are of Voigtmann design and manufacture; all parts are malleable iron. They are made entirely without springs; fitted to both top and bottom rails of the sashes, and the latch parts are attached and adjusted so that their operation can not be affected by the impact of the closing sash. They are absolutely positive in action.

Inside of frames and sashes are riveted reinforcing plates, to which hardware is attached.

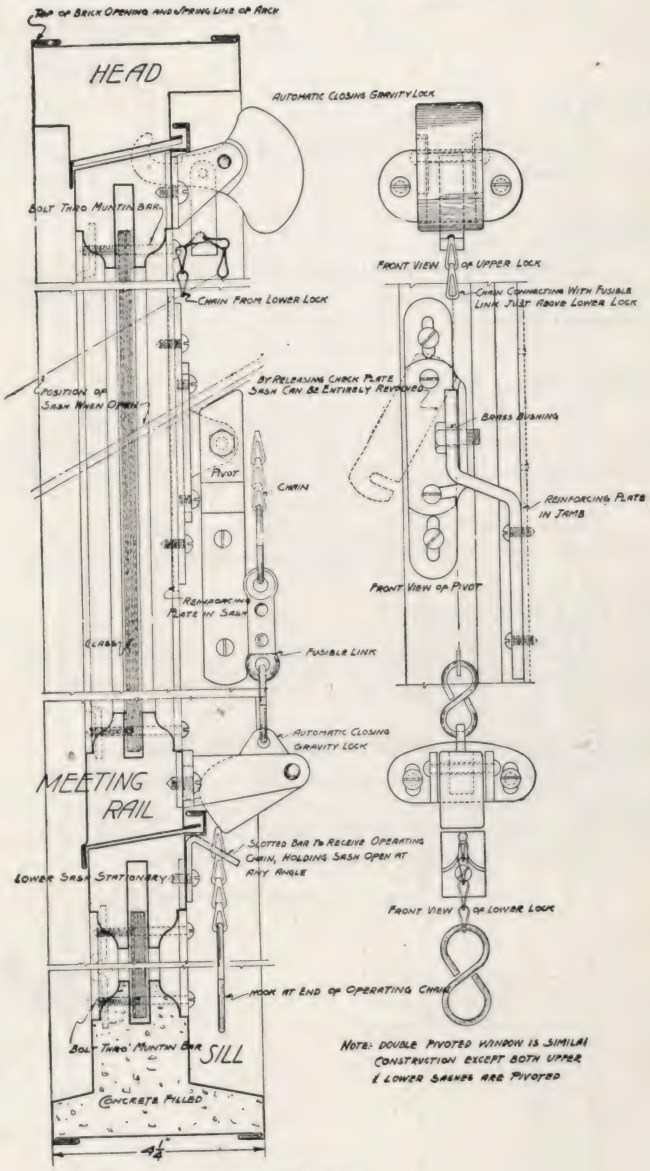


TYPICAL MUNTIN BAR



Plan

of 16 gage galvanized steel. This mullion is complete in itself and is shipped from the factory ready for installation. It does not require any additional structural reinforcing or concrete filling.



Section

DETAILS OF THE VOIGTMANN STANDARD PIVOTED WINDOW
Frame 4¼ in. thick; face of jamb 1⅛ in. deep.

Other Types of Windows

Double pivoted, both upper and lower sashes pivoted.

Pivoted single sash

Top hinged.

Stationary.

Casement and multiples forming any combinations desired.

Window Mullions

VOIGTMANN & COMPANY manufacture and have the underwriters' approval on a new type of mullion made

Services and Estimates

VOIGTMANN & COMPANY offer the services of competent engineers and draftsmen who will be able to aid with suggestions for incorporating Voigtmann work in plans and specifications. The services of this department are at the disposal of architects to aid in solving problems in connection with hollow metal windows.

In sending inquiries for prices please give all information possible as to sizes of openings, types of windows, glass, whether windows are to be segment or square heads and whether windows are to be installed in old or new walls.

THE WILLIS MANUFACTURING COMPANY

INCORPORATED 1891

Manufacturers of Hollow Metal Windows and Tin Clad Fire Doors

HOME OFFICE and FACTORY

GALESBURG, ILL.

Products

HOLLOW METAL WINDOWS of all types; TIN CLAD FIRE DOORS and Hardware.

Approvals

All types of Willis hollow metal windows and tin clad fire doors have been tested and approved by the National Board of Fire Underwriters.

Hollow Metal Windows

The Willis hollow metal window is made in all types including, double hung, single pivoted, double pivoted, top hinged, casement and stationary. Double hung with pivoted, hinged or stationary transoms.

Our approved mullion may be employed when it is necessary to use more than one single unit in an opening.

Tin Clad Fire Doors

Two-ply and three-ply, wood core, tin clad doors of the sliding or swinging type for any kind of opening.

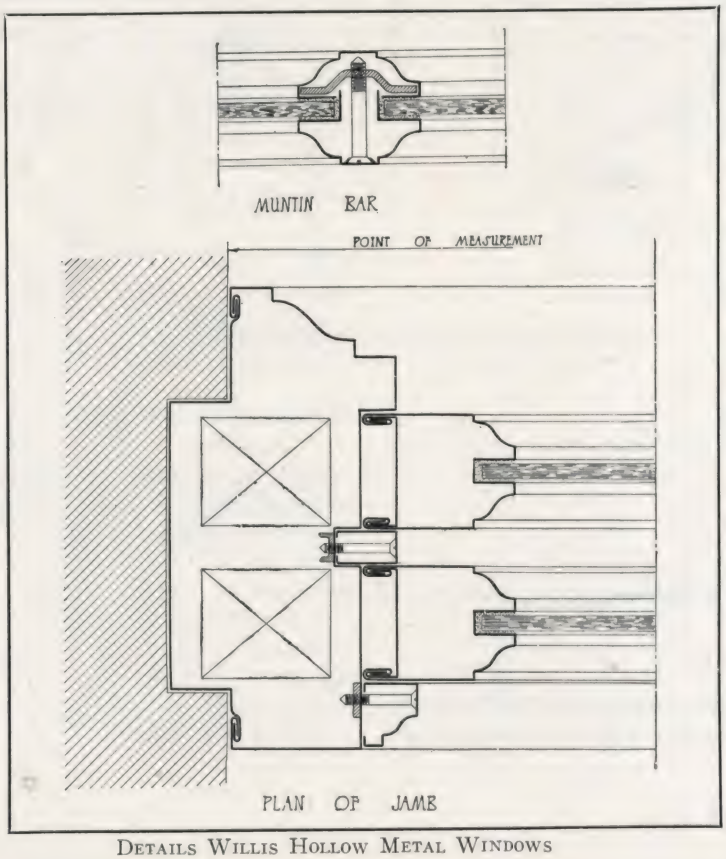
Specifications for Hollow Metal Windows

All hollow metal windows shall be those manufactured by THE WILLIS MANUFACTURING COMPANY of Galesburg, Ill., or such other make that will comply in every respect with their design and construction.

Metal used throughout shall be No. 24 gauge tight coated galvanized, as required by the Underwriters' Laboratories, Inc., and shall be copper bearing. Heads, jambs and all sash rails shall be constructed of one piece of metal each excepting back covers. All covers to be carefully and securely locked to their respective members. Heads and jambs shall have a moulded brick or staff bead and shall be properly constructed for building into brick, stone or terra cotta walls. All members must be carefully formed and miters neatly cut, lapped and riveted. Where two sash members lap on an exposed surface, the under member shall be offset the thickness of the metal to permit of a smooth and even surface to insure perfect operation of the sash.

Pulley stiles shall each be formed accurately to provide for perfect operation of the sash. Each jamb to have a weight pocket of ample size to permit of easy application of the sash weights. Weight pockets to have a removable cover which will fit tight and which will not offer obstruction to the sash in their operation.

Sash rails to be neatly mitered and riveted. All sash to be carefully fitted into the frames at the factory to insure perfect operation and a weathertight job. Meeting rails to lock tightly together when both sash are closed to insure strength and weathertightness. Glass rabbets on all side and bottom rails to be ¾ in. deep and on top rails 1½ in. deep. Sash to be divided with muntin bars into lights as required by the Underwriters' Laboratories, Inc., or as shown on the plans. Muntins to have re-



DETAILS WILLIS HOLLOW METAL WINDOWS

Continued on next page

movable caps to permit of glazing without removing sash from the frames. The outside section of the muntin to be securely fastened to the sash rails by rivets and reinforced every 12 in. with a steel, tapped plate. The inside muntin section to be secured to the outside section by means of screws passing through the reinforcing plates. Both sections of the muntin to be moulded to conform with the sash rails.

Hardware to consist of substantial ball bearing pulleys fastened in place in the jambs by means of screws passing through plates riveted on the inside of jambs. Sash shall be hung on heavy sherardized sash chain, approved by the Underwriters' Laboratories, Inc., and counterbalanced with sectional weights. All pulleys shall be placed in jambs in such a manner that they may be removed and replaced without disturbing other parts of the window. Sash shall be equipped with pole socket, bar lifts and underwriters' approved malleable iron lock, dead black, bronze or brass plated finish. Plates to be attached inside sash rails with rivets for attaching hardware.

Sash shall be glazed with ¼-in. wire glass (specify kind) thoroughly embedded in putty.

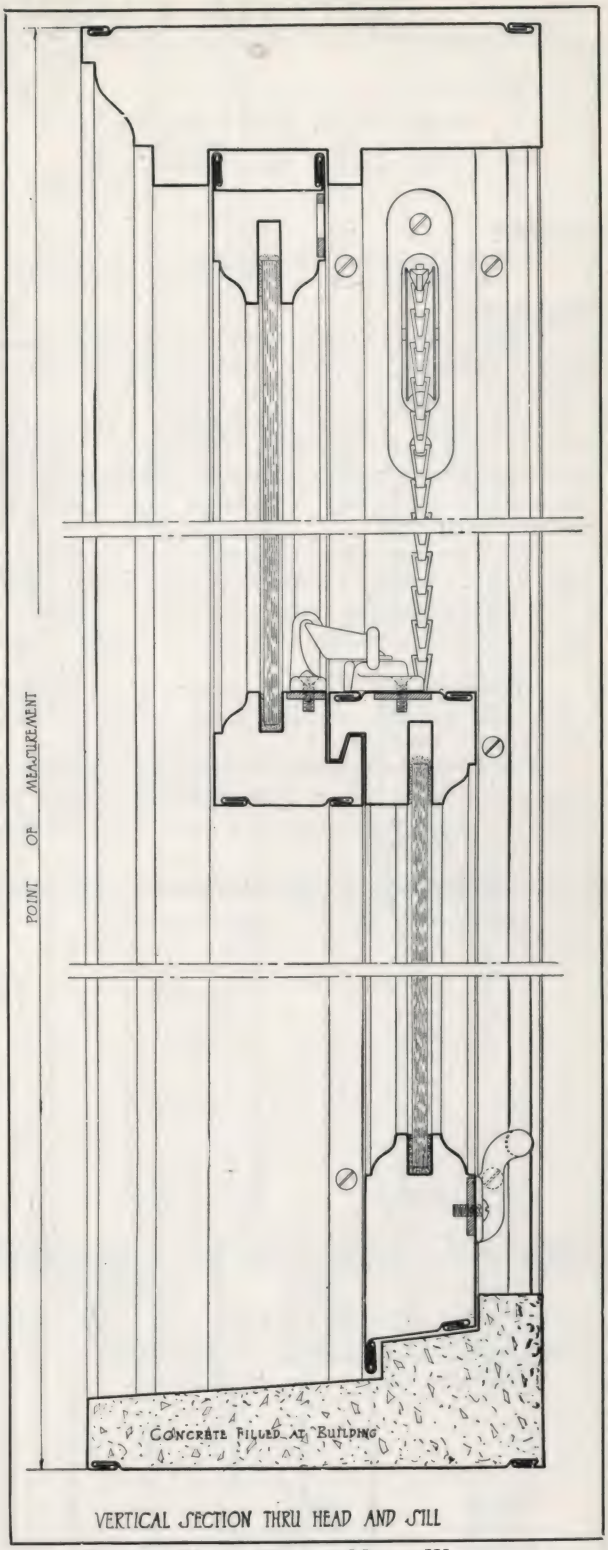
All metal shall have one shop coat of an approved metallic paint before leaving the factory.

All windows shall be constructed in accordance with the specifications of the National Board of Fire Underwriters and shall meet their requirements in every respect. All windows shall bear the underwriters' labels as well as those of the manufacturer.

Note: In sending in specifications be sure to furnish all necessary information such as type of window wanted, brick opening size, style of head, whether square or segment, division of glass in sash and kind of glass wanted.

Installations

Insurance Exchange Building, Des Moines, Iowa
Saunders-Kennedy Building, Omaha, Nebr.
World-Herald Building, Omaha, Nebr.
Freight Station, Pennsylvania R. R., Pittsburgh, Pa.
Iowa Biscuit Co., Burlington, Iowa
Hotel Fowler, Lafayette, Ind.
Ft. Stanwix Hotel, Johnstown, Pa.
Federal Reserve Bank, El Paso, Tex.
Foley Bros. Dry Goods Co., Houston, Tex.
Film Exchange Building, Kansas City, Mo.
Masonic Temple Building, Davenport, Iowa
Hass-Kruse Building, Davenport, Iowa
Baker-Vawter Building, Kansas City, Mo.
Gordon Square Buildings, Cleveland, Ohio
La Salle Hotel, La Porte, Ind.



DETAILS WILLIS HOLLOW METAL WINDOW

CRITTALL CASEMENT WINDOW COMPANY

DETROIT, MICH.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue
CLEVELAND, OHIO, Builders Exchange
ATLANTA, GA., Healey Building
CINCINNATI, OHIO, Greenwood Building
KANSAS CITY, MO., 214 Massachusetts Building
CHICAGO, ILL., 455 Peoples Gas Building

AGENCIES IN ALL PRINCIPAL CITIES

Product

CRITTALL SOLID STEEL CASEMENT WINDOWS.

TRADE-MARK

Description

Uses—For banks, public buildings, residences, churches, university buildings, office buildings, clubs, hospital operating rooms, etc.

Material—All Crittall casements are made from rolled steel sections, thoroughly straightened and cleaned of rust and scale previous to painting. They are given 2 coats of shop paint at the factory, each coat baked on separately.

Weathering—Double weathering is obtained at all points with the Crittall Universal section, regardless of whether inward or outward opening, or pivoted sash are used, thus insuring complete protection from the elements.

Welding—All Crittall corners are mitered and electrically welded. All hardware plates are welded to the casement section.

Hardware—Standard equipment includes solid bronze hardware of a dark statuary color. Special bronze or hand wrought iron hardware can be supplied for special requirements.

Glazing—Glass may be set from outside, using putty and spring clips or from the inside, using solid steel glazing stops with putty bedding.

Design—A wide variation of design is possible by assembling units of stationary and ventilated sash as desired. These units may be divided into panes with steel muntin bars, or undivided as preferred. Leaded glass can also be used to obtain small pane design.

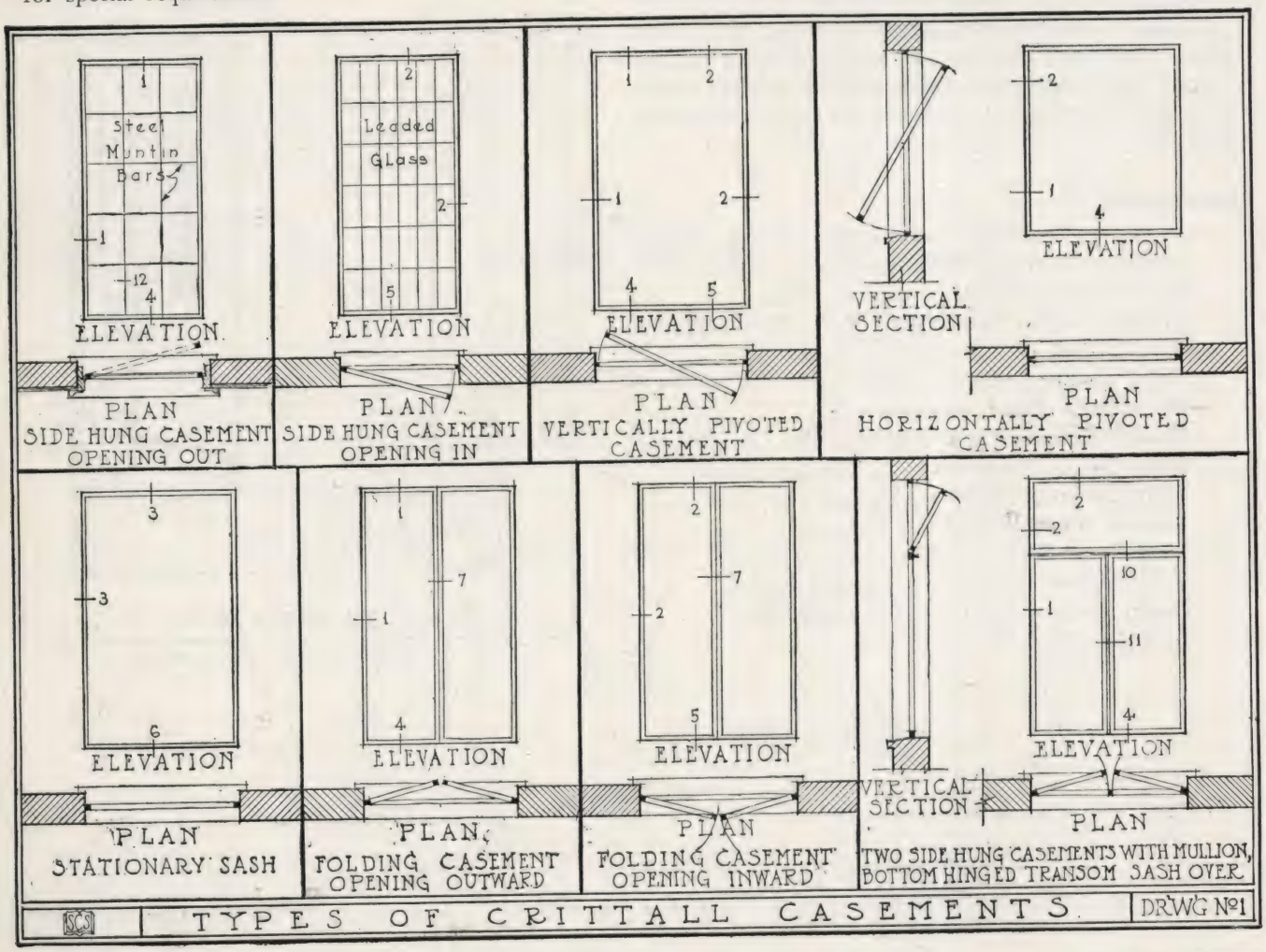
Erection—An efficient erection force is maintained by us to insure correct installation of sash.

Guarantee

Crittall casement windows, when erected properly, are guaranteed windproof and weathertight under all conditions.

Catalogue and Details of Construction

Catalogue showing details and various arrangements of Crittall sash will be sent gladly to any architect or engineer on request. A variety of full sized details of Crittall casements as set in many different types of construction will be sent if requested.



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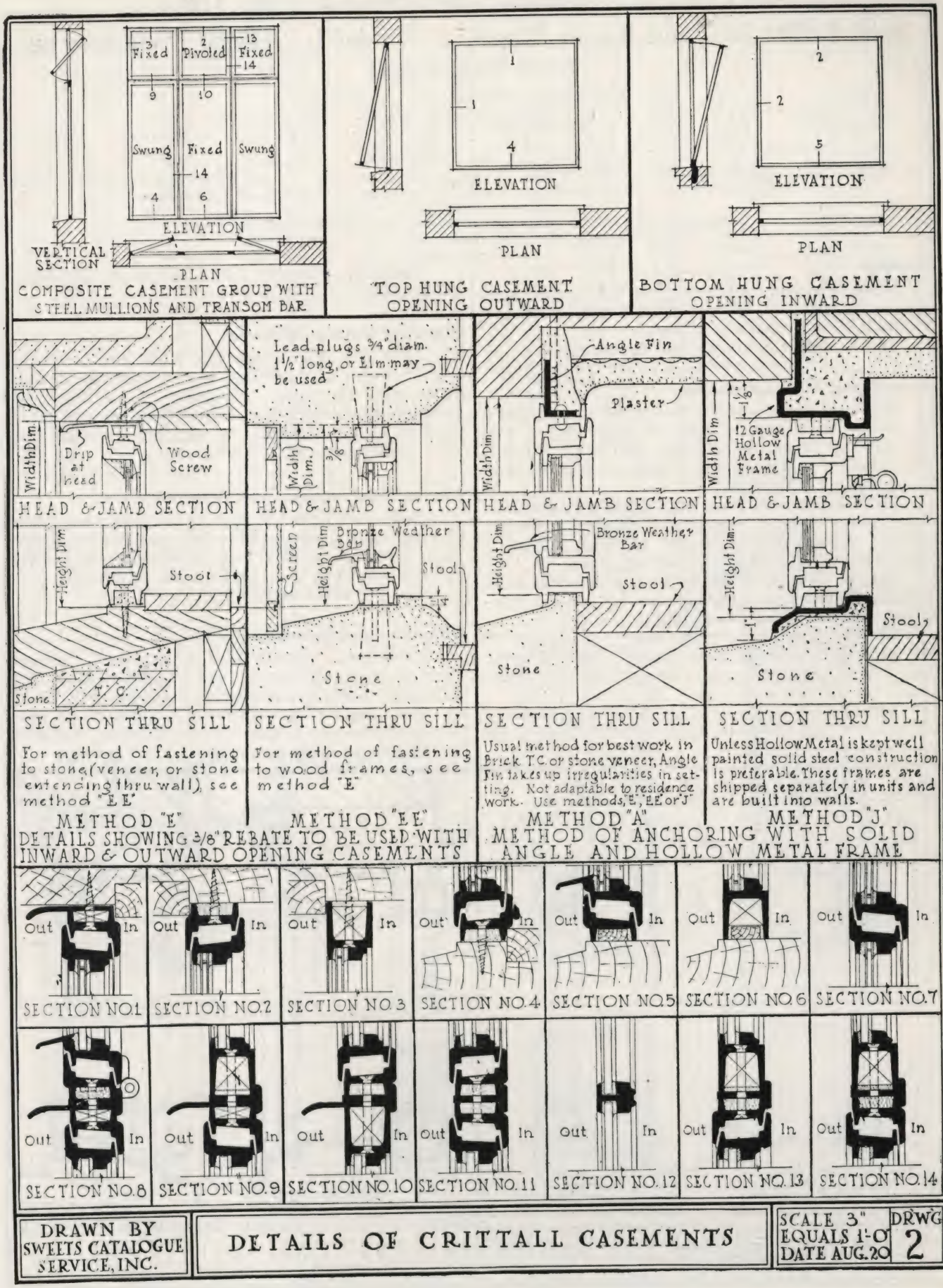

3 Fixed
2 Pivoted
13 Fixed
14
9
10
Swung
Fixed
Swung
14
4
6
ELEVATION
VERTICAL SECTION
PLAN
COMPOSITE CASEMENT GROUP WITH STEEL MULLIONS AND TRANSOM BAR
1
1
4
ELEVATION
PLAN
TOP HUNG CASEMENT OPENING OUTWARD
2
2
5
ELEVATION
PLAN
BOTTOM HUNG CASEMENT OPENING INWARD
Width Dim.
Drip at head
Wood Screw
HEAD & JAMB SECTION
Lead plugs 3/4" diam. 1 1/2" long, or Elm may be used
Width Dim.
3/8
HEAD & JAMB SECTION
Angle Fin
Plaster
Width Dim.
HEAD & JAMB SECTION
1/8
12 Gauge Hollow Metal Frame
Width Dim.
HEAD & JAMB SECTION
Height Dim.
Stool
Stone
SECTION THRU SILL
For method of fastening to stone (veneer, or stone extending thru wall), see method "EE"
METHOD "E"
Screed
Height Dim.
Bronze Weather Bar
Stool
Stone
SECTION THRU SILL
For method of fastening to wood frames, see method "E"
METHOD "EE"
Height Dim.
Bronze Weather Bar
Stool
Stone
SECTION THRU SILL
Usual method for best work in Brick T.C. or stone veneer, Angle Fin takes up irregularities in setting. Not adaptable to residence work. Use methods, "E", "EE" or "J"
METHOD "A"
Height Dim.
Stool
Stone
SECTION THRU SILL
Unless Hollow Metal is kept well painted solid steel construction is preferable. These frames are shipped separately in units and are built into walls.
METHOD "J"
DETAILS SHOWING 3/8" REBATE TO BE USED WITH INWARD & OUTWARD OPENING CASEMENTS
METHOD OF ANCHORING WITH SOLID ANGLE AND HOLLOW METAL FRAME
Out
In
SECTION NO. 1
SECTION NO. 2
SECTION NO. 3
SECTION NO. 4
SECTION NO. 5
SECTION NO. 6
SECTION NO. 7
SECTION NO. 8
SECTION NO. 9
SECTION NO. 10
SECTION NO. 11
SECTION NO. 12
SECTION NO. 13
SECTION NO. 14
DRAWN BY SWEETS CATALOGUE SERVICE, INC.
DETAILS OF CRITTALL CASEMENTS
SCALE 3" EQUALS 1'-0"
DATE AUG. 20
DRWG 2

INTERNATIONAL CASEMENT CO., INC.

Solid Rolled Steel and Bronze Casement Windows; "Austral" Windows in Solid Rolled Steel

FACTORIES AND GENERAL OFFICES
JAMESTOWN, N. Y.

BRANCH SALES OFFICES
NEW YORK, N. Y., 101 Park Avenue — CHICAGO, ILL., 58 East Washington Street — SAN FRANCISCO, CAL., Hearst Building
ST. LOUIS, MO., 1125 Chemical Building — BOSTON, MASS., 49 Federal Street
AGENTS IN ALL PRINCIPAL CITIES
CANADIAN ASSOCIATES: Architectural Bronze & Iron Works, TORONTO, CAN.
BRITISH ASSOCIATES: George Wragge, Ltd., MANCHESTER, ENG.

Products

International Casements in solid rolled steel and drawn bronze; Standard Cottage Window; "Austral" Solid Steel Windows.

Also Casement Hardware and Leaded Glass.

International Steel Casements

Solid rolled steel sections used on all types. Opening outwards or inwards, hung on drop forged steel pivots, bronze bushed, or on bronze butt hinges. Hardware supplied of heavy cast bronze or wrought iron to our own special designs.

Manufacture—All bars thoroughly straightened; corner joints machine mitered and electrically welded; surfaces cleaned free from rust or scale, painted 2 coats best lead and oil paint, each baked on.

Special Feature—International casements have 3 weathering points at head, sides and sill, and are guaranteed to be absolutely weathertight.

Glazing Beads—It is far more satisfactory to use steel glazing beads than ordinary putty glazing. They are set with brass screws and give a neat appearance.

Setting—Should be done by our own experienced workmen so that full responsibility can be assumed for the complete installation.

Estimates—Special estimates and details will be gladly submitted at all times.

Standard Cottage Windows

Solid steel sections, specially rolled, two weathering points; hinges of projecting type to facilitate cleaning from inside the room. Hardware of substantial but plain design in black iron with bronze working parts; adjuster of non-projecting swivel type. Standard sizes only as illustrated on following page.

International Austral Solid Steel Windows

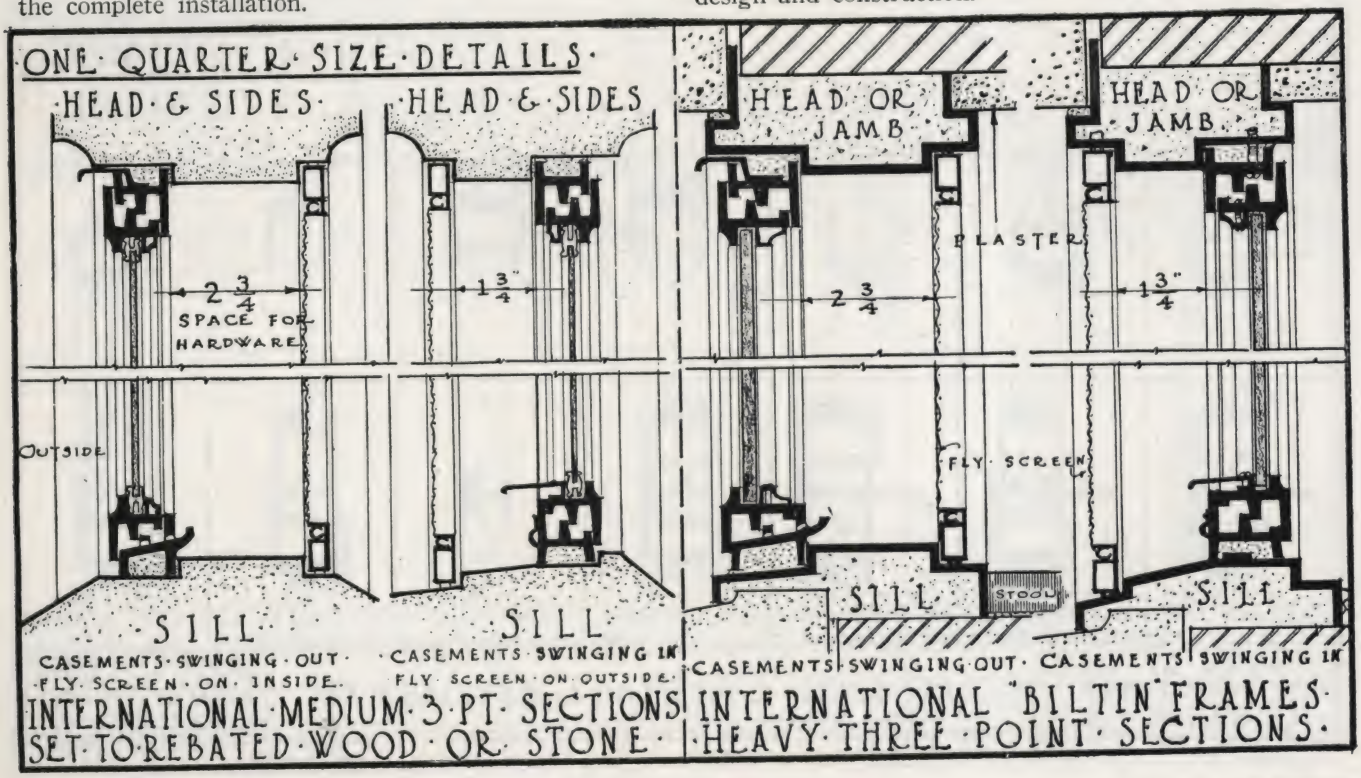
Solid rolled steel sections; two weathering points all around and at meeting rails; balance arms drop forged steel; hardware solid bronze; subframes for building in; sash set by us after rough trades advanced.

Window bears underwriters' label.

Literature and Drawings

Catalogues, "International Casements," "International Cottage Casements" and "International-Austral Windows" mailed to architects on receipt of letter.

Our Engineering department is ready at all times to submit drawings to meet special conditions of window design and construction.



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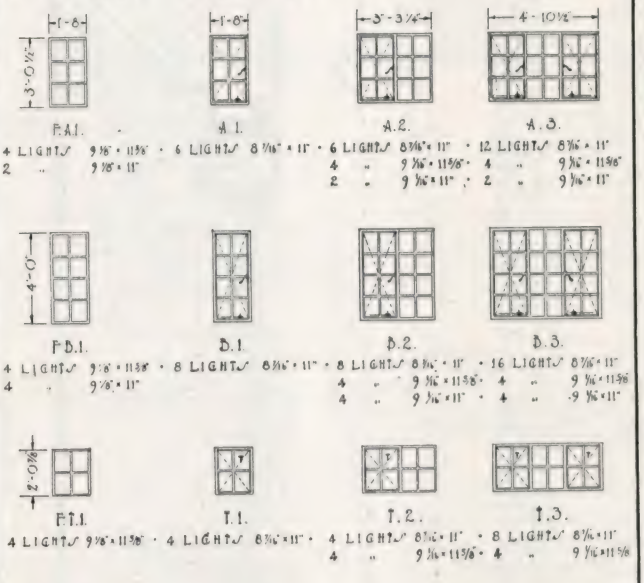
· COTTAGE · CASEMENT · WINDOWS ·

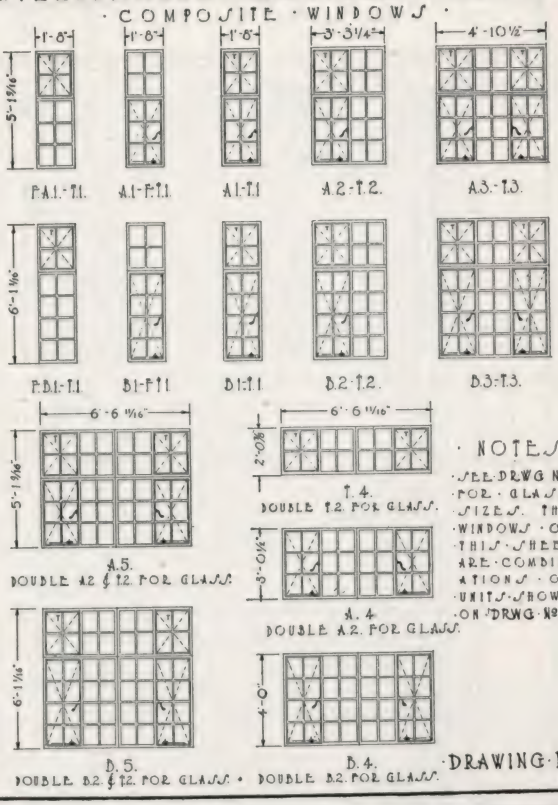
· INTERNATIONAL · COTTAGE · WINDOWS · · STANDARD · TYPES · AND · STOCK · SIZES ·



· NOTES · SEE · DRWG · No 3 · FOR · FULL · SIZE · DETAILS · WHICH · SHOW · WHERE · DIMENSIONS · ARE · TAKEN. · ELEVATIONS · ARE · ⅛" · SCALE · AND · ARE · DRAWN · FROM · OUTSIDE. · PORTIONS · MARKED · C · ARE · CASEMENTS · SIDE · HINGED · SWINGING · OUTWARDS. · IF · MARKED · THUS · T · ARE · TRANSOMS · TOP · HINGED · SWINGING · OUTWARD. · THE · GLASS · SIZES · ARE · GIVEN · BELOW · EACH · UNIT · AND · ARE · EXACT · CUTTING · SIZES.

· DRAWING · No 1

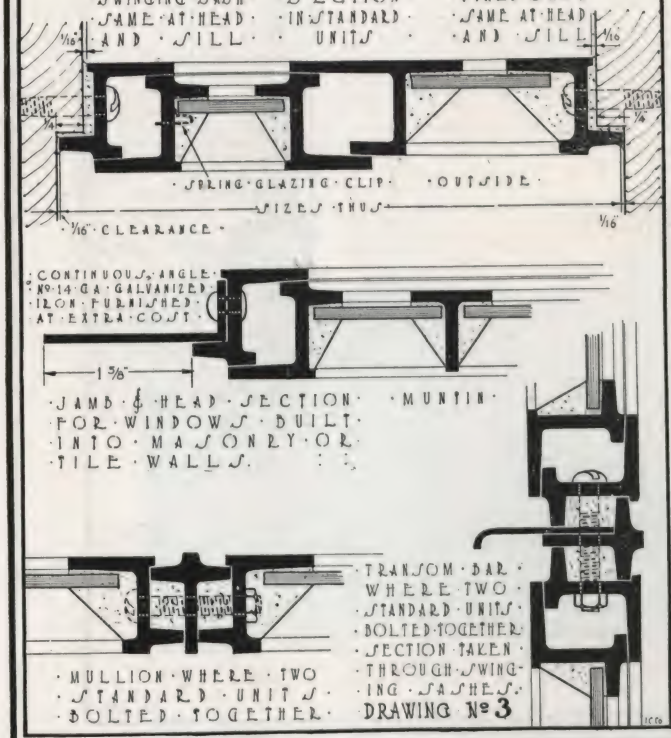
· INTERNATIONAL · COTTAGE · WINDOWS · · COMPOSITE · WINDOWS ·



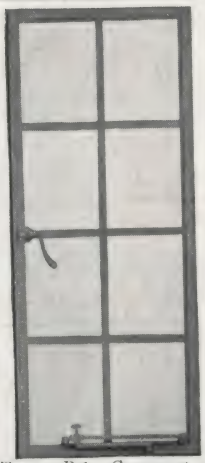
· NOTES · SEE · DRWG No 1 · FOR · GLASS · SIZES. · THE · WINDOWS · ON · THIS · SHEET · ARE · COMBINATIONS · OF · UNITS · SHOWN · ON · DRWG · No 1. ·

· DRAWING · No 2

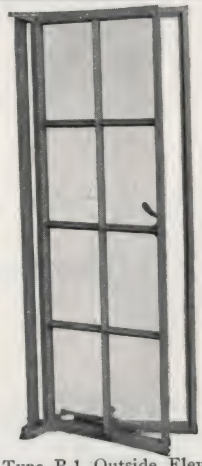
· INTERNATIONAL · STANDARD · WINDOWS · · HALF · FULL · SIZE · SECTIONS ·



· DRAWING · No 3



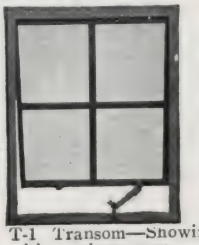
Type B-1 Casement—Side hinged swinging out. Inside elevation.



Type B-1 Outside Elevation —All side hinged casements have projecting hinges so they can be cleaned from inside of room.

Note: All working parts of hardware are bronze.

Type T-1 Transom—Top hinged swinging out. Inside elevation

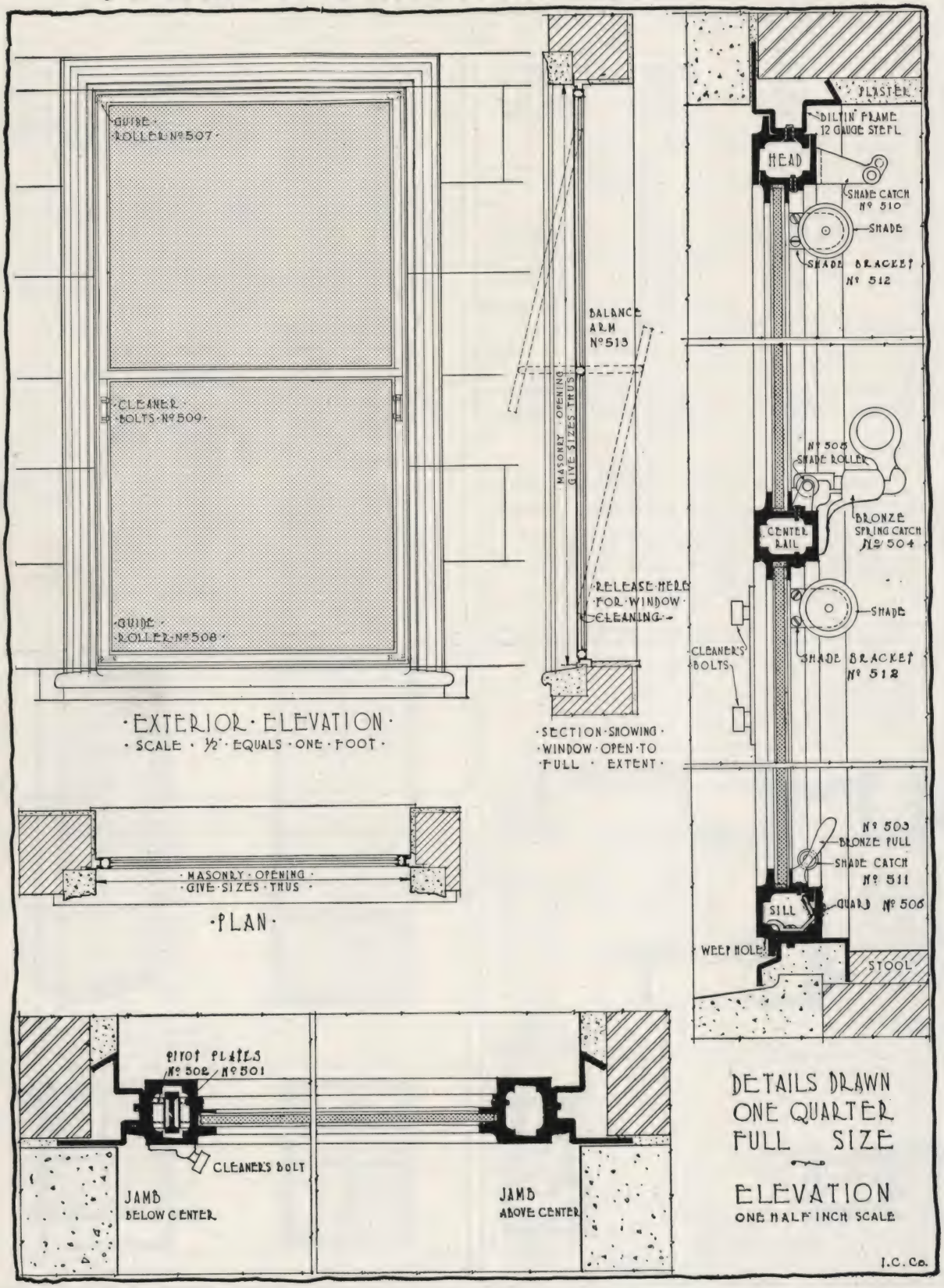


Type T-1 Transom—Showing position when open

· INTERNATIONAL · COTTAGE · CASEMENTS · IN · STANDARD · SIZES ~ · NEAT · IN · APPEARANCE ~ PRACTICAL ~ AS · CHEAP · AS · WOOD · SASH ~

Continued on next page

SOLID ROLLED STEEL WINDOWS FITTED WITH "AUSTRAL" BALANCE-ARMS



INTERNATIONAL-AUSTRAL WINDOW IN STEEL THE MOST SATISFACTORY SASH FOR SCHOOLS & OFFICE BUILDINGS
WEATHERTIGHT-VENTILATION WITHOUT DRAFT

HENRY HOPE & SONS

MAKERS OF

Metal Casements, Steel Windows, Leaded Glazing and Leadwork

Telephone :
MURRAY HILL 1514.

103 PARK AVENUE
NEW YORK, N.Y.

STEEL & BRONZE WINDOWS

suitable for Residences, Universities, Colleges, Public Buildings, Schools, etc.

SECTIONS

as illustrated full size, based upon over 100 years' experience, provide two points of contact, with ample interior cavity to prevent capillary attraction. This system has proved weathertight in the most exposed situations throughout the world.
These three Sections are of universal application, and can be made to open outwards, inwards, or to pivot horizontally or vertically. We recommend as a general rule that casements should open outwards and glaze on the outside.

HARDWARE.

Our Hardware is of the highest class, made from Bronze to U.S. Naval Specification, all working parts machined with ample bearing surfaces for everlasting wear. All hinges are of solid bronze, and horizontally and vertically pivotted casements are hung on our patent solid bronze cup pivots, which afford perfect security, easy working, and exclusion of the weather.

QUALITY.

We make three qualities: No. 1 fitted with Hope's bronze hardware; No. 2, with iron hardware (the steel for both these qualities is finished with two coats of anti-corrosive paint); Quality No. 1A is finished with a stoved coat of enamel in addition.

GLAZING & SETTING.

We keep a staff of fully qualified workmen, and undertake Contracts including setting and glazing complete.

HOPE'S WINDOWS

MANITOBA PARLIAMENT BUILDINGS FRANK W. SIMON, F.R.I.B.A., *Architect*

The finest buildings throughout the world are fitted with HOPE'S Casements

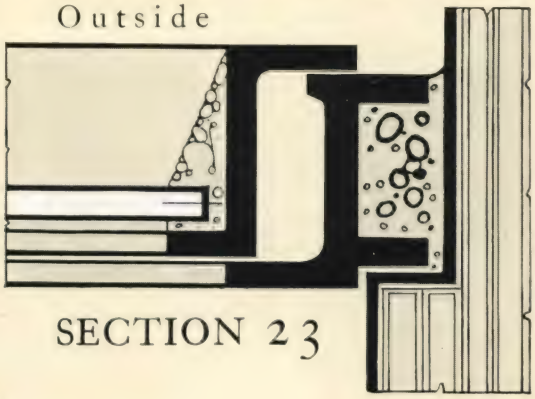
Continued on next page

HOPE'S STEEL & BRONZE WINDOWS

FULL SIZE DETAILS AT JAMBS *of* SECTIONS No. 21, 22, 23

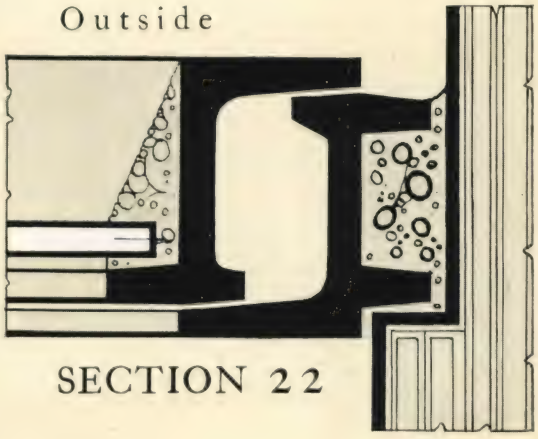
Hope's Office Window (Type Z), comprising French Casements opening outwards, with fixed mullion below transome and a top hung casement above transome, Section 22, Quality 1; fitted with Handle 1322 on Plate 1362 and Stay 223, with patent Cam Opener to transome light.

Outside



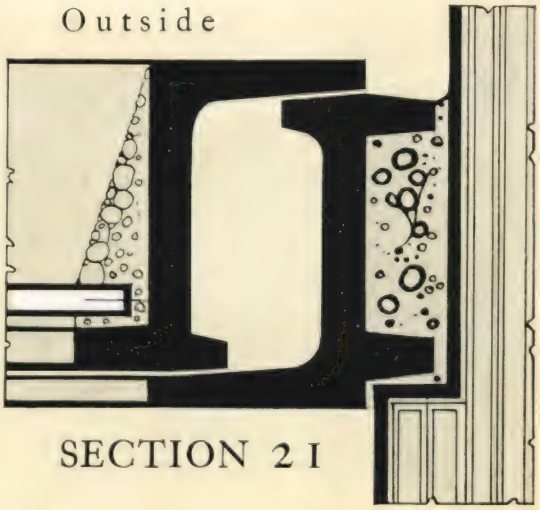
SECTION 23

Outside



SECTION 22

Outside



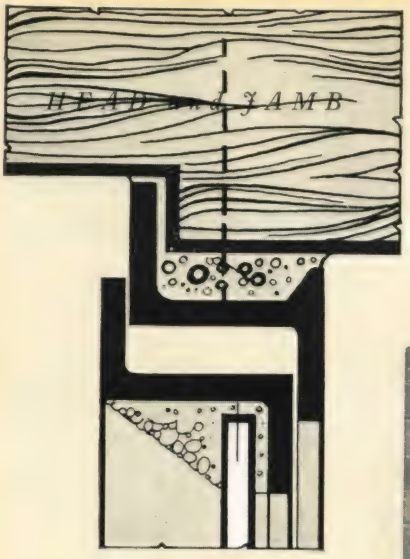
SECTION 21

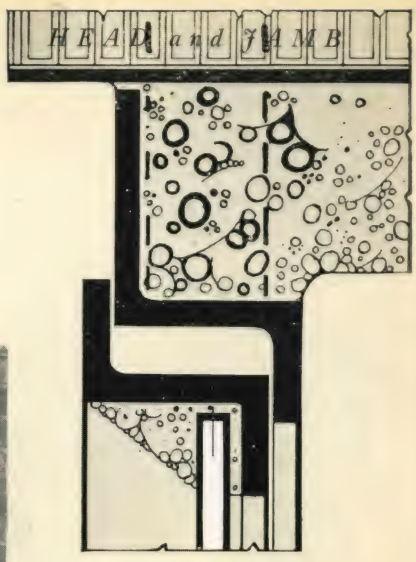
For the highest class of work we recommend the use of solid bronze: it is everlasting in wear, has a beautiful surface, and improves in colour with age. We make all our Sections in this metal and will furnish samples and estimate of the cost when desired.

Continued on next page

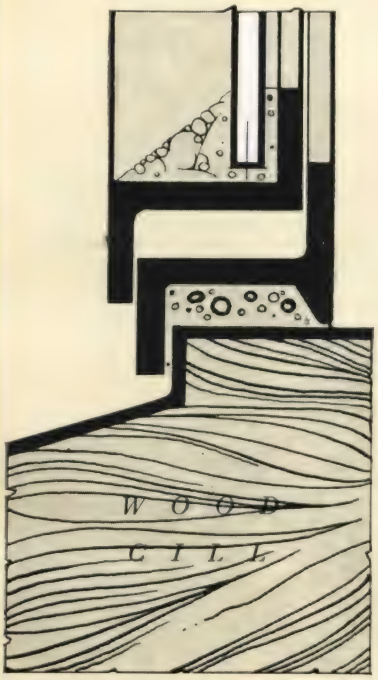
HOPE'S STANDARD WINDOWS

Full Size Details

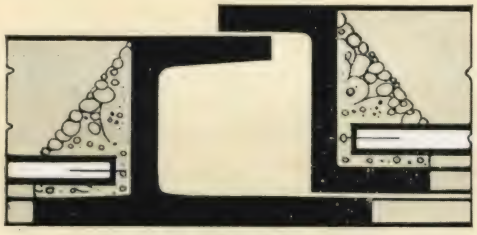




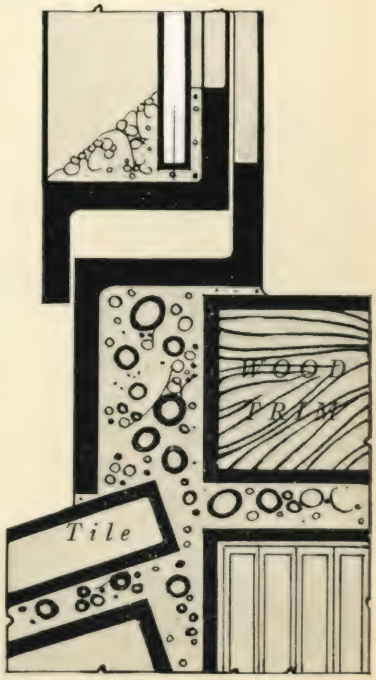
Exterior photograph of a standard window fitted with Hope's special cleaning hinges. These windows are made for building in as work proceeds. They are practically indestructible and adaptable to brick, concrete, or wood construction. The fittings provide a wide range of ventilation without rattling. Curtain Brackets are supplied, thus avoiding all plugging of walls. These windows are practical and pleasant in any situation, cheaper than wood, low first cost, and no repairs.



SECTION *through* OPENING PORTION



DETAIL *of* MULLION

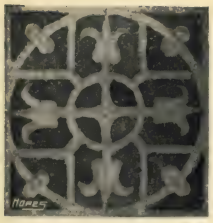


SECTION *shewing* LONG FLANGED FRAME

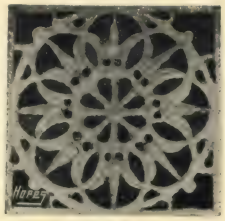
The detail on left is suitable for solid walls, when interior plaster finish does not exceed $\frac{1}{2}$" thick. The long flanged frame shewn on right should always be specified for use with hollow, rough-casted or cemented walls, sufficient space being provided with this flange for external cement and internal plaster without encroaching on hinges, fittings, etc. Write for fully illustrated booklet.

Continued on next page

HENRY HOPE & SONS
LEADWORK
and
HARDWARE



Fret No. 1



Fret No. 2

617

620

LOCK FURNITURE IN BRONZE OR BRASS

Pipe 609
4 in. × 3 in.

Pipe 610
4 in. × 3 in.

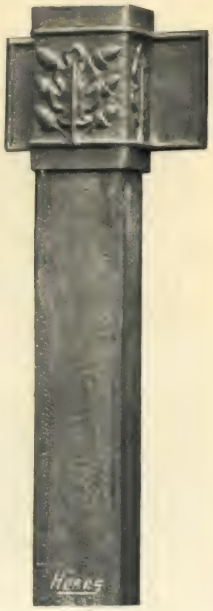
345

1160

FINGER PLATES IN BRONZE OR BRASS

LETTER PLATE 651 IN BRONZE OR BRASS

Pipe 679
4 in. × 3 in.



Pipe 608
4 in. × 3 in.

Fully illustrated catalogues, giving numerous examples of work executed, will be sent on application.

Printed in England at The Kynoch Press

DAVID LUPTON'S SONS CO.

Lupton Steel Casements; Apartment, Residence and Basement Windows

Allegheny Avenue and Tulip Street

PHILADELPHIA, PA.

For List of Sales Offices See Page 834

Products

LUPTON STEEL CASEMENTS: Side Hinged, Top Hung, Vertically Pivoted, Horizontally Pivoted and Projected.

LUPTON STEEL BASEMENT WINDOWS.

For Steel Sash and Sash Operating Devices, see pages 834-843.

For Steel Partitions, Doors and Frames, see page 1107.

For Steel Shelving Bins and Racks, see page 2050.

Lupton Steel Casements

In Lupton Steel Casements, European artistry in design is combined with American precision and interchangeability in manufacture. While Lupton Casements are made to order, the machines, tools and methods are such as to insure primary accuracy of product and leave minimum dependence on final hand fitting. In every respect, Lupton Casements measure up to highest standard of the art which they represent.

Heavy steel bars are used, process straightened and free from hammer marks. All corners, also intersections of muntins, are solidly oxy-acetylene welded. No pains are spared to make a true fit.

Types of Casements—Single and double side hinged types are made, opening out or in, as ordered. Outward opening casements are usually preferred. Several casements may be combined in one steel frame, like the circle head window here shown.

Stationary or operated transoms are furnished, if desired. These may be hinged, horizontally pivoted, or projected (see page 843 for a description of the Lupton "Projected" movement). Projected transoms require no adjuster to hold them at any opening. They may open in at top or out at bottom, as specified.

BUILT-UP CASEMENT WINDOW
Consisting of one double and two single casements opening in, also semicircular transom. Frame built up by oxy-acetylene welding and furnished by Lupton

Lupton Casements are also made with the Projected movement, opening in at top, out at bottom, or in or out at sides. They stay in any position without adjusters, and are recommended for their simplicity and low cost.

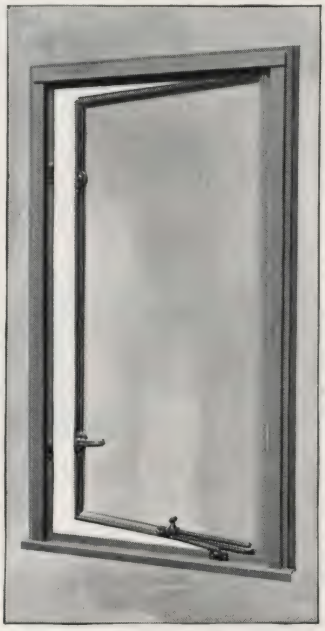
Casement Hardware—Hardware used with Lupton Hinged Casements may be either solid bronze or malleable iron with forged steel bars, at the purchaser's option and at a corresponding price. In either type, the design is handsome and the mechanical details are of the highest grade.

Maximum Sizes of Casements

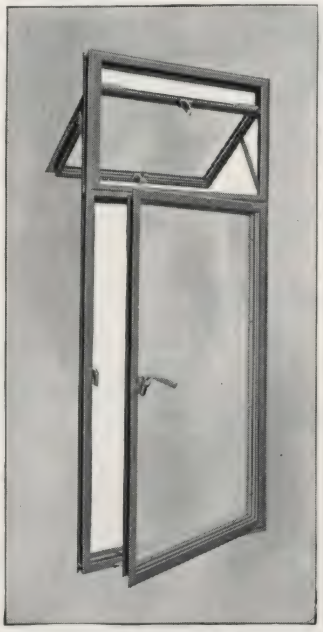
The maximum sizes for different types are as follows:

Side Hinged Casements (Opening Inward or Outward)—Width not to exceed 2 ft. 9 in.; height not to exceed 8 ft. 0 in.

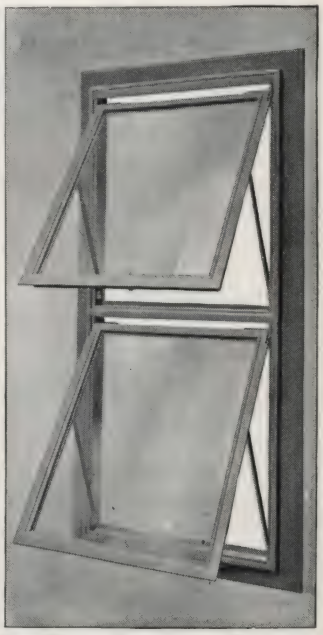
INWARD OPENING CASEMENT WITH PROJECTED TRANSOM
Plate frame shown may be omitted



OUTWARD OPENING CASEMENT
Steel muntins or lead cams may be added. Plate frame may be omitted.



PROJECTED CASEMENT OPENING IN AT SIDE, TRANSOM PROJECTING OUT
No plate frame is shown



PROJECTED CASEMENT OPENING OUT AT BOTTOM
Plate frame may be omitted

Continued on next page

Top Hung Casements (Opening Outward)—Width not to exceed 5 ft. 6 in.; height not to exceed 4 ft. 0 in.

Vertically Pivoted Casements—Width not to exceed 4 ft. 3 in.; height not to exceed 8 ft. 0 in.

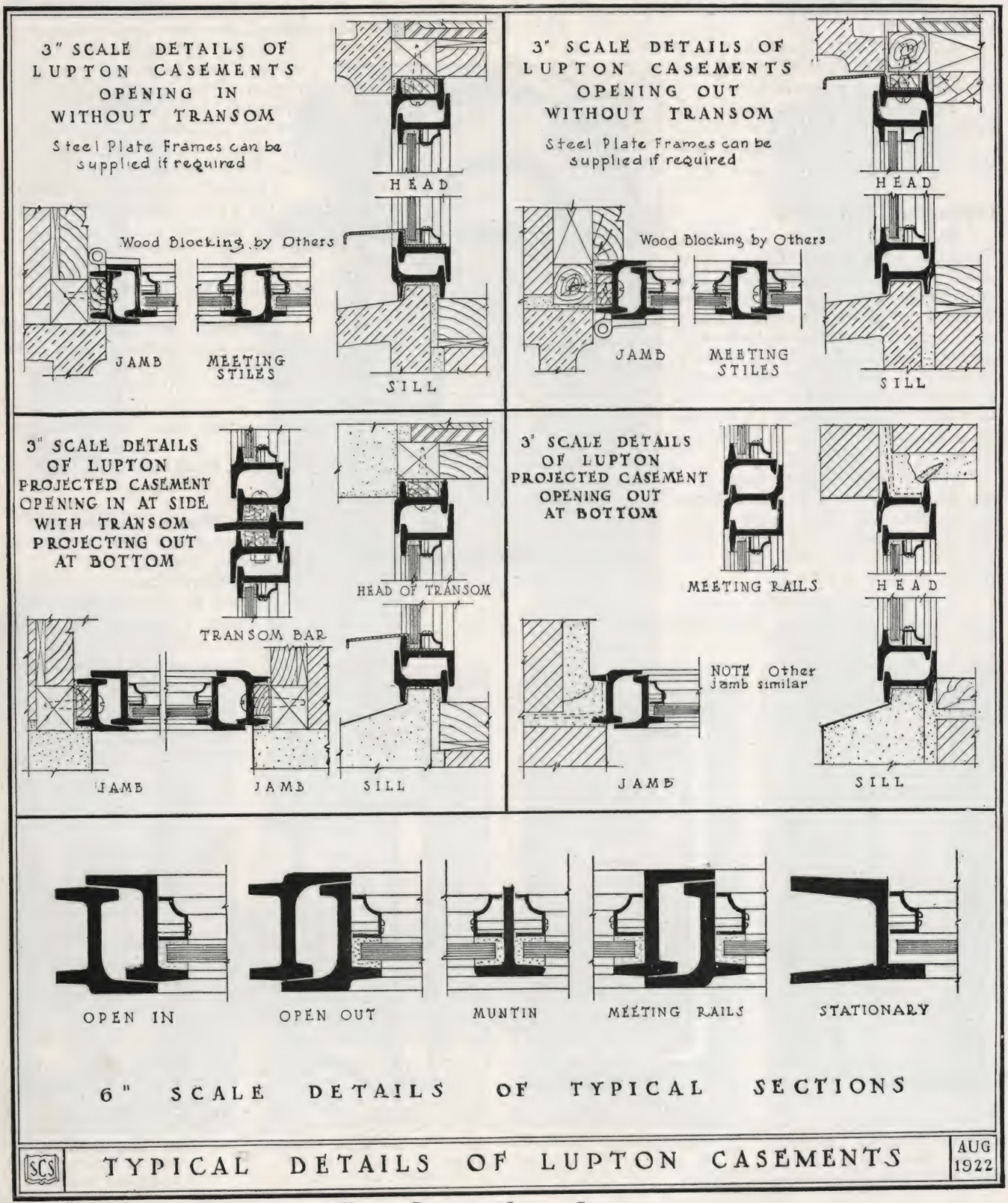
Horizontally Pivoted Casements—Width not to exceed 4 ft. 6 in.; height not to exceed 4 ft. 6 in.

Projected (Opening Top or Bottom)—Width not to exceed 4 ft. 6 in.; height not to exceed 3 ft. 6 in.

Note: When welded muntins are used, these limits may be exceeded.

Apartment and Residence Windows

Lupton Projected Windows (In or Out at Side)—Made from the same sections as used in Lupton Projected Sash (see page 814). They employ the Lupton "Projected" movement opening in or out at side. Stationary sash can also be furnished. They present much the appearance of casements, are moderate in price, well made and fit much closer than ordinary wood windows without weatherstrips. Standard sizes are shown in the diagram and table.



Continued on next page

Lupton Projected Windows (In at Top)—Made for bedrooms facing other rooms across a court or outside passage. With obscure glass or fitted with individual shades, they combine ventilation with privacy. See details below, also see page 814.

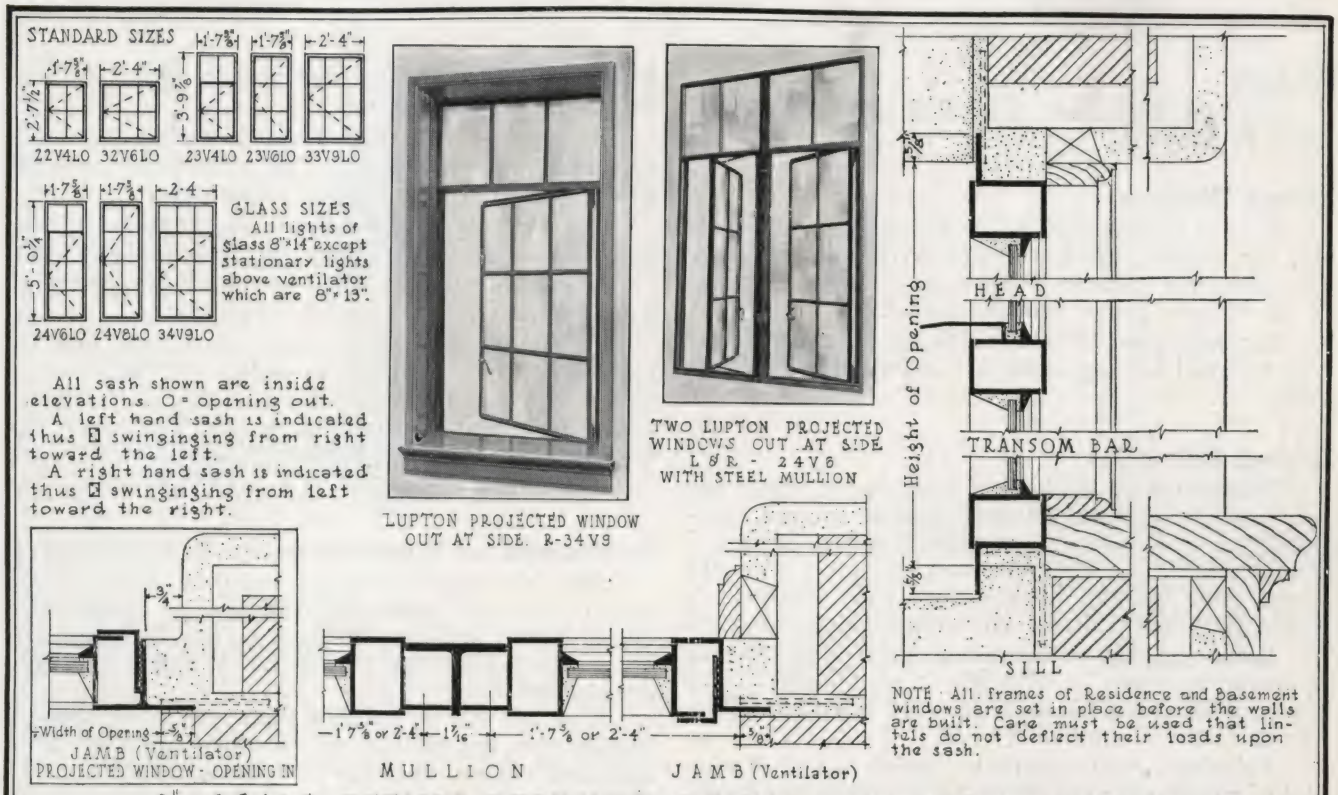
Lupton Basement Windows

Lupton Projected Basement Windows—Intended specially for basement laundries, combining ventilation with privacy. Made 2 lights wide, 2 ft. 7½ in.x1 ft. 11¼ in.; 3 lights wide, 3 ft. 9⅞ in.x1 ft. 11¼ in. Frame is a Z-bar like the standard basement window.

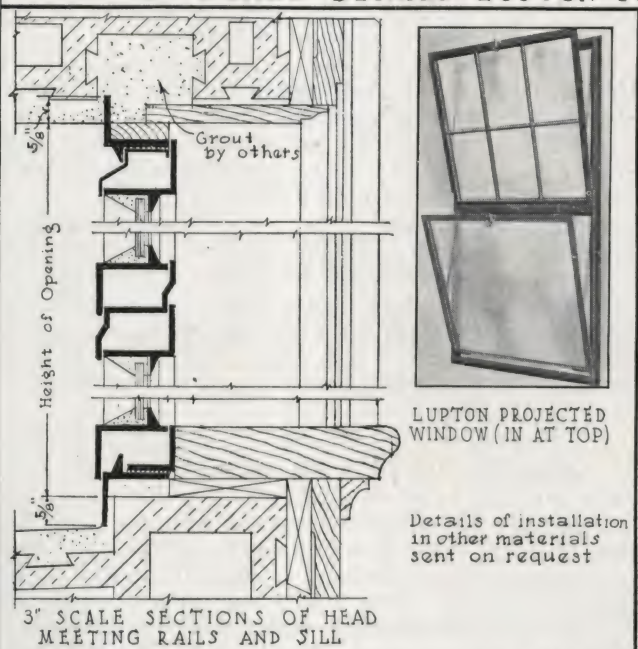
Lupton Standard Basement Windows—Hinged at top and open in (see illustration and sizes below).

Standard sizes carried in stock in warehouses.

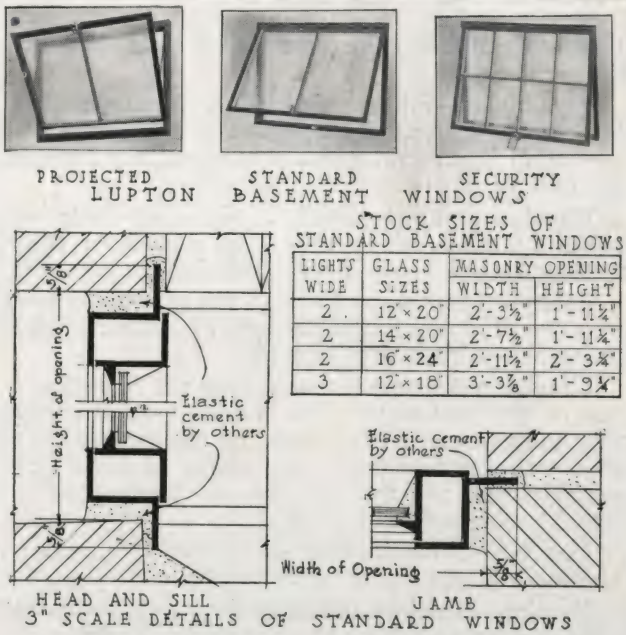
Lupton Security Windows—Take the place of a wood window with exterior iron grille. Their small lights (7x10 in.) prevent access by breaking the glass. They may be padlocked shut or 5 in. open.



3" SCALE DETAILS LUPTON PROJECTED WINDOWS (OUT AT SIDE)



DETAILS OF LUPTON PROJECTED WINDOW (IN AT TOP)



STOCK SIZES OF STANDARD BASEMENT WINDOWS

LIGHTS WIDE	GLASS SIZES	MASONRY OPENING WIDTH	MASONRY OPENING HEIGHT
2	12"×20"	2'-3½"	1'-11¼"
2	14"×20"	2'-7½"	1'-11¼"
2	16"×24"	2'-11½"	2'-3¼"
3	12"×18"	3'-3⅜"	1'-9¼"

DETAILS OF LUPTON BASEMENT WINDOWS

SCS LUPTON APARTMENT, RESIDENCE & BASEMENT WINDOWS AUG. 1922

RICHEY, BROWNE & DONALD, INC.

2101 Flushing Avenue

MASPETH, CITY OF NEW YORK

Products

BROWNE FIREPROOF, WEATHERPROOF and DUSTPROOF WINDOWS.

Browne Windows

Browne windows are of solid steel, built on principles that produce positive results in operation and in overcoming air leakage. The windows may be in groups of one or more pair of sash as desired.

Browne Fire Windows—Same in general appearance, and bearing labels of Underwriters' Laboratories, Inc.

General Description

Frames are of solid rolled steel shapes. Sash are solid rolled steel, firmly hinged together to open (outwardly) and shut under symmetrical control of hinged arms attached to a stationary vertical bar. Arms are forged steel and afford absolutely rigid support. A simple catch lock fastens sash when window is closed.

Glass—Should be furnished and set by glazing contractor and may be of grade or type desired. The glazing is simple and is easily accomplished from the inside by means of removable fillets.

Painting—All metal parts receive one good shop coat of paint before shipment. All finishing coats should be applied by the painting contractor.

Maximum Light and Vision—Sash are continuous from sill to head with no obstruction from horizontal meeting rails.

Ventilation—Full opening value. Ideal changing of air without drafts. The sash control forms flues that draw out all impure air, which is automatically replaced with fresh air.

Weather Protection—The airtight and dustproof qualities of the windows have been established under laboratory test of 140-mile wind velocity.

Safety—All parts of the sash are accessible from the inside. The expense and danger of outside window cleaning and painting are eliminated.

Simplicity—No track mechanism for the accumulation of dirt and water. No weight boxes to invite drafts and annoyance from noise, no chains, weights or pulleys to get out of order; no rattling of parts when open or closed, and the sash can not be disturbed or affected by any action of the wind.

Contact—No metal-to-metal weathering contact. The contact in all cases is metal-to-felt.

Service—Continuous and lasting, with no danger of sagging, warping, racking or wearing off paint.

Operation—Smooth, easy, noiseless, and without physical effort. The sash may be opened to any desired angle and may be secured at three different stages when partly open. Where windows can not be reached from the floor, our standard operator may be applied, locking the window in any position.

Strength—All parts are sturdy and substantial; the greatest care is taken in the construction and assembling to insure rigidity and permanence.

Curtains, etc.—Curtains, shades, Venetian blinds, and inside screens may be applied as for ordinary sash.

Weatherstripping—The weatherstripping is integral with the construction of the window.

Economy—Operating parts are simple and no special hardware is required; absence of maintenance costs; minimum cleaning costs; assurance of maximum results from heating arrangements, and fuel saving due to dependably tight openings are prominent features.

Hardware—Furnished by us with the window.

Specification for Browne Windows of Solid Steel

Furnish window frames and sashes of solid rolled steel of the best quality. Each frame to consist of a head, sill, two jambs and a center vertical division member, to which the sashes are attached by means of forged steel hinged arms.

The two sashes for each frame are to be mounted side by side, hinged together and carried entirely, without other support, upon the four hinged operating arms, two at top and two at bottom, pivotally attached to the center of each sash rail. The operating arms are to have bronze antifriction washers at all bearings.

Sashes shall be provided on the inside with removable glazing fillets of steel, and if divided, steel muntins shall be provided and spaced as shown.

All joints of frames and sashes shall be securely riveted together, and before assembling all parts are to be thoroughly painted, then joined and riveted.

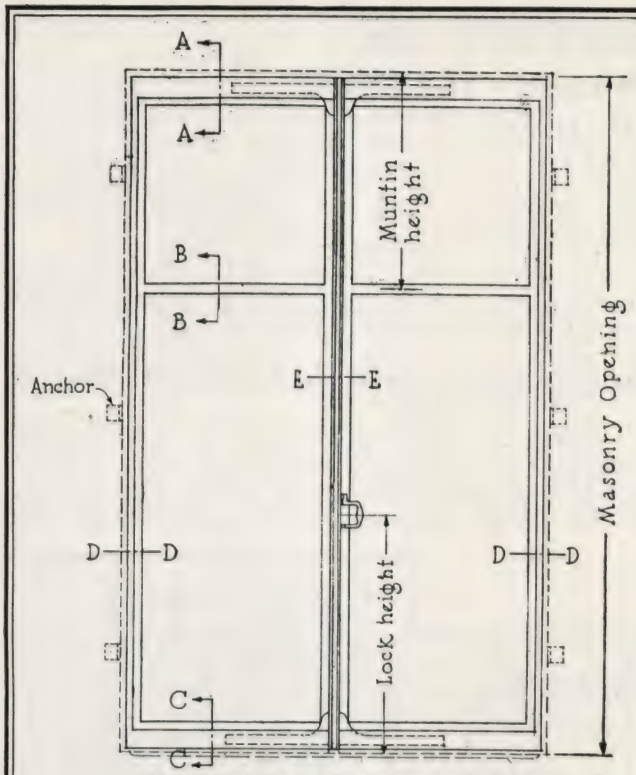
Provide standard "Browne" hardware, consisting of bronze handle and steel catch and holdfast hooks. No other hardware shall be required under this contract. Incorporate in the construction, all-wool resilient felt weather cushions, of the very best grade, securely attached and so placed that there shall be no metal-to-metal at the weathering contacts. All to be painted one shop coat.

Glass will be furnished and set by other contractors.

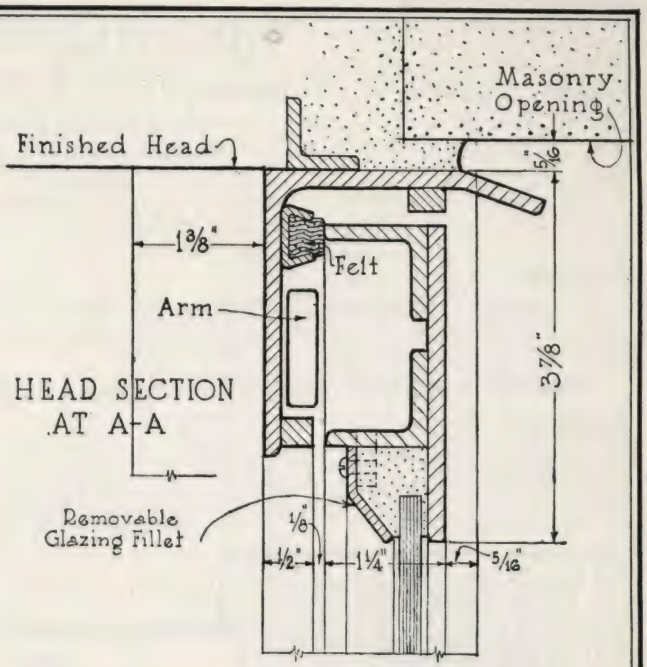
Erection—In all walls except stone masonry, windows shall be set in place by..... and shall be built in by the mason, who shall also thoroughly grout in the frames as walls progress, and point up the outside joint between frame and the wall, so that no calking and pointing with mastic shall be necessary.

In all stone masonry walls, masons shall leave recesses of required size. Windows shall be set in place by.....after the walls are built. The mason shall grout in the frames and thoroughly calk and point the outside joint between frame and stone work with approved mastic cement.

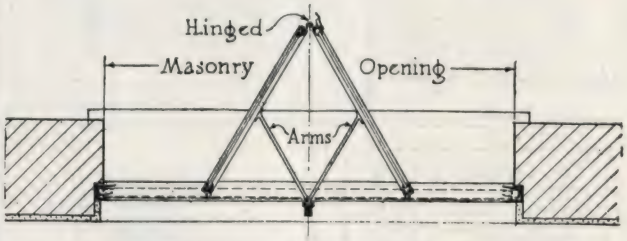
Continued on next page



INTERIOR ELEVATION



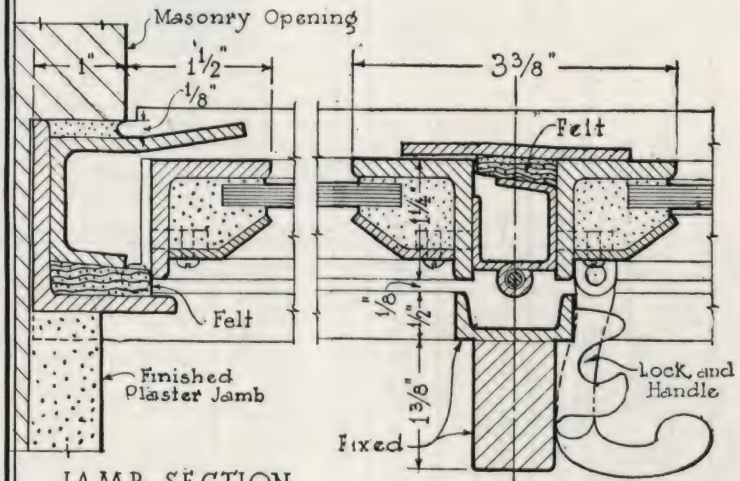
HEAD SECTION AT A-A



PLAN SHOWING WINDOW PARTLY OPEN

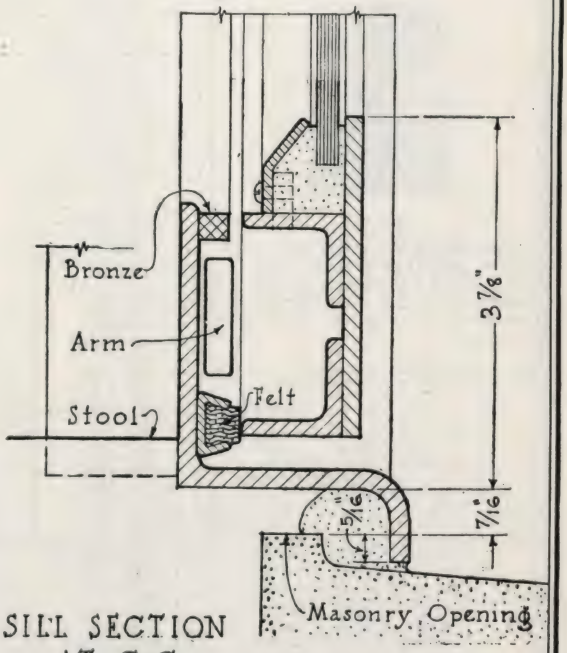
MUNTIN SECTION AT B-B

We reserve the right to modify the details if in our judgment it is advisable



JAMB SECTION AT D-D

SECTION AT E-E



SILL SECTION AT C-C

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	THE BROWNE WINDOW	SCALE 6" EQUALS 1'-0" DATE-JUN.22	DRWG 1

ESTABLISHED 1881

THE WILLIAM BAYLEY CO.

Manufacturers of Steel Windows and Doors

SPRINGFIELD, OHIO

BRANCH OFFICES

NEW YORK, 110 W. 40th Street
Telephone, Bryant 1311

CHICAGO, 6 N. Michigan Boulevard
Telephone, Majestic 7517

BOSTON 9, 73 Tremont Street
Telephone, Haymarket 3285

Sales Agencies in 60 American Cities

Products

PIVOTED VENTILATOR WINDOWS; Continuous and Other Forms of MONITOR WINDOWS; STEEL and GLASS SIDE WALLS and PARTITIONS; STEEL DOORS.

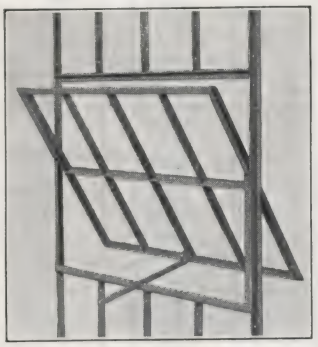
Also Mechanical Operating Devices.

Experience

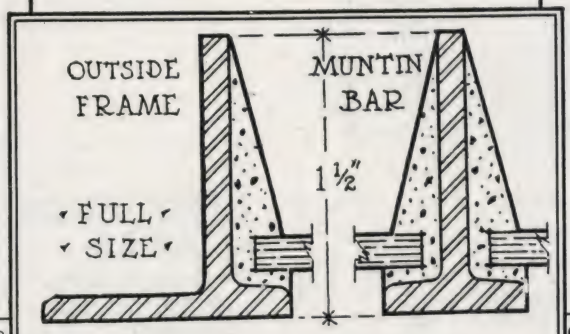
Bayley-Springfield merits are backed by 40 years of continuous manufacturing experience and 11 years of solid bar window sash manufacturing experience. Bayley-Springfield steel windows have been installed in most American and in many foreign cities. Write for illustrated descriptive booklets or general catalogue.

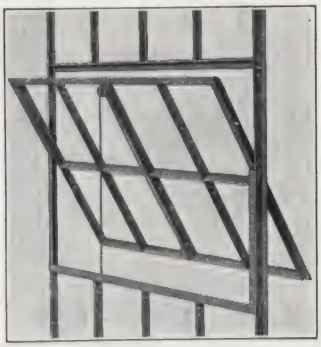
Bayley-Springfield Solid Steel Sidewall Windows (Factory Type)

Warehouse stock windows, ready to ship, are adapted to sidewalls and other vertical planes. There are 25 kinds; glass 14x20 in.; bars 1½ in. deep throughout and construction the same as made-to-order win-

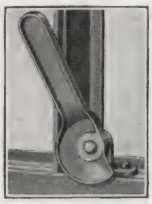


F LOCK BAR ON C P VENTILATOR





C CHAIN CATCH ON C P VENTILATOR



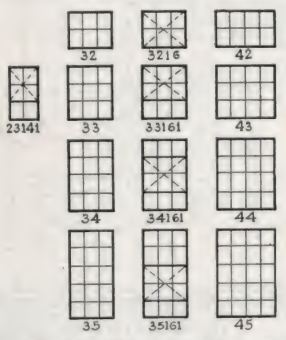
H CAM

Two cams are used on ventilator together with G Push Bar This hardware is an alternative for F- . Must be ordered special at additional cost.

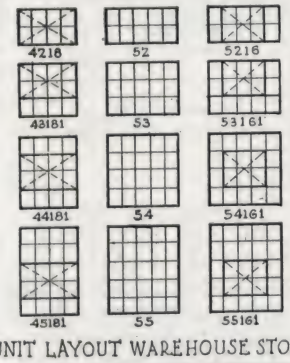
14 x 20 GLASS	Number Lights	Number of Units in Width of Window Opening	TABLE NO. 1 Number of Lights Wide in Each Unit of the Window					Number of Mullions in Width of Window Opening
Height of Window Opening	High		1st Unit	2nd Unit	3rd Unit	4th Unit	5th Unit	
3'-5⅝"	2							
5'-2"	3							
6'-10⅜"	4							
8'-6¾"	5							
Width of Window Opening	Wide							
2'-5⅝"	2	1	2					
3'-8"	3	1	3					
4'-10⅜"	4	1	4					
6'-0¾"	5	1	5					
7'-6"	6	2	3	3				1
9'-10¾"	8	2	4	4				1
11'-4"	9	3	3	3	3			2
12'-3½"	10	2	5	5				1
12'-6⅜"	10	3	3	4	3			2
13'-8¾"	11	3	3	5	3			2
14'-11⅛"	12	3	4	4	4			2
15'-2"	12	4	3	3	3	3		3
16'-1½"	13	3	5	3	5			2
16'-1½"	13	3	4	5	4			2
17'-3⅞"	14	3	5	4	5			2
17'-6¾"	14	4	3	4	4	3		3
18'-6¼"	15	3	5	5	5			2
19'-0"	15	5	3	3	3	3	3	4
19'-11½"	16	4	4	4	4	4		3
19'-11½"	16	4	3	5	5	3		3
20'-2⅜"	16	5	3	3	4	3	3	4
21'-4¾"	17	5	3	3	5	3	3	4
21'-4¾"	17	5	4	3	3	3	4	4
22'-4¼"	18	4	4	5	5	4		3
23'-9½"	19	5	5	3	3	3	5	4
23'-9½"	19	5	4	3	5	3	4	4
24'-9"	20	4	5	5	5	5		3
24'-11⅞"	20	5	4	4	4	4	4	4
26'-2¼"	21	5	3	5	5	5	3	4
26'-2¼"	21	5	4	5	3	5	4	4
27'-4⅝"	22	5	4	5	4	5	4	4
28'-7"	23	5	5	5	3	5	5	4
28'-7"	23	5	4	5	5	5	4	4
29'-9¾"	24	5	5	5	4	5	5	4
30'-11¾"	25	5	5	5	5	5	5	4

C CATCH

This catch is of sherardized steel and is used when ventilator is not within reaching distance of the floor. Vent closes automatically when chain is released.



UNIT LAYOUT WAREHOUSE STOCK



UNIT LAYOUT WAREHOUSE STOCK

THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO, U.S.A.

BAYLEY-SPRINGFIELD SIDE WALL WINDOWS

SCALE OF MEMBERS F.S. DRAWING NO. 1

Continued on next page.

dows. In single or combined units, these windows fill practically any masonry opening and provide practically any desired ventilation.

Ventilators—Center pivoted (CP). Have double weathering contact 1⅝ in. deep at sides and 1¾ in. deep at top and bottom. Exceptionally strong and tight.

Paint—One shop coat of Bayley-Springfield standard red.

Vertical Mullions—M2 for windows 2 lights high; M3, 3 lights high; M4, 4 lights high; M5, 5 lights high.

F Horizontal Mullions—Usually not furnished by this company. Made of structural materials and permit using one unit above another for powerhouses, etc.

Anchorage—Secured in masonry openings by embedding the outside frame member in cement fill. Windows may be clamped to structural steel by use of clips and bolts which are furnished when specified. Type of head, sill and jamb must be stated.

When Writing for Quotations—Avoid delay by giving complete information as follows:

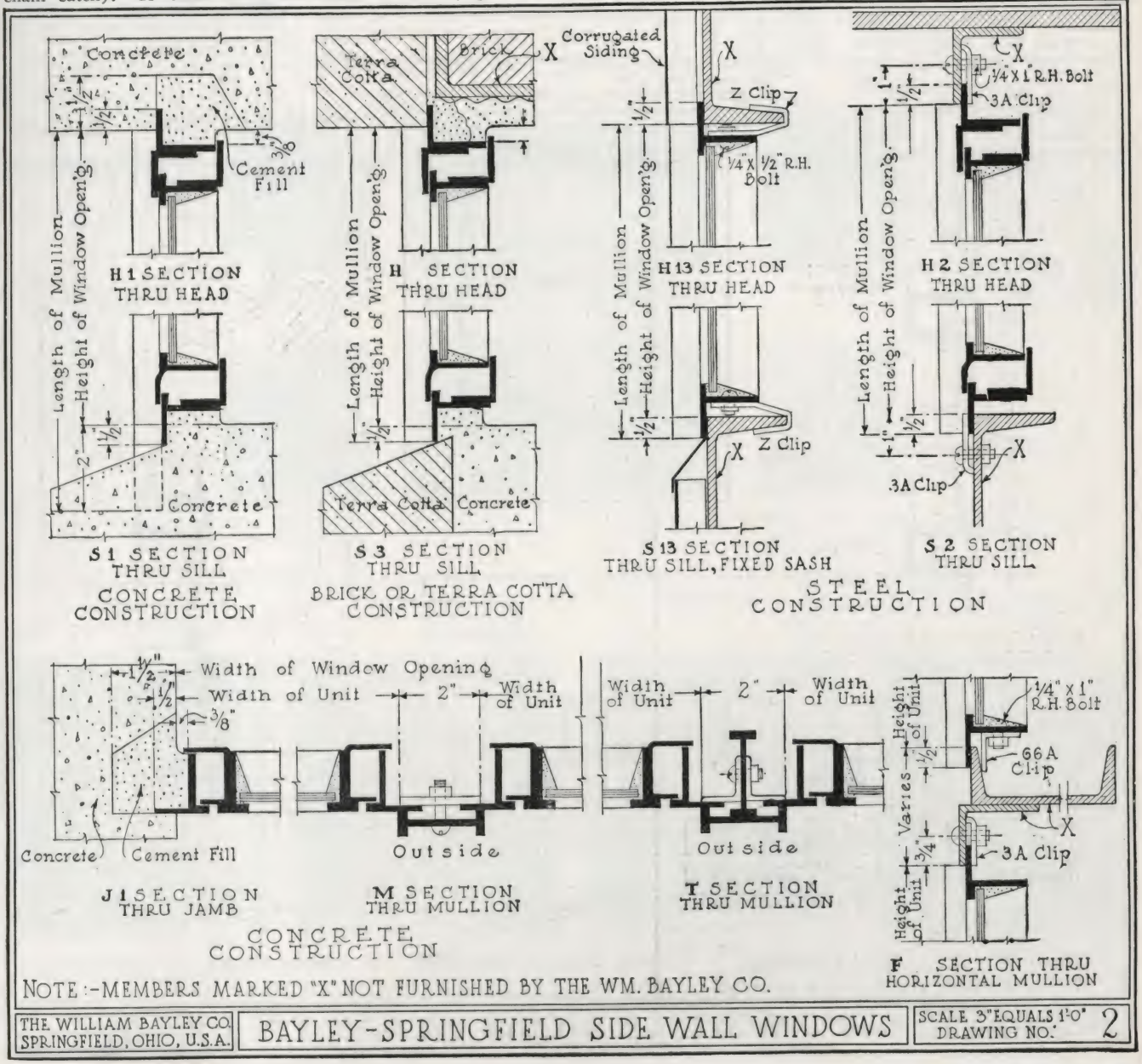
Type of units; number of units; number and kind of mullions, if any; kind of hardware (lock bar, push bar and 2 cams, chain catch). If chain catch hardware is desired, give distance from sill of window to floor. If to be installed in structural steel (anchors consequently required), state where anchors are needed. State when shipment is required.

Quotations cover window units complete with or without ventilators as specified, M mullions as required, with necessary clips and bolts, F lock bars (1 to each ventilator), 4K glazing springs (4 to each light), and (only when specified) 3A or 66A clips spaced about 2-ft. centers for attachment to structural steel.

Quotations do not cover (unless specifically stated) structural materials and parts not established and standardized as parts of steel windows and recognized as such in the practices of the trade, glass, putty, erection, glazing or other labor, etc.

Bayley-Springfield Standard Solid Steel Windows

Include warehouse stock and other most frequently used windows. These windows meet a very wide range of requirements both as to size and ventilation, and, being highly standardized, they are low in price. The Bayley-Springfield catalogue completely describes all classifications and types, including top, bottom and vertically pivoted windows of various layouts. The details shown here apply to these various types.



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Bayley-Springfield Underwriters' Solid Steel Windows

Inspected and approved by the Underwriters' Laboratories, Inc. For walls where the fire risk is great. Ask for complete information.

Bayley-Springfield Continuous Solid Steel Windows

Suitable for either vertical or inclined planes. They are top hung and furnish excellent ventilation. Rain can not enter these windows when open, because of the storm panels. Ask for complete information.

Bayley-Springfield AA Solid Steel Windows for Offices, Schools, etc.

Windows for offices, schools and other finished buildings should be of finished appearance, convenient to operate and weathertight, three well established features of Bayley-Springfield AA solid steel windows.

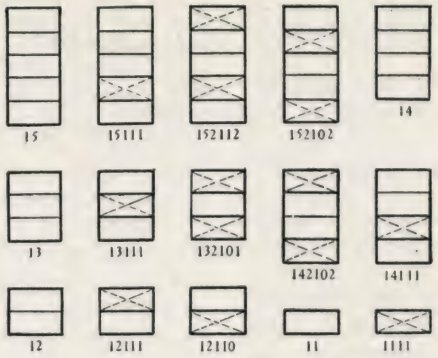
Glass width (see table) ranges between 12 and 49⅛ in.; height may be 18, 20 or 22 in.

Quotations ordinarily include glazing angles. However, when the glass width does not exceed 36¾ in., glazing springs may be substituted. The drawing shows construction, details and how Bayley-Springfield AA windows may be installed in wood or masonry.

Ventilators—One light high, pivoted 3 in. above the center and easily operated. The opened ventilators make no objectionable projection inward and do not obstruct the use of ordinary shades.

Hardware — Polished brass and consists of 2 friction adjusters and 2 cam latches, the latter exerting a very powerful closing force and insuring extreme tightness. Ventilators beyond reach from the floor are fitted with a window pole eye.

Screens—Screens are provided for in a modified type of AA windows. Ask for information.

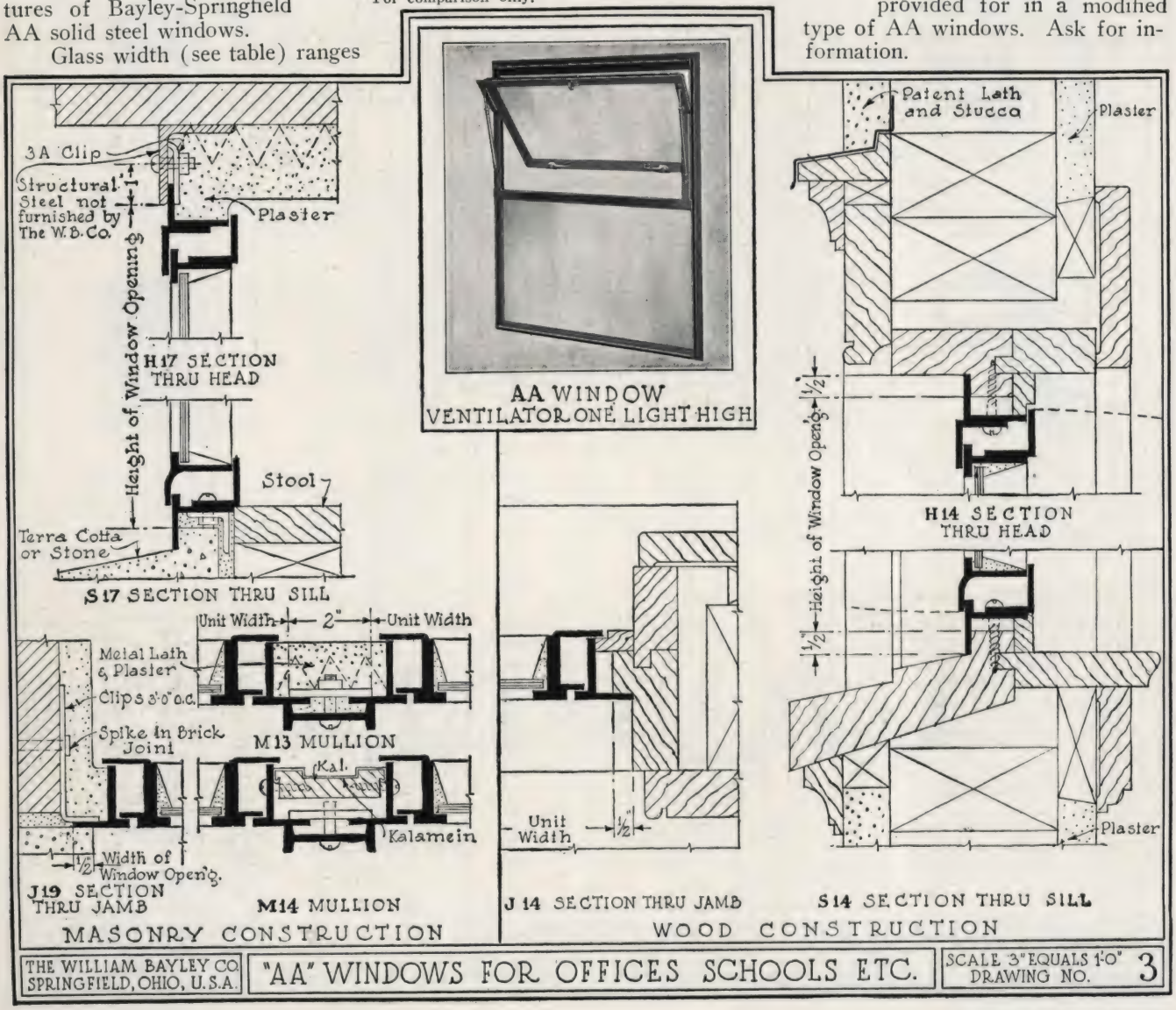


KINDS OF UNITS SHOWING VENTILATOR LOCATIONS

WINDOW OPENINGS AND GLASS SIZES AA WINDOWS

Width, AA Windows		Width, standard windows corresponding in width to AA windows**		Heights, AA Windows			
Glass width	Unit width	Lights wide	Glass width	Lights high	18″ glass	20″ glass	22″ glass
12″	*1′1¼″	1	12″	1	1′7¼″	1′ 9¼″	1′11¼″
14″	*1′3¼″	1	14″	2	3′1⅝″	3′ 5⅝″	3′ 9⅝″
16″	*1′5¼″	1	16″	3	4′8″	5′ 2″	5′ 8″
24⅜″	2′1⅝″	2	12″	4	6′2⅜″	6′10⅜″	7′ 6⅜″
28⅜″	2′5⅝″	2	14″	5	7′8¾″	8′ 6¾″	.....
36¾″	3′2″	3	12″	.....	.....	.....	.....
42¾″	3′8″	3	14″	.....	.....	.....	.....
49⅛″	4′2⅜″	4	12″	.....	.....	.....	.....

*Indicates units not ventilated.
**For comparison only.



Continued on next page

Bayley-Springfield Steel Doors

Complete information regarding these doors, also details and illustrations showing how they combine strength and rigidity with an attractive appearance, will be sent on request.

Construction—Bayley-Springfield steel doors can not sag or twist. Reinforcements (see BEA below) are driven tight into the tubes at the corners and the door is absolutely square and flat while the corners are process welded on the 45° miter. All inequalities of surface due to welding are then ground off. This construction is original with and followed only by THE WILLIAM BAYLEY CO. The plate in the lower part of the door is flanged and securely riveted on all sides. It acts as a truss and adds strength. Bayley-Springfield steel doors will stand rough usage and give permanent satisfaction.

Plate doors are made with their upper and lower portions of plate like the lower portion of the glazed doors described above.

Frames—Hinged door frames should be furnished by THE WILLIAM BAYLEY CO., but no sills are furnished, as our construction assumes masonry sills. If frames are to be furnished with the doors, economy may be effected by sending a rough sketch of door openings and obtaining recommendations.

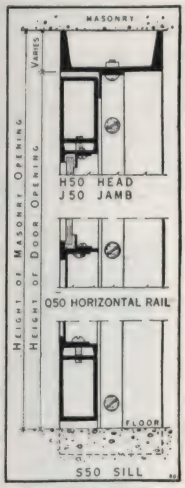
Sliding door frames are usually not required, therefore they are not furnished as standard. Details will be sent on request.

Catalogue—Sectional details and hardware are completely shown and described in catalogue. Write for it.

*STANDARD SIZES OF BAYLEY-SPRINGFIELD STEEL DOORS

Width	Height	Width	Height
TYPE D1—HINGED			
3′0″	7′0″	6′0″	7′0″
4′0″	7′0″	8′0″	7′0″
3′0″	8′0″	6′0″	8′0″
4′0″	8′0″	8′0″	8′0″
4′0″	10′0″	8′0″	10′0″
5′0″	10′0″	10′0″	10′0″
6′0″	10′0″	12′0″	10′0″
5′0″	12′0″	10′0″	12′0″
6′0″	12′0″	12′0″	12′0″
TYPE D11—SLIDING			
2′10″	6′10″	5′8″	6′10″
3′10″	6′10″	7′8″	6′10″
3′10″	7′10″	7′8″	7′10″
4′10″	7′10″	9′8″	7′10″
4′10″	9′10″	9′8″	9′10″
5′10″	9′10″	11′8″	9′10″
5′10″	11′10″	11′8″	11′10″

*Hinged doors: measure between frames for width and from underside of frame at head to sill for height; for clear openings, deduct width of stop angles.
Sliding doors: measure clear opening.

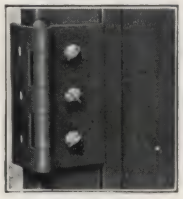


Sectional Detail of Hinged Door

Y52 Bitted Key Lock Unfinished handles

Y51 Cylinder Lock Polished Bronze

Y70 Extension Bolt for Hinged Double Doors

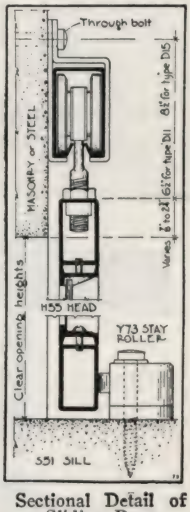

24A Hinge

Y54 Panic Release for Single Doors

Y55 Panic Release Outside lock may be omitted

Y72 Hasp Bolt for Double Doors

BEA Corner Reinforcement. Tubes are welded



Sectional Detail of Sliding Door

DETAILS OF BAYLEY-SPRINGFIELD STEEL DOORS

D1 Double Door, Y71 Cylinder Lock and Y70 Extension Bolt

D1 Door, and Odd-shaped Window Above

D15 Sliding Single Door Installed in Masonry Wall

D11 Double Door Filled with Plate and with a D1 Door Pass Door

BAYLEY-SPRINGFIELD STEEL DOORS

Design and construction permits their easily meeting all standard and most special requirements. When used in combination with transoms, or side lights, or both, openings of almost any size or shape can be satisfactorily handled. Call on our Engineering Department for assistance in solving special problems

THE BOGERT & CARLOUGH CO.

Manufacturers of Steel Sash, Doors and Partitions

PATERSON, N. J.

BRANCH SALES OFFICES IN ALL PRINCIPAL CITIES
CANADIAN MANUFACTURER: STEEL SASH LIMITED, LONDON, ONTARIO

Products

BOCA SOLID STEEL SASH; BOCA STEEL PARTITIONS; BOCA STEEL DOORS (Hinged and Sliding); BOCA "TOP SLIDING" SASH; BOCA CONTINUOUS SASH (Top Hung and Center Pivoted).

Also manufacturers of Boca Powerhouse Sash, Basement Sash, and Mechanical Operators.

BOCA SOLID STEEL SASH
TRADE-MARK

Boca Solid Steel Sash

Manufactured from heavy, specially rolled solid steel members, 1¼ in. in depth. These sash are adapted to all types of construction. The straight lines of Boca solid steel sash lend a feeling of character not obtainable with the use of moulded sections.

Patented Boca Lock Joint — Illustrations shown below indicate the rigid construction of this lock joint.

The metal is not distorted and the surface has a smooth and neat appearance.

This joint produces a rigid sash that does not get out of square.

Ventilators — Equipped with specially patented 3-point weathering members.

This 3-point contact is a special feature of this sash and has proved its value in giving 100% weatherproof construction.

A special section is supplied at head of ventilator, forming a drip.

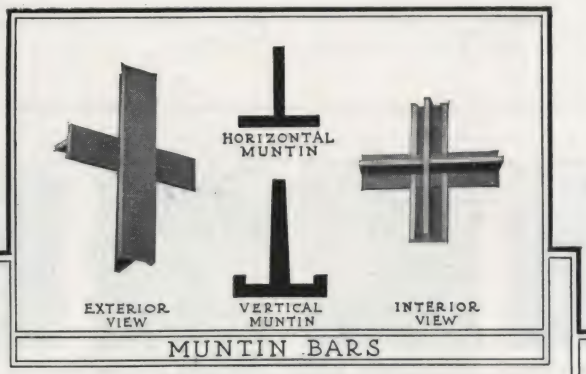
Glass for Ventilators—Glass must be trimmed 1⅛ in. at sides, and ¾ in. at top and bottom of ventilators.

Putty Cushion—The grooves in the vertical muntin bar afford the best conditions for back puttying the glass. The smooth putty cushion absolutely prevents leakage and protects the glass from the usual breakage.

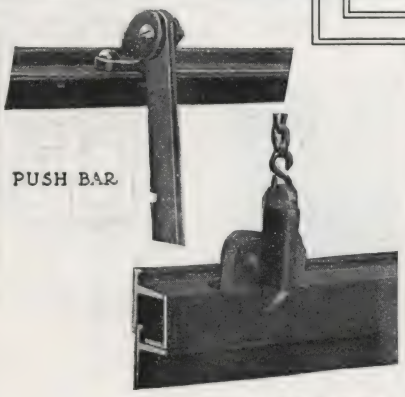
Glazing—Four special steel wire glazing clips are supplied for each light of glass. Glass is not included unless by special arrangement.

Boca Hinge—This type of hinge permits a continuous weathering of ventilator as the upper portion of weathering laps inside the lower.

Hardware — A notched push bar with attachment and catch for lower end are regularly supplied with sash. Other devices for operating ventilators, such as spring catch and chain, will be supplied where specified.

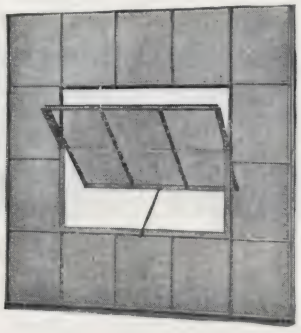


MUNTIN BARS

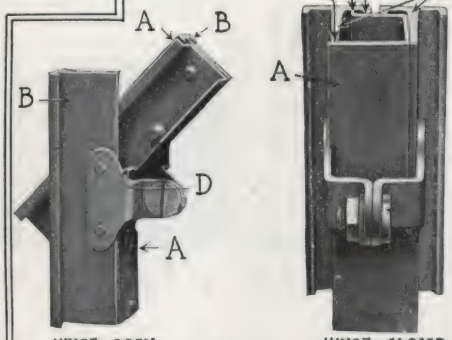


SPRING CATCH

HARDWARE



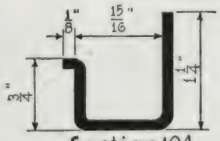
SASH·UNIT·OPERATED·BY·PUSH·BAR



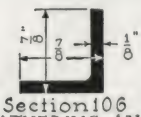
HINGE OPEN — HINGE CLOSED

A-Channel Weathering Section 104.
B-Vertical Tee Section 101.
C-Three Point Weathering.
D-Weathering Overlap.

BOCA VENTILATOR AT HINGE

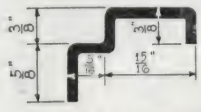


Section 104
THREE POINT WEATHERING MEMBER - FOR VENTILATOR

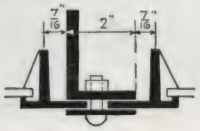


Section 106
WEATHERING ANGLE BOTTOM OF VENTILATOR

Section 109
MEMBER AT HEAD OF VENTILATOR

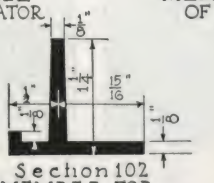


Section 105
WEATHERING MEMBER AT HEAD OF VENTILATOR

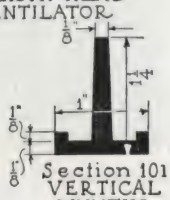


STANDARD MULLION

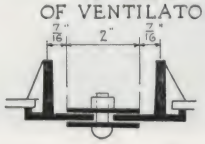
Section 103
HORIZONTAL MUNTIN



Section 102
MEMBER FOR HEAD JAMB AND SILL



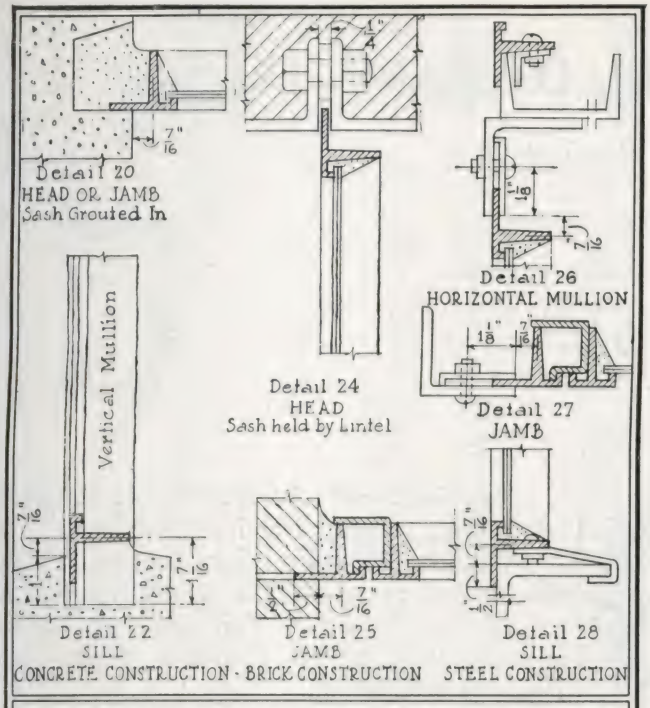
Section 101
VERTICAL MUNTIN



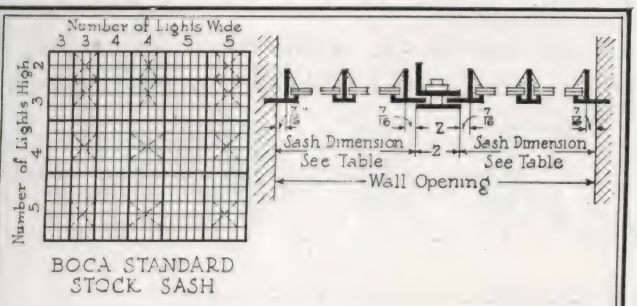
SPECIAL MULLION

FRAME AND MULLION MEMBERS

Continued on next page



BOCA SIDEWALL SASH CONSTRUCTION



BOCA STANDARD STOCK SASH

HEIGHT DIMENSIONS

No. Lts in Hght of Opening	No Units High	No Lights in Hght Units	12"X18" GLASS	14"X20" GLASS
2	1	2	3'-1 5/8"	3'-5 5/8"
3	1	3	4'-8"	5'-2"
4	1	4	6'-2 3/8"	6'-10 3/8"
5	1	5	7'-8 3/4"	8'-6 3/4"
6	1	6	9'-3 1/8"	10'-3 1/8"
7	1	7	10'-9 1/2"	11'-11 1/2"

WIDTH DIMENSIONS
Widths shown below furnished in heights shown in same column above

No. Lts in Width of Opening	No Units Wide	No Lights in Width Units	12"X18" GLASS	14"X20" GLASS
3	1	3	3'-2"	3'-8"
4	1	4	4'-2 3/8"	4'-10 3/8"
5	1	5	5'-2 3/4"	6'-0 3/4"
6	1	6	6'-3 1/8"	7'-3 1/8"
6	2	3,3	6'-6"	7'-6"
8	2	4,4	8'-6 3/4"	9'-10 3/4"
9	3	3,3,3	9'-10"	11'-4"
10	2	5,5	10'-7 1/2"	12'-3 1/2"
10	3	3,4,3	10'-10 3/8"	12'-6 3/8"
11	3	3,5,3	11'-10 3/4"	13'-8 3/4"
11	3	4,3,4	11'-10 3/4"	13'-8 3/4"
12	2	6,6	12'-8 1/4"	14'-8 1/4"
12	3	4,4,4	12'-11 1/8"	14'-11 1/8"
12	3	3,6,3	12'-11 1/8"	14'-11 1/8"
13	3	4,5,4	13'-11 1/2"	16'-1 1/2"
13	3	5,3,5	13'-11 1/2"	16'-1 1/2"
14	3	5,4,5	14'-11 7/8"	17'-3 7/8"
14	3	4,6,4	14'-11 7/8"	17-3 7/8"

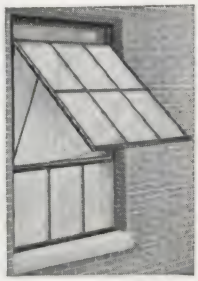
DIMENSIONS OF BOCA STANDARD SASH

Boca "Top Sliding" Sash

The Boca "Top Sliding" ventilator is so constructed that when opening, the head of the ventilator slides in the plane of the sash while the sill of the ventilator swings outward. The head is hinged on bronze slides which move up and down in the groove formed by the channel weathering shown on opposite page. This permits the entire window opening to be ventilated, thus 100% ventilation is secured. The weight of the ventilator is carried by side arms, so accurately, that at slight effort it can be opened to any degree.

This type of ventilator does not project inside the window. It permits the use of shades and screens in schools, hospitals, office and public buildings.

One of the illustrations shows this type of ventilator in its reversible position.



EXTERIOR VIEW

VIEW OF VENTILATOR REVERSED

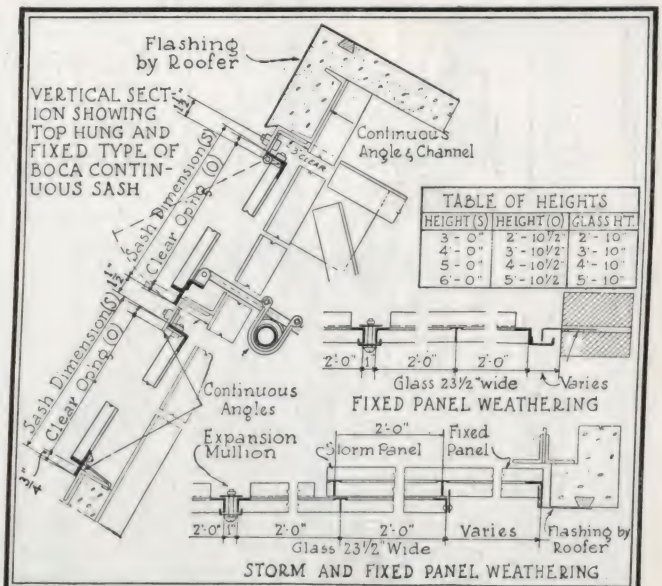
INTERIOR VIEW

Boca Steel Doors (Hinged or Sliding)

The stiles of these doors are made of seamless rectangular steel tubing 2½ in. in width and 1½ in. in depth, accurately mitered and welded at corners. The intermediate horizontal member is of the same material welded in position. The upper panel consists of a Boca sash unit securely bolted in place. The lower panel consists of a ⅛-in. steel plate and a 1¼ in. x ⅞ in. x ⅛ in. angle riveted along its edges and bolted in position.

Boca Steel Partitions

These partitions are constructed of regular sash units joined together with mullions, the lower part of units being of sheet steel. Door jambs, transoms and doors are supplied as required.



DETAILS OF BOCA CONTINUOUS SASH

CRESCENT STEEL COMPANY

Solid Section Steel Sash

MAIN OFFICE AND FACTORY
515-525 West Tesson Street
ST. LOUIS, MO.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

Products

CRESCENT ROLLED STEEL SIDEWALL SASH in the following types: Pivoted Factory, Powerhouse and Underwriters' Labeled.

Also manufacturers of Monitor Sash in the following types: Pivoted, Continuous Center Pivoted and Continuous Top Hung.

Sash Operating Devices.

TRADE-MARK

Crescent Rolled Steel Sidewall Sash

Manufactured from rolled steel sections 1⅜ in. deep.

Joint—Horizontal and vertical muntin joints have dovetailed miters interlocking the bars. Bars are interwoven so as to form a basket weave. Each muntin joint is welded.

Ventilator—Continuous double contact weathering; windproof and weatherproof.

Our special rolled ventilator bars are of such construction as to form a double weathering around entire ventilator. This double weathering is rolled within the bar, making a positive, continuous double contact.

Sections—Sections used in Crescent rolled steel sash are the result of years of study in steel windows.

Our frame bar is so constructed that grouting is therefore unnecessary, thus reducing the cost of installation.

Our muntin and ventilator sections are extra heavy and are so constructed that they will last for an unlimited period of time.

STANDARD OPENINGS OF CRESCENT ROLLED STEEL SIDEWALL SASH

12" BY 18" GLASS

Width of window opening ft.	in.	Total no. of lights wide	No. of units	Number of lights wide: 1st unit	2d unit	3d unit	4th unit	5th unit	6th unit	Mullion distance inches
3	2	3	1	3	.....	.....	.....	.....	.....	.....
4	2⅜	4	1	4	.....	.....	.....	.....	.....	.....
5	2¾	5	1	5	.....	.....	.....	.....	.....	.....
6	6	6	2	3	3	.....	.....	.....	.....	2
8	6¾	8	2	4	4	.....	.....	.....	.....	2
9	10	9	3	3	3	3	.....	.....	.....	2
10	7½	10	2	5	5	.....	.....	.....	.....	2
10	10⅜	10	3	3	4	3	.....	.....	.....	2
11	10¾	11	3	3	5	3	.....	.....	.....	2
11	10¾	11	3	4	3	4	.....	.....	.....	2
12	11⅛	12	3	4	4	4	.....	.....	.....	2
13	2	12	4	3	3	3	3	.....	.....	2
13	11½	13	3	4	5	4	.....	.....	.....	2
13	11½	13	3	5	3	5	.....	.....	.....	2
14	11⅞	14	3	5	4	5	.....	.....	.....	2
15	2¾	14	4	3	4	4	3	.....	.....	2
16	0¼	15	3	5	5	5	.....	.....	.....	2
16	6	15	5	3	3	3	3	3	.....	2
17	3½	16	4	4	4	4	4	.....	.....	2
17	6⅜	16	5	3	3	4	3	3	.....	2
18	6¾	17	5	3	4	3	4	3	.....	2
18	6¾	17	5	3	3	5	3	3	.....	2
19	4¼	18	4	4	5	5	4	.....	.....	2
19	7⅛	18	5	3	4	4	4	3	.....	2
19	10	18	6	3	3	3	3	3	3	2
20	7½	19	5	5	3	3	3	5	.....	2
20	7½	19	5	4	4	3	4	4	.....	2
21	5	20	4	5	5	5	5	.....	.....	2
21	7⅞	20	5	4	4	4	4	4	.....	2
21	10¾	20	6	3	3	4	4	3	3	2
22	8¼	21	5	4	4	5	4	4	.....	2
22	8¼	21	5	3	5	5	5	3	.....	2
23	8⅝	22	5	4	5	4	5	4	.....	2
23	11½	22	6	3	4	4	4	4	3	2
23	11½	22	6	3	3	5	5	3	3	2
24	9	23	5	4	5	5	5	4	.....	2
24	9	23	5	5	5	3	5	5	.....	2
25	9⅜	24	5	5	5	4	5	5	.....	2
26	0¼	24	6	4	4	4	4	4	4	2

14" BY 20" GLASS

Width of window opening ft.	in.	Total no. of lights wide	No. of units	Number of lights wide: 1st unit	2d unit	3d unit	4th unit	5th unit	6th unit	Mullion distance inches
3	8	3	1	3	.....	.....	.....	.....	.....	.....
4	10⅜	4	1	4	.....	.....	.....	.....	.....	.....
6	0¾	5	1	5	.....	.....	.....	.....	.....	.....
7	6	6	2	3	3	.....	.....	.....	.....	2
9	10¾	8	2	4	4	.....	.....	.....	.....	2
11	4	9	3	3	3	3	.....	.....	.....	2
12	3½	10	2	5	5	.....	.....	.....	.....	2
12	6⅜	10	3	3	4	3	.....	.....	.....	2
13	8¾	11	3	3	5	3	.....	.....	.....	2
13	8¾	11	3	4	3	4	.....	.....	.....	2
14	11⅛	12	3	4	4	4	.....	.....	.....	2
15	2	12	4	3	3	3	3	.....	.....	2
16	1½	13	3	4	5	4	.....	.....	.....	2
16	1½	13	3	5	3	5	.....	.....	.....	2
17	3⅞	14	3	5	4	5	.....	.....	.....	2
17	6¾	14	4	3	4	4	3	.....	.....	2
18	6¾	15	3	5	5	5	.....	.....	.....	2
19	0	15	5	3	3	3	3	3	.....	2
19	11½	16	4	4	4	4	4	.....	.....	2
20	2⅜	16	5	3	3	4	3	3	.....	2
21	4¾	17	5	3	3	5	3	3	.....	2
21	4¾	17	5	3	4	3	4	3	.....	2
22	4¼	18	4	4	5	5	4	.....	.....	2
22	7⅛	18	5	3	4	4	4	3	.....	2
22	10	18	6	3	3	3	3	3	3	2
23	9½	19	5	5	3	3	3	5	.....	2
23	9½	19	5	4	4	3	4	4	.....	2
24	9	20	4	5	5	5	5	.....	.....	2
24	11⅞	20	5	4	4	4	4	4	.....	2
25	2¾	20	6	3	3	4	4	3	3	2
26	2¼	21	5	4	4	5	4	4	.....	2
26	2¼	21	5	3	5	5	5	3	.....	2
27	4⅝	22	5	4	5	4	5	4	.....	2
27	7½	22	6	3	4	4	4	4	3	2
27	7½	22	6	3	3	5	5	3	3	2
28	7	23	5	4	5	5	5	4	.....	2
28	7	23	5	5	5	3	5	5	.....	2
29	9⅜	24	5	5	5	4	5	5	.....	2
30	0¼	24	6	4	4	4	4	4	4	2

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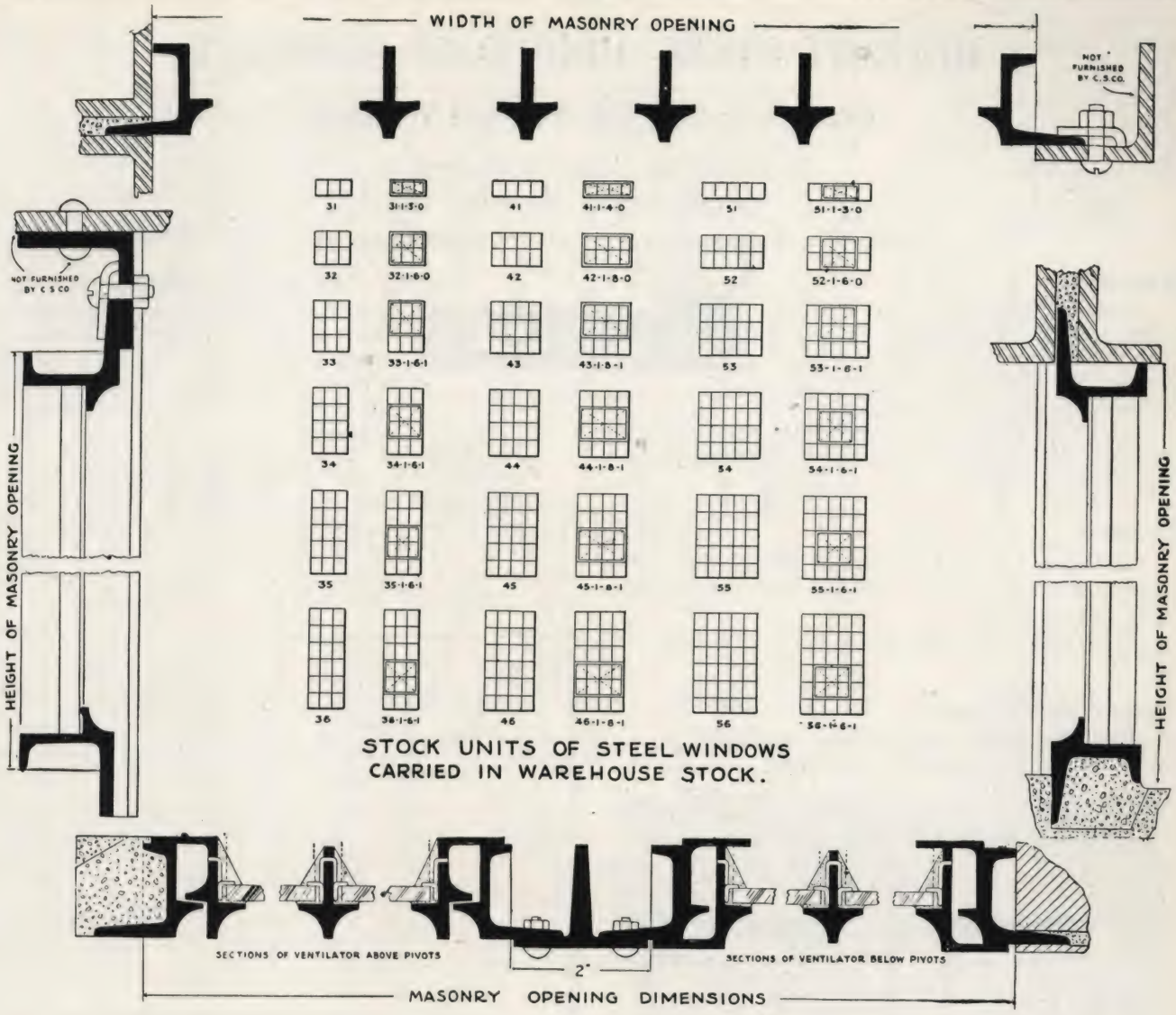
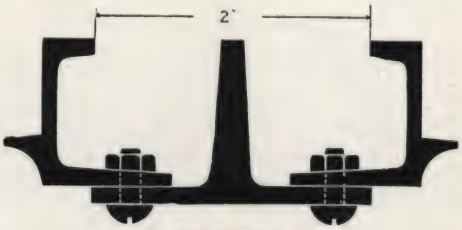
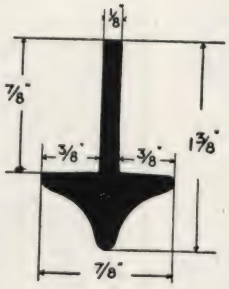
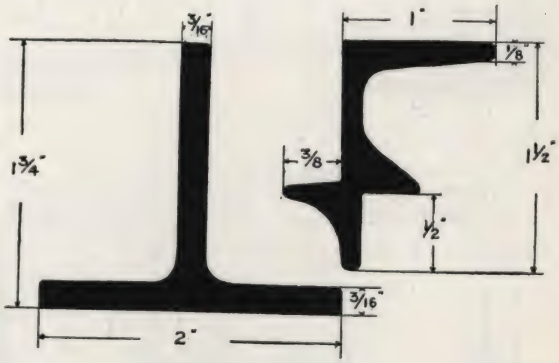


STOCK UNITS OF STEEL WINDOWS CARRIED IN WAREHOUSE STOCK.



MULLION A





14/20	14/20	14/20	14/20	14/20
14/20	13 1/4 / 19 1/4	14/19 1/4	13 1/4 / 19 1/4	14/20
14/20	13 1/4 / 19 1/4	14/19 1/4	13 1/4 / 19 1/4	14/20
14/20	14/20	14/20	14/20	14/20

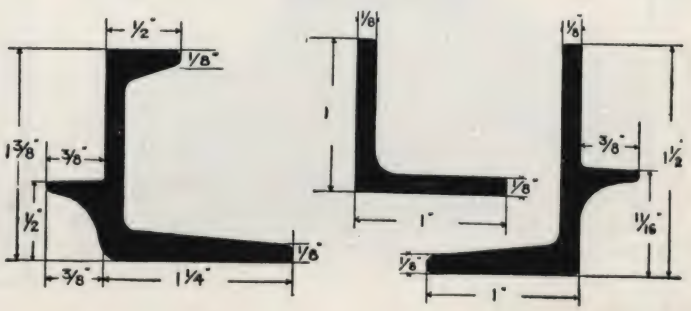
12/18	12/18	12/18	12/18	12/18
12/18	11 1/4 / 17 1/4	12/17 1/4	11 1/4 / 17 1/4	12/18
12/18	11 1/4 / 17 1/4	12/17 1/4	11 1/4 / 17 1/4	12/18
12/18	12/18	12/18	12/18	12/18

12" x 18" GLASS

Height of Window Opening	No. of Lights High
3'-1 5/8"	2
4'-8"	3
6'-2 3/8"	4
7'-8 3/4"	5
9'-3 1/8"	6

14" x 20" GLASS

Height of Window Opening	No. of Lights High
3'-5 5/8"	2
5'-2"	3
6'-10 3/8"	4
8'-6 3/4"	5
10'-3 1/8"	6



DETROIT STEEL PRODUCTS COMPANY

Manufacturers of Solid Steel Windows

2250 East Grand Boulevard
DETROIT, MICH.

BRANCH OFFICES AND DISTRIBUTING AGENTS IN ALL PRINCIPAL CITIES

Products

PIVOTED SIDEWALL SASH; COUNTERBALANCED WINDOWS; CONTINUOUS SASH; DETENTION SASH; STEEL BASEMENT WINDOWS, STEEL DOORS; REVERSIBLE VENTILATOR WINDOWS.

Also Camber and Circular Headed Sash, Economy Casements, Steel Partitions and a complete line of Sash Operating Devices.

Fenestra

TRADE-MARK

Catalogue

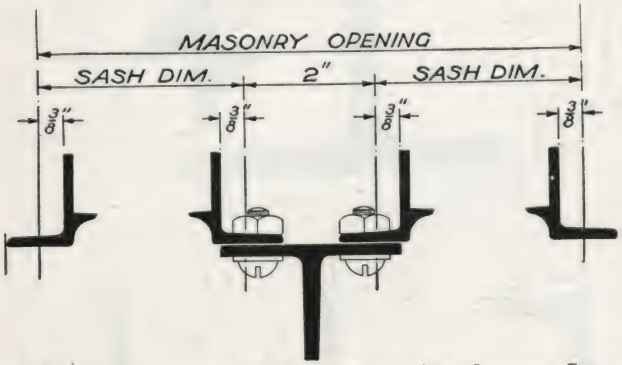
Complete catalogue on any or all of the above products sent on request. Ask for the Fenestra "Blue Book" on steel sash.

Designing and engineering advice supplied free without obligation.

Pivoted Sidewall Sash

Supplied in the accompanying standard types and sizes from warehouse stocks in 25 cities.

PIVOTED SIDEWALL SASH



TWO UNITS OF STOCK SASH COMBINED IN ONE OPENING SHOWING JAMB AND MULLION DETAILS AND GLASS SIZES

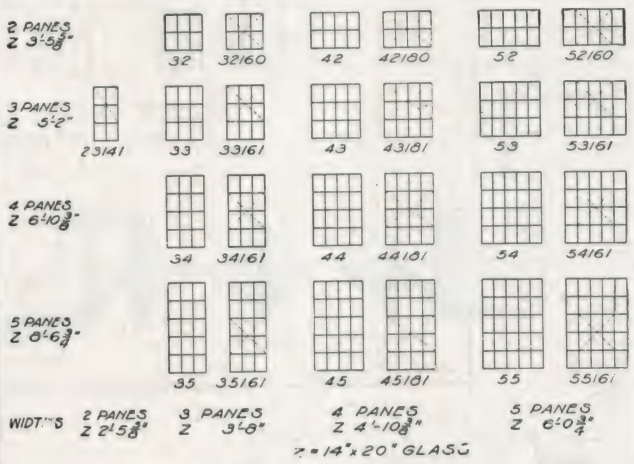
Ventilators pivoted 2 in. above center.

May be used in openings accommodating single units, or multiple units combined by use of our standard T-bar mullion.

Standard Fenestra hardware consisting of cam latch and stay or cam latch and chain supplied without extra charge when specified with orders. Glass size, 14x20 in. Ventilator lights cut down 1 in. along edge abutting on the sash.

See details on following page.

Special sash, with larger or smaller glass sizes, special arrangement of ventilators, or other unusual features are not carried in stock but are designed to fit the individual need. Consultation with our nearest branch office or engineer, is earnestly recommended when designs of this kind are contemplated.



STOCK TYPES OF PIVOTED SIDEWALL SASH

The table of over-all dimensions will help you where you want to put two or more units in one opening.

In the first column at the left, you will find sash heights of all stock windows and below these, over-all widths.

Suppose you want to fill an opening about 7 ft. high x 15 ft. wide:

Under "Sash heights," you find a dimension 6 ft. 10⅜ in., which is probably close enough to 7 ft. to serve your purpose, and under "Lights high" you will find the figure "4," which shows the windows will be 4 lights high. Glancing down the same column you find an over-all width dimension of 14 ft. 11⅛ in., and opposite this figure, in the next column to the right, you find the number 12, which means that the bay of sash when complete will be 12 lights of glass wide. In the next column, the figure 3 indicates that you will need 3 units or windows and therefore 2 mullions to join them together. The last column gives the figures 4, 4, 4, which indicate that each of the units will be 4 lights wide. Therefore you will want to use 3 Fenestra windows Z-44181 and two Z-4 mullions. The exact dimensions of your masonry opening will be 14 ft. 11⅛ in. wide x 6 ft. 10⅜ in. high.

DIMENSIONS OF COMBINED UNITS OF STOCK SASH

Sash heights	Lights high	No. of lights in total width of opening.	No. of sash units to fill opening	No. of lights in each unit.
3' 5⅝"	2			
5' 2"	3			
6'10⅜"	4			
8' 6¾"	5			
SASH WIDTHS Any width except 2'5⅝" may be had in any height				
2' 5⅝"		2	1	2
3' 8"		3	1	3
4'10⅜"		4	1	4
6' 0¾"		5	1	5
7' 6"		6	2	3, 3
9'10¾"		8	2	4, 4
11' 4"		9	3	3, 3, 3
12' 3⅛"		10	2	5, 5
12' 6⅜"		10	3	3, 4, 3
13' 8¾"		11	3	3, 5, 3
14'11⅛"		12	3	4, 4, 4
16' 1⅜"		13	3	4, 5, 4
16' 1½"		13	3	5, 3, 5
17' 3⅞"		14	3	5, 4, 5
17' 6¾"		14	4	3, 4, 4, 3
18' 6¼"		15	3	5, 5, 5
19'11½"		16	4	4, 4, 4, 4
22' 4¼"		18	4	4, 5, 5, 4
23' 9½"		19	5	5, 3, 3, 3, 5
24' 9"		20	4	5, 5, 5, 5

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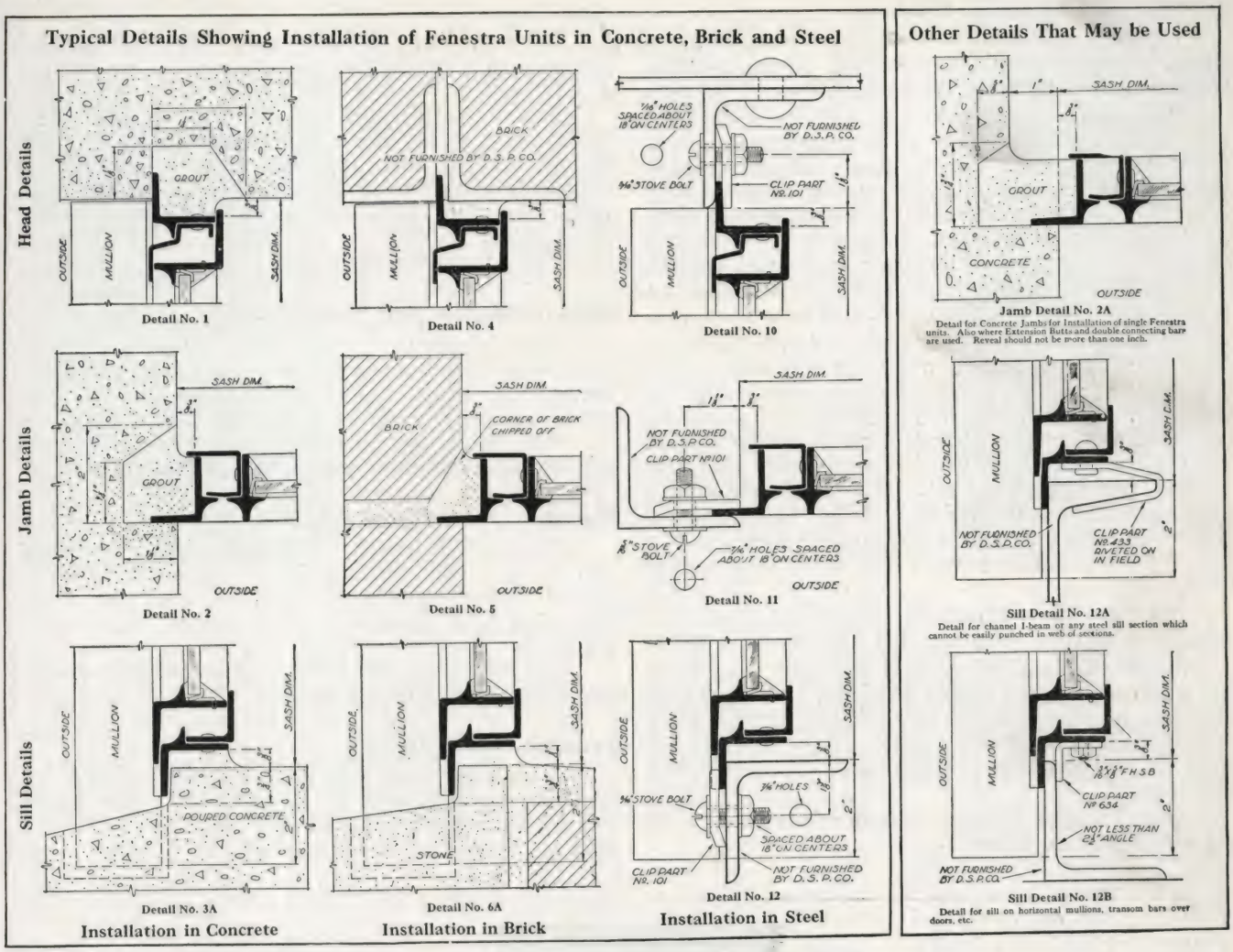


INSTALLATION DETAILS OF PIVOTED SIDEWALL SASH

Fenestra Counterbalanced Windows

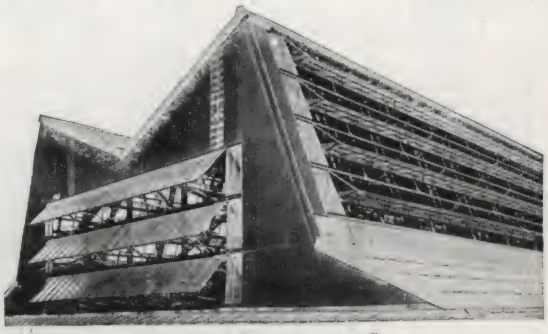
For schools, offices and public buildings. Ventilators, balanced against each other, slide vertically providing 50% ventilation. Ventilators of rolled steel channel shaped sections sliding in 4-in. steel I-beam jambs between flaring channel guides which permit easy operation without rattle or air leakage. Bronze weathering sections inserted at the jambs as an extra if desired.

Designed in 36, 42, 48, 54, 60, 66 and 72 in. glass heights and 14, 16, 18, 20, 22 and 24 in. glass widths. Types 2, 3 and 4 lights wide. Horizontal muntins supplied only when specified. Shipped "knocked down" and erected by our own erection department. Full catalogue with details, dimensions and photographs sent free on request.

FENESTRA COUNTERBALANCED SASH

Fenestra Continuous Sash

For monitor and saw-tooth roof construction especially desirable for all types of "hot" buildings. Designed to be top hung, center pivoted or stationary. Made from special solid rolled steel sections in units 20 ft. wide and in 3, 4, 5 and 6 ft. heights. Any number of standard units may be joined to form a continuous run opened and closed mechanically from one station. Complete details on request.



FENESTRA CONTINUOUS SASH

Continued on next page

Fenestra Steel Basement Windows

Designed for use in residences, apartments and stores. Easily installed in brick, brick veneer, concrete, concrete block, field stone, tile or any other construction.

Advantages—Admit 40% to 80% more daylight and air than wood windows at no greater cost. Sash, frame and hardware already assembled and painted. No extra frames, no fitting nor hanging of sash. Easy to handle and install. Each unit will stand upright without bracing while wall is erected around it. Ventilator removable for glazing. Hardware simple and durable. Solid steel sections will not warp, rot, stick nor decay. A protection from fire, burglars and rodents.

Installation—The outside of the frame takes the form of a channel against which the masonry may be laid up tight and true without danger of binding the ventilator. The windows are anchored in the wall by means of anchor straps inserted, one on either side of the window near the sill and one on either side near the head (see diagram below). These straps are straight flat pieces of steel about 1 in. wide by 9 in. long. All four come strung on a wire and securely fastened to a bar of the window to prevent their being lost in shipment.

Glazing—Glazed from the outside after bed puttying, glazing clips being supplied with each window.

Standard Sizes—Made in 4 standard sizes as illustrated below. The 2-light 14x20-in. and the 3-light 12x18-in. windows are especially suited to concrete block construction. The former takes a 1¾-in. troweled cement sill and the latter accommodates a standard 4-in. cut stone sill.

Sold Through Dealers—These windows are sold through dealers exclusively.

Steel Doors

Fenestra doors of heavy steel U-shaped channels are made to fit the following openings: 3x7 ft., 3x8 ft., 4x7 ft., 4x8 ft., 4x10 ft., 5x10 ft.

Fenestra tubular doors of heavy square steel tubes, mitered and welded at corners are made 5x12 ft., 6x10 ft. and 6x12 ft. Both types are made either single or double, to either swing or slide as specified. Lower panels are filled with steel kick plates, upper panels being glazed.

Full information on request.

Special Window and Door Designs

Special types of windows and doors are designed and manufactured to order—horizontally rolling sash, camber and circular headed sash, accordion doors, pilot doors, side hung or vertically pivoted windows.

Our engineering department is always glad to submit suggestions to meet unusual conditions.

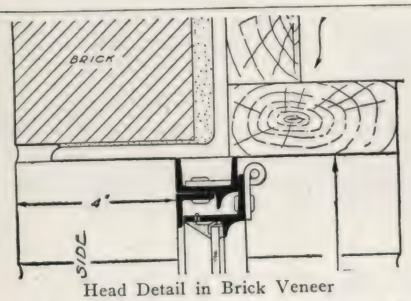
Fenestra Underwriters' Windows

Fenestra Underwriters' labeled windows may be had in any of the standard sidewall or counterbalanced types, window units being limited to 7x12 ft., either dimension being taken as width or height. ¼-in. wire glass must be used, held in place by glazing angles.

Our catalogue section No. 5 gives complete details and limitations. Free on request.

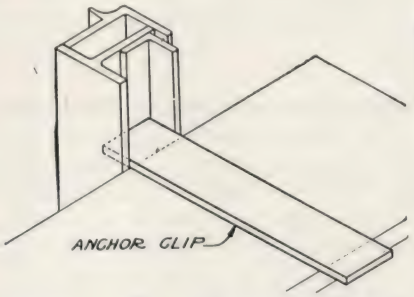
Fenestra Detention Sash

A combined steel window and grating suitable for hospitals, asylums, jails and institutions. Glass lights, 6x9 in. with ventilators one light high, pivoted in the center. Ventilators operated singly or in banks.



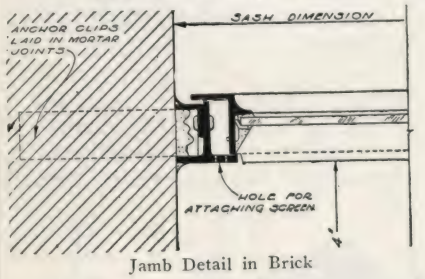
Head Detail in Brick Veneer

Inside View of Fenestra Steel Basement Window in Brick Veneer Wall

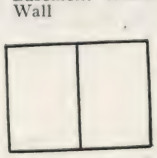


This Shows How the Windows are Anchored in the Wall

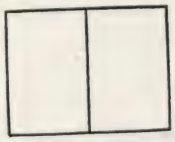
Four anchor clips are supplied. One is laid in the masonry on either side of the window near the sill and one on either side near the head. The clips protrude into the channel frame, as shown



Jamb Detail in Brick

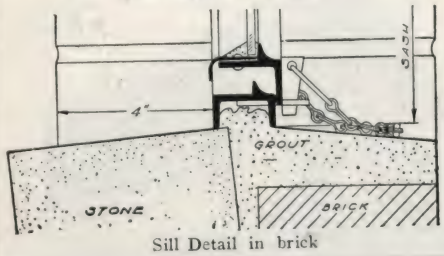

Two Lights Wide

Glass, 14x20 in. Masonry Opening, 2 ft. 7¼ in. x 1 ft. 11¼ in. Code, "Benefit"

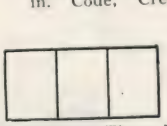

Two Lights Wide

Glass, 16 in. x 24 in. Masonry Opening, 2 ft. 11¼ in. x 2 ft. 3¼ in. Code, "Crest"

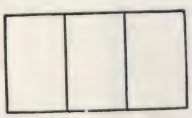
Exterior View of Fenestra Steel Basement Window with Troweled Cement Sill in a Concrete Block Wall



Sill Detail in brick


Three Lights Wide

Glass, 10 in. x 12 in. Masonry Opening, 2 ft. 9⅝ in. x 1 ft. 3¼ in. Code, "Elastic"


Three Lights Wide

Glass, 12 in. x 18 in. Masonry Opening, 3 ft. 3⅝ in. x 1 ft. 9¼ in. Code "Dungeon"

INSTALLATION DETAILS AND STANDARD TYPES OF FENESTRA STEEL BASEMENT WINDOWS

Continued on next page

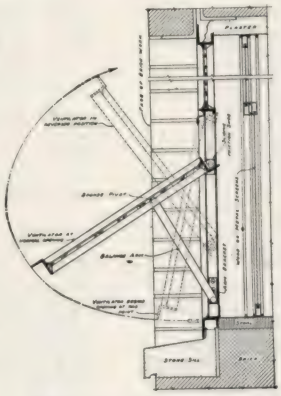
Fenestra Reversible Ventilator Windows

Designed especially for buildings of architectural quality such as office buildings, schools, banks, hotels and public edifices.

FENESTRA REVERSIBLE VENTILATOR WINDOW

Advantages—Finished and neat in appearance; easily screened and shaded; exterior may be washed from inside; large glass lights; unlimited variety in types and sizes.

Details—Ventilator balanced on side arms, one edge sliding in the plane of the window while the other swings out or in as specified. Hand, pole or chain operation as desired. Ornamental bronze hardware. Bronze friction shoes backed by compression springs prevent rattle, insure unusually easy operation and assist in holding ventilator in any desired position without stays or chains. Ornamental mullion covers of pressed steel cover recess at the mullion and provide attractive inside finish. Framing member at head, and sill and jambs designed from unequal leg, channel-shaped, rolled steel sections, affording wide flange for anchorage and a flat surface for neat plaster finish.

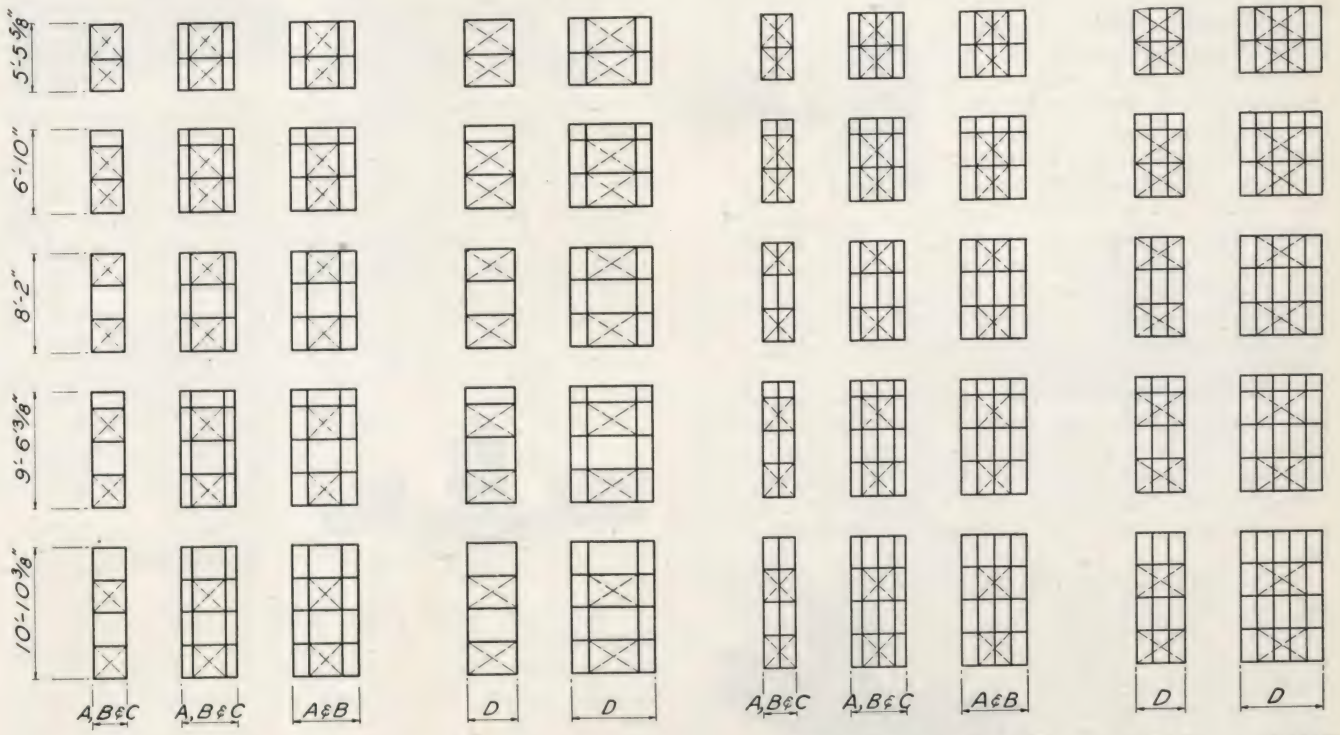


FENESTRA REVERSIBLE VENTILATOR

Standards—Standard glass height is 32 in. Standard glass widths are 14, 16 or 20 in. or larger heights corresponding to multiples of these dimensions. Fixed lights corresponding may be varied in width. *Note particularly that all ventilator lights which abut on the top, sides or bottom of the ventilators must be trimmed 1 in. along the abutting edge.*

FENESTRA REVERSIBLE VENTILATOR WINDOW

Catalogue—Complete catalogue giving full information details, installation diagrams, glass sizes, combinations and photographs will be sent gladly on request. We strongly recommend consultation with our sales engineers when designing window openings.



STANDARD TYPES AND SIZES OF FENESTRA REVERSIBLE VENTILATOR WINDOWS

FEDERAL BRIDGE AND STRUCTURAL COMPANY

Engineers, Designers and Fabricators of Febrisco Steel Sash

GENERAL OFFICES AND WORKS
WAUKESHA, WIS.

Products

FEBRISCO SOLID STEEL INDUSTRIAL SASH; FEBRISCO SOLID STEEL BASEMENT SASH and FRAMES; FEBRISCO SOLID STEEL STORE FRONT and SHOW WINDOW SASH.

Expert Engineering Advice

Architects and engineers are requested to confer with Febrisco engineers regarding the best and most economical methods of making sash installation, the kind and size of sash best suited, the ventilation required, the method of operating and the cost.

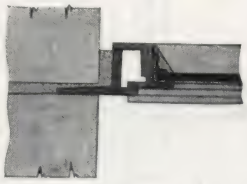
Febrisco Solid Steel Industrial Sash

Construction—Manufactured of solid rolled steel sections. Combines in its design, strength and simplicity of construction with neatness of appearance. The joints are mortised and welded to insure the greatest possible strength. This sash is absolutely square and true and cannot be racked out of shape by careless, rough handling or by the walls or foundations of the building settling.

WELDED JOINT

Joints—All joints in frame and muntin bars are mortised and welded together by a special process which makes the sash one solid steel frame.

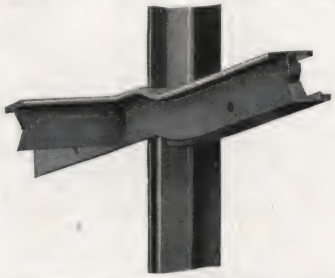
Weather Seal—This is a very important feature of Febrisco solid steel sash. The weather seal is made wider than in ordinary sash, to provide added strength and positive assurance against leakage around the frame. The weather side, which must withstand the action of the elements, is flush and smooth, with all pockets and projections eliminated. This adds greatly to the appearance of the sash and positively does away with the annoyance of dirt, dust collecting, and rusting of the steel in spots inaccessible to paint.



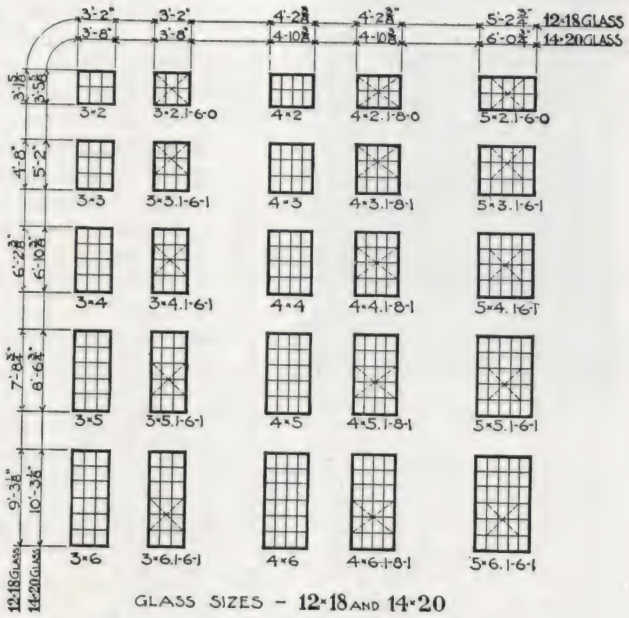
WEATHER SEAL

Febrisco Ventilators—Provided with double contact weathering surfaces to insure their being weathertight. They fit snugly into the sash and, because they are absolutely square and true, do not stick or bind. The pivoting arrangement (patent applied for) contains no bolts, nuts, cotters or washers to work loose or get lost.

One man, without the use of any tools whatsoever, can remove a Febrisco ventilator and replace it in less than a minute. Ventilators are operated either by a push bar or spring catch and chain. The push bar, which is attached by substantial double hinge, is arranged so that when the ventilator is closed the bar folds back against the sash and slips over a locking piece and securely locks the ventilator. The spring catch is operated by a chain. When the ventilator closes, it is at once locked.

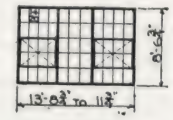


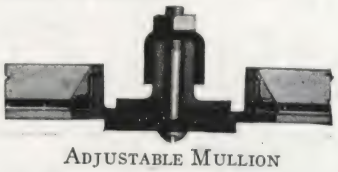
FEBRISCO STEEL SASH PIVOTED HINGE



STANDARD FEBRISCO SOLID STEEL INDUSTRIAL SASH

Febrisco Adjustable Steel Mullions—Adjustable both horizontally and vertically, thus permitting any discrepancies in wall openings to be taken up without forcing the sash. The yoke and bolt connections are simple and easily and quickly adjusted. The construction of the mullions adds additional strength and stiffness to wide or large window openings. Any combination of fixed sash or fixed and ventilated sash for any wall opening or for continuous sash can be built up by the use of these mullions.





ADJUSTABLE MULLION

COMPUTING MASONRY OPENINGS

1-UNIT 4-5.1-6-1	= 4'-10⅜"
MULLION	= 2" TO 3½"
1-UNIT 3-5	= 3'-6
MULLION	= 2 TO 3½"
1-UNIT 4-5.1-6-1	= 4'-10⅜"
MASONRY OPENING	13'-8¾" TO 11¾"

Febrisco Solid Steel Monitor and Saw Tooth Roof Sash—Made to special order only, with the same considerations of strength and simplicity which characterize all Febrisco sash, and made for both fixed and top hung ventilating sash. They are weathertight, being provided with storm panels and expansion joints. Glazing is from the outside, which prevents glass from dropping or being shaken out by vibration.

Operating Devices—Provided where long runs of ventilators are to be opened or closed simultaneously or where the location of the ventilator makes it inconvenient to operate from the floor.

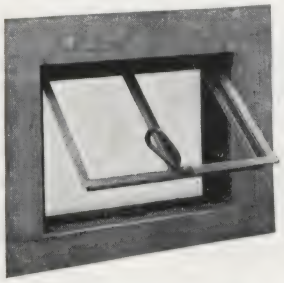
Continued on next page

Febrisco Solid Steel Basement Sash

Provides a perfect sash and frame for basement windows. The cost, under average conditions, is less than the cost of wood sash, when installed. Set by the mason, no carpenter work is necessary. Require the attaching of no hardware as the necessary hinges, catches and locks all form a part of the sash itself. Can be installed in brick, masonry, tile, concrete or cement block walls.

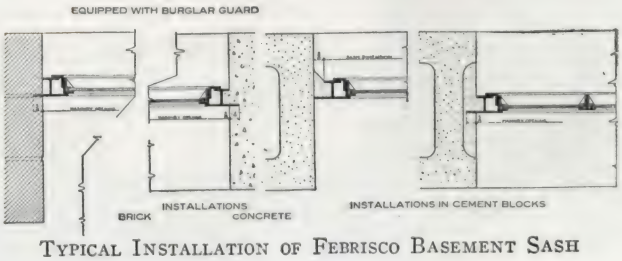
Construction—Febrisco solid steel basement sash are of solid rolled structural steel sections. All joints are carefully welded. The sash and frame are self-contained and non-separable. They are simple in design and very attractive in appearance. The pivot of the sash is inside the frame and contains no bolts, nuts, screws or washers to work loose. The lock is strong and rugged and so constructed that when the sash is closed and the handle turned in the locking position, a weathertight joint is secured. Simple provision is made for screening.

Febrisco solid steel basement sash are shipped unglazed. The glazing can be done by the painter. More light and better ventilation are provided for when Febrisco solid steel sash are installed. They will not rot, warp, bind or shrink. They are weatherproof and verminproof. They can not be broken, as the steel has a minimum thickness of ⅛ in.



FEBRISCO BASEMENT SASH OPEN

FEBRISCO BASEMENT SASH CLOSED



TYPICAL INSTALLATION OF FEBRISCO BASEMENT SASH

Sizes—The following table gives the sizes of 2- and 3-light sash.

STANDARD SIZES

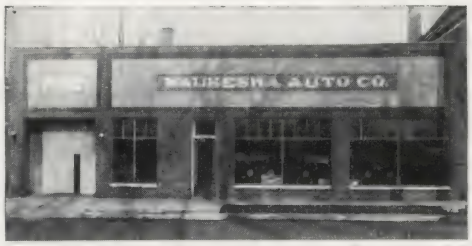
Mark	No. of lights	Glass size, in.
2LD	2	12x20
3LA	3	10x12
3LB	3	10x16
3LC	3	10x20

Febrisco Solid Steel Store Front and Show Window Sash

The large lower plate glass panel in Febrisco store fronts and show windows provides ample area for show purposes, while the upper portion, which gives the best interior light, consists of standard size lights. By this arrangement, the maximum amount of light is admitted to the interior while the first cost of glass and glazing and subsequent replacement costs due to breakage, are reduced to the minimum.

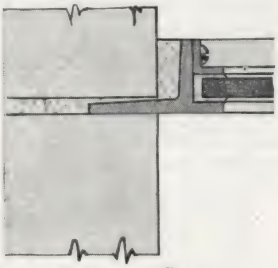
Febrisco solid steel store front and show window sash present a clean cut, attractive appearance; are strong, easily installed, have a positive weather seal, provide better light for the interior and give ample display space. They will not rack, warp or shrink and cost less than other sash installed and glazed.

Full details on request.



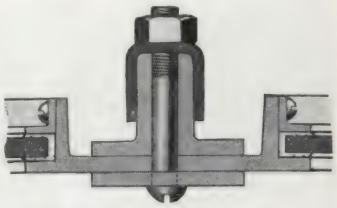
FEBRISCO STEEL STORE FRONT AND SHOW WINDOW SASH

Construction—The frame section is a solid steel angle with a long outstanding leg which forms the weather seal. The plate glass glazing angle is fastened to the short leg with screws. All joints in frame and muntin bars are mortised and welded together by a special process which makes each sash one solid steel frame. Individual pieces are assembled in a frame before joints are welded to insure perfect squareness and accurate dimensions; thus the sash cannot rack out of shape in shipping or handling.



WEATHER SEAL

Ventilators—Febrisco store front and show window sash are provided with ventilators when required. These are pivoted by a special pivoting device (patent applied for) which contains no bolts, nuts, washers or cutters to work loose and get lost. They can be easily removed and replaced without the use of any tools, and are provided with double-weathering contact surfaces and operated by a self-locking spring catch and chain.



ADJUSTABLE MULLION

Combinations—Febrisco store fronts can be built up in combinations of standard sizes with or without ventilators for any large windows.

Glazing—The glass in the upper portions of Febrisco solid steel store front and show window sash and in the ventilators, is secured by means of spring wire glazing clips and putty. The large plate glass pane is back puttied and secured by means of a continuous glazing angle attached firmly to frame with small screws —a quick, easy and positive method of glazing.

DAVID LUPTON'S SONS CO.

Manufacturers of Steel Sash

Allegheny Avenue and Tulip Street

PHILADELPHIA, PA.

SALES OFFICES

NEW YORK, N. Y., David Lupton's Sons Co., 50 Church Street
CHICAGO, ILL., David Lupton's Sons Co., 1114 Steger Building
PITTSBURGH, PA., David Lupton's Sons Co., 1415 Oliver Building
BUFFALO, N. Y.,David Lupton's Sons Co., 824 Marine Trust Building
ST. LOUIS, MO., David Lupton's Sons Co., 1633 Boatmen's Bank Building.
CLEVELAND, OHIO, David Lupton's Sons Co., 806 Swetland Building
BOSTON, MASS., David Lupton's Sons Co., 88 Broad Street
SAN FRANCISCO, CAL., Waterhouse-Wilcox Co., 523 Market Street
DETROIT, MICH., David Lupton's Sons Co., 908 Majestic Building
ATLANTA, GA., David Lupton's Sons Co., 502 Candler Building
BALTIMORE, MD., Walter S. Brauns, Munsey Building

Products and Service

Lupton Pivoted Sash.

Pond Continuous Sash: Roof Type, Side Wall Type.

Pond Continuous Sash Operating Device.

Lupton Double Hung Windows.

Lupton Counterbalanced Sash.

Lupton Counterweighted Sash.

Lupton Steel Windows: Projected Sash for schools.

For Lupton Steel Casement for business, public and residence buildings, see pages 815-817; for Lupton Steel Partitions and Lupton Seamless Tube Doors, see page 1107; for Lupton Steel Shelving, Bins and Racks, see page 2050.

Also a large variety of sheet and plate steel industrial equipment for the storage and handling of material and for various miscellaneous uses. Most of these are standardized, but special types will be furnished on orders of sufficient size.

Our engineering department is always at the service of customers desiring to know most effective application of our various products to meet their special needs.

Uses for Various Types of Lupton Steel Windows

Lupton Steel Sash for Industrial Buildings—

Lupton Pivoted Sash.
Pond Continuous Sash.
Lupton Counterbalanced Sash.
Lupton Projected Sash (office portions).
Lupton Counterweighted Sash (office portions).

Lupton Steel Windows for Business and Public Buildings (for schools, offices, hotels, hospitals and institutions)—

Lupton Casements.
Lupton Counterweighted Sash.
Lupton Double Hung Windows.
Lupton Counterbalanced Sash, with zinc weathering.
Lupton Projected Sash.

Lupton Steel Windows for Residential Buildings—

Lupton Casements.
Lupton Projected Windows (in or out at side).
Lupton Projected Windows (in at top).
Lupton Basement Windows.

Catalogues and Literature

Complete literature on the above will be sent on request. See list of catalogues following:

No. 11 Lupton Service Products. Complete general catalogue.

No. 110 Lupton Steel Windows.

Lupton Steel Casements and Double Hung Windows.

Stock room in steel sash department, showing standard steel bars ready for assembling. Note Pond A-frame in roof for admitting fresh air.

Upper view shows main office building of the Lupton factory and the artistic treatment of Lupton counterweighted sash.

Bird's eye view of the Lupton factory; 7½ acres under one continuous roof. Showing method of using Pond trusses with intermediate roof inlets to secure in-and-out ventilation.

A Few Views of the Lupton Factory

Working under a Pond truss in the Lupton factory. There is abundant light with no glare.

Continued on next page

Lupton Service in Daylighting and Natural Ventilation

Until the advent of steel sash, there was no such thing as a science of natural ventilation.

Steel sash, through the ease with which large openings can be controlled and through the large glass areas which it permits, has created entirely new possibilities in both lighting and ventilation. It has done more than any other one factor to promote health and personal efficiency in the great industrial plants of today.

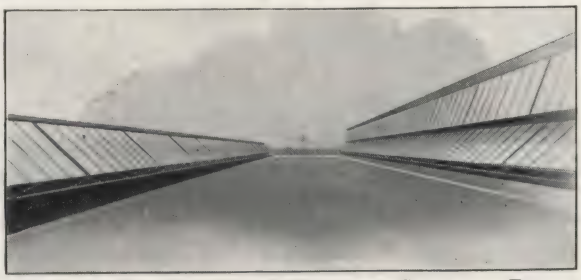
Yet good sash alone does not make good buildings. Structures planned 20 years ago, to make the best use of the wood windows then available, are wholly inadequate to get the best investment returns from modern steel sash. And the huge floor areas of modern buildings may be better lighted and ventilated than the small floor areas of 20 years ago.

Like many other branches of what may be called commercial engineering, this new science of ventilation has been developed most rapidly by the manufacturing interests specializing in that field. For the past 12 years, DAVID LUPTON'S SONS CO. has been a pioneer in this field and has originated many of the most valuable recent improvements both in sash and in the planning of buildings to utilize the sash to the best advantage.

Conspicuous among these new developments is the use of Pond Continuous Sash to facilitate complete and rapid air renewal throughout heat producing buildings (foundries, forge shops, glass factories, etc.). Such buildings may be of indefinite extent, heated air and gases being discharged through defined areas in the roof, and like volumes of fresh air admitted through other and equally defined openings in the same roofs.

From our study of heat producing buildings, we developed the Pond roof system, used today on more than 200 industrial buildings, most of which present problems in both daylighting and ventilation which could not have been adequately solved in any other manner.

The movements of smoke and steam are visible. By studying these movements in heat producing buildings, we have developed methods which, when applied to other buildings (machine shops, textile mills, etc.) where air movement cannot be seen, produce equally complete and effective ventilation. We are prepared to apply these principles to any practicable type of building for any purpose. To aid our customers in this respect, we maintain a large engineering department, and we are always glad to advise intending builders how to get best results from various Lupton and Pond types of sash.



PART OF ROOF OF LARGE FOUNDRY SHOWING POND A-FRAME AT LEFT FOR INLET AND POND TRUSS AT RIGHT FOR OUTLET

Studying and Planning Various Types of Industrial Buildings

To get the best results, the following procedure is recommended:

(1) Study is first made of the storage of primary material, the handling of material, the sequence of manufacturing operations, and the warehousing of finished product. Space for each process is determined and located in due relation to other processes. No limit is yet fixed for type or dimensions of building.

(2) Having made the floor layouts that apparently will result in the lowest storage, handling and manufacturing costs, the building is then designed to meet the mechanical and physical requirements. It is now possible to decide whether a single or multiple-story plant should be used, and to establish the floor dimensions and clearances required.

(3) The layout of building has now been determined. Next the roof planes, the types, areas and location of sash, and the mode of sash operation are all planned to produce desired result in natural ventilation and daylighting.

For multi-story buildings, the floor width will be governed by the nature of the work, the ceiling height, the glass and ventilating areas, and the proximity of neighboring buildings.

One-story buildings may be of unlimited length and width, and contain a number of processes generating heat, gas, smoke or steam, without sacrifice of either light or ventilation throughout the entire plant, provided the Pond roof system is used as recommended by us. In wide buildings, it is necessary to have certain roof areas for fresh air supply, under which no heat producing processes occur.

Plant extensions are often most economically made by converting existing buildings to ordinary uses and erecting a new building especially designed for the more exacting processes. An old-fashioned foundry can be converted into a machine shop by altering the roof, and a new foundry built according to modern lighting and ventilating ideas.

We invite consultation on these and similar problems.

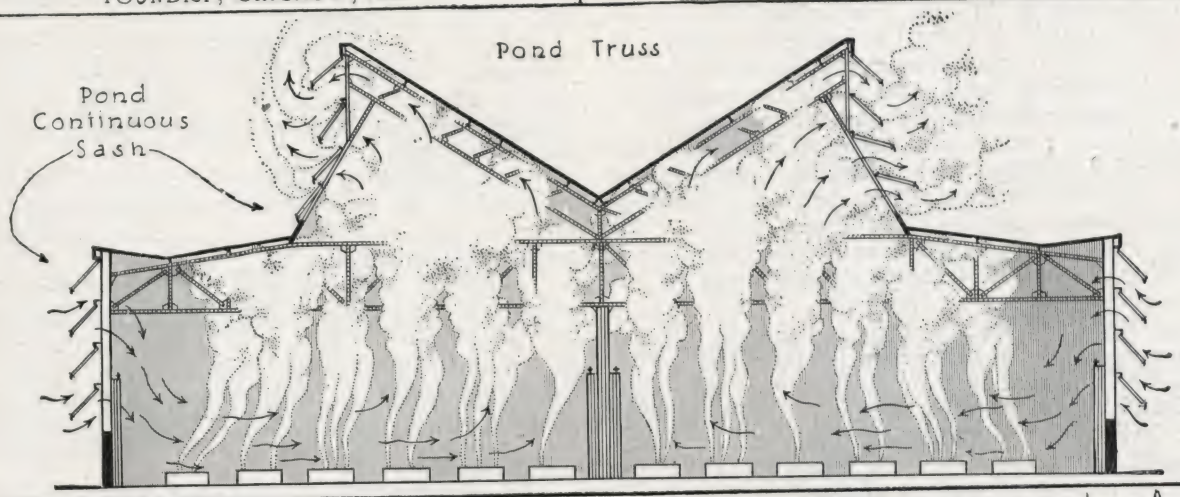
TOP FLOOR OF MULTI-STORY FACTORY, SHOWING POND CONTINUOUS SASH IN INVERTED ROOF AND LUPTON COUNTERBALANCED SASH IN WALLS

BRASS FOUNDRY 115x195 FT. WITH POND TRUSS ROOF. POND CONTINUOUS SASH AND LUPTON COUNTERBALANCED SASH USED

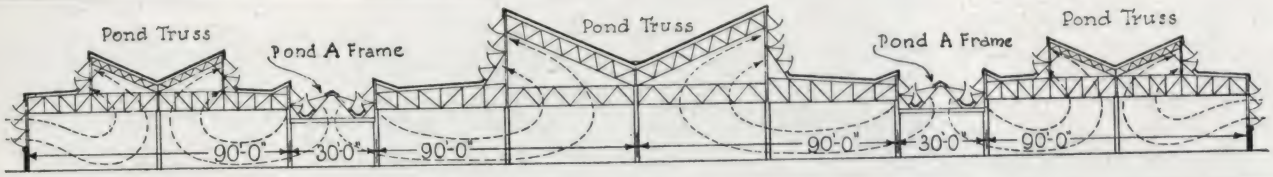
Continued on next page

POND TRUSS OVER INTERNATIONAL HARVESTER CO. FOUNDRY, CHICAGO, ILL.

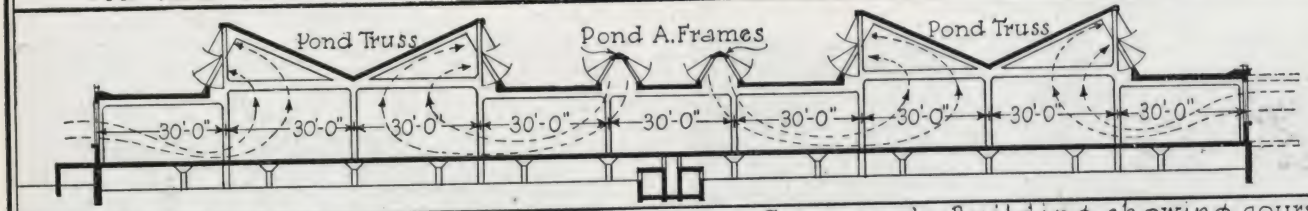
POND TRUSS OVER DAVID LUPTON'S SONS COMPANY FACTORY, PHILADELPHIA, PA.



Cross Section of Pond Truss foundry showing movement of air and heat currents



Large Foundry: The dotted lines indicate how air enters at low sections in the roof and moves to areas where heat is produced.



Cross Section of Dayton-Wright Airplane Company's Building showing course of air currents. Two Pond "A" Frames in center admit light and air.

IMPORTANT NOTE No attempt is made to give detailed information on these sections. The design of Pond Trusses for ventilation as well as light is an engineering problem to be solved for building

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	SECTIONS SHOWING USE OF POND TRUSS FOR VARIOUS TYPES OF BUILDINGS	SHEET NO. NOT DRAWN TO SCALE C1

Continued on next page

Lupton Pivoted Sash

Lupton Pivoted Sash embodies the results of 10 years' experience in manufacturing pivoted ventilator sash for industrial buildings. It contains every feature needed in this service at the lowest practical cost of manufacture. No attempt however has been made to sacrifice quality and efficiency for the sake of low first cost.

The fit, freedom of action, and weathertightness of pivoted ventilator sash depend as much on the workmanship as on the design. Lupton Pivoted Sash are carefully fabricated, and each sash is tested for its fit before it leaves our plant.

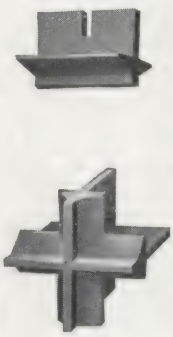
Every bar used in standard sizes is cut, punched and notched in a single operation. This prevents inaccuracies of length and fit.

The Lupton muntin joint combines neatness with unusual strength. The form is such that the tightness of the lock increases with the wind pressure. The frame corners and the ends of the muntins are of tongue and slot type, securely riveted.

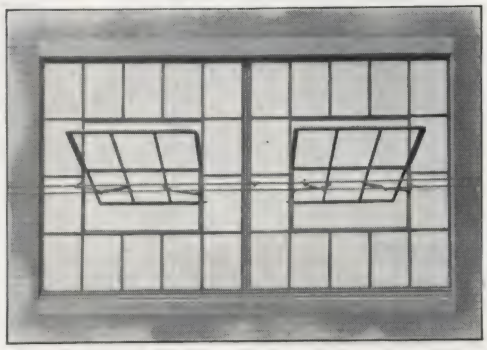
The weathering makes a 2-point contact all around. The hinges are integral with the weathering, hence can not get out of alignment and do not require adjustment.

The stay bar has an embossed fulcrum point, which makes a tight lock when the ventilator is closed (see illustration).

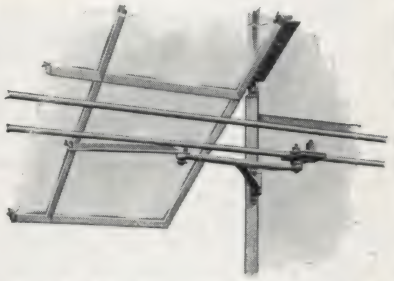
Lower ventilators are provided with stay bars, unless the sill height exceeds 6 ft., in which case a spring catch is used. Upper ventilators always use spring catches. If both ventilators of a pair have spring catches, separate clips are provided to hold the chains (see details below).



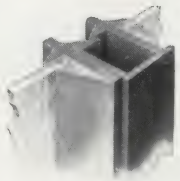
Lupton Muntin Joint Showing Flush Design and Interlock



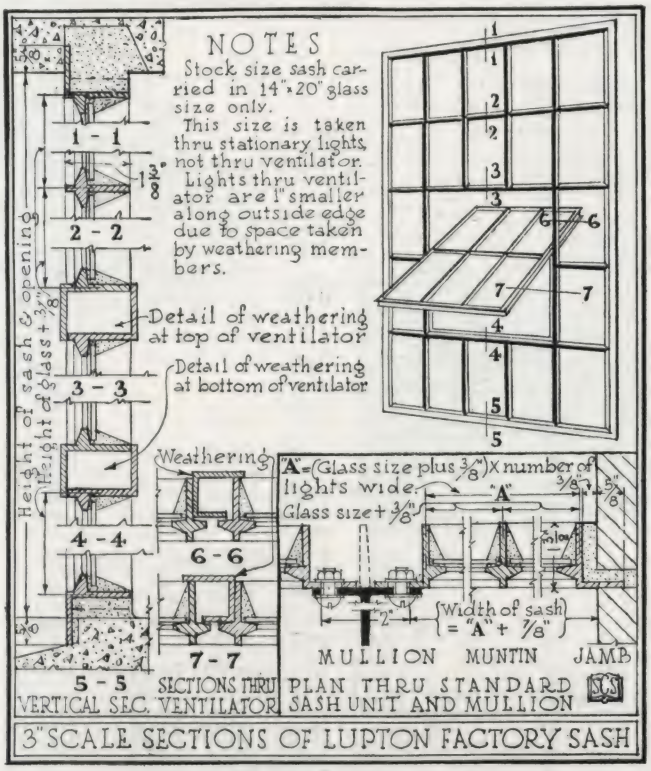
Lupton Pivoted Sash with Pond Operating Device

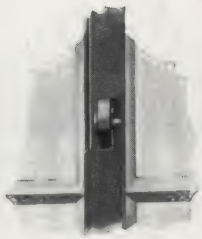


Detail of Pond Operating Device used with Lupton Pivoted Sash

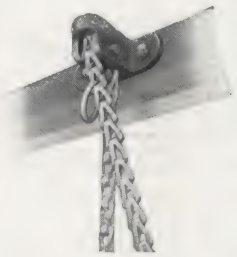


Donbue Contact Formed by Weathering Members of Ventilators

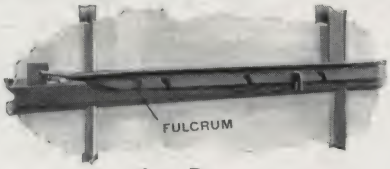




Integral Hinge used with Lupton Pivoted Sash



Upper Two Views Show Spring Catch and Chain Used with Upper Ventilators and Ventilators more than 6 ft. Above Floor.



Stay Bar

Clip which holds either Chain or Stay Bar

DETAILS OF LUPTON PIVOTED SASH

Continued on next page

Upper and lower ventilators will be furnished connected by double arms as an extra, if so ordered. Ventilators so connected, if they are the full width of sash, require a special form of jamb to give clearance to the arms.

Standard Construction Notes

Standard Frame Member—An angle bar, which is set into the masonry or framework ⅝-in. at head and jambs, and overlaps the sill by the same amount.

Nominal Sash Sizes—Sizes are taken to imaginary measuring lines ⅝-in. inside outer edges of frame members. Hence sash sizes and opening sizes are equal. For width of multiple openings, 2-in. is allowed for each mullion.

Mullions—Standard T-bars, having 2¼-in. flanges, and stems respectively 1½ and 2¼ in. deep. The longer stems are used for the larger sash units.

Mullion Flanges—Always set outside of sash. The stems may project inside or outside; greater wind resistance is gained by placing the stems outside.

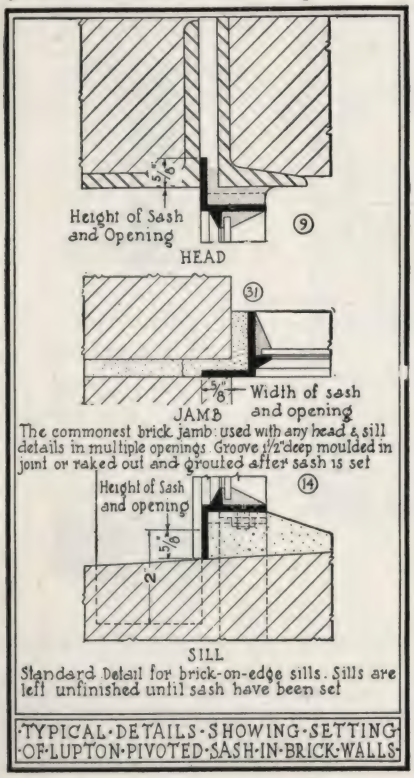
Lupton Pivoted Sash—Made in 2 sets of standard sizes, respectively for 12x18 and 14x20-in. glass (see diagram opposite). The shaded sizes for 14x20-in. glass only are carried in warehouse stock.

Lights in Ventilators—Reduced 1 in. in height or width on edges adjoining the edges of the ventilators. Sash may be ordered with or without glass. Glass thickness should not be less than double thick American.

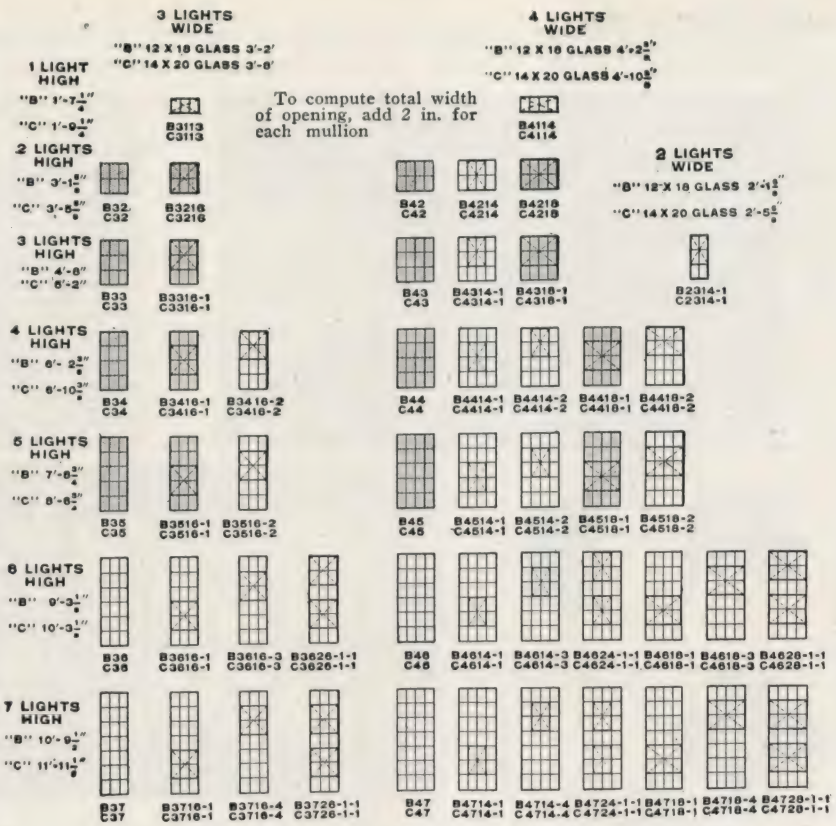
Walls—Except for special reasons, walls should be built before sash are erected. This can not always be done with single openings, unless a special form of jamb is used. Complete instructions for planning the walls and for ordering and erecting the sash are given in our catalogues Nos. 11 and 110.

Setting Details—Below are shown one-quarter size details of typical settings in brick walls. A large variety of settings for walls of different materials is given in our catalogues.

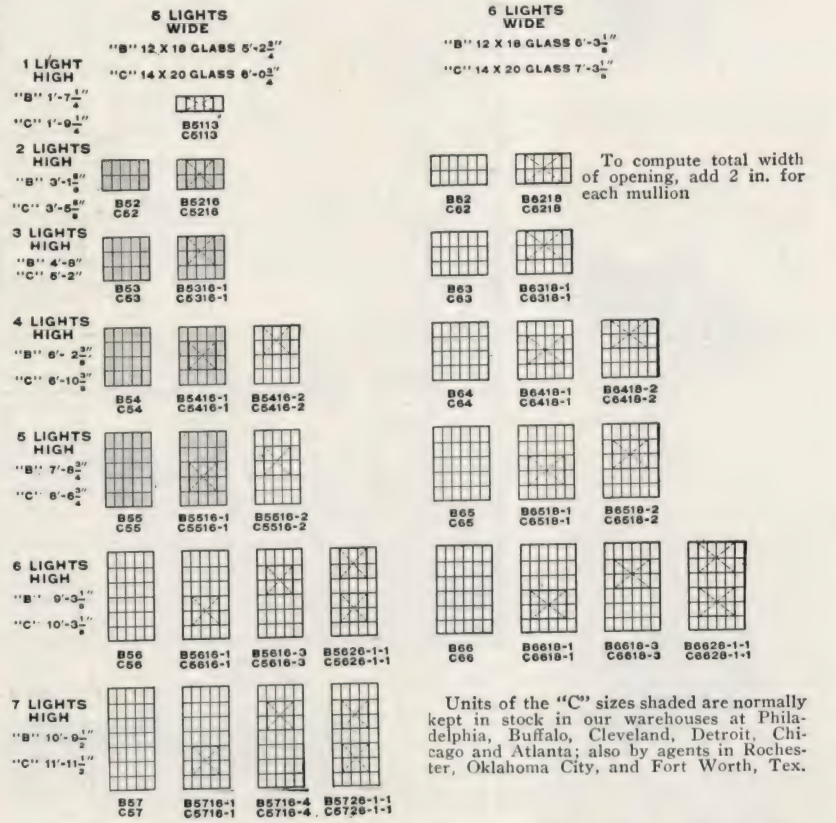
Underwriters' Labels—Lupton Pivoted Sash can readily be altered to receive Underwriters' labels, if specified in the original order. They can not be altered after shipment.



TYPICAL DETAILS SHOWING SETTING OF LUPTON PIVOTED SASH IN BRICK WALLS



Note: "C" sizes only of units shaded are carried in warehouse stock



Units of the "C" sizes shaded are normally kept in stock in our warehouses at Philadelphia, Buffalo, Cleveland, Detroit, Chicago and Atlanta; also by agents in Rochester, Oklahoma City, and Fort Worth, Tex.

DIAGRAM SHOWING STANDARD AND STOCK SIZES OF LUPTON PIVOTED SASH

Note nominal widths and heights above and to left of diagrams. These represent opening dimensions and are 1¼ in. less than over-all dimensions of units

Continued on next page

Pond Continuous Sash (Patented by Clarke P. Pond and Patents Pending)

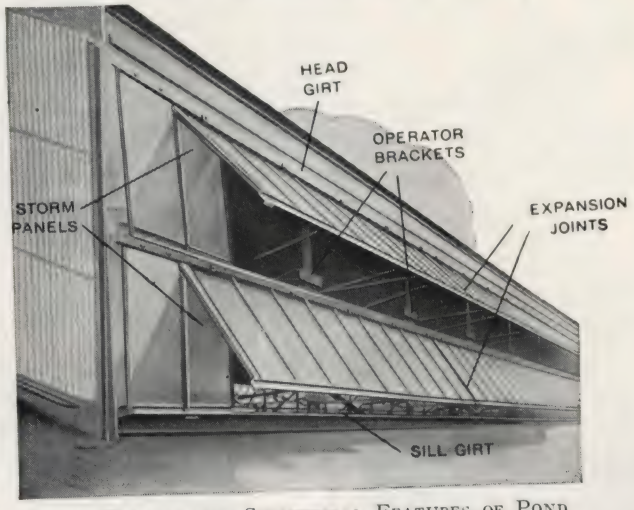
The original continuous sash for mass-controlled ventilation. Used in monitors and sidewalls of foundries, forge shops and other heat producing buildings to afford free escape for heated air and fumes; also in sidewalls where abundant and uniformly diffused inflow is desired. Used in roofs of machine shops, mills and factories to secure even, uniformly distributed outflow of stale air.

The most effective roof application is in the Pond Truss (see pages 836 and 840).

Type Recommended—The top hung type is recommended. It combines greatest ventilation with protection from weather and minimum need for opening and closing. Also requires least steelwork for support.

Sizes—Standard units 20 ft. long. Hung under a continuous overhanging angle; connected by weatherproof expansion caps which give flexibility for unavoidable errors in alignment of steelwork. The ends overlap rain-excluding storm panels 2 ft. wide.

Opening Widths—Measured in even feet, plus 3 in. for clearance and end flashings. Standard end units from 10 to 18 ft. by even feet are furnished as needed. For opening heights see drawing B1.



Storm Panels and Structural Features of Pond Continuous Sash

Length of Runs—May be from 150 to 300 ft. in vertical openings, depending on the height of sash (from 3 to 6 ft.). On a slope 30° from vertical, runs may be from 100 to 200 ft. By using spirals and counterweights these lengths of run may be doubled, and the motions required to open or close several runs correspondingly reduced. By using electric motors much longer runs may be operated (see under Pond Operating Device).

Control—Pond Continuous Sash is controlled by Pond Operating Device, which gives exceptional width of opening with minimum effort (see table).

OPENINGS FOR TOP HUNG SASH CONTROLLED BY POND OPERATING DEVICE

No. 3 sash	3 ft. high	46°	28 in.	No. 5 sash	5 ft. high	42°	43 in.
No. 4 sash	4 ft. high	47°	38 in.	No. 6 sash	6 ft. high	36°	44 in.

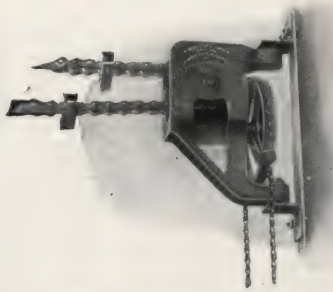
Construction—Heavy one-piece rolled steel sections oxy-acetylene welded at all joints; hence each section is a permanently rigid unit and there can be no glass breakage due to loosening of joints. The flexible expansion joints above mentioned occur between lights, and eliminate all danger of glass breakage where sections are joined.

Pond Operating Device (Patented by Clarke P. Pond and Patents Pending)

Guaranteed to open long lines of sash wider, with less friction and wear, than any other device. It works on the principle of tension transmission, increasing leverage as sash is raised. Will control any form of sash in long lines; but its advantages are most conspicuous with top hung sash. Power is transmitted by two lines of steel rods, connected by chains operating over a sprocket at one end and an idler at the other. These rods actuate sash arms through compound levers, the increasing leverage being due to varying angles of levers and sash arms.

Idler

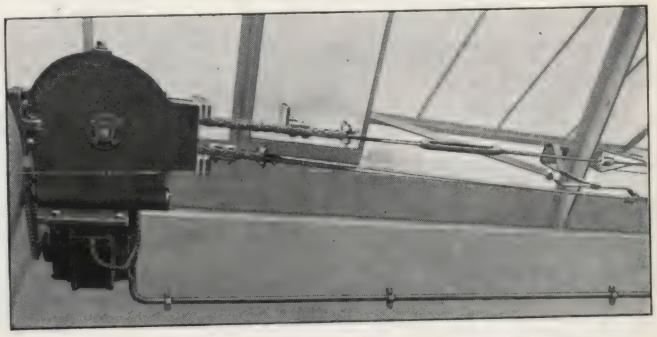
Spiral and Counterweight for Balancing Weight of Long Lines of Sash



Pond Operating Device with Hand Chain

All hinged connections are bronze bushed. Sprocket is driven by a worm gear and a hand chain. Worm gear is enclosed and runs in oil, hence has minimum friction and requires no attention.

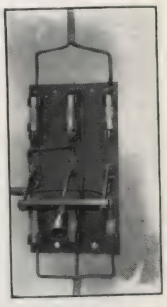
For long lines of sash, a spiral and counterweight are advised in place of idler pulley. The varying radius of spiral balances the varying load of sash. By using a spiral, the practical length of line for hand chain operation is doubled; for shorter lines time required to open is reduced. With motor operation the use of spirals and counterweights permits smaller motors to be used, and gives uniform load and speed from shut to full open.



Pond Operating Device, Motor Driven, Showing Motor and End of Sash Run

Pond Operating Device, motor driven, is recommended for extra long lines, or for simultaneous control of several lines. It uses a 3-phase, 220-volt, 60-cycle alternating current motor, specially designed and furnished by this company.

For long lines, special remote control switches are recommended and can be furnished at an extra cost.



Standard Knife Switch with Cover Removed

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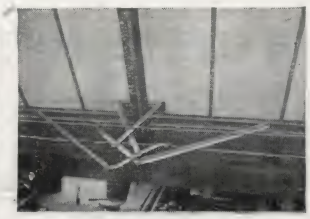
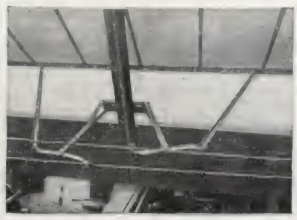
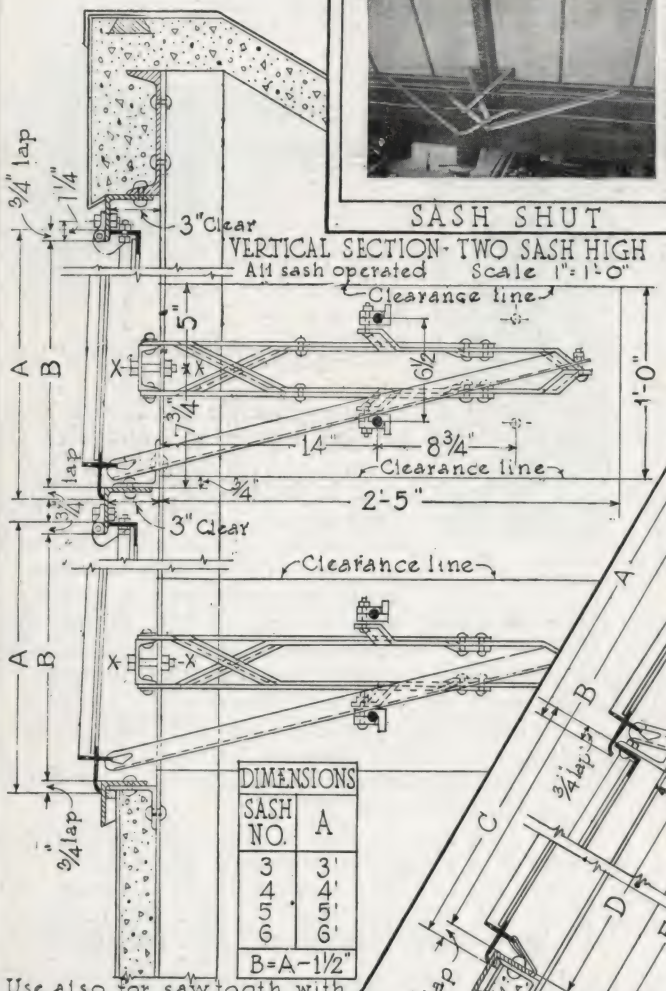




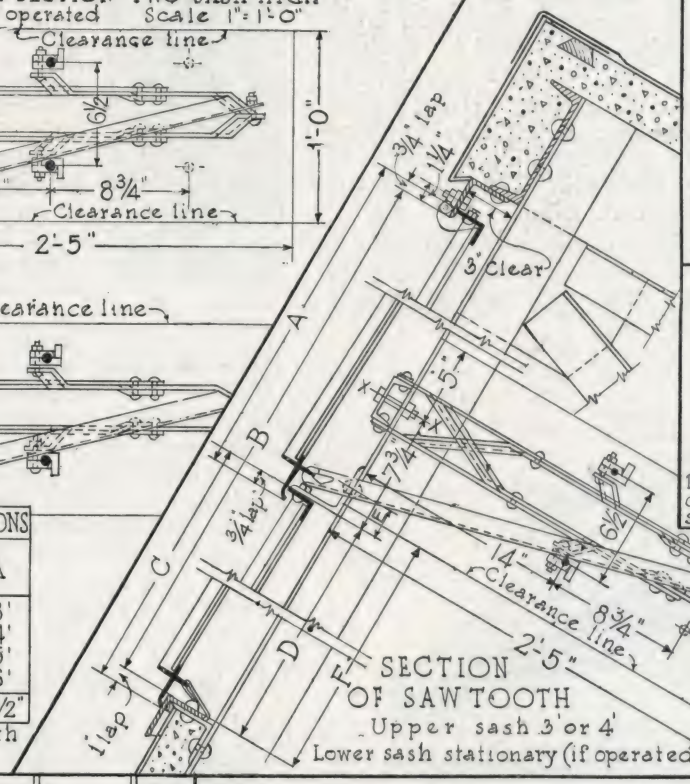
SASH SHUT PARTLY OPEN FULLY OPEN

VERTICAL SECTION-TWO SASH HIGH
All sash operated Scale 1"=1'-0"



DIMENSIONS	
SASH NO.	A
3	3'
4	4'
5	5'
6	6'
B=A-1 1/2"	

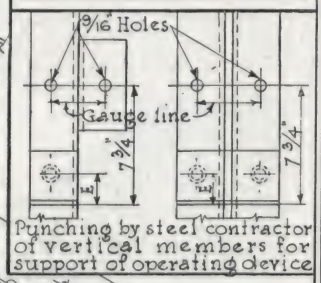
Use also for sawtooth with operated lower sash.



SECTION OF SAWTOOTH
Upper sash 3' or 4'
Lower sash stationary (if operated use vertical detail)

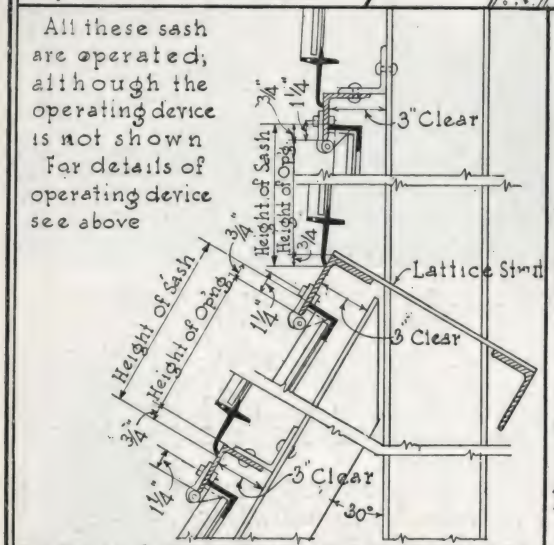
Vertical supports 8 to 12 ft. on centers.

DIMENSIONS WITH STATIONARY LOWER SASH	
A	C
3' OR 4'	3' 0"
" " "	4' 0"
" " "	5' 0"
" " "	6' 0"
B=A+C-2 1/2"	E=1 3/4"
D=C-1	F=C-1/4"

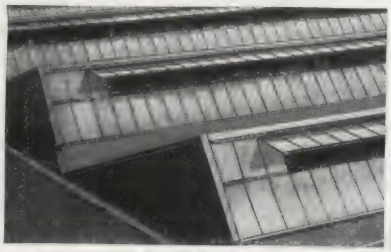


Punching by steel contractor of vertical members for support of operating device

All these sash are operated; although the operating device is not shown. For details of operating device see above



DETAILS OF POND CONTINUOUS SASH IN POND TRUSS ROOF



POND CONTINUOUS SASH IN SAWTOOTH ROOF

POND CONTINUOUS SASH IN POND TRUSS ROOF

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF POND CONTINUOUS SASH AS USED IN VERTICAL WALLS, SAWTOOTH & POND TRUSS ROOFS	SHEET NO. B1 SCALE 2" EQUALS 1'-0"

Roof openings measure 14, 16, etc., feet wide, to any even number of feet desired—no inches. Between pilasters, ends of sash overlap weathering formed by Lupton to suit engineer's specifications, and set in brickwork. Opening widths are 10, 12, 14, etc., even feet, plus 3 to 7 in.

Continued on next page

Lupton Double Hung Windows

Lupton Double Hung Windows combine a remarkable degree of draft-tightness with almost frictionless movement. They are especially desirable for hotels, apartment houses and office buildings.

Sizes—Made in any size required with Underwriters' labels if specified.

Frame—Built of formed and welded heavy steel plate. The jamb boxes are joined to the head and sill by continuous arc welds after being accurately squared. This construction permanently excludes moisture and secures rigidity.

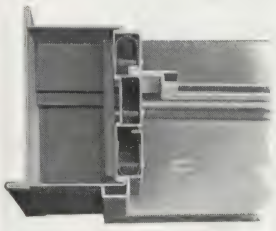
Exterior View of Lupton Double Hung Window

Jamb—Attached to each weight box are 3 formed steel strips, which are flanged and act as guide members and parting strip for the sash. These guide members are backed by U-shaped flat springs compressed by screws, which allow adjustment of the contact between guide members and sash.

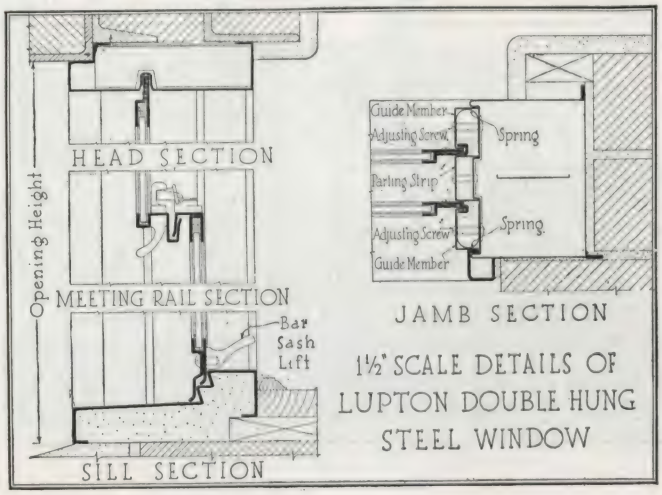
Sash—Made of heavy steel plate with oxy-acetylene welded corners. At top and bottom are glazing members forming parts of the sash structure. The side glazing members are removable and held by screws. Their edges are hidden in the jambs as shown.

Sash Chains—Attached to hooks on stiles of sash and run over roller pulleys.

Hardware—All necessary hardware furnished complete in solid bronze or electro-galvanized malleable iron hardware as specified.



Cross Section of Jamb Looking Down



Lupton Counterbalanced Sash

In Lupton Counterbalanced Sash, the upper and lower sash of each member are hung over 1 pair of pulleys, so that they open or close simultaneously. This feature is valuable in multistory industrial buildings requiring a large amount of ventilation, because it insures an outlet at the top to balance the inlet at the bottom. It is useful also, for the same reason, in schools and large offices.

Lupton Counterbalanced Sash in Office Building of Factory

For offices and schools it is furnished as an extra with zinc weathering and wind shields.

The jamb and mullion bars are specially designed I-beams, to which the parting strips and zinc weathering where used) are screwed. They are connected by heavy angle clips to the head and sill members.

The sill member is specially rolled of copper bearing steel, for high resistance to corrosion, and is shaped to afford the least possible exposure to weather.

The sash members are specially rolled channel sections, solidly oxy-acetylene welded at all corners. Muntins have riveted ends.

Standard sizes are given in the table on following page. For schools and offices, sizes under 5 ft. in width are advised.

The best appearance is had by omitting horizontal muntins. They must, however, be used for windows bearing Underwriters' labels, in which no glass light may exceed 350 sq. in. exposed area. Glazing angles may be used or omitted, at a corresponding price. They are necessary for labeled windows.

Lupton Counterweighted Sash

A high grade sash for offices. Construction is similar to Lupton Counterbalanced Sash, but weights and weight boxes are used, which increases the cost. Zinc weathering is always furnished. The workmanship and hardware are in keeping with the general high quality of the windows. See details on following page.

Interior of Schoolroom Showing Use of Lupton Counterbalanced Sash to Insure Equal Top and Bottom Openings

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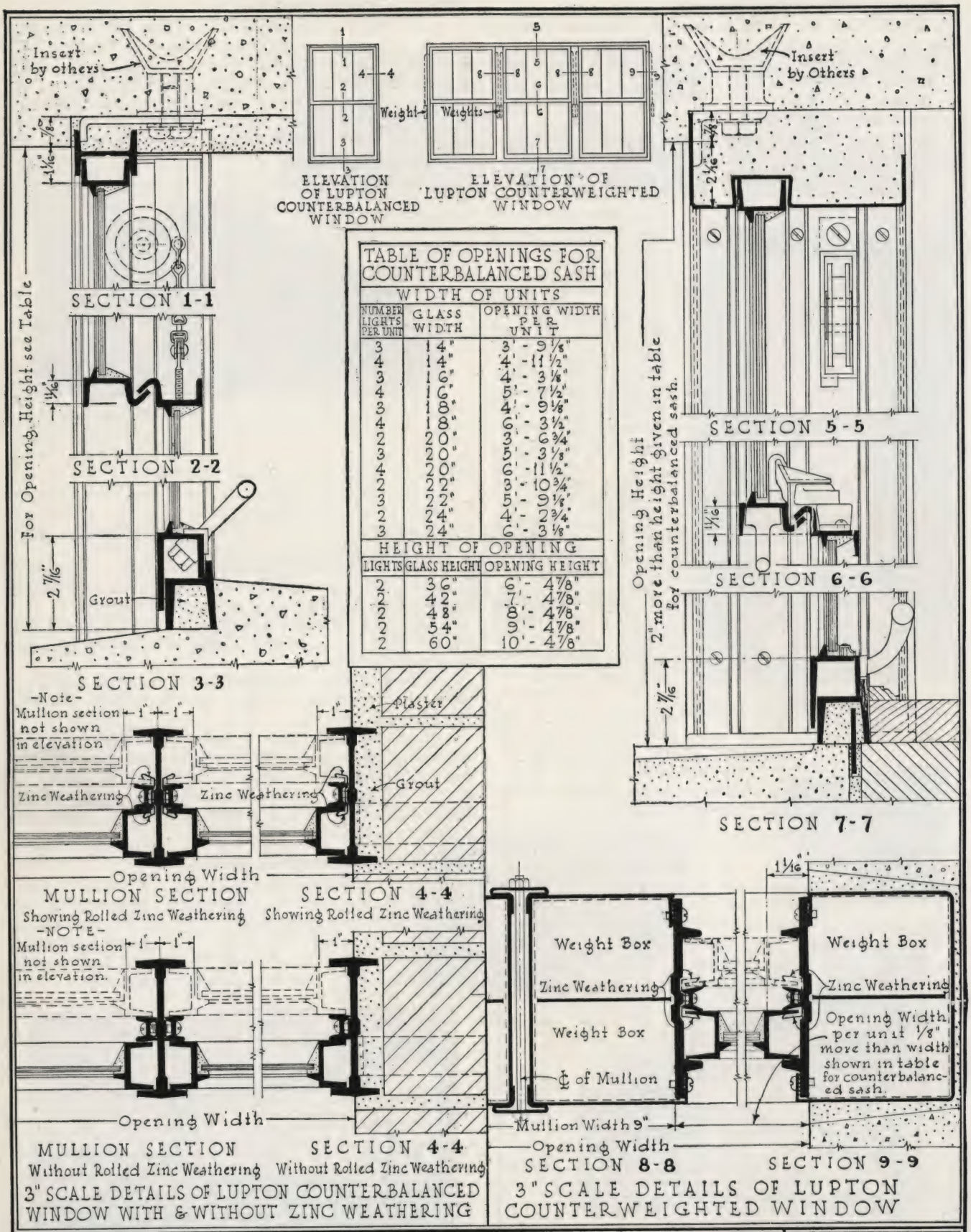


DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DETAILS OF LUPTON COUNTERBALANCED AND COUNTERWEIGHTED STEEL SASH	SCALE 3" EQUALS 1'-0" DATE-AUG:22	DRWG A3

Continued on next page

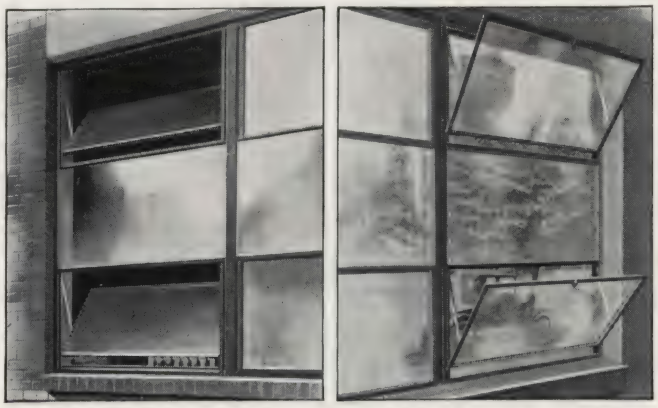
Lupton Projected Sash

A steel sash of moderate cost, of a high degree of weathertightness. Adaptable for schools and hospitals and office portions of industrial buildings.

As usually designed, each window is divided horizontally into 3 equal sections, the middle one being stationary and the upper and lower sections being balanced ventilators. The center section can also be arranged to open, as generally done for hospitals, or top section may be stationary and center and lower sections projected as illustrated below. Top and bottom ventilator is the standard construction.

The ventilators open either in at the top or out at the bottom edge. The other edge in each case is guided in the jamb members of the frame and controlled by bronze friction shoes which hold the ventilator at any angle desired. The ventilators are hung on radius arms, so that they are practically balanced for all ordinary openings. They are reversible for washing the outside of the glass from the inside of the room.

See diagram and table for standard sizes. Measurements are taken to imaginary measuring lines 5/8 in. inside of edges of frame, exactly as for Lupton Pivoted Sash, and erection is similar.



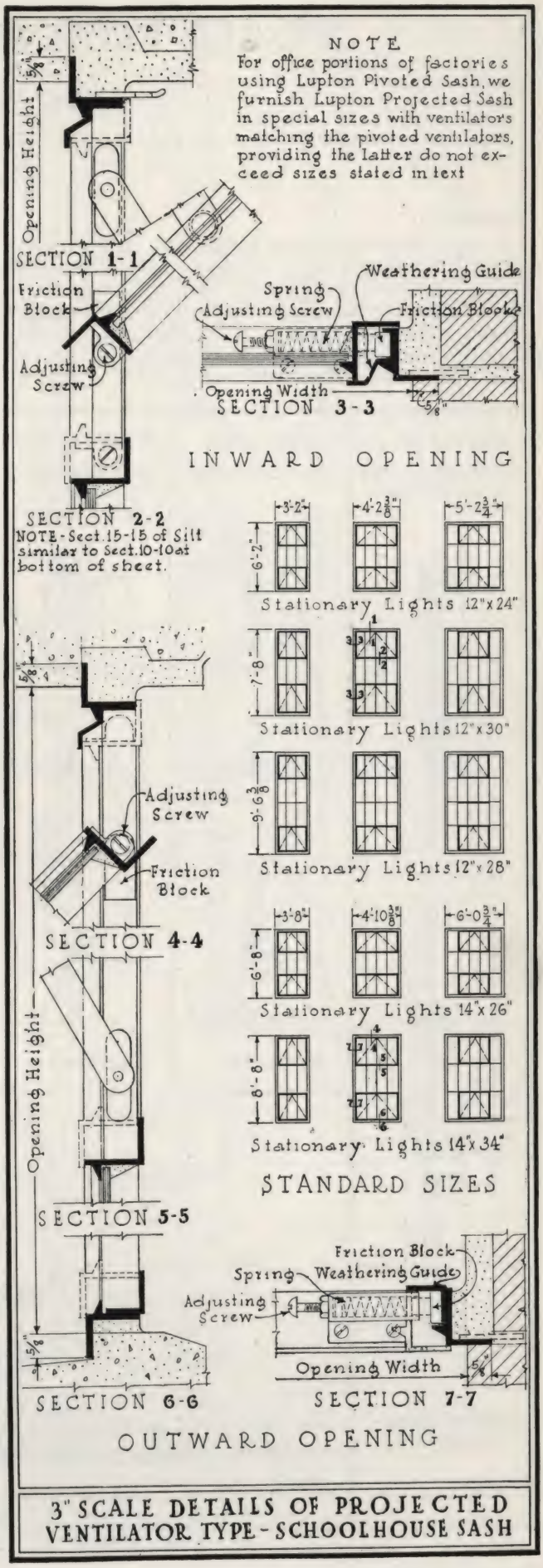
LUPTON PROJECTED SASH, IN AT TOP
Exterior view Interior view

Lupton Steel Windows for Schools

For all-around purposes, we consider Lupton Projected Sash the most suitable window ever made for schools. For high schools, and for recitation halls in colleges, Lupton Counterbalanced Sash is well suited, being more massive in construction and appearance and suited to a more formal style of architecture.

In mild climates, also for corridor windows, toilet rooms, etc., Lupton Pivoted Sash may be used, in connection with Lupton Projected Sash in recitation rooms.

LUPTON PROJECTED SASH IN SCHOOLROOM
Stationary transoms are used



3" SCALE DETAILS OF PROJECTED VENTILATOR TYPE - SCHOOLHOUSE SASH

MESKER BROTHERS IRON COMPANY

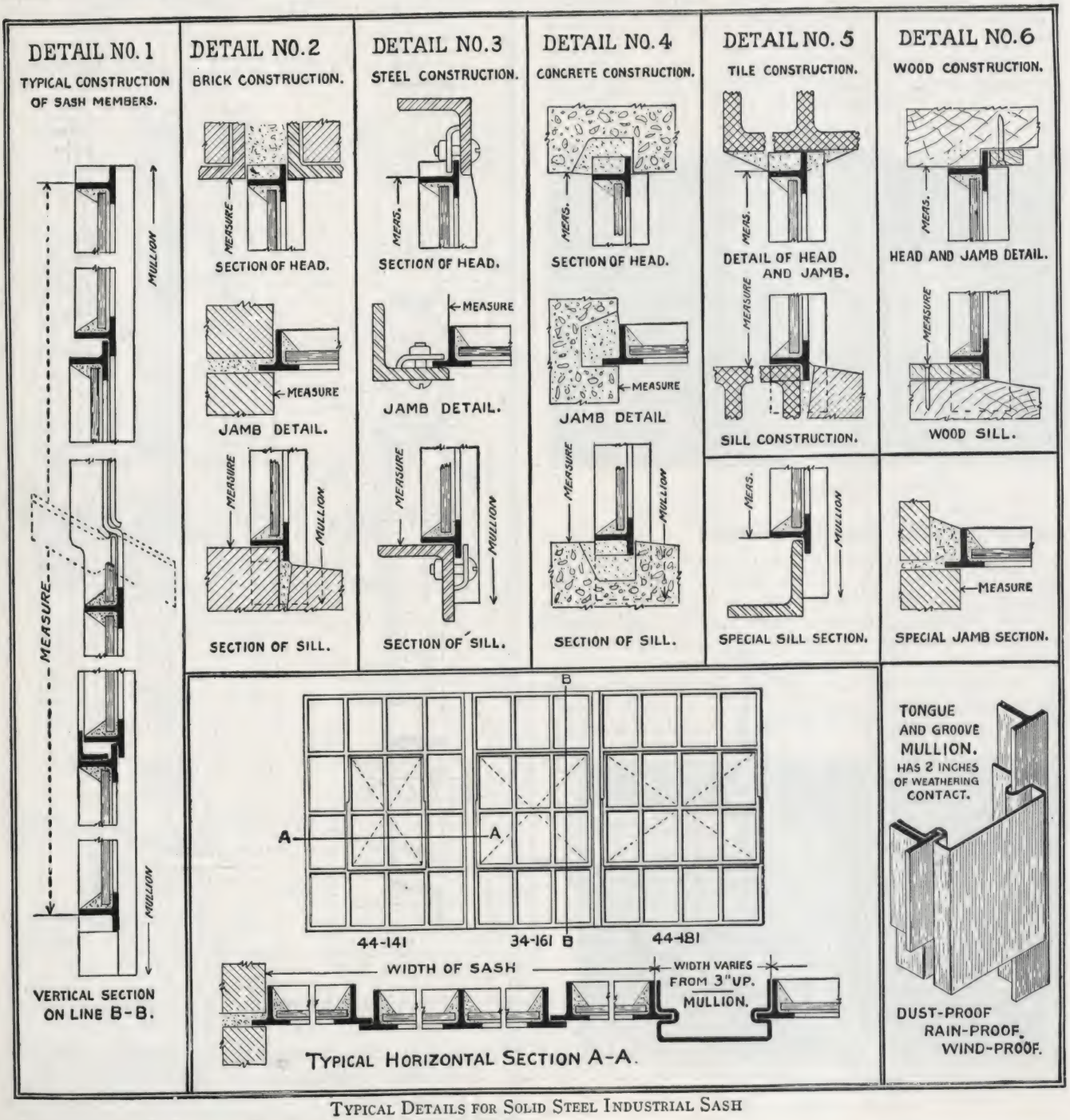
Fire Retardants

ST. LOUIS, MO.

Products

COMBINATION HOLLOW METAL and SOLID SECTION STEEL WINDOWS, Double Hung and Counterbalanced Types; UNDERWRITERS LABELED CENTER PIVOTED STEEL SASH; SOLID SECTION STEEL SASH, Fixed, Pivoted and Hinged; MONITOR SASH, Side Pivoted, and Top Hinged; IMPROVED SIDE ARM EXTENDING VENTILATOR SASH for schools; Underwriters' Labeled FIREPROOF HOLLOW METAL WINDOWS, Double Hung, Counterbalanced, Pivoted and Casement; FIREPROOF COMBINATION STEEL, SLATE, MARBLE or CONCRETE STAIRS.

Also Mechanical Operating Worm and Gear Devices, Solid Section Steel Basement Top Hinged Windows, Fireproof Doors and Shutters, Steel and Glass Stair and Elevator Enclosures, Plate Steel Sash Doors, Plate Steel Column Guards for Concrete Piers.



TYPICAL DETAILS FOR SOLID STEEL INDUSTRIAL SASH

Continued on next page

DIMENSIONS, UNIT PRICES AND WEIGHTS OF MESKER BROS. STEEL SASH

HEIGHT OF WINDOW OPENINGS. 3'-0⅞" / 3'-4⅞"	32	42	52	32-160	42-140	42-180	52-160
WIDTH OF OPENINGS.	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"
PRICE OF SASH AND WEIGHT.	$1.54 20 LBS. / $1.65 22 -	$1.90 26 LBS. / $2.16 29 -	$2.37 32 LBS. / $2.63 35 -	$3.76 31 LBS. / $4.12 38 -	$3.76 35 LBS. / $4.10 42 -	$4.45 38 LBS. / $4.79 46 -	$4.67 43 LBS. / $4.93 50 -
PRICE OF DOUBLE STRENGTH GLASS.	$2.37 24 - / $3.00 30 -	$3.16 30 - / $4.00 40 -	$3.94 40 - / $5.00 50 -	$2.37 24 - / $3.00 30 -	$3.16 30 - / $4.00 40 -	$3.16 30 - / $4.00 40 -	$3.94 40 - / $5.00 50 -
PRICE OF ⅛" FACTORY RIBBED GLASS.	$1.80 28 / $2.32 37	$2.39 38 - / $3.09 50 -	$3.00 48 - / $3.85 60 -	$1.80 28 - / $2.32 37 -	$2.39 38 - / $3.09 50 -	$2.39 38 - / $3.09 50 -	$3.00 48 - / $3.85 60 -
HEIGHT OF WINDOW OPENINGS. 4'-7¼" / 5'-1¼"	33	43	53	33-161	43-141	43-181	53-161
WIDTH OF OPENINGS.	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"
PRICE OF SASH AND WEIGHT.	$2.11 29 LBS. / $2.37 32 -	$2.73 37 LBS. / $3.09 40 -	$3.30 45 LBS. / $3.76 50 -	$4.30 39 LBS. / $4.52 44 -	$4.60 46 LBS. / $4.88 52 -	$5.30 49 LBS. / $5.57 56 -	$5.62 55 LBS. / $5.83 62 -
PRICE OF DOUBLE STRENGTH GLASS.	$3.54 36 - / $4.50 46 -	$4.74 47 - / $6.00 61 -	$5.92 59 - / $7.50 75 -	$3.54 36 - / $4.50 46 -	$4.74 47 - / $6.00 61 -	$4.74 47 - / $6.00 61 -	$5.92 59 - / $7.50 75 -
PRICE OF ⅛" FACTORY RIBBED GLASS.	$2.70 43 - / $3.48 55 -	$3.58 57 - / $4.63 73 -	$4.49 70 - / $5.77 91 -	$2.70 43 - / $3.48 55 -	$3.58 58 - / $4.63 73 -	$3.58 57 - / $4.63 73 -	$4.49 70 - / $5.77 91 -
HEIGHT OF WINDOW OPENINGS. 6'-1⅝" / 6'-9⅞"	34	44	54	34-161	44-141	44-181	54-161
WIDTH OF OPENINGS	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"
PRICE OF SASH AND WEIGHT.	$2.73 38 LBS. / $3.09 41 -	$3.61 47 LBS. / $3.97 52 -	$4.33 57 LBS. / $4.85 64 -	$4.93 47 LBS. / $5.40 56 -	$5.40 59 LBS. / $5.91 66 -	$6.08 62 LBS. / $6.60 70 -	$6.57 68 LBS. / $7.17 80 -
PRICE OF DOUBLE STRENGTH GLASS.	$4.74 47 - / $6.00 61 -	$6.31 63 - / $8.00 80 -	$7.89 79 - / $10.00 100 -	$4.74 47 - / $6.00 61 -	$6.31 63 - / $8.00 80 -	$6.31 63 - / $8.00 80 -	$7.89 79 - / $10.00 100 -
PRICE OF ⅛" FACTORY RIBBED GLASS.	$3.58 57 - / $4.63 73 -	$4.78 76 - / $6.18 96 -	$6.00 94 - / $7.74 120 -	$3.58 57 - / $4.63 73 -	$4.78 76 - / $6.18 96 -	$4.78 76 - / $6.18 96 -	$6.00 94 - / $7.74 120 -
HEIGHT OF WINDOW OPENINGS. 7'-8" / 8'-6"	35	45	55	35-161	45-141	45-181	55-161
WIDTH OF OPENINGS	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"
PRICE OF SASH AND WEIGHT.	$3.45 45 LBS. / $3.82 51 -	$4.33 58 LBS. / $4.85 64 -	$5.26 70 LBS / $5.93 78 -	$5.67 57 LBS. / $6.03 65 -	$6.20 69 LBS. / $6.74 75 -	$6.89 72 LBS. / $7.43 83 -	$7.45 81 LBS / $8.04 93 -
PRICE OF DOUBLE STRENGTH GLASS.	$5.92 59 - / $7.50 76 -	$7.89 79 - / $10.00 100 -	$9.85 98 - / $12.50 127 -	$5.92 59 - / $7.50 76 -	$7.89 79 - / $10.00 100 -	$7.89 79 - / $10.00 100 -	$9.85 98 - / $12.50 127 -
PRICE OF ⅛" FACTORY RIBBED GLASS.	$4.49 70 - / $5.57 91 -	$6.00 94 - / $7.74 120 -	$7.45 118 - / $9.66 153 -	$4.49 70 - / $5.77 91 -	$6.00 94 - / $7.74 120 -	$6.00 94 - / $7.74 120 -	$7.45 118 - / $9.66 153 -
HEIGHT OF WINDOW OPENINGS. 9'-2⅜" / 10'-2⅜"	36	46	56	36-161	46-141	46-181	56-161
WIDTH OF OPENINGS.	3'-1¼" 3'-7¼	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"	3'-1¼" 3'-7¼"	4'-1⅝" 4'-9⅛"	4'-1⅝" 4'-9⅛"	5'-2" 6'-0"
PRICE OF SASH AND WEIGHT.	$4.02 54 LBS. / $4.48 60 -	$5.03 69 LBS. / $5.77 77	$6.24 83 LBS. / $7.12 94 -	$6.40 66 LBS / $6.86 76 -	$7.04 80 LBS. / $7.51 91 -	$7.73 83 LBS. / $8.20 95 -	$8.63 94 LBS / $9.93 108 -
PRICE OF DOUBLE STRENGTH GLASS.	$7.10 70 - / $9.00 91 -	$9.48 95 - / $12.00 122 -	$11.83 119 - / $15.00 153 -	$7.10 70 - / $9.00 91 -	$9.48 95 - / $12.00 122 -	$9.48 95 - / $12.00 122 -	$11.83 119 - / $15.00 153 -
PRICE OF ⅛" FACTORY RIBBED GLASS.	$5.39 85 - / $6.96 109 -	$7.17 114 - / $9.27 147 -	$8.95 142 - / $11.60 183 -	$5.39 85 - / $6.96 109 -	$7.17 114 - / $9.27 147 -	$7.17 114 - / $9.27 147 -	$8.95 142 - / $11.60 183 -

Notes: Standard dimensions for glass 12x18 in. and 14x20 in. Also prices and weights of double strength glass and ⅛-in. factory ribbed glass. Putty not included, allow ½-lb. per sq. ft. 20% discount from this list. Right to change without notice is reserved. Follow heavy face type for 12x18-in. glass and light face type for 14x20-in. glass. Prices, f.o.b. St. Louis.

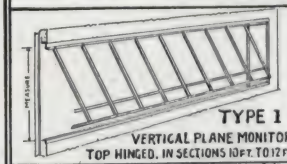
Underwriters' labeled sash, furnished at extra cost, are also carried in stock and are of the same construction as our standard sash, and of the same weight plus the small steel glazing angles. The sash are subject to the rigid requirements and inspection of the National Board of Underwriters, and adopted by rating bureaus everywhere in the United States and Canada

DIMENSIONS, LINEAL FOOT PRICES AND WEIGHTS OF MESKER BROS. MONITOR STEEL SASH

PUTTY REQUIRED PER LINEAL FOOT

Height 2'—10½"	14 oz.
" 3'—10½"	16 "
" 4'—10½"	19 "
" 4'— 7⅛"	36 "
" 5'— 1¼"	40 "
" 6'— 1⅝"	48 "
" 6'— 9⅝"	53 "

HEIGHT OF MONITOR SASH	GLASS SIZES	PRICES AND WEIGHT OF MONITOR SASH PER LIN. FT. PRICE	LBS	PRICES AND WEIGHT OF GLASS PER LINEAL FOOT ¼ IN. PLAIN RIBBED	¼ IN. RIBBED WIRE	LBS
2'-10½"	20"x35"	$3.00	6	$0.83	$1.13	13
3'-10½"	20"x47"	$3.30	7	$1.13	$1.53	17
4'-10½"	20"x59"	$3.70	8	$1.43	$1.93	22
4'-7¼"	3-12"x18"	$1.85	14	$1.36	$1.80	20½
5'-1¼"	3-14"x20"	$1.95	16	$1.46	$2.00	22½
6'-1⅝"	4-12"x18"	$2.25	18	$1.76	$2.40	27
6'-9⅝"	4-14"x20"	$2.35	20	$1.96	$2.70	30



TYPE 1
VERTICAL PLANE MONITOR
TOP HINGED. IN SECTIONS 10FT. TO 12 FT.

TYPE 2
VERTICAL PLANE MONITOR
SIDE PIVOTED. SECTIONS 10FT. TO 12 FT.

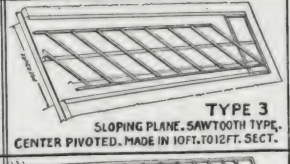
FREIGHT CLASSIFICATIONS
LESS THAN CAR LOAD

	Official	Southern	Western
Steel Sash Plain or WireGlass	2nd Cla.	2nd Cla.	2nd Cla.
	3rd Cla.	3rd Cla.	3rd Cla.

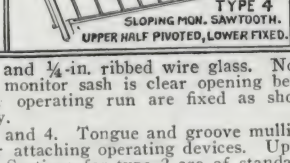
CAR LOAD LOTS

Steel Sash Plain or WireGlass	5th Cla.	5th Cla.	A Cla.
	5th Cla.	5th Cla.	5th Cla.

HEIGHT OF MONITOR SASH	GLASS SIZES	PRICES AND WEIGHT OF MONITOR SASH PER LIN. FT. PRICE	LBS	PRICES AND WEIGHT OF GLASS PER LINEAL FOOT ¼ IN. PLAIN RIBBED	¼ IN. RIBBED WIRE	LBS
2'-10½"	20"x34½"	$2.70	8	$0.85	$1.15	13
3'-10½"	20"x46½"	$3.00	8½	$1.15	$1.45	17
4'-10½"	20"x58½"	$3.30	9	$1.45	$1.95	22
5'-9"	UP. 20"x34½" LOW. 20"x35"	$4.74	16	$1.68	$2.28	26
7'-9"	UP. 20"x46½" LOW. 20"x47"	$5.14	18	$2.28	$3.08	34
9'-9"	UP. 20"x58½" LOW. 20"x59"	$5.64	21	$2.88	$3.88	44



TYPE 3
SLOPING PLANE. SAWTOOTH TYPE. CENTER PIVOTED. MADE IN 10FT. TO 12FT. SECT.



TYPE 4
SLOPING MON. SAWTOOTH. UPPER HALF PIVOTED, LOWER FIXED.

Notes: Prices and weights are also given for ¼-in. plain ribbed glass and ¼-in. ribbed wire glass. No putty included. All prices f.o.b. cars St. Louis. Mechanical operators will be supplied at extra cost. Height of monitor sash is clear opening between structural angles. For heights over 4 ft. 10½ in. a heavier construction must be used. End lights of each operating run are fixed as shown. Sash and muntin bars are of 1-in. rolled steel tee bars, interlocked at joints and pressed by heavy machinery.

Expansion joints or weathering of No. 18 steel included for types 1, 3 and 4. Tongue and groove mullions are included for type 2. A continuous 1¼x1¼x$\frac{5}{16}$-in. angle (in types 1, 3 and 4) is riveted to vertical bars for attaching operating devices. Upper half of type 4 is top hinged, lower half is fixed. Sections for types 1, 3 and 4 are furnished 10 or 12 ft. long. Sections for type 2 are of standard units.

We furnish no structural steel or flashing. Glazing is done from outside except type 2, which is glazed from interior. 20% discount from this list, subject to change without notice.

Write for special prices on car load lots or large quantities

Continued on next page

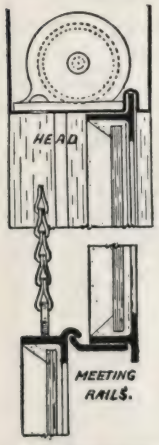
Combination Sheet Steel and Solid Section Steel Windows

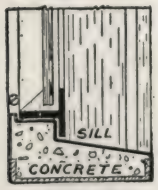
The most desirable types in this class of windows are the double hung and counterbalanced. These windows are constructed in knock down form and the expense of assembling at the building is more than covered by saving of freight.

Made to any dimensions, but the use of standard sizes 3 ft.x 6 ft. 6 in., 3 ft. 6 in.x7 ft. and 4 ft.x8 ft., will insure more prompt deliveries and lower prices.

Send schedule for prices.

KNOCK DOWN CONSTRUCTION
COUNTER-BALANCED

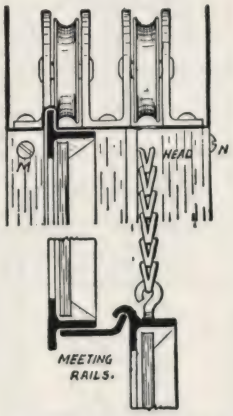


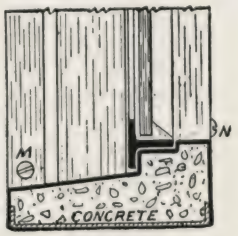


VERTICAL SECTION

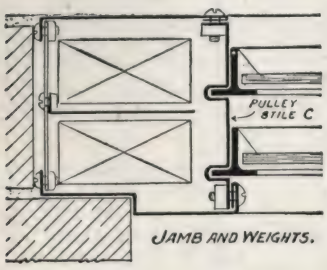
Prices f.o.b. cars St. Louis
20% discount subject to change without notice

KNOCK DOWN CONSTRUCTION
DOUBLE-HUNG

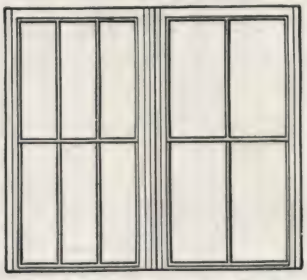




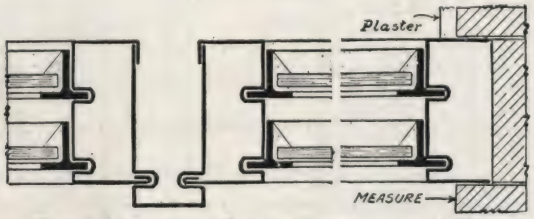
VERTICAL SECTION



JAMB AND WEIGHTS.



TWIN WINDOW-DOUBLE HUNG TYPE.



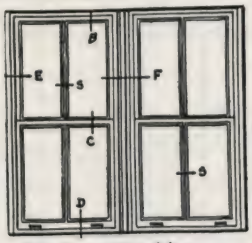
TYPICAL MULLION AND JAMB OF COUNTERBALANCED WINDOW.

Mesker Fireproof Hollow Metal Windows

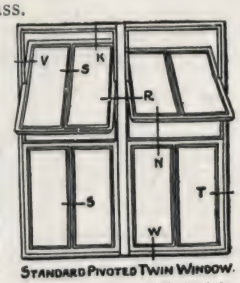
Approved by National Board of Fire Underwriters, Inc.

We manufacture the following types: double hung; counterbalanced; standard pivoted; double pivoted; double casement; double stationary; single pivoted; single casement; single stationary; single top hinged.

Frames and sash of No. 24 gauge galvanized steel or 20-oz. copper. Concreting of subsill must be done at building. Glass must not exceed 720 sq. in. Mullions F and R are of a non-bearing character, made of No. 16 gauge galvanized steel, and limited to 12 ft. high for twin, triple, quadruple, etc., windows. They must extend 3 in. down into sills and same distance up into brick arches where segments are used. For square head windows mullions must be attached to lintels with knees and bolts. We supply windows complete inclusive of hardware, sash weights and chains, fusible links for pivoted windows; ¼-in. rough ribbed or polished wire glass.

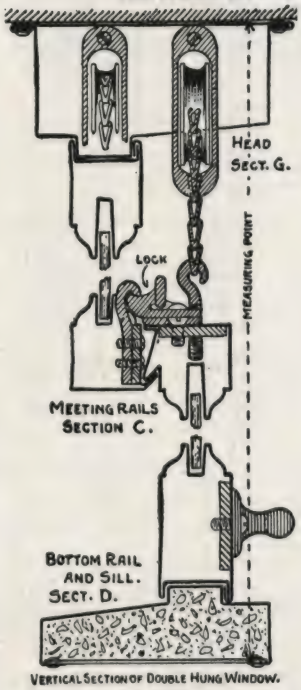


TWIN DOUBLE HUNG WINDOW.

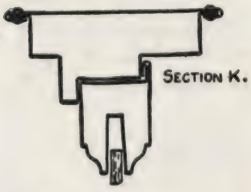


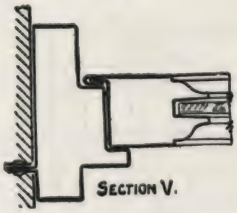
STANDARD PIVOTED TWIN WINDOW.

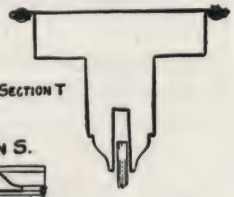
Underwriters' label is a guarantee that windows comply with every requirement and are accepted everywhere by rating bureaus as standard.



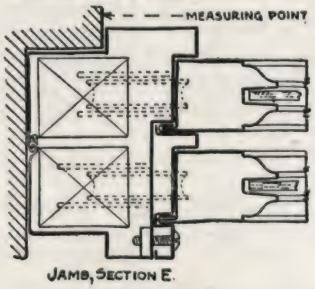
VERTICAL SECTION OF DOUBLE HUNG WINDOW.







MUNTIN S.



JAMB, SECTION E.

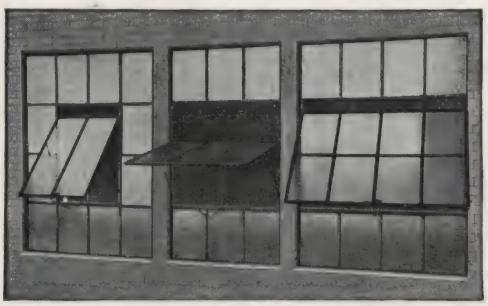
Dimensions of openings, ft.—in.	Sash wts., lbs.	Double hung window No. 24 galv. Frame, 1-in. T-bar sash		Counterbal. window No. 18 steel frame, 1-in. T-bar sash		¼-in. rib. wire glass		⅛-in. factory rib. glass	
		Ship. wt.	Price	Ship. wt.	Price	Lbs.	Price	Lbs.	Price
3–0 x 6–6	90	80	$32.00	80	$19.40	70	$ 6.70	50	$ 3.40
3–6 x 7–0	115	90	34.00	87	20.00	90	8.60	55	4.40
4–0 x 8–0	140	100	37.00	95	21.00	120	11.50	60	5.20

F.o.b. St. Louis 20% discount change without notice ft.—in.	Double Hung					Standard pivoted			
	Sash wts.	No. 24 gal. with hardware complete		¼-in. rib. wire glass		No. 24 gal. with hardware complete		¼-in. rib. wire glass	
Dimensions	Lbs.	Lbs.	Price	Lbs.	Price	Lbs.	Price	Lbs.	Price
3–0 x 6–6	85	85	$37.00	60	$ 5.70	60	$22.30	60	$ 6.00
3–6 x 7–0	100	95	38.50	76	7.30	70	23.60	80	7.80
4–0 x 8–0	130	105	42.00	100	9.90	80	25.00	100	10.35

Continued on next page

Mesker Side Arm Extending Sash Ventilator

The Mesker improved solid section rolled steel, side arm extending ventilators are especially adapted for schools, industrial and office buildings, or wherever a



SIDE ARM EXTENDING SASH VENTILATOR

superior window with maximum ventilation is desired. With this type of ventilator, 100% ventilation is obtainable, but ventilator may be opened to any desired angle without the use of push bar or other fastener. The extending ventilator meets the requirements of school boards for the most perfectly operating windows without projecting the sash into the rooms. When open the ventilator serves either as a rain shield or as an awning, as well as for ventilation.

The ventilator opens out from the bottom, causing the top to slide down vertically. This is accomplished by means of a pull chain fastened at the top, which projects the ventilator outwardly at the bottom. The necessary friction for the successful operation of this type of sash is developed by our special construction of sash bar. Has no springs to be adjusted, but has a vertical slide arrangement of the utmost simplicity, requiring the least effort to operate. The ventilator is self-balancing and automatically adjusts itself to any angle, from the vertical to the horizontal plane, by the slightest pull at the chain after releasing the lock.

With this construction the outside of the glass is easily accessible for window cleaners. The distinguishable feature of the extending ventilator is, that it admits the attachment of window screens on the interior, as well as window shades or draperies.

Mesker Patent Combination Steel and Concrete Interior Stairs

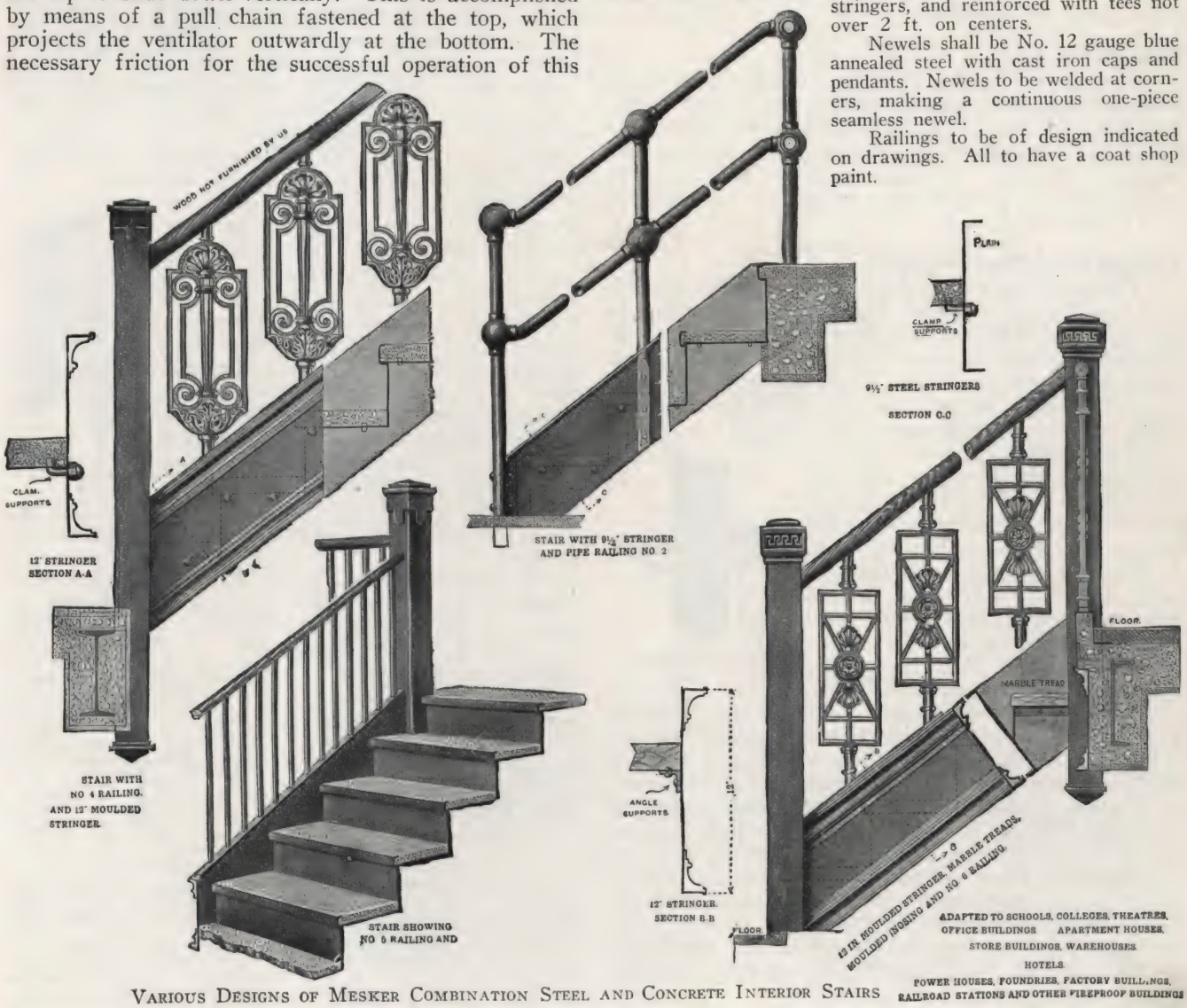
The Mesker stairs are specified as a "standard" of construction throughout the country and are installed in some of the best buildings erected within the past 15 years.

Specifications—Stringers shall be $\frac{3}{16}$-in. steel plate, bent in channel form and of width shown on plans. Treads and risers shall be made of one continuous steel plate No. 12 or No. 13 gauge, bent to form as indicated. Treads shall be supported at ends by special clamps, securely bolted to stringers with acorn heads on face strings and shall be filled with concrete or other material by others. (Tread filling 1½ in. more or less in thickness.)

Platforms or landings, where required, shall be No. 12 or No. 13 gauge steel plates, with nosings same as treads and supported on a 2x2x$\frac{3}{16}$-in. angle frame, riveted or bolted to stringers, and reinforced with tees not over 2 ft. on centers.

Newels shall be No. 12 gauge blue annealed steel with cast iron caps and pendants. Newels to be welded at corners, making a continuous one-piece seamless newel.

Railings to be of design indicated on drawings. All to have a coat shop paint.



VARIOUS DESIGNS OF MESKER COMBINATION STEEL AND CONCRETE INTERIOR STAIRS

TRUSCON STEEL COMPANY

Manufacturers of Steel Sash

YOUNGSTOWN, OHIO

BRANCH OFFICES IN THE FOLLOWING CITIES

ATLANTA, GA.
BALTIMORE, MD.
BIRMINGHAM, ALA.
BOSTON, MASS.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
COLUMBUS, OHIO
DALLAS, TEX.
DAYTON, OHIO
DENVER, COLO
DES MOINES, IOWA
DETROIT, MICH.
EL PASO, TEX.
FORT WAYNE, IND.
GREENSBORO, N. C.
HOUSTON, TEX.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW HAVEN, CONN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
NORFOLK, VA.
OKLAHOMA CITY, OKLA.
OMAHA, NEBR.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.
PROVIDENCE, R. I.
RICHMOND, VA.
ROSWELL, N. M.
ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN ANTONIO, TEX.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SPOKANE, WASH.
SPRINGFIELD, MASS.
SYRACUSE, N. Y.
TOLEDO, OHIO
TULSA, OKLA.
WASHINGTON, D. C.

DEALERS EVERYWHERE

TRUSCON STEEL WINDOWS

TRADE-MARK

Products

TRUSCON PIVOTED SIDEWALL WINDOWS; BASEMENT WINDOWS; BALANCED VENTILATOR WINDOWS; COUNTERBALANCED and COUNTERWEIGHTED VERTICALLY SLIDING WINDOWS; ECONOMY CASEMENTS; CONTINUOUS SASH; MECHANICAL OPERATORS.

Also Underwriters' Labeled Sash, Doors and Partitions.

For Reinforcing Steel and Steel Buildings, see pages 42-43; for Hy-rib Metal Lath, see pages 268-269; for Steel Joists, see page 496.

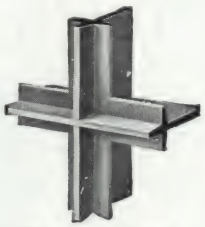
Truscon Service

A corps of Truscon engineers, familiar with every phase of daylighting and ventilating, are located in the principal cities throughout the country to serve architects, engineers, contractors, builders and owners without the slightest obligation. Truscon engineers will assist in making economical layouts and designs to conform with your construction.

Truscon Solid Steel Windows

Construction and Design—The highest type of steel craftsmanship, both in design and workmanship, is represented in Truscon solid steel windows—the result of more than twenty years' experience in all phases of structural steel fabrication. There are types and designs of Truscon steel windows to harmonize with almost every architectural treatment.

The Truscon Joint—The intersection of the horizontal and vertical muntins is formed by a special dovetailed mitered interlocking of the bars so they run continuously from the head to sill and from jamb to jamb. This construction affords maximum strength against wind pressure and vibration, and does away with racking and distorting of the sash during shipment and installation.



TRUSCON JOINT

Weathering—Continuous double flat contact weathering is used on all sides of the ventilator. Deep, heavy rolled sections give rigidity to the head and sill and form a perfect drip. Standard ventilators are horizontally pivoted 2 in. above centers by means of solid steel butts. The ventilators are accurately hung in the shop so adjustment is seldom necessary in the field.

Truscon Stock Windows—For convenience of the architects, contractors and builders, 25 of the most popular types of Truscon steel windows are constantly on hand for immediate delivery from our warehouse at the principal distributing centers and by Truscon dealers in every part of the country.

The sash are made entirely from standard Truscon solid rolled steel sections 14x20-in. glass sizes only. These types are shown in heavy black lines in the diagram of "Stock and Standard Types" on the following page.

Standard Glass Sizes — Designated glass sizes in dimension table and diagram on following page, occur only in the stationary portion of the windows. Glass in the ventilators are smaller. All lights at top and bottom of ventilators must be 7/8 in. shorter and all lights at sides of ventilators must be 1 in. narrower than in stationary portion of windows. The diagram shows example for 14x20-in. glass. Dimensions for windows with 12x18-in. glass are 2 in. less in all cases.

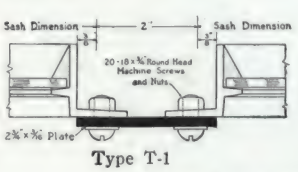
14" 20"	14" 20"	14" 20"	14" 20"	14" 20"
14" 20"	13" 19⅛"	14" 19⅛"	13" 19⅛"	14" 20"
14" 20"	13" 19⅛"	14" 19⅛"	13" 19⅛"	14" 20"
14" 20"	14" 20"	14" 20"	14" 20"	14" 20"

SIZES OF LIGHTS

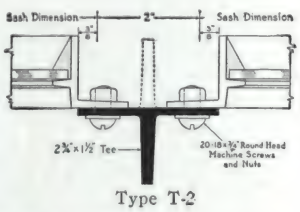
Glazing—Truscon steel windows are glazed from the inside. Each light is held in place by four spring wire glazing clips. Glass placed in steel sash must be embedded in putty so the glass does not come directly in contact with the steel. Spread putty over glazing rabbet; push the glass firmly into position so that the putty fills every crevice; now slip the spring wire glazing clip in place, as shown in the illustration, and apply the face putty. Be sure to use Truscon steel sash putty. It spreads easily and smoothly and has perfect adhesion to both steel and glass. Do not use wood sash putty; it will not harden satisfactorily on steel.

GLAZING CLIP

Multiple Units—Truscon steel windows may be combined to fill openings of any desired widths by means of Truscon standard mullions. All stock and standard windows are punched for mullions.



Type T-1



Type T-2

DETAILS TRUSCON STEEL WINDOWS

Type T-1. Recommended for use with sash units not more than 3 lights high. The plate is punched with horizontally slotted holes that coincide with vertically slotted holes in jamb members of sash. This allows for slight adjustment in erection

Type T-2. Designed to give added strength to sash greater than 3 lights high. This type should not be used for sash more than 3 lights high. The web of mullion to be either turned in or out. If turned in it should not be used with sash more than 6 lights high with 18 in. glass. For greater heights double T-bar mullions may be used

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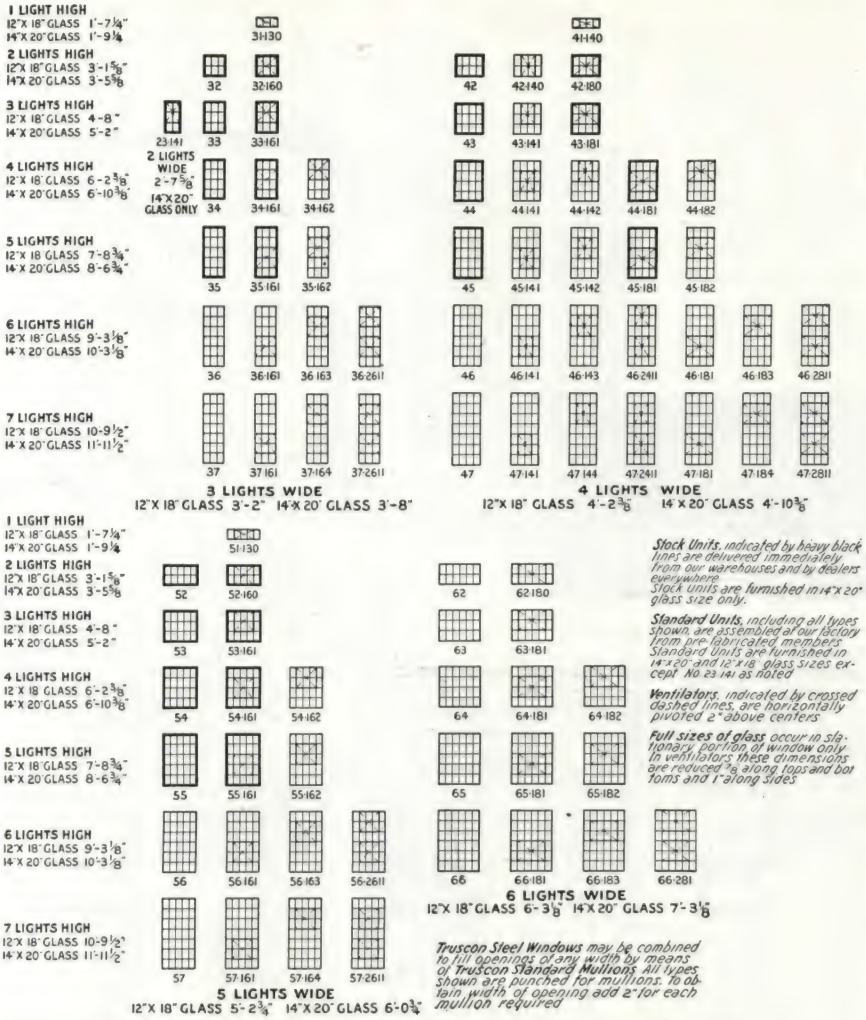


Stock Units, indicated by heavy black lines are delivered immediately from our warehouses and by dealers everywhere. Stock units are furnished in 14"x 20" glass size only.

Standard Units, including all types shown, are assembled at our factory from pre-fabricated members. Standard Units are furnished in 14"x 20" and 12"x 18" glass sizes except No 23 141 as noted.

Ventilators, indicated by crossed dashed lines, are horizontally pivoted 2" above centers.

Full sizes of glass occur in stationary portion of window only. In ventilators these dimensions are reduced ⅛ along tops and bottoms and 1" along sides.

Truscon Steel Windows may be combined to fill openings of any width by means of *Truscon Standard Mullions*. All types shown are punched for mullions. To obtain width of opening add 2" for each mullion required.

STOCK AND STANDARD TYPES OF TRUSCON STEEL WINDOWS

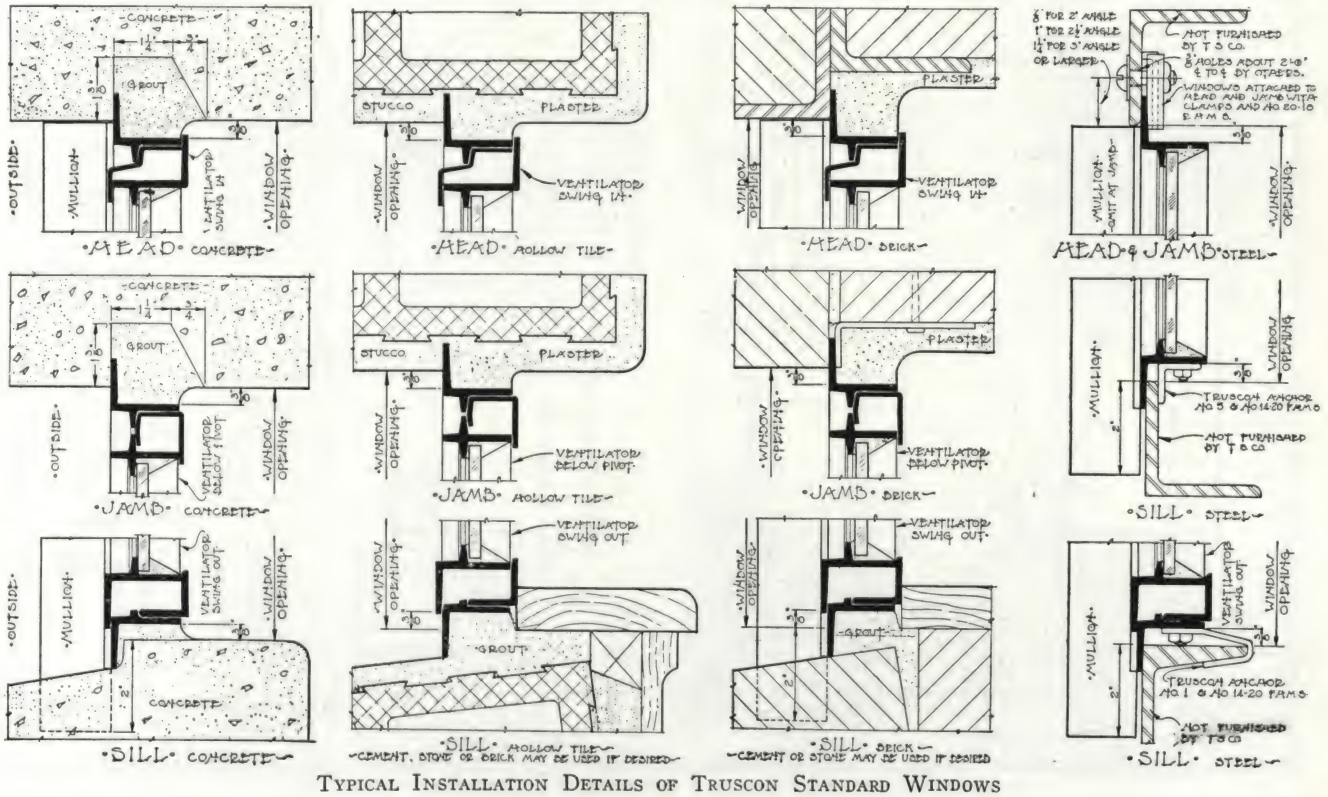
WINDOW OPENINGS FOR TRUSCON STEEL SASH

Glass sizes 12" x 18" Height, ft. in.	Glass sizes 14" x 20" Height, ft. in.	Number of lights high
1— 7¼	1— 9¼	1
3— 1⅝	**3— 5⅝**	2
4— 8	**5— 2**	3
6— 2⅜	**6—10⅜**	4
7— 8¾	**8— 6¾**	5
9— 3⅛	**10— 3⅛**	6
10— 9½	**11—11½**	7

Be sure to combine heights for 12"x18" glass with widths for 12"x18" glass and heights for 14"x20" glass with widths for 14"x20" glass.

Figures in bold type are for stock windows.

Any width may be had in any of above heights: Width ft. in.	Width ft. in.	Number of lights wide	Number of sash units	Number of mullions required
	2— 5⅝	1	1	None
3— 2	**3— 8**	3	1	None
4— 2⅜	**4—10⅜**	4	1	None
5— 2¾	**6— 0¾**	5	1	None
6— 3⅛	7— 3⅛	6	1	None
6— 6	7— 6	6	2	1
8— 6¾	**9—10¾**	8	2	1
9—10	**11— 4**	9	3	2
10— 7½	**12— 3½**	10	2	1
10—10⅜	**12— 6⅜**	10	3	2
11—10¾	**13— 8¾**	11	3	2
11—10¾	**13— 8¾**	11	3	2
12— 8¼	14— 8¼	12	2	1
12—11⅛	**14—11⅛**	12	3	2
12—11⅛	14—11⅛	12	3	2
13— 2	**15— 2**	12	4	3
13—11½	**16— 1½**	13	3	2
13—11½	**16— 1½**	13	3	2
14—11⅞	17— 3⅞	14	3	2
15— 2¾	**17— 6¾**	14	4	3
16— 0¼	18— 6¼	15	3	2
16— 0¼	**18— 6¼**	15	3	2
16— 6	**19— 0**	15	5	4
17— 0⅝	19— 8⅝	16	3	2
17— 0⅝	19— 8⅝	16	3	2
17— 3½	**19—11½**	16	4	3
17— 6⅜	**20— 2⅜**	16	5	4
18— 1	20—11	17	3	2
18— 6¾	**21— 4¾**	17	5	4
19— 1⅜	22— 1⅜	18	3	2
19— 4¼	**22— 4¼**	18	4	3
19— 4¼	22— 4¼	18	4	3
19— 7⅛	**22— 7⅛**	18	5	4
19—10	**22—10**	18	6	5
20— 7½	**23— 9½**	19	5	4
20— 7½	**23— 9½**	19	5	4
21— 5	24— 9	20	4	3
21— 5	**24— 9**	20	4	3
21— 7⅞	24—11⅞	20	5	4
21— 7⅞	**24—11⅞**	20	5	4
21—10¾	**25— 2¾**	20	6	5



TYPICAL INSTALLATION DETAILS OF TRUSCON STANDARD WINDOWS

Continued on next page

Truscon Steel Basement Windows

Truscon basement windows are solid steel units completely equipped ready to install with sash accurately fitted to the frame, and lock and hinges rigidly attached. They are indestructible, fireproof, weatherproof, will not swell, warp nor stick, and give 50% to 80% more daylight than wood. These windows are ready for immediate delivery from Truscon warehouses and by building supply and hardware dealers everywhere. Ask your dealer about them.

Installation—Truscon basement windows may be installed in any type of foundation, brick, stone or concrete; 5/8-in. anchorage into the construction insures absolute weather-tightness on all sides.

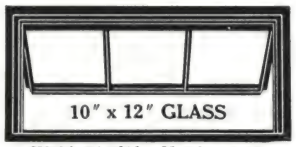
Screening—It is easy to screen Truscon basement windows. Two screws at each jamb hold the screen flush against the sash frame so there are no crevices for insects to enter.

Glazing—Truscon basement windows are glazed like wood sash, except that steel spring glazing clips furnished with each window are used. Be sure to use steel sash putty. Ordinary wood sash putty will not harden on steel.

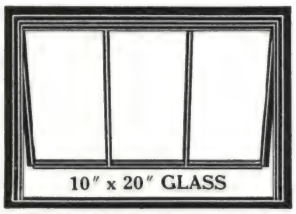
In Concrete Foundation

In Brick Foundation

Truscon Steel Basement Windows



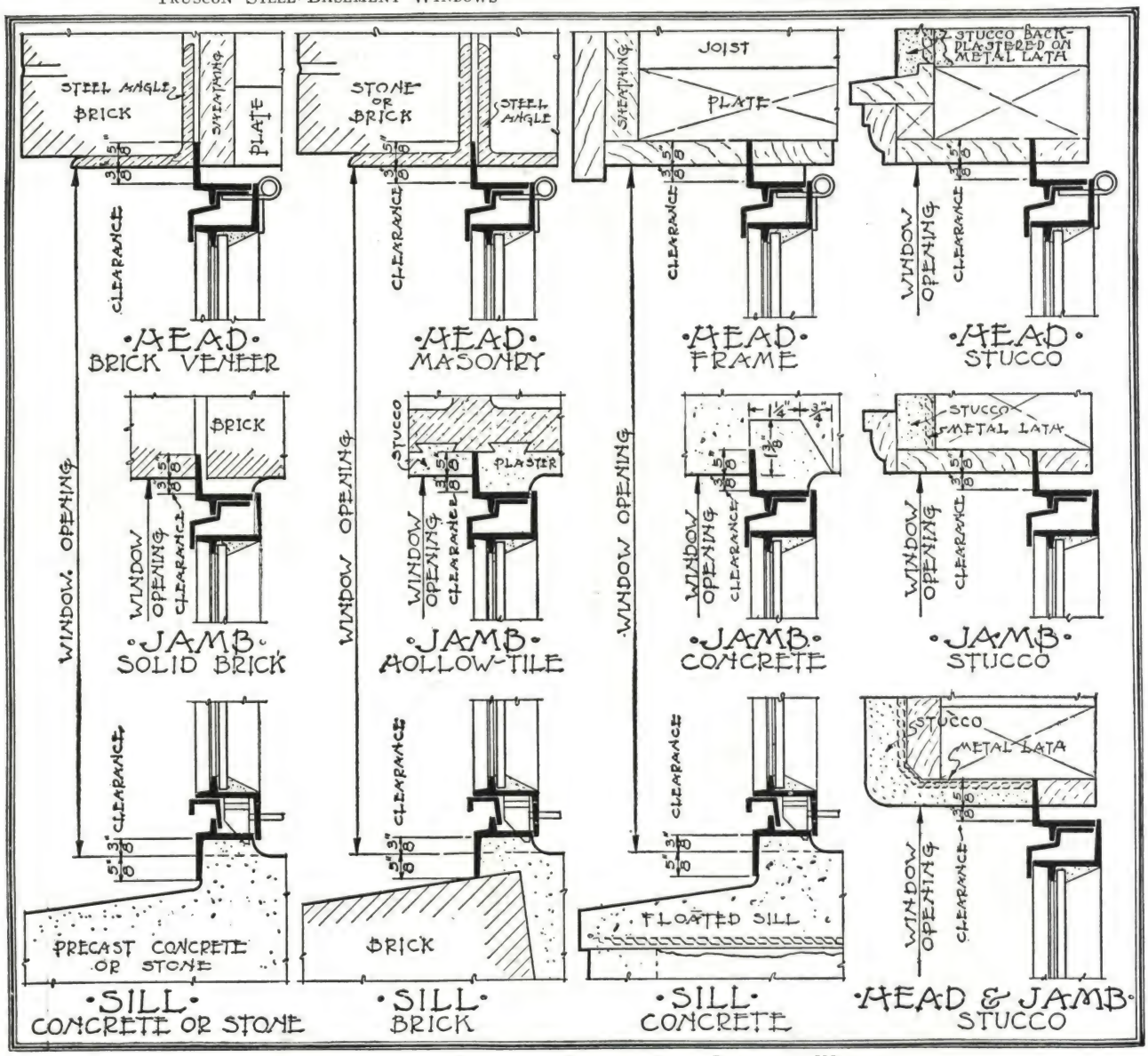
Width 2'-9¾" Height 1'-3"



Width 2'-9¾" Height 1'-11"

Standard Sizes

Above dimensions are measured from same points as "window opening" in following installation details. All dimensions allow 5/8-in. anchorage in construction on all sides. Be sure to allow 3/8-in. clearance at jambs for easy opening and closing of window



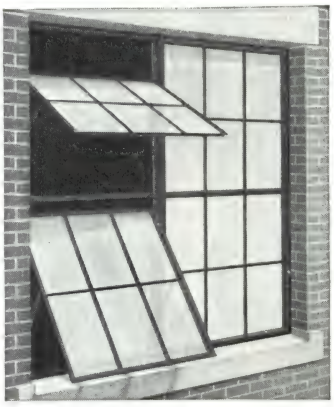
Typical Installation Details of Truscon Steel Basement Windows

Continued on next page

Truscon Perfection Balanced Ventilator

The Truscon Perfection balanced ventilator window meets the demands for pivoted window operating entirely outside the sash frame. Particularly adaptable for schools, hospitals, office and apartment buildings. The ventilators may be reversed.

The ventilator operates on a slide tension pivot which holds it in any desired position. There are no projections on the interior so that sash may be easily screened. Standard roller shades may be attached directly to the ventilators and thus form an awning when the window is open. The size and shape of the windows are made to conform with any architectural design.



BALANCED VENTILATOR WINDOW

Truscon Counterbalanced Windows

Standard units of Truscon counterbalanced windows consist of two sliding units counterbalanced against each other and give a maximum of 50% ventilation.

The sash units are hung by means of heavy galvanized iron chains with screw adjuster attached to lower units.

The windows can be glazed on the interior or exterior and can be furnished with copper weathering strips. The windows are made from solid rolled steel sections and in standard sizes, 2, 3 or 4 lights wide.

Closed Open

TYPICAL COUNTER-BALANCED WINDOW

Economy Casements

The design and arrangement of the lights makes Truscon Economy casements unusually adaptable for ornamental types of architecture. The sash are built from Truscon Standard solid rolled steel sections. Ventilators project so slightly on interior, when open, they do not interfere with curtains, drapes, shades or screens.

ECONOMY CASEMENTS

Truscon Pressed Steel Frames

Unusual refinement in architectural design of windows is afforded by use of pressed steel frames in conjunction with Truscon standard windows and continuous sash. Pressed steel frames are particularly adaptable for ornamental and monumental structures where massive effects are desired, such as power houses, banks, etc., and give great strength and rigidity for large openings.

The principle of manufacturing these frames makes their finish and the accurate fitting of the units far superior to frames made of brake metal.

Truscon windows with pressed steel frames are designed for each individual job and builders should consult our engineering offices located in the principal cities.

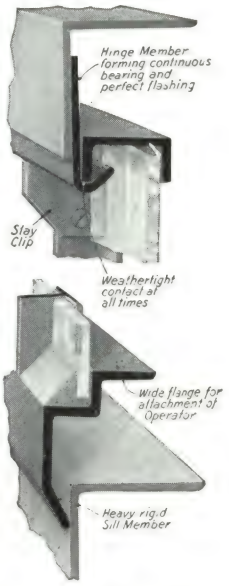
Truscon Continuous Sash

Truscon continuous sash are designed to give long continuous openings in the roof or sidewalls of foundries, drop forge plants, heat treating and other buildings requiring maximum ventilation.

The sash may be installed in any type of truss design and may be operated with equal efficiency in a vertical or sloping plane.

The sash are manufactured in three types, top hung, bottom hung, center pivoted and fixed lights. Because of varying requirements, consult one of Truscon's 45 engineering offices before making plans and layouts.

Construction — All members are solid rolled steel sections assembled by means of mortise and tenon joints. The joints are both welded and riveted.



SECTIONAL VIEWS CONTINUOUS SASH

Weathering—The supporting member at the head is a special steel adjustable member that affords a perfect bearing for the sash, at the same time making a weathertight connection. A weathertight connection is secured at the jambs by means of panels underlapping swing units.

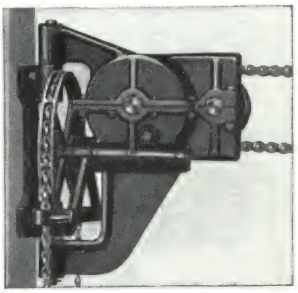
Standard Sizes—Shown in the table below. Units are designed for 20-ft. truss spans. The various units may be combined however.

CONTINUOUS STEEL SASH

Height of sash ft. in.	Height of opening ft. in.	Glass sizes		
		Standard panel, in.	Fixed panel, in.	Storm panel, in.
3—0	2—10½	22⅜ x 32¾	22⅜ x 32¾	24 x 32¾
4—0	3—10½	22⅜ x 44¾	22⅜ x 44¾	24 x 44¾
5—0	4—10½	22⅜ x 56¾	22⅜ x 56¾	24 x 56¾
6—0	5—10½	22⅜ x 68¾	22⅜ x 68¾	24 x 68¾

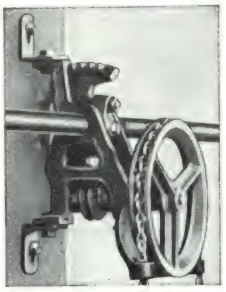
Truscon Mechanical Operators

Truscon mechanical operating devices for steel sash are designed to meet all conditions. Although they are built in a large number of sizes they are divided into two general classes: Tension operators and torsion operators.



TENSION TYPE SASH OPERATOR

Tension Type—Truscon tension operators are used with continuous sash, operated by hand or power. The entire mechanism is of rugged construction and designed to hold the sash securely in any open position.



TORSION TYPE SASH OPERATOR

Torsion Type—These operators are designed to control ventilators of pivoted sidewall sash. The power exerts force through a torsion pipe and arms attached to the ventilators. This method of control is extensively used where a large number of ventilators occur in a single sidewall bay, monitors, lanterns, etc.

UNITED STATES METAL PRODUCTS CO.

Steel Sash, Reversible and Double Hung Metal Windows, All-Metal and Tin Clad Fire Doors

OFFICE AND FACTORY

SAN FRANCISCO, CAL.

AGENTS IN

LOS ANGELES, CAL. SACRAMENTO, CAL. PORTLAND, ORE. FRESNO, CAL. SEATTLE, WASH. SPOKANE, WASH. HONOLULU, T. H.

Products

STEEL SASH (standard and special sizes); REVERSIBLE and HINGED STEEL CASEMENT SASH; DOUBLE HUNG STEEL SASH; METAL COVERED DOORS, TRIM and SASH; TIN CLAD and ALL-METAL FIRE DOORS; SANITARY STEEL DOOR JAMBS.

METPRODCO TRADE-MARK

For Bois Patented Steel Stairs, see pages 536-537.

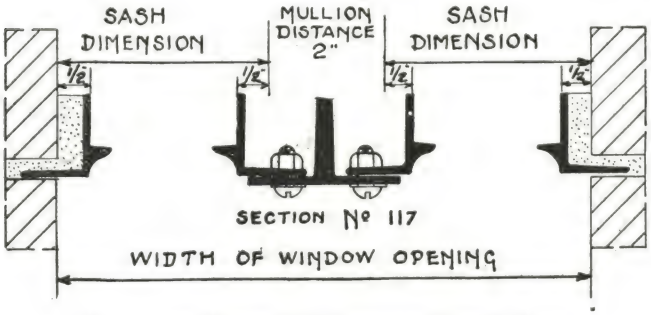
Sidewall Sash

Metprodco steel sash are made with hot rolled moulded shapes. Cross joints are electrically spot welded.

Ventilators are made with double contact weathering all around, making a vent which effectively excludes rain. The pivots are made of heavy wrought steel, and are riveted to the muntins and outside member of vents with heavy rivets. Ventilators are furnished with either notched bar locks or spring latch and chain.

Tee mullions are furnished for sash over 6 ft. 3 in. high; all smaller sash are supplied with flat mullions.

Special steel windows in camber and circle heads with lights arranged in any design. Either pivoted, side hinged or reversible vents of the casement or balanced type can be furnished.

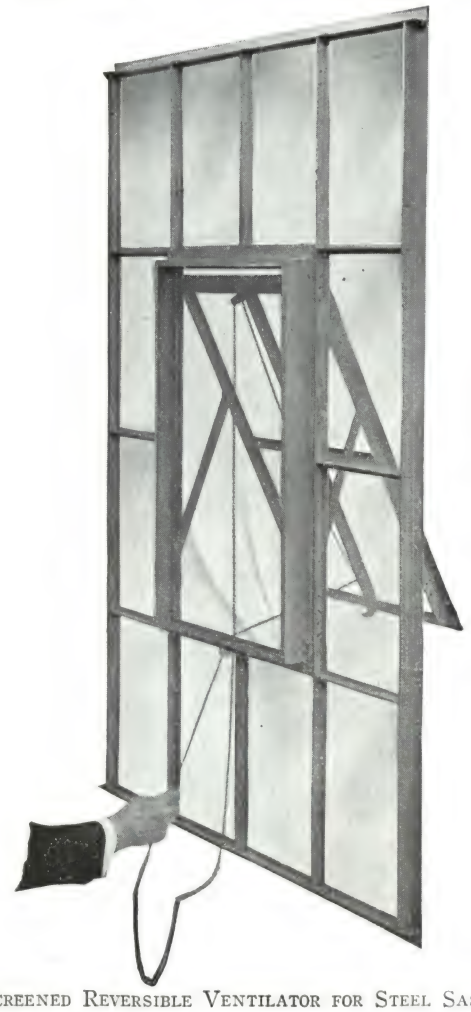


DIMENSION DETAILS OF STANDARD STEEL SASH

STANDARD STEEL SASH SIZES

12x18 in. Glass						14x20 in. Glass					
Number lights wide	Number units	Width window opening, ft.-in.	Number lights high	Number units	Height window opening, ft.-in.	Number lights wide	Number units	Width window opening, ft.-in.	Number light high	Number units	Height window opening, ft.-in.
3	1	3- 2	1	1	1- 7¼	3	1	3- 8	1	1	1- 9¼
4	1	4- 2⅜	2	1	3- 1⅝	4	1	4-10⅜	2	1	3- 5⅝
5	1	5- 2¾	3	1	4- 8	5	1	6- 0¾	3	1	5- 2
6	2	6- 6	4	1	6- 2⅜	6	2	7- 6	4	1	6-10⅜
7	2	7- 6⅜	5	1	7- 8¾	7	2	8- 8¾	5	1	8- 6¾
8	2	8- 6¾	6	1	9- 3⅛	8	2	9-10¾	6	1	10- 3⅛
9	3	9-10				9	3	11- 4			
10	2	10- 7½				10	2	12- 3½			
11	3	11-10¾				11	3	13- 8¾			
12	3	12-11⅛				12	3	14-11⅛			
13	3	13-11½				13	3	16- 1½			
14	3	14-11⅞				14	3	17- 3⅝			
15	3	16- 0¼				15	3	18- 6¼			
16	4	17- 3½				16	4	19-11½			
17	5	18- 6¾				17	5	21- 4¾			
18	4	19- 4¼				18	4	22- 4¼			
19	5	20- 7½									
20	4	21- 5									
21	5	22- 8¼									
22	5	23- 8⅝									

Reversible Ventilator with Screen—Reversible ventilator with screens can be applied to any stock or special size of Metprodco sash. The ventilator is operated with ease from any floor height, without the use of mechanical appliances.



SCREENED REVERSIBLE VENTILATOR FOR STEEL SASH

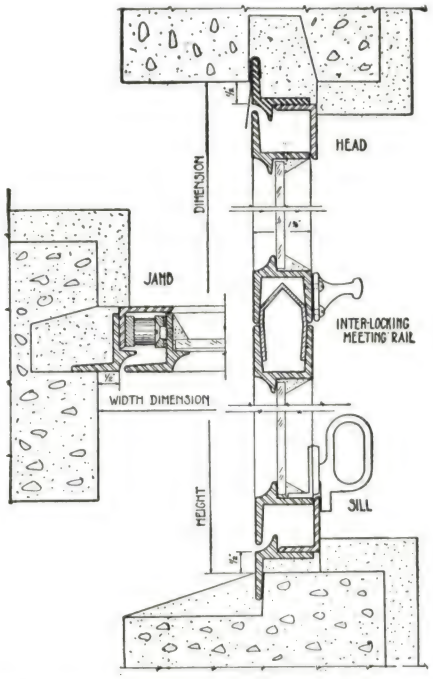
Reversible Steel Windows

Metprodco reversible steel windows are especially designed for use in schools, hotels, hospitals, office buildings and other types of buildings. The windows can be made to consist of one, two or three sash, each working independently of the other. Screens are easily applied on the inside of the opening.

This type of window can be opened to give 100% ventilation. For use in hotels it has an advantage over other types of windows, as a shade can be applied to each sash, the window can be opened sufficiently for ventilation—to act as a louver and still allow the desired privacy.

Continued on next page

The construction of this window is of the highest quality; all miter joints are welded, and the window leaves the factory only after being inspected, assuring ease of operation after installation.

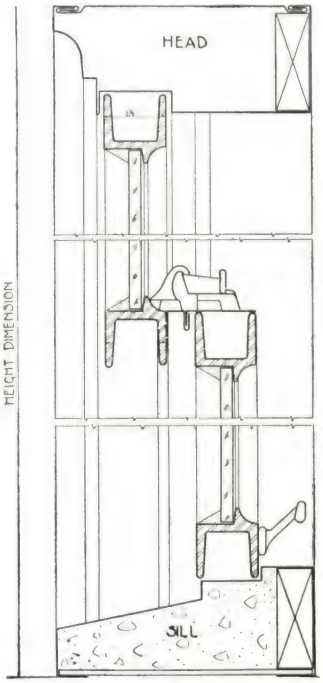


Detail Vertical Type Reversible Steel Window

Metprodco Double Hung Steel Window

Metprodco double hung (Type "G") windows are made with hollow metal frames and solid rolled steel sash and are designed for use in buildings of all types. They are made with clean-cut lines for architectural appearance, to give a maximum amount of light and to operate with simplicity and ease. The jamb width allows these windows to be easily installed in a 6-in. concrete wall.

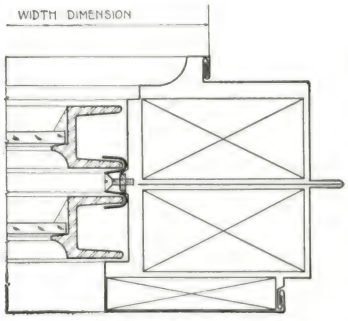
Windows are furnished complete with weights, chain and fixtures and all finished hardware.



Detail Double Hung Steel Window

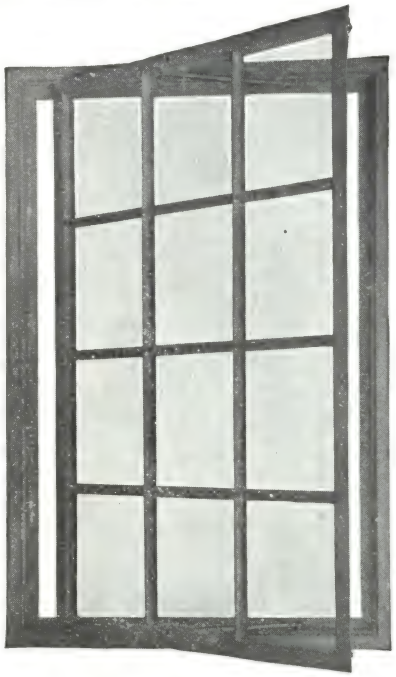
Hollow Metal Windows

Double hung, reversible or pivoted types to meet the requirements of the National Board of Fire Underwriters.



JAMB SECTION

Vertical Type Reversible Steel Window



Casement Type Reversible Sash

Metal Covered Doors and Trim

Metal covered doors, jambs and trim in kalamein iron, bronze and copper. Mouldings made according to architects' details when required.

Hollow Metal Door Jambs

Sanitary door jambs, for use in hospitals or other types of buildings.

Fire Doors

Standard tin clad and all-metal fire doors furnished and installed complete with hardware, to meet the requirements of the National Board of Fire Underwriters; or doors and hardware can be supplied for erection by others.

Catalogues

Catalogues and full-sized details sent on request.

THE LUNKEN WINDOW CO.

EXECUTIVE OFFICE AND WORKS
Cherry Street
CINCINNATI, OHIO

Product

LUNKEN WINDOWS: Double hung unit windows having 100% ventilation with disappearing sash and rewirable insect screens, copper weatherstripping.

Lunken Windows

Lunken windows provide any degree of ventilation up to the full opening, also allowing top, bottom or center ventilation with both sash locked. Close tight against air leakage—copper and phosphor bronze stripping effectively seals the window against wind, dust and moisture. The screens are in pairs and cover the entire window opening. They are made of 16-mesh copper cloth, rewirable, rustproofed, enameled metal frames, sliding in copper channels. The screens can be raised into the boxhead for winter storage and held by two turn catches—out of sight but always accessible—thoroughly protected against deterioration and damage, eliminating annual expense and annoyance of screen removal and replacements. Lunken windows resemble ordinary double hung windows with all advantages of both casement and the double hung types.

Adaptability

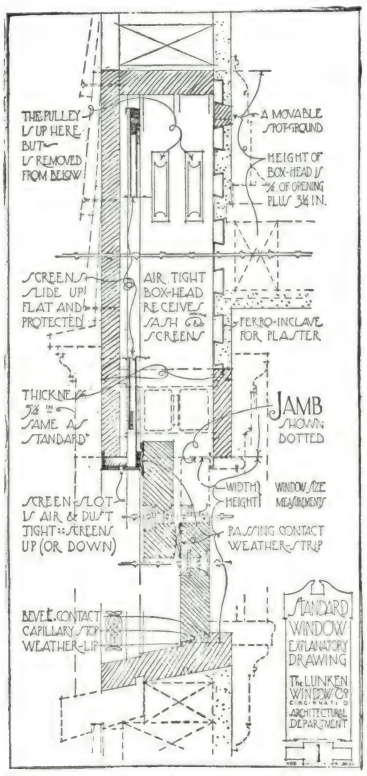
Lunken windows, in general, will fit any architecture or construction permitting of a wooden frame, non-casement type of window within their size range. A practical window for residences, hospitals, hotels, sanatoria, institutional and apartment buildings.

General Description

The Lunken window unit consists of a complete core, every operating part in final assembly and complete working order. The unit includes full box frame and pocket head, the sash glazed and fitted, balanced and hung, primed, rough and finish hardware applied, efficiently weatherstripped with copper and phosphor bronze stripping and rustproof metal rewirable frame copper cloth insect screens. Everything in place, ready for immediate use. The frame is set in the wall exactly as received from the factory and is then and there complete, requiring no further attention except adding the interior and exterior trim and the final coats of paint. Solid copper screen frames can be furnished on specification.

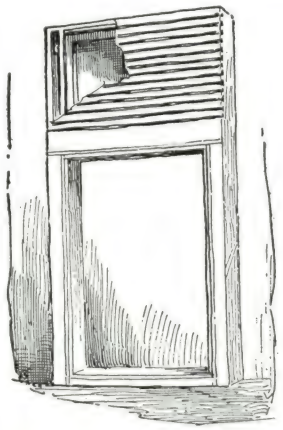
Quality

Highest throughout. Built of the very best materials obtainable under highly specialized methods and expert workmanship. Detailed in accordance with the best architectural practice and admits of the freest decorative treatment.



LUNKEN CORE INSTALLED IN TYPICAL 4-IN. STUD FRAME WALL WITH SIMPLE TRIM OUTSIDE AND INSIDE

Everything is furnished except the trim. By means of an airtight box-head and the use of materials of quality never before built in wooden windows, a 100% opening that will stay airtight and easy operating has been secured

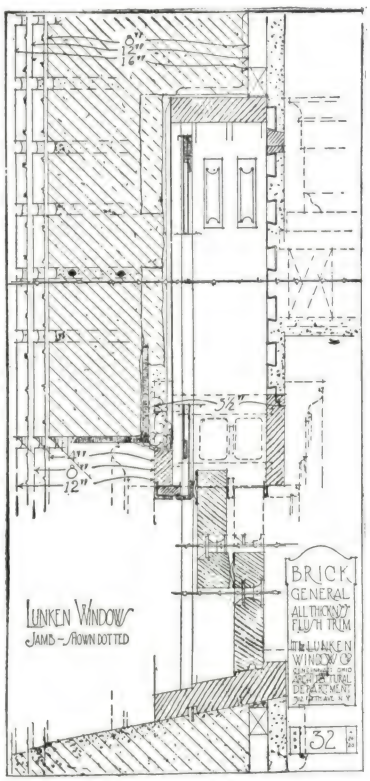


UNIT WINDOW AS SHIPPED

Fits any architecture. Once set, all window and accessory matters are completed

LUNKEN WINDOW

Built to receive practically any desired decorative treatment however ornate or simple



TYPICAL BRICK CONSTRUCTION, FURRED, WITH LUNKEN CORE PLACED FLUSH WITH INSIDE OF WALL

Adaptable to walls 8, 12, 16 in. or thicker, either furred as shown above, or without furring. Can also be placed in center of walls 12 in. and thicker, where desired. A suitable type box-head is supplied for such conditions. The Lunken window accommodates every class of brick construction

Continued on next page

Availability

Lunken windows are made in a wide range of sizes as indicated on the following pages—any width and any height within the size range. Suitable for practically all types of walls from 4-in. stud frame, stucco, veneer, weatherboard, masonry, brick or hollow tile 8 in. and thicker to reinforced concrete or steel construction. Lunken windows save time and worry during building progress for, once set, the whole window and accessory contracts are completed.

The only information required is (a) Size of frame opening; (b) Type; whether masonry or frame; (c) Number of lights for each sash. No further drafting work, superintendents, follow-up or uncertainty.

Fit any construction—fireproof to frame cottage—any architectural design that permits the use of the double hung type window.

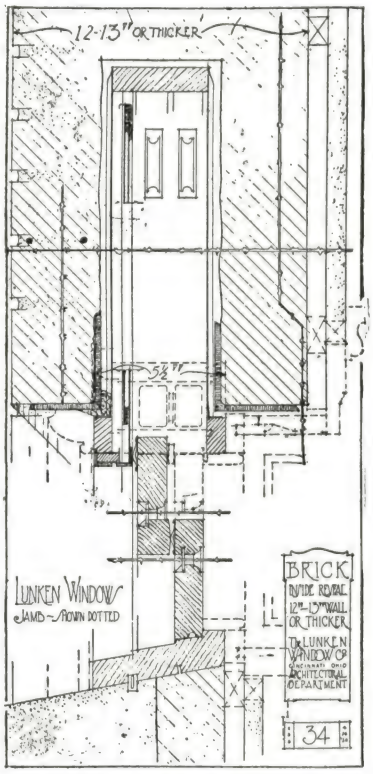
Shipments

Unless specifically agreed upon to the contrary, standard Lunken windows in the style, workmanship and quality represented by catalogue, are *shipped completely assembled*—viz: with glazed sash, fitted, weighted and hung; weatherstripped, full length screens, hardware attached, primed and in proper working order when delivered to cars. Protectively crated against shipping and installation damage by the Lunken Special crating method.

Mullion and Triple Windows

Lunken windows are usually furnished in single units. Where mullions are required, the single units are grouped together in the wall. This allows of ease of handling. Mullion widths: 8 in. for 1¾-in. sash; 7½ in. for 1⅜-in. sash.

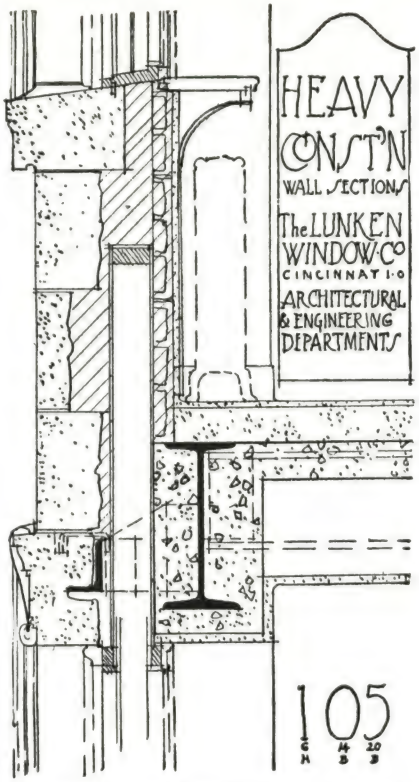
When required, built-up mullion and triple units, within size limits (governed by shipping facilities) will be furnished at a slight additional cost. Mullion widths of these units: 7¼ in. for 1¾-in. sash; 6¾ in. for 1⅜-in. sash.



TYPICAL BRICK CONSTRUCTION WITH LUNKEN WINDOW PLACED IN CENTER OF WALL TO SHOW A REVEAL BOTH INSIDE AND OUTSIDE

If no reveal is to be used on interior, window is set flush with wall and head equipped with non-corrosive dovetail iron sheet to receive plaster directly. Details available on request covering every common type of construction and will adapt the window to others on request.

A special portfolio covers heavy reinforced concrete and steel frame construction to which, except where a metal frame is compulsory, the window is equally well adapted

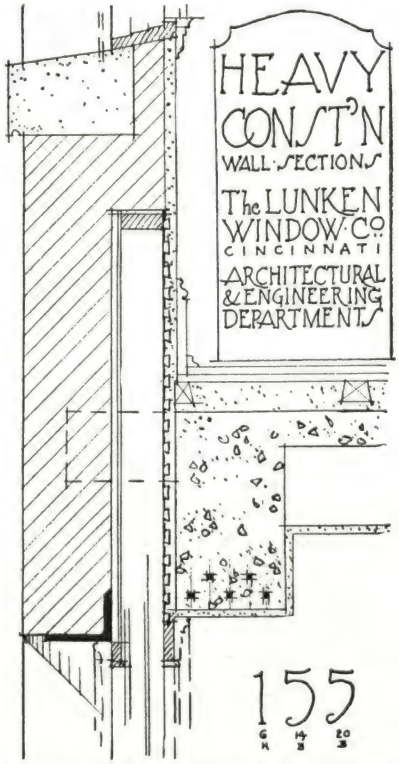


LUNKEN CORE INSTALLED IN HEAVY STEEL CONSTRUCTION

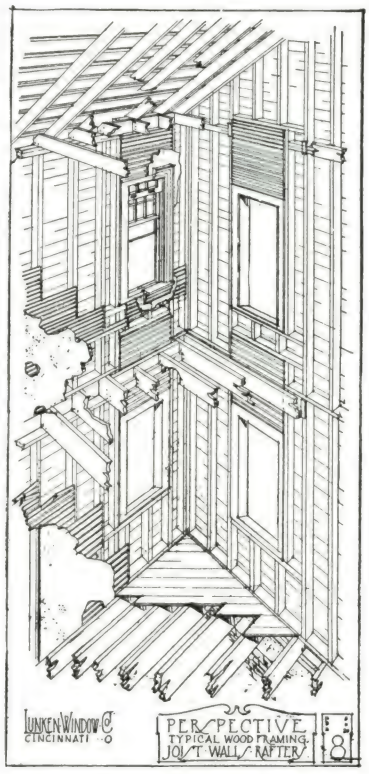
In heavy steel frame construction or reinforced concrete the Lunken window core requires but nominal change from standard methods, sometimes, none at all.

More than fifty conditions have been worked out successfully, of which 15 typical cases are shown in a special portfolio for heavy construction only.

In many cases the window actually benefits the structure by facilitating a vertical pipe chase and eliminating an excess weight of non-structural masonry in the spandrel



LUNKEN WINDOW CORE INSTALLED IN REINFORCED CONCRETE CONSTRUCTION



SHOWING SIMPLICITY OF FRAMING EVEN UNDER EXTREME CONDITIONS

At the right, in a non-bearing wall, there is no constructional change. Rough opening is merely made half again higher. At the left, a bearing wall uses headers at Lunken window head. No doubling or trimmers required, for the header load is carried practically at the bearing. Note that any lack of tieing value of the plate is more than made up by other members, joist, flooring, sheathing, collar beams, roof boarding, etc.

In masonry construction, box-head simply occupies space otherwise taken by a useless non-supporting spandrel of heavy brickwork. Tieing values are not disturbed in brick and masonry construction

Continued on next page

Specifications

Frame—Stiles and head, "B and B" yellow pine finished 1 in. Casings and backs Selected North Carolina yellow pine finished $\frac{13}{16}$ in. Sill 8/4 clear cypress finished $1\frac{5}{8}$ in. All thoroughly kiln dried stock. All parts of frames except stiles and inside casings primed one coat. Stiles and inside casings oiled one coat.

Pocket Sheathing Metal—Armco iron, corrugated and keyed sheet metal, galvanized and rustproof painted, edges calked and screwed to frame.

Pocket Sheathing Wood—$\frac{13}{16}$x$3\frac{1}{4}$ in. yellow pine flooring.

Sash—Clear Michigan white pine, thoroughly kiln dried. Finished with O. G. lugs on both sash unless otherwise specified. All tenons packed in white lead. Linseed oiled throughout. One-light sash furnished unless otherwise specified. Divided sash extra on specification.

Glass—Double strength, grade "AA," bedded, puttied and back puttied. Plate or obscure glass extra on specification.

Sash Pulleys—Lunken quick removable, galvanized finish. Special bushed, noiseless; self-lubricating steel wheel.

Sash Cord—No. 8 Samson Spot Cord.

Sash Weights—Cast iron.

Screen Frames—Rewirable; cold rolled steel galvanized and enameled. Solid copper frames can be furnished extra on specification.

Screen Wire Cloth—16-mesh copper, oxidized finish. Cloth is held in place by lead spline. This spline can be easily removed for rewiring the screen. The lead spline and rounded edges of screen frame eliminate the possibility of cutting the screen cloth.

Weatherstripping and Metal Trim—Screen guides, inner sash guides, parting strips and holders for meeting rail and upper sash weatherstrips fabricated of hard copper. Spring weatherstrips at meeting rails and head of window phosphor bronze.

Sash Hardware—Sash lifts, sash locks and pin locks solid brass. Optional finishes—brushed brass, sand blast brass, nickel or black. Finishes other than those listed quoted on special request.

Types of Box-heads, 1¾-in. Sash

The box-head of Lunken windows for heavy sash is made in four types, which accommodate every variety of wall construction. Be sure to order the type the work requires.

Type 5. Standard Frame—Box-head outside, $\frac{13}{16}$-in. flooring. Box-head inside, keyed sheet metal to receive plaster direct. For practically all kinds of frame construction, either shingled, clapboarded, stuccoed or imitation half timbered where stud is 6 in. or over, or for special construction. (See Types 7 and 8.)

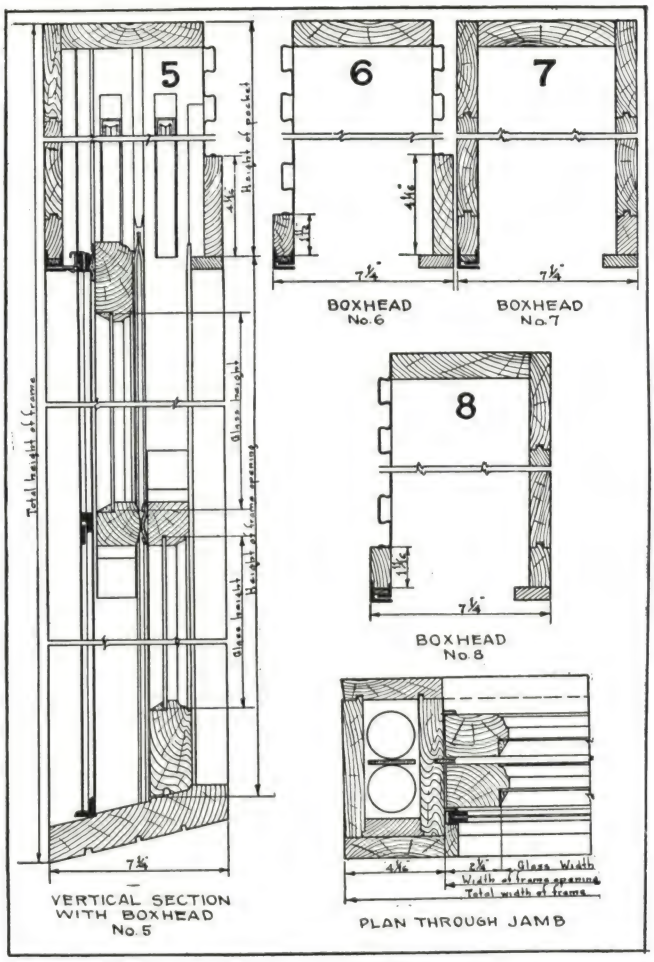
Type 6. Masonry—No inside reveal. Box-head outside, keyed sheet metal. Box-head inside, keyed sheet metal to receive plaster direct. For masonry construction generally, except poured concrete. (See Type 8.) Either brick, stone, hollow tile, concrete block, any thickness, but having window frames flush with inside face of wall.

Type 7. Concrete or Special Wood—Box-head outside and inside, $\frac{13}{16}$-in. flooring. For concrete walls, grout to be poured directly against box-head of window. Also for frame walls of unusual thickness, where inside is furred and where window is not flush with plaster, or where wall board is used in place of plaster.

Type 8. Type Five Reversed—A standard frame. Box-head outside, keyed sheet metal. Box-head inside, $\frac{13}{16}$-in. flooring. For concrete, brick, hollow tile, special stucco or other special construction.

Types of Box-heads, 1⅜-in. Sash

Box-head of Lunken windows for light sash is made in four types, as follows:



TYPES OF BOX-HEADS, 1¾-IN. SASH

HEAVY SASH FRAME

Any combination of following widths and heights furnished

WIDTHS, 1¾-IN. SASH

Glass width, in.	Width of frame opening, ft.—in.	Total width of frame, ft.—in.	Approximate wall opening, ft.—in.
16	1 8	2 4	2 0
18	1 10	2 6	2 2
20	2 0	2 8	2 4
22	2 2	2 10	2 6
24	2 4	3 0	2 8
26	2 6	3 2	2 10
28	2 8	3 4	3 0
30	2 10	3 6	3 2
32	3 0	3 8	3 4
34	3 2	3 10	3 6
36	3 4	4 0	3 8
38	3 6	4 2	3 10
40	3 8	4 4	4 0

HEIGHTS, 1¾-IN. SASH

Glass height, in.	Height of frame opening, ft.—in.	Total height of frame, ft.—in.	Height of pocket, ft.—in.	Approximate wall opening, ft.—in.
16	3 2	5 2⅝	1 10¼	3 6
18	3 6	5 8⅝	2 0¼	3 10
20	3 10	6 2⅝	2 2¼	4 2
22	4 2	6 8⅝	2 4¼	4 6
24	4 6	7 2⅝	2 6¼	4 10
26	4 10	7 8⅝	2 8¼	5 2
28	5 2	8 2⅝	2 10¼	5 6
30	5 6	8 8⅝	3 0¼	5 10
32	5 10	9 2⅝	3 2¼	6 2
33	6 0	9 5⅝	3 3¼	6 4
34	6 2	9 8⅝	3 4¼	6 6
36	6 6	10 2⅝	3 6¼	6 10
38	6 10	10 8⅝	3 8¼	7 2
39	7 0	10 11⅝	3 9¼	7 4

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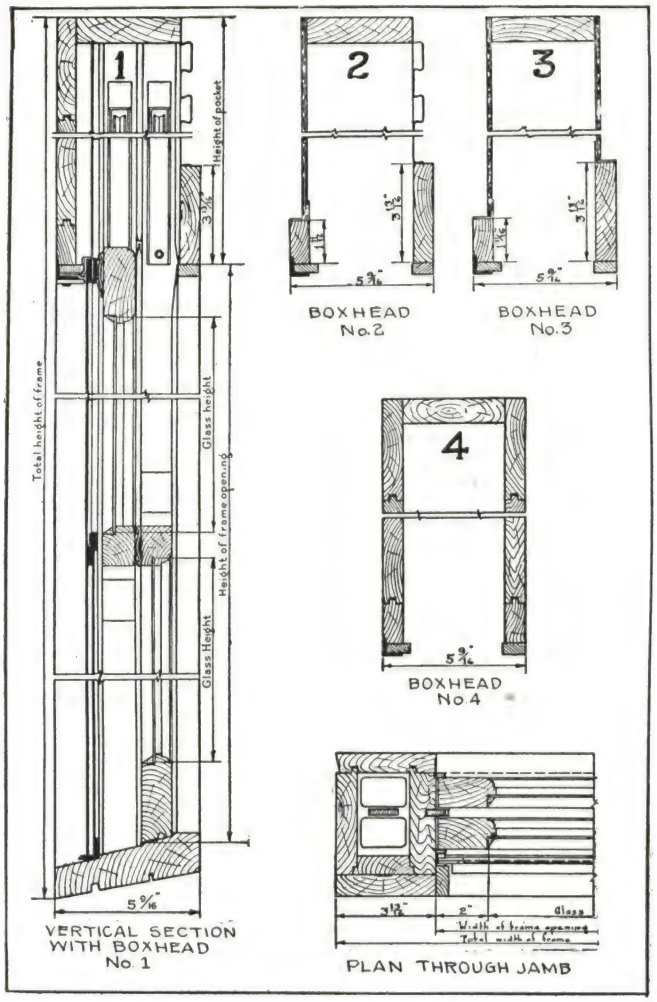


TYPES OF BOX-HEADS, 1⅜-IN. SASH

Type 1, Standard Frame—Box-head outside, 13/16-in. flooring; inside, keyed sheet metal to receive plaster direct. For either shingled, clapboarded, stuccoed or imitation half timbered work.

Type 2, Masonry—No inside reveal. Box-head outside, corrugated sheet metal. Box-head inside, keyed sheet metal to receive plaster direct. For masonry construction generally, except poured concrete. Either brick, stone, hollow tile, concrete block, any thickness, but having window frame flush with inside face of wall. For inside reveal, use masonry Type 3.

Type 3, Masonry—Inside reveal. Box-head inside and outside, corrugated sheet metal. For masonry walls of all kinds, except poured concrete, permitting an inside reveal or application of inside trim, to frame or window.

Type 4, Concrete or Special Wood—Box-head outside and inside, 13/16-in. flooring. For concrete walls, grout to be poured directly against box-head of window. Also for frame walls where inside is furred, 6-in. stud where window is not flush with plaster, or where wall board is used in place of plaster.

LIGHT WEIGHT SASH FRAME

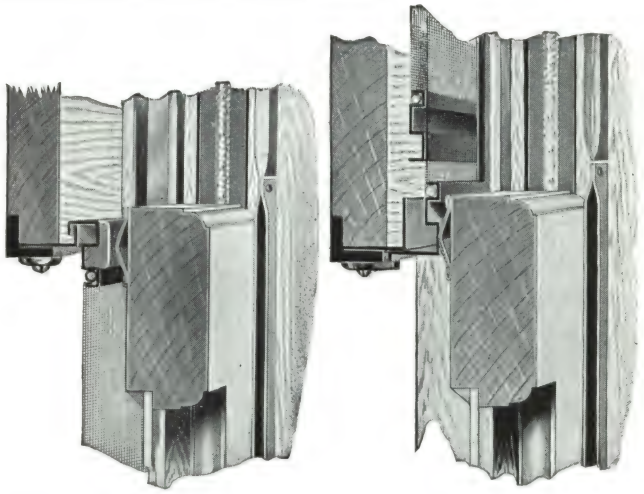
Any combination of following widths and heights furnished

WIDTHS, 1⅜-IN. SASH

Glass width, in.	Width of frame opening, ft.—in.	Total width of frame, ft.—in.	Approximate wall opening, ft.—in.
10	1 2	1 9½	1 6
16	1 8	2 3½	2 0
18	1 10	2 5½	2 2
20	2 0	2 7½	2 4
22	2 2	2 9½	2 6
24	2 4	2 11½	2 8
26	2 6	3 1½	2 10
28	2 8	3 3½	3 0
30	2 10	3 5½	3 2
32	3 0	3 7½	3 4
34	3 2	3 9½	3 6
36	3 4	3 11½	3 8

HEIGHTS, 1⅜-IN. SASH

Glass heigh , in.	Height of frame opening, ft.—in.	Total height of frame, ft.—in.	Height of pocket, ft.—in.	Approximate wall opening, ft.—in.
16	3 2	5 2⅜	1 10¼	3 6
18	3 6	5 8⅜	2 0¼	3 10
20	3 10	6 2⅜	2 2¼	4 2
22	4 2	6 8⅜	2 4¼	4 6
24	4 6	7 2⅜	2 6¼	4 10
26	4 10	7 8⅜	2 8¼	5 2
28	5 2	8 2⅜	2 10¼	5 6
30	5 6	8 8⅜	3 0¼	5 10
32	5 10	9 2⅜	3 2¼	6 2
33	6 0	9 5⅜	3 3¼	6 4

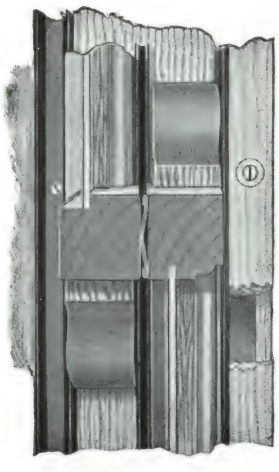


Screens Raised in Box-head, Sash Lowered, Window Closed

Screens held by 2 turn catches. Phosphor bronze cushion weatherstrip on upper sash stops air leakage between screen and sash at window top

Screens and Sash Lowered, Window Closed

Screens suspended by an interlock easily disengaged. Cushion weatherstrip on upper sash insures tight joint



Weatherstripping

Phosphor bronze cushion strip at meeting rails, and hard copper parting-weatherstrip separating sash from the inner and outer copper sash guides—all reduce air leakage to a negligible quantity

Quick Removal of Pulleys

A steel arm attached to pulley housing is fastened at bottom of box-head by a single screw, permitting easy removal of pulley for replacement of cord

SECTIONS OF A LUNKEN WINDOW

CHICAGO AUTOMATIC MACHINE CO.

Manufacturers of Security Wall Safes

TELEPHONE
WEST 4816

400-408 North Oakley Boulevard
CHICAGO, ILL.

Product

The SECURITY WALL SAFE, suitable for homes and apartments.

Security Wall Safe

The Security wall safe is by far the best protection for the home against sneak thieves, porch climbers, burglars and dishonest servants, that has yet been devised.

In these times when tenants expect every comfort and convenience, the installation of a wall safe in an apartment adds *appreciably to its desirability and renting value.* Owners of homes, also, feel that it is an economy to have a Security safe, realizing that its cost is more than offset by the reduced hazard of fire or theft, and the resultant peace of mind.

Security wall safes can be installed in any type of building, new or old, brick, frame or concrete.

Description

Safes are made of heavy gage sheet steel, folded in a press. All corners are double thickness, making an exceedingly strong construction. The back, sides and ends are paneled or recessed to receive cement in which safe is set. The front has three thicknesses of metal, protected by cement and asbestos fireproofing to depth of ½ in., all covered by plaster or other wall finish. Exterior of safe is treated with rustproof paint, interior is enameled white.

Door is conical faced, 6 in. in diameter, 1½ in. thick, made also of heavy gage steel. Asbestos fireproofing and air chambers give additional fire protection. Latches are 2½ in. wide, and 3/16 in. thick. Latches and other movable parts are made of brass and therefore can not rust or corrode; combinations are 3-tumbler.

Stock finish for doors is nickel.

Method of Operation

Door is fastened to a ring by a flat hinge 2 in. wide. This hinge folds against back of door when closed. When bolts are drawn from seat in ring, a spring on hinge throws door out and away from safe opening. The ring is semi-steel and is 1½ in. wide, ⅝ in. thick. It is fastened to the safe by 6 bolts which draw against the ring seat from inside of the safe.

Installation

Safes are usually built in an outside wall about 4½ ft. above the floor. The safe should be bound to the wall material by plaster or cement, and so set that the front is flush with lath. Plaster will then cover front of safe, concealing it and giving additional protection.

Safes are set in place by mason when walls are being laid. Wall material can then be built around safe without difficulty. If not set at this time opening left in the wall should be 2 in. larger than safe in both width and height to allow use of cement when set.

When shipped, a wooden plug is fitted in box opening to protect the interior from dampness while building is being erected. Doors are not set in safes until walls are dry and building ready for occupancy. Instructions for installing both safes and doors go with all shipments.

Styles

Style F—Used in shallow walls or in partitions. Depth of safe is the same as that of standard partitions or the inner course of brick in an 8-in. wall.

Style G—Used in 12-in. brick walls, taking space of two inner courses of brick; also used in concrete composition walls.

DIMENSIONS AND WEIGHT

Style	High, in.	Wide, in.	Deep, in.	Cu. in.	Weight, lbs.
F	Outside 11	12½	5½	480	40
	Inside 10	12	4	.....	.....
G	Outside 11	14¼	8¾	1050	60
	Inside 10	14	7½	.....	.....

METHOD OF INSTALLING SECURITY SAFES

HERRING-HALL-MARVIN SAFE CO.

GENERAL SALES OFFICE AND FACTORIES

HAMILTON, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 400 Broadway
BOSTON, MASS., 165 Devonshire Street
BIRMINGHAM, ALA., 2124 First Avenue
CHICAGO, ILL., 211 West Washington Street
SAN FRANCISCO, CAL., 214 California Street

Products

FIREPROOF SAFES, Underwriters' Laboratories, Inc., Class "A" and Class "B" Label; BURGLARPROOF BANK and SAFE DEPOSIT VAULTS; FIREPROOF VAULT DOORS; VAULT EQUIPMENTS.

Also manufacturers of Filing Devices; Safe Deposit Boxes; Steel Lined Safe Deposit Safes for hotels and clubs; Silver Safes and Special Safes and Vaults for residences; Burglarproof Chests, Messenger Boxes, etc.

Fireproof Safes

The body of this safe has the greatest possible structural strength that can be built into a safe. All angles, hoops and panel bars are of heavy steel and are fully and carefully welded together. The insulation in the walls forms a solid reinforcing mass and is shaped to the walls of the safe, greatly adding to its strength. The insulation is perfectly hard and perfectly dry. The safe has closely fitted, pressed steel jambs with tenon and groove and interlocking rear flange. The joint between the jamb and the rear flange is closed by means of a patent sealing device. The doors are hung on ball bearing hinges. The heavy round steel bolts and their steel connections are fully insulated from the face of the door. The specially designed Yale combination lock with detachable spindle is protected with a chrome steel drill-proof plate.

The larger sizes bear the "A" Label of the Underwriters' Laboratories, Inc.; the smaller sizes bear the "B" Label.

CLASS A FIREPROOF SAFE NO. 4030

Outside, 58 in. high, 40½ in. wide, 30 in. deep. Inside, 40 in. high, 30½ in. wide, 19¼ in. deep

Fireproof Vault Fronts

Specifications—Sides and top No. 16, bottom ⅛-in. sheet steel. Front frame formed of 3⅞x$\frac{3}{16}$-in. open hearth steel bars, riveted at the bottom into 2½x¼-in. sill bars, fastened at the top by bar clips.

The rear frame is formed of 1¼x1¼x$\frac{3}{16}$-in. open hearth angles, securely fastened to the vestibule. Removable bars 4x$\frac{3}{16}$ in. are fastened on the back of the rear angles. These bars may be removed until the vestibule is set into the wall, after which they are to be replaced, thus holding the vestibule securely in position.

Outer door plate formed of $\frac{3}{16}$-in. open hearth steel, reinforced on sides, top and bottom by 2x¼-in. bars, making doors $\frac{7}{16}$ in. thick on edge.

FIREPROOF VAULT FRONT NO. 21

Outside 80½ in. high, 33½ in. wide, and 20 in. deep. Wall opening required, 81½ in. high, 34½ in. wide. Clear opening through vestibule, 77¾ in. high, 29⅝ in. wide

Burglarproof Vault Equipments

Factories are fully equipped to manufacture both the simplest and cheapest, and the heaviest and most elaborate vault equipments of every description. The record and reputation established through a period of continuous service, covering eighty years, are so well known as to require no comment.

BURGLARPROOF VAULT DOOR

Co-operative Service

The Engineering Department is at the disposal of architects and customers, and will gladly submit designs, specifications and estimates promptly. All inquiries will receive immediate attention.

THE HALL'S SAFE CO.

FACTORY AND GENERAL OFFICE
Spring Grove Avenue
(P. O. Box 846)
CINCINNATI, OHIO

CABLE ADDRESS
"HALL'S SAFE, N. Y."

Products

FIREPROOF SAFES, VAULT FRONTS and WALL SAFES for office, business houses, residences and apartment houses; FIREPROOF and BURGLARPROOF VAULT FRONTS and VAULT WORK for banks, etc.

Also manufacturers of Grilles, Safety Deposit Boxes, Manganese Steel Bank Safes, Tellers' Chests, Combination Locks, Time Locks and Burglar Alarm Devices (wiring); a general Safe Line including Messenger Boxes, Burglarproof Chests and Fireproof Safes containing Burglarproof Chest suitable for post offices.

Also Special Safes of every description.

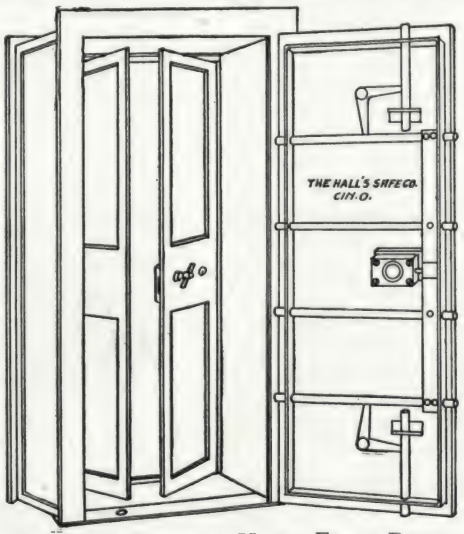
Service and Quality

Our engineering department has been created for the purpose of assisting the architect in connection with proposed vault work, equipment, installation, etc., and the company invites inquiries and will be pleased to furnish plans, layouts and specifications on request without charge or obligation. Charts, cuts and photographs are on hand fully describing in detail the various elements of our work.

The 20th Century line of vault and bank work reflects a distinctive advance in protective equipment and problems. Our plant and organization is devoted exclusively to the manufacture of the above described work which is made with utmost skill and care, from the highest grade materials of their respective kinds.

Fireproof Vault Fronts

Construction—Outside door is made of heavy steel plates reinforced at all sides with frame bars, thus giving door an added thickness on edge. Vestibules are made of No. 16 gauge steel plates properly secured at front and back with solid angle iron. Outer door is secured with 1 in. diameter lock bolts (see chart for number) and checked by a 4-tumbler combination lock. Inner doors are made of heavy sheet steel reinforced with panel bars; when opened, they swing back against the vestibule on each side. When closed, doors overlap and are secured by flat up-and-down bolts operated by a T-handle and checked by a flat key lock. Vault fronts are constructed with flanges overlapping the walls, both outside and inside. Inside flanges are so attached to rear of vestibule by screws that they can be removed for setting vestibule in place, or removed at any or all times from opening without injury to plaster or vault.



No. 1-AA FIREPROOF VAULT FRONT RIGHT-HAND SWING DOOR
To fit opening in wall 79 in. high, 32 in. wide, 20 in. deep

All handles, tips, dials and bolts heavily nickel-plated. Doors painted black, ornamented with gold striping and varnished. Also furnished with architraves on front.

Installation—These vault fronts are so constructed that they can readily be placed in position by any individual after the vault walls are built. This is accomplished by removing back bars as described above. All vault fronts are set up and tested in our factory, thus eliminating ill fitting.

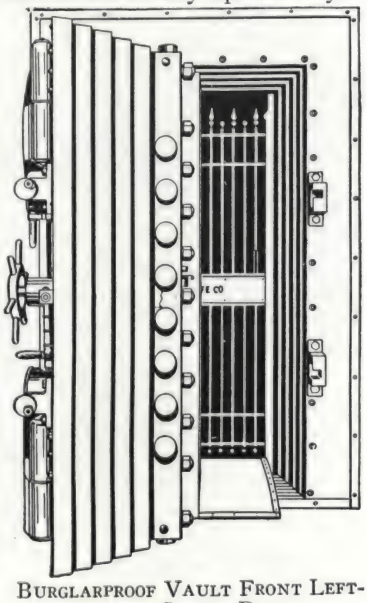
FIREPROOF VAULT FRONTS

No.	Wall opening, in.			Door plate. in.	Door on edge. in.	Bolts			Bolt frames, in.	Door	Weight, lbs.
	High	Wide	Deep			Cross	Up	Down			
Tile A.....	76	26	13½	5/16	3/8	2	1	1	Angle, 2x2x3/16	Single	500
1-AA.....	79	32	20	¼	7/16	4	1	1	Angle, 2x2x3/16	Single	635
15-AA.....	79	36	20	¼	7/16	4	1	1	Angle, 2x2x3/16	Single	750
1-AAA.....	79	32	20	¼	7/16	3	.....	.....	Angle, 2x2x3/16	Single.	635
3-C.....	79	32	20	¼	½	8	2	2	Bar 1¾x7/8	Single	1050
10-AA.....	82	44	24	¼	7/16	8	2	2	Angle, 2x2x3/16	Double	1000

Self-closing Device—An added feature to Hall vault doors is the self-closing device, which operates and closes the inner doors automatically. When the outer door closes, this device eliminates the possibility of leaving the inner doors open when they should be closed. This closing device is not applied to the standard vault unless specified, and an additional charge will be made. An antidynamite device is attached on all No. 1AA vault fronts made by us.

Burglarproof Vault Fronts

We are in the position to build any special style or size vault doors other than our standard to meet requirements, and on receipt of specification will be pleased to quote our best prices and time of delivery. No work too large or too small to handle, as our past record needs no comment. Our vaults are made to meet the requirements of insurance companies, thus carrying lowest possible rate of insurance. Consult us without obligation as we are at the disposal of architects and others seeking information.



BURGLARPROOF VAULT FRONT LEFT-HAND SWING DOOR

Continued on next page

Construction Data for Fireproof and Burglarproof Vaults

Classifications—Vault for 1½-in. thick door should have masonry walls lined throughout with ¼-in. thick steel or constructed of concrete 12 in. thick.

Vault for 2½-in. thick door should have walls lined throughout with ½-in. thick steel or constructed of *non-reinforced* concrete 18 in. thick, or of *reinforced* concrete 12 in. thick

Vault for 3½-in. thick door should have walls constructed of *non-reinforced* concrete 36 in. thick or of *reinforced* concrete 18 in. thick.

Vault for 5½-in. thick door same as preceding rule.

Vault for 6-in. thick door should have walls lined throughout with 1-in. thick steel, or walls constructed of *non-reinforced* concrete 36 in. thick or *reinforced* concrete 18 in. thick.

Vault for 7-in. thick door should have walls lined throughout with 1-in. thick steel, or walls constructed of *non-reinforced* concrete 36 in. thick or *reinforced* concrete 18 in. thick.

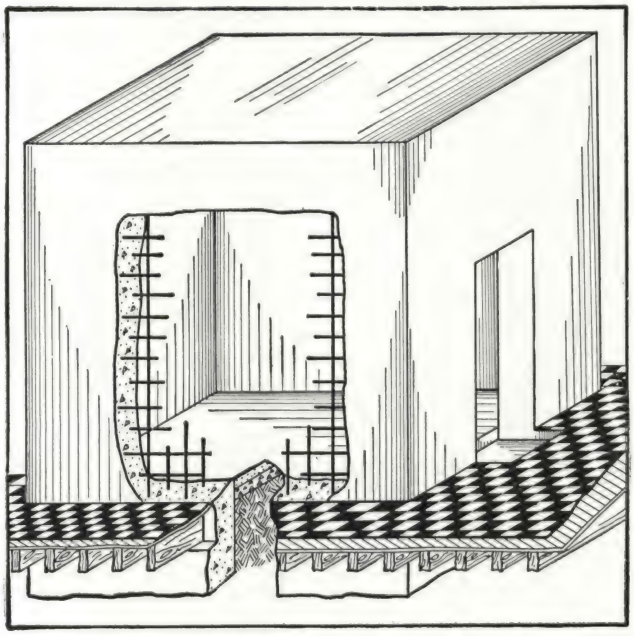
Vault for 9½-in. thick door should have walls lined throughout with 1½-in. thick steel or walls constructed of *non-reinforced* concrete 54 in. thick or *reinforced* concrete 27 in. thick.

In vault walls constructed of *non-reinforced* concrete or stone:

12-in. thick wall equals ¼-in. steel lining.
18-in. thick wall equals ½-in. steel lining.
Each additional 9 in. of wall thickness equals additional ¼-in. steel lining.

In vault walls constructed of *reinforced* concrete:

12-in. thick wall equals ½-in. steel lining.
18-in. thick wall equals 1-in. steel lining.
27-in. thick wall equals 1½-in. steel lining.



Typical Fireproof and Burglarproof Construction

Reinforced Cement Walls—Should consist of a double row of reinforcing bars (Ransom) running vertically and horizontally on 8-in. centers. Front row bars should intervene rear row spaces, in other words, they should form a 4-in. mesh taken in a flat plane.

Vault Roofs and Floors—Should coincide with wall construction. Therefore it shall not be necessary to particularly specify construction of same. Vaults are entirely independent of the building walls and floor construction.

Steel Lining—In designing vaults where a steel lining is required, a space of at least 2 in. should be allowed at the front, back, sides and top, between the concrete walls and outside of lining.

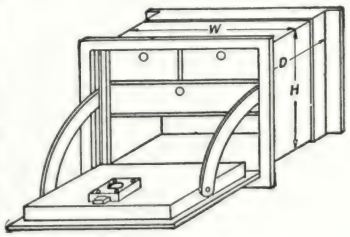
In other words, a concrete vault with interior wall dimensions 8 ft. 6 in. high, 10 ft. wide, and 12 ft. deep requiring 1-in. or ½-in. thick lining will have inside lining dimensions as 8 ft. 2 in. high, 9 ft. 6 in. wide, and 11 ft. 6 in. deep. Same vault with 1½-in. thick lining will have inside lining dimensions as 8 ft. 1 in. high, 9 ft. 5 in. wide, and 11 ft. 5 in. deep.

When a lining is to be attached to a vault front, the front walls should be 2 in. narrower than the vault front depth.

Fireproof Wall Safes

The present day wall safes have been used extensively in homes, apartment houses, hotels and offices.

This special type of safe affords convenience, protection and secrecy and is indispensible to those who appreciate the real qualities that such a safe affords. They are designed for brick or concrete walls thus economizing floor space. Also made in special sizes to meet requirements.



Fireproof Wall Safe

No.	High, in.	Wide, in.	Deep, in.	Width flange
1	10	10	8	13
2	12	10	8	13
3	12	16	8	19

Hall's Fireproof Safes

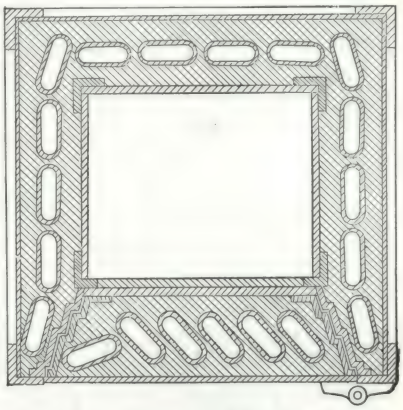
The Hall's patent filling used in the manufacture of Hall's safes is the greatest improvement in safe making for sixty years. Safes made under this patent are as near fireproof as is possible for human ingenuity to invent.

Construction—The Hall's patent filling is made up of hermetically sealed cement tubes in conjunction with Hall's special cement filling. The tubes are made in our works, under our formula and on forms of our design. They are placed within the space between the inner and outer shells and in the doors between the outside plate and the inside cap. The special cement filling is poured in around them, making a safe with cement filling in addition to air space in the filling, giving a double security in case of fire, as illustrated.

Advantages—By the use of these tubes a stronger, lighter, fireproof safe is obtained; one free from dampness, with no possibility of swelling, which heretofore has been the bane of safe makers.

Sizes—Hall's fireproof safes are made in all types, with any desired arrangement of inside cabinet construction.

Made in all sizes for any use. Write for catalogue.



Sectional View of Hall's Patent Filling Construction
Method of placing tubes in walls

THE SCHWAB SAFE COMPANY

Fireproof Safes and Vault Doors

LAFAYETTE, IND.

Products

Manufacturers of UNDERWRITERS' LABEL SAFES, STANDARD FIREPROOF SAFES, FIREPROOF FILING SAFES and FIREPROOF VAULT DOORS.

Schwab B-Label Safe

We wish to announce to the architects and builders that we are now in a position to figure on their requirements for B-Label safes. No installation too large for us to handle promptly and none too small to merit our careful attention.

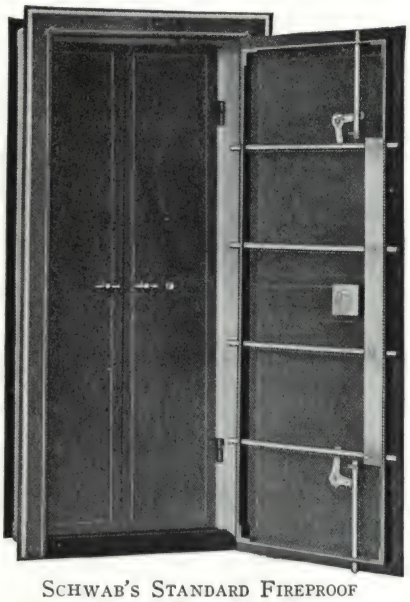
We can build B-Label safes in any special sizes up to 72 in. high, 45 in. wide and 30 in. deep, inside measurements, and with any steel interior equipment necessary to take care of the requirements of clients' particular needs.

We are always glad to co-operate directly with the architects in figuring on installations. Our engineering service is at their disposal, and without cost.

Write us for engineer's specifications and Underwriters' Laboratories Heat Chart of the Schwab B-Label safe.

THE SCHWAB B-LABEL SAFE

Schwab Fireproof Vault Doors



SCHWAB'S STANDARD FIREPROOF VAULT DOOR NO. 20

These can be built according to specifications for vault wall opening of any height, width or thickness and with $\frac{3}{16}$- or $\frac{1}{4}$-in. door plate. This style door is suitable for brick, tile or concrete wall of any thickness.

The outside door of Schwab's Standard Fireproof Vault Door is constructed of No. 10 gauge Bessemer steel stiffened on the edges by 2x2x$\frac{3}{16}$-in. steel angles. Frame is solid welded at all corners. Bolt work on outside door consists of 4 horizontal bolts, one up and one down. Bolts, 1 in. in diameter, are made of cold drawn steel. Bolt work is checked by a 4-tumbler combination lock. The outside door is hung on heavy pin hinges securely fastened to the frame and door. The front sill bars are constructed of 3½x$\frac{3}{16}$-in. steel bars solid welded at all corners. The front and rear angle frame are constructed of 1½x1½x$\frac{3}{16}$-in. steel angles securely fastened to the front frame and vestibule.

The inside doors are made in pairs of No. 8 gauge Bessemer steel. Back sill bars are made removable so vault can be installed after building is completed. Handles, hinge tips, lock dials and bolt work heavily coppered and nickelplated. Every vault is handsomely finished in dark olive green and striped in gold. All work is done in first class manner.

For Convenience of Architects in Specifying Schwab Fireproof Vault Doors

The contractor shall furnish and install Schwab's No. 20 fireproof vault door manufactured by THE SCHWAB SAFE CO., Lafayette, Ind. Outside door to have 4 cross bolts, one up and one down, 1 in. diameter cold rolled steel, checked by a 4-tumbler combination lock, inside doors to have heavy flat bolts and key lock, vault to be finished in dark olive green with gold striping, all trimmings and bolt work heavily nickelplated. The vault wall opening to be 77 in. high, 32 in. wide, 18 in. deep and must be built square, plumb and level; rear flange of vault frame to be removable so contractor can install vault door after building is completed and not mar the finish. Inside clearance of vault door, 74 in. high and 28 in. wide. Approximate weight, 620 lbs.

YAWMAN AND ERBE MFG. CO.

Manufacturers of "Y and E" Insulated Safes and Filing Devices

MAIN FACTORIES AND EXECUTIVE OFFICES
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Agents and Dealers in All Principal Cities

Product

"Y AND E" DRY INSULATED SAFES, Underwriters' Class "B" Label.

Also manufacturers of Filing Devices.

For "Y and E" Sectional Steel Shelving, see pages 2054-2055.

"Y and E" REG. U.S. PAT. OFF.
TRADE-MARK

Features of Construction

"Y and E" dry insulated safes are designed and built to give maximum protection from fire to valuable papers and irreplaceable records.

Insulation—Contains diatomaceous earth and asbestos fiber of remarkable heat resisting qualities. Contains no free moisture. All insulating material is thoroughly baked to remove all traces of free moisture before being placed in the finished safes.

Walls and Doors—Made of steel plates of extra strength. A new "step" design of construction around the doors increases their resistance to heat.

Bolts—Eleven bolts, four vertical in each door and three horizontal inter-locking bolts, are provided in all Class "B" dry insulated safes. They effectively prevent buckling in severe fires.

Combination Lock—One of the best known and most efficient combination locks, the Yale & Towne, is fitted in every "Y and E" Class "B" safe.

Interior Equipment—Standard equipment for fire resisting safe interiors is wood, which, for such use, is better than steel because of its superior insulating qualities when not in direct contact with flame. Wood or steel interiors can be assembled from standard "Y and E" horizontal sections in various combinations. Catalogue upon request.

Advantages of Dry over Moist Insulation

Dry insulation lightens the safe considerably. This makes it easier to move around while still giving maximum protection.

Moist insulating materials usually contain from 15% to 50% free moisture. This moisture gradually dries out so that in time, the heat resisting qualities of the moist insulated safes are reduced till they are unable to meet requirements. Moist insulated safes are also subject to deterioration due to the corrosive action of the moisture.

Dry insulated safes, on the other hand, retain their heat resisting qualities indefinitely.

Underwriters' Tests

Samples of the "Y and E" dry insulated safes successfully passed the two-hour-protection tests required for a class "B" label, at the laboratories of the National Board of Fire Underwriters.

A "Y and E" dry insulated safe containing papers was placed in a furnace and subjected for two hours to temperatures ranging from 1000° Fahr. to 1850° Fahr. over the exposed surface of the safe. Recording instruments showed that the temperature *inside* the safe did not exceed 300° Fahr. at any time. After cooling, the safe was examined and found to have afforded full protection for the inflammable papers which it contained. The "Y and E" is the first dry insulated safe to successfully pass the underwriters' tests for a Class "B" label.

CLOSED VIEW OF "Y AND E" UNDERWRITERS' CLASS "B" INSPECTED SAFE

Drop Test

Safes in burning buildings frequently fall considerable distances. To determine the ability of the "Y and E" safe to protect its contents under such circumstances, it was subjected to a drop test. The safe was heated in a furnace for one hour. While still red hot it was dropped 30 ft. on to a heap of broken stone, brick and debris. The next day the safe was placed bottom up in a furnace and re-heated for one hour. Subsequent examination showed that all papers inside the safe had been kept unharmed and that the safe had fulfilled every requirement.

INTERIOR OF "Y AND E" DRY INSULATED FIRE RESISTING SAFE

With No. 122 top, No. 28 document section, No. 65 cash drawer section, No. 38 ledger section, No. 54 letter-size section

SIZES

		No. 2000	No. 2003
Inside	Width	33⅛"	33⅛"
	Height	59"	45"
	Depth	19"	19"
Outside	Width	42¾"	42¾"
	Height	72¾"	58¾"
	Depth	29¾"	29¾"
Shipping weight		1185 lbs.	1050 lbs

ESTABLISHED 1882

YORK SAFE AND LOCK CO.

FACTORY AND GENERAL OFFICE

YORK, PA.

BRANCH OFFICES AND SALESROOMS IN ALL PRINCIPAL CITIES

Products

Designers and manufacturers of VAULTS and SAFES, which include: Bankers' Safes and Chests, Fireproof and Burglarproof Safes, with Steel Lined Outer Doors, Bank and Safe Deposit Vaults and Doors, Manganese Steel Bank Safes, Safe Deposit Boxes, Fireproof Vault Doors.

Also Special Safes for fireproof buildings, etc.

The York Safe

The ordinary system of building fireproof safes has been completely revolutionized by the new construction and materials used by this company only.

All these safes are made of the best fire resisting materials known.

The York Improved Filling (patented) radiates heat instead of conducting it; is perfectly dry, extremely light and pliable in texture, indestructible, and, unlike the cement-filling in other safes, it never deteriorates through evaporation.

This Silicious Fireproof Compound is a combination of the best known fire resistants, namely, electro vulcan, asbestos and magnesian talc.

Ordinary fireproof safes are made in many sizes and styles, with single or double doors, interior arrangements as required, etc. (Fig. 2.)

Vaults and Vault Doors

We build many styles of vaults and vault doors, from the simplest and cheapest to the heaviest and most expensive. Plans and specifications furnished free of cost. Send exact requirements, measurements of ground space, elevation and position in building, etc., for full information and cost of erection (Figs. 3 and 4).

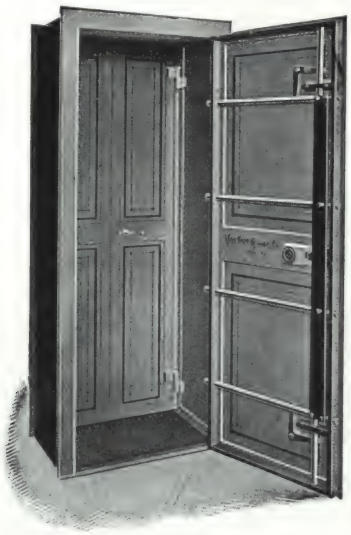


FIG. 1. FIREPROOF VAULT DOORS

For wall openings 78½ in. high by 31½ in. wide.
Standard door is for wall 20 in. thick, but this can be reduced to any thickness desired.
Outside door is locked by combination lock, inside doors by key lock

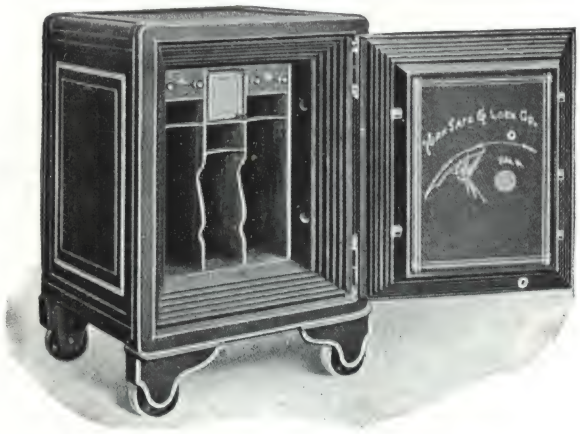


FIG. 2. SEVEN-FLANGE, SINGLE DOOR, FIREPROOF SAFE

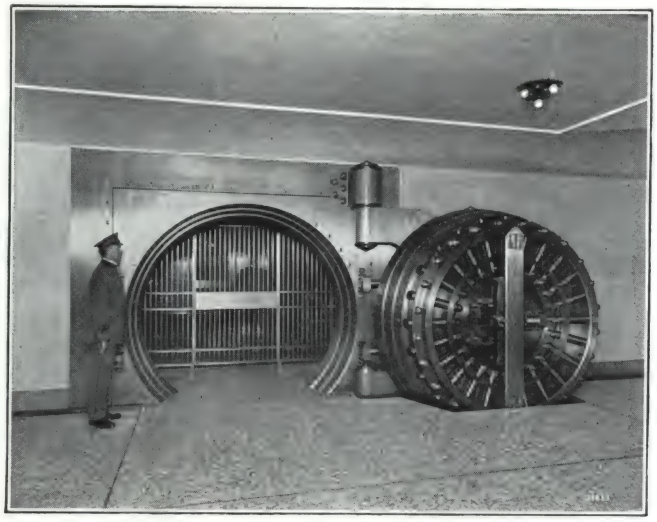


FIG. 3. VAULT OF THE GUARANTY TRUST CO., NEW YORK

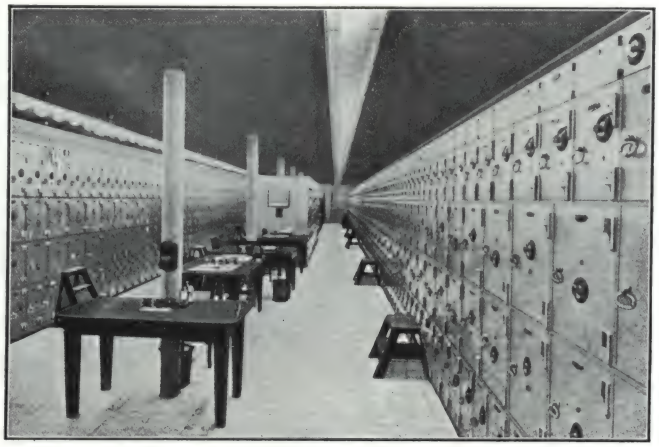


FIG. 4. INTERIOR OF NEW YORK STOCK EXCHANGE VAULT

VARNUM DOOR ENGINE COMPANY

Manufacturers of Electric Door Engines

949 West 16th Street

LOS ANGELES, CAL.

Products

VARNUM ELECTRIC DOOR ENGINES for operating sliding or swinging gates or doors.

Varnum Door Engine

Both types of Varnum engines are designed to open and close doors or gates varying in weight from a few pounds, such as the ordinary wooden door, up to grille doors weighing 600 lbs. The engines operate electrically merely by the momentary depression of an electric switch operated by hand or foot. One switch performs both operations of opening and closing. Varnum door engines operate instantly and are perfectly silent, making them especially desirable for use in the safe deposit departments of banks where heavy grille doors or gates are used in front of the vaults.

Swinging Type

The Varnum door engine for operating swinging doors is built in an iron box 16 in. square by 7 in. deep, which is set in the floor with the cover plate flush with the floor. The engine is connected to the door by means of a vertical shaft which projects through the cover plate and is fastened to the bottom of the door, and acts as a hinge pivot for the door. An electric lock furnished with the engine is set in the door frame and is operated by an automatic switch in the engine. With this type of engine no mechanism is visible above the floor.

Sliding Type

The Varnum door engine for operating sliding doors is usually installed in the floor at the rear of the door. The engine is fastened in an iron box 17½ in. long by 7 in. wide by 10 in. deep, the cover plate of which is flush with the floor. The door is actuated by two operating arms which are in turn connected to the engine by a connecting rod operating through a flanged slot in the cover plate. When the door is closed these arms are in a straight line and form an effectual lock. In operation they are forced upward by the connecting rod, which action moves the door to the open position. The reverse action closes it.

The engine for sliding doors can be placed in a suspended ceiling, the cornice or even on the grille itself if required. We recommend the floor installation when possible.

Motor

Both types of stock door engines are fitted with a ⅙ h. p. motor requiring 110-volt single phase 50- or 60-cycle current. If this current is not obtainable special motor can be furnished.

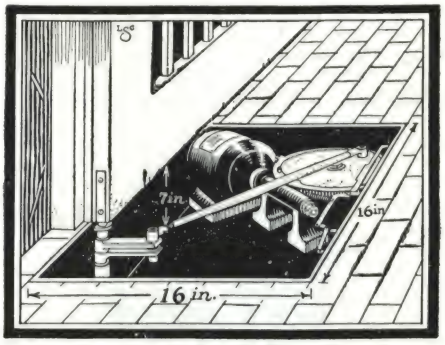
Price and Descriptive Matter

Price of stock models: Sliding $250.00; swinging $300.00. Prices and specifications for engines for special or heavier doors furnished on application. Engines are set up complete in the iron box which sets in the floor. Operating switches are not included.

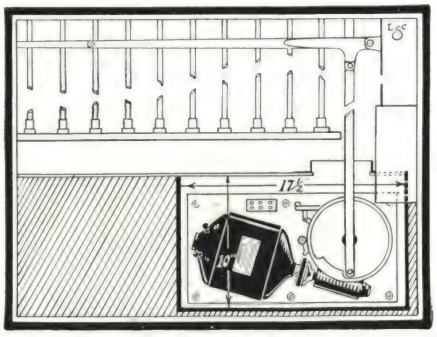
Descriptive catalogue and blue prints furnished on request. Complete blue prints and directions for installation are furnished with each door engine.

References

For references as to installation write any Los Angeles Bank.



Swinging Type Installed with Floor Plate Removed



Cross Section of Sliding Type Showing Operating Arms Connected to Grille Door

Varnum Door Engines Used on Swinging Gates in Front of Vaults, Southern Trust & Savings Bank, San Diego, Cal.

Varnum Door Engines Used on Sliding Grille Doors in Front of Vaults, Showing Operating Arms. International Branch, Bank of Italy, Los Angeles, Cal.

DETAILS AND INSTALLATIONS OF THE VARNUM DOOR ENGINE

AMERICAN TAR PRODUCTS COMPANY

INCORPORATED

Coal Tar Products for Roofing, Waterproofing, Wood Preserving and Paving

208 South La Salle Street

CHICAGO, ILL.

CHICAGO, ILL. MILWAUKEE, WIS. YOUNGSTOWN, OHIO BIRMINGHAM, ALA. STEUBENVILLE, OHIO ST. LOUIS, MO. ROCKTON, ILL.

Products

AMERICAN SPECIFICATION, a Built-up Roof Covering.

AMERICAN TARRED FELT for Roofing and Waterproofing.

OLD STYLE PITCH, for Roofing, Waterproofing and Paving.

Also Tar-Mac, a bituminous Road Binder for paving.

Felts, dry and deadening.

ATP Wood Preserver, a pure coal tar creosote highly refined, for preservation of timber.

ATP Roof Cement, a tough, adhesive, elastic waterproof cement.

ATP Fiber Coating, especially designed for the coating of old roofs.

ATP Metal Paint, prepared for the preservation and protection of iron and steel.

TRADE-MARK

Specifications and Information

Copy of American specifications and complete information on any of our products sent on request.

The American Specification

This is a built-up roof covering for use over boards or concrete.

It is approved by the Underwriters' Laboratories, Inc. Standard Class A.

American Tarred Felt

Made from the best quality of dry felt. Saturated with just the proper amount of pure dehydrated coal tar, thereby insuring a finished product of uniformity and maximum lasting qualities. Thoroughly seasoned before shipment.

Put up in rolls of 400 sq. ft. each, 32 in. wide and weighing approximately 60 lbs. per roll.

LABEL

Old Style Pitch

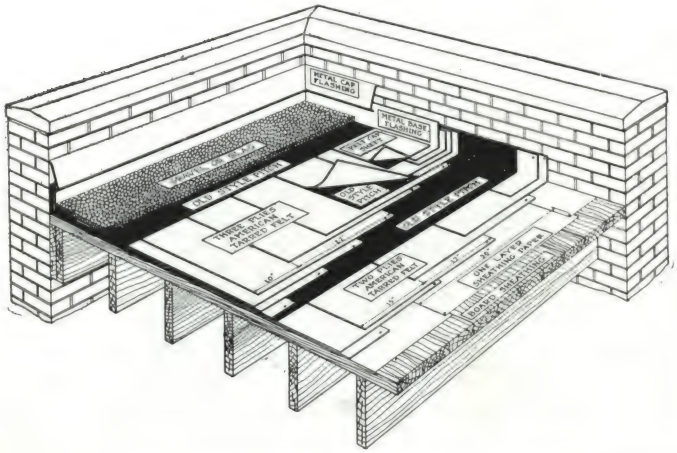
A pure coal tar product. Distilled under the most modern and scientific methods, insuring the highest binding efficiency and greatest durability. Our supply of crude tar from large sources insures a uniform finish product.

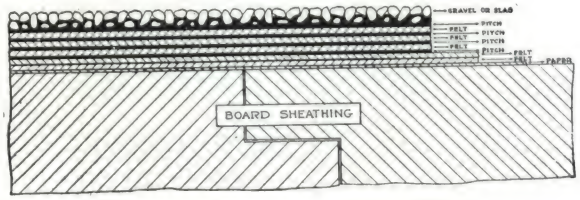
Old Style Pitch is put up in barrels (light or heavy cooperage) weighing approximately 400 to 600 lbs. each.

LABEL

Inspection

Thorough inspection is made of all felt and pitch before shipping.





DETAILS AND ENLARGED SECTION OF AMERICAN SPECIFICATION BUILT-UP ROOFING OVER BOARDS (5-PLY)

THE RUBEROID CO.

FORMERLY THE STANDARD PAINT CO.

Ruberoid Roofings and Shingles, Building Papers and Metal Preservative Paints

CHICAGO, ILL. NEW YORK, N. Y. BOSTON, MASS.

Products

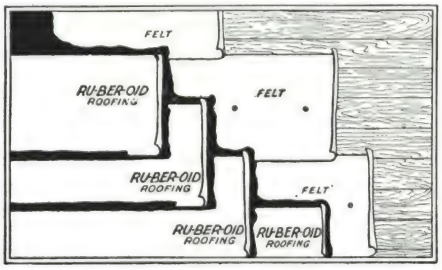
PREPARED ROOFINGS; COMPOSITION SHINGLES; BUILT-UP ROOFS; CEMENT-WATERPROOFING.

Also Waterproof Felts; Insulating and Sheathing Papers; Floorings; Roof Coatings; House and Technical Paints; Electrical Insulating Varnishes and Plastics; Shingle Stains; Asphalt Specialties.

TRADE-MARK

Ruberoid Built-up Roofs

The essential difference in structure between a Ruberoid Built-up Roof and the general run of built-up roof construction is that by building into the roof two layers of Ruberoid Specification Roofing, there are added two unusually dense and impenetrable barriers against the passage of moisture. Furthermore, the use of Ruberoid Specification Roofing makes it possible to lay a portion of the fabric (which reinforces the roof) and a portion of the asphalt (which waterproofs the roof) in inseparable form for the one labor cost.



BUILT-UP ROOF CONSTRUCTION

Ruberoid Roll-roofing; Smooth-surfaced and Mineralized (Green or Red)

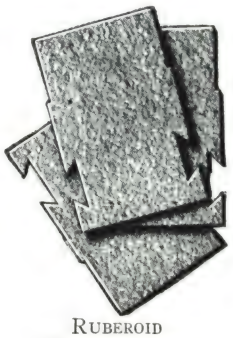
The Smooth-surfaced is especially suitable for use on factories, warehouses and similar structures; the Mineralized for inexpensive residences and wherever a more decorative effect is desired than can be obtained by the use of grey Smooth-surfaced Ruberoid. These roll-roofings are made in various weights and have stood the test of time for thirty years.

RUBEROID ROLL-ROOFING

Ruberoid Cement-waterproofing

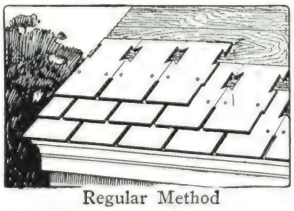
A bituminous compound free from calcium stearate or other soap. Used in combination with cement and sand to waterproof cellars, pits, tanks, stucco work, etc. Especially recommended for waterproofing the cellars of residences and public buildings.

Ruberoid Unit-shingle (Interlocking and Self-spacing)

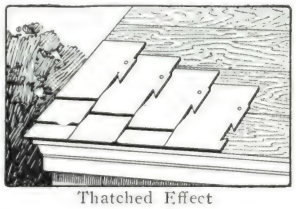


RUBEROID UNIT-SHINGLES

This improved form of the Ruberoid Unit-shingle locks into place on the roof. Due to its patented shape, it can be laid in two attractive styles. Besides the regular method of laying, which allows a 9½x5-in. weather exposure, this shingle may be laid in a thatched effect by the interlocking method (exposure 8⅓x8 in.) and, by the use of Ruberoid Shingle-stains, a tapestry effect in various shades of green and red may be obtained.



Regular Method



Thatched Effect

METHODS OF APPLYING UNIT-SHINGLES

The Ruberoid Unit-shingle is a composition shingle of unusual quality and fine appearance which is used extensively on residences of the better type. It is unusually thick, is surfaced with green, red or steel-blue crushed natural slate and has a heavy, asphaltic back coating. It is larger (10x15½ in.) and heavier than the ordinary shingle and allows a larger exposure to the weather, which means a 32% saving in time and labor of application.

Ruberoid Strip-shingle (Patented)

A strip-shingle with many unusual features. Its patented form allows a saving of 50% in time and cost of application over individual shingles. Due to their shape and the extra heavy felt and coating, these shingles will lie flat. They are surfaced with green, red or steel-blue crushed slate and their design makes possible many different decorative effects. Size of strips, 11x32 in.

RUBEROID STRIP-SHINGLES

Further Information

Booklet describing Ruberoid products will be sent on request.

THE BARBER ASPHALT COMPANY

Asphalt Roofing and Waterproofing for all Industrial Purposes

PHILADELPHIA, PA.

NEW YORK PITTSBURGH ST. LOUIS KANSAS CITY CHICAGO ATLANTA SAN FRANCISCO

Products

STANDARD TRINIDAD LAKE ASPHALT BUILT-UP ROOFING MATERIALS.

GENASCO MEMBRANE WATERPROOFING.

GENASCO ASPHALT FLOORING.

GENASCO ASPHALT SATURATED FELTS and FABRICS.

GENASCO READY ROOFINGS (Smooth and Slate Surface).

GENASCO LATITE ASPHALT SHINGLES (Red, Green or Blue-black Slate Surface).

GENASCO BLACK ASPHALT PAINTS and COATINGS (for industrial uses, roofs, boilers, etc.).

GENASCO ACIDPROOF ASPHALT PAINTS.

Also manufacturers of Genasco Sealbac Shingles—individual or strip (red, green or blue-black slate surface); Genasco Asphalt Tile Cement; Genasco Asphalt Putty; Genasco Elastic Boiler Cement; Genasco Insulating and Pipe Coating Compounds; Trinidad Lake Asphalt (for streets and roofs); Bermudez Road Asphalt; Gilsonite; Genasco Lubricants; Genasco Building Papers: Deadening Felt, Insulating Paper, Sheathing Paper, Stringed Felt, Wall Lining.

TRADE-MARKS

Specifications for Genasco Standard Trinidad Lake Asphalt Built-up Roof—Over Boards

Materials—The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt.

The reinforcing factor shall be Genasco all-rag standard felt and Genasco all-rag cap felt 32 in. wide. The Genasco standard felt shall weigh approximately 15 lbs. per 100 sq. ft. and the Genasco cap felt shall weigh approximately 30 lbs. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—2 layers of Genasco standard felt shall be laid on the roof boards, lapping each sheet 17 in. and mopping the full width of the lap, using approximately 30 lbs. of asphalt per square. This felt shall be nailed through its longitudinal center, catching the upper edge of the felt below with broad head roofing nails, spaced 12 in. apart.

Second Operation—Over the 2 layers of Genasco standard felt thus laid, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco cap felt, lapping each sheet 2 in. and nailing the upper edge with broad head roofing nails, spaced 12 in. apart.

Third Operation—Over the Genasco felts thus laid, mop down approximately 30 lbs. of asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

2 layers Genasco Standard Felt	30 lbs.
1 layer Genasco Cap Felt	30 lbs.
3 layers Genasco Trinidad Lake Roofing Asphalt	90 lbs.
	150 lbs.

This roof contains 128 lbs. of waterproofing factor and 22 lbs. of reinforcing factor, or 85% waterproofing factor and 15% reinforcing factor.

Specifications for Genasco Standard Trinidad Lake Asphalt Built-up Roof—Over Concrete

Materials—The primer shall be Genasco concrete primer.

The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt.

The reinforcing factor shall be Genasco all-rag standard felt and Genasco all-rag cap felt 32 in. wide. The Genasco standard felt shall weigh approximately 15 lbs. per 100 sq. ft. and the Genasco cap felt shall weigh approximately 30 lbs. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—Prime the concrete with Genasco concrete primer, using approximately 10 lbs. per square.

Second Operation—Over the concrete thus primed, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 2 layers of Genasco standard felt, lapping each sheet 17 in. and mopping the full width of the lap, using approximately 30 lbs. of asphalt per square.

Third Operation—Over the 2 layers of Genasco standard felt thus laid, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco cap felt, lapping each sheet 2 in.

Fourth Operation—Over the Genasco felts thus laid, mop down approximately 30 lbs. of asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

1 layer Genasco Concrete Primer	10 lbs.
4 layers Genasco Trinidad Lake Roofing Asphalt	120 lbs.
2 layers Genasco Standard Felt	30 lbs.
1 layer Genasco Cap Felt	30 lbs.
	190 lbs.

This roof contains 168 lbs. of waterproofing factor and 22 lbs. of reinforcing factor, or 88% waterproofing factor and 12% reinforcing factor.

Specifications for Genasco Economy Trinidad Lake Asphalt Built-up Roof—Over Boards

Materials—The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt.

The reinforcing factor shall be Genasco all-rag standard felt and Genasco all-rag cap felt 32 in. wide. The Genasco standard felt shall weigh approximately 15 lbs. per 100 sq. ft. and the Genasco cap felt shall weigh approximately 30 lbs. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—Lay 1 layer of Genasco cap felt on the roof boards, lapping each sheet 2 in. and nailing through the laps and longitudinal center with broad head roofing nails, spaced 12 in. apart.

Second Operation—Over the Genasco cap felt thus laid, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco standard felt, lapping each sheet 2 in. The laps of the Genasco standard felt shall fall midway between the laps of the Genasco cap felt.

Third Operation—Over the Genasco felts thus laid, mop down approximately 30 lbs. of asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

1 layer Genasco Cap Felt	30 lbs.
1 layer Genasco Standard Felt	15 lbs.
2 layers Genasco Trinidad Lake Roofing Asphalt	60 lbs.
	105 lbs.

This roof contains 88 lbs. of waterproofing factor and 17 lbs. of reinforcing factor, or 84% waterproofing factor and 16% reinforcing factor.

Continued on next page

Specifications for Genasco Economy Trinidad Lake Asphalt Built-up Roof—Over Concrete

Materials—The primer shall be Genasco concrete primer.

The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt.

The reinforcing factor shall be Genasco all-rag standard felt and Genasco all-rag cap felt 32 in. wide. The Genasco standard felt shall weigh approximately 15 lbs. per 100 sq. ft. and the Genasco cap felt shall weigh approximately 30 lbs. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—Prime the concrete with Genasco concrete primer, using approximately 10 lbs. per square.

Second Operation—Over the concrete thus primed, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco cap felt, lapping each sheet 2 in.

Third Operation—Over the Genasco cap felt thus laid, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco standard felt, lapping each sheet 2 in. The laps of the Genasco standard felt shall fall midway between the laps of the Genasco cap felt.

Fourth Operation—Over the Genasco felts thus laid, mop down approximately 30 lbs. of asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

1 layer Genasco Concrete Primer	10 lbs.
3 layers Genasco Trinidad Lake Roofing Asphalt	90 lbs.
1 layer Genasco Cap Felt	30 lbs.
1 layer Genasco Standard Felt	15 lbs.
	145 lbs.

This roof contains 128 lbs. of waterproofing factor and 17 lbs. of reinforcing factor, or 88% waterproofing factor and 12% reinforcing factor.

Specifications for Genasco Membrane Waterproofing

Materials—The primer shall be Genasco concrete primer.

The waterproofing factor shall be Genasco Waterproofing Asphalt.

The reinforcing factor shall be Genasco all-rag standard felt weighing approximately 15 lbs. per 100 sq. ft.

Application—Genasco Membrane Waterproofing shall be laid in the following manner, using the above materials:

First Operation—Prime the surface to be waterproofed with Genasco concrete primer, using approximately 10 lbs. per square.

Second Operation—Over the surface thus primed, mop down approximately 30 lbs. of asphalt per square, into which, while hot apply 2 layers of Genasco standard felt, lapping each sheet 17 in. and mopping the full width of the lap, using approximately 30 lbs. of asphalt per square.

Third Operation—Over the 2 layers of Genasco standard felt thus laid, mop down approximately 30 lbs. of asphalt per square, into which, while hot, apply 1 layer of Genasco standard felt, lapping each sheet 2 in., so the laps will fall midway between the laps below.

Fourth Operation—Over the 3 layers of Genasco standard felts thus laid, mop down approximately 30 lbs. of asphalt per square, finishing the membrane in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF SURFACE

1 layer Genasco Concrete Primer	10 lbs.
4 layers Genasco Waterproofing Asphalt	120 lbs.
3 layers Genasco Standard Felt	45 lbs.
	175 lbs.

Note: For temperatures in excess of 100° Fahr. use Genasco Waterproofing Asphalt B on vertical surfaces.

This membrane contains 160 lbs. of waterproofing factor and 15 lbs. of reinforcing factor, or 91% waterproofing factor and 9% reinforcing factor.

Specifications for Genasco Asphalt Flooring for Floors, Sidewalks and Park Walks Over Concrete, Brick, Wood or Cobblestones

Materials—The waterproofing factor shall be Genasco Trinidad Lake Flooring Asphalt.

The reinforcing factor shall be Genasco silicious mineral.

The waterproofing factor and the reinforcing factor shall be combined and properly mixed, in suitable proportions, by the manufacturer and furnished in blocks ready to be heated and applied in place by the contractor without the addition of any other material.

The finished floors shall weigh not more than 12 lbs. per sq. ft., 1 in. thick and shall withstand a dead load of 200 lbs. per sq. in. at a temperature of 75° Fahr.

Application—*First Operation*—Establish a permanently stable foundation of either concrete, brick, cobblestone, wood or other suitable material, over which to apply Genasco asphalt flooring.

Second Operation—Establish grade line of the finished Genasco asphalt floor, so that minimum thickness of the floor desired will be equal to the difference between the highest elevation of the foundation and grade line of floor.

Grade lines must be established to provide drains in case other than a uniformly level floor is desired.

Third Operation—Genasco asphalt flooring shall be deposited on the foundation at a temperature of approximately 400° Fahr. and the floor brought to grade in one operation to insure a uniform bond throughout its entire thickness.

Fourth Operation—The hot material shall be thoroughly compacted and brought to grade and troweled to a smooth uniform finish.

Genasco Roll Roofings

Made of highest quality all-rag felt, thoroughly saturated, and then coated on both sides with Trinidad Lake asphalt cement. The water and weatherproof qualities of Trinidad Lake asphalt give them exceptional durability.

Manufactured in several types: smooth surface, light, medium and heavy; slate surface, red, green or blue-black color. Kant Leak Kleets, the most scientific and efficient roof fastening device made, furnished with each roll.

Genasco Latite Asphalt Shingles

Slate surfaced asphalt shingles, of unique and distinctive design. Finished with a double butt, and applied in honeycomb design. Present a "shadow line" and depth of texture not found in ordinary asphalt shingles.

Latite shingles lock together tightly on the roof, by means of a wire band or key in the butt of each shingle, so that wind or rain can not penetrate.

They are particularly adapted for re-roofing operations, being applied directly over old, worn out surfaces. Made in three colors—red, green or blue-black natural color slate; and in two sizes—16x16 in. and 12x12 in.

Genasco Asphalt Paints and Coatings

The several types of Genasco asphalt paints and coatings are manufactured under strict laboratory supervision. Each is designed to meet the exacting requirements of the particular purpose for which it is recommended.

There are Genasco asphalt paints for preserving metal or prepared roofs, for painting machinery or other industrial uses, for resisting acids and gases, for priming, and many other purposes.

THE BARRETT COMPANY

Manufacturers of Roofing, Waterproofing, Dampproofing Paints, Floors and Paving; also Insulating and Building Papers

ATLANTA, GA. CHICAGO, ILL. DULUTH, MINN. LATROBE, PA. PHILADELPHIA, PA.
BALTIMORE, MD. CINCINNATI, OHIO ELIZABETH, N. J. MILWAUKEE, WIS. PITTSBURGH, PA.
BANGOR, ME. CLEVELAND, OHIO HOUSTON, TEX. MINNEAPOLIS, MINN. RICHMOND, VA.
BETHLEHEM, PA. COLUMBUS, OHIO JACKSONVILLE, FLA. NEW ORLEANS, LA. ST. LOUIS, MO.
BIRMINGHAM, ALA. DALLAS, TEX. JOHNSTOWN, PA. NEW YORK, N. Y. SALT LAKE CITY, UTAH
BOSTON, MASS. DENVER, COLO. KANSAS CITY, MO. OMAHA, NEBR. SYRACUSE, N. Y.
BUFFALO, N. Y. DETROIT, MICH. LEBANON, PA. PEORIA, ILL. SAN FRANCISCO, CAL.
TOLEDO, OHIO. WASHINGTON, D. C. YOUNGSTOWN, OHIO

THE BARRETT COMPANY, LIMITED

MONTREAL, QUE. TORONTO, ONT. WINNIPEG, MAN. VANCOUVER, B. C. ST. JOHN, N. B. HALIFAX, N. S.

Products

The Barrett Company
TRADE-MARK

ROOFING MATERIALS:

For flat surfaces: The BARRETT SPECIFICATION ROOF.

For steep surfaces special specifications submitted covering sawtooth construction, monitor, umbrella, butterfly, hopper, plain hip, etc. For steep surfaces such as residences, farm buildings, etc.: EVERLASTIC ROOFINGS.

WATERPROOFING:

For foundations, reservoirs, swimming pools, subways, tunnels, floors, etc., special specifications submitted.

INSULATING and BUILDING PAPERS:

For sheathing, lining, etc.

DAMPPROOFING and PRESERVATIVE PAINTS, WOOD PRESERVATIVES, FLOORING.

For Asphalt Paving and Waterproofing Material, see page 415; for flashings for Brick and Concrete Walls, see pages 946-947; for Roof Leader and Roof Vent connections, see pages 948-949.

Barrett Specification Tarred Felt

Made from specially selected materials for use with Barrett Specification Pitch in roofing and waterproofing.

Particular care is given each step of manufacture and no other felt is so uniformly good for the purposes mentioned. Every roll bears label as illustrated.

It weighs from 14 to 16 lbs. per 100 sq. ft., is put up in measured rolls containing 400 sq. ft., and is sold by the roll.

TRADE-MARK LABEL

Barrett Specification Pitch

Made from selected coal-tars mixed in the proportions which experience and modern laboratory tests show will give the best results when used for roofing and waterproofing purposes. Poor pitch is never cheap enough to warrant its use. Other pitch may have the same appearance, but whether it is as good or not can be determined only in a well equipped laboratory by one familiar with not only the technical but also the practical side of the business. Every barrel of Barrett Specification Pitch is labeled as per illustration below.

It is put up in barrels weighing from 300 to 600 lbs., and is sold by the hundredweight.

The Barrett Specification Roof

A roof that is guaranteed by a twenty-year or ten-year surety bond, as desired.

A roof that is scientifically and mechanically correct in every detail.

A roof that contains more than twice as much actual waterproofing material as is generally used in other built-up roofing.

A roof that has a wearing surface which resists all sorts of abuse and the most severe weather conditions.

A roof that is fire retardant; it carries Class "A" rating by the Underwriters' Laboratories, Inc.

A roof that takes the base rate of fire insurance.

A roof that must pass the most rigid inspection.

A roof that needs no repairs or paint.

A roof that costs less per year of service than any other roofing suitable for flat surfaces.

TRADE-MARK LABEL

The Guaranty Bond

A 20-year Guaranty Bond is offered on Barrett Specification Type "AA" Roofs and a 10-year Guaranty bond on Barrett Specification Type "A" Roofs by THE BARRETT COMPANY without charge in accordance with Note 1 of the Barrett Specifications hereinafter printed. Guarantees and bonds do not keep out water, but the Barrett Guaranty Bond differs from every other roofing guarantee or bond, in that this Company does not apply the roof and has no contractor's profit as a motive for cheapening the roofing. When applied by experienced and reliable roofing contractors, and carefully inspected by competent inspectors, Barrett Specification Roofs applied in accordance with the specifications are just as economical and serviceable without the bond as with it.

Barrett Specification Roofs
TRADE-MARK

Continued on next page

THE BARRETT COMPANY has prepared an inspection manual, known as "Requirements Covering Application and Inspection of Barrett Specification Roofs," for use by architects, engineers and owners where the Company's inspection service is not available.

The Barrett Specification, Type "AA" Roof—for Use over Board Sheathing—5 Plies

Bonded for 20 years. (Revised April 15, 1920.) See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

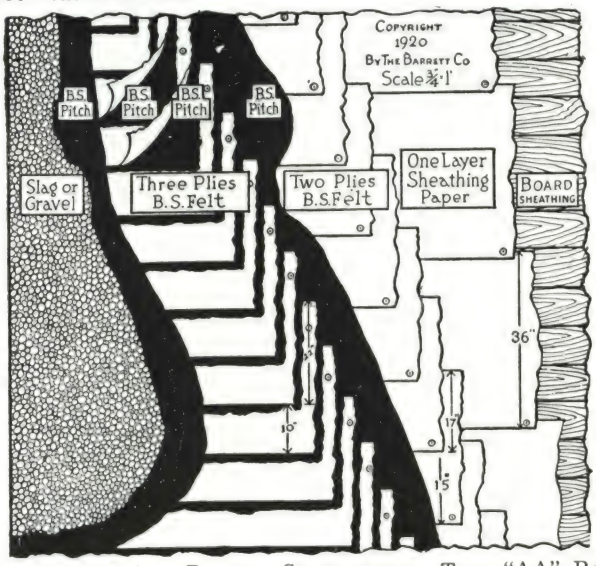


DIAGRAM SHOWING BARRETT SPECIFICATION, TYPE "AA" ROOF OVER BOARDS
Bonded for 20 years

Fourth—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt.

Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of felt.

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of Specification Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Co., of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

20-Year Guaranty Bond—*Note No. 1*—THE BARRETT COMPANY will give its 20-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in cities of 25,000 population and upwards, in the United States and Canada, and in smaller centers where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Note No. 2—Incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding, is advised. If an abbreviated form is desired, the following is suggested:

Abbreviated Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "AA," laid in accordance with the Barrett Specification (for use over Board Sheathing), dated April 15, 1920, by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "AA" Roof—for Use over Concrete—4 Plies

Bonded for 20 years. (Revised April 15, 1920.) See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay four (4) plies of Specification Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding one, mopping with Specification Pitch the full twenty-four and one-half (24½) inches on each sheet, so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of twenty years from date of completion, in accordance with Note No. 1.

20-year Guaranty Bond—*Note No. 1*—THE BARRETT COMPANY will give its 20-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in cities of 25,000 population and upwards, in the United States and Canada, and in smaller centers where its Inspection Service

Continued on next page

is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Note No. 2—Incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding, is advised. If an abbreviated form is desired, the following is suggested:

Abbreviated Specification—*Roofing*—Shall be a

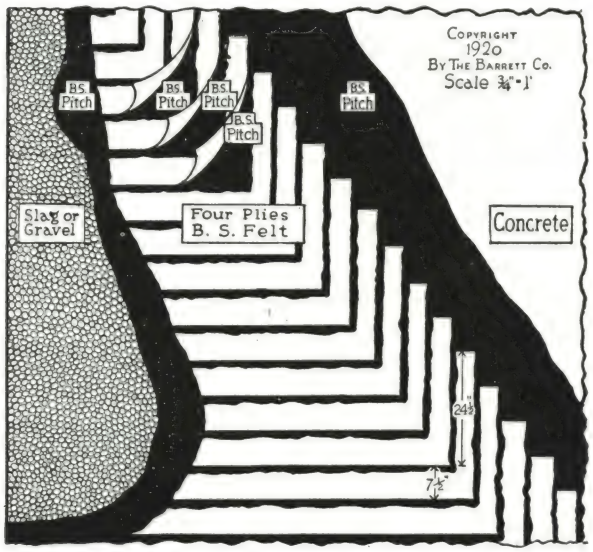


DIAGRAM SHOWING BARRETT SPECIFICATION, TYPE "AA" ROOF OVER CONCRETE
Bonded for 20 years

Barrett Specification Roof, Type "AA," laid in accordance with the Barrett Specification (for use over Concrete), dated April 15, 1920, by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "A" Roof—for Use over Concrete—3 Plies

Bonded for 10 years. (Revised April 15, 1920.) See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) inch to five-eighths (⅝) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and seventy-five (175) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

10-year Guaranty Bond—*Note No. 1*—THE BARRETT COMPANY will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft., or more, in cities of 25,000 population and upwards, in the United States and Canada, and in smaller centers where its Inspection Service

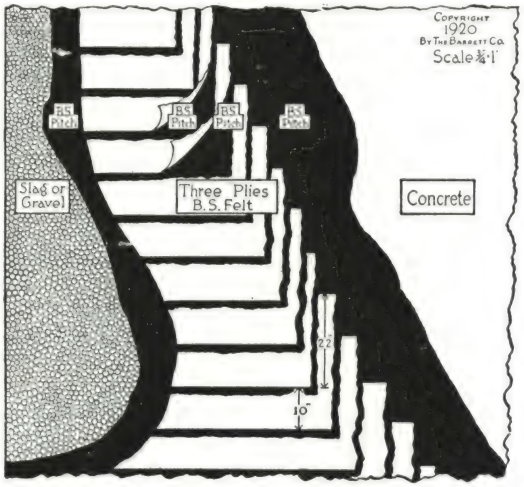


DIAGRAM SHOWING BARRETT SPECIFICATION, TYPE "A" ROOF OVER CONCRETE
Bonded for 10 years

is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Note No. 2—Incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding, is advised. If an abbreviated form is desired, the following is suggested:

Abbreviated Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "A," laid in accordance with the Barrett Specification (for use over Concrete), dated April 15, 1920, by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for ten years, in accordance with Note Nc. 1 of said Specification.

The Barrett Specification, Type "A" Roof—for Use over Board Sheathing—4 Plies

Bonded for 10 years. (Revised April 15, 1920.) See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—*First*—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Continued on next page

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Specification Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than one (1) ply of felt.

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter (¼) to five-eighths (⅝) inch in size, dry and free from dirt.

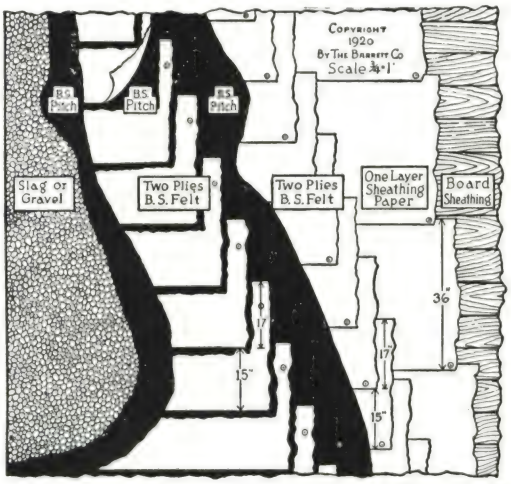


Diagram Showing Barrett Specification, Type "A" Roof Over Boards
Bonded for 10 years

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and twenty-five (125) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by The Barrett Company. He shall furnish The Barrett Company's Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

10-year Guaranty—*Note No. 1*—The Barrett Company will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft., or more, in cities of 25,000 population and upwards, in the United States and Canada, and in smaller centers where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by The Barrett Company, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Note No. 2—Incorporating the full wording of the Specification and inserting roofing details in plans, in order to avoid any misunderstanding, is advised. If an abbreviated form is desired, the following is suggested:

Abbreviated Specification—*Roofing*—Shall be a Barrett Specification Roof, Type "A," laid in accordance with the Barrett Specification (for use over Board Sheathing), dated April 15, 1920, by a roofing contractor approved by The Barrett Company. The roofing contractor shall furnish The Barrett Company's Surety Bond Guaranty for ten years, in accordance with Note No. 1 of said Specification.

Roofing for Steep Surfaces

Special specifications for built-up steep roofing for sawtooth, monitor, umbrella, butterfly, hopper, plain hip, and other types of steep roof construction are furnished on request. Special attention is given by the Specification Department to steep roofing problems, each of which is carefully studied and specifications worked out to meet the conditions. Each job of steep roofing is a problem in itself because of the variety of designs of roof structures, the many kinds of roof decks on the market, the different inclines, the occupancy of the building, and the cost or need of either permanent or temporary roofing.

In addition to special steep roof specifications for built-up work, the following roofings of the prepared or ready roofing type are widely used and recommended for steep slopes where the character of the building is suitable for them:

Anchor Brand Roofing

Anchor Brand Asphalt Felt—Used for roofing, sheathing, and waterproofing. A felt made from high grade fiber, saturated with an asphalt compound which 40 years' experience has proved the most permanent. No taint or odor, thus making it especially suitable for insulating and waterproofing cold storage compartments. In rolls 32 in. wide, containing 400 sq. ft., weighing about 60 lbs. Rolls labeled (see illustration) the label being printed in red, black and gray.

Label on Roll of Anchor Brand Asphalt Felt

Anchor Brand Roofing Cement—Refined from the purest asphalts selected to produce a compound possessing to the fullest degree those cementitious and enduring qualities most essential to a perfect roofing cement. Suitable also for membrane waterproofing. In barrels of about 50 gals. capacity, and weighing about 525 lbs. each. Each barrel is stenciled (see illustration) in black on a gray background.

Label on Barrel Head of Anchor Brand Roofing Cement

Quantities Required—Over boards for each 100 sq. ft. of roof surface:

432 sq. ft. Anchor Brand Felt
100 to 110 lbs. (Net) Anchor Brand Cement, steep roofs
110 to 135 lbs. (Net) Anchor Brand Cement, flat roofs

The quantity of roofing cement varies with weather conditions and the skill of the workmen employed.

Specification for Barrett Anchor Brand Roofing (Over Boards or Unit Tile Construction)

For *steep surfaces.* This specification has been prepared for roof inclines of from 2 in. to the foot and upward. Properly applied, the Anchor Brand Roof is suitable for inclines up to 6 and 7 in. to the foot and even steeper. (Specifications suitable for flat surfaces or for use over concrete roof decks furnished on request.)

Continued on next page

The roof deck shall be smooth, firm, dry and free from loose material and shall be properly graded to outlets.

First—Cover the roof area with four (4) thicknesses of Anchor Brand Felt, lapping each sheet twenty-four and one-half (24½) in. over the preceding one and securing with 3 penny barbed roofing nails driven through tin discs, spaced about twelve (12) in. apart and placed about six (6) in. below the upper edge of the sheet. Mop back eighteen (18) in. between the laps with a uniform coating of Anchor Brand Roofing Cement.

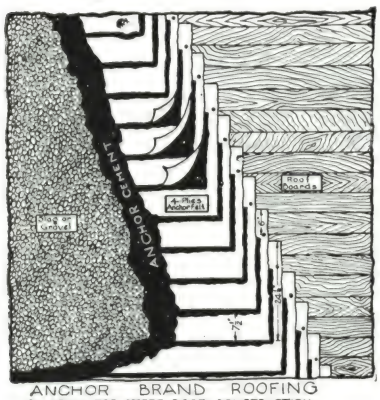


DIAGRAM OF ANCHOR BRAND ROOF

Second — Over the surface thus laid, spread with a mop a heavy uniform coating of Anchor Brand Roofing Cement, into which, while hot, embed slag. The slag shall be clean, dry, free from dirt and shall be from one quarter (¼) to five-eighths (⅝) in. in size. If the roof is applied in freezing weather, the slag must be heated.

The roofing shall be applied by a roofing contractor experienced in applying built-up roofing on steep surfaces.

Note: Ordinarily commence laying felt at low points and at right angles with the incline of the roof. Where extreme inclines compel the use of scaffolding, felt should be laid parallel with the incline of the roof.

Special Note for Architect—We recommend that the full text of the Specification be used. If, however, an abbreviated form is desired, we suggest:

Roofing—Shall be Barrett Anchor Brand Asphalt Roofing, laid strictly in accordance with printed specifications (for use over boards or unit tile construction—steep surfaces), dated March 3, 1922, using the materials specified.

Tile-Tite Asphalt Felt

Placed beneath inclined tile or slate roofs it prevents leaks, especially those which result from drifting snow, also serves the purpose of a cushion, reducing breakage. It is an effective dampproof sheathing, and an invaluable insulator, reducing fuel requirements. Made of warm dry felt protected by a thorough saturation of natural asphalt. In rolls 32 in. wide, containing 100 sq. ft. Two weights, Nos. 30 and 40, weighing approximately 30 and 40 lbs. respectively. Each roll is labeled (see illustration) with green and red label.

LABEL ON ROLL OF TILE-TITE ASPHALT FELT

Anchor Asphalt Roof Coating (99.8% Pure)

For treating all surfaces where a paint with saturating properties is desired, including old (sun cracked) wooden shingles, rubber roofing, prepared roofing, gravel surfaced ready roofings, asphalt shingles and kindred roofings. Restores the life and waterproof qualities which have been exhausted by exposure to the sun. Resists alkali and acid fumes. Used also for dampproofing brick, concrete and stone walls.

Shipped in 50-gal. barrels; 25-gal. half barrels; 5-gal. kits; 1-gal. cans (6 cans packed in strong wooden case).

Anchor Asphalt Paint (99.8% Pure)

For protecting metal surfaces against the ravages of the elements. Dries quickly with a glossy, lustrous finish sufficiently flexible to prevent scaling. Resists alkali and acid fumes and solutions. For treating metal roofs of all kinds, smokestacks, boilers, fences and metal surfaces generally. Shipped in packages same as the Anchor Asphalt Roof Coating.

Everlastic "Rubber" Roofing

This is a "rubber," or smooth surface, ready roofing of the highest grade, made in light, medium and heavy weights, and largely used for steep surfaces.

Put up in rolls 36 in. wide, containing 108 sq. ft., weighing 35, 45 and 55 lbs. respectively. Nails and cement are packed in the center of each roll.

Barrett Everlastic ROOFING
TRADE-MARK

Everlastic Mineral-Surfaced Roofing

A roofing manufactured in the most scientific and careful way, surfaced with red or green mineral thoroughly embedded in a heavy layer of tested waterproofing compound.

It is put up in rolls 36 in. wide, contains 108 sq. ft., and weighs about 85 lbs. Nails and cement are packed in the center of each roll.

Barrett Everlastic MINERAL-SURFACED Roofing
TRADE-MARK

Everlastic Octagonal Strip Shingles

A new Everlastic four-in-one strip shingle made in an unique form and mineral-surfaced in red or green. Many distinctive designs can be created by interchanging the colors and reversing some of the shingles.

Everlastic Octagonal Strip Shingles are 11x32 in. in size, laid with a 3-in. overlap, and are self-spacing. No chalk marking is needed.

Each package contains 55 strips—sufficient to cover 50 sq. ft. of roof surface.

Barrett Everlastic OCTAGONAL STRIP SHINGLES
TRADE-MARK

Everlastic Multi-Shingles (4-in-1)

This is called "the 4-in-1 roofing," as it consists of 4 shingles in one, size 32¼x10 in. Everlastic Multi-Shingles are made on a waterproof felt base with a red or green mineral surface, natural colors that never fade.

Everlastic Multi-Shingles are durable and attractive, also highly fire retardant. They require fewer nails and less labor to apply than individual shingles. Recommended for all steep roof buildings where moderate price, beauty and durability are desired.

Barrett Everlastic MULTI-SHINGLES
TRADE-MARK

Continued on next page

Everlastic Giant Shingles

Barrett Everlastic GIANT SHINGLE TRADE-MARK

Aside from a heavier felt base, Everlastic Giant Shingles are exactly like Everlastic Single Shingles. They are just as beautiful, just as fire resistant. They have the same fadeless red or green mineral surface, and the same rotproof "seal-back." They are "giants" for wear and service.

Put up in packages of 85 shingles. Laid 4 in. to the weather, 5 packages are required to cover 100 sq. ft. of roof surface; 4 packages, if laid 5 in. to weather.

Everlastic Single Shingles

Barrett Everlastic SINGLE SHINGLES TRADE-MARK

Everlastic Single Shingles are made of the same materials as Multi-Shingles but are cut 8x 12¾ in. These are applied like slate but look better and cost much less. Laid 4 in. to the weather, making a triple covering for entire roof.

Building Paper, Sheathing, Lining, etc.

For sheathing purposes use Jack Frost Sheathings, Barrett tarred felts, namely, Barrett Specification Tarred Felt, 2-ply or 3-ply Red Seal Felt, or Barrett Slater's Felt. These felts are especially adaptable for sheathing under slate and lining for houses. Protect against vermin and insects. Their use means less coal for heating, and cooler buildings during hot weather. They are much superior for sheathing and lining purposes to the so-called rosin-size sheathings and unsaturated felts.

LABEL

Barrett Tomb Brand Deadening Felt

A sound deadener for use in walls and floors; also insulates against heat and cold.

Hydronon

Hydronon The Damp-Proofing Paint TRADE-MARK

A dampproofing paint for use on the interior of stone, brick or concrete walls, to exclude dampness. Plaster may be applied directly on the Hydronon, as Hydronon has ample adhesive power, thus saving all the costs of furring or lathing, and expediting construction. Where walls are masonry, every living room should be protected with Hydronon.

Eternium Metal Paint (Anticorrosive)

Eternium Paint (Black) is recommended for protecting structural steel, which, if unpainted, should receive a priming coat of red lead. It is made from a specially prepared coal-tar pitch base, and is especially resistant to acids and alkalies.

Barrett Velvex Creosote Shingle Stains

Barrett VELVEX Creosote Shingle Stains TRADE-MARK

The ideal coloring and preservative for shingles and all rough, unplaned timber. Cheaper than paint and easier to use. The creosote penetrates and preserves the wood. All colors, in beautiful, soft, velvety tones.

Color samples on request.

Barrett Carbosota Liquid Creosote Oil

The name Carbosota is a guarantee of an absolutely uniform wood preservative. Carbosota is a highly refined and specially processed coal-tar creosote, particularly adapted to surface treatments (brush treatment, painting, spraying or dipping), and the open tank process. It conforms to standard specifications.

Barrett B Carbosota Liquid Creosote Oil For Preserving Wood TRADE-MARK

Detailed recommendations for application free by addressing nearest Barrett office.

Waterproofing—Foundations, Reservoirs, Swimming Pools, Subways, Tunnels

Each job of waterproofing is a problem in itself and requires especial attention. Special specifications submitted on receipt of complete details.

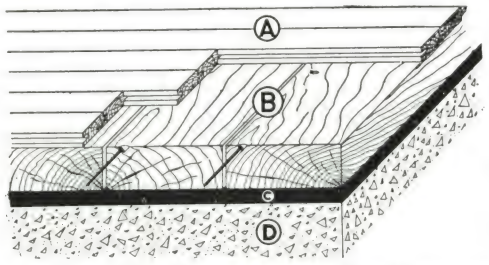
Floor Waterproofing

Barrett Specification Tarred Felt and Barrett Specification Waterproofing Pitch meet the "Regulations Governing Standard Mill (slow burning) Construction" of the National Board of Fire Underwriters, for waterproofing wooden floors. See edition of 1918, pages 7 and 8. Special specifications for waterproofing wooden or concrete floors furnished on request.

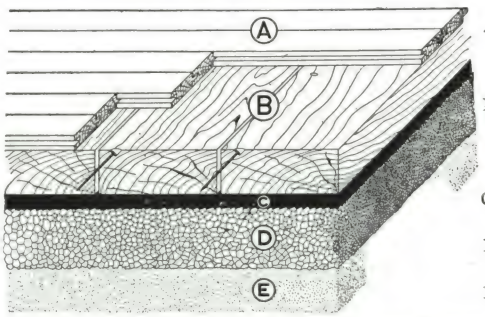
Tar-Rok Subfloor Construction

The most suitable surface on which to bed plank where a wooden floor is desired in factories, machine-shops, storehouses, etc. Sleepers are absolutely unnecessary. These floors insure a maximum of strength and rigidity, as well as protection against dry-rot, decay and fire, at a minimum cost. Separate concrete foundations are not required for any self-contained machinery. Tar-Rok subfloors are applied directly over earth, or over concrete slabs. Send for Tar-Rok Subfloor Booklet.

TAR-ROK TRADE-MARK



Tar-Rok Subfloor Over Concrete



Tar-Rok Subfloor Over Earth

Co-operative Service

The Barrett Company will be pleased to submit additional information on roofing, flashing, waterproofing, etc., and to assist architects and engineers in preparing specifications to meet their problem.

THE PHILIP CAREY COMPANY

Manufacturers of Roofing

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES
FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products and Services

CAREY BUILT-UP ROOFING.

CAREY FELTS for Waterproofing, Weatherproofing and Roofing purposes.

CAREY ASPHALT PITCH.

Contracts taken to furnish and apply Carey Built-up Roofing in all locations.

For Waterproofing and Dampproofing see pages 70-71; for Expansion Joints, see page 495; for Asphalt Shingles, see page 907; for Pipe Coverings, see pages 1736-1737.

Carey PRODUCTS
TRADE-MARK
Registered

Experience and Facilities

Established in 1873, THE PHILIP CAREY COMPANY has furnished millions of squares of roofing, distributed and applied to buildings of every description throughout the world. The Carey mills are modern, and facilities for handling large business are maintained to a high standard.

Carey Roofs

Carey roofs are laid strictly in accordance with the Carey specifications for various weights and thicknesses adapted to meet the requirements of the roof structure, and the conditions to which the roofing will be subsequently exposed.

Carey Felts

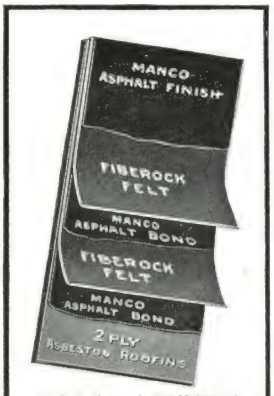
Carey felts consist of the best grade of stock, carefully prepared and saturated in asphalt to insure absolute waterproofing protection and permanent flexibility.

Fiberock (Asbestos Asphalt Impregnated Felt)—Used in Carey built-up roofing specifications, also for waterproofing and weatherproofing work. Put up in rolls containing 324 sq. ft.; width, 36 in.; weight about 45 lbs. per roll.

Feltex (Asphalt Saturated Felt)—Used in Carey built-up roofing, waterproofing and weatherproofing work. Furnished in rolls containing 324 sq. ft.; width 36 in.; weight, about 45 lbs. per roll.

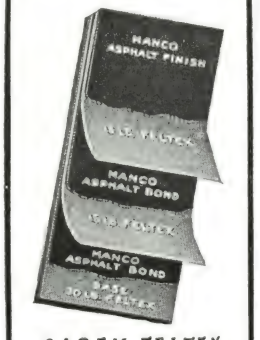
Manco (Carey Asphalt Pitch)

More than 40 years' experience in asphalt refining is back of Carey Manco. For roofing purposes, no other asphalt can equal its splendid qualities. If interested in high grade asphalt, write to this company, stating requirements.



CAREY ASBESTOS BUILT-UP ROOFING

CAREY FLEXIBLE CEMENT ROOFING



CAREY FELTEX BUILT-UP ROOFING

Carey Flexible Cement Roofing

The Carey flexible cement roofing is a solid, compact and indivisible sheet of roofing. Its foundation consists of a wool-felt, manufactured from the best grade of stock and saturated so as to render it waterproof and permanently flexible. A heavy body of asphalt cement is laid over the felt foundation. The top reinforcement consists of a strong Calcutta burlap embedded into the asphalt composition, giving great tensile strength to the roofing sheet.

The weight of Carey flexible cement roofing, without any completing materials, is approximately 75 lbs. per square. This roofing was placed on the market in 1885. Since that time it has been extensively used on buildings of every description, in all climates, proving by actual time test its practicable and durable qualities. Furnished in rolls, 1 square each, with necessary materials for proper application. For specifications and method of laying, see following page.

Carey Asbestos Built-up Roofing

This roof is specified for the most permanent construction, including all types of buildings, flat or steep surfaces, particularly the sawtooth type of construction, where it has been proved in common practice that the ordinary roof covering fails to meet the necessary requirements.

The smooth asphalt finished surface of this roof (see illustration), constantly washed by the rains, always presents a clean and uniform appearance. For specifications see following pages.

Carey Feltex Built-up Roofing

This roofing is constructed of Carey high grade Feltex (asphalt saturated felt), and Manco Asphalt Pitch. It is suitable for buildings of every description, with the exception of those having very steep roof surfaces. The Manco Asphalt Pitch is prepared with a high melting point, and is therefore not affected by any temperature of the sun's heat. It is made to three specifications as illustrated and specified on the following pages.

Correspondence

Information and advice respecting the adaptability of Carey roofing specifications to meet any particular requirements will be furnished on request. Write for samples and further information.

Continued on next page

Specifications for Carey Roofings

(1) Work by Other Trades—Provision for the following work should be included under the proper specification headings:

(2) *Preparation of Wood Surfaces*—Roof surface is to be prepared and made ready for the application of Carey Roofing with dry seasoned sheathing boards of uniform thickness, closely laid. On permanent buildings, tongue and grooved sheathing 6 to 8 in. wide, is recommended. All sheathing boards to be surfaced nailed with at least two nails to each purlin in addition to any blind nailing. Sheathing boards to be placed on building horizontally. Remove or hammer down all projecting nail heads; cover all knot holes, etc., in the sheathing and sweep the sheathing clean before the roofing is applied.

(3) *Preparation of Concrete, Tile or Gypsum Surfaces*—All concrete, tile or gypsum surfaces shall be prepared for the application of Carey Roofing with a comparatively smooth, hard finish, free from holes and loose particles of sand and cement, and the expense of rectifying any extensive irregularities, such as depressions in the plane of the roof surface, which must be filled, shall be chargeable to (—Contractor). All sharp angles to be rounded out so as to avoid rough or sharp edges. On steep surfaces provision shall be made for anchoring the roofing sheets, the anchor strip to consist of a wood strip embedded into the concrete surface at the ridge. All down-spout openings must be sufficient size and the gutters properly graded by the cement contractor, so that water will not stand at any point.

(4) *Sheet Metal Work*—Counterflash all walls with No. 26 gauge galvanized iron, or if preferred, copper or Carey Fiberock counterflashing may be used. Metal counterflashing to be firmly attached to wall with suitable plugs and portland cement. (If furnished by the roofing contractor, both material and labor of installation shall be charged to the acceptor of this proposal as an extra, unless otherwise specifically stated in proposal.)

(5) *Nailing Strips*—(General Contractor) to provide nailing strip in wall for roof flashings not more than 12 in. nor less than 6 in. above roof line.

Specification C—Carey Flexible Cement Roofing, Style "C" (Over Wood Sheathing)

(1) Work Proposed—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work included.)

Sheathing must be dry before applying the roofing.

(2) Materials—Carey Flexible Cement Roofing, Style "C," 75 lbs. per square. Carey Fibre Coating (1½ gals.) 17 lbs. per square. Carey Fibre Coating (½ gal. for laps), or 6 lbs. Manco Asphalt, 6 lbs. per square. 1-in. large head roofing nails, 1¼ lbs. per square.

Weight per square, when applied, to be approximately 99 lbs.

(3) Application—The roof surface shall be covered with Carey Flexible Cement Roofing, lapping the sheets 2 in. at the joints and 4 in. at the cross seams, and cementing between the sheets at the joints and cross seams with Carey Fibre Coating or Manco Asphalt.

Roofing sheets shall be nailed at the joints and cross seams with large head roofing nails, to be driven not more than 2 in. apart. Care should be taken to avoid driving nails in cracks or knot holes.

The patent lap shall be securely cemented down over all joint and nail heads with Carey Fibre Coating or Manco. No nail heads must be left exposed.

(4) Gutters and Valleys—First line with a single sheet of saturated felt, mopping the same in solid, then mop in solid over the felt a full length sheet of roofing cut to a width of not over 18 in. Lay the sheets lengthwise with the valley or gutter so that joints will not occur in the center. All gutter and valley sheets to be applied as specified under "Application."

Note: All concrete or brick walls to be flashed, to be primed to full height of flashing with Carey Asphalt Primer.

(5) Flashing—The roofing sheets shall be cut so that they will extend up on all fire walls, skylights, curbs, chimneys and other vertical surfaces to a height of 3 in. A sheet of Carey Roofing, full length and cut to a width of 9 in., to be applied along the vertical surface, extending 3 in. on the roof proper and 6 in. on the wall, being securely cemented and nailed to the roof surface and to the nailing strip in the fire wall. (Also see details for flashing where cricket is used.)

(6) Counterflashing—See under "Work by Other Trades."

(7) Roof Finish—The entire surface of the roofing applied shall be coated with Carey Fibre Coating, evenly spread to a uniform finish.

Specification No. 2—Carey Flexible Cement Roofing, Built-up (Over Wood Sheathing)

(1) Work Proposed—Use paragraph 1, Specification C.

(2) Materials—Carey Flexible Cement Roofing, Style C, 75 lbs. per square. Carey Manco Asphalt Pitch, 30 lbs. per square. Carey Fiberock Felt or Feltex, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. 1-in. large head roofing nails, 1¼ lbs. per square.

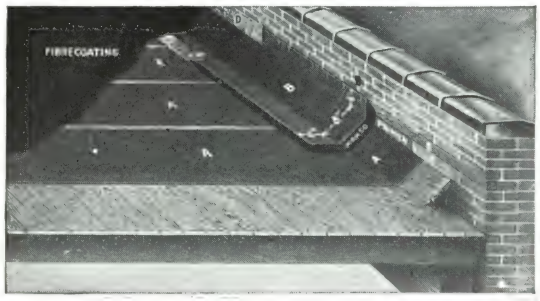
Weight per square, applied, to be approximately 146 lbs.

(3) Application—The roof surface shall be covered with Carey Flexible Cement Roofing, lapping the sheets 2 in. at the joints and 4 in. at the cross seams. (The patent lap is not to be used but covered entirely by the succeeding sheet.)

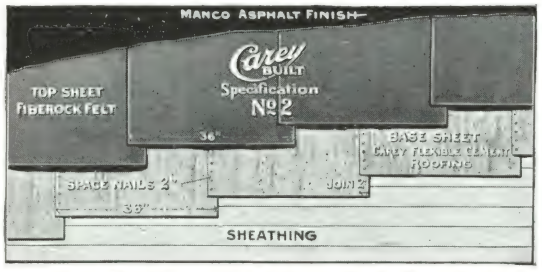
Roofing sheets shall be nailed at the joints and cross seams with large head roofing nails, to be driven not more than 2 in. apart. Nails must be driven straight and care used to avoid driving nails in cracks or knot holes.

The Carey Roofing surface shall then be mopped with Carey Manco Asphalt Pitch, into which, while hot, embed 1 layer Carey Fiberock Felt, lapping the sheets about 2 in. and laying the Fiberock sheets crosswise of the Carey Roofing sheets or with the Carey Roofing sheets, as best suits the type of roof construction.

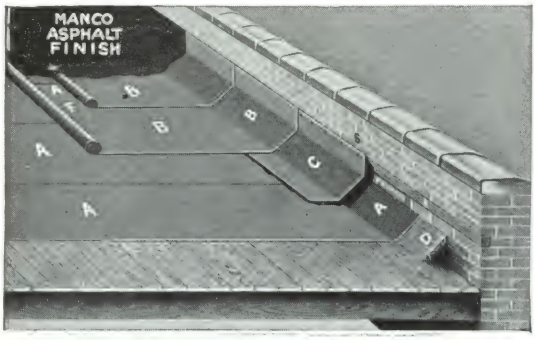
(4) Gutters and Valleys—Apply 1 sheet of Carey Flexible Cement Roofing, cut to a width of not over 18 in., mopping this sheet solid, then apply over the sheet of Carey Roofing, 1 sheet of Carey Fiberock Felt, thoroughly mopping same to the top surface of the Carey Roofing. Lay all sheets lengthwise with the gutters or valleys so that joins will not occur in the center. All gutter sheets are to be applied as specified under "Application."



APPLICATION OF CAREY FLEXIBLE CEMENT ROOFING, STYLE "C" (OVER WOOD SHEATHING)



APPLICATION OF CAREY FLEXIBLE CEMENT ROOFING —— SPECIFICATION NO. 2



METHOD OF FLASHING CAREY FLEXIBLE CEMENT ROOFING —— SPECIFICATION NO. 2

CAREY FLEXIBLE CEMENT ROOFING

Continued on next page

Note: All concrete or brick walls to be flashed, should be primed to full height of flashing.

(5) **Flashing**—Allow Carey Roofing Sheets from main deck to lap on to cricket. Cut cap strip of Carey Roofing sufficient width and cement same in solid, nailing the upper edge to wood strip in wall. The Fiberock Felt from main roof to run to wall only, in case cricket is not used in angle of wall.

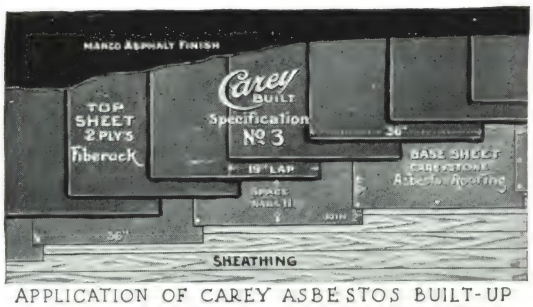
(6) **Counterflashing**—See under "Work by Other Trades."

(7) **Roof Finish**—The entire surface of Fiberock Felt shall be mopped with Carey Manco Asphalt Pitch, applied in a light thin coat, less than $\frac{1}{16}$ in. thick, and spread to a uniform finish.

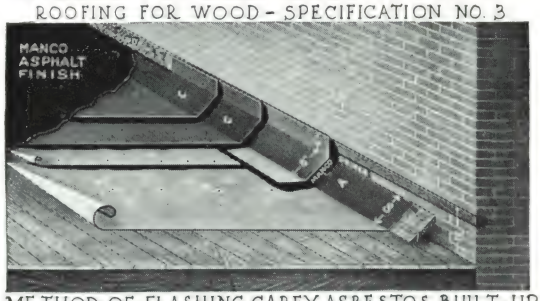
Specification No. 3—Carey Asbestos Built-up Roof (Over Wood Sheathing)

(1) **Work Proposed**—Use paragraph 1, Specification C.

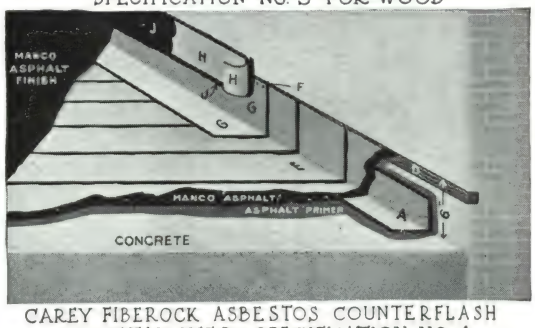
(2) **Materials**—One roll (108 sq. ft.) 2-ply Careystone Roofing, weight 35 lbs. 30 lbs. Carey Fiberock Asphalt Impregnated Asbestos Felt. 60 lbs. Carey Manco Asphalt Pitch. 1 lb. $\frac{7}{8}$-in. nails. $\frac{3}{4}$ lb. flat tin caps.



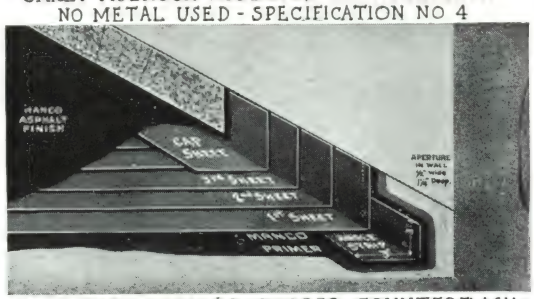
APPLICATION OF CAREY ASBESTOS BUILT-UP ROOFING FOR WOOD - SPECIFICATION NO. 3



METHOD OF FLASHING CAREY ASBESTOS BUILT-UP SPECIFICATION NO. 3 FOR WOOD



CAREY FIBEROCK ASBESTOS COUNTERFLASH NO METAL USED - SPECIFICATION NO 4



GALVANIZED IRON OR COPPER COUNTERFLASH CAREY SPECIFICATION NO 4

CAREY ASBESTOS BUILT-UP ROOFING

(3) **Application**—Roof surface shall be covered with 2-ply Careystone Asbestos Roofing, laid with the white surface next to sheathing boards. All joints to be lapped 2 in., cap-nailing sheets at joints securely to the sheathing board every 6 in. with one additional row of nails and caps 11 in. apart through the center of the sheet. This surface to be mopped with Carey Manco Pitch and on to this surface shall be laid 2 layers of 1-ply Fiberock Asphalt Impregnated Asbestos Felt, cementing solid between these sheets so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 17 in. are left exposed. After these materials are applied spread over the entire surface a coating of Carey Manco Asphalt Pitch in an even, uniform manner.

(4) **Flashing**—The 2-ply Careystone base sheet shall extend from main deck to lap the full height of cricket. A strip of 2-ply Careystone (18 in. wide, more or less, depending on conditions) shall be nailed to top edge of nailing strip in wall and this asbestos strip to be thoroughly cemented over cricket and same to lap on to main roof deck at least 4 in. The final 2 plies of Fiberock from main roof are then run to top edge of flashing, each being cemented in solid over cap sheet. Height of flashing, width of cricket and flashing material, may be regulated to suit height of wall and other prevailing conditions.

(5) **Counterflashing**—See under "Work by Other Trades."

Specification No. 4—Carey Asbestos Built-up Roof (Over Concrete or Tile)

(1) **Work Proposed**—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work included.) The concrete, or roof base, must be thoroughly dry and clean before the roofing is applied.

(2) **Materials**—1 gal. Carey Asphalt Primer. 45 lbs. Carey Fiberock Asphalt Impregnated Asbestos Felt. 90 lbs. Carey Manco Asphalt Pitch.

(3) **Application**—The roof surface shall first be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. Then mop entire surface with Carey Manco Asphalt Pitch into which while hot embed 3 layers of Carey Fiberock (Asphalt Impregnated Asbestos Felt) each layer of which is thoroughly bonded with Manco Asphalt so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 11 in. are left exposed. After proper application of such materials the entire surface is given a light coating of Carey Manco Asphalt Pitch spread in an even, uniform manner.

(4) **Flashing**—All walls to be flashed shall be given a coat of Carey Asphalt Primer. Cement strip of Fiberock Felt 6 in. wide in angle of wall, 3 in. to wall and 3 in. to flat deck. The Fiberock sheets from main roof to be cut so they will extend up on all fire walls, skylights and other vertical surfaces to a height of 6 in.; this extension to be cemented to vertical surface. A cap sheet of Fiberock Felt cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck.

(5) **Counterflashing**—See under "Work by Other Trades."

Specification No. 5—Carey Feltex Built-up Roofing (Over Wood Sheathing)

(1) **Work Proposed**—Use paragraph 1, Specification C.

(2) **Materials**—Carey Feltex, 30 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. Carey Feltex, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. $\frac{7}{8}$- or 1-in. large head nails, 1 lb. per square.

Weight per square, when applied, to be approximately 96 lbs.

(3) **Application**—The roof surface shall be covered with 1 sheet of Carey Feltex, 36 in. wide, weighing about 30 lbs. per square. Lap the sheets not less than 2 in., then nail the sheets at the joints with large head $\frac{7}{8}$- or 1-in. nails on 6-in. centers, with one additional row of large head nails spaced 11 in. apart lengthwise through the center of the sheet. After the 30-lb. Feltex sheet has been completed in accordance with above instructions, proceed to cover the same with 1 layer of Carey Feltex, 36 in. wide and weighing about 15 lbs. per square. The 15-lb. sheet to be cemented with Manco Asphalt securely to the 30-lb. sheet, lapping the top sheets not less than 2 in. between the joints of the lower sheet—no nails to be used through the top sheet.

(4) **Gutters**—Line all gutters in the same manner as described under "Application."

In certain types of construction it is desirable to reinforce all gutters and valleys with an extra sheet of felt, weighing not less than 15 lbs. per square, well mopped in with Manco Asphalt Pitch. (This extra reinforcement, if required, to be charged for as an extra on time and material basis.)

Note: All concrete or brick walls to be flashed should be primed to full height of flashing.

Continued on next page

(5) **Flashing**—(General Contractor or Owner) to provide suitable nailing strips in the walls at time of construction—usual size about 2x4 in.; also provide crickets for bridging angle of wall and roof deck.

Note: Height of flashing, width of cricket and flashing materials may be regulated to suit height of wall and other conditions prevailing.

(6) **Counterflashing**—See under "Work by Other Trades."

(7) **Roof Finish**—The entire surface of the roof applied shall be mopped with Manco Asphalt Pitch, applied hot, and spread to a uniform finish.

Specification No. 7—Carey Feltex Built-up Roofing (Over Wood Sheathing)

(1) **Work Proposed**—Use paragraph 1, Specification C.

(2) **Materials**—Carey Feltex, 30 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. Carey Feltex, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. Carey Feltex, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. ⅞- or 1-in. large head nails, 1 lb. per square.

Weight per square, when applied, to be approximately 136 lbs.

(3) **Application**—The roof surface shall be covered with sheets of Carey Feltex, 36 in. wide, weighing about 30 lbs. per square. Lap the sheets not less than 2 in., then nail the sheets at the joints with large head ⅞- or 1-in. nails on 6-in. centers, with one additional row of large head nails spaced 11 in. apart lengthwise through center of sheet.

After the 30-lb. Feltex sheets have been completed in accordance with the above instructions, proceed to cover the same with 2 layers of Carey Feltex, weight about 15 lbs. per square each, cementing solid between sheets and joining same to the 30-lb. sheet so that at no place shall felt touch felt, each sheet to overlap the previous sheet so that 17 in. are left exposed, making a continuous 2-ply built-up over the 30-lb. base Feltex sheet—no nails to be used through the top sheets.

(4) **Gutters**—Use paragraph 4, Specification No. 5.

(5) **Flashing**—Use paragraph 5, Specification No. 5.

(6) **Counterflashing**—Use paragraph 7, Specification No. 5.

(7) **Roof Finish**—Use paragraph 6, Specification No. 5.

Specification No. 8—Carey Feltex Built-up Roofing (Over Concrete, Tile or Gypsum Block)

(1) **Work Proposed**—Use paragraph 1, Specification 4.

(2) **Materials**—Carey Asphalt Primer, 1 gal., 9 lbs. per square. Carey Manco Asphalt Pitch, 50 lbs. per square. Carey Feltex Felt, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. Carey Feltex Felt, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square. Carey Feltex Felt, 15 lbs. per square. Carey Manco Asphalt Pitch, 25 lbs. per square.

Weight per square, when applied, to be approximately 179 lbs.

(3) **Application**—The concrete shall be coated with Carey Asphalt Primer, applied cold, and thoroughly brushed in. The surface shall be mopped with Carey Manco Asphalt Pitch, into which, while hot, embed 3 layers of Carey Feltex (Asphalt Saturated Felt), cementing solid between the sheets so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 11 in. are left exposed, making 8 courses of Asphalt and Felt.

(4) **Gutters**—Apply 3 layers of Carey Feltex Felt lengthwise with the gutter. Each sheet to overlap the previous sheet so that one-third of its length is left exposed. (Use sheets cut to uniform length.)

All gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets and are to be applied as specified under "application."

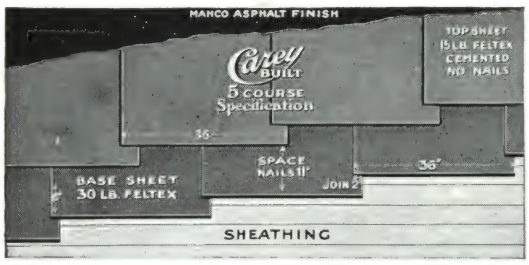
Note: All concrete or brick walls to be flashed should be primed to full height of flashing with Carey Asphalt Primer.

(5) **Flashing**—Cement strip of Feltex 6 in. wide in angle of wall, 3 in. to wall and 3 in. to flat deck. The Feltex sheets from main roof to be cut so they will extend up on all fire walls, skylights and other vertical surfaces to a height of 6 in.; this extension to be cemented to vertical surface. A cap sheet of Feltex cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck.

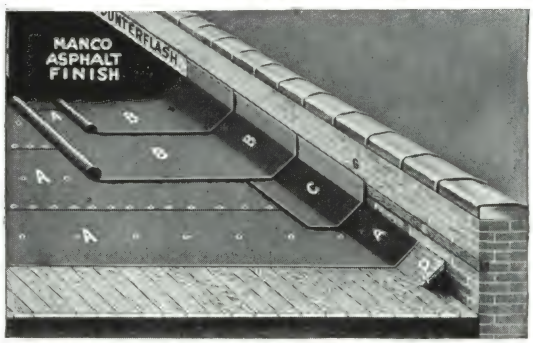
General Contractor to leave opening in the walls for inserting counterflash.

(6) **Counterflashing**—See under "Work by Other Trades."

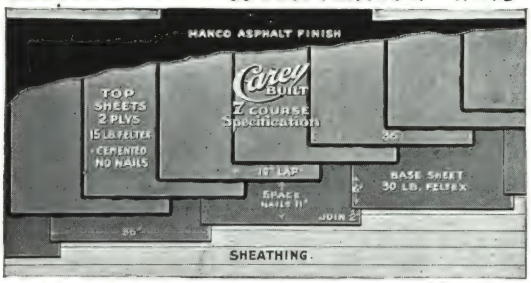
(7) **Roof Finish**—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt Pitch, applied hot, evenly spread to a uniform finish.



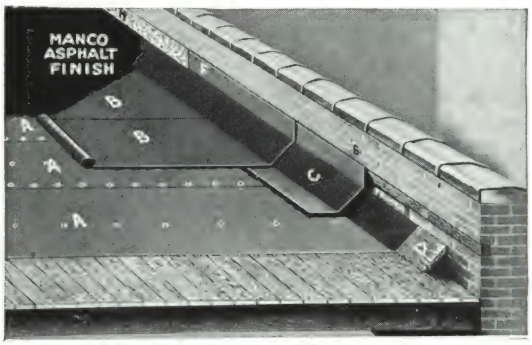
CAREY FELTEX BUILT-UP ROOFING, SPECIFICATION NO. 5 (OVER WOOD SHEATHING)



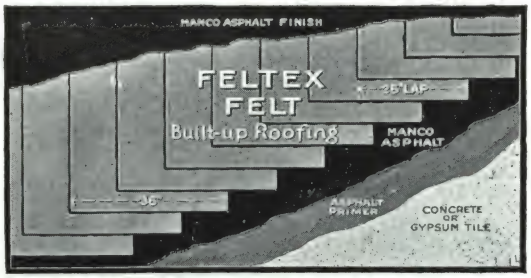
METHOD OF FLASHING CAREY FELTEX ROOFING —— SPECIFICATION NO. 5



CAREY FELTEX BUILT-UP ROOFING, SPECIFICATION NO. 7 (OVER WOOD SHEATHING)



METHOD OF FLASHING CAREY FELTEX ROOFING —— SPECIFICATION NO. 7



CAREY FELTEX BUILT-UP ROOFING, SPECIFICATION NO. 8 (OVER CONCRETE, TILE, OR GYPSUM)

CAREY FELTEX BUILT-UP ROOFING

THE NATIONAL ROOFING CO.

Manufacturers of Asphalt Roofing

184 Fillmore Avenue

TONAWANDA, N. Y.

SALES OFFICE: National Roofing Co., 608 Empire Building, PITTSBURGH, PA.

BRANCH DISTRIBUTERS

BALTIMORE, MD., Clarke Asphalt Roofing & Paint Co., 1048 West Baltimore Street
BINGHAMTON, N. Y., Gillett-Barnes Co., 91 State Street
BUFFALO, N. Y., Cordes, Ayrault & Co., Inc., 502 Michigan Street
CLEVELAND, OHIO, National Roofing & Supply Co., 6318 Kinsman Road
DETROIT, MICH., National Roofing & Paint Co., 1351 Michigan Avenue
LOCKPORT, N. Y., Cordes, Ayrault & Co., 13 Cottage Street
LOUISVILLE, KY., Central Paint & Roofing Co., 314 West Main Street
MILWAUKEE, WIS., Cream City Roofing & Paint Mfg. Co., 910 Winnebago Street
NEW ORLEANS, LA., Kracke & Flanders Co., 4124 Toulouse Street
NIAGARA FALLS, N. Y., Cordes, Ayrault & Co., 1429 Main Street
PROVIDENCE, R. I., Narragansett Supply Co., 830 Eddy Street
SYRACUSE, N. Y., Onondaga Builders Supply Co., 569 South Clinton Street
TONAWANDA, N. Y., Cordes, Ayrault & Co., Fillmore Avenue

Products

Security Wide Weld Asphalt Roofing, a Ready-to-lay Roofing for flat or steep roofs.

Security Wide Lap Asphalt Strip Shingles.

TRADE-MARK

Security Wide Weld Asphalt Roofing (for Flat or Steep Roofs)

Security Wide Weld asphalt roofing is a patented ready-to-lay, gravel, or slate surfaced asphalt roofing, for use on either flat or steep roofs.

The 6-in. Patented Joint—Security Wide Weld roofing is made with a patented 6-in. wedge-shaped joint that can not leak, welds the whole roof into one continuous piece, and covers all nail heads with the full thickness of roofing (see illustration), a feature not found in any other type of ready-to-lay roofing.

The joint is made by lapping each sheet of roofing 6 in. over the one that lies next below it on the roof, and welding the two together with hard, natural mineral asphalt cement, heated to 350° Fahr. As will be noted by referring to the illustration the union is made between two smooth surfaces, a 6-in. ungraveled margin being left along one edge for this purpose.

Built-up in Five Layers—Security Wide Weld roofing is built up in 5 layers as follows:

A—One layer of asphalt saturated wool felt 36 in. wide.
B—One layer of natural mineral asphalt 32 in. wide.
C—One layer of asphalt saturated wool felt 32 in. wide.
D—One layer of natural mineral asphalt 32 in. wide.
Over the last 2 in. of this layer, which forms a part of the 6-in. weld, is laid a strip of thin tissue paper tape, which prevents sticking in the roll. This dissolves entirely in the process of welding.
E—Surfacing, 30 in. wide.

No Coal Tar—Security roofing is made of special high grade, long fibered wool felt, saturated with natural mineral asphalt, which is refined by our own formula, the result of over 25 years' experience. Not a particle of coal tar or pitch in any form enters into the composition of any of our roofings.

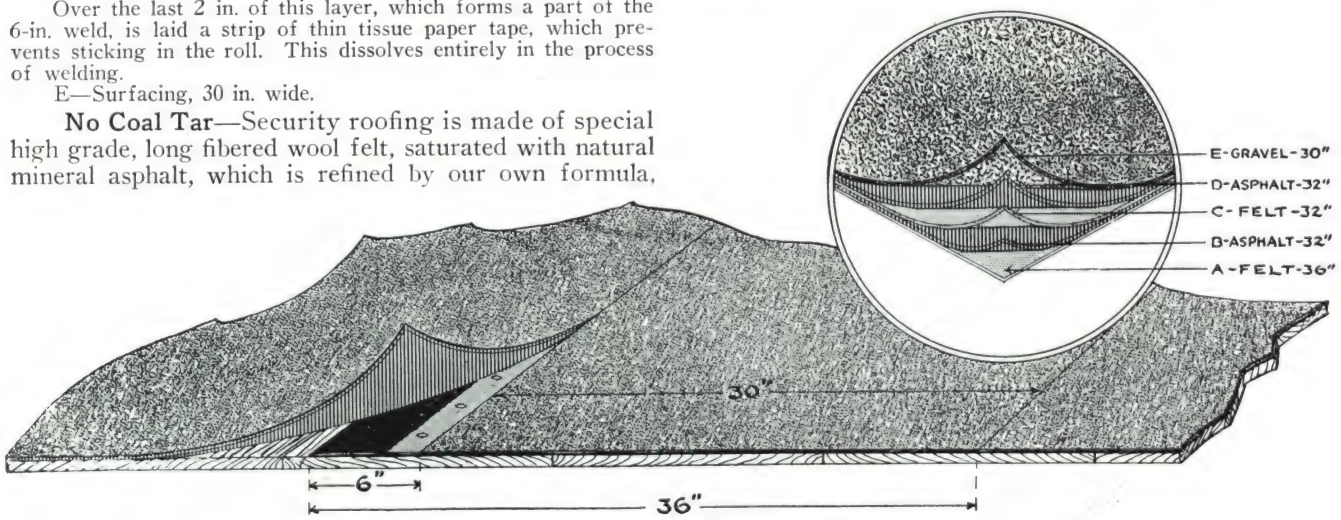
Surfacing—The surfacing of Security roofing is a heavy layer of natural mineral asphalt cement, into which, while hot, is permanently embedded a final layer of white sea gravel, or crushed red or green slate. This adds to the durability, weatherproofing and fire resisting qualities, and obviates all need of painting and repairs. The color may be changed by using our "Asphaltus" Coating.

Security Roofing Is Durable—This roofing has lasted long periods of time, not only without renewal, but without any attention whatever. Ten-, twelve- and fifteen-year-old roofs are still in good condition and will apparently remain so for many years to come.

Underwriters' Approval—Security Wide Weld roofing is approved by the National Board of Fire Underwriters.

Three Styles—Security roofing is made in three styles: sea-gravel surface, red slate and green slate. It can also be furnished with burlap insertion for siding, or for roofs over one-half pitch. Security roofing is satisfactory for all classes of roofs, and easily applied by any intelligent workman. The gravel surface is used extensively as a non-slip stair tread.

How to Obtain Security Roofing—Security roofing is sold only by our exclusive agencies. As these



Detail Showing Construction and Laying of "Security" Wide Weld Asphalt Roofing

Continued on next page

cover the entire country, there is probably one not far from you. If, however, you are unable to find the roofing in your immediate locality, write to us direct, and we will make it our business to see that you are supplied.

Specifications for Security Wide Weld Roofing

Roofing Over Concrete or Tile Surfaces—(1) *Preparation of Roof Surface*—Roof surface shall be graded to properly drain water freely into gutter or down-spouts. All concrete surfaces shall be prepared for the application of the roofing with a comparatively smooth, hard finish free from depressions and loose particles of sand or cement. Saddles shall be built behind all chimneys, skylights and other projections toward which the water flows in order to turn the water around them.

(2) The (Owner or Contractor) shall furnish and put into place three-cornered cant strips against all walls or places of right angles where flashing is to be made, breaking the corners at least 3 in. Also put into place wood nailing strips not more than 15 ft. apart on roofs of more than one-third pitch.

(3) *Materials*—The materials used in the construction of this roof shall be The National Roofing Co.'s National Asphalt Primer, Natronite MC Asphalt Mopping Cement and Security Wide Weld Roofing constructed at their factory.

(4) *Application of Materials*—The concrete shall be thoroughly primed with National Asphalt Primer, applied cold and thoroughly brushed in.

(5) Mop thoroughly the entire primed concrete surfaces with Natronite MC Asphalt Cement, into which, while hot, embed the Security Wide Weld Asphalt Roofing, lapping each sheet 6 in. over the preceding one at the joint allowed for this purpose, fitting perfectly. Then weld the entire 6-in. joint with National Asphalt Cement at 350° Fahr., pressing the sheets together with the foot or heavy roller.

(6) Care should be taken that no spaces or skips are allowed in welding the joint.

(7) *Gutters and Valleys*—Lay the Security sheets lengthwise with the gutter or valley so that no joints will occur in the center.

(8) If necessary to reinforce the gutter, lay one or two sheets of National Asphalt Saturated Felt over which is spread a uniform layer of Asphalt Cement, into which, while hot, embed a full length sheet of Security Wide Weld Roofing cut to width.

(9) *Flashing*—Security Roofing shall be cut lengthwise into strips so that they will extend up on all firewalls, skylights, curbs, chimneys and other vertical surfaces to a height equal to the wooden nailing strip which has been set into the wall by the (Owner or Contractor). The strips shall be cemented to the walls, fastened to the wood nailing strip and finished at the top with a narrow cleat nailed through the roofing into the wood nailing strip and sealed with hot cement.

(10) *Counterflashing*—Such flashing, if necessary, shall be made with Security Roofing cut into strips of proper width, or if preferred, No. 26 galvanized iron or copper may be used.

Roofing Over Wood Sheathing—(11) *Preparation of Roof Surface*—Roof surface shall be graded to properly drain water freely into gutter and down-spouts. Roofing boards must be well seasoned and the ends of each board shall rest on and be properly secured to joists and purlins. If edges of sheathing board are curled up, they shall be drawn down and secured firmly to joists or purlins, eliminating all standing nail heads and other projections. Saddles shall be built behind all chimneys, skylights and other projections toward which the water flows in order to turn the water around them. All loose knots and other flaws shall be removed and all holes filled or covered. All chips and other rubbish shall be removed and the roof deck made and kept free from all obstructions other than tools and appliances of the roofer. All to be done by the owner or contractor.

(12) The (Owner or Contractor) shall furnish and put into place three-cornered cant strips against all walls or places of right angles where flashing is to be made.

(13) *Materials*—The materials used in the construction of this roof shall be The National Roofing Co.'s Security Wide Weld Roofing constructed at their factory.

(14) *Application of Materials*—Lay Security Gravel Surface Wide Weld Roofing next to the sheathing, lapping each sheet at joint allowed for this purpose, nailing the upper edge through the 2-in. white tape every 2 or 3 in., then weld the entire 6-in. joint with Natronite MC Asphalt Cement at 350° Fahr., pressing the sheets together with the foot or heavy roller.

(15) Care should be exercised that no spaces or skips are allowed in welding the joint. The roofing sheets should be laid parallel to and not cross the sheathing boards.

Note: For Gutters, Flashing, etc., copy paragraphs 7, 8, 9 and 10.

Security Wide Lap Strip Shingle (for Slanting Roofs)

A quarter of a century of experience in the manufacture of asphalt prepared roofing has shown the limitation of roll roofing for use on slanting roofs of high grade buildings. To meet this demand, roll roofing was cut into shingles, which made a very pleasing roof, but owing to the excessive weight, the large amount of waste, and the consequent high cost, they were out of reach of the average consumer.

To offset this, The National Roofing Co. has combined individual shingles with roll roofing—producing Security Wide Lap strip shingles which has all of the advantages of individual shingles and roll roofing with none of the disadvantages.

Security Wide Lap strip shingle is made of the same high grade, long fibered asphalt saturated felt, the same grade of asphalt binder, together with the quality of workmanship that goes with Security Wide Weld roofing. The celebrated Security 6-in. joint Wide Weld roofing was taken as a model, the joint modified and the surfacing placed in such a relative position that a shingle effect, superior to individual shingles, is produced. Every ounce of material in the roofing is utilized for the purpose intended—2 layers of felt and asphalt over every inch of roof surface.

The wide unsurfaced lap makes a positive, secure joint when cemented together with asphalt cement. The strip has a tendency to hug toward the roof surface, making a practically airtight surface unattainable with individual or slab shingles, and is recommended for any roof having sufficient pitch to drain the surface thoroughly.

There are no exposed raw edges, as every edge is hermetically sealed with weatherproof asphalt.

The shingle effect is indicated by omitting the red and green surfacing at regular intervals—but the asphalt and the felt are still there.

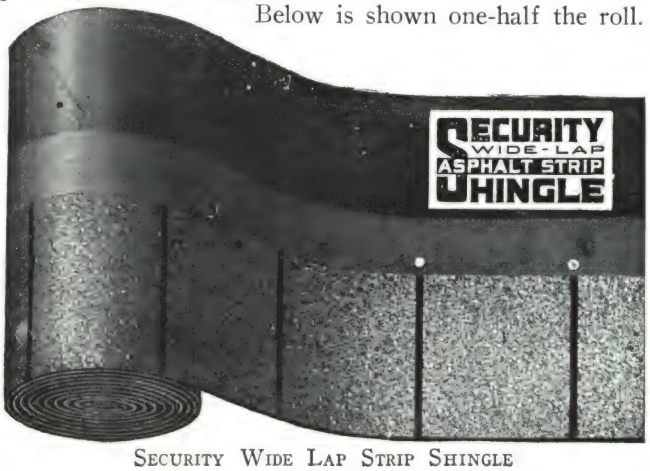
It is impossible to lay Security Wide Lap shingles wrong (as is the case with ordinary shingles) because they are self-spacing and easily aligned.

The nailing is another feature. There are 2 nails to every shingle effect. *All nails are covered by a full thickness of the roofing.* Nails are driven through the center of the sheet and a wrinkle or buckle is impossible.

Each roll contains 2 strips, the edges meeting the center of the roll which is so scored that after unrolling the strip may be torn apart accurately, and on account of this Security Wide Lap strip shingles are less expensive in the application, thereby saving labor.

Security Wide Lap Strip shingles are packed in convenient form in rolls 32 in. wide, containing 110 sq. ft. to lay 50 sq. ft. of exposed surface. Nails and cement packed inside of each roll.

Below is shown one-half the roll.



Security Wide Lap Strip Shingle

ESTABLISHED 1868

THE RICHARDSON COMPANY

Roofing Manufacturers

LOCKLAND, (CINCINNATI) OHIO

DISTRICT SALES OFFICES

LOCKLAND (CINCINNATI), OHIO
ATLANTA, GA.
ST. LOUIS, MO.
DALLAS, TEX.
CHICAGO, ILL., Conway Building
NEW ORLEANS, LA.

FACTORIES: LOCKLAND (CINCINNATI), OHIO; MELROSE PARK (CHICAGO), ILL.; NEW ORLEANS, LA.

Products

VISKALT ROOFING and WATERPROOFING MATERIALS, which include:

Viskalt Roofing Compound.
Viskalt Waterproofing Compound.
Richardson Felt (Viskalt Saturated).
Viskalt Waterproofed Felt (Saturated and Coated).
Viskalt Saturated Fabric.
Richardson Roofing Asphalt.
Viskalt Coated Sheathing.
Vis-Kote (Coated Sanitary Sound-deadening and Insulating Fabric).
Viskalt Dampproofing Paint (Interior and Exterior Walls).
Viskalt Fibrated Cement.
Viskalt Fibrated Asphalt Coating.
Viskalt Roof Paint.
Viskalt Metal Preservative.
Viskalt Concrete Primer.
Flex-a-Tile Construction Roofing (19-in. lap, Red or Green).
Flex-a-Tile Super-Giant Shingle, 10x14-in. (Weathered Brown, Green, Red, Blue-Black).
Flex-a-Tile Giant Shingles (Green, Red, Blue-Black).
Flex-a-Tile Standard Individual Shingles (Green, Red, Blue-Black).
Flex-a-Tile Style 4-slab Shingles (Green, Red, Blue-Black).
Flex-a-Tile Wide Space Shingles (Green, Red, Blue-Black).
Flex-a-Tile Shingle Roll (Green or Red).
Flex-a-Tile Giant Mica Surfaced Roofing.
Flex-a-Tile Slate Surface Roofing (Red or Green).
Rubbertex Roofing.
Nuroid Roofing.
Flex-a-Tile Blue Plaster Board.
Flex-a-Tile Deadening Felt (Uncoated).

Experience

THE RICHARDSON COMPANY has been manufacturing the basic materials for waterproofing purposes since 1868. More than 50 years of straightforward business dealings are behind Richardson Products.

Properties and Applications of Vis-Kote (Sanitary Sound-deadening and Insulating Fabric)

Vis-Kote is a heavy, loosely woven fabric, coated with Viskalt—a blended bitumen from THE RICHARDSON COMPANY'S refineries. Its purpose is two-fold: first, to provide permanent sanitation between walls and floors—places that are inaccessible after the building is completed; and second, to deaden sound and insulate against heat and cold.

Vis-Kote is rendered absolutely clean and germ-free by the process by which it is manufactured; and its sanitary qualities are preserved by its Viskalt coating, which mice, moths and other vermin will not touch, and in which spillage can not set up an unsanitary condition.

In floor construction Vis-Kote cements itself, on the under side, to the rough boards, and on the upper side to the finished flooring, making an actual and distinct separation between rooms and floors.

The use of Vis-Kote is especially important in churches, schools, hospitals and nurseries, where sanitation is necessary; and in refrigerating plants and cars, where insulation is demanded. Its properties, however, make its use highly effective for sound-deadening in residences, and for insulation under tin, copper or tile roofs. Linoleum manufacturers also endorse the use of Vis-Kote under this type of floor covering.

The Construction Materials Division of THE RICHARDSON COMPANY will send complete specifications for the application of Vis-Kote on request.

Specifications for Viskalt Roof

Over Concrete Roof Deck—

Materials—Primer: The priming coat shall be Viskalt Concrete Primer.

Felt—The first layer of felt shall be Richardson Viskalt Saturated, special heavy grade, weighing approximately 28 to 30 lbs. per 100 sq. ft.

The next 2 layers of felt shall be Richardson Viskalt Saturated, special grade, weighing about 14 to 15 lbs. per 100 sq. ft.

Membrane—The membrane shall be Viskalt Compound heated to a temperature of 350° Fahr. uniformly mopped. For each membrane use approximately 3 gals. per square of 100 sq. ft.

Construction—First—The concrete shall be swept clean and free of all debris.

Second—A thorough coating of Viskalt Primer shall be applied. The primer provides a perfect bonding surface.

Third—Thoroughly cover the entire surface with the first coating of Viskalt Compound, using approximately 3 gals. per 100 sq. ft.

Fourth—Embed in the hot Viskalt Compound 1 layer of Richardson Felt, special heavy grade, lapping it not less than 2 in. thus thoroughly sealing the membrane of Viskalt Compound. The felt must be unwound and laid down opposite to the roll so that it will lay flat.

Fifth—Thoroughly cover this layer of Richardson Felt, special heavy grade, with the second membrane of Viskalt Compound.

Sixth—Embed in the hot Viskalt Compound 2 layers of Richardson Felt, special grade, lapping each layer 17 in. over the preceding layer, mopping between the lap a heavy coating of Viskalt Compound, thus forming a solid and continuous membrane between these layers of felt.

Seventh—Thoroughly cover the entire surface with a heavy and final coating of Viskalt Compound.

Eighth—Hot coat the entire fire walls or parapet walls with heavy coat of Viskalt Compound. (Permanent protection.)

Over Board Roof Deck—

Materials—Felt—The first layer of felt shall be Richardson Viskalt Saturated, special heavy grade, weighing approximately 28 to 30 lbs. per 100 sq. ft.

The next 2 layers of felt shall be Richardson Viskalt.

Continued on next page

Saturated, special grade, weighing approximately 14 to 15 lbs. per 100 sq. ft.

Membrane—The membrane shall be Viskalt Compound, heated to a temperature of 350° Fahr. uniformly mopped. For each membrane use approximately 3 gals. per square of 100 sq. ft.

Nails—The nails shall be of the broad head type.

Construction—First—The deck must be swept clean and free of all debris.

Second—Cover the entire surface with 1 layer of Richardson Felt, special heavy grade, lapped 2 in.; securely nail the felt at the lap, every 6 in. Care must be taken to see that the nails are solidly seated and not driven between the boards. The felt should be unwound and laid opposite to the roll so as to lay flat.

Third—Thoroughly cover the entire surface with the first membrane of Viskalt Compound, using approximately 3 gals. per 100 sq. ft.

Fourth—Embed in the hot Viskalt Compound 2 layers of Richardson Felt, special grade, laping each layer 17 in. over the preceding layer; mopping between the layers a heavy coating of Viskalt Compound, thus forming a solid and continuous membrane between these layers of felt.

Fifth—Thoroughly cover the entire surface with a heavy and final coating of Viskalt Compound.

Sixth—Hot coat the entire fire walls or parapet walls with heavy coat of Viskalt Compound. (Permanent protection.)

Short Specification Form for Viskalt Roof or Waterproofing

Roofing—Shall be a Viskalt Roof laid in accordance with Viskalt Roof specification as published by THE RICHARDSON COMPANY.

Waterproofing—Shall be Viskalt felt or fabric base, in accordance with Viskalt Waterproofing specifications as published by THE RICHARDSON COMPANY.

Flat Tile with Viskalt Roofing

Tile may be used in connection with Viskalt as shown in Fig. K. Over the concrete, after the same has been grouted, put down a Viskalt Roof. Over the waterproofing thus laid spread a ½-in. bed of hot Viskalt, laying into this a tile (6x9x1) covering, with expansion joints, as indicated.

Fig. H shows Viskalt used for expansion joints, the tile (6x9x1) being laid on a 1-in. cement bed.

Flashing

The accompanying illustrations show various modes of flashing recommended:

Fig. C—A method seldom used but coming to be recognized as a method well adapted for high class structures, and being very economical should appeal to architects, engineers and owners.

Fig. D—Where a very good job is desired we recommend the above method of flashing, carrying the roof into the concrete recess. Securely nail with a wood strip, coating the entire wall with hot Viskalt Compound.

Fig. E—Where the roof pitches to the center, instead of saddles carry the Viskalt Roof to the walls and up 3 in., the flashing being of heavy Flex-A-Tile Roofing brought down on the roof 4 in. and mopped in solid. Fill the recess with Flex-A-Tile Fibrated Cement, then coat the entire wall with a heavy coating of hot Viskalt Compound.

Fig. F—Where the Viskalt materials are wanted but in a less expansive roof and where the roof is carried up on the walls about 12 in., fastened with a furring strip, nail to the wall and then coat the furring strip with Flex-A-Tile Fibrated Cement and cover the entire wall with a heavy coating of hot Viskalt Compound.

Fig. G—Where the roof is continuous from outside to outside and positively eliminates wall saturations and flashing troubles, coat the entire wall with hot Viskalt Compound.

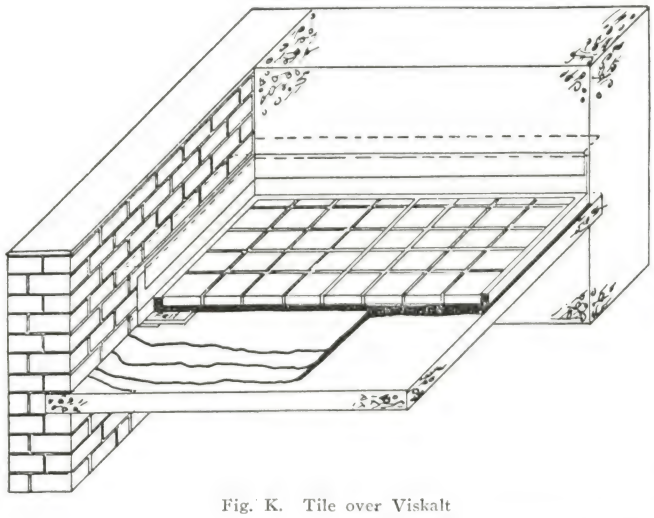


Fig. K. Tile over Viskalt

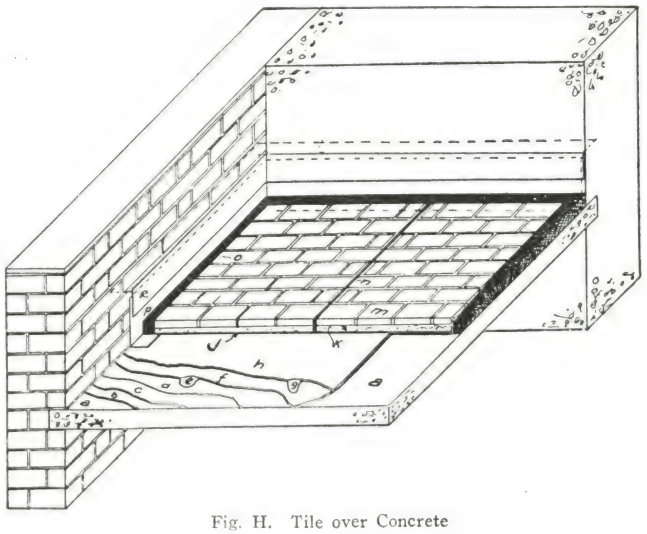


Fig. H. Tile over Concrete

FLAT TILE ROOFING IN CONNECTION WITH VISKALT ROOF

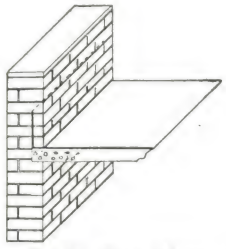


Fig. C. Over Wood or Concrete

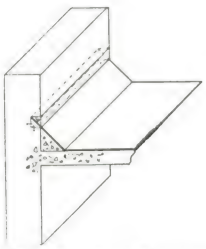


Fig. D. Over Concrete

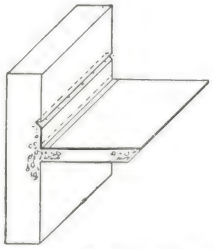


Fig. E. Over Concrete

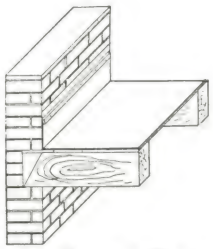


Fig. F. Over Wood

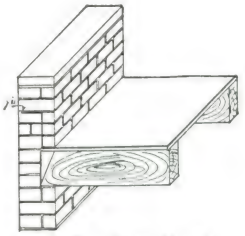


Fig. G. Over Wood

APPROVED METHODS OF FLASHING WHERE VISKALT ROOFING IS USED

SALL MOUNTAIN COMPANY

Manufacturers of Asbestos Products and Asphalt Roofing

TELEPHONE
RANDOLPH 7854

140 South Dearborn Street
CHICAGO, ILL.

OFFICES
SCRANTON, PA., 233 Cliff Street
NEW YORK, N. Y., 141 West 20th Street
BOSTON, MASS., 268 State Street
FACTORIES: SCRANTON, PA.; ROCKDALE, OHIO; PORTER, IND.

Products

SAL-MO PRODUCTS: ASPHALT ROLL ROOFINGS; ASPHALT INDIVIDUAL, SAL-MO-LINK SHINGLES, and SECTIONAL (4-1) SHINGLES; ASBESTOS PAPER; ASBESTOS PIPE COVERINGS; ASBESTOS FIREBOARD; ASBESTOS MILLBOARD.

Also manufacturers of Asphalt Roof Paint, Rooftite Cement, Asbestos Cement, Tubes. Packing, Corrugated Paper.

TRADE-MARK

Sal-Mo Asphalt Roofing and Shingles

Carefully selected rags are used in the manufacture of Sal-Mo roofing felts. All felts are tested for tensile strength, saturating ability and moisture content. Our saturating and coating asphalts are blown; the impurities have been driven off.

On our Sal-Mo shingles and mineral surfaced roofing we use a natural colored surfacing that is very resistant to weathering. Besides the artistic value, the crushed mineral lends a fire resisting surface.

Sal-Mo asphalt shingles are for the average home; the cost is moderate. Because of the lasting and artistic properties, they are also used on the more expensive types of residences. Sal-Mo plain and pattern roofings cost considerably less than the shingles. Sal-Mo Reliance or Aduro roofing can be laid quickly and at a small cost.

SHINGLES AND ROLL ROOFINGS

Product	Approx. weight per square, lbs.	Surfacing	Size, in.	How packed
Shingles:				
Sal-Mo Individual	240	Red, green and blue	8x12½	In 4 bundles: 424 shingles per square laid 4 in. to the weather
Giant Individual	260		8x12½	340 shingles per square laid 5 in. to the weather
Sal-Mo-Link	220		36x12	100 sections per square packed securely in 2 bundles
Sal-Mo Sectional (4-1)	185		36x10	100 sections per square packed securely in 2 bundles
Roll Roofings:				
Sal-Mo	85			Put up in rolls 36 in. wide containing 108 sq. ft. each, allowing sufficient material for lap. Wrapped in heavy Kraft paper, patented metal roll protector ends. Sufficient broad-head nails and lap cement furnished to properly lay material. Instructions for laying in each roll.
Sal-Mo (Giant)	100			
*‡Sal-Mo (Pattern)	85			
Reliance	Light, 35, medium 45, heavy, 55,	Mica coated		
Aduro		Talc surface		

*Red and green only.
‡Made 32 in. wide.

Sal-Mo Asbestos Paper

Fireproof and verminproof. Extremely efficient as an insulation against cold, heat and sound. Because of its flexibility and uniformity, Sal-Mo asbestos paper is especially adapted for sheathing purposes where a fireproof insulation material is required.

Put up in rolls 36 in. wide weighing approximately 100 lbs. each, also smaller rolls of special widths.

Sal-Mo Asbestos Pipe Coverings

Air Cell—*For low pressure work.*

Made of alternate layers of plain and corrugated asbestos paper. Can be applied quickly and cheaply. Made in ½-, ¾- and 1-in. thicknesses.

Multicell—*For medium and high pressure lines.*

Made of alternate layers of plain and ⅛-in. corrugated asbestos paper. Its efficiency is high but it costs less than other high pressure coverings. Made in ¾- and 1-in. thicknesses.

Expanded—*For high pressure work.*

Made of expanded and laminated asbestos felt. Withstands vibration, not easily damaged from handling. This covering combines stability with high efficiency. Made in thicknesses from ¾ up to 2 in.

Conduit—*For underground systems and exposed lines.*

Made of expanded felt. Has a heavy waterproof jacket which is stitched to one side of the longitudinal cut and has an end and side lap of 2½ in. Shipped ready to apply with cement and staples. Made in 1-, 1½- and 2-in. thicknesses.

Alaska—*To prevent freezing in pipes.*

Made of wool felt with a ½-in. inner lining of hair felt. Resists extreme cold and is durable. Waterproof jacket furnished for pipes exposed to weather. Made 1 in. thick.

Wool Felt—*For cold and hot water pipes.*

Made of soft but firm, slightly corrugated, wool felt with a heavy interlining of asbestos felt, ½-, ¾- and 1-in. thicknesses.

Note—Every covering made to fit all standard pipe sizes, in sections 3 ft. long. Covered with canvas jacket and brass lacquered metal bands. Special thicknesses made to order.

Sal-Mo Asbestos Fireboard

For covering boilers, drums, and heaters; lining walls, partitions, ceilings, roofs and elevator shafts. Can be easily nailed to wooden supports and cemented to iron. Constructed of corrugated Sal-Mo asbestos felt. It is light and fireproof. Corrugations run in opposite directions in alternate layers. Made of ¼- and ⅛-in. corrugated asbestos felt. Standard sized sheets 36 x 36 in. Thicknesses, ½ to 3 in. (also special sizes).

Sal-Mo Asbestos Millboard

Fireproof and acidproof, and conforms to the recognized standards for millboard such as the specifications laid down by the United States Navy. It is used extensively in protecting ceilings and walls exposed to direct radiation from heating apparatus, in lining stoves, ovens and furnaces, and also in electrical insulation work. Sal-Mo asbestos millboard is used very satisfactorily where a fireproof insulation material is required that is light in weight and uniform in thickness.

Supplied in standard sized sheets 42 x 48 in. Put up in crates weighing approximately 450 lbs. each. Can be furnished cut to size to meet particular specifications.

LOS ANGELES PRESSED BRICK COMPANY

Largest Manufacturers of Clay Products in the West

Frost Building, 2nd Street and Broadway

LOS ANGELES, CAL.

ASSOCIATED COMPANY, RICHMOND PRESSED BRICK CO., RICHMOND, CAL.

PRINCIPAL SALES AGENCIES

SAN FRANCISCO, CAL., United Materials Co., Sharon Building
PORTLAND, ORE., P. L. Cherry Co., 271 Hawthorne Avenue
SEATTLE, WASH., Savage Scofield Co., 1733 Westlake Avenue, North
PHOENIX, ARIZ., Vernon L. Clarke, 343 North First Avenue
SALT LAKE CITY, UTAH, Hawley-Richardson-Williams Co., Dooley Building
BUTTE, MONT., D. E. Fryer & Co.
SPOKANE, WASH., D. E. Fryer & Co.
HONOLULU, T. H., Lewers & Cooke

Member of American Face Brick Association

Products

Roofing Tile.
Architectural Terra Cotta.
Face Brick: Wire Cut, Dry Pressed and Enameled.
Hollow Tile: All sizes, including Heath Unit Tile of load-bearing type.
Also manufacturers of:
Promenade or Quarry Tile.
Refractories: Standard and special shapes.
Drain Tile.
Silo Tile.
Flue Lining.
Terra Cotta Pipe and Fittings.
Radial Chimney Blocks.

Roofing Tile

This company enjoys the distinction of manufacturing the widest variety of patterns and colors in roofing tile.

Roofing tile are made in the different designs as follows: Large and Small Spanish, Large and Small Mission, Granada, Italian and Shingle.

Colors—The Spanish, Italian and Shingle are made in the various shades of red only and the Mission and Granada are made in shades of old gold, purple and gunmetal, as well as red.

Trim—Hips, hip starters, ridges, finials, rakes, eave closures and end bands are made in various styles to fit the different designs of tile.

Residence of Frank Wood, Los Angeles
Will C. Clarke, Architect
Varicolor Granada Roof Tile and Heath Hollow Tile Walls

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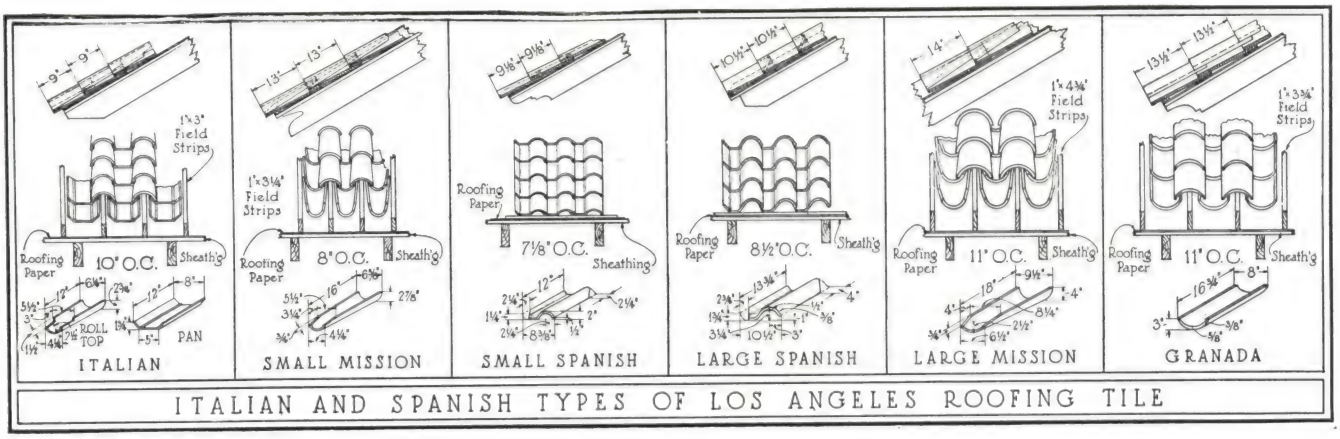
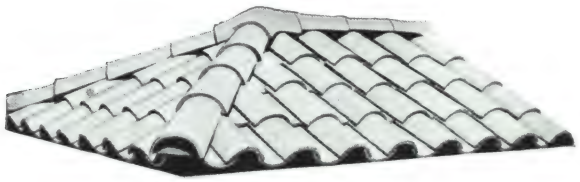
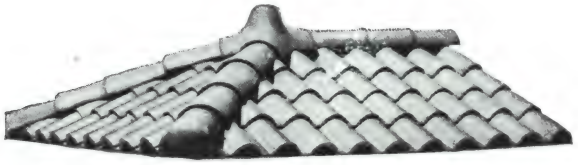


ITALIAN AND SPANISH TYPES OF LOS ANGELES ROOFING TILE



GRANADA TILE

Using HE and RE for hip and ridge, HSE for hip starter and FE2 for finial



LARGE SPANISH TILE

Using HD and RD for hip and ridge, HSD for hip starter and FD2 for finial

LARGE MISSION TILE

Using HD and RD for hip and ridge, HSD for hip starter and FD2 for finial

LOS ANGELES ROOFING TILE

Style	Number tile to square	Number lbs. to square
Small Spanish	220	880
Large Spanish	165	1000
Small Mission	280	1200
Large Mission	185	1500
Granada	200	1300
Shingle	400	1300
Italian	320	1150

All weights and measurements are subject to slight variation. Allowance must be made for cutting to fit hips and valleys.

Specifications—*Tile to Be Used*—Cover all pitched roofs with LOS ANGELES PRESSED BRICK COMPANY'S .....Tile, using:

Ridge ..... Hip Starter.....
Hip ..... Finials .....

Preparation of Roof—The general contractor shall have the roof properly prepared in every way before tile setter is sent for. The following details shall be carefully complied with: Roof shall be sheathed tight and covered with 30-lb. felt, properly tacked with large headed nails. This felt shall be laid in rows with not less than 2½ in. lap starting at the eaves, over all valleys and under all flashings. All strips (see detail) shall be properly installed. Metal valleys 24 in. wide with edges turned up at least ½ in. shall be placed over one layer of 30-lb. felt. All other flashing required on the building shall be ready for installation at the direction of the tile setter.

Laying—The tile setter shall use great care in properly laying tile. All rows to be laid at right angles to the eaves and parallel with each other. Under no circumstances are the tile to be stretched. He shall cut the tile that verge along the hip and ridge boards as close as possible, filling the void with cement. Hip and ridge tile and other trim shall be properly installed after the field tile have been laid. Only expert tile setters to be employed on this work.

Face Brick

Sizes—The size of all wire cut brick is 2⅜x8⅜x 3⅞ in. and of pressed or enameled, 2⅜x8⅜x4 in.

Styles—*Wire Cut Brick, Smooth Texture*—In buff, gray, and various tones of flashed.

Rough Texture—Ruffled (horizontal texture) and rug (vertical texture) in wide variety of colors.

Dry Press—Buff, cream, gray, old gold and red.

Enameled—White, ivory, pulsichrome, speckled, red, green and blue; also transparent glaze in buff, cream, gray and red.

Hollow Tile

Sizes—2x12x12 in. to 12x12x12 in. Load-bearing type in Denison Interlocking tile and Heath Unit tile.

References

The following are a few of the thousands of buildings roofed with tile furnished by the LOS ANGELES PRESSED BRICK COMPANY:

Both Army and Naval Aviation Stations, North Island
Marine Base, Dutch Flats, San Diego
Naval Training Station, Loma Portal, San Diego
Naval Hospital, Balboa Park, San Diego
United States Nurses Home, Sawtelle
Administration Building, University of Southern California
Ambassador Hotel, Los Angeles
Huntington Hotel, Pasadena
Beverley Hotel, Beverley Hills

Continued on next page

THE FIFTH STREET STORE, LOS ANGELES, CAL.
ALECK E. CURLETT and CLAUD BEELMAN, Architects
The terra cotta on this building is a gray standard finish; the face brick, shades of red, brown and purple*

BROWNSTEIN-LOUIS BUILDING, LOS ANGELES, CAL.
JOHN PARKINSON and DONALD B. PARKINSON, Architects
Entrance detail, terra cotta, executed in pulsichrome brown and white*

**Note:* We are prepared to execute designs in any color or range of colors in standard and vitreous or matt texture.

IMPERIAL ROOFING TILES

Made by

LUDOWICI-CELADON COMPANY

General Offices

Monroe Building

CHICAGO, ILL.

Product

"Imperial" Shale Roofing Tiles.

Description

We manufacture vitreous shale roofing tiles in all standard shapes. Three regular stock patterns are shown here, in addition to which the "Imperial Roman," the "Imperial Greek," the "Imperial" slab shingle and the "Imperial" English shapes are manufactured. These are produced in a natural red color or in glazes of almost any color.

Specifications

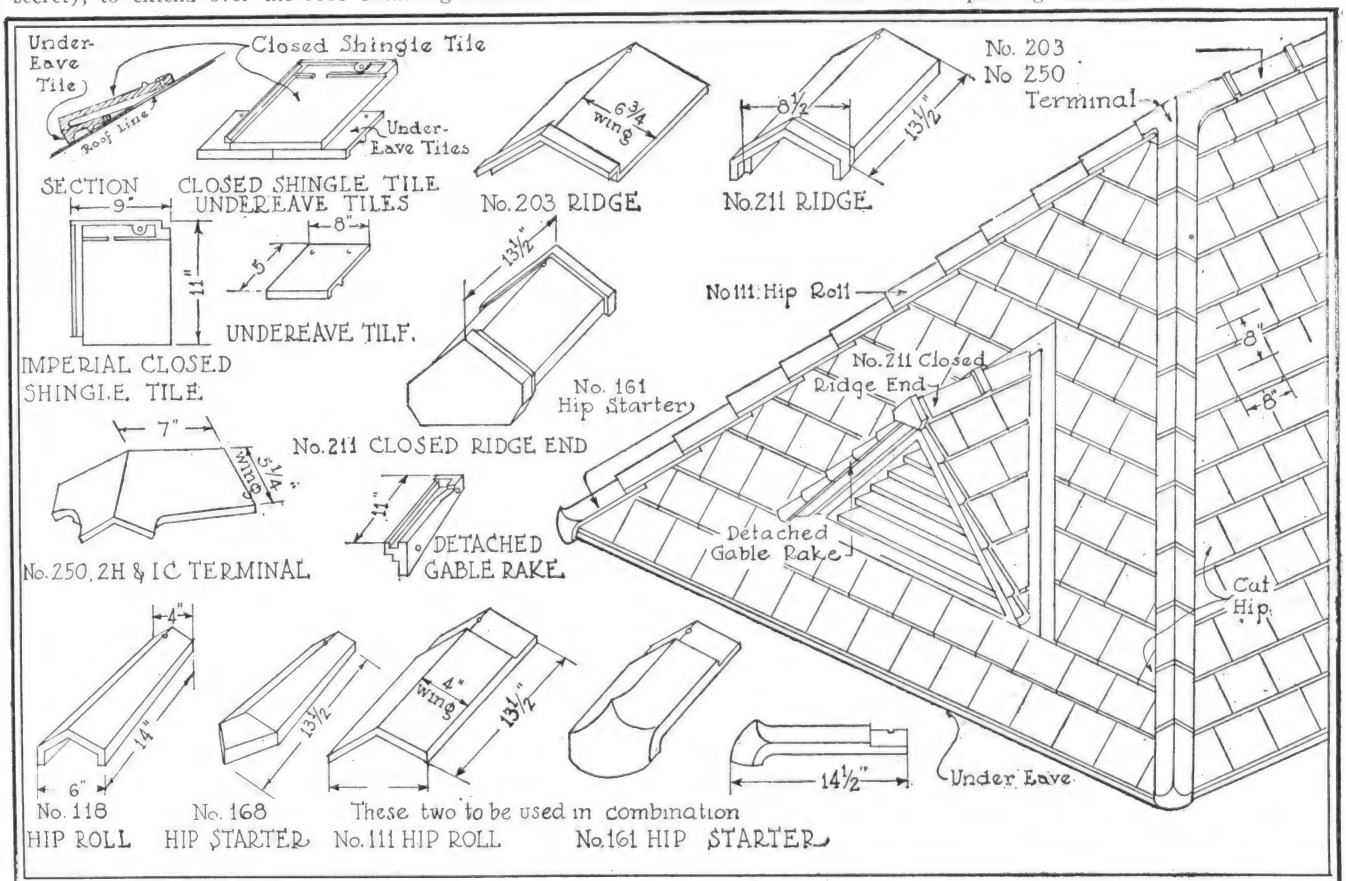
All pitched roofs shall be covered with (insert name of pattern) tiles made by the Ludowici-Celadon Company with stock fitting suitable for each pattern. The tiles as specified above must be hard burned of ..... color, and in accordance with samples deposited in the office of the architects.

Before the roofer is sent for, the owner or general contractor should construct roofs in strict accordance with plans, sheath the roofs *tight,* have all chimneys and walls above roof line completed, have all vent lines put through roofs, furnish all strips of required width used under hip rolls, furnish any strips that may be used under tile at eaves, and have all scaffolding ready for roofers use. The metal contractor should have all gutters in place on the roof (gutters, whether box, hanging or secret), to extend over the roof sheathing and run under the felt and tile at least 8 in. and should also have in place all valley metal, the width of which must be not less than 24 in with both edges turned up ¼ in., the entire length of the valley. The valley metal to be fastened with clips and never nailed or punctured in any manner. The valley metal must be laid over 1 layer of felt running lengthwise the entire distance of the valley. The metal contractor must have in readiness all flashing metal used along side and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after arrival of the tile roofer and in accordance with the requirements of the tile.

After the roofs have thus been prepared to receive the felt and tile, the tile roofer shall cover the sheathing of the roofs with 1 thickness of asphalt roofing felt weighing not less than 30 lbs. to the square, laying same with a 2½-in. lap and securing in place with capped nails. The felt should be laid parallel with the eaves and lapped over all valley metal about 4 in. and laid under all valley metal about 6 in.

The roof having thus been prepared, the tile layer is to fasten tile with copper nails. The roofer shall see that the tiles are well locked together and lay smoothly, and no attempt shall be made to stretch the courses.

The tiles must be laid so that the vertical lines are parallel with each other and at right angles to the eaves. The tiles that verge along the hips should be cut close against the hip board, and a watertight joint made by cementing cut hip joint to hip board with elastic cement. Each piece of hip roll shall then be nailed to the hip board, and the hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with the pointing material.



SCS

STANDARD SHAPES OF "IMPERIAL", CLOSED SHINGLE TILE

DRW'G 1

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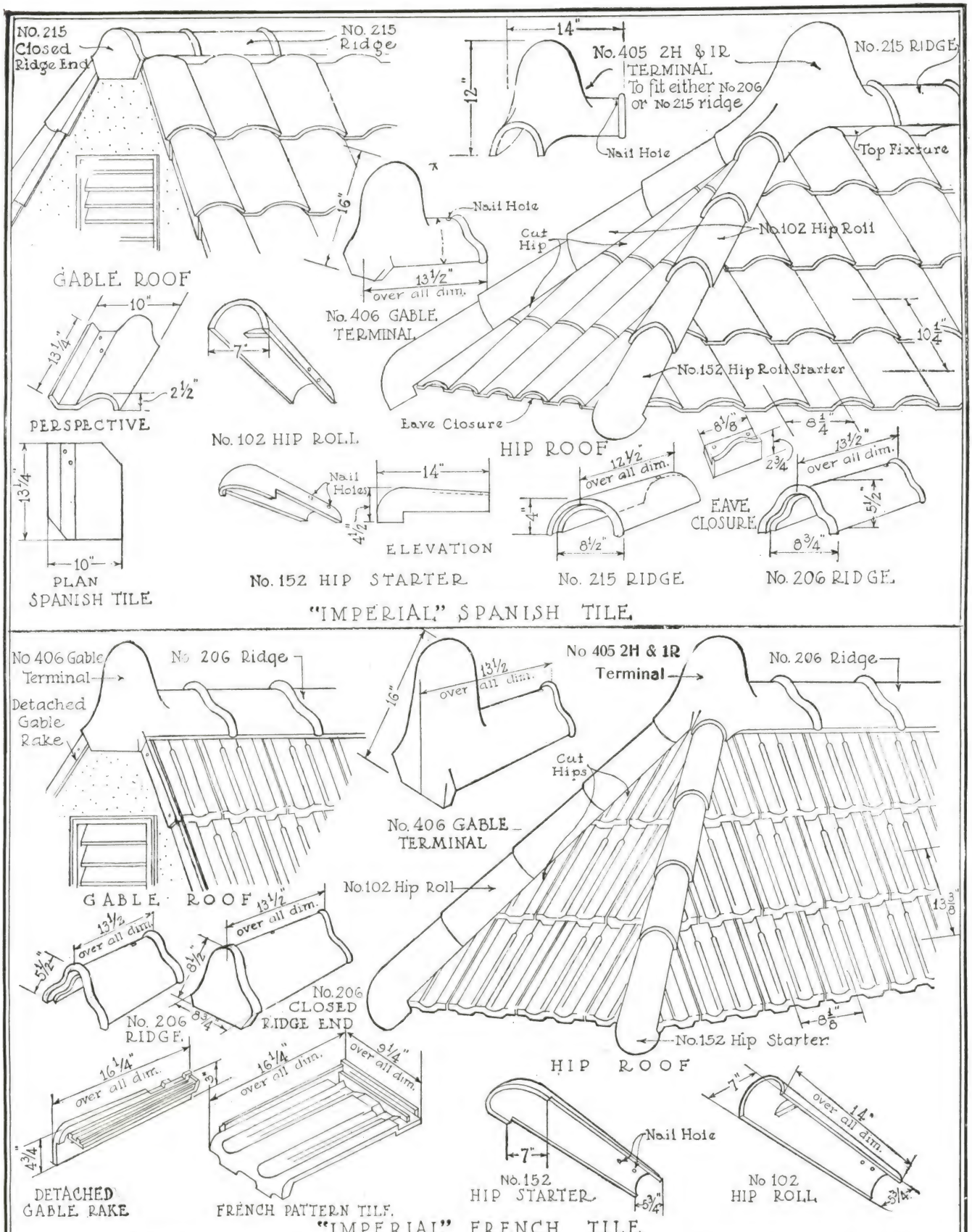
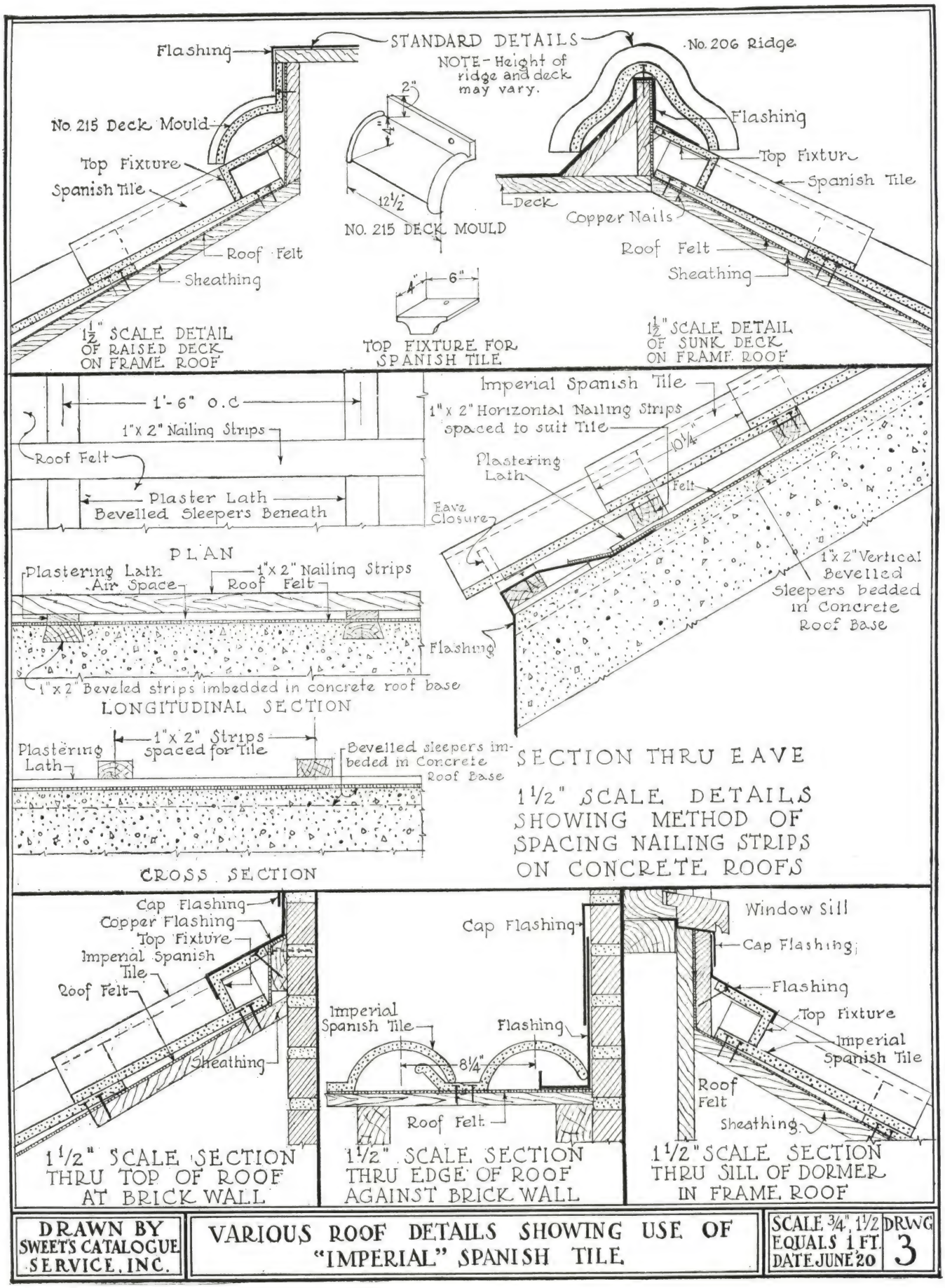


DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD SHAPES OF IMPERIAL SPANISH AND FRENCH PATTERN TILE.	NOT DRAWN TO SCALE DATE JUNE 20	DRWG 2

Continued on next page


STANDARD DETAILS
Flashing
No. 215 Deck Mould
Top Fixture
Spanish Tile
Roof Felt
Sheathing
1½" SCALE DETAIL OF RAISED DECK ON FRAME ROOF
NOTE - Height of ridge and deck may vary.
2"
12½"
NO. 215 DECK MOULD
6"
TOP FIXTURE FOR SPANISH TILE
No. 206 Ridge
Flashing
Top Fixture
Spanish Tile
Deck
Copper Nails
Roof Felt
Sheathing
1½" SCALE DETAIL OF SUNK DECK ON FRAME ROOF
1'-6" O.C
1"x 2" Nailing Strips
Roof Felt
Plaster Lath
Bevelled Sleepers Beneath
PLAN
Plastering Lath
Air Space
1"x 2" Nailing Strips
Roof Felt
Flashing
1"x 2" Beveled strips imbedded in concrete roof base
LONGITUDINAL SECTION
Plastering Lath
1"x 2" Strips spaced for Tile
Bevelled sleepers imbeded in Concrete Roof Base
CROSS SECTION
Imperial Spanish Tile
1"x 2" Horizontal Nailing Strips spaced to suit Tile
10¼"
Plastering Lath
Felt
Eave Closure
1"x 2" Vertical Bevelled Sleepers bedded in Concrete Roof Base
SECTION THRU EAVE
1½" SCALE DETAILS SHOWING METHOD OF SPACING NAILING STRIPS ON CONCRETE ROOFS
Cap Flashing
Copper Flashing
Top Fixture
Impenal Spanish Tile
Roof Felt
Sheathing
1½" SCALE SECTION THRU TOP OF ROOF AT BRICK WALL
Cap Flashing
Imperial Spanish Tile
Flashing
8¼"
Roof Felt
1½" SCALE SECTION THRU EDGE OF ROOF AGAINST BRICK WALL
Window Sill
Cap Flashing
Flashing
Top Fixture
Imperial Spanish Tile
Roof Felt
Sheathing
1½" SCALE SECTION THRU SILL OF DORMER IN FRAME ROOF
DRAWN BY SWEET'S CATALOGUE SERVICE, INC.
VARIOUS ROOF DETAILS SHOWING USE OF "IMPERIAL" SPANISH TILE
SCALE ¾", 1½" EQUALS 1 FT. DATE JUNE '20
DRWG 3

PORETE MFG. CO.

Manufacturers of Lightweight Concrete Products

TELEPHONE
BRANCH BROOK 6700

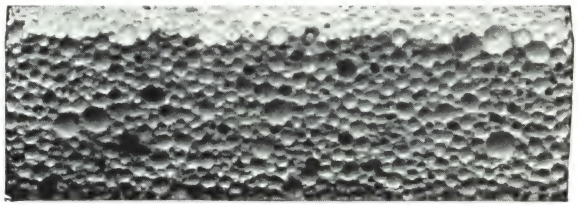
26 Verona Avenue
NEWARK, N. J.

Product

PORETE (LIGHTWEIGHT CONCRETE).

What Porete Is

Porete is portland cement concrete of honeycombed structure. It has the lightness of wood and can be nailed like wood. On account of the air cells which it contains, it is a good heat and sound insulator. Porete is a better fire resisting material than solid concrete because of its low heat conductivity. Its permanency is equivalent to that of concrete and its strength improves with age.



FULL SIZE STRUCTURE OF PORETE

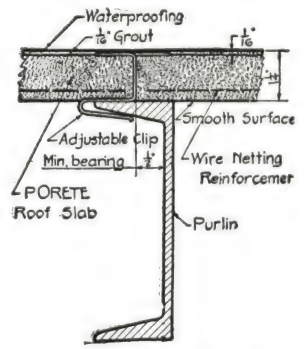
Fireproof Roof Decks

On account of its light weight Porete is an ideal material for fireproof roofs. Porete roofing slabs are 24x32x1⅛ in. thick, smooth on the lower side and rough on the upper side. They are reinforced with wire netting which is well protected with cement to prevent corrosion.

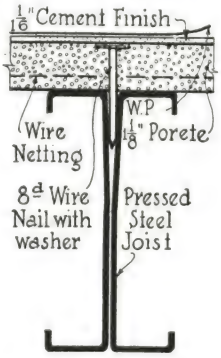
The slabs are fastened with galvanized clips to steel purlins (usually channels or pressed steel joists), set at 32-in. centers. After all the slabs are laid, a thin cement grout should be brushed over the surface and this roof deck is then ready for the waterproofing, which is ordinarily a tar and felt roof. If slate and tile are applied to Porete, a ¼-in. Porete-nail finish is put on the top of it, which holds the nails as well as wood.

Advantages—Porete roofs can be adapted on any roof design, flat or slanting. They are easily erected in winter as well as in summer. They weigh only 7 lbs. per sq. ft., which is one-half as much as other fireproof roofs. The single slabs weigh 30 lbs., which can be handled by one man. A Porete roof will carry a live load of 50 lbs. per sq. ft. with a factor of safety of 6. Buildings covered with Porete will cost less to heat because Porete is a good heat insulating material. Porete roof decks present a clean, smooth stone finish on the underside. Due to their light weight there is a saving in the steel of the supporting trusses. Porete roofs on pressed steel joists are very economical as the joists are set far apart. In the ordinary steel lumber, metal lath and concrete roof, the metal lath is exposed on the underside and is liable to rust out soon. This can not happen with Porete.

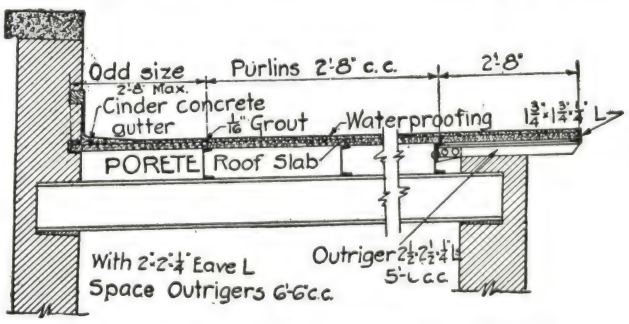
The erection of Porete roof decks is done by the PORETE MFG. CO.'s experienced force or can be done by the local contractor.



DETAIL OF PORETE SLAB ROOF AT PURLIN



PORETE SLAB ON METAL LUMBER

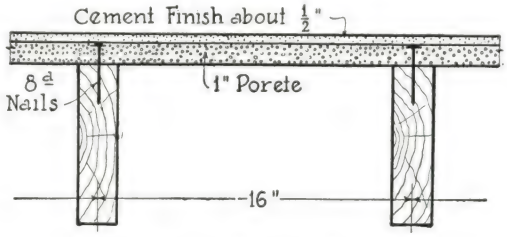


DETAIL OF FLAT ROOF; PARAPET AND OVERHANG

Floors

Porete flooring slabs, 24x32x1 in. thick are nailed to wooden beams or pressed steel joists on 16-in. centers. After the slabs are all applied a ¼- to ½-in. cement coat is put on top or tile can be laid into a cement grout as a top finish. Such a floor is good for 150 lbs. live load per sq. ft. For heavier loads or longer spans we supply a stronger slab.

Porete floors make a better base for tile in bathrooms, lobbies of apartments, hotels and dwellings, store and garage floors. Especially in bathrooms the Porete floor provides a dry space for the pipes compared with damp cinder concrete in the ordinary construction, where the pipes corrode fast.



DETAIL OF PORETE FLOOR SLAB

Various Applications of Porete Siding Slabs

Porete siding slabs 24x32x1 in. are used as a base for stucco walls on wood framing for the building of stucco dwelling houses. They save the sheathing boards, lath and one coat of stucco and make a better wall because there is no lath to deteriorate.

They are also used for furring brick and concrete walls, for thin partitions and for fireproofing wooden structures.

Our Engineering and Estimating Departments are at the service of engineers and architects.

AMERICAN CEMENT TILE MFG. CO.

Manufacturers of Cement Tile Roofing
Oliver Building
PITTSBURGH, PA.

BRANCH OFFICES
NEW YORK, N. Y., 50 Church Street
BIRMINGHAM, ALA., 2700 North 23rd Street
PHILADELPHIA, PA., 815 Commercial Trust Building

WORKS: WAMPUM, PA.; LINCOLN, N. J.; BIRMINGHAM, ALA.

Products

Manufacturers of BONANZA "CEMENTILE"—a reinforced cement tile roofing.

BONANZA CEMENTILE
TRADE-MARK

Description of Bonanza "Cementile"

Bonanza "Cementile" are very large, light, reinforced cement roofing tile furnished in three distinct types, namely, interlocking, flat and channel, besides such necessary fittings as ridge tile of various types, skylight or glass insert tile, flashing tile, collar tile, etc., all factory made and cured—a specialized product, brought to its highest state of development.

The tile are laid by us, directly on open steel roof purlins (which are spaced on a span suitable for the type of tile selected).

In no case is sheathing or other base support required. This eliminates excessive weight and insures greatest economy in design of the supporting structure.

All in all, Bonanza "Cementile" roofs are roofs of economy and quality, speedily laid, with guaranteed results backed by our established reput tion as manufacturing and contracting engineers, over a period exceeding 20 years.

Bonanza interlocking tile are designed for pitched roofs. Laid directly on purlins spaced approximately 4 ft. apart, they are fireproof and waterproof, the finished surface having a particularly pleasing red Spanish tile effect. Like the flat and channel tile, they are very strong, though light in weight.

Bonanza flat and Bonanza channel tile are designed for flat roof construction or for pitched roofs where it is desired to waterproof with composition covering. These tile are laid directly on purlins spaced 5 to 10 ft. apart. The 1½-in. flat tile for spans approximately 5 ft., and the channel tile for the longer spans, are a combination of tremendous strength and lightness that eliminates all form work and assures speed with positive results.

Advantages of Bonanza "Cementile"

Economy—Being laid directly on the roof purlins, the absence of roof boarding, nailing strips and other forms of fastenings makes the initial cost reasonable. Maintenance charges are eliminated, thus making the first cost usually the last.

Weight—These tile are designed along economical lines, reducing the dead load on the steel structure to a minimum.

Strength—In conformity with the standard purlin spacing, Bonanza "Cementile" roofs will sustain such roof loads as are usually encountered. Breaking load tests made at Columbia University for the New York Building Department, showed as high as 300 lbs. per sq. ft. under a uniformly distributed load on the standard spacing.

Adaptability—Bonanza "Cementile" will be found suitable for any type of roof construction and of any size.

Erection—An experienced and capable field force insures absolute satisfaction. "Cementile" roofs can be laid regardless of temperature or climatic conditions, thus eliminating delays.

Weatherproof and Fireproof—Bonanza "Cementile" are impervious to water and the elements, are proof against fire, and are everlasting under ordinary conditions.

Interlocking Tile

Designed for pitched roofs and form a finished, watertight and fireproof covering.

Standard tile is 26 in. wide by 52 in. long (24x48 in. exposed surface) and 1 in. thick, accurately reinforced with a steel fabric. It develops an ultimate breaking load capacity of 300 lbs. per sq. ft.

The tile are made up as single units with no loose connections. The side "roll" of one tile overlaps the

AFTER THE FORD FIRE AT KEARNEY, N. J.

The Bonanza "Cementile" roof shown at the left was a very important factor in checking the fire and more than 60% of the tile was salvaged and used again on the rebuilt structure shown at the right

Continued on next page

"rabbet" of the adjacent tile. All joints are properly sealed with elastic cement. A 4-in. lap is provided on each row of tile by the row above, which is staggered. The tile are hooked in place on purlin flanges by means of a continuous 1-in. offset at top of each tile. The wire-glass insert interlocking tile which interchange with the standard tile, provide any lighting effect demanded.

Guaranteed to carry a uniformly distributed load of 200 lbs. per sq. ft. over a 4-ft. span.

DIMENSIONS AND WEIGHTS OF INTERLOCKING TILE

Size of tile	26x52 in.
Thickness of tile	1 in.
Surface exposed to weather	24x48 in.
Weight per sq. ft.	13¾ lbs.
Weight per sq. ft. of finished roofing	15 lbs.
No. of tile per square of roof (100 sq. ft.)	12½

Roof Design—Minimum pitch desirable for slope of roof is 1/6, which is 4 in. to 1 ft.

In order to arrive at the proper purlin spacing always start at the eaves; then use standard spacing of 3 ft. 10 in. to 4 ft. ½ in., as conditions call for. Any short spacing should be placed at the ridge; should this spacing be less than 1 ft. 4 in., special 60-in. tile should be used at the eaves. Steel channel purlins should be provided, held in alignment by sag rods.

Flat Tile

Designed for both flat and pitched roofs; the application of a standard composition roofing is required to make roof watertight.

This type of Bonanza "Cementile" is 1½ in. thick, 24 in. wide and 60 in. long. Standard purlin spacing is 5 ft.; where necessary, odd lengths are provided for spacing below 60 in. or up to 72 in.

Ends have an offset which are laid on flange of I-beam purlins, after which joints are properly pointed, preparatory to application of composition roofing. Flat tile are properly reinforced.

Guaranteed to carry a uniformly distributed load of 150 lbs. per sq. ft. over a span of 5 ft.

DIMENSIONS AND WEIGHTS OF FLAT TILE

Thickness of tile	1½ in.
Size of standard tile	24x60 in.
Surface exposed	24x60 in.
Weight per sq. ft.	16 lbs.
Weight per square of roof	1600 lbs.

Channel Tile

Designed to meet the demands of the present tendency to use extra wide spans in flat roof construction. Also used extensively on sawtooth roofs.

Standard channel tile is 18 in. wide and 5 to 10 ft. long; legs of channel are 1⅝ in. thick at foot and 1 in. thick along rib.

Ends are laid directly on flange of I-beam purlins, joints are then properly pointed and entire roof deck covered with some form of composition roofing. Channel tile are properly reinforced.

DIMENSIONS AND WEIGHTS OF CHANNEL TILE

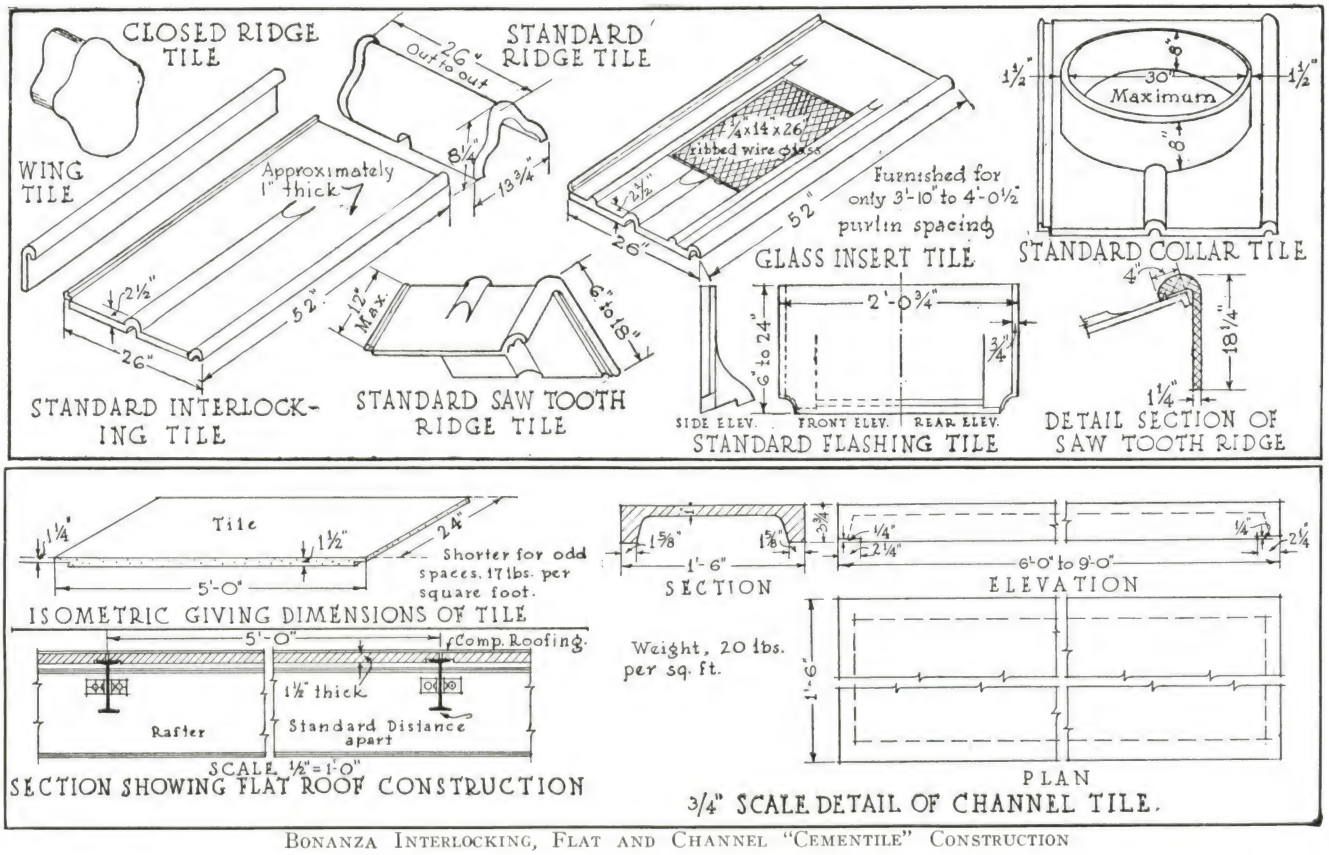
Thickness through web	1 in.
Length of Channel Tile	18x60 to 120 in.
Height at legs	3¾ in.
Weight per sq. ft.	20 lbs.

Service

Our engineering department renders free service to owners, engineers, architects and contractors whenever desired. Send your problems and preliminary plans during the early stages of the work. Our experience of 20 years allows us to offer suggestions as to the most economical purlin layout. Upon receipt of preliminary or finished drawings, either approximate or definite proposals will be furnished, as may be desired.

Bonanza "Cementile" roofs are erected by experienced and efficient crews maintained by the company.

All materials and workmanship fully guaranteed.



Bonanza Interlocking, Flat and Channel "Cementile" Construction

CONTINENTAL CEMENT TILE COMPANY

Manufacturers of Reinforced, Pre-cast Cement Tile Roofing

TELEPHONE
FRANKLIN 4144, 4126

6 North Clark Street
CHICAGO, ILL.

WORKS
BLUE ISLAND, ILL.

BRANCH OFFICES IN PRINCIPAL CITIES

Product

Manufacturers of CONTINENTAL PRECAST REINFORCED CEMENT TILE ROOFING: STANDARD PITCHED TILE; FLAT SLABS; CHANNEL SLABS and TRIMMINGS; CORRUGATED GLASS TILE.

TRADE-MARK

Services

The CONTINENTAL CEMENT TILE COMPANY *manufactures* and *erects* cement tile roofs for all types of industrial buildings, theaters, auditoriums, schools, railroad terminals, etc. This Company maintains a corps of competent engineers, whose services are, without obligation, at the disposal of engineers and architects. It will, upon receipt of blueprints and specifications, prepare approximate estimates or definite proposals for furnishing and erecting Continental cement tile roofs. Give all information when requesting estimates.

Plant

The plant of the CONTINENTAL CEMENT TILE COMPANY is fully equipped with the most modern machinery for the production of a uniformly high grade product.

Continental Cement Tile

Endurance—Endurance is assured by our production of slabs of great strength and density by skilled workmen, under rigid supervision and by the use of only such of the highest grade of raw materials as have successfully passed our exacting routine tests. The breaking load of Continental cement tile is many times that specified in any building ordinance.

These tile form the lightest permanent fireproof roof obtainable.

Economy—Economy is effected by the use of Continental cement tile due to its moderate first cost, by the complete absence of any maintenance expense (see our guarantee), and by its light weight which permits use of light structural sections without sacrificing rigidity.

Appearance—The rich red color and attractive design of Continental pitched tile create an architectural feature worthy of place in the highest type of construction. This type of tile is laid directly on the steel purlins and requires no composition or prepared covering. It is exposed directly to the weather.

An excellent appearance is obtained in the flat and channel slabs by eliminating form marks and by their light, clean, uniform undersurfaces, which reflect a maximum amount of light and which do not require painting of the exposed interior surface.

Composition and Reinforcement—These tile are manufactured from highest grade portland cement and sand, and are reinforced to carry a load many times greater than that required by any building code. They are practically indestructible and offer unyielding resistance to the hardest wear and tear to which roofs are subjected.

Continental Flat Tile Slabs—For roofs of slight pitch, flat slabs are laid directly on steel purlins, expansion joints taking care of construction and expansion. Five-foot centering is the standard purlin spacing. Standard size is 5x2 ft. x 1⅝ in. and weighs 18 lbs. per sq. ft. These tile are made in lengths from 5 to 6 ft.

Continental Pitched Tile—Continental cement tile for pitched roofs do away with the necessity of applying any composition or prepared covering as they lie directly exposed to the weather and form a roof of excellent appearance on the exterior and interior. The outer color is a permanent rich red.

The standard purlin spacing required is 4 ft. on centers. Each tile is 52x23⅞ in. The tile interlock, are self-adjusting and require no sheathing or fastening. All joints are hermetically sealed with elastic cement. Special lengths are furnished where odd spacings are unavoidable. Ridge coping and finishing tile for gable ends are also made.

Continental Channel Slab

Where long spans are required between purlins, channel slabs are recommended. Purlins may often be dispensed with, the slabs being laid directly on the trusses or rafters spaced 6 to 10 ft. on centers.

These slabs are made in lengths ranging from 6 to 10 ft.x18 in. wide, and weigh 21 lbs. per sq. ft. Standard stock lengths are 8 and 10 ft.

Corrugated Glass Tile

Permits maximum lighting area, each light 8 sq. ft. Cracking from contraction and expansion is eliminated.

Typical Continental Cement Tile Roofing Installations

INDUSTRIAL BUILDINGS

Corn Products Refining Co., North Kansas City, Mo.—Entire new plant, roofs for sixteen buildings
Santa Fe Railroad, Topeka, Kans.—Shops, J. Moss, Builder
American Steel Foundries, Alliance, Ohio
Railway Steel Springs Co., Chicago Heights, Ill., Hughes-Foulkrod Company, Engineers and Constructors
Universal Portland Cement Co., Buffington, Ind.
Ruggles & Rademaker, Manistee, Mich.—Salt Plant
Niagara Radiator & Boiler Co., Chicago, Ill., Kenwood Bridge Co., Builders
Durant Motor Co., Lansing, Mich.
Hinde-Dauche Paper Co., Fort Madison, Iowa, The H. K. Ferguson Co., Engineers and Architects
National Supply Co., Toledo, Ohio, Mills, Rhines, Bellman & Nordhoff, Engineers
Burnside Steel Co., Chicago, Ill.
Illinois Central Railroad Car Repair Shop, McComb, Miss., Ellington-Miller Co., General Contractors
Studebaker Corporation, South Bend, Ind., Albert Kahn, Architect; Henry G. Christman Co., General Contractors

MISCELLANEOUS

Edgewater Beach Hotel, Chicago, Ill.—Terrace over garage; Marshall & Fox, Architects
Selwyn & Harris Theaters, Chicago, Ill., C. Howard Crane, Architect
Fourteenth Church of Christ, Scientist, Chicago, Ill., N. Max Dunning, Architect

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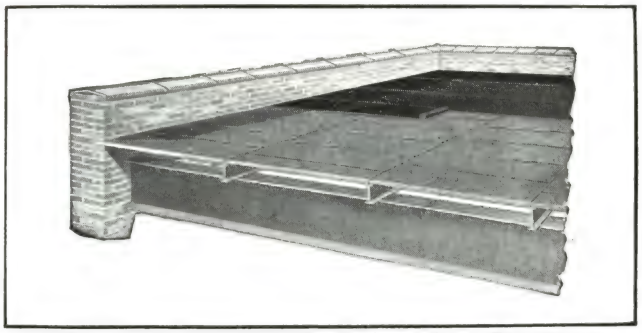


FIG. 1. CONTINENTAL FLAT SLAB LAID DIRECTLY ON STEEL PURLINS

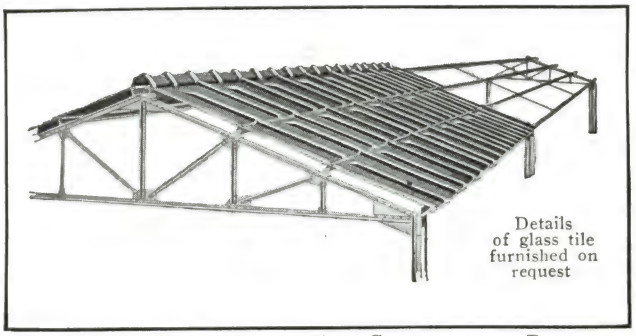
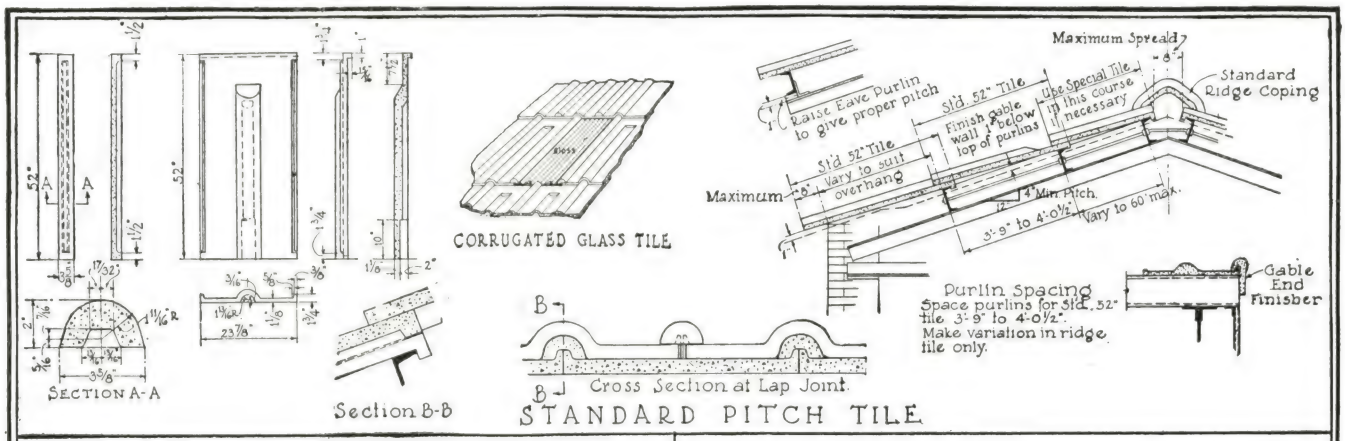
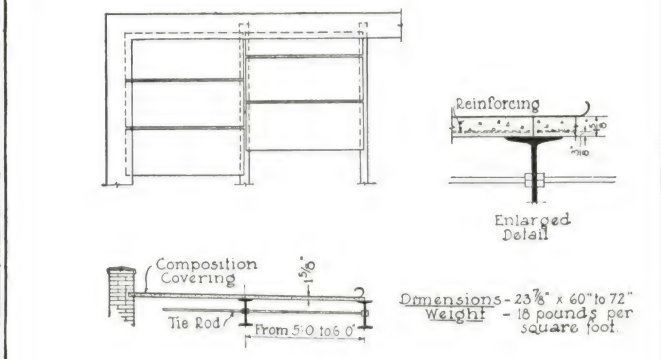
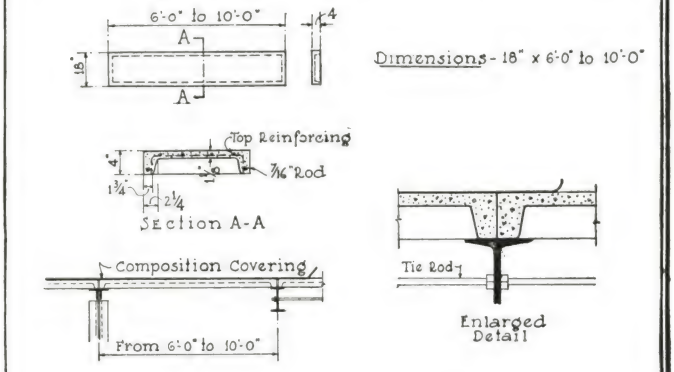
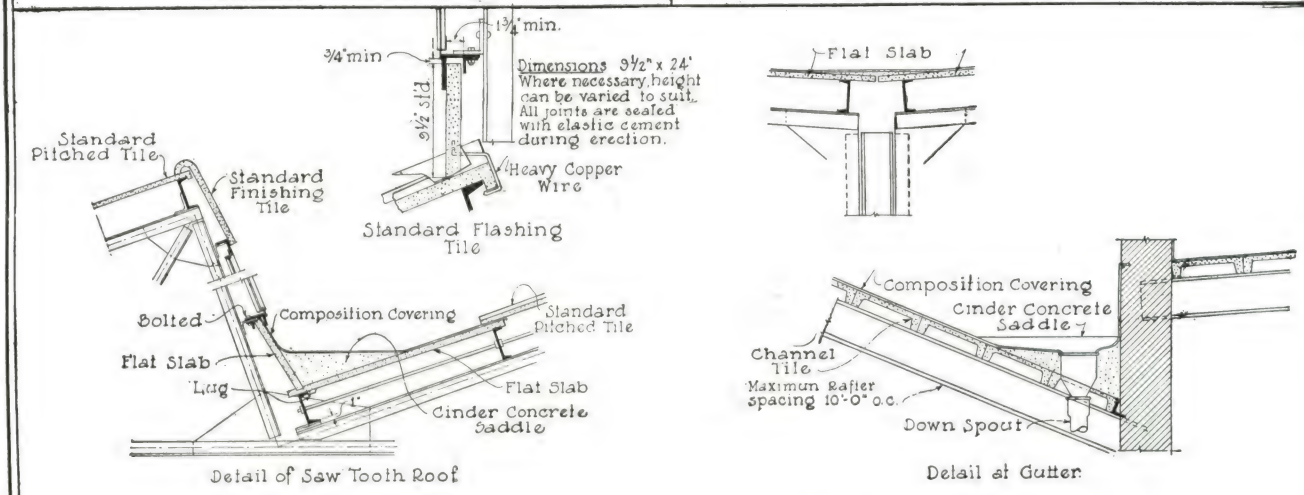


FIG. 2. STANDARD PITCHED TILE CONSTRUCTION, REQUIRES NO COVERING









• DETAILS OF CONTINENTAL CEMENT TILE AND METHODS OF CONSTRUCTION •

FEDERAL CEMENT TILE COMPANY

110 South Dearborn Street

CHICAGO, ILL.

WORKS: HAMMOND, IND. AND DETROIT, MICH.

Products

FEDERAL PRECAST CONCRETE SLABS for roofs and floors; FEDERAL GLASS TILE for the "Daylight Roof."

Federal Reinforced Concrete Slabs

For flat or pitched surfaces. Impervious to severest elements; not affected by heat, cold, fire or water; strengthen with time. Laid directly on structural steel, making a lightweight, fireproof construction. Require no painting, repairing, or other maintenance, and once in place will last as long as the structure.

Federal interlocking tile for pitched surfaces forms a complete waterproof roof, entirely eliminating composition covering. Its attractive red color greatly enhances the appearance of the building. When used in combination with Federal glass tile, an ideal "daylight roof" is obtained. These glass tile interlock with the remainder of the slabs forming the roof and can be so distributed as to reflect light either diffused over the entire floor space or concentrated on any technical or exacting operation.

Federal flat slabs and channel slabs are designed for roofs having a pitch of less than $4\frac{3}{16}$ in. to the ft., but can also be used on roofs of a greater pitch. With each of these types some form of composition covering is employed. In addition to their permanence and imperviousness, considerations of economy dictate their use. Their light weight and long span effect a structural steel saving, and they eliminate the costly labor and materials incidental to roofs poured or plastered on the job. Federal channel slabs can be furnished in spans varying up to 10 ft.

Where plant operations are of such a nature as, for example, in paper mills, that it is impossible to quickly dispose of all of the moisture by means of ventilation, Federal book tile or hollow flat tile afford a splendid super-installation. 10 ft. is the maximum span for the book tile.

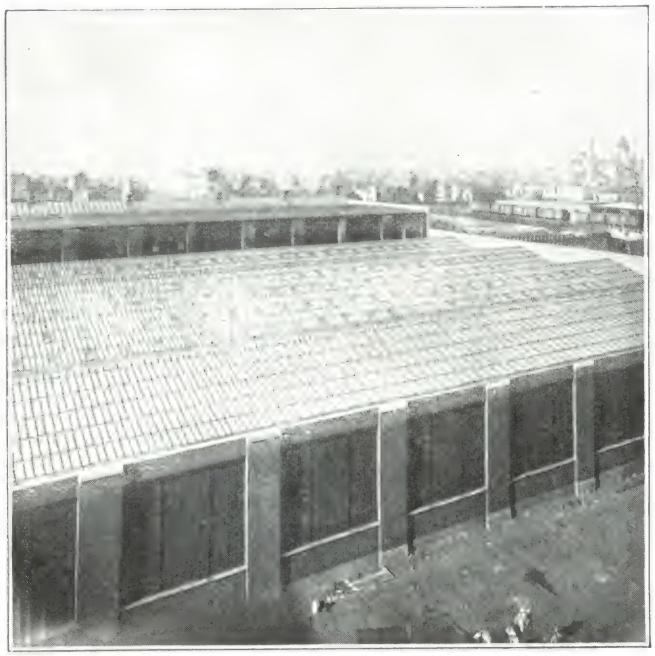
Cost

Federal slabs make the most economical construction on the market. They are made, laid, and guaranteed by the manufacturer. Being indestructible and everlasting, they involve no expense for maintenance, repairs, or renewals. In addition to effecting a saving on the structural steel, they eliminate wood sheathing and other inflammable materials, thereby very favorably affecting fire insurance rates.

Service and Details

Blue print standards containing full details, and catalogue showing photographs of installations, will be furnished gladly on request. Our engineers are structural experts, and will assist architects and engineers in laying out steel work to carry Federal slabs, making no charge for this service.

Hill Pump Valve Co., Chicago, Ill.



A. M. Castle Co., Chicago, Ill.

FEDERAL INTERLOCKING TILE AND GLASS TILE FORMING THE DAYLIGHT ROOF

Continued on next page

References

Federal slabs are adapted to practically every type of structure. This will be evidenced by the following partial list of installations:

GOVERNMENT PLANTS

United States Arsenal, Watertown, Mass.
United States Nitric Acid Plant, Nitro, W. Va.
Auto Truck Repair Plants, Baltimore, Md., Atlanta, Ga. and San Antonio, Tex.
Ford Eagle Chaser Plant, River Rouge, Mich.
Dodge Bros. Gun Recoil Plant, Detroit, Mich.
American Shipbuilding Co., various plants
Balloon Hangar, Avia, Ill.

PAPER MILLS

Nekoosa Edwards Paper Co., Port Edwards, Wis.
Marathon Paper Mills, Rothschild, Wis.
Kimberly-Clark Co., Kimberly, Wis.
Henry Weis, Quincy, Ill.
Thilmany Pulp & Paper Co., Kaukauna, Wis.

FOUNDRIES, BLACKSMITH AND MACHINE SHOPS, POWERHOUSES, ETC.

United States Steel Corporation, 6 plants
International Harvester Co., 5 plants
American Steel Foundries Co., 5 plants
Advance Rumely Co., 2 plants
Crane Co., Chicago, Ill. and Bridgeport, Conn.
J. T. Ryerson & Sons, Chicago, Ill.
Steel & Tube Co. of America, various plants
Calumet Steel Co., Chicago Heights, Ill.
National Malleable Castings Co., Chicago, Ill.
Union Drop Forge Co., Chicago, Ill.
American Maize Products Co., Robey, Ind.
American Brake Shoe & Foundry Co., Chicago, Ill.
National Tool Co., Cleveland, Ohio
City of Chicago, various buildings
Industrial Works, Bay City, Mich.
American Seeding Co., Grand Rapids, Mich.
National Brake & Electric Co., Milwaukee, Wis.
A. M. Castle Co., Chicago, Ill.

RAILROAD BUILDINGS

Southern Pacific Lines, Houston, Tex.
Kansas City Station and Train Sheds.
Illinois Central R.R., various buildings
Pennsylvania R.R., Chicago, Ill. and Indianapolis, Ind.
Elgin, Joliet & Eastern Ry., Joliet, Ill. and Gary, Ind.
Chicago & Northwestern R.R. Co., 3 plants
Chicago Great Western R.R. Co., Stockton, Ill.
Baltimore & Ohio R.R., Chicago, Ill.
Grand Trunk System, Chicago, Ill.
Louisville & Nashville R.R., Louisville, Ky.
Chicago, Burlington & Quincy R. R., Centralia, Ill.

AUTOMOBILE PLANTS

Ford Motor Co., Detroit, Dearborn and River Rouge, Mich.
Willys-Overland Co., Toledo and Elyria, Ohio
Studebaker Corp., Detroit, Mich. and South Bend, Ind.
General Motors Co., various plants
Maxwell Motor Co., Detroit, Mich.
Packard Motor Car Co., Detroit, Mich.
Hudson Motor Car Co., Detroit, Mich.
Haynes Automobile Co., Kokomo, Ind.
Dodge Bros., Detroit, Mich.
Pan Motor Co., St. Cloud, Minn.
Nash Motors Co., Kenosha, Wis.
Handley-Knight Motor Corp., Kalamazoo, Mich.

FOOD AND IMPLEMENT PLANTS

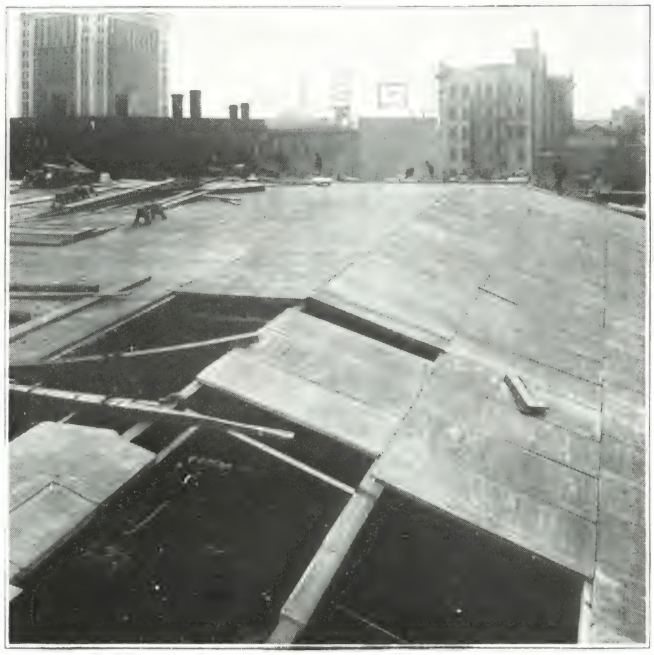
International Harvester Co., 5 plants
Bucyrus Co., Evansville, Ind. and South Milwaukee, Wis.
Advance Rumely Co., La Porte, Ind. and Battle Creek, Mich.
Emerson-Brantingham Co., Rockford, Ill.
Western Wheeled Scraper Co., Aurora, Ill.
Deere & Co., Moline, Ill.
Moline Plow Co., Moline, Ill. and Stoughton, Wis.
J. I. Case Plow Works, Racine, Wis.
Armour & Co.., Omaha, Nebr. and St. Paul, Minn.
Swift & Co., Hammond, Ind.

COKE, GAS AND OIL PLANTS

Solvay Process Co., Detroit, Mich.
By-Products Coke Corporation, various plants
Texas Co., Texas City and Port Arthur, Tex.
Gulf Refining Co., Port Arthur, Tex.
Sinclair Refining Co., various plants
Standard Oil Co., Tulsa, Okla.
Corn Products Refining Co., Argo, Ill.
Milwaukee Gas & Coke Co., Milwaukee, Wis.

AUDITORIUMS AND THEATERS

Virginia Theater, Champaign, Ill.
Michigan State Fair Coliseum, Detroit, Mich.
World Theater, Omaha, Nebr.
Tower Theater, St. Paul, Minn.
Municipal Auditorium, Wellington, Kans.
High School, Wyandotte, Mich.
Orpheum Theater, Detroit, Mich.
High School, Harvey, Ill.
Franklin Theater, Saginaw, Mich.
Regent Theater, Detroit, Mich.
Globe Theater, Kansas City, Mo.
Michigan State College Auditorium, Ypsilanti, Mich.
Juneau Theater, Milwaukee, Wis.

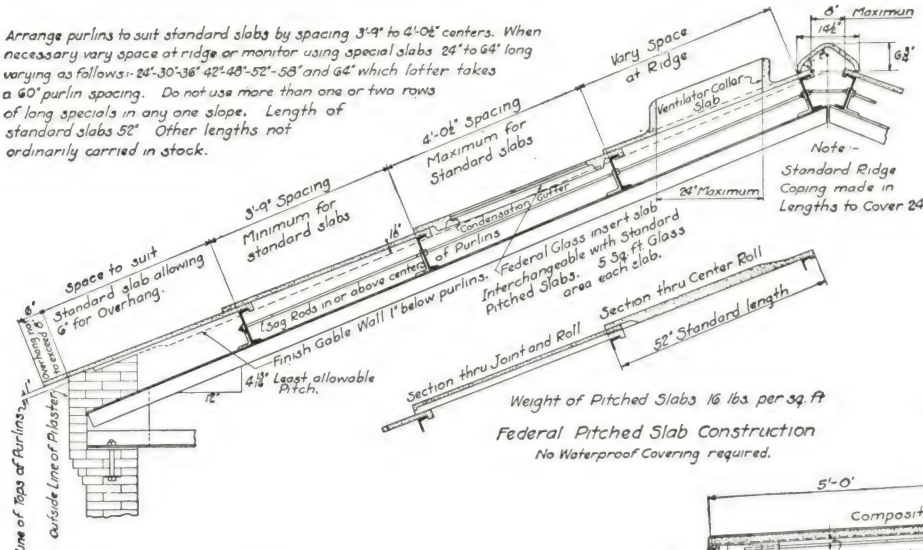


FEDERAL FLAT SLAB ROOF DECK PLACED ON CONCRETE SHOES RESTING ON CHANNEL PURLINS
World Theater, Omaha, Nebr.

FEDERAL LONG SPAN CHANNEL SLABS EFFECTING A SUBSTANTIAL STRUCTURAL STEEL SAVING
Handley-Knight Motor Corp., Kalamazoo, Mich.

Continued on next page

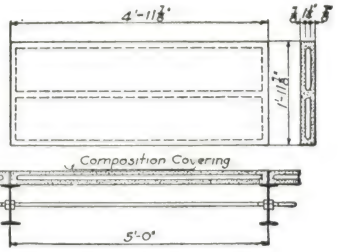
Arrange purlins to suit standard slabs by spacing 3'-9" to 4'-0½" centers. When necessary vary space at ridge or monitor using special slabs 24" to 64" long varying as follows:- 24"-30"-36"-42"-48"-52"-58" and 64" which latter takes a 60" purlin spacing. Do not use more than one or two rows of long specials in any one slope. Length of standard slabs 52" Other lengths not ordinarily carried in stock.



Weight of Pitched Slabs 16 lbs. per sq. ft

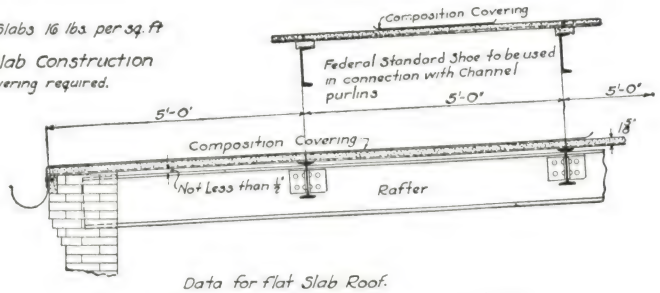
Federal Pitched Slab Construction

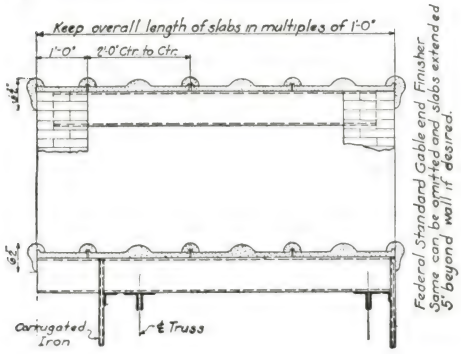
No Waterproof Covering required.



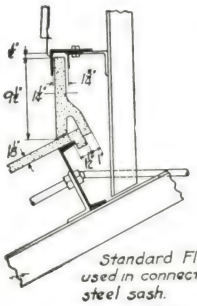
Hollow Flat Slab

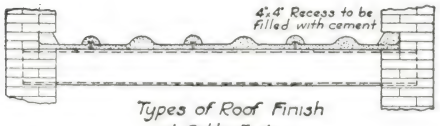
Weight 25 lbs. per sq. ft.



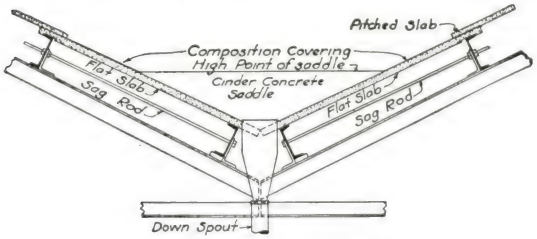


Data for Flat Slab Roof.
Width of slab 24" Length of standard slab 60"
Special lengths to order.
Weight per sq. ft. 18 lbs. Thickness 1⅝"
Reinforcing Metal No. 10 wire longitudinal, No. 17 wire crossways.
Safe carrying load 100 lbs. per sq. ft.

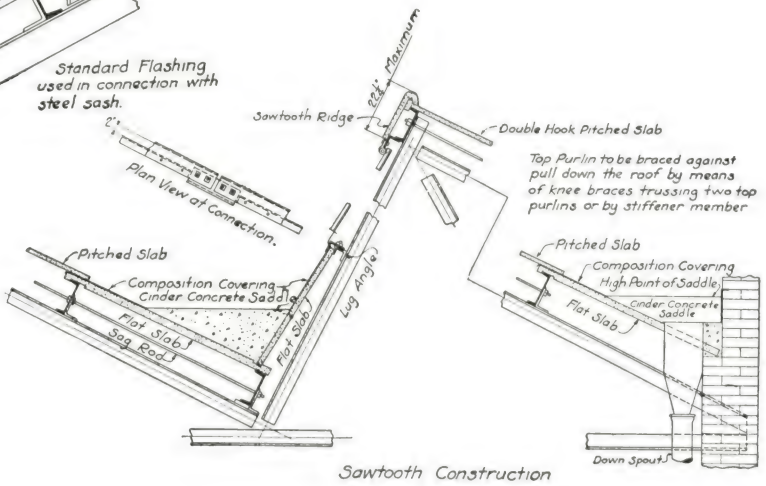




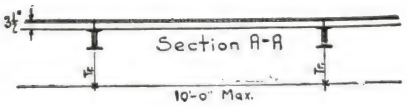
Types of Roof Finish at Gable Ends.

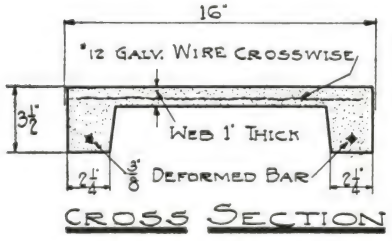


Gutter Construction

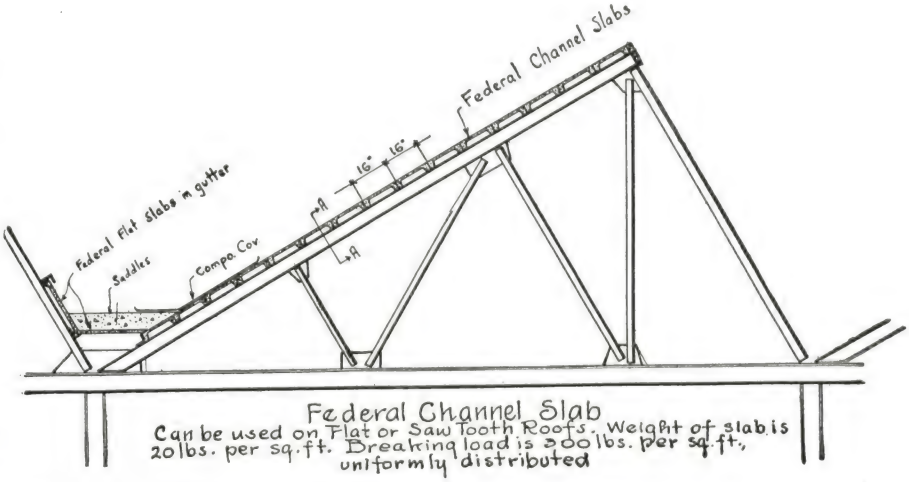


Sawtooth Construction





CROSS SECTION



Federal Channel Slab

Can be used on Flat or Saw Tooth Roofs. Weight of slab is 20 lbs. per sq. ft. Breaking load is 200 lbs. per sq. ft., uniformly distributed

DETAILS OF FEDERAL ROOF CONSTRUCTION

UNITED STATES GYPSUM COMPANY

Reinforced Roof Tile and Monolithic Roof

205 West Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
BUFFALO, N. Y. Ellicott Square
BOSTON, MASS., 77 Summer Street
WASHINGTON, D. C., 410 Bond Building
BALTIMORE, MD., 910 American Building
PHILADELPHIA, PA., 107 Empire Building
PITTSBURGH, PA., 1723 Oliver Building
CLEVELAND, OHIO, 646 Hanna Building
ATLANTA, Ga., 358 Williams Mill Road
CINCINNATI, OHIO, 52 Blymyer Building
DETROIT, MICH., 1360 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 650 Builders Exchange
ST. LOUIS, MO., 1339 Syndicate Trust Building
KANSAS CITY, MO., 523 Bryant Building
OMAHA, NEBR., 301 Peters Trust Building
DENVER, COLO., 401 Boston Building
LOS ANGELES, CAL., 902 Citizens National Bank Building

Products

Manufacturers and erectors of PYROBAR REINFORCED ROOF TILE (made of Structolite) for Roof Decks; PYROFILL MONOLITHIC FLOOR AND ROOF CONSTRUCTION.

For Pyrobar Floor Tile, Partition, Furring Tile, and Column Covering, see pages 166-167; for Gypsum Wall Plasters and Finishes see pages 368-371; for Plaster Board Partition Systems, see pages 307-309; for Sheetrock Wallboard, see page 1128.

Services

Twenty-one producing mills, located at advantageous points, insure prompt delivery for any quantity.

An Engineering and Construction Department is maintained for the purpose of assisting engineers and architects in designs and estimates. We will gladly submit erected bids on Pyrobar Roofs and Pyrofill Roofs and Floors.

Pyrobar Reinforced Roof Tile

Pyrobar roof tile are made of Structolite, a specially prepared, hard, dense gypsum, reinforced with steel and designed to carry the full required roof load. These tile are manufactured in two general types: Long span (either hollow or channel sections), and 30-in. type (solid and hollow).

The long span tile are made either with or without lap joint, the lap joint tile being designed chiefly to meet construction difficulties, such as where purlins are not in true alignment or where sufficient flange bearing has not been provided to receive standard section tile.

Advantages—*Strength*—Pyrobar roof tile are designed to carry 50 lbs. per sq. ft., total uniform load, with a factor of safety of 4.

Fireproof—Gypsum is acknowledged to be one of the best fire resisting materials known. Gypsum will not support combustion or conduct heat; neither has it appreciable contraction nor expansion; consequently, it will not warp, buckle or spall under severe fire.

Minimizes Condensation—Superior heat insulation is a salient feature of Pyrobar tile. Tests give the following values of B.t.u. transmitted per square foot per hour, per degree Fahrenheit difference in temperature, for various roof deck materials:

	B. t. u.
2-in. yellow pine plank	0.385
3-in. solid concrete slab (1-2-4)	0.750
1¼-in. solid cement tile	0.990
3-in. solid gypsum roof tile	0.250
4-in. hollow gypsum roof tile	0.200

Less heat is transmitted through gypsum than through any other structural material. On account of its low conductivity, the under surface of Pyrobar roof deck remains at practically the same temperature as the air of the interior of the building, regardless of changes of extreme temperature. Under these conditions, no "sweating" or "dripping" can occur and condensation of moisture is eliminated.

Heat Saving—The superior heat insulation value shows a decided saving compared to a concrete slab, in tons of fuel used for heating purposes and also in heating plant installation.

Light Weight—Pyrobar tile are 50% lighter than concrete per square foot of surface for equal thickness, which results in considerable saving in steel framing.

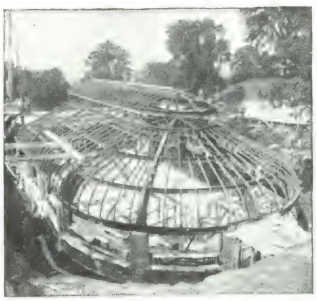
Adaptability—Suited to any form of roof design, flat or peaked, and easily cut and fitted.

A slate or ornamental tile may be nailed directly to Pyrobar long span channel section roof tile if "Extra Thick Nailing Deck" is specified; also to Pyrobar 30-in. solid type if "Extra Dense" is specified.

Quickly Erected—The large, light weight units are very quickly installed during any weather conditions and their erection does not interfere with plant operations going on below.

Light Diffusive—The under surface of the roof is white, uniformly smooth and light reflecting, assisting in the solution of the lighting problem.

PYROBAR LONG SPAN TILE
Spanning from purlin to purlin



STEEL FRAME READY FOR 30-IN. TYPE PYROBAR

PYROBAR APPLIED TO STEEL

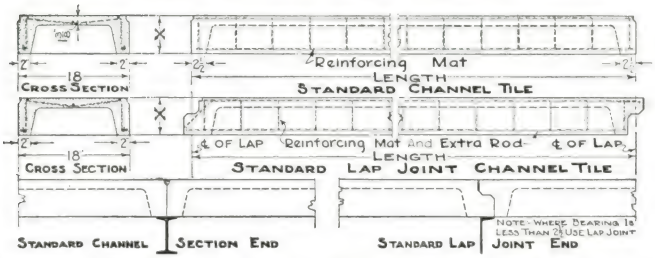
Continued on next page

Permanency—The permanency of Pyrobar tile has been established through many years of use. The tile are not affected by the chemical action of smoke or the deteriorating action of sulphuric acid fumes; thus maintenance cost is eliminated.

Pyrobar Long Span Roof Tile

Long Span Channel Type—This type of tile is manufactured in 4- to 8-ft. lengths. The tile are laid directly on steel or wood framing.

PYROBAR LONG SPAN CHANNEL TYPE

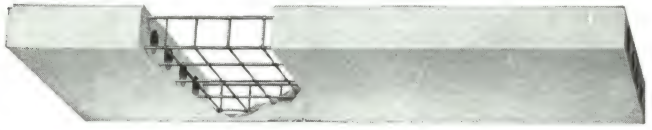


DETAILS, PYROBAR LONG SPAN CHANNEL TYPE WITHOUT AND WITH LAP JOINT

WEIGHTS, LONG SPAN CHANNEL AND HOLLOW TYPE TILE

	Channel Tile		Hollow Tile	
Length	0" to 6'3"	6'3" to 8'0"	0 to 6'3"	6'3" to 8'0"
Depth, "X", in.	5	6	5	6
Wt. per sq. ft., lbs.	17	19	20	25

Long Span Hollow Type—The "hollow" type tile are manufactured in the same lengths as the "channel" type up to 8 ft.; the hollow type, however, provides a flat and better light reflecting ceiling, with maximum insulation. This type can also be furnished with lap joint.



PYROBAR LONG SPAN HOLLOW TYPE

PURLIN TABLE FOR LONG SPAN CHANNEL OR HOLLOW TYPE TILE, OR 30-IN. TILE ON TEES

Total uniform dead load of 50 lbs. per sq. ft.

PURLIN SPAN		8'-0"		10'-0"		12'-0"		14'-0"		16'-0"		18'-0"		20'-0"		22'-0"		24'-0"	
SHAPE		I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C
SLAB-SPAN	40"	DEPTH-INS.	3	4	4	4	4	5	5	6	5	7	6	7	7	8	7	9	8	10
		WT. PER FT. LB.	5½	5¼	7½	5¼	7½	6½	9¾	8	9¾	9¾	12¼	9¾	15	11¼	15	13¾	18	15
	50"	DEPTH-INS.	3	4	4	5	5	6	5	7	6	7	7	8	7	9	8	10	8	10
		WT. PER FT. LB.	5½	5¼	7½	6½	9¾	8	9¾	9¾	12¼	9¾	15	11¼	15	13¾	18	15	18	15
	60"	DEPTH-INS.	4	4	4	5	5	6	6	7	6	8	7	9	8	10	8	10	9	12
		WT. PER FT. LB.	7½	5¼	7½	6½	9¾	8	12¼	9¾	12¼	11¼	15	13¾	18	15	18	15	21	20½
	70"	DEPTH-INS.	4	5	5	6	5	7	6	8	7	9	8	9	8	10	9	12	9	12
		WT. PER FT.-LB	7½	6½	9¾	8	9¾	9¾	12¼	11¼	15	13¾	18	13¾	18	15	21	20½	21	20½
	80"	DEPTH-INS.	4	5	5	6	6	7	6	8	7	9	8	10	9	12	9	12	10	12
		WT. PER FT.-LB	7½	6½	9¾	8	12¼	9¾	12¼	11¼	15	13¾	18	15	21	20½	21	20½	22	20½

DESIGNING DATA

Spans for various T-irons spaced 30¾ in. on centers

Span	Up to 5' 3"	5' 3" to 5' 10½"	5' 10½" to 6' 5½"	6' 5½" to 8'
Size T-iron	2¼"x2¼"-4.1 lbs.	2¼"x2¼"-4.9 lbs.	2½"x2½"-5.5 lbs.	3"x3"-6.7 lbs.

30-inch Type Pyrobar Roof Tile

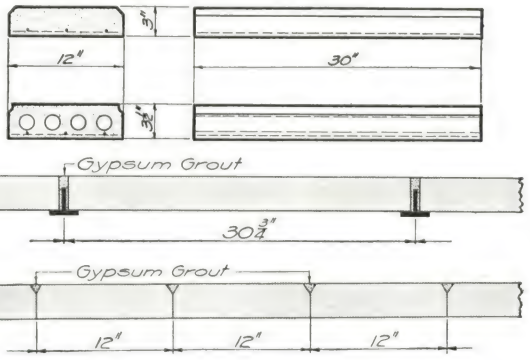
Made in hollow and solid types, surface measurements 12 by 30 in.; solid type 3 in. thick; hollow or cored type 3½ in. thick. (Note: 4-in. hollow tile will be furnished on special order.) Adapted for curved or other intricate roof designs and easily cut to fit any requirements. The tile are placed on T-iron purlins spaced on 30¾-in. centers. Curbs or walls for monitor and sawtooth sash are built of 3-in. solid Pyrobar tile; the end walls of monitors and sawteeth are similarly built, the roof covering being extended to cover curbs and end walls.

Where it is necessary to build up roof for drainage purposes, a material known as "drainage fill" is supplied—a combination of gypsum and cinders or wood chips that sets within 30 minutes after being placed—permitting application of roof covering without delay.

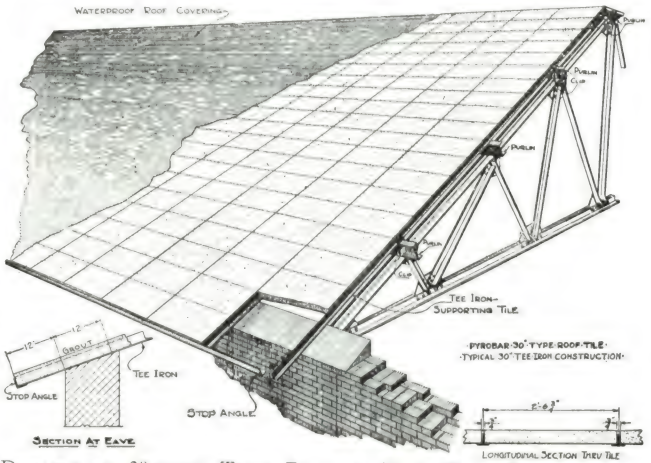
30-INCH PYROBAR ROOF TILE

	Solid 3"	Hollow 3½"
Depth		
Length	30"	30"
Wt., sq. ft.	15 lbs.	15 lbs.

Wt. of 3" extra dense, 17 lbs.



SECTIONS OF 30-INCH TILE SHOWING JOINTS OF GYPSUM GROUT



DETAILS OF 30-INCH TYPE PYROBAR ROOF TILE CONSTRUCTION

Continued on next page

Specifications for Pyrobar Roof Tile

Long Span Channel Type; Long Span Hollow Type—All roofs as shown on drawings, unless otherwise noted, shall be constructed of Pyrobar Long Span Reinforced Roof Tile (specify whether channel or hollow type and also if lap joint shall be used), manufactured by the UNITED STATES GYPSUM COMPANY. The tile shall be placed directly upon roof supports without mortar and with sides tight together. All joints on top surface of roof are to be pointed with gypsum mortar composed of 1 part unfibred gypsum cement plaster and 2 parts of clean, sharp sand.

Curbs under monitor and sawtooth sash, also end walls of monitors and sawteeth, shall be constructed of 3-in. solid Pyrobar Tile set in gypsum cement mortar, the joints being well bedded and struck.

Note: Where slate or ornamental tile is to be nailed directly to the roof deck, the above specification should read, "shall be constructed of Pyrobar Long Span Type Reinforced Roof Tile with thick nailing deck."

Flat headed nails having a penetration of not less than 1½ in. into the Pyrobar tile shall be used to fasten the slate or ornamental tile.

30-in. Type, 3-in. Solid or 3½-in. Hollow—All roofs as shown on plans, unless otherwise noted, shall be constructed of (3x12x30-in. solid) or (3½x12x30-in. hollow) Pyrobar Reinforced Roof Tile manufactured by the UNITED STATES GYPSUM COMPANY. The tile shall be laid tightly together on T-irons without mortar, all joints on top surface of roof to be pointed with gypsum mortar composed of 1 part unfibred gypsum cement plaster and 2 parts clean, sharp sand.

Curbs under monitor and sawtooth sash, also the end walls of monitors and sawteeth, shall be constructed of 3-in. solid Pyrobar tile set in gypsum cement mortar, joints to be well bedded and struck. (The foregoing curb specifications can also be used for 4-in. solid tile.)

Note: Where slate or ornamental tile is to be nailed directly to the roof deck, specification should read, "shall be constructed of 3x12x30 in. Solid Reinforced, Extra Dense Pyrobar Roof Tile."

Flat headed nails shall be used to fasten roof covering, and shall have at least 1½ in. penetration into tile.

Pyrofill Monolithic Floor and Roof Construction

An economical form of poured-in-place construction. Formwork is provided the same as required for concrete slab; steel cables are laid across the purlins and securely fastened. The principles in its design are the same mathematically as those of a suspension bridge, and its strength can be calculated with the same accuracy. A transverse steel rod is laid across the cables at the center of each span so as to secure uniform deflection.

This type of roof is made of Pyrofill, a specially calcined gypsum mixed with a definite proportion of wood shavings. Pyrofill requires only the addition of water to make it the required consistency. It is poured on the reinforcing and leveled off to the specific thickness of slab.

Weight of roof slabs: 3-in. slab, 12 lbs.; 3½ in., 14 lbs.; 4-in., 16 lbs.; 4½-in., 18 lbs.; 5-in., 20 lbs.

Specifications for Pyrofill Monolithic Floor and Roof Construction

Unless otherwise shown, all roof slabs shall be constructed of poured gypsum, using the system of the UNITED STATES GYPSUM COMPANY known as Pyrofill Gypsum Roof. This contractor shall provide necessary forms, reinforcing cables, Pyrofill and all labor required. The forms shall be made in a workmanlike manner of dressed and matched lumber and shall be carefully leveled up so as to insure a uniform depth of slab.

Reinforcing shall consist of steel cables made by twisting two No. 12 wires. These cables shall be calculated to take the entire roof load and shall be fastened at their ends in such manner as to develop the full strength required.

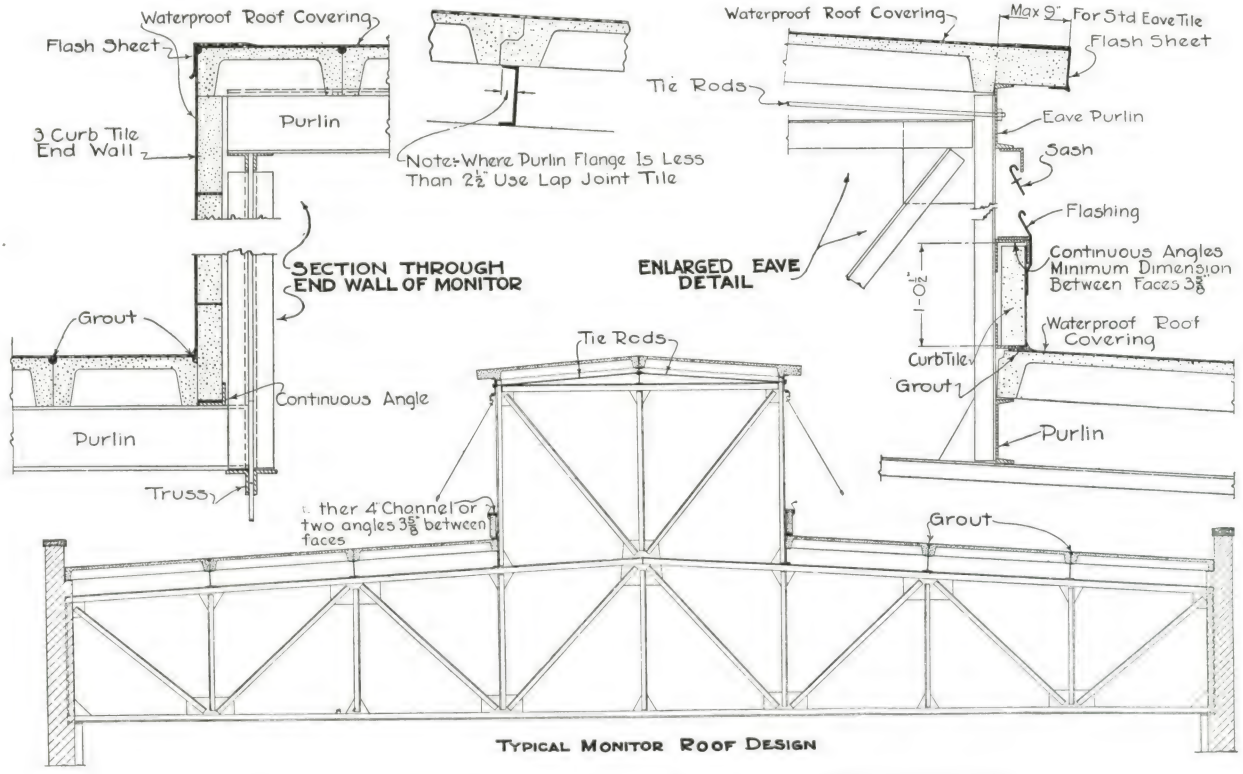
In no case shall the stress in the cables exceed 20,000 lbs. per sq. in., or more than 20% of the ultimate strength. The spacing of these cables and the depths of slabs must conform to the standards of the UNITED STATES GYPSUM COMPANY.

The gypsum composition for making the slabs shall consist of a uniform mixture of Pyrofill and water. The top surface of this slab shall be screeded smooth so as to leave an even surface to receive the roof covering.

All cantilever construction, such as eaves, etc., shall be cast solid of Structolite, properly reinforced and anchored to the adjoining slab. All curb walls, ends of monitors, etc., shall be constructed of 3-in. Pyrobar Gypsum Tile, neatly laid up in gypsum mortar, joints to be well bedded and struck.

The steel contractor shall provide proper steel framing around all openings such as vent stacks, ventilators, etc.

For further information and designing details on Pyrofill Monolithic construction, send for folder PM-1.



CONSTRUCTION DETAILS SHOWING TYPICAL DESIGNS OF PYROBAR ROOF TILE

ASBESTOS SHINGLE, SLATE & SHEATHING CO.

MAIN OFFICE AND FACTORY
AMBLER, PA.

BRANCH OFFICES

ATLANTA, GA. BALTIMORE, MD. BOSTON, MASS. CINCINNATI, OHIO BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO MINNEAPOLIS, MINN PHILADELPHIA, PA. WILKES BARRE, PA. MILWAUKEE, WIS. NEW YORK, N. Y. PITTSBURGH, PA. WASHINGTON, D. C. DETROIT, MICH. MONTREAL, QUE. TORONTO, ONT.

SOUTHWESTERN DISTRIBUTER: R. V. Aycock Co., Kansas City, St. Louis, Tulsa, Houston

WESTERN DISTRIBUTER: J. A. Drummond, San Francisco, Los Angeles, Fresno

Products

Ambler Asbestos Shingles for roofs and sidewalls, Ambler Asbestos Corrugated Roofing and Siding.

For Ambler Linabestos (Asbestos) Wall Board, and Ambler Asbestos Building Lumber, see pages 1118-1119.

The Company and Its Products

This Company not only manufactures a full line of asbestos shingles but also supplies all the necessary appurtenances required in the installing of its products. For use with shingles a special waterproof roofing paper is made; all necessary nails, clips, etc. exposed to the weather are of heavy gauge copper and the concealed nails are triply galvanized. Copper driving nails can be supplied if desired.

Ambler Asbestos Shingles

Ambler asbestos shingles are a highly fireproof and waterproof product made of selected asbestos fibers and portland cement with the addition of natural unfading mineral colors in the colored shingles, scientifically combined in water and formed under 10,000 lbs. per sq. in. hydraulic pressure.

Underwriters' Approval—Ambler asbestos shingles have received the approval of the Underwriters' Laboratories, Inc. They bear a class A label when applied in the American method, because of the overlap, and a class B label when applied in the French or honeycomb methods. The fact that only asbestos fiber and portland cement are used in their manufacture and that they are compressed so as to prevent exfoliation insures the fact that they can not burn, and their method of application causes them to form a single unit on the roof.

Waterproof—The lamination process used and the pressure exerted on Ambler asbestos shingles in their manufacture makes them absolutely waterproof unlike other types of shingles which are more or less porous.

Advantages—They are not affected by heat, cold or exposure to the weather.

They may also be exposed to the action of sea air and sea water as well as to acid fumes and smoke without undergoing deterioration.

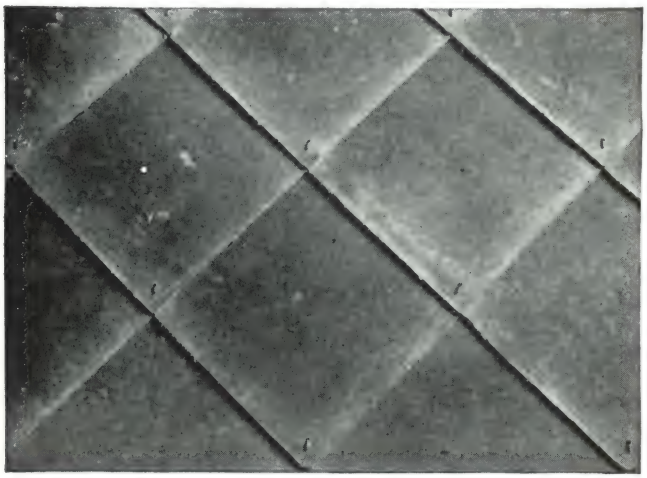
They will not curl or warp and can be walked on while on the roof without breaking.

Ambler asbestos shingles can not burn.

Where They Are Used to Advantage—They are used to advantage where a permanent, fireproof roof covering is desired that will never require painting or repairs. We do not recommend using them on roofs having a rise of less than 4 in. to the foot, although they have been used successfully on many roofs where the pitch is considerably less.

The United States Government is a very large user of Ambler asbestos shingles. A few of their installations are the barns at the Naval Academy, Annapolis, Md., the naval training station and dirigible hangar at Cape May, N. J., the hospital buildings at Aberdeen, Md., Fort Bliss, Tex., and Camp Bragg, N. C.

Economy and Durability of Ambler Asbestos Shingles—They are economical for two reasons: (1) They are not expensive; (2) there is no upkeep. They do not deteriorate from exposure or age.



French Method of Application

Honeycomb Method of Application

Continued on next page

Colors—Ambler asbestos shingles are, in their natural color, a beautiful gray, known as Newport gray; they are also made in solid and veneered permanent colors of slate black, brown, Indian red, green and the ¼-in. thick American method shingles are made in a variety of reds, browns, and grays to be laid according to the architect's specifications as to color design.

The colors used in all colored Ambler asbestos shingles are permanent mineral pigments and can not fade or deteriorate. The green shingle is the result of more than 10 years research and is truthfully the only permanent green shingle manufactured.

Shapes and Sizes—All Ambler asbestos shingles are $\frac{3}{16}$ in. thick, excepting the ¼ in. 9x18-in. vari-colored style. They are made to be laid in 4 methods, the French or diagonal method, the Honeycomb method, the narrow American method and the broad American method.

They are made in a wide variety of sizes, the most popular for the French and Honeycomb styles being 16x16 in., 12x12 in. and 8x8 in. and the American 8x16 in., 6x12 in. and 4x8 in., while all the ¼-in. shingles are made to be laid in the American method and are 9x18 in.

Application—Each shingle is punched for nailing and for storm nails in the French and Honeycomb styles. Copper nails and flashings are recommended to be specified but a high grade galvanized nail can be furnished for unexposed parts. Roof beams should be sheathed with boards not over 9 in. wide and the shingles should be laid over 1-ply felt or waterproof paper. (See specifications.)

Types and Methods of Laying—There are three methods of application for which Ambler asbestos shingles are made.

(1) The French, or diagonal method (see illustration), is the most economical because it requires less material to cover a given area. Ambler asbestos shingles laid in this manner average 290 lbs. per square varying in accordance with the size selected.

(2) The Honeycomb method (see illustration), is the same as the French with the exception that the lower corner is cut off each shingle, forming a butt which gives the roof texture and causes the shingles to appear thicker.

(3) The American, or straight, method of application for Ambler asbestos shingles is the same as that for natural slate or wooden shingles. The average square of Ambler asbestos shingles, American method will weigh 425 lbs. or 200 lbs. less than a No. 1 slate roof. The ¼ in. thick 9x18-in. Ambler asbestos shingles weigh 650 lbs. per square.

American Method of Application

Specifications for French or Diagonal and Honeycomb Methods of Laying Ambler Asbestos Shingles

Sheathing—All roofs specified to be covered with asbestos shingles, to be tightly sheathed with well seasoned tongued and grooved boards not more than 9 in. wide, free from loose knots and to be well spiked to the rafters.

Felt—Over roof boards (see carpentry specifications) lay 1-ply slater's felt, tacked on with 4-in. lap, and on hips and valleys with at least 1-ft. lap.

Ambler Asbestos Shingles—Over the felt, apply Ambler asbestos shingles (give color), as manufactured by the Asbestos Shingle, Slate & Sheathing Co., according to the "French" or diagonal method, following the manufacturer's details. Nail $\frac{3}{16}$x1-in. cant strip flush with lower edge of roof board. Apply 1 course of No. 16 shingles end to end laterally, overhanging the eaves 1½ to 1¾ in., over which lay 1 course of No. 46 shingles, entirely covering the No. 16 to break joints. Starter No. 35 to be laid over this, exposing one-half the lower double course. Balance of roof to be covered with No. 3 shingles, 16x16 in., laid diagonally as directed and exposed 13x13 in. to the weather. Each shingle to be nailed with two 1¼-in. galvanized iron needle point nails, and the No. 3 to be fastened down at the tip with the patented copper "Storm" nails. All No. 3 shingles to be laid showing diagonal lines on a 45° angle with eaves. Hips and ridges to be covered with Ambler asbestos ridge and hip roll, properly flashed and fastened in place to hip or ridge pole of sufficient height, rabbeted to fit hip or ridge, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge roll.

Flashing—At all hips, valleys, chimneys, and against all abutting sidewalls, except as otherwise specified, flash and counterflash with each course of Ambler asbestos shingles, using .....

Specifications for American Method of Laying Ambler Asbestos Shingles

Sheathing—See under French method.

Felt—See under French method.

Ambler Asbestos Shingles—Over the felt, apply Ambler asbestos shingles, as manufactured by the Asbestos Shingle, Slate & Sheathing Co., according to the American, or straight laid, method, following the manufacturer's details. Nail $\frac{3}{16}$x 1-in. cant strip flush with the lower edge of roof board. Apply 1 course of No. 16 shingles end to end laterally, overhanging the eaves 1½ to 1¾ in. Over this lay 1 course of No. 16 shingles with long edge at right angles to eave line breaking joints. Lay next course in the same way, allowing 6-in. exposure. Balance of roof to be covered with No. 16 shingles 8x16 in., laid perpendicularly, breaking joints and exposed 7 in. to the weather. Each shingle to be nailed with two 1¼-in. galvanized iron needle point nails as indicated by the nailhole in the shingles, nails not to be driven down too tight. Hips and ridges to be covered with Ambler asbestos ridge and hip roll, properly flashed and fastened to hip or ridge pole of sufficient height, rabbeted to fit hip or ridge, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge roll. (Hip and ridge can be covered according to regular Boston hip scheme if desired.)

Flashing—See under French method.

Ambler Asbestos Corrugated Roofing and Siding

This material is similar to the Ambler asbestos shingles in its structure and qualities. It is made in a corrugated form in sheets 27½ in. wide and in lengths from 3 to 10 ft. Its weight is about the same as No. 14 or No. 15 corrugated iron and is used for similar services.

JOHNS-MANVILLE

INCORPORATED

Miners of Asbestos, Manufacturers of Asbestos and Allied Products

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NEW YORK, N. Y.

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ATLANTA	CINCINNATI	DULUTH	MEMPHIS	PHILADELPHIA	SAN DIEGO	TULSA
BALTIMORE	CLEVELAND	ERIE	MILWAUKEE	PITTSBURGH	SAN FRANCISCO	WASHINGTON
BIRMINGHAM	COLUMBUS	HOUSTON	MINNEAPOLIS	PORTLAND	SEATTLE	WILKES-BARRE
BOSTON	DALLAS	INDIANAPOLIS	NASHVILLE	ROCHESTER	SPRINGFIELD	YOUNGSTOWN
BUFFALO	DAYTON	KANSAS CITY	NEWARK	ST. LOUIS	SYRACUSE	HAVANA CUBA

CANADIAN JOHNS-MANVILLE CO., LIMITED

HAMILTON MONTREAL OTTAWA TORONTO VANCOUVER WINDSOR WINNIPEG

Products

ASBESTOS SHINGLES (Rigid); ASBESTOS SLATE SURFACED SHINGLES (Flexible).

ASBESTOS ROOFINGS: Built-up, Corrugated, and Ready-to-lay Forms.

KEYSTONE HAIR INSULATOR; ACOUSTICAL CORRECTION; PIPE and BOILER INSULATION; UNDERGROUND SYSTEM OF PIPE INSULATION; RADIATOR and STEAM TRAPS; INDUSTRIAL FLOORING.

Also manufacturers of Insulating Sheets and Blocks, Insulating and Refractory Cements.

For Underfloor Electric Duct System, see page 1812.

TRADE-MARK

Service

Johns-Manville Roofing, Building and Insulating Materials are backed by the responsibility of JOHNS-MANVILLE, INC., which assures the architect better service, better value and greater satisfaction, because of the long, economical service which they will give clients. Full details, specifications and drawings will be gladly furnished by the engineering service department of our nearest branch.

Our engineers will be glad to confer on any problems of roofing; insulation of boilers, hot and cold pipe systems (inside, outside or underground); acoustical correction of commercial, industrial and public buildings and sound deadening in walls, floors or ceilings; waterproofing, flooring, or the use of radiator or steam traps.

Johns-Manville Asbestos Shingles, Standard and Colorblende

Made of asbestos rock fiber and portland cement, united under great hydraulic pressure. Of relatively high tensile strength, tough and resilient, these shingles are unaffected by climatic conditions, except that they become more durable as they age on the roof.

Because of their construction, they are fireproof and waterproof; and require no painting. They are comparatively light in weight and do not require heavy supporting construction. They can be applied by any roofer, slater or carpenter on new decks or on top of old wooden shingles.

Made in four colors—Natural Gray, Indian Red, Autumn Brown and a composite of four shades of brown known as Conglomerate Brown. To the latter, when laid alone or in combination with Indian Red or Natural Gray, the registered name of Colorblende has been given.

The first three colors are made in various sizes, with smooth edges ⅛ in. thick only, except Nos. 50, 51 and 52 sizes which are ¼ in. thick with rough edges. Conglomerate Brown shingles made only in ¼-in. thickness, rough edge, Nos. 50 and 52 sizes.

Johns-Manville Flexstone Shingles (Slate Surfaced)

Made of asbestos felt, surfaced with crushed red or green slate; size 8x12¾ in.; also in the form of strip shingles 32x10 in., 4 shingles to the strip. An improved, all-mineral form of the slate surfaced shingle.

Johns-Manville Asbestos Roofings

Asbestos rock, a fire resisting, practically imperishable mineral, is the base of Johns-Manville Asbestos Roofings, in all forms. By a special manufacturing process this rock is fabricated into rugged, fire-safe, weather resisting sheets, thoroughly saturated with a durable combination of natural asphalts, or combined with portland cement as the case may be.

Asbestos Built-up Roofing—Smooth surface; for application to roof decks of wood, concrete or gypsum; for flat roofs or those with a moderate pitch; affords a clean, quick draining surface free from slag or gravel. Made of sheets of asbestos felt which are mopped together with hot asphalt cement. Accompanied with flashings made of asbestos felts—cap and base—thus eliminating metal. Specially reinforced in valleys and flashings. Guarantee for finished roof includes valleys and flashings and is given for all jobs irrespective of size or location.

Asbestos Ready-to-lay Roofings—In rolls or sheets 32 in. wide, in various forms; smooth, black surface both sides; red or green slate surfaced one side or a white surface one side. For application on decks where pitch is 1½ in. to the foot or over; (white surface is only laid on a minimum of 3 in. to the foot). Shipped in rolls or sheets ready for application.

Corrugated Asbestos Roofing—In two forms: Johns-Manville Transite Corrugated Asbestos Wood, an all-mineral roofing or siding for skeleton frame construction. Made of asbestos fibers and portland cement united under hydraulic pressure into dense, structurally strong, rigid sheets, 42 in. wide by 96 in. long by ¼ in. thick. A fireproof, economical, practically everlasting material.

Also Johns-Manville Corrugated Asbestos Roofing and Siding; made of asbestos felts with a reinforcing core of sheet steel plied together with natural asphalts. Furnished in 3-, 4-, and 5-ply form with Nos. 22, 24, 26, 28 gauge metal reinforcement; in sheets 28 in. wide, 6, 7, 8, 9, 10, 11 and 12 ft. long.

Underwriters' Laboratories Approval

Johns-Manville Asbestos Roofings and Shingles are approved by Underwriters' Laboratories, Inc., take base rates of insurance and can be used in restricted zones.

Continued on next page

Johns-Manville Keystone Hair Insulator

A sheathing composed of a heavy layer of cleansed and sterilized cattle hair, secured between sheets of tough building paper (waterproof or plain) or asbestos paper; the crossing and recrossing of the fibers, at every conceivable angle, form innumerable small cells, in which the air is sealed and deadened, producing an insulating cushion more effective than many layers of building paper. Proof against rot, moisture and vermin; slow burning; and will not settle, dry out or split. Shipped in bales of 500 sq. ft.

Johns-Manville Acoustical Service

Confusion of sound or poor acoustics in buildings, otherwise creditable from an architectural standpoint, is due, in many instances, to recent developments in fireproof construction. The use of harder wall, ceiling, and flooring materials, and of hard surfaced equipment, has increased reverberation appreciably. In offices, another factor has been the elimination of interoffice partitions, and the grouping of typewriters and other noise producers as demanded by modern efficiency.

Acoustical correction is not a matter for haphazard guesswork. Reverberation and echoes causing sound confusion are dependent on so many surrounding conditions that comprehensive rules for correction would be too exhaustive to be practical. The sound absorbing qualities of every material used in the building or its decoration, as well as its quantity and position, have relation to the quantity, quality and location of the corrective material required. The problems involved are highly technical, and for their satisfactory solution the expert knowledge of the specialist is indispensable.

In the Acoustical Department of JOHNS-MANVILLE, INC., the advice of the best acoustical authorities in the country, and the services of competent acoustical engineers, are available to architects and others who have difficulties to overcome either in designing new buildings or in correcting existing ones.

Johns-Manville Underground System of Pipe Insulation

The Johns-Manville underground system of pipe insulation provides a permanent, efficient and economical means of placing underground- and insulating-pipes conveying steam or hot water.

The efficiency of the Johns-Manville system is at least 90% when installed according to the Johns-Manville specifications and by them or under their supervision. This efficiency is maintained for a long period of time on account of the character of the materials that are used in the construction of the system.

Johns-Manville Pipe and Boiler Insulation

One of the most important results of the development of asbestos by Johns-Manville has been the saving of heat through insulation. Johns-Manville have developed materials, built on asbestos as a base, that retard the escape of heat from boilers, furnaces, pipes and flues. Twenty-seven years' specialization, directed by the highest engineering talent, has enabled Johns-Manville to develop and produce insulations of exceptional efficiency and durability under every service condition.

Asbesto-Sponge Felted, for example—a remarkable felt which combines the insulating value of sponge with the endurance of asbestos—ranks first in efficiency among commercial steam pipe insulation; or 85% Magnesia, or Improved Asbestocel, Zero, Anti-Sweat, or Brine and Ammonia Insulations. Whatever the needs, they can be met efficiently with one of the Johns-Manville insulations tabulated in the next column.

Service	Type of Insulation	Insulation Recommended
Steam pipes, all pressures	Sectional	Asbesto-Sponge Felted; 85% Magnesia
Medium and low pressure steam pipes	Sectional	Improved Asbestocel
Low pressure and hot water pipes	Sectional	Improved Asbestocel
Antifreezing	Built-up and sectional	Built-up Hair Felt; Zero
Brine and ammonia pipes	Built-up and sectional	Brine and Ammonia; Anti-Sweat
Cold water pipes	Built-up and sectional	Anti-Sweat or Built-up
Boiler insulation	Sheet and block and Cement	Asbesto-Sponge; Improved Asbestocel; 85% Magnesia; Cements, Nos. 302, 400, 85% Magnesia
Stack lining	Sheet	Vitribestos

Johns-Manville Radiator Trap

This device permits the free discharge of water from the radiator without loss of steam, whether the system operates by gravity or vacuum. The action is direct; that is, the operation of the trap depends on the movement of the water flowing into it, rather than the temperature or the pressure of the steam. Thus the capacity of the trap does not vary. The principle of operation is the same for all types and models.

There is just one moving part—a ball, which is held against the discharge bushing by unbalanced pressure and which rises when water flows into the chamber. After the water level reaches a point slightly above the discharge orifice, the buoyant force of the water rolls the ball up and exposes part of the discharge orifice, allowing free escape of water and air. As the water level lowers, the ball settles back and closes the discharge orifice, and the water seal which is maintained prevents steam leakage.

The operation of the Johns-Manville trap is continuous, for it discharges as the water is received.

Johns-Manville Steam Trap

This trap is made for power plants and generally used in sizes with connections from ¾ in. to 2 in. inclusive, and is similar to the Johns-Manville Radiator Trap in construction and principle.

Johns-Manville Industrial Flooring

This flooring is in the nature of an asphaltic concrete and consists of a binder, or cement, made up of a combination of natural asphalts and a well graded mineral aggregate of crushed stone, torpedo gravel and sand, with particles ranging in size from those passing a ⅜-in. mesh screen down to those which pass a 200-mesh screen.

Johns-Manville Industrial Flooring can be laid in any consistency between extreme hardness and softness and, while always dense, possesses a certain amount of resiliency. Does not cause foot soreness and fatigue like concrete and other non-yielding floor surfaces; and where employees of machineshops, factories, and other industries are compelled to stand while at work, it adds greatly to their comfort and efficiency. Furthermore, being dampproof, it is a protection against ailments common to dampness.

This is essentially a floor that is "made to fit"; therefore, each installation should be treated as an individual problem and a specification written to meet the exact requirements. A brief description of conditions sent to any of our Branch Engineering Departments will bring immediate response.

MOHAWK ASBESTOS SLATE CO., INC.

Manufacturers of Tapered Asbestos Shingles

MAIN OFFICE
UTICA, N. Y.
FACTORIES: UTICA, N. Y., AND ONEIDA, N. Y.
BRANCH OFFICES
NEW YORK, N. Y., 101 Park Avenue BOSTON, MASS., 618 Scollay Building

Products

TAPERED ASBESTOS SHINGLES.
ASBESTOS RIDGE ROLLS.

Mohawk Tapered Asbestos Shingles

Made of pure asbestos fiber and the best grade of portland cement, and colored with iron oxide. They are compressed in water and cured by a patented Mohawk process which makes them color-fast, fireproof and weatherproof. They can not curl nor warp and their texture precludes splitting.

These shingles are tapered like wood shingles, and made with 4 countersunk nailholes—a saving of time and labor in application.

Furnished in red, brown, buff and gray. Standard size, 8x16 in.

Advantages of Mohawk Tapered Asbestos Shingles

Fireproof—These shingles are fireproof. The white flame of a blowtorch applied to them will heat only the immediate point where touched by the flame. The shingle will not ignite.

Insulating Qualities—Mohawk shingles do not radiate heat. Their non-conductive qualities assure moderate temperature in the attic during all seasons of the year.

Beauty—No two shingles are exactly alike in color. This gives an irregularity of color tone, making an artistically blended whole, without stiff, straight lines. An attractive and age-weathered effect is obtained by the rough surface of the shingles. The heavy butt and beveled edge give a very desirable shadow line effect.

Sun, wind, rain and snow have no effect whatever on Mohawk asbestos shingles except to add a mellow weathered appearance which enhances the architectural beauty of the roof.

Light Weight—These shingles are much lighter than natural slate or tile, ordinary roof construction being strong enough to carry their weight.

The "Standard" shingle averages 550 lbs. per square and the "Rustic Colonial" 700 lbs.

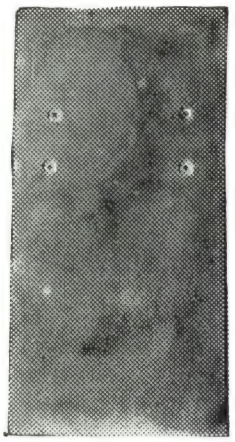
Long Life—Mohawk shingles are extremely durable. Their strength of construction renders them practically everlasting.

Low Cost—The first cost of these shingles is but slightly higher than ordinary wood shingles, but due to their durability there is practically no upkeep cost. This makes them one of the most inexpensive shingles which can be selected.

Mohawk "Rustic Colonial" Tapered Asbestos Shingles

This shingle is hand treated to produce the much desired weatherbeaten, age-old and irregular effect. Made 8x16 in., ½ in. thick at butt. When laid 7 in. to the weather 260 shingles are required per square. Average weight per square, 700 lbs. Colors: red, brown, buff and gray.

"Rustic Colonial"



"Standard"

MOHAWK TAPERED ASBESTOS SHINGLES

Mohawk "Standard" Tapered Asbestos Shingles

This type has beveled edges and heavy butt, producing an artistic shadow line effect. Made 8x16 in., ⅜ in. thick at butt. 260 shingles are required per square, laid 7 in. to the weather. Average weight per square, 550 lbs. Colors: red, brown, buff and gray.

Mohawk Asbestos Hip and Ridge Rolls

Made of the same materials as the shingles, and in the same colors. In sections 16 in. long, 93 sections of ridge roll are required to cover 100 lineal feet of ridge or hip.

MOHAWK ASBESTOS RIDGE ROLL

Specifications

All roof surfaces shall be covered with Mohawk "Standard" "Rustic Colonial" Tapered Asbestos Shingles, 8x16 in., as manufactured by the MOHAWK ASBESTOS SLATE CO., INC., of Utica, N. Y.

Note: In Carpenter's Specification specify that roof boards shall be laid in the usual manner, breaking joints and nailing securely at every bearing, leaving no loose ends. All roof sheathing shall be of narrow width and well seasoned.

Over all roof sheathing lay one thickness of good quality slater's felt as furnished by the MOHAWK ASBESTOS SLATE CO., INC., making laps not less than 4 in. except on hips and valleys where laps must be not less than 10 in.

At edge of eaves provide cant strips, using ⅜-in. thick laths for this purpose.

The starting course at eaves shall be 9x16-in. Mohawk Asbestos Shingle starters, laid parallel with and overhanging the eaves 1½ in.

The second course shall be 8x16-in. Mohawk "Tapered" Asbestos Shingles, covering the first course and breaking joints with it.

Proceed with laying the shingles in precisely the same manner as with natural slate, exposing the asbestos shingles 7 in. to the weather, except that the Mohawk Shingles having bevelled edges should be laid close together instead of separated as with natural slate.

All nails shall be 1¼ in. long galvanized needle point nails as furnished by the MOHAWK ASBESTOS SLATE CO., INC. The nails shall be driven flush with the asbestos shingles surface, but not down too tight.

For all hips and ridges provide Asbestos Ridge Rolls as manufactured by the MOHAWK ASBESTOS SLATE CO., INC.

THE PHILIP CAREY COMPANY

Manufacturers of Asfaltslate Shingles

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES
FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

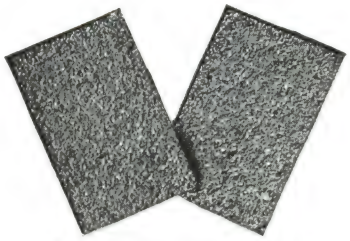
Products

CAREY SHINGLES.

For Waterproofing and Dampproofing, see pages 70-71; for Expansion Joints, see page 495; for built-up Roofing, see pages 876-879; for Pipe Coverings, see pages 1736-1737.

Carey ASFALTSLATE SHINGLES
REG. U.S. PAT. OFF.

"The Shingle that never curls"
TRADE-MARK
Registered



ASFALTSLATE SHINGLES
Furnished in natural colors of red and green

Carey Shingles

Asfaltslate, Standard, Jumbo and 4-in-one are produced in the same factories, from the same materials, the difference being in weight and form of the finished shingles.

Carey Asfaltslate Shingles—Composed of extra heavy base of wool felt thoroughly saturated with tempered asphalt compound. Both sides of felt are coated with asphalt into which particles of fine crushed slate are embedded and rolled while the asphalt is hot. The extra heavy felt is produced in the Carey mill and the asphalt used for saturation and coating is refined and compounded in the Carey refinery. Quality of the shingle is entirely controlled by the Carey factories beginning with the raw material. The result is a shingle with extraordinary wearing qualities and unusual rigidity.

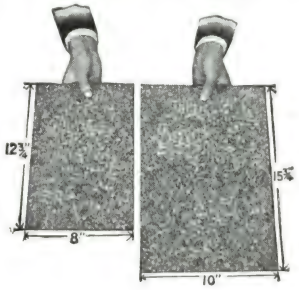
Size and Weight—Standard size 8x12¾ in. Weigh 245 lbs. to the square.

Carey Standard Shingles—Same as Asfaltslate shingles except that they are lighter in weight—235 lbs. to the square.

Carey Jumbo Shingles—Made from an extra heavy felt base. They are heavier and thicker than the Asfaltslate shingles and are made in two sizes. Standard size 8x12¾ in. and extra large size 10x15¾ in. The large size shingles are especially recommended for the higher priced homes and buildings with large roof areas. Standard size, when laid 4 in. to the weather, weighs approximately 315 lbs. to the square. The large size laid 5 in. to the weather weighs 300 lbs. to the square.

Package

Carey shingles are packed in bundles containing one-eighth square, or metal strap packages containing one-quarter square. One square of shingles packed for shipment occupies 7 cu. ft. of space.



SIZE OF LARGE CAREY JUMBO SHINGLES BY COMPARISON WITH ORDINARY SIZE SHINGLES

Official Approval

Carey shingles are tested and approved by Underwriters' Laboratories, Inc., and bear the underwriters' label as a Class "C" roofing material. This roofing takes lower insurance rate than an inflammable roof.

Specifications

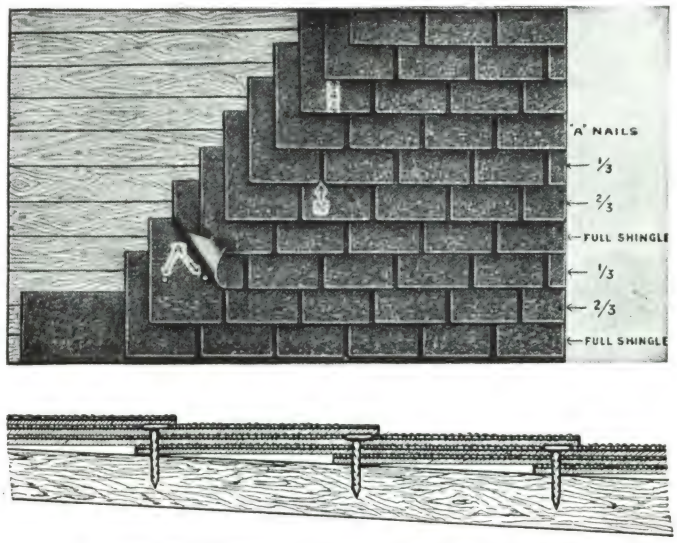
Shingles shall be Carey (state brand here) shingles and shall be delivered on the job in packages bearing Carey labels. Sheathing boards to be thoroughly dry, not over 6 in. wide, laid parallel with eaves. After nailing, have surface free of nail heads, etc. Use 1-in. galvanized nails with large heads. Line valleys with valley lining, 18 in. wide, same color and material as shingles. Nail lining 4 in. from either side (nails 12 in. apart); do not nail center.

Lay in 9-in. starter strips, same color and material as shingles, along eaves, extending over ½ in., nailed 1 in. from lower edge, nails 6 in. apart. Begin with full sized shingle parallel to and flush with outer edge of roof, lower end flush with lower edge of starter strips. Two nails to each shingle, 4½ in. from lower end and 1 in. from sides. Allow ½-in. space between shingles.

Second row use two-thirds size shingle, 4 in. to weather.

Third row use one-third size shingle, same spacing.

Fourth row use full sized shingle again and continue as shown in sketch below.



METHOD OF APPLYING CAREY ASFALTSLATE SHINGLES

THE LEHON COMPANY

Roofing, Waterproof Papers, Compounds and Flooring Materials

West 44th Street and Oakley Avenue

CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1 Liberty Street
JACKSON, MISS., 214 Daniel Building
OMAHA, NEBR., J. B. Watkins Co., 2511 O Street
BIRMINGHAM, ALA., 828 North 19th Street
ST. LOUIS, MO., 1946 Railway Exchange Building
MINNEAPOLIS, MINN., 179 North Western Avenue

Products

Manufacturers of Mule-Hide Cor-Du-Roy Panel Strip Shingles, Mule-Hide Asphalt Shingles; Mule-Hide Roll Roofings; Mule Hide Waterproof Insulating Paper; Mule-Hide Built-up Asphalt Roofing; Seal-skin and Black-bear Waterproof Building Papers.

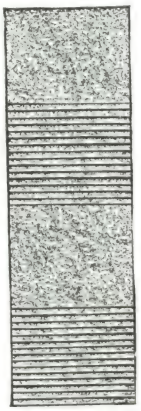
Also manufacturers of Mule-Hide Asphalt Felt; Mule-Hide Waterproofing Asphalt; Mule-Hide Waterproof Insulating Fabric; Mule-Hide House Lining; Mule-Hide Porch Deck Canvas; Concrete Waterproofing Membranes; Damp-Tite Waterproofing Compound; Asphalt Paints and Cements; Mule-Hide Mastic Flooring Materials; Expansion Joints for concrete pavements.

TRADE-MARK

Mule-Hide Cor-Du-Roy Panel Strip Shingles

Cor-Du-Roy Panel Strip is a novel combination of the famous Cor-Du-Roy alternated with the plain Mule-Hide asphalt shingle and built into a solid unit of four.

It is made in the standard size 10x32 in., weighing 230 lbs. to the square; and in the super size, 12¾x32 in. with a weight of 280 lbs. to the square. In each square there are 112 shingles, sufficient to lay 4 in. to the weather. The 10-in. shingle gives a double thickness over the entire roof, while the 12¾-in. shingle means a triple thickness all over the roof.



Cor-du-roy Panel Strip Shingle 10x32 in. (Patent Applied for)

Asphalt Shingles

Mule-Hide Standard Weight Shingles—Size 8x12¾ in. should be laid 4 in. to the weather. They are furnished in either gray-green or red; 424 shingles to the square. Approximate weight, 220 to 240 lbs.

Mule-Hide Four-unit Shingles (Four on the Strip)—Mule-Hide four-unit shingles are similar to what are commonly known as "slab" or "strip" shingles. They are furnished in blue-black, red or gray-green, 112 strips to the square, sufficient to cover 1 square when laid 4 in. to the weather. Approximate weight, 200 lbs. per square. Size 10x32 in.

Mule-Hide Double Thick Shingles—Size 8x12¾ in. They are furnished in red or gray-green, 340 shingles to the square, sufficient to cover 1 square when laid 5 in. to the weather. Approximate weight, 245 to 260 lbs.

Roll Roofing (Smooth Surface)

Mule-Hide Roll Roofing—Made by a slow process that produces superior saturation with high melt point asphalt, which is less volatile and, therefore, remains elastic for long-time service. Made 32 in. wide, in rolls containing 108 sq. ft. Special, extra large headed, thin shank galvanized, barbed roofing nails and cement included in each roll. In three weights, medium, heavy and extra heavy, minimum weight, 40, 50 and 60 lbs. to the square, respectively.

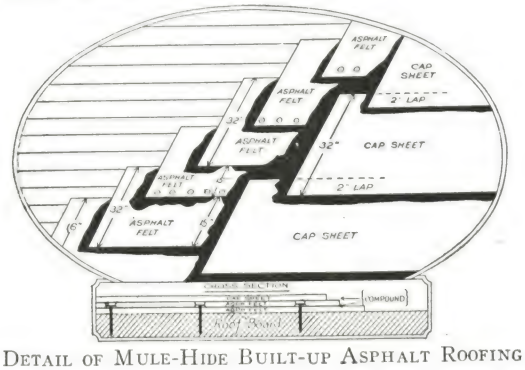
Mule-Hide Slate-Kote Roll Roofing—Surfaced with either red or gray-green crushed slate, 32 in. wide, put up in rolls containing 108 sq. ft., complete with nails and cement. In two weights; 90 lbs., also Mule-Hide Slate-Kote extra heavy, 105 lbs.

Insulating Paper

A waterproof insulating paper used in the walls of refrigerators, coolers, butchers' boxes, refrigerator cars, etc., and has both waterproof and insulating qualities, such as furnished to the leading refrigerator car lines and railroads operating in the United States. Furnished with widths up to and including 112 in., in weights of 80, 90, 110, 125, and 160 lbs. per 1000 sq. ft.

Built-up Asphalt Roofing

The modern protection for permanent structures—modern because it is more efficient. Its base consists of Mule-Hide Asphalt felt, thoroughly saturated with Mule-Hide waterproof asphalt. This same asphalt is used in mopping between the layers of felt. Specifications furnished on request.



Detail of Mule-Hide Built-up Asphalt Roofing

Waterproof Building Papers

Seal-Skin and Black Bear Waterproof building papers are far superior to red rosin papers because they will not split or crack in any temperature. These waterproof papers are especially suitable for use in cold climates as they furnish an excellent insulation and effect a decided saving in fuel.

Seal-Skin Waterproof Building Paper—For lining and sheathing walls and floors of houses, refrigerators, cold storage plants, icehouses, etc., for lining shipping cases, covering new cement sidewalks, etc. In rolls containing 500 sq. ft.; weight, from 40 to 45 lbs.; 36 in. wide.

Black-Bear Waterproof Building Paper—Desirable for lining and sheathing between walls or floors of houses, barns, poultry houses, refrigerators, etc. In rolls containing 500 sq. ft.; weight, from 30 to 35 lbs.; in widths of 32 or 36 in.

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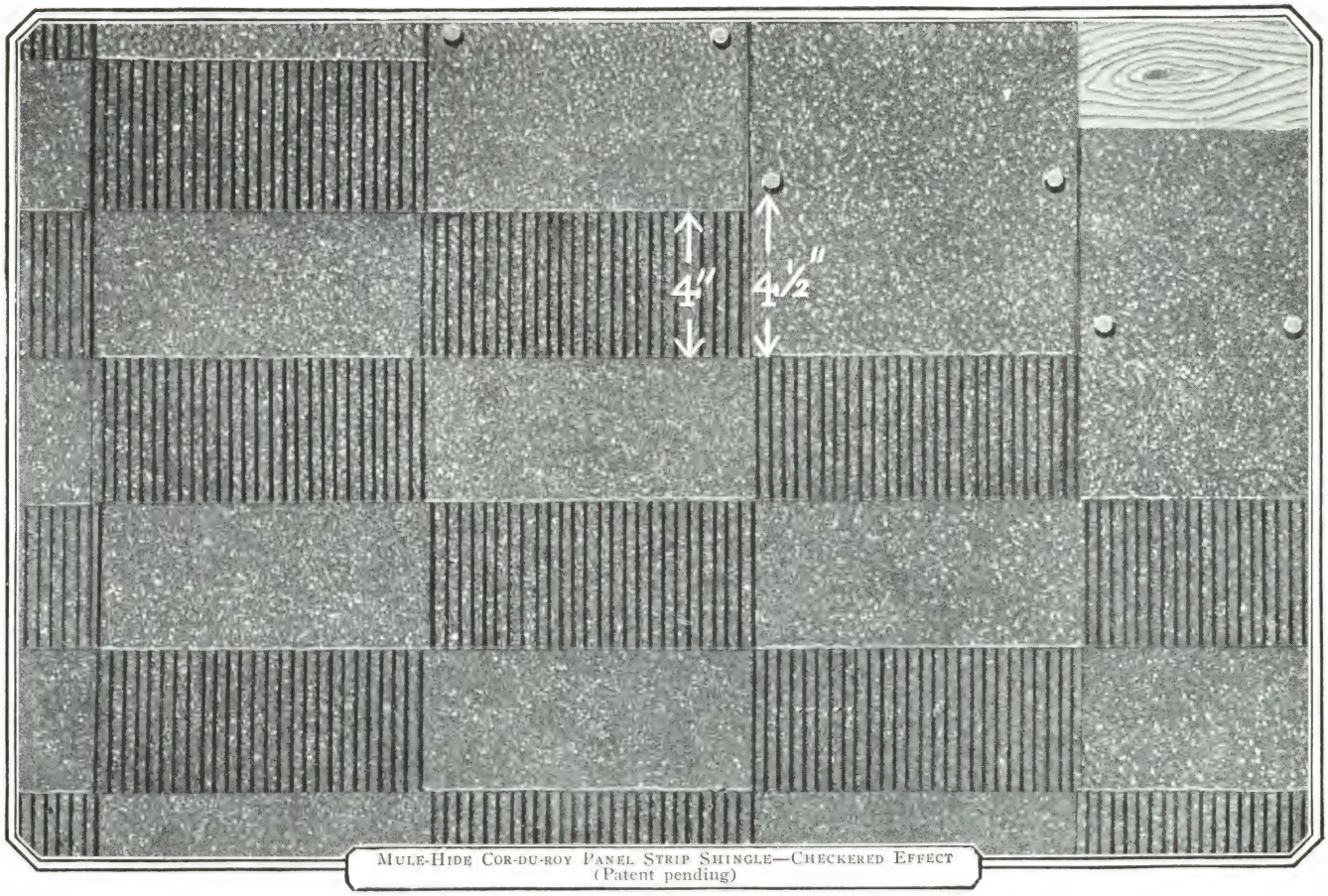
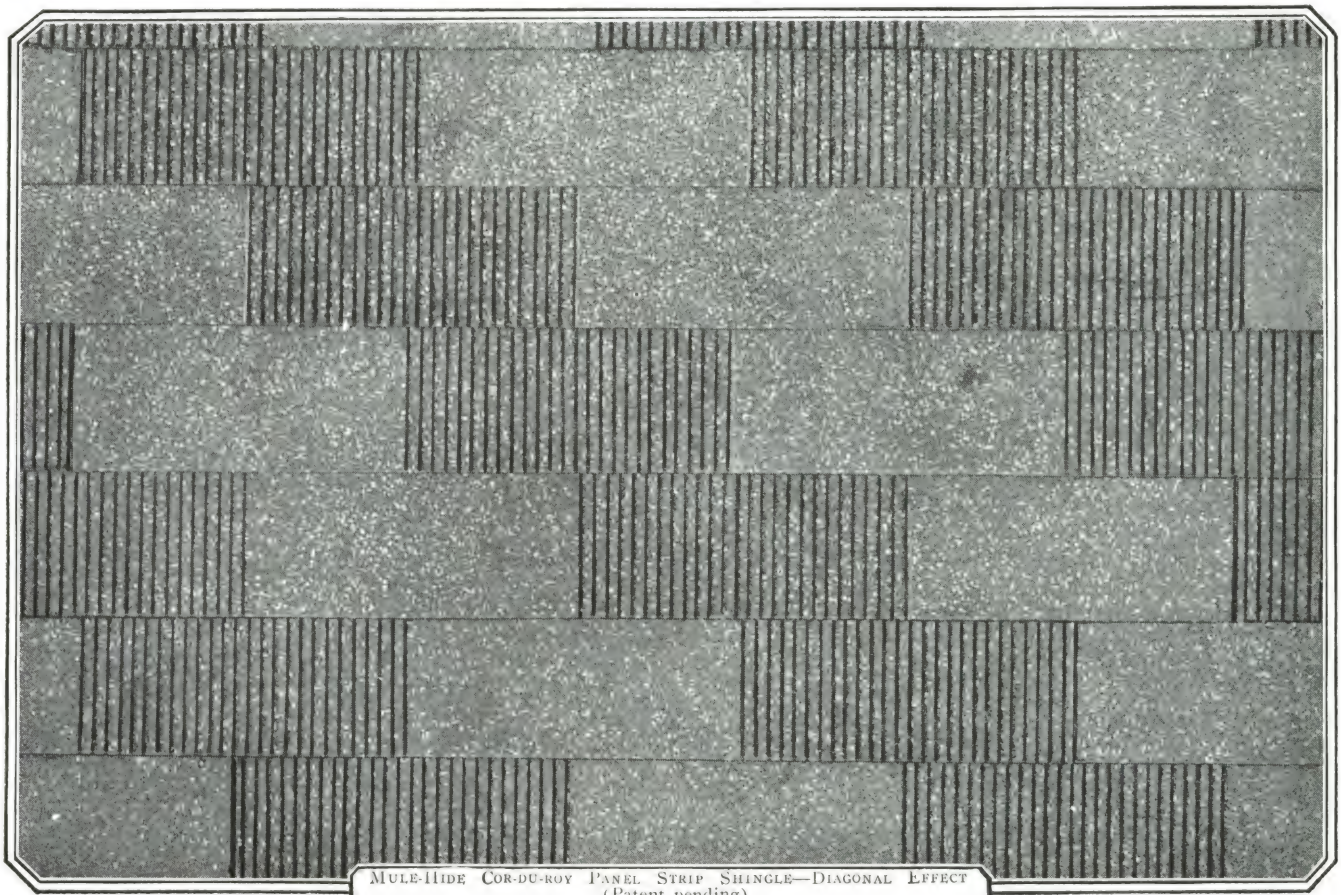


MULE-HIDE COR-DU-ROY PANEL STRIP SHINGLE—CHECKERED EFFECT
(Patent pending)



MULE-HIDE COR-DU-ROY PANEL STRIP SHINGLE—DIAGONAL EFFECT
(Patent pending)

ESTABLISHED 1868 INCORPORATED 1901

THE H. M. REYNOLDS SHINGLE COMPANY

Originators of the Asphalt Shingle

GRAND RAPIDS, MICH.

Products

REYNOLDS SHINGLES; REYNOLDS MINERAL SURFACED ROLL ROOFINGS.

APPROVED BY THE TRADE MARK H.M.R. ESTABLISHED 1868 UNDERWRITERS LABORATORIES

Reynolds Shingles (Individual and Multiple)

Reynolds shingles are made in two types: individual, 8x12½ in.; multiple, four 8x12½-in. shingles on one strip.

The felt used in their manufacture must meet our quality requirements and specifications before it is approved for use. This felt base is super-saturated with pure asphalts, coated with a heavy layer of asphalt and surfaced with natural colored minerals in shades of reds, greens and grays. Minerals are not rolled; their rugged surfaces weather to the best advantage and the method by which they are welded to the shingle itself prevents their sloughing or wearing off.

The shingle surface never requires painting, but *grows more beautiful with age.*

Reynolds shingles were subjected to a 10-year test in actual service on roofs before they were put on the market. They are the only asphalt shingles that have given service on roofs since 1901. Many of these 15-to 20-year old roofs are still in excellent condition.

Reynolds multiple (strip) shingles are made from the same quality materials as the individual shingles and may be obtained in surfacings identical with those of the individual shingles. When laid, they present the same appearance as the individual shingle roof.

Adaptability—Reynolds shingles are adaptable for use on roofs of quarter pitch or greater. They are especially suitable for thatched roof effects, eyebrows, dormers, Spanish tile and other feature designs of roofs which embrace curved surfaces.

Many architects are using them to good advantage on sidewalls to obtain brick effects. When used in this manner, shingles should be exposed 2½x8 in. In order to save materials, the shingles may be cut into two pieces, each 6¼x8 in. When laid correctly, they can be hardly distinguished from real brick.

Surfaces and Brands—*Red or Green Slate*—The standard Reynolds shingle, either individual or multiple, having a surfacing of red or green granulated slate.

Red or Green Rock—Same as above but having red or green rock surfacing.

Pioneer—Same as above but surfaced with natural gray Michigan rock.

Weights and Packages—All weights are subject to variations. Our individual shingles usually weigh from 240 to 260 lbs. per square; the multiple shingles weigh 200 lbs. or more per square.

Individual shingles are packed in quarter-square bundles of 106 shingles each; multiple shingles are packed in half-square bundles of 56 strips each.

Fire-safe—Reynolds shingles have proved themselves to be fire retardants of prime preventive value. They are approved by the Underwriters' Laboratories, Inc., and obtain a preferred insurance rating.

Guarantee—Reynolds shingles, when laid according to directions, are guaranteed for a period of 10 years against any defects whatever in materials or workmanship. New shingles furnished free of charge to replace any shingles that prove defective.

Specifications—"Roof to be covered with Reynolds shingles manufactured by THE H. M. REYNOLDS SHINGLE COMPANY of Grand Rapids, Mich. Shingles to be (insert here color and brand). Roofing boards to be ⅞-in. seasoned lumber (no boards wider than 3 in.) to be laid close, not allowing more than 1 in. space between. All flashings to be of good 'old style' tin. All shingles to be laid 4 in. to the weather and nailed with 2 nails 4½ in. from the lower end and 2½ in. from the edges. One-half inch space to be left between shingles. First course to be laid double with broken joints projecting on metal drip edge or lip."

Note: Sheet roofing with same surfacing as shingles is recommended for valleys. Ridges and hips may be covered with sheet copper or galvanized iron, but it is recommended to use Reynolds shingles as shown on pages 8 and 9 of "Directions for Laying," which will be sent on request. Explicit directions for laying are contained in each bundle.

Reynolds Mineral Surfaced Roll Roofings

Quality roof coverings, suitable for use on all roofs of 1-in. or more fall to the foot. They are surfaced with non-fading minerals in colors and surfaces identical with Reynolds individual shingles. Directions for laying, cement and nails packed in each roll. A 6-in. lap should be used on all roofs having less than a 4-in. fall per foot and should be applied with hard cement.

Brands and Surfaces—*Ideal Red or Green*—Surfaced with red or green slate; weight, about 80 lbs.

Peninsular—Green rock surfacing; weight, about 80 lbs.

Buckeye—Red rock surfacing; weight, about 80 lbs.

Gibraltar—Gray rock surfacing, weight, about 80 lbs.

Ideal Granite—Natural Michigan gray rock extra heavy surface; weight, about 100 lbs.

Ideal Granite (6-in. Lap)—Same as above but having a 6-in. lap. Suitable for large roofs having only 1-in. fall per foot.

Reynolds Shingle-Tile Roofs (Patented Oct. 17, 1916, No. 1201811)

Reynolds Shingle-Tiles meet the demand for a tile roof covering without the great weight or expense incurred by the use of cement or clay tiles.

Reynolds standard shingles are used for this purpose and the effect is produced by the method of laying. They are not noisy like metal, never need painting, will not rust and are non-conductors of heat and cold. Unlike baked tiles which are often underbaked or baked too hard, these shingle-tiles are never porous and will not disintegrate, neither are they brittle, nor discolored. Reynolds Shingle-Tiles are absolutely impervious to moisture. Their mineral colored surfaces will weather to soft harmonious shades of red, green or gray, depending on the surfacing employed. They are fire-safe and the expense is nominal when compared to other tiles of like style.

These constructions are not experimental. They have been subjected to tests under the most adverse conditions and have proved themselves to be durable, attractive and economical. Reynolds Shingle-Tiles have given service on roofs since 1914. After 8 years service in a hot southern climate, they are more beautiful and as good as ever. Reynolds roofs always *grow more beautiful with age.*

Continued on next page

Adaptability—*Spanish Tile Construction No.* 1 for large buildings such as club houses, schools and public buildings in general. *Spanish Tile Construction No.* 2 is similar to No. 1 except that it is somewhat tighter and suitable for all medium size buildings. *Spanish Tile Construction No.* 4 for all sizes of buildings, especially dwellings. *Shingle V-Tile Construction No.* 5 for all sizes of buildings, especially dwellings.

Specifications for Construction No. 1—

Note: This construction should not be used on a roof having less than 30° pitch without slater's felt laid under the shingles and over the prepared woodwork.

Provide purlins or trusses not over 8-ft. centers if 2x4-in. rafters are used. Apply rafters horizontal instead of vertical; need not be closer than 3-ft. centers. Rafters may be blocked up to take care of curves in roof surface. Curves, where used, should be long enough to take the bend of a 2x10 in. laid flat or kerfed, or if shorter, use short pieces of the "cut" 2x10 in. Nail ⅞x6-in. sheathing boards in straight square lines up and down the roof, spaced 10-in. centers. Have 2x10-in. joist ripped as per full size detail, nailing the 2 small pieces together to form a full section. Where roofs join walls and at edges of gables, start with a half "cut" piece. Nail the "cut" 2x10-in. pieces on the ⅞x6 in., spacing them 10 in. on centers and keep in straight lines up and down roofs. Eave ends of these are cut off square, showing a projection of about ½ in. at bottom in front of the eave board, behind which the eave boarding or ⅞x6-in. boards should stop. The ⅞ x6-in. boards should be 1½ in. apart at their ends on the hips and ridges, making a seat on which to nail the 2x2-in. pieces which should be set to a line. Nail on the sloping ⅞x6-in. pieces as shown in detail. Sheet the valleys, close the width shown and, before the "cut" 2x10 in. pieces are laid, nail a line of lath 10½ in. on either side of the valley center. "Cut" pieces lay on these and are held clear of valleys.

Reynolds Shingle-Tile Roof Construction No. 1 Covering St. Petersburg Country Club House, St. Petersburg, Fla.
This roof was laid in 1914

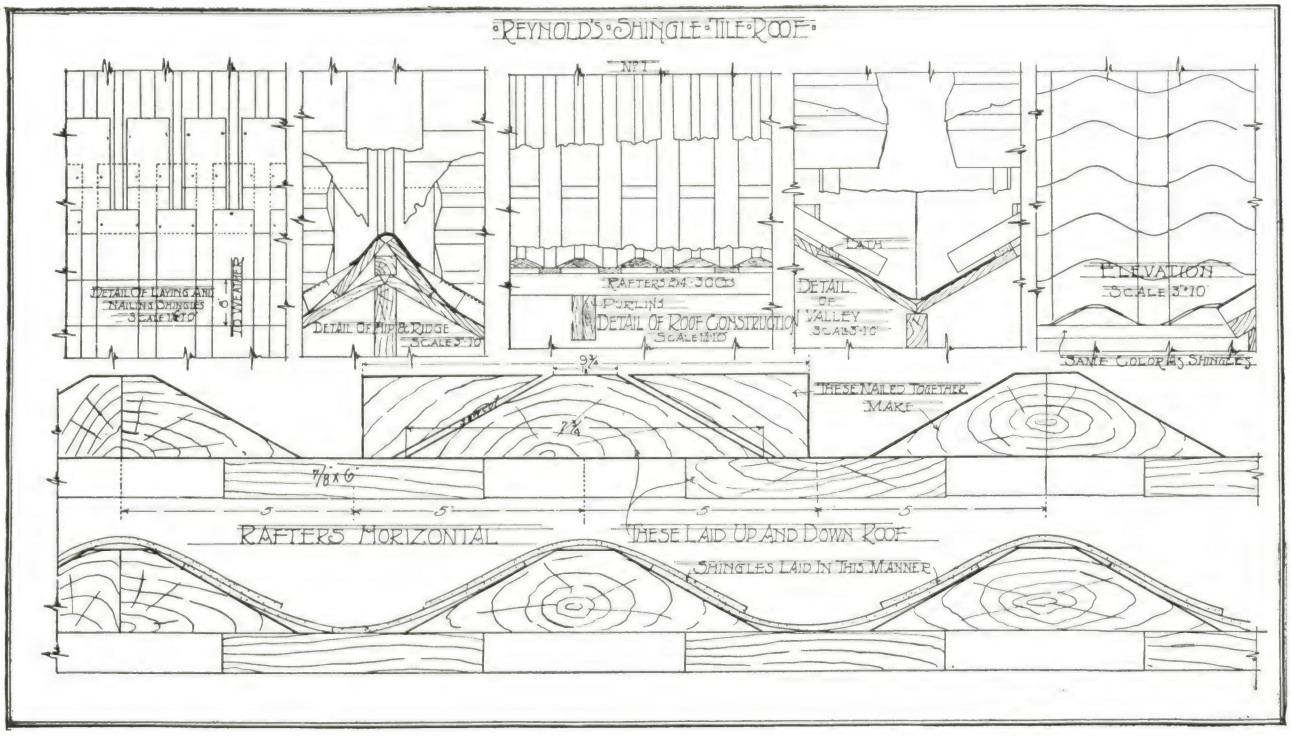
Shingling—Before starting shingling, cut a roll of roofing (same make as shingles) into 2 parts, one 20 in. wide and the other 12 in. wide. Lay 12-in. strip in center of valley and cover with 20-in. strip, having each continuous from end to end of valley. Slip these strips up under overhanging "cut" pieces and turn upper end over ridge on hip; then nail at upper end only, thus a new valley can be put in at any time without disturbing roof except at upper end. Shingling may proceed up and down in valleys or across roof. Snap a chalk line across roof in lines 8 in. apart, which will leave a mark on top of "cut" pieces. This line is not covered by valley shingles and gives a clear guide for roll course. Press both valley and roll shingles firmly down in place when nailing. Bend roll shingles in hands before laying.

Put 2 large head galvanized nails to each shingle at points shown. This gives 4 nails for valley shingles. At hips and ridges, turn valley and roll shingles over the top, exercising care that side laps are properly made to turn water. Shingle hips and ridges, turn valley and roll shingles over the top, exercising care that side laps are properly made to turn water. Shingle hips and ridges with shingles laid crosswise and showing 4 in. to the weather. Cover lower ends of hips with pieces of shingles lapped and nailed up under shingles and nailed at lower edge. Have painter stain or paint eave and valley ends of "cut" pieces same color as surfacing used.

Note: Blue-printed specifications for this and other styles may be obtained from authorized Reynolds dealers or from The H. M. Reynolds Shingle Company of Grand Rapids, Mich. No charge to recognized architects or contractors.

Patent Rights—Reynolds Shingle-Tile constructions are protected by letters patent issued Oct. 17, 1916.

Authority to use these constructions is hereby granted free of charge when Reynolds shingles are used. If these constructions are used with any other shingle or roof covering, royalties must be paid for the privilege of using them.



Details of Reynolds Shingle-Tile Roof (Patented Oct. 17, 1916; No. 1201811)

McHENRY-MILLHOUSE MFG. CO.

Manufacturers of Asphalt Shingles

MAIN OFFICE
SOUTH BEND, IND.
FACTORIES: SOUTH BEND, IND.; FULTON, N. Y.; BALTIMORE, MD.

Products

ASPHALT SHINGLES, Individual, Slab, Arro-Lock; ROLL ROOFINGS.

Also manufacturers of Felts, Building Paper, Roof Coatings.

TRADE-MARK

Veribest Asphalt Shingles

These individual shingles are made on a thicker and heavier felt base than ordinary asphalt shingles. They are much heavier to the square foot and therefore give better service, not only for the first few years, but for the many years to follow.

Special Advantages—Veribest asphalt shingles are fireresisting; they are attractive; they require no painting; their colors are fadeless; they cost no more than wooden shingles; they save insurance; they make the house warmer; they are almost indestructible; no special construction of roof is necessary; they will not warp nor curl.

Quality and Size—Veribest asphalt shingles are 8 in. wide by 12¾ in. long with 4 in. of the length exposed to the weather. When the shingles are laid, they form three thicknesses of absolutely waterproof materials. They give an up-to-date roof, which, in addition to being waterproof, is firebrandproof, and a non-conductor of heat and cold.

Where Used—Veribest shingles are made especially for all classes of residences or public buildings where either wood, slate or tile shingles might ordinarily be used. They are particularly suitable for tops of porches, bay windows or dormer windows, as their great pliability permits a perfect fit in any corner or angle.

Finish—These shingles have a most attractive finish or coating and the coloring is the natural tint of crushed rock with which it is coated, therefore they are absolutely fadeless. There are two colors: dark red and greenish gray.

Packages—Veribest shingles are packed one-quarter square to the bundle and weigh about 235 lbs. per square. One square covers 100 sq. ft. of roof with allowance made for all laps.

Arro-Lock Shingles

Arro-Lock shingles (patent applied for) lock in place by a most simple process. A machinemade cut or slit, on both sides, 2 in. above the shingle-butt, provides the interlocking feature. Each shingle locks in with each other shingle, through these butt slits. The Arro-Lock is thus formed, when the tab points made by these slits fit tightly up and under the shingle corners.

Special Advantages — Arro-Lock asphalt shingles form a locked-on-tight roof; strong winds or storms can not pry or blow them up; they are distinctively different in design; cost less by one-third to buy; cost less by one-third to apply on account of the saving in time, labor and nails.

Quality and Size—Arro-Lock asphalt shingles are made of the best materials; they are tough, strong and pliable, waterproof and fire resistant. Size is 16x16 in.

Where Used—Arro-Lock shingles may be used for same class of structures that are recommended for the Veribest shingles. Their shape and added security gives them the preference. The choice however depends mainly on individual taste.

Finish—Arro-Lock shingles are finished in rich, mellow-tone natural red or green, permanent, non-fading colors.

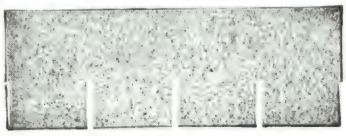
Packages—46 shingles per bundle; 92 shingles per square; 2 bundles per square; approximate weight, 135 lbs. per square.

Slab Shingles
(4-in-1—10x32 in.; also 12½x32 in.)

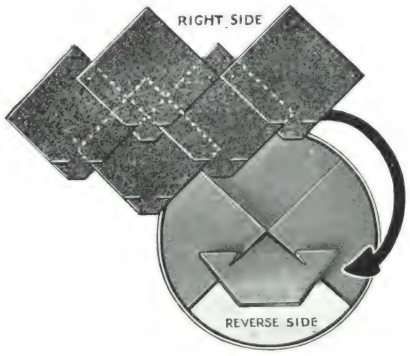
McHenry-Millhouse slab "4 in 1" asphalt shingles are made for those desiring a high grade, economical shingle roof. High grade, because they are made by highly skilled and painstaking workmen who use only the best materials obtainable. Economical, because they are laid *four-at-a-time*.

When laid they look exactly like individual shingles. In laying a slab shingle, one handling is equal to four handlings of individual shingles and only five nails are used instead of eight.

They are made of natural slate in two colors; red and green. The colors positively can not fade because *natural slate* is used. The same heavy felt and other select materials used in the manufacture of our individual shingles also go into our "4 in 1" type. This means that they are extra thick and possess a slate surface which never wears off. Approximate weight: 10-in. width, 185-190 lbs. per square; 12½-in. width, 250 lbs. per square.



SLAB SHINGLE



ARRO-LOCK SHINGLES

Prepared Roll Roofings

Prepared roofings in rolls bearing the McHenry-Millhouse trade-mark are as good as can be had. They are practical for gable roofs and for flat roofs having a fall of not less than 1 in. to the foot. They can be depended on to insure dry, comfortable buildings in all sorts of weather. Red or green natural slate; also black and gray plain. Pliable like rubber, they last for years. Rolls contain 108 sq. ft., 32 in. wide, and are manufactured in various weights. Nails and cement furnished with all roll roofings.

SERVICISED PRODUCTS CO.

(Not Incorporated)

Manufacturers of Asphalt and Asbestos Shingles and Roofing

TELEPHONE
RANDOLPH 0755

First National Bank Building
CHICAGO, ILL.

Products

Manufacturers of INDIVIDUAL, STRIP and SLAB ASPHALT SHINGLES; ASBESTOS CEMENT SHINGLES; LAP CEMENT TAPES; SEAM CLEATS; ASPHALT PAVING EXPANSION JOINTS.

Also Slate Semicomposition Roofing, Asbestos Pipe Covering, Cold Water Paint, Mastic Tapes, Fiber Floor Covering (Industrial), Roofing Paints, Plastic Cements; Roll Roofings, Plain and Printed.

TRADE-MARK

Standard Individual Asphalt Shingles

Coated with non-fading slate of best quality; the backs are sealed, and felt body is constructed of very best grades of felt with full saturation, adapted to be laid 4 in. to the weather. Packed 220 to 240 lbs. to the square, in the green or red.

"Everstick" Sticky Back Asphalt Shingles (Patents Pending)

Identical with standard individual shingles but provided with a sticky back, extending 5 in. from one end of shingles. Designed to prevent blowing up in wind and curling.

Packed back to back so that when separated the adhesive is agitated and in proper condition for laying. Packed 170 lbs. to the square, and a square contains 312 shingles, when laid 5 in. to the weather. The sticky mastic is placed over the sealed back of shingles.

Four-in-one Strip Asphalt Shingles

Covered with non-fading slate in the red or green, and have felt body fully saturated, containing best grade of felt. Weight approximately 190 lbs. to the square, containing 4 shingles to slab.

Four-in-one Offset Slab Asphalt Shingles (Patents Pending)

Contain 4 shingles to slab, slightly offset at edge so that shingle has appearance of being at least ⅜ in. thick at base. This slab shingle is the fastest laid roofing on the market and is the most beautiful of any shingle design, having a deep, rugged appearance. Can not blow up in the wind or curl. Packed 200 lbs. to the square, each square containing 90 slabs.

"Interlock" Self-spacing Asphalt Shingles (Patents Pending)

Laid 6 in. to the weather and present a beautiful woven combination in red or green non-fading slate. These shingles can not blow up in the wind, and they make an unusually attractive roof covering. Packed 150 lbs. to the square, containing 268 shingles.

Three-way Self-spacing Asphalt Shingles

Provided in the red or green non-fading slate, and can be spaced ⅜, ½ or ¾ in. apart. Very beautiful effects are obtainable, and an irregular appearance is obtained by irregular spacing, or the shingles can be spaced alike. Prepared with the sticky back or without, as desired. When provided with sticky back they are prepared 312 shingles to the square, and without the sticky back, 424 shingles to the square.

Self-spacing registering shingle also manufactured.

Four-in-one Hexagon Strip Asphalt Shingles (Patents Pending)

These shingles are offset on a foundation sheet giving very heavy border lines, and making a very effective roof covering in the red or green. They approximate 200 lbs. to the square, are as quickly laid as the Servicised Four-in-one Offset shingles, and make a highly desirable roof covering.

Asbestos Cement Shingles

Especially fabricated to be laid the American method, with ½-in. spaces, and in following designs:

Green shingles, white spacings	Gray shingles, white spacings
Green shingles, black spacings	Gray shingles, black spacings
Green shingles, red spacings	Gray shingles, red spacings
Red shingles, white spacings	Gray shingles, green spacings
Red shingles, black spacings	Purple shingles, white spacings
Red shingles, green spacings	Purple shingles, black spacings
Red shingles, red spacings	Purple shingles, green spacings

Approximately 214 shingles to the square when using 8x11-in. shingles. The cement shingles are alternated with foundation sheets.

Servicised asbestos shingles are laminated, making a tough, pressure resisting cement and composition roof. Requires half the shingles usually necessary.

Slate Roofing

The slates have a heavy cushion between so that the nail contact is with the heavy roofing and not with the slate.

This roofing costs less to ship, is absolutely fireproof and has a more defined outline of slate layers. It can not be distinguished from a regular slate roof.

Lap Cement Tapes

Masty sticky tapes are provided with roll roofings instead of the black lap cement usually provided, which must be applied with paint brushes in the old way. Lap cement tapes are unrolled along the 2-in. edge of the roofing sheet, and save from 15 to 20 minutes in application per square. They make a better and stronger joint and do not soil the roofing sheet in application.

Seam Cleats

Overlap all roofing seams, thus making a fireproof metal edge. The nail bosses are staggered so that sheathing boards can not be split in nailing. They improve the roofing hold at least 25%. By reason of their construction they direct the water away from the seams and form excellent dripping plates along the eaves of roof.

Asphalt Expansion Joint (Patents Pending)

Servicised expansion joint, Type A, Type AA and Type B, is used for construction purposes wherever it is desired to provide for expansion and contraction in floors, walls, sidewalks and pavements.

THE VULCANITE ROOFING COMPANY

(DIVISION OF THE BEAVER BOARDS COMPANIES)
ADMINISTRATION OFFICES
BUFFALO, N. Y.

THOROLD, ONT. LONDON, ENG.

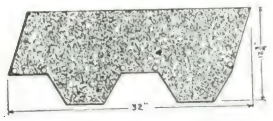
DISTRICT SALES OFFICES
NEW YORK, N. Y. ALBANY, N. Y. BUFFALO, N. Y. CHICAGO, ILL. CINCINNATI, OHIO KANSAS CITY, MO.

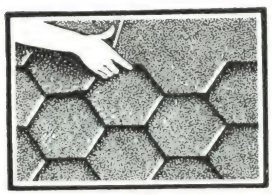
Products

VULCANITE SHINGLES: Hexagon Slab Shingles, Doubletite Slab Shingles, Self-spacing Shingles, 4-in-1 Slab Shingles, Standard Individual Shingles; VULCANITE SLATE and SMOOTH SURFACED ROLL ROOFINGS; VULCANITE BUILT-UP ROOFING and a complete line of BUILDING PAPERS.

Vulcanite Hexagon Slab Shingle

This is a patented Vulcanite shingle, of exclusive design. It is built of the best quality Vulcanite felt and asphalt, heavily surfaced with natural color crushed slate, red or green. It spaces automatically, gives double thickness at every point and triple thickness at the butts. It is admirably suited for laying over old wood shingles. It builds a beautiful, tilelike roof that is highly fire resisting and proof against any kind of weather. These are packed in two bundles, in all 112 slabs, to the square. Two weights of shingle are made: Standard, which weighs approximately 205 lbs.; and Jumbo, which weighs approximately 265 lbs., to the square.



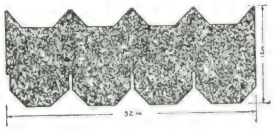


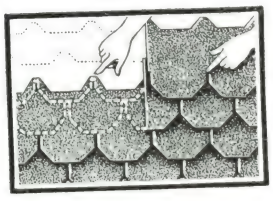
HEXAGON SLAB SHINGLE
Note the width and depth of this shingle

Vulcanite Doubletite Slab Shingle

The Doubletite has all the advantages of low cost and quick application found in the usual slab shingle, plus better looks and greater protection. It forms a pleasing tile pattern and the triangular tabs are placed so that they back up the slots in the second shingle above. This design, together with the extra width, gives protection offered by no other similar shingle. Made of the same high quality materials as the Hexagon slab.

These shingles are made in the standard weight only and are packed in two bundles, 112 slabs weighing 195 lbs. to the square. Are made with red, green or gray-black crushed slate surface.





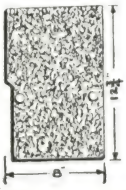
DOUBLETITE SLAB SHINGLE

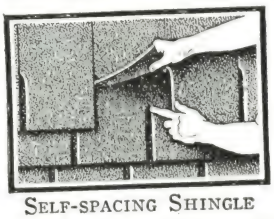
Vulcanite Standard Individual Shingle

This shingle is built of the same high quality of felt and asphalt as the other vulcanite shingles. Standard and Jumbo weights. Surfaced with red, green, or gray-black crushed slate.

Vulcanite Self-spacing Shingle

This patented Vulcanite shingle builds a tighter, better looking roof than the ordinary individual shingle and with a great saving in application cost, because of its patented shoulder. The shoulder fits tightly against the side of the next shingle, perfectly sealing the roof and eliminating the need of measuring or estimating the width of the slots. Laid 4¼ in. to the weather it builds a triple thick roof with double thickness at the slots. These are packed four bundles to the square. Standard weight, 4¼ in. to the weather, 408 shingles, approximately 230 lbs. to the square. Jumbo weight, 4 in. or 5 in. to the weather, weighing approximately 320 lbs. and 265 lbs. respectively, to the square. Are made with red, green or gray-black crushed slate surface.



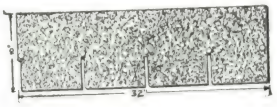


SELF-SPACING SHINGLE

Vulcanite 4-in-1 Slab Shingle

For economy in laying as well as first cost, this shingle gives the maximum of service per dollar. It builds a tight roof of long wearing quality. It can be laid right over old wood shingles to advantage.

These are surfaced with red, green, or gray-black crushed slate, and come in standard and Jumbo weights.



4-IN-1 SLAB SHINGLE

Vulcanite Roll Roofings

There is a Vulcanite roll roofing for every need. The slate surfaced is of the highest quality felt and asphalt, surfaced with natural color crushed slate—red or green—or in various shingle patterns known as Vulcanite Ornamentals. Standard weight approximately 85 lbs. and Jumbo weight approximately 105 lbs., to the square. Vulcanite smooth surfaced roofings are furnished in weights of from 35 lbs. to 90 lbs. to the square and finished in sand, mica, or talc. There is a style to meet any requirement of price and service.

Vulcanite Built-up Roofs and Building Papers

Vulcanite built-up roofs, constructed of the finest of felt and asphalt under Vulcanite Specifications, have an attractive guarantee and they are giving troubleproof service on many of the largest industrial and business buildings in the country.

There is a complete line of Vulcanite building papers.

Distribution Facilities

Vulcanite roofing is sold by lumber and building material dealers everywhere. Our factories and warehouses all over the country insure low freight charges and prompt shipment. Samples and literature gladly furnished on request.

CREO-DIPT COMPANY, INC.

STANDARD STAINED SHINGLE CO.

Manufacturers of Stained Shingles

GENERAL OFFICES, WAREHOUSE AND FACTORY

NORTH TONAWANDA, N. Y.

BRANCH FACTORY FOR WESTERN TRADE

MINNESOTA TRANSFER, ST. PAUL, MINN.

SALES OFFICES IN PRINCIPAL CITIES

Products

"CREO-DIPT"
TRADE-MARK

Originators and sole manufacturers of "Creo-Dipt" Stained Shingles for both roofs and sidewalls, preserved with creosote; delivered to the job all bundled; stained any shade desired.

"Creo-Dipt" Thatch Stained Shingles to produce the Thatched Effect.

"Creo-Dipt" Shingle Stains, including "Creo-Dipt" Dixie White Stain.

"Creo-Dipt" Zinc Coated Hot Dipped Cut Shingle Nails.

Originators and Sole Manufacturers of "Creo-Dipt" Stained Shingles

Creo-Dipt Company, Inc., with general offices and factories at North Tonawanda, N. Y., and Minnesota Transfer, Minn., is the pioneer in the production of stained shingles. It is the only concern manufacturing stained shingles exclusively and is the originator and sole manufacturer of "Creo-Dipt" stained shingles. The latter have been on the market for over 14 years and have stood the test against all conditions.

"Creo-Dipt" stained shingles are being specified by leading architects throughout the country, indorsed by responsible contractors, approved by home builders, and the most prominent lumber dealers are recommending and selling them to their customers for both roofs and side walls.

Shipped to All Parts of the Country

"Creo-Dipt" stained shingles are shipped in perfect safety to all parts of the United States from our North Tonawanda, N. Y., and our Minnesota Transfer, Minn., plants.

"Creo-Dipt" Stained Shingles

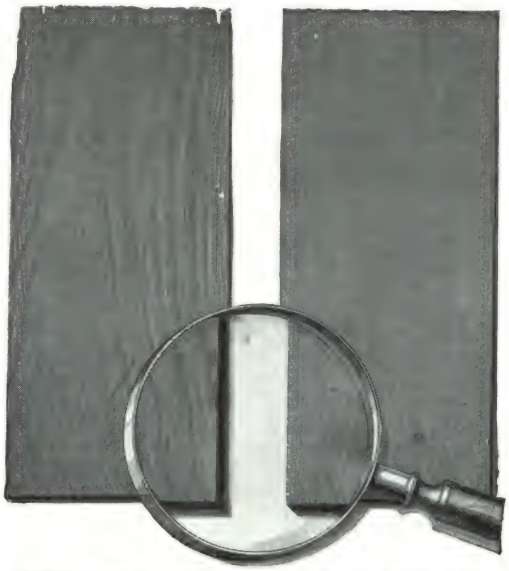
Co-operative Service

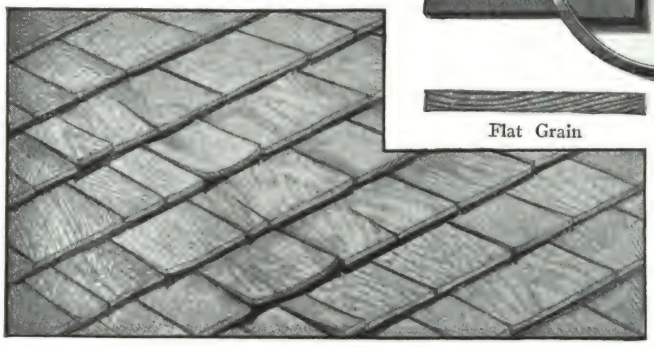
A service department is maintained to co-operate with architects, contractors and home builders. We go over plans carefully, criticising them if requested, and offering suggestions, giving approximate quantity of "Creo-Dipt" stained shingles required and other information which is of necessary assistance in obtaining the very best results, especially for thatched roofs.

Why 100% Vertical Grain Shingles Should Be Used for Both Roofs and Sidewalls

"Creo-Dipt" 100% vertical grain shingles are the best grade shingles obtainable. The timber is sound and free from imperfections and the shingles are as nearly perfect as is possible to manufacture. They will not rot, split or curl. No such shingles are obtainable in the open market, as the grading rules of the open market permit a very large percentage of flat grained shingles. *All "Creo-Dipt" shingles are vertical grain.*

The difference between the appearance of the vertical grain and edge grain shingles is clearly shown in the accompanying illustrations. A flat grain shingle after a few years' service will curl, split and rot on account of the nature of the timber from which they are cut.





Showing how the Flat Grain Shingle, after a few years' service, will curl, split and rot.

100% Vertical Grain Shingles are sound and free from imperfections They will not rot, split or curl.

Comparison of Flat Grain and Vertical Grain Shingles

Continued on next page

Creosoting Shingles to Preserve Them

Creosote is the best known wood preservative. Wood treated with it is not subject to dry rot or other decay, and no process of wood preserving is better established than the process that "Creo-Dipt" stained shingles undergo. "Creo-Dipt" stained shingles will last twice as long as shingles painted, brush coated or treated in any other manner.

"Creo-Dipt" shingles are dipped by our process so that each shingle is entirely protected by the creosote.

Superiority of Our Factory Dipped Shingles Over Shingles Dipped on the Job or in Any Other Manner

Shingles in order to properly absorb the creosote, must be perfectly dry before being dipped. Shingles dipped on the job are rarely if ever dry before being dipped. This damp condition prevents the proper penetration of the creosote and the coloring pigment, even though the dipping is carefully superintended. The preserving qualities are therefore diminished and the shades are not permanent.

"Creo-Dipt" shingles are all seasoned and kept perfectly dry before being dipped. Our process of creosoting and coloring "Creo-Dipt" shingles causes each one to be treated separately. The creosote, by this method, has perfect conditions for penetrating and the preserving is sure and thorough. The coloring pigments are carried into the wood so that the shades are uniform and permanent.

Guaranteed Quality of "Creo-Dipt" Shingles

All sizes and grades of "Creo-Dipt" shingles are guaranteed 100% vertical grain British Columbia red cedar shingles. They are sawed from logs cut from the best portions of selected first growth live timber and not from stumpage left in the forest. Shingles cut from old stumps (cheap grades of shingles) will always curl and rot. "Creo-Dipt" shingles are all parallel widths and free from sap and imperfections.

Economy of Using "Creo-Dipt" Stained Shingles

Labor Saving—"Creo-Dipt" stained shingles are handled more easily and quickly than shingles stained on the job. The bundles can be carried intact to the place where they are required, greatly reducing the labor of handling as required by loose dipped shingles.

They save the labor of dipping and the cost of an additional brush coat which is usually necessary when shingles are treated on the premises.

Cost—"Creo-Dipt" stained shingles cost 25% less than shingles dipped on the premises or which are painted. They cost at least 50% less to lay; the results are as anticipated and not a disappointment, as is often the case when the shingles are treated in any other manner.

Quality—The shingles, being guaranteed clear and 100% vertical grain British Columbia red cedar, are superior to any that can be bought in the open market. All "Creo-Dipt" shingles are parallel widths and free from imperfections.

Sizes and Covering Capacity of "Creo-Dipt" Stained Shingles

We have only one quality of shingles—100% vertical grain clear shingles. The difference in the names refer to the difference in the lengths and thicknesses and not to any grading rules of the open market.

Sizes—In specifying, the name indicating the thickness should be given in addition to the length of the shingles.

"*Creo-Dipt*" *Royals*—24 in. long; random widths; 8/16 in. in thickness at the thick end.

"*Creo-Dipt*" *Perfections*—18 in. long; random widths; 5 shingles will measure 2¼ in. in thickness at the thick end.

"*Creo-Dipt*" *Eurekas*—18 in. long; random widths; 5 shingles will measure 2 in. in thickness at the thick end.

"*Creo-Dipt*" *XXXXX Clears*—16 in. long; random widths; 5 shingles will measure 2 in. in thickness at the thick end.

"*Creo-Dipt*" *XXX Clears*—16 in. long; random widths; 6 shingles will measure 2 in. in thickness at the thick end.

"*Creo-Dipt*" *Thatch Shingles*—16 in. long; random widths; 5 shingles will measure 2 in. in thickness at the thick end. Sawed in various patterns to produce the thatched effect.

Covering Capacity—All shingles are sold on the basis of the square (100 sq. ft.). The table on the second page following gives the covering capacities of a square of shingles at various exposures.

Old Long Island Type of Farm House

Alfred Hopkins, Architect, 101 Park Avenue, New York, N. Y.

24-in. "Creo-Dipt" stained shingles, for wide shingle exposure used on side walls. Color, Dixie White.

18-in. "Creo-Dipt" stained shingles on roof. Color, weathered gray.

Residence of Dr. George W. Hawley, Bridgeport, Conn.

Edward B. Caldwell, Jr., Architect, Bridgeport, Conn.

The wall "Creo-Dipt" stained shingles are 24 in. long for the wide shingle exposure and are of variegated color effect of white, gray, green and black. On the roof, "Creo-Dipt" 16-in. stained shingles are laid, using the same colors as on the walls, with the addition of red and yellow.

Continued on next page

Note: All "Creo-Dipt" stained shingles for the regular shingle work are square sawed, but can be obtained sawed irregular for the thatched and for the old-fashioned shingle effect at a slight additional cost. The thatched shingles for the thatched roof effect are sawed in special patterns for this type of roof construction.

COVERING CAPACITY OF "CREO-DIPT" SHINGLES PER SQUARE FOR VARIOUS EXPOSURES, IN SQUARE FEET

Name	Length, in.	Exposure to weather, inches									
		5	5½	6	6½	7	7½	8	10	10½	11
Royals	24	....	....	....	....	....	75	....	100	105	110
Perfections Eurekas	18	....	100	111	120	129	138	148	....	....	....
XXXXX Clears XXX Clears	16	100	110	120	....	....	....	....	....	....	....

24-in. "Creo-Dipt" Stained Shingles for Side Walls

The larger "Creo-Dipt" stained shingles have come very much into favor with architects and home builders who are designing and building homes a little different from the ordinary shingled house or bungalow. The butts are very heavy and give the appearance of the old-fashioned shingles of colonial days, and are especially suited to the colonial style of architecture. They are usually laid 10 in. to the weather on side walls and 7½ in. on roofs.

"Creo-Dipt" Colors Are Permanent

The colors used in the creosoting and staining of "Creo-Dipt" stained shingles are the strongest and most expensive chemically pure pigments, ground to the finest possible condition in pure linseed oil in our own mills. They are then suspended in a vehicle of pure creosote oil, which is especially refined so it will properly carry the colors without injuring them. They will thoroughly preserve the wood against dry rot and other decay.

Colors Permanent—"Creo-Dipt" stained shingles, being perfectly dry at the time of creosoting, allow the wood to absorb more of the preservative. The ground colors are taken up into the pores in a much greater quantity, obtaining a permanent color that is impossible to procure by the old method of treating on the premises where the shingles have been exposed to the weather and dampness before staining.

Do Not Require a Brush Coat—"Creo-Dipt" stained shingles do not require an additional brush coat in greens, browns or reds, and we do not recommend it for grays, as the effect from our process on grays is highly admired.

Stain Shipped for Retouching, Patching and Cutting—With every order for "Creo-Dipt" shingles, a small quantity of stain to match the color of shingles is shipped for use in retouching shingles which have to be trimmed or cut to fit flashings, valleys and other roofing conditions.

HOME AT RIVERSIDE, N. Y.
DWIGHT J. BAUM, Architect, Riverdale-on-Hudson, N. Y.
24-in. "Creo-Dipt" stained shingles used on side walls for wide shingle exposure. Color, Dixie White for true Colonial white effect. 16-in. 5X "Creo-Dipt" Stained Shingles used on roof. Color, moss green

30 Regular Shades

"Creo - Dipt" stained shingles are manufactured in 30 regular shades. We will make any special shades and submit samples without charge.

A color pad showing all regular shades on red cedar shingles will be sent to architects on request. Shades are shown on shingles sawed 2½x10 in, put up as shown, for convenient handling.

"CREO-DIPT" COLOR PAD

Variegated Effects

Many architects are now specifying "Creo-Dipt" stained shingles for the variegated color effect which is obtained by using two or more shades of "Creo-Dipt" stained shingles. The shingles being stained in equal proportion of each shade selected, are packed in this proportion promiscuously in each bundle. "Creo-Dipt" stained shingles are then laid by the workmen as received. These effects are most artistic, and it is impossible to obtain them in any other manner.

"Creo-Dipt" Dixie White

"Creo-Dipt" Dixie White is a successful white shingle stain. Two brush coats give the desired whitewash effect to the "Creo-Dipt" stained shingles after they are laid, they having been creosoted and stained at our factories with a special preparation No. 207, which acts as filler, primer binder and preservative. We have the only successful method of producing the real whitewash effect. Special samples on request.

"Creo-Dipt" Zinc Coated Hot Dipped Cut Shingle Nails

Since "Creo-Dipt" roofs and side walls are only as good as the weakest nail driven, it is useless to expect perfect, beautiful shingles to live their appointed life of 40 years if they are laid with cheap nails which will rust.

"Creo-Dipt" zinc coated hot dipped cut shingle nails should be used with "Creo-Dipt" stained shingles; the roof and side walls will then last as long as the building itself. No matter how excellent the quality of the "Creo-Dipt" stained shingles, nails that rust accomplish their destructive work. They enlarge the nail holes, the heads come off, and the "Creo-Dipt" stained shingles can be ripped off by the wind.

"Creo-Dipt" nails are rustproof, weatherproof and unaffected by atmospheric conditions.

The first cost of "Creo-Dipt" nails is but little more per house than cheap nails that rust. Cheap nails prove to be very expensive.

Continued on next page

Nail Information—For the "Creo-Dipt" XXX Clears use 3d nails; for XXXXX Clears and Eurekas, use 3d or 3½d nails (the latter preferably); for Perfections, use 3½d nails; for Royals, use 4d nails.

The 3d, 3½d and 4d nails are used for the regular "Creo-Dipt" stained shingle work on roofs and side walls. The 6d nails are used on the rounded sections of the thatched "Creo-Dipt" stained shingle roofs.

NAILS REQUIRED PER SQUARE OF SHINGLES

Nails		Length of shingles		
Size	Length, in.	16 in.	18 in.	24 in.
3d	1¼	4¼ lbs.	3¾ lbs.	.....
3½d	1⅜	5¼ lbs.	4 lbs.	.....
4d	1½	6½ lbs.	5 lbs.	3½ lbs.
6d	2	.....	.....	.....

Important When Specifying

We advise incorporating in specifications the full wording "'Creo-Dipt' stained shingles (giving color, number, grade, width and length desired) manufactured only by Creo-Dipt Company, Inc., of North Tonawanda, N. Y., or Minnesota Transfer, St. Paul, Minn." This will avoid misunderstanding and substitution.

"Creo-Dipt" zinc coated hot dipped cut nails should always be specified for use with "Creo-Dipt" stained shingles to secure a lasting and satisfactory job.

Instructions for Designing and Constructing a "Thatch Roof" With Special "Creo-Dipt" Stained Shingles

Special "Creo-Dipt" stained shingles are furnished for thatched effect roofs, ready for application. If our instructions and details are adhered to, there should be absolutely no trouble in obtaining the desired results. This has been the experience of the architects and contractors who have built this type of roof on the hundreds of buildings in all sections of the country.

The details of the various sections of a thatched roof shown will enable architects and contractors to construct the roof and lay "Creo-Dipt" stained shingles so as to carry out the true thatched idea.

Consultation—When the thatched roof is contemplated, we recommend that plans and specifications be sent to our general offices at North Tonawanda, N. Y., where we maintain a service department to cooperate with architects, contractors and home builders. The plans will be gone over carefully, criticised if requested and valuable suggestions offered. We also estimate approximate quantities of "Creo-Dipt" stained shingles required and give other information which will assist in obtaining best and most artistic results.

No charge for service.

Proper Blocking—At the gables blocking should be constructed with the greatest care and covered with 1 x 2-in. shingle strips running with the roof rafters, which carry the general convex line of roof to meet the running verge board. Shingle strips 1 x 2 in. should also be used on valleys and hips running from eaves to ridges and on eaves running at right angles to rafters.

At the rounding of the gables, blocking should be brought well forward to the verge board and then returned against it; forming in section the arc of a circle. This rounding of the gables is greatest at the apex and diminishes towards the eaves.

Roof Framing—On the main roof, when a decided softening of the gables is wanted, it is often advisable to drop the roof rafters gradually at the ridge for a distance of 3 or 4 ft. back from the verge board. To be effective, the drop at verge board must necessarily be sudden. This roll at gables should be constructed with the greatest care. It has been the fault of some architects and contractors who have used the thatched roof with special "Creo-Dipt" stained shingles to make the roll at gables too short. The accompanying details illustrate the most successful methods of constructing the roof and the proper radius for various conditions. These will make the laying of the special "Creo-Dipt" stained shingles easier and produce the best results.

Properly Laying the Shingle Lath—Caution should be used in building the rounded and flat surfaces, to lay the shingle lath or roof boarding with sufficient spacing to allow for ventilation, as a roof properly ventilated will dry off more quickly after rains and greatly increase the life of the "Creo-Dipt" stained shingles. Do not use roofing paper, felt or any other material, except flashing in the proper places, that will prevent proper ventilation. With good ventilation, the roof will last as long as the house it covers.

Bent Shingles—On the rounding of the gables, on the valleys, eaves, hips and quick turns, and the angles between the side walls of the dormer, it is necessary to use the bent "Creo-Dipt" stained shingles.

On the first course at eaves, square butt "Creo-Dipt" stained shingles bent to a 20-in. radius are used in double thickness, the inside of the butts to be on a plane parallel with the wall of the building. This point is the beginning of a curve using bent "Creo-Dipt" stained shingles, the radius of which is to be not less than 20 in. to the point of merging with the roof line.

"Creo-Dipt" stained shingles, or any other shingles, cannot be bent against the grain or crosswise to a radius of less than 20 in. Our machinery is constructed to bend to this radius, and plans must be drawn accordingly. The "Creo-Dipt" stained shingles bent with the grain or lengthwise to be used on valleys, gables and hips, can be bent to a 10-in. radius. They are flexible and can be used on almost any radius, whereas those bent against the grain or crosswise, are not as flexible.

Home at Scarsdale, N. Y.
Designed by W. Stanwood Phillips, New York, N. Y.
Showing how the true Thatched Roof effect is obtained with "Creo-Dipt" stained shingles

Continued on next page

Nailing Shingles on Rounded Surfaces—On the rounded surfaces of the eaves, use 6d "Creo-Dipt" zinc coated, hot dipped cut nails, nailing as closely to the exposed part of the butt as possible. On the balance of the roof, the 3½d "Creo-Dipt" zinc coated, hot dipped cut nails should be used.

Producing the Thatched Effect—One of the best features of the thatched effect roof is the texture produced by the special thatch "Creo-Dipt" stained shingles being laid out of the horizontal. This produces long, irregular waves, so that the courses vary in exposure to the weather from 1 to 5 in. and with an average exposure of 3 in., or from 2 to 5 in. with an average exposure of 3½ in.

To produce these long, irregular waves, "Creo-Dipt" stained shingles are sawed at the butts in a variety of our special thatch patterns, and are laid with the long side of each shingle to the short side of the previous one until the maximum exposure is reached. To bring the course down again to the minimum exposure, this procedure is reversed, i. e., the short side of each shingle is laid to the long side of the previous one. This manner of laying "Creo-Dipt" stained shingles is carried out on each course of the entire roof surface with the exception of the first at eaves. There should be no uniformity in the courses—that is, the wave of each course should vary.

The best effect on the eaves is gained by laying special "Creo-Dipt" stained shingles from 1 to 3 in. to the weather until the flat portion of the roof is reached.

The thatched effect is better gained on the flat portion of the roof and gable ends by laying the "Creo-Dipt" stained shingles from 1 to 5 in. to the weather with an average exposure of 3 in., rather than from 2 to 5 in. with an average exposure of 3½ in., as is sometimes done for economical reasons. But if 3½-in. exposure is used, hips and valleys must still be laid with 3-in. exposure and it will be necessary to weave in a course now and then, in order to keep to this exposure.

On the rounded ridges, "Creo-Dipt" stained shingles can be used as shown in section B (see page 922) or they can be capped with a suitable metal, preferably copper, rounded to appear from below as a continuance of the "Creo-Dipt" stained shingles. Metal would be somewhat cheaper, but not quite so artistic as the "Creo-Dipt" stained shingles.

We advise the construction of the gutter as shown in our detail, as this arrangement does not hide the rounded eaves, and when painted to match the "Creo-Dipt" stained shingles, it accentuates the droop at the eaves when seen at a distance.

It requires a few more special "Creo-Dipt" stained shingles for a thatched roof than for a regular "Creo-Dipt" stained shingle roof, but it is more durable, as the average exposure is less.

Always use the special "Creo-Dipt" 16-in. British Columbia, XXXXX red cedar shingles, random width, for thatched roofs. They are 100% vertical grain, free from sap, and not wedge shaped. They lend themselves particularly to the process required and since the average exposure is less than for ordinary roofing purposes, they are more economical and suitable.

Standard Specifications for "Creo-Dipt" Thatched Effect Roofs

Shingles—All roof surfaces to be covered with thatched "Creo-Dipt" stained shingles as furnished by the "Creo-Dipt" Company, Inc., of North Tonawanda, N. Y., to produce the thatched effect, following carefully details shown in Sweet's Architectural Catalogue (Seventeenth Edition).

All eaves, gables, valleys, hips and ridges to be covered with bent "Creo-Dipt" stained shingles to carry out the curved idea at all points, as follows:

"Creo-Dipt" stained shingles bent across the grain or crosswise, for eaves and ridges, to be on a radius of 20 in. Those bent with the grain or lengthwise, for valleys, hips and gables, to conform with the ridge lines.

The first course at the eaves to be laid double with "Creo-Dipt" square butt shingles bent with a 20-in. radius. The balance of the eaves to be covered with special thatched butt "Creo-Dipt" stained shingles bent across the grain, laid in long irregular waves at varying exposure of 1 to 3 in.

Flat surfaces to be laid with special thatched butt "Creo-Dipt" stained shingles in long, irregular waves, with exposure varying from 1 to 5 in. (average exposure 3 in.), with variation of wave in each course, avoiding uniformity. This effect is produced by laying the long side of each shingle to the short side of one previously laid, until the maximum exposure is reached, then reversing the procedure, i. e., laying short side to the long side until minimum exposure is reached.

Furring—*Note: Do not include specifications for furring unless it is to be used in the construction of the roof.*

All furring to be constructed with the greatest care so that roof be given a slightly convex surface by furring each rafter from 4 to 6 in. in height in center of roof, and diminishing the furring to nothing at ridges and eaves.

Blocking—Blocking at gables to be covered with 1x2-in. shingle strips running with the roof rafters, and brought well forward to the verge board and then returned against it, forming in section the arc of a circle. Arc to be greatest at apex and diminish towards eaves.

Blocking at valleys and hips to be covered with 1x2-in. shingle strips running from eaves to ridges. All rafters to be rounded at eaves and ridges to a 20-in. radius and covered with 1x2-in. shingle strips running across rafters.

Sufficient space must be allowed in laying the shingle lath or roof boarding to insure proper ventilation.

Nailing—All nails used for laying shingles shall be "Creo-Dipt" zinc coated, hot dipped cut nails of following sizes: for rounded surfaces of eaves use 6d nails, nailing the shingles as closely as possible to the butt; on balance of roof use 3½d nails.

Capping—Ridges to be capped by using "Creo-Dipt" stained shingles bent with the grain, or with copper strips, rounded and painted to conform to color of roof.

Gutters—Gutters to be suspended from and centering on first course at eaves.

Color—Color of "Creo-Dipt" stained shingles to be (see "Special Color Scheme" below).

Special Color Scheme for Thatched Roofs

It is intended that thatched "Creo-Dipt" stained shingles have the texture and softness of thatch without gross imitation, and that the color should not be uniform to produce the most effective results.

For thatched roofs we usually furnish "Creo-Dipt" stained shingles in 5 shades, known as our thatch colors, A, B, C, D, and E. The orders are stained 30% color A, 30% color B, 30% color C, 5% color D, and 5% color E, and packed in this proportion promiscuously in the bundles and laid by the workmen as received.

The colors A, B and C were matched to some straw that had weathered to various hues during a period of 9 years. Color D is a soft shade of green, and E is a medium shade of red, which add life and warmth to colors A, B and C. This color effect is warm, variegated and full of life, individuality and texture, and is entirely different from regular conventional shingle stain shades. It has been truthfully reproduced on paper and will be submitted on request.

Colors other than the above furnished in any shade or shades desired and can be selected from our color pad, which also will be sent on request.

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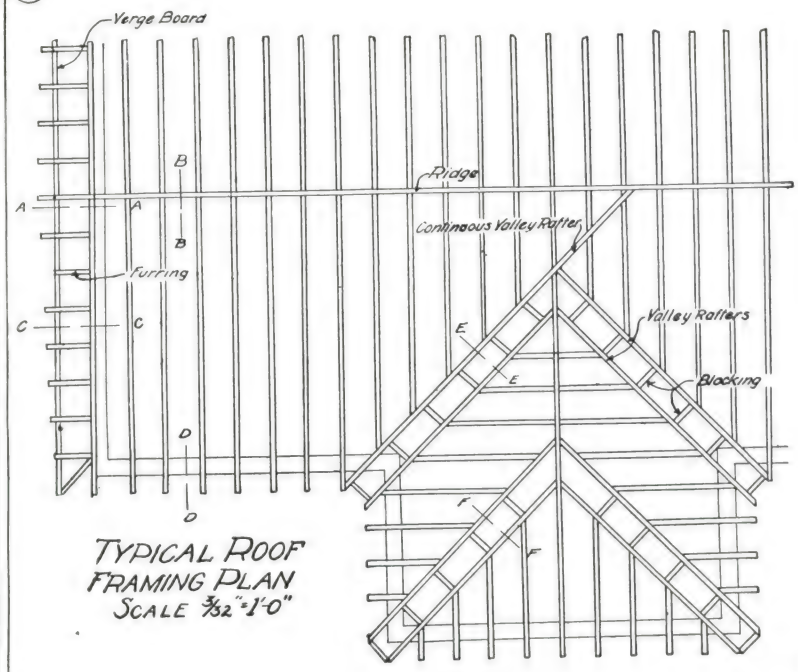
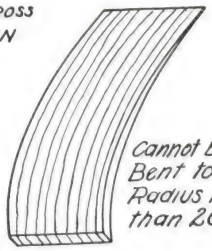
(1)



TYPICAL ROOF FRAMING PLAN
SCALE 3/32"=1'-0"

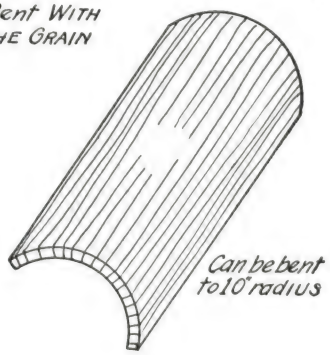
BENT ACROSS THE GRAIN



Creo-Dipt Shingles can be furnished bent across the grain to any radius, but with minimum radius 20". This type is used on the rounding of the Eaves (Section D) and Ridge, (Section B).

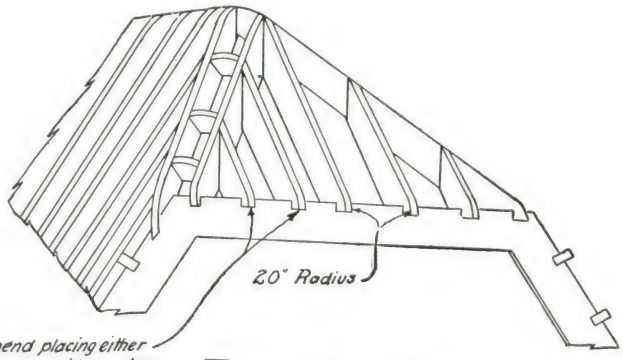
Creo-Dipt Shingles 16" long Random widths extra clear are recommended for use on thatched roofs. They are furnished already stained with any color desired.

BENT WITH THE GRAIN



Creo-Dipt shingles can be furnished bent with the grain to any radius but with minimum radius 10" and are somewhat flexible so they can be used with almost any radius. The above type of shingle is used to lay along the rake (Sect C) and the Hips and Valleys (Sects. E and F) and for the capping of the Ridge.

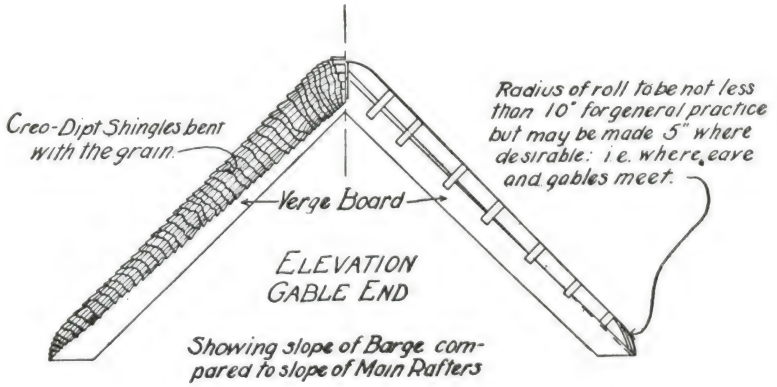
Nails: Creo-Dipt Zinc-coated Hot Dipped Cut nails are especially adapted for use on all parts of the roof, 6d for the curved sections and 3½d for the flat.



We recommend placing either flat or rounded moulding returning to verge board to be stained in colors to match shingles

TYPICAL BULL NOSE

The Ridge, Hip, Rake and Eave sections are the same for this treatment of Roof.

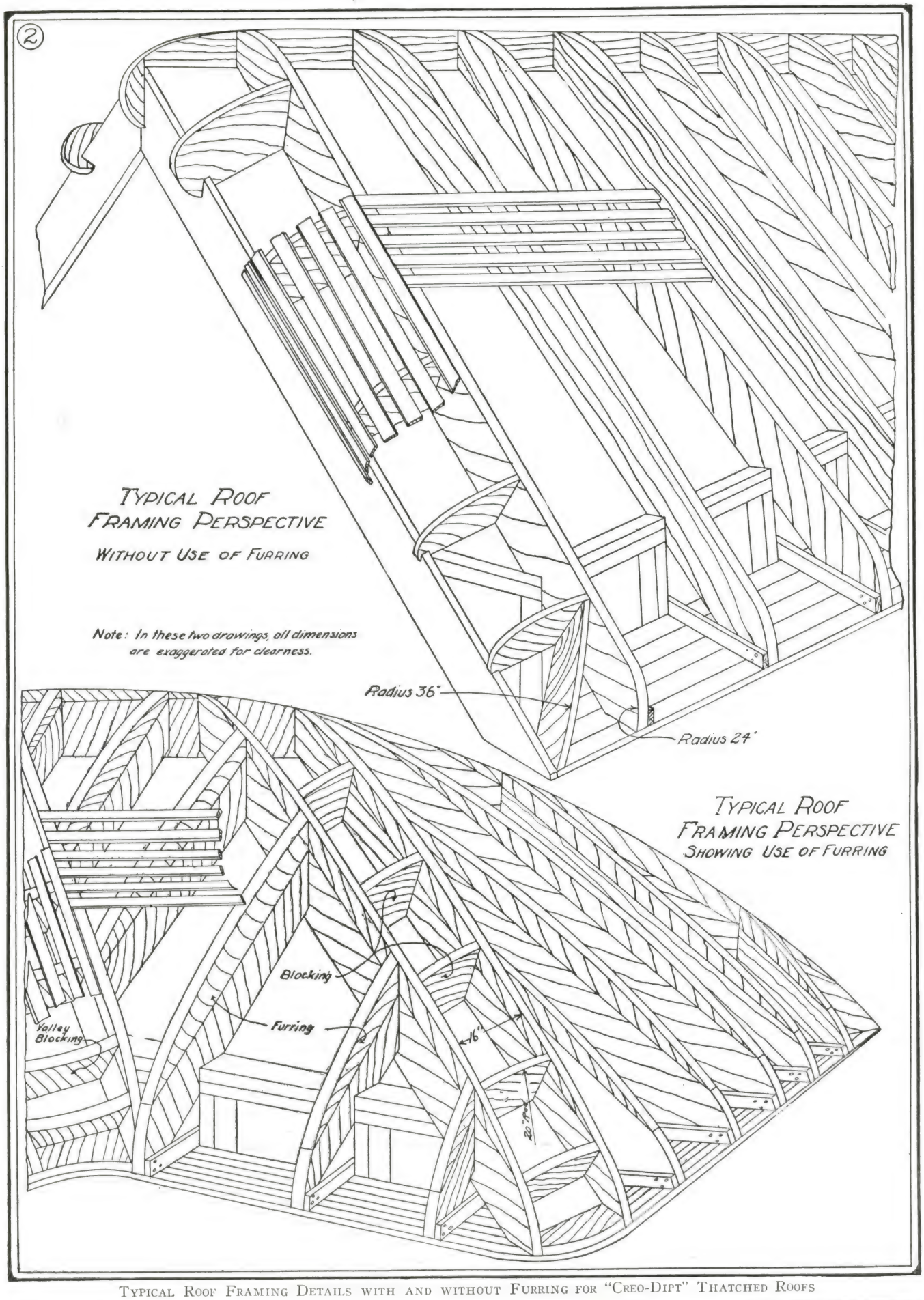


ELEVATION GABLE END

Showing slope of Barge compared to slope of Main Rafters

TYPICAL ROOF FRAMING DETAILS OF GABLES FOR "CREO-DIPT" THATCHED ROOFS

Continued on next page



TYPICAL ROOF FRAMING DETAILS WITH AND WITHOUT FURRING FOR "CREO-DIPT" THATCHED ROOFS

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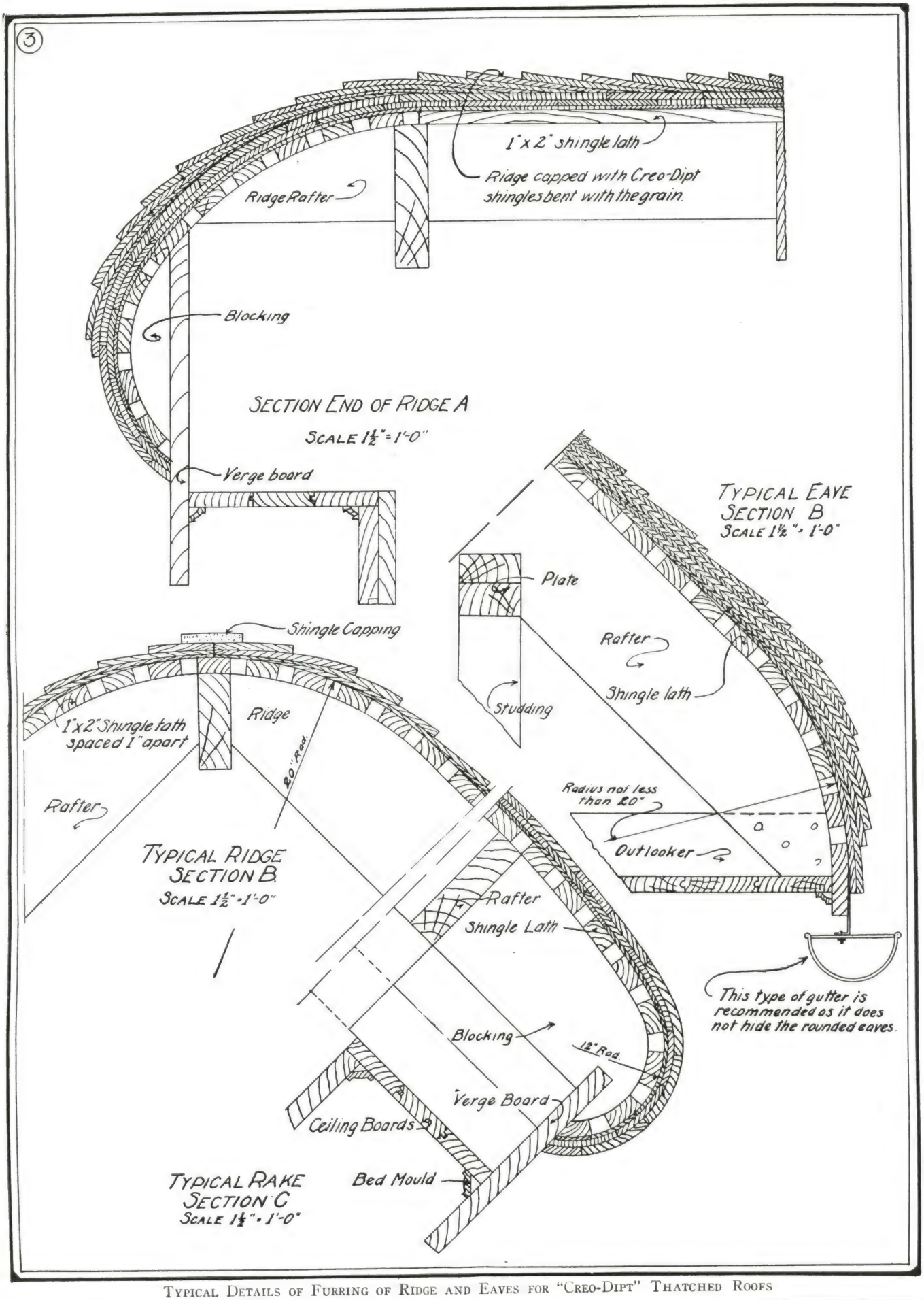

TYPICAL DETAILS OF FURRING OF RIDGE AND EAVES FOR "CREO-DIPT" THATCHED ROOFS

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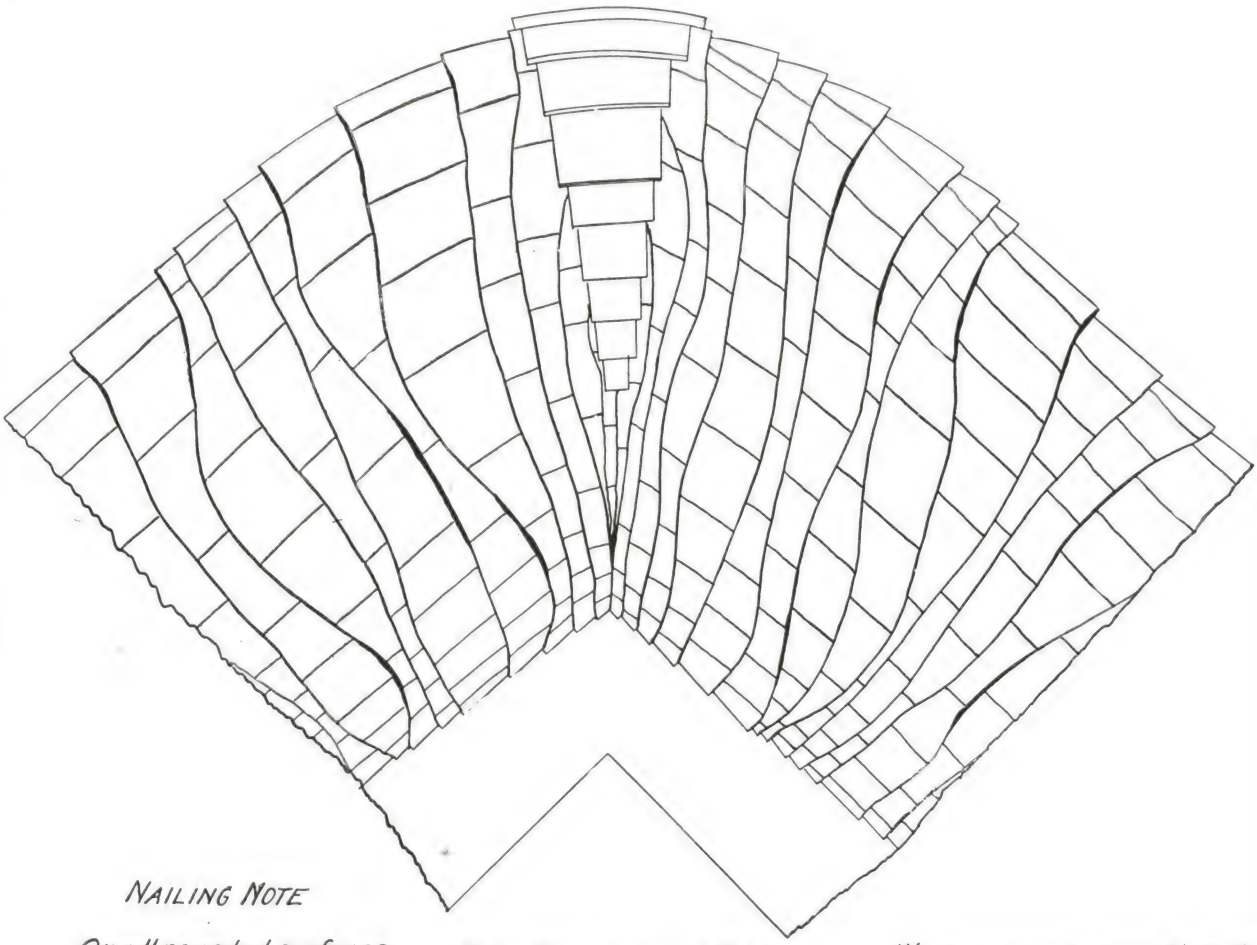
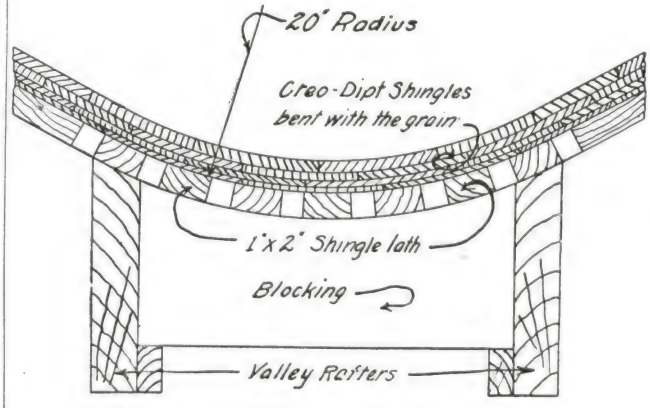


NAILING NOTE

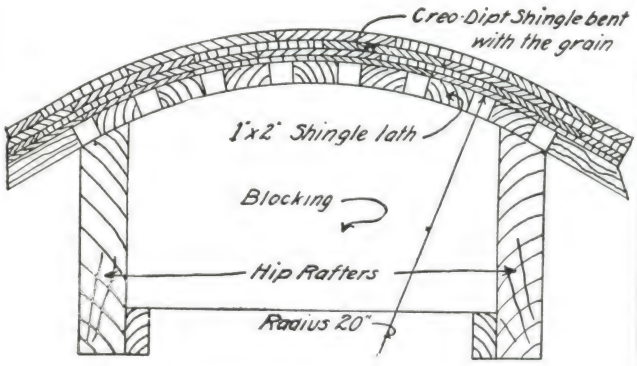
On all rounded surfaces Creo-Dipt shingles should be nailed as closely to the exposed part of the butt as possible with six penny Creo-Dipt Zinc-coated Cut Nails. On the flat surfaces use three and one-half penny "Creo-Dipt" Zinc-coated Cut Nails

ELEVATION SHOWING RIDGE AND GABLE INTERSECTION

We recommend Creo-Dipt Zinc-coated Hot-dipped Cut Shingle Nails be used with Creo-Dipt shingles and all shingles. They are rust and weather proof and increase the life of any shingle roof or sidewall.



TYPICAL VALLEY SECTION E
SCALE 1½"-1'-0"



TYPICAL HIP SECTION F
SCALE 1½"-1'-0"

TYPICAL DETAILS FOR VALLEY, HIP AND RIDGE FOR "CREO-DIPT" THATCHED ROOFS

COPPER SHINGLES AND COPPER SPANISH TILE

COPPER AND BRASS RESEARCH ASSOCIATION
25 Broadway
NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Skylights	964
Store Fronts	1010
Ventilators	990

Copper Shingles

Copper shingles are the outgrowth of a widespread demand for a permanent roofing material which is reasonable in price and at the same time artistic in effect and pleasing in design.

Light in weight, permitting economies in construction; easy to apply, reducing labor cost of laying to a minimum; free to contract and expand, completely fire proof, impervious to the action of the elements, thus preventing costly repairs and replacements—the copper shingles have met with instant approval among architects.

Advantages of the Copper Shingles

Copper shingles provide all the advantages of the copper roof, with a quick, convenient means of laying. They are made from roofing temper copper sheets, in a variety of sizes and designs. The method of application is simple. Each shingle is secured to the roof sheathing by copper nails and laps over the adjoining shingles in such a manner as to form a permanently water-tight joint. No soldering is required. No allowance for expansion is necessary, as the form of the shingle provides ample room for movement.

Copper shingles can be laid equally well on new roofs or over old shingles. Their raised-butt construction provides an air space between the metal and the roof sheathing, allowing perfect ventilation with consequent coolness in summer.

A copper shingle roof weighs only one-ninth as much as slate and one-third as much as wood.

Copper Shingles Are Beautiful

Copper shingles may be obtained in natural copper finish and in various shades of red, brown, green and blue. These colors are permanent.

Copper shingles, either in single tone or in blended combination, will harmonize perfectly.

Copper Shingles Are Not Expensive

Architects may now specify copper shingles at a genuine saving to their clients.

Copper shingles cost less than slate or tile. Their first cost is naturally higher than that of wooden shingles, but the difference in price is trifling in comparison with the difference in service.

The first cost of copper shingles is the last cost—nothing need ever be spent for painting, repairing or replacing. Once laid, a copper shingled roof needs no further attention and is a lasting adjunct to the appearance of the building.

Copper Spanish Tile

Copper Spanish tile is a beautiful roof covering. These tile are faithfully reproduced in the form of the usual clay product, with none of the disadvantages of the latter, such as excessive weight, liability to crack and leak, etc.

Graduated tile may be secured for domes, towers, and all conical surfaces, also copper finials, hip and ridge rolls, etc.

A RESIDENCE ROOFED WITH COPPER SHINGLES

A COPPER SPANISH TILE ROOF

ESTABLISHED 1870

ILLINOIS ZINC COMPANY

Manufacturers of Zinc Shingles

280 Broadway
NEW YORK, N. Y.

332 So. Michigan Avenue
CHICAGO, ILL.

1331 Filbert Street
PHILADELPHIA, PA.

SMELTERS AND ROLLING MILLS, PERU, ILL.

Product

ZINC SHINGLES.

TRADE-MARK

The Roof That Is Always New

Zinc is a non-ferrous metal—*it can not rust*. Illinois shingles are made of pure zinc and are proof against every trouble that ever meant damage and repair to roofs. That is why Illinois zinc shingles make *the roof that is always new.*

Advantages of Illinois Zinc Shingles

Durability—Illinois shingles will outlast the building they protect. They can not rust, crack, work loose, warp, curl, rot or burn.

Artistic Appearance—Illinois zinc shingles build a practical butt-shingled roof as artistic as tile, slate or wood shingles. They are pre-oxidized to a soft, weathered gray which requires no paint, although they can be painted any desired color.

Light Weight—Illinois zinc shingles weigh only 105 lbs. per square, thus a lighter roof construction is required than for wood shingles or slate.

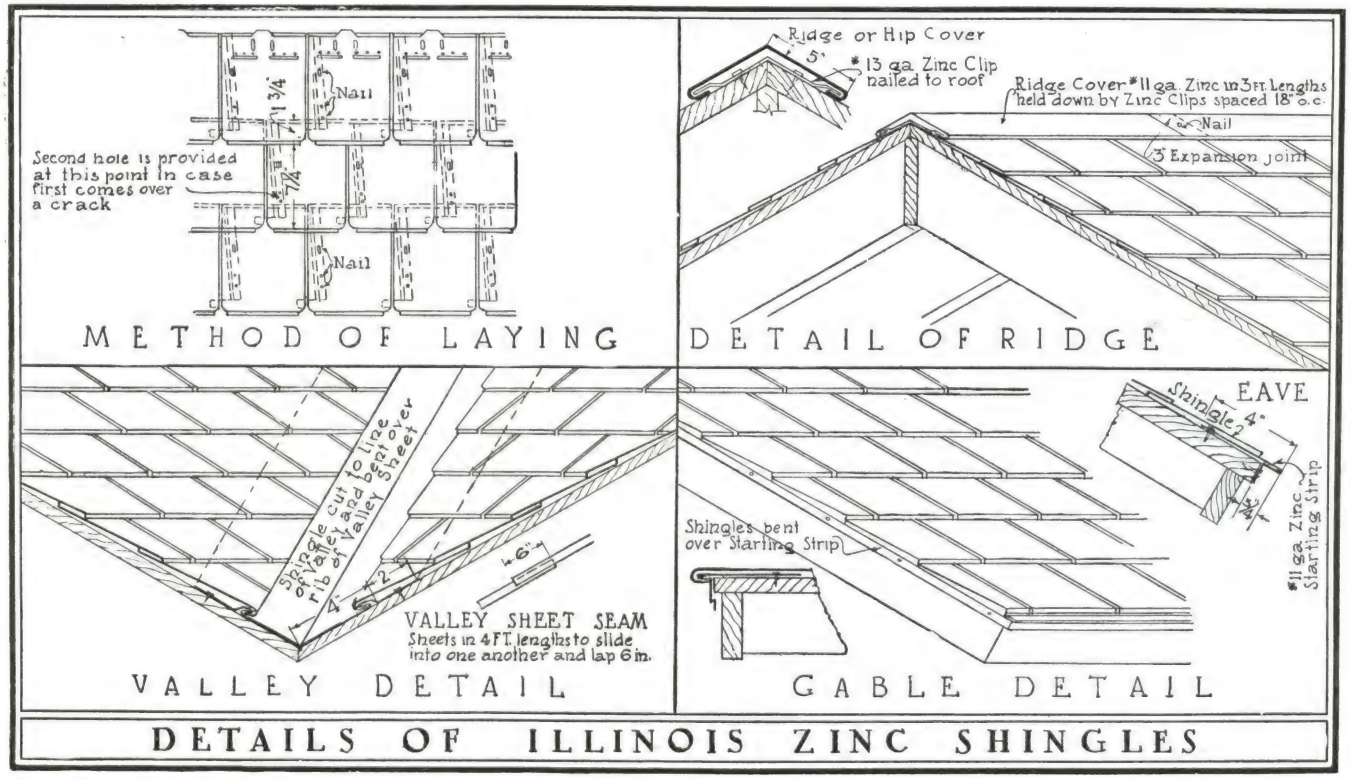
Weathertight—Illinois zinc shingles are laid overlapping, the joints between the shingles forming a gutter with an interlock at the lower end, thus they are held securely at all points and are positively weathertight. Ample provision is made for expansion and contraction.

ILLINOIS ZINC SHINGLE

Easily and Rapidly Laid—The possibility of incorrect application is reduced to a minimum on account of the simplicity of design. They have the advantage over tile in the ease with which they can be fittted at gables and valleys. Being flat in section, they may be cut and bent over the starting strip at gables, and cut to fit the angle of the valley. They are laid 7¼ in. to the weather and it takes 274 shingles to lay a square.

Economical—Illinois zinc shingles cost less to buy and lay and are easier to lay than tile, slate or other types of shingles. They never require repairs—no upkeep cost.

Protect Against Fire and Lightning—Illinois zinc shingles afford an excellent protection against fire and are lightning resisting, thus a lower rate of insurance is secured.



MATTHIESSEN & HEGELER ZINC CO.

Manufacturers of Zinc Shingles

LA SALLE, ILL.

Products

ZINC SHINGLES.

Also Zinc Valleys and Flashings, Zinc Sheets, Plain and Corrugated, for all building purposes.

M & H Zinc Shingles

Zinc has for many years been recognized and used as an unexcelled roofing material, but its use has been limited because no inexpensive method of application has been developed.

Zinc shingles have solved the problem of permanent roofing at moderate cost.

M & H zinc shingles are perfect in design and workmanship. They combine the best material with an easy and satisfactory method of applying. They are double-locked on all sides, making it impossible for rain or snow to be driven through the seams. The double-gutter side locks are so designed as to permit perfect ventilation and also prevent any possibility of water or dampness passing over them. The cross-lock is an absolute lock and not only makes the roof weatherproof, but also holds the shingles securely in place, eliminating the rattle which makes some types of metal roofs so objectionable. The locking device is so made as to take care of all natural expansion and contraction.

M & H zinc shingles come in various sizes, suitable for use on every type of building.

Advantages of M & H Zinc Shingles

Rustproof—Zinc shingles will not rust or corrode.

Fireproof—Zinc shingles are fireproof. They protect the building from flying sparks and lightning. Their use means lower insurance rates.

Weatherproof—The double-locked feature of M & H zinc shingles makes them absolutely weatherproof. Any moisture which works under the first lock is carried down by the gutter inside, completely preventing leakage.

No Upkeep Cost—M & H zinc shingles require no paint. They are made from rolled zinc and will not crack or break. They are very durable and provide a permanent roof which will outlast the building. Once the roof is applied, it is on to stay and requires no further attention.

Good Appearance—A roof covered with M & H zinc shingles does not in any way have the appearance one associates with the obsolete tin roof, but on the contrary reminds one of slate. The soft silver gray color, together with the pleasing design, of M & H zinc shingles add beauty and dignity to buildings they cover.

Low Cost—While an M & H zinc shingle roof may cost slightly more than some forms of temporary roofing, it is the cheapest roof that can possibly be installed, considering that it is a permanent roof. Its cost is about half that of a copper roof, its only possible rival.

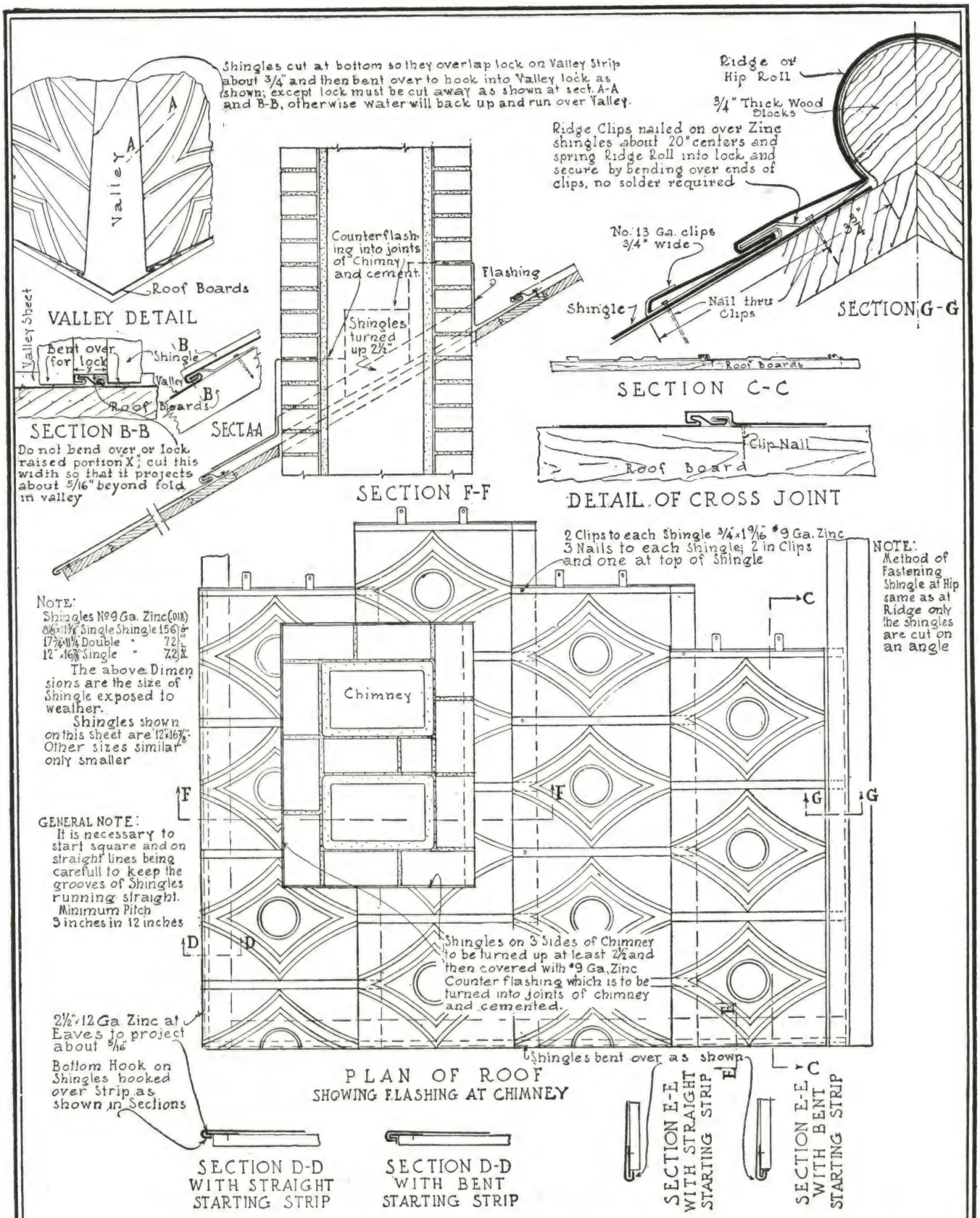
Easily Applied—M & H zinc shingles require no more skill in their application than the ordinary wooden type. Methods of applying them are shown below and on the opposite page.

Zinc Roofing Is Not an Experiment

M & H zinc has been used as roofing material for many years with complete satisfaction. Roofs applied 30 years ago, which have had neither paint nor repairs, are still in perfect condition.

METHOD OF APPLYING M & H ZINC SHINGLES

Continued on next page



DRAWN BY SWEET'S CATALOGUE SERVICE INC.	DETAILS SHOWING METHODS OF APPLYING M. & H ZINC SHINGLES	SCALE ¾" & 6" EQUALS 1' DATE AUG 22	DRWG 1

COPPER ROOFING

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER AND BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

Copper—The Best Material for General Sheet Metal Purposes

Copper is the best material for general sheet metal purposes—roofing, eaves-troughs, gutters, leaders, flashings, ridge rolls, ridge caps, leader heads, cornices, etc.

Its physical and chemical characteristics make it the outstanding metal for long service under severe conditions.

Because there are no appreciable maintenance costs, the service value of copper roofing increases with age.

Durability

A roof of pure sheet copper will outlast the building of which it is a part. Numerous important buildings, as well as many fine residences, in the United States have copper roofs over 100 years old; in Europe and Asia are many copper roofs which have lasted for centuries.

Copper retards appreciably the corrosive action of acid fumes, and is a most effective material for use under extreme atmospheric conditions such as are found in manufacturing localities and cities. Even near the sea coast its durability is unquestioned.

Appearance

The green carbonate coating which appears on copper after exposure to the atmosphere not only acts as a shield against deterioration, but also makes it the most beautiful of all roofing materials.

Other color effects can be produced and can be made permanent. Wherever used on a building copper adds beauty, dignity and character.

THE COPPER ROOF ON CHRIST CHURCH, PHILADELPHIA, IS 173 YEARS OLD AND IS STILL GIVING SPLENDID SERVICE

Weight

The non-corrosive properties of copper make it possible to use a thin sheet, and its comparative lightness permits its use in construction work without the necessity of heavy supporting structures.

The weight of various roofing materials per square (100 sq. ft.) on the roof are as follows:

Material	Weight for 100 sq. ft., laid, lbs.
Shingle Tile	1200–1800
Spanish Tile	650– 850
Slate	450– 675
Felt and Gravel (or Slag)	400– 625
Asbestos Shingles	300– 650
Hardlead Sheets	210– 325
Wood Shingles	200– 300
20 g. Galv. Iron (Corrugated)	225
16 oz. Copper (Standing Seam)	125
Copper Shingles	84– 100
Tin	75

Malleability

Copper is one of the most ductile of metals. No other is more easily worked or so permanent when formed. It may be spun, stamped, rolled, hammered, hot or cold, or worked by almost any known process. This is a decided advantage in working with copper, as the "brittleness" which renders other metals difficult to handle is not present.

Salvage Value

Copper has a higher salvage value than any other metal used for building purposes. Being indestructible it can be salvaged for a reasonable figure from any building destroyed.

Economy

Freedom from repairs or maintenance expense, combined with durability and absolute protection against the weather under all conditions, makes copper the most economical as well as the best roofing material obtainable. It does not require painting or special protective treatment of any kind. First cost is the only expense involved in the use of copper for building purposes.

Sloping and Flat Copper Roofs

For sloping roofs, there are two methods of applying copper sheets—the ribbed seam method and the standing seam method.

Continued on next page

For flat roofs, the flat seam method is employed. For details see drawings 1, 2 and 3. A description of these methods is embodied in the specifications.

Lightning and Fire Protection

A copper roof, grounded by means of copper leaders, is a most effective protection against lightning.

A copper roof is completely fireproof.

Copper Leaders and Gutters

Regardless of the roofing material, there is undoubted economy in the use of copper for conductor pipe, gutters, leader-heads, eaves-troughs, gutter linings, skylights, strainers, tubes and outlets, ventilators, cornices and other sheet metal work. For details, see drawings on following pages.

Copper Flashings

Copper flashings should be used on all roofs, whatever the roofing material may be.

Flashings of inferior metal frequently do not last as long as even the temporary kinds of roofing material.

Copper flashings provide permanent insurance against corrosion, leaks, costly upkeep and replacement.

If the roofing itself is not copper and requires replacement, the work may be done without removing or injuring the copper flashing. For details, see drawings on following pages.

Copper Shingles

Other forms of copper roof coverings are copper shingles and copper Spanish tile, which are described in another section of this volume.

Copper Conductor Pipe, Gutters, etc.

It is important that conductor pipe, gutters, conductor pipe heads, eaves-troughs, gutter linings, skylights, strainers, tubes and outlets, ventilators, cornices and other sheet metal work be of copper, regardless of the nature of the roofing material. For details, see drawings.

Copper Roofing and Sheet Metal Specifications

GENERAL

(1) Where shown on drawings and described elsewhere and below in the specifications, all roofing and sheet metal work, including copper roofs, flashings, gutter linings, eaves-troughs, leaders, leader heads, skylights and all other work of like class or incidental to the above listed work necessary for its proper completion, shall be best grade copper sheet of size and weight specified.

All materials shall be plainly marked with manufacturer's label and weight.

(2) All copper throughout the work, except as specified below, shall be of 16 oz. soft (roofing temper) copper sheets.

(3) All hanging gutters, leaders and cornices as specified below shall be of 16 oz. hard (cornice temper) copper sheets.

(4) All solder shall be of the best grade and shall be composed of one-half pig lead and one-half block tin (new metals).

(5) Resin shall be used as a flux.

(6) All nails used throughout the work shall be of best grade hard copper. All sheets shall be secured by means of copper cleats 1½ by 3 in., which shall be fastened to the sheathing boards by two copper nails ⅞ in. long. The ends of the cleats shall be turned back over the nails.

(7) Where copper sheets are being laid on a roof or deck the contractor shall display prominent signs warning against unnecessary walking thereon. Under no circumstances shall metal-edged implements be used to clean a roof.

(8) The contractor shall give to the owner a written guarantee which shall specify the kind, weight and manufacturer of the materials used and shall guarantee all workmanship against failure for a period of .... years after the acceptance of the work.

(9) Before applying copper to any surface, this contractor shall see that same is properly sheathed with thoroughly seasoned lumber laid close and well nailed, nails set. All uneven edges of boards shall be smoothed off to give a firm even surface.

Note: Under carpenter specification provision should be made for properly preparing the sheathing for placing copper.

(10) Before laying copper over wood sheathing, cover all surfaces with building paper of approved quality felt, resin sized, or asbestos. Paper shall be as wide as possible. All paper shall be secured with copper nails.

(11) After roof is complete, all joints shall be carefully tested for leaks. All surplus resin shall be carefully removed and the whole surface be carefully swept and left in first class condition.

(Specifications continued on page 935.)

Copper, the Ideal Roof, Adds Dignity and Charm to the Beautiful Grand Central Terminal, New York, N. Y.

A Town House in East 70th Street, New York, N. Y., with Copper Roof and Copper Cornices

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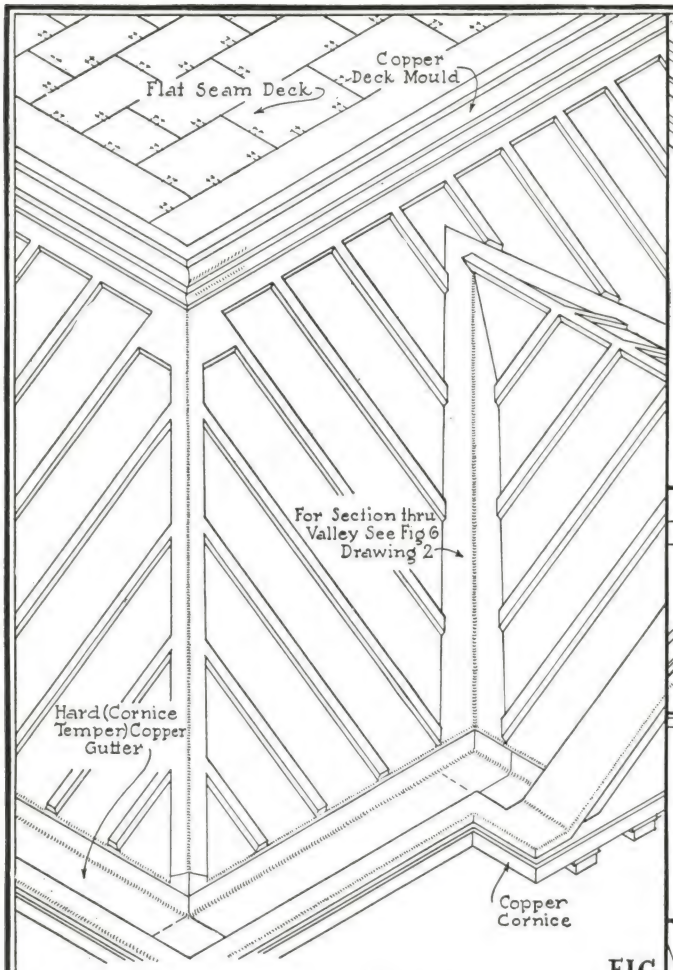
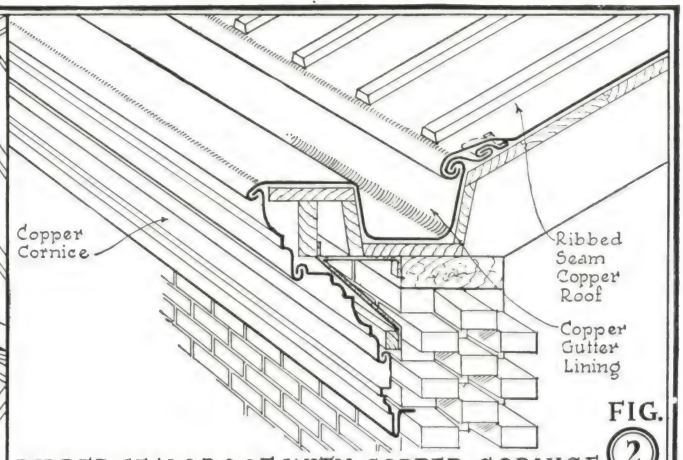


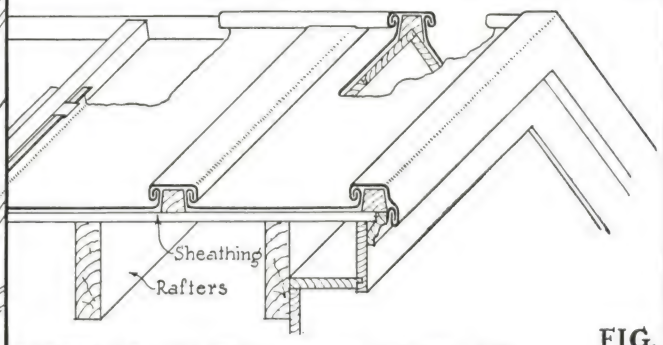
DETAIL SHOWING APPLICATION OF RIBBED SEAM COPPER ROOFING

FIG. 1



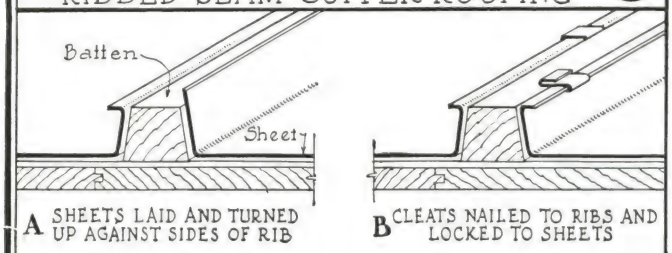
RIBBED SEAM ROOF WITH COPPER CORNICE

FIG. 2



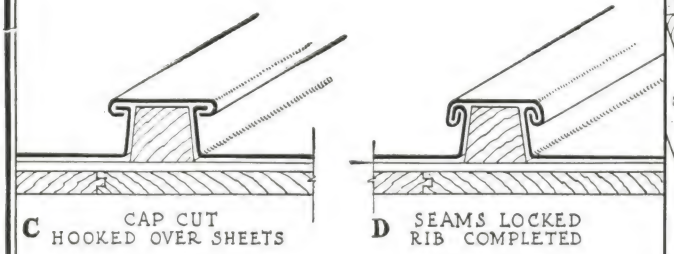
METHOD OF FINISHING ROOF AT GABLE END AND RIDGE

FIG. 3



A SHEETS LAID AND TURNED UP AGAINST SIDES OF RIB

B CLEATS NAILED TO RIBS AND LOCKED TO SHEETS

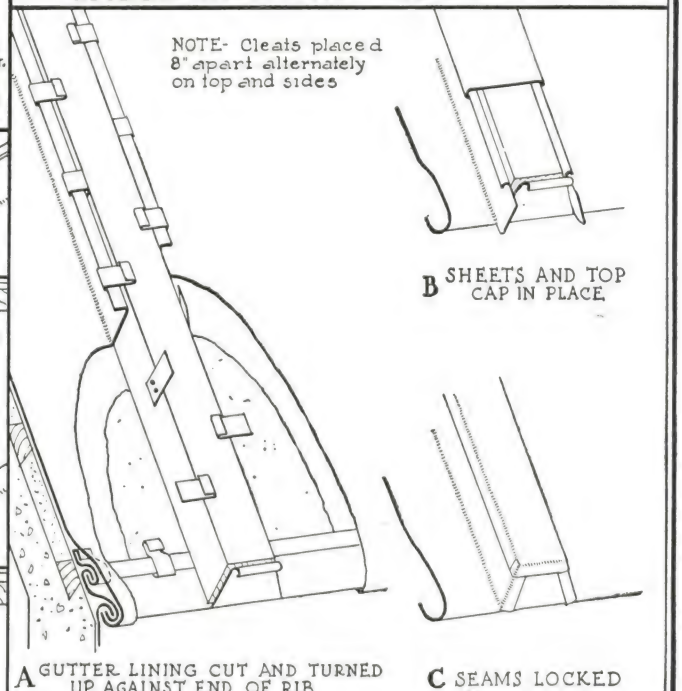


C CAP CUT HOOKED OVER SHEETS

D SEAMS LOCKED RIB COMPLETED

STEPS IN LAYING RIBBED SEAM COPPER ROOFING

FIG. 4



A GUTTER LINING CUT AND TURNED UP AGAINST END OF RIB

B SHEETS AND TOP CAP IN PLACE

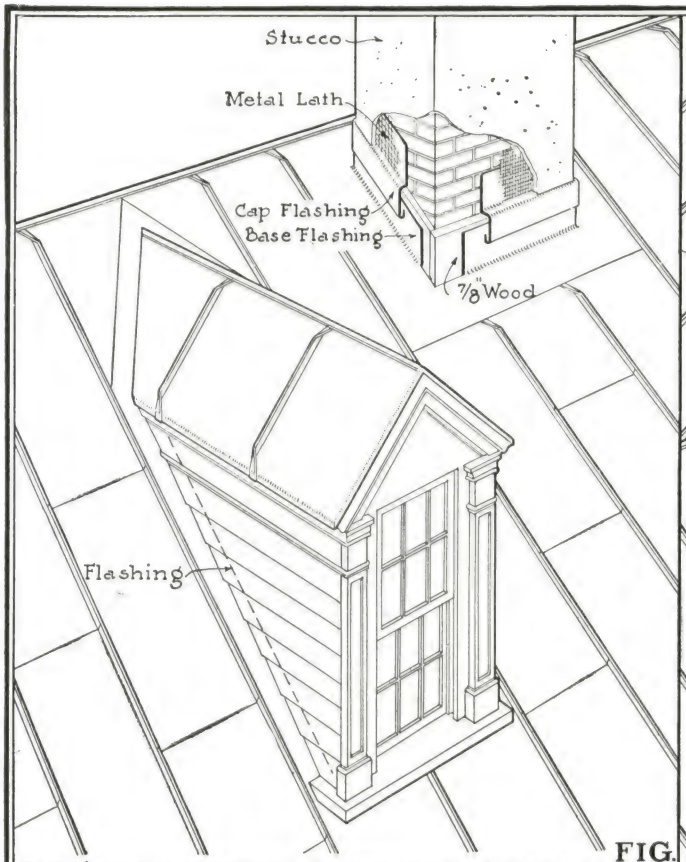
C SEAMS LOCKED

METHOD OF FINISHING ENDS OF RIBS

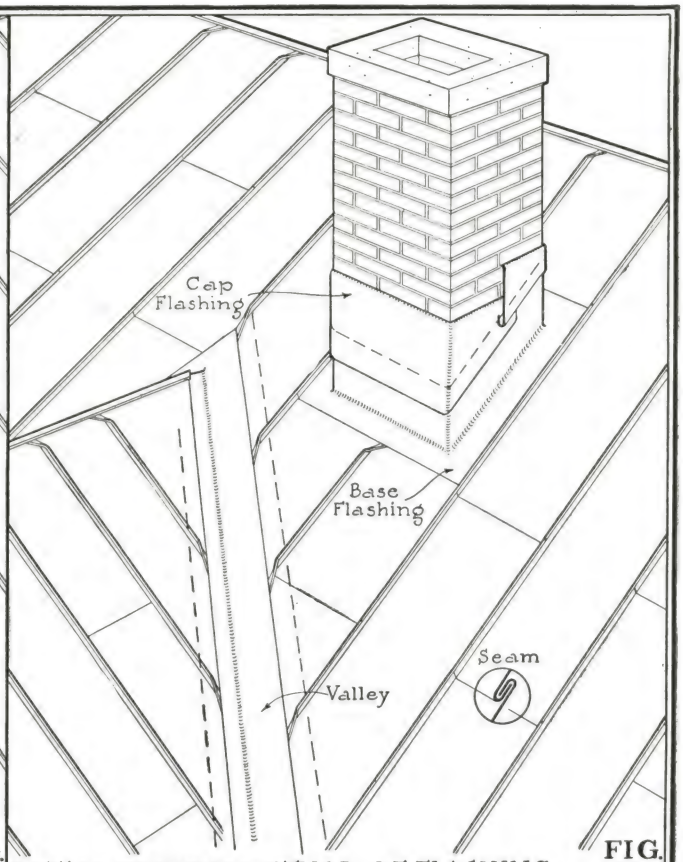
FIG. 5

COPPER AND BRASS RESEARCH ASSOCIATION	DETAILS OF RIBBED SEAM COPPER ROOFING	NOT DRAWN TO SCALE DATE JUN 22	DRWG 1

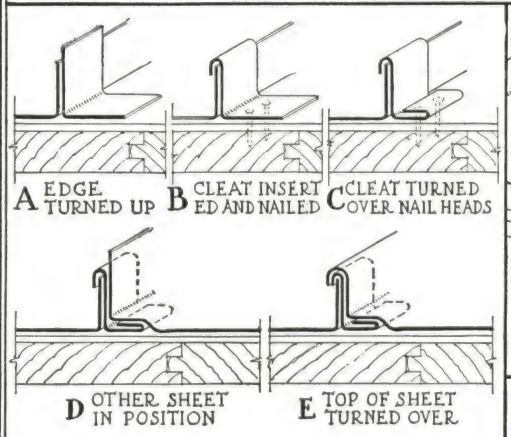
Continued on next page



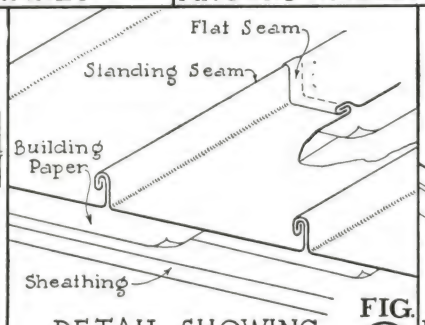
DETAIL SHOWING METHOD OF FLASHING AROUND DORMER AND STUCCO CHIMNEY FIG. 1



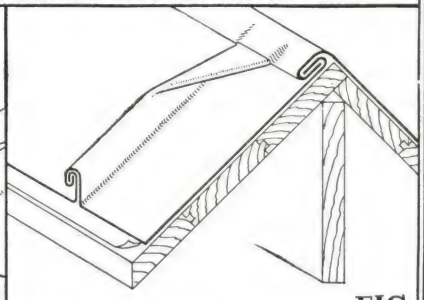
DETAIL SHOWING METHOD OF FLASHING AROUND VALLEY AND BRICK CHIMNEY FIG. 2



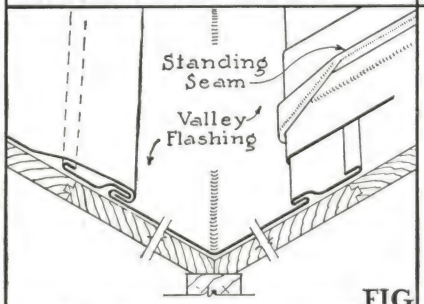
STEPS IN LAYING A STANDING SEAM COPPER ROOF FIG. 3



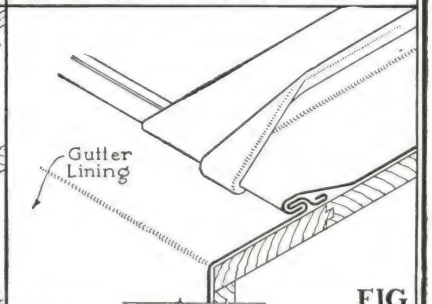
DETAIL SHOWING SPACING OF SEAMS FIG. 4



DETAIL SHOWING STANDING AND FLAT SEAM AT RIDGE FIG. 5



DETAIL SHOWING STANDING SEAM AT VALLEY FIG. 6

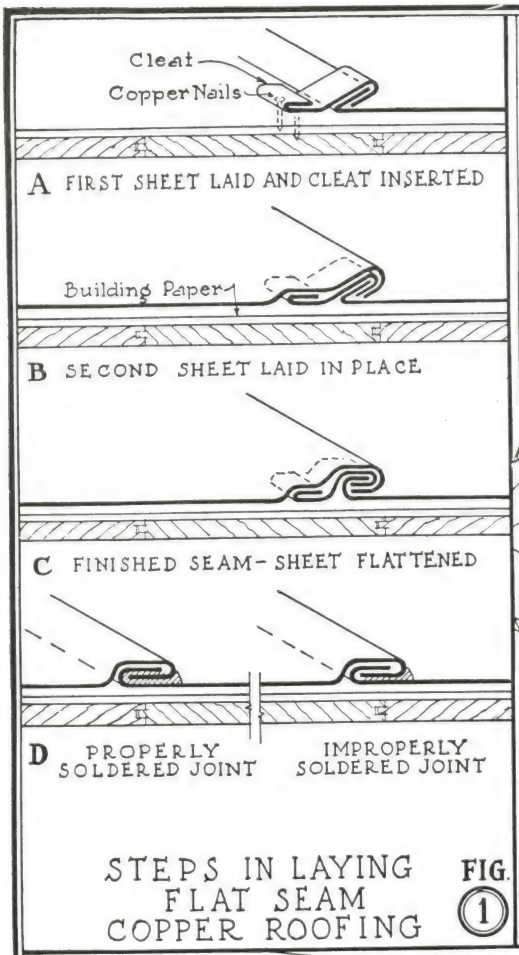


DETAIL SHOWING STANDING SEAM AT GUTTER FIG. 7

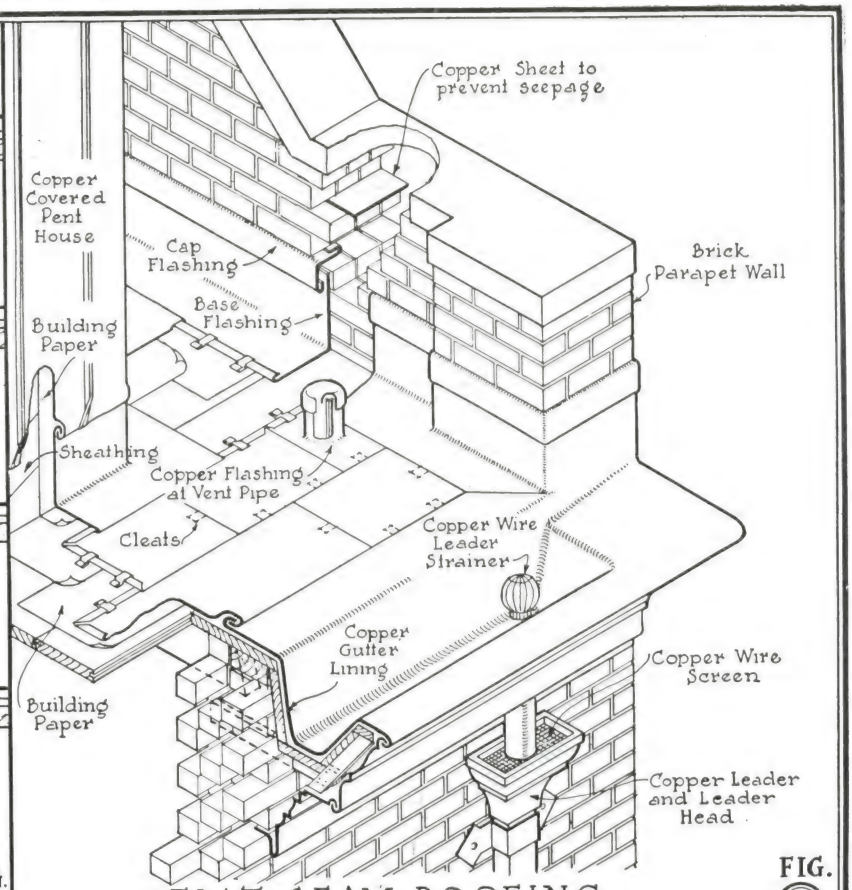
NOTE - ALL SEAMS HAVE BEEN EXAGGERATED TO SHOW CLEARLY METHOD OF LAYING

COPPER AND BRASS RESEARCH ASSOCIATION	DETAILS OF STANDING SEAM COPPER ROOFING	NOT DRAWN TO SCALE DATE JUN. '22	DRWG 2

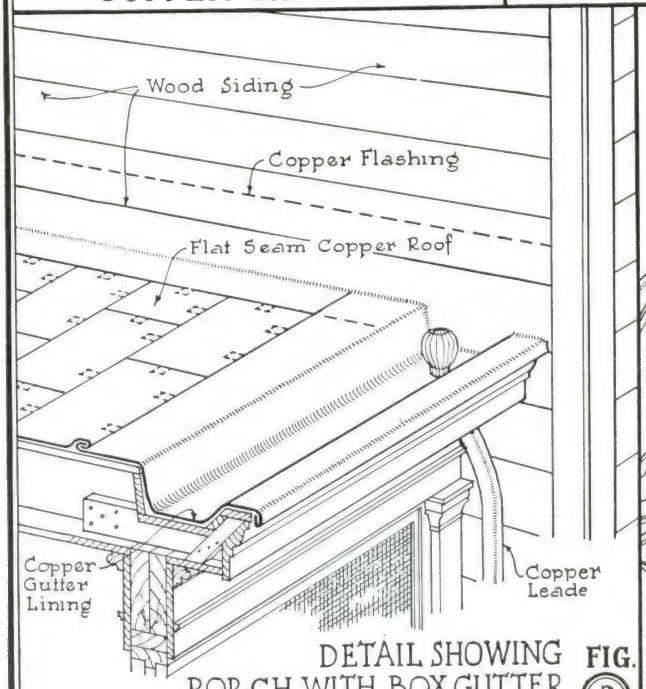
Continued on next page



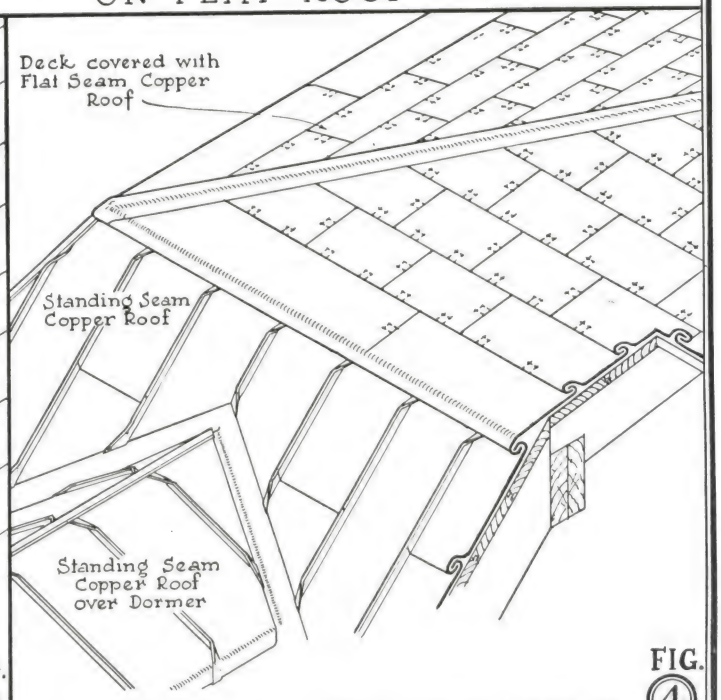
STEPS IN LAYING FLAT SEAM COPPER ROOFING **FIG. 1**



FLAT SEAM ROOFING ON FLAT ROOF **FIG. 2**



DETAIL SHOWING PORCH WITH BOX GUTTER AND FINISH AGAINST SIDING **FIG. 3**

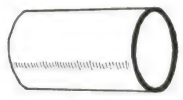


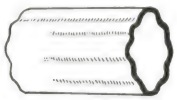
FLAT SEAM ROOFING ON FLAT DECK **FIG. 4**

NOTE ALL SEAMS HAVE BEEN EXAGGERATED TO SHOW CLEARLY METHOD OF LAYING.

COPPER AND BRASS RESEARCH ASSOCIATION	DETAILS OF FLAT SEAM COPPER ROOFING	NOT DRAWN TO SCALE DATE JUN.22	DRWG 3

Continued on next page


ROUND (Plain)


ROUND (Corrugated)

SQUARE (Corrugated)

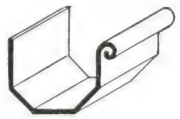
RECTANGULAR (Plain)

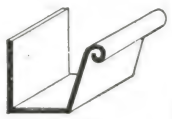
TABLE OF SIZES	
SHAPES	SIZES
ROUND (Plain)	2", 3", 4", 5", 6"
ROUND (Corr.)	2", 3", 4", 5", 6"
SQUARE (Corr)	2" (1¾" x 2¼"), 3" (2⅜" x 3¼") 4" (2¾" x 4¼"), 5" (3¾" x 5").
RECTANGULAR (Plain)	1¾" x 2¼", 2" x 3" 2"x4", 3"x4", 4"x5" 4"x6"

NOTE - These Leaders are made from hard (cornice temper) sheets.

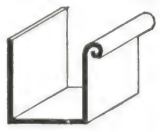
FIG. 1

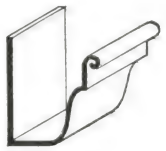
COPPER LEADERS

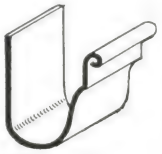

STYLE C.

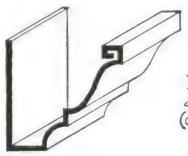

STYLE D.

STYLE E.


STYLE F.


STYLE G.

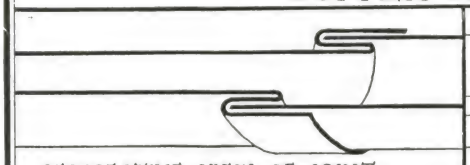

STYLE H.


STYLE J.

NOTE - These gutters are made from hard (cornice temper) sheets.

FIG. 4

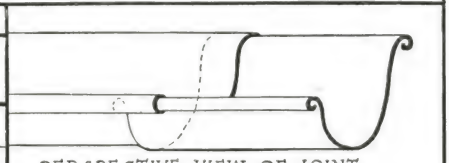
MOULDED HANGING GUTTERS



PLAN OF JOINT BELOW BEAD

FIG. 2

DETAILS SHOWING EAVES TROUGH WITH SLIPJOINT

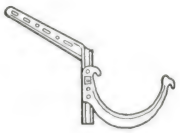


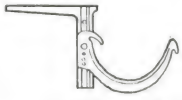
PLAN OF JOINT BELOW BEAD

FIG. 3

DETAILS SHOWING EAVES TROUGH WITH LAP JOINT

SECURED UNDER SHINGLES


SECURED TO SIDE OF RAFTER


DRIVEN INTO BRICK JOINT

NOTE - These hangers should be of brass.

FIG. 5

GUTTER HANGERS

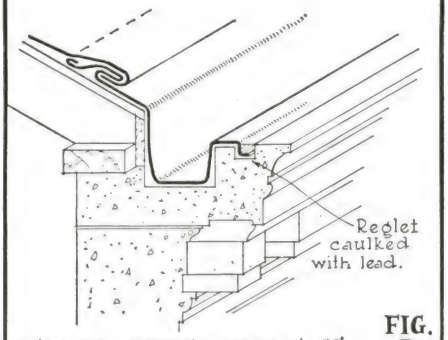


FIG. 6

COPPER GUTTER LINING SECURED TO REGLET IN CORNICE

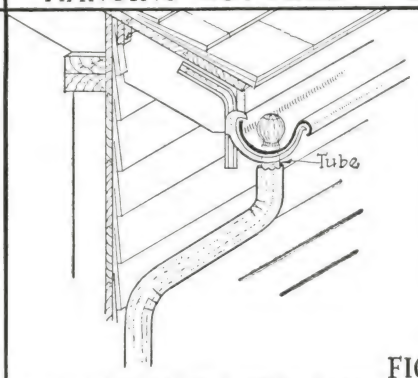


FIG. 7

COPPER EAVES TROUGH AND LEADER

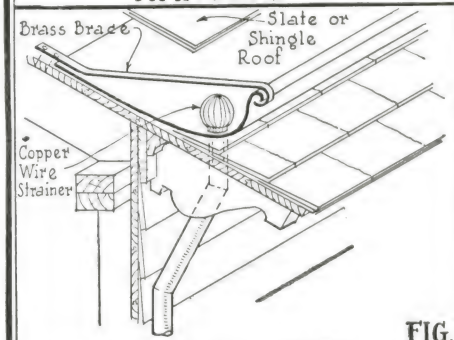


FIG. 8

COPPER ROOF GUTTER AND LEADER

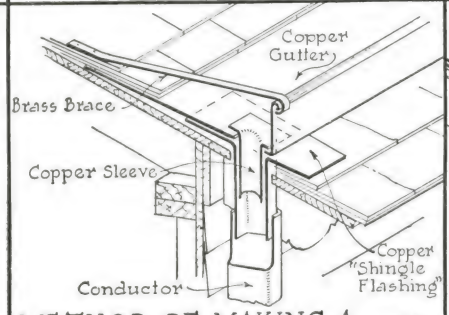


FIG. 9

METHOD OF MAKING A WATERTIGHT JOINT WITH LEADER

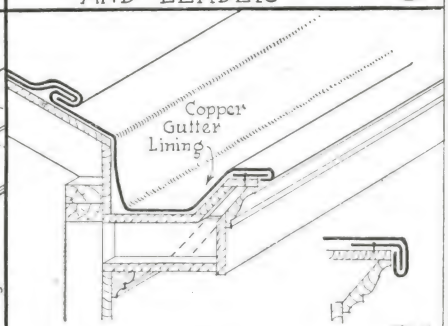
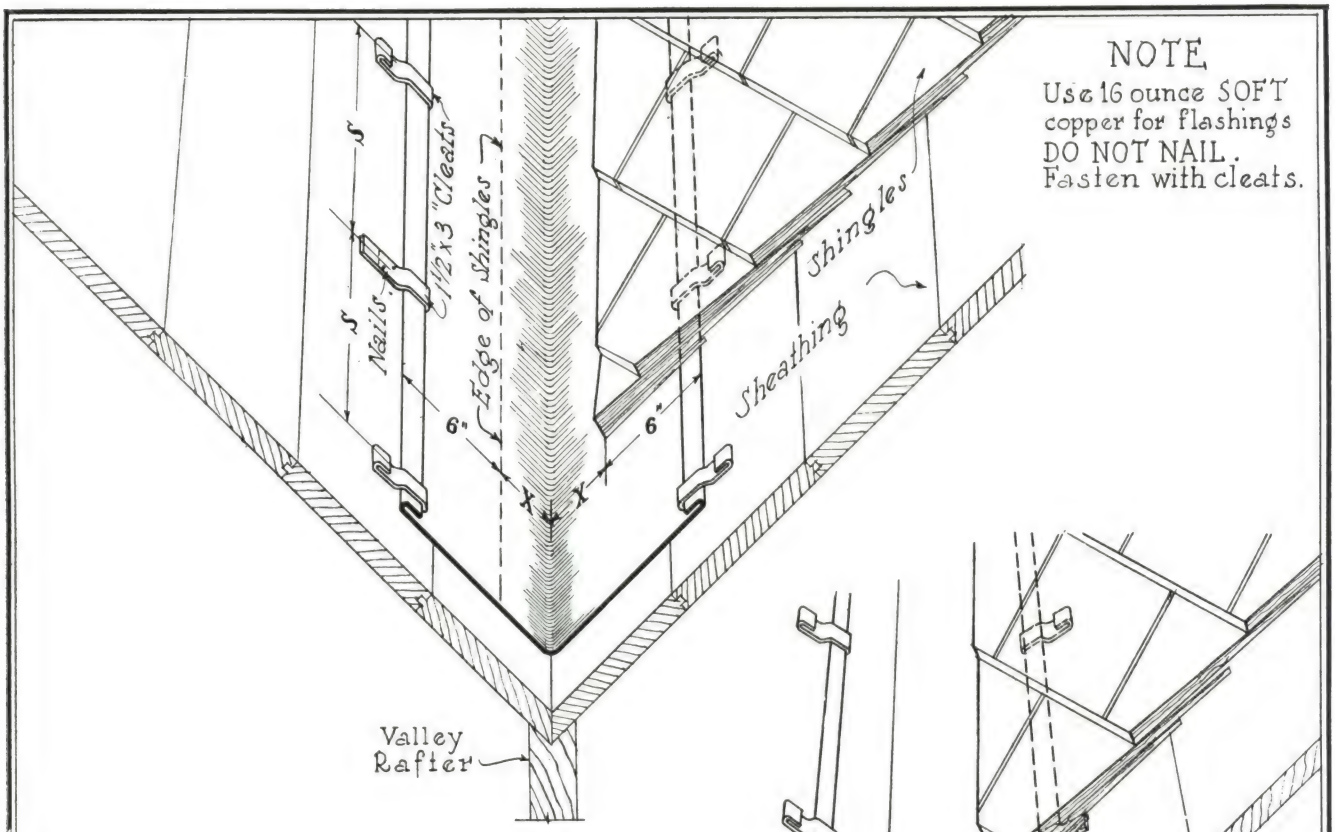


FIG 10

COPPER LINED GUTTER WOOD CORNICE

COPPER AND BRASS RESEARCH ASSOCIATION	DETAILS OF COPPER GUTTERS AND LEADERS	NOT DRAWN TO SCALE DATE JUN 22	DRWG 4

Continued on next page

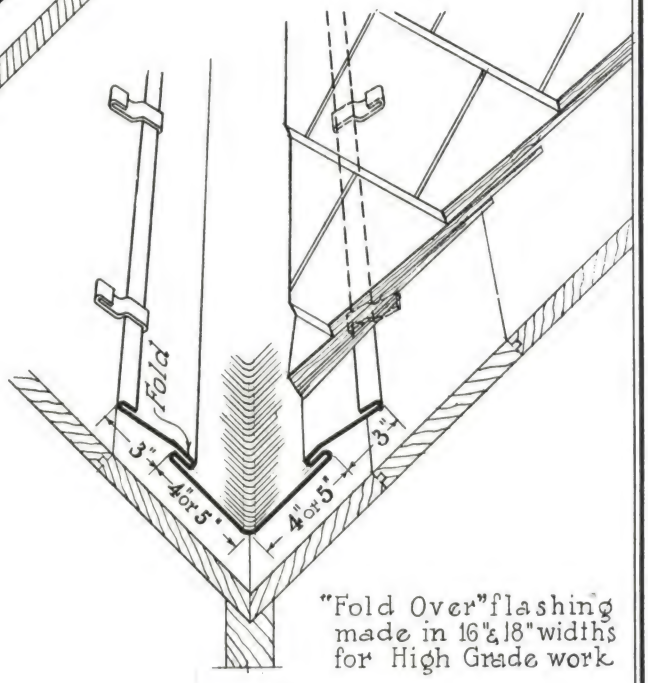


NOTE
Use 16 ounce SOFT copper for flashings DO NOT NAIL. Fasten with cleats.

Spacing of cleats S = 8"(min) to 12"(max)
Exposed flashing in open valleys should be wider at the bottom than at top.
It is recomended that dimension "X" be not less than 2" at the narrowest part of valley and widen out ½" in 8'-0" toward the bottom.

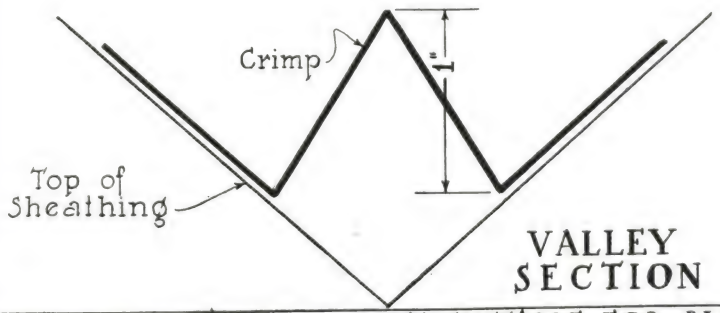
Flashings should be secured by soft copper cleats 1½"x 3", fastened to roof by two copper nails with ends of cleats turned back over nails.
Cleats lock to sheet by ½" flat lock.

OPEN VALLEY FLASHING



"Fold Over" flashing made in 16" & 18" widths for High Grade work

"FOLD OVER" FLASHING



VALLEY SECTION

When the slopes of the roofs forming the valley are of a different pitch, or when one roof discharges a greater volume of water than the other the crimp is used to break the force of the water so that the discharge from one roof will not force its way above the flashing on the opposite roof.

NOTE- COPIES OF THIS SHEET SUITABLE FOR BLUE PRINTING SENT UPON REQUEST

COPPER & BRASS RESEARCH ASSOCIATION	RECOMENDED PRACTICE FOR COPPER VALLEY FLASHING	SCALE 3"&12" EQUALS 1' DATE SEPT22	DRWG 5

Continued on next page

RIBBED SEAM ROOF

(12) All wood ribs shall be placed under another contract. The roofing contractor shall see that these are well secured with all nails well set, truly lined and evenly placed, and shall not proceed until all faults have been corrected. Sheets shall be 20 or 30 in. wide and 96 in. long. They shall be fastened by 1½ by 3-in. cleats spaced 8 in. apart and secured alternately to the top and side of the batten. Cleats shall be locked to the sheet and battens shall be covered with a flashing cap locked over the cleats and edges of sheets on both sides.

All cross seams shall be tinned 1½ in. on both sides, locked and thoroughly sweated with solder.

Note: Pitch of ribbed seam copper roofs should not be less than 2 in. and preferably 4 to 6 in. to the foot.

STANDING SEAM ROOF

(13) Sheets shall be 20 or 30 in. wide and 96 in. long. All sheets shall be laid with long edges turned up 1¼ in. on one side and 1½ in. on the other and shall be secured by cleats spaced not more than 12 in. Cross seams shall be staggered.

Note: If ¾-in. finished seam is specified, turn up edges 1 and 1¼ in. respectively.

All cross seams shall have edges turned up to form lock joints with adjoining sheets and shall be tinned 1½ in. on both sides. All cross seams shall be flattened as specified above and shall be well soldered.

Note: Pitch of standing seam copper roofs should not be less than 2 in. and preferably 4 to 6 in. to the foot.

FLAT SEAM ROOF

(14) The roofing shall be applied the narrow way, joints staggered, using 10 by 14 or 14 by 20 in. sheets. All sheets shall be tinned at least 1½ in. wide all around and on both sides and shall be properly notched. Each sheet shall be secured to the roof with 1½ by 3-in. copper cleats evenly distributed along the edges of the sheet and fastened as specified above. The 10 by 14 in. sheets shall be secured by two cleats on the long and one on the short side; 14 by 20-in. sheets shall be secured by two cleats on each side. All cleats shall be locked into the seams and the sheets flattened smooth with a mallet.

Thoroughly sweat all seams with solder, soldering first the long and then the short seams.

Note: Pitch of roofs to be covered with flat seam copper roofing should not be less than ½ in. nor more than 3 in. to the foot.

FLASHINGS

(15) All intersections of roofs with vertical surfaces of every nature shall be flashed and counterflashed with soft (roofing temper) copper. Flashings generally shall be full length pieces locked and soldered. Base flashings shall be 16-oz. soft (roofing temper) copper. They shall not be less than 8 in. high and shall project at least 4 in. out onto the roof. Where roof is of copper, the flashings shall be connected to it with locked and soldered joints.

Cap or counterflashing shall be of 16-oz. soft (roofing temper) copper. It shall extend into the wall not less than 4 in. and be turned down over base flashing not less than 4 in. and edge turned back ½ in.

Step flashings shall be used where vertical surfaces occur in connection with pitched roofs. Steps shall lay not less than 3 in.

Flashings around all shafts and skylights shall be extended up the full height of curbs and properly locked to eaves or gutters.

All pipes passing through the roof shall be flashed and counterflashed with copper. Flashings shall extend out not less than 8 in. against the pipes. The counterflashing shall be caulked into the hubs or embedded in elastic cement and held with brass clamps.

REGLETS

(16) Where flashings occur against stone, reglets shall be cut in same by other contractor as required by this contractor. Cap flashings shall be turned into reglets not less than 1 in. and shall have a ⅛ or ¼-in. bend on the edge. Reglets shall then be filled with molten lead on horizontal areas, and lead wool on vertical areas, flush with face of stone.

VALLEYS

(17) All valleys shall be flashed with soft (roofing temper) copper. The sheets shall have no longitudinal seams and shall be of sufficient width and so cut as to increase in width from top to bottom. They shall extend under roof covering at least 6 in. and shall have their edges turned back ½ in., and shall be secured with cleats. On copper roofs, valleys shall lock with copper sheets to form a watertight joint.

MOULDED HANGING GUTTERS

(18) Moulded hanging gutters shall be formed at the eaves of all roofs where shown on the drawings. They shall be secured by proper top braces of brass or copper spaced 30 in. apart. Joints shall lap 1 in. and shall be riveted and soldered. On copper roofs, gutters and sheets shall be locked together. Gutters, where noted, shall have inner linings of 16-oz. soft (roofing temper) copper.

EAVES TROUGHS

(19) Where shown on the drawings, hanging gutters shall be erected of hard (cornice temper) copper. The weight of metal shall be 16-oz. unless otherwise specified. The shape shall be as shown on detailed drawings.

All gutters shall be secured to buildings by approved hangers of brass fastened by brass screws or bolts.

Ends of gutter sections shall either be tinned 1½ in. on both sides, lapped at least 1 in. and well soldered or have an approved type of slip joint. Care shall be taken to allow room for movement in the gutters.

GUTTER LINING

(20) All masonry gutter lining shall be of copper. The back edges of this lining shall be 3 in. higher than the front edges. Where the roofing is of copper, it shall be connected thereto with locked joints. Where indicated, lining shall carry up and finish under cap flashing.

The outer edge of the lining shall be finished into reglets as shown and specified above.

Care shall be taken to provide for expansion and contraction and linings must fit loosely in the gutters.

All cross seams shall be tinned 1½ in. wide on both sides and thoroughly sweated with solder. Laps shall be in the direction of drainage. Long gutters shall have ample provision for expansion and contraction.

STRAINERS

(21) All outlets from roofs or gutters shall be covered with an approved type of wire strainer made of No. 14 gauge copper wire.

CONDUCTOR PIPES

(22) Conductor pipes shall be installed where and as shown on the drawings of hard (cornice temper) copper. They shall be of ample capacity. All conductor pipes shall be fitted with elbows where shown or as may be necessary. When conductor pipes are not connected to sewer, they shall be provided with heavy goosenecks or shoes at the bottom. Conductor pipes shall be held in position 1 in. clear of walls by approved fasteners of brass or copper. Not more than 20 ft. of pipe shall be soldered in one length.

Laps for conductor pipes shall be at least 1¼ in. and pipe shall be tinned on both sides. Slip joints shall be at least 1½ in. and shall not be driven tight.

TUBES AND OUTLETS

(23) Where tubes are used to connect gutters to leaders, a special flashing consisting of a "shingle flashing" with a sleeve soldered thereto shall be inserted in such a manner as to be under the gutter and inside the leader, so as to prevent any leakage around the joint made by the gutter and the outlet tube.

SKYLIGHTS

(24) Copper skylights shall be furnished where shown on the drawings. They shall be constructed in a watertight manner with joints interlocked, riveted and soldered and shall conform to the requirements of the National Board of Fire Underwriters. Ribs shall be formed with condensation gutters, reinforced as required and shall be provided with capping secured in place with brass bolts.

Detailed drawings shall be submitted for approval.

CORNICES

(25) All cornice work shall be 16 to 20-oz. hard (cornice temper) copper accurately bent to the profiles shown on the detailed drawings and reinforced with straps and angles as required. All plain surfaces shall be of crimped copper. The ornament shall be stamped in soft (roofing temper) copper with dies made from approved models. Joints and seams shall be interlocked, riveted and soldered, reinforced on the back and made watertight.

COPPER COVERED WALLS

(26) On vertical walls marked "copper," erect standing seam or paneled surfaces as indicated. This includes all bulkheads, skylight curbs, penthouse walls, etc. All standing seam work shall be fastened to wall surfaces with cleats nailed with copper nails to wood sheathing, or furring strips filled between with cement mortar. All paneled work shall have casings or strips to receive copper. All large panels or large area of plain surfaces shall be crimped.

PRECAUTIONARY NOTES

Nails should never be driven through copper sheets. The sheets should be secured in position by copper cleats, the latter only being nailed. Never use iron or steel to fasten copper at any place or under any circumstances.

Never use copper in direct contact with another metal. If the plan of construction requires the use of iron or steel devices, the latter should be heavily tinned or sheet lead inserted between the copper and the other metal. The use of brass devices is recommended.

THE NATIONAL BRASS AND COPPER COMPANY

Manufacturers of Copper in Sheets, Plates and Rolls

ROLLING MILLS

LISBON, OHIO

SALES OFFICE, 30 Church Street, NEW YORK, N. Y.

Products

COPPER SHEETS, PLATES and CONTINUOUS ROLLS.

Uses of Copper as a Building Material

Copper is suitable for general sheet metal purposes—roofing, eaves trough, gutters, conductor pipe, flashing, ridge rolls, ridge caps, leader heads, etc.

National Brass and Copper Company Guarantee

National Brass and Copper Company copper is guaranteed *99.9+% pure.*

Pure copper is indestructible, non-corrosive, incombustible, protects against lightning and prevents the spread of fire. Its service value does not lessen with age and there are no maintenance costs—the first cost is the only cost.

Pure copper is easy to apply, light in weight and possesses a beauty unsurpassed by any other roofing material. After years of service, its salvage value is of the highest.

Advantages of Pure Copper

Durability—A roof of copper, *99.9+% pure,* will last for generations, possibly for centuries.

Given proper provision for expansion and contraction (such as we present in the appended specifications), there is practically no limit to its endurance.

The physical and chemical characteristics of copper make it the outstanding material for long service.

Numerous important buildings in the United States have been roofed with copper which has lasted over 100 years, and in Europe and Asia there are many examples of copper roofs which have endured for centuries.

ADDITION TO THE NEW YORK STOCK EXCHANGE
TROWBRIDGE & LIVINGSTON, New York, Architects
MARC EIDLITZ & SON, INC., New York, Builders
L. A. STORCH & CO., Brooklyn, Sheet Metal Contractors
National Brass and Copper Company's *99.9+% pure* copper used throughout
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Resistance to Corrosion—Copper *99.9+% pure* is non-corrosive. It is unaffected by the action of salt laden air. It alone withstands the corrosive action of sulphuric acid fumes and is consequently the material best suited for roof construction in cities where the fumes from manufacturing plants condense and fall on roofs.

In every city great quantities of corrosive gases are projected into the atmosphere. Pure copper is impervious to the action of such gases.

Economy—Freedom from repair or maintenance expense, combined with durability and absolute protection against the weather under all conditions, makes pure copper the most economical as well as the most efficient roofing material obtainable. It does not require painting or special protective treatment of any kind. The first cost is the only expense involved in the use of copper for building purposes.

Appearance—The green carbonate coating which appears on copper after exposure to the atmosphere not only acts as a permanent shield against deterioration, but also renders it the most beautiful of all roofing materials. This color effect, which has long been recognized as contributing distinction and giving the impression of age so often desired, can be secured artificially on newly laid roofing. Copper roofs and copper trim go far to enhance the beauty of many of the world's finest buildings; wherever it is used it creates an effect of richness, substantiality and good taste. Copper, *the metal eternal,* improves with age.

Salvage Value—Copper has a higher salvage value than any other metal used for building purposes. Since it is non-corrosive and indestructible, it may be readily utilized for numerous purposes after it has given generations of service. It is fair to say that any roof made of copper, *99.9+% pure,* will have a salvage value approximating the first cost of the metal.

Weight—The non-corrosive properties of copper make it possible to use a thin sheet and its comparative lightness permits of its extensive use in construction work without the necessity of heavy supporting structures.

The weights of various roofing materials per square (100 sq. ft. on the roof) are as follows:

Shingle tile, 10½x6¼ in. (5¼ in. to the weather)		1800 lbs.
Spanish tile, 14½x10½ in. (7½ in. to the weather)		850 lbs.
Slate, 3/16 in. good grade	(average)	675 lbs.
5-ply gravel	(average)	625 lbs.
4-ply slag	(average)	550 lbs.
3-ply slag	(average)	400 lbs.
Shingles		300 lbs.
Corrugated galvanized iron, No. 20 gage		225 lbs.
Copper, 16 oz., standing seam		125 lbs.

Continued on next page

Malleability—Copper is one of the most ductile of metals. No other metal is more easily worked or formed. It may be formed hot or cold, spun, stamped, hammered or worked by almost any known process. This is a decided advantage in working with copper, as the "brittleness" which renders other metals difficult to handle is not present.

Protection Against Lightning and Fire—Copper roofing, when properly grounded, gives full protection against lightning, a fact which is recognized by fire insurance companies in adjusting premium rates. Since copper is incombustible and forms a blanket roof, it is a preventive against the spread of fire.

Application and Maintenance—Good workmanship means nothing when inferior roofing materials are used, but it is essential if the best results from good materials are to be secured.

Copper roofing is easily and economically laid but it is essential that it be applied according to the standard specifications given below. If this is done, there will be no further maintenance cost and the owner may be assured that such a roof will suffer no deterioration from heat or cold or the action of the elements. Should accidental damage occur, the trouble can be readily localized and easily repaired.

National Brass and Copper Co. Copper Is 99.9+% Pure

Centuries of use have taught us that pure copper is the best possible material for roofing.

In permanence, economy, beauty and general satisfaction it is unequalled.

The architect specifying National Brass and Copper Company copper is using copper as pure as it is possible to manufacture. It is equal in quality to the copper that has endured through the ages.

Inspection

All copper products are rigidly tested and inspected at every stage of fabrication and before shipment.

It is the extreme care in manufacturing which permits of our guarantee of purity and complete satisfaction.

Packing

All copper products are shipped in specially built cases or crates to reduce possibility of damage in transit and to insure ease in handling.

Specifications for Copper Roofing and Sheet Metal

(1) Where copper roofs are shown on the drawings or called for in the specifications, copper necessary to complete all sheet metal work and roofings including all copper roofs, crickets, gutters, linings, flashings, leaders and leader boxes, sleeves, screens, skylights, ventilators, louvers and all incidentals in connection with the above listed work necessary to the completion of the sheet metal work and roofing shall be copper *99.9+% pure,* 14, 16, 18 and 20 oz. No substitutes will be permitted and each sheet must carry the brand and the weight of the metal.

(2) Unless otherwise specified, all copper for roofings and flashings shall be 16-oz. soft (roofing temper). All moulded work, unless otherwise specified, shall be 16 to 20-oz. hard (cornice temper) copper.

(3) Solder—All solder shall be of the best grade and shall be composed of one-half pig lead and one-half block tin (new metals). Rosin shall be used as a flux and all joints shall be sweated full of solder.

(4) Guarantee—All materials and workmanship necessary to complete the work shall be of the materials specified and the workmanship of approved standard. The contractor shall be held strictly responsible for failure due to poor workmanship and lack of proper provision for expansion and contraction.

(5) Roof Sheathing—Where copper roofing is laid over wood roof sheathing, said sheathing shall be of thoroughly seasoned lumber laid close and well nailed in place, nails set. Before applying the copper, all uneven edges of the boarding shall be smoothed off to give a firm even surface.

(6) Flat Seam Roof—Roofing shall be laid with 10x14-in. or 14x20-in. sheets and shall be applied the narrow way. Sheets shall be tinned 1½ in. wide all around and on both sides. Edges of sheets shall be turned up ½ in. All sheets shall be correctly notched. Sheets shall be secured to roof by copper cleats locked into seams and each cleat secured to roof sheathing by 2 copper nails ⅞ in. long, 3 cleats to each sheet for small sheets and 4 cleats for large sheets. Cleats to be 1½x3 in., so that end of cleat may be turned back over nails. Cleats shall be locked into seams and the sheets flattened smooth with a mallet. No nails shall be driven through the sheets. Thoroughly sweat all seams with solder. First solder the long seams, then the short seams. After soldering is complete, all seams shall be tested carefully for leaks and the surplus rosin removed. The roof shall be carefully swept and left in first class condition.

(7) Standing Seam Roof—All standing seam roofing shall be laid with edges turned up 1¼ in. on one side and 1½ in. on the other side.

Note: If ¾-in. finished seam is specified, turn up edges 1 in. and 1¼ in. respectively. (Sizes of sheets commonly used for copper standing seam roofing are 20x96 in.)

All cross seams shall be tinned 1½ in. on both sides. Sheets shall be secured to roof sheathing by copper cleats fastened to roof with copper nails. Cleats shall be 1½x3 in., spaced not more than 12 in. apart and locked into seams. No nails shall be driven through the sheets.

No solder shall be used on standing seams. All cross seams shall be thoroughly sweated with solder. After soldering is complete, all seams shall be carefully tested for leaks and surplus rosin removed. Roof shall be carefully cleaned and left in first class condition.

(8) Batten Roofing—All wood ribs shall be securely nailed to wood sheathing or other roof construction and shall be carefully spaced to maintain the proper width throughout. Sides of battens shall be slightly beveled and secured to roof with the narrow face up. Ribs shall be spaced as shown on the drawings. The copper sheets shall be in 8-ft. lengths with edges turned up the height of the batten and flanged outward at the top. Sheets shall be secured to roof by copper cleats fastened to wood ribs, spaced 8 in. apart. Cleats shall be nailed to ribs with copper nails.

Sheets shall be locked to cleats. Cover the tops of the wood ribs with copper cap locked over the sheets on either side of the rib. These seams shall be malleted down against ribs. Copper flashing caps secured to roof boarding by copper nails shall be provided over exposed ends of all ribs. Sheets and copper rib cap shall be locked over flashing cap. All cross seams shall be tinned 1½ in. both sides, cleated and locked and thoroughly sweated with solder.

No solder shall be used on sloping seams of ribs. No nails shall be driven through the sheets. After soldering is complete, all seams shall be thoroughly tested for leaks and the surplus rosin removed. The roof shall be carefully cleaned and left in first class condition.

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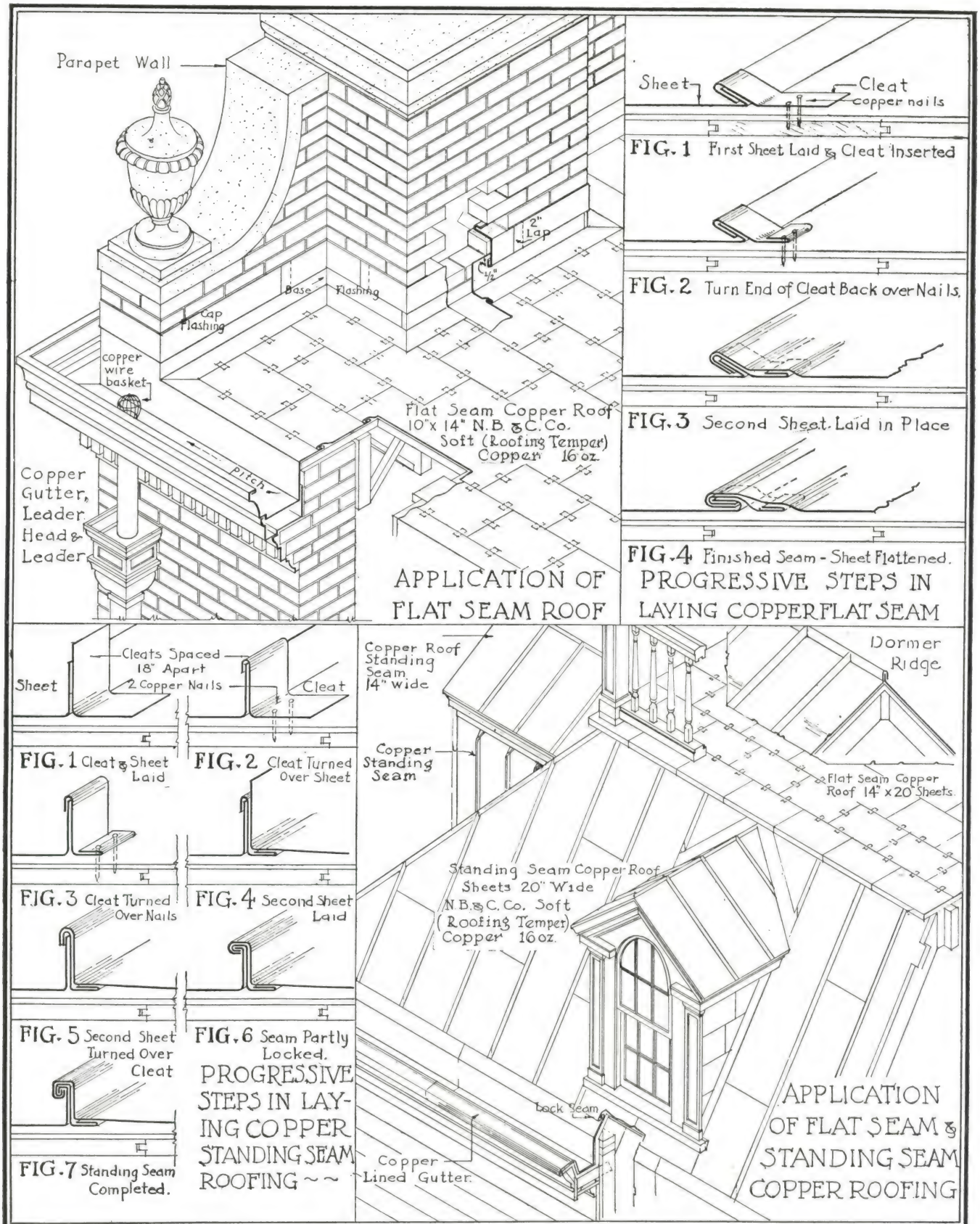

~ DRAWN BY ~ THE NATIONAL BRASS AND COPPER COMPANY	METHOD OF LAYING AND FLASHING FLAT AND STANDING SEAM COPPER ROOFS ✧	NOT DRAWN TO SCALE DATE AUG. 22	DRWG 1

Continued on next page

(9) **Flashings**—All intersections of roofs with vertical surfaces of every nature shall be flashed and counterflashed with copper. Flashings generally shall be full length pieces locked and soldered.

(10) Base flashing shall be 16-oz. soft (roofing temper) copper. Base flashings shall not be less than 8 in. high and shall turn out on roof not less than 4 in. Where the roof is of copper, the flashing shall be connected to it with locked and soldered joints.

Cap or counter flashing shall be of 16-oz. soft copper. Cap flashing shall extend into wall not less than 4 in., and be turned down over base flashing not less than 4 in. with edges turned back ½ in.

Where flashings occur against stone, raglets shall be cut in same. Cap flashings shall be turned into raglets not less than 1 in. and be secured with metal plugs spaced 12 in. apart and carefully leaded in place smooth with the face of the stone.

Step flashings shall be used in all cases where vertical surfaces occur in connection with pitched roofs. Steps shall lap not less than 3 in.

Flashings around all shafts and skylights shall be extended up to curbs and properly locked to eaves or gutters. All pipes passing through the roof shall be flashed and counterflashed with copper. Flashing shall extend out on roofs 4 in. and shall be turned up not less than 10 in. against pipes. Counterflashing shall be calked into hubs or embedded in elastic cement and held with brass clamps.

(11) **Gutters**—*(a)* Gutters shall be formed at the eaves of all roofs where shown on the drawings. Copper wire baskets of No. 14 gage metal shall be placed over each leader outlet. All gutters shall be of sizes indicated and constructed in strict accordance with the designs shown on detail drawings.

All moulded gutters, unless otherwise specified, shall be of 16-oz. hard (cornice temper) copper.

(b) Masonry (Copper Lined)—Copper linings shall be of soft (roofing temper) laid in all masonry gutters. The back of the gutter lining shall be carried up under the roofing not less than 6 in. or connected with roofing, if same is of copper, with locked joints.

Where so indicated, back of gutters shall carry up on the building side and finish under cap flashings.

The outer edge of gutter lining shall be turned out on masonry ledge to the distance shown and shall be turned into raglets cut in masonry and securely calked with lead.

Special care shall be taken in laying copper gutter linings to provide ample play on all sides for expansion and contraction. Lining must fit loosely in gutter.

All cross seams shall be tinned 1½ in. wide on both sides, cleated and locked, malleted down and thoroughly sweated with solder. Cross seams shall lap in direction of drainage. All long gutters shall have ample provision for expansion and contraction. No nails shall be driven through the sheets.

(c) Hanging Gutters—Hanging gutters shall be erected, where shown on drawings, of 16-oz. hard (cornice temper) copper (weight of metal depending on size of gutters). Where gutters are provided with inner lining, it shall be of 18- or 20-oz. hard copper. Gutters shall be secured to roof by top braces of brass or copper, spaced 30 in. apart and secured to roof boarding by brass screws or copper nails. No nails shall be driven through the copper sheets.

Ends of gutters, where overlapped, shall be tinned 1½ in. The gutters shall be lapped 1 in., tacked with solder and secured with flat head copper rivets, rivet holes 1 in. apart. Seams shall be thoroughly sweated with solder.

Care shall be taken to provide for expansion and contraction; lining must fit loosely in gutter.

(d) Eaves Trough—Where eaves troughs are shown, they shall be single bead or double bead stock pattern in short lengths (10 ft.) and connected by slip joints. The slip joint must be at the end towards the outlet. Great care shall be exercised in erecting to permit proper play in joints to provide for expansion and contraction.

The eaves trough hangers shall be of copper or brass and shall not be riveted or bolted to eaves trough.

(12) **Conductor Pipe**—Conductor pipe shall be installed, as specified or where shown on the drawings, of 16-oz. hard (cornice temper) copper and shall be of ample capacity. All conductor pipe to be fitted with elbows where shown or where necessary.

Where conductor pipes are not connected to sewer, they shall be provided with goosenecks or shoes at the bottom.

Conductor pipes shall be held in position 1 in. clear of walls by means of copper straps not over 6 ft. apart or secured to masonry by bronze hooks. Not more than 20 ft. of pipe shall be soldered together in one length. The lap shall be not less than 1¼ in. tinned inside and outside and the seam thoroughly sweated with solder. Where slip joints are made at the job, they shall be 1½ in. and the joints must not be driven tight. Allowance must be made for expansion and contraction.

(13) **Skylights**—Copper skylights shall be furnished where shown on the drawings. Skylights shall be constructed watertight with joints interlocked, riveted and soldered (skylights are to conform to the requirements of the National Board of Fire Underwriters). Ribs shall be formed with condensation gutters, reinforced as required and shall be provided with capping secured in place with brass bolts.

(14) **Copper Cornices**—The cornice work shall be of 16- to 20-oz. hard (cornice temper) copper accurately bent to the profiles shown on detail drawings and reinforced with straps and angles as required. All plain surfaces shall be of crimped copper. The ornament shall be stamped in soft copper with dies made from approved models. Joints and seams shall be interlocked, riveted and soldered, reinforced on the back and made watertight. The cornice work shall be flashed 6 in. into roofing material and calked into raglet at bottom.

Notes: Pitch—Pitch of roofs to be covered with flat seam copper roofing shall not be less than ½-in. nor more than 3-in. fall to the foot.

Finish—Copper needs no painting or other artificial protection. Copper will develop verdigris within a few months. When it is desired to secure a verdigris finish immediately, it can be done by artificial means, using one of the following methods:

(a) Apply the following solution: 1 lb. of powdered sal ammoniac to 5 gals. of water; dissolve thoroughly and let it stand 24 hours before using. Apply to copper with a brush, covering every part. Let it stand 1 day, then sprinkle with clear water, using a brush and spraying it on lightly.

(b) A solution of ½ lb. of salt to 2 gals. of water may be used to produce the same effect.

If a dark copper finish is desired, it can be obtained by the following method: rub off the copper with cotton waste and boiled linseed oil. Touch up all the outside soldered seams with copper bronze.

Warning Sign—A sign should be placed at entrance to roof warning against unnecessary walking thereon. When walking on copper roof, rubber soled shoes should be worn by workmen. Under no circumstances should metal or metal edged implements be used to clean the roof or clear it of ice or snow.

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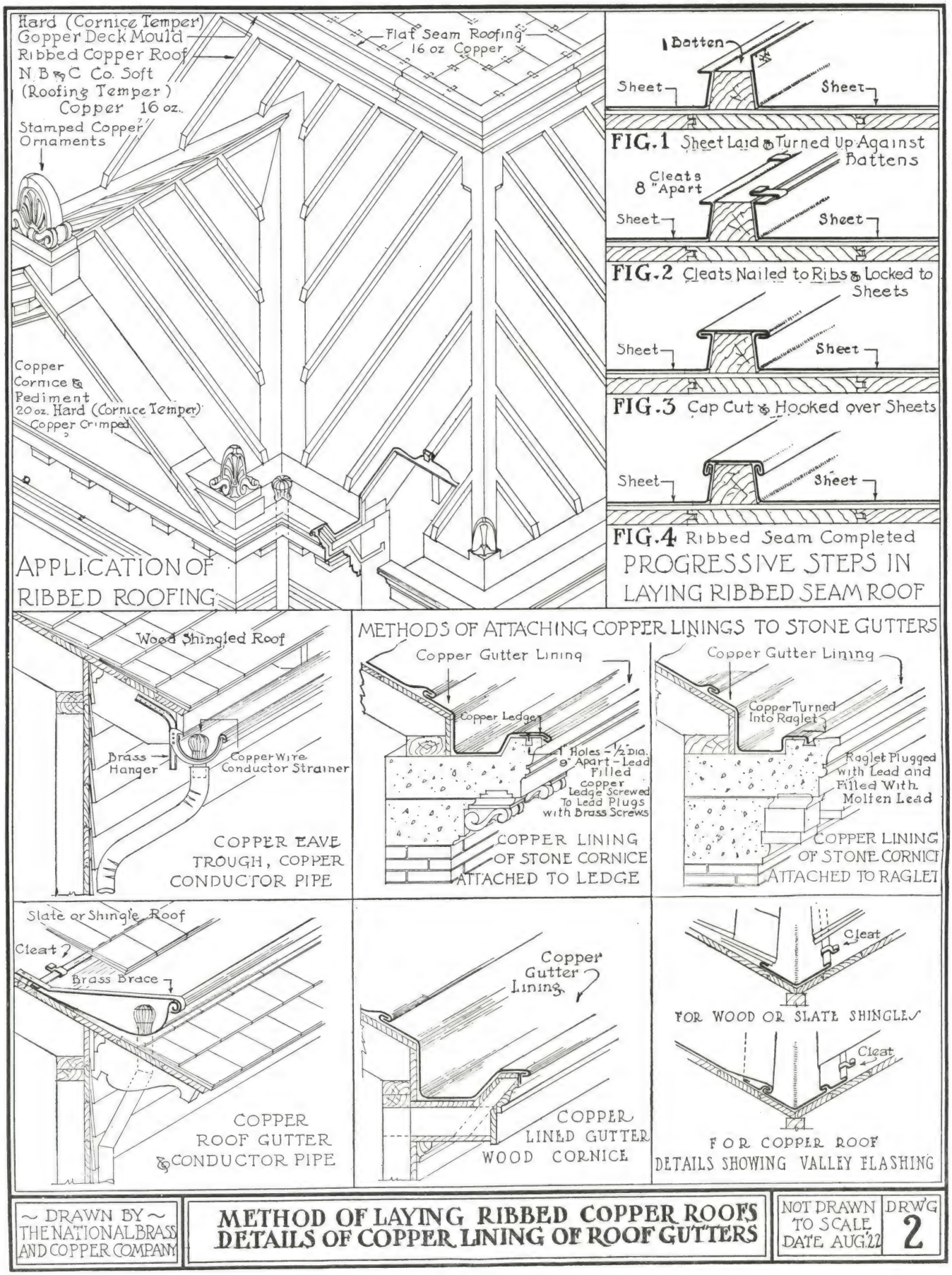

Hard (Cornice Temper) Copper Deck Mould
Ribbed Copper Roof
N.B.&C. Co. Soft (Roofing Temper) Copper 16 oz.
Stamped Copper Ornaments
Flat Seam Roofing 16 oz Copper
Copper Cornice & Pediment 20 oz. Hard (Cornice Temper) Copper Crimped
APPLICATION OF RIBBED ROOFING
Batten
Sheet
Sheet
FIG. 1 Sheet Laid & Turned Up Against Battens
Cleats 8" Apart
Sheet
Sheet
FIG. 2 Cleats Nailed to Ribs & Locked to Sheets
Sheet
Sheet
FIG. 3 Cap Cut & Hooked over Sheets
Sheet
Sheet
FIG. 4 Ribbed Seam Completed
PROGRESSIVE STEPS IN LAYING RIBBED SEAM ROOF
Wood Shingled Roof
Brass Hanger
Copper Wire Conductor Strainer
COPPER EAVE TROUGH, COPPER CONDUCTOR PIPE
METHODS OF ATTACHING COPPER LININGS TO STONE GUTTERS
Copper Gutter Lining
Copper Ledge
1" Holes - ½ Dia. 9" Apart - Lead Filled
Copper Ledge Screwed To Lead Plugs with Brass Screws
COPPER LINING OF STONE CORNICE ATTACHED TO LEDGE
Copper Gutter Lining
Copper Turned Into Raglet
Raglet Plugged with Lead and Filled With Molten Lead
COPPER LINING OF STONE CORNICE ATTACHED TO RAGLET
Slate or Shingle Roof
Cleat
Brass Brace
COPPER ROOF GUTTER & CONDUCTOR PIPE
Copper Gutter Lining
COPPER LINED GUTTER WOOD CORNICE
Cleat
FOR WOOD OR SLATE SHINGLE
Cleat
FOR COPPER ROOF
DETAILS SHOWING VALLEY FLASHING
~ DRAWN BY ~ THE NATIONAL BRASS AND COPPER COMPANY
METHOD OF LAYING RIBBED COPPER ROOFS
DETAILS OF COPPER LINING OF ROOF GUTTERS
NOT DRAWN TO SCALE
DATE AUG. 22
DRW'G 2

THE AMERICAN ROLLING MILL CO.

Producers of Armco Ingot Iron

GENERAL OFFICES
MIDDLETOWN, OHIO

DISTRICT OFFICES

NEW YORK, N. Y., 50 Church Street
CHICAGO, ILL., People's Gas Building
PHILADELPHIA, PA., Widener Building
HOUSTON, TEX., 419 First National Bank Building
DETROIT, MICH., Dime Bank Building
PITTSBURGH, PA., Oliver Building
ST. LOUIS, MO., Liberty Central Trust Building
SAN FRANCISCO, CAL., 10th and Bryant Streets
CLEVELAND, OHIO, 819 Finance Building
CINCINNATI, OHIO, Union Trust Building
BUFFALO, N. Y., Niagara Life Building

Products

"ARMCO" INGOT IRON SHEETS: "Armco" Ingot Iron Galvanized Sheets, "Armco" Ingot Iron Black Sheets, "Armco" Ingot Iron Corrugated Sheets.

Also "Armco" Ingot Iron Metal Lath.

Five Points of Superiority of Armco Ingot Iron

ARMCO Ingot Iron acceptably fulfills the demand on its five points of superiority—chemical purity, rust-resistance, enameling properties, welding properties and electrical conductivity—each a characteristic of tremendous importance to the diversified industries of America.

Chemical Purity

The raw materials entering into the manufacture of ARMCO Ingot Iron are especially selected.

The iron ore must be of the highest quality and a large part of it is taken from mines owned in part by the company.

In producing its own pig iron also, ARMCO scores another point for chemical purity by being able to reject and divert to the making of steel any pig iron which does not meet the extraordinarily high standard set for ingot iron.

Other raw materials entering into the open hearth furnace charge must be of an especially low sulphur, phosphorous, manganese and copper content, and every car of such materials is carefully checked in a control laboratory before it is allowed to enter the plant.

Analyses and check analyses taken at different stages in the process of manufacture, must prove the product to contain in the aggregate not more than 16/100% of not only the impurities usually considered in steel practice (i. e., silicon, sulphur, phosphorus, manganese and carbon), but also copper, and the gases oxygen, hydrogen and nitrogen.

Special deoxidizing agents are used to reduce the gaseous content to a minimum.

Any material not meeting the purity standard set is rejected. Therefore, uniformity and chemical purity are practically assured to the ultimate consumer.

Rust-Resisting Property

"The Electrolytic Theory of Corrosion" holds that purity, homogeneity, denseness and uniformity are necessary to combat rapid deterioration.

It is well known that the segregation of impurities accelerates corrosion through electrolytic action. By practically eliminating the impurities in the manufacture of ARMCO Ingot Iron, rust resistance is assured.

ARMCO Ingot Iron is manufactured with such skill, intelligence and accuracy in each step that all of the above requirements are met.

Specifications for Sheet Metal Work

Furnish material and labor for completion of all sheet metal work required by drawings and specifications. All such work, unless otherwise specified, shall be made from ARMCO Ingot Iron Galvanized sheets as manufactured by THE AMERICAN ROLLING MILL CO. of Middletown, Ohio.

The iron shall be galvanized with a high grade zinc spelter coating which coating shall be free from blisters and other imperfections. Each sheet must have the "ARMCO" trade-mark and gauge number stenciled on it.

SUGGESTIONS FOR GAUGES FOR DIFFERENT CLASSES OF WORK

Installation	Residences, Gauge No.	Offices and Public Buildings, Gauge No.	Factories and Warehouses, Gauge No.
Roofing	26	26	18 to 26
Siding	.....	.....	20 to 26
Cornices	24 to 27	24 to 27	22 to 26
Skylights	24 to 26	20 to 26	20 to 26
Ventilators	24 to 26	18 to 24	16 to 24
Heating and ventilating ducts	22 to 26	16 to 26	16 to 26
Eaves troughs	26	24 to 26	22 to 24
Leaders	26	24 to 26	22 to 26
Flashing	26	26	same gauge as roof
Valleys	26	24 to 26	same gauge as roof
Ridge roll	26	26	same gauge as roof
Window frames	22 to 24	22 to 24	22 to 24
Window sash	24	24	24

The heavy gauges shown above should be used where unusually severe corrosive conditions are present.

Standard Gauges and Sizes

Armco Ingot Iron Galvanized Sheets are carried in stock in the following sizes: Gauges 14, 16, 18, 20, 22, 24, 26, 27 and 28. Widths, 24, 26, 28, 30 and 36. Lengths, 60, 72, 84, 96, 108, 120, 132 and 144 in.

Armco Ingot Iron Black Sheets are carried in stock in the same gauges and sizes as galvanized.

Armco Ingot Iron Corrugated Sheets for roofing and siding purposes are made with 5, 3, 2½, 2, 1¼ and ⅜-in. corrugations. For general building purposes we recommend and carry in stock a 2½-in. corrugated sheet, 26 in. wide (after corrugating) for siding, and 27½ in. wide (after corrugating) for roofing. This size covers 24 in. in the width and allows for a 2-in. lap for siding and a 3½-in. lap for roofing.

These sheets may be had from stock in the following sizes: Gauges 20, 22, 24, 26, 27 and 28. Widths, 26 and 27½ in. Lengths, 60, 72, 84, 96, 108, 120, 132 and 144 in.

All of the above sizes are termed standard sizes because they are carried in stock and used most frequently. All grades of sheets may be had in special sizes when an order is placed for 2000 lbs. or more of a size.

APPROXIMATE THICKNESS AND WEIGHT OF SHEET IRON AND STEEL

Gauge No.	Weight per sq. ft., lbs.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.	Gauge No.	Weight per sq. ft., lbs.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.
28	.625	1/64	.015625	21	1.375	11/320	.034375
27	.6875	11/640	.0171875	20	1.50	3/80	.0375
26	.75	3/160	.01875	18	2.	1/20	.05
25	.875	7/320	.021875	16	2.5	1/16	.0625
24	1.	1/40	.025	14	3.125	5/64	.078125
23	1.125	9/320	.028125	12	4.375	7/64	.109375
22	1.25	1/32	.03125	10	5.625	9/64	.140625

A complete handbook of useful data on iron and steel sheets will be sent on request.

AMERICAN SHEET AND TIN PLATE COMPANY

Manufacturers of Sheet and Tin Mill Products

PITTSBURGH, PA.

DISTRICT SALES OFFICES

CHICAGO, ILL. PHILADELHIA, PA. NEW ORLEANS, LA. DENVER, COLO. ST. LOUIS, MO.
DETROIT, MICH. CINCINNATI, OHIO PITTSBURGH, PA. NEW YORK, N. Y.

EXPORT REPRESENTATIVES

NEW YORK, N. Y., United States Steel Products Company

PACIFIC COAST REPRESENTATIVES

SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE, United States Steel Products Company

Products

Keystone Copper Steel for Roofing Tin Plates.

Apollo-Keystone Copper Steel Galvanized Sheets for Sheet Metal Work.

Apollo Best Bloom Galvanized Sheets for Sheet Metal Work.

Also manufacturers of Sheet and Tin Mill Products of every description, including Corrugated and Formed Roofing and Siding Products, Black and Galvanized Sheets, Fire Door Stock, etc.

Keystone Copper Steel

Keystone Copper Steel is an alloy made by adding a certain amount of copper to well made steel. Copper added to steel in the correct proportion is *not* an impurity, any more than copper is an impurity in brass and bronze. It loses its identity by becoming *thoroughly diffused* through the steel—thus forming a *new metal or alloy.*

This company began experimenting, a number of years ago, with a view of supplying metal roofing and sheet metal superior to any which had been furnished in the past without materially increasing the cost. These experiments proved successful and announcement was made early in 1911 of the development of a product which would not only resist the acid test upon which much stress was then being laid, but which would also resist corrosion in actual service better than any iron or steel product on the market.

KEYSTONE COPPER STEEL
TRADE-MARK

Because of this excellence, proved in actual service, Keystone Copper Steel has been adopted for the base of all our roofing tin plates and Apollo-Keystone Copper Steel galvanized sheets for sheet metal work. It means more satisfactory roofs and sheet metal work for the owner, and better practice for the architect who insists upon plates manufactured from this high grade material. Specify Copper Steel sheets for all roofing and sheet metal work and insure maximum quality, service and rust resistance in tin roofs; and the most lasting and satisfactory galvanized sheet metal work, such as cornices, gutters, leaders, skylights, ventilators, etc.

Keystone Copper Steel Tin Roofing Plates

These plates represent the highest standard of manufacture, uniformity of coating and quality in every detail. The sheets or plates are coated in a molten bath of tin and lead, the heavier coatings being obtained by re-dipping. The plate is then carefully cleaned and inspected, and each perfect sheet impressed with weight of the coating and the "stamp of quality"—Keystone Copper Steel.

Brands—The durability of any tin roof depends primarily on the weight of the coating. Keystone Copper Steel is manufactured with standard amounts of coating used by the trade, from 8 lbs. to 40 lbs. Plates carrying less than 20 lbs. should not be used for permanent buildings; 30 to 40 lbs. coating is recommended.

MF Brand—32 lbs. coating. This brand has been made continuously since 1822, and unquestionably is the most popular roofing tin manufactured. The coating is applied by hand dipped pure palm oil process.

MF 32 POUNDS COATING IC KEYSTONE COPPER STEEL
TRADE-MARK

U. S. Eagle Brand—40 lbs. coating. This brand is the highest quality roofing tin produced in this country. Coated by the MF process, combined with Numethodd—these are the roofing plates par excellence.

Other Brands—Other high grade roofing tin with a Copper Steel base made under the following brands:

Brand	Coating
American Old Style AAAAA	40 lbs.
American Old Style AAAA	35 lbs.
American Old Style AAA	30 lbs.
American Old Style AA	25 lbs.
American Old Style A	20 lbs.
American Special	15 lbs.
American Extra	12 lbs.
American	8 lbs.
American Numethodd B	40 lbs.
American Numethodd D	30 lbs.
American Numethodd F	20 lbs.
American O. H. Fire Door Stock	20 lbs.

Identification Marks—All brands of roofing tin made with this "Keystone Copper Steel" base are distinctly stamped with the weight of the coating, "Keystone Copper Steel" and the brand. Many jobbers' private brands are also made of this material and bear the Keystone stamp and weight of coating. It is, therefore, an easy matter to tell at a glance whether or not the grade of plate specified is being used.

Sizes and Thicknesses—Furnished in two standard thicknesses, IC, approximately No. 30 gage U. S. Standard; and IX, approximately No. 27 gage. Furnished in two standard sizes, 14 x 20 in. and 20 x 28 in. Also furnished in other sizes and thicknesses to meet individual requirements.

Apollo-Keystone Copper Steel Galvanized Sheets

This product, like the roofing tin, has the highly rust resisting Keystone Copper Steel base. It is made in standard sizes and gages and in standard patterns, such as flat sheets, corrugated sheets, V-crimped roofing, standing seam roofing, plain roll roofing, etc.

TRADE-MARK

Continued on next page

Apollo Best Bloom Galvanized Sheets

Produced under the very best conditions and are manufactured from the best materials by skilled workmen. The coating is uniform, thoroughly protecting the base sheet; the final inspection critical and exacting. Hence the substantial and satisfactory service which is and always has been characteristic of this well-known galvanized product.

Standard Tin Roofing and Sheet Metal Specifications

(1) **Material**—*Tin Roofs*—Where tin roofs are required by the drawings, all tin for roof and surfaces, including flashings, counterflashings, gutter linings, crickets, etc., shall be MF [U. S. Eagle, American, or American Numethodd] Brand, Keystone Copper Steel, with 32 [25, 30, 35, 40] lbs. coating. No substitute will be allowed and each sheet shall be stamped with name of brand and weight of coating.

(2) All tin unless otherwise specified shall be IC thickness.

(3) *Sheet Metal*—All sheet metal for sheet metal cornices, hanging gutters, down-spouts, skylights, ventilators, etc., shall be No. 24 gage Apollo-Keystone [Apollo Best Bloom] Galvanized Sheets.

(4) **Guarantee**—All material and workmanship in connection with roof coverings, including all flashings, counterflashing, ventilators, scuttles, or similar work, shall be guaranteed to be the materials specified and the workmanship up to approved standard.

(5) **Sheathing Paper**—Roof sections, where tin is required, to be covered with rosin-sized building paper weighing at least 6 lbs. per 100 sq. ft. and laid with 2-in. lapped joints.

(6) **Flat Seam Roofing**—Edges of sheets shall be turned under ½ in.; all seams shall be well locked and well soaked with solder. Sheets to be fastened to sheathing boards by cleats spaced 8 in. apart, cleats locked into seams and fastened to roof with two 1-in. tinned barbed wire nails; no nails to be driven through sheets.

(7) **Standing Seam Roofing**—Sheets shall be put together in long lengths in the shop, cross seams to be well locked and well soaked with solder; sheets to be made up the narrow way in the rolls and fastened to sheathing boards by cleats spaced 1 ft. apart.

(8) **Ribbed Roofing**—All ribs to be securely nailed to sheathing and of sizes and spacings shown on detail drawings. Sheets to be made up the narrow way in rolls and fastened to ribs with cleats 1 ft. apart as detailed.

(9) **Caution**—No unnecessary walking over tin roof, or using same for storage of material, shall be allowed. In walking on the tin, care must be taken not to damage paint nor break coating of tin. Rubber soled shoes or overshoes should be worn by men on the roof.

(10) **Flashings**—Flash the intersection of all roofs and decks with dormers, chimneys, walls, and all vertical surfaces, about roof cants, about pipes passing through roofs to insure a weathertight job, using kind of metal elsewhere specified, with locked and soldered joints.

(11) Base flashing shall not be less than 12 in. high and shall turn out on roofs not less than 4 in., or where roofing is metal shall be connected to same with locked and soldered joints.

(12) All base flashings shall be capped. The cap flashing shall be turned down over the base flashing not less than 4 in. The cap flashing shall be built into the masonry joints not less than 2 in., or into the reglets in stone not less than 1 in., and shall be secured into same with metal plugs leaded in smooth with the stone work. Step flashing shall be used for vertical surfaces in connection with pitched roofs where required. Flashings which are to be built in shall be supplied to the mason when or where he may require.

(13) Base flashing of shafts and skylights must be extended up to curbs and connected to eaves or gutters.

(14) Collars or flashing about plumbing and other pipes extending through roofs shall be turned up at least 8 in. about same. The plumber will calk aprons of lead in hub of pipe and turn down over these collars at least 6 in.

(15) **Gutters**—Gutters shall be formed at eaves of all roofs as required, of the sizes indicated on drawings, laid with continuous fall to drainage points. Wire baskets of same metal as gutters shall be placed over each outlet to leader. Hanging gutters and gutter linings shall be carried up 10 in. under the roofing, connected with flashings and roofs with locked and soldered joints.

(16) Hanging gutters shall be made with clamped, riveted and soldered joints with roll on outer rim entirely covering continuous ⅝-in. galvanized iron bar which shall be placed therein, supported at least every 4 ft. in length by straps with edges rolled on themselves to stiffen them. They shall be wrapped around the roll and iron bar on outer edge of gutter and riveted. All rivets, screws, straps, etc., shall be of same metal as gutters.

(17) **Leaders**—Leaders shall be of ample capacity and same metal as gutters (except where otherwise specified) and shall be set to all roofs and gutters as shown; hereinbefore specified or necessary.

(18) Interior leaders put in to take the discharge from roof cesspools will be of cast or wrought iron (as provided for under "Plumbing") extended to within 18 in. (or as near as practical) of cesspool outlet and finished with hub end. These shall be connected to gutters and roof cesspools with brass ferrules and 6-lb. lead tubes heavily soldered. Connecting tubes shall have graduated increase of 1 in. in diameter to top.

(19) **Down-spouts**—Sheet metal down-spouts shall be as designed. They shall be flanged and soldered to the gutters and secured to the building with tinned conductor hooks or with metal strips ⅛x½ in. in cross section soldered to the down-spouts and fastened to woodwork with screws and to masonry by screws and lead sleeves. Straps and screws shall be galvanized.

(20) Where down-spouts connect with underground drainage system a suitable conductor head shall be provided (by the plumber) at the upper end of the drain pipe to receive the down-spout, and the joint between conductor head and drain pipe made with cement mortar well worked into place and finished smooth by the sheet metal contractor.

(21) **Metal Cornice**—Furnish and set complete, sheet metal cornice as shown on detail drawings. To be of No. 26 [or No. 24] gage Apollo-Keystone Galvanized Sheets with ornamental work stamped out of heavy zinc.

(22) The cornice shall be built up on heavy galvanized forms bent to correct profiles and firmly anchored in place. All joints, angles, miters and fittings to be thoroughly well made and finished. Ornamental work, modillions, etc., shall be planted on watertight backings.

(23) **Solder**—Solder shall be of best grade, bearing the manufacturer's name and guaranteed one-half tin and one-half lead—new metals. Use rosin only as a flux.

(24) **Painting**—All surfaces of tin and galvanized sheet metal work and iron and steel in connection therewith shall be thoroughly cleaned, all traces of flux removed, and painted as follows:

Surfaces that will be unexposed after being placed shall be given 1 [2] coat of paint before being installed and all surfaces that will be exposed after installation shall be given 1 coat of paint within 3 days after being placed, and before the contract is completed all exposed surfaces shall be given 2 [1] additional coats of paint, the final coat to be tinted in colors to be selected by the architect.

(25) All paint on unexposed surfaces and the first coat on exposed surfaces shall be composed of 15 lbs. red lead to 1 gal. raw linseed oil with not more than ½ pt. oil dryer, and all subsequent coats shall be composed of 15 lbs. white lead to 1 gal. raw linseed oil with not more than 5% of oil dryer and the necessary color to give the desired tint.

(26) Before the galvanized sheet metal work on the exterior of the buildings is painted it must be treated with the following solution which must be prepared in a glass or earthenware vessel:

Dissolve 2 oz. copper chloride, 2 oz. copper nitrate, and 2 oz. sal ammoniac in 1 gal, clear soft water, and when solution is complete add 2 oz. of crude hydrochloric acid. Apply this solution to the sheet metal and allow it to become dry at least 24 hours before the red lead paint is applied.

(27) All paints shall be applied with hand brush and well rubbed in.

Literature for Architects

This company will send, on request, booklets 8½ x11 in. in size, as recommended by architects, describing fully their Keystone Copper Steel sheets and roofing products. This literature is of value to every architect interested in the construction of flat seam, standing seam, or ribbed seam tin roofs; or the correct detailing of galvanized sheet metal work.

The nearest District Sales Office will be pleased to furnish information on request.

N. & G. TAYLOR COMPANY

Manufacturers of Tin Plate of all Kinds

ESTABLISHED 1810
113TH YEAR

Chestnut and Third Streets
PHILADELPHIA, PA.

WORKS
CUMBERLAND MD.

BRANCH OFFICES

CHICAGO, ILL., 208 South LaSalle Street
FRESNO, CAL., 2225 Fresno Street
LOS ANGELES, CAL., 508 Douglas Building
SAN FRANCISCO, CAL., 245 Mission Street

Products

"Target and Arrow" Brand of Roofing Tin, formerly known as "Taylor's Old Style."

"Taylor's Extra Coated 40-lb. Copper Bearing, Open Hearth"; "Taylor's Fire Protection Terne"; with other brands of Roofing Tin, Ternes, Bright Tin Plate and Black Plate.

Advantages of Tin Roofing

These can be summed up briefly as follows:

(1) Durable. (2) A time-tried, long established material. (3) Easily applied. (4) Adaptable to any kind of surface. (5) Moderate first cost. (6) Low cost of maintenance. (7) Easily and quickly repaired if damaged. (8) Loses nothing in appearance with age. (9) Light in weight. (10) Weatherproof. (11) Not affected by heat or cold. (12) Gives protection against lightning. (13) Incombustible and prevents spread of fire. (14) Can be painted any color.

Maintenance

A coat of paint every four or five years, to keep the surface in first class condition. Use for first coat only metallic brown, Venetian red, iron oxide, red lead, or white lead, with pure linseed oil. Afterward any color to suit the color scheme of the building.

Each painting restores the roof to its original condition. With this slight attention a "Target and Arrow" tin roof will usually outlast the building it covers.

"Target and Arrow" Brand Roofing Tin

This is our highest grade and the same durable quality of roofing tin that this company has supplied to the American sheet metal roofing trade for more than 70 years. It is an old specialty, made by a process handed down from the early days of our business. The base plate is a special quality, developed in our complete works, following the best practice of former years.

Extreme durability is obtained by an old-time coating process of ours, by which an exceptionally heavy coating is applied, rich in pig tin. The black sheets used are cut accurately to the finished standard size, 14x20 in. or 28x20 in. before tinning, to prevent uncoated edges. The finished sheets are closely inspected, and only the primes or perfect sheets are stamped with the "Target and Arrow" trade-mark.

Trade-mark Stamped on Each Sheet

This tin has in many cases lasted in good condition on the roof for more than 60 years.

Furnished in standard thicknesses, known as IC (pronounced *eyesee*), approximately No. 30 gage U. S. Standard; IX (pronounced *one-cross*), approximately No. 28 gage. Odd sizes can be made to order.

For Fireproof Buildings

The small amount of wood required for a light deck, supported by steel roof framing, and covered with tin, represents so small a fire risk as to be negligible in the case of fireproof buildings. The tin roofing protects the roof from exposure risks, and in the case of fire within the building prevents the flames from breaking through. Moreover, there is a considerable saving in using this type of roof in contrast with heavy, costly forms of roof construction.

Specifications for Standing and Flat Seam Roofing

Form recommended by the National Association of Sheet Metal Contractors for the use of architects:

Tin Roofing Work—All tin used on this building shall be Taylor's "Target and Arrow" brand. No substitute for this brand will be allowed. Use IC thickness for roof proper, decks, etc., and IX thickness for valleys, gutters, flashings and spouts, as required by design. One coat of red or white lead, iron oxide, metallic brown, or Venetian red paint, with pure linseed oil, shall be applied to underside of tin before laying.

For Flat Seam Roofing—Edges of sheets to be turned ½ in.; all seams to be locked together and well soaked with solder. Sheets to be fastened to sheathing boards by cleats spaced 8 in. apart; cleats locked into seams and fastened to roof with two 1-in. barbed wire nails; no nails to be driven through the sheets.

For Standing Seam Roofing—Sheets to be put together in long lengths in shop; cross seam to be locked together and well soaked with solder. Sheets to be made up the narrow way in the rolls and fastened to sheathing boards by cleats spaced 1 ft. apart. Valleys and gutters to be formed with flat seam well soldered; sheets to be laid the narrow way. Flashings to be let into joints of brick or stonework, and cemented. If counterflashings are used, lower edge of counterpart shall be kept at least 3 in. above roof. Solder to be of best grade, bearing the manufacturer's name, and guaranteed one-half tin and one-half lead—new metals. Use rosin only, as a flux—never use acid.

Caution—No unnecessary walking over tin roof or using it for storage of material shall be allowed. In walking on the tin, care must be taken not to damage paint nor break coating of tin. Rubber soled shoes or overshoes should be worn by men on the roof.

Painting Tin Work—All painting of tin work to be done by roofer, using red or white lead, iron oxide, metallic brown, or Venetian red paint, with pure linseed oil. No patent dryer or turpentine to be used.

All paints to be applied with a hand brush and well rubbed on. Tin to be painted immediately after laying. A second coat shall be applied in a similar manner, two weeks later.

No deviation from these specifications shall be made unless authority be given in writing by the architect. Only a first class roof will be accepted.

Note: Extra copies of this form ready for insertion in building specifications will be sent on request.

UNITED ALLOY STEEL CORP'N

STARK DIVISION

Manufacturers of Toncan Metal Rust and Corrosion Resisting Sheets, Roofing, Siding and Accessories

MILLS AND MAIN OFFICE

CANTON, OHIO

Products

TONCAN METAL, BLACK, BLUE ANNEALED, and GALVANIZED SHEETS.

TONCAN METAL ROOFING: Roll, V-Crimped, Pressed Standing Seam and Corrugated.

Also Toncan Metal Siding: Corrugated, and Reproductions of Rock Faced Stone, Rock Faced Brick and Lapped Weatherboard; Toncan Metal Corrugated Sheets, straight and curved, for use with concrete work and other special purposes.

A BETTER IRON TONCAN METAL TRADE-MARK

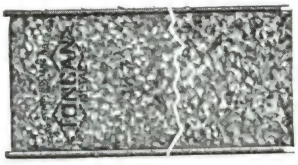
Description and Uses

Toncan is a pure iron alloyed with copper. It is the most rust-resisting, anti-corrosive metal sheet made from iron ore. Our book "Better Sheet Metal" gives complete details and evidence.

Toncan Metal is widely used for expanded metal lath, eaves trough, conductor pipe, ridge roll, valleys, flashing, cornice, balcony, marquise, window frames, skylights, tanks, ventilation, refrigeration—in fact for every purpose which demands a durable sheet metal.

ROLL ROOFING

Painted or galvanized. Excellent for low pitched roofs. Covering width, 24 in. Each roll lays 100 sq. ft. on the building



STANDING SEAM ROOFING

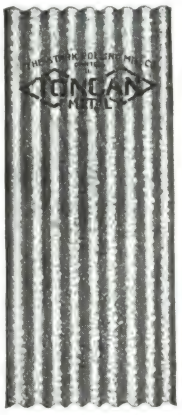
Painted or galvanized. Suitable for sloping roofs. Covering width, 24 in. Lengths, 5, 6, 7, 8, 9, 10 or 12 ft. Gauges, 20 or lighter

Expanded Metal Lath

Many architects specify Toncan Metal lath for all lath work as an extra assurance of lasting service. It should always be used for stucco and other exterior or exposed work.

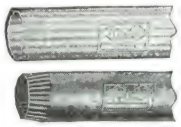
TONCAN METAL EXPANDED LATH

Galvanized or black. Gauges, No. 22 to No. 26 inclusive. Standard size 24 in. wide by 96 in. long



TONCAN METAL CORRUGATED SHEETS

Painted or galvanized. Suitable for roofing and siding



TONCAN METAL CONDUCTOR PIPE

Round corrugated, square corrugated, and plain round conductor pipe. Lengths, 8 and 10 ft. All diameters. Elbows, miters and cut-offs to match

TONCAN METAL EAVES TROUGH

Length, 10 ft. All widths; and gauges 28, 26, and 24

CORRUGATED RIDGE ROLL

2½-in. or 1¼-in. corrugations. Lengths, 27 and 96 in.

CORRUGATED END WALL FLASHING

Flat side on wall, 2 in. Corrugated apron, 4 in. Lengths, 27 and 96 in.

Advantages

In Toncan Metal lies the architect's most satisfactory solution for the sheet metal problem. It enables him to specify a moderate priced sheet metal of unquestionable durability—a durability proved by many years of use in thousands of structures and in every form of severe sheet metal service.

Identification

The trade-mark shown above is stamped in two or three places on every Toncan Metal sheet and die stamped on all eaves trough, conductor pipe, elbows, etc.

Sources of Supply

Jobbers and tinners everywhere sell Toncan Metal sheets and products. On request, we will supply names of manufacturers or dealers who can furnish any special Toncan Metal product you may have in mind.

Specification Data

For any sheet metal work where rust resistance is important, architects should specify "Toncan Metal manufactured by the UNITED ALLOY STEEL CORPORATION of Canton, Ohio," for Toncan meets all the requirements of the most advanced modern sheet metal practice.

Our book "Better Sheet Metal" gives weights, sizes, gauges and other material for preparing specifications.

References

Thousands of installations in all parts of the country are proving the lasting qualities of Toncan Metal. A few are mentioned below; others will be supplied on request.

Rhode Island Hospital, Providence, R. I.
Kendall, Taylor & Co., Boston, Mass., Architects
The Del-Mar Apartments, Toledo, Ohio, Sidney E. Aftel, Toledo, Ohio, Architect
Statler Hotel, St. Louis, Mo., Geo. B. Post & Son, New York, N. Y.; associates, Mauran, Russell & Crowell, St. Louis, Mo., Architects
Peoples Bank, Harrisburg, Va., Alfred C. Bossom, New York, N. Y., Architect
Fresno State Normal School, Fresno, Cal., Geo. B. McDougall, Architect
Montgomery Hotel, San Jose, Cal., William Binder and Ernest N. Curtis, Architects
Oak Park Country Club, Oak Park, Ill., E. E. Roberts, associated with Patton, Holmes & Flynn, Chas. E. White and William Drummond, Architects

OAK PARK COUNTRY CLUB, CHICAGO, ILL.

THE BARRETT COMPANY

Flashings for Brick and Concrete Walls

40 Rector Street
NEW YORK, N. Y.

For Branch Offices, see page 870

Products

FLASHINGS for Brick and Concrete Walls (Patented), PLASTIC ELASTIGUM for Flashings.

For Asphalt Paving, see page 415; for Roofing, Waterproofing, Building Papers, Preservative Paints, etc., see pages 870-875, for Roof Leader and Roof Vent Connections, see pages 948-949.

Essential Features of Barrett Flashings

Barrett Flashings, which are the result of over sixty years of successful roofing experience, embody all of the following essential features:

(1) They provide amply for expansion and contraction.

(2) Their elasticity takes care of settlement or shrinkage.

(3) All joints are watertight under every weather condition.

(4) They will not pull away from either roof or wall.

(5) They are practical and easy to install.

(6) They are adaptable to every complex wall construction.

(7) They are durable and require no maintenance or repair.

(8) They eliminate division of responsibility between contractors.

(9) Their cost is moderate.

Guaranteed for Ten Years

As proof of our confidence in the Barrett Flashing when installed in Barrett Flashing Block and the Barrett Flashing Form, we guarantee it for 10 years against all repair expense, when used with Barrett Specification Bonded Roofs and installed under our supervision. While not guaranteed when used with other roofs, they may be employed to great advantage with any type of bituminous roof construction.

Barrett Flashing Blocks and Flashing for Brick Walls

These blocks provide a permanent upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing itself. This cap, being an integral part of the wall, is as permanent as the wall itself, and can not become detached.

The flashing material is installed over one unbroken plane, eliminating the buckling, tearing, pocketing, and special wear which so frequently occur where flashings are turned in at right or acute angles. The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

Barrett Flashing Form and Flashing for Concrete Walls

This flashing form is identical in principle with the flashing blocks described above. The metal flashing form, as shown in detail on following page, provides a permanent, upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing itself. This cap, being an integral part of the wall, is as permanent as the wall itself, and can not become detached.

The metal flashing form is not intended to be permanent, its only function being to shape or create the flashing groove. It is left in the wall merely as a matter of convenience.

The flashing material is installed over one un-

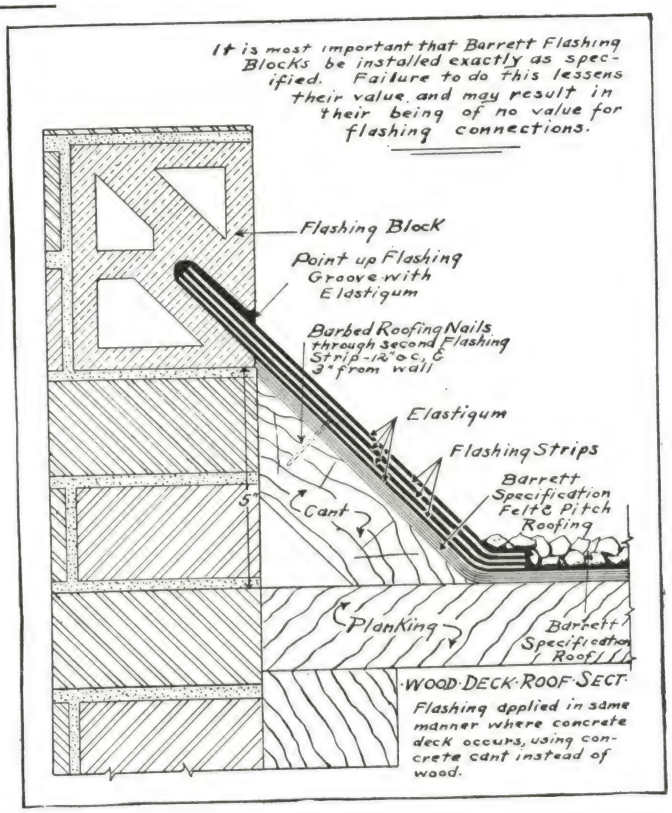
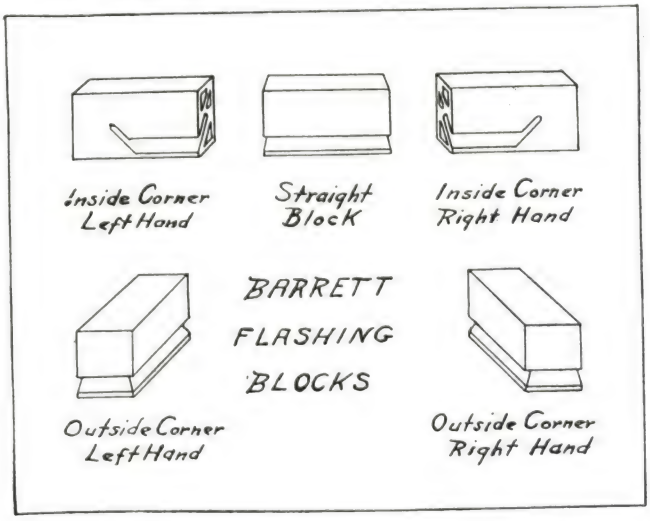


DIAGRAM SHOWING BARRETT FLASHING BLOCKS AND FLASHING FOR BRICK WALLS



DIAGRAMS OF BARRETT FLASHING BLOCKS

Continued on next page

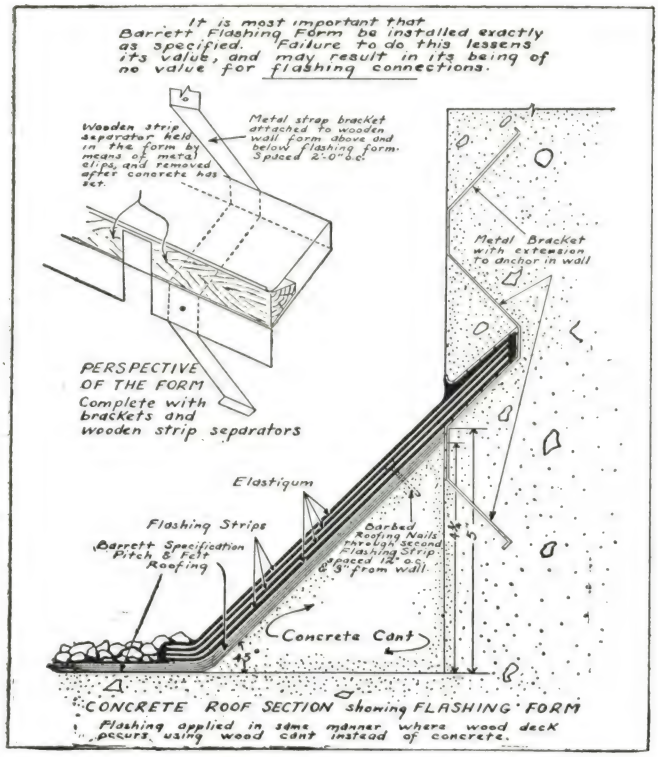
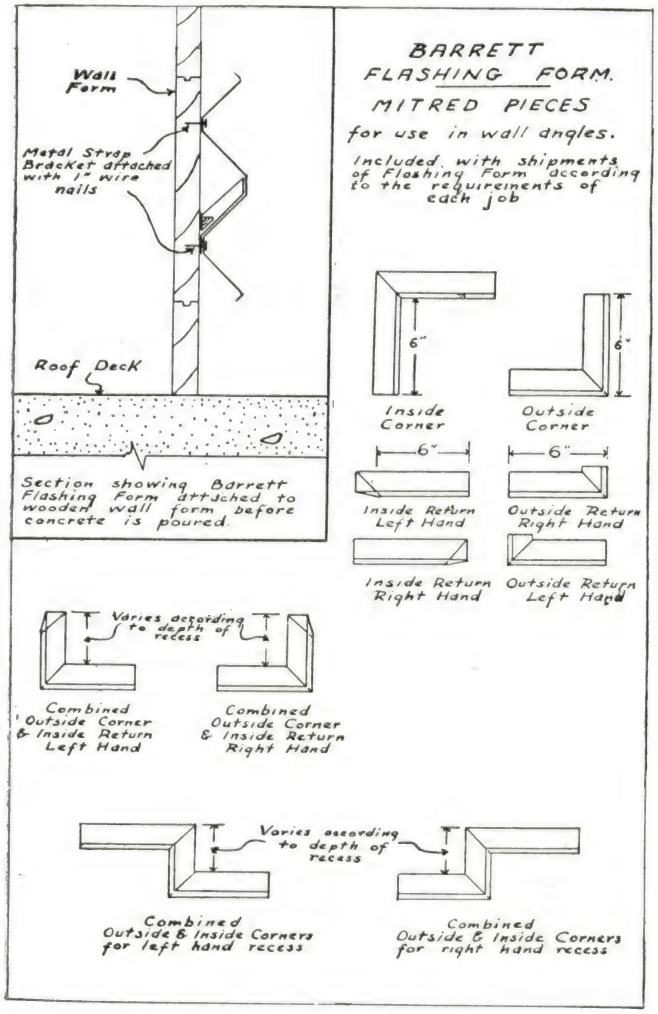


DIAGRAM SHOWING BARRETT FLASHING FORM AND FLASHING FOR CONCRETE WALLS



DIAGRAMS OF BARRETT FLASHING FORMS, MITRED PIECES FOR USE IN WALL ANGLES

broken plane, eliminating the buckling, tearing, pocketing, and special wear, which so frequently occur where flashings are turned in at right or acute angles.

The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

Barrett Flex-Lock Flashing for Built-up Roofs

This flashing construction for built-up roofs was designed to provide a dependable flashing which could be easily and properly installed by the same contractor who applied the roofing material, thus eliminating the division of responsibility for leaks, which has caused so much trouble in the past.

The construction consists of applying strips of roofing felt cemented together with Elastigum to the vertical surface of the wall and overlapping the roof surface 4 in. (see illustration), and covering this construction with Barrett Flex-Lock Flashing set in Elastigum, and coated on the exposed surface with the same material.

The Barrett Flex-Lock Flashing consists of No. 28 gauge galvanized iron strips, 8 ft. long, already prepared for insertion into the raked mortar joint which is to be liberally filled with Elastigum, making a permanently watertight joint. Galvanized malleable iron flashing hooks 2½ in. long are furnished with the flashing strips. These hooks provide ample holding power even though the mortar is of uncertain quality.

Barrett Flex-Lock Flashing is made in 8-ft. strips, weighs approximately 8 lbs. to the strip, and is shipped in crates containing 200 lineal ft. A sufficient number of flashing hooks necessary to install is furnished with each crate. Approximately 150 lbs. of Elastigum and one roll of Barrett Specification Felt are required for each 100 lineal ft. of flashing. Flex-Lock Flashings are used principally on old roofs where the worn-out metal flashings need to be replaced. Thus no guarantee is given.

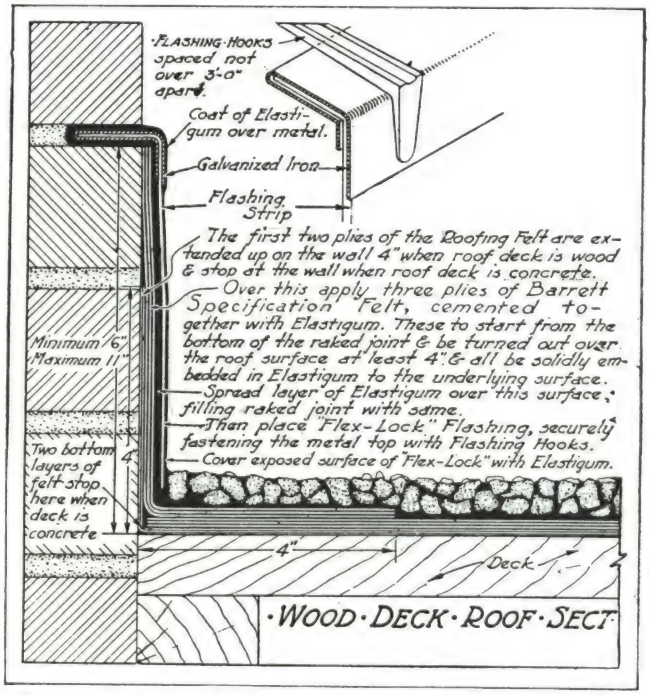


DIAGRAM SHOWING BARRETT FLEX-LOCK FLASHING FOR BRICK WALLS

Specifications and Details

Specifications and details of the above flashings are furnished on request. Apply to Specification Department, nearest Barrett branch.

THE BARRETT COMPANY

Roof Leaders and Roof Vent Connections

40 Rector Street

NEW YORK, N. Y.

For Branch Offices, see page 870

Products

HOLT ROOF LEADER and ROOF VENT CONNECTIONS (Patented).

For Asphalt Paving, see page 415; for Roofing, Waterproofing, and Building Papers, Preservative Paints, etc., see pages 870-875; for Flashings for Brick and Concrete Walls, see pages 946-947.

Holt Roof Connections

Mechanically compact, Holt Roof Connection does not require the cutting away of a large amount of sustaining roof structure, which must be done to receive the old style outlet boxes and cast iron roof outlets.

A series of three gravel stops and a cast iron strainer entirely prevent any loose gravel, leaves or roof rubbish from washing into and clogging the leader lines.

The connection is made integral with the roof deck by means of a locking arrangement. This eliminates any strain or movement at the roof line.

The expansion joint or flexible connection creates a watertight and gastight joint, and prevents leaks around outlets due to settlement or shrinkage of roof deck and expansion and contraction in leader lines. It overcomes collapsing and condensation which are the inherent weaknesses of old style connections.

Made of heavy copper and cast iron, it is durable.

Holt Roof Connections are easily specified, readily obtainable at the various Barrett branches, installed at minimum cost, and carry with them a positive assurance of uninterrupted service for as long a period of time as any other part of the roof construction.

Send for service sheets Numbers 4, 5, and 6.

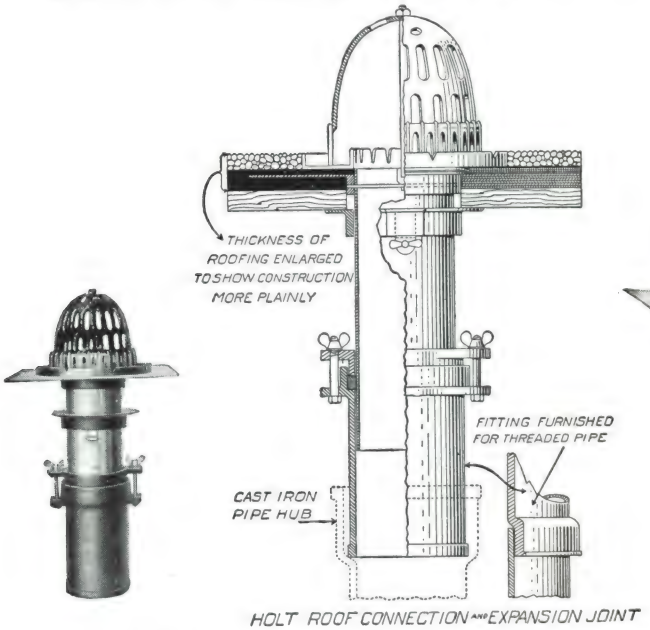
Types 1, 3, 4, 5, 6-L, 6-V, and 6-T are designed to meet the varying conditions presented by flat roof decks. Type 2 is especially designed for use with sloping roofs, and has a wide field in connection with sawtooth construction, and wherever valleys or parapet wall gutters are so narrow that a specially designed connection is required. Since this type is installed in an inclined roof deck, it obviates the necessity of constructing fills and crickets for drainage in valleys. It is adjustable to varying inclines.

For types 1, 3, and 4, a wide copper flashing flange is fused to each of these connections. Fusing joints requires intense heat and extreme care in workmanship. It is a factory job and is a necessary operation to provide a permanent watertight connection. It is not good or safe practice to permit flashing flanges to be soldered on the job. It is a difficult field operation even under the best of conditions.

For types 2, 5, 6-L, 6-T, and 6-V, a wide copper flashing flange is furnished with each of these connections. All necessary parts are provided to bolt the flashing flange to the connection, an operation done in accordance with the best mechanical practice, and one that provides a permanent watertight joint. This is the only dependable method of creating a watertight flashing joint, where a field operation is necessary, and types 2, 5, 6-L, 6-T, and 6-V come under this classification.

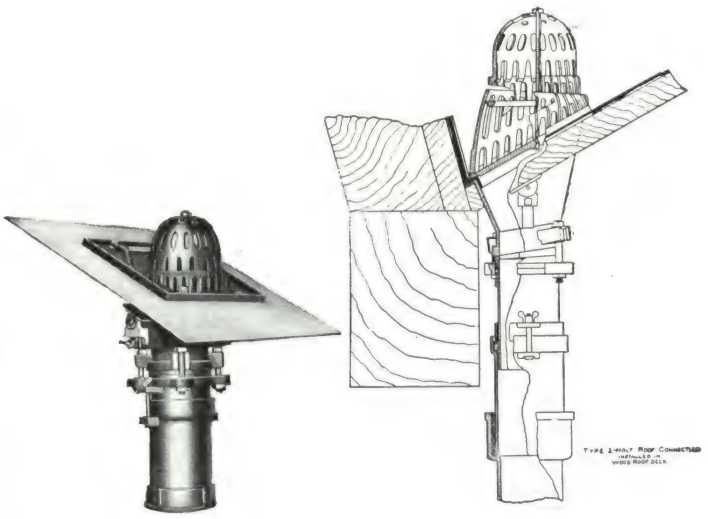
Catalogues, etc.

Complete catalogue, detailed drawings and specifications furnished on request.



TYPE 1, HOLT ROOF CONNECTION

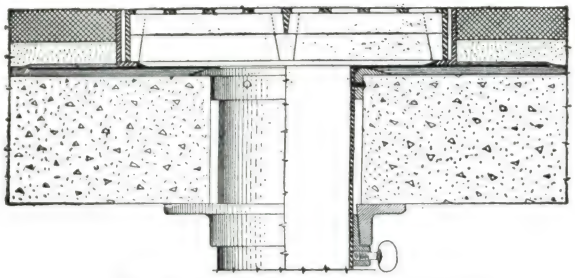
Exterior and cross section views. To connect with leader lines—flat surface. For complete details and specifications, ask for Service Sheet No. 4



TYPE 2, HOLT ROOF CONNECTION

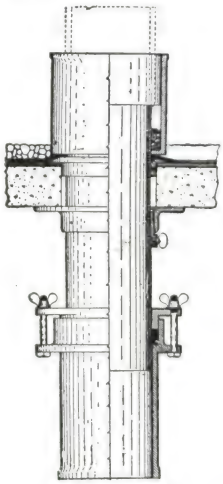
Exterior and cross section views. To connect with leader lines—steep surface. For complete details and specifications, ask for Service Sheet No. 6

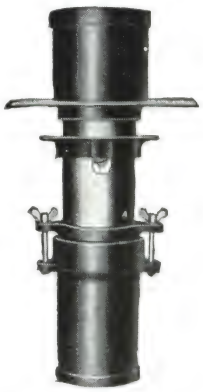
Continued on next page



Type 3, Holt Roof Connection

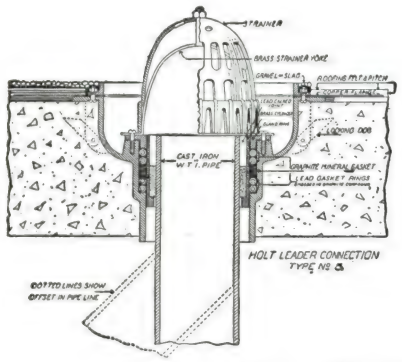
Exterior and cross section views. To connect with leader lines—flat, tile or brick surface. For complete details and specifications, ask for Service Sheet No. 4

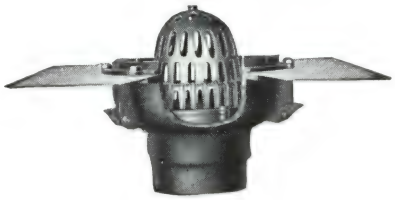




Type 4, Holt Roof Connection

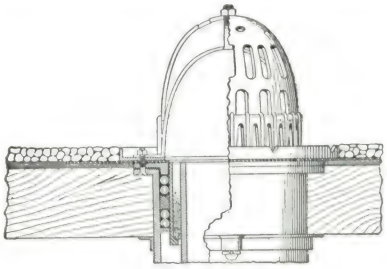
Exterior and cross section views. To connect with vent pipes—flat surface. For complete details and specifications, ask for Service Sheet No. 4



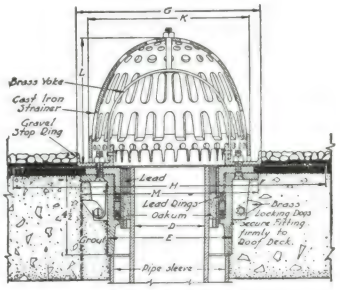


Type 5, Holt Roof Connection

Exterior and cross section views. To connect with leader lines—flat surface. For complete details and specifications, ask for Service Sheet No. 5



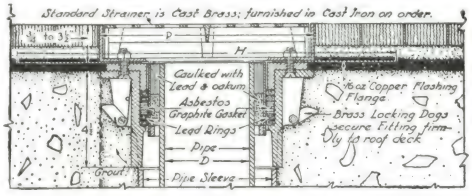
Over Board



Over Concrete

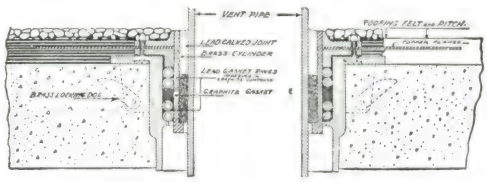
Type 6-L, Holt Roof Connection

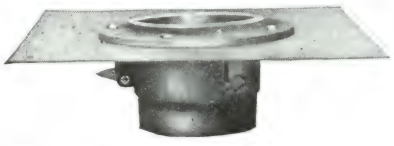
Exterior and cross section views. To connect with leader lines—flat surface. Cross section at right shows fitting for use in concrete, gypsum, etc., decks over 3 in. thick, and is provided with brass locking dogs. Cross section at left shows fitting with sliding lock collar for wood roof. For complete details and specifications, ask for Service Sheet No. 5

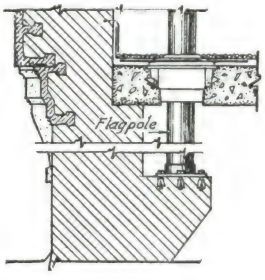


Type 6-T, Holt Roof Connection

Exterior and cross section views. To connect with leader lines—flat tile or brick surface. Sliding lock collar can be furnished. For complete details and specifications, ask for Service Sheet No. 5







Type 6-V, Holt Roof Connection

Exterior and cross section views. To connect with leader lines—flat surface. Cross section at left shows fitting as used with vent stack on concrete roof; at right a flagpole flashing. Sliding lock collar can be furnished. For complete details and specifications, ask for Service Sheet No. 5

THE RILE COMPANY, INC.

Manufacturers of Roof and Floor Sumps

247 McDougall Avenue
DETROIT, MICH.

Product

Roof and Floor Sumps.

Introduction

There has been a long-felt want among architects and engineers for a more lasting, permanent connection between roof and rain leaders, than that afforded by ordinary sheet metal. The integrity of any roof is restricted to the duration of its materials, for no roof can be stronger than the connections between roofing and rain leaders.

Roof Sump

Description—The Rile roof sump is an efficient, non-freezing, permanent rain conductor roof connection, forming a part of the general roof construction. It will effectively exclude foreign matter from the eduction or leader pipe.

Made of cast iron, the Rile roof sump is standard with many of the best architects and engineers for all classes of buildings and the various types of roof construction, including concrete, wood, book tile, hollow tile, gypsum roof tile, Federal tile, American tile, Truscon tile, or Hy-Rib.

Advantages—The Rile roof sump can not be readily broken, or stopped up, and is always accessible for cleaning.

Costs no more than the old soldered sheet metal types. Tapped for 4-, 5-, and 6-in. soil or wrought iron pipe.

The action of steam or sewer gases leaking through the drainage system and vented through the rain leaders has no effect on the Rile roof sump.

There are no soldering acids to cause trouble; no breaking of joints by expansion, contraction and buckling.

It will outlast the average roofing materials and is in position for the renewal of roofing or plumbing connections.

The use of Rile roof sumps effects a saving of from 3 to 6 weeks' time in the completion of every concrete structure in which they are used. By simply screwing a nipple and elbow to base of sump with a temporary pipe to discharge water outside of the building, sumps are ready for service the minute the structural roof slab is in place. Until such time as centering can be removed, to allow plumber to extend conductors and connect same, the lower stories are kept dry for flooring, the roof valleys and finish can be prepared for roofer, and finished roofing can be placed in advance of the plumbing.

Construction—Sump is made entirely of highest grade gray cast iron, and is entirely free from nuts, bolts, packed joints or other soldered or mechanical parts, and can be used for either wrought or cast iron conductor pipes. Main body, in the form of a cone frustum, is expanded into a flange at upper end. A removable cover, having perforation in the top and side openings, is seated in an annular seat in body by means of a peripheral flange. Bottom of body is screw-threaded to connect the cast or wrought iron eduction pipe.

Within the body is placed a removable catchbasin with integral perforated standpipe. Over the top of the catchbasin is placed a strainer, having perforations arranged radially and increasing in size toward the periphery, so that bulk of water and any foreign substance will pass downwardly (if at all) between the walls of catchbasin and the walls of standpipe strainer, and any foreign substances be retained in catchbasin.

Operation—The coarser foreign substances will be kept out by the cap. Smaller particles which may pass through the cap will be stopped by the strainer. Still finer sediment will be arrested and held in catchbasin.

Sump is readily cleaned by removing cap, stainer and catchbasin.

Installation—In order to properly secure sump to roofing so as to form a perfectly tight and strong joint, there is provided in upper flange of the body an annular dovetail groove, into which the inner circular edge of flashing plate is placed, by being flanged downwardly and inwardly. Dovetail groove is then filled with molten lead and calked, forming a perfectly tight, strong and permanent joint.

This means of securing the roofing metal work or flashing to sump is an important feature, as well as the general design of main body containing catchbasin, strainers, etc., in which the major portion of sump is suspended below the roof and subject to action of dissipated heat units within building, thus insuring its non-freezing qualities—an important factor in the design of buildings containing high tension electrical generating and transmission apparatus.

Specifications—Contractor for plumbing (or roofing) will furnish and place as indicated on drawings (location of sumps should be indicated on architect's working drawings), or as required (state number required 4-, 5-, or 6-in.) standard cast iron Rile roof sumps (The Rile Company, Inc., 247 McDougall Avenue, Detroit, Mich.). Plumber to pour and calk final lead joint between flashings and sumps. Flashings to be provided and applied by contractor for roofing.

Floor Sump

Tapped for 4-in. pipe only. Dimensions and detail of body and the two inside strainers same as the roof sump, with the exception of the top flat member, which is circular in form, 17 in. in diameter, and made without the calking groove.

A heavy flat top strainer is furnished with each floor sump (3 strainers in all).

Made for garage, laboratory and laundry floors.

References

Recent installations and orders:

United States Government
Aviation Dept. U. S. Army
United States Warehouses
Great Lakes Shipbuilding Co.
Cincinnati Milling Machine Co.
United States Tire Corporation
Geo. A. Fuller Construction Co.
Stone & Webster Corporation
Lincoln Motor Co.
Lockwood, Green & Co.
Corn Products Co.
Solvay Process Co
Ontario Power Co.
Canadian Steel Corporation
General Electric Co.
Packard Motor Car Co.
Leonard Construction Co.
Ford Motor Co.
Dodge Brothers (Motor Cars)
Cadillac Motor Car Co.

And scores of other leading engineers and builders.

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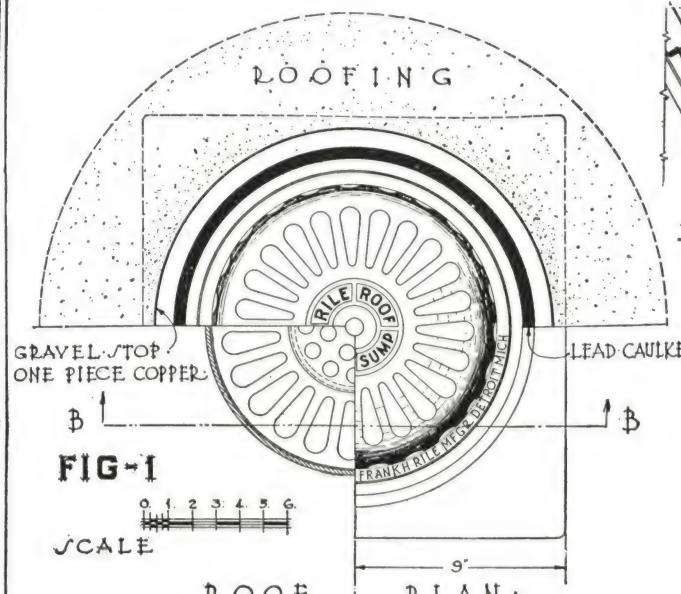


FIG-1

SCALE 0 1 2 3 4 5 6

ROOF PLAN.

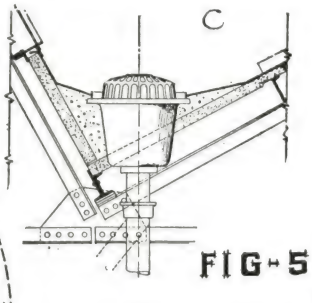


FIG-5

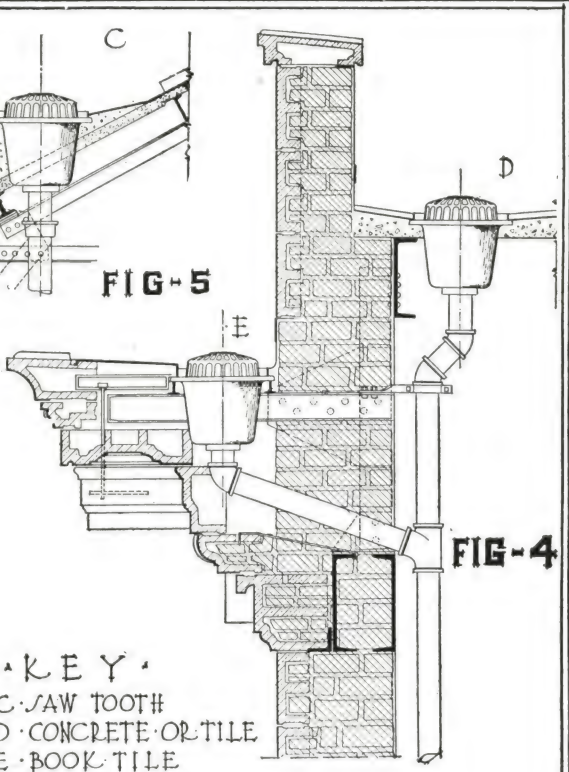


FIG-4

KEY
- C SAW TOOTH
- D CONCRETE OR TILE
- E BOOK TILE
- F CEMENT TILE

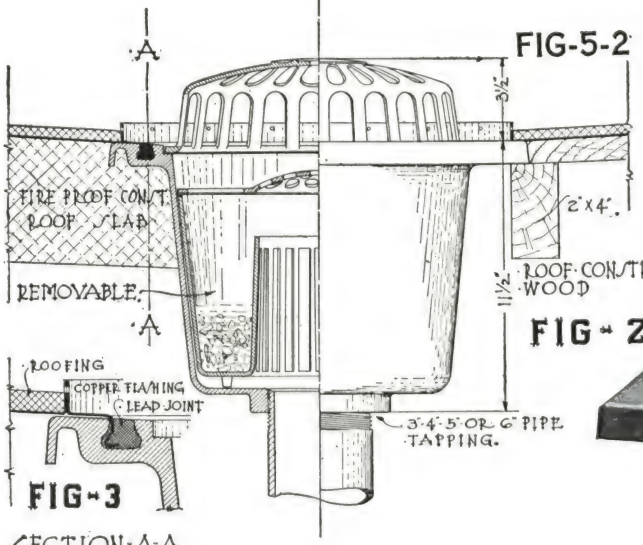
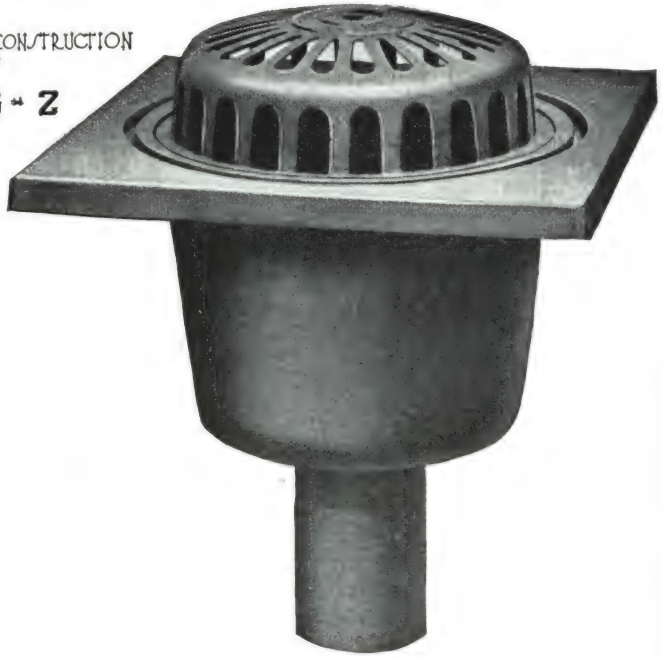


FIG-5-2

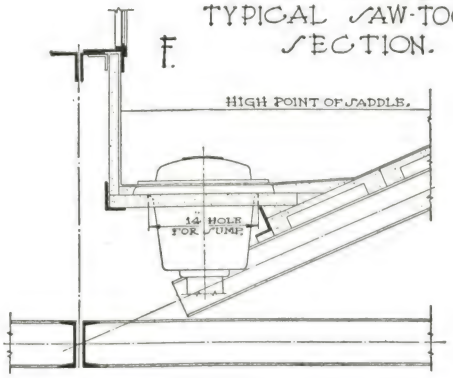
FIG-3

SECTION A-A

FIG-2



CEMENT TILE. TYPICAL SAW-TOOTH SECTION.



NOTE.- MADE IN ONE SIZE ONLY HEIGHT 15", WIDTH 18" WEIGHT 90# TAPPED FOR EITHER 3", 4", 5" OR 6" PIPE AS REQUIRED.

DRAWN FOR THE RILE COMPANY, INC.	METHODS OF INSTALLATION AND DETAILS OF RILE ROOF SUMPS	SHEET NO. 1 SCALE ⅜", 1½" & 3" EQUALS 1-0"

HARKER MFG. CO.

Manufacturers of Roof Flashing

121-123 West 3rd Street
CINCINNATI, OHIO

Product

RETLAW TELESCOPIC ROOF FLASHING.

Retlaw Telescopic Roof Flashing

The Retlaw telescopic roof flashing is the only elastic, collapsible, telescopic roof flange on the market.

It is drawn out of one piece of pure soft lead into circular corrugations without a seam and weighs 4 lbs. to the sq. ft. It can be easily adjusted to any condition that may exist upon a roof, regardless of its extremity in pitch or covering. It needs no hub, excels a boot, and its flexibility and elasticity will allow for extreme settling of roof or soil pipe.

Ease of Retlaw Installation

The illustration in the center shows the flange in its manufactured state, on a flat roof. It clearly shows the heavy galvanized iron band and brass bolt, which can be drawn up with a screwdriver, thereby compressing lead around pipe and making an absolutely rigid and tight joint.

The illustration on the left shows how easily the flange can be adjusted, with the slightest effort, to fit any desired angle of roof, by simply collapsing one side and drawing out the other.

The illustration on the right shows the neat and secure appearance of the flange after being adjusted upon a slant roof.

Meets All City Requirements

As the weight of Retlaw flashing is 4 lbs. to the sq. ft., it will more than meet the ordinance requirements for flashing, of all cities.

A Few of Many Reasons That Make Retlaw Flashing Superior

The following advantages clearly show why Retlaw telescopic roof flashing is the best and most economical flange on the market:

(1) After being placed in position, there is no come-back for leaking seams.

(2) It can be placed equally well on a straight roof, an angle roof, or a round cupola.

(3) The material of which it is made is pure soft lead, which will wear as long as any roof.

(4) It can not cause a hitch under the most trying circumstances.

(5) It needs no hub at roof to make a watertight joint.

(6) It can be pulled over the soil pipe like a rubber boot and made to fit any condition that may exist.

(7) It will allow for relaxation in case of vibration, contraction, expansion or settling of either the soil pipe or roof, as it has extreme telescopic elasticity.

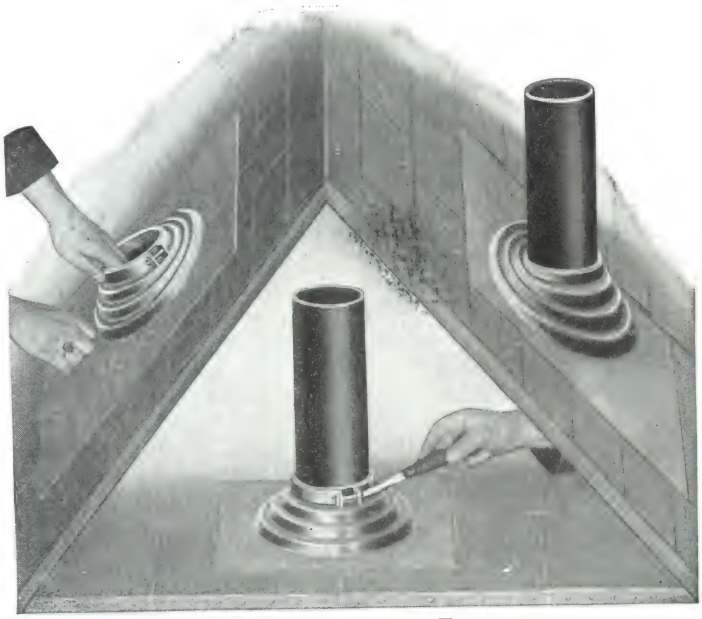
(8) It is indorsed by many leading plumbers as having many advantages over the hand made or boot flashing, and being considerably cheaper.

Sizes

The dimensions shown in the accompanying table are the standard sizes manufactured by this company.

We recommend their use as being most practical.

However, if relative sizes of pipe opening and base or apron do not conform with your opinion, Retlaw can be made up with any size apron.



RETLAW TELESCOPIC ROOF FLASHING
(Pat. Sept. 30, 1919)
Showing ease of installation on flat or pitched roofs

SIZES OF RETLAW FLASHING

Pipe opening, in.	Size of base, in.
1¼	14x16
1½	14x16
2	14x16
2½	14x16
3	16x18
4	16x18
5	18x20
6	18x22

Retlaw is made of 4-lb. sheet lead.

Each flashing is packed in a separate carton; six cartons to a box. This warrants delivery against mutilation.

Prices

Prices will be quoted on application.

All prices are quoted on the size of base or apron regardless of the pipe opening.

Specifications

When specifying, we would recommend the following:

All the vent pipes to be flashed at the roof line with the Retlaw telescopic lead roof flashing.

THE NEW JERSEY ZINC COMPANY

ESTABLISHED 1848

Manufacturer of "Horse Head" Rolled Zinc

160 Front Street
NEW YORK, N. Y.

REPRESENTATIVES

MINERAL POINT ZINC COMPANY
1111 Marquette Building
CHICAGO, ILL.

CLEVELAND, OHIO, THE NEW JERSEY ZINC SALES CO., 1138 Guardian Building

PITTSBURGH, PA., THE NEW JERSEY ZINC SALES CO., 1439 Oliver Building

SAN FRANCISCO, CAL., THE NEW JERSEY ZINC SALES CO., 1205 Merchants' Exchange Building

Product

"HORSE HEAD" ROLLED ZINC.

For Paint Pigments, see page 1357.

TRADE-MARK

Leaders, Gutters, Flashings, etc.

The facts of greatest interest to architects in specifying the metal to be used for eaves troughs, conductor pipes, valleys, flashings, etc., are durability, low cost, adaptability and artistic appearance. All these requirements are met by "Horse Head" rolled zinc, which will last a generation, costs much less than other durable metals, can be easily shaped and stamped without cracking, and blends in color with modern, architectural practice.

Historical

Rolled Zinc was first manufactured in Europe in 1805. Six years later rolled zinc was used for the metal roofing work on the Church of St. Barthelemy at Liege, Belgium, by the well-known Vieille-Montagne Company; an examination made in 1900 showed the metal to be still in excellent condition. Zinc roofing work spread rapidly to France, England, Germany, Austria and the Scandinavian countries, where rolled zinc soon became universally used for these purposes.

Notable Buildings Equipped with Zinc—Among the more notable European buildings on which rolled zinc was used for the metal roofing work are:

Church of St. Barthelemy, Liege: Gare du Nord, Brussels; Zoological Gardens, Antwerp; Kursall, Ostend; German Imperial Palace; Haymarket Theater, London; Universities of Bonn and Berlin; Canterbury Cathedral, England, Hotel de Ville, Paris.

European and American Methods Contrasted

In European countries where labor is cheap, the common practice is to take ordinary sheet zinc and make leaders, gutters, etc., on the job, seams and joints being soldered by hand. In America, where labor conditions are different, tinsmiths have come to demand manufactured articles made in standard shapes and sizes with locked seams and crimped one-piece elbows. This requires pure metal devoid of brittleness.

"Horse Head" Rolled Zinc

With the advent of "Horse Head" rolled zinc which will analyze better than 99.9% pure and can be worked as easily as copper or soft steel, brittleness, which has prevented the successful use of zinc in the past, has been removed. "Horse Head" zinc for roofing purposes can now be obtained in widths up to 20-in. in 10-ft. lengths; and up to 18 in. in coils. Spouting made from this zinc, when erected in accordance with the following carefully prepared specifications, will insure a lasting job at minimum cost.

Color—Zinc spouting on exposure to the weather soon takes on a silvery-gray coating which gradually darkens with age and which acts as a protection against further corrosion by the elements.

Painting—Paint may be used when desired for artistic effects but is not necessary for protective purposes. Where paint is to be used the metal should first be treated with a solution of copper acetate or copper sulphate in water (6 to 8 oz. per gal.). After this has dried the resulting powder should be brushed off and paint applied in the usual manner.

Staining—The use of zinc eliminates the staining of marble, white, or stucco buildings which is an undesirable characteristic of many other metals.

Comparative Costs—The material cost of "Horse Head" zinc spouting is about midway between that of copper and galvanized steel. Inasmuch as its life is many times that of the cheaper material and comparable with that of the most durable and expensive metals, the resultant economy from its use becomes apparent.

Specifications

(1) All eaves trough, conductor pipe, ridge roll, valleys, flashings, etc., shall be made from "Horse Head" Rolled Zinc, cornice crimped.

(2) The metal used for eaves trough, conductor pipe, ridge roll and accessories shall be not less than 0.024 in. thick (No. 11 Zinc gauge); valleys and flashings shall be not less than 0.020 in. thick (No. 10 Zinc gauge.)

(3) Eaves trough shall be supported by hangers of the shank and circle type which shall be heavily galvanized. These shall be spaced not more than 2 ft. apart and not more than 8 in. from each end or corner.

Conductor pipe sections shall be hung preferably by heavily galvanized adjustable fasteners of the rack and pin type. These shall be carefully soldered to the pipe and located, one to each section, about 2 ft. from the lower end. Galvanized hinged hooks may be used, and shall be similarly spaced and tacked with solder to prevent slipping.

(4) Ridge rolls shall be fastened to the roof by means of clips of rolled zinc and the sections shall overlap not less than 2 in.

(5) Flashings and counter flashings shall be installed in the regular manner. The rows of brick above and below the flashing shall be given a coat of asphaltum paint and the masonry pointed up with neat cement. Raw acid shall not be used to wash the masonry in the vicinity of the flashing.

(6) The valley sections shall be attached to the roof by means of rolled zinc clips. The nails holding the shingles or other roofing material must not pass through the valley.

(7) Shingles and metal tile shall be made from "Horse Head" Rolled Zinc not less than 0.018 in. (No. 9 Zinc gauge.) They shall be laid according to the manufacturer's specifications and all valleys, ridges, flashings, etc., shall be made of "Horse Head" Rolled Zinc.

Note: In all cases where zinc is used in connection with another metal in exposed positions, care must be taken to prevent actual contact between the metals because of the danger of electrolytic action with resulting corrosion of the zinc. Satisfactory insulation can ordinarily be secured by the use of portland, or roofing, cement or asphaltum paint.

U. T. HUNGERFORD BRASS & COPPER CO.

Hungerford Building, Lafayette, White and Franklin Streets
NEW YORK, N. Y.

BRANCH OFFICES AND WAREHOUSES

BOSTON, MASS., Franklin and Broad Streets
PHILADELPHIA, PA., 510 Arch Street
BALTIMORE, MD., Lombard and South Streets
SAN FRANCISCO, Cal., 438 Market Street

Products

TRADE-MARK

COPPER LEADERS, ELBOWS, SHOES, STRAPS, STRAINERS, HEADS.

COPPER GUTTERS: MITERS, END PIECES, CAPS, OUTLETS and HANGERS.

SHEET COPPER; ROOFING NAILS; COPPER SHINGLES; COPPER SPANISH TILE; BRONZE COPPER and MONEL METAL SCREEN CLOTH.

Also, Snow Guards; Copper Ridge Caps, Rolls, Valleys and Flashings; Brass and Bronze Railings; Grilles; Ornamental Wire Work.

For Seamless Brass and Copper Pipe and Tubing, see page 1459.

Hungerford Star Brand Copper Leaders

Only full weight, pure copper will give the satisfactory long life and permanently trim, neat appearance that rightfully should be and is expected of copper leaders and gutters.

Every length of our Star brand leader and gutter is clearly embossed with our name and the net weight of hard rolled, roofing temper pure sheet copper from which it is made. Our name and brand mark on a length of copper leader or gutter is positive assurance of full net weight, standard quality material. All Hungerford "Star Brand" copper products are unconditionally guaranteed.

"X-L" GUTTER HANGER

In order to meet requirements of the building trades for prompt service we carry on hand in our warehouses, ready for *immediate* shipment an extensive stock of our "Star Brand" copper leaders comprising the following sizes and kinds:

Copper Leader	Weight of Copper oz.	Lengths, ft.	Diameter, in.
Plain round	16	10	2, 3, 4, and 5
Plain round	14	8	2 and 3
Corrugated round	16	10	2, 3, 4, 5, and 6
Corrugated round	14	8	2 and 3
*Corrugated square	16	10	2, 3, 4, and 5
Corrugated square	14	8	2 and 3

*From long custom this type of leader is termed "square," whereas it is in reality rectangular in shape. Sizes carried in our stock as noted above are standard. Actual measurement of 2-in. "square" corrugated leader is 1¾x2¼ in.; 3 in. = 2⅜x3¼ in.; 4-in. = 2¾x4¼ in.; 5-in. = 3¾x5 in.

COPPER SHINGLE

ROUND PLAIN COPPER LEADER

ROUND CORRUGATED COPPER LEADER

SQUARE CORRUGATED COPPER LEADER

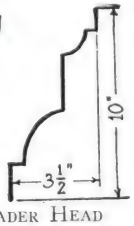
Rectangular plain copper leader is not regularly carried in stock but can be made very promptly to special order. Adherence to regulation sizes of "square" leaders is advisable in order to secure advantage of being able to use stock sizes and types of fittings and accessories.

COPPER SPANISH TILE

SINGLE BEAD LAP JOINT COPPER GUTTER

BRICK DRIVE TINNED IRON LEADER HOOK

NO. 14. COPPER LEADER HEAD



WOOD DRIVE TINNED IRON LEADER HOOK

GUTTER END PIECE WITH CAP AND OUTLET

"REX" STRAP COPPER GUTTER HANGER

INSIDE CORNER COPPER GUTTER MITRE

ROUND CORRUGATED ELBOW

STYLE B COPPER LEADER STRAP

COPPER WIRE LEADER STRAINER

STYLE C COPPER LEADER STRAP

SQUARE CORRUGATED ELBOW

CUT COPPER SHINGLE NAIL

COPPER WIRE SLATING NAIL

COPPER STORM NAIL

Continued on next page

Hungerford Star Brand Copper Gutter

Single bead, lap joint half round. Stock sizes: 16 oz. copper, 10-ft. lengths, 4, 5, and 6 in. in diameter.

Double bead, half round gutter, also double or single bead, *slip* joint types can be furnished promptly to special order.

To meet special requirements a variety of "OG" and other types of copper gutters can be made to order promptly. The following suggested patterns give some idea of our facilities in this direction.

STYLES OF SPECIAL COPPER GUTTERS

The above end or contour views show some types of "OG" and special patterns of copper gutters that can be made promptly to special order (not drawn to scale). These designs may be varied in any particular to conform with architects' plans and can be made in any size desired.

Hungerford Star Brand Copper Leader and Gutter Fittings and Accessories

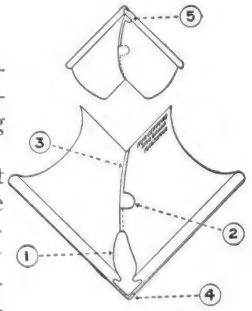
No. 1 45° No. 2 60° No. 3 75° No. 4 90° Shoe

TYPES OF LEADER ELBOWS

Elbows, shoes, miters, end pieces, caps and outlets are also carried in our warehouse stock in sizes and patterns to correspond with foregoing stock items of leader and gutter.

Leader elbows are ordinarily designated by "number" and diameter. "Number" indicates degree of angle (see accompanying sketch).

A roof gutter's weakest point is usually at the corners. We have developed a reinforced type of copper gutter miter which obviates any possibility of failure of the equipment at this point. Note the following five points of superiority in our Star brand miters (see accompanying sketch):



STAR BRAND MITERS

(1) Wedge shaped reinforcement, ¾ in. wide running down to a depth of 3 in. is securely sweated over the inside seam with the best grade of strictly ½ and ½ solder.

(2) ½-in. semicircular "lip" at the exact inside center of miter gives greater bearing surface for soldering and consequent increase of strength.

(3) $\frac{3}{16}$-in. lap runs from inside corner to the inside center, and beyond the auxiliary "lip" at that point is folded under and extended on the outside surface to the outside corner; all thoroughly soldered.

(4) ¼-in. "lip" carried around outside edge and soldered firmly makes virtually an overlapping corner.

(5) A third thumbnail "lip" carried around outside corner under the bead and securely soldered gives added reinforcement.

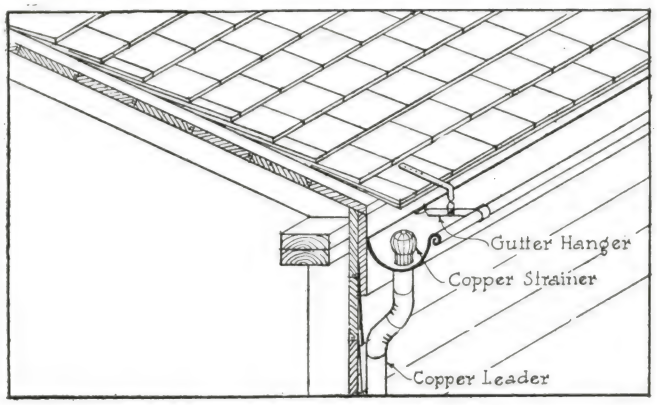
Copper Gutter Hangers

Copper hangers should of course always be used with copper gutters and it is also important that copper nails be used for fastening; iron nails of any type should never be driven through or allowed to come in contact with copper; galvanic action which is sure to result from such practice will quickly disintegrate copper.

Rex Strap Copper Gutter Hangers—These have the following outstanding features of superiority:

Truss type of cross bar $\frac{5}{64}$ in. thick by ⅝ in. wide provides ample strength for carrying any reasonable theoretical or actual load of water, snow or ice and also protects gutter from being bent out of shape or alignment by painters' ladders.

Hook will automatically adjust itself to any variation in size of bead. This feature insures tight fit.



TYPICAL INSTALLATION OF SOME STAR BRAND PRODUCTS

Spur on underside of strap slips up under bead and forms a lock when strap is bent around gutter.

Hole is punched for nailing through gutter and hanger into facia board. Prevents gutter from tipping over.

Adjustable locking feature permits pulling strap to a snug, tight fit all around the gutter, eliminating any possibility of rattle or sagging after gutter is in place.

Shank is made of $\frac{1}{16}$x⅝-in. copper of sufficient length to permit secure fastening to face of the roof and is firmly riveted to top of truss with $\frac{5}{32}$-in. copper rivet.

Hungerford Genuine Bronze Pure Copper and Monel Metal Window, Door and Porch Screening

The superiority of bronze screen cloth is firmly established. Pure copper cloth while highly resistant to corrosion lacks the necessary strength to hold its mesh permanently straight and flat. We make pure copper cloth but recommend unconditionally the use of our Hungerford genuine bronze which is an alloy possessing equal corrosion resistant qualities with copper and by virtue of its alloying agents has the necessary strength to withstand every day wear and tear.

Monel metal is a natural alloy of copper and nickel grayish white in color, somewhat similar to pure nickel, absolutely non-corrodible and possesses tensile strength equal to mild steel. Monel is probably the most expensive of all screening materials but any increased first cost is more than offset by elimination of all future expense for maintenance and renewals. On work where *quality* is the first and only consideration there is nothing to equal monel metal.

Bronze, copper and Monel screen cloth are available for immediate warehouse shipment in 14-, 16- and 18-mesh; 100-ft. rolls; 24-in. wide and every 2 in. wider up to and including 48 in.

Hungerford "Star Brand" Sheet Copper

Has a fifty-year old reputation with the roofing and sheet metal working trades as a dependable, uniformly satisfactory product.

Every step in the production of "Star Brand" sheet copper from mine to ingot and from ingot to the rolled sheet is carried out in full accordance with present day standards and improved methods. "Star Brand" sheet copper is as near 100% pure as any sheet copper can be made.

By writing "Hungerford Star Brand Sheet Copper" into specifications you will have the satisfaction of knowing that you are providing for material with a thoroughly tried and proved reputation for quality.

(See Copper & Brass Research Association section for approved form of specifications.)

UNITED LEAD COMPANY

Hoyt Hardlead Products for Buildings

111 Broadway
NEW YORK, N. Y.

Products

HOYT HARDLEAD PRODUCTS for buildings, including Leader Heads, Leader Pipe, Elbows, Goosenecks, Bands, Gutters, and Sheets for Roofs, Flashings, Copings, Valleys, Ridges, Cornices, Mouldings, etc.

Hoyt Hardlead

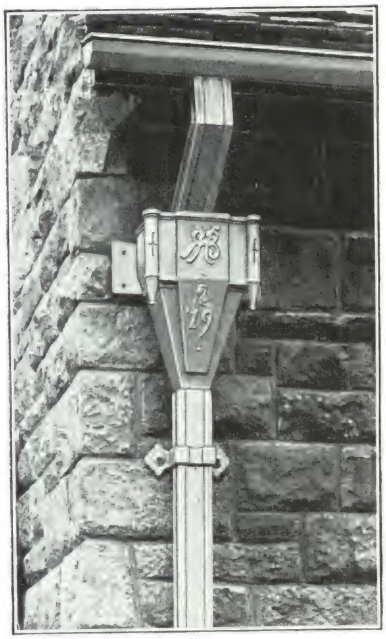
The use of lead was known to the ancients 7000 years ago and through the ages has been recognized beyond all other metals for *durability*.

HOYT HARDLEAD for buildings is far superior to galvanized iron, zinc, soft lead and copper. It is rustproof, galvanic proof and acid resisting.

The color of HOYT HARDLEAD is permanent. The expense of painting or other treatment for preservation or artistic purpose is unnecessary. Exposure to air leaves it a soft gray, harmonizing beautifully with the finish of the building.

HOYT HARDLEAD will outlast the building. There is only one labor cost —the first. When necessary to renew installations, all other metals have labor costs for taking down the old and putting up the new material.

Repeated freezing will not rupture seams. No possibility of staining painted woodwork, marble walls, terra cotta, or other expensive building material.



HOYT HARDLEAD LEADER PIPE AND HEAD, BAND, GUTTER AND GOOSENECK

Roofs properly installed with HOYT HARDLEAD sheets are watertight and permanent, consequently no danger to building contents and decorations from leaky roofs.

The expansion and contraction of HOYT HARDLEAD is exceedingly small. It has a high tensile strength and five times the elastic limit of soft lead.

HOYT HARDLEAD is superior for roofs, flashings, valleys, ridges, chimneys, dormer windows, gravel stops, cupola domes. These are costly and difficult parts to renew.

HOYT HARDLEAD always has a salvage value, equal to market price of scrap lead. Other metals have practically no salvage value.

Sheet metal workers will find the easy working qualities of HOYT HARDLEAD a decided advantage as compared with all other metals.

HOYT HARDLEAD sheets are so pliable that they can be shaped on the edge of a straight piece of wood, or by hand if necessary.

Heads and bands are solid castings, completely finished to size, so there is no labor expense to the sheet metal worker in making up these products as with other metals.

For use of HOYT HARDLEAD in connection with glass skylights, see page 983.

Our Technical Department is at your service for detailed information.

HOYT HARDLEAD ROOF, GUTTER AND FLASHING, RESIDENCE OF MR. THOS. W. LAMONT, NEW YORK, N. Y.
WALKER & GILLETTE, Architects

Continued on next page

Specifications

All sheet and cast metal shall be HOYT HARDLEAD, manufactured by the UNITED LEAD COMPANY, 111 Broadway, New York, N. Y.

All work to be applied in strict conformity with the best methods, employing only competent workmen throughout the operation.

Joints in HOYT HARDLEAD shall be soldered. The HOYT HARDLEAD shall be accurately soldered above all dowels.

Flashings—All flashings throughout shall be 2-, 2½- or 3-lb. per sq. ft. HOYT HARDLEAD sheet (specify which) carried at least 4 in. under the finished roofing and 6 in. on the wall.

All counterflashings shall overlap all flashings at least 3 in. and shall be furnished in ample time to be built in by the mason as the work goes up. It shall be stepped on the rakes, built at least 1½ in. into the walls and joints carefully filled and pointed with approved roofing cement and carefully turned down over the flashings.

Parapet—The tops of all parapet walls shall be protected against the weather with 2-, 2½- or 3-lb. HOYT HARDLEAD (specify which). The HOYT HARDLEAD shall be turned down 2 in. on each side and run through under all copings, the sheets themselves being at least .... wide, but in all cases to cover the width of wall and turn down as above. Where the copings are just above the roof levels HOYT HARDLEAD shall constitute the counterflashings and have the lap called for above.

Valleys—Use 2-, 2½- or 3-lb. HOYT HARDLEAD (specify which) of proper lengths and not less than 24 in. wide to give 6-in. lap for the various courses on both sides of the valley.

Hip and Ridges—The flashings on all hips and ridges shall be 8 in. on either side and of a length to give a 3-in. lap and shall be shingled in with the slate, all of 2-lb. HOYT HARDLEAD.

Decks and Flats—Decks and flats shall be covered with 2-, 2½- or 3-lb. HOYT HARDLEAD (specify which), the joints to be carefully locked and soldered and properly secured with lead clips underneath the sheets.

Gutters—The gutters shall everywhere be as shown in detail of HOYT HARDLEAD. All hanging gutters to be made of HOYT HARDLEAD of stock sections and size shown. All gutters shall have proper fall to all inlets, in all of which the contractor shall supply and set heavy copper wire strainers lead coated.

Hanging gutters shall be carried on steel HOYT HARDLEAD coated brackets, 2 ft. on centers, and secured with two HOYT HARDLEAD coated screws on each.

Leaders—All conductors shall be shaped, locked and soldered, of HOYT HARDLEAD panelled octagon, square, oblong, of standard stock designs (designate size and shape). They shall be erected in an unbroken line from the iron connection to the gutter absolutely perpendicular above water table and without sharp bends. The joints between the sections shall have a lap of at least 2 in., the joints being covered in each case with a HOYT HARDLEAD leader band. The lower lengths shall be neatly tucked into the cast iron shoe, of same sectional shape as leader, provided and set 5 ft. above grade by the plumber, and shall be calked for at least 2 in. with oakum and slater's cement.

Bands—Conductors shall be fastened to the wall by cast HOYT HARDLEAD bands of stock design, and by HOYT HARDLEAD expansion bolts not more than 4 ft. on centers.

All installations shall be made with HOYT HARDLEAD covered screws and HOYT HARDLEAD covered bolts of proper sizes for each fitting.

H-73

H-71

H-69

H-74

No.	Width at top, in.	Depth, in.	Height, in.
64	10½	10½	18½
69	9½	5⅜	12⅜
71	36	11	36
73	16⅝	9⅝	25¼
74	19¾	6¾	17¼

H-64

HOYT HARDLEAD LEADER HEADS

Continued on next page

Heads—The conductor heads as shown shall be HOYT HARDLEAD not less than 8 lbs., per ft. of stock pattern in exact conformity with design shown, securely fastened to the wall, and properly connected to the leader.

Scuppers—The scuppers shall be lined with 2-, 2½- or 3-lb. HOYT HARDLEAD (specify which) soldered and connected in perfect manner with roofing, and to fit openings perfectly.

Scuttles—Scuttles shall be covered with 2-lb. HOYT HARDLEAD secured in the usual manner and made watertight, to be in one piece.

Ventilators—All vents shall be thoroughly flashed and counterflashed with 3-lb. HOYT HARDLEAD and thoroughly calked against iron rings.

Special Work—All of the cast metal shown on the elevations, viz., finials, weathervanes, cresting and running ornaments shall be cast with HOYT HARDLEAD of the proper hardness for this purpose, in accordance with the drawings and details and models of the architects.

Suggestions as to Hoyt Hardlead Specifications

The following weights of HOYT HARDLEAD are suggested as meeting general requirements:

2-lb. No. 8 HOYT HARDLEAD for roofs, lining of box gutters, wall and other flashings, copings, valleys, hips, ridges, decks, scuppers, scuttle covers.

2½-lb. or 3-lb. No. 8 HOYT HARDLEAD for roofs, valleys, flashings, decks and gutters, where heavy tile or heavy slate is used.

3-lb. No. 8 HOYT HARDLEAD for decks, gutters and flats subject to severe use, extra large saddle backs, snow pockets, roof flanges, mouldings, cornices and skylights.

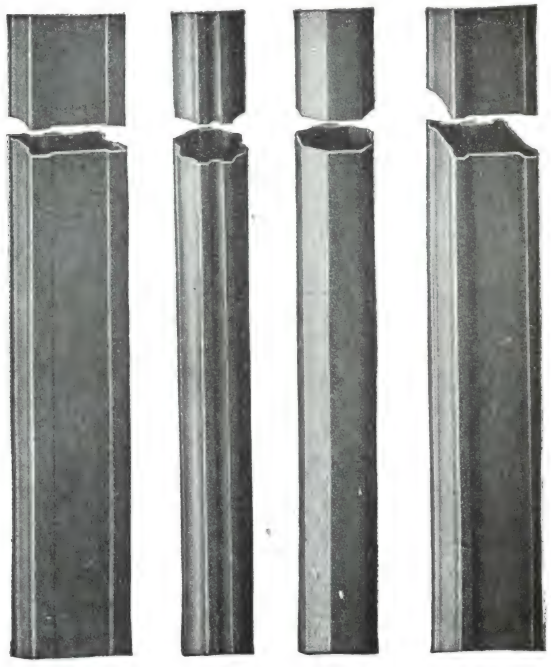
If special shapes are desired to be made by the sheet metal contractor, such as odd sized leader pipe or gutters, not less than 3-lb. HOYT HARDLEAD should be specified.

All stock leader pipe and gutters are made of HOYT HARDLEAD and should be specified by size and catalogue number.

Hoyt Hardlead Leader Heads and Leader Bands—These are solid castings and should be specified by symbols and number, as shown in catalogue. We are equipped to furnish special designs in both leader heads and leader bands.

Installation—The sheet metal contractor should follow the general methods used for copper installation, making the same provision for expansion and contraction.

Complete details as to the proper installation of HOYT HARDLEAD products are shown on the following pages.



L-1, 2 Oblong | L-3, 4 Corrugated | L-8, 9 Octagon | L-5, 6 Square

HOYT HARDLEAD LEADER PIPE

Made in 8-ft. lengths. Bottom of leader pipe swedged to fit over top of next length; soldering unnecessary

SIZES OF LEADER PIPE

No.	Size, in.	No.	Size, in.
L-1	2½ x 3¼	L-5	2 x 2
L-2	2½ x 4¼	L-6	3½ x 3½
L-3	3 in. diam.	L-8	3in. diam.
L-4	4 in. diam.	L-9	4in. diam.

Larger sizes are made if desired.

E-84, 85 Square | E-80, 81 Oblong

E-86, 87 Octagon | E-82, 83 Corrugated

HOYT HARDLEAD ELBOWS

SIZES OF ELBOWS

No.	Size, in.	No.	Diam., in.
E-80	2½ x 3¼	E-82	3
E-81	2½ x 4¼	E-83	4
E-84	2 x 2	E-86	4
E-85	3½ x 3½	E-87	3

HOYT HARDLEAD GOOSENECK

Made special, to order, in any shape desired

B-46, 47 Oblong, plain flange | B-41, 42 Oblong, beade edge | B-55 Square, panel face | B-43, 57 Octagon, beaded edge

B-48 Square, plain flange | B-49, 50 Oblong, fancy flange | B-52 Corners square, fancy flange | B-44, 45 Corrugated, plain

HOYT HARDLEAD BANDS

B-40—Similar to B-48 with beaded edge.
B-51—Similar to B-48 with fancy flange.
B-53, B-54—Similar to B-55, oblong.
B-56—Similar to B-47, heavy.

SIZES OF BANDS

No.	Size, in.	No.	Size, in.	No.	Size, in.
B-40	2 x 2	B-46	2½ x 3¼	B-52	3½ x 3½
B-41	2½ x 3¼	B-47	2½ x 4¼	B-53	2½ x 3¼
B-42	2½ x 4¼	B-48	3½ x 3½	B-54	2½ x 4¼
B-43	3 in. diam.	B-49	2½ x 3¼	B-55	3½ x 3½
B-44	3 in. diam.	B-50	2½ x 4¼	B-56	2½ x 4¼
B-45	4 in. diam.	B-51	3½ x 3½	B-57	4 in. diam.

Continued on next page

G-20, G-21, G-22—Half Round

G-23, G-24, G-25, G-26, G-27—Octagon

HOYT HARDLEAD GUTTERS WITH REINFORCED BEADED EDGE
Made in 8-ft. lengths

SIZES OF GUTTERS

No.	Size, in.	No.	Size, in.	No.	Size, in.
G-20	3	G-23	4	G-26	3
G-21	4	G-24	5	G-27	5½
G-22	5	G-25	6		

STEEL HANGERS HEAVILY COATED WITH LEAD

SIZES OF HANGERS

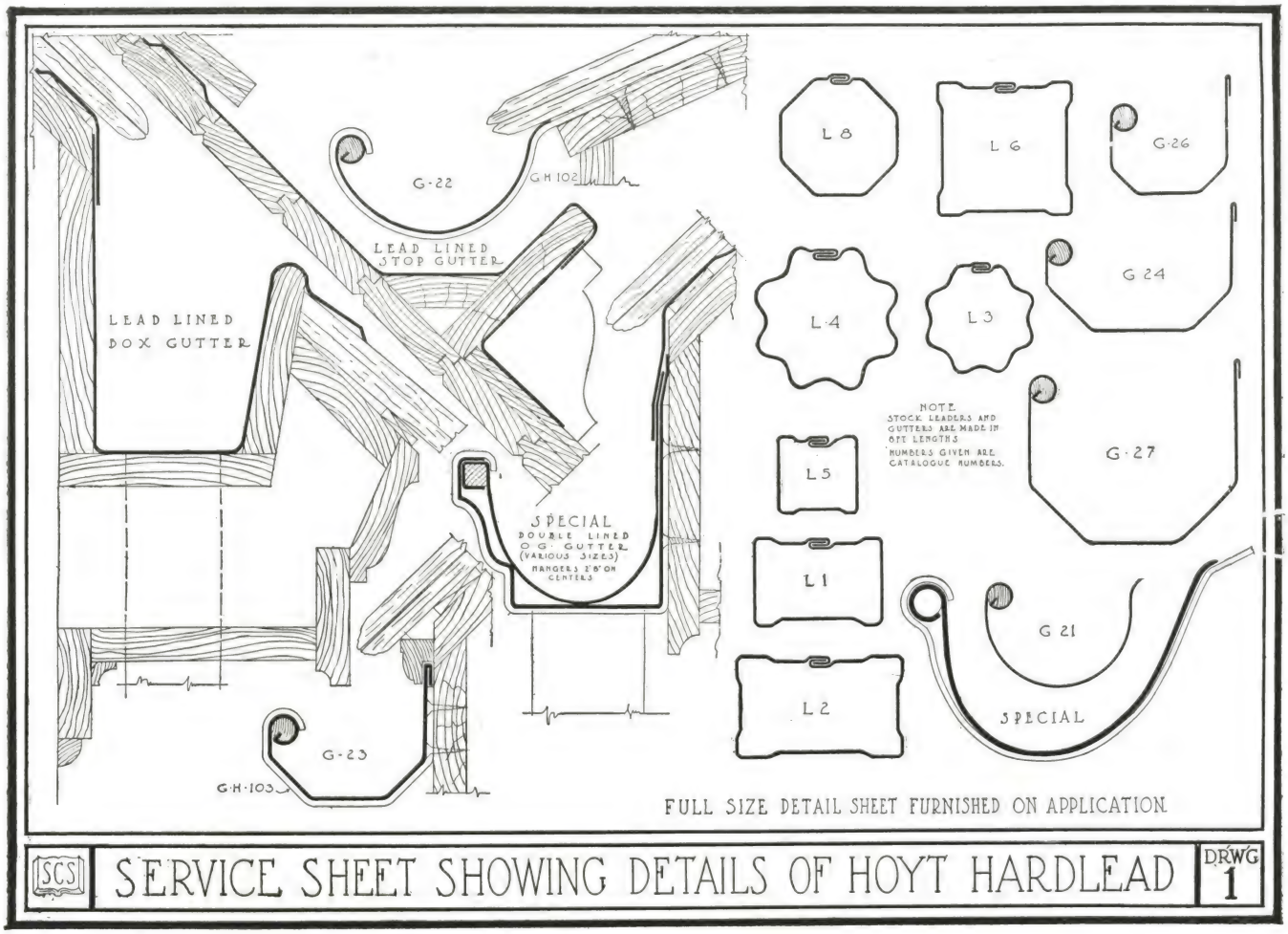
Octagon		Round	
No.	Size, in.	No.	Size, in.
GH-103	4	GH-100	3
GH-104	5	GH-101	4
GH-105	6	GH-102	5
GH-107	5½	GH-106	6

HOYT HARDLEAD SHEETS
Weights 2, 2½ and 3 lbs. per sq. ft.

SIZES OF SHEETS

No. 6 Metal				No. 8 Metal			
Rolls, in.		Sheets, standard mill sizes, in.		Flat sheets, in.		Sheets, standard mill sizes, in.	
16x120	30x120	6x10	10x12	30x96	44x96	6x 8	11x12
20x120	36x120	8x12	12x12	36x96	48x96	10x12	12x12
24x120	40x120			40x96			
28x120							

Note: No. 8 metal is harder than No. 6.



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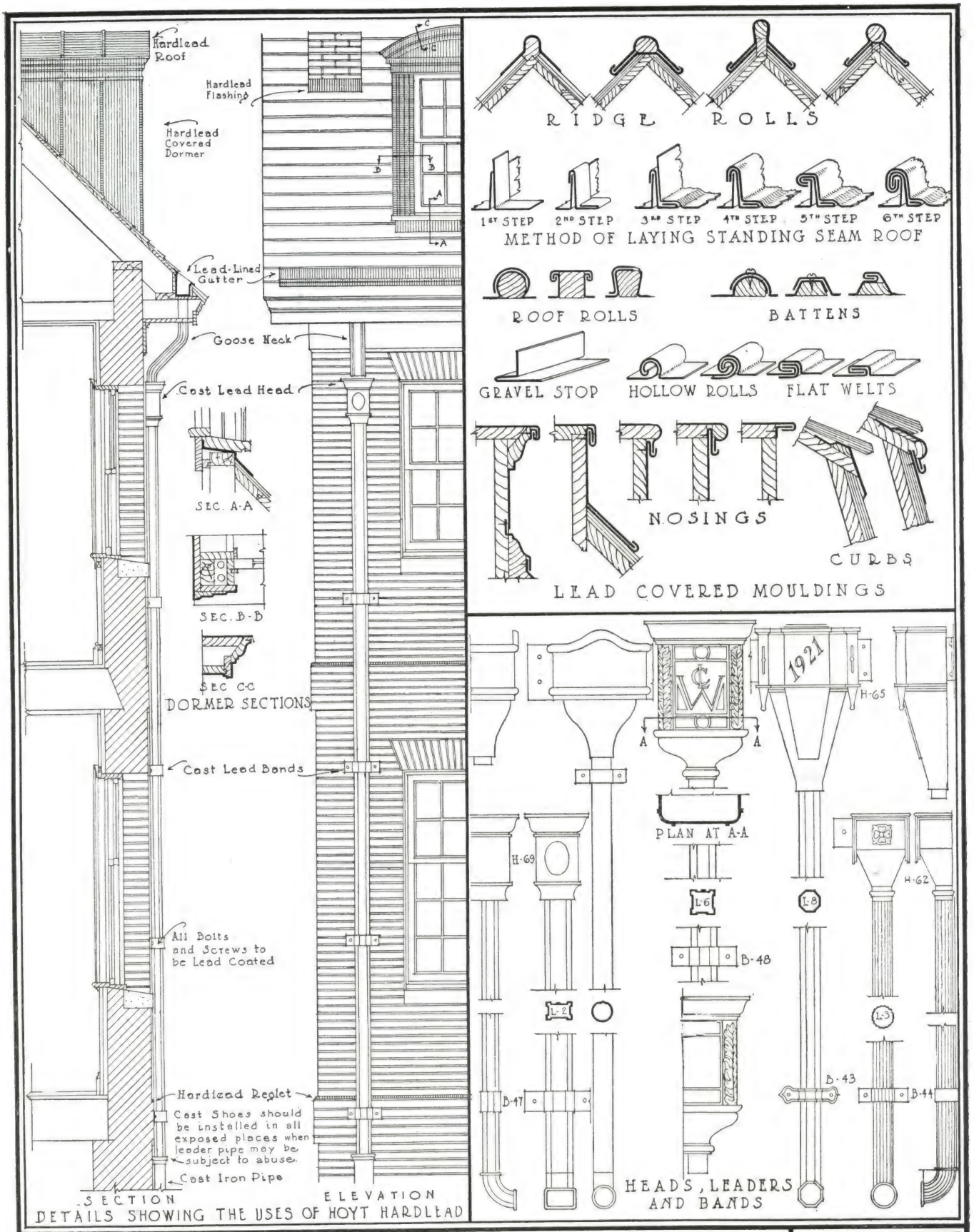
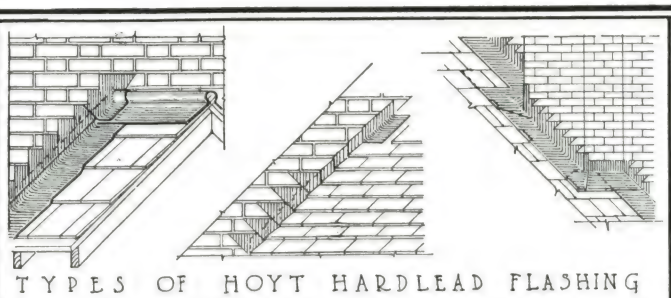
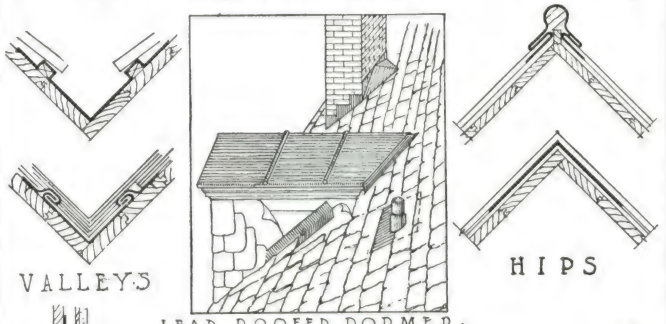


DRAWN BY SWEETS CATALOGUE SERVICE, INC.	SERVICE SHEET SHOWING DETAILS OF HOYT HARDLEAD	NOT DRAWN TO SCALE DATE MAY 22	DRWG 2

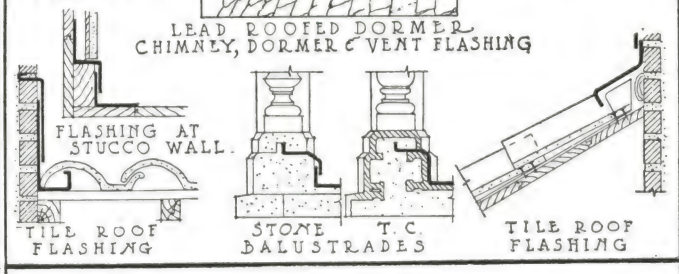
Continued on next page

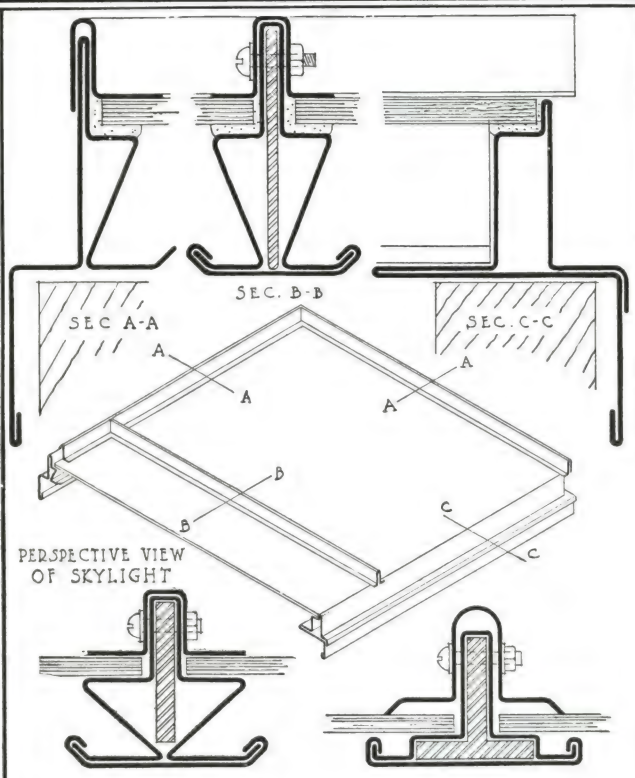


TYPES OF HOYT HARDLEAD FLASHING

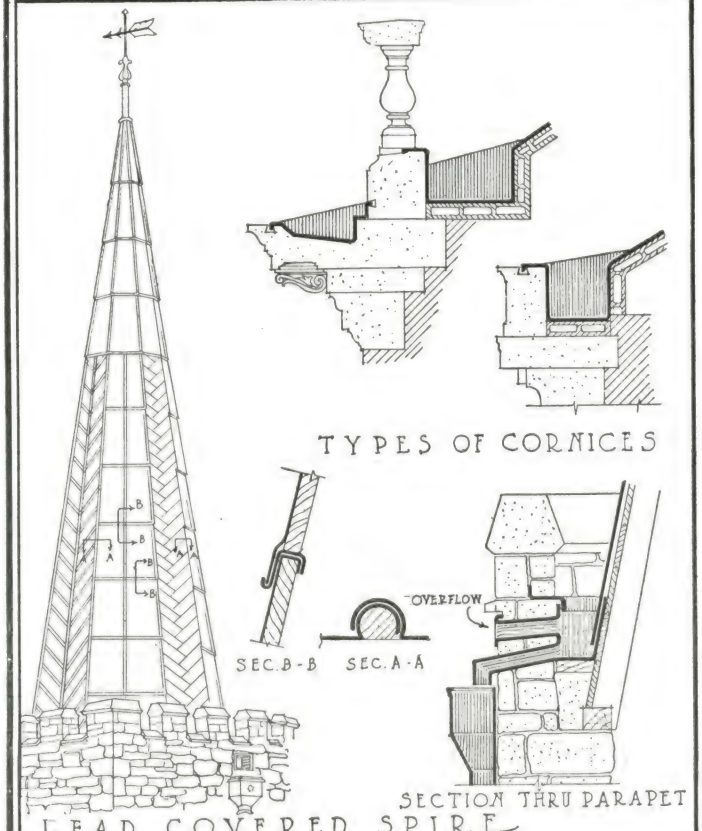


LEAD ROOFED DORMER
CHIMNEY, DORMER & VENT FLASHING





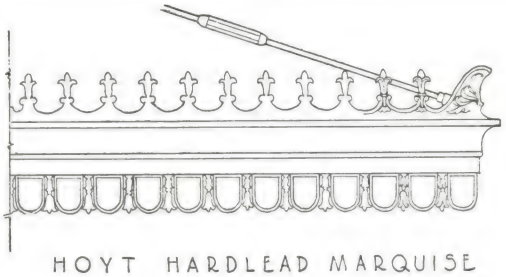
SKYLIGHT BARS



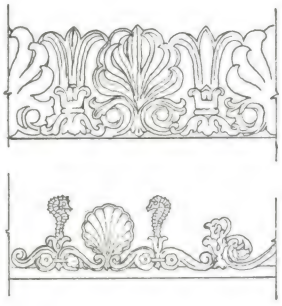
TYPES OF CORNICES

SECTION THRU PARAPET

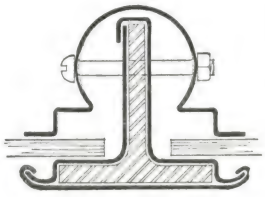
LEAD COVERED SPIRE



HOYT HARDLEAD MARQUISE



CAST CRESTING



MARQUISE BAR

HOYT HARDLEAD FOR MARQUISE

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	SERVICE SHEET SHOWING DETAILS OF HOYT HARDLEAD	NOT DRAWN TO SCALE DATE MAY ??	DRWG 3

BERGER BROTHERS COMPANY

Gutter Hangers and Conductor Pipe Fasteners

229-237 Arch Street
PHILADELPHIA, PA.

Products

GUTTER HANGERS and CONDUCTOR PIPE FASTENERS, of malleable iron, wrought iron and solid cast brass.

Also a general line of Sheet Metal Workers' Requirements.

TRADE -B B- MARK

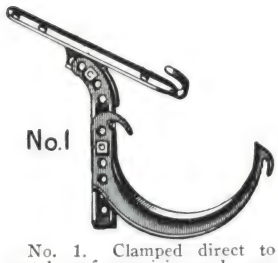
The Mark of Quality Which Protects the Purchaser

We are the originators, designers and manufacturers of the best grade of gutter hangers and conductor pipe fasteners on the market.

Our registered trade-mark appears on all products manufactured by us. This mark represents dependability, durability and strength and protects the purchaser against inferior imitations.

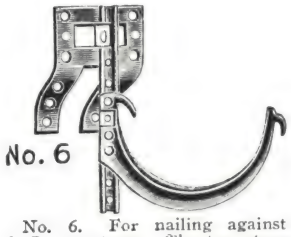
When specifying, full protection is assured by insisting that our trade-mark appear on every piece.

How Furnished—Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), and of solid cast brass. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks. Free samples on request.

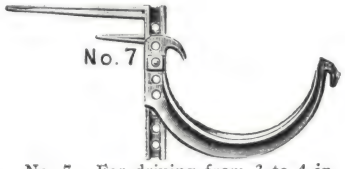


No. 1. Clamped direct to metal roof, requiring only one bolt through the iron. Especially suitable for awnings and corrugated roofs

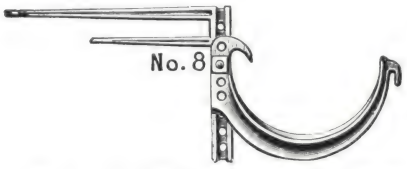
No. 5. Will span over various shaped mouldings and is easily bent larger or smaller before nailing to eave



No. 6. For nailing against O. G. mouldings. The two stays are made to fit in the cove and can be bent to suit variation



No. 7. For driving from 3 to 4 in. square in cornice. Lower prong forms a brace for the upper and makes it strong and firm

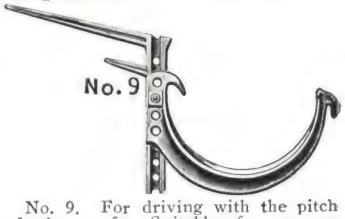


No. 8. For driving from 3 to 6 in. square in cornice. Intended for eaves where shingles project over the cornice

Penn Gutter Circle. For double bead gutters. Sizes, 3½, 3¾, 4, 4½, 5, 6, 7 and 8 in.

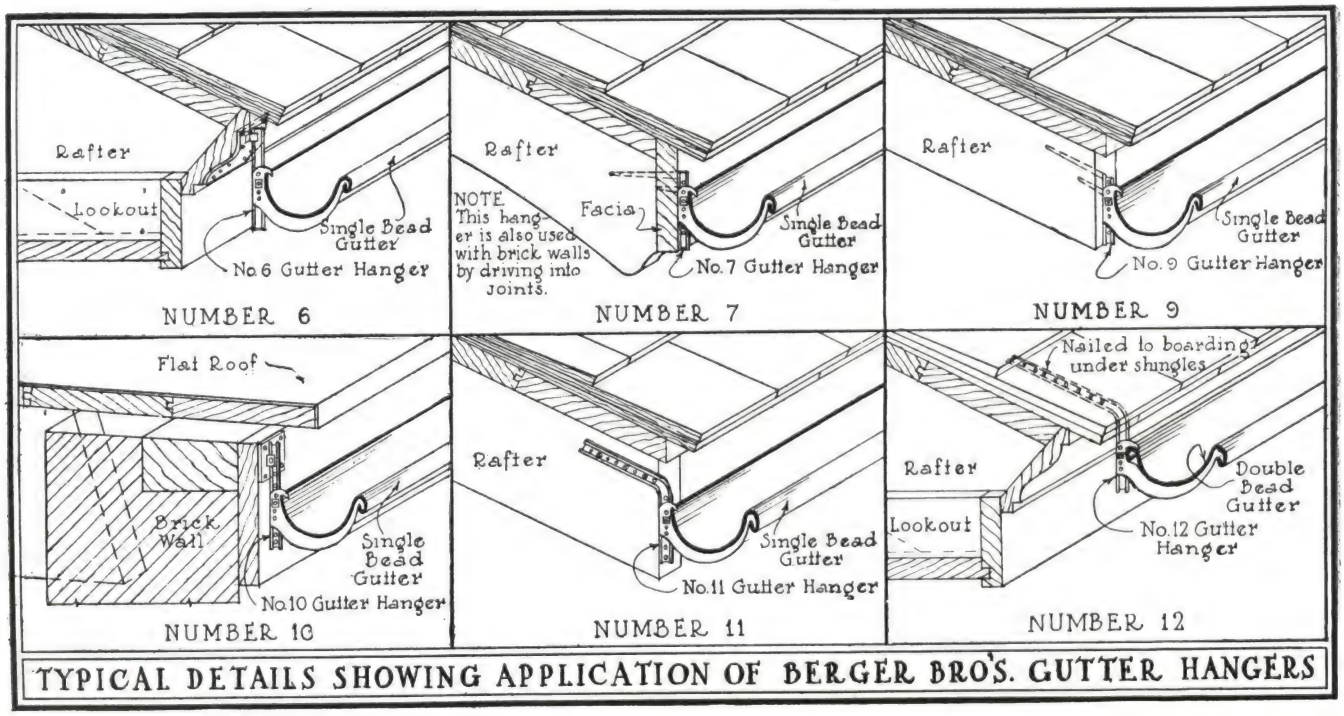
Gem Gutter Circle. For single bead gutters. Sizes, 3, 3¼, 3½, 3¾, 4, 4½, 5, 6, 7 and 8 in.

Circles are applicable to any B. B. hanger



No. 9. For driving with the pitch of the roof. Suitable for narrow moulded cornice

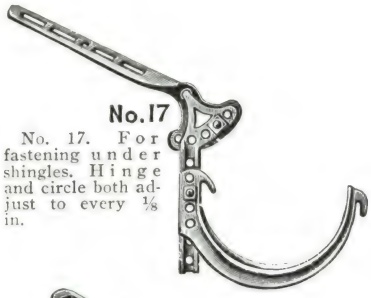
B. B. GUTTER HANGERS



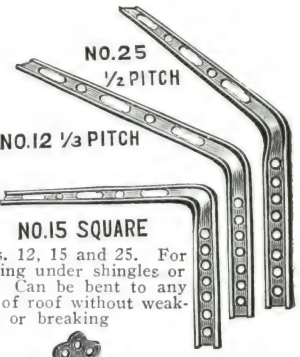
TYPICAL DETAILS SHOWING APPLICATION OF BERGER BRO'S. GUTTER HANGERS

Continued on next page

No. 10. For nailing against square box cornice



No. 17. For fastening under shingles. Hinge and circle both adjust to every ⅛ in.



Nos. 12, 15 and 25. For fastening under shingles or slate. Can be bent to any pitch of roof without weakening or breaking

No. 11. For nailing to the side of exposed rafters

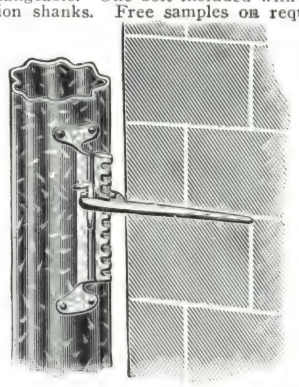
Clamp Gutter Hanger. Strong, convenient and simple. Will adjust to any pitch of roof. Sizes, 4, 5 and 6 in.

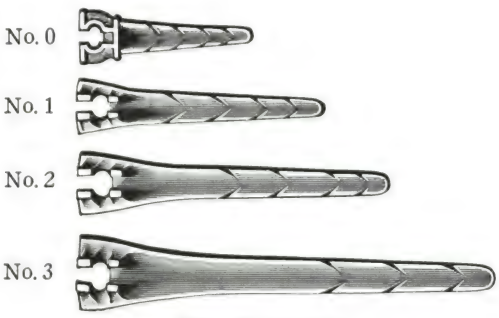
No. 16. For fastening under shingles

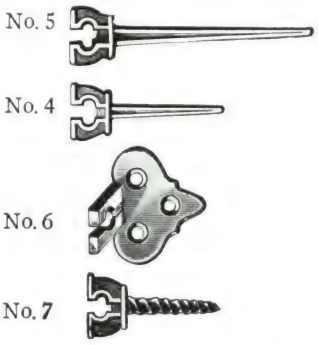
No. 20. For nailing or screwing to various shaped mouldings at any angle desired. Hinged for any pitch of roof

B. B. Gutter Hangers

Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), and of solid cast brass. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks. **Free samples on request.**



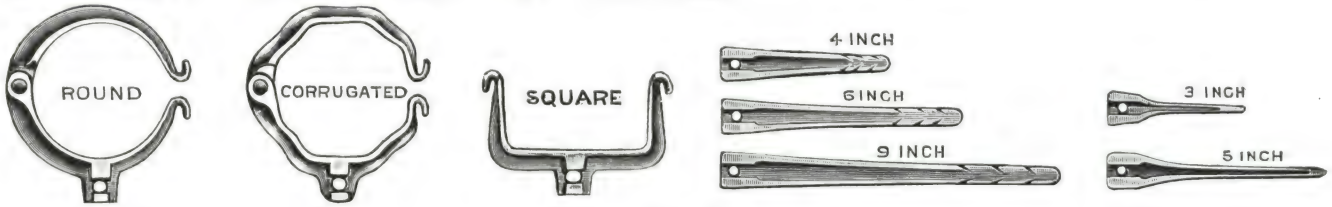




Pipe Fasteners

For fastening all kinds of conductor pipes at any distance from the wall. Used in any position and allow enough variation to let pipe slip together until tight in the joints. Needs no close measuring on wall to find a joint for the drive

No. 0. For brick, 3 in. No. 1. For brick or stone, 4½ in. No. 2. For stone, 6 in. No. 3. For stone, 9 in. No. 4. For wood, 3 in. No. 5. For wood, 5 in. No. 6. To nail on wood. No. 7. To screw in wood.



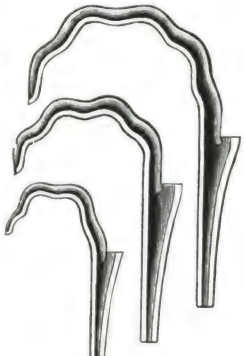
Clasp Pipe Hooks

For fastening conductor pipe to wood, brick or stone at any distance from the wall. Length drives, 3 and 5 in. for wood; 4, 6 and 9 in. for brick and stone

Round Corrugated Hinged Pipe Hook. With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.

Plain Round Hinged Pipe Hook. With brick drive in 2, 3, 4, 5 and 6 in., and wood drive in 2, 3 and 4 in. sizes

Plain Sickle Pipe Hooks. With wood and brick drive. Sizes, 2, 2½, 3, 3½, 4, 5, 6 and 8 in.



Corrugated Sickle Pipe Hooks. With wood and brick drive. Sizes, 2, 3 and 4 in.

Square Wired Pipe Hook. With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.

Round Wired Pipe Hook. With wood drive. Sizes, 2, 3 and 4 in.

B. B. Conductor Pipe Fasteners and Hooks

Made of tinned malleable iron and of solid cast brass

COPPER SKYLIGHTS

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Store Fronts	1010
Ventilators	990

Superiority of Copper Skylights

A good skylight is as important as a good roof. Skylights particularly are subjected to severe service conditions—not only must they resist the action of the weather on the outside, but also condensation, acid fumes, gases, etc., on the inside. To withstand successfully such conditions, the skylight should be made of copper throughout.

Copper—the everlasting metal—is the best material known for this purpose. It is non-corrosive; it will never rust or disintegrate, and it is a most effective material for use under extreme atmospheric conditions such as are found in manufacturing localities and cities. It also successfully resists the action of acid laden air and the salt in sea fogs.

A copper skylight does not require painting or other attention—it is a permanent installation, free from leaks, repairs, upkeep expense and replacements.

Skylights made of corrodible metals do not withstand the unceasing action of the elements. Even if painted or galvanized, they are sure to rust, which results in leaks, repairs and inevitable replacements.

Metals containing copper in small quantities or coated with copper are not as proof against corrosion as pure copper. For dependable results, skylights should be made of pure copper throughout. Bolts, etc. should be of brass or bronze. No metal that rusts should be used.

Certain portions of skylights are inaccessible, and therefore can not be painted; if made of corrosive materials, they are certain to fall an early prey to rust.

On account of their permanently dependable service, copper skylights have won preference everywhere. Great numbers have been placed in all classes of buildings, and are giving dependable, uniform service.

Copper Skylights Are Cheaper Because You Pay for Them Only Once

The installation of copper skylights is insurance against upkeep expense and renewals.

In a few years copper saves the difference in initial cost—it is a paying investment.

Superior Appearance of Copper Skylights

Copper skylights enhance the beauty of any structure and keep on doing so as long as the structure stands. Unsightly rust and soiled paint on skylights are the results of using metals that rust.

Copper adds beauty, dignity and character wherever used and never requires any treatment to preserve its attractive appearance. It looks well and wears well not for a few months, but forever.

Strength of Copper Skylights

Copper skylights, properly constructed, are as strong as skylights made of other materials. Moreover, on account of their lasting qualities, copper skylights retain their original strength. On the other hand, the strength of skylights made of corrodible materials is diminished by unceasing rust action which causes structural weaknesses and ultimate failure.

COPPER SKYLIGHTS, VENTILATOR AND GUTTERS
Metropolitan Museum of Art, New York, N. Y.

COPPER SKYLIGHT
Standard Arcade Building, New York, N. Y.

AUGUST KUHNLA, INC.

Manufacturers of Skylights

10-20 Lorimer Street

BROOKLYN, N. Y.

Product

"KUPE" AUTOMATIC VENTILATING SKYLIGHT.

Also Contractors for Roofing and Sheet Metal Work.

For "Kupe" Automatic Stage Ventilators, see page 993.

KUPE

T.M. Pending U. S. Pat. Office

TRADE-MARK

"Kupe" Automatic Ventilating Skylight

A combined ventilator and skylight, weatherproof and dustproof. It consists of a rectangular metal frame having a hipped roof of glass. The sides of the structure consist of vertical sash openings, fitted with side pivoted metal sash. Struts from the bottom rail of these sash connect with a runner on a fixed vertical rod. A chain from this runner extends to a point suitable for manual operation, where it passes through a key slot arrangement permitting the sash to be opened simultaneously and locked in any desired position. Sash may be manually opened or thermally closed by means of a fusible link.

The weight of the operating device effects a positive opening action on the sash when the chain is released.

When closed, the head of the sash swings under the rain shed, the flanges on the side stiles are deposited into corresponding grooves on the panels, and the apron on the bottom rail overlaps the sill. This construction prevents obstruction of the sash by ice and snow.

Gutters under the roof supports conduct condensation to the exterior.

Construction and Installation

We manufacture these skylights of standard gauge galvanized iron or copper and install same complete with glass, gutters, leaders and operating device in the following sizes:

(Outside curb measurement, ft.)

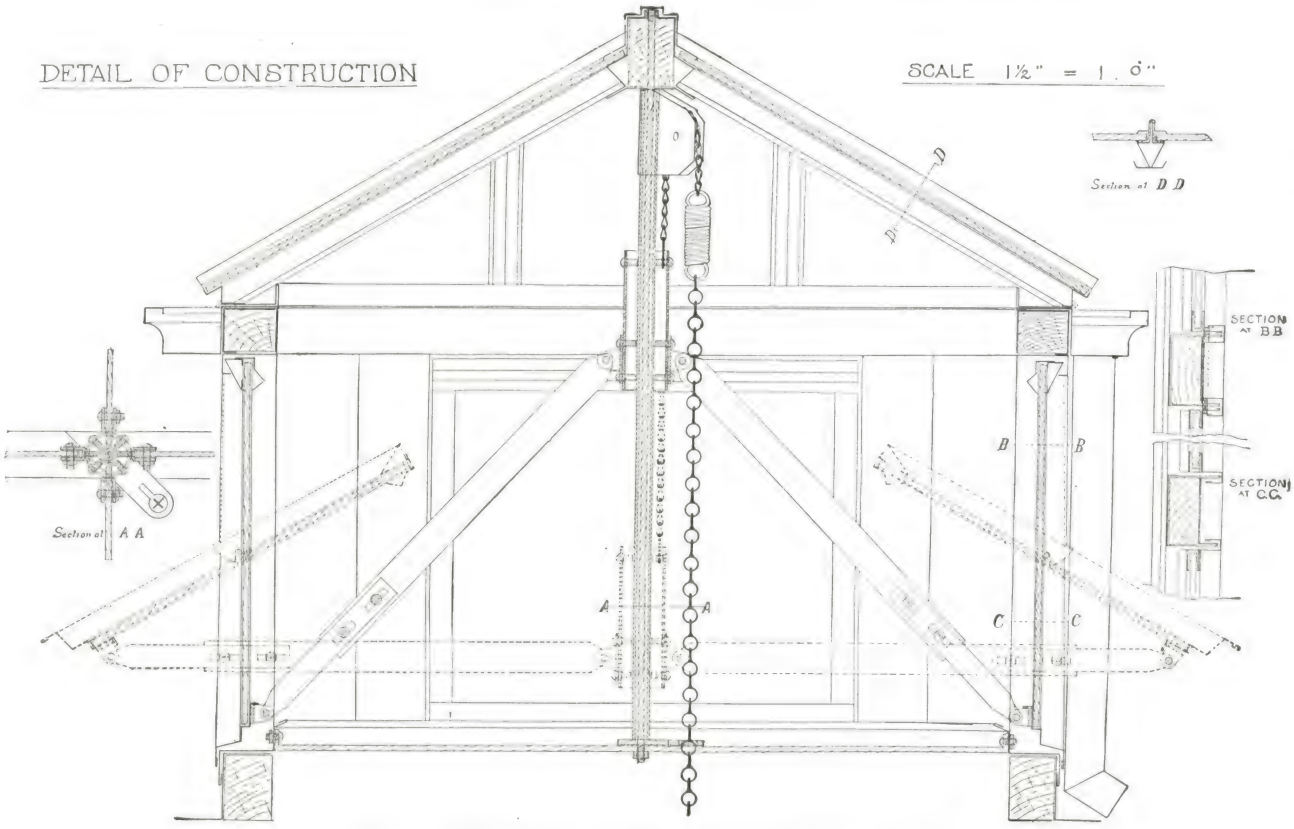
2x3	6x 8	8x20
3x4	6x10	10x10
4x4	7x 9	10x12
4x6	8x 8	10x14
5x5	8x10	10x16
5x7	8x12	10x20
6x6	8x16	

Other sizes if required.

"KUPE" AUTOMATIC VENTILATING SKYLIGHT (PATENTED)

Indorsement

Approved by architects, engineers, contractors and owners after rigid tests and inspection.



DETAILS "KUPE" TYPE A SKYLIGHT FOR GENERAL USE

Model on exhibition at Architects Samples Rooms, 101 Park Avenue, New York City

THE G. DROUVÉ COMPANY

Manufacturers of Puttyless Skylights and Sash Operators

TELEPHONE
NOBLE 1950

CABLE
Western Union Code

(Post Office Address)

BRIDGEPORT, CONN.

AGENCIES IN ALL PRINCIPAL CITIES

FACTORY
FAIRFIELD

Products

"ANTI-PLUVIUS" PUTTYLESS SKYLIGHT, trade-marked and patented.

"ANTI-PLUVIUS" (NON-CORROSIVE) PUTTYLESS SKYLIGHT, trade-marked and patented.

"STRAIGHT-PUSH" SASH OPERATOR, tension type.

"DROUVE LOVELL" SASH OPERATOR, tension type.

WORM and GEAR SASH OPERATOR, torsion type.

Also manufacturers of the "Drouvé" Double Gutter Ventilators.

Facilities and Service

A modern one-story factory building containing 40,000 sq. ft. of floor space, equipped complete with the most modern sheet metal and skylight working machinery known to the trade.

This entire plant, one of the largest of its kind in the country, is devoted exclusively to the manufacture of our "Anti-Pluvius" puttyless skylights, ventilators and various types of sash operating devices.

A competent Engineering Department, invested with our twenty years of experience in the manufacture of puttyless skylights, is maintained for the purpose of furnishing you with practical information pertaining to all types of skylight construction.

Detailed drawings of different types of skylights embodying various conditions of installation will be forwarded on request, if you will advise us approximately regarding requirements.

We maintain an erecting force thoroughly skilled in the erection of our skylights.

Catalogues and estimates will be furnished on request.

"Anti-Pluvius" Puttyless Skylights

The original "Anti-Pluvius" puttyless skylight construction was first placed on the market by us twenty years ago. It was necessarily based on theory. The "Anti-Pluvius" puttyless skylight of today is the result of twenty years of practical experience obtained under the most exacting conditions. It is interesting to note in this connection that the basic principle of our construction is the same today as in the original design. Experience has proved that only a few minor changes have been necessary to make a perfect skylight.

"Anti-Pluvius" (Non-corrosive) Puttyless Skylights

This skylight in design and construction is identical with our "Anti-Pluvius," the difference being only in the metals used. These are of non-corrosive materials (not a protective process). This construction is guaranteed absolutely against any form of deterioration for an indefenite length of time. The cost of this construction is surprisingly low considering the fact that it is a skylight entirely free from any maintenance expense. This construction is ideal for use on powerhouses, chemical plants, railroad shops, foundries, etc., as it is the only construction that will stand up under the conditions existing in these types of buildings.

Advantages of "Anti-Pluvius" Puttyless Skylights

The "Anti-Pluvius" puttyless skylight (either type) will satisfy the most exacting requirements for strength.

It is positively watertight. The strength of materials of the structure is ideal (see specifications opposite page).

The glass in the skylight may be readily cleaned by laying planks across the bridge sections, on which men can stand without injury to the glass, bridges, or any other parts of the skylight structure.

The frames are flexible and ample allowances are made for expansion and contraction, vibration and wind pressures.

The skylight is adaptable to all types of roof construction.

It can be erected by anybody, anywhere.

Each light of glass as placed in the skylight is independent of every other light. The lights do not come in contact with each other nor do they come in contact with any metal.

The glass rests on pure non-rotting cattle hair felt.

"Straight-Push" Sash Operator

Designed to operate all types and makes of sash in monitors, skylights and sidewalls of buildings. Designed to withstand all manhandling and unexpected conditions.

Guide rolls mounted on brass pins to prevent rusting. All working parts have brass-to-iron connections. The sweep of levers is level.

Leverage force applied is uniform throughout length of line, insuring equal opening and closing of all sash.

Erecting crews are maintained by the company to handle any job, anywhere, or any workman can install from erection instructions.

"Improved Lovell Dreadnought" Sash Operator

This design, with its sweeping movement, gives large openings to heavy top hung sash. All parts made extra heavy, with phosphor bronze working joints.

Worm and Gear Operators

Practically all types of standard worm and gear devices supplied as desired for operating lines of ventilating sash in sidewalls, pitched roofs, sawtooth roofs and monitors, and for pivoted or hinged sash.

Details of standard worm and gear operating devices forwarded on application and, when sufficient information is given, recommendations will be made as to efficient and economical procedure.

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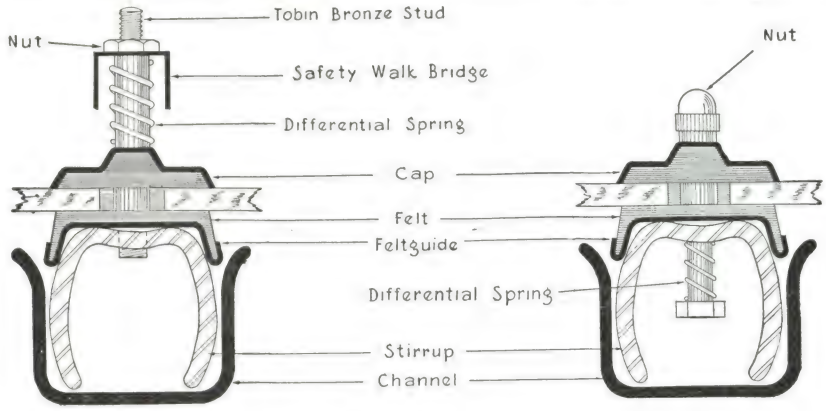


THE DROUVE' SAFETY WALK BRIDGE
[An exclusive feature of Anti-Pluvius Construction]

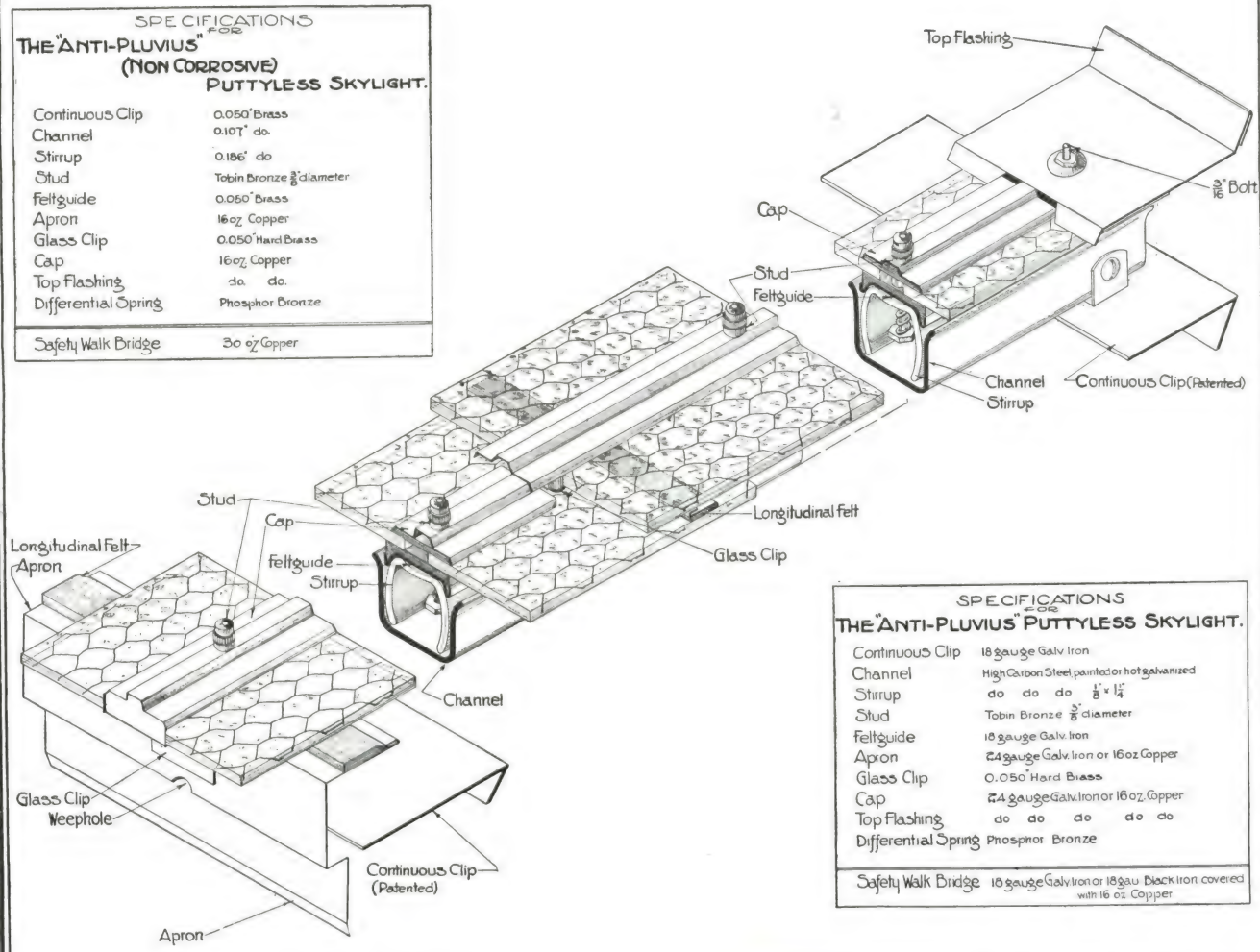
On skylights the span of which does not exceed six feet from ridge to eaves the Walk Bridge is unnecessary and therefore not recommended.

On skylights the span of which does exceed six feet, the Walk Bridge permits one to stand or walk on the skylight to clean it without injury to the glass or other parts of the structure.

The difference in expansion between glass and metals is adjusted by the differential spring in both cases

SPECIFICATIONS FOR
THE "ANTI-PLUVIUS" (NON CORROSIVE) PUTTYLESS SKYLIGHT.

Continuous Clip	0.050" Brass
Channel	0.107" do.
Stirrup	0.186" do
Stud	Tobin Bronze $\frac{3}{8}$" diameter
Feltguide	0.050" Brass
Apron	16 oz Copper
Glass Clip	0.050" Hard Brass
Cap	16 oz Copper
Top Flashing	do. do.
Differential Spring	Phosphor Bronze
Safety Walk Bridge	30 oz Copper



SPECIFICATIONS FOR
THE "ANTI-PLUVIUS" PUTTYLESS SKYLIGHT.

Continuous Clip	18 gauge Galv. Iron
Channel	High Carbon Steel painted or hot galvanized
Stirrup	do do do $\frac{3}{8} \times 1\frac{1}{4}$
Stud	Tobin Bronze $\frac{3}{8}$" diameter
Feltguide	18 gauge Galv. Iron
Apron	24 gauge Galv. Iron or 16 oz Copper
Glass Clip	0.050" Hard Brass
Cap	24 gauge Galv. Iron or 16 oz Copper
Top Flashing	do do do do do
Differential Spring	Phosphor Bronze
Safety Walk Bridge	18 gauge Galv. Iron or 18 gau. Black Iron covered with 16 oz Copper

DRAWN FOR THE G. DROUVE' COMPANY	CONSTRUCTION DETAIL OF THE ANTI-PLUVIUS SKYLIGHT	SCALE 3" & 6" EQUALS 1'-0" DATE AUG. '22 — DR'WG 1

THE E. F. HAUSERMAN COMPANY

Hauserman-System Puttyless Skylights

1729 East 22nd Street
CLEVELAND, OHIO

BRANCH OFFICES
NEW YORK, N. Y., 41 East 42nd Street — DETROIT, MICH., Penobscot Building — PITTSBURGH, PA., Oliver Building

Products

HAUSERMAN-SYSTEM SKYLIGHTS (Glasteel Puttyless Construction).

Designers, manufacturers and erectors of complete Skylight Installations.

For Hauserman-System Industrial Partitions, see pages 1104-1105; Hauserman-System Toilet Partitions, see pages 1558-1559; for Hauserman-System Shelving, see pages 2046-2047.

Service

Hauserman-System skylights are *designed* and *built* from the user's viewpoint, and *installed* as an integral part of the roof. The Hauserman-System, "Organized for Service," extends from a thorough study of requirements to the final installation of the job.

Hauserman-System Skylights

Hauserman-System skylights appeal particularly to the discriminating engineer or architect who desires a quality product with a minimum maintenance cost. Every Hauserman-System skylight is to comply with the following requirements of the ideal skylight:

(1) As an Integral Part of the Roof—All exposed parts are of copper, galvanized iron or monel metal, as specified; unexposed parts are of rust resisting steel covered with two coats of baked-on olive green enamel. Ample facilities are provided for gravity drainage and the circulation of air. Built to last as long as the roof.

(2) To Keep Moisture Out of the Building—Felt packing is held firmly against the glass by rigid top cap; an extruded hole in cap prevents leakage around dome nut; asphaltum sealing of overlapping glass; large condensation gutters.

(3) To Admit a Maximum of Light—Wide lights of Pentecor wire glass insure ample illumination.

(4) To Prevent Breakage of Glass—Glass supported on dry felt over wide bearing surface; rigid one-plane frame keeps glass level; non-binding resiliency upward obtained through phosphor bronze springs.

(5) To Be Readily Accessible—Heavy dome nuts provide bearing for planks when making repairs; lights of glass readily removed for painting and cleaning.

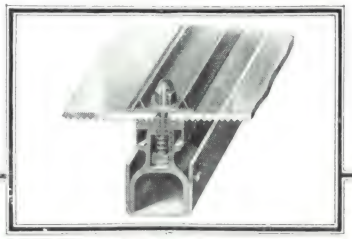
Monel metal or other indestructible material and Bitumastic coating can be used in case of excessive acid fumes, smoke or moisture.

Specifications

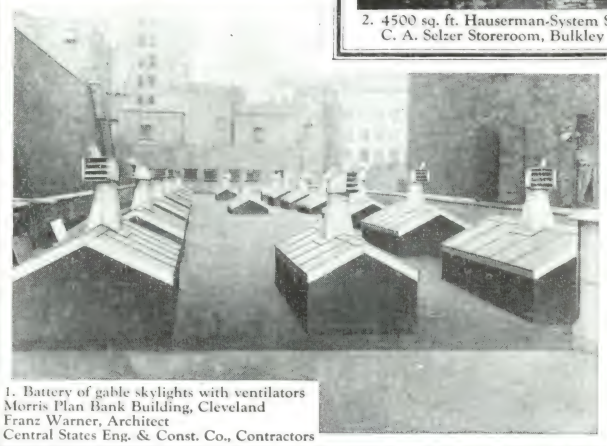
Furnish and install skylights where shown on plans, same to be of the puttyless type as manufactured by the E. F. HAUSERMAN COMPANY, Cleveland, Ohio. Condensation gutter forming structural member must be open to allow free circulation of air. Glaze with ¼-in. Pentecor wire glass carried on a level bed and set between cushions of long fiber hair felt. All unexposed parts to be anticorrosive steel protected by 2 coats of olive green baked-on enamel.

All exposed parts to be 16-oz. copper (Monel metal, galvanized iron or other corrosion resisting metal) secured to framing members with standard ⅜-in. sherardized bolts, capped with brass dome nuts. Provide phosphor bronze springs acting against bolts to prevent binding of glass.

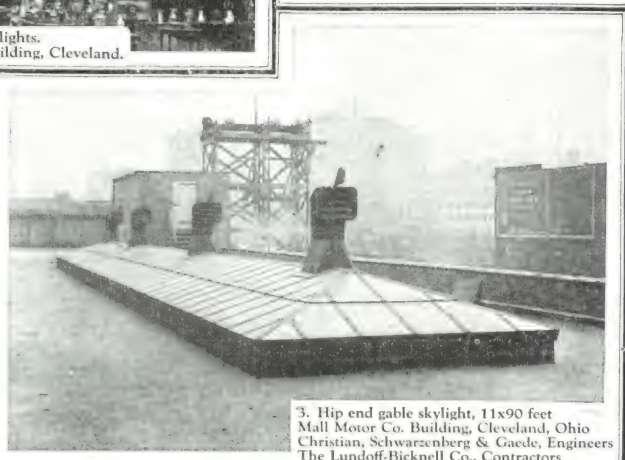
All gutters, down-spouts and roof flashing will be specified under another head but this contractor will flash entirely around his skylight with 16-oz. copper.



2. 4500 sq. ft. Hauserman-System Skylights.
C. A. Selzer Storeroom, Bulkley Building, Cleveland.



1. Battery of gable skylights with ventilators
Morris Plan Bank Building, Cleveland
Franz Warner, Architect
Central States Eng. & Const. Co., Contractors



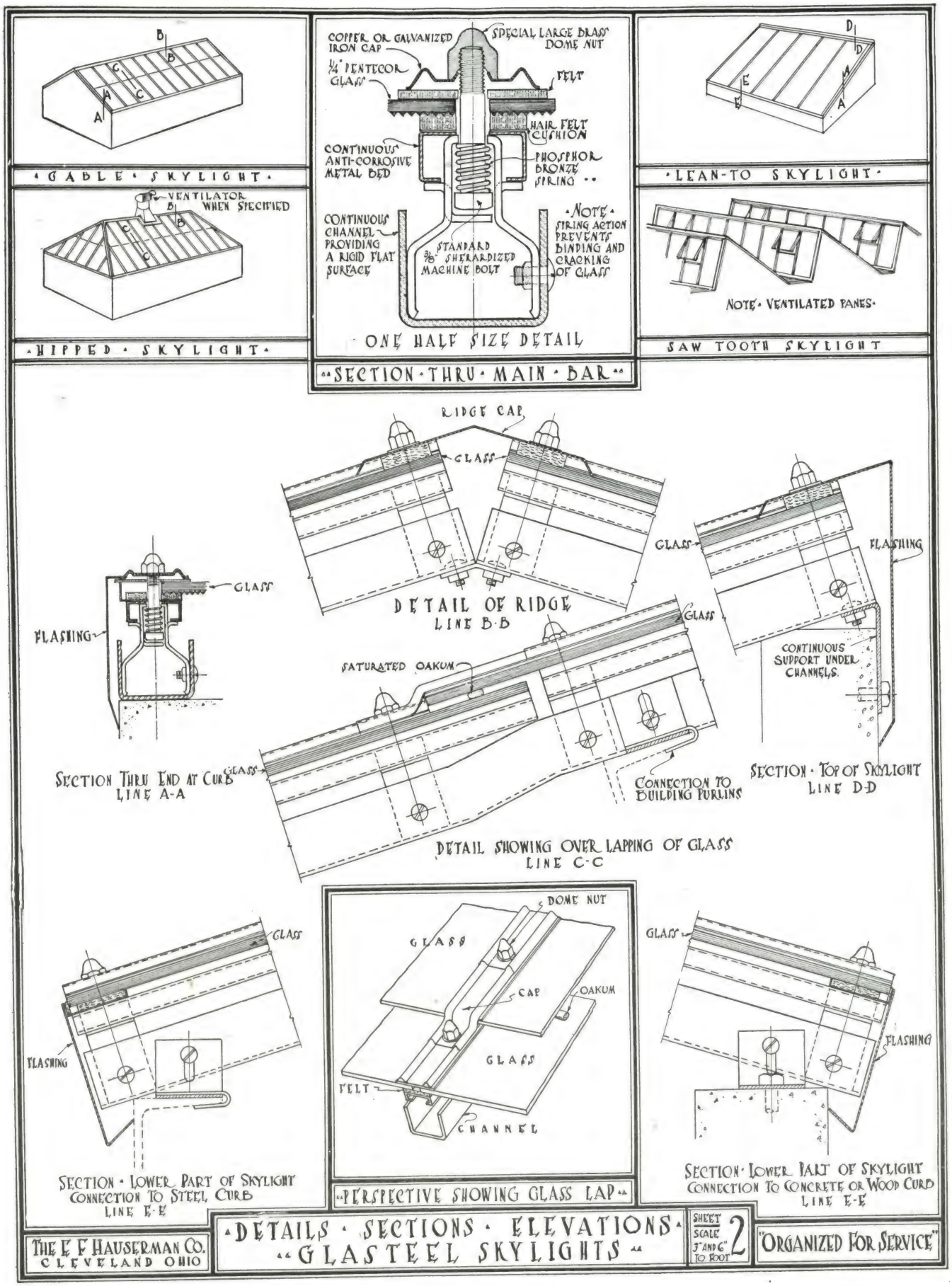
3. Hip end gable skylight, 11x90 feet
Mall Motor Co. Building, Cleveland, Ohio
Christian, Schwarzenberg & Gaede, Engineers
The Lundoff-Bicknell Co., Contractors

THE E. F. HAUSERMAN CO
CLEVELAND OHIO

···TYPICAL INSTALLATIONS···
···GLASTEEL SKYLIGHTS···

"ORGANIZED FOR SERVICE"

Continued on next page


GABLE SKYLIGHT
HIPPED SKYLIGHT
LEAN-TO SKYLIGHT
SAW TOOTH SKYLIGHT
VENTILATOR WHEN SPECIFIED
COPPER OR GALVANIZED IRON CAP
SPECIAL LARGE BRASS DOME NUT
¼" PENTECOR GLASS
FELT
HAIR FELT CUSHION
CONTINUOUS ANTI-CORROSIVE METAL BED
PHOSPHOR BRONZE SPRING
CONTINUOUS CHANNEL PROVIDING A RIGID FLAT SURFACE
STANDARD ⅜" SHERARDIZED MACHINE BOLT
NOTE STRING ACTION PREVENTS BINDING AND CRACKING OF GLASS
ONE HALF SIZE DETAIL
SECTION THRU MAIN BAR
NOTE VENTILATED PANES
RIDGE CAP
GLASS
DETAIL OF RIDGE LINE B-B
FLASHING
SECTION THRU END AT CURB LINE A-A
SATURATED OAKUM
CONNECTION TO BUILDING PURLINS
DETAIL SHOWING OVER LAPPING OF GLASS LINE C-C
CONTINUOUS SUPPORT UNDER CHANNELS.
SECTION TOP OF SKYLIGHT LINE D-D
SECTION LOWER PART OF SKYLIGHT CONNECTION TO STEEL CURB LINE E-E
DOME NUT
CAP
OAKUM
FELT
CHANNEL
PERSPECTIVE SHOWING GLASS LAP
SECTION LOWER PART OF SKYLIGHT CONNECTION TO CONCRETE OR WOOD CURB LINE E-E
THE E F HAUSERMAN CO. CLEVELAND OHIO
DETAILS SECTIONS ELEVATIONS
GLASTEEL SKYLIGHTS
SHEET 2
SCALE 3" AND 6" TO FOOT
"ORGANIZED FOR SERVICE"

ESTABLISHED 35 YEARS
HUGH R. BURNS, PRES. JOHN A. MERCIER, VICE-PRES. PAID IN CAPITAL $100,000.00
CHRIS YOUNG, SECY.-TREAS.

THE HOWIE COMPANY, INC.

Manufacturers of Skylights

TELEPHONE
GARFIELD 4660

5241 Wesson Avenue
DETROIT, MICH.

Products

PEERLESS SKYLIGHTS.

Also manufacturers of Fireproof Windows, Tin Clad and Metal Covered Doors, approved by Underwriters' Laboratories, Inc.; Copper and Bronze Doors, Architectural Sheet Metal Work.

Peerless Skylight, Sawtooth and Marquise Constructions

These are designed to provide a weatherproof and dustproof skylight construction and one that can be guaranteed against any and all possible glass breakage due to vibration, or through expansion and contraction due to temperature changes.

Bars, Cushion, Cap Strip and Condensation Gutter—Supporting bars are of special rolled steel bars, 1¾x1¾-in. T-section with upturned flanges. The glass is laid directly on these flanges in small panes, 24x24-in. size, overlapping each other 2 in. with a felt packing strip laid between, thus forming a cross condensation gutter. A special felt strip is laid along edge of glass and against side of bar. A sheet metal spring bearing cap is provided for a covering of T-bar and packing strips. This cap is but 23 in. long and is provided with a heavy brass cotter pin through center of cap. Cotter pin engages a slot provided in bar in such manner as to insure a tight springlike fitting to glass and packing strips; each light of glass being held in place independent of every other light by means of this cap and cotter pin, and thus left wholly free to move whenever affected by either expansion or vibration.

Glass, Overlapping, Flexible Cross Joint—The standard ¼-in. wire glass is used in lights 24x24 in. in size, necessitating the offsetting of T-bars every 22 in., thus providing a horizontal flexible cross joint throughout the construction.

Expansion Castings—Provision for the expansion of the bar is provided by the upturned flanges of the bar engaging the special casting flanges, which castings are fastened to curb, ridge and intermediate purlins, as required, to suit the construction of the building. The curb castings are provided with weep holes.

Continuous Curb Gutter—The sheet metal curb flashing is turned up ¾ in. on the inside directly back of curb casting; this necessitates the bar being offset at curb end, thus providing a continuous curb gutter 1¼ in. deep by 3 in. wide, guarding against the possibility of a leaky frozen-up curb. The metal ridge is bolted to bar with a ¼x1¼-in. brass bolt.

Sheet Metal Trimmings—The only sheet metal used in this construction is the cap curb and ridge, which can be of galvanized iron, lead coated metal or copper.

Standard Construction—The above is a standard construction and is carried in stock, thus facilitating quick shipment upon receipt of order.

Cost and Maintenance—Peerless skylights cost no more than ordinary skylights and last from 4 to 5 times as long without additional cost of maintenance.

Summary—The Peerless skylight is designed to meet all requirements and is the last word in skylight, marquise and sawtooth construction. It is absolutely proof against water, snow and dust; and will last as long as the building, with no glass breakage possible excepting by accident.

Types of Peerless Skylights

This company manufactures all types of skylights. Among the important types are the standard, sawtooth, and ventilating.

Standard Type—This type is well illustrated by the detail sketches on the lower portion of the following page. A number of applications are included therein.

Sawtooth Type—This type as illustrated below is also given in detail on the middle of the following page.

Ventilating Type—Illustrations are shown of this type at the top of the following page. This type is easily operated and when closed is perfectly watertight.

Specifications for Peerless Skylight and Marquise

Intent—This specification together with the accompanying drawings and details is intended to provide for all labor and material required for the completion and erection of all skylights as shown or mentioned.

Work by Others—All steel framing, wood curbs, nailing strips, gutters and roof flashings, shall be provided for under another contract, unless otherwise specified.

Work Required—Provide and install all skylights as shown or indicated on drawings. All skylights shall be "Peerless" skylight construction as manufactured by THE HOWIE COMPANY, INC., DETROIT, MICH., complete as shown by their standard details, and adapted to the construction of the building.

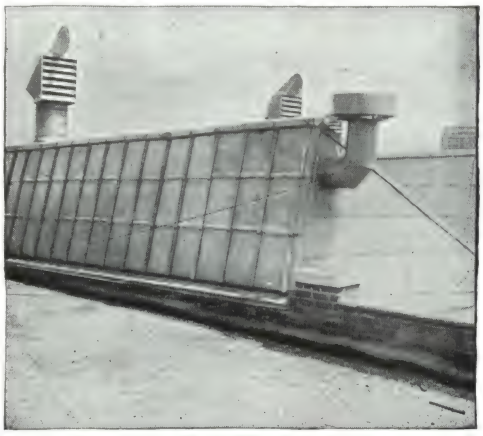
All sheet metal trimming shall be of No. 24 gauge galvanized iron or 16-oz. cold rolled copper.

Glazing—All skylights to be glazed with best quality ¼-in. rough wire glass not to exceed 24 in. in width. All glass to be left whole and clean at completion of the work.

Painting—All metal work in connection with skylight, except copper, shall be painted; also paint all skylight bars with 1 good coat of approved paint.

Pivoted Sections—Provide pivoted sections of Peerless construction as shown on drawings, complete with chain-operated lifting devices.

Guarantee—This contractor is to furnish a written guarantee for 5 years.



PEERLESS SAWTOOTH SKYLIGHT

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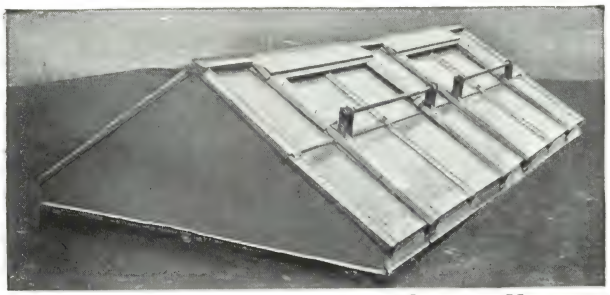
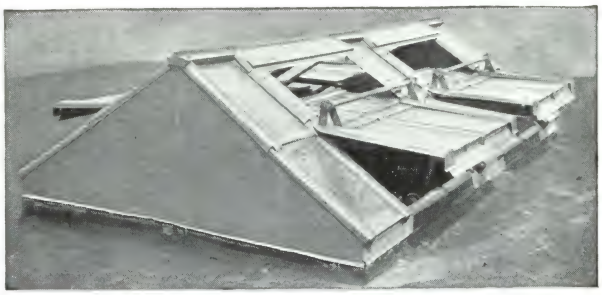




VIEWS OF VENTILATING TYPE PEERLESS SKYLIGHTS

Lead covered, copper, galv. iron sheet metal spring bearing cap secured by cotter pin thru slot in bars

Felt Packing

Wire Glass

1 3/4"

1 3/4"

Condensation Gutter

2' 0 1/2" o.c.

FULL SIZE DETAIL OF SKYLIGHT BAR
1 3/4" x 1 3/4"

This Sawtooth form of roof construction is especially adapted to shops of large floor area with low head room and furnishes the best solution of the problem of excluding the direct rays of the sun and obtaining the desirable north light.

Peerless Skylight Construction is especially adaptable to this type of roof combining rigidity with absolute weather tightness.

Ventilator Bolt "B"

Ridge Tie (Bar Spacer)

24"x24" Wire Glass

May be used without center supports up to 8'-0"

Felt Packing

Brass Cotter Pins

Pivoted Ventilating Sections

Panels in this roof of sawtooth may be solid metal interchangeable with glass if required.

Continuous Gutter

"A"

"C"

•NOTE• Skylight bars are continuous from curb to curb no ridge support required.

CROSS SECTION
SCALE 3/4"=1'-0"

Flashing

Metal ridge

Bolt

Top Casting

SECTION AT RIDGE OF SINGLE PITCH SKYLIGHT SUPPORTED ON STEEL CHANNEL BOLTED TO WALL

Sheet metal ridge

Bar spacer

SECTION THRU RIDGE AT "A"
Skylight bars are continuous from curb to curb - No ridge support required

Sheet metal ridge

Cap

SECTION THRU RIDGE AT "B"

Metal cap

Top casting

Metal Roofing

Felt Packing

End casting

Continuous Gutter

Cotter pins

24"x 24" Glass

22" O.C.

Cross condensation gutter

"D"

Bolts

"A"

SECTION THRU SKYLIGHT FORMED IN SLOPE OF ROOF

"C"

Brass cotter pins securing cap

Cross condensation gutter

Metal ridge

24" x 24" Glass

"E"

End casting

Sheet metal curb & apron

SECTION THRU. GABLE SKYLIGHT WITHOUT CENTER SUPPORTS

"B"

I Beam ridge

Cross condensation gutter

22" O.C.

On flat pitch roofs, the Peerless bar can span up to 6'-0" on 1/4 & 1/3 pitch roof it can span 8'-0" between curb & purlins. The gable skylight indicated without supports may be used to span openings up to 18'-0" wide, the bar length being 11'-0" from curb to center of ridge. A rigid curb is required for wide spans. Skylight bars are carried in stock in 30'-0" lengths. In these skylights standard size 1/4" wire glass is used measuring 24"x24" & in order to work to a given rafter length one light at curb or ridge will be of special size to meet the required rafter length.

Skylight bars will span 8'-0" purlin to purlin.

Purlin spacing should not exceed 8'-0"

22" O.C.

Sheet metal spring bearing cap

1/4" Wire Glass 24" x 24"

Continuous gutter

Metal curb

SECTION THRU SKYLIGHT CARRIED ON STEEL PURLINS.

"C"

Packing

DETAIL OF BAR OFFSET WITHOUT CENTER SUPPORT

1"x 1"x 1/8" Clips bolted to standards to carry screens

Screen

3/16" x 1 1/4" Standards welded on top of skylight bars 24" o.c. Standard to be on every other bar

Packing

Cross condensation gutter

DETAIL OF SUPPORT FOR SCREENS

DETAILS OF PEERLESS SKYLIGHTS

A. H. JETER & COMPANY, INC.

Manufacturers of Puttyless Steel Skylights

GENERAL OFFICE AND WORKS
496-498 Hancock street
LONG ISLAND CITY, N. Y.

TELEPHONE
ASTORIA 4940

Products

PUTTYLESS STEEL SKYLIGHTS.
CAST IRON ROOF DRAINS.
Also Sheet Metal Skylights, Turrets and Louvers; Architectural Sheet Metal Work of every description; Metal, Tile and Slate Roofing.

Services and Estimates

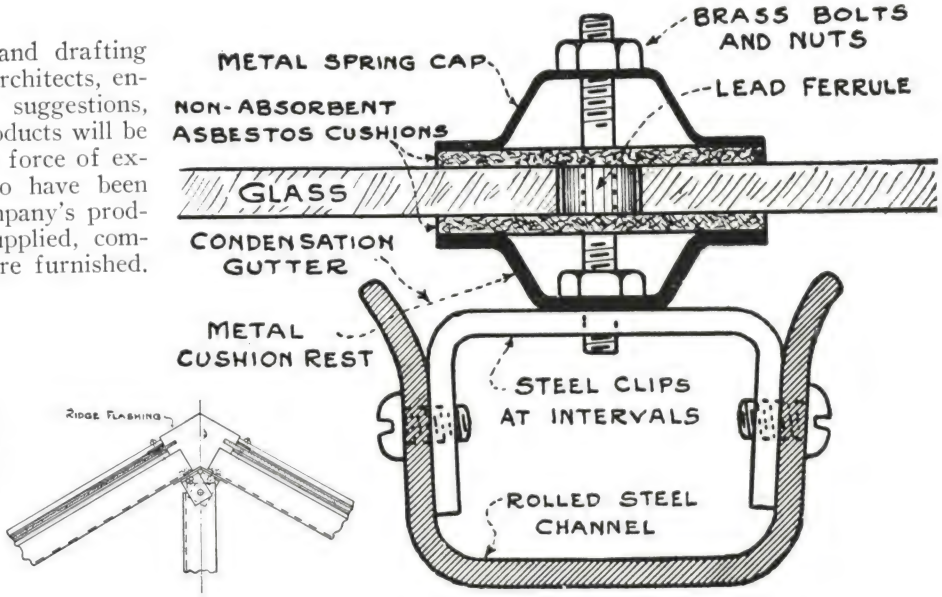
This company's estimating and drafting department is at the disposal of architects, engineers and owners. Estimates, suggestions, specifications and plans for its products will be gladly given on request. A large force of experienced men is employed, who have been carefully trained to erect the company's products. When material only is supplied, complete instructions and drawings are furnished.

Facilities

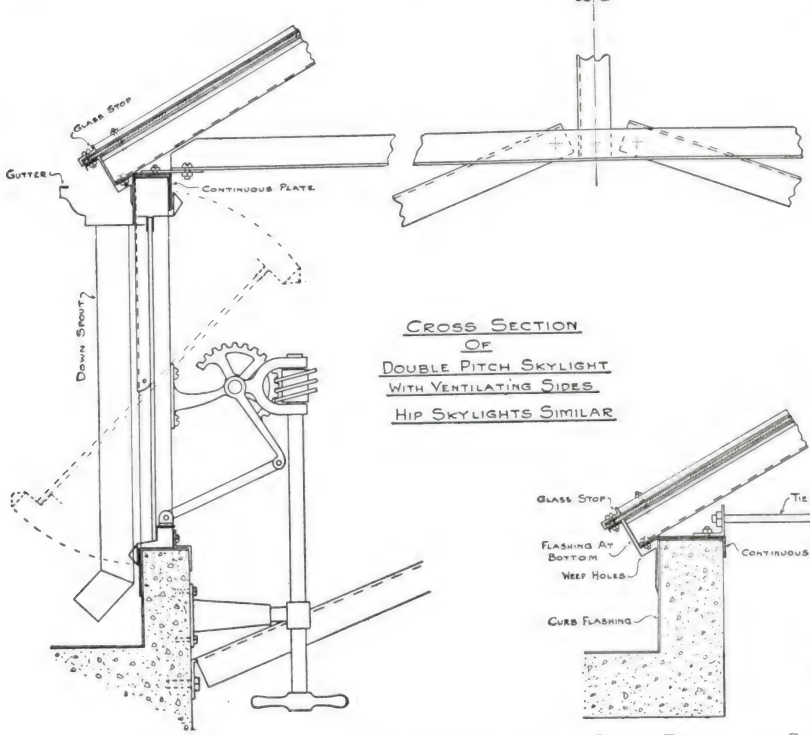
This company's factory is situated in Long Island City, near the Long Island Railroad and Brooklyn Eastern District Terminal. This gives direct shipping facilities to any point in the world, either by railroad or water.

Jeter's Puttyless Skylights

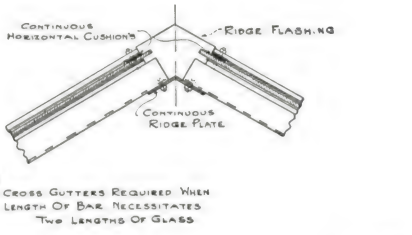
Special Features—The sash bar of Jeter's patented puttyless steel skylight is composed of a lower channel, over which is placed a special moulded glass rest, secured to the bottom channel by means of wrought iron stirrups and tap bolts.

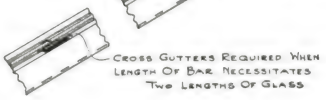


FULL SIZE SECTION THRU SKYLIGHT BAR

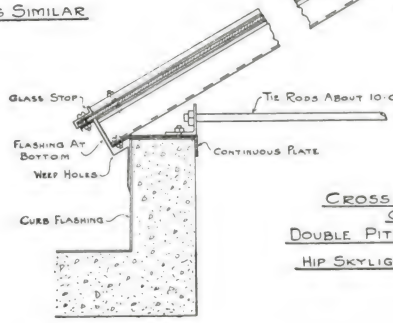


CROSS SECTION OF DOUBLE PITCH SKYLIGHT WITH VENTILATING SIDES
HIP SKYLIGHTS SIMILAR

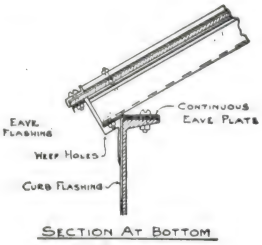




CROSS GUTTERS REQUIRED WHEN LENGTH OF BAR NECESSITATES TWO LENGTHS OF GLASS



CROSS SKYLIGHT OF DOUBLE PITCH SKYLIGHT
HIP SKYLIGHTS SIMILAR



SECTION AT BOTTOM SHOWING STEEL CURB

TYPICAL DETAILS OF JETER PUTTYLESS STEEL SKYLIGHTS
Scale: 1 in. = 1 ft.

Continued on next page

The glass rest is held in position by a brass bolt, which is of sufficient length to engage and secure the metal cap that covers the edges of the glass.

On the special moulded glass rest, a cushion of heavy saturated asbestos is provided, running entirely across the glass rest. After the glass is laid in place, a saturated asbestos sealing strip is provided, which is securely held in place by the metal cap. This feature insures against any dust or moisture getting under the glass and in to the sash bars or gutters.

A special moulded section is used as a continuous bottom support for the glass. This section also contains a pocket, on which is placed a strip of saturated asbestos upon which the glass rests. Connections at intervals of about 20½ in. are provided in the continuous bottom members, which receive and secure the bars. This method of asbestos cushioning device makes the skylight waterproof and dustproof and, being of a soft indestructible material, reduces the cracking of the glass to a minimum.

Adaptability—Jeter's patented system of puttyless steel glazing is adaptable for use in railroad terminals, museums, schools, hospitals, factories, machine-shops, etc.

The very simplicity of construction enables any mechanic to readily erect this system.

Specifications—All skylights shall be of rolled steel, of a type to allow for free expansion and contraction and made tight without use of paint, cement or putty.

Sash bar shall be composed of a special U-channel 2 in. wide and 1⅝ in. deep, made of high carbon steel ⅛ in. in thickness.

A special moulded glass rest made of No. 16 gage steel shall be provided. This glass rest shall be formed in the shape of a trough and shall be supported on wrought iron stirrups which will be tap-bolted through the walls of the special U-bar.

A heavy non-absorbent asbestos cushion shall be placed over the glass rest. Cushion and glass rest shall be securely fastened to the wrought iron stirrup by means of brass or copper machine screw.

A special continuous moulded member shall be provided at eaves of skylights. Between this member and the glass shall be placed a non-absorbent asbestos cushion and same drawn up tight under glass by means of bolts at bar centers.

After glass is set in place, provide a metal spring cap 1¾ in. out to out of flanges. This cap shall be underlined with a sealing strip of non-absorbent asbestos material, held in position by being punched and strung over the cap bolts. Edges of sealing strip shall not protrude beyond edges of cap. Securely fasten cap by means of a brass nut.

All skylights to be glazed with ¼-in. ribbed wire glass.

All caps, combing and trim shall be of (specify copper, zinc or galvanized iron).

After fabrication and before assembling the sash bars, all parts, shall be thoroughly coated with an application of bitumastic solution (or specify hot galvanizing).

Jeter's Improved Cast Iron Roof Drains

These drains are decidedly superior to the troublesome old style drains and are offered at about the same cost as the latter.

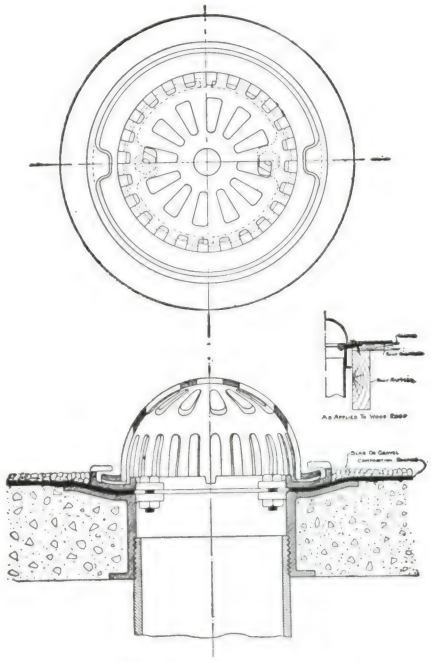
They are adapted for use with interior leaders on slag, gravel or promenade tile roofs, with either concrete or wood construction.

They are substantially constructed of cast iron, insuring service for the life of the building.

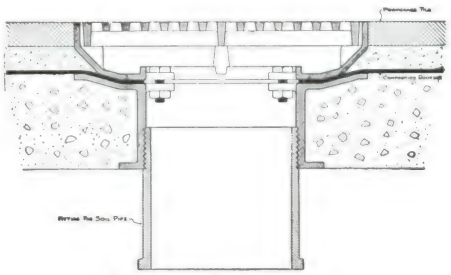
No extra metal flashing is required, as the roof material is flashed directly to the drain and clamped down in place by flashing rim, which also forms gravel or tile stop.

Being incorporated in concrete roof slab or fastened to wood construction eliminates any chance of shrinkage or separation between roofing material and drain, and proof against leakage is assured.

Their simplicity, few parts, ease of installation, durability and economy make them ideal drains.



For Slag or Gravel Roofs



For Promenade Tile Roofs

DETAILS OF JETER'S CAST IRON ROOF DRAINS
(One-eighth full size)

McKEOWN BROS. COMPANY, INC.

Contractors and Engineers

Distributers of Blaski Ventilating Skylights

112 West Adams Street
CHICAGO, ILL.

21 East 40th Street
NEW YORK, N. Y.

Products

BLASKI VENTILATING SKYLIGHTS.
For Wood Roof Trusses, see pages 14-15.

Service

Our engineers will be pleased to work in conjunction with architects and engineers and suggestive details will be submitted on request.

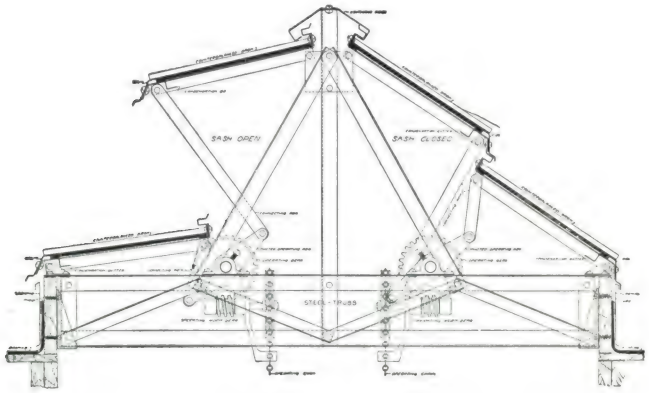
Distinctive Features of Blaski Skylights

Blaski skylights are made either ventilating or non-ventilating, or a combination of both. They are ideal for garages, machineshops, laundries, factories and foundries.

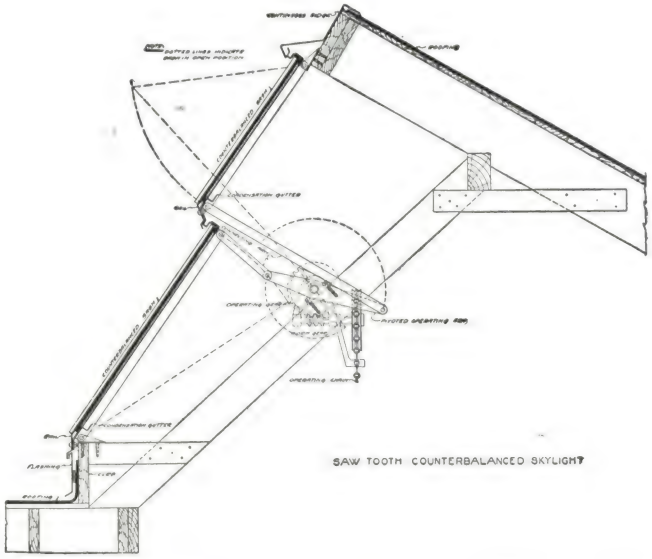
The Blaski method of counterbalancing results in the two sash being in equilibrium in all positions, thus making for ease of manipulation, at the same time the use of a worm gear insures against change of position of the sash through the effect of wind pressure or any other influence on the sash.

From accompanying illustration it is readily seen that each side of the skylight is subdivided into two sashes. The upper sash is pivoted at the top and the lower one at the bottom. The free ends of the sashes are connected by links to a double crank attached to the shaft of a worm type operating gear.

The same principle of balanced sash is applied to sawtooth roof construction as shown in illustration below. They are absolutely weatherproof in all positions.

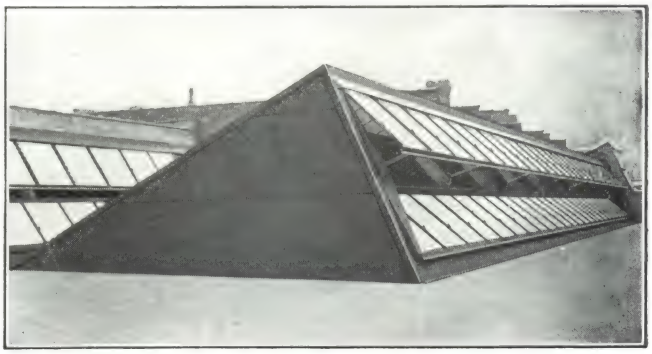


DETAILS OF BLASKI VENTILATING SKYLIGHT—DOUBLE PITCHED



DETAILS OF BLASKI VENTILATING SKYLIGHT APPLIED TO SAW-TOOTH ROOF CONSTRUCTION

DOUBLE PITCHED-HIPPED END TYPE



WITH SAWTOOTH ROOF CONSTRUCTION

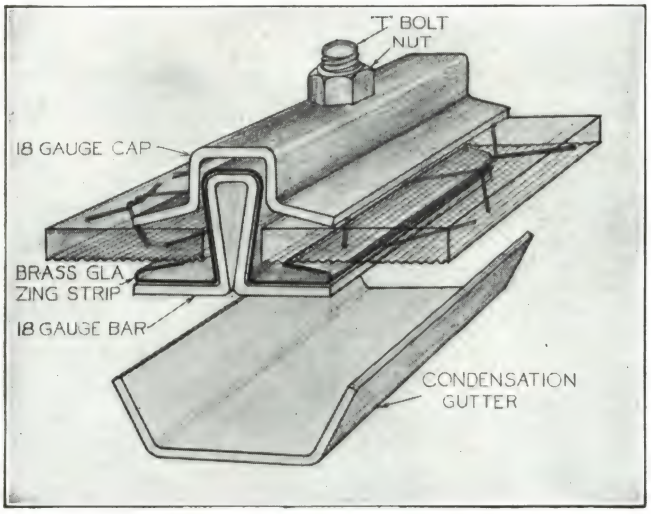
Continued on next page

Construction Details

Substructure — Trusses built of 2x1½x⅛-in. angles supported by hangers screwed to skylight curb.

Sash — Ventilating and non-ventilating sash stamped from No. 18 gauge iron and galvanized. The bars and rails are formed in sash with the Blaski method of cleating—there is no solder used in any parts of the entire skylight.

Puttyless Glazing—Putty glazing renders good service under ordinary conditions, but where abnormal conditions arise, such as machinery and hanging pulley vibrations, it is necessary that the glass be held in place by a resilient metallic pressure rather than a brittle putty.

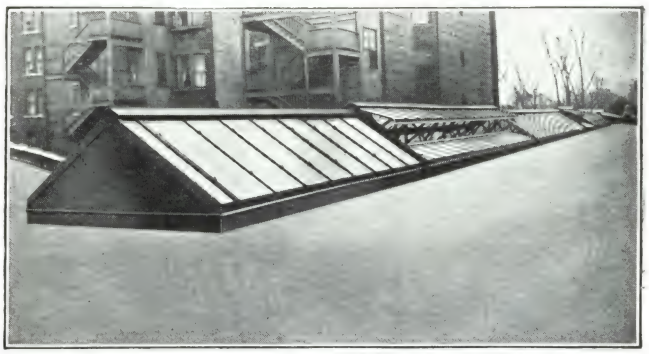


Details of Puttyless Glazing

Special attention is called to the large condensation gutter fastened to upper and lower ends of bar—can easily be removed for painting purposes. (See illustration.)

Glass is laid on the resilient brass strips; space filled with a special cement which never hardens, yet produces a perfect bond between the glass and the bar.

Flashing—Effective flashing is provided at the top in the form of a continuous immovable ridge. At the junction of the upper and lower sashes and the hinges of the lower sash, the flashing is provided by overlapping



Installation Where it is Desirable to Ventilate Portions of a Skylight Only

rail construction. Curb flashing is standard and non-destructible.

Operators—Of worm gear type, $1\frac{5}{16}$-in. shafting. Lever arms, 2x¼-in. steel bars.

Condensation—Effective gutters form part of the lower sash rails. Weep holes are closely spaced.

Paint—All parts are given 1 coat of red mineral paint at the factory.

Glass—Ribbed wire ¼ in. thick. Widths are equal and standard.

Erection

The erection of Blaski skylights requires no soldering or riveting, just a few bolts. Any handy man can erect them. Installation by us when desired.

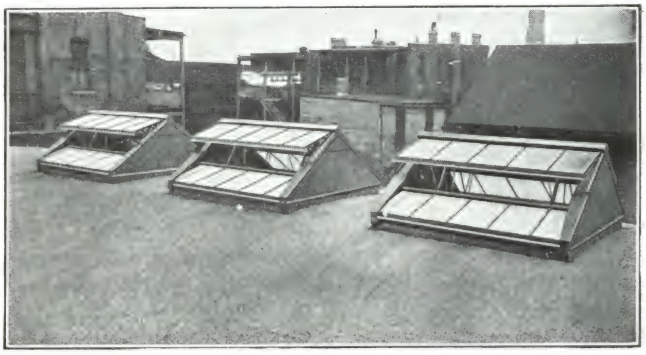
Shipments

Blaski skylights are shipped knocked down, ready for erection to any part of the United States. Erection details accompany shipments. Large quantities of standard sizes, in widths of 6, 8, 10 and 12 ft. and any length, are always carried in stock.

Blaski-Lite

These are small skylights suitable for stores, apartments and offices. They are given the same attention as our large skylights.

The Enormous Opening in the Sides Pulls Foul Air Out or Forces Fresh Air In



Installation of Blaski-Lite Skylights

NATIONAL VENTILATING COMPANY

Manufacturers of Puttyless Skylights

GENERAL OFFICE AND FACTORY

75 Tenth Street
LONG ISLAND CITY, N. Y.

TELEPHONE
HUNTERS POINT, 5733, 5734

Products

MULTI-UNIT PUTTYLESS SKYLIGHTS.

Also manufacturers of Side Lights, Operating Sash, and National Ventilating Devices; all kinds of Sheet Metal Products; Drawing and Stamping.

Adaptability

Skylights for railway terminals, power stations, machineshops, factories, foundries, libraries, museums, art galleries, and all other buildings whereon permanent watertight skylights of large area are required.

Advantages and Distinctive Features

Referring to Fig. 4 on following page, the bar and upper lights are supported in a fixed manner by the purlin thereunder; while the lower bar, supporting the lower lights, is secured by the same purlin in a loose manner, permitting it to expand freely.

This construction, being repeated at each purlin, permits movement, all in same direction, due to expansion, contraction, or vibration (along the slope of the skylight) of the cap, glass and bar of each unit or tier of glass, independently of every other unit or tier.

Along the longitudinal line of the skylight the steel frame of the building and the entire length of the glass are each taken as separate units, and the difference, nearly 100%, in the expansion and contraction of these materials (glass and steel) is likewise thoroughly taken care of by the copper spreader clips shown in transverse section at supporting bar (Fig. 2). These spreader clips are placed over each cap bolt, spaced about 10 in. along each skylight bar, and incidentally they serve also to better secure in place the brass bolts for holding the caps.

The cap is strong and yet resilient. Its upper half is of an inverted "U" shape, which provides strength and rigidity; while the lower half, especially at the lower extremities, is resilient, so as to conform thoroughly, when secured in position, to the surface of the the glass.

All gutters and parts that are non-accessible, without removing the glass, are of non-corrosive material. The entire top of the bar is covered with 8-oz. copper, the same being applied while the last coat of bar-paint is still wet; and a flexible bearing for the glass is formed, which adjusts itself to any warps or irregularity of the glass along its bearing line.

The company is equipped to cover the bottom of the bar also. Both the top and bottom bar covers are made by special dies and both fit the bar snugly.

No packing or filling substance of any kind is required, and no material is used other than glass and metal.

Standard Specification, Multi-unit System Puttyless Skylights

All curb and roof flashings shall be included under heading "Sheet Metal Work." They must be well connected, ready to receive the skylight work, and must include all necessary counter flashing, well secured to roof flashings and made watertight.

The skylights shall be of the puttyless type, of a design to allow for free expansion and contraction, or movement due to vibration, of the glass and supporting bars in line with the pitch of roof, *all in the same direction.*

Each light of glass shall be entirely independent of every other light, so that one light does not support another; and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

The bearing for the glass shall be flexible, so as to adjust itself to any warps or irregularities of the glass along its bearing line.

The caps shall be spring bearing, in order to thoroughly conform along the lines of contact, when secured in position, to the surface of the glass.

All bar gutters shall be of copper and all exposed parts other than sheet metal shall be of brass.

The supporting bars shall be of rolled steel, and shall be held in a loose manner at the upper end and in a fixed manner at the lower end.

Packing, filling substance of whatever kind, or material other than glass and metal shall not be used.

All skylight sheet metal work shall be [copper, zinc, or galvanized iron].

The glass shall be ⅜ in. thick [wire, plain or ribbed].

Adopted by Leading Railroads

The Pennsylvania Railroad Company, after carefully examining all other types of puttyless skylights in actual service, adopted the construction herein shown and described for its new New York & Long Island Railroad Passenger Station, 31st to 33d Streets and 7th and 8th Avenues, New York City, on which building this company completed, about 11 years ago, the erection of 83,000 sq. ft. of skylight, embracing nearly every known variety, such as hipped, ridge, flat, barrel-roof, sawtooth with bowed ridges, circular, elliptical, etc., all constructed with flat glass.

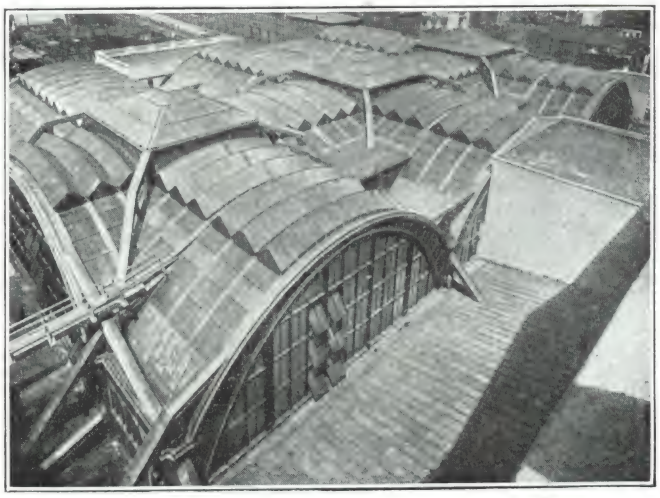


FIG. 1. GROUP OF MULTI-UNIT SKYLIGHTS OVER CONCOURSE OF PENNSYLVANIA TERMINAL, NEW YORK, N. Y.
Area of this group, about 50,000 sq. ft. Total area on the terminal, 83,000 sq. ft.

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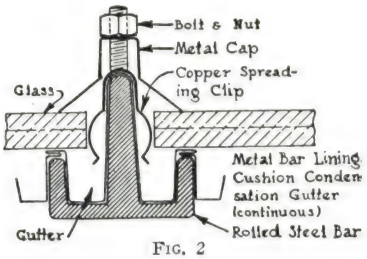


FIG. 2

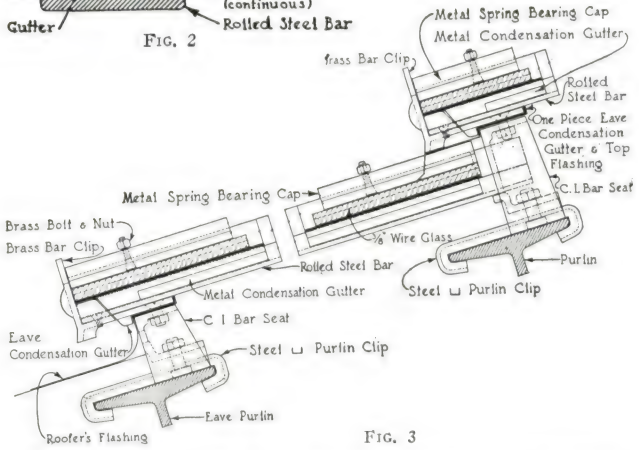


FIG. 3

FIG. 2. HALF SIZED TRANSVERSE SECTION AT SKYLIGHT SUPPORTING BAR
(Patents applied for)

FIG. 3. REDUCED SCALE CROSS SECTION FROM EAVE TO NEXT PURLIN ABOVE
(Patents applied for)

Construction shown on the right side is repeated at each purlin between the eave and the ridge
Scale, 2 in. equals 1 ft.

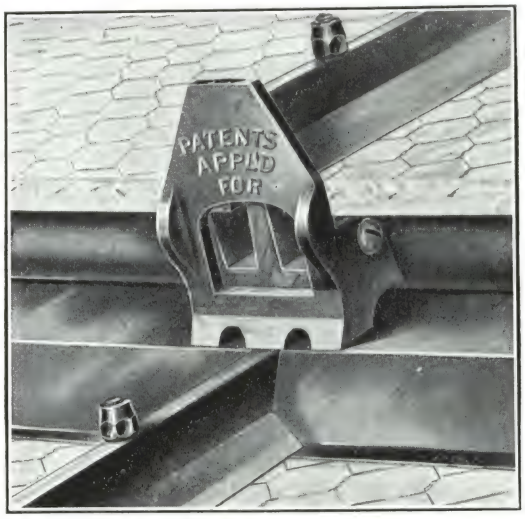


FIG. 4. HALF SIZED PERSPECTIVE
Showing exterior view over each purlin between the eave and the ridge

The Central Railroad of New Jersey has also adopted this system of skylights for its new terminal at Jersey City, N. J., where 116,000 sq. ft. of this construction has been installed.

The New York Central Railroad Co. also has this construction on its new Grand Central Terminal at 42nd Street, New York City; on its New York City Power House at 50th Street and Lexington Avenue; Power Stations at Yonkers and Port Morris, N. Y.; Boiler Shops at West Albany, N. Y., Reed & Stem, Architects, and for their new Passenger Station at Utica, N. Y., Stem & Fellheimer, Architects.

Result of Thorough Investigation

The system of skylight construction described here is the result of experience and investigations made by the NATIONAL VENTILATING COMPANY in this line over a period of nearly 20 years.

All efforts during this time have been directed to producing, not the cheapest, but the best construction. As to skylights, true economy does not consist in buying the cheapest.

Public Buildings and Other Notable Installations

The following are a few, among many, installations made by this company during the past 16 years; in some cases replacing other work with the new and improved system above described:

BUILDING, LOCATION AND ARCHITECT

New Walters Art Gallery, Baltimore, Md., Delano & Aldrich
New Library Building, Bar Harbor, Me., Delano & Aldrich
Sun Parlor for E. Parmalee Prentice, New York, N. Y., Delano & Aldrich
International Paper Co. Mills at Niagara Falls, Palmer and Fort Edward, N. Y., and Rumford Falls and Chisholm, Me.
Sage Art Gallery, Menands, N. Y., Wm. H. Hiller
Maryland Institute, Baltimore, Md., Pell & Corbett
Auditorium Building, Springfield, Mass., Pell & Corbett
Municipal Building, Springfield, Mass., Pell & Corbett
New York Edison Co. Waterside Power Station, New York, N. Y.
U. S. Navy Yards at Norfolk, Va., Charlestown, Mass., Brooklyn, N. Y., Pensacola, Fla., and Washington, D. C.
Brooklyn Rapid Transit Co. Shops, Maspeth, N. Y.
American Steel & Wire Co. Mill, Worcester, Mass.
C. K. G. Billings Residences, New York and Locust Valley, N. Y.
Terminal Passenger Station, Norfolk, Va., Reed & Stem
New York Stock Exchange Building, New York, N. Y.
New U. S. Post office, New York, N. Y., McKim, Mead & White
New Municipal Building, New York, N. Y., McKim, Mead & White
Munsey Building, Washington, D. C., McKim, Mead & White
Brockton Library, Brockton, Mass.
New York, Westchester & Boston R. R., Quaker Ridge Station, New Rochelle, N. Y., and 180th Street Station, Bronx, N. Y., Stem & Fellheimer.
United Electric Light & Power Co., Powerhouse, 201st Street Station, New York, N. Y.
Julius Kayser & Co. Loom Building, Brooklyn, N. Y., Wm. Higginson
Institute of Arts and Sciences, Brooklyn, N. Y., McKim, Mead & White
The Beaver Companies' Mill, Thorold, Ontario, Can.
Museum of Fine Arts, Minneapolis, Minn., McKim, Mead & White
Administration Building, Balboa, Canal Zone, Panama
People's National Bank, Lynchburg, Va., Stem & Fellheimer
Metropolitan Museum of Art Building, Sections "J" and "K," New York, N. Y., McKim, Mead & White
Standard Arcade Building, New York, N. Y., Severance & Van Alen
Robert Brewster's Enclosed Tennis Court at Mount Kisco, New York, Walter D. Blair
Enclosed Pastime Tennis Court, Long Island City, N. Y., Walter D. Blair
Brooklyn Rapid Transit Co. Substation, Ozone Park, N. Y.
Ford Motor Co. Service Building, Long Island City, N. Y.
Union Passenger Station, Macon, Ga., Alfred Fellheimer
John J. Raskob's Residence, Claymont, Del., McClure & Harper
Buffalo General Electric Co., 1917 River Station Extension, Black Rock, N. Y., Stone & Webster, Engineers
American Tobacco Co. Building, Brooklyn, N. Y., Francisco & Jacobus
American Can Co. Building, Brooklyn, N. Y., N. M. Loney
U. S. Naval Operating Base, Hampton Roads, Va.
National City Bank, New York, N. Y.
Trenton Bank Building, Trenton, N. J., Dennison & Hirons
Commodore Hotel, New York, N. Y., Warren & Wetmore
Amherst College Library, Amherst, Mass., McKim, Mead & White
Standard Oil Company, Devoe Works, Long Island City, N. Y.
Kwang Tung Electric Supply Co. Building, Canton, China
U. S. Assay Building, New York, N. Y.
Westinghouse Electric Co. Warehouse, Essington, Pa.
S. W. Strauss Building, New York, N. Y., Warren & Wetmore
Continental Can Co., Jersey City, N. J., Francisco & Jacobus
Empire City Bank, New York, N. Y., Trowbridge & Livingston
New York Telephone Co., 6 Central Exchange Buildings, McKenzie, Voorhees & Gmelin

H. H. ROBERTSON CO.

Manufacturers of Robertson Process Metal and Asphalt Products

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA., WALTHAM, MASS., SARNIA, ONT.

BRANCH OFFICES

BALTIMORE, MD.
BIRMINGHAM, ALA.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DENVER, COLO.
NEW YORK, N. Y.
PHILADELPHIA, PA.
SAN FRANCISCO, CAL.
ALLENTOWN, PA.
ATLANTA, GA.
DAVENPORT, IOWA
EASTON, PA.
HONOLULU, T. H.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
MINNEAPOLIS, MINN.
NASHVILLE, TENN.
NEW ORLEANS, LA.
OMAHA, NEBR.
PORTLAND, ORE.
SCRANTON, PA.
ST. LOUIS, MO.
SEATTLE, WASH.
TULSA, OKLA.

LONDON, E. C., ENGLAND, Edward La Bas & Co., Dock House, Billiter Street

FOR CANADA

H. H. ROBERTSON CO., LTD. Sarnia

GENERAL SALES AGENTS FOR CANADA

B. & S. H. Thompson & Co., Ltd., Montreal, Toronto, Winnipeg, New Glasgow, N. S., and Vancouver, B. C.

Products

Robertson Glazing Construction.

Robertson Process Metal: Flat, Corrugated Sheets and Bars for Roofing, Siding, Flashings, Ridge Caps, Louvers, Gutters, Down-spouts, Ventilators and Skylights.

Also manufacturers of Robertson Process Asphalt; Saturation Compounds, Insulation Compounds, Mineral Rubber, Battery Sealing Compounds.

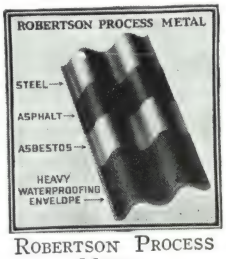
TRADE-MARK

Robertson Process Metal (R.P.M.)

A metal building material which is fully protected from the most severe weather conditions, smoke, fumes, acids, alkalis, condensation and sea air by means of three impervious coatings: asphalt, asbestos felt and waterproofing.

It is made in sheets and bars for use in roofing, siding, down-spouts, gutters, general building trim, skylights and ventilators.

The moderate first cost of Robertson Process Metal is its only cost, for this enduring material requires neither painting nor repairs. Maintenance expense is eliminated. Depreciation charges are reduced. Furthermore, the original cost of R.P.M. is spread over such a long life of service that its yearly cost is remarkably low.



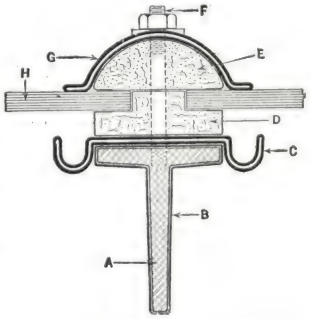
Robertson Process Metal

Robertson "Standard" Glazing Construction

A condensed description of Robertson "Standard" skylight components follows:

(A) Standard Rolled Steel Tee, Angle or Channel Bar-beam—*Always* initially stiff enough, regardless of span, to carry its load without deflection—the main cause of glass breakage.

(B) Robertson Process Protective Coating—Proof against acid, alkali, fumes and moisture; heat and fire resisting. Preserves steel bar-beam from corrosion and consequent loss of initial stiffness. Obviates expensive periodical painting.



Cross Section of Robertson Process Metal Skylight Construction

(C) Robertson Process Metal Condensation Gutter—Not a part of the beam. Collects condensation from glass. Can not corrode. In sawtooth and continuous monitor sash, the condensation gutter illustrated, C, is usually omitted.

(D) Asphaltic Glass Cushion and Separator—Provides a non-absorbent, resilient, permanent and insulating bed for glass. Positively keeps glass from contact with hard substances, even the bolts, and gives it a broad and continuous bearing; hence preventing destructive strains. It is composed of very high grade asphalt and other materials.

(E) Asphaltic Cap Filler—Leaves no hollow spaces. Follows contour of glass surface, and *adheres* to it, hence absolutely excludes water. Made of softer material than the cushion.

(F) Cap Bolt and Nut—Clamps the glass between flexible cushion and filler, insuring permanently waterproof joints. Supports cleaner's bridge planks without straining glass. Usually made of brass.

(G) Robertson Process Metal Cap—Protects filler and distributes pressure evenly and continuously. Spring tension locks the cap nuts. Of pleasing appearance and does not allow snow and dirt to lodge.

(H) Glass—As specified.

Finish—The bar, A, may be merely painted if desired.

Bar Lengths—Our experience shows that 6-ft. bar lengths give maximum value, in glass area per dollar in either single or double pitch skylights. You save money by designing skylights for same.

Versatility in Glazing Construction

Robertson glazing construction is pre-eminently suited to other uses besides skylights, such as monitor sash, sawtooth fronts, etc., both single and double glazed.

It is widely used on all kinds of public, commercial and industrial buildings. It is particularly adapted to extreme fume and moisture conditions and will give maximum durability in chemical plants, foundries, silk and paper mills, weave sheds, dyehouses, etc.

Robertson glazing construction is manufactured in a variety of shapes and sizes. It is a patent type of construction, the long life of which is due to the design and the use of Robertson Process Metal and Robertson Process Asphalt.

Bulletins completely describing any of the Robertson Process products will be sent on request.

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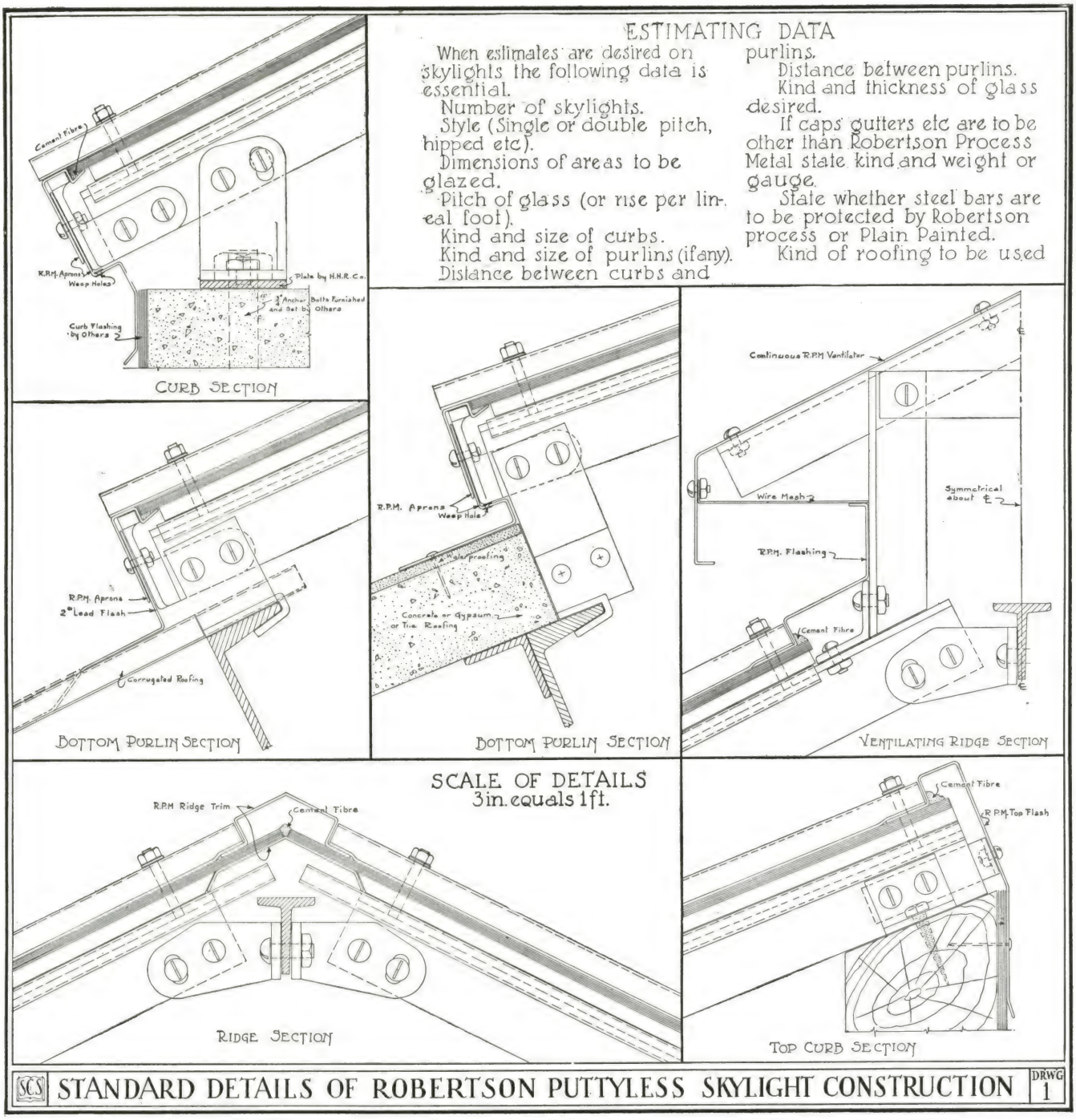

UNION STATION, INDIANAPOLIS, IND.

On these train sheds 60,000 sq. ft. of Robertson skylights have been used. With every metal part of Robertson Process Metal, these skylights effectively resist the destructive combination of sulphur dioxide fumes and excessive humidity

CADILLAC MOTOR CO., DETROIT, MICH.

Part of 107,000-sq. ft. installation of Robertson skylights on the buildings of the new Cadillac plant

Dodge, Ford, Packard, Pierce-Arrow and other leaders in the automobile field are users of Robertson skylights

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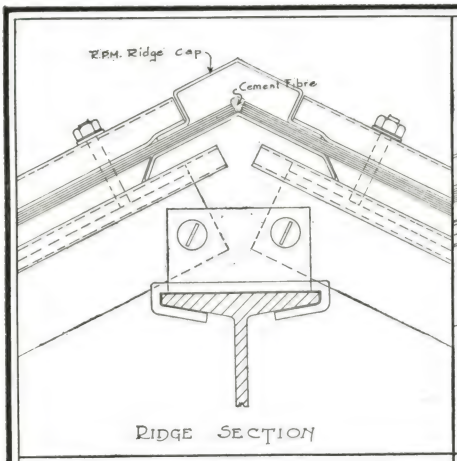
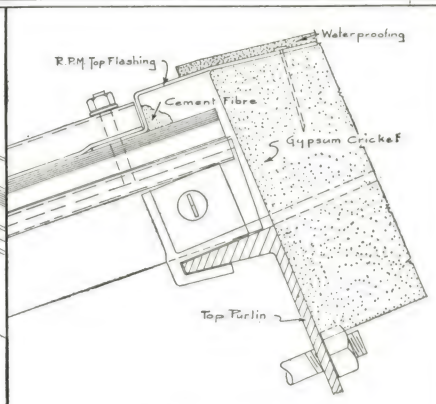


RIDGE SECTION



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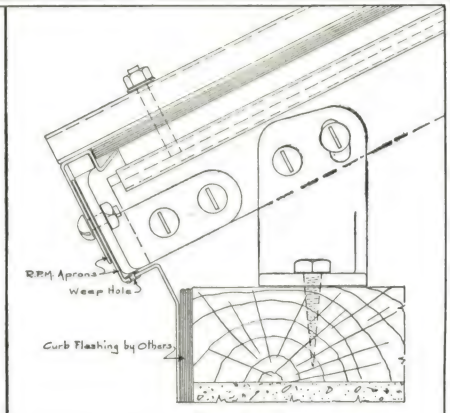

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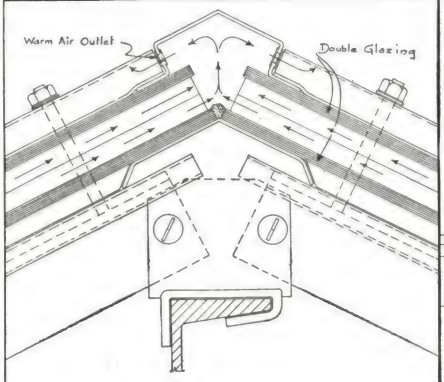

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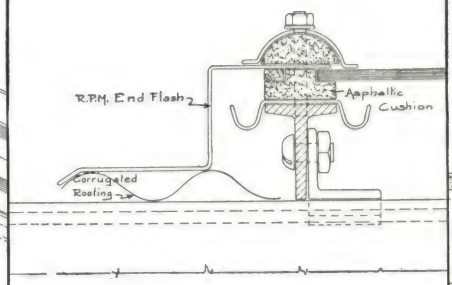

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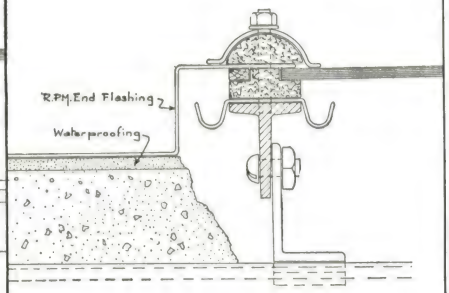

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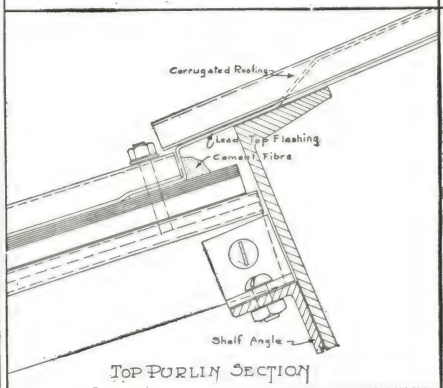

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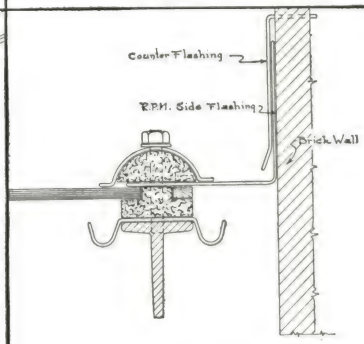

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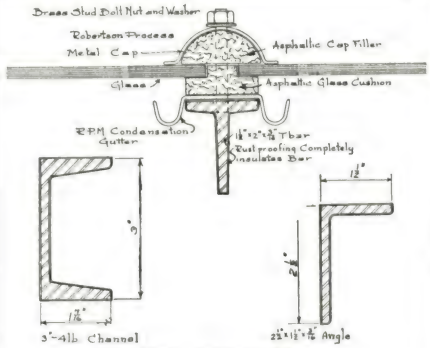
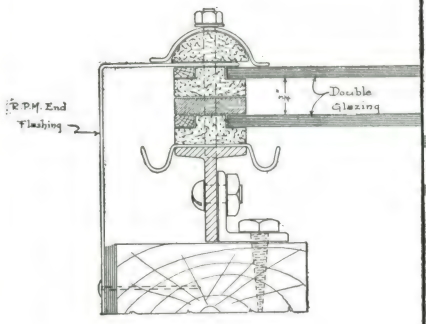
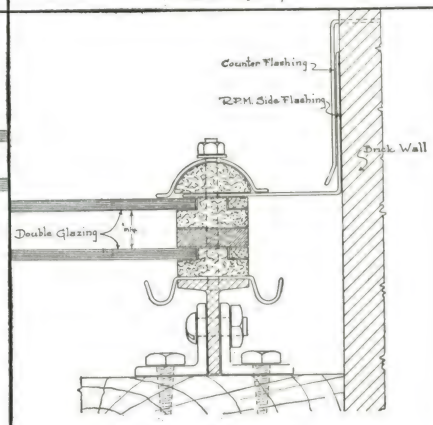


BAR SECTIONS



END CURB SECTION



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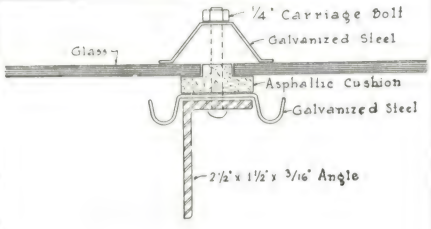


NOTE
The bars may be
1½" x 2" x 3/16" Angles
1½" x 2½" x 3/16" "
1½" x 2½" x ¼" "
3" or 4" Channels

The "Modified" has the same bar stiffness, the same style of condensation gutter, and the same glass cushion as the Robertson Standard "Skylight"

ROBERTSON MODIFIED SKYLIGHT

DRAWN FOR H.H. ROBERTSON COMPANY	STANDARD DETAILS OF ROBERTSON PUTTYLESS SKYLIGHT CONSTRUCTION	SCALE 3 IN. EQUALS 1 FT. DATE JULY 22	DRWG 2

ESTABLISHED 1873

E. VAN NOORDEN & COMPANY

Skylights

TELEPHONE
ROXBURY 3040, 3041, 3042

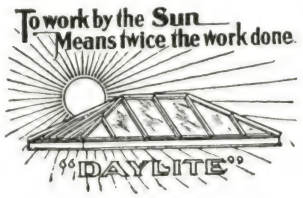
100 Magazine Street, near Massachusetts Avenue
BOSTON, MASS.

Products

Manufacturers of "ANCHOR-BAR" ROLLED STEEL, PUTTYLESS SKYLIGHTS.

Also manufacturers of Sheet Steel and Copper Skylights of every type, Sheet Steel or Copper Windows, Kalamein Doors.

For Ventilators, see page 1007.



TRADE-MARK

Rolled Steel, Puttyless Skylights—"Anchor-bar" Type (Patent No. 931638)

The Van Noorden rolled steel "Anchor-bar" puttyless skylight is designed particularly for large skylight areas, and is a most economical construction for skylights where the bar length exceeds 8 ft. *Fewer purlins* and *steel supports* are required than for any other skylight.

This company solicits from architects an opportunity of suggesting framework for any type of glazed roof structure, and a saving in the steel framework required is assured.

The structural parts of rolled steel, and the trim of sheet metal (generally copper), form a combination which can not be surpassed; namely—steel for strength and copper for weather protection.

Bar—The bar consists of a tee and angle combination as shown. The angle member serves as a gutter for condensation. Glass rests loosely on cushion of pure wool felt.

Curb—The "Anchor-bar" skylight is the only skylight of prominence which has continuous steel reinforcement at the base. The thrust of skylight bars is directly against this member, which can not give way while the curb holds.

General Features

The distinctive feature of "Anchor-bar" skylight is the unit steel frame, consisting of bars, base and ridge—an independent self-supporting steel structure, upon which the glass is loosely bedded; after which, the exposed portions, such as bar caps, ridge caps, base and side apron of sheet metal (generally copper), are applied. Caps are secured with brass bolts.

Expansion and Contraction

Owing to the fact that the sheet metal parts of "Anchor-bar" skylights are independent of the rolled steel parts, expansion and contraction are amply provided for. Glass sets loosely on the cushion of wool felt, thus there is no possibility of breakage due to expansion and contraction.

Accessibility for Re-painting

A feature to be recommended in "Anchor-bar" skylights is their accessibility for the easy re-painting of the rolled steel portions. The sheet metal portions, being preferably of copper, are impervious to weather conditions.

Adaptability

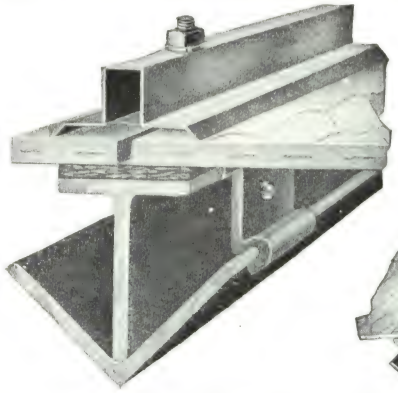
"Anchor-bar" skylights are recommended wherever overhead light is desired. Inquiries should state over-all length of outside of curb, bar length, pitch of skylight (5 in. to the foot, or more) and distance between intermediate purlins.

"Anchor Truss Bar" (Patent No. 1140909)

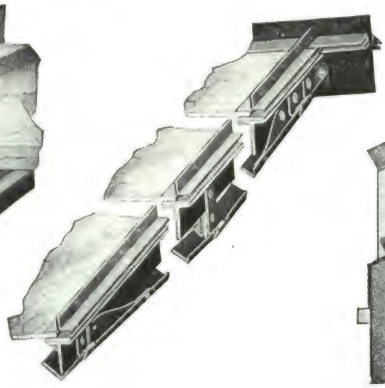
"Anchor Truss Bars" are used where bar length is more than 11 ft., unless intermediate purlins are provided. Truss bars are self-supporting for a bar length up to 15 ft. The saving effected in the steel frame support is far greater than the excess cost of truss bar construction. Details on application.

Notable Installations of "Anchor-bar" Skylights

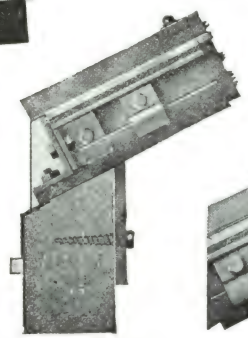
U. S. Treasury Annex, Washington, D. C.
U. S. Naval Hangar, Lakehurst, N. J.
General Electric Co., Lynn, Mass.
Gymnasium and Ball Cage, Middlesex School, Concord, Mass.
Republic Railway & Light Co., Lowellville, Ohio
Ford Service Stations, Cambridge, Mass.; Indianapolis, Ind.; Cincinnati, Ohio
El Paso Electric Co., El Paso, Tex.
New Departure Mfg. Co., Bristol and Meriden, Conn.
State Capitol, Augusta, Me.
Widener Library, Cambridge, Mass.
U. S. Post Offices, New Haven, Conn.; Ashtabula, Ohio; Brazil, Ind.
Colt Patent Fire Arms Co., Hartford, Conn.
Seamless Rubber Co., New Haven, Conn.



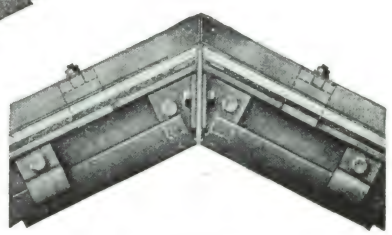
SECTION OF BAR, VAN NOORDEN "ANCHOR-BAR" SKYLIGHT



"ANCHOR TRUSS BAR"
For lengths between supports exceeding 10 ft.



Through Curb



Through Ridge

SECTIONS OF "ANCHOR-BAR" SKYLIGHTS

AMERICAN 3 WAY-LUXFER PRISM CO.

Manufacturers of Puttyless Skylights

13th Street and 55th Court
CICERO, ILL.
(Suburb of Chicago)

139-41 Spring Street
NEW YORK, N. Y.

For list of Branches and Representatives, see page ....

Products

3-Way Simplex Reinforced Concrete Skylight Construction.

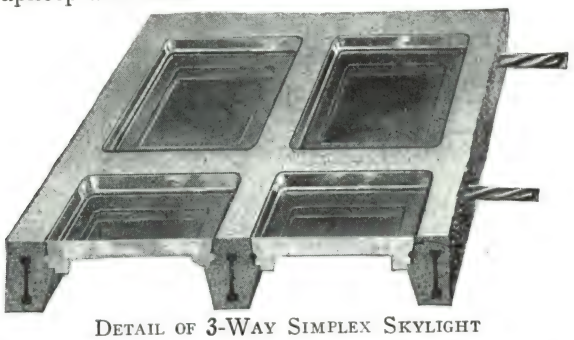
Steelead Skylight Construction.

Also manufacturers of Luxfer Skylight and Floor Light Construction.

For Prism Glass Construction, see pages 486-487.

3-Way Simplex Skylight Construction

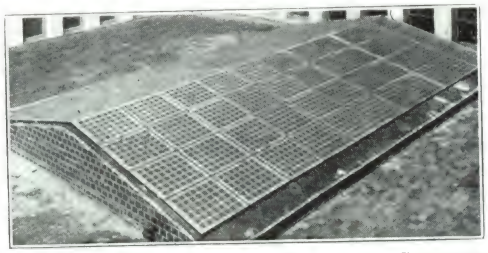
A double reinforced concrete skylight construction that combines the following advantages: great daylight area, great strength, is rustless and everlasting, requires no upkeep attention.



Detail of 3-Way Simplex Skylight

Made by the well-known 3-Way Simplex process in preformed slabs and finished on the job; sizes and shapes to conform to plans. Reinforcing is steel "I" bars punched and interlaced with deformed rods spaced 7⅜ in. on centers. Concrete is made of reground cement of which 97% must go through a 200-mesh screen, to make an absolutely waterproof, homogenous mass that will not slake and set after finishing and cause internal pressure to break the glass. The lenses are 6⅛ in. square, made of Lazalite glass which does not turn pink or purple under action of the elements. Each is tested under the polariscope for hidden stresses and strains and every defective one is discarded. Only absolutely perfect lenses are used. This, combined with the use of reground cement in the concrete, makes a skylight so free from faults that it never fails because of materials.

An outer surface of glass and concrete, perfectly smooth, and strong enough to be walked over. Carrying capacity, 400 lbs. per sq. ft. on a 6 ft. clear span. Never needs paint or putty. Glass broken by accident replaced without chipping the cement. We recommend installing 3-Way Simplex skylights in the gable or lean-to type skylights, or, if flat, raised on copings.



Example of 3-Way Simplex Skylight Construction
General Motors Building, Detroit, Mich.

Steelead Skylight Construction

An everlasting all-metal construction that embodies the points the architect, builder and owner have sought, namely:

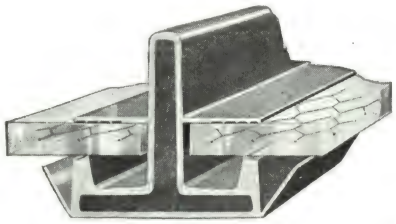
Everlasting—The heavy lead sheath does not rust or corrode. Not affected by fumes, smoke or weather; never needs paint.

Puttyless—Glass held on lead by lead.

Weatherproof—Glass held securely, solidly, with no chance for water, wind or dust to enter. All attaching bolts are underneath. No clips or clamps on outside.

Self-supporting—On spans up to 6 ft.

Steelead is a complete skylight construction, the basis of which is the Steelead bar. This Steelead bar is a steel "T" over which is extruded a seamless lead sheath of special design. This provides a lead seat for the glass, forming a drip gutter and a corrugated lead wing which is pressed down on the glass, holding it in place with a weatherproof contact. On the sides of the lead "heel" of the bars are formed wings which are opened into condensation gutters after the bars are set.



Cross Section of Steelead Skylight Bar

Ridge cap, flashings and gutter strips are all lead—impervious to the weather and never needing paint. When installing a Steelead skylight, all metal parts are placed and the glass can be set any time after other construction is completed.

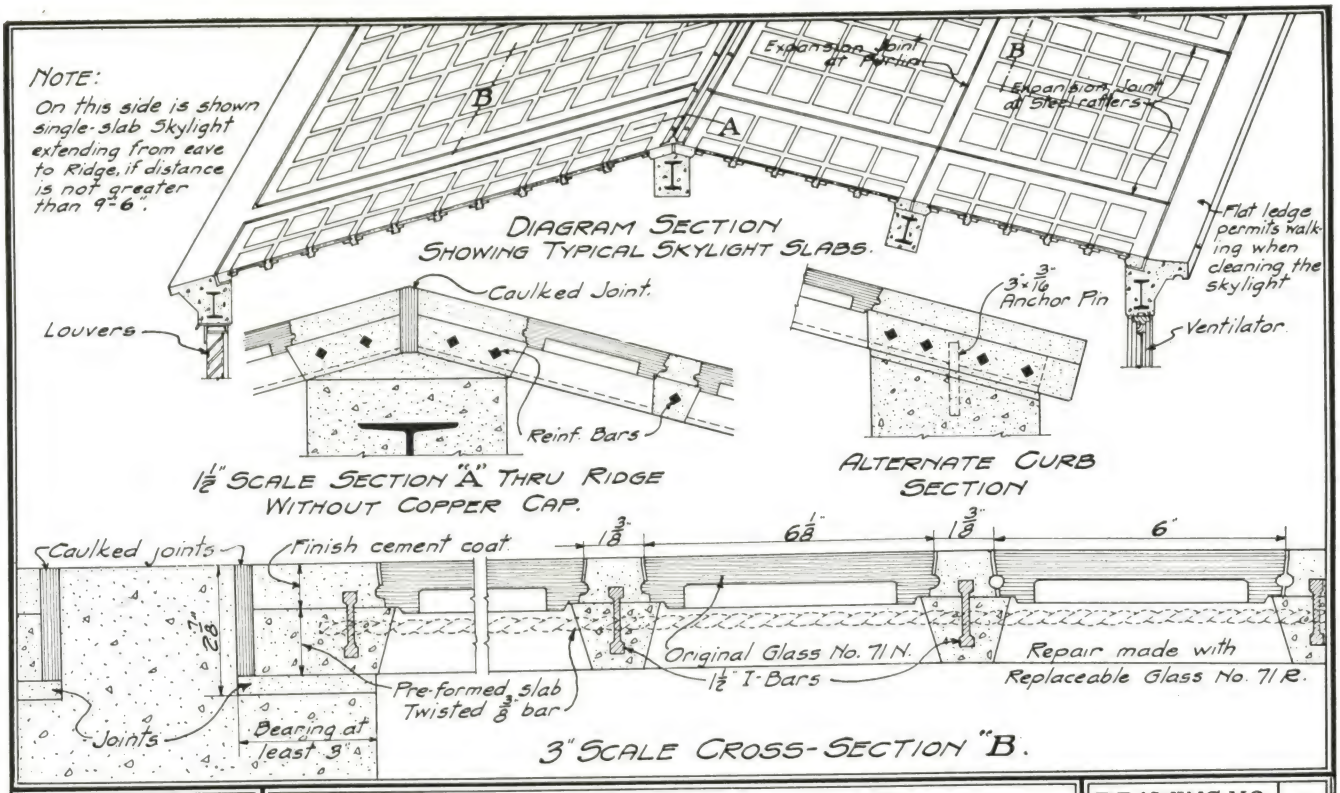
Steelead is far superior to the best copper construction at no greater cost.

Steelead can be installed by any sheet metal or iron worker. Glass replacement is fast and easy.

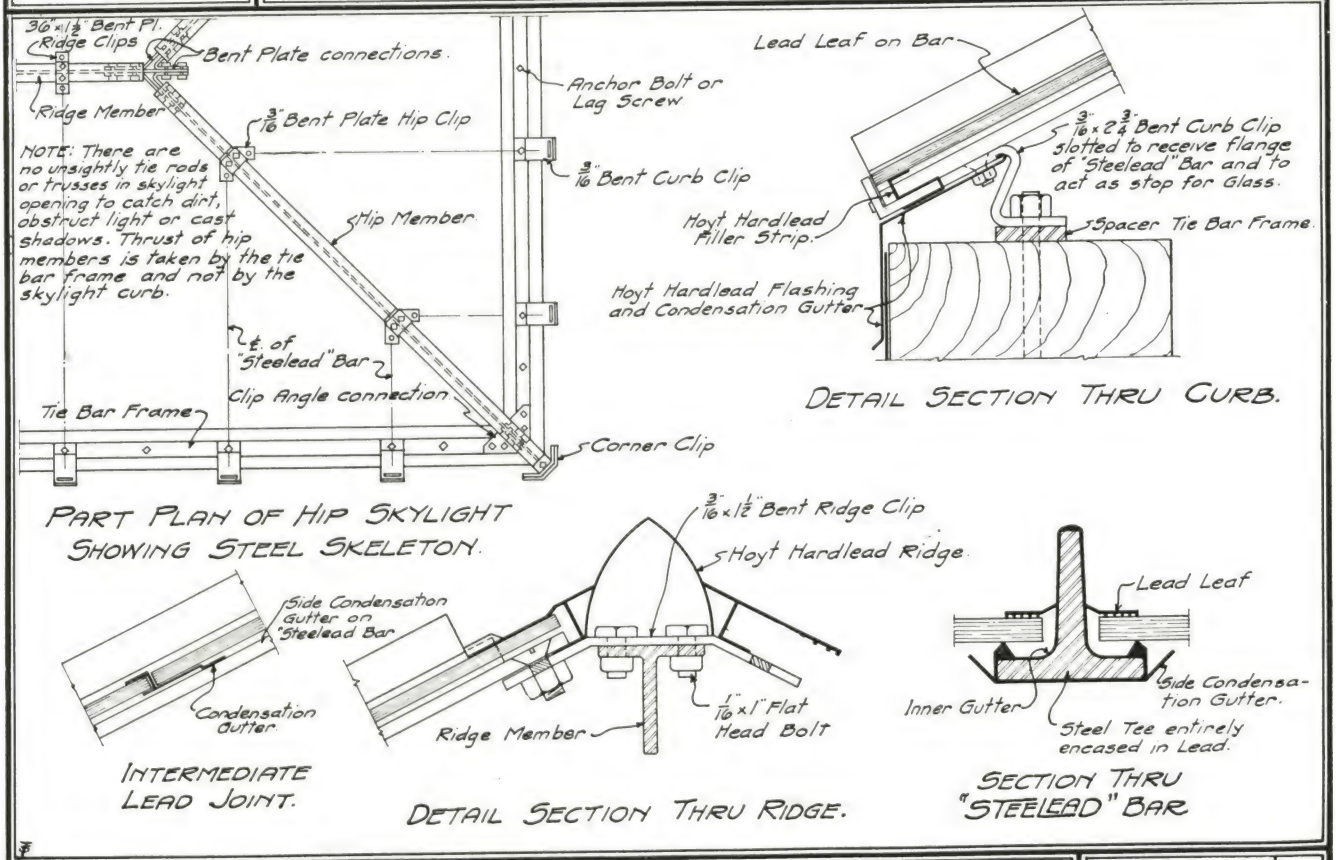
Steelead is the one skylight construction without a fault.

Example of Steelead Skylight Construction
Electrical Laboratory, University of Kansas, Lawrence, Kans.

Continued on next page



AMERICAN 3 WAY-LUXFER PRISM CO.	TYPICAL DETAILS OF 3-WAY SIMPLEX SKYLIGHT CONSTRUCTION	DRAWING NO. SCALE: ¼"-1½"&3" EQUALS 1'-0" 1



AMERICAN 3 WAY-LUXFER PRISM CO.	TYPICAL DETAILS OF "STEELEAD" SKYLIGHT CONSTRUCTION	DRAWING NO. SCALE: ½"-3"&6" EQUALS 1'-0" 2

ACME VENTILATOR CORPORATION

399 Atlantic Avenue
BOSTON, MASS.

Products

ACME AUTOMATIC ROTARY VENTILATOR (United States Patent No. 1202842; Dominion of Canada Patent No. 189715; United Kingdom of Great Britian and Ireland Patent No. 173650).

AIROUT AUTOMATIC BALL BEARING VENTILATOR. (Patent applied for.)

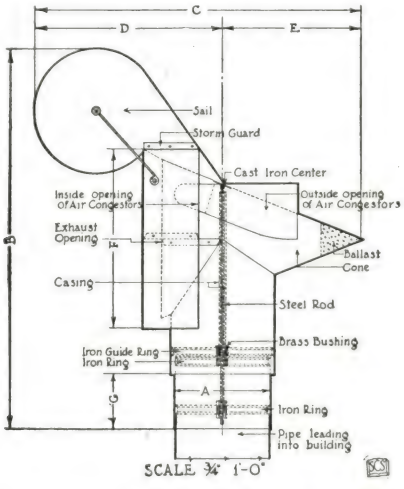
Acme Automatic Rotary Ventilator

The exceptional suction ability which Acme ventilators provide is attained by applying the principles that operate to take the greatest possible advantage of free air to produce suction.

It is, in common with several others, rotary type, and has the advantage of discharging in the wind direction. Its easy, noiseless and dependable operation is assured by its rigid mechanical construction, as shown in the detailed diagram.

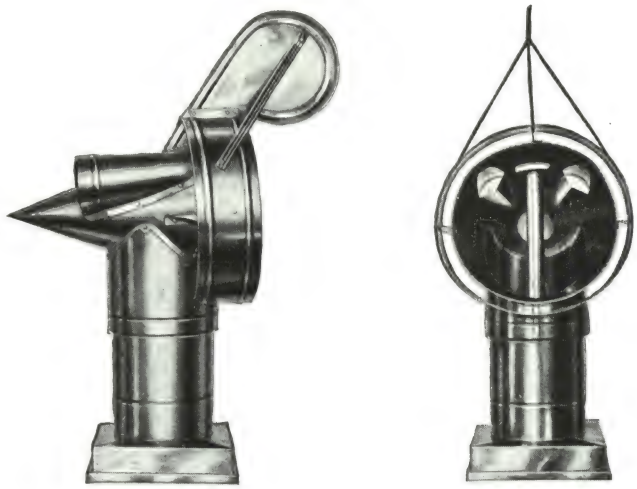
By its cone shape, the free air is arrested to the slightest possible degree and to whatever extent it is checked, the Acme by its construction turns to its advantage.

The pressure of the arrested air increases the velocity of the air that passes between the storm guard and the rim of the ventilator and through the air congestors. The effect of this is to provide a strong rim suction and a syphoning effect through the congestors. The streams of air that pass through the congestors are located so that they do not in any sense interfere with the passage of exhaust air through the orifice of the ventilator, but, on the contrary, break up eddies and increase the velocity of air through the ventilator.



DETAIL OF ACME AUTOMATIC ROTARY VENTILATOR

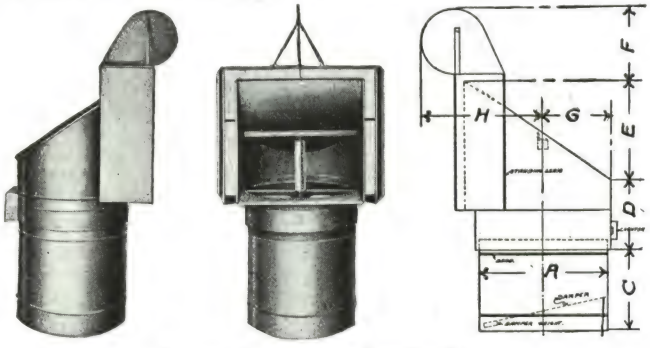
Size, in.	Dimensions, in.						
	A	B	C	D	E	F	G
4	4	16	13¾	7¾	6	7½	3¼
6	6	24	20½	11¾	8¾	11¼	5
8	8	32	27½	15¾	11¾	15	6½
10	10	40	34¼	19½	14¾	18¾	8½
12	12	48	41¼	23¾	17½	22½	10
14	14	56	48	27½	20½	26¼	11½
16	16	64	55	31½	23½	30	13
18	18	72	61¾	35¼	26½	33¾	15
20	20	80	68¾	39¼	29½	37½	17½
22	22	88	75½	43¼	32¼	41¼	18¼
24	24	96	82½	47¼	35¼	45	20
30	30	120	103	59	44	56¼	25



ACME AUTOMATIC ROTARY VENTILATOR

Size, in.	Cap., cu. ft. per hour	Galvanized Iron Ventilators			Copper Ventilators		
		Gauge of metal	Weight, lbs.	Price	Weight of metal, oz.	Weight, lbs.	Price
4	5600	26	5	$12.00	16	5½	$18.25
6	12169	26	10	16.00	16	11	25.40
8	22418	26	16½	20.00	16	18	32.50
10	35028	26	29½	24.00	16	32	39.70
12	50441	26	40	29.00	16	44	47.75
14	68656	26	58	36.00	16 and 18	63	62.30
16	89673	26	73	45.00	16 and 18	80	75.00
18	113493	24	109	60.00	18	120	99.40
20	140115	22 and 24	140	72.00	18	154	115.75
22	175143	22	175	88.00	20	192	143.00
24	201765	22	217	112.00	20	238	172.00
30	314464	20	450	280.00	22	490	394.00

NOTE—The above exhaust capacities should be compared with other ventilators. These tests were made with actual outdoor working conditions, and are not the result of laboratory tests. Velocity of wind at time of tests, 6½ miles per hour. Temperature inside, 68°; outside 50°. With higher temperature inside building and lower temperature outside, capacities would be greatly increased.



AIROUT AUTOMATIC ROTARY BALL BEARING VENTILATOR

DIMENSIONS OF AIROUT VENTILATORS

Size	Dimensions, in.							Gauge of metal	Oz. copper	Net wgt., lbs.	Cu. ft. per min.
	A	C	D	E	F	G	H				
8	8	5	4⅜	6⅜	4⅝	4¼	7	24	18	12	160
10	10	6¼	5⅜	8	5⅞	5¼	8¾	24	18	15	250
12	12	7½	6½	9½	7	6¼	10½	24	18	25	350
14	14	8¾	7½	11	8⅛	7¼	12¼	24	18	38	460
16	16	10	8⅝	12½	9⅜	8¾	14	24	18	50	625
18	18	11¼	9¾	14¼	10½	9⅜	15¾	24	18	56	825
20	20	12½	10¾	15⅞	11⅝	10½	17½	24	18	62	1000
24	24	15	13	19	14	12½	21	24	18	105	1375
30	30	18¾	16¼	23¾	17½	15½	26	22	20	150	2100
36	36	22½	19½	28½	21	18⅞	31½	22	24	200	3200
42	42	26½	22⅞	33¼	24½	22	37	20	26	280	4250
48	48	30	26	38	28	25	42	20	26	475	5550
54	54	34	29	42¾	31½	28	47	20	28	650	6850
60	60	37½	32½	47½	35	31	52½	20	28	750	8575

AREX COMPANY

Industrial Ventilating Engineers

TELEPHONE
FRANKLIN 5453

1598 Conway Building
CHICAGO, ILL.

BRANCH OFFICES IN PRINCIPAL CITIES

FACTORIES
SOUTH GARY, IND.
PHILADELPHIA, PA.
BRANTFORD, ONT., CAN.

Product

AREX ORIGINAL SIPHONAGE ROOF VENTILATOR.

Also manufacturers of Arin Antidraft Window Ventilators.

Arex Siphonage Roof Ventilator

This ventilator assures, by natural means, constant, positive, uniform ventilation for any kind of buildings—Mills, factories, foundries, warehouses, power plants, train sheds, etc.

Foul air, warm air, fumes, gases, vapors, steam and smoke quickly and completely removed. Passing wind plays upon the siphons so as to accelerate the outflow of foul air from interior of building, but it permits none of the outside wind to enter the ventilator. Every opening an outlet. Of galvanized iron, ingot or Toncan metal, cold rolled copper or any other special metal in any size or gage.

"The Power Fan's Only Rival."

Advantages

Down-drafts impossible; constant, positive ventilation assured; 300% greater air exhaust obtained; half the number of ventilators required. No cost for maintenance or operation; every joint securely riveted; no solder used; no movable parts; the whole is one strong, solid piece.

Approved by leading architects and engineers; also by government officials.

Standard Specifications for Arex Ventilators

All ventilators to be Siphonage Type of galvanized metal or copper. Ventilators to have an inwardly bent indentation at the upper end of the main pipe. Each indentation covered by a siphon of conical form, forming therewith air channels open at the top and bottom; a frusto conical shield, or skirt, to surround these siphons, forming additional air channels. This shield to extend above the top of the pipe. Top to be of double conical construction, mounted, spaced above the top of the pipe. A storm band to surround the space between cone top and end of shield, or skirt manufactured by the AREX COMPANY, Chicago, Ill.

Co-operative Service

Installations shown below are standard; special bases and pipe connections to order. Submit sketch.

The Arex Engineering Department gladly offers expert advice on any ventilating problem without obligation.

AREX ORIGINAL SIPHONAGE VENTILATOR (PATENTED)

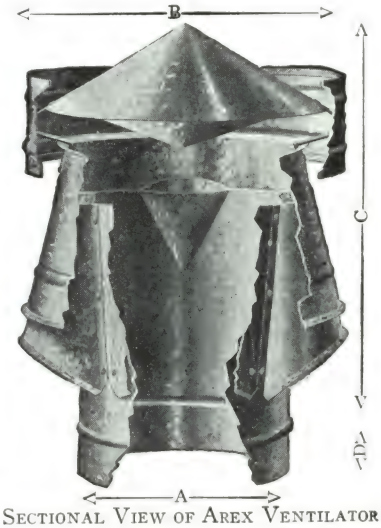
AREX ORIGINAL SIPHONAGE VENTILATOR—GALVANIZED

Principal dimensions, in.				Area sq. in.	Exhaust per hour, cu. ft.	App. shipping, weight, lbs.	Gage of metal	Price, f.o.b. factories	
A	B	C	D					Dampers	Ventilators
6	9	12	1¼	28	9425	7	26	$2.40	$10.00
7	10½	14	1½	38	12828	11½	26	2.60	11.00
8	12	16	1¾	50	16755	14	26	2.80	12.00
9	13½	18	2	64	21206	16¾	26	3.00	13.00
10	15	20	2¼	79	26180	20	24	3.60	14.00
12	18	24	2½	113	37699	28	24	4.20	16.00
14	21	28	2¾	154	51313	38	24	4.80	18.00
16	24	32	3	201	67021	54	24	5.40	22.00
18	27	36	3¼	254	84823	68	24	6.00	26.00
20	30	40	3½	314	104720	93	22	6.80	32.00
22	33	44	3¾	380	126711	108	22	7.60	38.00
24	36	48	4	452	140796	130	22	8.40	44.00
26	39	52	4¼	531	176976	155	22	9.20	52.00
28	42	56	4½	616	205251	186	22	10.00	60.00
30	45	60	4¾	707	235619	225	20	11.00	72.00
36	54	72	5	1018	339293	405	20	14.00	100.00
42	63	84	5¼	1385	461813	475	20	17.00	140.00
48	72	96	5½	1810	603187	620	20	20.00	190.00
54	81	108	5¾	2290	763407	890	20	24.00	260.00
60	90	120	6	2827	942477	910	18–20	30.00	350.00

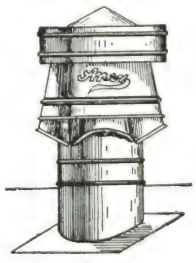
Prices of larger sizes and ventilators made of ingot iron, Toncan metal, copper or any other special metal, quoted on application.

These prices do not include bases and condensation arresters. Write for prices of these items.

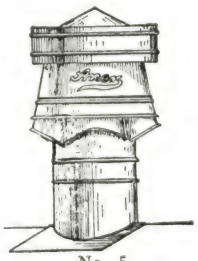
Immediate shipment from large stock always on hand from either of our three factories located at Gary, Ind., Philadelphia, Pa., and Brantford, Ont., Can.



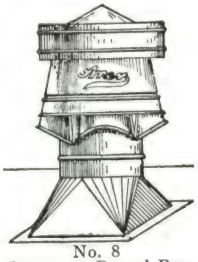
SECTIONAL VIEW OF AREX VENTILATOR
Showing siphonage system and extraordinary outlet for escape of air



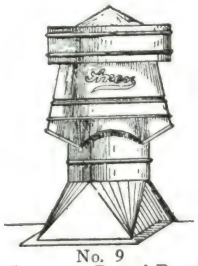
No. 3
Round Base for Slant Roof



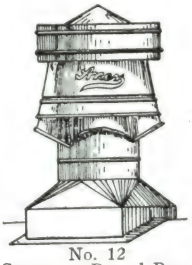
No. 5
Round Base for Gable Roof



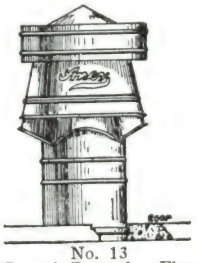
No. 8
Square to Round Base for Slant Roof



No. 9
Square to Round Base for Gable Roof



No. 12
Square to Round Base with Shoulder for Gable Roof



No. 13
Round Base for Flat Concrete Roof with Angle Iron Ring at Bottom

TYPICAL STANDARD INSTALLATIONS OF AREX ORIGINAL SIPHONAGE VENTILATORS

AMERICAN LARSON VENTILATING CO.

Manufacturers of Revolving Suction Ventilators

PITTSBURGH, PA.

Product

AMERICAN-LARSON REVOLVING SUCTION VENTILATORS.

Description

This ventilator consists of a pivoted elbow cowl having its mouth inclined in a slightly upward direction; a cone shaped tube, with its axis parallel to the line of discharge, is inserted in the back of the cowl.

Features

(1) Vane firmly riveted to top.

(2) Vane reinforcement rods heavily galvanized.

(3) Spindle welded to reinforcing plate.

(4) Heavy standing seams which add strength and rigidity.

(5) Steel center spindle coated with rust resisting paint.

(6) Stabilizing rings on both top and base which give concentric action, making top and rod pivot as one.

(7) Dustproof and rustproof ball bearing of best quality which insures free and noiseless pivot action.

(8) Suspension spider is weather protected and holds step bearing rigid.

(9) Graphite step bearing needs no lubrication or attention.

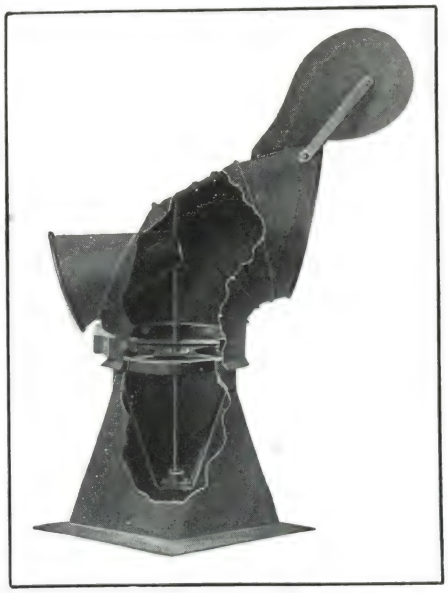
(10) Hardened steel pivot point provides against friction.

(11) Vane keeps ejector presented to outside air currents, prevents backdraft and makes ventilator stormproof and dustproof.

(12) Unrestricted area permits easy discharge without friction.

(13) Mouth weather protected, offering unrestricted area for exhaust.

(14) Ejector tube is an exclusive patented feature. The air currents passing through create a suction that makes this the most efficient ventilator.



THE AMERICAN LARSON VENTILATOR

(15) Direction of outside air current through the ejector.

(16) Axis of ejector in line with exhaust which is always upward.

(17) Line of exhaust upwards offering no resistance to upward draft.

(18) Easily rotating design of spindle and ball bearings and made of best materials.

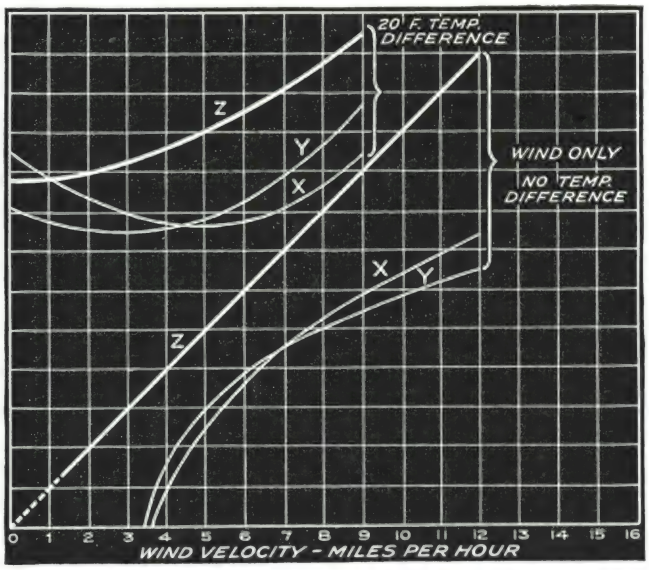
(19) Design of working parts increases maximum efficiency.

(20) Noiseless pivoting—is foolproof and requires no attention.

Actual Discharge vs. Rated Capacity

A large corporation (whose name may be had upon request) employed Professor Trinks of the Carnegie Institute of Technology of Pittsburgh, in 1921, to carry on a series of tests to determine the relative merits of the three most widely used ventilators on the market.

The results of these tests are shown on the graphic chart below. Z represents the American-Larson Ventilator, Y a competitive make of the rotary type, and X a stationary ventilator of the siphon type—all were of the same throat size diameter.



GRAPHIC CHART OF TESTS MADE AT CARNEGIE INSTITUTE OF TECHNOLOGY

The official report of the Institute says, in part: "The comparison shows that the American-Larson is far superior to both types at all wind velocities. At very low velocities of wind, it still ventilates while the other types do not move any air. Similarly, the American-Larson ventilator utilizes wind to increase the effect of temperature differences, while in the other types a gentle breeze actually diminished the ventilating effect."

When drawing up specifications, and when ordering, be sure that you pay for actual (not rated) discharge capacities.

Partial List of Prominent Installations and Users

American Sugar Refining Company, Baltimore, Md.
Baldwin Locomotive Works, Philadelphia, Pa.
Brown & Sharpe Mfg. Co., Providence, R. I.
Buffalo, Rochester & Pittsburgh Ry., Rochester, N. Y.
Clinton Wire Cloth Co., Clinton, Mass.
Duquesne Light Company, Pittsburgh, Pa.
Edison Storage Battery Co., New York, N. Y.
Erie Malleable Iron Works, Erie, Pa.
General Electric Co., Schenectady, N. Y.
Hyatt Roller Bearing Co., Detroit, Mich.
National Lock Washer Co., Newark, N. J.
Navarre Hotel, Newark, N. J.
National Tube Co., Pittsburgh, Pa.
New York & Pennsylvania Co., Johnsonburg, Pa.
Pennsylvania R. R. Co., Trenton Shops
Shawmut Paving Brick Co., St. Marys, Pa.
Standard Oil Co., Eagloil Works, Jersey City, N. J.
Turner Construction Co., New York, N. Y.
United States Metal Products Co., San Francisco, Cal.
United States Navy Yard, Brooklyn, N. Y.

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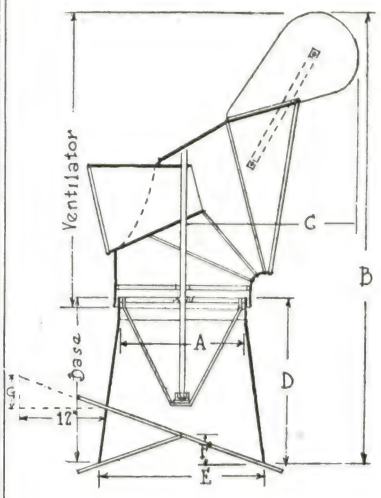
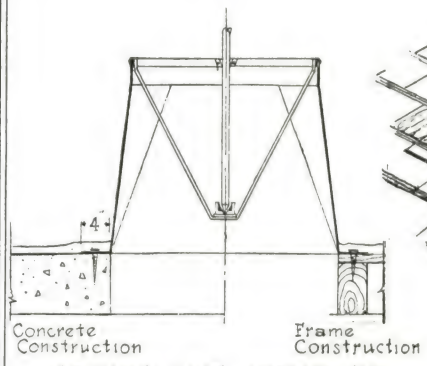


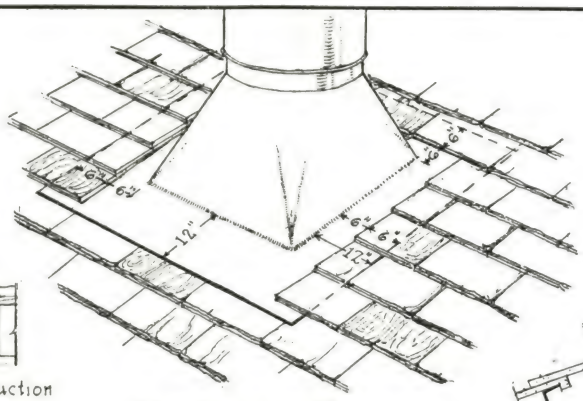
CAPACITIES, DIMENSIONS, GAUGES, PRICES, & WEIGHTS OF VENTILATORS

Discharge in cu. ft. per hour Five miles Velocity	Diam. A in inches	B in.	C in.	D in.	E in	Gauge Galv iron	List Price, Ventilator	List Price, Damper	Net weight lbs.	Crated weight lbs.
11,550	8	27 13/16	10 21/32	10 15/64	10 13/64	24	$ 18.00	$ 1.50	12	26
17,820	10	34 51/64	13 21/64	12 51/64	12 51/64	24	22.00	2 15	18	35
24,800	12	41 3/4	16	13 23/64	13 23/64	24	30 00	2.90	26	46
34,980	14	48 23/32	18 21/32	17 59/64	17 59/64	24	35.00	3.30	32	57
46,200	16	55 11/16	21 21/64	20 31/64	20 31/64	24	40.00	3.80	39	70
58,410	18	62 41/64	24	21 3/64	21 3/64	24	45.00	4.30	49	85
71,940	20	69 33/64	26 21/32	25 39/64	25 39/64	22	50.00	4.80	68	115
103,620	24	83 33/64	32	30 23/32	30 23/32	22	60.00	5.80	92	145
161,700	30	104 3/8	40	38 7/16	38 7/16	20	75.00	7 15	146	206
232,890	36	125 9/32	48	46 5/64	46 5/64	20	110.00	9.30	225	325
287,760	40	139 13/64	53 21/64	51 13/64	51 13/64	20	140 00	11 50	282	412
412,500	48	167 3/64	64	61 7/16	61 7/16	20	170.00	17 00	390	560
524,700	54	187 59/64	72	63 1/8	63 1/8	18	220.00	20.00	620	820
646,800	60	208 47/64	80	76 7/8	76 7/8	18	300.00	25.00	790	1025
782,100	66	229 11/16	88	84 31/64	84 31/64	18	375.00	35 00	930	1215

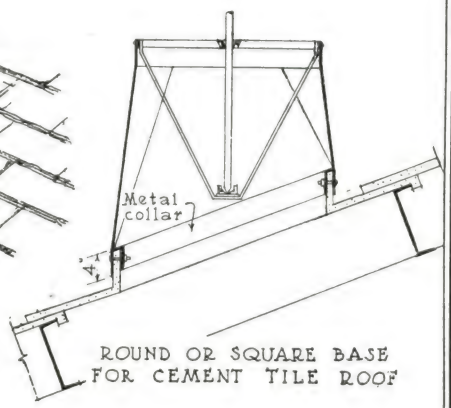
NOTE: In ordering, dimension A is required, also pitch of roof, F or G



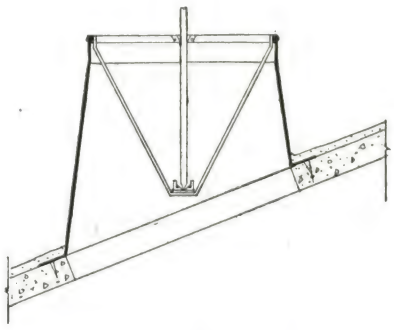
SQUARE BASE APPLIED TO FLAT ROOF CONSTRUCTION



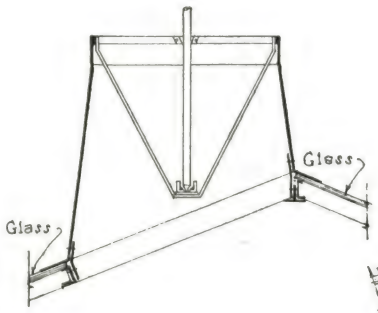
SQUARE BASE & FLASHING FOR PITCHED SLATE ROOF



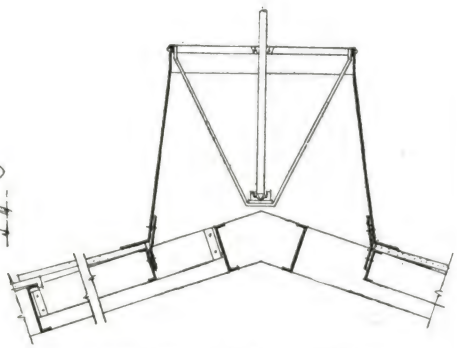
ROUND OR SQUARE BASE FOR CEMENT TILE ROOF



SQUARE BASE APPLIED TO PITCHED CONCRETE OR GYPSUM TYPE OF CONSTRUCTION



SQUARE BASE APPLIED TO RIGHT OR LEFT OF RIDGE OF METAL SKYLIGHT CONSTRUCTION



SQUARE BASE APPLIED TO RIDGE FOR TILE CONSTRUCTION

DETAILS OF APPLICATION OF BASES TO VARIOUS TYPES OF ROOFS

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DATA & DIMENSIONS OF VENTILATORS & BASES AMERICAN-LARSON VENTILATORS	NOT DRAWN TO SCALE DATE: JUL '22	DRWG 1

THE BURT MANUFACTURING COMPANY

Manufacturers of Roof Ventilators

600 Main Street

AKRON, OHIO

PITTSBURGH OFFICE, Diamond Bank Building
MONTREAL, CAN., Geo. W. Reed & Co., 84 and 87 St. Antoine Street

Products

"Burt" Roof Ventilator: Sliding Sleeve Damper in Glass and Metal Top; Double Damper, Fan, Sliding Cone Damper; and Ball Bearing Revolving, Square and Rectangular.

Co-operative Service

The engineering department of this organization will gladly and expeditiously co-operate with architects, engineers, contractors and others, in the selection of proper types and sizes of ventilators to suit particular conditions and requirements. Blue prints of all types will be furnished on application.

Ventilators for Power Plants and Industrial Buildings

Every unventilated boiler house is dark and dingy, and its atmosphere is usually saturated with gases and fine particles of coal dust; but when equipped with the "Burt" glass top ventilators, the result is thorough ventilation and much improved light. During warm weather, when the temperature of boiler rooms is likely to be excessively high, it can be greatly modified by using the "Burt" ventilator.

"Burt" Sliding Sleeve Damper Ventilator

General Description —The "Burt" ventilator is no mere experiment, as it has been on the market for about sixteen years and many of the largest manufacturing concerns in the country have installed these ventilators.

The "Burt" is manufactured in any size required. The regular patterns are built throughout of galvanized iron, of suitable weight for each size, and every ventilator is so strongly braced (steel bands of extra heavy weight) and riveted that it will withstand any strain to which it is liable to be subjected.

The "Burt" is made with a metal top instead of a glass top, when required. With the exception of the top, both styles are precisely alike in construction and operation; but the metal top style is a ventilator solely, and does not admit light. The sliding sleeve damper is furnished in all metal top ventilators, the same as in the glass top style.

Practical tests have clearly shown that the sliding sleeve damper is a great improvement over the flat damper. The sliding sleeve damper, having no flat surface, does not collect dust or refuse, to be shaken off into the buildings, as is the case with other dampers, and it maintains its position wherever it is set, while the flat damper is kept constantly in motion by the currents of air and hence requires frequent adjustment. The sliding sleeve damper leaves the air shaft open and unobstructed, consequently the "pulling power" is greater than where the flat damper is used, and for this reason a smaller number of Burt ventilators than of any other make is necessary to ventilate any building.

It is a combination ventilator and skylight in which the light is never obscured or shut out. The air shaft is always entirely unobstructed, and the air current is never deflected downward.

Those who do not desire a glass top ventilator will find the metal top ventilator a great improvement over every make in which the flat damper is used. The Burt ventilator is constructed on scientific principles, and in any case in which the location of ventilators is such that dampers are not required, it will be found that the "Burt" is equal to any ventilator made.

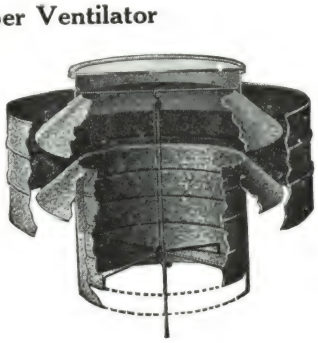


Fig. 200-B
Glass Top

Fig. 210-B
Metal Top

SECTIONAL VIEWS OF "BURT" VENTILATORS

Diameters, in.		Gage of iron	Height without base, in.		Length air shaft from bottom of wind-shield, in.	Net weight without crating, lbs.		Area of diameter in. sq. in.	Price
Neck	Outer rim or band		Glass top	Metal top		Metal top	Glass top		
12	22	22	14	17	4¼	17	20	113.10	$8.00
14	24	22	15	17½	4¼	20	24	153.94	12.00
16	26	22	15½	19	5	24	30	201.06	15.00
18	29	20	16	21	5½	28	34	254.47	19.00
20	32	20	18	23	5½	33	42	314.16	23.00
24	38	20	22	26	6	45	56	452.39	27.00
30	46	18	24	30	6	90	105	706.85	38.00
36	54	18	27	36	8	130	155	1017.88	57.00
40	64	18	33	40	10	175	200	1256.00	75.00
42	68	18	34	42	10	190	225	1386.00	81.00
48	78	18	36	46	11	300	320	1809.00	90.00
54	86	18	40	51	14	350	400	2390.00	105.00
60	94	16	43	54	12½	430	480	2827.00	120.00
66	102	16	46	55	15½	500	550	3456.00	135.00
72	110	16	51	66	15½	560	610	4071.00	150.00

Prices f. o. b. Akron, Ohio, and include sliding sleeve damper. Ventilator bases are charged for extra, for which prices will be quoted on receipt of specifications. Operating rope or chain not furnished.

Construction — The top is heavy wired glass, which is set in a patented notched rim and made absolutely watertight by means of waterproof cement. It is guaranteed against leaks.

A trough or lip (patented) is placed below the glass top, into which runs any condensed water which may gather on the glass, making it impossible for water to drop down into the building. A trough is also placed in the lower part of the base so as to collect all condensation which might possibly form on the air shaft.

Where the glass top feature is ordered, an especially designed band or notched rim (patented) is furnished, to fasten the glass, so that on large sizes the glass can be shipped separately and easily

Continued on next page

placed in position by any first-class workman. If the glass is broken in any way, a new glass can be placed in position without taking down the ventilator. Ventilator is so constructed that no water will stand on glass and it is guaranteed absolutely stormproof.

The patented damper used on all "Burt" ventilators consists of a sliding sleeve. It is operated from below by means of a cord and pulley. Each "Burt" ventilator is fitted with a patented clip so that whenever it is necessary to adjust the damper it can be set in any position and is held permanently, thus it is not necessary to fasten the cord to a nail, hook, post, or counterbalance the same. Where the common flat damper is used, it has always been necessary to fasten the cord to some convenient place, and this quite often interferes with the operation of machinery, but where the "Burt" ventilator is used, this is done away with entirely.

"Burt" Double Damper Ventilator (Patented)

Designed especially for weave sheds. It is being adopted by two-thirds of the new textile mills now being erected in the Eastern States. When condensation is very severe, lower damper acts as a drip pan and collects moisture, and later this evaporates. Lower drip pan is placed below bottom damper as a safety device. The condensation trough in the air shaft collects a great deal of moisture and passes this to outside of ventilator.

Fig. 300-V
"Burt" Double Damper Ventilator
Open

"Burt" Sliding Cone Damper Ventilator

This ventilator possesses the merits of a good ventilator and at the same time has the important feature of closing automatically in case of fire. It is constructed with fusible link connection for automatic closing when fire occurs, meeting all of the requirements of the Underwriters' Association.

Raising and Lowering Device—Patented. Simple in construction and positive in action. This company guarantees damper will not stick or bind. Cone damper moves up and down on center rod, and can be held in any position by means of patented clip, so that it is not necessary to fasten cord or rope to nail, hook or post.

Made only with metal tops; all sizes.

Fig. 500-X
Sectional View "Burt" Sliding Cone Damper Ventilator
With cone damper open

"Burt" Revolving Ball Bearing Ventilator

A late development in the "Burt" line of ventilators—neat, well constructed and highly effective. It is fitted with two sets of high grade ball bearings, and is positively guaranteed not to stick or bind.

Its distinctive construction causes exterior air currents to pass not only over top and sides of the ventilator, but directly through ventilator. This creates a partial vacuum and greatly increases the pulling power of the ventilator in expelling foul air from within. This same construction also has a tendency to hold the ventilator steady with the wind, thus preventing a continuous whirling motion, which is a faulty feature to be found in some types of revolving ventilators.

Each ventilator is fully tested before shipment, thus insuring perfect balance. Dampers are not put in revolving ventilators but if so specified where bases are furnished by this company, they will be equipped with dampers without charge; if desired, dampers can be of the fire retarding type which automatically closes in case of fire.

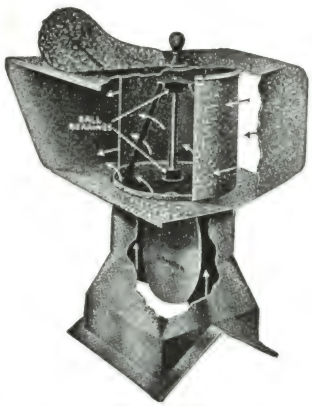


Fig. 800-Z
Sectional View, "Burt" Revolving Ventilator

"Burt" Fan Ventilator

Designed only for the most difficult conditions and, at slight expense, will effectively and quickly remove excessive fumes and odors from blacksmith shops, dye houses, foundries, rubber factories, theaters, laundries and similar buildings. More economical than the average blower system. Fan has a speed of 350 to 400 r.p.m. and is operated either from line shafting or by motor pulley drive or direct connected. Power required to operate motor about ¼ h.p. to ½ h.p. In case of fire, fusible links will break, causing damper to drop and shut off draft.

Three stock sizes: 30-in., 36-in., and 48-in.; can be made in any required size above 30 in.

Blue prints on application showing different ways of installing.

Fig. 650-Z
Sectional View, "Burt" Fan Ventilator

Ordering, etc.

In ordering bases, always furnish sketch showing pitch of roof and location of ventilators (whether on ridge or slope) and whether round or square.

Ventilator bases are charged for extra; figures will be quoted on receipt of specifications.

Prices on ventilators made of copper, Toncan, American ingot iron, zinc, or any other material desired will be furnished on application.

Guarantee

This company guarantees its ventilators against defects in workmanship and material, and will replace free of charge f. o. b. factory any ventilator proving so defective.

COPPER VENTILATORS

COPPER AND BRASS RESEARCH ASSOCIATION
25 Broadway
NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010

Copper Roof Ventilators for Permanence

Durability, efficiency, strength and freedom from upkeep expense are the important features to consider when specifying roof ventilators.

Roof ventilators are subjected to severe service conditions—not only must they resist the unceasing action of the elements on the outside, but also the action of smoke, gases, acid fumes and condensation on the inside. On account of their exposed position roof ventilators should be made of copper.

Roof ventilators made of corrodible metals quickly rust and are consigned to the junk heap. They require frequent painting in order to prolong their life, and no matter how often they are painted or coated, they can not escape the ravages of rust. Moreover, there are surfaces of roof ventilators that are inaccessible and therefore can not be painted.

Many metals have been used in roof ventilators in the effort to prevent corrosion, but severe tests have established the fact that copper is the most durable, most practicable, and ultimately the least expensive metal for this purpose.

Copper will not rust or disintegrate; it never requires painting or other treatment to preserve its life and is impervious to the action of the weather.

For non-corrosive properties, long life, attractive appearance, freedom from leaks, repairs and renewals, high salvage value, strength and economical features, copper roof ventilators are unexcelled.

Copper Roof Ventilators Eventually—Why Not Copper in the First Place

Copper roof ventilators, on account of their non-corrodible properties, will give permanently dependable service.

Ventilators made of corrosive metals are certain to rust—then follow incessant painting, repairs and inevitable renewals.

By specifying copper ventilators in the first place, all this trouble and expense are avoided.

Copper ventilators are cheaper because you pay for them only once.

Superior Appearance of Copper Ventilators

Copper roof ventilators are permanently attractive in appearance—they add beauty, dignity and character wherever used.

Ventilators made of corrodible metals become coated with unsightly rust, and even though painted they can not compare in appearance with copper ventilators.

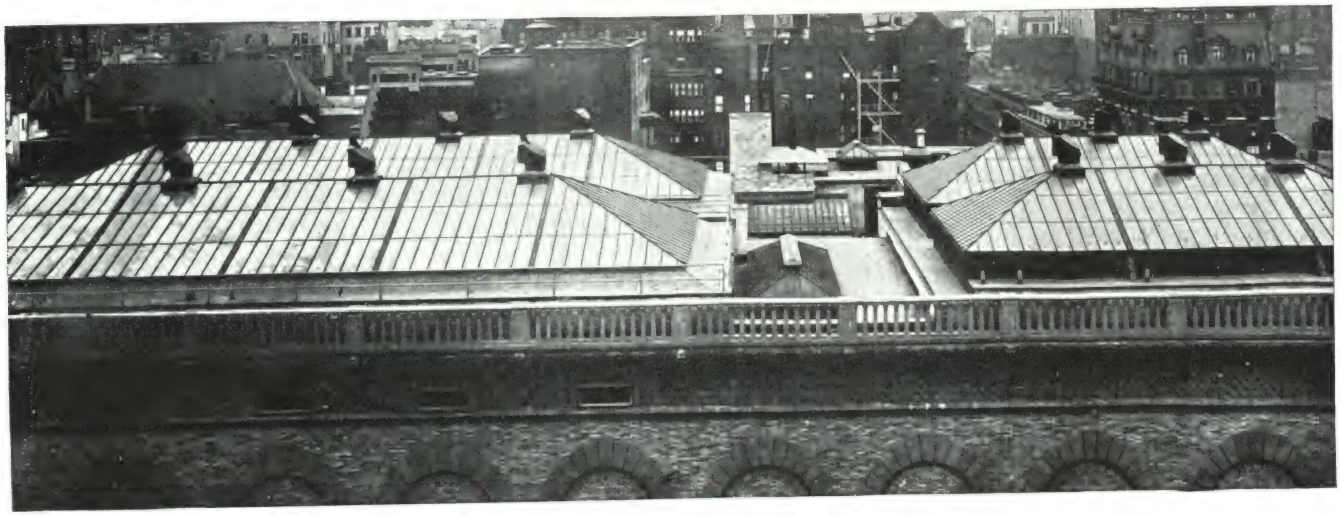
Specify Solid Copper

Metals containing copper in small quantities or coated with copper, are not proof against corrosion.

Provide permanence and expense-proof service by specifying *solid* copper ventilators. Otherwise, no matter how carefully guarded against, nature will have its way and the result is rust, ruin and replacement.

Salvage Value of Copper

Copper has a higher salvage value than any other metal used in building operations. Its indestructibility permits it to be salvaged and sold even after it has given many years of service.



COPPER VENTILATORS AND SKYLIGHTS ON TENNIS AND RACKET CLUB, NEW YORK, N. Y.

PAUL DICKINSON INCORPORATED

Ventilators, Scuppers and Exhaust Heads

TELEPHONE
LaFayette 1863

3324-3354 South Artesian Avenue
CHICAGO, ILL

BRANCHES
BALTIMORE, MD. ST. LOUIS, MO.

Products

"Æolus" Roof Ventilators
Cast Iron Scuppers.
Cast Iron Exhaust Heads.

"Æolus" Roof Ventilators

Adaptable to buildings of every type. Made of materials to suit the requirements.

Easily eliminates foul, dust-laden air, gas, disagreeable odors, smoke, fumes or heat; substituting in their stead pure, clean air.

"Æolus" Roof Ventilator

Construction—This is the original American siphon type ventilator pulling at least 10% more air, by actual test, than any other of similar construction.

The six flues and six intermediary valleys surrounding the induction pipe, catch the air currents from every direction, deflecting them upward with increased velocity.

The ventilator can be made of galvanized steel, Armco Iron, Toncon Metal, copper or light gray cast iron to meet requirements. Bases and dampers are furnished when desired.

Ventilators above the 30-in. size are shipped knocked down to facilitate their handling.

The construction of the rain cap makes them absolutely proof against rain and dust, yet does not interfere in any way with the ready entrance or exit of the air.

No Maintenance Expense—Once "Æolus" ventilators are installed expense practically ceases. There are no mechanical parts to get out of order. Strong and sturdy they operate constantly and effectively.

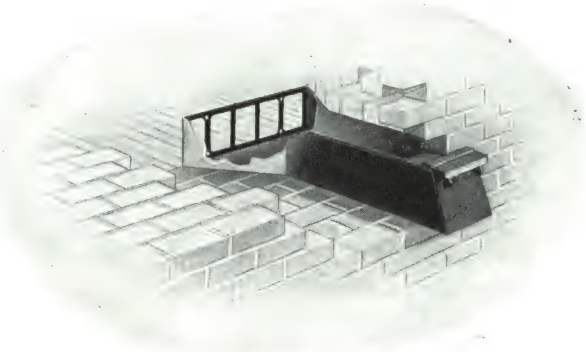
Exhaust Capacities—We invite tests of air capacity whenever and wherever installations of roof ventilators are contemplated.

Elaborate figures are published constantly purporting to be the results of tests that have been made in the past, but we prefer to rely upon actual—on the job—comparisons of findings. This company is equipped to conduct tests of this character upon short notice—and with absolutely no cost to you.

Cast Iron Scuppers

Dickinson's scuppers are constructed of light gray cast iron. They are simple, yet effective, durable and easily installed. The portion which protrudes beyond the wall is covered by a hood which immediately opens when the pressure of water from the inside strikes it. The inner opening is equipped with a protective grating.

The Board of Insurance Underwriters recognize the value of scuppers and make due allowance for them when applied to a fireproof building.

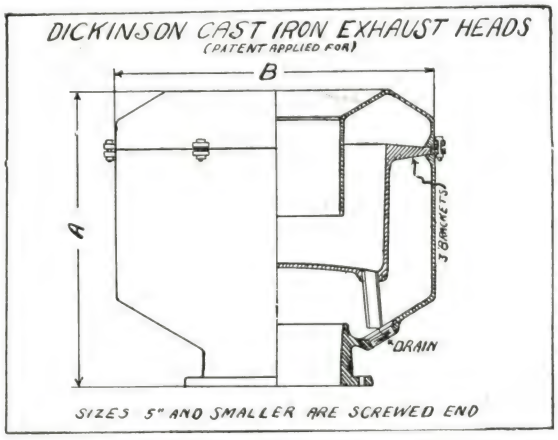


Cast Iron Scupper

Cast Iron Exhaust Heads

Dickinson exhaust heads are constructed entirely of cast iron and will last as long as the average building. They are simple in design, yet none the less effective in operation.

This exhaust head is offered today in a variety of sizes.



Detail Dickinson Cast Iron Exhaust Head

Quotations and Shipments

Requests for quotations promptly handled.
Shipments made to meet requirements.

GLOBE VENTILATOR COMPANY

205 River Street
TROY, N. Y.

Products

Sole manufacturer of "GLOBE" DOME TOP SUCTION VENTILATORS; "GLOBE" CHIMNEY CAPS; "GLOBE" BARN BIRDPROOF VENTILATORS.

Also "Globe" Ventilated Ridging; Special "Globe" Car Ventilators and "Globe" Lamp Jacks.

Uses of "Globe" Ventilators

Especially adapted for removing excessive heat and foul air from churches, schoolhouses and public buildings; for exhausting steam, smoke and gases from mills, foundries and factories; and for expelling impure air, moisture and odors from barns and stables—in fact, they meet every requirement of ventilators.

Description of "Globe" Ventilators

The "Globe" ventilator is made in all materials, of the proper gages to give lasting service; it is strongly braced with extra heavy steel bands, and is riveted, making an exceptionally strong ventilator, which is efficient under all conditions.

Glass Top "Globe" Ventilators

Glass top ventilators possess all the qualities of the metal top ventilators, and are designed to secure the greatest degree of ventilation and the largest area of light.

"Globe" Chimney Caps

Prevent downward currents in chimneys and increase drafts in sluggish flues.

Anemometer Readings

Below is given a test made on the "Globe" 24-in. ventilator with 6-in. outlet, under the low wind velocity of less than 5 miles an hour.

RENSSELAER POLYTECHNIC INSTITUTE
Department of Mechanical Engineering
Troy, N. Y.

No. of reading	Velocity of wind in miles per hour	Velocity of air in the ventilator in feet per minute	Temperature difference
1	4.41	468	38°
2	4.65	457	38°
3	4.36	462	38°
4	3.74	447	37°

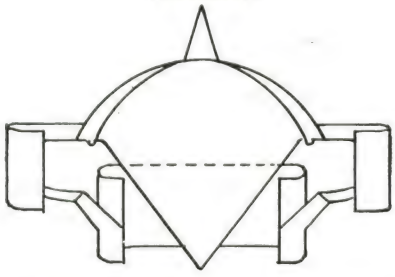
(Signed) ARTHUR M. GREENE, JR., M. E.

DOME TOP "GLOBE" VENTILATOR

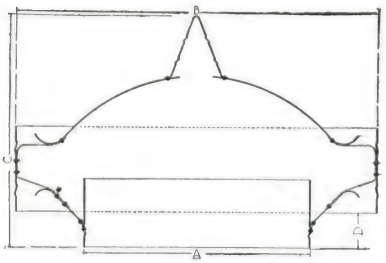
GLASS TOP "GLOBE" VENTILATOR

"GLOBE" BARN VENTILATOR
For barns, stables, creameries and silos. Furnished with or without weathervanes

SECTIONAL VIEW, DOME TOP "GLOBE" VENTILATOR



DOUBLE DOME GLOBE VENTILATOR
For use over blowers and fans



SECTION
A, diameter of pipe. B, diameter at widest part. C, height. D, distance from bottom of band to bottom of ventilator

PRICES AND DIMENSIONS GLOBE VENTILATORS

Principal dimensions in inches A	B	C	D	Gage of iron	Weight of copper, oz.	Area, sq. in.	List price *	Principal dimensions in inches A	B	C	D	Gage of iron	Weight of copper, oz.	Area, sq. in.	List price *
6	11	9	1½	26	18	29	$ 3.40	24	43	29	6½	20	20	453	$ 40.00
8	14	11	1½	24	18	51	4.65	30	50	35	6½	20	24	707	65.00
10	17	12	1½	24	18	79	5.75	36	68	50	8½	18	24	1018	120.00
12	19	13	1½	24	18	113	6.75	40	74	57	8½	18	24	1257	180.00
14	25	17	3	24	18	154	13.00	48	84	64	10	18	28	1810	240.00
16	28	19	3½	22	18	201	20.00	54	92	67	10	18	28	2290	300 00
18	32	22	4	22	18	255	27.00	60	99	70	10	18	28	2828	360.00
20	36	23	4	22	18	314	33.00	72	111	80	12	18	28	4072	480.00

*Subject to liberal discount.

AUGUST KUHNLA, INC.

Manufacturers of Automatic Stage Ventilators

10-20 Lorimer Street
BROOKLYN, N. Y.

Product

"KUPE" AUTOMATIC STAGE VENTILATOR.

Also contractors for Roofing and Sheet Metal Work.

For "Kupe" Automatic Ventilating Skylight, see page 965.

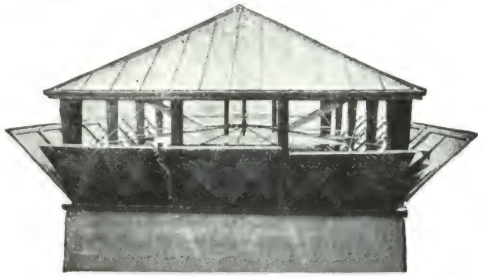
KUPE
T.M. Pending U. S. Pat. Office
TRADE-MARK

"Kupe" Automatic Stage Ventilator

A combined ventilator and weatherproof skylight. It consists of a metal frame with hipped roof, and sides provided with bottom hinged metal sash. Hempen ropes or cables equipped with fusible links pass over pulleys and connect the top of each sash to a main rope which extends down to the stage floor and within reach of the fly gallery. This main rope is also provided with fusible links. Under ordinary conditions the sash are hand operated, but in times of emergency the sash may be quickly opened by cutting the rope; in case of fire the operation of the sash is effected either individually or simultaneously by the melting of said fusible links. Connecting the top rail of the sash with the head jamb is a jackknife bracket which acts as a lever in thrusting the sash outward, overcoming any possible obstruction of ice, snow, or other encumbrances. This bracket also prevents the sash from opening beyond a certain point, and holds same rigid against wind when open.

Gutters under the roof supports conduct condensation to the exterior.

This is a scientifically constructed, efficient, self-opening ventilator, proof against obstruction by ice or snow, and positive in action under all conditions.



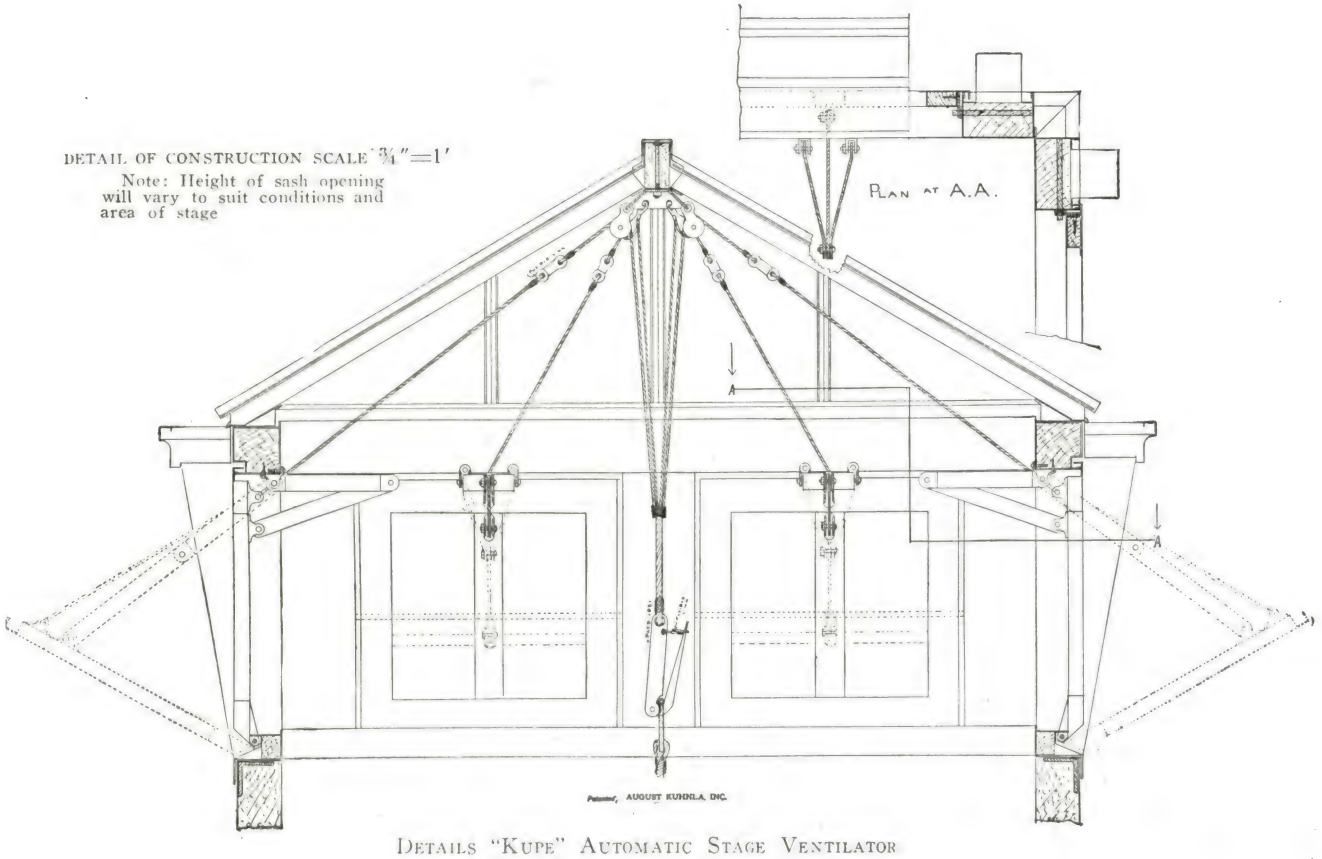
"KUPE" AUTOMATIC STAGE VENTILATOR (PATENTED)

Construction and Installation

We manufacture these ventilators to any dimension, complete, glazed with sheet or ribbed glass according to requirements and equipped with woven wire screen at base of ventilator frame. We use standard gauges of galvanized iron or copper and the sash hinges are of heavy brass bolted to both sash and frame.

Indorsement

Approved by the New York Board of Fire Underwriters, city officials, architects and owners.



DETAILS "KUPE" AUTOMATIC STAGE VENTILATOR

KERNCHEN COMPANY

Ventilating Engineers

111 West Washington Street

CHICAGO, ILL.

FACTORIES
SOUTH GARY, IND.
PHILADELPHIA, PA.
BRANTFORD, ONT., CAN.

NEW YORK OFFICE: 1265 Broadway—Telephone, Pennsylvania 2711
AGENCIES IN PRINCIPAL CITIES

Products

"K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS), with or without dampers.

Fuse Link Dampers for same when desired.

"K-S-V" (Kernchen Siphonage Ventilator)

For any type of building or enclosure, railway and street cars; chimneys, defective drafts, etc.

"K-S-V" (Kernchen Siphonage Ventilator) does the work of three others. Save this cost.

TRADE-MARK

The correct siphon is the most powerful pulling force known to gravity science. It not only exhausts, it terrifically pulls.

The siphons harness the most delicate air currents, compressing and compelling them to co-act in mightily increasing the upward movement of air through the ventilator, and consequently increasing the pull.

Construction—Simplicity of construction and absence of any mechanism whatever are extra features of the K-S-V (Kernchen Siphonage Ventilator). Free area of outlet over 200% of pipe area. Nothing choking or hindering. Friction at minimum, exhaust at maximum.

The eduction pipe is of cylindrical form throughout. The upper end of the pipe is provided with several V-shaped slits or openings, each opening covered with a siphon, tapered inwardly toward the top and rising above the level of the pipe. A jacket of conical shape envelops these siphons, whereby other siphons are formed, greatly increasing the terrific pulling power of the ventilator. In addition, two hoods are put over the jacket near its mouth, augmenting considerably the pulling force and preventing rain, hail, sleet or snow from going through, thus being absolutely stormproof. There is no band of iron around the two top hoods interfering with the exhaust or outlet area. (See illustration of ventilator.)

The ventilator is in one piece and stationary—no mechanism, nothing revolving or rotating—always silently doing its work. Nothing to wear out. No cost for maintenance. A rotary ventilator requires a certain amount of wind energy to swing it around *before it gets ready to ventilate*. The "K-S-V" *uses this same wind energy to ventilate.*

The damper is equally as simple as the ventilator and is made in one piece. It has no sliding sleeves or mechanism.

Caution—Beware of imitations and infringements. Protect yourself by specifying as follows: "K-S-V's (Kernchen Siphonage Ventilators), manufactured by KERNCHEN COMPANY, 111 West Washington Street, Chicago, Ill.," and see that KERNCHEN COMPANY brass tags are on ventilators.

Official Tests

Note in the following two indisputable official tests (which are *signed* by eminent authorities) the absolute proof of capacity and terrific pulling power. Compare the Case School of Applied Science Official Test (which was made on the roof of a building) with the Armour Institute Official Test (which was conducted in a laboratory), for scientific corroboration and verification of each other, and of our statements regarding the actual powerful pull of "K-S-V's."

We challenge all to furnish such *signed,* Institutes of Technology Official Tests.

Ventilation of Industrial Buildings

Pivoted sash, sawtooth or monitor roofs, with hinged or pivoted windows, do not ventilate and are useful for light only. Wind pressure, direction, and angle govern

OFFICIAL TEST OF "K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS) CONDUCTED BY ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO

SHOWING EXHAUST UNDER DIFFERENT WIND VELOCITIES, AND WHICH SCIENTIFICALLY PROVES THE TERRIFIC PULLING POWER AND 100% TO 300% MORE EFFICIENCY THAN THAT OF OTHER VENTILATORS

Wind velocity, miles per hour	Air pulled through ventilator, lineal ft. per min.	Cubic feet air pulled through ventilator: Size of ventilator, in.	12	14	16	18	20	24	30	36	40	48
5	460	Per min.	364.0	492.2	644.0	814.2	1,003	1,444	2,250	3,247	4,000	5,776
		Per hr.	21,840	29,532	38,640	48,852	60,180	86,640	135,000	194,820	240,000	346,560
10	670	Per min.	525.0	717.0	938.0	1,186	1,460	2,103	3,280	4,730	5,830	8,412
		Per hr.	31,500	43,020	56,280	71,160	87,600	126,180	196,800	283,800	349,800	504,720
15	960	Per min.	754.0	1,027	1,344	1,699	2,100	3,014	4,700	6,777	8,350	12,056
		Per hr.	45,240	61,620	80,640	101,940	126,000	180,840	282,000	406,620	501,000	723,360
20	1,220	Per min.	957.0	1,305	1,708	2,159	2,660	3,830	5,980	8,613	10,640	15,320
		Per hr.	57,420	78,300	102,480	129,540	159,600	229,800	358,800	516,780	638,400	919,200
25	1,480	Per min.	1,161	1,584	2,072	2,619	3,230	4,647	7,250	10,448	12,870	18,588
		Per hr.	69,660	95,040	124,320	157,140	193,800	278,820	435,000	626,880	772,200	1,115,280

(Signed) G. F. GEBHARDT, A. H. ANDERSON, Mechanical Engineers, Armour Institute of Technology

CASE SCHOOL OF APPLIED SCIENCE—TEST NOV. 6, 1913 ON ROOF OF LEADER BUILDING, CLEVELAND, OHIO		ARMOUR INSTITUTE OF TECHNOLOGY—TEST APRIL 17, 1911, IN LABORATORY
15 inches	Diameter of ventilator	15 inches
5.32 miles per hour, or 6⅔% stronger than Armour's	Velocity of outside wind	5 miles per hour
497	Velocity of air pulled through ventilator per min., lineal ft.	460
610	Exhaust of ventilator per min., cubic ft.	564
Outside temperature, 67° Fahr.	Inside temperature, 85.8° Fahr.	

(Signed) F. H. VOSE,
Head of Mech. Eng. Dept.,
Case School of Applied Science

(Signed) G. F. GEBHARDT,
A. H. ANDERSON,
Mech. Engrs., Armour Institute of Technology

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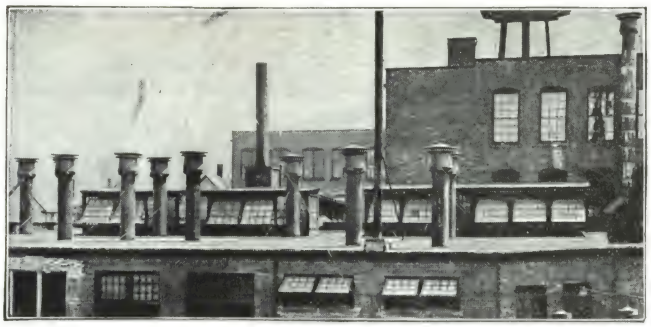
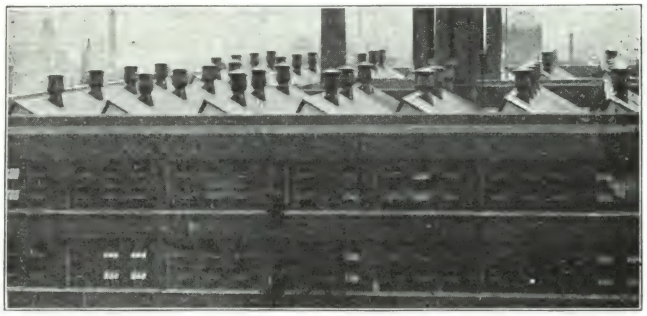


"K-S-V's" Installed on This Monitor or Lantern Roof with Pivoted Sash



52 "K-S-V's" Installed on This Sawtooth Roof with Pivoted Sash

window ventilation and produce contrary results. Instead of providing ventilation, they have generally an exactly opposite effect, for the outside air, entering a building through such openings, blows down or back the foul air, smoke, fumes, etc., which, instead, should be pulled out.

Louvers also have proved to be nothing but complete intakes, driving the foul air, fumes, steam, smoke, etc., down to the floor.

Greater Results with Less Cost

"K-S-V's" (Kernchen Siphonage Ventilators) are far cheaper than other makes since less than half the number or size are required to exhaust the same amount of air. Even then the inferior types, with their larger number or greater size, will not give results equal to the "K-S-V's" (Kernchen Siphonage Ventilators) when the outside air currents are low.

This saving in the number or size of ventilators involves an added saving in installation.

KERNCHEN SIPHONAGE VENTILATOR DATA

Size, in.	Area, sq. in.	Exhaust per hour cu. ft., 10-mile wind velocity	Approximate shipping wt., lbs.	Gage	Price, Galvanized	
					Dampers	Ventilators
6	28	7878	10	26	$2.55	$10.67
8	50	14070	16	26	3.14	12.98
10	78	21900	20	24	3.89	17.16
12	113	31500	28	24	4.67	18.04
14	154	43020	47	24	5.35	21.56
16	201	56280	58	24	5.92	25.08
18	255	71160	82	24	6.46	28.60
20	314	87600	108	22	7.51	36.08
22	380	106080	123	22	8.15	42.68
24	453	126180	155	22	9.17	47.96
26	521	148740	190	22	10.35	60.72
28	615	171600	221	22	10.58	68.64
30	707	196800	270	20	12.82	74.36
36	1017	283800	450	20	14.90	101.20
42	1385	349800	580	20	18.07	154.00
48	1810	504720	785	20	22.42	228.80
54	2290	648200	990	20	26.77	290.40
60	2827	787800	1025	18-20	32.04	429.00

These prices do not include bases, condensation arresters, fusible fire links or damper chain. Prompt shipment from stock from our factories at South Gary, Ind., and Philadelphia, Pa.

And so, while the initial cost of the "K-S-V" (Kernchen Siphonage Ventilator) may be higher than some others from a diameter standpoint, this is much more than offset by its surpassing exhaust.

Special Ventilation Service

The Kernchen Company specializes in ventilation and its engineers are always available, gratis.

Particular attention given to difficult or unusual problems involving great heat as well as temperatures below the freezing point; steam conditions; elimination of condensation, moisture, fumes, gases or smudge, foul or vitiated air, in every type of building or room.

Booklet—"It Pulls"

A postal will bring our latest illustrated booklet, entitled "It Pulls," containing complete information concerning the "K-S-V's" (Kernchen Siphonage Ventilators).

Testimonials

The following letters, selected from many received from industrial houses of national and international reputation, convey a limited idea of the way that we and our "K-S-V's" (Kernchen Siphonage Ventilators) are completely curing vexing and costly conditions of foul air, steam, smudge, condensation, moisture, gas, smoke, fumes, dust, etc., giving absolute satisfaction, in many cases after large fans and other types of ventilators have failed to give adequate relief:

American Car and Foundry Co., Chicago—"The Kernchen Siphonage Ventilator has proved very satisfactory. It is installed above our blacksmith shop and it pulls the bad air out."

Packard Motor Car Co., Detroit—"Kernchen Siphonage Ventilators are handling the ventilating of the third floor of our Heat Treat Department and our Truck Blacksmith Shop very well indeed."

The Thompson & Norris Co., Brookville, Ind.—"During the months previous to the extreme cold weather, the Kernchen Ventilators absolutely prevented any dripping and condensation in our Machine and Store Room where we were formerly bothered very much, although we had four 36 in. fans and two ordinary ventilators.

"It was such a positive pleasure to go into this room after your ventilators were installed and find the floor and ceiling dry, whereas both used to be covered with moisture, that we wondered if such would be the case when the extreme cold weather set in. The extreme cold weather has been encountered and we have found your ventilators to be just as effective, and our Machine and Store Room has been kept absolutely free from steam, condensation and dripping."

Frazer Paint Co., Detroit—"The summer of 1916 will pass into weather history on account of the long, torrid spell in the Middle West. Factories and furnaces were forced to suspend operations on account of the heat or materially curtail productions.

"Detroit was no exception as a sufferer from the heat and our factory of metal sash construction became so hot that the men could not stand it and we were confronted with a shutdown at the time of the greatest rush of business in our experience.

"But instead, we installed K-S-V's (Kernchen Siphonage Ventilators) according to the layout proposed by your man, and they saved the day for us.

"Not only did they cause a refreshing current of air by withdrawing the hot, bad air, but they reduced the temperature of the working rooms several degrees. We did not shut down, but, instead, had an output beyond the usual.

"When our factory was built in 1915, we had intended to install K-S-V's, but the architect provided others and the contract had been let before we noticed it and we did not insist. Under stress, they proved entirely inadequate.

"We regard the K-S-V in a class by itself."

KING VENTILATING COMPANY

Ventilating Engineers for Farm Buildings and Creameries

1100 North Cedar Street
OWATONNA, MINN.
CANADIAN OFFICE: MOOSE JAW, SASK.

Products and Services

Ventilating Engineers and manufacturers of KING SYSTEMS of VENTILATION for Barns, Hog Houses, Poultry Houses and Creameries; also KING AERATORS separately, which are used above the roof.

The services of this Company include the Planning of the Proper System of Ventilation needed for any farm building or creamery, and the Supplying of the Needed Material for installing the system. Co-operation is offered to architects in designing the plans of ventilation for any of these buildings to fit the architects' plans of construction, whether for complete new structures or remodeling old buildings. When necessary, the system can be installed by the Company, but generally the plan of the system and the material are supplied with instructions and blue prints for installing.

In all cases this Company assumes the responsibility for the system and guarantees its ventilating the building properly, provided that the system is installed and operated according to directions.

A thoroughly equipped Research Department is maintained, which conducts Ventilation Tests in all kinds of farm buildings, making comparisons of the different ideas of ventilation, also Testing the Air in buildings not ventilated.

King System of Ventilation

The heating and ventilating of a barn are inseparable problems. A tight, well built structure is of first importance. As a barn is not artificially heated, but must rely upon the body heat of the stock housed in it, the space to be heated must not be out of proportion to the number of animals. Then, too, a barn that is not properly constructed will not retain the heat. Until such faults are corrected, no ventilating system could give satisfactory results.

As there are no two buildings with conditions exactly alike, each building has its own ventilation problem. Therefore, each King system is designed for the building into which it goes.

Each King system consists of 3 units: the King aerator, the foul air flues and the fresh air intakes. It is the proper application of these units that insures satisfactory ventilation. These units are made in different sizes, and their number and location vary according to the needs of the building.

Barn Ventilation

The problem in barn ventilation is to take out the excessive moisture and foul air, and to bring in fresh air without reducing the temperature of the barn too much in cold weather. It is estimated that the animals in a barn require the oxygen contained in 2 lbs. of air for the proper consumption of 1 lb. of food and water. An ordinary herd of cows gives off about a barrel of water per day through the nostrils and pores of the skin. Therefore, the proper ventilation of a barn is a vital problem.

Creamery Ventilation

In creameries the hot steam, wet floors and open vats put a great amount of moisture into the air. Unless this moisture is removed immediately, it condenses upon the walls, ceilings and the machinery. It makes the building a damp, unhealthy place for workers, spoils the quality of the product and shortens the life of the building and its equipment.

The KING VENTILATING COMPANY is equipped to answer these problems in ventilation. King systems have been installed in thousands of farm buildings and creameries throughout the United States and Canada. References in every locality will be furnished to customers.

King Aerator

This is the part of the King system which appears above the roof. Because of its importance, it is the first unit of the system, but it can be used with or without the other units of the King system. It can be put upon any barn, hog house, poultry house or creamery, new or old. Its beauty harmonizes with almost any style of architecture. King aerators add beauty to buildings.

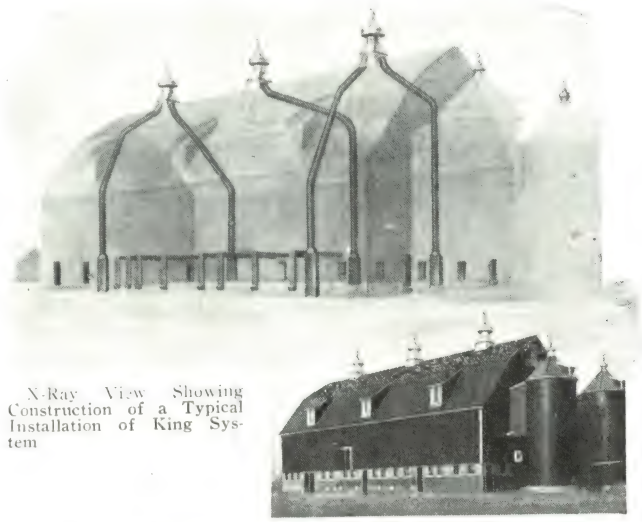
KING AERATOR

First part of the King system of ventilation.

Ten sizes:

No.	Flue	No.	Flue
50	13 in.	400	30 in.
100	16 in.	500	36 in.
200	20 in.	600	40 in.
300	24 in.	700	44 in.
350	28 in.	800	48 in.

No. 400 King aerator is used on most barns from 30 to 36 ft. wide. The number required depends on the length of the building



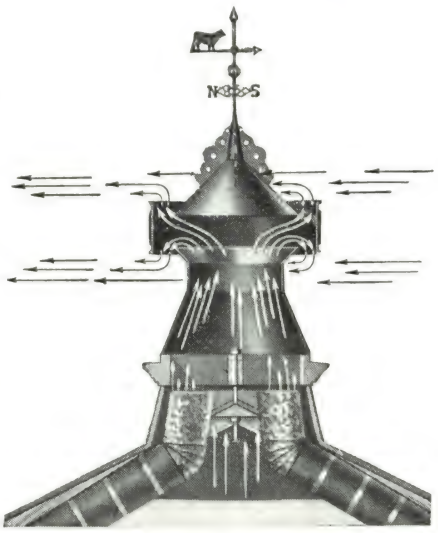
X-Ray View Showing Construction of a Typical Installation of King System

P. F. COGGINS' BARN, BLOOMING PRAIRIE, MINN.

Continued on next page

The King aerator is made of highest quality galvanized steel, finished in beautiful silver. Its operation as a ventilator is on the siphon principle.

(Note illustration.) As the wind passes around the King aerator head, it creates a draft or suction from below. The foul air passes out on all sides of the King aerator head. It makes no difference from which direction the wind is blowing. Being round, it presents the same face in all directions. When used in connection with the King system, the aerator creates a suction in the foul air flues. Also draws the foul air out of the open space in the upper part of the building. Made in a size for every barn, hog house, poultry house and creamery, square or round base, including several sizes for silos.



Sectional View of Aerator
Arrows show direction of air currents

Adaptability—The King aerator is also used on other types of buildings, or on buildings where the complete King system may not be required. This aerator is giving complete satisfaction on grain elevators where there has been a demand for a ventilator that would keep out rain, snow and birds and still allow the fine dust to be drawn out.

On closed lumber sheds King aerators generally save their cost in one year by preventing lumber from becoming moldy and decaying in the piles.

Lightning Rod Attachment—Where a building is to be equipped with lightning rods, the use of the King lightning rod attachment in the King aerator is advised. A pure copper, nickelplated point, connected to a pure copper cable running down inside the aerator and out through its base, is supplied.

Vanes—Each King aerator is mounted with a beautiful weathervane, delicately balanced to respond to the slightest breeze. Any of the following designs: horse, cow, bull, hog, rooster, sheep, auto and arrow.

Foul Air Flues

Through this unit of the King system, the foul air from the stockroom below is discharged into the King aerator on the roof. The size of the flues must be adapted to the size and the construction of the building and the number of head of live stock housed. King foul air flues are made of galvanized steel, and thoroughly insulated to prevent moisture from condensing inside the flues. They are equipped with control dampers and doors.

Fresh Air Intakes

The fresh air intakes are the supply valves for the King system. They bring in the fresh air from the outside to enter at the ceiling of the room; while the foul air is taken out from points near the floor. This is the principle of the King system. The movement of air is from the ceiling to the floor. And as heat naturally rises and cold air falls, the heat from the animals is trapped and held while fresh air is constantly moved through the room.

There are two things which create this movement of air with the King system. One is the expansion of air caused by the heat from the animals; the other is the suction created by the wind passing across the King aerator head on the roof.

Estimates

Upon receipt of sketch of building with actual measurements, together with general description, quotations can be made for the King system designed to ventilate it properly. But it is suggested that customers write for catalogue and also the plan sheet on which can be given the information needed to guide the King engineers in designing the plan of ventilation to fit the actual conditions in the building. As each King system is built individually for the building it goes into, it is necessary to plan the system before quotations are made. No obligations will be assumed in sending plans or having the King representative call.

Books on Barn and Creamery Ventilation

The company has two books; one on King system for farm buildings and one for creameries. Either or both will be sent on application.

Experience and Indorsements

King Ventilating Company has given many years of exclusive study to this work, and specializes in farm building and creamery ventilation. Thousands of King systems have been installed under its direction in all parts of the country and ample proof of their successful operation under almost all conditions can be shown. The following letters are but a few from many thousands which have been received:

D. J. Healy, Alvord, Iowa—If I was to lose my barn by fire or cyclone, I would put the King Ventilating System right back in the new barn. I have noticed a great deal of difference for the better in both the horse and cattle parts of the barn.

I made arrangements at the time I was building my barn to have a specialist come to make plans and measurements. The King Ventilating Company planned the system and made blue prints showing how to put it in.

The thing I have noticed is that steam does not settle in the barn on the walls, but escapes through the foul air tubes. The cattle are 100% better able to stand the cold weather. No steam, but pure air in the barn at all times.

Moose Jaw Creamery, Moose Jaw, Sask., Can.

E. S. Stevens, Sec'y., The Thompson Creamery Co., Thompson, Ohio—We have had the King System in use in our creamery nearly four years, and find it satisfactory for ventilating our plant, and for removing surplus steam in cold weather, which was a serious trouble with us.

Glenwood Dairy Union, Glenwood City, Wis.
Some King Ventilated Creameries

THOMAS LEE & SON CO.

Manufacturers of Dampered Ventilators, Rotary and Stationary Types

OFFICE AND FACTORY
128-132 West Second Street
CINCINNATI, OHIO

Products

LEE ROTARY and STATIONARY VENTILATORS (Patented) with Metal or Glass top.

For Metal Windows and Tin and Kalamein Doors, see page 794.

Special Features of Lee Dampered Ventilators

A simple, powerful damper operating device that will not get out of order.

A damper that can not bind.

Adaptability—The Lee ventilator is especially desirable for churches, schoolhouses, residences, factories, barns, or any building demanding perfect ventilation.

The glass top style will in many cases save the expense of a skylight.

Prices—Price list, with discount, will be furnished on application. Bases are extra.

Materials and Sizes—Lee ventilators are made of heavy galvanized iron or copper, firmly braced, riveted and soldered, in sizes from 12 to 96 in. in diameter, with or without damper. Sizes less than 12 in. are not made with damper.

Lee Rotary Ventilator

This ventilator is strongly constructed of galvanized sheet steel, and as shown in illustration, is a combined weathervane and ventilator.

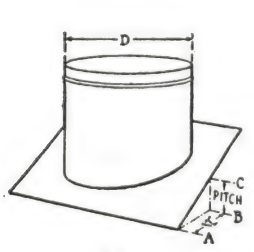
The rotary turns sensitively on ball bearings. It is equipped with outside louver dampers which are operated from within by a chain or cord. Absolutely storm-proof; no shield necessary.

The wind turns the ventilator so that the opening is leeward. The movement of air past it produces a vacuum in front of its mouth, drawing out the foul air, with which it is continually filled.

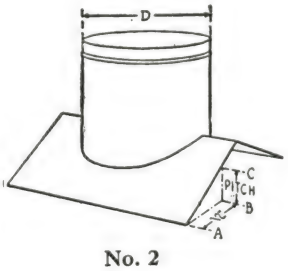
Made also with glass top.

GLASS TOP VENTILATOR
(Patented)

METAL TOP VENTILATOR
(Patented)



No. 1



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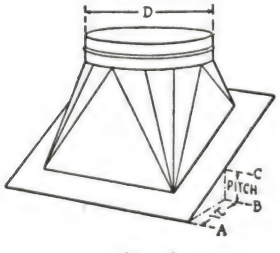

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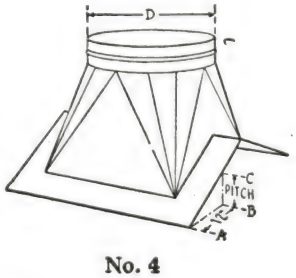
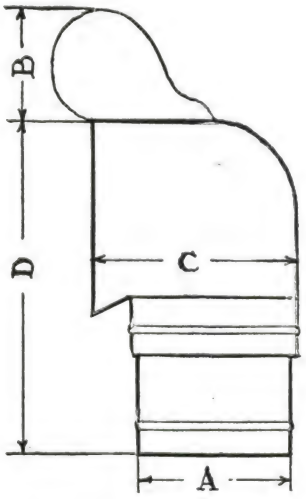


No. 4

BASES
Specify type desired, giving dimensions B-C and D

LEE ROTARY
VENTILATOR



DIMENSION DIAGRAM LEE
ROTARY VENTILATOR

A, in.	B, in.	C, in.	D, in.
12	8	15	26
14	8	17	28
16	10	19	30
18	10	22	32
20	13	26	36
24	15	28	42
30	18	36	48
36	22	40	53
42	22	47	73
48	30	54	90

LICHTY METAL PRODUCTS CO.

Manufacturers of Rotary Ventilators and Skylights

WATERLOO, IOWA

Products

MONITOR ROTARY SUCTION VENTILATORS; STANDARD and VENTILATING SKYLIGHTS.

TRADE-MARK

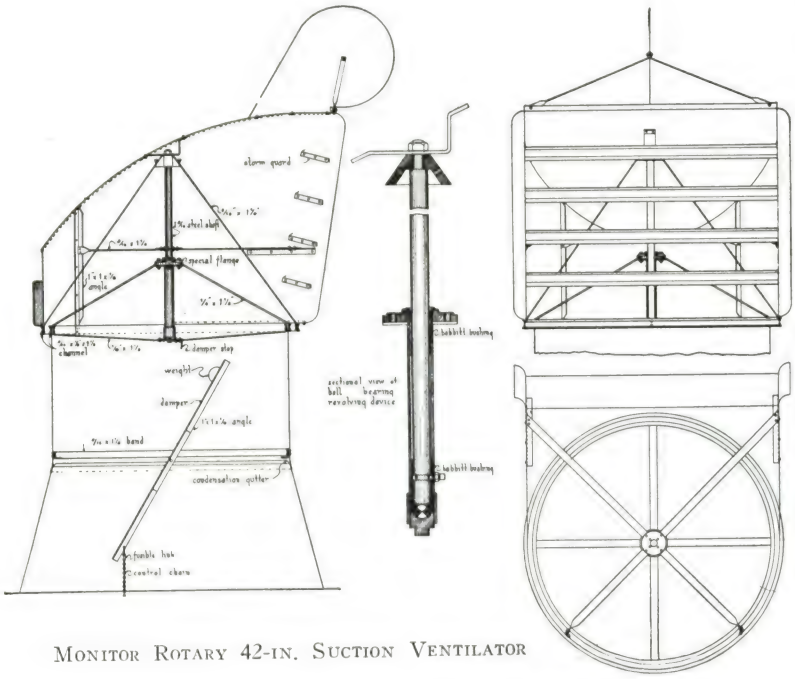
Monitor Rotary Suction Ventilators

These ventilators are the rotating head type which proved the most powerful ventilators in the tests made by the United States Bureau of Standards. They are substantially constructed; well braced and reinforced with heavy steel braces and bands (galvanized after formed). The exhaust head opening is 20% larger than the flue capacity. This together with the curved top eliminates practically all resistance. The pivot ball bearing revolving device permits this ventilator to turn with less than one oz. pressure on the 42-in. size. High grade babbitt guide bushings are used in all sizes 36 in. and larger.

This revolving device is weatherproof and will work perfectly for many years without attention.

Monitor suction ventilators are regularly manufactured of galvanized copper steel and finished in gray iron enamel but can be manufactured of any brand of sheets, also copper. The workmanship and finish are of the very finest, which makes them suitable for the most artistic structures. Every ventilator bears a serial number and is fully guaranteed.

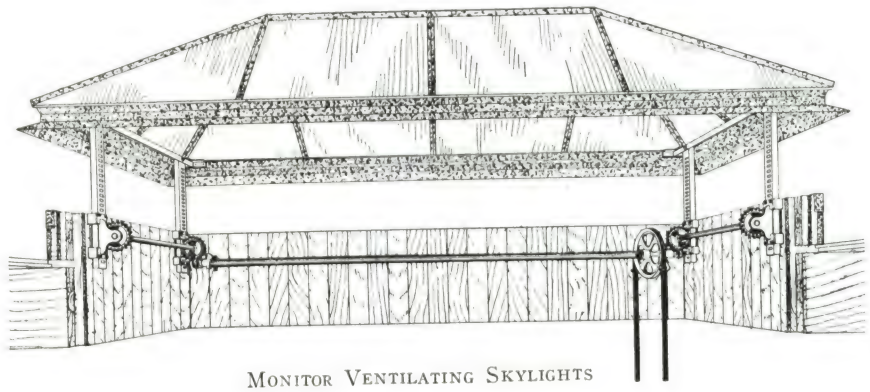
These ventilators are patented.



MONITOR ROTARY 42-IN. SUCTION VENTILATOR

MONITOR SUCTION VENTILATORS

Size, in.	Exhaust capacity, cu. ft. per min.	Weight, lbs.	Gauge steel
12	275	30	26
14	370	40	26
16	490	50	24
18	630	65	24
20	800	70	24
24	1100	120	24
30	1700	160	22
36	2550	210	22
42	3400	320	22
48	4450	430	20
54	5500	650	20
60	6850	730	20
66	8250	850	20
72	9850	970	20



MONITOR VENTILATING SKYLIGHTS

Monitor Ventilating Skylights

These are manufactured with either hand or electrical operating device. The ventilating device raises the entire skylight and holds it open at any desired height up to 12 in. It is easily operated; is very strong and rigid when in operation and gives a large amount of ventilation.

Regularly manufactured of galvanized copper steel; finished in gray iron enamel; in widths from 4 to 6 ft. and lengths from 4 to 10 ft.

THE OHIO BODY AND BLOWER COMPANY

Rotary Ball Bearing Ventilators

MAIN OFFICE AND FACTORY
CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 103 Park Avenue
CHICAGO, ILL., 318 West Washington Street
BOSTON, MASS., 136 Federal Street
PITTSBURGH, PA., Jones Law Building
DETROIT, MICH., Penobscot Building
BUFFALO, N. Y., Mutual Life Building

QUALIFIED AGENTS IN ALL PRINCIPAL CITIES FROM COAST TO COAST

Products

"SWARTOUT" ROTARY BALL BEARING VENTILATORS.

Also Metal Buildings and Industrial Ovens.

For Power Plant Equipment and Steam Heating Specialties, including: Steam and Oil Separators, Air Separators, Hydromatic Steam Traps, Cast Iron Exhaust Heads, Feed Water Heaters and Sediment Strainers, see page 1705.

TRADE-MARK

"Swartwout" Principle and Operation

The "Swartwout" principle is very simple. It actively *compels* the flow of air. Rotating on accurately machined ball bearings and controlled by an ample vane, the "Swartwout" always faces *away from the wind.* The passing breeze continually creates an active suction before the mouth of the ventilator, thus pulling out a steady flow of used air from below.

The entire area of the opening is always efficient. As it responds to every change in wind direction, no part is ever inoperative. Perfect operation on any type of roof. The wind always blows *past,* never *into,* the ventilator.

"Swartwout" Rotary Ball Bearing Ventilator

Standard Type—Made of rust-resisting galvanized metal (or copper, on specification) of ample gauge covering a framework of sturdy angle iron, accurately formed and punched. Built for lasting resistance, it is practically indestructible.

The main portion of ventilator is suspended on a skeleton of steel channels and angle iron, revolving on centrally placed bronze bearings and hard composition balls. Bearings are non-corrosive, of large size to insure perfect balance, and practically frictionless.

Operates easily and effectively. Only one right angle turn is required for air flow, which is accurately controlled by stormproof louvers or dampers, operated simultaneously from within by rustproof chains over brass pulleys. A unique louver-setting device permits setting of the louvers at fullopen, halfopen or closed. Distinctly efficient without sacrificing appearance. On account of its great capacity, fewer or smaller ventilators are required.

Air-light Type—The standard construction, except for the substitution (on specification) of a full size, strong, wire glass top for the metal top, provides a combination skylight and ventilator. The top, steeply pitched, is self-cleaning. No obstruction of direct passage of light is possible.

PHANTOM VIEW OF SWARTWOUT VENTILATOR

Continued on next page

An Analysis of Ventilator Requirements

For those in whose mind there is still some confusion as to the fundamental requirements in the choice of an efficient ventilator, we offer the following:

(1) Do not select a mere "hole in the roof", as there will be no upward or outward pull of air with such a ventilator when temperature within the structure is equal to or below that of the outside air.

(2) Do not choose a ventilator which forces escaping air to turn an acute angle or to flow out through a series of bends. Each angle and bend causes a definite friction, reduces pressure of air current and hinders the purpose for which a ventilator is intended.

(3) The true cost of a ventilator is the cubic feet of air handled *during its whole life* divided by the first cost. Keep this firmly in mind and select ventilators which are undeniably *built to endure*.

(4) Select, wherever possible, a ventilator so designed that it actually assures a steady flow of air, in other words, a "ventilating machine."

(5) When the question becomes a choice between a fan ventilating system and induced ventilation secured by ventilators of the semimechanical type, include in your computation not only first cost of the two systems, but also a definite comparison of annual cost of operation and upkeep (see "Tests" below).

Testing Ventilators and the "Swartwout" Ventilator Testing Room for the Use of Architects and Engineers

So many laboratory ventilator tests have been made on identical ventilators in various parts of the country and with such varying results, that we now maintain a testing room, installed under natural conditions, for the testing of ventilators. This room is for the use of architects, engineers and prospective customers.

It is located on the top of a 5-story building where the wind has free access to it and is far above surrounding buildings which might cause unfavorable eddies and uncertain results. It is equipped with the most accurate and reliable instruments obtainable, the measuring instruments being similar to those used in the United States Weather Bureau.

Comparative tests will be made or the reports of various tests of the "Swartwout" with other ventilators will be given upon application to this company. These tests extend over a considerable length of time and are as accurate as it is possible to make tests of this nature.

Results of Two Tests Made in Actual Practice

Test A—On a test of a ventilator made for Hollingsworth & Whitney Co., Waterville, Me., it required only 2 oz. on a postal scale to move a 72-in. ventilator. This is equivalent to a wind pressure of less than .001 oz. per sq. in.

Test B—In a competitive test made by a famous food plant, it was found that a 10-h.p. motor driven fan, costing $960.00 per year to operate, exhausted 12,816 cu. ft. of air per minute. Four 48-in. "Swartwout" ventilators installed on the same building removed 19,248 cu. ft. per minute, *at far less first cost and no operating expense.*

Capacities and Sizes of "Swartwout" Rotary Ventilators

For capacities, sizes and data on "Swartwout" ventilators, see detail drawing on following page.

Fresh Air Requirements for Various Services

Figures in cubic feet per person per hour from table prepared by Prof. John R. Allen, Department of Mechanical Engineering, University of Michigan:

Workshops and barracks	3000
Office rooms	1800
Schools	2400
Hospitals	3600
Churches and theaters	2000
Dining rooms	1800
Toilets and bathrooms	2400

Standard Specifications for "Swartwout" Ventilators

All ventilators to be of the rotary ball bearing type [metal top] [glass top] of galvanized (copper) rust-resisting metal, all interior members of angle iron, hot galvanized *after* forming and punching. Ventilators to turn sensitively on accurately machined bronze bearings, employing bell metal balls, and counterweighted on outside. Ventilators to be equipped with outside louver dampers to throw accumulated dirt outside of building; louver to be operated from within by brass chains over brass pulleys. Gauge of metal to be the standard of The Ohio Body and Blower Company, Cleveland, Ohio, as furnished in "Swartwout" rotary ball bearing ventilators at regular prices. Top of collar and bottom of hood to be stiffened with galvanized angle iron rings.

Note: If desired, give standard gauge for each size. Specifications and data for both ventilators and bases will be gladly furnished on request in convenient card form to fit your card index.

Specifications for Bases

Build each base individually for its job.

Ventilator bases to be of galvanized, rust resisting metal, 2 gauges heavier than ventilator, according to The Ohio Body and Blower Company standard for ventilator bases, and of size corresponding to nominal size of ventilators. Collars to be 5 in. high, grooved and riveted to body of base with 1-in. lap and 5-in. spacing. Body of base to be a square-to-round section with opening of the square 4 in. larger than the collar. Bases 18 in. and smaller to be 23 in. high over all, and larger sizes 27 in. high. All bases to fit roof dimensions accurately with 5-in. flange, bent out, not sharp (if concrete roof, to fit detail shown), and must form an absolutely watertight juncture with the roofing material and be left so on completion. Seams at roofing line can not be allowed, except to fill in corners of base. Top of base to be absolutely level and round.

Note: For capacity, rigidity, tightness, economy, use square bases only.

Drafting Room and Specification Helps

"The Gospel of Fresh Air," a 36-page ventilation handbook with air-requirement tables, ventilator capacities, complete drawings, specifications, photographs, etc.

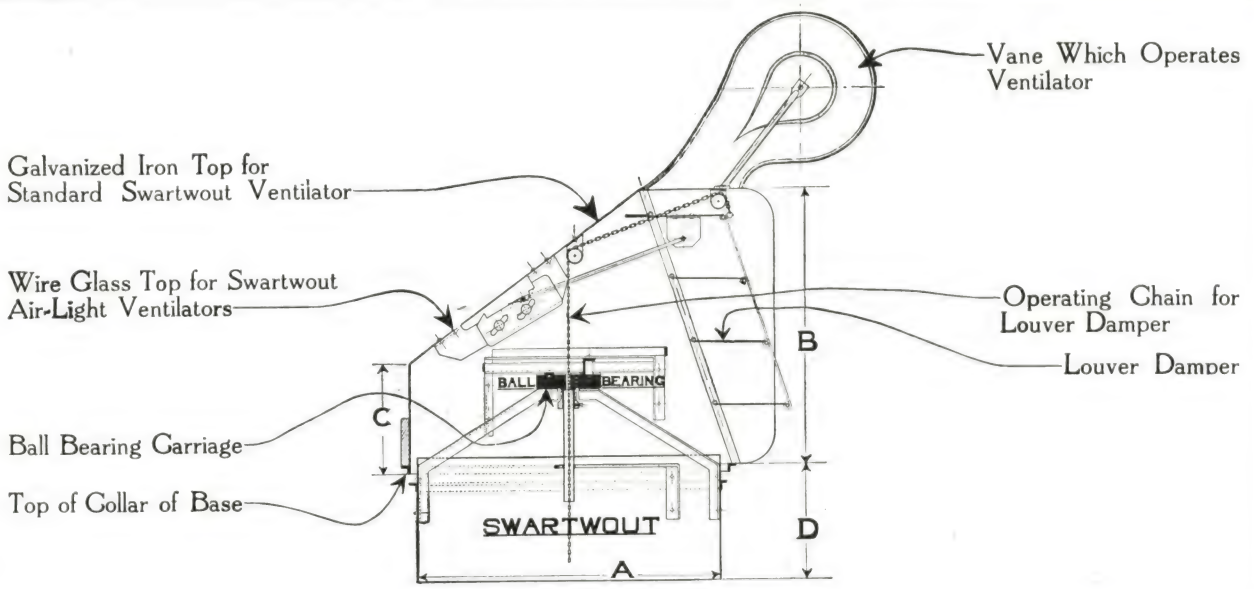
Ventilation Data Card, 8½x11 in.; heavy card reference. Covers air requirements, capacities, ventilator and base specifications and drawings. Widely used for instant reference.

Ventilator Specification File Card, sizes 3x5 in. or 4x6 in. Same for bases. Any of above helps free on request.

Co-operative Planning Service

Our engineering department, with many years of practical experience in mechanical ventilation, will gladly study ventilation problems and make suggestions absolutely without obligation. Write us today.

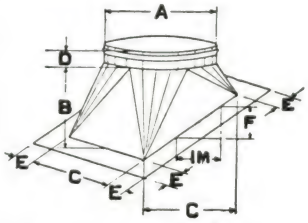
Continued on next page



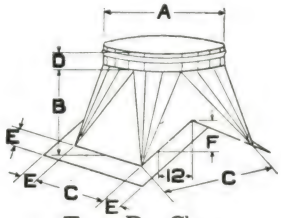
CAPACITIES AND DIMENSIONS OF SWARTWOUT VENTILATOR—WIND VELOCITY 5 MILES PER HOUR

Capacities Cu. ft. per min.	A	B	C	D	Gauge iron U. S. Std.	Weight of copper per sq. ft.	Net weight lbs.	Gross weight, lbs.	Volume boxed for export cu. ft.	List prices	Code word
....	10	9 1/8	4	5	24	18 oz.	15	50	1.1	$ 25.00	Sulcicolle
275	12	11	4 3/4	5	24	18 oz.	20	60	1.8	25.00	Sulciforme
370	14	12 7/8	5 3/4	5 1/2	24	18 oz.	30	80	2.9	40.00	Sulcipenne
490	16	14 3/4	6	5 1/2	24	18 oz.	40	100	4.3	50.00	Suleiman
650	18	16 1/2	6 5/8	6 1/2	24	18 oz.	45	130	5.7	65.00	Sulfacide
800	20	18 1/2	7 1/16	6 1/2	24	18 oz.	50	140	7.4	75.00	Sulfatable
1100	24	22	9	6 3/4	24	18 oz.	85	230	12	85.00	Sulfatado
1700	30	27 1/2	11 5/16	9 1/8	22	20 oz.	120	330	25	100.00	Sulfatage
2550	36	33	13 1/2	11	22	24 oz.	160	430	42	150.00	Sulfactamos
3400	42	38 1/2	15 3/4	11 1/4	20	26 oz.	225	650	67	210.00	Sulfataria
4450	48	44	18 7/8	11 1/4	20	26 oz.	320	860	97	240.00	Sulfataron
5500	54	49 1/2	20 1/4	13 3/4	20	28 oz.	525	1300	140	350.00	Sulfateur
6850	60	55	22 1/2	15 1/2	20	28 oz.	610	1470	192	400.00	Sulfatique
8250	66	60 1/2	24 3/4	16 3/4	20	28 oz.	700	1650	254	450.00	Sulfato
9850	72	66	27	16 3/4	20	28 oz.	810	1920	323	500.00	Sulfazote

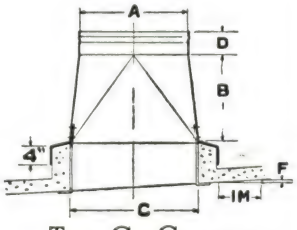
Collar 2 gauges heavier than top. All ventilators supplied with chain through ventilator with swivel at end. Additional chain furnished at nominal cost. In ordering, only dimension "A" is required.



Type A Base—Ridge



Type B—Slope



Type C—Concrete

DATA AND DIMENSIONS FOR STANDARD BASES IN INCHES

Diam. A	Dimensions, in. B	C	D	E	F	Gauge Galv. iron U. S. Std.	Weight of Copper, oz. per sq. ft.	Weight, lbs. Net	Crated	Diam. A	Dimensions, in. B	C	D	E	F	Gauge Galv. iron U. S. Std.	Weight of Copper, oz. per sq. ft.	Weight, lbs. Net	Crated
10	18	14	5	5	*	22	20	16	20	30	22	34	5	5	*	18	22	80	95
12	18	16	5	5	*	22	20	20	25	36	22	40	5	5	*	18	26	95	110
14	18	18	5	5	*	22	20	26	30	42	22	46	5	5	*	18	28	105	125
16	18	20	5	5	*	20	20	35	40	48	22	52	5	5	*	18	28	115	135
18	18	22	5	5	*	20	20	38	45	54	22	58	5	5	*	18	30	125	150
20	22	24	5	5	*	20	20	45	55	60	22	64	5	5	*	18	30	140	165
24	22	28	5	5	*	20	20	55	65	66	22	70	5	5	*	18	30	155	185
....	....	....	....	....	....	.....	.....	.....	.....	72	22	76	5	5	*	18	30	170	200

*F—Required dimension, slope per foot.

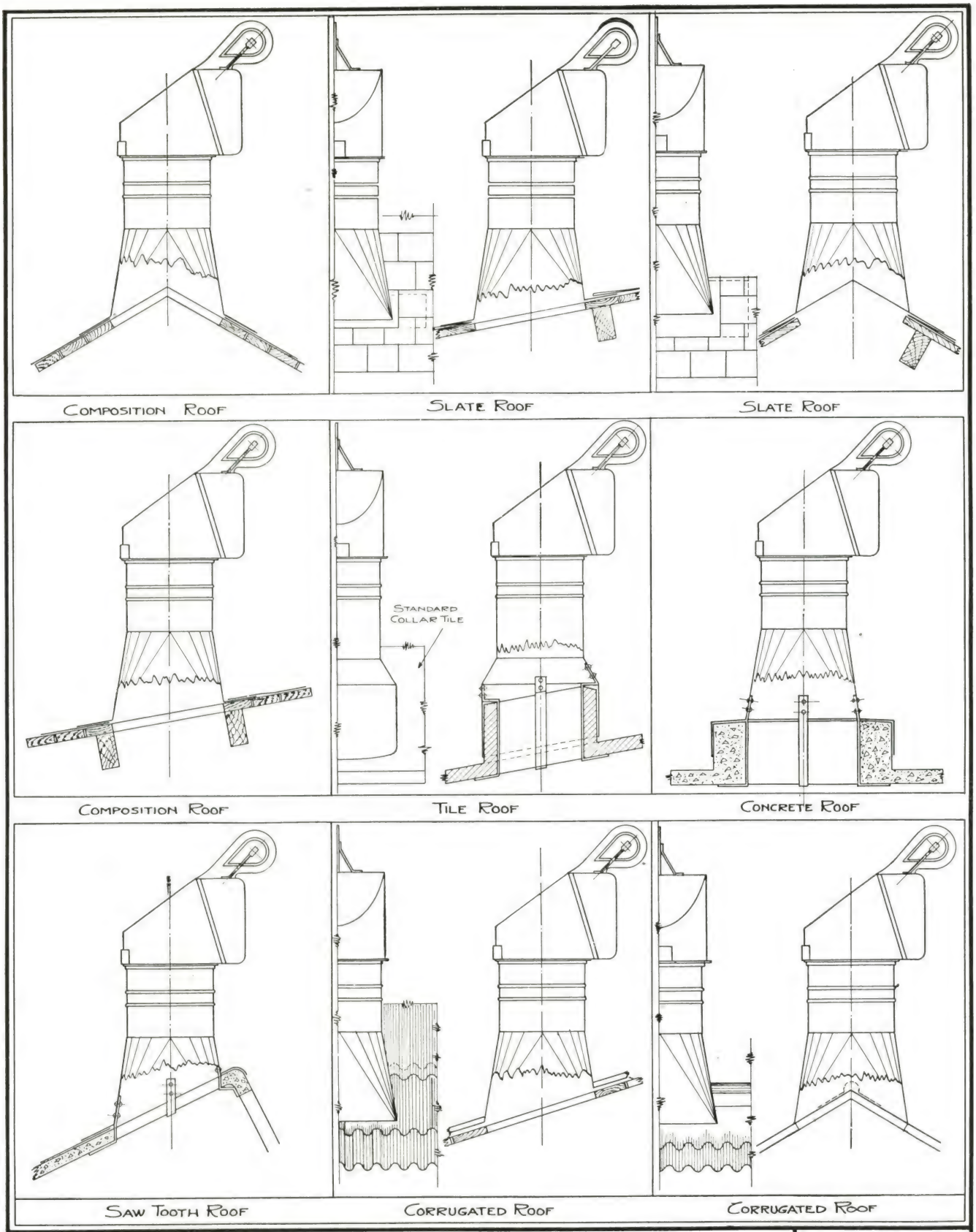
NOTE—When specifying, inquiring or ordering, refer to type of base by letter. State type and pitch of roof, and whether ventilator will rest on peak or slope.

DRAWN BY OHIO BODY & BLOWER CO. CLEVELAND, OHIO

DATA AND DIMENSIONS OF VENTILATORS & BASES FOR SWARTWOUT ROTARY BALL BEARING VENTILATORS

NOT DRAWN TO SCALE DATE AUG. '22 DR'WG 1

Continued on next page



DRAWN BY OHIO BODY & BLOWER CO. CLEVELAND, OHIO	DETAILS OF FLASHING CONDITIONS SWARTWOUT ROOF VENTILATOR	SCALE 1½" EQUALS 1'-0" DATE AUG.-'22	DRWG 2

ROYAL VENTILATOR COMPANY

412 Locust Street
PHILADELPHIA, PA.

Products

Manufacturers of "Royal" Ventilators of Galvanized Steel, Pure Iron, Copper, etc.

Glass Top Ventilators; Rectangular and Square Ventilators with fire retarding dampers; Smoke Jack and Combination Ventilators; Insectproof and Birdproof Ventilators.

Double Cone Ventilators

The double cone is designed to withdraw smoke, fumes, and impure air without any resistance being offered to the outward flow. The lower cone is placed directly in the center of ascending air, which, upon striking it, is deflected directly upward and outward. There are no obstructions. Only an upward draft is obtained. The "Royal" ventilates continuously, regardless of wind or temperature conditions. The tapered frustums force outside air currents over top and down sides, providing a constant strong upward draft.

Construction

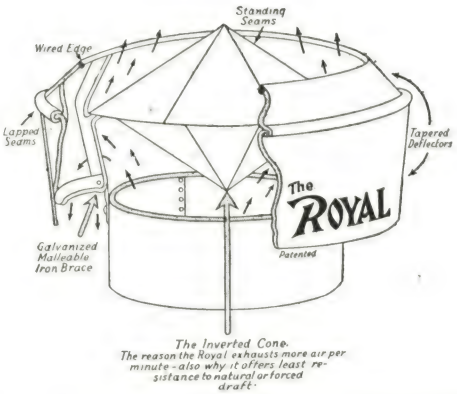
If the construction of the "Royal" ventilator is examined critically, the "Royal" will be specified.

The double cone has two thicknesses of metal, doubling the life of the ventilator. Every known mechanical improvement is embodied in the "Royal"; all sections are built with lapped seams, giving three thicknesses of metal at joints; all edges are wired for rigidity and weather resistance; all bracing is accomplished with galvanized iron stays, so arranged as not to impede passage of air. Absolutely weatherproof.

The "Royal" is especially adapted for foundries and chemical plants.

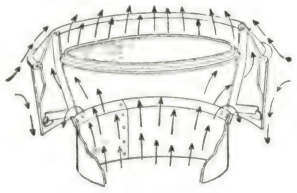
Specification

"Furnish and erect Royal Double Cone [Glass Top] Ventilators, manufactured by Royal Ventilator Company, Philadelphia, Pa."



Double Cone Ventilator, Illustrating the "Royal" Principle—100% Efficient

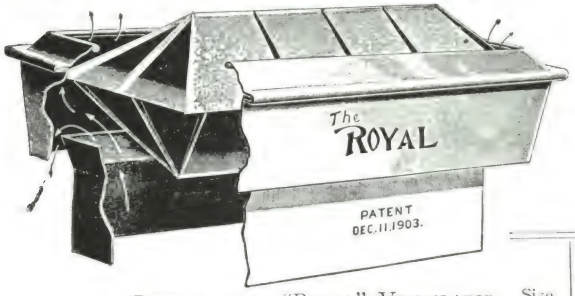
Bases Made to Fit Any Type of Roof



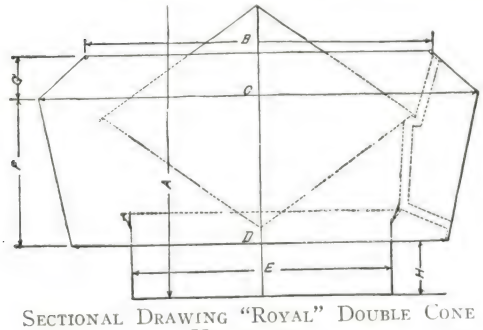
"Royal" Glass Top Ventilator
Gives more light and ventilation

Insectproof Ventilator
For hospitals, barns, powder mills, etc.

"Royal" Ventilator
With fire damper



Rectangular "Royal" Ventilator
Metal or glass top. Made to any size



Sectional Drawing "Royal" Double Cone Ventilator
Send for catalogue and model

"ROYAL" DOUBLE CONE VENTILATOR DATA

Size, in.	Dimensions, in.								Area, sq. in.	Gage of iron	Weight of copper, oz.	List price	Cu. ft. exhaust per minute, wind 7 miles per hour
	A	B	C	D	E	F	G	H					
10	12	13	16	14	10	5	2	3	78	24	16	$ 5.75	141
12	13	15	19	16	12	6	2	3	113	24	16	6.75	159
16	17	20	26	23	16	8	3	3	201	24	16	20.00	388
18	18	23	29	26	18	8	3	3	255	24	16	27.00	490
20	21	25	31	28	20	10	4	5	314	24	16	33.00	606
22	24	26	34	32	22	11	4	5	380	24	16	36.00	729
24	24	30	39	34	24	11	5	5	453	22	16	40.00	874
26	24	33	42	36	26	13	4	3	527	22	16	50.00	1005
28	26	35	45	40	28	13	5	3	615	20	16	56.00	1186
30	26	35	45	41	30	14	5	4	707	20	18	65.00	1364
32	25	37	47	44	32	14	5	4	804	20	18	80.00	1551
34	28	40	50	48	34	15	5	4	908	20	18	100.00	1765
36	28	44	56	51	36	15	6	4	1017	20	18	120.00	1961
40	34	47	61	55	40	16	7	5	1257	18 and 20	18	180.00	2424
42	32	52	68	63	42	17	7	3	1386	18 and 20	18	190.00	2673
44	35	54	70	64	44	18	7	5	1620	18 and 20	18	200.00	3124
48	39	59	75	70	48	19	8	4	1809	18 and 20	20	240.00	3489
54	42	68	84	77	54	22	9	4	2390	18 and 20	20	300.00	5414
60	47	76	94	82	60	23	8	8	2807	18	24	360.00	6665
66	52	81	103	94	66	26	9	6	3504	18	24	420.00	7851
72	50	86	108	98	72	26	10	6	4071	18	24	480.00	10682

F. O. SCHOEDINGER

Manufacturer of Rotary Suction Ventilators

COLUMBUS, OHIO

Products

FOSCO ROTARY SUCTION BALL BEARING VENTILATORS.

Also "Columbus" Stationary Ventilators; Puttyless Skylights; Underwriters' Tin Clad Fire Doors; Underwriters' Fireproof Metal Windows.

Also sole manufacturer of Fosco Universal Lock Joint Metal Ceilings and Kinnear & Gager's Quad Lock Metal Ceilings, also Metal Hospital Furniture.

FOSCO

TRADE-MARK

Description

The Fosco rotary suction ventilator is rigidly constructed from galvanized steel, Armco iron or copper, supported by an adequate framework of rust resisting steel and malleable iron. It is equipped with high grade, high speed hardened steel ball bearings, which are immersed in heavy acid resisting lubricant, fully weatherproofed and easily accessible.

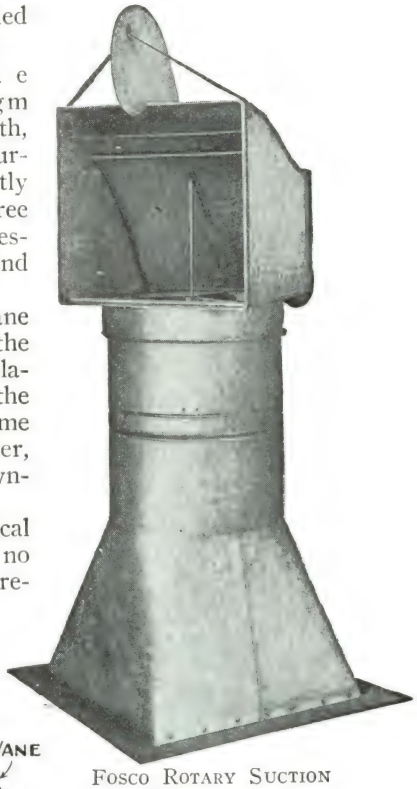
Operation

The Fosco rotary suction ventilator contains the inner air passage through which the passing winds and breezes blow with accelerated force, unhampered by conflicting cross currents, causing a pronounced vacuum in the head of the ventilator. The head of the ventilator is much larger than the stem, allowing the rising foul air to spread out along the horizontal line of the diaphragm, where it is caught by the suction of the swiftly moving air currents discharging from the passage above and carried out.

The diaphragm consists of a smooth, curved galvanized surface, which greatly assists in the free passage of the air, especially at low wind velocities.

The ample vane always holds the mouth of the ventilator away from the wind, making same proof against weather, rain, storm and downdrafts.

As no mechanical power is used, no operating expense results.



FOSCO ROTARY SUCTION VENTILATOR
Mounted on square base

·OFFICIAL TEST·
OF
·Schoedinger's Rotary Suction Ventilators·
·Made at the Mechanical Engineering Laboratory of·
·The Ohio State University·

Wind Velocity Miles Per Hour		5	10	15		5	10	15
Velocity of Air thru Ventilator, Feet Per Minute		538	632	726		538	632	726
		·Cubic Feet of Air Discharged by Ventilator·						
Size of Ventilator, Inches.	10	Per Min.	294	345	397	36	3810	4470	5130
		Per Hour	17640	20700	23820		228600	268200	307800
	12	Per Min.	423	497	571	42	5170	6080	6990
		Per Hour	25380	29820	34260		310200	364800	419400
	14	Per Min.	575	674	774	48	6750	7920	9120
		Per Hour	34200	40440	46440		405000	475200	547200
	16	Per Min.	752	880	1013	54	8550	10030	11550
		Per Hour	45120	52800	60780		513000	601800	693000
	18	Per Min.	950	1117	1283	60	10570	12400	14270
		Per Hour	57000	67020	76980		634200	744000	856200
	20	Per Min.	1173	1380	1585	66	12800	15000	17280
		Per Hour	70380	82800	95100		768000	900000	1036800
	24	Per Min.	1690	1985	2280	72	15230	17880	20550
		Per Hour	101400	119100	136800		913800	1073000	1233000
	30	Per Min.	2640	3100	3570	—	·	·	·
		Per Hour	158400	186000	214200		·	·	·

The above table is based upon actual tests of 18 in., 24 in., 36 in., and 48 in., Ventilators. The tests were made with the Ventilators located on the roof of the laboratory, 38 ft. above the floor. All results were corrected to an inside temperature of 70° Fahrenheit and an outside temperature of 30° F.

F. W. Marquis.
Professor of Steam Engineering
The Ohio State University
June, 9, 1917.

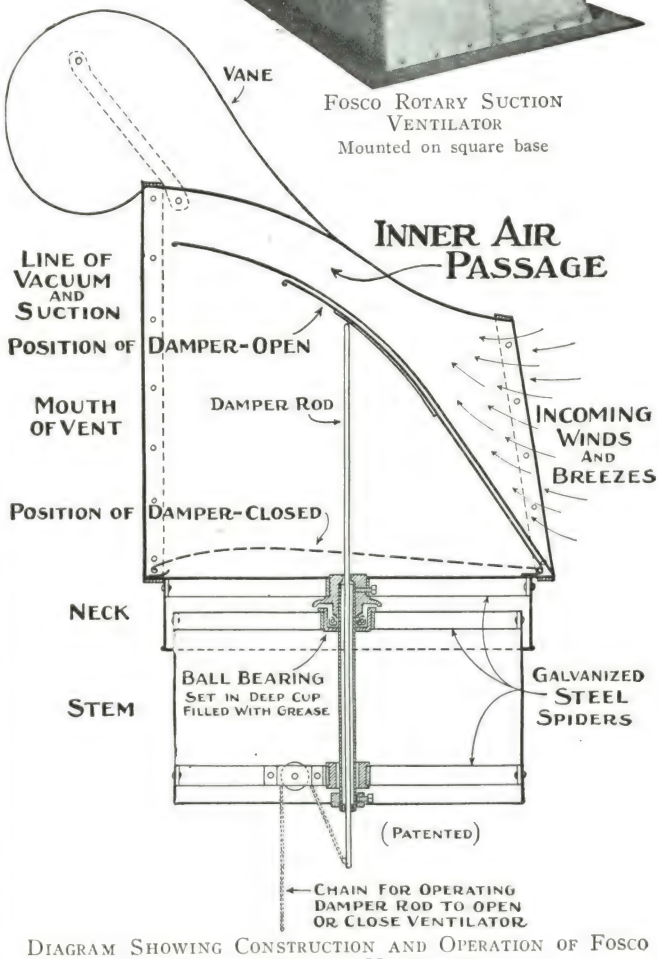


DIAGRAM SHOWING CONSTRUCTION AND OPERATION OF FOSCO ROTARY SUCTION VENTILATORS

THE STARK SHEET METAL WORKS CO.

Roof Ventilators
418 Second Street, S. E.
CANTON, OHIO

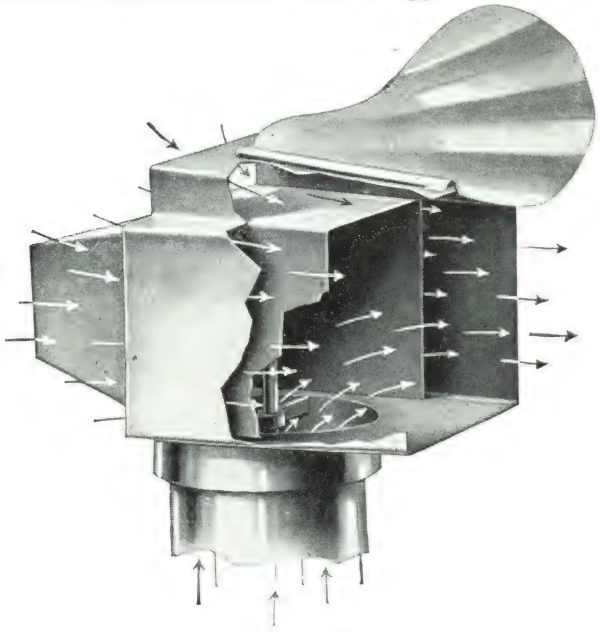
Products

MACK EJECTOR-VENTILATOR.
AIR-O-MATIC VENTILATOR.
For Heat Regulating Devices, see page 1720.

Mack Ejector-Ventilator (Patented 1919)

It is readily admitted that nearly all ventilators are weatherproof and it is also common knowledge that all of them ventilate with varied efficiency under favorable conditions, but the requirements of a ventilator do not cease here. The ventilator to be desired is one that will operate in a low wind as well as in a high wind, one that has ease of motion so that down-draft is eliminated and, lastly, one that has proved its dependability in actual practice.

The Mack Ejector is of recent origin, thus we have been enabled to embody in it all the principles of good ventilation that modern science can suggest.



MACK EJECTOR-VENTILATOR
Showing direction of air currents

AIR CHANGES PER HOUR WITH THE MACK EJECTOR-VENTILATOR

For ventilating workshops and factories	2 to 3
To prevent sweating in closed rooms	3 to 5
Comparatively crowded buildings, such as restaurants, schools, hospitals, theaters, etc.	5 to 10
For removing of light fumes, smoke, odors, etc.	8 to 10
For drying leather, paint, etc.	10
Highly heated rooms up to 100° Fahr.	10 to 12
For removing steam or heavy fumes	15 to 20
For removing light dust	20
Highly heated rooms up to 120° Fahr.	20 to 30

Do not place ventilators more than 30 ft. apart; average distance, 20 ft.

WEIGHTS AND SIZES, MACK EJECTOR-VENTILATOR

Size No.	4	6	8	10	12	14
Gauge steel	26	26	24	24	24	24
Weight, lbs.	15	18	20	35	45	65
Displacement, cu. ft. per hour	4,300	9,600	17,000	26,600	38,400	52,200

Size No.	16	18	20	24	30	36
Gauge steel	22	22	22	22	20	20
Weight, lbs.	85	120	135	185	265	450
Displacement, cu. ft. per hour	68,200	86,300	106,500	153,400	230,000	278,000

Operation—The wedge is always headed into the wind due to the practically frictionless bearing. This prevents back pressure or down-draft. The wedge deflects the current into three perfect ejectors which cover the head. These ejectors, decreasing in size toward the discharge ends, act as air compressors so that the current is accelerated in passing through and discharged at high velocity. This means the utilization of low velocity wind pressure. This powerful and constant ejector discharge generates a continuous partial vacuum in the head, causing a strong suction in the stack. Heavy gases and cold air are easily lifted regardless of weather or climate.

Bearing—The bronze cone bearing, working in a female part, may be likened to a top, operating with comparatively the same ease and as silently. Furthermore each ventilator is properly balanced, thus reducing friction to a minimum. Repairs and other attention are practically nil.

Installations and Testimonials—Mack Ejector-Ventilators have been on the market six years and thousands are in use. Far from being an experimental idea, they have by actual service proved their merit for many of the country's largest industrial concerns, such as:

The B. F. Goodrich Rubber Co.
International Harvester Co.
Firestone Tire & Rubber Co.
National Screw & Tack Co.
Dodge Bros.
Standard Oil Co.
The Barrett Co.
Diamond Match Co.
Willard Storage Battery Co.

Also various schools, hotels and public buildings.

Numerous testimonials have been received and are in our files. An example is the following from the National Screw & Tack Co.:

"Our nickel plating department caused us considerable trouble. The fumes passed through into other departments, causing the bright bolts which were in process to become badly coated with rust.

"Since your installation of these ventilators all of our trouble has been avoided, the air in this room being perfectly pure at all times. Not only we ourselves, but the men working in this department, praise your ventilators every day."

Air-o-matic Ventilator

This ventilator is of the stationary type and constructed along lines that are scientifically correct in every respect.

Regardless of the direction of the wind (straight across, up or down) this ventilator will perform at maximum efficiency without danger of down-draft. This in itself is an accomplishment, the secret of which lies in the fact that our first consideration has been the unobstructed passage of air.

The special double cone safeguards against inclement weather and down-draft without needlessly sacrificing free air capacity. The lower part of the body is open so that rain driving in at the top will strike the lower cone and fall harmlessly on the roof.

Made in two sections—easy to paint and erect.

AIR-O-MATIC VENTILATOR

ESTABLISHED 1873

E. VAN NOORDEN & COMPANY

Ventilators

TELEPHONE
ROXBURY 3040, 3041, 3042

100 Magazine Street, near Massachusetts Avenue
BOSTON, MASS.

Products

GALVANIZED STEEL or COPPER VENTILATORS.
For Skylights, see page 981.

Storm King Ventilator

Consists of a revolving ball bearing head on a stationary barrel. Because of the large fin on the head and free ball bearing, head always swings into the wind.

Flaring shape of head causes a powerful suction at mouth of ventilator and a free exhaust of full capacity of shaft.

Damper is hinged about midway at the top and in an open position sets against underside of head, thereby allowing a full flow of exhaust air unhampered by any obstructions.

When closed, damper completely seals mouth of ventilator and prevents any back action of snow and sleet, which can not lodge on sloping surface of damper.

Gutters are provided at each side of damper, also weatherstrip at top, insuring tightness. The damper is operated with a chain running through tubular spindle, thus the chain can not foul braces and supports.

Owing to careful adjustment of bearings, the head is very sensitive to alternating currents and is effective even in moderate winds.

Simplex Ventilator with "Suretite" Damper

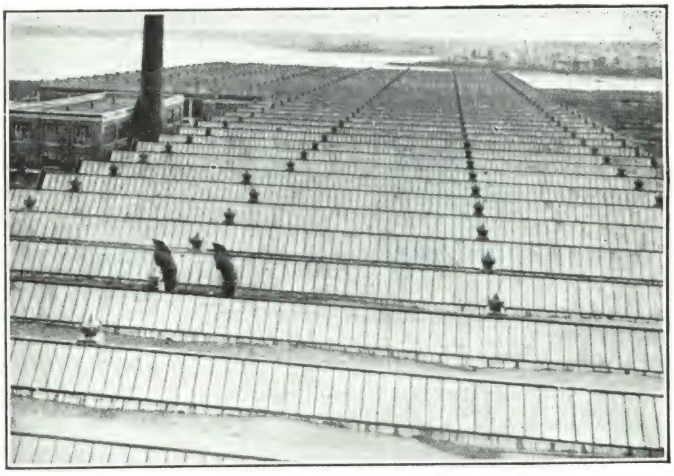
The Van Noorden leading type of fixed ventilator.

In addition to the band shield (for weather protection when ventilator is open), damper is constructed to completely close top of shaft, insuring an absolutely weatherproof ventilator when up-draught is cut off.

Damper is of a double cone form. With damper closed, upper cone will shed filtration of fine snow. With damper open, lower cone or deflector accelerates up-draught in shaft and at the same time prevents "pocketing" or back-draught.

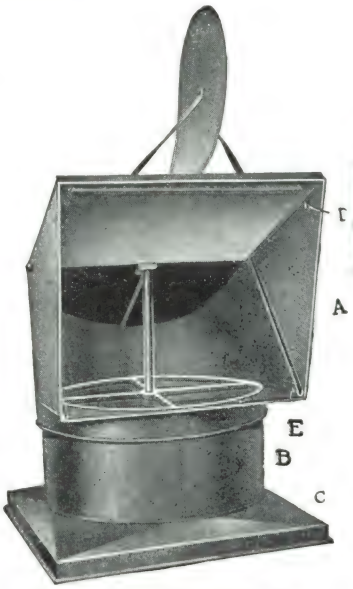
Vent heads without deflectors mean uncertainty of air movement and ineffective exhaust.

The "Suretite" damper is of a sliding type, easy to operate, and can be locked in varying positions.



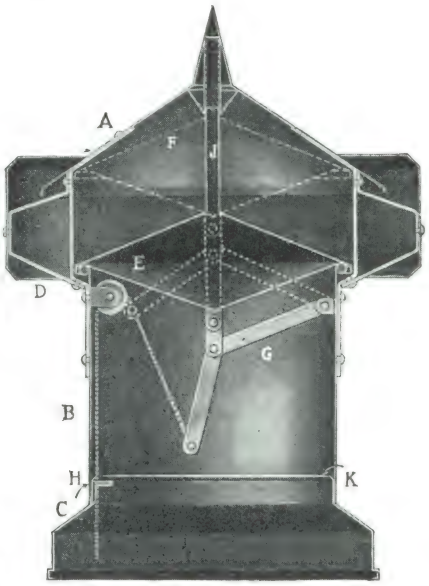
WEAVE SHED OF NAUMKEAG STEAM COTTON CO., SALEM, MASS.
100,000 sq. ft. of Van Noorden skylights with 250 Simplex ventilators

"STORM KING" ROTARY BALL BEARING VENTILATOR



"STORM KING" ROTARY BALL BEARING VENTILATOR

A—Revolving head; B—Fixed barrel; C—Base; D—Gravity damper (open position); E—Side gutter insuring tightness of damper



"SIMPLEX" VENTILATOR WITH "SURETITE" SLIDING DAMPER

A—Head; B—Barrel; C—Base; D—Weather shield; E—"Suretite" gravity sliding damper (closed); F—Damper (open); G—Operating arm; H—Chain lock (locking damper in open position); J—Telescopic damper guide; K—Gutter (for condensation)

BRASCO MANUFACTURING COMPANY

Metal Store Fronts

TELEPHONE
DREXEL 3160

5025-5035 South Wabash Avenue
CHICAGO, ILL.

Products

BRASCO SYSTEM COPPER STORE FRONTS; distributers of BRASCO-HESTER SYSTEM COPPER STORE FRONTS.

Also Drawn Metal Mouldings in Copper, Brass, Bronze, Steel; Drawn Metal Covered Mouldings; Metal Store Front Ventilators and Showcase Doors; Brass Thresholds, Push and Pull Plates, Kick Plates, Push Bars; Brass and Bronze Railings; Ladders, and other Brass, Bronze and Copper Architectural Products.

Co-operative Service

Full descriptive catalogue and detail portfolios available for architect's use sent on request. This company will gladly assist architects in solving any special store front problem they encounter.

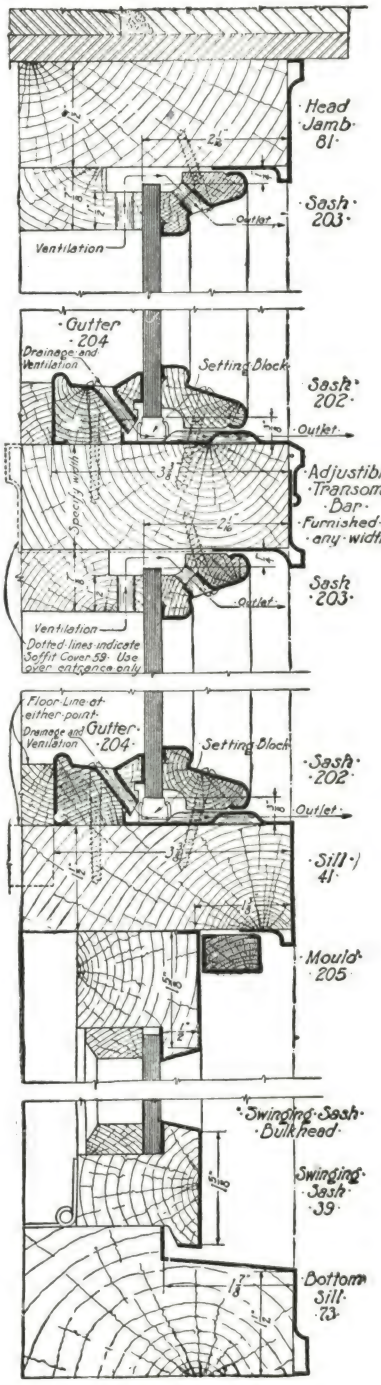
Brasco and Brasco-Hester Systems of Store Fronts

Both systems embody the essential elements necessary to insure safety and permanency in the setting of plate glass. They combine simplicity and practicability with architectural beauty, eliminate painting and repairing and obtain the lowest rate of plate glass insurance. Such other features as ventilation, drainage, maximum daylighting and ease of installation are embodied, which, together with the principle of indirect screw pressure, reach the highest degree of perfection in both systems. No direct screw pressure with its erratic grip to cause breakage either in setting or during sudden climatic changes.

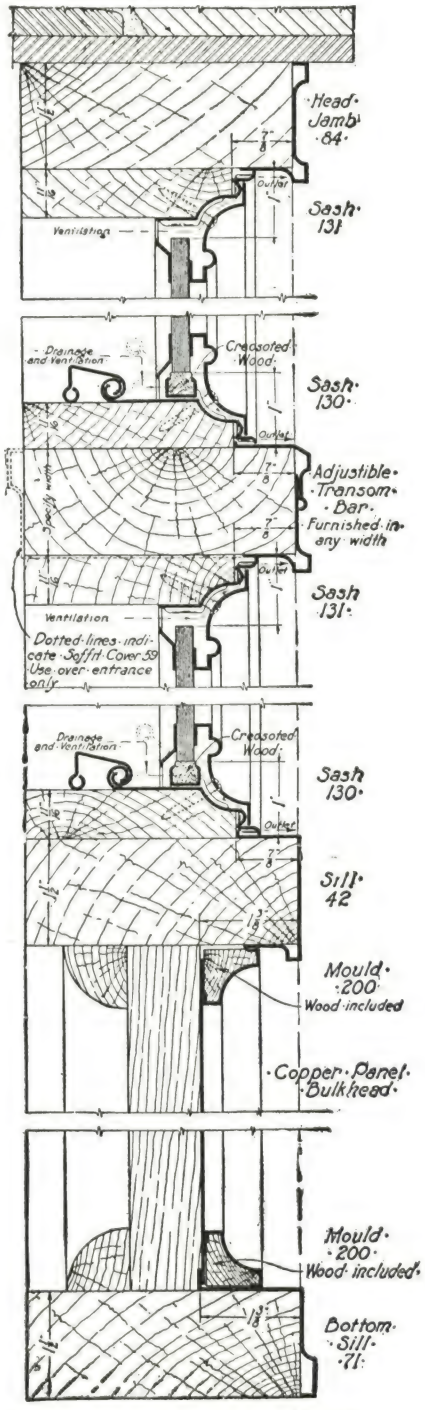
The Hester construction is made of heavy gauge solid copper uniformly attractive and durable. No unsightly gutter holes show on inside of glass; no holes are punched in outer retaining strip to weaken sash or catch lint and dirt.

Insurance Company's Approval

Brasco utilizes what the insurance companies' statistics prove to be the safest method of setting glass—the uniformly supple wood stop, rendered imperishable by Brasco special creosoting process, through which it passes. This specially treated cypress moulding has been adopted as the basis for glass setting because insurance records show less glass breakage for the old fashioned wood stop than for any other setting. In addition to the protective chemical treatment, pure lake copper of substantial gauge is tightly drawn and securely locked over every portion of the wood exposed to the weather, forming a highly attractive and at the same time most practical and safe system of construction.



SECTIONAL DETAIL OF BRASCO STORE FRONT CONSTRUCTION



SECTIONAL DETAIL BRASCO-HESTER STORE FRONT CONSTRUCTION

Continued on next page

Advantages of Brasco Copper-Covered Creosoted Type

Utilizes the merit of the wood setting, determined by every insurance company as being safest for glass, together with the imperishable properties of cypress and creosote, and the beautifying and protective qualities of copper.

Instead of the resilient and erratic glass grip or the hard tension grip Brasco employs the approved firm, supple, and uniform hold.

Glass is set from outside and sash placed by the indirect screw pressure method.

Has the widest drainage gutter of any store front system on the market.

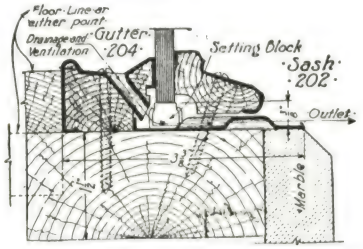
Details Brasco Copper Covered Creosoted Sash

Affords more ventilation than any other copper front, therefore, insures clearer plates and more efficient display service.

Details show the sturdy, durable and beautifully designed mouldings used.

Brasco jamb, transom, sill and sash members take standard size of lumber.

Copper used where copper is necessary, therefore, *Brasco costs less.*



Brasco Sash as Used at Base Without Copper Sill Member

Advantages of Brasco-Hester Shell Copper Type

Large heavy gauge solid copper sash.

Drain and vent holes are embossed in the inner member and not punched in the outer retaining strip. The latter method, which is ordinarily practiced, tends to weaken the sash and to catch lint and dirt.

The inside gutter holes do not show.

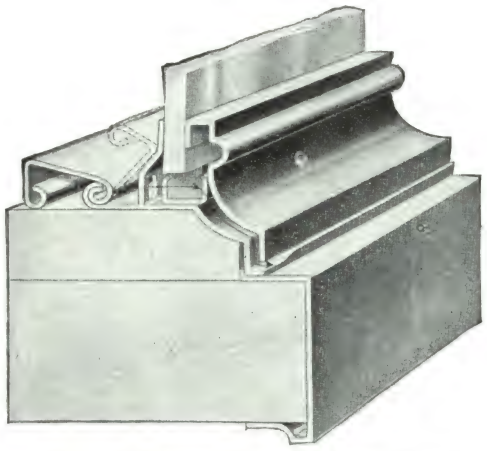
The even indirect screw pressure method of glass setting is employed.

Affords maximum daylight.

Sash can be used without jamb or sill.

The most efficient system for keeping show windows free from frost and mist.

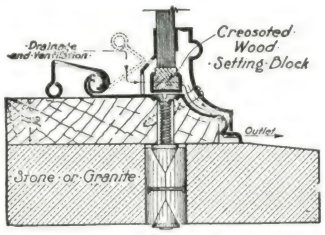
Has a smooth working dust regulator.



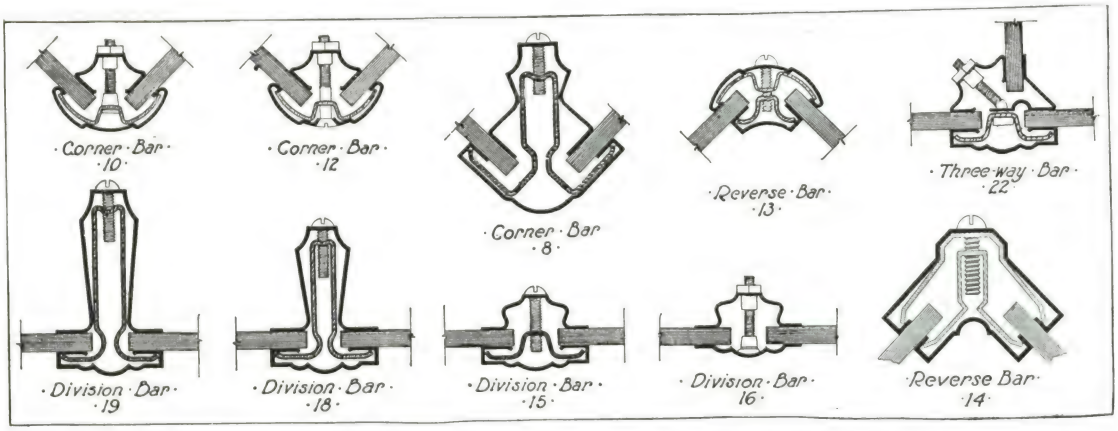
Details Brasco-Hester Hollow Type Copper Sash

Mouldings are of substantial and artistic design.

Takes stock sizes of mill work. *Costs* no *more* than the ordinary lightweight sash.



Brasco-Hester Sash as Used at Base Without Copper Sill Member



Corner and Division Bars, Brasco and Brasco-Hester Systems

These bars for use with both Brasco and Brasco-Hester types

COPPER STORE FRONTS

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER AND BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Ventilators	990

Copper and Brass in Store Front Construction

Some years ago a practicing architect whose work had largely to do with the problem of store front construction, devised the modern hollow metal system that is the parent of the numerous types now in common use.

The store front that is popularly used today lays just claim to a sound architectural foundation, but it is not altogether because of its architectural value that this development has become popular. Its characteristics and the materials from which it is commonly made have played an important part in modern merchandising.

The passing of the wood store front and its poor display is as much a mark of progress and efficiency as is the passing of the hunting case watch of yesterday and many other obsolete inconveniences.

Copper and brass have been used almost exclusively in the development of the modern store front because of their non-corrosive qualities, their strength and character, distinctive adaptability to machine production of architecturally correct contours and desirable color effects, and the ductility which makes these metals sympathetically responsive to the "come and go" of the correlated construction.

Copper and Brass Store Fronts for Efficient Merchandising

The relation of the modern copper store front to modern merchandising is one that should not be underestimated by the designer of the building or the owner. The show window is either the magnet that draws prospective purchasers to a face-to-face knowledge of the merchandise the store contains or it is an instrument that turns the prospective purchasers away from the desired result at the most inopportune time.

The purpose of the show window is to display merchandise to advantage. The sympathetic character of the frame for the picture either contributes to the desired result or detracts from it; the frame is incidental, but harmony is essential. The simple and dignified lines and proportions of the modern copper construction are pleasing without being conspicuous.

Another function of the show window is salesmanship. Good salesmanship demands an uninterrupted presentation that is impossible with the massive construction and embellishment of the wood store front.

The modern copper store front construction has made possible the utilization of every square foot of building frontage for display. It has eliminated the shadows cast by bulky parts, and has provided the maximum of daylight for display of merchandise within the store. It has also removed the limitations on the old type of merchandise display, and, by its adaptability to ingenuous arrangement and design, has made possible the combination of spacious entrance ways flanked by long and commodious display windows and unobstructed vision.

NEW YORK'S FIRST COPPER STORE FRONT, INSTALLED MORE THAN 30 YEARS AGO, TODAY GOOD AS NEW

Standardized Store Front Construction

The various parts of copper and bronze store front construction have been standardized by the manufacturers so that all of the ordinary and practically all of the extraordinary requirements are satisfactorily, scientifically and economically met.

Ventilating sash, glass stops, division bars, 3-way bars, reverse corner bars, sill coverings, transom bar coverings, bulkhead construction, copper panel work, kick plates, thresholds, etc. are provided and all of the standard construction is quickly available through the numerous local dealers who carry stocks of store front construction, as they do other standard products that enter into the building operation.

Architectural Drawings

Manufacturers of standard copper and brass store front construction are and have long been co-operating with architects by presenting the detail of their products in drawings made to a scale that fits the architect's preference and working procedure.

These presentations are very comprehensive, and in most cases intelligently cover the many conditions that are parts of the architects' considerations. Most of these manufacturers maintain service departments that co-operate with architects in working out extraordinary requirements.

The COPPER AND BRASS RESEARCH ASSOCIATION refers the architect to these manufacturers and particularly to the ones whose reputation and standing carries with it the assurance of permanent satisfaction.

THE J. W. COULSON & CO.

Store Front Construction

95-107 West Spring Street
COLUMBUS, OHIO

Products

Sole owners and manufacturers of the COULSON PATENT STORE FRONT CONSTRUCTION.

Also Drawn Copper Moulding.

Description

This construction is complete and adaptable to any store front, large or small, expensive or inexpensive. It is furnished ready to set in place and is easily installed. It makes an attractive, substantial and durable store front and provides a safe and practical setting for the glass.

The corner posts, division bars, transom bars and stops include the wood, and all but the last named are reinforced with steel tees having lugs at either end by which they are secured to the base, jamb and lintel casing and door posts, and where they intersect are bolted together. This makes a strong steel framework. The wood that incases them is treated with creosote to prevent decay.

Finish

The entire outer surface is covered with copper. The finish is polished copper, statuary bronze, nickel-plated, gunmetal and spotted oxidized copper.

Ventilating System

Proper and effective ventilation of show windows is accomplished by using Coulson ventilating transom bar at the top of the lower glass and Coulson ventilating and drainage sill at the bottom.

The transom bar includes the creosoted wood reinforced with steel tee, to which an angle is attached when a support is required for the canopy ceiling and metal covering, and stops.

The ventilating openings provide an outlet for air that has passed through tubes in the sill and circulates over the inside surface of the glass and through enclosed show windows. It also provides for ventilation and drainage for transom glass.

Awning Provisions

The Coulson awning hood is of copper metal, supported on copper covered steel brackets, and provides a protection for the awning when rolled up.

With it is furnished a complete metal covered awning transom bar, of creosoted wood 8 and 10 in. wide, reinforced by a 2x2-in. steel tee with lugs at either end to secure it to the jamb casing. The part over the vestibule is covered with metal underneath. With spring roller or chain awnings, supports are necessary. For this purpose lugs are secured to steel tees in the corner posts and division bars, to which these awning fixtures are attached.

Metal Coverings

When specified, metal coverings are furnished for jamb and base or bulkheads, of several stock designs.

Also for door posts and other parts of store fronts of shapes and designs required; together with metal covered sash doors with door posts for showcases, polished brass kick plates, and polished brass thresholds.

Specification Data

The frames for the store fronts shall consist of the Coulson patent store front construction as manufactured by THE J. W. COULSON & Co., Columbus, Ohio.

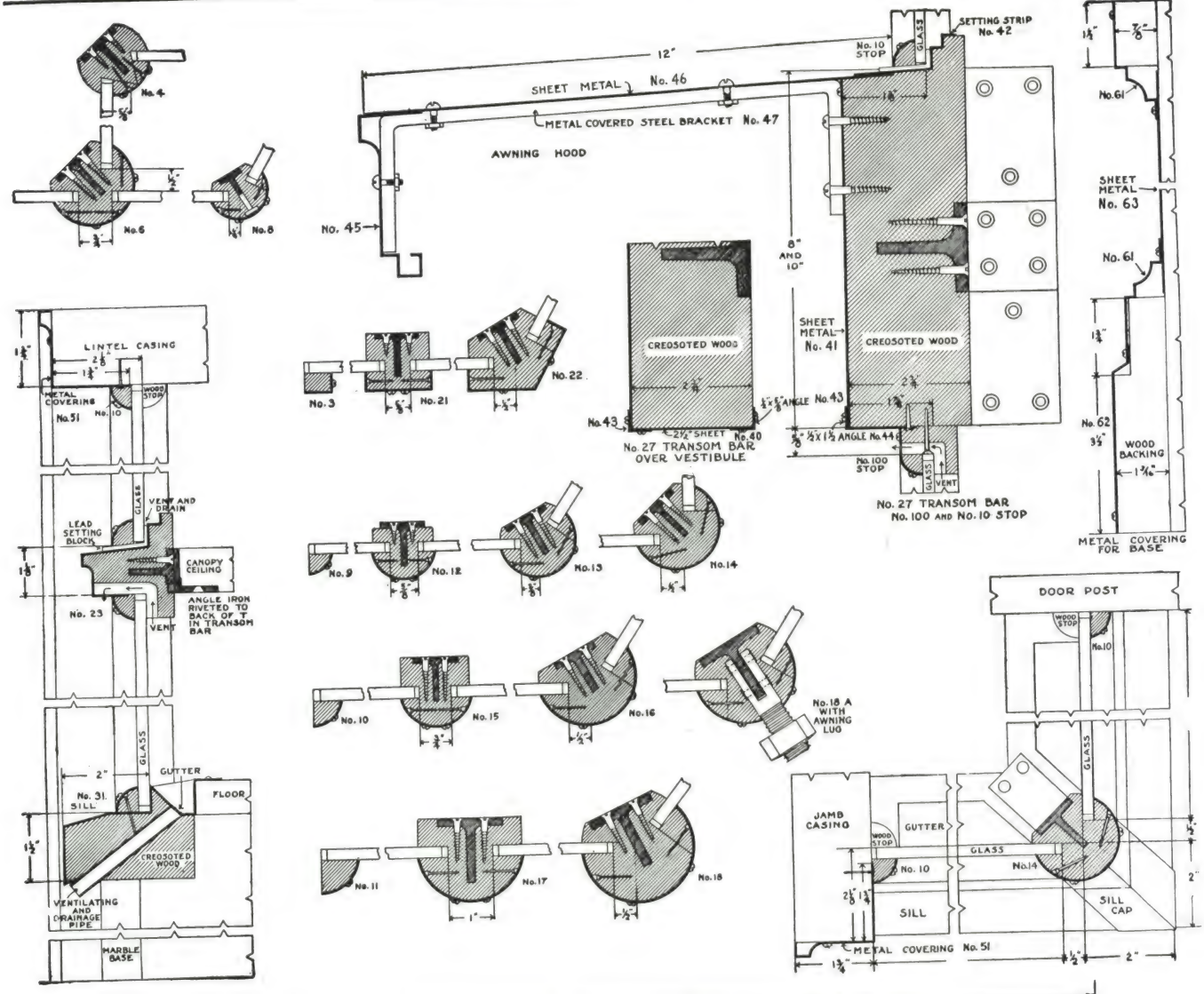
Lintel and jamb casing to be No. 51; sills to be No. 31; stops, division bars and corner posts to be [here give numbers] (see following page for sizes and numbers); transom bars to be No. 23; transom bar over vestibule to be No. 27. (If awning hood is desired, specify transom bar No. 27 with metal covered awning hood No. 45.)

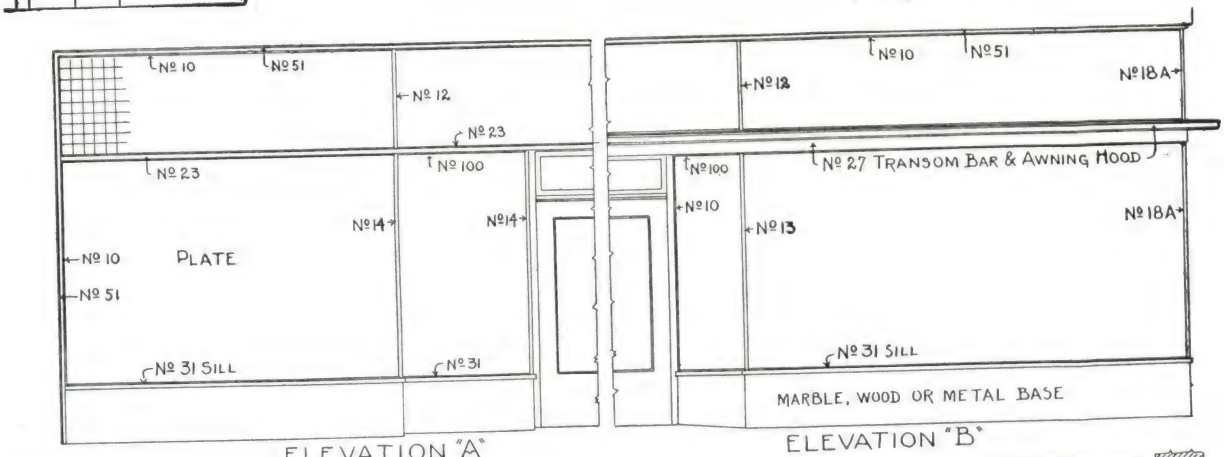
If metal covering for base is desired, specify the required members by numbers as shown on following page.

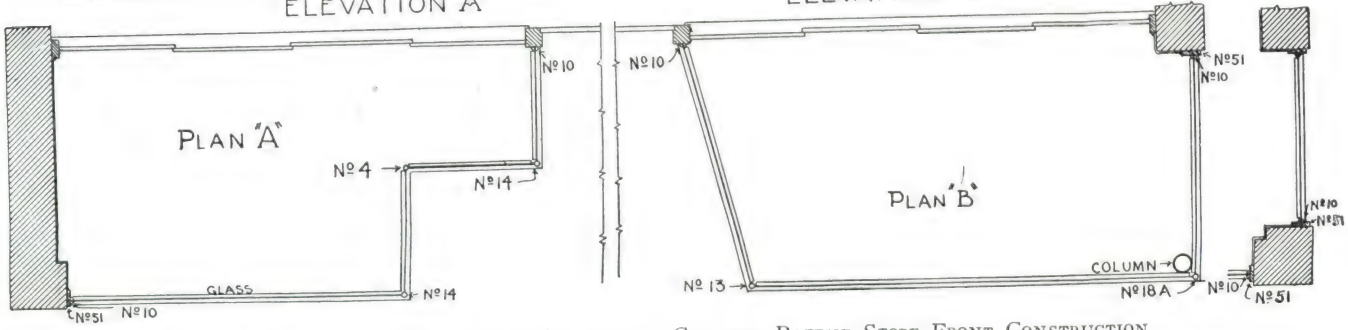
If metal covering is desired for doors, hinged or pivoted sash, door posts, showcases, etc., this should be specified in detail.

TYPICAL INSTALLATION OF COULSON PATENT STORE FRONT CONSTRUCTION

Continued on next page







PLANS, ELEVATIONS AND 3-INCH SCALE DETAILS OF COULSON PATENT STORE FRONT CONSTRUCTION

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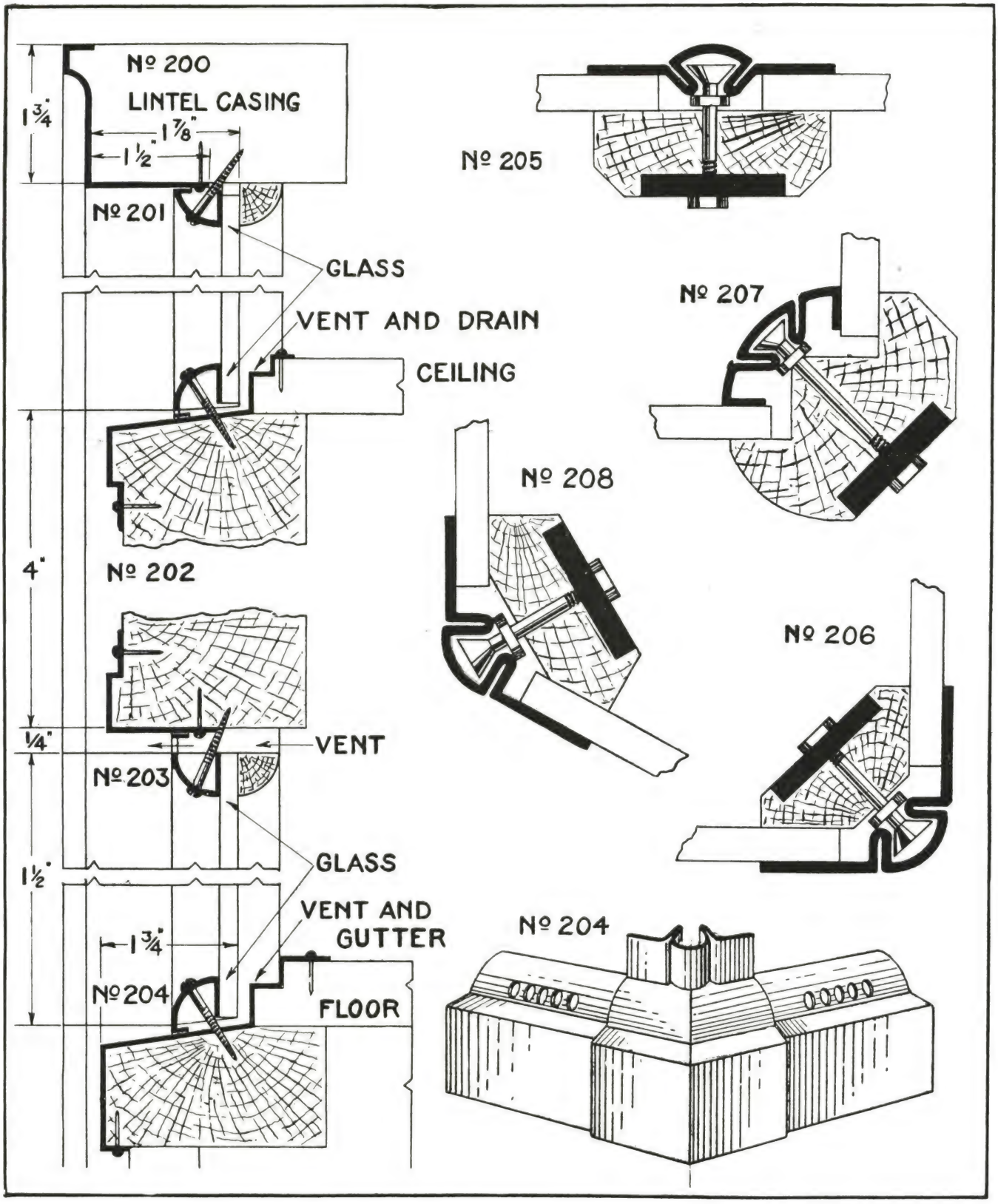


Coulco Store Front Construction Manufactured by the J. W. Coulson & Co.

DETROIT SHOW CASE COMPANY

Makers of Metal Store Front Construction

DETROIT, MICH.

Products

"Desco" Metal Store Front Construction.

Desco METAL STORE FRONTS
TRADE-MARK

Description

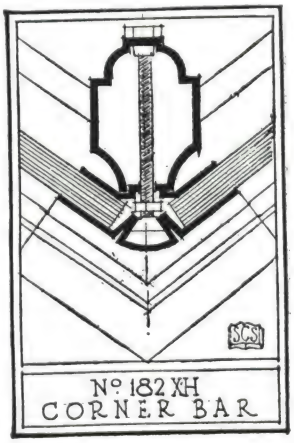
"Desco" store front construction is made and designed along the most approved architectural lines. The several shapes harmonize perfectly with the modern styles of store front construction. All glass-bearing members are of solid, heavy gage copper. The corner and division bars are reinforced at the back by steel channels which have been treated by a special rustproof process. This makes for greater strength, safety to the glass and permanency.

"Desco" Line Complete—The "Desco" line of store front construction is complete in every detail, including ventilated sash, glass stops, division bars, corner bars, 3-way bars, reverse corner bars, sill coverings, transom bar coverings, bulkhead constructions, copper panel work, kick plates, thresholds, etc.

Simplicity—The simplicity of "Desco" store front construction is one of its strongest points. Each member is designed to perform its particular work in the simplest, safest and most practical manner. There are no freak ideas, and over-designing has been systematically avoided. The ordinary mechanic without previous experience can properly and hastily install "Desco" construction. The division and corner bars are easy to handle and the sash resembles, in principle, the long used wood stops. This construction, however, is far more attractive.

Ventilation and Drainage—"Desco" ventilated sash is so designed that the glass rests in a deep rabbet against creosote dipped cypress blocks (about 6 in. long), so placed that ventilation and drainage are well provided for. Large holes are punched in the solid copper face piece of the sash, resulting in free circulation of cool, dry air along the inner surface of the glass, preventing the formation of sweat or frost.

A Typical "Desco" Store Front



Architectural Service

Details of the members used in "Desco" store front construction are shown herewith, together with suggestion for the design of a typical store front.

"Desco" Store Front Construction is sold through distributors and dealers in practically all parts of the country.

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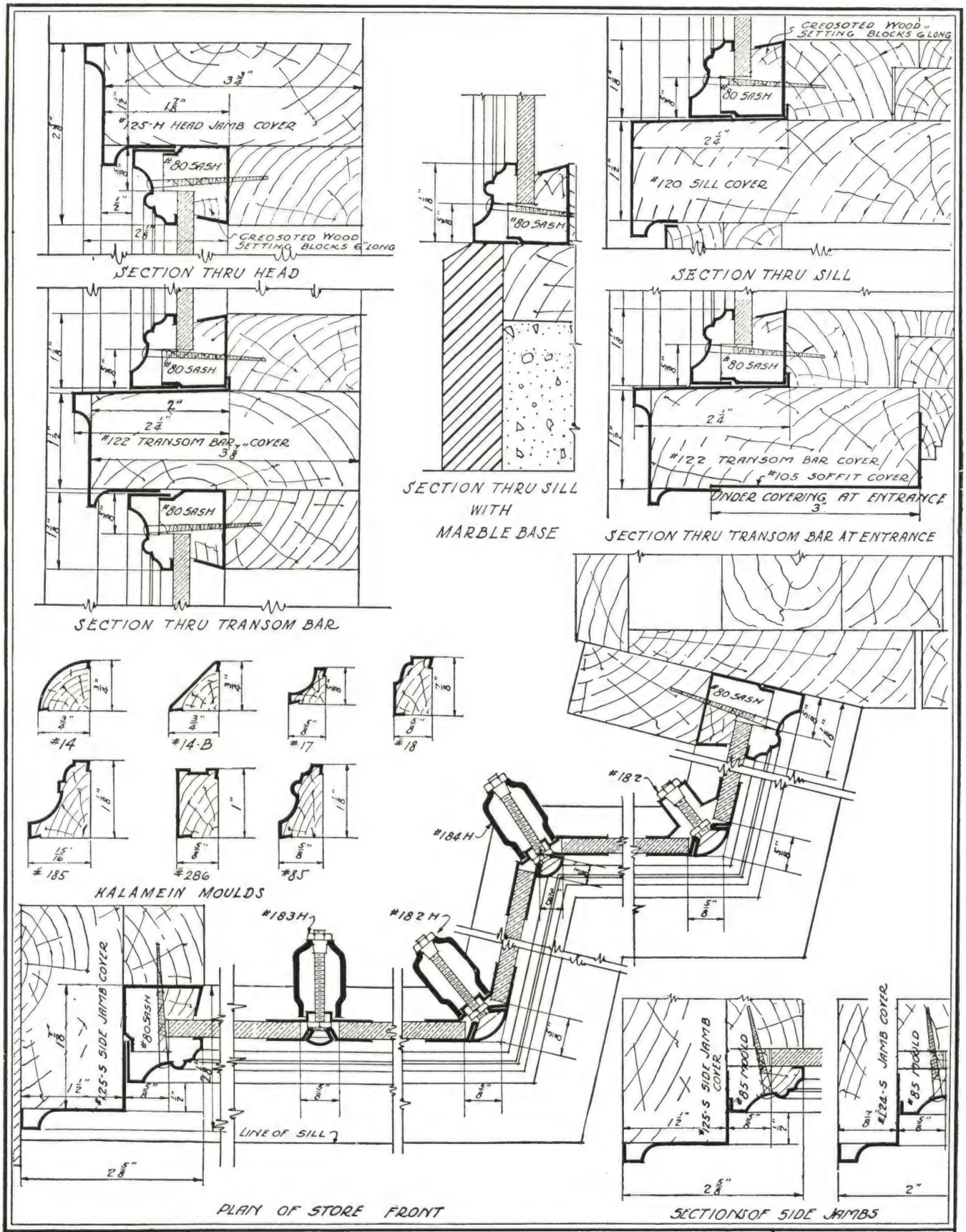
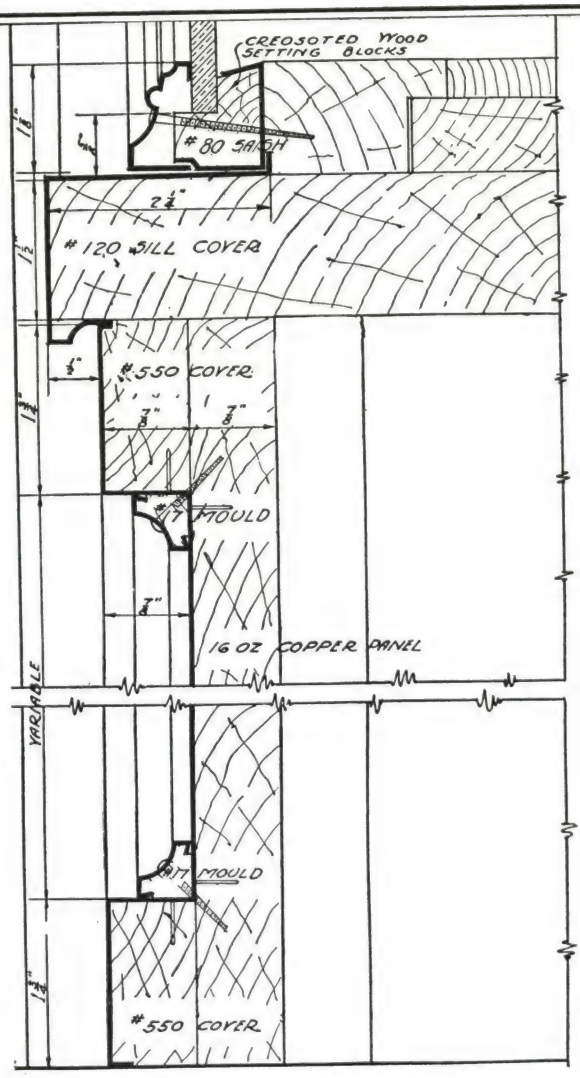
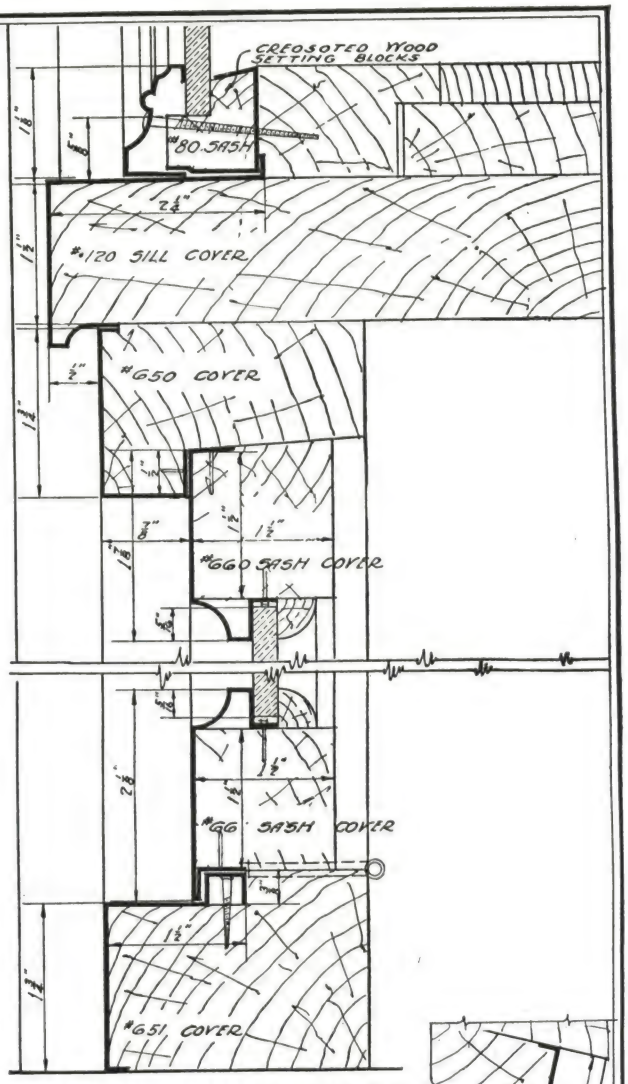


DRAWN BY DETROIT SHOW CASE COMPANY	DETAILS OF "DESCO" COPPER STORE FRONT CONSTRUCTION	SCALE 6" EQUALS 1' 0" DATE APR'22	DRWG 1

Continued on next page

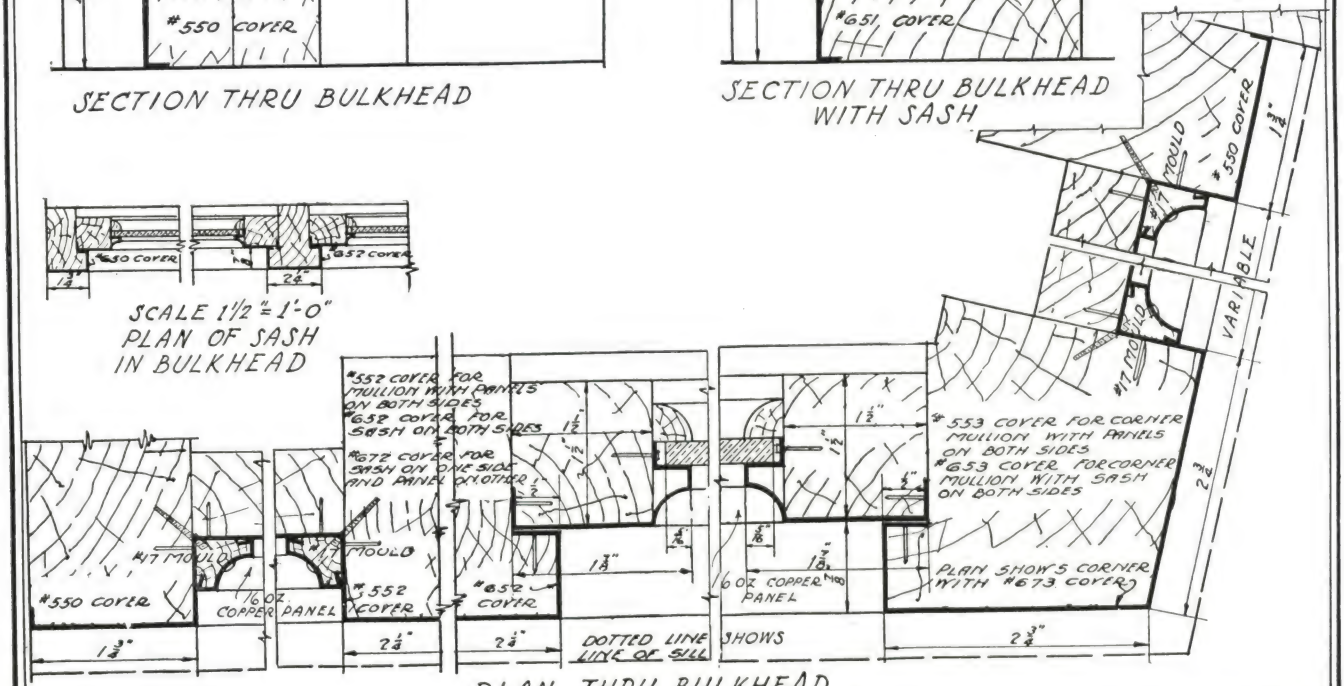


SECTION THRU BULKHEAD



SECTION THRU BULKHEAD WITH SASH

SCALE 1½" = 1'-0"
PLAN OF SASH IN BULKHEAD



PLAN THRU BULKHEAD

DRAWN BY DETROIT SHOW CASE COMPANY	DETAILS OF "DESCO" COPPER STORE FRONT CONSTRUCTION	SCALE 1½" & 6" EQUALS 1'0" DATE APR. '22	DR'WG 2

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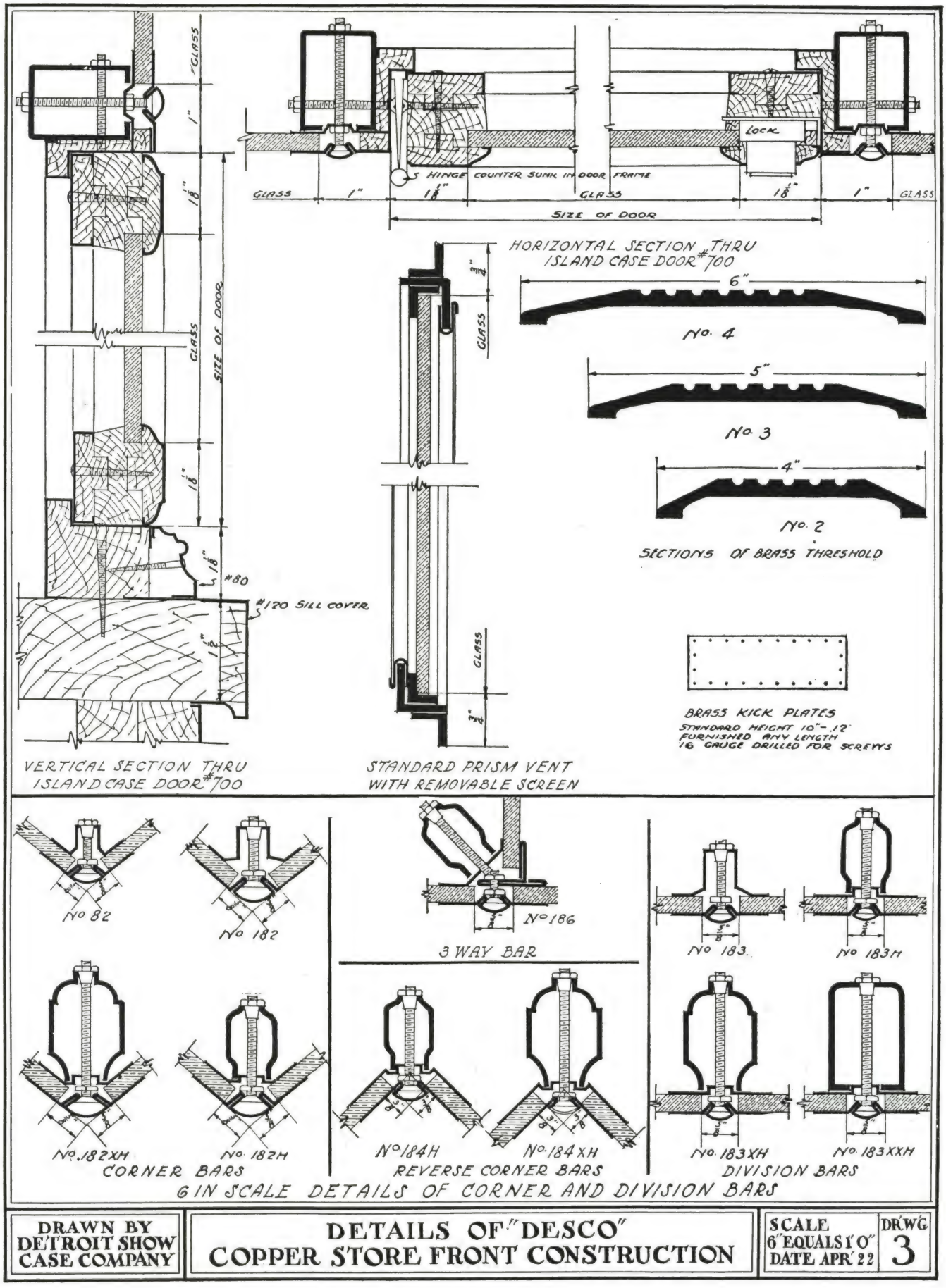

DRAWN BY DETROIT SHOW CASE COMPANY	DETAILS OF "DESCO" COPPER STORE FRONT CONSTRUCTION	SCALE 6" EQUALS 1'0" DATE APR '22	DRWG 3

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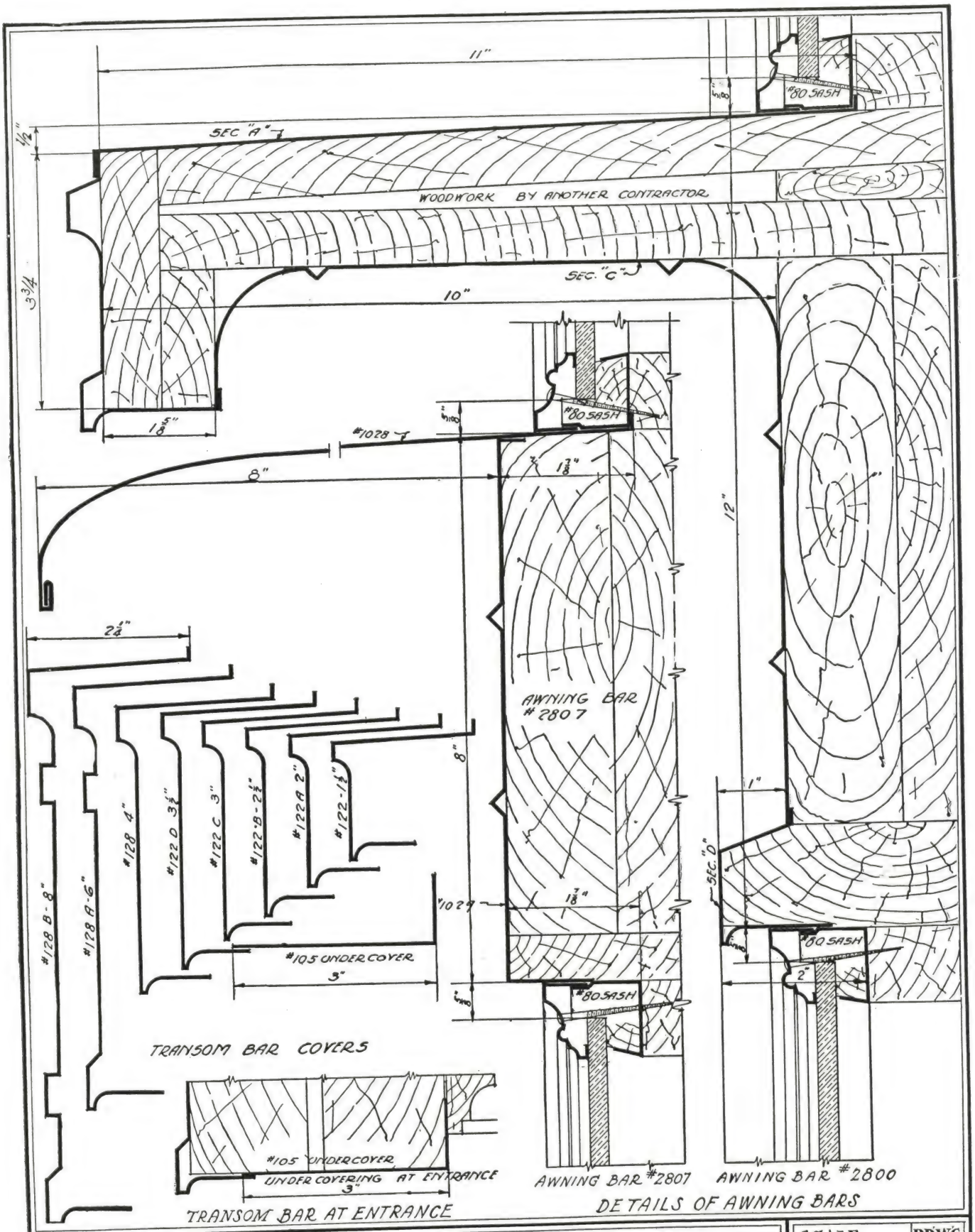

DRAWN BY DETROIT SHOW CASE COMPANY	DETAILS OF "DESCO" COPPER STORE FRONT CONSTRUCTION	SCALE 6" EQUALS 1'-0" DATE APR '22	DRWG 4

THE KAWNEER COMPANY

Metal Store Fronts and Drawn Metal Mouldings

NILES, MICH.

BRANCH OFFICES

ATLANTA, GA., 1109 Candler Building
BOSTON, MASS., 6 Beacon Street
BUFFALO, N. Y., 551 Ellicott Square
CHICAGO, ILL., 1260 Conway Building
DETROIT, MICH., 610 Ford Building
KANSAS CITY, MO., 1211 Grand Avenue Temple
NEW YORK, N. Y., 233 Tenth Avenue
PHILADELPHIA, PA., 501 Central Trust Building

Products

Kawneer SOLID COPPER STORE FRONTS TRADE-MARK

STORE FRONTS made of Solid Copper.

HOLLOW DRAWN METAL MOULDINGS of all descriptions.

Also manufacturers of Reversible Window Fixtures; Pivoted and Hinged Windows made of copper or bronze covered steel frames; Showcases, Thresholds, Metal Window Ventilators, and a number of other Metal Specialties.

Store Fronts

Description—Kawneer store front construction is designed along the *simplest* principles possible. There are no unnecessary and intricate parts to confuse a workman and hamper installation.

All members of this construction are designed along pleasing architectural lines. Each member has a certain relationship to another, thus a harmonious installation is made possible.

Only solid copper is used for the glass gripping parts of any member. Where strength is required, rigid tubular reinforcements are used. These are made of steel and are finished in heavy copper plate.

Advantages—The *resilient grip* as found in the Kawneer store front construction, applied to *both* sides of the glass, is the safest known insurance against glass breakage. The glass is held in a yielding, springlike grip, which absorbs all jars, shocks and vibrations, thus relieving the glass from undue strain. Compare this *resilient* feature with unyielding, viselike grips of metal or wood, as found in less up-to-date methods of glass setting.

Installation—It does not require skilled men or complicated framework to prepare an opening to receive a Kawneer store front.

The construction in general is such that no confusion is possible; expensive mistakes are, therefore, eliminated and installation can proceed with speed and precision.

What Bars to Select—In order to facilitate the selection of the proper bars, a table is given herewith which will be of great assistance in ordering.

As an explanation of this table, a formula is submitted as follows:

It is recommended that all bars, shown in column "A," be used in instances where the combined surfaces of two plates held by such a bar is less than the number of square feet shown in Column "B," and where the square footage of one plate, see Column "C," does not exceed three-fifths of the combined glass area.

This rule applies to all bars up to the limited height, which is found in column "D."

	A	B	C	D
No.	3-B	50 sq. ft.	30 sq. ft.	84 in.
No.	4-B	100 sq. ft.	60 sq. ft.	96 in.
No.	6-B	150 sq. ft.	90 sq. ft.	108 in.
No.	9-A	200 sq. ft.	120 sq. ft.	120 in.
No.	7-B	128 sq. ft.	77 sq. ft.	96 in.
No.	8-B	180 sq. ft.	108 sq. ft.	108 in.
No.	11-B	50 sq. ft.	30 sq. ft.	60 in.
No.	12-B	128 sq. ft.	77 sq. ft.	96 in.
No.	13-B	180 sq. ft.	108 sq. ft.	108 in.
No.	17-B	100 sq. ft.	60 sq. ft.	96 in.
No.	18-B	150 sq. ft.	90 sq. ft.	108 in.

WIND PRESSURE

Velocity	Pressure per sq. ft.	Miles per hour
Brisk gale	1¼ lbs.	16
Very Brisk	3 lbs.	25
High wind	6 lbs.	35
High storm	12 lbs.	50
Great storm	21 lbs.	65
Hurricane	32 lbs.	80
Violent hurricane	50 lbs.	100

Architectural Service—A serviceable catalogue, Catalogue "L," has been published by the company for the convenience of architects. This catalogue shows Kawneer standard construction and may be had on application.

The manufacturers also will be glad to mail to any architect a portfolio of full sized details.

Drawn Metal Mouldings

Drawn metal mouldings can be used advantageously for a vast variety of purposes.

This company's equipment enables it to make them in any conceivable shape of copper, bronze or steel, in gages from .012 to .125.

Mouldings manufactured in this manner have sharp corners, absolutely correct curves, and are true to detail, assuring perfect alignment.

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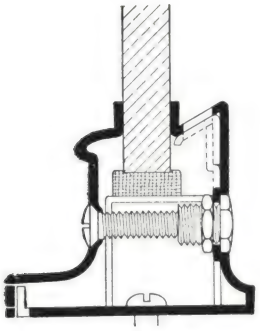
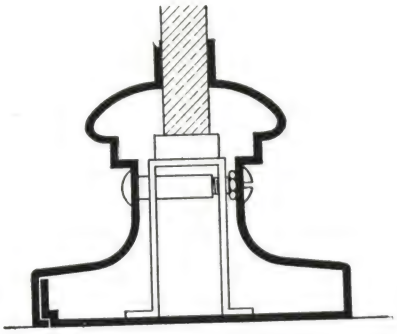
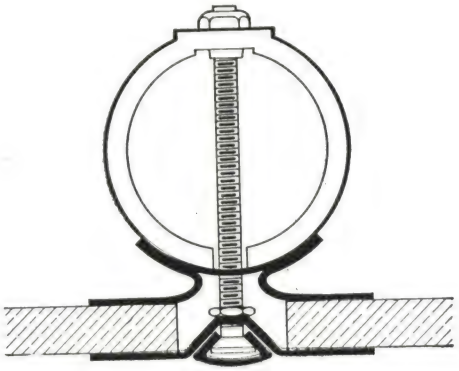


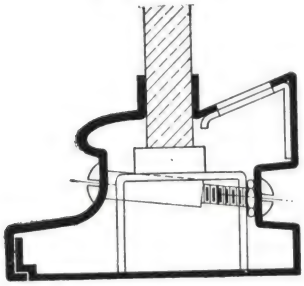
N° 40 SASH



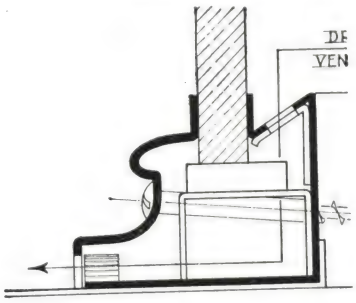
N° 35 SASH



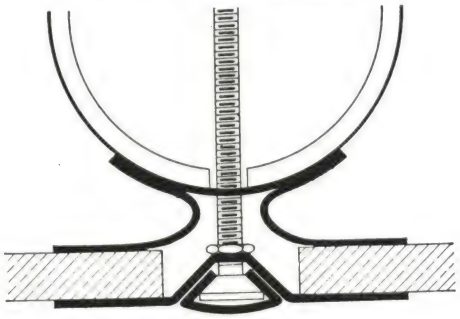
N°12-B DIVISION BAR



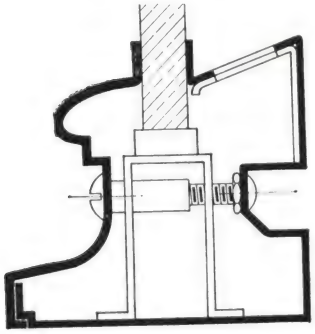
N° 36 SASH



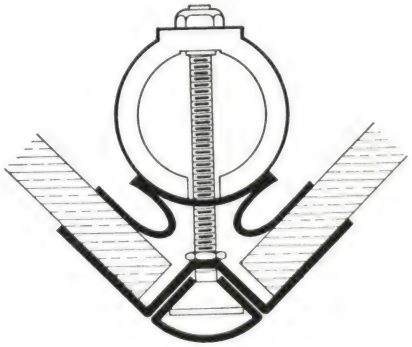
N° 30 SASH



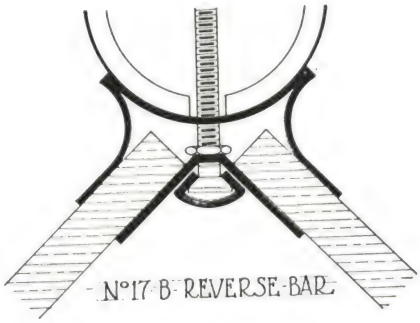
N°13-B DIVISION BAR



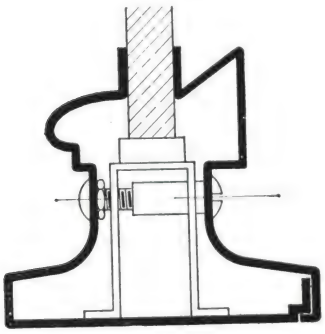
N° 31 SASH



N°6B CORNER BAR

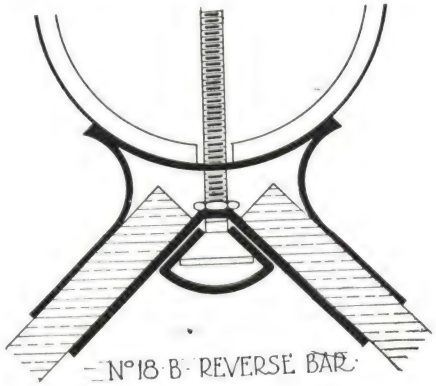


N°17-B REVERSE BAR

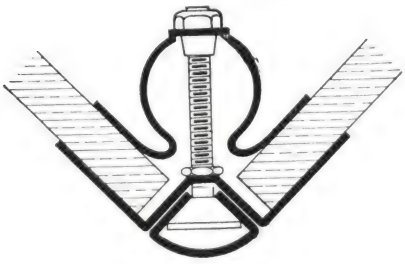


N° 34 SASH

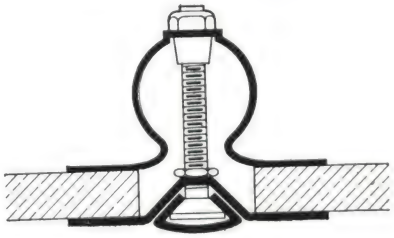
N° 9-A CORNER BAR



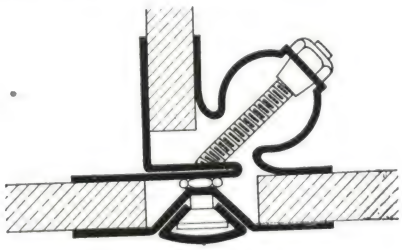
N°18-B REVERSE BAR



N°4-B CORNER BAR



N°11-B DIVISION BAR



N°19-A THREE WAY BAR

KAWNEER STORE FRONT SASH AND BARS

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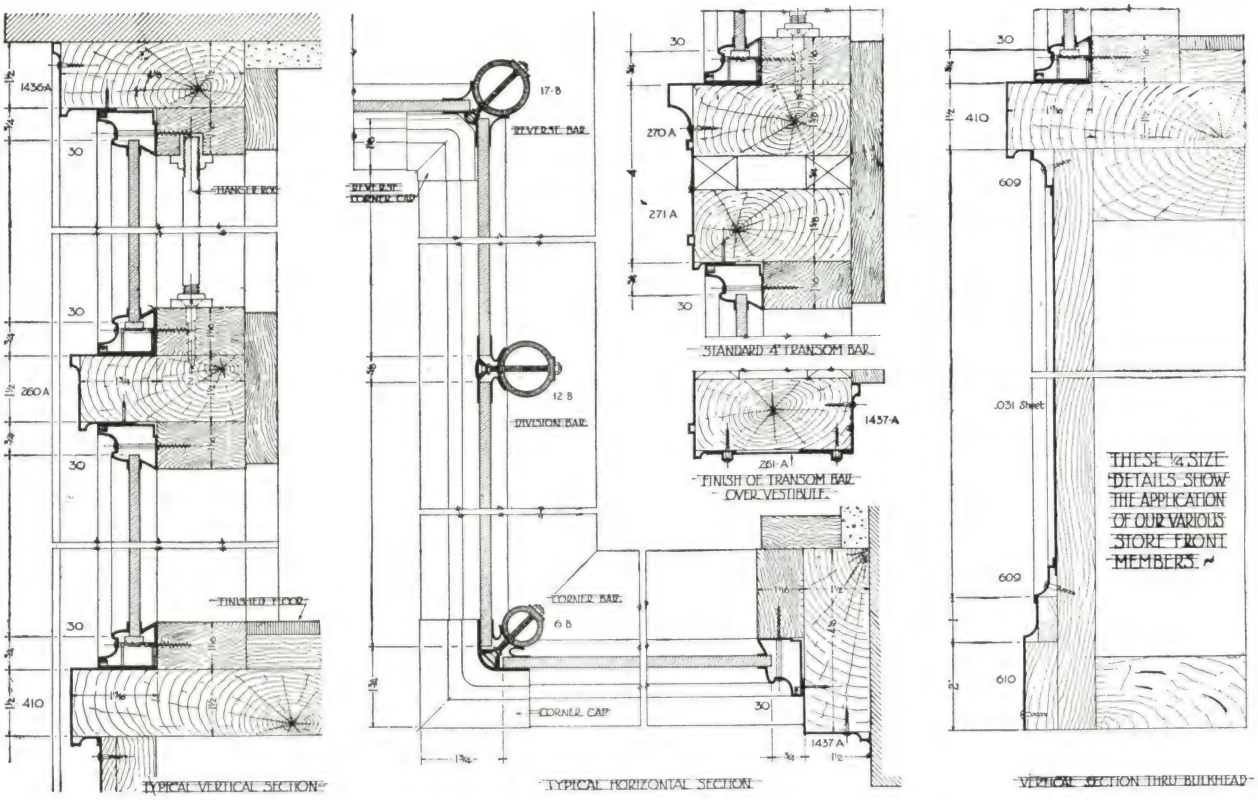
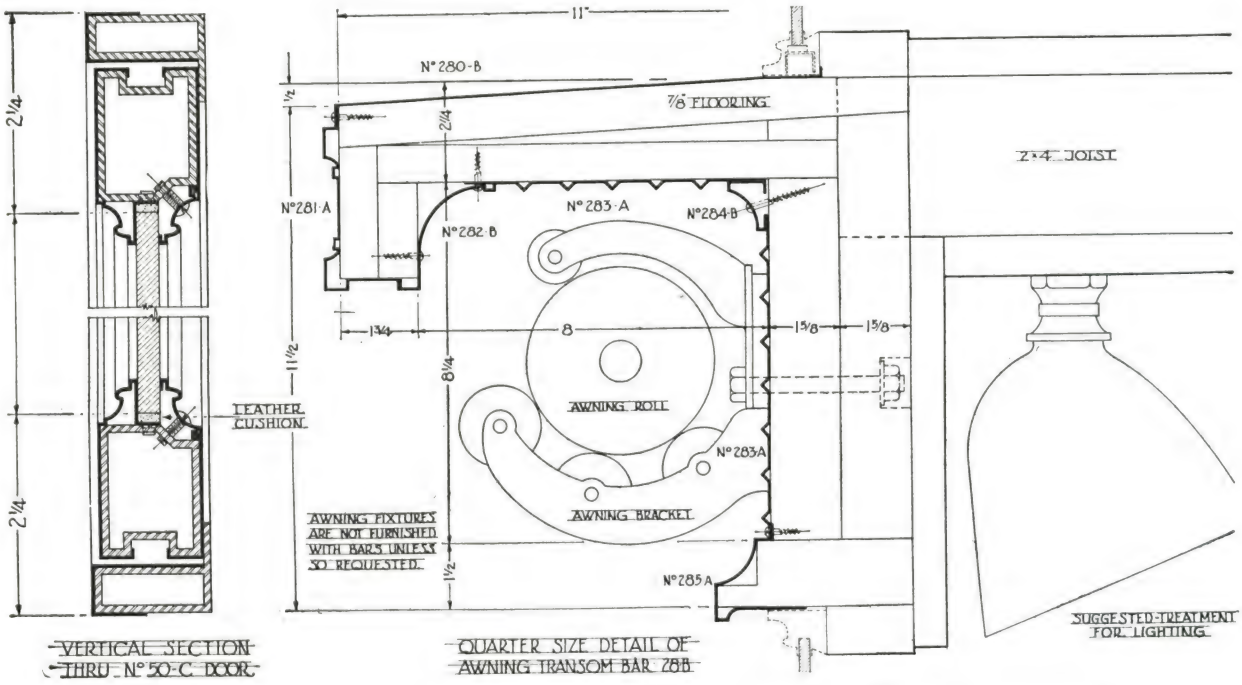


MEASURED VERTICAL AND HORIZONTAL SECTIONS OF KAWNEER STORE FRONT CONSTRUCTION

Showing relations of various members and wood sections required for each when used with No. 30 sash
For sizes when other sash are used, see Catalogue "L"



SUITABLE MOULDINGS OR PARTS FOR KAWNEER SOLID COPPER STORE FRONT CONSTRUCTION

THE THORNE HOLD-FAST METAL BAR CO.

INCORPORATED

Metal Store Fronts

TROY, N. Y.

Product

Manufacturers of THORNE PATENTED STORE FRONT SYSTEM.

Description

The "Thorne System" of copper store front construction is well known for its strength, simplicity, and durability. It is readily and easily installed by any good mechanic. We have avoided the usual difficulties found in the so-called "copper store fronts" by producing a heavier solid copper construction which can be securely fastened in place. The use of the "Thorne System" enhances the appearance of the show window and offers the greatest possibilities for effective display. It also provides a complete solid copper setting from sidewalk to "I" beam.

Setting

The "Thorne System" is so constructed that the glass can be set either from the inside or the outside as may be desired. The No. 20-B sash (inside setting) is the most desirable setting for all forms of glass. It is perfectly smooth with no bolt or screw holes to mar its outside beauty—because it is *Thorne* inside construction. The No. 20-D sash (outside setting) provides the strongest and most durable outside setting on the market today, enabling the contractor to set the glass from the outside in perfect safety. Drainage and ventilation is provided in both forms of setting.

Heavy Drip Sill

The sill bar is the only natural extra heavy sill on the market and is equally suitable as a covering for marble, wood or metal, avoiding the extra cost of a copper moulding. It gives a distinctive effect to the large or small store front which can not be obtained by the use of any other form of setting.

Adjustable Corner Bar

The newest store front innovation is the Thorne patent adjustable corner bar—the one bar that is adjustable to any and all angles from 70° to 170°. The metal is heavy—a reinforced solid copper bar that holds fast to the glass, can not move from the set angle and the reinforcement extends the entire length of the bar.

Material and Finishes

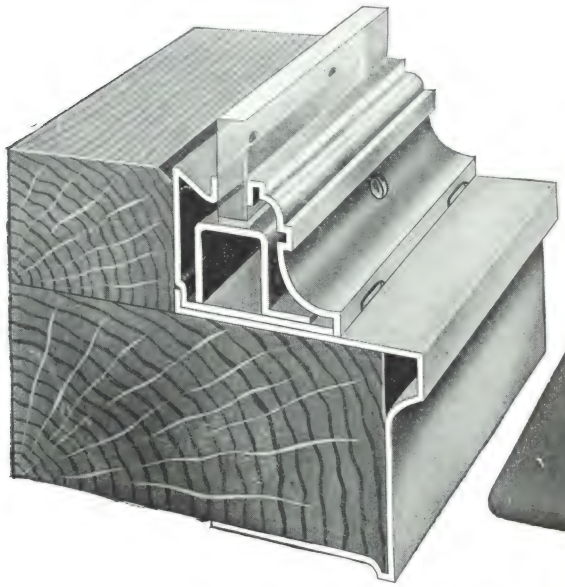
The "Thorne System" is furnished only in solid copper, which can be finished in polished copper, gun metal, oxidized, statuary bronze, or nickelplated finish.

Co-operative Service

Our designing service is freely offered to architects and builders, where details or suggestions for the use of our construction are desired.

Samples, Etc.

Samples, catalogues and prices mailed on application.



No. 20D SASH AND No. 143 SILL COVERING

No. 15 HEAVY DRIP SILL

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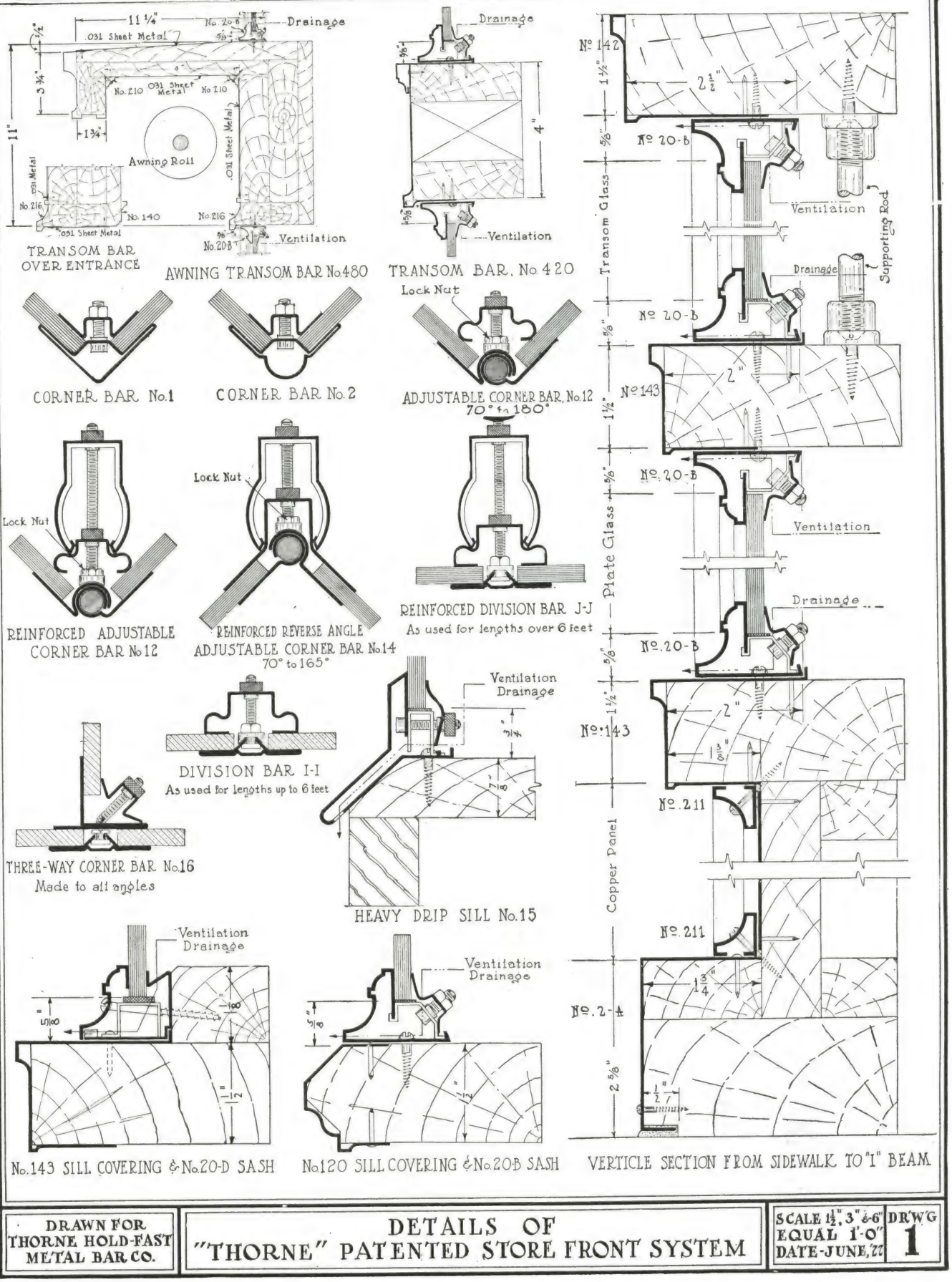


DRAWN FOR THORNE HOLD-FAST METAL BAR CO.	DETAILS OF "THORNE" PATENTED STORE FRONT SYSTEM	SCALE 1½", 3" & 6" EQUAL 1'-0" DATE-JUNE, 27	DRWG 1

UNIT SASH & SALES COMPANY

Manufacturers of Store Fronts

LINCOLN, NEBR.

Product

UNIT SYSTEM STORE FRONT CONSTRUCTION (Patented).

Unit System

UNIT-SYSTEM STORE FRONTS "DUST-PROOF"

TRADE-MARK

The Unit system marks a decided step forward in glass setting. The theory of Unit settings, on which our patents were granted, has been proved efficient and practical by thousands of store fronts now in use throughout the country.

Unit construction provides full hollow metal outside without screws into wood, and gives wood cushion for the glass. Unit system store fronts are attractive, dust-proof and durable.

Features of Construction

Cold drawn, heavy gage shell mouldings for all outside surfaces of members.

Wood cushion for all inside members in contact with the glass. The furnishing of our own wood sill, jambs, and backstops is economical and insures the buyer's getting perfectly fitted mill work for our mouldings.

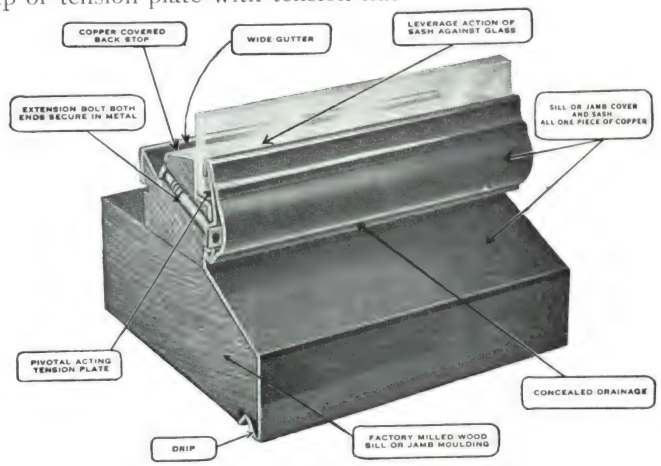
The elimination of outside wood screw into wood, which is made possible by the leverage action of our shell mouldings against the glass and wood cushions, and obtained by a 2-in. clip or tension plate with tension nut and bolt having both ends secure in metal. These plates slide in sash to meet bolt holes in backstop.

This arrangement takes care of all expansion and contraction and maintains a perpetual and uniform grip on the glass which reduces breakage to the minimum. It also provides one piece of solid metal between the wood and weather, thereby giving a dust-proof show window.

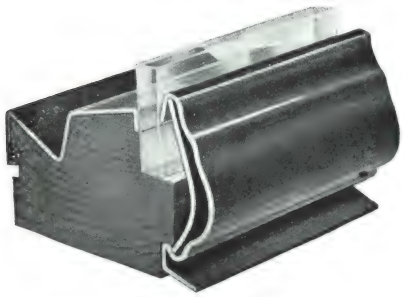
Drainage is provided for by means of equally spaced copper tubes running diagonally from the inside gutter through the copper covered backstop to concealed drain holes in the lower part of the sash proper and down the face of the sloping sill to the drip.

This is not a kalamein sash, but an all shell, cold drawn, heavy gage, copper moulding on the outside that can be removed at will by loosening the screws from the inside.

All of the wood as shown in the Unit is factory milled and furnished by us.

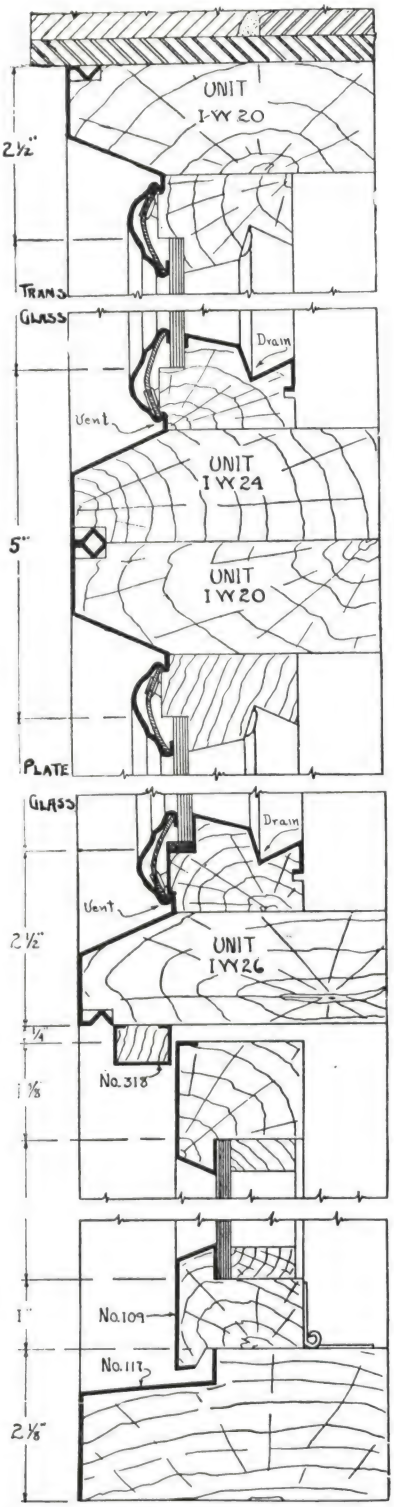


UNIT IW26 COMBINED SASH AND SILL



UNIT I-24 SASH

UNIT I-20 SASH



VERTICAL SECTION THRU STORE FRONT

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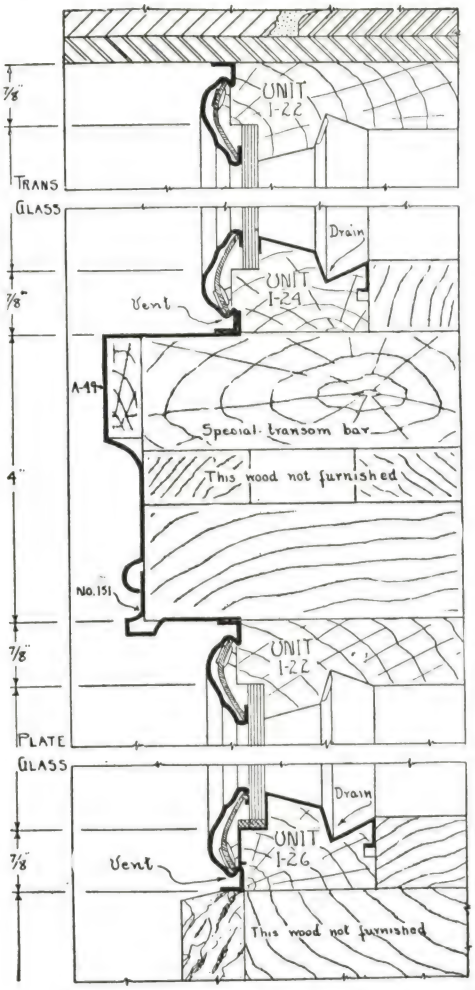
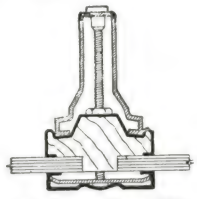


•VERTICAL• SECTION• THRU •STORE• FRONT •

Unit 31A Corner Bar

Unit 37A Division Bar

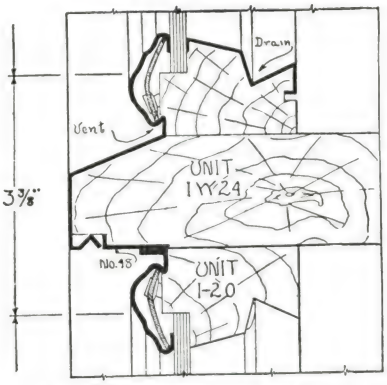
•CORNER•BAR•31•



•DIVISION•BAR•37B•

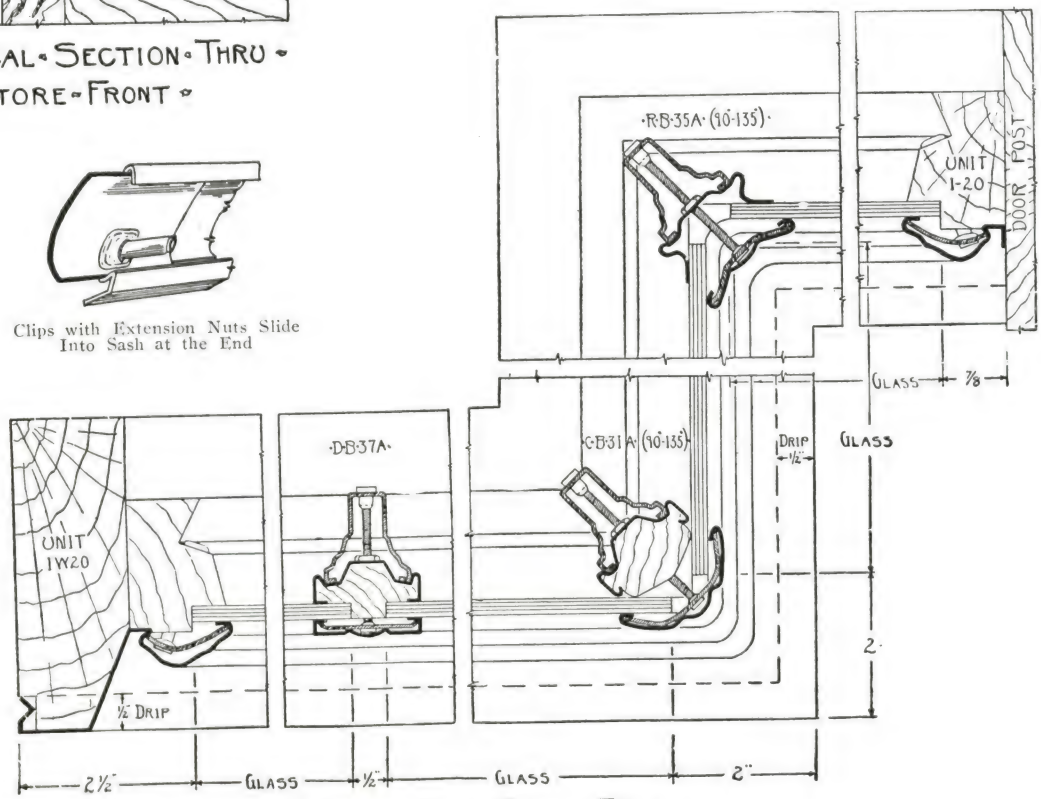
Regular corner and reverse bars are all adapted for any angle, 90° to 135°

Divison Bar - 37



•LIGHT• TRANSOM • BAR•

Clips with Extension Nuts Slide Into Sash at the End



•HORIZONTAL• SECTION• THRU • STORE • FRONT•

DETAILS OF UNIT SYSTEM STORE FRONT CONSTRUCTION

ZOURI DRAWN METALS COMPANY

Manufacturers of Zouri Safety Key-set Copper Store Front Construction

GENERAL OFFICES AND FACTORY

CHICAGO HEIGHTS, ILL.

AGENTS IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Product

ZOURI SAFETY KEY-SET and INTERNATIONAL STORE FRONT CONSTRUCTION.

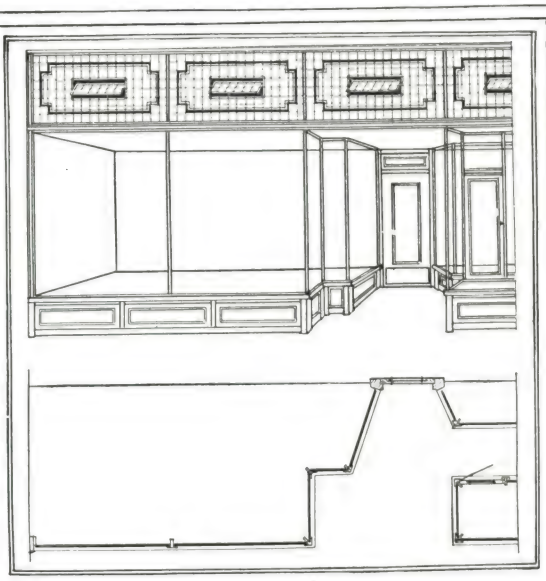
Description

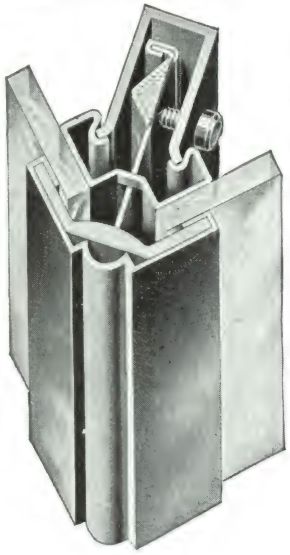
Preferential rating on plate glass is inevitable, as it is now in successful operation in every other line of insurance. Flat rating is the arch enemy of safety. It encourages the cheapest substitutions that mechanical ingenuity can produce. Zouri safety key-set sash, corner and division bars with self-adjusting setting blocks offer features of safety not found in any other line.

Zouri safety key-set lines are approved by Underwriters' Laboratories, Inc., under date of July 26, 1919, S. A. No. 135. Operating under Murnane and Marr patents. Other patents pending.

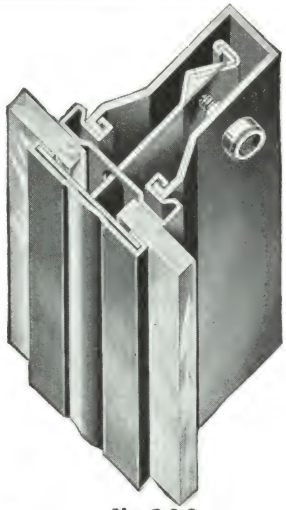
Catalogue

Free on application.

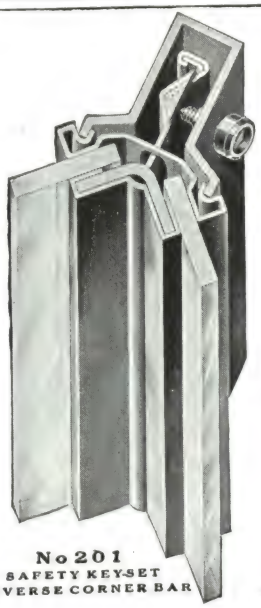




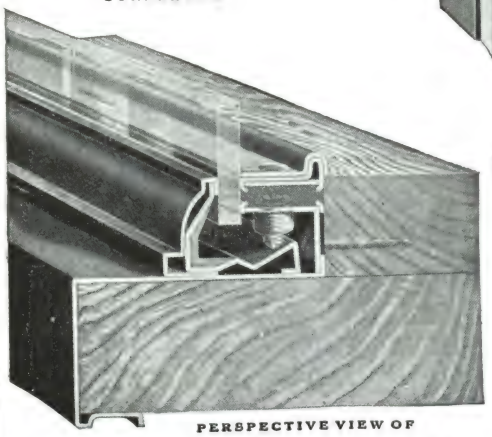
No 200
SAFETY KEY-SET
CORNER BAR



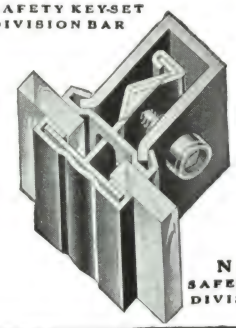
No 300
SAFETY KEY-SET
DIVISION BAR



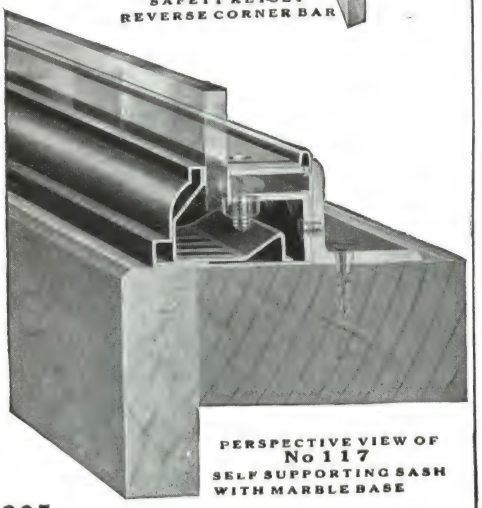
No 201
SAFETY KEY-SET
REVERSE CORNER BAR



PERSPECTIVE VIEW OF
No 115 SASH & 705 SILL



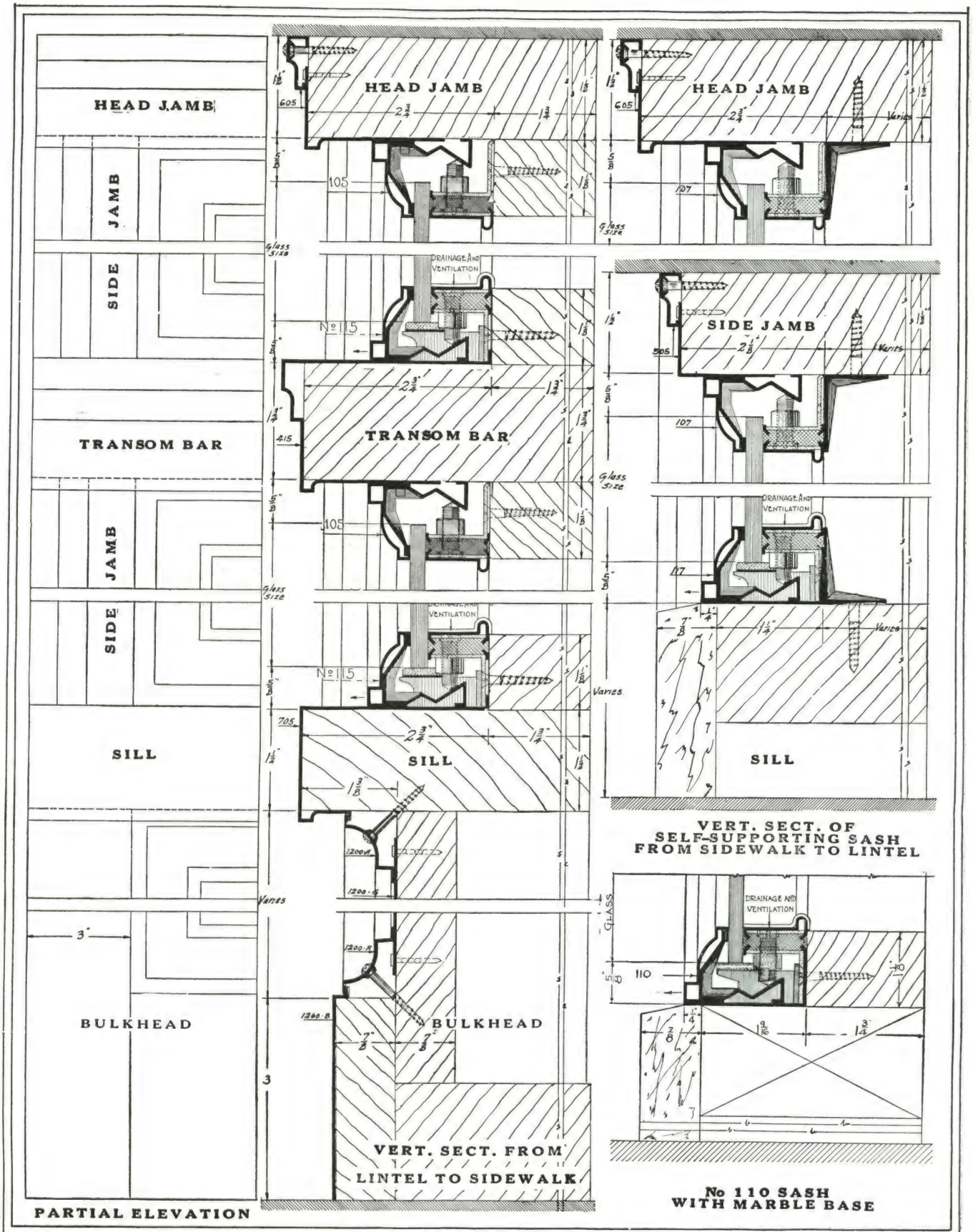
No 305
SAFETY KEY-SET
DIVISION BAR



PERSPECTIVE VIEW OF
No 117
SELF SUPPORTING SASH
WITH MARBLE BASE

DRAWN BY THE Z. D. M. CO.	ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION	DRAWING NO. 1 SCALE — HALF SIZE

Continued on next page



DRAWN BY THE Z. D M. CO.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION

DRAWING NO. 2
SCALE – HALF SIZE

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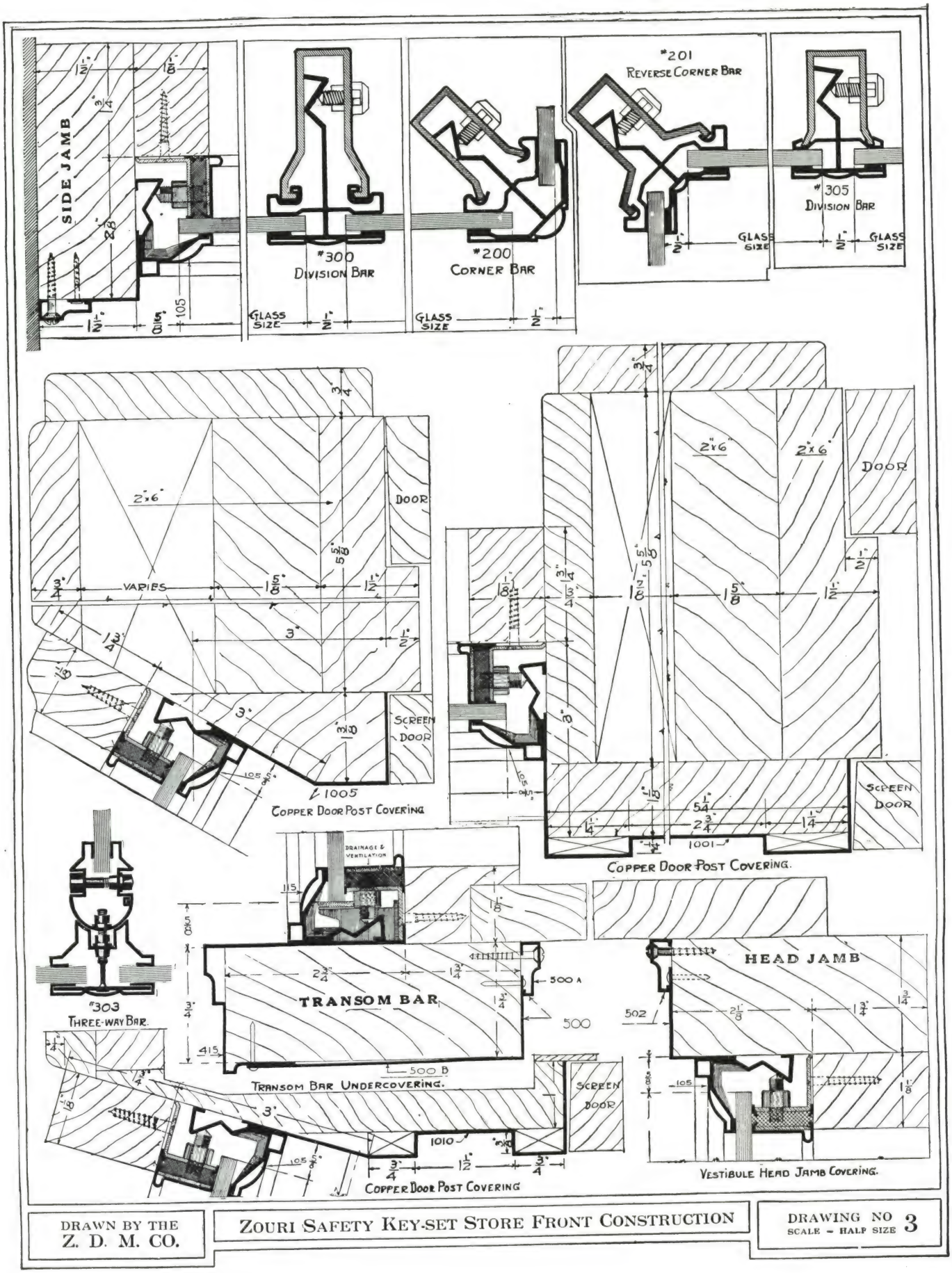


DRAWN BY THE Z. D. M. CO.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION

DRAWING NO 3
SCALE – HALF SIZE

Continued on next page

Murnane Self-adjusting Setting Blocks

Murnane self-adjusting setting blocks prevent the distortion of plate glass as indicated in the illustration at the right. Distortion is the foe of plate glass conservation. It is one of the principal sources of breakage.

Illustrated at the bottom of this page is a Murnane self-adjusting setting block approved by the Underwriters' Laboratories, Inc., under date of July 26, 1919.

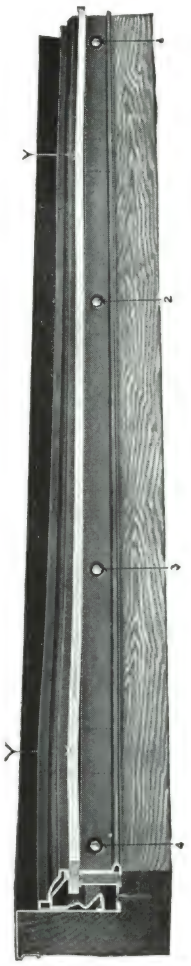
In the illustration on the right, the arrows "A" and "B" show the location of stationary setting blocks. Note the distorted position of the glass which has been drawn into contact with the rabbet on both sides of the setting blocks by the screws indicated at points 1, 2, 3 and 0.

The weight and friction of a plate of glass set on stationary blocks is so great that it will not slide into contact with the rabbet at the point where it sets on the blocks. When glass is not in contact with the rabbet at the setting blocks, it is distorted as indicated and thereby becomes an easy prey to wind pressure or vibration.

The following is the method of glazing plate glass in store fronts. The plate is lifted by means of straps and set on two blocks, which are placed about 14 in. from the ends of the plate. When the glass is set on the blocks, it must be a sufficient distance from the rabbet to allow the withdrawal of the straps. It must be again lifted off the blocks by means of a pry so that it can be forced into contact with the rabbet at the points where it sets on the blocks. This second operation is dangerous and frequently overlooked by the glaziers.

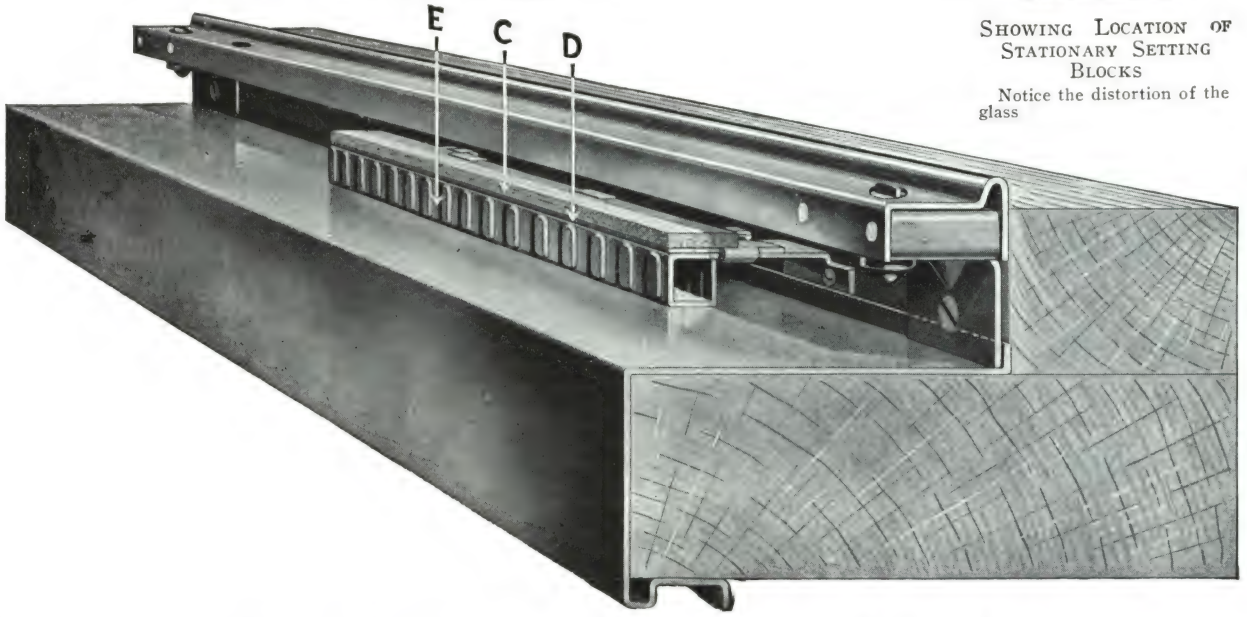
Where Murnane self-adjusting setting blocks are used, this second operation is unnecessary, for when the outer member of the sash is drawn into position, the glass is brought automatically into contact with the rabbet at the points where it sets on the blocks, or it may be pushed into contact with the rabbet with slight pressure of the hand through the self-adjusting features of the Murnane patent setting blocks.

Below is illustrated a section of sill on which is shown a Murnane self-adjusting setting block. "C" indicates the sole leather cushion on which the glass sets; "D" the bronze plate to which the sole leather cushion is connected. This bronze plate forms an antifriction bearing with the copper setting block "E" to which it is adjustably connected, so that when the outside moulding is applied, the self-adjusting portions of the setting blocks slide inwardly until the glass is in contact with the rabbet.



SHOWING LOCATION OF STATIONARY SETTING BLOCKS

Notice the distortion of the glass



SECTION OF SILL EQUIPPED WITH A MURNANE SELF-ADJUSTING SETTING BLOCK.

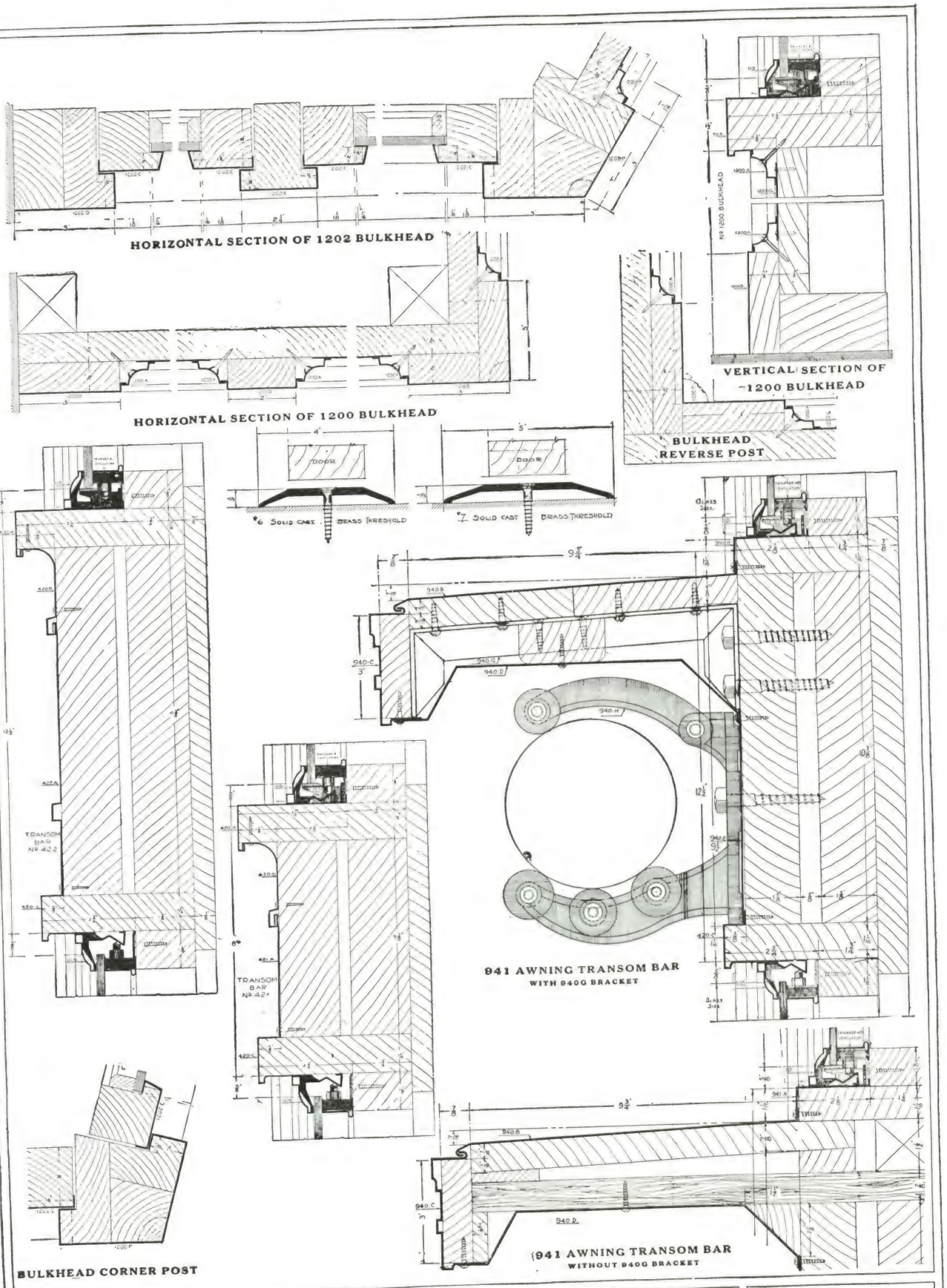
Murnane self-adjusting setting blocks have become one of the most important factors known in the preservation of plate glass in store fronts

DRAWN BY THE Z. D. M. CO.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION

DRAWING NO. 4
SCALE – HALF SIZE

Continued on next page



DRAWN BY THE Z. D M. CO.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION

DRAWING NO. 5
SCALE – 3"=1'-0"

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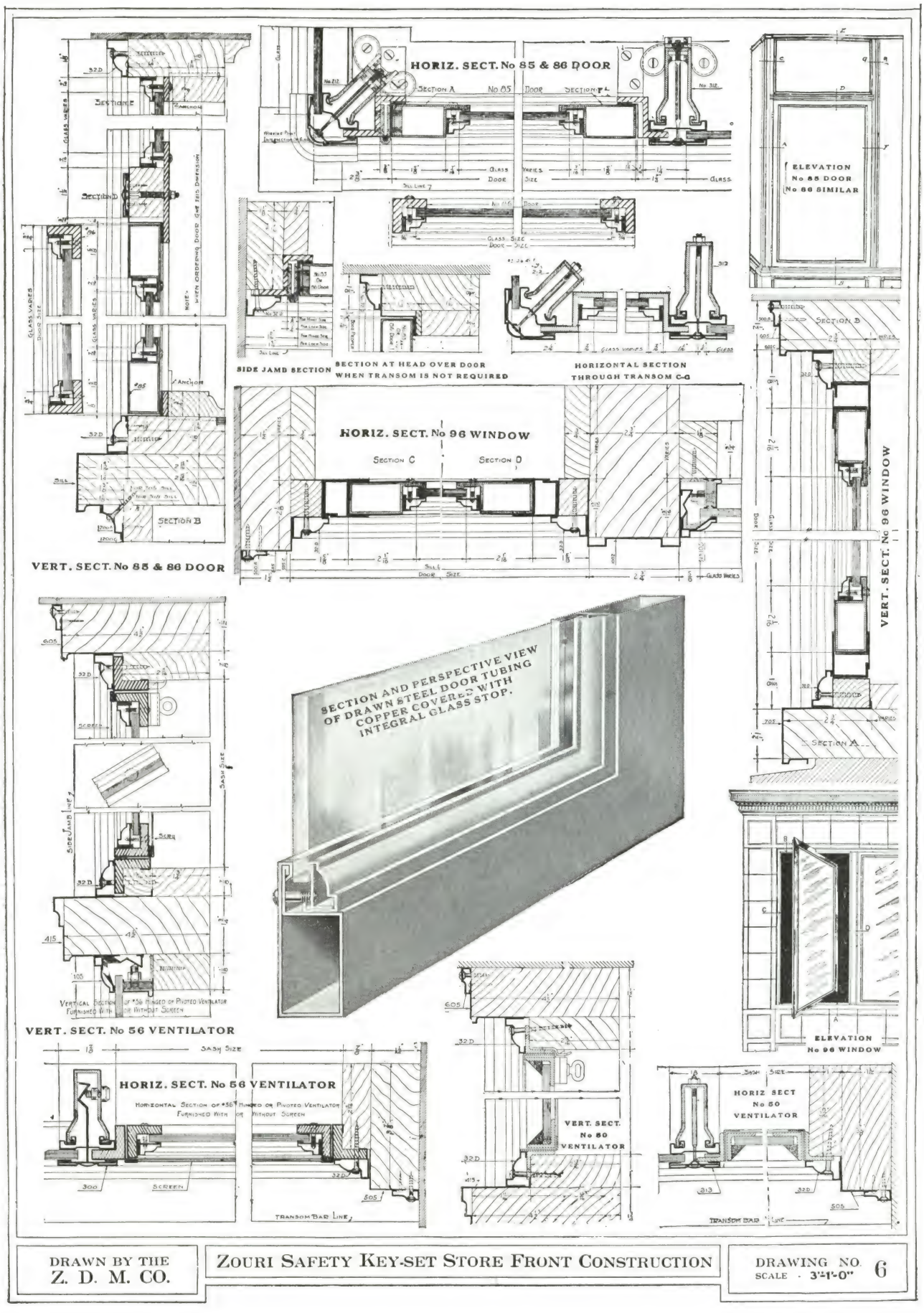

DRAWN BY THE Z. D. M. CO.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION

DRAWING NO. 6
SCALE - 3"-1'-0"

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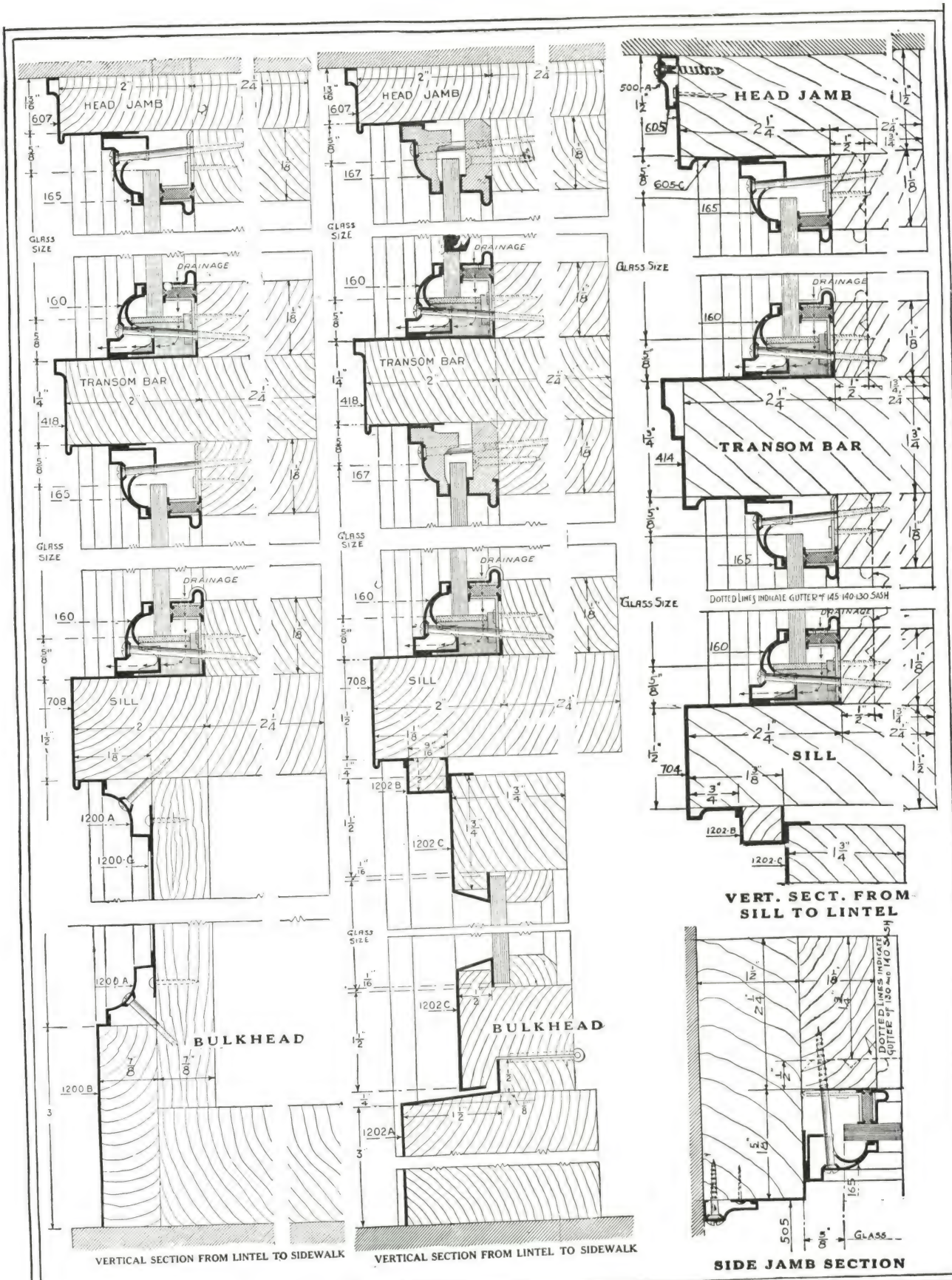

DRAWN BY THE Z. D. M. CO.

INTERNATIONAL STORE FRONT CONSTRUCTION

DRAWING NO. 7
SCALE — HALF SIZE

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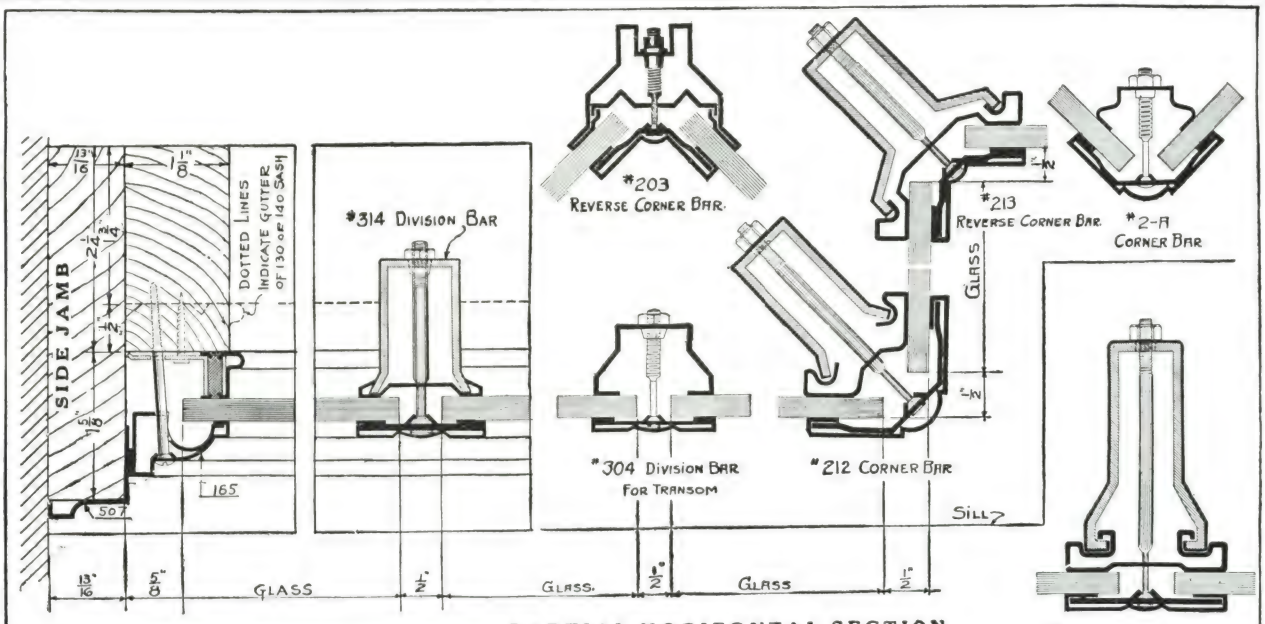
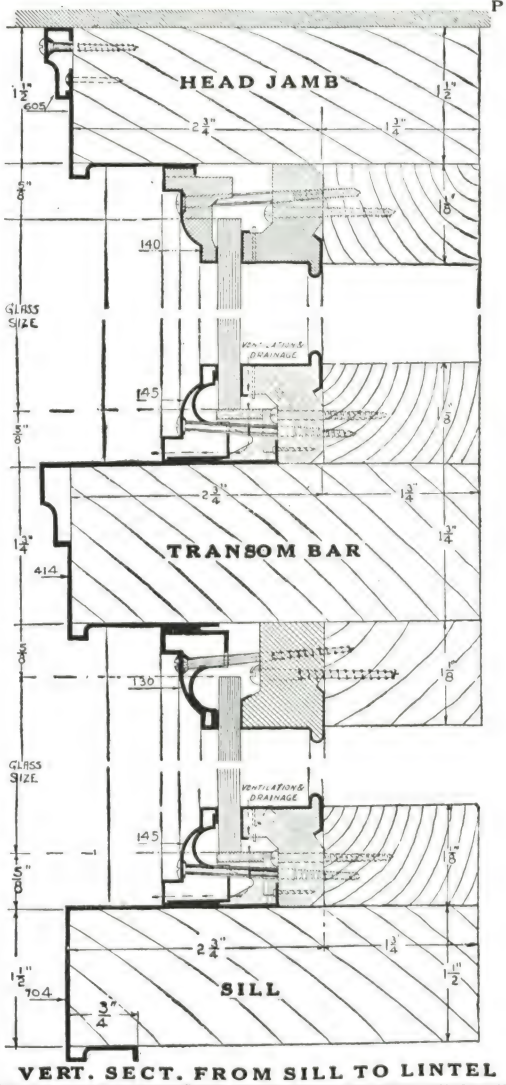
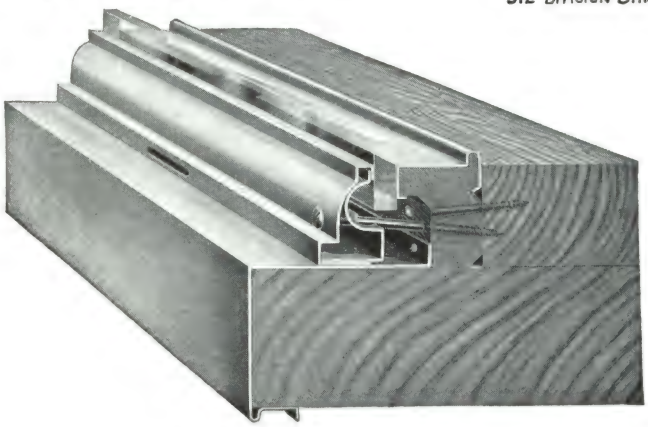


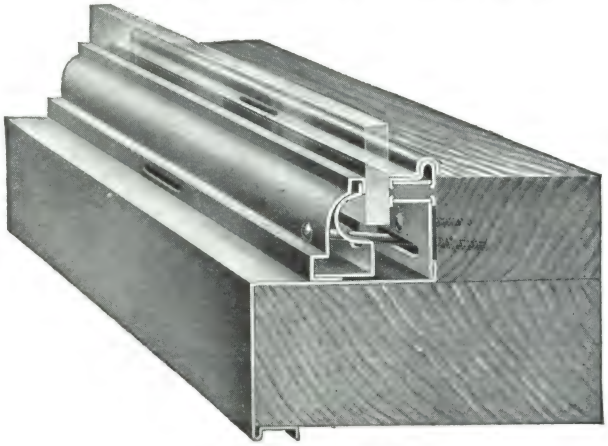
PARTIAL HORIZONTAL SECTION



VERT. SECT. FROM SILL TO LINTEL



PERSPECTIVE VIEW OF
INTERNATIONAL
SASH No 145 WITH SILL COVERING No 708



PERSPECTIVE VIEW OF
INTERNATIONAL
SASH No 160 WITH SILL COVERING No 708

DRAWN BY THE Z. D. M. CO.

INTERNATIONAL STORE FRONT CONSTRUCTION

DRAWING NO. 8
SCALE — HALF SIZE

THE EDWARDS MANUFACTURING CO.

INCORPORATED 1901

Metal Ceilings and Roofing

CINCINNATI, OHIO

BRANCH OFFICES AND WAREHOUSES

DALLAS, TEX., 1635-39 Pacific Avenue — NEW YORK, N. Y., 81-83 Fulton Street

PITTSBURGH, PA., Oliver Building

Products

EDWARDS METAL CEILINGS and WALLS.
METAL SHINGLES.
METAL SPANISH TILE.
PATENTED PRESSED STANDING SEAM CORRUGATED STEEL ROOFING.

Also, "Reo" Cluster Shingles, Metal Culverts, Metal Garages, Portable Steel Buildings, Metal Wall Coverings, Metal Lath, Corrugated Iron Roofing and Siding, Steel Imitation Brick and Stone Siding, Galvanized Iron Cornice, Eaves Trough, Conductor Pipe, Cellular Metal Fireproofing and "Keyridge" Reinforcement and Lath, "Edmanco Tightcote" Fire Resisting Paint.

Edwards Metal Ceilings and Walls

Metal ceilings are no longer a luxury—they may almost be said to be a necessity. Where formerly they were used almost exclusively in churches, stores, halls and other buildings, they are now extensively used also in private residences.

There are a number of excellent reasons for this growing popularity. From every viewpoint the metal ceiling is the ideal ceiling.

In the first place, it is unusually attractive. With the wide variety of patterns which comprise the Edwards line to choose from, any architectural effect can be obtained.

Nor do the advantages of a metal ceiling end with its beauty and attractiveness. It is economical, the first cost being slight, and, with proper care, no subsequent expense for repairs.

It is the most sanitary and easiest to keep clean of any ceiling; is absolutely proof against fire, moisture and vermin.

Makes the room cool in summer and warm in winter; and eliminates danger from falling plaster.

Edwards Metal Shingles and Metal Spanish Roofing Tile

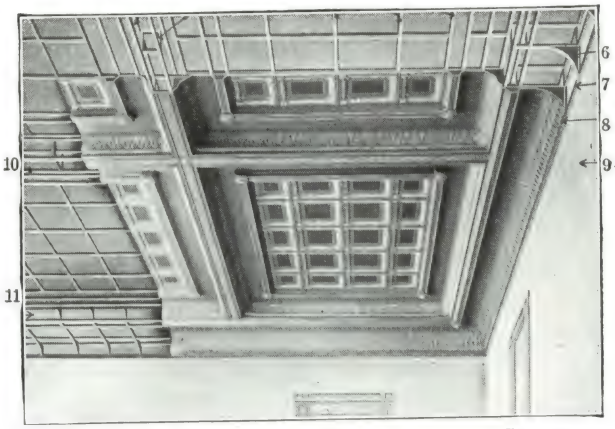
Are made from best quality terne plate, furnished painted or "Tightcote" galvanized, also in copper.

Their exceedingly attractive appearance is only one of the numerous advantages which commend them to builders and architects.

They are proof against fire, lightning, rain, snow and wind.

Do not warp or rot as wooden shingles do; and when laid according to the simple directions, will last a lifetime.

All Edwards metal shingles and metal Spanish tile are made with a patented side lock. Their interlocking device permits of a tight interlocking of each shingle or tile with the one lying next to it, so that, when the entire roof is laid, it is practically the same as one solid sheet of metal, without a crack or crevice anywhere through which a drop of water can seep. Although the seams are absolutely watertight, the lock is so devised as to allow for expansion and contraction



DETAILS OF APPLICATION, EDWARDS METAL CEILING

Furring strips ⅞x1¼ in. soft wood can be applied over old plaster direct to joist or wood ceiling.
(1) Construction of false beam. (2) Brace form. (3, 4, 5) Furring strips for ceiling. (6) Cornice bracket. (7) Furring strips at bottom of cornice or cove. (8) Cove. (9) Side wall. (10) Construction of false beam. (11) Showing small cornice at top of large cove

Plate No. 1735

Center, No. 2312

EDWARDS FRENCH RENAISSANCE METAL CEILINGS

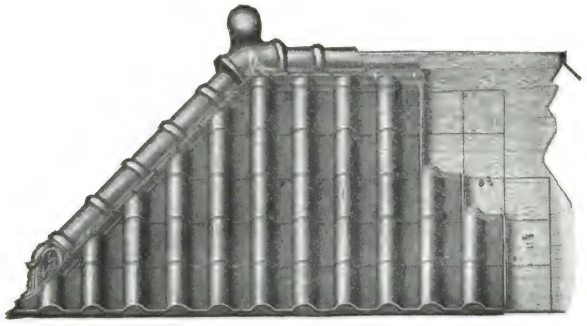
FIG. 104
Gothic
10x14 in.

FIG. 211
Roman
10x14 in.

Queen Anne
10x14 in.
FIG. 157

EDWARDS METAL SHINGLES

Continued on next page



Method of Applying Tile and Fixtures

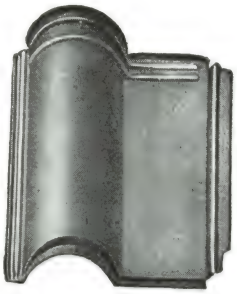


Fig. 367. Tile for Main Part of Roof

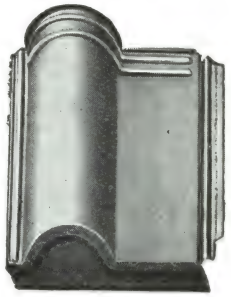


Fig. 369. Tile-Starter or Eave Tile, with Closed End for Edge of Roof at Gutter

Fig. 414. Hip or Ridge Finish
Height, 6 in.; width, 7 in.; length, 28 in.

Fig. 409. Ridge Flashing Nailed to 2x4-in. Strip on Ridge. Ridge Finish Fastened to Flashings with Cleats, 10-ft. Lengths

Method of Locking Valley Tile into Valley

Fig. 397. 3-Way Finial, 2 Hips, 1 Ridge.
Height, 17 in.; width, 17 in.

Details Edwards Metal Spanish Roofing Tile

of the metal due to heat and cold, and thus there is never any danger of the roof buckling, warping and springing leaks.

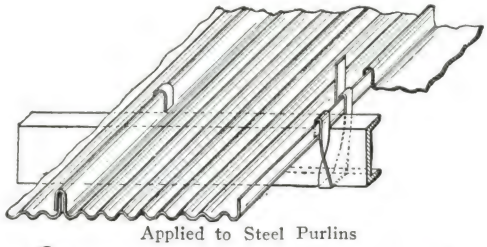
Patented Pressed Standing Seam Corrugated Steel Roofing

Edwards patented pressed standing seam corrugated steel roofing is especially adapted for use on structural steel buildings, as will be seen by the accompanying details. This roof has perfectly tight seams and can be applied directly to the purlins without rivets of any kind. Made in Nos. 16 to 28 gage, painted or galvanized.

In the use of this new roofing, a saving of 11% can be effected on side seams alone, and a much tighter side lock is assured. The method of cleating makes the cleats absolutely tight and at the same time allows for vibration. It makes a 50% more watertight job. It has another advantage in that it can be placed on the roof and worked entirely from above, no scaffolding of any kind being necessary; and an entire roof can be put on without puncturing the sheets in the least, preserving the galvanized coating intact.

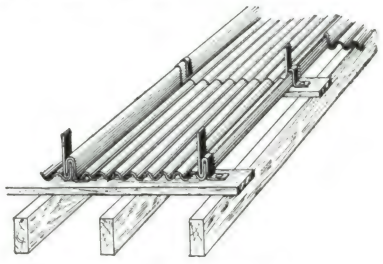
While the cost of this material is somewhat more than the regular corrugated sheets, the saving in side laps and application more than makes up for the difference.

This roofing has been applied to a number of large buildings in various parts of the country and is giving absolute satisfaction. One roof, put on 6 years ago, covers a single building requiring over 1000 squares.



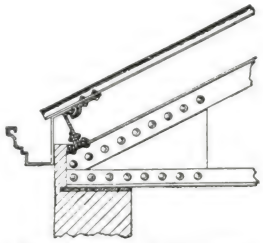
Applied to Steel Purlins

Cleat after Sheet is Applied



Applied to Wood Sheathing

Section through Cleat



Finishing out Eaves when Gutters are Used

Details Edwards Patented Pressed Standing Seam Corrugated Steel Roofing

THE BERGER MANUFACTURING CO.

Metal Ceilings

CANTON, OHIO

BRANCHES

SOUTH BOSTON, MASS., 307-315 Dorchester Avenue
NEW YORK, N. Y., 514-524 West 25th Street
PHILADELPHIA, PA., 16th and Washington Avenue
CHICAGO, ILL., 20 North Market Street
ST. LOUIS, MO., Third and Russell Avenues
NORTH KANSAS CITY, MO., 14th and Charlotte Streets
MINNEAPOLIS, MINN., 1701-1729 Broadway, N. E.
SAN FRANCISCO, CAL., 1120 Mission Street
LOS ANGELES, CAL., 405 East Second Street
DALLAS, TEX., Corinth and Pearl Streets
ROANOKE, VA., DOMINION METAL PRODUCTS CORP.
JACKSONVILLE, FLA., FLORIDA METAL PRODUCTS CO.

EXPORT DEPARTMENT, 514-524 West 25th Street, NEW YORK, N. Y.

Products

BERLOY METAL CEILINGS.

Also, Metal Shingles and other formed Sheet Metal Roofings and Sidings; Ridge Rolls; Gutters; Eaves Troughs; Conductor Pipe, etc.

For Metal Building Materials, see pages 256-257; for Steel Lockers, see page 2044.

BERLOY
TRADE-MARK

Description

Berloy metal ceilings are beautiful moulded plaster designs accurately reproduced in steel on a draw press under a pressure of 900 tons. They possess a perfection, beauty, and sharpness of detail that was often lacking in ceilings made by the old drop-hammer process.

Berloy metal ceilings offer wide range of beautiful modern designs from which selections to harmonize with architecture appointments and decorations can be made.

Advantages

Attractive Appearance—The same effects that are secured by moulded plaster.

Permanence—The ceiling will retain its beauty without cracks or streaks as long as the building lasts.

Safety—Metal ceilings do not come loose and fall like plaster. They remain firmly in place.

Sanitary—Easily cleaned, an especial advantage for hospitals and similar service. There is no flaking or dusting off of the material.

Economy—The first cost of metal ceilings is less than moulded plaster and but little more than ordinary plaster on wood lath. Permanence considered, metal ceilings are in the long run much less costly than either.

Fire Resistance—Berloy metal ceilings are unburnable, and case after case is on record where they have checked and held fire till the arrival of the firemen. They can be counted on to give a considerable measure of fire resistance.

For Remodeling

Where the interior of a building is to be refinished, Berloy metal ceilings and sidewalls applied over the old plaster give attractive, satisfactory and permanent results. They have been widely used in this way as well as for new buildings.

Estimates and Drawings

Architects are invited to avail themselves of the services of our estimating department in preparing suggested drawings free of cost, and estimates on contemplated metal ceiling and sidewall work.

Send sketch and accurate dimensions of room; state height of ceiling; indicate preferences as to style, design or ornamentation desired, with other information helpful in determining practical, effective and appropriate treatment to comply specifically with the ruling conditions.

NEVER SLIP NAILING POINT
Self-centering and self-guiding

Other Details

Berloy ceilings are mechanically perfect and result is freedom from irregularities in finished appearance.

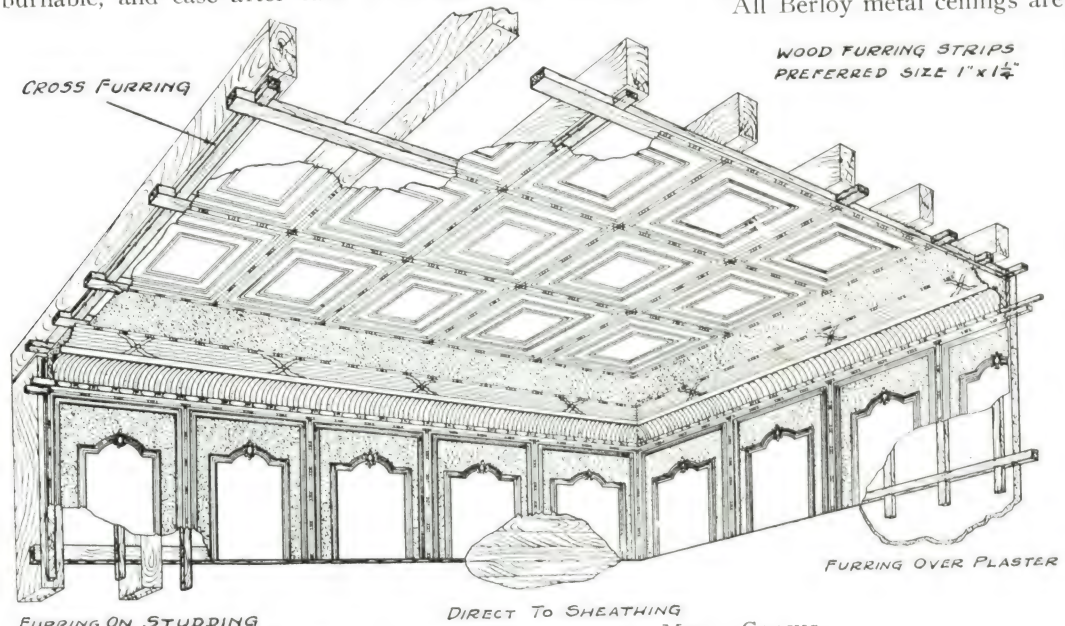
The bead and button construction shown here makes it easy to fit the plates together accurately. The bead reinforces the plates at joints, and the top of the nailing button is countersunk, forming a never slip nailing point to guide the erector.

All Berloy metal ceilings are painted both sides before shipment with a good, uniform priming coat of special "Ceilcote" paint made from our own formula.

Two additional coats of oil paint of any color desired are sufficient for finishing the ceiling after it is installed. And the final result is certain to be pleasing both to architect and building owner.

Design Catalogue

Catalogue D-52 shows the Berloy ceiling designs and gives complete details. It will be sent promptly to any architect on request.



METHOD OF CONSTRUCTION OF BERLOY METAL CEILING

WEST COAST FOREST PRODUCTS BUREAU

Western Oregon and Washington Forest Products

GRAND CENTRAL TERMINAL

NEW YORK, N. Y.

Products

WEST COAST WOODS:

Douglas Fir	West Coast Hemlock
Sitka Spruce	Western Red Cedar

Uses

West Coast woods are particularly adapted to the following uses:

Framing	Structural timbers
Flooring	Ship timbers
Finish	Airplane stock
Siding	Paving blocks
Shingles	Wood stave pipe

Timber Resources

WAR INDUSTRIES BOARD BULLETIN 43—"The Northwest is now the last great reservoir of undeveloped timber wealth in this country."

REPORT OF THE COMMITTEE FOR THE APPLICATION OF FORESTRY OF THE SOCIETY OF AMERICAN FORESTERS—"The Pacific Coast region has today the world's greatest stand of high grade timber. Within 10 years it will be supplying the bulk of the Nation's lumber."

Sitka Spruce

For airplane stock, finish, siding, and factory, shop and box grades.

The giant of the genus.

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS REPORT 67—"Spruce is the wood par excellence for the construction of aircraft."

Western Red Cedar

For finish, siding, shingles.

Western red cedar furnishes three-fourths of the shingles used in the United States.

The life of a Rite-Grade shingle is limited only by the kind of nails with which it is put on.

Douglas Fir

For framing, flooring, finish, siding, structural timbers, ship timbers, pipe and tank stock, wood block paving.

FOREST SERVICE BULLETIN 88—"Douglas fir may, perhaps, be considered as the most important of American woods. Its rapid growth in the Pacific Coast forests, and the great variety of uses to which its wood can be put, place it first. As a structural timber it is not surpassed."

West Coast Hemlock

For flooring, finish, siding, boards, boxes.

West Coast hemlock is a distinctive wood and should not be confused with other species of the same family.

FOREST SERVICE BULLETIN 115—"The demand for western hemlock will no doubt increase when its properties are better known," and, referring to a possible prejudice against it because of its species name "A thorough investigation of its properties proves this prejudice to be unfounded."

Working Stresses

In the table below are given the working stresses recommended by the Forest Products Laboratory, U. S. Forest Service, for West Coast Woods in Building use:

WORKING STRESSES

	Douglas Fir	West Coast Hemlock	Sitka Spruce	Western Red Cedar
Bending:				
Extreme fiber	1500	1300	1100	900
Horizontal shear (maximum)	95	75	85	80
Compression:				
Parallel to grain (short columns)	1100	900	800	700
Perpendicular to grain	325	300	250	200

Service

The WEST COAST FOREST PRODUCTS BUREAU welcomes correspondence on the use of West Coast woods, and maintains a staff of field men who would be glad to call on any one interested.

Copyright, 1911, Darius Kinsey, Seattle

A WEST COAST FOREST

ARKANSAS SOFT PINE BUREAU

LITTLE ROCK, ARK.

Products

ARKANSAS SOFT PINE INTERIOR FINISH, stock and special patterns; QUARTERSAWN (EDGE GRAIN) FLOORING; MOULDINGS; SOFT, NON-SPLITTING PLASTER LATH; COMMON LUMBER.

Sold by

Local lumber dealers and planing mills east of the Rockies.

Individual Advantages

Arkansas Soft Pine is the highest quality short leaf Southern pine, known botanically as Pinus Enchinata.

Due to the workable character and also because of certain definitely individual qualities—freedom from excessive pitch, light weight, soft lustrous texture and fine grain—the wood has received a marked preference among architects, carpenters and builders.

It more closely resembles the Northern White Pine than any of the southern pines. Because of its tough fibered, non-resinous make-up, it yields readily to edged tools and does not "gum" saws, knives or chisels.

General Uses

Arkansas Soft Pine in the common grades supplies an all-around framing material for residences, stores, apartments, churches and buildings of like character.

Specific Uses

Satinlike Interior Trim—It is from the thick, clear, sap wood with its fine lustrous texture and virtual absence of resinous oils that the highest grade of interior trim is manufactured; and it is because of the large percentage of this clear material, peculiar to South Central Arkansas timber, that Arkansas Soft Pine attains its maximum of value, merit and beauty when employed as interior trim.

Flooring—Arkansas Soft Pine flooring is manufactured in approximately 10 grades. Edge grain is especially desirable and admits of no pieces in which the angle of the grain exceeds 45° from vertical to any point.

The most satisfactory pattern measures $\frac{13}{16}$ in. by $2\frac{1}{4}$-in. face and usually runs 8 to 20 ft in length, the greatest percentage being 10 to 16 ft. In the finished floor, longer lengths reduce number of end joints as compared to hardwood flooring, which in turn must be accepted as short as 18 in.

The finished floor will take any desired treatment in stain, varnish, gloss or wax, and produces a hard wearing floor of attractive appearance.

Dependable Wood Lath—Arkansas Soft Pine lath are very light in weight and color; are strictly uniform in manufacture; may be had $\frac{3}{8}$x$1\frac{1}{2}$in.x32 or 48 in. long; and will not split, warp, buckle nor twist. They are thoroughly dried and can be relied upon to supply a dependable wall backing.

Individual Treatment

Contrary to the necessary preliminary shellacking or filling of certain pine, which is required to neutralize the rosin or inherent oily qualities, the stains or flat white coats are applied *directly* to the sanded surface of Arkansas Soft Pine. Thus the stain or white lead is evenly absorbed and a perfectly smooth base upon which to build up the final coats is established.

Properly Balanced Absorption—Any prejudice which may have existed against soft woods as interior trim has been due in part to the tendency of some of them to overabsorb varnishes or enamels.

Arkansas Soft Pine is not of that corklike softness which literally drinks up oil and varnish. The tough fiber prevents just that possibility; moreover, the finished surface will hold its luster permanently.

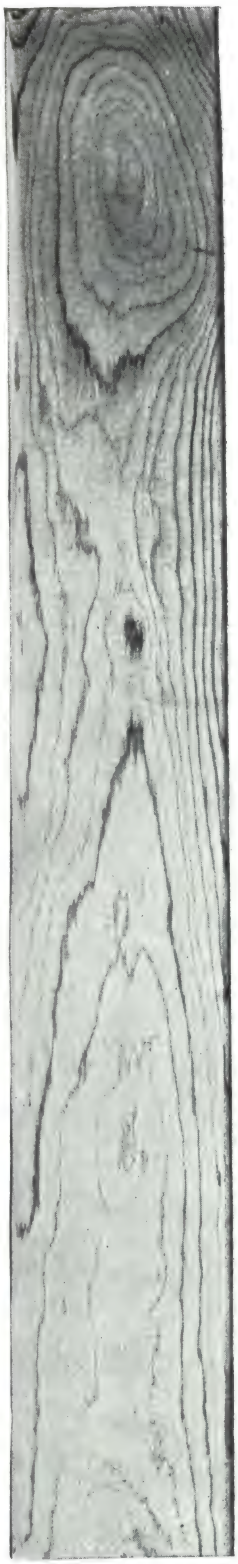
For White Enamel

Particular emphasis is laid on the merit of this wood as a base for white enamel. The absence of rosin or oil content insures against any possibility of staining the white surface from underneath. The close fiber takes the flat white coat with a perfectly uniform absorption, nor is any trouble experienced with raised grain, as the fine texture of the wood prevents such tendency.

Proper Sanding

A prime prerequisite is that flat faced finish shall be machine sanded.

If the local lumber yard is not equipped with such apparatus, the work may be done at a nominal charge at any first-class planing mill. This method is preferable, for it insures a smooth polished surface on the natural wood and eliminates the liability of scuffing the sap sections as is so often done when worked on the bench by hand.



TYPICAL GRAIN OF SLASH SAWN ARKANSAS SOFT PINE CASING
From an actual photograph

Continued on next page

Source of Supply

Arkansas Soft Pine attains its greatest degree of perfection in the south central section of the state for which it is named. Certain favorable geological, topographical and climatic elements contribute to this condition; as for example, soil properties, rain fall and drainage. The ARKANSAS SOFT PINE BUREAU is composed exclusively of manufacturers whose plants are located in this identical region. The product of these mills bears the trade-mark appearing on the opposite page. To be sure of genuine Arkansas Soft Pine, all stock should bear this trade-mark.

For Your Information

In addition to the handbook described below, literature on painting and finishing, together with finished and natural samples, will be sent on request.

Specifications

(1) Arkansas Soft Pine, stamped with the trademark of the ARKANSAS SOFT PINE BUREAU, shall be used throughout for structural and finishing purposes, as specified below.

(2) All lumber used shall conform to the grading rules of the Arkansas Soft Pine Handbook on grades adapted from those of the Southern Pine Association.

(3) **Framing**—All framing timbers, joists, girders, studs, etc., shall be Arkansas Soft Pine (No. 1 Common or No. 2 Common) grade, of standard sizes.

(4) **Sheathing**—All outside walls and roofs shall be covered with Arkansas Soft Pine (shiplap or sheathing boards), No. 2 Common grade (or better). Sheathing boards shall be surfaced (one or two sides), shall be well nailed to the studs and shall be laid diagonally.

(5) **Window and Door Frames**—Shall be Arkansas Soft Pine rabbetted and moulded as detailed and of the dimensions shown.

(6) **Exterior Trim**—Shall be Arkansas Soft Pine, ("B" & Better finishing grade or "C" finishing grade), and shall be worked strictly in accordance with the scale and detail drawings.

(7) **Bevel Siding**—All exterior walls, as shown or noted on the drawings, shall be covered with Arkansas Soft Pine bevel siding of "B" & Better grade, laid (2½ in. in 4-in. and 4 in. in 6-in. widths) to the weather.

(8) **Partitions**—Except as otherwise shown or noted on the drawings, shall be constructed of Arkansas Soft Pine, "B" & Better grade, "V" or so-called New England pattern. (See Arkansas Soft Pine Handbook.)

(9) **Lathing**—All walls and ceilings to be plastered shall be covered with Arkansas Soft Pine lath, No. 1 grade, laid horizontally, 2 in. on centers, with breaking joints. In no case shall the lath be laid vertically and all lath shall be well nailed to every stud or other bearing, using 4 nails to the lath.

(10) **Subflooring**—On all floors throughout, except as otherwise shown or noted, lay Arkansas Soft Pine subflooring, (No. 1 Common or No. 2 Common) grade shiplap, each board well nailed to every joist.

(11) **Finish Flooring**—In (locations) ..... lay a finish floor (after plastering is completed) of Arkansas Soft Pine, edge grain, Grade ("A" or "B" & Better), tongued and grooved and well strained and blind nailed to every (joist or sleeper) with two 8d cut flooring nails.

(12) After laying, the finish floors shall be well protected by covering them with heavy paper, or other approved material.

(13) **Interior Trim**—Shall be Arkansas Soft Pine, Grade ("A" or "B" & Better), worked in strict accordance with the scale and detail drawings (or as selected from the ARKANSAS SOFT PINE BUREAU Handbook).

(14) **Mouldings**—All mouldings shall be run true and straight, carefully worked and finished, and shall be selected from the Handbook of the ARKANSAS SOFT PINE BUREAU, as designated by the numbers specified or shown on the drawings (or in accordance with the detail drawings).

(15) All trim shall be triple machine sanded before installation, and shall be turned over to the painting contractor ready for finishing. All nailholes shall be puttied up, using putty to match the color of the wood, and all wood that is to be stained shall have all finger marks removed.

(16) **Painting and Finishing**—All stains shall be applied directly to the wood without the use of filler, and followed by the subsequent coats of varnish as called for.

(17) Where white enamel finish is called for, a coat of zinc undercoater shall first be applied.

(18) No shellac shall be used as a priming coat.

Arkansas Soft Pine Handbook

The Arkansas Soft Pine handbook, containing the complete grading rules of the Southern Pine Association and illustration of stock mouldings will be sent to architects on request.

Member Companies

Arkansas Lumber Company, Warren, Ark.
Cotton Belt Lumber Co., Bearden, Ark.
Sales Office, Stout Lumber Co., Thornton, Ark.
Crossett Lumber Co., Crossett, Ark.
Eagle Lumber Co., Eagle Mills, Ark.
Edgar Lumber Co., Wesson, Ark.
Fordyce Lumber Co., Fordyce, Ark.
Freeman-Smith Lumber Co., Millville, Ark.
Gates Lumber Co., Wilmar, Ark.
Ozan-Graysonia Lumber Co., Prescott, Ark.
Southern Lumber Co., Warren, Ark.
Stout Lumber Co., Thornton, Ark.
Union Saw Mill Co., Huttig, Ark.
Sales Office, Boatmen's Bank Bldg., St. Louis, Mo.
Wisconsin & Arkansas Lumber Co., Malvern, Ark.

All stock bearing the Arkansas Soft Pine Trademark is manufactured and sold exclusively by the above companies composing the ARKANSAS SOFT PINE BUREAU, Little Rock, Ark.

THE SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1214 Poydras Building
NEW ORLEANS, LA.

1214 Graham Building
JACKSONVILLE, FLA.

Products

CYPRESS LUMBER.
CYPRESS SHINGLES.

TRADE-MARK

Reg. U. S. Pat. Off.

Trade-mark Guarantee

As a guarantee of quality, accurate grading, and responsible methods of manufacture, architects should specify that every piece of cypress, "The Wood Eternal," shall bear the above trade-mark.

Where Grown

The cypress today is distinctly a swamp tree growing along the coasts of the Atlantic Ocean and Gulf of Mexico from Maryland to Texas, and in the Mississippi Valley as far north as southeastern Missouri.

Varied Utility

Cypress wood having been used for many years, the evidence of its fitness for numerous purposes is overwhelmingly large. Testimony of its peculiar qualities comes from all parts of the world.

Durability

Cypress stands almost unique among the woods on the American lumber market in that it has qualities not paralleled by any other wood.

Possessing certain singular antiseptic qualities which protect it where exposed to weathering, its great resisting power to the various decay influences and parasitic injuries is practically unequaled.

It is also free from the ills which affect pine and hardwoods—such as staining and decaying after being cut and placed in a pile.

Color

Cypress varies in color from almost white, such as found in Arkansas, Tennessee and Missouri, to almost black, such as found in many of the brakes in southern Louisiana and Florida.

It is usually yellowish, and sometimes grayish brown, with the sapwood considerably lighter in color than the heartwood.

What is known as "tidewater" cypress is the most valuable. It is usually dark, with a very fine and even grain; frequently marked by various colored zones, which oftentimes extend for great lengths throughout the log.

Other Advantages

For the greatest variety of uses as a finishing lumber, cypress ranks high among the woods of today. It is rapidly supplanting all other woods for uses wherein endurance and resistance to decay are valued factors.

It is very easy to work and is easy on edged tools, as it is soft and has an even grain, sometimes with beautiful figuring, and is capable of taking an exquisite, rich finish.

Cypress has a good average strength; is fine for sills and woodwork anywhere near to or in contact with the earth or under other conditions which invite decay. It checks and splits very little and is noted for its durability.

It is strongly favored for porch floors, joists and posts; but is not recommended for interior floors, except in creameries and similar places.

Interior Uses

About one-third of the higher grades of cypress is used for fine interior trim in good houses.

For interior finish its ease of working, straightness of grain, non-resinous nature, and the fine, wide, clear sizes obtainable, make it without doubt one of the best woods for mouldings, doors, sills, panels, sash, casings, etc.

As cypress shrinks or swells imperceptibly, it is especially desirable for doors, which are very beautiful when made of this wood.

Exterior Work

On account of its great durability and weather resisting qualities cypress excels for all exterior work, such as foundation timbers, sidings, girders, doors, jambs, facings, window blinds, porches, columns, railings, steps, weatherboarding, etc., whether on wood, brick or stone construction; and everybody knows that cypress shingles outlast all others.

Shingles

Cypress is peculiarly adapted to shingles. They are almost everlasting, having extraordinary durability. They possess the added virtues of having more wood in them and of weighing more than any other shingle now on the market, and the life is not roasted out of them in the dry kilns. They are sold as dimension shingles and are always full count, 4000 lin. in. to constitute 1000 shingles.

Country Uses

For country use—for fencings, posts, water troughs, well boxes, silos, incubators, barns and sheds—cypress is the cheapest and best, owing to its wearing and lasting qualities.

Imparting no odor, taste or color, and being almost non-porous, it is unexcelled for water tanks, and for use in dairies. Acid manufactories, breweries, laundries, soap factories, tanneries, dye plants, etc., should be equipped with cypress tanks and vats.

Greenhouse Construction

In greenhouses, cypress is an invaluable wood because of its resistance to decay. The entire woodwork of some of the best greenhouses in the country—rafters, roof, girders, benches—is constructed entirely of cypress.

In consequence of its long lasting power it is well adapted for all kinds of cold frames.

Continued on next page

For Fireproof Buildings

Cypress is an excellent wood for sash and casings in otherwise fireproof buildings, and is being specified and used largely for that purpose by well-known architects and contractors.

"Pecky" Cypress

In the cheap grades "Pecky" cypress is recommended for all uses where resistance to decay, and not beauty or great strength, is the chief end in view.

It is a grade of lumber which appears to be more or less honeycombed and decayed, yet in reality is one of the most decay resisting woods known in this country.

It will not decay in 100 years and is therefore adaptable for culverts, fence posts, all kinds of underground work or work in damp places; planking of small bridges, barn floors, and for foundation timbers.

Painting

For both exterior and interior work cypress can be successfully painted, as the texture of the wood allows the paint to sink in and give perfect results.

Natural Finish

But as the charm of modern architecture is in the use of the natural wood, cypress, on account of the beauty of its grain and variety of its rich shadings, should be varnished and finished in the natural.

"Sugi" Finish

One of the most modern and interesting developments of cypress for interior finish is achieved by the Japanese treatment, known as "Sugi." It reproduces with remarkable accuracy the historic and highly artistic "driftwood effect."

"Sugi" finish imitates this famous and greatly coveted finish "without waiting for decades of erosion." It can be done by any one who can wield an ordinary gasoline torch (such as is used by plumbers), and who then has the patience (and good taste) to brush out the charred portion of this peculiar wood. The "Sugi" finish has been tried on other woods, but without success. Its cost is slight. The freedom of cypress from the resinous quality of most woods renders it adaptable to this extraordinary handling. There is practically no limit to the utilization of American cypress for this purpose.

Staining

Cypress can also be stained with great success. In imitation of mahogany—becoming even more beautiful than mahogany itself—of cherry, black walnut, the different oaks; or tinted any desired shade the most fastidious fancy may suggest.

United States Government Report on Cypress

The United States Agricultural Department (Forest Service Bulletin No. 95) reported on cypress under date of June 30, 1911. The following are extracts therefrom, stated with characteristic conservatism:

"As with many other woods, it is only the heartwood that shows great durability. The sapwood lasts but a few years when subjected to conditions favoring decay. On the other hand, instances have been cited, on what is apparently good authority, showing remarkable periods of use for heart cypress shingles. A roof at Greenwich, Conn., was laid in 1640, and was said to be serving well 250 years afterwards; another in Brooklyn, N. Y., was said to have lasted 228 years, and another at Clifton, Staten Island, had 200 years to its credit when last reported, and was still in use. Many instances of use exceeding a century are cited to show the wood's lasting qualities. This is not only true when used as roofs, but for other purposes. New Orleans cypress water mains remained sound nearly a century, and a cypress headboard at a grave in South Carolina was so well preserved after 140 years that the letters on it were easily read. Marble and sandstone gravestones often decay and crumble in less time. A still longer period has been claimed for cypress coffins in Charleston, S. C. It is said they were found in fair condition at the time of the earthquake, though they had been in the ground since 1678.

"**Exterior and Interior Finish**—Cypress is put to almost every use as interior trim for houses. It may be finished in natural color or stained. The wood contains little resin and thus affords a good surface for paint, which it holds well. It shrinks, swells, or warps but little.

"For the parts of houses exposed to the weather it serves equally well. *As siding it practically wears out before it decays.* When made into porch and portico columns it retains its shape, holds paint, and has sufficient strength to sustain necessary loads. It is placed as cornice, gutter, outside blinds, pilasters and railing, and is much used for porch floors and steps.

"One of the widest uses of cypress is in greenhouse construction. It is pre-eminently fitted for that trying place, where it is called upon to resist dampness, excessive heat, and all the elements that hasten decay. It is said that no other lumber approaches cypress in the quantity used for green- and hot-houses. It is manufactured into sash, frames, benches, boxes, and practically all else that the builder needs. Its slight tendency to warp has caused its employment by builders of incubators."

Samples, etc.

Samples, detailed information, references, etc., can be had on application.

Cypress Pocket Library

We believe we are rendering a real public service by extending the scope of The Cypress Pocket Library (44 vols.), uniform and convenient in size, authoritative in character, of provable value as a technical guide, and careful and scrupulous in its every statement or inference.

We do not by any means recommend the use of cypress without discrimination. Cypress is not the best wood for every use, but where it is appropriate it is so emphatically (and demonstrably) the one best wood that the many should know about it, instead of the comparatively few who hitherto have profited by their special knowledge.

Architects are invited to write for any of the 44 volumes of the Cypress Pocket Library. Volume No. 1 contains a full list of our publications.

Architects are particularly invited to write informally and in detail as to any special requirements, or for specific information. Our replies will be personal, responsive and authoritative.

THE LONG-BELL LUMBER COMPANY

R. A. Long Building

KANSAS CITY, MO.

Long-Bell
THE MARK ON QUALITY LUMBER
TRADE-MARK

Products

Longleaf and Shortleaf Southern Pine Lumber.

Oak Flooring; Southern Hardwoods.

Creosoted Lumber including Ties, Posts, Poles, Piling, Wood Blocks and Posts for Guard Rails.

California White Pine Lumber including Sash and Doors, Screen Doors, 3-ply Veneer and Box Shooks.

Source of Supply and Facilities

The Long-Bell Lumber Co. operates 11 large, modern sawmill plants—8 of them manufacture Southern pine: 5 of them are in Louisana, 2 in Texas, and 1 in Mississippi. There are 2 hardwood plants: 1 in Arkansas and 1 in Mississippi.

A most complete and up-to-date oak flooring plant is operated at Pine Bluff, Ark.

This company's white pine lumber, etc., are manufactured at Weed, Cal.

The Long-Bell Lumber Co. has an aggregate annual capacity of 600,000,000 ft.

This company is the largest manufacturer of Southern pine in the United States. All its lumber products are branded with the trade-marked name *Long-Bell*.

Illustrating the Beauty of the Grain of Southern Pine

From an unretouched photograph. Stain or varnish enhances the grain, producing striking effects in interior trim. This wood is equally adaptable to painting and enameling

The company's exceptional railroad facilities permit shipments with dispatch and immense reserve stocks are constantly on hand.

Scope of Use of Southern Pine

Southern pine is an all-purpose wood unequaled by any other in its wide range of adaptability.

Its use ranges from beautiful interior trim and finish to the great timbers of the heaviest construction.

Among its universal uses are posts, girders, joists, flooring, dimension boards, interior and exterior trim, ceiling, siding, frame-work, newel posts, sheathing, lath, wood blocks for floors, paving, etc.

Advantages of Long-Bell Southern Pine

United States Government tests show that longleaf Southern Pine has greater breaking, bending, shearing, crushing and tensile strength than any other wood generally used in building construction.

The illustration shown herewith furnishes a striking example of the remarkable bending and tensile strength of longleaf Southern pine.

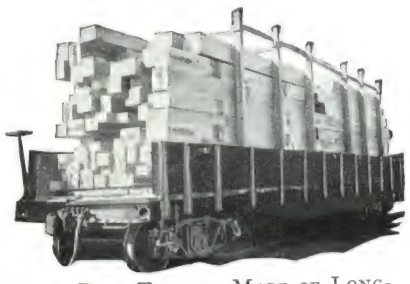
Southern pine is practically unequaled for durability. In the humid climate of the South there are hundreds of structures in a perfect state of repair that were built of Southern pine 100 years ago, and, in not a few instances, 150 years ago.

Illustrating the Remarkable Strength of Longleaf Southern Pine

This pine was bent over in a storm by a falling tree. Though its top was pinned to the ground and its trunk twisted, the fibers remained intact

Grades of Southern Pine

The Long-Bell Lumber Co. specializes on such grades of timber as will meet all requirements for permanence, strength, safety and economy in mill construction work. Particular attention is given to structural timbers and this company is prepared to handle unlimited quantities of stock under the density specifications prescribed by the American Society for Testing Materials, from the largest sizes of posts and girders down to the 3-in. thickness of factory flooring.



Long-Bell Timbers Made of Longleaf Southern Pine

Can be supplied in lengths up to 60 ft., either creosoted or untreated

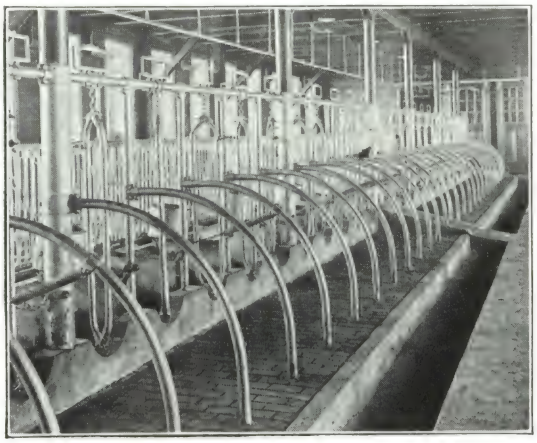
For residential and small building construction, The Long-Bell Lumber Co. produces Southern pine in all the various grades adopted by the Southern Pine Association.

Continued on next page

Creosoted Products

THE LONG-BELL LUMBER CO. operates three creosote treating plants and its unexcelled facilities enable it to make large shipments without delay. The exceptional qualities of Southern pine make it especially adaptable to the Long-Bell pressure-vacuum creosoting treatment.

Creosoted Wood Blocks—Southern pine wood blocks, when creosoted by the Long-Bell process, make an ideal pavement for all industrial plants, barns, stables, garages, loading platforms, railroad shops, warehouses,



FLOORS OF LONG-BELL CREOSOTED WOOD BLOCKS

Long-Bell creosoted wood blocks make ideal floors that will withstand the heaviest use for a lifetime. For stables, driveways, garages, factories, etc.

driveways and streets. Wood blocks are far more durable than other forms of paving and are sanitary, dustless, noiseless and economical, cutting upkeep to the minimum.

Creosoted Poles, Piling, Timbers, Lumber, Fence Posts, etc.—Long-Bell poles cut from selected longleaf Southern pine and treated under hydraulic pressure with creosote are not an experiment. Many years of service in the United States and abroad have proved conclusively that poles properly treated with creosote in airtight cylinders, under hydraulic pressure, give far longer life than ordinary poles.

Thousands of large estates and farms are being fenced yearly with Long-Bell creosoted fence posts, known as "The Post Everlasting." These posts are stronger, more durable and more attractive than any other fence posts ever placed upon the market.

LONG-BELL CREOSOTED BARN POLES AS USED IN GARAGE CONSTRUCTION

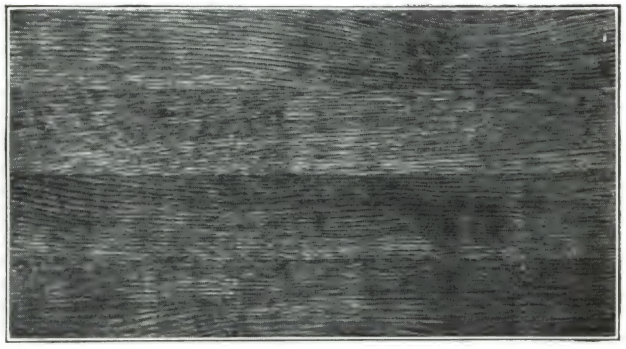
Hardwoods

Long-Bell Southern hardwoods come from the bottom lands of the Saline River region of Arkansas and the Bucatana Basin of Mississippi. This fact, coupled with the most modern hardwood manufacturing equipment, and capable sawmill management, insures products worthy of carrying the well known trade-mark—*Long-Bell.*

OAK TIMBERS FOR RAILROAD AND OTHER HEAVY CONSTRUCTION

Oak Flooring

This company manufactures the famous Long-Bell oak flooring which can not be surpassed for beauty, wear and ultimate economy in interior floors. It is even in color and texture, superior as to grade and manufacture.



LONG-BELL OAK FLOORING

Flooring as it came from the factory. It has not been scraped, waxed or varnished. Note its beauty, even color and remarkably smooth surface

California White Pine, Sash and Doors, etc.

THE LONG-BELL LUMBER CO.'s plant at Weed, Cal., is well known for the high quality of its California white pine lumber, sash and doors, screen doors and 3-ply veneers.

Long-Bell Trade-mark

The products of THE LONG-BELL LUMBER CO. are branded at the mills during the process of manufacture with the trade-marked name, *Long-Bell,* an assurance to the user that he is obtaining the best stock it is possible to make in modern plants and by a strict adherence to the most exacting grading rules.

Literature and Information

Attractive literature and full information concerning this company's products will be sent to interested persons on request.

THE PACIFIC LUMBER COMPANY

OF ILLINOIS

Midwestern and Eastern Distributors of California Redwood

2078 McCormick Building
CHICAGO, ILL.

40 Rector Street Building
NEW YORK, N. Y.

THE PACIFIC LUMBER COMPANY

Manufacturers and Pacific Coast Distributors

MILLS: SCOTIA, HUMBOLDT COUNTY, CAL.

OFFICES: 311 California Street, SAN FRANCISCO, CAL., and Central Building, Sixth and Main Streets, LOS ANGELES, CAL.

EXPORT COMPANY: A. F. THANE & Co.

SAN FRANCISCO, CAL., 311 California Street — NEW YORK, N. Y., 40 Rector Street Building

Products

REDWOOD LUMBER, a non-resinous soft wood permeated during growth with an odorless *natural* preservative.

REDWOOD MILLWORK.

For California Redwood Block Floors, see pages 408-413.

Uses for Redwood

Redwood is a superior wood for exterior finish (siding, cornice, window and door frames, porches, columns, doors, sash, etc.) for shingles and shakes on roofs and sides of buildings; for sleeping porches, pergolas, summer houses, flower boxes and vases; for greenhouse construction; for interior finish wherever great beauty of grain, freedom from knots or blemishes, and immunity from shrinkage or warping is desired in a finish wood; wherever wide paneling from one piece is required; for special farm uses—such as silo construction—and for hot-bed sash, beehives and incubators; for tanks, pipes, flumes, culverts, and cesspools.

These subjects are treated more fully in the pages indicated:

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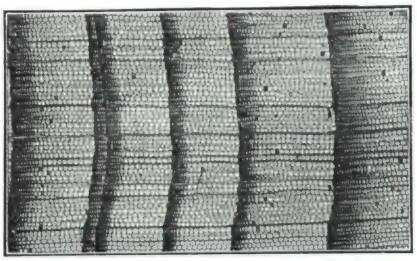
Distinctive Characteristics of Redwood

Redwood is light in weight, yet of ample strength, and varies from light pink to reddish brown. It has a soft texture with a close, even grain. It is notable for its peculiar cellular structure—layer on layer of tiny hexagonal cells, containing no resinous substances, and these cells, when the natural moisture is removed by seasoning and curing, become dead air spaces, and make Redwood one of the best natural insulators known. The walls of these minute cells, when cut through in sawing, provide, on the surface of the lumber, millions of tiny projecting anchorages evenly spaced for holding paint, varnish or glue.



MICROSCOPIC VIEW OF CROSS SECTION OF REDWOOD

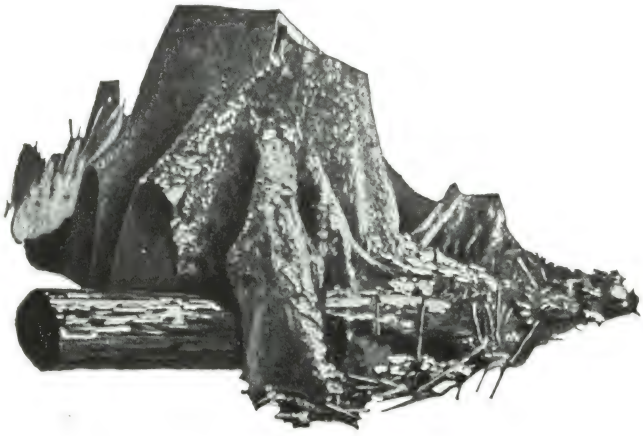
The same *natural*, odorless preservative which has enabled the Redwood tree to withstand the ravages of time and the elements during its long centuries of growth is found in every fiber of Redwood lumber. This preservative provides unusual resistance to wet or dry rot, the action of earth acids, chemical solutions, the propagation of fungus growth and the destructive attacks of insects and worms.

The rot-resisting properties of Redwood are shown in the recent finding of a part of a fallen Redwood tree partially embedded in the ground beneath the roots of

THE PACIFIC LUMBER COMPANY'S MILLS, YARDS AND EMPLOYEES' HOMES IN THE TOWN OF SCOTIA, CAL.—
THE HOME OF REDWOOD

Continued on next page

a giant spruce tree, which itself, when cut down, was found to be over 600 years old. Through all these centuries the buried Redwood log had remained in good condition and when taken to the sawmill was found to be sound, marketable timber.



Redwood Log Embedded Under Stump

Redwood, being free from pitch or other highly inflammable resinous substances, is difficult to ignite, and, when burning, the flame is easily extinguished. It is significant that throughout many acres of Redwood timber lands no forest fire patrols are found because forest fires do not occur in Redwood forests.

Properly seasoned, Redwood will not warp, swell nor shrink and is not affected by variations of temperature. This "still" quality of Redwood makes it extremely valuable for many particular and exacting uses.

Redwood has made remarkable records of resistance to rot and destruction under the most severe conditions. Over a century ago Russian settlers at Fort Ross, California, built a chapel entirely of Redwood hewn from the forest with a primitive broadax. Until the earthquake of 1906 this building stood intact. In 1915 it was restored by the state, using the original Redwood from which it was built—a remarkable proof of the lasting qualities of Redwood.

Greek Chapel Built of Redwood by Russian Settlers in California Over a Century Ago

Its longevity under stress of continued service in all climates accounts for the extensive use of Redwood water tanks by the railroads; for oil storage tanks in the great oil fields; for tanks and vats holding the leaching solutions used in refining copper; by textile mills for roof boards and vats; for immense pipes for water supply on irrigation projects; and by builders of silos for storing green fodder for cattle.

Wherever a wood is required that is practically immune to destruction by the weather or by ground moisture, Redwood should be used.

Notwithstanding its unusual qualities and exceptional service Redwood is not a high priced building material. Its cost is well in line with that of other woods, none of which can compare with Redwood in value to the home builder. These facts should be considered by every home builder before the home is built. Redwood is equally suitable for every type of frame building—a sound investment for rich and poor alike.

Growth

The Redwood trees, or Sequoia Sempervirens, take their name from Sequoia, the name of a famous Indian Chief of great power and influence among his people, and the Latin word Sempervirens, meaning ever-living. While the Redwoods are closely related in general characteristics to the Sequoia Gigantea, or the "big trees," the texture of Redwood is considerably different, and it is this timber that is being cut for commercial use. The Sempervirens are found only in California, existing in dense stands in the northern coast counties, while the Gigantea may be seen only in comparatively small patches in various sections of the Sierra Nevadas.

The massive trees in a Redwood forest, with trunks ranging in diameter from 5 to 25 ft. and attaining a height of from 75 to 300 ft., are as impressive as the cold, silent walls of some ancient and gigantic cathedral. So close together do these great trees grow that the forest is at all times in semidarkness, with the sunlight only penetrating through where a tree has fallen. The forest is thickly carpeted with ferns and there is an entire absence of bird life because there are no insects or worms in Redwood trees.

From careful computation of the annular rings of felled trees, it is estimated that many of these giants were good sized saplings long before Caesar crossed the Rubicon.

The root structure of a Redwood tree differs from that of most trees. It has no tap root, but spreads its roots in a circle of much larger diameter than its trunk and is thus held to earth through its many centuries of growth. Owing to the density of the growth and the consequent darkness of the forest, the Redwood tree fights a constant battle upward toward the light. It is this light-seeking characteristic which gives to the tree its straight trunk, clear of branches for many feet from the ground, and which, while adding rapidly to the height, makes for slow addition to girth and imparts that close concentration of rings and even texture which is a marked feature of Redwood lumber.

Redwood Reforestation—The Redwood is a prolific seeder and even on cut-over-land the stump never seems to die. *Reforestation is going on naturally and rapidly* and it is an ordinary sight to see dozens of healthy young trees springing out from the stump or growing up out of the roots which remain in the ground. The usefulness of this so-called second growth Redwood can not at this time be estimated, but it is more than likely that long before the present timber stands are gone they will have attained a size and texture that will make them of as great value to future generations as the Redwood today is to us.

Continued on next page

Supply

In the limited area of California, in which the Redwoods grow, there are millions of trees, and according to United States Government figures these contain between 50,000,000,000 and 60,000,000,000 board feet of Redwood timber—more than enough to supply the world's needs for nearly a century. An average acre of Redwood will produce several hundred thousand board feet of lumber, and there are instances where a single acre has yielded more than 1,000,000 board feet.

Many trees now produce 50,000 or upwards board feet of lumber, so careful are the logging and manufacturing processes. Uses have been found for every part of the tree—even the sawdust being used for packing California grapes—and careful research is developing many valuable purposes for which the bark will soon be utilized.

Mills, Facilities and Capacity

The Pacific Lumber Company is the largest manufacturer and distributor of Redwood lumber. Our annual production capacity is now over 125,000,000 ft. of Redwood.

Owning many thousands of acres of the finest Redwood timber lands in Humboldt County, California, together with two large sawmills and planing mills, located in Scotia, California, The Pacific Lumber Company further enhances its production facilities by owning all the commercial, housing and recreational buildings in the town of Scotia, in which the employees live. It has exclusive use of the Leaver drying kilns, invented and constructed by an officer of the company to assist nature in drying Redwood for industrial use, at the same time not disturbing the *natural* preservative that permeates Redwood.

In logging operations, sawmills, planing mills, storage yard and shipping plants, every modern mechanical device is employed.

Stocks and Shipments

Sawed and seasoned Redwood lumber of all sizes, together with a large variety of milled products, are continually carried in stock at the mills at Scotia—usually this stock approximates 75,000,000 ft. Production and shipping are facilitated by an electric overhead monorail system, which operates throughout the mills, yards and shipping houses. Direct rail shipments to the middle west and east are now made via the Northwestern Pacific Railroad, whose tracks adjoin the mills.

A large stock of Redwood is also carried at our "quick shipment" depot, in Chicago, to supply middle west and eastern demands where time is a factor. Shipments can be made from Chicago, either in carload or less than carload lots.

Trade-mark

Wherever practicable, the registered trade-mark is placed upon Redwood from The Pacific Lumber Company, a mark to indicate to the trade and user that the product is the result of every refinement in the production of Redwood. In the cases where shipping tags are used, the trade-mark label is on the tags.

All Redwood siding is plainly marked with our trade-mark, surface measure, grade and size.

Door and window frames are stamped with trade-mark.

Moulding packages are marked with trade-mark, total number of pieces, lineal measurements and pattern.

Shingles in packages are marked with trade-mark and number of shingles.

As fast as possible, arrangements are being made to further protect buyers by extending our trade-mark to other forms and sizes of Redwood.

Sales Offices

All sales in the territory east of the Rockies are made by The Pacific Lumber Company of Illinois. Its general offices are in Chicago, in the McCormick Building, 332 South Michigan Avenue.

The Eastern territory is handled through the New York office, in the 40 Rector Street Building.

Sales in Pacific Coast territory are made from The Pacific Lumber Co.'s San Francisco office, 311 California Street. A branch sales office is located in the Central Building, 6th and Main Streets, Los Angeles.

Painting and Staining

It is not necessary to paint or stain Redwood in order to make it durable; but those who prefer a painted or stained effect will find that Redwood will take any finish that any other wood will take, and some that no other wood will take. It takes stain readily, and the stain penetrates so thoroughly that any damage to the surface does not show because the pinkish color of the natural wood does not show through the stain.

Redwood is especially well suited to all kinds of paint and enamel work, because of its fine grain, smooth surface and the absence of resin or pitch. High class jobs of white enamel on Redwood, with hand rubbed finish, have lasted as long as 20 years, in recorded cases, without repainting. The freedom of Redwood from shrinking and swelling tends to insure against unsightly cracks in enamel work.

Cost

Many people think that Redwood must necessarily be a high priced wood, on account of its being found only in California; but this is not the case. Because Redwood is lighter than other woods when dry, the item of freight is consequently reduced.

Redwood sells at a price that, in spite of the high production and shipping costs, compares favorably with the cost of other woods which have been used for similar purposes, for most of which uses Redwood's unusual adaptability and lengthened service tends to further reduce the actual costs of material.

Grades of Redwood

Uppers—(Under the heading of Uppers shall be included Clear, Sap Clear, Select or "A" and Standard or "B.")

Clear—Shall be good and sound, free from knots, shakes or splits, except a fair proportion in each shipment may contain pin knots showing on one face only. Will allow a reasonable amount of birdseye, and sap not exceeding 4% of the area of all the surfaces.

Sap Clear—Shall conform generally to the grade of clear, except that it may contain any amount of sap. Discolored sap, when sound, shall not be considered a defect.

Select or "A"—Shall be good and sound, free from shakes or splits. Shall be graded from the face side and will allow birdseye and 1 small, sound knot 1 in. in diameter or its equivalent in each 6 superficial ft. In the absence of other defects, will allow 1 soft knot ½ in. in diameter in each 6 superficial ft. Sap allowed not exceeding 4% of the area of all surfaces.

Standard or "B"—Shall be graded from the face side

Continued on next page

RESIDENCE, COUNTRY CLUB DISTRICT, KANSAS CITY, MO.
Colonial Redwood siding painted white

and will allow birdseye, any amount of sap, and in each 6 superficial ft., 2 sound knots not exceeding 1¼ in. in diameter, or their equivalent. In the absence of sound knots, will allow one soft knot 1 in. in diameter or its equivalent in each 6 superficial ft.

Worked Uppers—*Clear, Sap Clear and Select Worked*—Shall be well manufactured and worked smoothly to uniform thickness. Will admit of slight roughness or variation in milling, and defects mentioned under grades of Clear, Sap Clear and Select.

Standard Worked—Will admit in addition to stock of regular Standard Grade, Clear, Sap Clear and Select or "A" which, owing to poor machining, is unsuitable for these grades.

Shop Lumber—This is strictly a cutting-up grade, and will be graded to produce 50% to 70% Sap (A) and Better cuttings, 5 in. and wider and 3 ft. and longer. Will allow sap, loose or rotten knots, or other defects, but must contain percentage of "A" and Better cuttings as above described.

Architectural Specifications for the Use of Redwood

General—All lumber used, whether for rough or finished woodwork, unless otherwise specified, shall be thoroughly seasoned California Redwood, and shall be of the first quality of the respective grades, and guaranteed against any objectionable shrinkage or other imperfections not permitted by the California Redwood Association.

Note: Redwood should be specified for:

All exterior trim
Balusters
Ceiling
Columns
Door and window frames
Eaves
Fencing
Framing
Gutters
Lath
Lattice
Moulding
Mud sills
Newels
Pickets
Porch flooring
Rails
Roofing (shingles and shakes)
Septic tanks
Siding

RESIDENCE, MISSION HILLS, COUNTRY CLUB DISTRICT, KANSAS CITY, MO.
Redwood siding painted white

RESIDENCE, PLAINFIELD, N. J.
Redwood siding painted white

Lathing—All partitions, walls, and elsewhere as indicated or shown on drawings shall be lathed with No. 1 California Redwood laths, ⅜ in. by 1½ in. by 4 ft., free from bark or dead knots, and of full thickness. They are to be laid ⅜ in. apart on ceilings and soffits, and ¼ in. apart on walls and partitions, with four nailings to a lath and joints broken every 18 in. Set all laths horizontally and leave no long, straight, vertical joints; laths shall not be put on vertically in any instance.

Porch Flooring—Lay the porch floor with Clear Grade California Redwood flooring, tightly strained and blind nailed to every bearing with two 8d nails, the joints run in white lead. Finish the edge of the floor with floor mould as detailed.

Shingles—Cover all roofs, dormers, gables, so marked on drawings, with a layer of waterproof paper and (Clear or "A") California Redwood Shingles, laid ..... in. to the weather, and laid with two zinc coated iron nails to each shingle.

Note: If shingles are to be dipped, so specify here.

Shakes—Cover all roofs, walls, gables, dormers, etc., so shown on drawings, with a layer of waterproof paper, and (split or sawn) (Clear Vertical Grain or Clear XX) California Redwood shakes, laid 16 in. to the weather.

Siding—All walls or portions of walls, so shown on drawings, shall be covered with (Clear or "A" or Select, or "B" or Standard, as desired) California Redwood (lap siding or drop or novelty siding as per details), size ....., laid ..... in. to the weather, well nailed over every bearing, with zinc coated cut iron nails, set for puttying. No butt joints will be allowed in panels 12 in. long or under, and no butt joints are to come over window or door openings in the first course above such opening.

Exterior Trim—All exterior trim, except as otherwise noted, shall be of Clear California Redwood, thoroughly seasoned and in strict accordance with the scale and detail drawings. All finished work shall be primed by painter before erection.

Note: "A" or Select or "B" or Standard Grade may be used for trim that is not to be painted.

RESIDENCE, PLAINFIELD, N. J.
Redwood siding painted white

Continued on next page

RESIDENCE, DES MOINES, IOWA
8-in. Colonial Redwood siding painted white

RESIDENCE, COUNTRY CLUB DISTRICT, KANSAS CITY, MO.
Redwood siding painted white

All box gutters shall be lined with 13/16 in. California Redwood, Clear Grade.

All windows and door frames and sash shall be of (Grade "A" or Select and Better) California Redwood.

Columns—All exterior columns shall be of (Grade "A" or Select and Better) California Redwood, built up of staves, thoroughly seasoned and made in strict accordance with the detail drawings.

Interior Finish—All stock used for interior finish woodwork, unless otherwise shown on drawings or specified shall be Clear Grade California Redwood. All shall be hand planed, scraped and sandpapered and all tool marks, stains and defacements removed. All mouldings shall be carefully worked out and run true and straight. All work shall be delivered to painter clear and in perfect condition, ready for finishing.

Note: If not to be painted, trim may be specified Grade "A" or Select or "B" or Standard.

Essential Qualities of an Ideal Lumber for Residential Construction

The permanent beauty of any wooden house depends primarily on the lumber used. If it is hard in some spots, and soft and spongy in others, if it "bleeds" pitch here and there, it is almost impossible to give it a painted surface that will look well—and stay looking well. In a short time it gets "spotty." Where it gets "spotty" there is shrinking, swelling and warping. Decay begins. In a few years repairs become necessary. The value of the house shrinks as the soundness of its sidings, porch posts and columns, railings, gutters, window frames, eaves, roof, water tables and other parts, constantly exposed to climatic changes and moisture, gradually deteriorate.

Architects fully appreciate the necessity for a careful selection of kinds and grades of wood to be used. No wood meets all requirements for all purposes. Hard wood is best for some uses, soft wood for others.

For exteriors, paint holding qualities and resistance to rot are extremely important. Redwood possesses both these qualities to a remarkable degree. Every fiber is impregnated with *natural* preservative which guards it against rot and decay. It has a uniform cellular structure which provides paint tenacious surfaces. It is free from pitch and other resinous substances. Redwood is also remarkably free from knots, splits, sapwood, worm holes and other blemishes. It is close grained and of uniform texture.

Properly dried, Redwood resists the action of the elements longer—painted, stained or unfinished—than most woods generally used in building construction. It is practically free from warping and twisting.

Where Redwood Should Be Used

Where Redwood is used for exterior construction and finish—in those parts of the home exposed to the climate and to the action of soil moisture and insect and worm activity—this item of repair is reduced to a minimum. The rot-resisting properties of Redwood, its uniformly even texture, natural paint holding surface and non-warping qualities, together with the fact that it contains no pitch or other resinous substances and is consequently difficult to ignite and easily extinguished if burning, highly recommend this lumber for:

RESIDENCE, CHETEK, WIS.
Clear Redwood siding, natural oil finish

RESIDENCE, CHETEK, WIS.
Clear Redwood siding, natural oil finish

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NEW ENGLAND RESIDENCE AND GARAGE
Redwood siding painted white

Siding	Pergolas	Eaves
Clapboards	Porch columns	Gutters
Shingles	Porch rails	Garden
Window frames	Porch flooring	Furniture
Outside doors	Porch ceiling	Mud sills
Frames	Newels	Lattice
Mouldings	Fencing	Pickets
Balusters		Greenhouses

Redwood for Siding

The sidewalls of a house are as important as the roof or the foundation—they should be absolutely weatherproof, leakproof, and impervious to dampness; they should last without expense, without paint if necessary, and should not crack, scale or rot, at the same time being capable of attractive treatment from an architectural viewpoint.

Redwood beveled, resawn and drop siding are fast coming into popular favor in the East. In the West they have been used for many years in all sections of that country. Redwood siding, or a shingle or shake siding, is a covering that gives artistic beauty as well as longer service. It can be stained or painted to any color, and adds to the value of the property because the exterior of the house looks just as uniformly attractive and is still as perfectly weatherproof 25 years after as it was the day it was built.

Redwood Shingles

No other shingle, or substitute roof covering gives the ideal combination of rot resistance and fire retardance, with the additional merit of being rustproof and free from tar, gum or any other substance to melt in the sun and fill gutters, water pipes or drains.

RESIDENCE, HIGHLAND PARK, ILL.
Redwood sawn shingles painted white

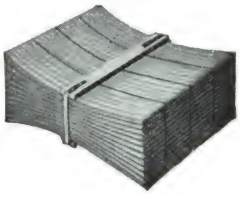
All Redwood shingles are free from sap—it is the sap of any wood that rots first. An all-heart Redwood shingle will give satisfactory service for half a century or more without paint or stain of any kind, *provided only that the proper kind of shingle nail is used.* This point can not be emphasized too strongly.

Redwood shingles come in two grades, No. 1 Clear and A. The former is a carefully selected vertical grain shingle, free from all defects, and is used invariably on coverings where service demands first consideration. The latter is a 10-in. clear butt shingle, "slash" grain being no defect, and it is recommended for sidewalls rather than for roofing.

Always lay Redwood shingles with zinc coated cut iron nails. This will prolong the life of the roof many years. The ordinary steel shingle nail will rust out while the shingle itself is still in first class condition. A Redwood shingled roof, laid with the right kind of nails, will give satisfactory service for from 30 to 50 years.

Redwood shingles, either dimension or random widths, will give longer service than any similar style of roof or side shingle.

The *natural* preservative in Redwood makes it unnecessary to stain or paint Redwood shingles.



SQUARE SHINGLES

RESIDENCE, INDIANAPOLIS, IND.
Redwood siding and shingles

REDWOOD BUNGALOWS PAINTED WHITE

Continued on next page

The new style sawn shingles are fast coming into use for the side walls of residences in the middle west and east.

They are either 24 in. or 26 in. long, as desired, both sizes being 5½ in. wide and are ¾ in. thick at the butt.

They are Clear Redwood, of the highest grade — and when laid 13 in. to the weather and painted white, give the appearance of wide clapboards as will be seen in the illustration.

These shingles do not warp when in use—they take and hold paint indefinitely, and are recommended for high class residential work, where their ultimate economy will be proved by a practically unlimited period of service.

Sawn Shingles

Redwood Millwork

The fine soft texture of Redwood makes it a splendid wood for millwork of all kinds.

For contact with the ground, as mud sills and underpinning, or for exposure to the weather, as exterior trim, porch columns and flooring, porch rails, etc., there is no wood more durable than Redwood.

It is manufactured into all kinds of general millwork, such as frames for doors and windows, mouldings, columns for interior and exterior, newels, balusters, rails, spindles, pickets, battens, trim and specialty products. Many are built-up on the linderman machine, with its dovetail glued joint—a joint that Redwood makes perfectly and because of its close grain the joint is barely discernible.

Redwood Window and Door Frames

Redwood door and window frames are fast coming into use in all eastern localities. Redwood should always be used for the portion of the frame that comes in contact with the weather, as well as the part covered when the frame is set into the building and which is likely to be reached by moisture or rain seeping behind the casing. Houses built this way have no back rot.

Information Necessary for Estimates—To avoid errors and misunderstanding, orders should state:

Window Frames—

(1) Number of frames wanted.
(2) Our catalogue style number.
(3) Size of sash opening—width first, height next.
(4) Thickness of sash.
(5) Glass size and number of lights.
(6) Whether frame is for plain or check rail sash.
(7) Whether pulley stiles bored for pulleys or not.
(8) Send sample pulley.
(9) Whether pockets are to be ripped only, or ripped and cut (and whether screwed in or not).
(10) Whether drip cap or crown cap head casings are to be nailed up or not.
(11) Give rise of sill ("sill pitch") in inches to each 6 horizontal inches.

Unless otherwise specified or shown in our catalogue we will furnish a ¾-in. to 6-in. rise ("three-quarters pitch") ¾ by 6 in. only.

If deviations from catalogue style are required state further:

(12) Thickness of pulley stile.
(13) Width of pulley stile.
(14) Any other information special to frames ordered.

Door Frames—

(1) Number of frames wanted.
(2) Whether inside (I.S.) or outside (O.S.) frames.
(3) Our catalogue style number.
(4) Size of door—width, height and thickness.
(5) Width and thickness of jambs.
(6) Whether plain or rabbeted jambs.
(7) Width of rabbet or size of stops.
(8) Whether sills are to be furnished by us or not.
(9) If without sills whether dadoed for sills or not.
(10) Whether drip cap or crown cap head casings are to be nailed up or not.
(11) Give rise of sill ("sill pitch") in inches to each six horizontal inches.

Unless otherwise specified or shown in our catalogue, we will furnish a ¾-in. to 6-in. rise ("three-quarters pitch") ¾ by 6 in. only.

(12) Any other information special to frames ordered.

Prompt Shipments—The Pacific Lumber Company can make prompt delivery on any of the standard sized window and door frames for any district in the United States.

Shipments are made from either the mills at Scotia, California, or from the quick shipment depot in Chicago, where stocks of seasoned Redwood lumber and millwork are always carried.

Porch Columns and Pergolas

Redwood's resistance to rot and perfect adaptability to paint make it a most desirable and efficient wood for porch columns. The Pacific Lumber Company has met the large demand for Redwood porch columns by manufacturing them in sufficient quantity at their mills so as to be able to supply standard sizes of columns and newels, in any reasonable number, immediately from stock.

Redwood columns are built of staves properly dried, and there is no shrink, warp, or swell to throw them out of alignment. Redwood's perfect adaptability to paint also contributes to the reasons why it is the best wood for a pergola.

Porch Columns

Like the sleeping porch, the pergola, because of its being outdoors, should be built entirely of Redwood—of Redwood columns, girders, flooring, rafters and lattice. Then there will be no rot due to contact with the ground or exposure to weather.

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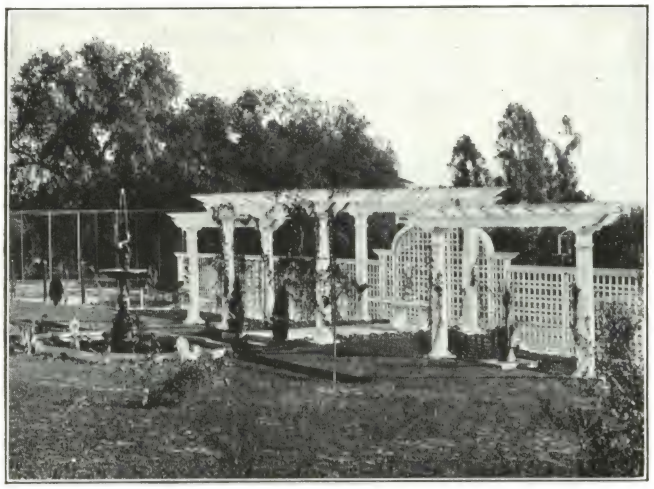


REDWOOD PERGOLA
Columns, beams, girders and lattice work of Redwood painted white

Sleeping Porches and Greenhouses

Redwood should be used in building the sleeping porch because of its splendid weathering qualities—in fact, the nature of the wood is perfectly adapted to this usage.

A sleeping porch is an economy in the reduction of doctor bills, and a Redwood sleeping porch is an actual saving in the long run. It should be built entirely of Redwood.

No better lumber exists for use in greenhouse construction. It is not affected by the wet earth in the benches, nor by the difference in temperature between the outside and inside atmosphere. Constant repairs, due to decay, warping and twisting, are avoided.

Redwood Fire Door Cores

Redwood is one of the four woods specified by the Fire Underwriters Laboratories as a material from which fire door cores should be built.

Of these four woods Redwood is the first preferred, for these reasons:

(1) Natural resistance to fire because of slow ignition and slow burning.

(2) Absence of pitch, resin, or other inflammable elements.

(3) Does not dry rot when denied ventilation.

(4) Will not "wet" rot due to moisture from sweating metal.

(5) Light in weight, strong and easy to work.

(6) Always hangs true, and is not affected by swelling or shrinking in the core by reason of moisture or dampness that might penetrate through steaming, sweating, etc.

FIREPROOF DOOR SHOWING REDWOOD CORE
Approved by the Fire Underwriters' Association

In the State Housing Act of California, Redwood only is specified as a wooden fire resisting material for fire doors.

The following from Sections Nos. 58 and 59 of the Act effective September 1st, 1921:

"In every tenement house or hotel hereafter erected, every boiler used for purposes of heating the building, using fuel other than gas, and every heating furnace or water heating apparatus, *using oil or other fluid fuel,* shall be installed in a room.

"Any door in the wall of such rooms shall be a fire resisting door, constructed of three thicknesses of ⅞-in. by not more than 6-in., tongued and grooved, matched *redwood boards* entirely covered on the sides and edges with lock-jointed tin; every such door shall be self-closing, so hung as to overlap the walls of the room at least 3 in., and any glass in any such door or any glass in any window or opening in the walls of a boiler room shall be wired glass, not less than ¼ in. thick, set in a metal or metal covered sash."

The following letter from a large Pacific Coast manufacturer of fire doors is based on years of practical experience:

LOS ANGELES, CAL.,
Aug. 16, 1916.

GENTLEMEN:

In reply to your letter of August 15th.

There has been much discussion on the relative merits of various soft woods to be used in construction of fire doors.

In my experience I find that Redwood is the best wood in all cases, it having, you might say, no pitch in it, which makes it almost non-burnable. Also, it does not dry-rot when enclosed by metal and denied ventilation.

Most woods I have noticed that are encased in metal will sooner or later dry-rot, and I have noticed a number of doors after having been enclosed for seven or eight years were reduced to scrap or junk through dry-rot.

We are the largest manufacturers of fire doors on the coast, and we have never had one complaint about our material going bad. In fact, in the course of a change in one of the Pacific Telephone Buildings in San Francisco, the engineer in charge cut in two one of the metal doors that we manufactured, the door in mention having been in place about eight years; and he, the engineer, returned a part of the door to us, and a letter stating that the door was in just as good condition as the day we manufactured it.

Also, another thing that I noticed on the Redwood doors is that after they have been subjected to a fire they are not burned up. I could cite a number of incidents, but I remember one in particular in which I went to examine the doors after a fire. I found that the door next to the fire had been charred possibly one-quarter of an inch deep. The fire did not get in any further; in fact it stopped, and as I said, this is due to the fact that there is no pitch in the wood to help it burn.

After the fire at the Times Mirror Company's plant (The Los Angeles Daily Times explosion), I noticed on the building across the alley there was a shutter protecting a window opening. Considering the great heat from the explosion and fire, the shutter had fulfilled its duty much more so than any other protection used on the adjoining window. In fact, some of them had hollow metal windows, and frames, and they had gone absolutely to pieces, but this Redwood shutter kept the fire out of this particular opening; and without doubt in my mind if they had been used on the adjoining openings they would have saved that building.

In conclusion, you can see where I stand regarding the use of Redwood. We will not use anything else because I deem it that our customers are entitled to the best and it is up to us to see that they get it.

Yours very truly,
CALIFORNIA FIRE PROOF DOOR CO.,
(Signed) MGR. J. A. MOTTASHED.

Redwood Fire Walls

Redwood's slow ignition, slow burning, and the ease with which fire is extinguished have made it the recognized material for fire walls.

Experience on the Pacific Coast has demonstrated that a solid Redwood fire wall will perform its functions satisfactorily.

Continued on next page

In the State Housing Act of California, effective September 1st, 1921, Redwood is specified as the only wood allowed for fire walls and ceilings.

A portion of the Act reads as follows:

"In every tenement house or hotel hereafter erected any portion of such building, in which there is kept or stored any automobile or automobiles, shall be a room, the enclosing partitions of which shall be built of concrete, reinforced concrete, brick, stone, concrete tile or blocks, or terra cotta tile, not less than 6 in. thick or may be of wood studs lined on the automobile storage room side with *Redwood Boards* not less than ⅞ in. thick covered with asbestos paper ⅛ in. thick, and then covered with No. 26 (gage) galvanized iron, or such enclosing partitions may be constructed of studs lathed on both sides with metal lath and plastered with portland cement plaster not less than ¾ in. thick. Such enclosing partitions shall extend from the floor of the room to the ceiling of the same. The entire ceiling of such room shall be built of material or materials *similar to that used in the construction of its walls*, or shall be lathed with metal lath and be well plastered not less than ¾ in. thick. The floor of every such room shall be of concrete not less than 2 in. thick.

"Every door, window or other opening in the walls of buildings included within the district above described, shall be protected in the same manner as required by this act for doors, windows and other openings in a boiler room."

Building ordinance No. 399, of the city of Eureka, California, is typical of the permitted use of Redwood for fire wall purposes, and reads as follows:

"Sec. 2. The exterior walls and all party walls of the buildings included within the district above described, shall be constructed of concrete or brick, natural or artificial stone, or iron or a combination of any or all of the above described materials, or of Redwood as provided by this ordinance.

"Sec. 3. The height of all wooden buildings hereafter constructed within the fire limits shall be limited to 50 feet, from the sidewalk grade to top of fire wall or peak of roof.

"Sec. 4. All wooden buildings hereafter erected within the fire limits of the city of Eureka, except those built for, and used exclusively as dwelling houses, outhouses, and private stables, shall be constructed with solid walls, the same to be not less than four inches thick in all one and two story buildings, and in all three or more story buildings, the two upper stories shall be constructed with solid walls of like thickness, and the lower story or stories shall be constructed with solid walls not less than six inches thick. The above thickness of walls to be exclusive of plaster, weather boarding or rustic."

OAKLAND, CALIFORNIA,
April 11, 1917.

GENTLEMEN:

With reference to your communication of the 7th inst., would advise you we have selected Redwood in many parts of our new building on account of the resistance this lumber has to decay and deterioration, and also on account of its resistance to fire. We particularly selected Redwood for our elevator shaft on account of the well-known resistance of this wood to fire. The construction of our shaft is 2x6-in. Redwood timbers placed on top of each other, making a solid wall 6 in. thick.

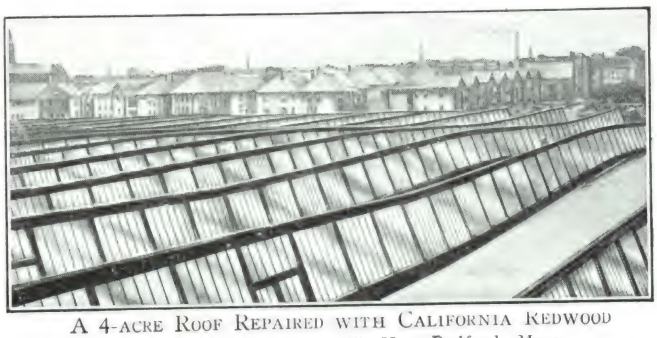
We gladly recommend this lumber to anyone desiring slow burning construction.

Yours very truly,
CALIFORNIA COTTON MILLS CO.,
Mgr. J. R. Millar.

Redwood for Roofs

Redwood possesses a number of qualities that make it highly preferable for roofs, and particularly in factories where there is humidity and condensation to contend with. It has been found particularly serviceable in connection with the so-called "sawtooth" type of roof.

In many kinds of business such as textile mills, paper mills, etc., where there is humidity or rising steam, there is trouble with condensation that drops back on to the products handled and creates a manufacturing loss. This is due to the fact that the roofing materials do not properly insulate the sharp differences in temperature between the exterior and interior, and particularly where there is severe cold weather.



A 4-ACRE ROOF REPAIRED WITH CALIFORNIA REDWOOD
Part of roof of textile mill, New Bedford, Mass.

REPAIRING 4-ACRE SAWTOOTH ROOF WITH REDWOOD
A closer view of the preceding illustration

It is not necessary to subject Redwood to artificial preservatives to protect it from rot and decay—it possesses a *natural* preservative that resists rot, not only in contact with water, moisture or humidity, but also when subjected to variable conditions of heat or dryness, or to severe alternating dry and moist conditions. Redwood can be denied ventilation by sealing in metal, and under conditions of this kind it has a high resistance to dry rot; this same resistance to dry rot is present even if the wood is not denied air.

In Redwood, as in other woods, the heart stock will last longer than the sap. There is a sharp distinction between heart and sap in Redwood, as the natural color of the heart wood is a soft reddish brown, while the sap wood is cream color. Redwood sap wood, however, is as durable as any other soft wood when painted.

Redwood's natural resistance to decay under moisture or humidity gives it a maximum of life, while its inherent resistance to the attack of acids or alkalis, or the fumes of chemicals, makes it preferable in cases where such conditions prevail. It is light in weight, and sufficiently strong under proper design.

Redwood also possesses the necessary attribute of holding its shape—when wet it does not swell and, when again dried, does not shrink perceptibly. Redwood is not sensitive to severe changes of temperature or atmospheric conditions which set up counteracting strains in wood. It can be depended on to hold its shape when one side is subjected to freezing and the other to heat or humidity.

Redwood is a thoroughly satisfactory surface to paint. Its surface affords a firm grip for the paint and makes it possible to get a thorough coverage. As Redwood, when thoroughly dry, is subject to a minimum of movement in the wood itself under varying conditions of heat or moisture, there is a minimum tendency to check the paint film from such cause.

Continued on next page

Where Proper Insulation and Resistance to Decay Are Particularly Valuable

F. J. Hoxie, Engineer and Special Inspector of the Associated Mutual Factory Fire Insurance Companies, Boston, Massachusetts, writes regarding this work:

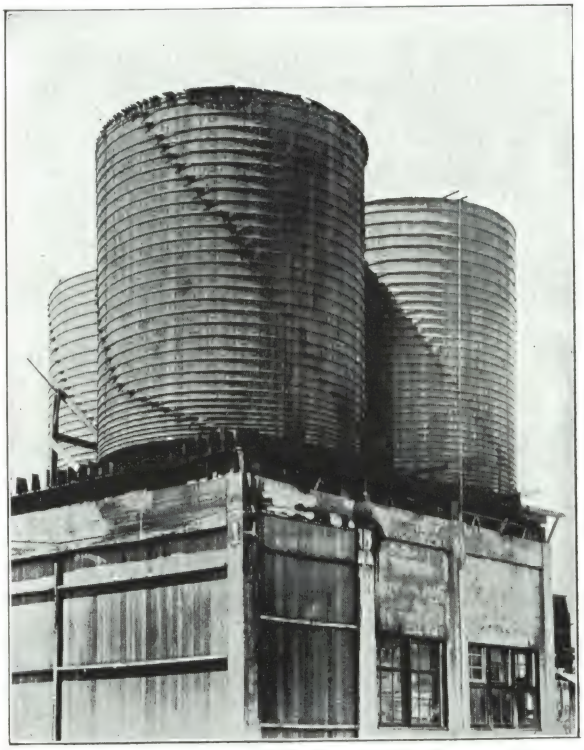
"I am well aware of the excellent rot-resisting qualities of California Redwood, also of its high insulating power. I believe there is an excellent field for Redwood for roofs, especially in paper mills, weave mills and other finishing mills."

The peculiar and uniform cellular structure of Redwood accounts for its insulating qualities, while the *natural* preservative prevents the formation or growth of decay producing fungi in Redwood lumber.

Redwood Tanks and Vats

Redwood makes a superior stave for tanks as it is a non-conductor of heat and cold; 2 in. of Redwood is equivalent in insulating power to approximately 30 in. of steel or concrete. This is an element of high importance in the stave for this use because it preserves the temperature of the contents of the tank. Redwood staves are made from clear heart straight-grain stock, and come in standard sets of 6 to 9 ft. and 10 to 20 ft. in length.

Redwood's long life and resistance to decay or corrosive acids and alkalis make it extremely valuable for tanks. Redwood tanks can handle muriatic acid solutions up to 6%, and up to 28% of nitrohydrochloric acid. Redwood tanks are in general use for water storage and fire protection in all types of buildings, railroads, etc.



REDWOOD TANKS AFTER WITHSTANDING SEVERE FIRES

The two tanks in the foreground are of Redwood and were simply charred by the fire. The tank in the rear is a new tank made necessary because the old one which was of another wood was destroyed by the fire

Redwood Tanks Are a Sound Investment

Utility, service and cost are the three considerations that should determine water tank specifications.

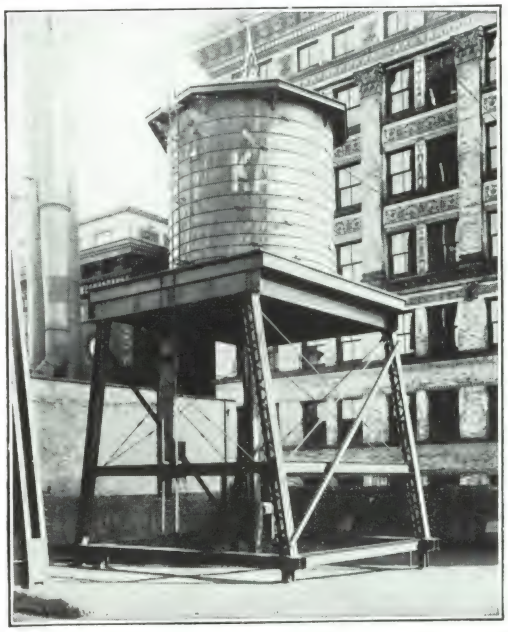
In first cost some tanks—both wood and metal—are slightly cheaper than Redwood tanks. But judged by the term of service, and cost for upkeep, Redwood tanks are better and cheaper. Hoops may rust out and be repeatedly renewed while Redwood endures. Repair or replacement costs are minimized whether the service be 10 years or 30 years.

A 30,000-GAL. WATER TANK OF 3-IN. REDWOOD

Installed at the Pittsburgh Field Club for club water system, watering the greens and supplying water for swimming pool

Water does not rot Redwood. Fungus does not attack it. No protective treatment is required because Redwood is impregnated during growth with the *natural* preservative which remains in the fiber during the life of the tank. Redwood is odorless and tasteless. It is unaffected by acids, alkalies or oils. Redwood tanks, pipes and vats are in continual use for supplying cities and institutions with water, tanning leather, dyeing textiles and for the strong solutions used in the leaching of copper. In all climates of the world Redwood tanks have been used for years, giving exceptional service.

A permanent tank is assured by the use of Redwood, one that neither rusts nor rots, that remains tight and sound indefinitely, that does not affect the tank's contents and is not affected by them.



A 15,000-GAL. REDWOOD TANK FOR SPRINKLER SYSTEM SERVICE

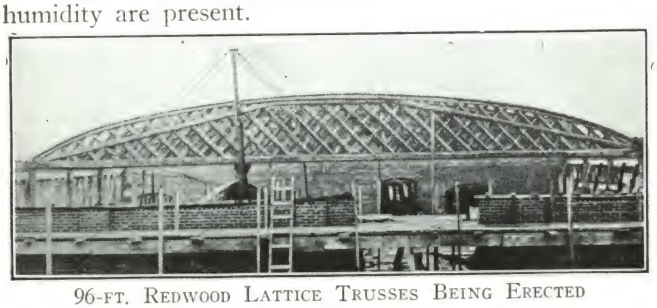
Erected on the roof of one of Pittsburgh's large department stores

Continued on next page

Lattice Roof Trusses

The wood lattice roof has been designed to meet the modern demand in industrial building for a light roof truss which can be built easily, quickly and at a low cost. The design is of such a nature that the truss can be built to span all ordinary lengths between walls without the need of intermediate supports, thus providing clear floor space in the building. Although light in weight it must be strong and constructed of material which can be obtained without delay.

Redwood's long life and its resistance to fire, decay, and to corrosive acids make a Redwood lattice truss extremely suitable in construction where fire hazard, acid fumes, excessive moisture, or a combination of heat and humidity are present.



96-FT. REDWOOD LATTICE TRUSSES BEING ERECTED
Roof boards, also of Redwood, fastened directly to trusses

Insulating Qualities of Redwood Ideal for Cold Storage Requirements

Redwood cellular structure, when studied under a microscope, looks very similar to a comb of honey between the dark annular rings. Every one of these millions of cells in the growing tree is full of sap, but when the tree is cut into lumber the lumber must be "seasoned" or dried before it goes into commercial use. This "seasoning" process consists merely of evaporating the natural moisture of these cells. Each cell, therefore, becomes a dead air space.

The cellular make-up of Redwood is uniform, both in the thickness of the cell wall and the size of the cell. It is plainly evident, therefore, that heat, applied to one side of a piece of Redwood, to travel through the Redwood must pass through a thin cell wall and then another dead air space, and so on. Heat passing through this combination rapidly dissipates.

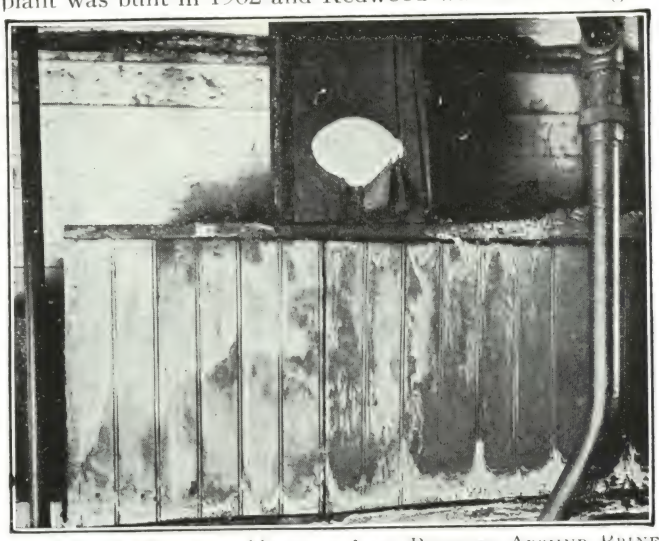
Prof. L. J. Towne, of Columbia University, gives the relative power of conduction of 1 to 20 between wood and stone, cement or clay products. This means that stone and cement are 20 times a better medium for the conduction of heat or cold than is wood. The millions of dead air cells between the annular rings of Redwood are what give Redwood its insulating power.

A large manufacturer of silos in the East, one of the pioneer concerns in the use of Redwood for silos, makes the statement that 2 in. of Redwood is equivalent to 30 in. of concrete in insulating power. This manufacturer has studied Redwood thoroughly from this angle for the reason that the success of a silo depends upon the non-conductivity of the silo wall—as dissipation of the natural heat of the silage through the silo wall increases the percentage of waste silage.

Installations of Redwood Insulation in Cold Storage Plants

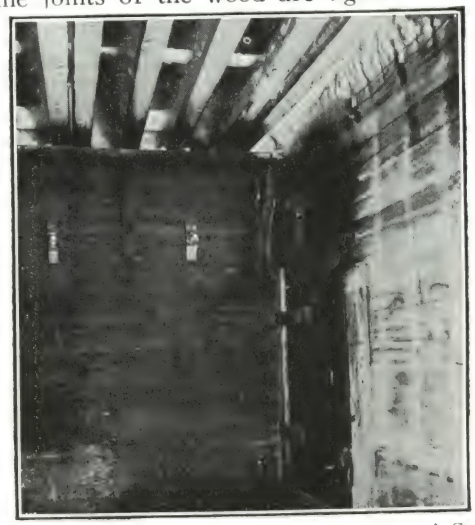
Manufacturing plants use Redwood as a substitute for corkboard for insulating.

There are some splendid examples of Redwood's insulating power as well as its remarkable longevity under the most severe service in the old plant of the National Ice & Cold Storage Co., San Francisco. This plant was built in 1902 and Redwood was used throughout. The system of brine casing is incased in Redwood boxes made of 1-in. matched and surfaced Redwood. Nearly all of these insulation boxes are still in use. The temperature in the brine pipes is 6° above zero, and they have gradually built up around the pipe, inside of the box, an incrustation of frost that completely fills the box. In spite of the fact that the temperature of the inside of these insulation boxes is 6° above zero, and the temperature in the engine room of the plant is 80°, there is no shrink, warp, swell, twist nor check in these boxes, nor is there any gathering of frost on the outside of the box which would indicate free conductivity through the wood.



INSULATING BOXES OF MATCHED 1-IN. REDWOOD AROUND BRINE PIPES
15 years old. Engine room temperature, 80°; inside of box, 5°. Frost formed around pipes is gradually forcing box out of shape, but there has been no decay, warp nor check in the wood. Insulating qualities shown by absence of frost on exterior of box

Not only this plant, but most of the icehouses on the Pacific Coast use Redwood as lining for cold storage and ice rooms. In the plant above referred to there are ice storage rooms that have been in continuous use for 15 years, and where Redwood has been incased with frost and ice for that period, and in spite of this severe service these rooms are thoroughly airtight—the joints of the wood are tight.



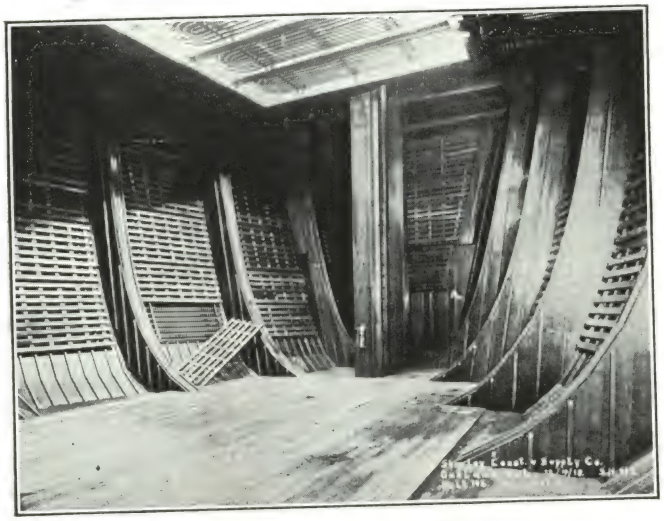
REDWOOD ICE STORAGE ROOM AFTER 15 YEARS' SERVICE
In plant of National Ice & Cold Storage Co., San Francisco. In spite of severe conditions of service, this room is still airtight, and there has been no decay in planking or timbers

Continued on next page

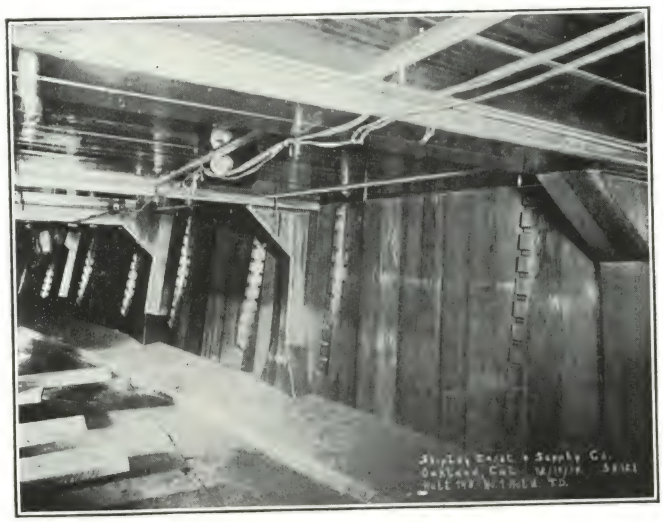
Redwood Insulation in Refrigerator Vessels

During the war the Shipley Construction Co. of Brooklyn, New York, fitted out on the Pacific Coast, for the Government, eight refrigerator vessels, each of approximately 10,000 tons dead weight capacity.

The holds of these vessels were no more or less than immense Redwood refrigerator rooms and a number of the vessels, owing to disturbances in the Panama Canal, were forced, in order to get to the Eastern Coast, to go through the Straits of Magellan. This necessitated their passing the equator both south and north bound, and they were utilized in their trip east for carrying machinery, so that they were not frozen down until they reached the East Coast. Without any repairs whatever, the refrigerating machinery was then started, and the interiors of the vessels brought to the freezing point. When the machinery was shut off, the 7/8-in. Redwood insulation was sufficient to maintain the temperature with less than 1° of loss in 24 hours. Had the heat of the tropics disturbed the placement of the Redwood in any way, it would, of course, have been impossible to maintain this temperature.



HOLD OF REFRIGERATOR SHIP
Showing Redwood insulation, 7/8 in. thick



HOLD OF REFRIGERATOR SHIP USED IN EQUATORIAL WATERS
A 24-hour stoppage of refrigeration resulted in a rise of only 1°. Redwood insulation prevents any damage being done to goods in storage as a result of temporary breakdowns of the refrigerating machinery

The following are quotations from a letter recently written us by the shipbuilders:

BROOKLYN, N. Y.

Referring to your request for our opinion relative to the use of California Redwood in the insulation of refrigerated meat vessels.

We have pleasure in stating that we have used this wood exclusively for the insulation of eight large meat carrying steamers having an aggregated capacity of over 2,500,000 cubic feet of insulated space. These vessels carry frozen beef cargoes at temperatures below 15° F. and have been in service for periods varying between twenty-one months and twelve months, chiefly sailing between South American and European ports and North American and European ports. The vessels have been operated by the United States Navy and the United States Shipping Board.

The Redwood has proved entirely satisfactory for the purpose and we do not hesitate in saying that where we can procure it in quantities sufficient for the purpose, we would prefer to use it instead of ——— or timbers usually obtainable in these parts. The wood lends itself to being economically worked and as it does not check, the amount of loss incurred by waste is very small in comparison with the commercial grades of ———.

Redwood is quite sufficiently hard for the purpose, even when fitted on the wearing surfaces of insulated decks. However, in these positions under the hatchways it must be protected by an upper layer of harder wearing lumber such as ——— or ———. This also applies to ———, ———, or any other lumber used for insulating so that California Redwood is not at any disadvantage in this respect.

The absence from checking has proved a great advantage inasmuch as it enables side and overhead insulation to be contained by one thickness of board without the use of paper. With commercial ——— it is necessary to use double boards with paper in between so that the insulation filling will not sift out through checks which almost invariably appear in the boards, due to the wet and dry conditions experienced in insulated steamers between voyages carrying refrigerated cargoes and general cargoes respectively.

At least one of the steamers fitted with Redwood was very badly damaged in one of her insulated compartments by contact with a floating mine, resulting in flooding the entire compartment. After the vessel had been dry docked and dried out the Redwood was found to be in no way damaged by immersion in sea water.

Very truly yours,
SHIPLEY CONSTRUCTION & SUPPLY CO.,
Per L. Williams,
Marine Department.

Railroad Stations and Track Side Structures

Redwood is splendidly adapted for track side structure because it is sufficiently strong, light in weight, does not shrink, swell nor warp, is hard to set on fire and burns very slowly, is not subject to wet or dry rot, and takes and holds paint perfectly. The absence of shrink or swell makes it particularly desirable for roofing under varying climatic conditions.

Redwood is generally specified for railroad stations in the western country because of its extreme durability in contact with the ground and exposure to the weather, its satisfactory painting surface, and its fire resistance. Redwood is specified for such work to reduce the upkeep cost on small stations.

Special Information and Service

All of our offices are prepared to consult with any lumber user concerning his needs, and to advise as to the suitability of Redwood and its economical use.

If interested in the adaptability of Redwood for your requirements, we shall be glad to give full information and advice without obligation on your part.

THE CASEIN MANUFACTURING CO.

Manufacturers of "Casco" Waterproof Glue

TELEPHONE
CHELSEA 3030

GENERAL OFFICE
15 Park Row
NEW YORK, N. Y.

CABLE ADDRESS
"CASEINCO, NEW YORK"

CASCO SALES OFFICE: 3 West 14th Street, NEW YORK, N. Y.
OFFICES IN PRINCIPAL CITIES OF THE UNITED STATES

Product

"CASCO" WATERPROOF GLUE.

Definition

"Casco" Waterproof Glue is the strongest known adhesive suitable for commercial uses. It produces a joint which is *unaffected by heat or moisture*. Being a Casein product it is not subject to bacteriological deterioration but, inversely, its strength increases with age.

CASCO
WATERPROOF GLUE
TRADE-MARK

Why Architects Should Specify "Casco" Waterproof Glue

"Casco"-glued woodwork may be used for outside trim or for interior trim which is subject to the most unusual and abnormal changes in humidity and temperature.

Checked veneers, opened joints, loose faces do not occur in "Casco"-glued work. Disregarding the extra factor of superstrength inherent in all "Casco"-made products, the qualities of moisture and heat resistance set "Casco" apart as an unusual product for both usual and unusual work, yet "Casco" is *less* expensive than hide glues and no more costly than vegetable glues.

"Casco" has no odor.

Reasons for Superiority of "Casco" Waterproof Glue

There is never any doubt when "Casco" is used.

Maximum strength is assured.

Durability is unquestionable.

"Casco" is not an experiment. It is produced by the largest manufacturer of Casein products in the world.

The advent of "Casco" Waterproof Glue marked an epoch in the woodworking industry. All animal or vegetable glues are water soluble and disintegrate under heat or through decay. In "Casco" a chemical change occurs during the drying, so that, once dry, the glue is forever insoluble to everything but corrosive chemicals. To some of the latter, too, it offers unusual resistance.

Simple Tests Prove "Casco" Quality

The special qualities of "Casco" Waterproof Glue can easily be proved to the satisfaction of any observer by boiling, soaking or baking a "Casco"-made joint.

"Casco"-glued samples of wood may be boiled for eight hours, baked for eight hours, soaked for three days, without showing the slightest trace of separation.

A "Casco"-glued line will withstand a higher degree of temperature than that of the ignition point of wood.

"Casco" Waterproof Glue Widely Known and Used

In all products where glue is used, "Casco" is now recognized as the standard, by more than 3000 manufacturers.

A few of its applications are as follows:

Aeroplanes	Partitions
Cabinet work	Plywood
Columns	Sash and frames
Door panels	Screens
Furniture	Store fronts
Joint work	Trim
Millwork	Veneered products

Laying linoleum, cork carpet and rubber tile.

The real impetus for its commercial use came during the World War, when "Casco" Glue was used in great quantities in the manufacture of aeroplane fuselages.

The famous NC-4 was glued with "Casco."

The steamship Leviathan is being refitted with "Casco"-made panels and partitions.

A Convincing Testimonial

The following quotation is from one of the leading manufacturers of veneered products in this country:

"Veneered products will never attain full public confidence until the waterproof glue is used universally—observation of the veneer on door panels and furniture throughout the country is all that is necessary to convince any one of this fact. We are using your glue as much for the good name of veneered products in general as for the improvement of our own production."

Specify "Casco"—The Master Glue

Waterproof Glue—All work specified or required to be glued, such as joints, panels, veneers, miters, linoleums, etc., shall be glued with "Casco" Waterproof Glue as manufactured by the CASEIN MANUFACTURING CO., 15 Park Row, New York, N. Y.

Literature

Send for our "Red Book" which gives full information regarding "Casco" Waterproof Glue.

UNITED STATES PLYWOOD CO., INC.

314 West 16th Street

NEW YORK, N. Y.

OFFICES IN PRINCIPAL CITIES OF THE UNITED STATES
STOCK CARRIED IN NEW YORK CITY WAREHOUSES

Products

"CASCOMADE" WATERPROOF PLYWOOD (impervious to heat and moisture) in all woods and constructions, for Wall Panelling, Wainscoting, Furniture, Table Tops, Laminated Aircraft Panels, Ship Bulkheads and Partitions, Door Panels, and "Roddis" Flush Doors; Plain and Fancy Veneers in all foreign and domestic woods.

"Cascomade" Waterproof Plywood and Veneered Panels

"Cascomade" plywood and veneered panels introduce a new era in the woodworking field. The adhesive used in laminating the various plies is unaffected by either *heat* or *moisture*. "Cascomade" plywood should therefore be specified both for the usual interior panelling, wainscoting, furniture, etc., and for outdoor signs, shutters, steamship partitions, ceilings, etc. It may be set up against the studding, or over the brown or white plaster coats, or framed.

Sizes—Produced in practically all sizes and thicknesses, the following being standard and always carried in stock:

Thicknesses, ¼ and ⅜ in. (3- and 5-ply); widths, 24, 30 and 36 in.; lengths, 48, 60, 66 and 72 in. ¾-in. panels in large sizes and varied woods.

Note: Larger and smaller sizes always carried in stock but not in all woods.

Woods Used

"Cascomade" Waterproof Bataan Mahogany—These panels are of a beautiful, highly figured stripe also showing a delicate radial figure. They are probably the most beautiful mahogany panels obtainable and take finish exceptionally well—either polished or rubbed. These figured bataan mahogany panels are no more expensive than the plain variety usually stocked.

Note: We can furnish bataan mahogany lumber to match, for stiles, rails and trim.

"Cascomade" Waterproof Bataan Teak—These panels of subdued beauty and extreme hardness present an opportunity for unusual effects, and are sold at the *price of plain oak.*

"Cascomade" Waterproof Oregon Fir—The appearance of these panels is similar to cypress or long leaf yellow pine. The faces are of one piece without joint and are light, bright and clean. These panels are ideal for nurseries and kitchens, and can be used for all purposes. They are inexpensive—the ¼-in. are priced but little higher than the pulp and pasteboard wallboards. The surfaces are excellent for painting.

"Cascomade" Waterproof Plain Oak—Carried with both heavy flower figure and fine French figure.

Duali—This imported wood produces an extremely hard panel with the grain of oak and the color of birch. It may be stained mahogany or oak and is indistinguishable from either. It is the lowest priced fine hardwood panel obtainable and sells at the price of unselected birch.

"Cascomade" Waterproof Birch—These panels are mostly of one-piece faces and birch or maple cores (not gum). They are stiff and straight.

Quartered Oak—Carried in flash figure as well as French or Australian figure. Cut from selected Indiana logs.

Quartered Figured Gum—Carries a highly pronounced matched figure, frequently used for Circassian walnut.

Unselected Gum—A well made panel—very low in price.

"Cascomade" Waterproof Yellow Poplar—The ideal panel for painting and enamelling. An exceptionally well behaved wood.

American Black Walnut—In the minds of many, the most beautiful wood that grows. Carried in heavy figure as well as two-toned stripe.

Circassian Walnut—Not carried in stock, but made up on special order.

Basswood—An exceptionally light, well behaved wood—excellent for painting, but particularly where light weight is a factor. Used extensively in the manufacture of trunks and suitcases, vehicle panels, etc.

Permanence

Woodwork glued with old-fashioned hide or vegetable glues fails under heat or moisture. The adhesive used in "Cascomade" waterproof plywood is impervious to both.

"Cascomade" plywood is guaranteed for the life of the building.

Economy

"Cascomade" waterproof plywood may be used either indoors or outdoors, and may be placed directly against the walls or studding, if desired. Certain types of "Cascomade" plywood are very close in price to the pasteboard wallboards, and as they require merely a coat of stain and varnish to produce a delightful finish, are in reality less expensive than some types of wallboard.

Veneer Department

We carry in our New York warehouses, a full and complete line of both plywood and flitches of veneers, in various woods, so that architects wishing to specify a particular type or design of veneer, may refer to our flitch numbers. Literature on plywood and on the waterproof glue cheerfully furnished on request.

Samples of veneer and "Cascomade" plywood in either finished or unfinished state cheerfully furnished.

ANDERSEN LUMBER COMPANY

Manufacturers of Standard White Pine Door and Window Frames

SOUTH STILLWATER, MINN.

Products

ANDERSEN STANDARD WHITE PINE WINDOW FRAMES.

Also manufacturers of White Pine Door Frames and Cellar Sash Frames.

Experience

For 20 years this Company has specialized in the manufacture of Andersen standard window frames.

TRADE-MARK
(Registered
U. S. Pat. Off.)

Variety of Uses

These window frames are adaptable to a wide variety of uses, among them being modern or period houses, mansions, modest dwellings, garages; city, suburban or country buildings of brick, frame or stucco construction.

Materials

White pine is the best wood for out-of-door use, because of its ability to withstand shrinking, swelling, warping, rotting and creeping under all weather conditions. All exposed portions of Andersen frames are made of *genuine white pine*. The white pine construction gives long life, and keeps the Andersen frame accurate.

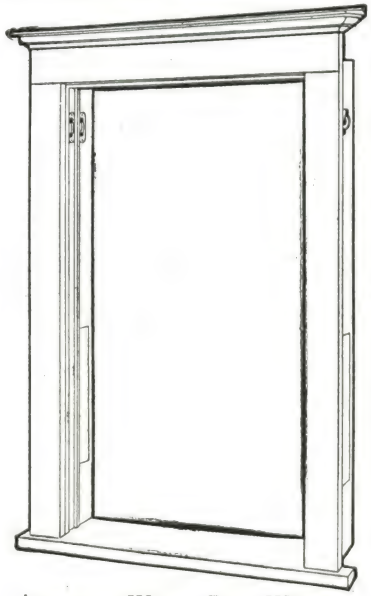
Andersen window frames are equipped with high grade cast iron sash pulleys. The face and wheel have been grounded, polished and lacquered; face is 1x4⅜ in., wheel is 2 in. in diameter with ¼-in. steel axle. The grooved wheel will carry standard size sash cord.

Distinctive Features

This frame is made up in seven units. Other knock-down frames average eighteen. These seven units are accurately cut. No trimming or fitting is required when assembling. Windows fit snugly yet run easily in Andersen frames because of the painstaking, accurate construction.

The seven units of the frame with pockets and pulley in place are shipped in two small, compact bundles, each weighing less than 20 lbs. The interchangeability of side and end pieces makes it possible to make up 121 sizes of frames from a stock of only 11 sizes.

Dealers in Andersen standard frames can thus supply a large variety of sizes the same day they are ordered.



ANDERSEN WHITE PINE WINDOW FRAME

Advantages

Accuracy attained in Andersen standard white pine window frames gives smooth running windows.

Specialization saves time and lumber in every stage of manufacture. This economy is passed on to the builder.

Handling is easier, trucks can haul larger loads, and less storage space is required. One man with a hammer can assemble an Andersen frame in ten minutes or less. That means a considerable saving in labor and lumber.

Andersen standard white pine window frames need not be ordered weeks in advance, as in the case of made-to-order frames. Delivery is made when the frames are needed without expensive delays.

Sizes of Andersen Window Frames

Dealers stock 11 standard sizes of Andersen window frames:

16 x 16	18 x 18	20 x 20
22 x 22	24 x 24	26 x 26
28 x 28	30 x 30	36 x 32
40 x 34	44 x 36	

By simply interchanging heights and widths, it is possible to supply 121 different sizes to two-light windows from these 11 standard sizes.

Complete Information

Any Andersen dealer will be glad to supply the complete story in book form, and explain fully the many advantages and economies in the use of Andersen standard white pine frames.

Estimates and specifications may be obtained promptly from the nearest dealer in Andersen standard frames, whose name will be furnished by addressing the ANDERSEN LUMBER COMPANY direct.

CURTIS COMPANIES SERVICE BUREAU

CLINTON, IOWA

Maintained and Operated in the Interest of the Following Curtis Companies:

CURTIS BROS. & CO., Clinton, Iowa
CURTIS & YALE CO., Wausau, Wis.
CURTIS SASH & DOOR CO., Sioux City, Iowa
CURTIS, TOWLE & PAINE CO., Lincoln, Nebr.
CURTIS, TOWLE & PAINE CO., Topeka, Kans.
CURTIS-YALE-HOLLAND CO., Minneapolis, Minn.
CURTIS & BENTLEY CO., Oklahoma City, Okla.
CURTIS DOOR & SASH CO., Chicago, Ill.
CURTIS DETROIT CO., Detroit, Mich.

CURTIS COMPANIES, INC., CLINTON, IOWA
Maintaining Sales Offices At:

PITTSBURGH, PA., Commonwealth Building
NEW YORK, N. Y., 25 West 44th Street
BALTIMORE, MD., 641 Calvert Building

Manufacturers of Trademarked Architectural Interior and Exterior Woodwork, Standardized

Products

STANDARDIZED ARCHITECTURAL WOODWORK:

Complete Entrances
Exterior Doors
Interior Doors
Frames
Mantels
Panel Work
Dining Alcoves
Stairways
Stair Material
Windows and Sash
Louvres
Blinds
Porch Work

Built-in Woodwork:
Bookcases
Corner Cases
Sideboards
Buffets
Kitchen Dressers
Ironing Boards
Dressing Tables and Cases
Medicine Cabinets
Exterior Moulding
Interior Trim

1866 CURTIS TRADE-MARK

Construction

A few typical details are presented on the following pages to impress upon the architect in search of dependable woodwork the sincere effort made by the Curtis Organization to supply a product of quality.

It is impossible here to adequately cover the subject of the construction of Curtis woodwork; hence a typical detail is shown on the next page. Display copy on the following pages indicates clearly our desire to provide the architect with material designed to make the use of Curtis Standards easy, practical and profitable.

In general our manufacturing practice may be summed up as follows:

(1) Extreme care in selection of woods used.

(2) Rigid inspection maintained to insure quality of material, workmanship and packing.

(3) Approved methods of door, sash and cabinet work construction employed. Some are described on following pages.

(4) Standardized operations insure constant construction, excellence and unvarying quality.

Standardized Production

The productive capacity of the Curtis plants is practically standardized on the production of architectural woodwork as described in the Curtis Catalogue No. 400, "Architectural Interior and Exterior Woodwork, Standardized" and as covered by "Curtis Details," 20 plates 17x22 in. to fold to 8½x11 in. The catalogue and details give all necessary information, sizes, woods used and character of designs. These will be sent to architects of standing located in territories efficiently served by Curtis plants.

(Designs created by Trowbridge & Ackerman, New York City.)

Deliveries

Quantity production based on standardization has made available to the architect and his clients for the first time a complete line of woodwork of accepted architectural design. The Curtis Companies desire to be taken into the confidence of the architect.

With an exact knowledge of the architect's particular problems, his requirements being known, the acceptance of an order by any Curtis institution or representative means on-time deliveries.

Any lumber merchant can supply Curtis woodwork. Many dealers carry a representative line on their floors. The wide territory covered by the several Curtis institutions insures prompt and inexpensive delivery to points in the greater portion of the United States.

Entrance C-100 Colonial

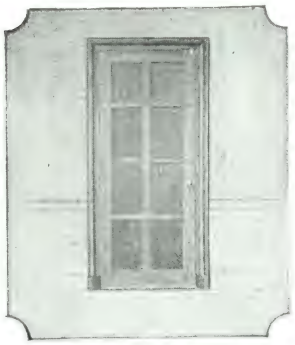
Entrance C-103 Colonial

Entrance C-111 English

Entrance C-302 Colonial

TYPICAL CURTIS STANDARDS

Continued on next page



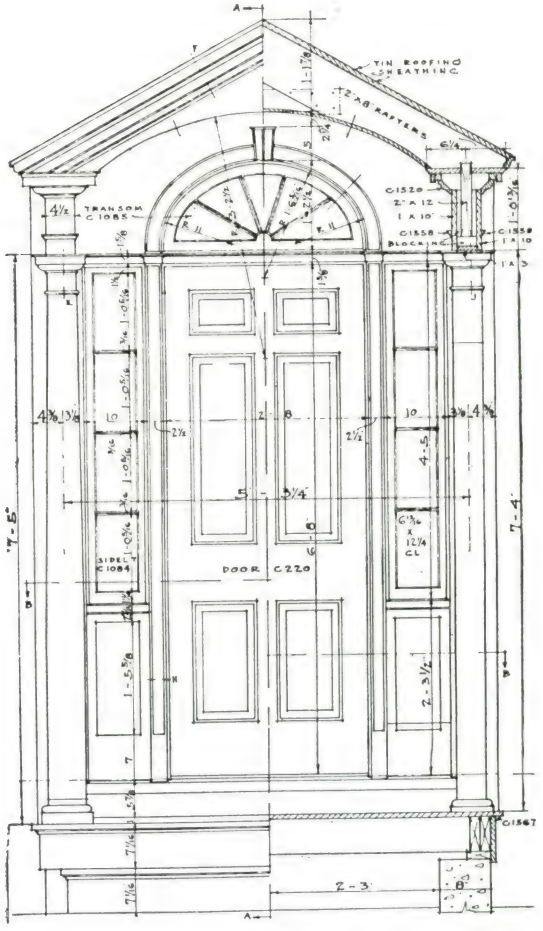
Door C-305 English

French Door C-320

Bookcase C-579

Mantel C-617 Colonial

TYPICAL CURTIS STANDARDS



A PORTION OF A TYPICAL SHEET OF CURTIS DETAIL

Entrance C-100 front elevation only. Side elevation, sections full sized moulding details shown in original. This entrance illustrated in lower left-hand corner of preceding page

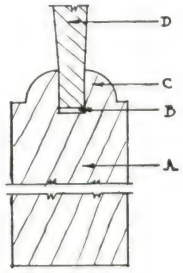


FIG. No. 1

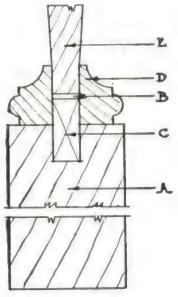


FIG. No. 2

SOLID DOOR SECTIONS

Fig. 1. Ovolo sticking (C) on stile or rail (A). Solid panel (D) set in panel groove (B) with sufficient allowance to accommodate maximum shrink and swell of the panel. Similar detail used when laminated panels are employed.

In veneered doors the white pine lock block core, the edge strips and face veneers ⅛ in. thick, are held together with waterproof glue. Dowels hold stiles and rails firmly.

Fig. 2. Typical door section showing applied moulding. Moulding (D) is nailed to spline (C) inserted in groove in stile or rail (A). Thus any shrink or swell in panel (E) is taken up in panel groove (B)

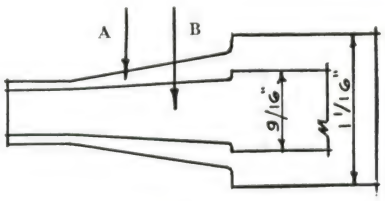


FIG. No. 3

SOLID RAISED PANEL SECTION

A marked sharp clean-cut raise in the panels adds much to the appearance of a door. Panels of solid white pine $1\frac{1}{16}$ in. thick are recommended in 1¾-in. doors and are stock with Curtis. In 1⅜-in. doors $\frac{9}{16}$-in. panels are provided. Where a cheaper door is required we offer a few patterns 1⅜ in. thick having $\frac{7}{16}$-in. panels.

In hardwood doors, laminated panels are produced from ⅛-in. panel stock, the grain of the face veneer and the grain of the core veneer running in opposite directions. This method produces a superior panel as compared with the practice of using thicker core veneers and thinner face veneers

Mantel C-619 English

Corner Case C-700 Colonial

Corner Case C-704 English

Sideboard C-712 English

TYPICAL CURTIS STANDARDS

Continued on next page

Dining Alcove C-740

Kitchen Dresser C-750

Adjustable Ironing Board C-770

Dressing Table Combination C-810

TYPICAL CURTIS STANDARDS

NO NAILS TO MAR THE SURFACE

One of many refinements in Curtis cabinet work is the lock-mitered joint at the left above which is compared in the illustration with the more common nailed-butt joint at the right. Other distinguishing features are center guide drawer construction, laminated drawer bottoms, dovetailed drawer corners

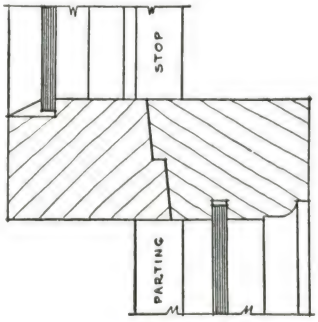


Fig. A

CURTIS RABBETED CHECK RAILS

Check rails of Curtis double hung windows are rabbeted, Fig. A. This feature readily asserts its value when compared with the usual check rail section. Houses fitted with Curtis windows and standard weatherproof frames are unusually weathertight. Windows and sash are produced from white pine which resists warping but may be easily worked, free from pitch, knots, blue sap and cracks. They are carefully machined and sanded, requiring a minimum of work to install.

Curtis trade-mark imprinted into stiles of sash means quality wood, fashioned carefully, inspected thoroughly. It signifies that the makers have done their best to produce an article above criticism.

Guarantee

"The makers of Curtis woodwork guarantee complete satisfaction to its users." Their product is delivered ready for installation and finishing with a minimum of preparatory work, tending to economize labor and minimize construction delays.

A letter to the CURTIS COMPANIES SERVICE BUREAU will bring complete information.

Architectural Woodwork, Standardized

After three years of constant effort and no little expense the Curtis Companies are in a position to offer the architect woodwork items of recognized architectural value. To do this required many changes in administrative and manufacturing practice.

An examination of the illustrations of the typical Curtis Standards on this and the two preceding pages will, we believe, satisfy you, as an architect, as to the value of these designs. The use of these standards in your plans does not limit individuality but rather permits you to increase your opportunities for service to the public at large. By adapting these standards to your plans you will produce a happy combination of good planning and good woodwork. The result will be a satisfied client—with less effort and expense on your part and less outlay on the part of the man who pays the bills.

It resolves itself into a question of substituting Curtis Standard items of good design at stock prices for millwork made to special detail at special prices.

The price for Curtis quality is reasonable because the higher costs of better materials and workmanship are largely offset by the advantages of standardized manufacturing.

See the second preceding page, under "Standardized Production," for helpful literature prepared especially for the architect.

Stairs C-900 Colonial

Stairs C-912 English

Twelve-light Window C-1024

Eight-light Casement C-1030

TYPICAL CURTIS STANDARDS

CARNAHAN MANUFACTURING CO.

Special Veneered Doors and Millwork to Detail

303 Mill Street
LOOGOOTEE, IND.

Products

VENEERED DOORS: INTERIOR DOORS, FRONT DOORS, EVANS HOLLOW SANITARY DOORS; EVANS RING JOINT.

Also, all kinds of Millwork, Interior Trim, Stairs, Wainscoting, Mouldings, etc.

Facilities

The CARNAHAN MANUFACTURING CO. has abundant raw material, up-to-date manufacturing equipment and thoroughly competent artisans. Every facility is at the disposal of architects, and a specialty is made of architects' work.

Special Millwork

All kinds of special millwork made from architect's plans.

STANDARD CONSTRUCTION OF DOORS

Interior Veneered Doors

See illustration of standard construction, the result of our many years' experience in the veneered door business.

Front Doors

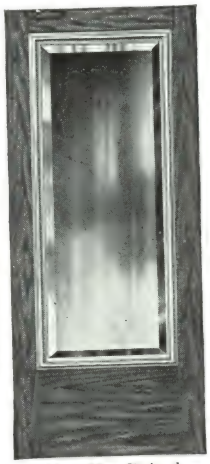
Made in any kind of wood desired, glass paneling or divided lights in different designs.

Hollow Sanitary Flush Doors

The Evans process flush door has a frame of core wood the size of the door, into which is placed a series of vertical ribs with air spaces between. Over this frame is glued a $\frac{3}{16}$-in. cross band, with a strip or tip of hardwood along the edges covering the glue joint between core and cross banding, thus avoiding the exposure of any end wood. The face veneer, consisting of a sheet of $\frac{1}{8}$-in. veneer, is then applied, completely covering the surface of the door. (See detail.)

This sanitary door is as soundproof as a hollow

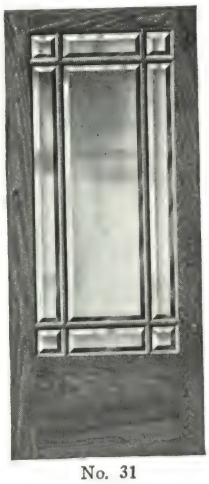
No. 19. Cove and Bead Sticking



No. 20. Raised Mould

No. 41. Paneled with Divided Lights

No. 30



No. 31

No. 42

STANDARD VENEERED FRONT DOORS

No. 1A

No. 4A

No. 7A

No. 8A

No. 9A

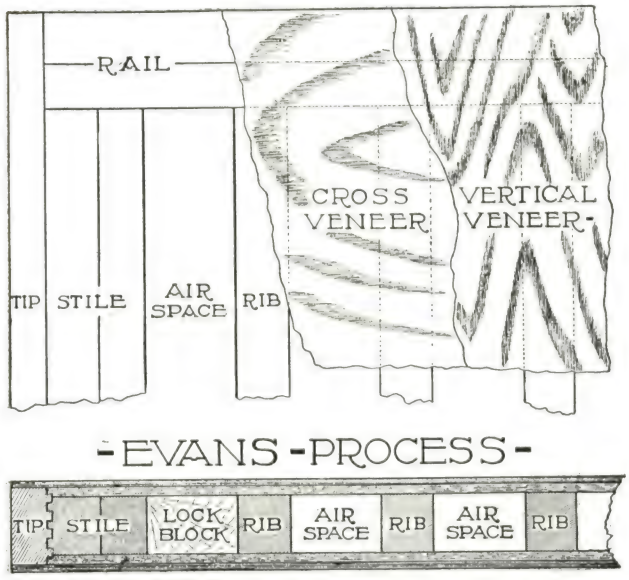
No. 10A

INTERIOR VENEERED DOORS

Cove and bead sticking. Veneered in any kind of wood

Continued on next page

partition, and is heat and cold resisting. It does not shrink in length or breadth; it stays straight, and does not distort. Light in weight (one-half that of a solid core door, or 3½ lbs. per sq. ft.). Light on its hinges; easy to open and close.



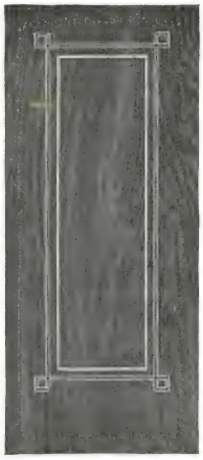
Detail of Construction, Evans Process Hollow Sanitary Door

Covered by United States and Canadian Patents

No. E51

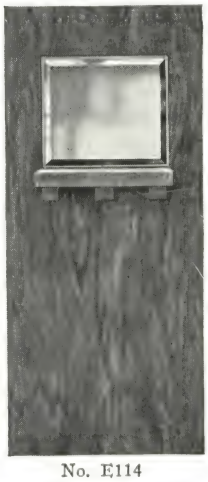
No. E52

Inlaid ebony and holly

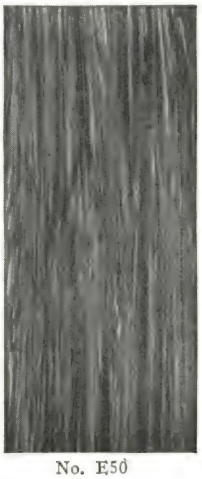


No. E53

No. E118



No. E114



No. E50

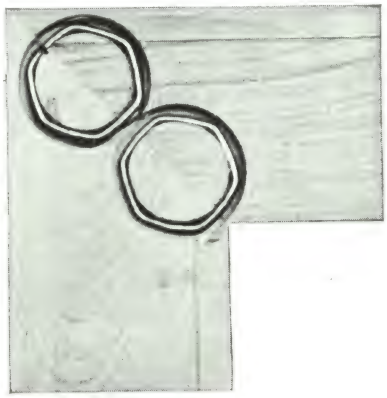
Evans Process Sanitary Flush Doors

Evans Ring Joint for Mitered Corners (Patented)

The Evans ring joint can not open from any cause whatsoever. Pressure takes up any variation caused by shrinkage; the more the wood swells, the tighter the joint becomes.

A corrugated tempered steel ring is expanded over a steel cone until it forms a true circle, and at the same time is put into place under heavy pressure. The expanded ring has a tendency to resume its corrugated form, thus exerting a strong holding force on the joint.

Furnished from 1 to 4 in. and in fractional parts. Should necessity arise, rings smaller than 1 in. or larger than 4 in. can be made.



Evans Ring Joint (Patented)
Showing back side of corner of mitered casing

Guarantee

Veneered doors are guaranteed against defective workmanship and material, when properly handled, and we agree to replace "in the white" (unfinished) any veneered door of our manufacture that proves defective.

Installations of Carnahan Doors

In the following partial list of installations, the name of the architect is also given:

Agricultural Building and Girls' Dormitory, University of West Virginia, Morgantown; Paul A. Davis III.
Preble County Courthouse, Eaton, Ohio; Richards, Macarty & Bulford
Magnolia Building, Dallas, Tex.; Alfred Bossom
Chemical Laboratory, Bozeman, Mont.; Fred E. Wilson
Courthouse, Delphi, Ind.; E. E. Dunlap Co.
Home for Aged Baptists, Ironton, Mo.; L. Baylor Pendleton
Palace Theater, Cincinnati, Ohio; C. W. & G. L. Rapp
Deaconess' Hospital, Evansville, Ind.; H. E. Boyle & Co.
St. Mary's Hospital, Evansville, Ind., C. Shoppell & Co.
Home Lawn Sanitarium, Martinsville, Ind.; Wilson B. Parker
Dormitory, University of Cincinnati; Harry Hake
First National Bank, Richmond, Ind.; C. C. & E. A. Weber
Sarah Scott School, Terre Haute, Ind.; Johnson & Miller
Infirmary, St. Mary's of the Woods, Terre Haute, Ind.; D. A. Bohlen & Son
Good Samaritan Hospital, Cincinnati, Ohio; Gustave W. Drach
Federal Reserve Bank, Houston, Tex.; Sanquinet, Staats & Gottlieb
North Dallas High School, Dallas, Tex.; Wm. B. Ittner
La Salle Hotel, South Bend, Ind.; Nicol-Scholer-Hoffman
Masonic Dormitory, Norman, Okla.; W. T. Schmidt
Agricultural Building and Main Hall, University of Tennessee, Knoxville, Tenn.; Miller, Fulwider & Dowling
Harper Hospital Nurses' Home, Detroit, Mich.; Albert Kahn
Herman Kiefer Hospital, Detroit, Mich.; Albert Kahn
Jennie Edmunsen Memorial Hospital, Council Bluffs, Iowa; Jansen & Larsen
Metropole Hotel, Cincinnati, Ohio; J. G. Steinkamp & Bro.
School of Commerce and Finance, Indiana University, Bloomington, Ind.; R. F. Daggett
McKinley School, Canton, Ohio; Geo. F. Hammond
John H. Lehman School, Canton, Ohio; Thayer & Johnson
Hotel Sontag & Victory Theater, Evansville, Ind.; J. E. O. Pridemore

ESTABLISHED 1886

W. D. CROOKS & SONS

Manufacturers of Hardwood Veneered Doors Exclusively

GENERAL OFFICE AND MILLS

WILLIAMSPORT, PA.

Products

HARDWOOD VENEERED DOORS of every description to architects' specifications and details; SANITARY (FLUSH) DOORS and all designs of Stock Doors.

CROOKS 1886 DOORS

TRADE-MARK

Guarantee

W. D. CROOKS & SONS guarantee to replace *at any time* any Crooks door that proves defective in material or workmanship. Trade-mark is stamped on top rail of each door.

Policy

Limited Quantity—Unlimited Quality.

A limited output—now 300 doors per day—has always been the policy of this organization. The company's heads believe this the only possible means of maintaining its standard of workmanship on special doors to architects' details, which constitute 75% of its sales.

Let it be understood, in this connection, that W. D. CROOKS & SONS regard its sanitary (flush) door as a special. The firm's individual construction—later described—necessitates special work throughout, even for the flat faced, unembellished door.

From necessity, rather than choice, the remainder of the Crooks output consists of stock designs. Standard sizes of doors, also stiles, rails and panels for odd sizes are manufactured during the dull winter months to equalize production. This not only permits quick assembling and delivery during rush periods but also insures proper seasoning.

Construction

Crooks doors are veneered with any wood specified. All veneer is first shrunk in a re-drying machine. It is then mechanically tested to prove the absence of moisture. Core is "built-up" of narrow, soft wood, kiln dried strips, which are glued together and kept in retainers in hot rooms until perfect joints are assured. Core is then planed to even thickness and veneers applied under hydraulic pressure. Material is again held in retainers in hot rooms until all moisture is eliminated from the glue. Succeeding operations are practically identical in all factories, the only difference being in the skill with which the work is performed.

Delivery and Distribution

The policy outlined above permits quick completion of orders. Special orders for one-house jobs are frequently turned out in three weeks. The average time for all special orders is four weeks, while straight stock is shipped same day orders are received.

Located in the heart of the eastern territory—but 200 miles (approximately) from New York, Washington, Pittsburgh, Buffalo and Albany—and with sidings of three trunk line railroads at its mills, W. D. CROOKS & SONS can assure its eastern patrons, at least, of unusually quick delivery after orders are shipped.

Any retail lumber dealer can purchase Crooks doors direct from the manufacturers. There are no exclusive agencies and no jobbers.

Prices

Crooks doors are sold in competition with those of other reputable manufacturers. The trade is supplied with price lists covering standard designs and all dealers can obtain prices on specials by submitting details and lists

Special Doors

Specifications and details on this work are followed to the letter. Details are never cut and dimensions never reduced. "Matching up" veneers to obtain the most attractive grain effects is considered of the greatest importance. The men who do this work can be justly classed as "artists."

Important Specifications—Architects are urged to specify sawed veneers and hand cleaning for special doors. Unless you definitely do so, manufacturers' estimators are tempted to figure on rotary cut veneers and ordinary machine sanding to meet competition, even when the general character of the job indicates that these are not desired.

In rotary cutting of veneers the log, revolving against the knife, shatters the fiber of the wood. After a year's use these million little broken fibers can not resist the extremes of expansion and contraction caused by changing temperature. Small checks and larger splits on face of door are the result. Hand cleaning is the only possible way to remove sandpaper scratches (which are magnified by the finish) from the cross rails.

Continued on next page

Sanitary (Flush) Doors

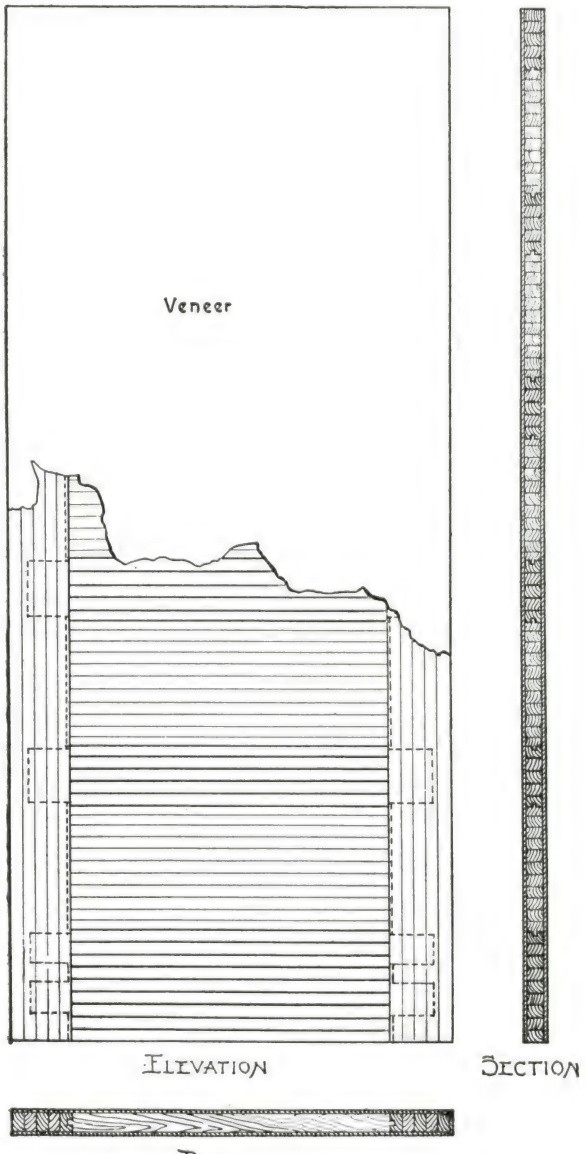
Core consists of narrow, soft wood strips. These are glued together to form stiles, cross rails and flush panels. After planing to even thickness, all parts are completely *framed* and assembled into a "core door," then re-dried in hot rooms. Sanding for perfectly even surface is succeeding operation and finally Standard ¼in. *sawed* face veneers are applied under hydraulic pressure.

This framed core absolutely prevents shrinking and swelling, thus overcoming warping. The heavy sawed veneer eliminates checking (see Important Specifications) also blistered and sunken face. This construction has been used for more than twenty years to manufacture thousands of "Crooks" flush doors.

Stock Doors

Several thousand stock doors in chestnut, birch, plain red oak and red gum are always on hand for immediate shipment. Fifteen designs of red oak entrance doors are included. These are made with ¼-in. *sawed* veneers.

An assortment of stiles, rails and panels for the quick assembling of odd size doors, or semistock designs, eliminates shipping delays, which so frequently result when a small amount of this class of work appears on an order.



Construction of Crooks Non-warping Sanitary Door

Catalogue

An art book of door designs, including practical tables of layouts and dimensions, full size moulding sections on blue print pages, inlay designs for flush doors, and embellished with attractive etchings of many prominent Crooks equipped buildings, will be sent on request.

References

Following are a very few of the best Crooks installations:

Union Medical College, Peking, China
House and Senate Chambers of U. S. Capitol Building, Washington, D. C.
Pennsylvania State Capitol Building, Harrisburg, Pa.
Delaware State Capitol Building, Dover, Del.
Sea View Hospitals, New York, N. Y.
Georgia State Hospitals, Augusta, Ga.
City Club, Boston, Mass.
Chalfonte Hotel, Atlantic City, N. J.
First Church of Christ, Scientist, Rochester, N. Y.
Office Building, (Durant) General Motors Corp., Detroit, Mich.
Office Building, Hartford Fire Ins. Co., Hartford, Conn.
Residence of John D. Rockefeller, Pontantico Hills, N. Y.
Residence of Eugene DuPont, Centreville, Del.
Residence of E. T. Stotesbury, White Marsh Valley, Philadelphia, Pa.
Residence of U. S. Senator Wolcott, Dover, Del.
Residence of Capt. Isaac E. Emmerson, Naragansett Pier, R. I.
Residence of F. M. Kirby, Wilkes-Barre, Pa.
Residence of Sir Reginald Gamble, Peking, China
Residence of Dr. S. Lewis Zigler, Philadelphia, Pa.
Residence of Dr. Louis A. Dreyfus, Grymes Hill, Staten Island, N. Y.
Jefferson Hall Apartment Building, Detroit, Mich.
First Presbyterian Church, Pittsburgh, Pa.
Union Trust Company Building, Baltimore, Md.
Home Savings & Loan Building, Youngstown, Ohio
National State Bank Building, Newark, N. J.
National Bank of Commerce, Norfolk, Va.
Princeton College Buildings, Princeton, N. J.
Engineering Building, University of Pennsylvania, Philadelphia, Pa.
Charles M. Schwab Auditorium, Pennsylvania State College
Girard College High School, Philadelphia, Pa.
Waterbury High School, Waterbury, Conn.
Oglethorpe Club, Savannah, Ga.
Manufacturers Club, Philadelphia, Pa.
Times-Dispatch Building, Richmond, Va.
Chamber of Commerce Building, Pittsburgh, Pa.
Y. M. C. A. Building, Charleston, S. C.
Municipal Building, Springfield, Mass.
Union League Building, Philadelphia, Pa.

MORGAN WOODWORK ORGANIZATION

Manufacturers of Morgan Quality Standardized Doors and Woodwork

FACTORY
OSHKOSH, WIS.

WAREHOUSES
CHICAGO, ILL., Morgan Sash and Door Co.
DETROIT, MICH., Morgan Sash and Door Co.
BALTIMORE, MD., Morgan Millwork Co.
JERSEY CITY, N. J., Morgan Millwork Co.
SAWMILL OPERATIONS: ORIN, WASH.; FOSTER CITY, MICH.; FORREST CITY, ARK.

SALES OFFICES
CLEVELAND, OHIO
NEW YORK, N. Y.
ATLANTA, GA.

Products

Morgan Doors: Exterior and Interior, including Sanitary Doors, Solid and Veneered.

Also Morgan Quality Standardized Interior Woodwork and Cabinet Work, including Stairwork, Colonnades, Mouldings, Kitchen Cabinets, Medicine Cabinets, Mantels, Wall Paneling, Buffets, Sideboards, Breakfast Nooks, Linen Cases, and other items of built-in woodwork.

Morgan Quality Standardized Exterior Woodwork, including Windows and Sash, Casement Sash, Blinds, Shutters, Window and Door Frames, Porch Work, Pergolas and Exterior Mouldings.

Manufacturing and Distributing Facilities

Morgan Quality standardized woodwork is manufactured and distributed at the above mentioned cities.

Each one of these plants is equipped with the most modern machinery. Many of the machines are original with this company, are built to meet the requirements of the building trades at the present time and are in harmony with its own ideas gained from long experience in all kinds of millwork manufacture.

The products of the Morgan Woodwork Organization are for sale by dealers in lumber and millwork throughout the country. This method of distribution permits shipments anywhere with dispatch.

Guarantee

All woodwork bearing the "Morgan" stamp which with proper care fails to give satisfaction will be replaced free of charge. Every piece of genuine Morgan woodwork is stamped with the name "Morgan."

"Building With Assurance"

The Morgan Woodwork Organization has published a book called "Building With Assurance" which is an unusually comprehensive book relating to practical and artistic home dwelling. It not only serves as a complete catalogue of Morgan Quality standardized woodwork, but also contains information on many phases of homebuilding, such as lighting, interior decorations, flooring, furniture selection, etc.

For complete information as to how to secure a copy, write our nearest office.

Morgan Hardwood Veneered Doors

Made of hardwood, they are light, strong, durable, weatherproof and wearproof, retaining at the same time all the beauties of hardwood grain. The raw material comes from *Morgan* forests, is cut in *Morgan* mills and is manufactured from beginning to end under the personal supervision of the firm in its own factory. Every piece of wood going into the door is made absolutely dry, then kept in rooms heated to a high degree of temperature so that no moisture can re-enter the pores. This is the first step toward construction. The name "Morgan" is stamped on every door.

Construction—After the thorough drying process, the cores or foundations are built up of narrow strips of pine, with edges of hardwood glued together with best veneer glue, brought together by powerful hydraulic pressure and kept in pressure retainers for many hours, so as to make a perfect and durable joint. Cores are then planed to even thickness, face or surface veneers are applied, and again cores are subjected to tremendous hydraulic pressure. Grain of core, or centerpiece, is always placed at right angles to grain of veneer, thus increasing the strength and preventing swelling, shrinking or checking.

Veneers—Only the best grained and best quality rotary cut and sawed veneers are used.

Plain oak, brown ash and birch contain rotary cut figures; while mahoganies and quartered oaks are selected for colors, as well as figures.

The mahogany stain on Wisconsin birch escapes detection by experts.

Morgan Entrance, M61

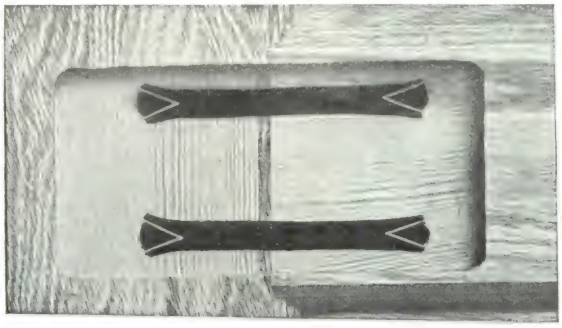
Morgan Stairway and Bookcase, M204

Continued on next page

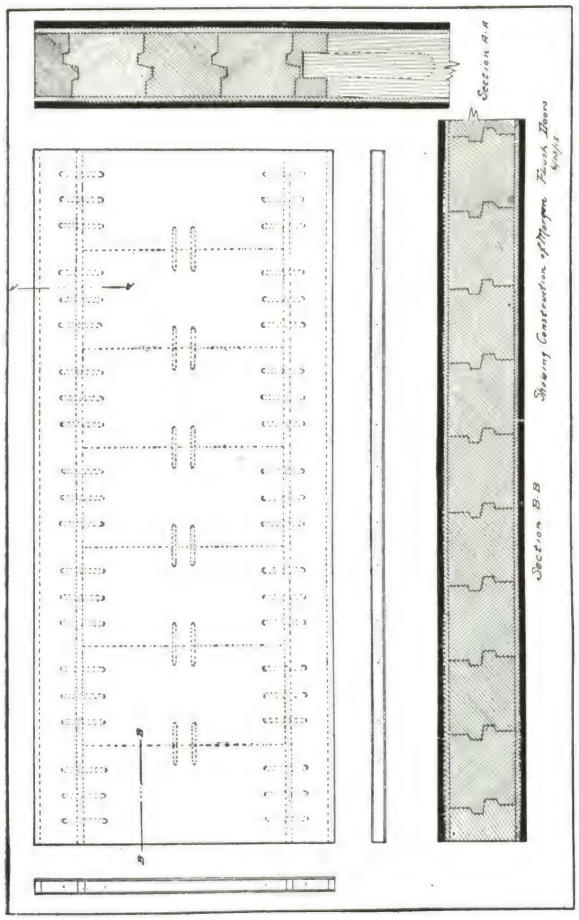
Wedge Dowel

More evidence of Morgan leadership is the patent wedge dowel now used in all Morgan doors. Never before has a dowel been made that would grip like this new wedge dowel.

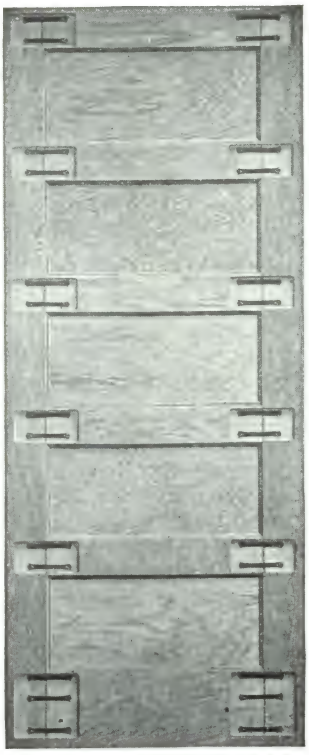
This patent dowel is of hardwood split obliquely at each end. A wedge-shaped piece of hardwood is fitted into each end of the dowel. When the dowel is clamped into place the wedges are drawn into the dowel, expanding the ends so that they hold like a vise.



SECTION THROUGH DOOR IN WAY OF DOWEL
Note how the ends of the dowel are expanded by the hardwood wedges



SKETCH SHOWING CONSTRUCTION OF MORGAN FLUSH OR SANITARY DOORS
NOTE—Fifty-four dowels in each core

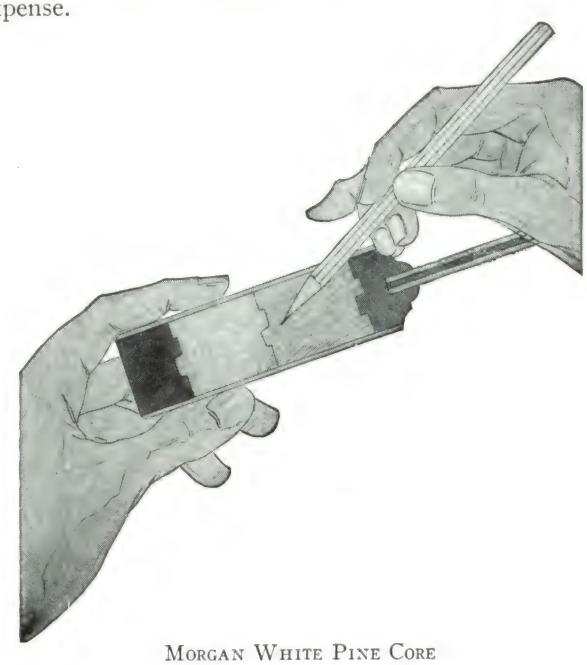


TYPICAL MORGAN DOOR
Section in way of dowels

Morgan All White Pine Core

Morgan doors are built with an all white pine core which prevents swelling, warping, sticking and the troubles that follow in the train of poorly constructed doors.

To the architect, the use and recommendation of doors which he knows are absolutely guaranteed, means protection—and avoidance of trouble, annoyance and expense.



MORGAN WHITE PINE CORE

RODDIS LUMBER AND VENEER CO.

CABLE ADDRESS
"RODDIS, MARSHFIELD"

Manufacturers of Flush and French Doors

GENERAL SALES OFFICE AND FACTORY

MARSHFIELD, WIS.

CODES USED
American Telecode ABC
(4th and 5th Editions)
Western Union
Lieber's

BRANCH OFFICES IN ALL THE PRINCIPAL CITIES OF THE UNITED STATES; IN MONTREAL, CANADA; IN LONDON, ENGLAND; PARIS, FRANCE; MADRID, SPAIN
SAWMILLS: PARK FALLS AND MARSHFIELD, WIS.

RODDIS
Flush and French
DOORS
TRADE-MARK

Products

RODDIS STERLING FLUSH and FRENCH DOORS.

Also, Lumber, Desk and Table Tops, Panels, Plain and Inlaid Wainscoting, Counter Fronts, Shaped and Flat Waterproof Plywood, Cedar Poles and Posts, Cedar Shingles.

Trade-mark

Doors are branded with our trade-mark for your protection.

Facilities

We own over 40,000 acres of virgin timber, 25 miles of railroad, two sawmills, the largest veneer plant in the world, and our experience covers more than a quarter of a century.

Roddis Flush Veneered Doors

Roddis doors are widely used in high class homes, apartment houses, hotels, schools and hospitals; state, public and office buildings; in fact, in all buildings where elegance, beauty and sanitation are factors.

Our Wisconsin birch veneers, all cut from our own forests, when stained mahogany, almost defy detection even by an expert.

Roddis doors are soundproof and burglar proof, as well as fire retarding.

A large line of flush doors in stock sizes carried, ready for immediate shipment.

Materials

We control every step of quality behind Roddis doors. We manufacture all the lumber and veneers which are used and the selection is safeguarded by men of years of experience. Lumber is all cured in the pile and then scientifically kiln dried.

Construction

Sterling flush veneered doors are made 5-ply as shown in the illustration.

The cores are glued together. There is a hardwood band 7/8 in. in thickness entirely around the door. The crossband is glued over this core, then the face veneers are laid vertically. The hardwood bands and crossbanding incase the core in an airtight compartment, keeping the core dry, and thereby making it impossible for the door to shrink, swell or warp.

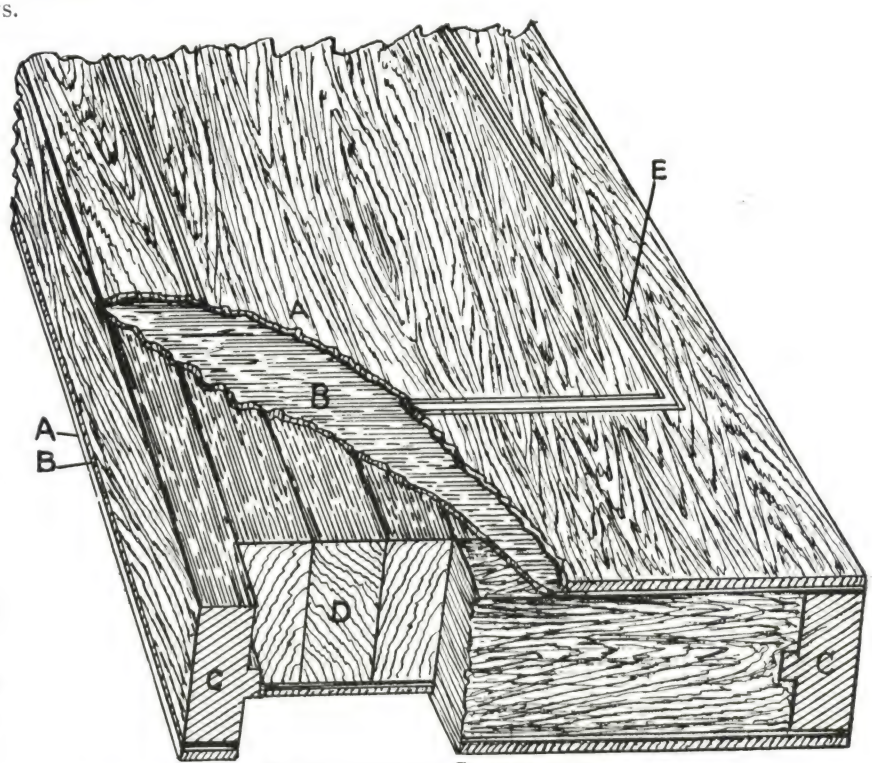
The cores are solidly built from end to end. The narrow strips of soft wood which are used eliminate warpage and every joint is glued firmly, which in reality produces a core that is one piece, but all strain has been equalized.

The flush door is unlike the stile and rail type in surface, weight and construction. We never have used dowels, attempts to glue end wood and edge wood together; experience has proved that a superior door can not thus be produced.

We are practically the originators of the flush door in a commercial way and we have made no change in its basic construction for 17 years.

Thickness of Veneers

Unless otherwise specified, we use 1/16 in. veneer for all doors. Years of experience have taught that it is the proper thickness. Pianos and furniture are veneered with 1/24 or 1/28 in. veneer.



RODDIS STANDARD CONSTRUCTION
A—Face veneer
B—Cross banding
C—Hardwood band on both edges and across top and bottom
D—Core glued together
E—Inlaying

Continued on next page

Waterproof Glued

All Roddis doors are glued exclusively with waterproof glue under the same formula as used by us in our Signal Corps work during the war, under the direct inspection of the United States Government.

In case of fire this glue is not affected by intense heat or by moisture and the plies will not blister or separate.

Inlays

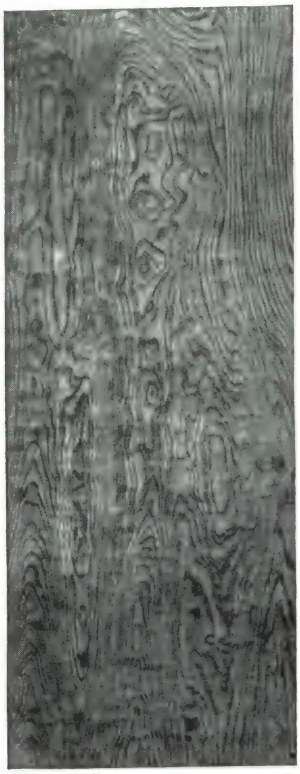
Inlays supplied in plain and fancy wood on Grecian lines. We furnish numbers, crests or any special designs.

Where doors are to be inlaid, they should first be stained, thus insuring the inlay from damage. This should be done at the factory by our experts.

Guarantee

This Company expressly agrees to repair or replace, free of charge, any of its doors which shall at any time within two years be found to be defective in workmanship or material.

SPECIAL MAHOGANY FACE WITH INLAY
Supplied in all woods and inlays



FLUSH DOOR WITHOUT INLAY

FRENCH DOOR

Specifications

All interior doors throughout shall be Roddis Sterling laminated 5-ply flush veneered doors without panels, made by the RODDIS LUMBER AND VENEER CO., of Marshfield, Wis.

These doors shall be 1¾ in. thick with cores built up of strips not over 3 in. wide running lengthwise of the door, and glued together and veneered with two $\frac{1}{28}$-in. veneers on each side, the lower veneer or crossbanding running crosswise, and the face veneer running lengthwise. All edges, outside or exposed, shall have bands of hardwood ½ in. thick tenoned and glued to the cores. The crossbanding shall run to the edge of the door.

All doors shall be glued exclusively with waterproof glue and guaranteed by manufacturers for a period of two years. All doors to be hand-sanded, carefully crated and subject to approval of architects.

Our Responsibility

We respectfully refer to:

R. G. Dun & Co., Bradstreet's, Lumbermen's Credit Association.
First Wisconsin Nat'l Bank, Milwaukee, Wis.
Old Commerce National Bank, Oshkosh, Wis.
First National Bank, Marshfield, Wis.
Park Falls State Bank, Park Falls, Wis.

Catalogues

Complete catalogue of our doors and plain and inlaid wainscoting will gladly be furnished on request.

Installations of Years Ago

This is to show how the Roddis Door has stood the test of time:

CLEVELAND, OHIO, March 23rd, 1922.

GENTLEMEN:

"Some fourteen years ago we installed about two hundred fifty Roddis Flush Veneer Doors at the East Technical High School of this city.

"These doors due to their workmanship and construction are still in A-1 condition.

"As these doors have proven so satisfactory to the Board of Education of Cleveland and ourselves we do not hesitate to recommend the Roddis Flush Veneer Doors to be used wherever a high grade door is required."

Yours very truly,
WALTER I. THOMPSON,
President.
W. I. Thompson & Son Co.
General Contractors

We will be pleased to furnish any number of such on request.

Recent Installations

HOMES

J. B. Taylor, Alexandria Bay, N. Y.
F. S. Duesenberg, Indianapolis, Ind.

HOTELS AND CLUBS

Elks' Club, Portland, Ore.—200
Woodruff Hotel, Watertown, N. Y.—411
Wilson Hotel, Webster City, Iowa—109
Y. M. C. A., Cincinnati, Ohio—185
New Statler Hotel, Buffalo, N. Y.—4500
Wade Park Manor Hotel, Cleveland, Ohio—1250

SCHOOLS

Public Latin School, Boston, Mass.
Cass Technical High School, Detroit, Mich.

HOSPITALS

Buffalo City Hospital, Buffalo, N. Y.
Clark Co. Asylum, Owen, Wis.
National Home for Disabled Veteran Soldiers, Dayton, Ohio.
St. Mary's Hospital, Duluth, Minn.

Names and addresses of architects, builders or contractors on above buildings furnished on request.

HYDE-MURPHY COMPANY

Millwork, Cabinet Work and Trim

RIDGWAY, PA.

BRANCH OFFICES

NEW YORK, N. Y., 10 East 43rd Street
PITTSBURGH, PA., 6101 Penn Avenue
WASHINGTON, D. C., District National Bank Building
SAN JUAN, PORTO RICO, P. O. Box 927

Products

MILLWORK, CABINET WORK and TRIM, including Bank and Office Fixtures, Mantels and Stairs.

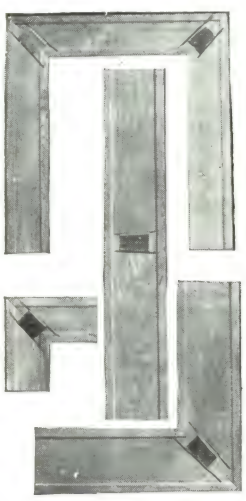
Quality Millwork, Cabinet Work and Trim

For over 50 years we have been engaged in the manufacture of millwork and cabinet trim and have enlarged our facilities, perfected the equipment and built up an organization capable of handling woodwork contracts of any size or description in practically any part of the United States.

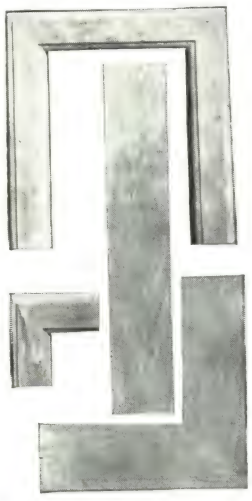
We have established a reputation among architects and builders as producers of high quality woodwork and our facilities are such that patrons are served promptly and receive "maximum value at minimum cost."

Trim Held with "The Grip of Steel"

The miter joints of all trim furnished by us are securely held with "the grip of steel" by Keystone lock joint clamps. These clamps are used on all our erected trim without additional cost to the purchaser and they are of great utility in erecting sections of wall paneling, wainscoting, etc., which must be assembled on the job. Keystone lock joint clamps are patented and are furnished only in connection with trim furnished by us.



Showing Application of Clamp



Showing Finished Joints Formed with Clamp

A FEW EXAMPLES OF "LOCK JOINT" ERECTED TRIM

It is unconditionally guaranteed that miter joints held by Keystone lock joint clamps can not open or come apart, thus eliminating unsightly open joints resulting from ordinary methods of miter construction.

To secure the best results, specify and insist upon the use of the Keystone lock joint clamp on all miter trim joints.

"No Warp" Flush Veneer Doors

These sanitary doors are made in the best manner possible, having cores of thoroughly seasoned laminated chestnut stiles and rails, cross framed and doweled together and covered with 1/8-in. face veneers.

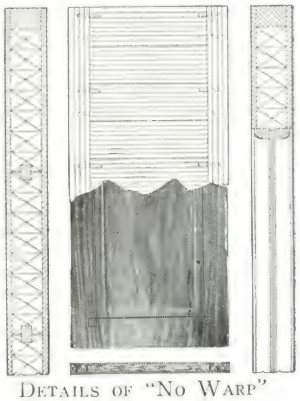
They will not warp nor twist and are guaranteed against defects due to the use of improper materials or defective workmanship.

"No Warp" doors combine beauty and utility, and embody the best features developed by 50 years' experience.

For schools, hospitals, churches, hotels and other public buildings where sanitary and soundproof features are essential, "No Warp" doors are unexcelled. They are equally desirable for residences where their beautifully figured veneer surfaces, plain or inlaid, blend with other architectural features of the various rooms, giving that pleasing and restful appearance so necessary to the home.

Where desired, openings are formed in doors for grilles or glazing. Stops furnished to secure glazing.

Made in any design, finish and size desired. Any kind of veneer may be had.



DETAILS OF "NO WARP" FLUSH VENEER DOORS

Some Representative Hyde-Murphy Installations

Biltmore Club, Rye, N. Y., Geo. A. Fuller Co., Contractors
Hotel DuPont, Wilmington, Del.
Emergency Hospital, Washington, D. C.
Mesta Machine Co. Office Building, Pittsburgh, Pa., Benno Janssen, Architect
Lee House Apartment Hotel, Washington, D. C., J. H. deSibour, Architect
First National Bank Building, Miami, Fla., Mowbray & Uffinger, Architects; Geo. A. Fuller Co., Contractors
Hopkins Apartment Hotel, Baltimore, Md., Frederic A. Fletcher, Architect
New York City Public Schools Nos. 115, 29, 136, 38, 60, 61, 45, 97, 73, 144, 130 and 181, C. B. J. Snyder, Supervising Architect
U. S. Fidelity & Guarantee Building, Baltimore, Md., Wyatt & Noelting, Architects; Geo. Dose Eng. Co., Inc., Contractors
Monroe Terrace, Richmond, Va., A. C. Bossom, Architect
New Hamilton Hotel, Washington, D. C., J. H. deSibour, Architect; R. P. Whitty Co., Contractors
Francis Marion Hotel, Charleston, S. C., W. L. Stoddart, Architect; John W. Cowper Co., Contractors
Ullevaal Hospital, Christiania, Norway
The Seamen's Home, St. Johns, N. F.
Carnegie Library, San Juan, Porto Rico
United States Custom House, Wilmington, N. C.
Public Schools 15 and 18, San Juan, Porto Rico
Branch Residence, Richmond, Va., John Russell Pope, Architect
Hadley Apartments, Washington, D. C., A. P. Clark, Jr., Architect
Monticello Hotel, Norfolk, Va.
Loew's Theater, Newark, N. J.

ESTABLISHED 1853

PAINE LUMBER COMPANY, LTD.

Manufacturers of Veneered Doors

OSHKOSH, WISC.

PRODUCTS

Miracle Doors.
Klimax Doors.
Korelock Doors.

The Miracle Door

TRADE-MARK

Miracle Trade-mark

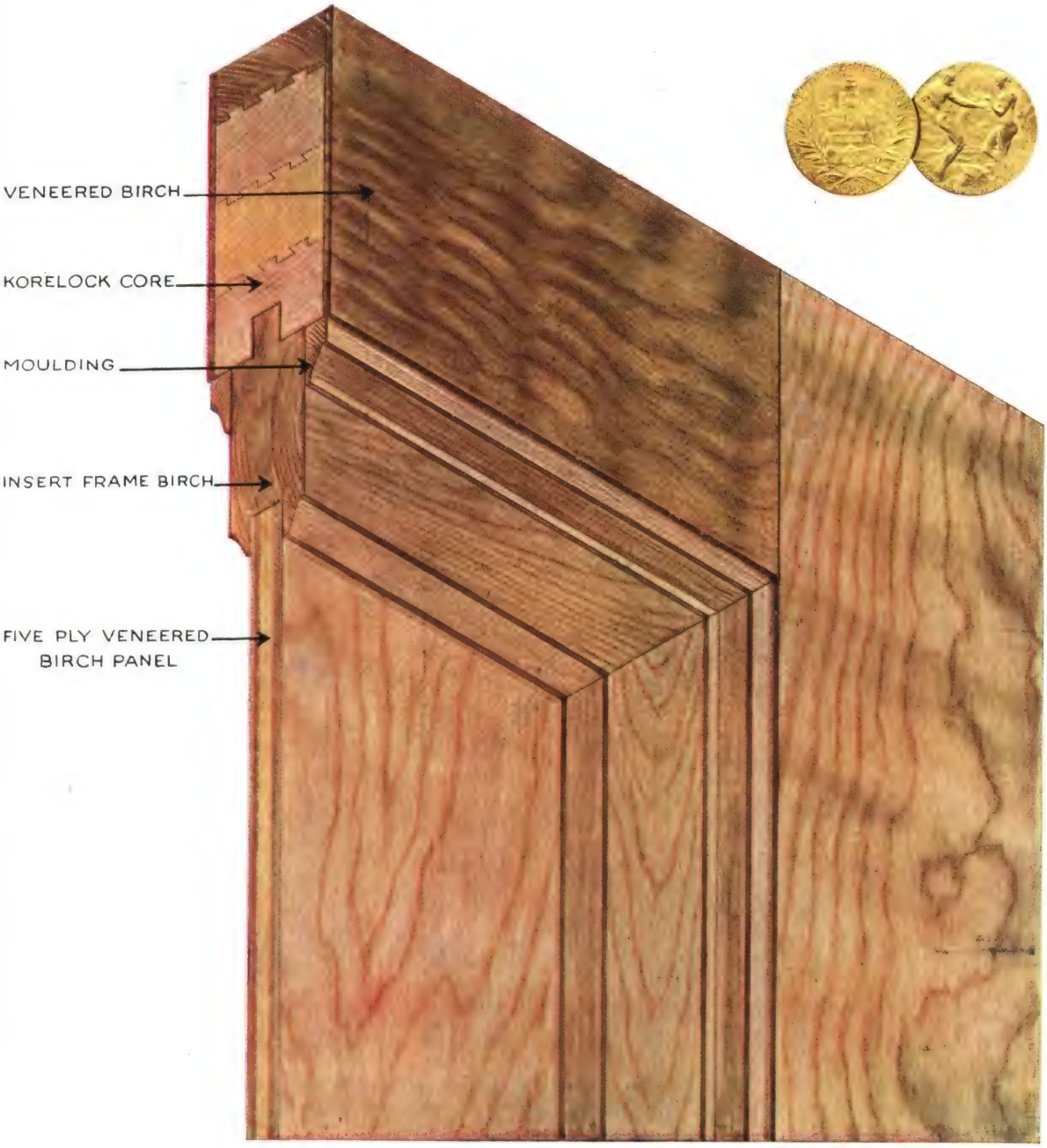
Trade-mark is registered. Design and construction patents are pending.

Price

The Miracle Door costs only one dollar more than an ordinary door.

Miracle Veneered Doors

The Miracle Door marks an epoch in the door industry and is the greatest value ever offered in doors. It is a cabinet shop product.



CONSTRUCTION OF THE MIRACLE DOOR

Continued on next page

The Miracle Door is built and guaranteed by an organization that starts in the forest and operates from the tree to the finished product with the largest woodworking plants in the world. Like all Paine products, it is fully guaranteed.

Stiles and top rail width including flush moulding, 5¼ in., on square 4¼ in.; combined width including insert frame, 7½ in. Wider stiles will be furnished at a reasonable extra if required. Bottom rail 9½ in. on square.

Over eighty wholesale stocks of Miracle Doors in all the ordinary stock sizes are carried in over sixty cities. For sale by all dealers or write us direct.

Catalogues are ready for distribution.

The Miracle Door

THE VENTILOUVRE COMPANY

CONTROLLED AND OPERATED BY THE INVESTING & MANUFACTURING CO.

Manufacturers of Louvred Ventilators for Use in Transom Space and Doors

First National Bank Building
BRIDGEPORT, CONN.

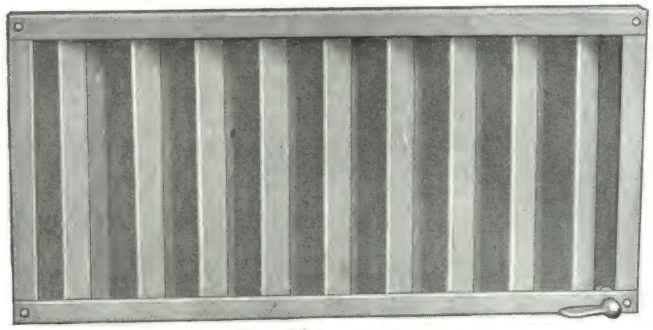
Product

THE VENTILOUVRE.

What the Ventilouvre Is

The ventilouvre is a louvred ventilator for use in doors and transom space. While providing for ventilation it affords absolute privacy as it excludes vision and the possibility of ingress. It prevents drafts as it baffles the air currents. It presents a handsome appearance. It can be finished to match any door. Operation is effected by a simple turn of a handle conveniently located. It can be adjusted to any degree of opening and stays put without rattling. It is fireproof. It can not get out of order; it is practically foolproof.

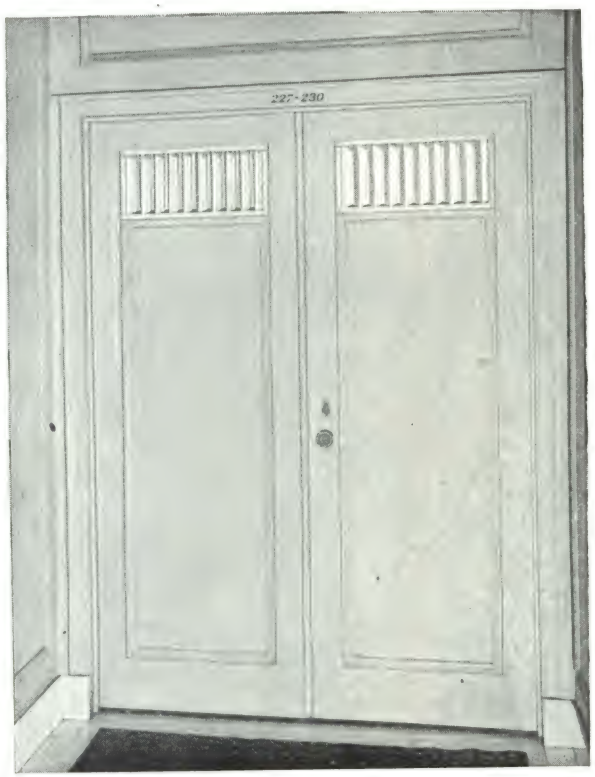
The ventilouvre is used both in the transom space and installed directly in the door. In buildings having low studded rooms where a transom is impracticable the ventilouvre is placed directly in the door. This feature is also advantageous in existing buildings where it is found necessary to provide additional ventilation as the installation of transoms is a matter of great expense and inconvenience.



THE VENTILOUVRE

Where the Ventilouvre Is Used

In hotels, as one hotel manager has phrased it, "they improve the value of a room from a renting point of view as well as giving satisfaction to the guest." They are used in hospitals; dormitories and clubs; in locker rooms and in Y. W. C. A. and Y. M. C. A. buildings. Admirably suited for apartment houses, almshouses, municipal buildings, residences, telephone booths, moving picture booths, dark rooms, churches, schools, banquet halls, Pullman and street cars, and stateroom doors of ships.



VENTILOUVRES IN CORRIDOR DOORS OF AMBASSADOR HOTEL, NEW YORK, N. Y.

VENTILOUVRE IN CORRIDOR OF U. S. GOVERNMENT HOSPITAL BROADVIEW, ILL.

Continued on next page

Construction Details

The ventilouvre is strongly and substantially built of medium gauge pressed steel.

Finish—Ventilouvres are furnished in one coat of priming only, or in two coats of baked enamel plain color to match trim. These are our standard methods of finishing. Grained finish can be had however at an additional cost per device.

Operating Hardware—Our standard finish for the operating hardware for the both types of device is bright brass. If oxidized brass or nickelplated finish is desired we make a slight additional charge per ventilouvre.

Standard Sizes

Type "D" Ventilouvres for Doors—Heights: 10 and 12 in. Lengths: 20, 22, 24, 26, 28 and 30 in.

Type "T" Ventilouvres for Transoms—Heights: 12 and 14 in. Lengths: 26, 28, 30, 32, 34 and 36 in.

Special Sizes

Ventilouvres are limited to a maximum height of 24 in. but can be furnished in any length desired.

Type "D" Ventilouvres for Doors—Heights: 10 and 12 in. Lengths: 21, 23, 25, 27 and 29 in.

Type "T" Ventilouvres for Transoms—Heights: 12 and 14 in. Lengths: 27, 29, 31, 33 and 35 in.

Approval

The Ventilouvre has been approved by the Underwriters' Laboratories, Inc. of Chicago. Report on application.

Specifications

(1) **Ventilouvres**—The [carpenter] contractor shall furnish and set Ventilouvres, as manufactured by THE VENTILOUVRE COMPANY, Bridgeport, Conn., in all doors, transoms and partitions where indicated on drawings or herein specified, as follows: (here mention location).

(2) Ventilouvres, including all required hardware to be delivered f.o.b. factory by the manufacturer, finished to match adjoining work, (or in accordance with instructions to be furnished by the architect or contractor).

(3) *Installation*—For new work the Ventilouvres shall be installed in accordance with detail drawings (to be furnished by the architect).

(4) For existing work the [carpenter] contractor shall do all cutting required to install the Ventilouvres and shall furnish all mouldings and other work required to adapt the Ventilouvres to existing conditions.

Ventilouvre Is Not an Untried Novelty

The Ventilouvre has been in successful service for 7 years. It is fully covered by patents and the name is registered.

Among the leading installations are the following:

Commodore Hotel, New York, N. Y.
Biltmore Hotel, New York, N. Y.
Ambassador Hotel, New York, N. Y.
Prince George Hotel, New York, N. Y.
McAlpin Hotel, New York, N. Y.
Allerton Hotel, New York, N. Y.
Hotel Northern, Canton, Ohio
Sheraton Hotel, High Point, N. C.
Hamilton Hotel, Washington, D. C.
Grace Dodge Hotel, Washington, D. C.
Kimball Hotel, Springfield, Mass.
Robert Treat Hotel, Newark, N. J.
Hotel Rialto, Providence, R. I.
George Washington Hotel, Washington, Pa.
Union Club, New York, N. Y.
Friars Club, New York, N. Y.
University Club, Bridgeport, Conn.
U. S. Public Health Service Hospital, Perryville, Md.
U. S. Public Health Service Hospital, Broadview, Ill.
Prospect Heights Hospital, Brooklyn, N. Y.
City National Bank, Evanston, Ill.
Robert Fulton Apartment House, New York, N. Y.
Milburn Apartment, Washington, D. C.

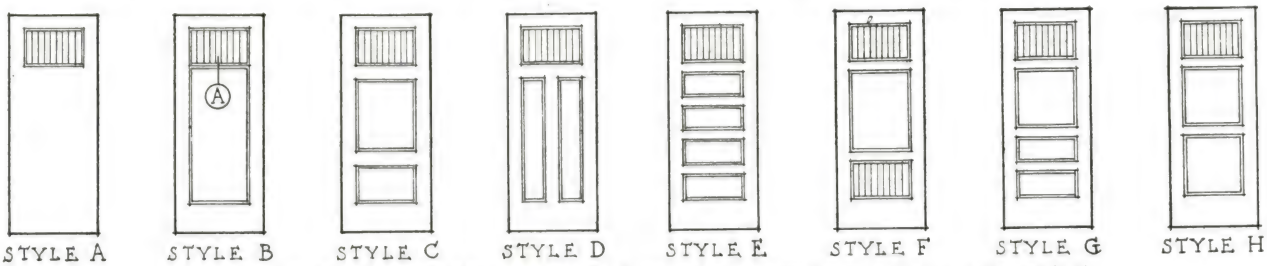
University Club,
Bridgeport, Conn.

Commodore Hotel,
New York, N. Y.

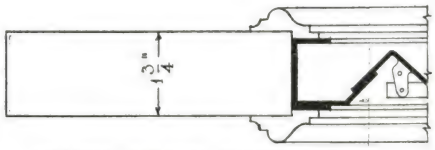
Sheraton Hotel,
High Point, N. C.

VENTILOUVRE INSTALLATIONS

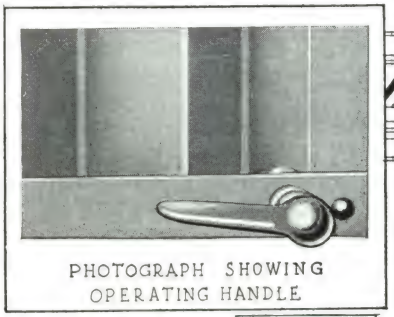
Continued on next page



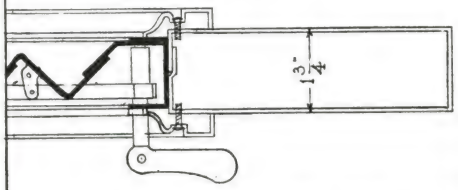
VENTILOUVRE USED WITH VARIOUS STYLES OF DOORS



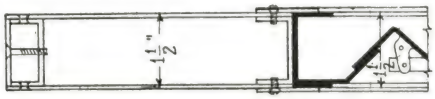
VENTILOUVRE IN WOOD PANELED DOOR



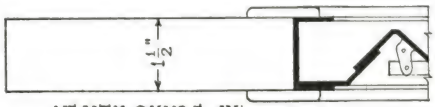
PHOTOGRAPH SHOWING OPERATING HANDLE



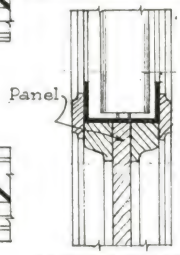
DETAIL OF VENTILOUVRE IN STEEL DOOR SECTION TAKEN ON LINE D



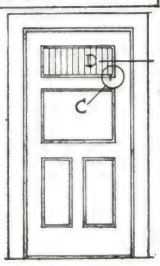
VENTILOUVRE IN STEEL FLUSH (HOSPITAL) DOOR



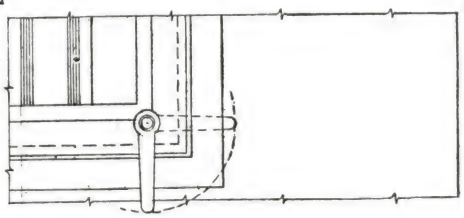
VENTILOUVRE IN WOOD FLUSH (HOSPITAL) DOOR



SECTION ON LINE A (See Elevation Above)

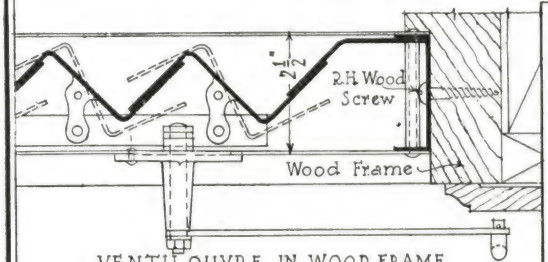


KEY ELEVATION

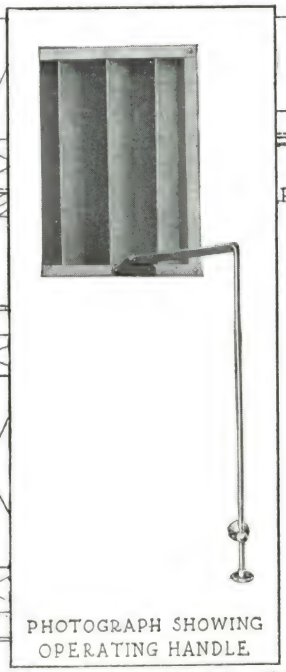


ELEVATION AT C SHOWING VENTILOUVRE AND OPERATING DEVICE

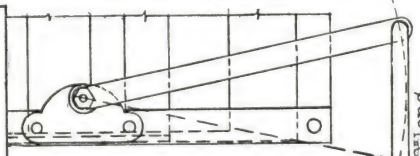
DETAILS OF MODEL "D" VENTILOUVRE FOR USE IN-DOORS



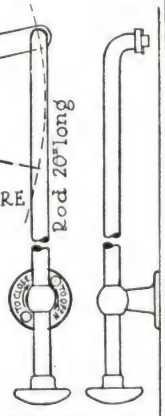
VENTILOUVRE IN WOOD FRAME SECTION ON LINE A SHOWING OPERATING DEVICE



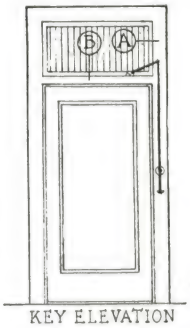
PHOTOGRAPH SHOWING OPERATING HANDLE



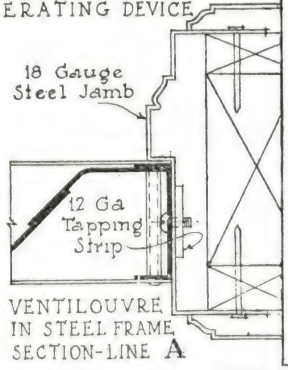
PART ELEVATION OF VENTILOUVRE SHOWING OPERATING DEVICE



FRONT VIEW SIDE VIEW OPERATING HANDLE



KEY ELEVATION



VENTILOUVRE IN STEEL FRAME SECTION-LINE A

SECTION ON LINE B

DETAILS OF MODEL "T" VENTILOUVRE FOR USE IN TRANSOMS

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DETAILS OF VENTILOUVRE	SCALE 3 IN. EQUALS 1 FT. DATE JUN 22	DRWG 1

BURLINGTON VENETIAN BLIND COMPANY

MAIN OFFICE AND FACTORY
BURLINGTON, VT.

BRANCHES IN THE PRINCIPAL CITIES

Products

VENETIAN BLINDS.
SLIDING BLINDS.
WINDOW SCREENS.
SCREEN DOORS.

Service

"Burlington" blinds and screens are made to order and are the output of a large, well equipped factory, and of skilled workmen trained to this kind of work. Details to suit any of the varying conditions that arise, catalogues, prices and special information will be forwarded on request.

Will be pleased to send order blanks showing information desired.

Venetian Blinds

Uses—For keeping out the glare of the sun, controlling the quantity and quality of outside light admitted through window and other openings where desired, and for regulating the entrance and direction of outside air through such openings.

Adaptability—For general use in moderate cost cottages or largest and most costly residences, hospitals, club houses, hotels and offices.

Also for verandas, summerhouses and sleeping porches.

Installation—The installation is simple and anyone who can hang a window shade can hang or remove these blinds without difficulty. They can be hung on stop beads or subjambs having a flat surface of ¾ in. or more.

Below find illustrations of right-hand hangers in various locations for "Burlington" style blinds.

Hangers for "Roller" blinds are attached in similar manner but are somewhat larger to support larger blinds.

Attached to Stop Beads or Subjambs

Attached to Face of Casings

Attached to Top of Window Frame

RIGHT-HAND HANGERS FOR "BURLINGTON" VENETIAN BLINDS

Types—*"Burlington"*—Generally used for openings not exceeding, say 50 sq. ft.

"Roller" and "Junior Roller"—Used for openings exceeding, say 50 sq. ft.

Operation—The tilting of slats in all types (slats are "raised" flat under each other) is accomplished by operating a cord at the left of the blind. They will remain in a fixed position until changed, owing to pressure of spring against circular face of right-hand hanger. The tension of spring may be adjusted by turning the screw. (See illustration at right.)

In the "Burlington" and "Junior Roller" types the slats are raised and lowered by a cord on the right of the blind and held at any desired elevation by one turn around the cord fastener placed on the right-hand casing.

In the "Roller" type the blind is held at desired elevation automatically by a rachet in the device, operated by a hand tape.

SPRING ON TOP RAIL
Engaging with hangers and holding slat at desired angle

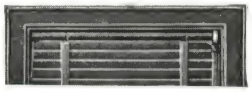
Slats—Slats about ⅛ in. thick, 2⅜ in. wide are generally used; 2 in. wide, in the smaller windows; the wider the slat, the lower the price; fewer slats being required.

Space Occupied—With 2-in. slats, a "Burlington" blind 5 ft. high will occupy about 10 in. at top of window when it is gathered; and 1 in. more for each additional foot in height—thus, a 6-ft. blind would be 11 in.; a 7-ft., 12 in., etc. On 2⅜-in. slats, same height blind would take about 2 in. less.

The "Roller" styles require about 2 in. more in space at top for same height blind than the "Burlington" style.

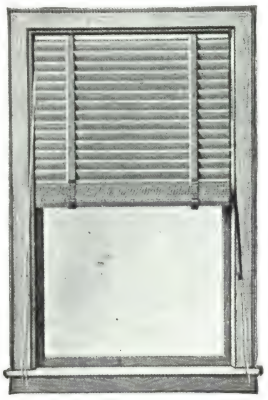
Tenoned Slats—Furnished with the "Roller" blinds when ordered; tenons engage with grooved guides at sides of windows, preventing the swaying of blind.

Materials and Finishes—All types are made of any kind of wood desired, from linden to mahogany, and finished in any style as ordered—varnished, machine or hand



SECTION OF "ROLLER" TYPE

SECTION OF "JUNIOR ROLLER" TYPE
With tenoned slats and guides



"BURLINGTON" TYPE

Horizontal Slats

Radial Slats
SHOWING TREATMENT OF SEMICIRCULAR TOPS

Continued on next page

rubbed, plain enamel, rubbed between coats, etc.—using the best material only for staining, painting and varnishing.

Prices—List prices per square foot of blind depend on the width of slats, finishes, and kind of wood used.

Estimates and prices will be sent on receipt of window or porch sizes and other necessary particulars.

"Burlington" Inside Sliding Blinds

Adaptability—When properly fitted, the "Burlington" inside sliding blinds add to the comfort and convenience of all classes of buildings.

Advantages—(1) Sunlight can be excluded, when desirable to do so.

(2) Freely admit air for required ventilation.
(3) Will not sag.
(4) Noiseless in operation.
(5) Cost less than folding blinds.

Description—Usually made in 3 sections placed vertically, the 2 upper sections having stationary slats and lower one equipped with rolling slats; or, in any other number of sections, as ordered; or, with rolling slats in more than one section, as desired.

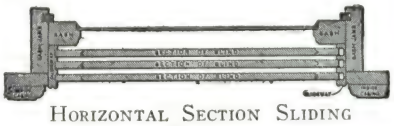
Sections may be at various elevations in window, and are with 2 or more horizontal divisions of slats in each section, according to width of openings. Constructed of any wood, with any finish, and attachable to any window. The sections run in grooved guideways, 2¾ in. wide, more or less, to accommodate all of them.

Sliding Blind

No hinges, therefore sections can not sag; no rattle, because sections are held in their vertical slots by strong springs; no interference with window draperies, blinds being set between facing jambs next to inside sash.

Operation—Sections slide past each other, upward and downward; by pressing sections against springs, one way horizontally, they are removable from guideways for cleaning purposes.

Installation—The accompanying sketch illustrates an installation of an inside blind of 3 sections.



Horizontal Section Sliding Blind

Note 3 sections of blind, sash, casings, jambs, etc.

Sizes—Generally ½ in. thick and strong; other dimensions, as ordered.

When Ordering—State, for regular square windows, the following exact measurements: (1) width of window between jambs; (2) height from window sill to top jamb; (3) distance from lower sash to face casings; (4) if blinds are to run to floor, give length that slides must be; (5) if windows have segment or circular heads or swells, send full particulars with pattern or radius measurements; (6) for circular blinds, state whether jambs are set parallel to each other or on radius lines.

Prices—According to wood used, finish and size.

"Burlington" Window Screens

Inside Sliding—When used with "Burlington" sliding blinds, the grooved guideways for blinds are provided with an extra groove next to the sash to be used for the screens. When not used with blinds, grooved guideways with but one groove for the screen are provided, these guideways being the entire height of window so the screen may be used either at bottom or top of window.

It is the work of but a moment to take them entirely from the windows by pressing slightly to one side.

Outside Sliding—The frames are usually of pine $\frac{13}{16}$ in. thick and painted as desired; but they can be made of other dimensions, woods, and finishes, if preferred, though painted frames only are recommended for outside screens.

Outside Sliding Screen

The splines on which the screens run are attached to the edges of casing closest to the upper sash, in proper position. The springs placed in deep groove of screen will hold the screen in place and at any desired elevation. These screens travel entirely upon the splines.

Outside Full Size—These screens may be used between the blind stops and fastened in with buttons, or attached at top, so as to easily open outward, thus affording a convenient way for washing the glass without removing the screen.

The frames may be $\frac{13}{16}$ in. or 1⅛ in. thick, as is advisable, and painted such color as suits purchaser. The use of painted frames for outside screens is recommended.

Screens for enclosing porches are also furnished.

Screen Doors

Made of best material; the frames 1⅛ in. thick, containing panels as desired, are manufactured and finished in harmony with frames of wood door with which the screen door is to be used.

Lower panels can be made of wood or wire, or regular wire covered with grille.

Prices—According to square feet in screens and number of panels in doors; fewer the panels, lower the price.

Further particulars on request.

Wire Cloth for Windows and Doors

14-mesh regular black, rustproof (gray finish), special black, and dark or bright bronze. Higher meshes used if ordered.

H. E. HOLBROOK COMPANY

Caledonia Venetian Blinds

444-447 Massachusetts Trust Building

BOSTON, MASS.

FACTORY: CALEDONIA, N. Y.

Products

Manufacturers of CALEDONIA VENETIAN BLINDS.

Manufacturers' Agents for High-grade Screen and Weather Strip Equipment, Rolling Steel Doors, Folding and Rolling Partitions, and School Wardrobes.

For Whitney Casement Hardware, see page 1309.

Caledonia Venetian Blinds

This is the only blind which affords perfect control of light and ventilation and dispenses with the necessity of shades or awnings. By the use of this blind the light of the room may be controlled to a marked degree, effecting a very considerable reduction in up-keep and lighting expense. All direct sunlight may be shut out, while the slats are open allowing perfect ventilation, reflecting over the entire room a soft, diffused light, with glare and shadows entirely eliminated. This blind gives the minimum light obstruction, either at the top or bottom of the opening.

CALEDONIA VENETIAN BLINDS IN OFFICE OF JOHN HANCOCK MUTUAL LIFE INSURANCE CO., BOSTON

CALEDONIA VENETIAN BLINDS IN OFFICE OF JOHN HANCOCK, MUTUAL LIFE INSURANCE CO., BOSTON

Illustrations

These illustrations are actual photographs of windows in the new home office building of the John Hancock Mutual Life Insurance Company, Boston, the greater part of which building is equipped with the Caledonia Venetian Blind. These photographs illustrate the various positions in which this blind may be used, operating either from the top or bottom of the window. with all operating cords at the side of the opening. (Note the minimum light obstruction when the blind is either completely raised or lowered). The slats may be tilted to any desired angle by a slight pull on a cord, the slats being automatically and rigidly held in place at any such angle. The ends of the top, bottom and intermediate slats operate in metal channels by which the blind is noiselessly held in position.

SIMON VENTILIGHTER CO., INC.

Ventilating Vane Shades for Windows, Sleeping Porches and Skylights

101 Park Avenue
NEW YORK, N. Y.

Product

VENTILIGHTER, a scientific shading device designed to control light in all its phases, decreasing solar heat and eliminating shadows and solar glare, without loss of light or ventilation.

Ventilighter
TRADE-MARK

SCIENTIFIC SHADING
SLOGAN

Principles of Ventilighter

Ventilighter is not a screen, not an awning, not a blind and not a curtain, but has the advantages of all these devices with the disadvantages of none. It consists of a series of specially woven fabric vanes (although metal or other material may be substituted in special instances) mounted in a metal lattice frame. The vanes may be opened or closed so as to overlap, ventilation remaining unimpaired. The use of various types of vanes corresponding to the individual problem permits the concentration, diffusion or elimination of light rays.

Where Ventilighter Is Used

Ventilighter is used on skylights, windows and sleeping porches.

The skylight Ventilighter is made to frame about all obstructions and to fit all types of irregularly shaped openings.

Window and sleeping porch Ventilighters collapse horizontally to the jamb and occupy a space, when folded, of approximately ½ in. to the running foot. The sleeping porch ventilighter is absolutely noiseless in its operation; hence, the sleeper is not disturbed by flapping or rattling, as with the old-time blind. Neither does the Ventilighter warp nor crack. The circular head window Ventilighter is the only device of its kind that opens and closes.

On account of its lighting and ventilating advantages and on account of its flexibility of construction, Ventilighter should be adopted wherever shading problems exist: in art galleries, libraries, museums, banks, studios, drafting rooms, hospitals, solariums, public buildings, private offices, residences, etc. Wherever used, its simplicity of construction, skilled manufacture and tested high grade parts make it highly decorative and, at the same time, permanent and foolproof.

Specification

All skylights [windows] [sleeping porches] (specify location) shall be equipped with Ventilighter, a scientific shading device, as manufactured by SIMON VENTILIGHTER CO., INC., 101 Park Avenue, New York, N. Y., consisting of a series of special vanes, adjustable as desired by the operation of a movable metal lattice frame, in which the vanes are mounted, thus permitting the control of light without impairing ventilation. Material of vanes to be a specially woven fabric with selvage on both edges (or specify any other material desired). Frames to be finished to match surroundings.

Estimates and Installation

In writing for information please submit a sketch illustrating conditions. For skylight Ventilighters show construction of skylight opening and possible obstructions such as columns, piping, etc. For window Ventilighters show section of jamb, head and sill.

We furnish blue prints showing an easy method of installing. Our staff, if desired, will undertake complete installation.

Write for catalogue of construction, and installations.

Some Buildings Where Ventilighter Is Installed

Name of building and architect:

Borough Hall, Brooklyn, N. Y.
H. S. Borden, Squash Court, Oceanic, N. J., George S. Chappelle
James G. Butler, Jr., Art Gallery, Youngstown, Ohio, McKim, Mead & White
California Institute of Technology, Pasadena, Cal., Bertram G. Goodhue
Consolidated Gas Co., New York, N. Y., Warren & Wetmore
Fifth Avenue Guaranty Building, New York, N. Y., Cross & Cross
Freer Collections Building, Washington, D. C., Charles A. Platt
Globe Indemnity Building, Newark, N. J., Frank Goodwillie
Metropolitan Life Annex, New York, N. Y., Everett D. Waid
New York City Public Libraries, Carrère & Hastings
Pennsylvania Hotel, New York, N. Y., McKim, Mead & White
Worcester Art Gallery, Worcester, Mass.

CIRCULAR HEAD OPEN; WINDOW VENTILIGHTER FOLDED TO SIDE

VENTILIGHTER INSTALLED IN STATE EDUCATIONAL BUILDING, ALBANY, N. Y.

Note absence of glare

CIRCULAR HEAD AND WINDOW VENTILIGHTER CLOSED

ESTABLISHED 1856

SWEDISH VENETIAN BLIND COMPANY

Importers and Sole Distributers on this Continent of Swedish Venetian Blinds

TELEPHONE
PENNSYLVANIA 1620

1265 Broadway
NEW YORK, N. Y.
AGENCIES IN ALL PRINCIPAL CITIES

CABLE ADDRESS
"VENETBLIND"

Product

SWEDISH VENETIAN BLINDS.

For Partitions, Rolling Doors and Shutters, see page 1091.

Swedish Venetian Blinds

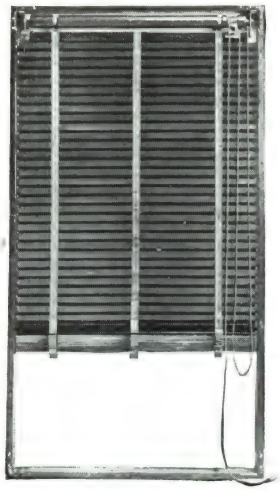
These are the only imported blinds on the market and are radically different from all others, excelling in material, improved construction, ease of operation, durability and harmony of color.

Added to their excellence are conveniences, refinements and niceties which, together with the perfect service and easy control, afford a luxury only to be expressed by the term "Swedish Venetian."

The slats are made of Norway pine, straight grained, very thin and, due to our secret process, are guaranteed not to warp; they are very flexible, tough and as strong as steel slats. The cords run through glass rings, so as to prevent wear.

The blinds stay at any height when pulling ceases and are adjusted to any desired angle by a patent regulating device. They need no tying or fastening as with ordinary types. They can be put up and taken down as easily as a roller shade. No tools required.

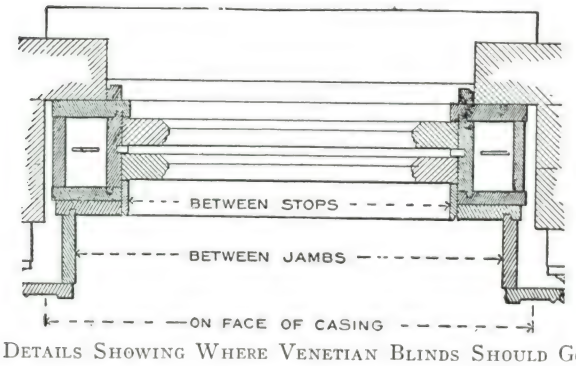
When pulled up, they occupy one-third less space than is required by domestic makes. Our blinds close tightly, present a neat appearance and darken the room. Installed in the finest residences throughout the country.



SLIDING VENETIAN BLIND IN GROOVES

Sliding Venetian Blinds

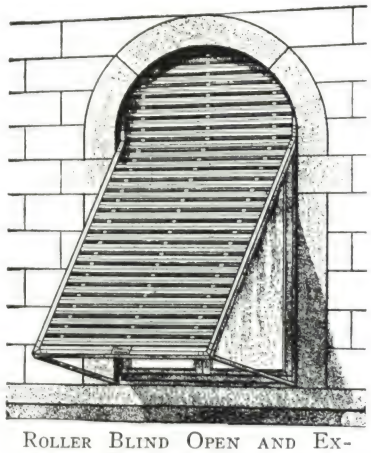
For outside and inside purposes, with or without grooves. Also made with extensions, taking the place of awnings. They answer the purpose of a shutter to a certain degree when let down.



DETAILS SHOWING WHERE VENETIAN BLINDS SHOULD GO

Roller Blinds

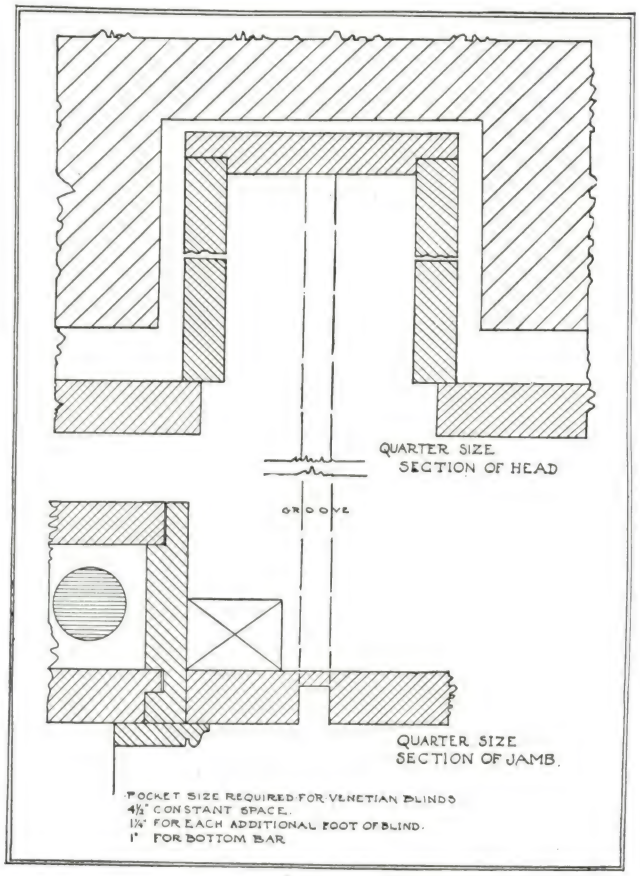
Made of wood and steel; improved construction throughout. Can be extended out like an awning affording perfect ventilation or can be locked and used as burglarproof shutters. Operated from inside by strap, spring roller or gear wheel.



ROLLER BLIND OPEN AND EXTENDED OUT LIKE AN AWNING

Venetian Porch Blinds

Sleeping porches and outside lounging rooms can not adequately serve their purpose without Swedish Venetian blinds, which insure absolute privacy, at the same time allowing free ventilation, a feature that is so much sought nowadays.



DETAIL OF JAMB AND POCKET

When above details are followed, it will result in a most satisfactory installation of Venetian blind, either outside, between screen and sash, or on the inside, making the blind withstand atmospheric conditions, practically as the house itself, thereby giving a better service than any other blind of its kind.

WESTERN BLIND & SCREEN COMPANY

Manufacturers of Venetian Blinds
2700 Long Beach Avenue
LOS ANGELES, CAL.

NEW YORK REPRESENTATIVE: FRANKLIN S. COBB, 103 Park Avenue

DISTRICT OFFICES

CHICAGO, ILL., 510 Hearst Building, 326 W. Madison Street
KANSAS CITY, MO., Mutual Building
SAN ANTONIO, TEX., 523 Hicks Building
PORTLAND, ORE., 205 Henry Building
SAN FRANCISCO, CAL., 921 Hearst Building
SAN DIEGO, CAL., 536 Spreckels Building
SALT LAKE CITY, UTAH, Boston Building
DENVER, COLO., Chamber of Commerce Building
ATLANTA, GA., 309 Flatiron Building

Product

"WESTERN" VENETIAN BLINDS.

WESTERN VENETIAN BLINDS

TRADE-MARK

Uses

"Western" Venetian blinds are used as combination awnings and window shades. They keep out the direct sunlight and heat, afford better distribution of daylight and control ventilation.

Adaptability

They are suitable for banks, office buildings, schools, public buildings, solariums, sleeping porches, prism store transoms, garage showrooms, etc.

Installation

All the necessary hardware and fixtures for "Western" Venetian blinds are furnished with each order, together with complete instructions for installing.

As a general rule, small jobs are installed by the contractor or owner. The factory usually contracts for installation of large or complicated jobs.

Operation

Descriptive details and illustrations shown in the following pages cover the different operating devices, which vary in accordance with the size of the blind.

A suitable operating device is supplied to make all blinds operate freely and easily, and with the minimum wear.

Prices

Owing to the varying sizes of windows and finishes of the blinds, it is impracticable to quote prices here. Estimates may be had, however, by furnishing a list of the windows, showing sizes, to the nearest office shown above.

Common Type C Blinds

This type of blind is designed for small windows—such as found in schools, office buildings, etc.

They are standard as to slats, ladder tape, cord and finish.

See details on page 1083 for different methods of hanging.

Recommended for windows less than 4 ft. 6 in. wide and containing not more than 35 sq. ft.

Type A Easy-lift Blinds

The double acting cord arrangement in this type of blind reduces the lifting strain to one-half the weight of the blind, and lifts the blind evenly.

Standard as to slats, ladder tape, cord and finish.

See page 1083 for different methods of hanging.

Recommended for windows up to 100 sq. ft. in area and those over 4 ft. 6 in. wide.

Oscillating Roller Type Blinds

This type of blind is designed for use in very large openings, such as found in banks, etc. Regardless of the size of the opening, these blinds are made to operate easily and freely. These blinds are well suited for use in connection with rolled steel windows of the industrial type. See illustration of General Cigar Co. installation, page 1085.

Standard as to slats, ladder tape, and finish. Lifted on $\frac{1}{16}$-in. flexible wire cables, by means of a single No. 6 sash cord.

See page 1084 for details of different methods of installation.

Recommended for blinds containing more than 100 sq. ft.

Rod Guide Blinds for Doors and Transoms

Blinds for transoms which swing into the room should be equipped with rod guides. This attachment consists of small swivel rings securely attached to the ends of slats which operate on $\frac{7}{32}$-in. brass or Bessemer steel rods, holding the blind firmly to the sash at all times.

This arrangement is also preferable for doors, as it prevents the blind from flapping as the door is operated, but in no way interferes with the operation of the blind or the door.

This attachment is also recommended for blinds which are exposed to strong winds.

Continued on next page

Tenon Blinds

This type of blind is used to a great extent on sleeping porch windows, or in cases where the blind must be subjected to strong winds.

The standard tenon on ends of slats is ½x½ in., and, where the jambs are prepared, the groove should be $\frac{9}{16}$x$\frac{9}{16}$ in. In cases where the jamb is not grooved for the slats, a special grooved strip is furnished with the blinds. See details on page 1083.

This type of blind is not recommended on windows more than 4 ft. in width.

Type K Circular Head Blinds

This type of blind is made with stationary slats tilted to 45° angle. They are made with a horizontal bottom bar to which the uprights are securely fastened. After the slats are notched into these uprights, they are neatly covered with tapes. A strip ⅛x1¾ in. is bent around the circle to cover the ends of the slats, which are supported by small brads through this strip.

Type F Circular Head Blinds

This type is made the same as Type K above, with the exception that instead of bending a strip around the circle, a solid circular sawn frame 1¼x1¾ in. is used, and the ends of the slats are fastened to this.

Where there is no transom bar in the window, Type A blinds may be attached directly underneath the bottom rail of either Type F or Type K circular blinds; adequate supports are provided, regardless of width.

Attractive Appearance

"Western" Venetian blinds not only outwear the ordinary fabric window covering, but distinguish the building by reason of the clean cut exterior. The architectural lines are maintained and both interior and exterior appearance is enhanced.

Specifications

Slats—Made from clear Port Orford white cedar (a wood of fine texture suitable for staining to match hardwoods, etc.) finished ⅛ in. thick. Standard width 2⅜ in. Also made in 2-in. width. Guaranteed against warping, splitting or breaking for an indefinite period. Slats made from other wood are furnished, but not recommended or guaranteed; 2-in. slats recommended only for small windows.

Ladder Tape—Best quality cotton and linen fabric, interwoven ladders; imported or domestic.

Cord—Hollow, specially braided, glazed to prevent wear.

Finish—The blinds are finished to match or contrast woodwork. Natural white cedar finish constitutes three coats of high grade floor varnish. Stained finishes are covered with two coats of varnish. Painted or enameled finishes are regularly furnished in three coats.

Dark finishes are not recommended where daylight must be considered.

Hangers—Stamped from sheet metal, carrying cord rollers ⅞ in. in diameter, made from self-lubricating lignum-vitae wood. Two styles for Type C blinds—one for installation between jambs or stops, and the other on face of casings. When installed between jambs, Type C hangers require a minimum of ¾-in. space. When installed on face of casing, the slats should lap 1½ in. on each side.

How to Measure for "Western" Venetian Blinds

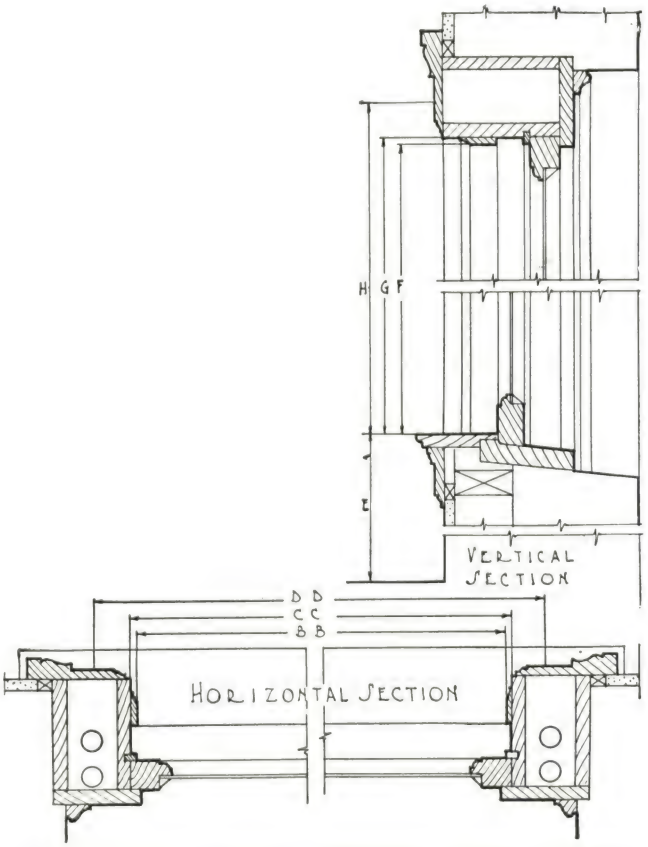
For Ordinary Windows—When blinds are to hang between stops or jambs (B-B or C-C) always give full net width and height of opening between such points and mention where measured.

When to be hung on face of casings (D-D) give the actual width and height of the blind wanted, mentioning where measured. For example—"Width D-D, 48 in., height of blind, 84 in."

For Doors or Hinged Transoms—When measuring these for "Western" Venetian blinds, always give the actual size of the glass. It is also desirable to mention the distance from the edge of the glass to the nearest point of any hardware which occurs on the transom sash or door stiles.

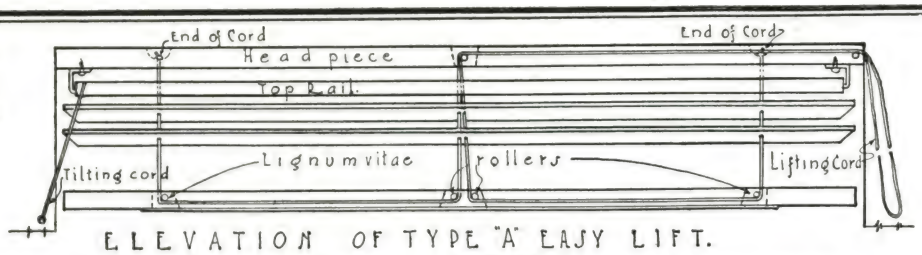
For Circular Windows—In furnishing working measurements for circular transoms, etc., it is usually best to cut a paper templet the size and shape of the opening where the blind is to go.

Note: Always give distance from floor to bottom of blind, so that operating cords may be made the proper length.

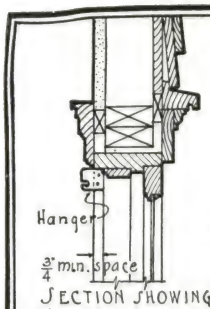


Measurement Diagram of "Western" Venetian Blind

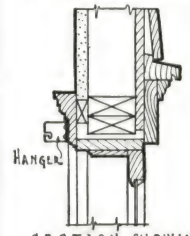
Continued on next page



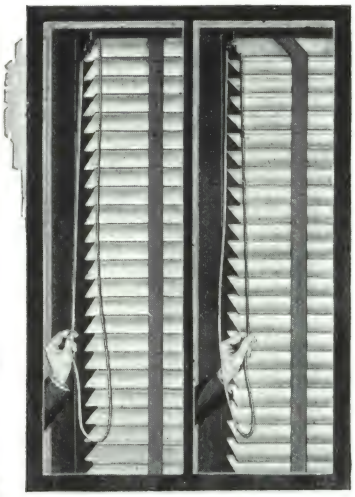
ELEVATION OF TYPE "A" EASY LIFT.



SECTION SHOWING HANGER ATTACHED TO SIDE JAMBS.

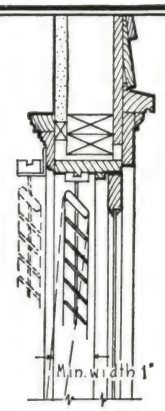


SECTION SHOWING HANGER ATTACHED TO CASING

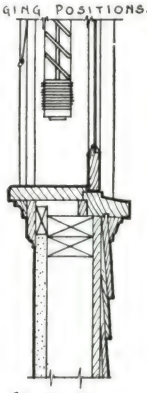


METHOD OF ADJUSTING SLATS.

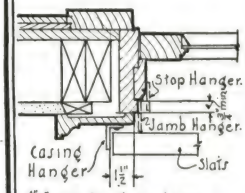
A VISION SCREEN IF DESIRED.



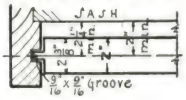
SECTION THRU HEAD SHOWING ALTERNATE HANGING POSITIONS.



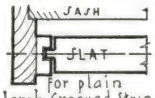
SECTION THRU SILL.



1" SCALE PLAN OF JAMB SHOWING ALTERNATE SCHEMES FOR USING HANGER



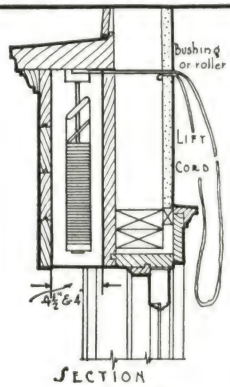
1" SCALE PLAN OF JAMB SHOWING 2" & 2 3/8" SLATS WITH TENONED ENDS.



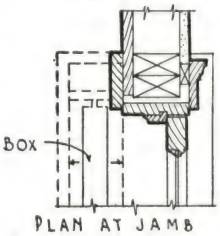
NOTE:- THE BLINDS MAY BE CLOSED AT THE BOTTOM AS HIGH UP AS DESIRED, THEREBY SERVING THE PURPOSE OF A VISION SCREEN.

3/4" SCALE DETAILS OF COMMON "C" TYPE BLINDS.

3/4" SCALE DETAILS OF "A" TYPE BLINDS.



SECTION

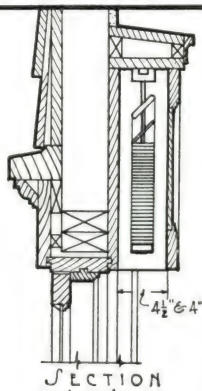


PLAN AT JAMB
BLIND CONCEALED OUTSIDE OPERATED FROM ROOM.

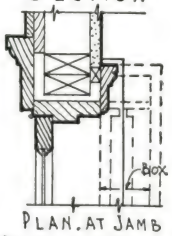
NOTE BLINDS WITH 2 3/8" SLATS REQUIRE A POCKET 4 1/2" WIDE. TO DETERMINE DEPTH OF POCKET BEGIN WITH 3" AND ADD 1 1/4" FOR EACH FOOT IN HEIGHT OF ACTUAL WINDOW OPENING.

BLINDS WITH 2" SLATS REQUIRE A POCKET 4" WIDE. FOR DEPTH BEGIN WITH 3" AND ADD 1 1/2" FOR EACH FOOT IN HEIGHT OF ACTUAL WINDOW OPENING.

SHOWING BLIND PARTLY RAISED



SECTION



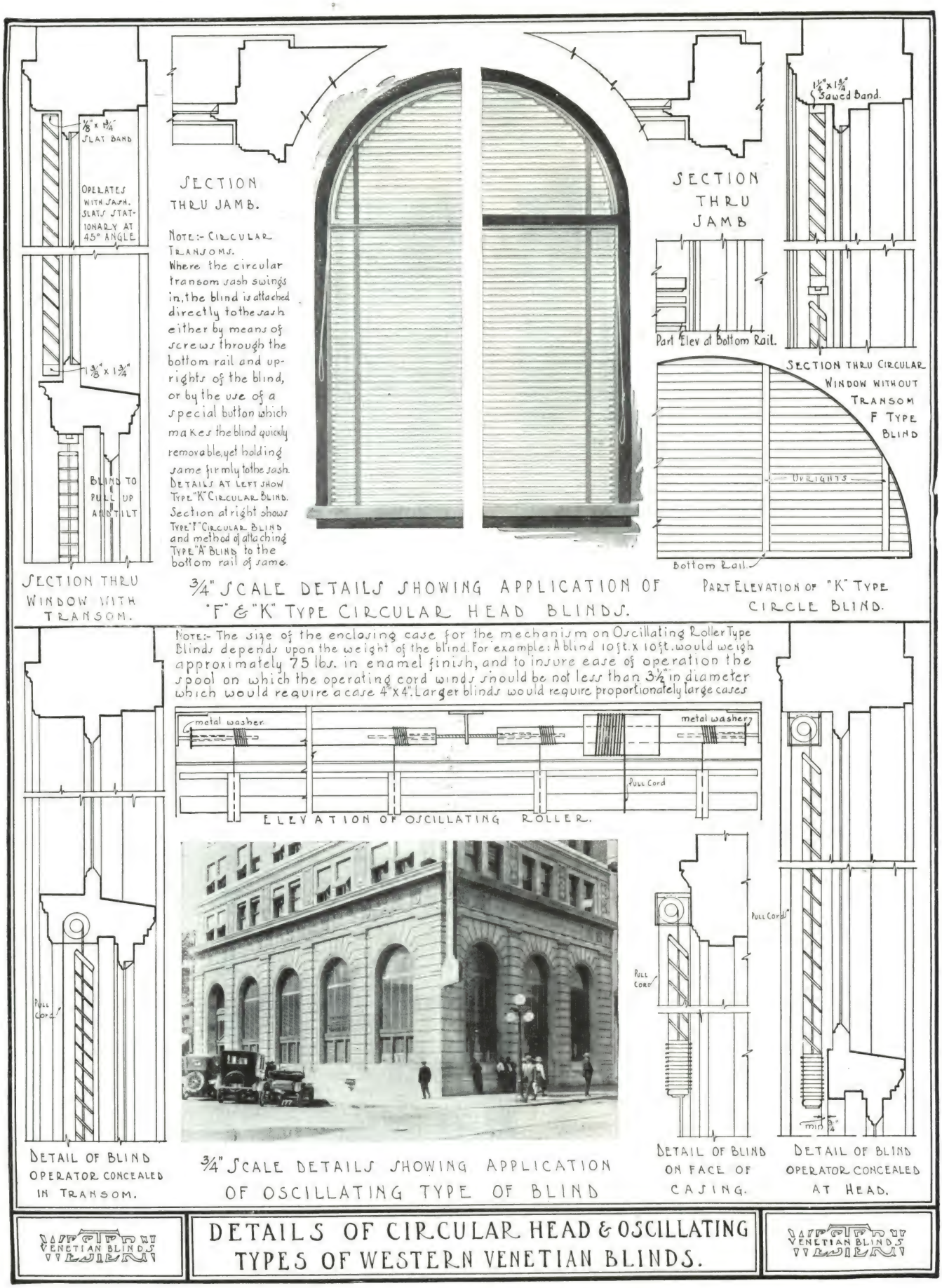
PLAN AT JAMB
BLIND CONCEALED IN ROOM.

WESTERN VENETIAN BLINDS

DETAILS OF COMMON C TYPE & A TYPE WESTERN VENETIAN BLINDS

WESTERN VENETIAN BLINDS

Continued on next page



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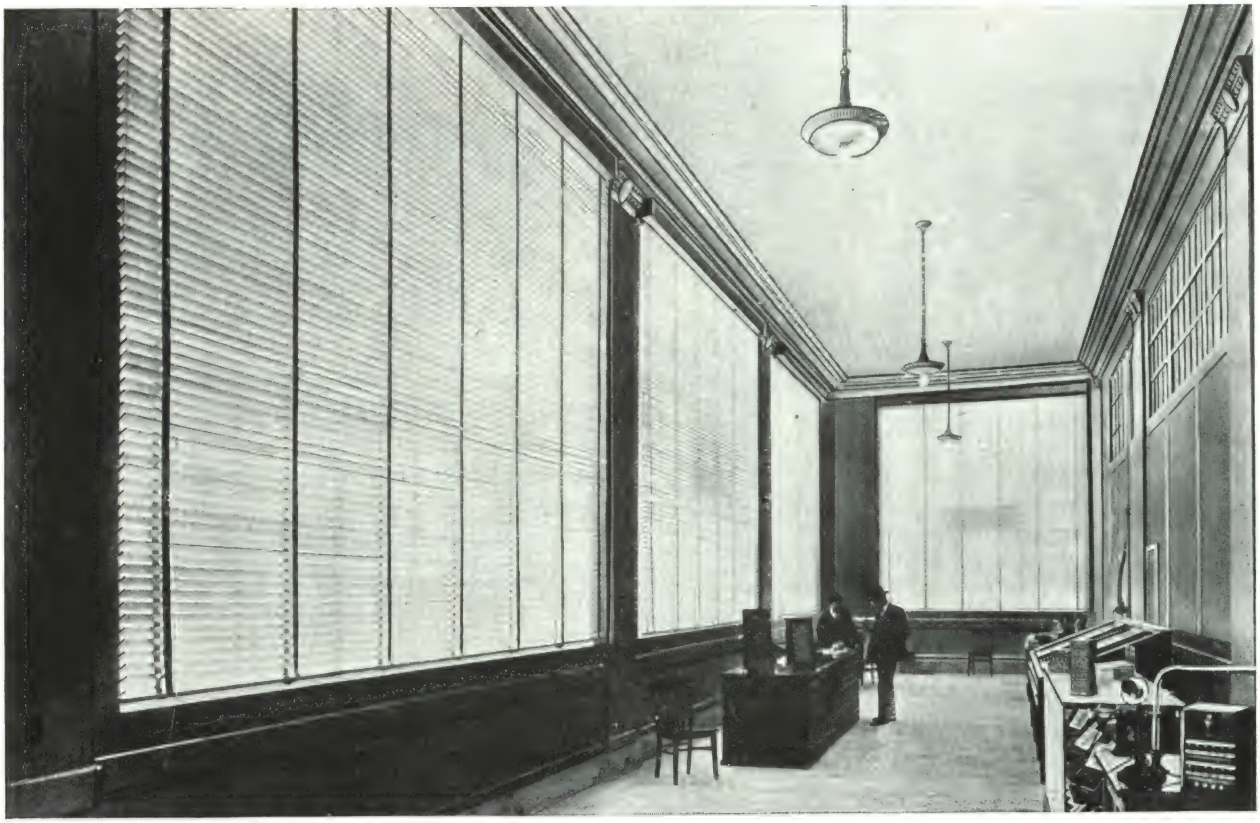
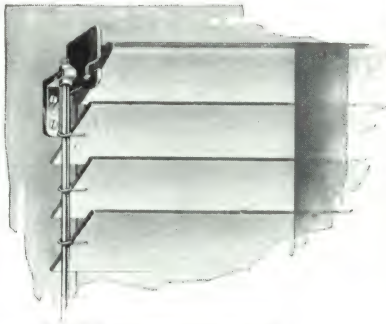
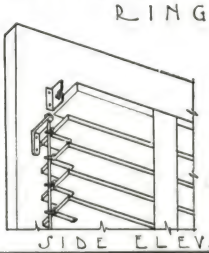


"Western" Venetian Blinds Installed in the Salesroom of the General Cigar Co., San Francisco, Cal.

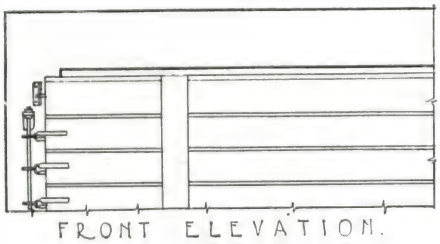
Blinds are of the Oscillating Roller Type and are 16 ft. 7 in. wide by 13 ft. 8 in. high



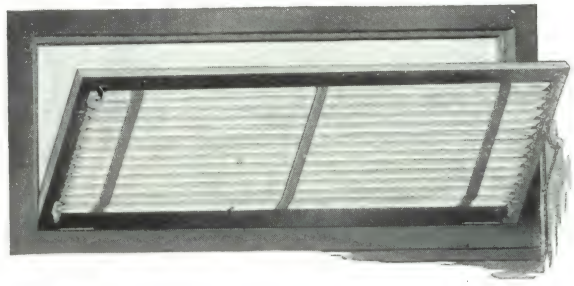
DETAIL OF SWIVEL RING

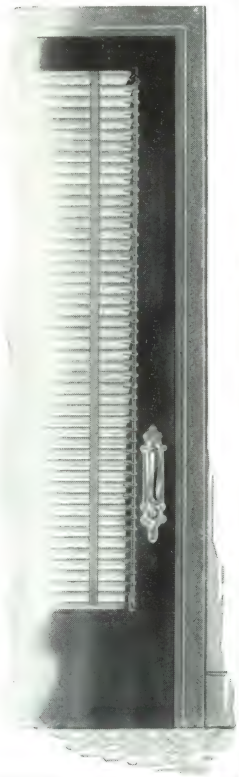


SIDE ELEV.



FRONT ELEVATION.





DETAILS OF DOOR AND TRANSOM TYPES OF WESTERN VENETIAN BLINDS.

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

Manufacturers of Blinds and Awnings

TELEPHONE
VANDERBILT 9636, 9637

24 East 36th Street
NEW YORK, N. Y.

CABLE:
"LYDIAN, NEW YORK"

FACTORY ADDRESS—MAIL AND TELEGRAPH: NORFOLK, VA.

For Offices and Agencies, see page 763

Products

AWNING, PORCH and QUEEN ANNE ROLLING BLINDS.

DIFFUSELITE BLINDS.

For Rolling Doors and Shutters in steel and wood, see pages 763-771; for Sectionfold and Rolling Partitions and Wardrobes, see pages 1094-1099.

Wilson Awning Blinds

Type 1-4—A Venetian awning blind which takes the place of shutters and fabric awnings, and gives perfect control of light and ventilation. The slats slide on rods, which can be extended to form an awning. This construction prevents their being blown about by wind and does away with all rattling noise. Side wings or slats may be provided to keep out the sun when it is at an angle to the window.

Installed on the outside of buildings, it may be raised or lowered while either in an extended or vertical position, with slats at all times capable of adjustment for the regulation of light and ventilation.

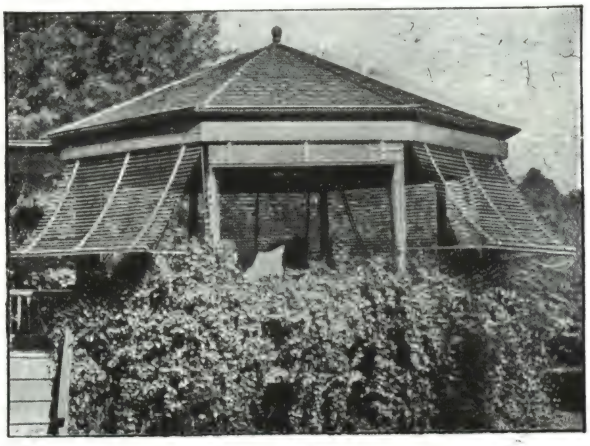
As an awning, it far surpasses the prevailing fabric type as it cuts off the direct rays of the sun without pocketing air to become dead and superheated. It permits a free circulation of air at all times and creates air currents which carry into the room, giving perfect ventilation.

Wilson's awning blinds do not have to be taken down in the fall to be erected again in the spring; although, if this is contemplated, it is well to provide pockets into which they may be drawn during the winter months.

Nor do they invite fire through ignition from stray matches, lighted cigarettes, cigars or other sources. Their upkeep is slight, their life indeterminate. From the standpoint of economy, it is the least expensive installation that can be made.

Wilson awning blinds are built to fit exactly the openings for which they are made, so that they are readily installed. If desired, operation of the slats can take place from the inside of the room without opening the sash.

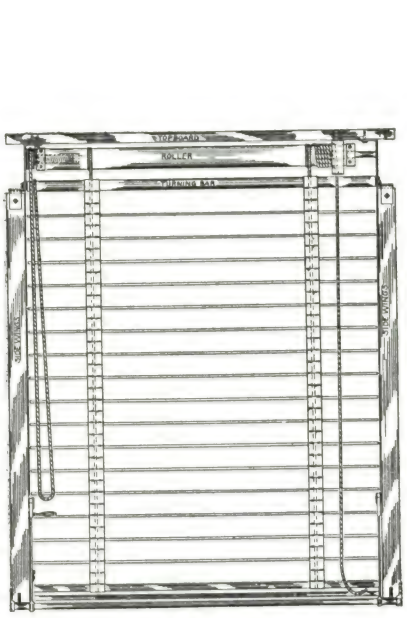
Type 3-5—A moderate priced awning blind for pagodas, porches, etc., which protects from sun without curtailing privacy or obstructing the view. Similar to Type 1-4 except that it has no side wings or rods on which the slats slide.



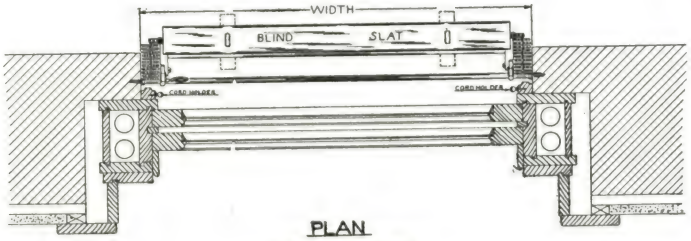
WILSON TYPE 3-5 AWNING BLIND
Used on a porch

WILSON TYPE 1-4 AWNING BLIND
View showing various positions

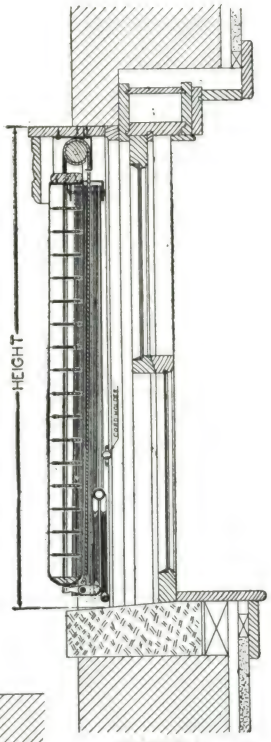
Continued on next page



ELEVATION

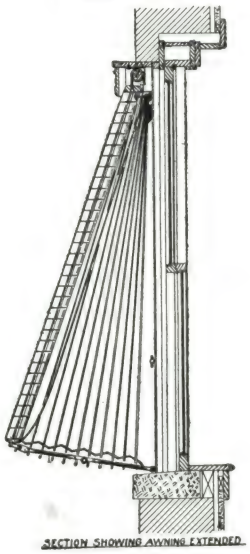


PLAN
FRAMES NOT REQUIRED



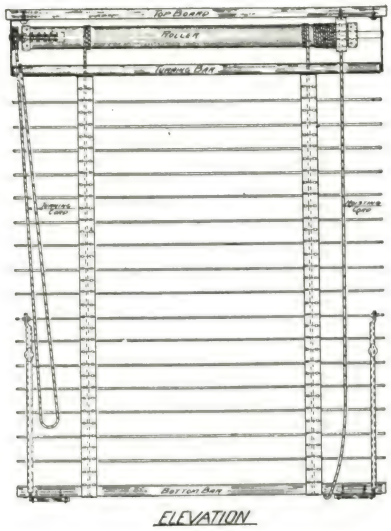
SECTION

SCHEDULE	
SPACE REQUIRED FOR BLIND WHEN UP	
HEIGHT OF BLIND	2" SLATS METAL TAPE
4'-0"	12"
5'-0"	14"
6'-0"	15"
7'-0"	17"
8'-0"	18"
9'-0"	20"
10'-0"	21"
11'-0"	23"
12'-0"	24"
BLINDS CONTAINING OVER 32 SQ FT ADD 1"	
" " " 60 " " 2"	
METAL TAPES ARE USED ON 2" SLATS ONLY	

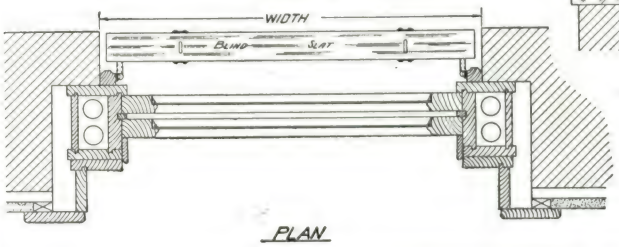


SECTION SHOWING AWNING EXTENDED

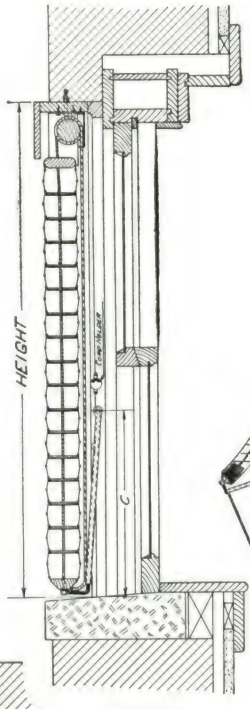
Wilson Venetian Awning Blind No. 1-4



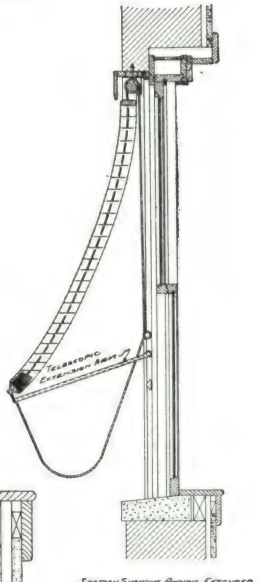
ELEVATION



PLAN



SECTION



SECTION SHOWING AWNING EXTENDED

SCHEDULE	
HEIGHT OF POCKETS FOR TWO CASE ROLLER BLINDS	
HEIGHT OF BLINDS	2" SLAT METAL TAPE
4'-0"	12"
5'-0"	14"
6'-0"	15"
7'-0"	17"
8'-0"	18"
9'-0"	20"
10'-0"	21"
11'-0"	23"
12'-0"	24"
BLINDS CONTAINING OVER 32 SQ FT ADD 1"	
BLINDS CONTAINING OVER 60 SQ FT ADD 2"	
METAL TAPES ARE USED ON 2" SLATS ONLY	

AWNING EXTENSION	
C	HEIGHT OF BLINDS
18"	3'-10" TO 5'-9" INCL.
24"	5'-9" TO 6'-9" INCL.
30"	6'-10" TO 8'-6" INCL.

NOTE:- EXTENSION ARM IS COMPOSED OF PIPE SLEEVE OR ROD OR SIDE SUITABLE FOR A SLIDING FIT. WHEN BLIND IS BEING RAISED THE EXTENSION ARM WILL SWING AROUND SCREW WHICH ATTACHES SAME TO BUILDING UNTIL IT REACHES ALMOST A VERTICAL POSITION. THEN AS THE BLIND CONTINUES IN AN UPWARD TRAVEL THE ROD WILL SLIDE IN THE SLEEVE. THUS PERMITTING BLIND TO BE RAISE THE FULL HEIGHT.

Wilson Venetian Awning Blind No. 3-5

DETAILS OF WILSON VENETIAN AWNING BLINDS

Continued on next page

Porch Blinds

These blinds are so constructed that when used on sleeping porches, protection from inclement weather, without interference with ventilation, is provided. Noise, rattle or swaying in the wind is prevented by use of grooves in which the slats slide.

Early morning light is barred and absolute privacy secured.

Wilson Queen Anne Rolling Blinds

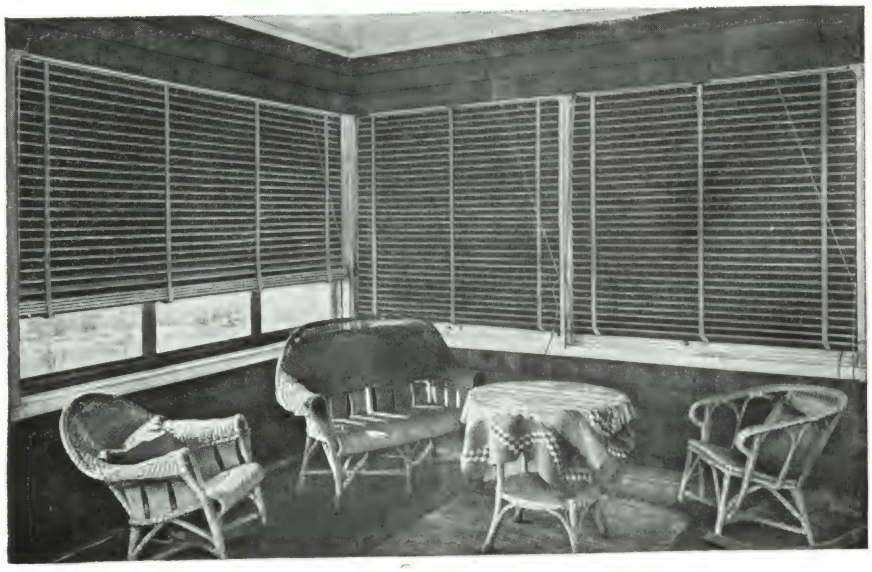
A durable and artistic covering for side or top of open porches. These blinds, while solid in appearance, admit both air and light from without and vision from within. They operate on a counterbalanced spring roller and are easily rolled up to occupy a small space. They slide in grooves and are absolutely noiseless.

Diffuselite Blinds (Inside)

Diffuselite blinds cut off the direct rays of the sun and diffuse natural light evenly throughout the room.

They perform all the functions of fabric shades, fabric awnings and ventilators, making an installation of these latter commodities alone or together unnecessary. In addition they furnish at least five times more light to a room than can be obtained when fabric shades or fabric awnings are used. Slats can be tilted or raised and lowered as occasion demands.

Catalogue, details, prices, forwarded on request.



Typical Installation of Wilson Porch Blinds

Typical Office Installation of Diffuselite (Inside) Blinds

Continued on next page

General Tables

For size of Pockets Location of Grooves etc.

Metal Tapes are used on 2⅛ Slats only

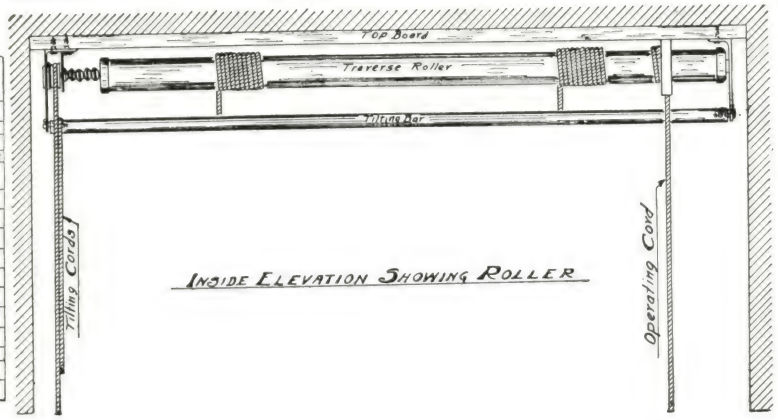
Approximate size of Blinds in Sq Ft		1 to 30	30 to 60	60 to 90
		Pockets for Metal Tapes		
L		5 3/4	5 3/4	6
M		2 3/4	2 1/8	2 1/8
N		2 3/4	2 3/4	3 1/4
		Pockets for Linen Tapes		
L		4 7/8	5	5 1/2
M		2 1/4	2 1/4	2 1/4
N		2 1/4	2 1/4	3 1/4
		Dimensions of Head		
O		1 7/8	1 7/8	1 7/8
Q		1 7/8	3 1/4	4 1/4
E		7/8	7/8	7/8
F		1 1/2	2	2 1/2
G		2 3/8	3 1/4	3 1/4
J		3/4	3/4	3/4

Are Sash Lifts Flush if They Project give Size & Location

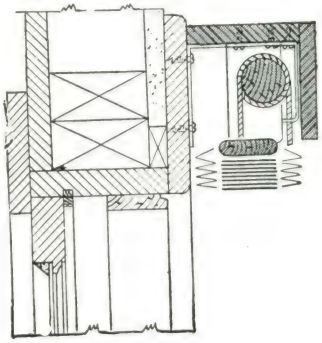
Heights of Pockets for Traverse Roller Blinds

Height of Opening	2 Slat Cloth Tape	2½ Slat Cloth Tape	2½ Slat Metal Tape
4'-0"	13½"	12"	12"
5'-0"	15"	13½"	13½"
6'-0"	16½"	14½"	15"
7'-0"	18"	15½"	16½"
8'-0"	19½"	17"	18"
9'-0"	21"	18½"	19½"
10'-0"	22½"	19½"	21"
11'-0"	24"	20½"	22½"
12'-0"	25"	22"	24"

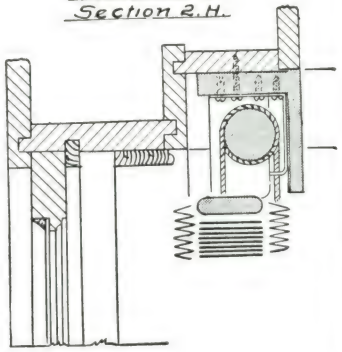
Blinds Containg over 32 Sq Ft add 1½"
" " " 60 " " 2½"



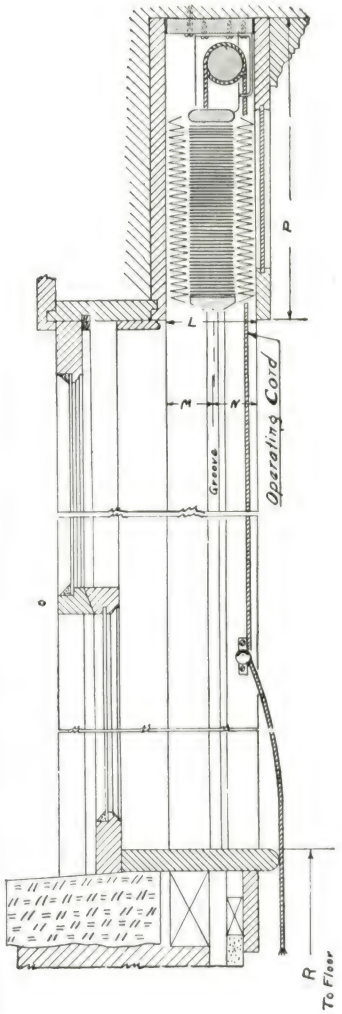
Plan 1
Section 1.H.



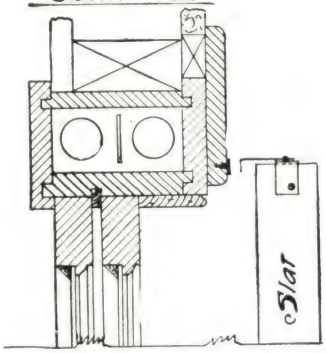
Plan 2
Section 2.H.



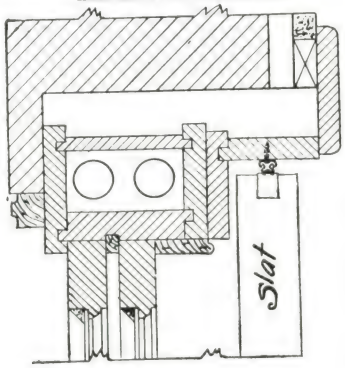
Section Thru Pocket



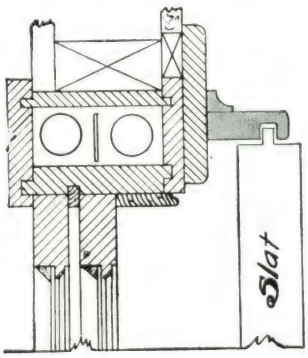
Section 1.B.



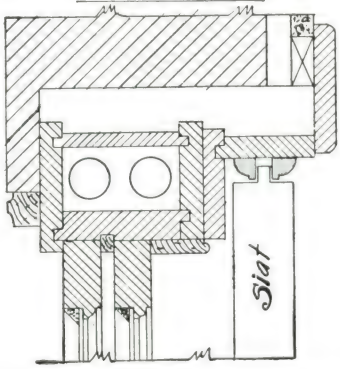
Section 2.B.



Section 1.C.



Section 2.C



DETAILS OF DIFFUSELITE INSIDE BLINDS

GRANT PULLEY AND HARDWARE COMPANY

Vertical Coiling Doors and Horizontal Rolling Partitions

Architects Building, 101 Park Avenue

TELEPHONE CONNECTION NEW YORK, N. Y.

Agents in all principal cities of the United States and Canada, and our Name will be found listed in the Telephone Directories

Products

Manufacturers of "GRANT" VERTICAL COILING DOORS and HORIZONTAL ROLLING PARTITIONS for churches, schools, public buildings and residences.

Also Ventilating School Wardrobes with front rolling either vertically or horizontally, accommodating any number of pupils.

For Sash Pulleys and Window Cleaning Devices, see pages 1200-1201; for Revolving Window Devices, see page 1293; for Door Hangers and Bar Locks, see pages of Reliance-Grant Elevator Equipment Corp.

Construction

"Grant" doors and partitions are made of ¾-in. and ½-in. thick mouldings, respectively, of any kind of wood.

The wood is varnished, finished, stained or painted to harmonize with the interior of a building, and all doors and partitions are supplied with appropriate hardware. Material and workmanship are the best obtainable.

Rolling Partitions

Openings of any width can be closed with one or more horizontal partitions.

By use of movable posts, a clear floor is secured when partitions are rolled up.

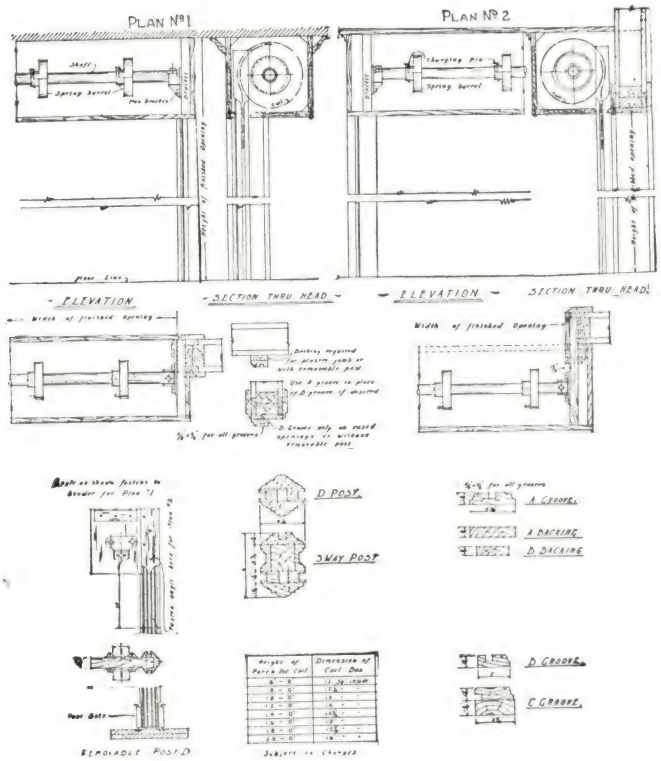
Guarantee

All "Grant" doors and partitions are guaranteed to work satisfactorily if installed in accordance with "Grant" instructions.

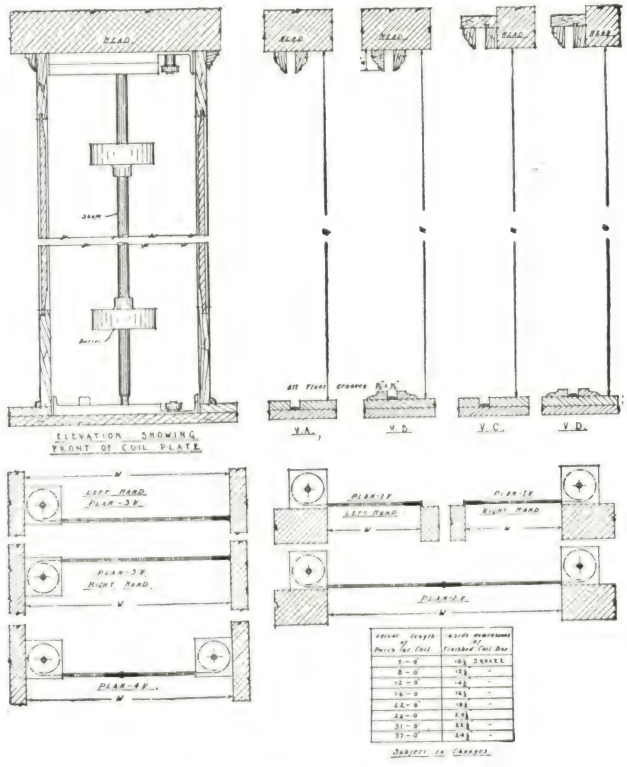
Illustrations

The illustrations below show methods of installation and measurements.

Full size details of all our specialties will be sent on request.



"GRANT" HORIZONTAL ROLLING PARTITIONS



"GRANT" VERTICAL COILING DOORS

ESTABLISHED 1856

SWEDISH VENETIAN BLIND COMPANY

Rolling Wood Partitions and Steel Rolling Doors and Shutters

1265 Broadway

NEW YORK, N. Y.

AGENCIES IN ALL PRINCIPAL CITIES

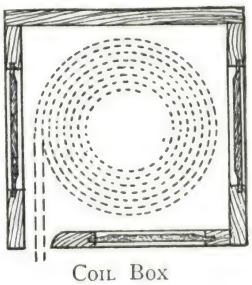
Products

ROLLING WOOD PARTITIONS.
ROLLING STEEL DOORS and SHUTTERS.
For Swedish Venetian Blinds, see page 1080.

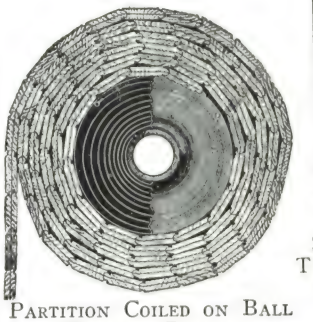
Horizontal Rolling (Overhead Coiling) Wood Partitions

Our horizontal rolling wood partitions are made for all purposes where division of rooms is necessary as in schools, churches, club rooms, factories, residences, etc. They are guaranteed to be equal to or better than any on the market and their cost is less. By their use, convenient, economical floor arrangement can be obtained. They dispense with folding and accordion doors which take up valuable room.

Made of the best wood obtainable for the purpose. Slats are 1¾ in. wide by ½ in. thick and have non-friction joints connected by metal straps.



COIL BOX



PARTITION COILED ON BALL BEARING ROLLER

SECTION THROUGH SLATS

DIMENSIONS OF ROLLING WOOD PARTITIONS

Height of partition including coil, ft.	Inside dimensions of coil box, in. sq.
6	12
8	12½
10	13
12	14
14	14½
16	15
18	15½
20	16

Improved ball bearing coiling device insures ease of operation and noiselessness.

Furnished in any finish desired, with attractive hardware, adjusted coiling apparatus and hangers to carry ends of shafts.

Openings of any width can be closed with one or more partitions. By the use of removable posts (furnished by us if desired) a clear opening is secured when partitions are rolled up. Single partitions should not be over 12 ft. wide.

Detail drawings furnished on request.

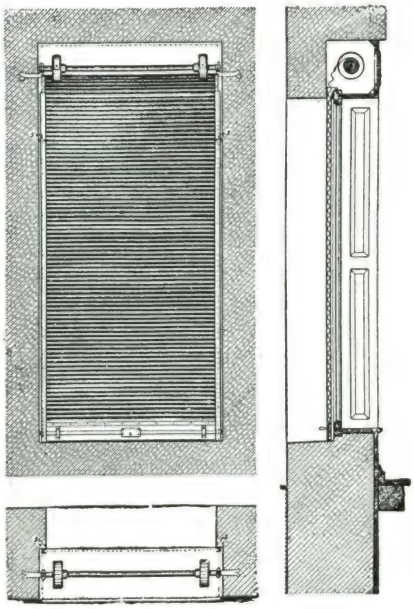
Steel Rolling Doors and Shutters

Made of the best grade of English continuous corrugated steel sheets. Different operating mechanisms furnished to suit varying conditions.

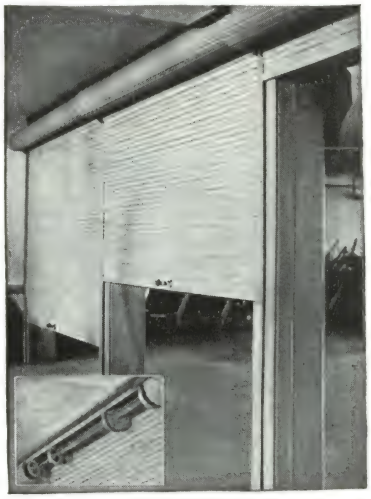
Used for all kinds of openings where strength, durability, ease of operation, efficiency and economy of space are required.

Any good mechanic can easily erect our products from details furnished by us.

We have had many years' experience in this line and guarantee a perfect product.



CORRUGATED STEEL SHUTTER
Hood Removed to Show Operation



TYPICAL INSTALLATIONS OF HORIZONTAL ROLLING WOOD PARTITIONS

At the left is illustrated several sections of rolling wood partitions. For openings wider than 12 ft., movable posts are used as guides between partitions. These posts can be easily detached after partition is coiled away and the two rooms converted into one large space. The spring roller which operates the partitions is also shown. At the right is illustrated the rolling wood partition installed in an assembly room

ESTABLISHED 1886

UNION BLIND & LADDER COMPANY, INC.

Horizontal and Vertical Rolling Wood Partitions

OAKLAND, CAL.

REPRESENTATIVES

AMARILLO, TEX., Panhandle Builders' Supply Co., 27 Fuqua Building
BUTTE, MONT., D. E. Fryer & Co.
DALLAS, TEX., R. J. De Wees Co., Slaughter Building
DENVER, COLO., George P. Heinz & Co., 1740 Champa Street
FARGO, N. D., Northern School Supply Co.
KANSAS CITY, MO., American Sash and Door Co., 16th and Bellefontaine Streets
LOS ANGELES, CAL., C. P. Helpman, 213 Story Building
PORTLAND, ORE., Cress & Company, 96 Front Street
SAN ANTONIO, TEX., Alamo Steel Products Co., 207 Owl Building
SAN FRANCISCO, CAL., Chas. Christensen, 77 O'Farrell Street
SEATTLE, WASH., D. E. Fryer & Co., Lumber Exchange
SPOKANE, WASH., D. E. Fryer & Co., Paulsen Building
TACOMA, WASH., D. E. Fryer & Co., Provident Building

Products

Vertical and Horizontal Self-coiling Wood Slat Doors and Partitions used in churches, schools, auditoriums, gymnasiums, roundhouses, warehouses, garages, wardrobes, etc.

Features

Operating ease. Large size practicable. Saves floor space. Simple to install. Used in old or new buildings.

Construction

Our simple and efficient tension device maintains close contact of slats under all weather conditions; and thoroughly modern construction, ball bearing throughout, insures durability, and unmatched ease of operation. Each partition is tested before leaving the factory, and is warranted to give superior service.

Acme Horizontal Partitions (Coiling Overhead)

Class "A," for Exterior Use—For garages, warehouses, or roundhouses. Chain operated. Slats of selected pine or Port Orford white cedar, ¾ to 1 in. thick, 1½ to 1¾ in. wide, threaded on bronze bands running through slats and securely anchored in bottom rail. Top of band attached to overhead coiling mechanism. Operating mechanism, improved type, spring balance, with special designed antifriction bearings; differential gear, and chain lift; trussed shaft. Acme construction and chain lift handle the largest doors with ease—12 to 23 ft. wide and 12 to 20 ft. high.

Class "B," for Interior Use—For churches, schools, etc., hand operated. Slats of pine, white cedar, oak, birch, etc. Slats ½ in. thick, 1½ in. wide, strung on tempered steel bands. Operating mechanism on double annular antifriction ball bearings. Standard finishes. Blackboard surface on one side if desired. Suitable for opening less than 12 ft. wide; for openings over 12 ft. wide, use two or more partitions and removable post, or our Class "A" for widths under 24 ft.

Acme Vertical Partitions (Coiling to Side)

For openings 6 to 60 ft. wide, 8 to 18 ft. high. Used in churches, auditoriums, stages, gymnasiums. A partition 30 ft. wide by 19 ft. high, weighing 1500 lbs. can be readily opened and closed by hand. All partitions accurately assembled and adjusted before packing, shipped in surfaced coil box, ready to install. Blue prints and full directions for installing included in all shipments.

Service

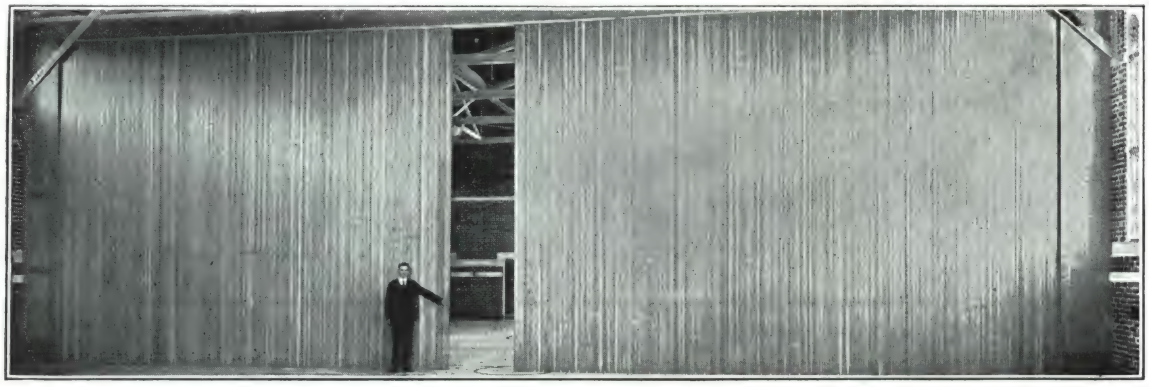
Factory office maintains Estimating and Drafting Departments to co-operate with prospective users. We invite correspondence relative to special or unusual requirements. Special facilities permit shipment within 10 to 20 days after receipt of order, and special freight car service to Eastern points enables us to make prompt deliveries. Thousands of Acme partitions in use all over the United States and in foreign countries.

Specifications

It is suggested that architects and engineers use the following in their specifications:

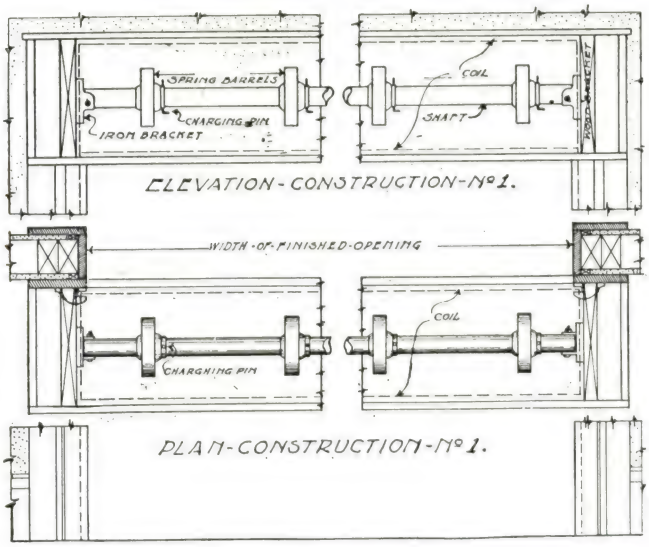
The horizontal [vertical] partitions in this building to be of the type manufactured by the Union Blind & Ladder Company, Inc., of Oakland, Cal., and as described on their pages in Sweet's Architectual Catalogue, 1922 Edition, to be erected by general contractor [or carpenter] in accordance with detailed instructions supplied by manufacturer.

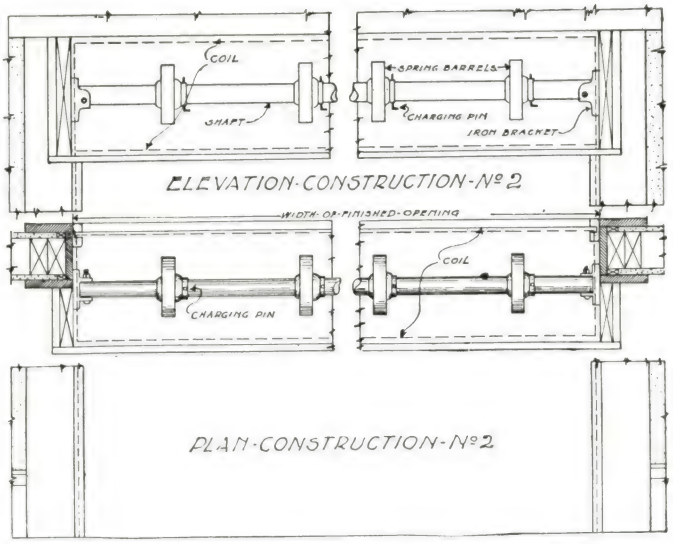
Note: Specify kind of wood and finish.

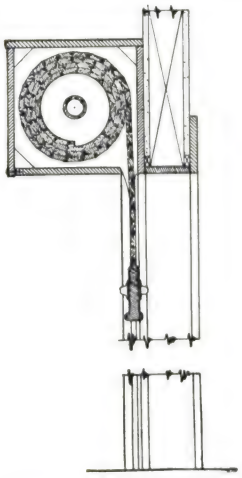


Two Vertical Partitions Closing An Opening 60x19 ft. in a School Gymnasium
One minute required to open

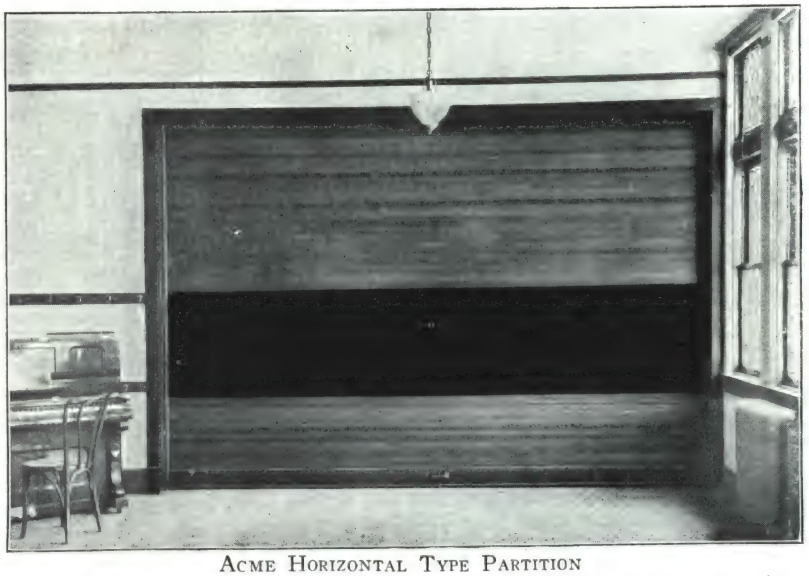
Continued on next page

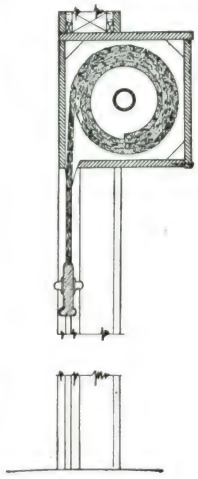






SECTION CONSTRUCTION No. 1 AT SIDE OPENING

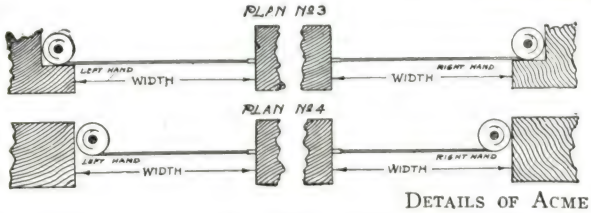


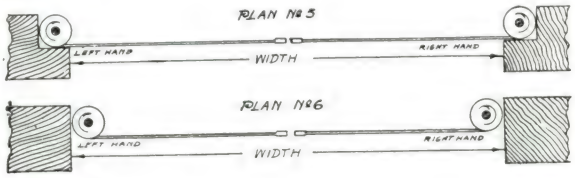


SECTION CONSTRUCTION No. 2 UNDER GIRDER

ACME HORIZONTAL TYPE PARTITION

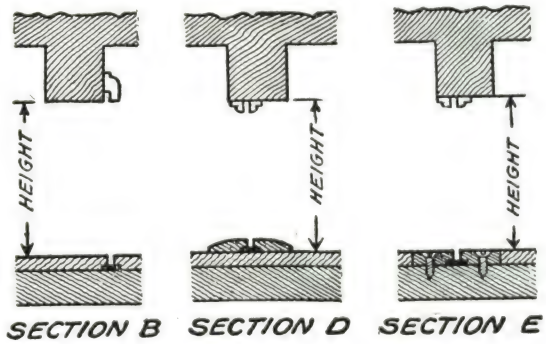
Detail drawings above show dimensions required when writing for estimates for horizontal partitions. Give number of openings, net height and width of each, and kind of finish desired





DETAILS OF ACME VERTICAL TYPE PARTITIONS

These drawings and those below indicate dimensions required in estimating cost of verticals. Give number of openings, net height and width of each, and finish desired



DETAILS OF ACME VERTICAL TYPE PARTITIONS

CLEAR SPACE REQUIRED FOR COIL

Vertical Type			Horizontal Type			
Width of openings, including box, ft.	Size of each box for pair of boxes, in.	Size of box for single door, in.	Height of opening including coil, ft.	Coiling space, inches square	Height of opening including coil, ft.	Coiling space, inches square
			CLASS B			
8	12	14½	4	10½	14	14½
10	13	15½	5	11	15	15
12	13	16½	6	11½	16	15
14	14	17½	7	12	17	15½
16	15	18½	8	12½	18	16
18	15	19½	9	13	19	16
20	16	20	10	13½	20	16½
22	16	20½	11	14	21	16½
24	17	21	12	14	22	16½
26	17	21½	13	14½		
28	17½	22½				
30	18	23½	CLASS A			
			10	15½	15	17
			11	16	16	17
			12	16	18	18
			13	16½	22	19
			14	16½		

Notes: Allow 1 in. more floor space for coil box than table specifies. Allow 2¼ in. vertical clearance above coil box for installing. Shipping weight of vertical doors: pine, 4 lbs. per sq. ft.; oak, 5 lbs. per sq. ft.

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

Sectionfold and Rolling Partitions; Disappearing Door and Rolling Front Wardrobes

TELEPHONE
VANDERBILT 9636, 9637

24 East 36th Street
NEW YORK, N. Y.

CABLE
"LYDIAN, NEW YORK"

FACTORY ADDRESS—MAIL AND TELEGRAPH: NORFOLK, VA.

For Offices and Agencies see page 763

Products

SECTIONFOLD PARTITIONS.
ROLLING PARTITIONS.
DISAPPEARING DOOR WARDROBES.
ROLLING FRONT WARDROBES.

For Rolling Doors and Shutters in steel and wood, see pages 763-771; for Blinds and Awnings, see pages 1086-1089.

Quality

Wilson rolling partitions and wardrobes were first introduced and manufactured by James G. Wilson in 1876. Many improvements have since been made in their construction. The test of time has demonstrated the quality of the Wilson products, as over 39,000 buildings are equipped with Wilson partitions and wardrobes, and hundreds of letters commending them have been sent this company.

Sectionfold Partitions

"One room into many—many into one."

Sectionfold partitions offer a practical and artistic solution of what is often a perplexing problem. By their use, a large room may be subdivided in any manner which may be desired, by partitions which, although of a substantial and apparently per-

Commercial Club, San Francisco, Cal.
FREDERICK WHITTON, Architect

First Presbyterian Church, Mt. Vernon, N. Y.
C. C. MAY & W. B. HILLARD, Architects

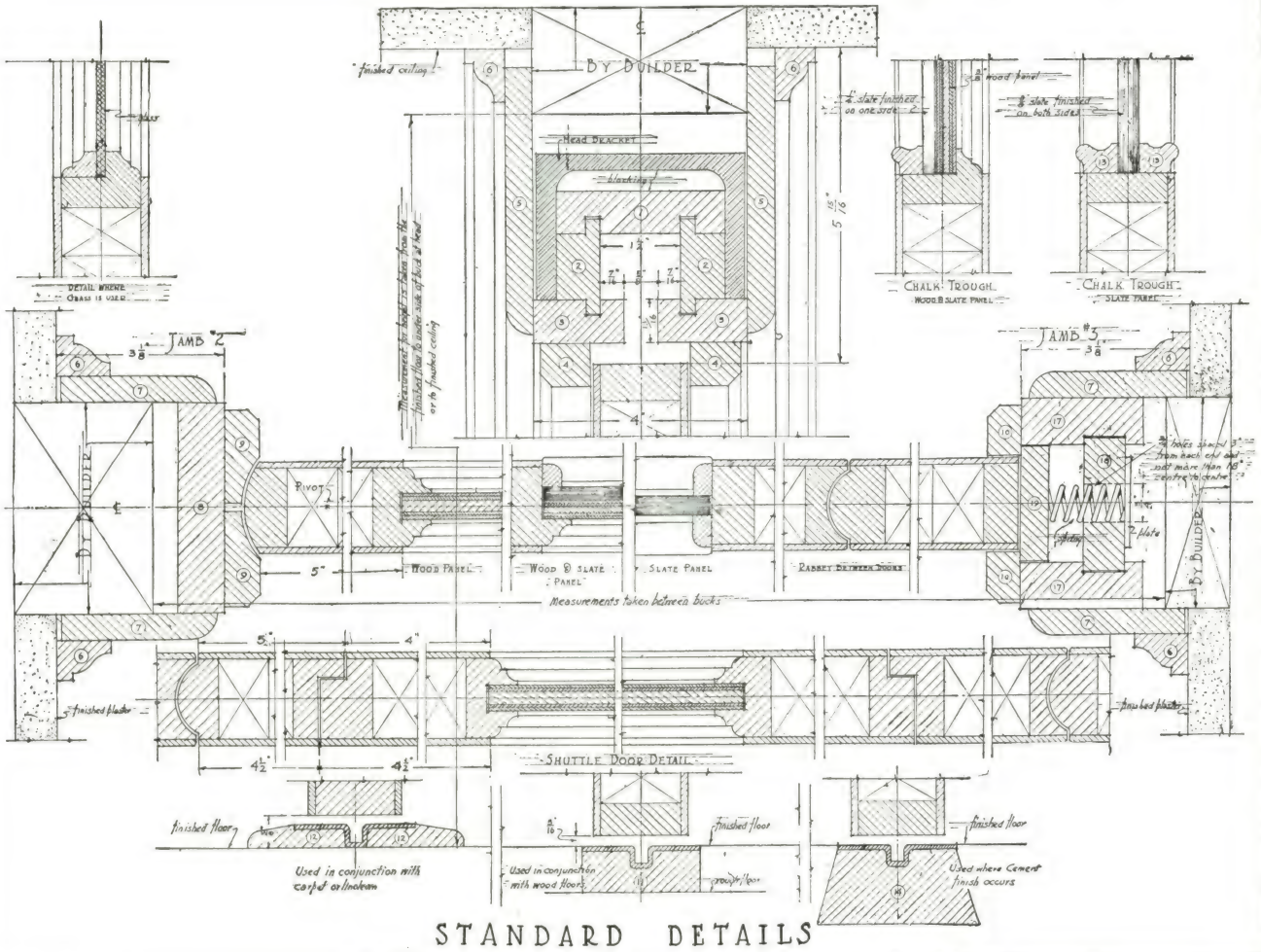
East Pensacola Heights School, East Pensacola, Fla.
WALKER D. WILLIS, Architect

View Showing Partition Folding Into a Pocket with Pocket Door Open

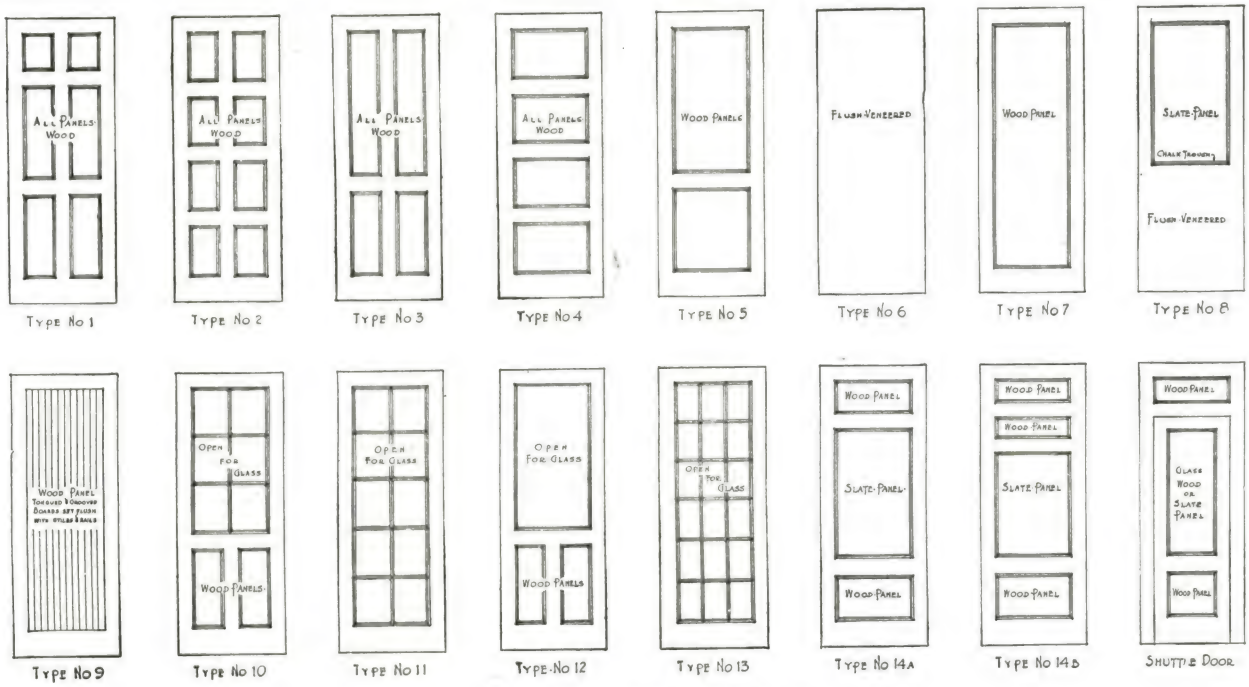
Marlin-Rockwell Building, New York, N. Y.
WARREN & WETMORE, Architects

FOUR VIEWS SHOWING INSTALLATIONS OF THE SECTIONFOLD PARTITION

Continued on next page



STANDARD DETAILS



STANDARD TYPE DOORS

WILSON SECTIONFOLD PARTITION

Continued on next page

manent character, may be folded back quickly and easily when the room is to be used as a whole.

These partitions enable the architect or the builder to provide large rooms which may be converted into a series of small rooms in a manner which will meet all requirements and contingencies, either present or future.

They enable owners or occupants of old or new buildings to meet changed conditions by converting a large room into several small ones, either for occasional or permanent use. This change may be made, either from small rooms to large or vice versa, in a few moments.

Practical and Convenient—The partitions do not have to be put up or taken down by carpenters every time the change is made. They are made up of doors hinged together in pairs, the number of pairs depending upon width of space to be covered.

These doors are carried upon case hardened ball bearing casters which run on a grooved floor track of steel. The track is laid flush with floor, and offers no obstruction when used in gymnasiums, ballrooms, etc. Slightly raised types of floor tracks are provided for floors covered with carpet or linoleum.

When not in use, the partitions are easily folded back against the side wall or into pockets, folding so compactly that they project only about 4 in. to every 6 ft. of partition.

Doors communicating from room to room may be introduced wherever desired.

Mechanical Simplicity — Sectionfold partitions are not only easy to install and simple in operation, but present no mechanical difficulties or complications.

Settling of floors, or floor unevenness in old buildings, does not interfere with their operation, as the casters are adjustable, and each pair of doors has only two points of contact with the floor.

The head of the partition supports no weight, but simply acts as a guide for the case hardened, ball bearing top guide wheels.

Three types of hinges are used—fast pin, loose pin and Soss invisible. When the last named are used, the closest scrutiny fails to reveal that the partition is a folding wall.

The doors are made up of wood, glass or slate panels as desired. The slate is intended for school use, affording additional blackboard space. There are a number of types, paneled and flush, made to harmonize with the character and decorations of the room in which they are to be used.

Catalogue, details and prices will be forwarded on request.

Installation—Wherever possible, we prefer to install the partitions, as we can then guarantee them in all respects.

Details—Typical details of construction and standard types of doors are shown on the previous page. For designs other than standard, special details will be prepared.

Estimates—In asking for estimates, give the following information:

Width and height of opening.

Kind of material.

Type of door.

Whether panels are to be wood or glass, or slate for blackboards.

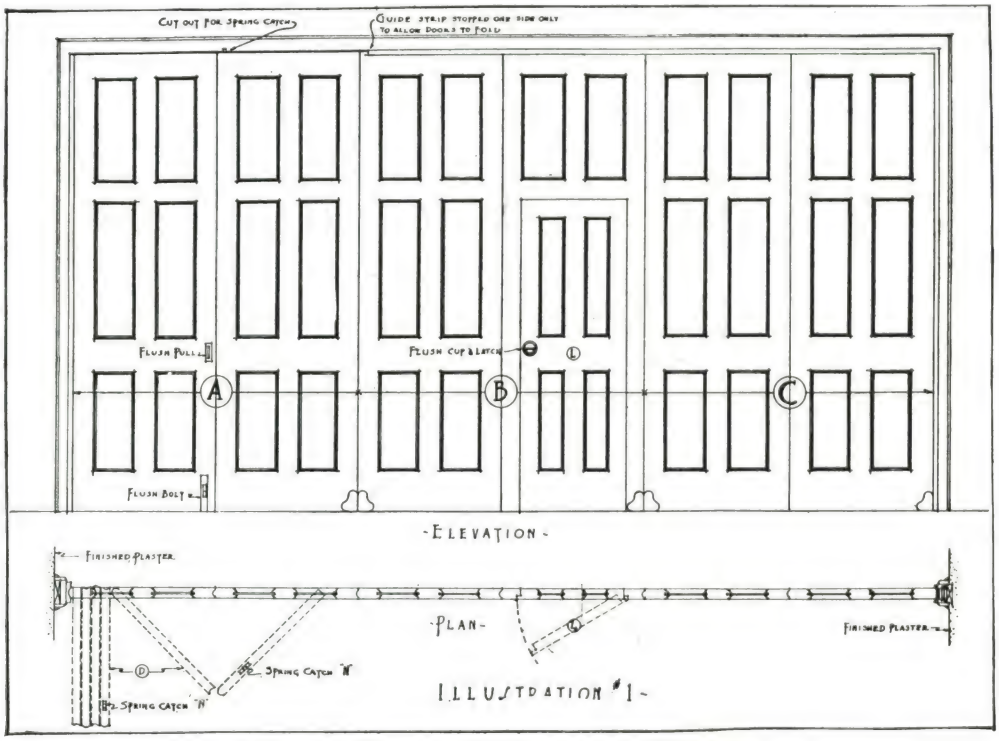
Finish of hardware.

Also, whether partition is to fold to one or both sides and whether any shuttle or communicating door is required.

Catalogue, details and prices will be forwarded on request.

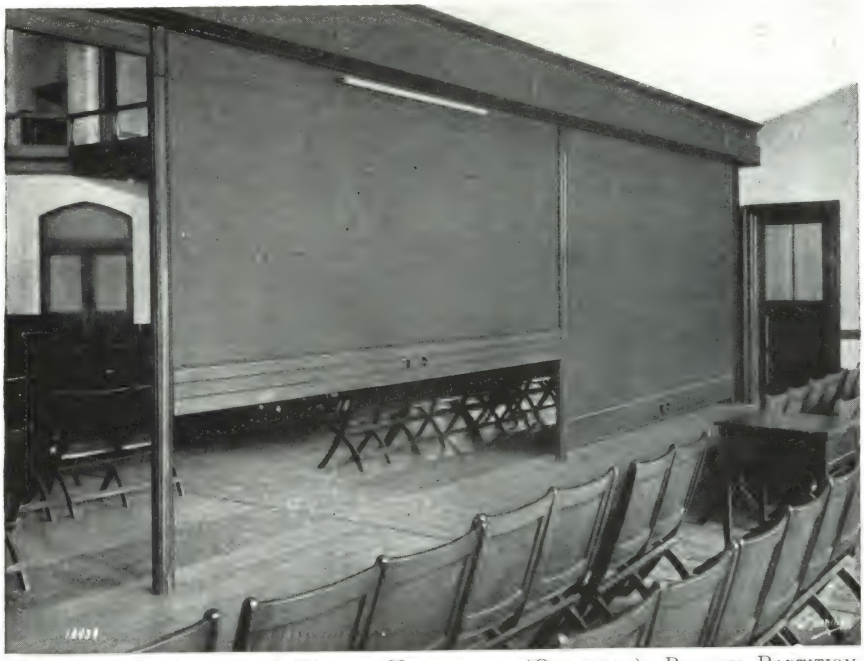
Horizontal (Overhead) Rolling Partitions

These rolling partitions are composed of wood slats 1½ to 2 in. wide and ½ to ¾ in. thick, fitted with rule joints, edge to edge, and threaded on tempered steel bands running from top to bottom about 16 in. apart. These bands are riveted to top bar of partition, and each band is attached separately to a spiral spring anchor concealed in bottom rail, and fitted with simple means of ad-



PLAN AND ELEVATION OF SECTIONFOLD PARTITION
Showing partition formed by three pairs of doors, A, B, C. Dotted lines D indicate manner in which partition is folded

Continued on next page



TYPICAL INSTALLATION OF WILSON HORIZONTAL (OVERHEAD) ROLLING PARTITION

justment for regulating the tension. This tension holds slats in close contact, so that, when partition is rolled down, joints are absolutely airtight and form a sound-proof screen, as well as automatically adjusting them to all atmospheric changes. This is a distinctive Wilson feature.

Horizontal partitions should not be over 12 ft. wide. This will insure ease in operation.

With movable posts, any size room can be advantageously divided with these partitions. Swinging doors can be introduced where desired to allow passage through the partition.

Blackboard or Decorative Surfaces—In horizontal partitions, when a portion or whole of one side of partition is prepared with flat, smooth surface, as for blackboard use or decorative purposes, joints are so close that lines are discernible only at a very short distance; and when surface is coated with black silicate, it is in every respect equal to a slate blackboard.

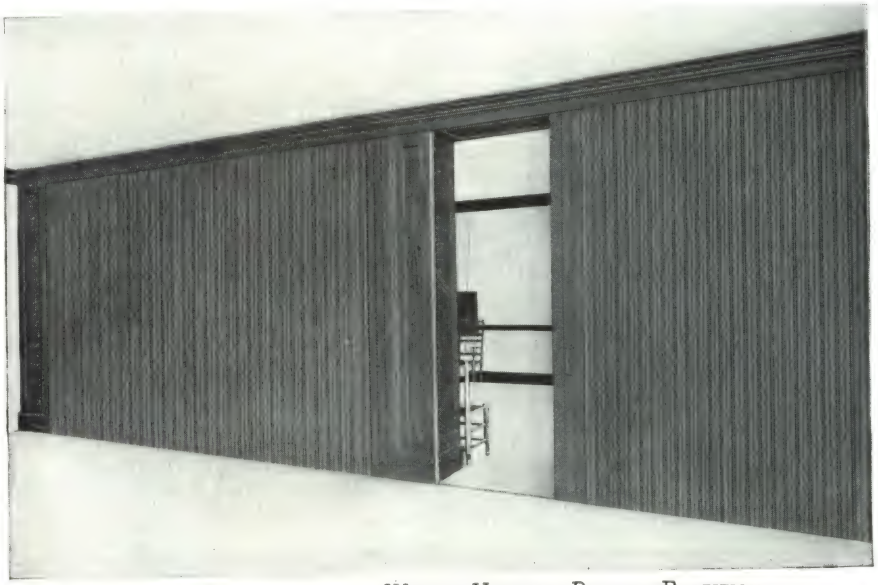
Can be used for decorative purposes where it is desired that partition should harmonize with color of walls.

Vertical (Side) Rolling Partitions

We find no difficulty in closing openings 40 ft. wide by using partitions coiling to both sides of opening, and without intermediate posts. Operating device is very simple, and can not get out of order if properly installed.

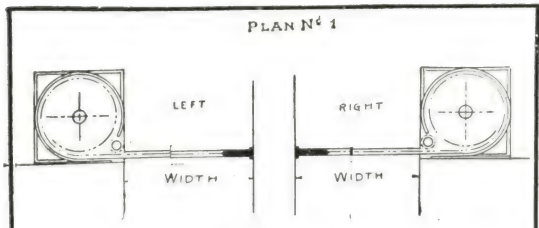
To Specify Horizontal and Vertical Partitions

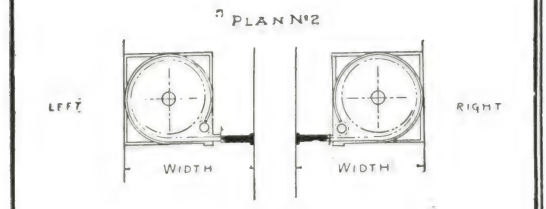
The openings, shown on plans (describe them by notes or otherwise), are to be furnished and completely equipped with rolling wood partitions of horizontal (or vertical) type, constructed in accordance with detail drawings shown in SWEET'S ARCHITECTURAL CATALOGUE, Seventeenth Edition, page 1098, and of woods to match finish of various rooms in which they occur. They are to be erected by manufacturer, with all hardware, parts and fittings required, or by general contractor (or carpenter) in accordance with "erecting instructions" supplied by manufacturer, and are to be left in complete and easily operating working order.

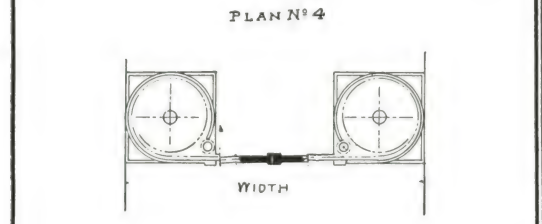


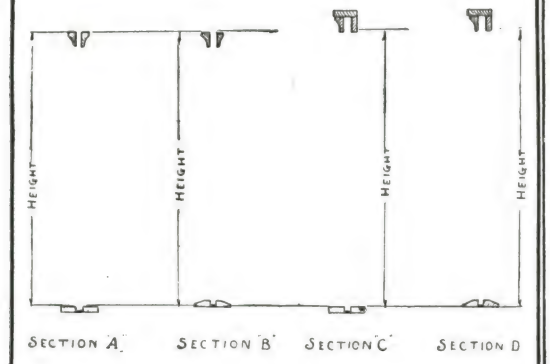
TYPICAL INSTALLATION OF WILSON VERTICAL ROLLING PARTITION

Continued on next page



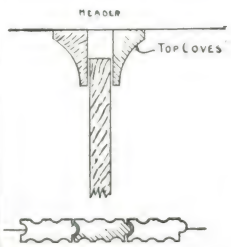


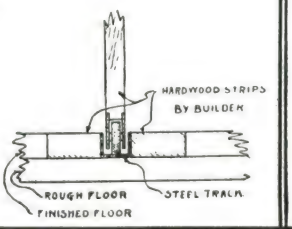




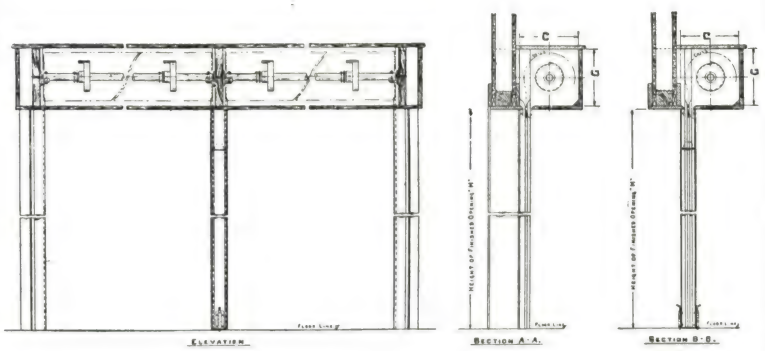
ACTUAL LENGTH OF PART IN INCL. COIL	INSIDE DIMENSIONS OF FINISHED COIL BOX
4' 6"	10½" Square
7' 6"	12½ "
9' 6"	13½ "
11' 6"	14½ "
13' 6"	15½ "
15' 6"	16½ "
17' 6"	17½ "
20 6	18½ "
23'	19½ "
26'	20½ "
29'	21½ "
33'	22½ "

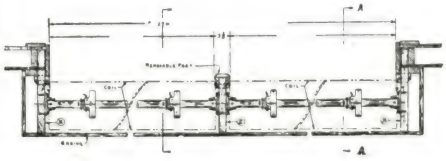
SUBJECT TO SMALL CHANGES.

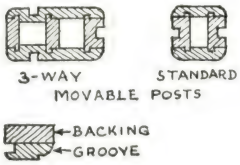




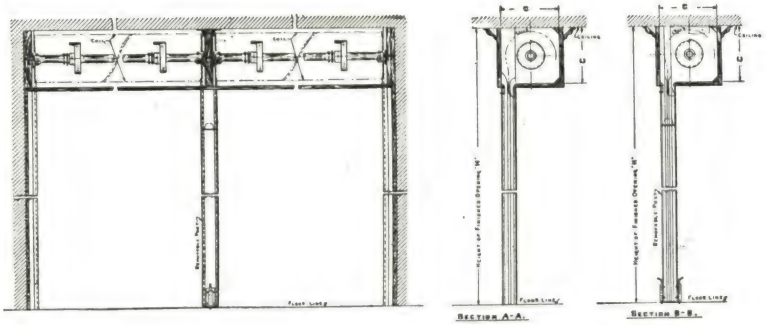
No. 3436 and 3437. Wilson's Vertical Partitions Rolling to the Side

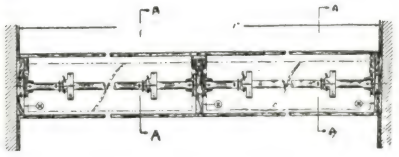


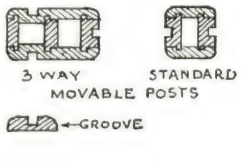




H	DIMENSION AT "C"
6'-0"	12" Sq. INSIDE
8'-0"	13" " "
10'-0"	13½" " "
12'-0"	15½" " "
14'-0"	16" " "
16'-0"	16½" " "
18'-0"	17" " "
20'-0"	17½" " "
②	BRACKET FURNISHED WITH REMOVABLE POST
⊗	BRACKET FURNISHED BY CUSTOMER UNLESS ORDERED
	CASING FURNISHED BY CUSTOMER UNLESS ORDERED
W	IF WIDTH OF OPENING IS OVER 12'0" REMOVABLE POST SHOULD BE USED







H	DIMENSION AT "C"
4'-11"	12" Sq. INSIDE
6'-10"	13" " "
8'-9½"	13½" " "
10'-7½"	15½" " "
12'-7"	16" " "
14'-6½"	16½" " "
16'-6"	17" " "
18'-5½"	17½" " "
②	BRACKET FURNISHED WITH REMOVABLE POST
⊗	BRACKET FURNISHED BY CUSTOMER UNLESS ORDERED
	CASING FURNISHED BY CUSTOMER UNLESS ORDERED.
W	IF WIDTH OF OPENING IS OVER 12'-0" REMOVABLE POST SHOULD BE USED

No. 3423 and 3424. Wilson's Horizontal Rolling Partitions

Continued on next page

Wardrobes

Wilson hygienic wardrobes have been used as standard for many years by a great many architects, who, after careful investigation and tests, have found them added features to school hygiene.

These wardrobes economize space to such an extent that they more than pay for themselves in total reduction of the size or cost of building.

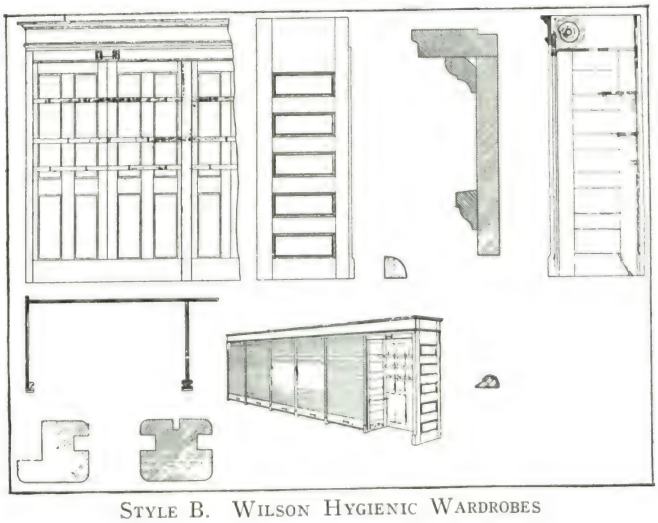
Rolling Front Wardrobes

The wardrobe is generally made of units about 4 ft. wide; these are often advantageously connected with the ventilating system. Hot water or steam pipes, when placed in wardrobes, effectively dry clothing.

These wardrobes are manufactured in 4 styles. Types A, B and C are similar in construction, the difference being that Type A has a false floor, giving space for heating purposes; Type C has a wire mesh instead of a solid panel back. In Type D, doors roll sideways.

Type B seems to have given the very best satisfaction.

Hygienic Wardrobe in Riverside School, Jacksonville, Fla.



Style B. Wilson Hygienic Wardrobes

Disappearing Door Wardrobe

The Wilson disappearing door wardrobe is the latest development and improvement of the Wilson hygienic wardrobe, for so many years the standard for modern school buildings, public institutions, and business offices.

With its disappearing doors, this wardrobe combines the very necessary feature of economy in space. The doors, as they open, move in a quarter circle, disappearing into the side of the wardrobe out of sight and out of the way. The movement is smooth and free from noise.

Simple in construction and substantially made in various woods, and finished as desired to harmonize with interior finish, the Wilson disappearing door wardrobe is a most useful and attractive piece of school or office furniture. Built in units 4 ft. wide, extension to any length is possible. In all respects they are the last word in wardrobe service.

In the Modern School—Where economy of space and hygienic conditions are so important, the advantages of Wilson wardrobes are widely recognized. Connecting with the ventilating system of the school, a constant current of fresh, dry air is assured; while space usually occupied by coatrooms is conserved. Installed in the schoolroom, the wardrobe is always under the eye of the teacher, or it may be placed in the corridor without interference with passageways.

Each 4-ft. unit accommodates clothing for 17 pupils.

Blackboards—Blackboards of composition or slate are provided as desired for doors. This is an added economy.

Teachers' Closets—Each wardrobe may be equipped with separate section for use of the teacher.

For Office Buildings—Finish and fittings are supplied to comply with any need. In addition to clothes, this wardrobe is most convenient for the storage of stationery, files, etc., or it may be used to conceal a washbasin.

Catalogue, details and prices will be forwarded on request.

Doors Open

Doors Partially Closed

Wilson Disappearing Door Wardrobe

W. L. EVANS

Vanishing Door Equipment

700 Block
WASHINGTON, IND.

Products

EVANS VANISHING DOORS, including complete woodwork cut to size ready to assemble for Wardrobes, Lavatories and Lockers, Telephone Booths, Ventilated Closets, Bed Closets, Exterior and Communicating Doors, the Garage, and wherever conservation of space, or easy noiseless movement is essential.

Co-operative Service

Upon request we will mail a catalogue which contains cuts, complete details and general information, together with net prices. When advised as to the requirements and given a list of the bidders, we will send to each quotations and a copy to the architect's office.

Evans Vanishing Door Wardrobes

They occupy the smallest possible space, the doors moving outward and inward at the same time, and when entirely open they have vanished within the compartment; thus its name "Vanishing Door."

The doors can not stick or bind as they close against felt instead of between jambs.

They are noiseless, easy to operate, and being entirely out of the way they do not take up floor space or block the aisles. The wardrobes are ventilated, sanitary and unusually convenient. When placed in the schoolroom they contribute to the morals of the pupils.

The doors swing on double pivoted arms—no tracks or noisy rollers.

Lavatory and Locker Cabinets

They are especially adapted to offices, conserving at least 10 sq. ft. of space. When the doors are open they do not shade the interior of the cabinet. The ventilation is arranged the same as for the wardrobes.

Telephone Booths

They are ventilated and nearly soundproof. The walls, tops and doors are made of Evans Patent Process, which is a hollow, sanitary construction, flush without panels. The air is taken into the hollow wall near the floor and passing upward is discharged near the vertical center of the booth. The air is taken out through the hollow top, entering at the center and discharging at a point near the rear. The air spaces retard the vibration, and for all practical purposes the booths are soundproof.

Toilets

The Evans Vanishing Door for toilets conserves space of value equal to many times the cost of the equipment. The doors open inward and swing around the occupant in closing. There is no slamming of the door or noise.

Ventilated Closets

The air is taken from beneath the door and discharged at the top. The doors swing inward and provide a hanging space on the door as well as back of it if so arranged. Much floor space is conserved as no provision has to be made for space in which to swing the door.

Bed Closets

For bed closets this arrangement is ideal; no space has to be provided for the swinging of the door. As in a ventilated closet, the doors can be set up from the floor.

Hinges

Floor hinge A is used in wardrobes Classes A, E. F, as well as for many other purposes. Jamb hinge Z is used in wardrobes Classes Y and Z, as well as for ventilated closets, water closets, etc.

Hinge D is designed for exterior, communicating and garage doors and for bed closets. A multitude of other uses will be found for it.

Interchangeable

The doors and hinges for wardrobes A, E, and F are interchangeable with wardrobes Y and Z, and vice versa, changing also the strips at the top of the doors as shown by details.

Thus wardrobe Class A can be specified to have doors and hinges Class Z, etc.

Hinge Action

It is the combination of two movements producing a new mechanical motion. The hinge action of hinges A, D, and Z are all different from each other and fully illustrated by the square inch scale in the details shown in our catalogue.

It will be seen that floor hinge A uses less space inside and more space outside the compartment; the action of jamb hinge Z being just the reverse. Neither of these hinges will ever supersede the other; they are of different mechanism, different action, and often serve a different purpose. However as in the case of wardrobes, either of these hinges can be successfully used, but for water closet doors it is evident a jamb hinge is required.

The jamb hinge moves the door inward according to the length of the arm, which also makes an automatic stop.

The floor hinge continues to carry the door inward until stopped. Either hinge is a successful creation; it only remains to choose the hinge adapted for its particular work.

Continued on next page

Evans Vanishing Door Wardrobe—Class A

Evans Vanishing Door Wardrobe—Class E

Evans Vanishing Door Wardrobe—Class F

IMPROVED OFFICE PARTITION CO.

Manufacturers of the Telescoping, Sectional, Portable Partition

Grand Street
ELMHURST, N. Y.

TELEPHONE
NEWTOWN 3400-3401

Product

"TELESCOPARTITION" (patented), a TELESCOPING INTERCHANGEABLE PORTABLE OFFICE PARTITION for subdividing.

Telesco Partition REG. U.S. PAT. OFF. IT TELESCOPES

What Telescopartition Is

A telescoping portable office partition for subdividing. Telescopartition is a high quality sectional wood and glass office partition. All units are standardized and are easily assembled in place and easily dismantled without alteration. Sections are made in seven widths to meet all horizontal requirements. Telescoping posts make the partition adjustable to any height.

Telescopartition Is a Permanent Investmert

It is especially designed to eliminate waste and reduce operating expense in office buildings. Any carpenter can make tenant changes without loss of time or rent. It is adjustable to all conditions without cutting or special fitting. Its salvage value is 100%. All units can be used numberless times without damage. Only screws are used in erecting it; no nails.

It is of cabinet quality, neat and pleasing in design.

Construction

Material—Seasoned, kiln dried plain oak, quartered oak, birch, mahogany and walnut.

Section Units—Made of 1¼-in. stock in 7 different widths: 1 ft. 6 in.; 2 ft.; 2 ft. 6 in.; 3 ft.; 3 ft. 6 in.; 4 ft.; 4 ft. 6 in. Height, 7 ft.

Panels—Panels in section units are built-up and veneered.

Doors—Built-up and veneered, 3 ft. wide, 6 ft. 8½ in. high, 1⅜ in. thick. One door is included in each 20 ft. of partition.

Posts—Built-up hollow, of four pieces, 7 ft. long and 3½x2⅝ in. Each post is grooved on two sides to receive section units. Hollow space of post encloses telescoping extension post 7 ft. long. Extension post can be fitted to any ceiling up to 13 ft. 6 in. Special extension members for higher ceilings are supplied.

Floor Strips—Grooved floor strips are secured to wood floor by screws, and to concrete floor by expansion bolts. Posts are screwed to floor strip.

Hardware—Bronze mortised locks, Russell & Erwin make. Butts 3½x3½ in. All coupling irons, knee braces, screws and transom pivots are furnished.

How Shipped

The partition is shipped crated, knocked down in the white or stained and shellaced, without glass, including all hardware, ready for immediate erection.

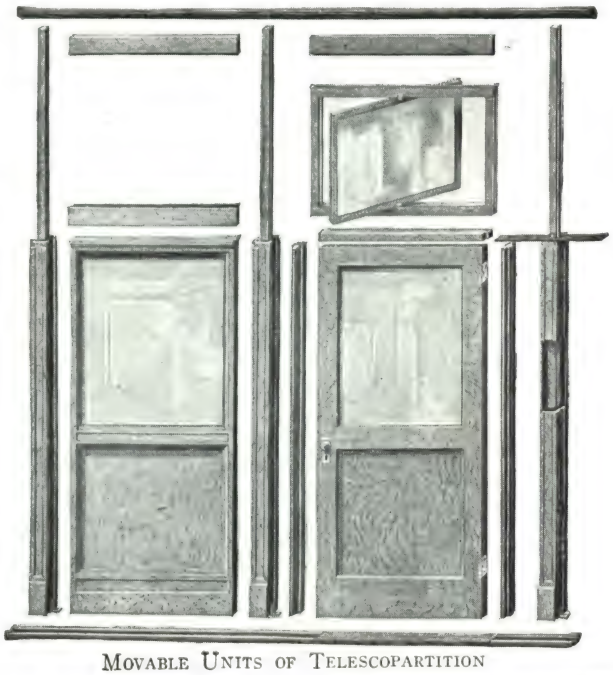
Erection

Any mechanic can set and move Telescopartition as all units are numbered to conform with numbers shown on all detail on opposite page, are standardized and fit everywhere. Complete instructions for erection in booklet form are furnished.

Some Prominent Installations

Architects Building, New York, N. Y., LaFarge & Morris and Ewing & Chappel, Architects
Equitable Building, New York, N. Y., Graham, Burnham & Co., Architects
National City Building, New York, N. Y., McKim, Meade & White, Architects
Canadian Pacific Building, New York, N. Y., Starret & Van Vleck, Architects
New York Central Building, New York, N. Y., Warren & Wetmore, Architects
Munson Building, Washington, D. C., McKim, Meade & White, Architects
Union Central Life Insurance Building, Cincinnati, Ohio, Garber & Woodward and Cass Gilbert, Architects
Book Building, Detroit, Mich., Louis Kamper, Architect
Farmers & Mechanics Bank Building, Fort Worth, Tex., Sanguinet & Staats, Architects

ASSEMBLED PARTITION



MOVABLE UNITS OF TELESCOPARTITION

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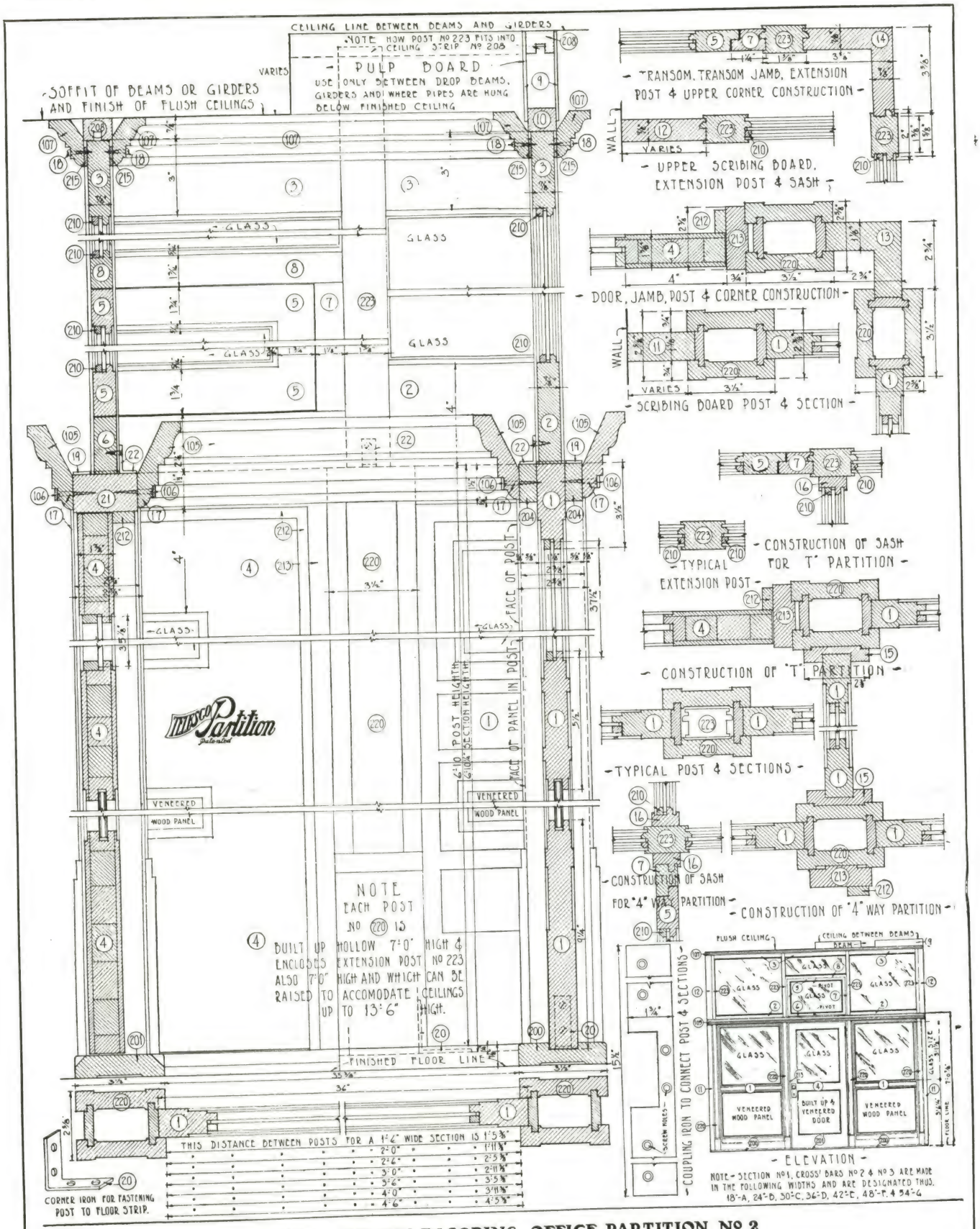


DETAILS OF TELESCOPING OFFICE PARTITION No 2

MANUFACTURED BY

IMPROVED OFFICE PARTITION CO.

No 1018 ELMHURST. NEW YORK, N. Y.

THE E. F. HAUSERMAN COMPANY

Steel Office and Industrial Partitions

1729 East 22nd Street

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 41 East 42nd Street — DETROIT, MICH., Penobscot Building — PITTSBURGH, PA., Oliver Building

Products

HAUSERMAN-SYSTEM OFFICE PARTITIONS and RAILINGS; HAUSERMAN-SYSTEM INDUSTRIAL PARTITIONS. (Unitbilt Steel Construction.)

General Steel Sash Glazing and Erection Contractors.

For Hauserman-System Skylights, see pages 968-969; for Hauserman-System Toilet Partitions, see pages 1558-1559; for Hauserman-System Shelving, see pages 2046-2047.

Service

The Hauserman-System, "Organized for Service", extends from a thorough study of requirements to the final installation and includes the design and installation of partitions to meet every specific condition.

Hauserman-System Partitions

Partitions consist of standardized interchangeable units, easily erected and moved. They combine rugged strength, clean-cut appearance, extreme flexibility and continuous utility. Furnished in baked-on olive green enamel or a prime coat; attractive enough for executive offices in high grade commercial buildings, rigid enough for rough factory usage. Designed to meet all types of ceiling and end conditions.

The single door (H2D) is interchangeable with any 2-light wide panel. In like manner, any number of panels are interchangeable with any other number where the total width in lights is the same.

Base and post conduits for the distribution of electric, telephone and telegraph wires, special baseboards, carpet strips and moulding, vertically pivoted ventilators, as desired. Special soundproof construction for executive offices.

Installation

Hauserman-System partitions are sold preferably on the basis of a complete installation by us. Hauserman workmen, thoroughly familiar with our partitions, conserve erection costs and insure maximum satisfaction with a minimum of expense.

Specifications

All partitions indicated on plans to be Hauserman-System Partitions of steel and glass (or steel and wire mesh or solid steel) as manufactured by the E. F. HAUSERMAN COMPANY, Cleveland, Ohio.

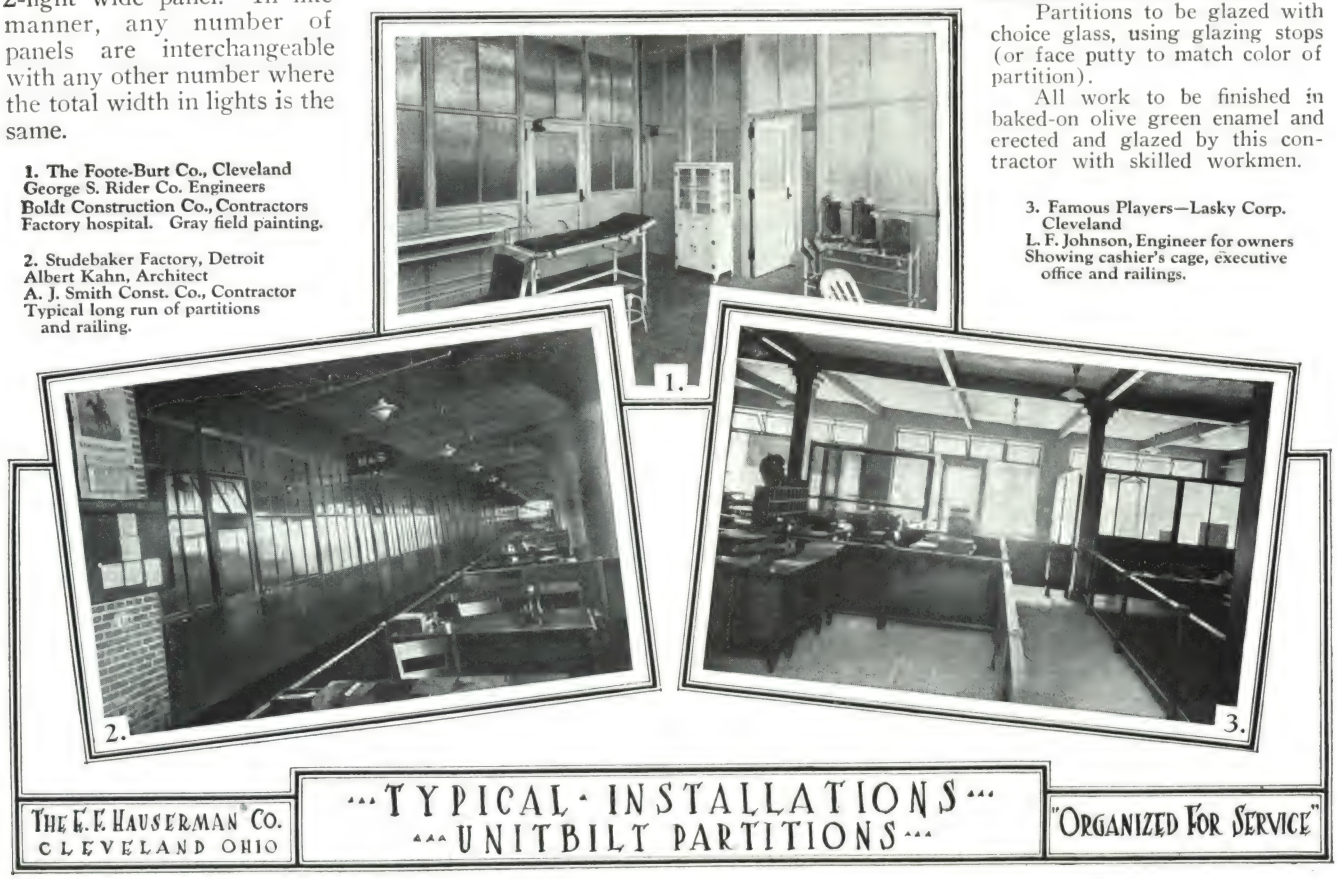
All post members are to be hollow sections formed from sheet steel to give a finished appearance. Panels between posts are to be of standard sizes and so arranged as to be interchangeable with like sizes of glass, steel or wire mesh and consisting of an assembly of independent panel units permitting flexibility in assembly and erection of partitions with regard to variation in height as well as length of runs.

Furnish where indicated, vertically pivoted ventilators, hinged wickets, deal plates, etc.

Hardware to be furnished with all doors, same to be manufacturer's standard. All doors to be equipped with cylinder locks and door checks. Doors to be 1¾ in. thick with hollow stiles and rails, stiles to be 4½ in. wide.

Partitions to be glazed with choice glass, using glazing stops (or face putty to match color of partition).

All work to be finished in baked-on olive green enamel and erected and glazed by this contractor with skilled workmen.



1. The Foote-Burt Co., Cleveland
George S. Rider Co. Engineers
Boldt Construction Co., Contractors
Factory hospital. Gray field painting.

2. Studebaker Factory, Detroit
Albert Kahn, Architect
A. J. Smith Const. Co., Contractor
Typical long run of partitions and railing.

3. Famous Players—Lasky Corp. Cleveland
L. F. Johnson, Engineer for owners
Showing cashier's cage, executive office and railings.

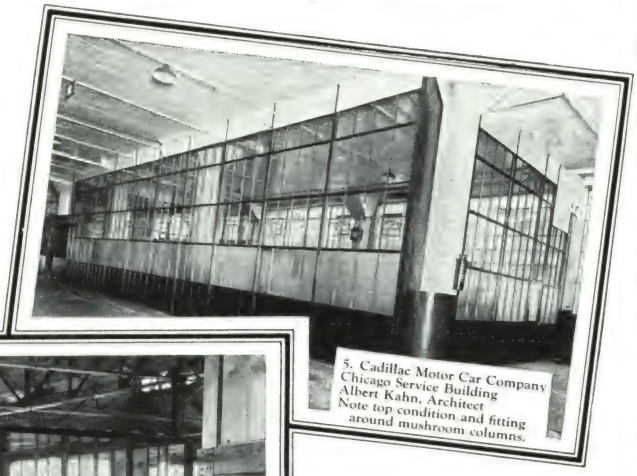
THE E. E. HAUSERMAN CO. CLEVELAND OHIO

···TYPICAL · INSTALLATIONS···
···UNITBILT PARTITIONS···

"ORGANIZED FOR SERVICE"

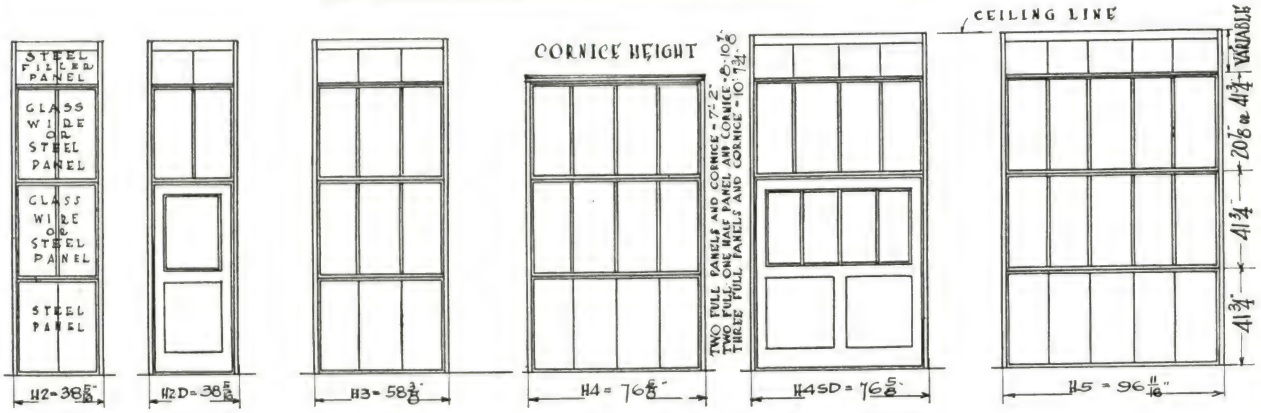
Continued on next page

4. Packard Motor Car Company
Chicago Service Building
Albert Kahn, Architect
The E. L. Scheidenhelm Co., Contractors
Note large double sliding doors.



5. Cadillac Motor Car Company
Chicago Service Building
Albert Kahn, Architect
Note top condition and fitting around mushroom columns.

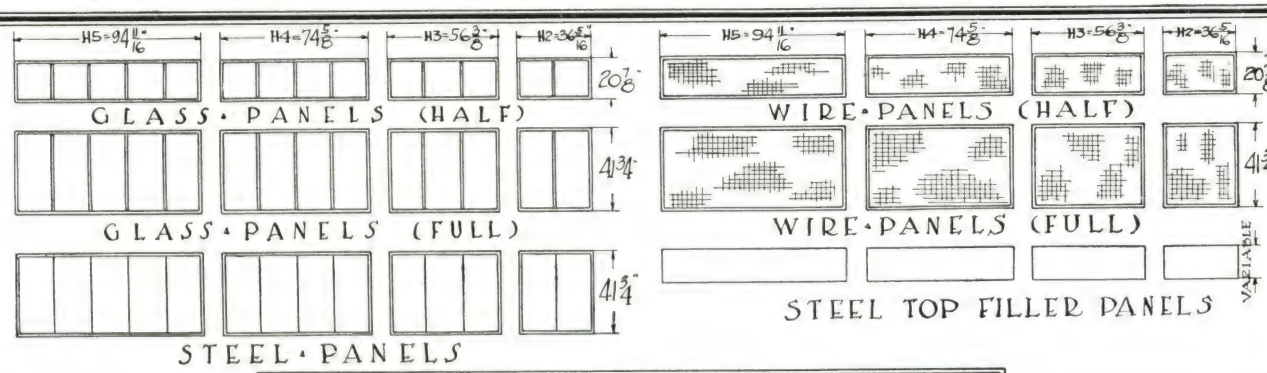
6. American Auto Parts Co., Detroit
American Steel Foundries, Eng. Dept. Thompson-Starret Co., Contractors
Foreman's office with steel ceilings. Note mezzanine toilet in back-ground



••• EXPLANATORY • REMARKS •••

• SINGLE SWING DOOR IN H2 UNIT •• •• SINGLE SLIDE DOOR IN H3 UNIT •• ••• DOUBLE SWING OR SINGLE SLIDE IN H4 UNIT •
• SINGLE SLIDE DOOR IN H5 UNIT •• •• DOUBLE SLIDE DOOR IN TWO H3 UNITS •• ••• DOOR HEIGHTS ARE 81¼" – 102⅛" AND 123" •
• TWO HALF PANELS (20⅞) TOTAL ONE FULL PANEL (41¾) IN HEIGHT ••• TOP FILLER PANEL IS VARIABLE ••• ADD 2½" TO PANEL HEIGHT FOR •
• CORNICE •••

••• ELEVATIONS • OF • TYPICAL • UNITBILT • PARTITION • UNITS •



THE E.F. HAUSERMAN CO.
CLEVELAND OHIO

• ELEVATIONS • SIZES •
ARRANGEMENT • UNITBILT • PARTITIONS •

SHEET 2
SCALE ⅛" = 1'-0"

"ORGANIZED FOR SERVICE"

EMPIRE STEEL PARTITION CO., INC.

Third Avenue and Eleventh Street
COLLEGE POINT, N. Y.

Product

ADJUSTABLE HOLLOW STEEL OFFICE PARTITIONS.

The Ideal Partition for Offices

Our adjustable hollow steel partition is constructed of Nos. 18 and 20 gage cold rolled strip and sheet steel, the slip joint method of construction being employed and all welds made by the electrical process.

This partition is adjustable to any ceiling height, the adjustment being taken care of above the lower cornice line; all material below that line being standard height (see details below). All fastenings are concealed, thereby eliminating the unsightly appearance of screws, rivets and bolts.

The hollow construction permits of the concealment of telephone, telegraph and annunciator wires within the partition. Furnished with or without glass. We will install if so desired.

May Be Used Over and Over Again Without Damage

Our partition is a product of exceptional utility. It may be taken down and re-erected in another location to suit a new layout, without loss or depreciation of any of its parts—it can be used over and over again without damage. For this reason it is the ideal partition for office buildings where tenant changes are frequent.

It is fireproof and non-shrinkable, and lends itself to almost any condition in the layout of offices—it can be erected overnight; re-arranged or dismantled quickly at less than 25% of the cost of the ordinary steel partition, and is always 100% salvageable.

Cost

The initial cost of this partition is slightly more than that of a wooden partition. But the additional cost, together with the advantages offered over the wooden type which make it vastly superior to any type on the market, represents an asset.

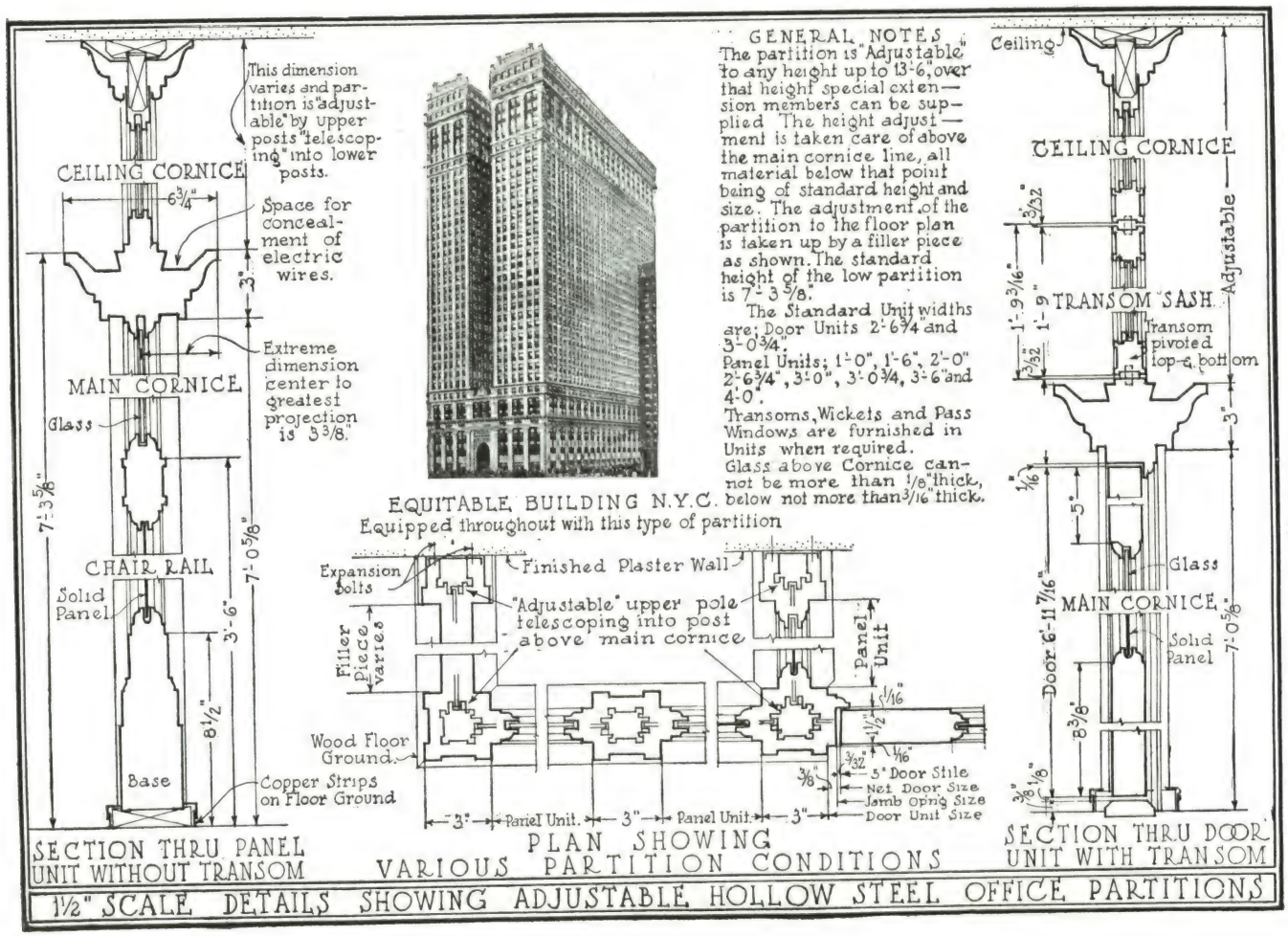
Reduce Fire Insurance Rates

Our partition is made particularly for protection against fire and pays for itself through the reduction in insurance rates secured by its use.

This partition is a factor in the low insurance rate on the Equitable Building, New York, N. Y., where it is installed throughout.

Finishes

Regularly furnished in baked enamel mahogany, oak and olive green, or in other special finishes to match any scheme of color decoration.



DAVID LUPTON'S SONS CO.

Manufacturers of Steel Partitions, Doors and Frames

Allegheny Avenue and Tulip Street

PHILADELPHIA, PA.

For List of Sales Offices see page 834

Products

STEEL PARTITIONS, DOORS and FRAMES.

For Steel Shelving, Bins and Racks, see page 2050.

For Steel Sash and Sash Operating Devices, see pages 834-843.

For Steel Casements see pages 815-817.

Lupton Special Partition (for Offices)

Marked by broad surfaces, substantial mullions and strict interchangeability. A door may be inserted or any desired sections rearranged without disturbing others.

Mullions and head rails are of formed steel plate, with the frame members of sections bolted between them. Mullions are set over cast iron standards, fastened to the floor. The base plate is No. 14 gauge in one piece between mullions. Horizontal muntins are avoided as far as practicable.

Standard units 6 ft. wide. Door may be paired with narrow units to make 6-ft. width. Standard height 8, 9, 10, 11, and 12 ft.

Doors, seamless tube construction, with base plates to line up with partition.

Lupton Standard Partition (For Stockrooms, Timekeepers' Offices, etc.)

Employs H-section steel mullions and 3-in. channel head rails. Standard units are 6 ft. 2¾ in. wide, with door units 3 ft. 1¾ in. wide. Door units can not be interchanged with other units.

Standard heights are 8 and 10 ft.; 18x26-in. glass is used, with 40-in. base plates between the vertical muntins. Wire screens may be used in place of glass.

Lupton Seamless Tube Doors

Same general construction as the seamless tube doors for offices, but of larger sizes.

Standard doors are 3 and 4 ft. wide and 7, 8 and 10 ft. high (10-ft. doors are only 4 ft. wide). Made single and double, swinging or sliding. Larger doors are made to order.

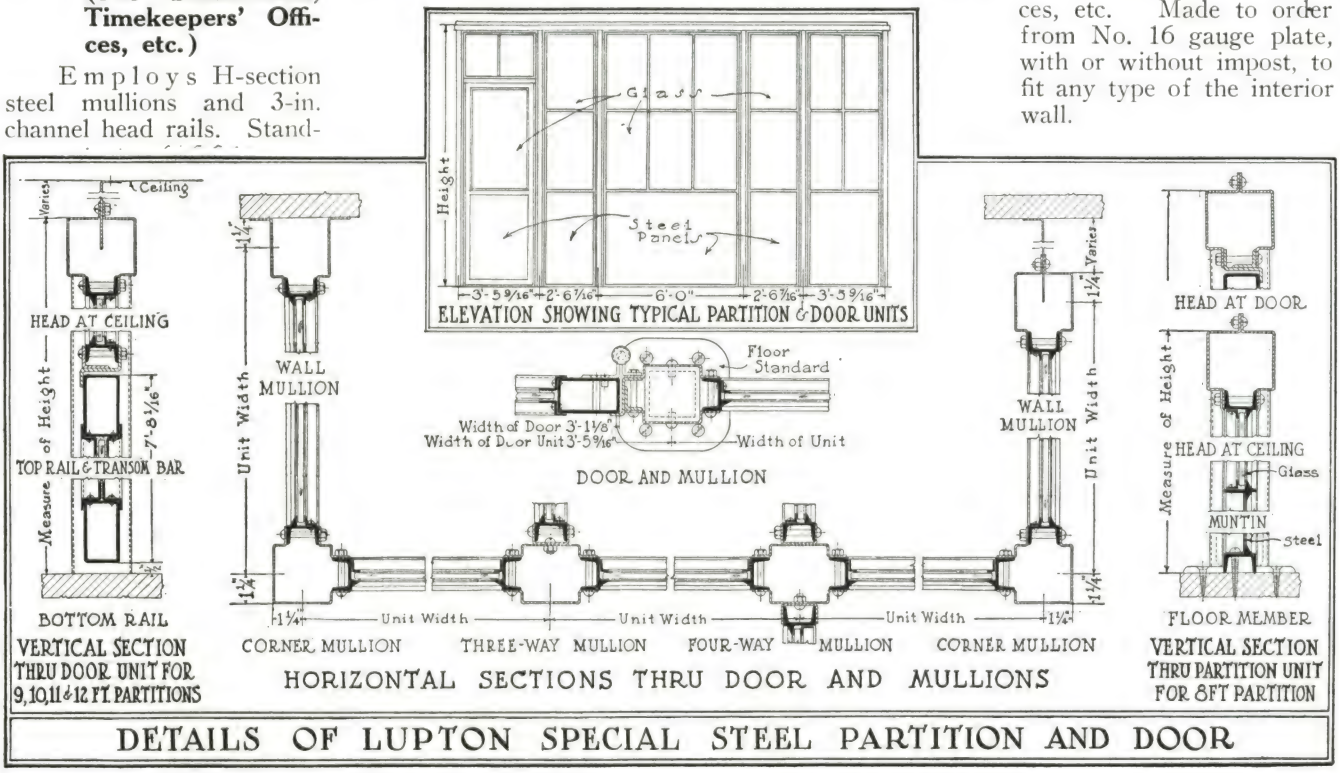
LUPTON SPECIAL STEEL PARTITION AND DOORS IN DRAFTING ROOM

Lupton Standard Doors

Built up from sash channel sections and formed steel plate, with oxy-acetylene welded corners. Sizes up to 4x8 ft. for swinging doors and 8x10 ft. for sliding doors. Regularly used with Lupton standard partition.

Lupton Pressed Steel Door Frames

Intended for use with wood doors in hotels, offices, etc. Made to order from No. 16 gauge plate, with or without impost, to fit any type of the interior wall.



DETAILS OF LUPTON SPECIAL STEEL PARTITION AND DOOR

HARTMANN-SANDERS CO.

Exclusive Manufacturers of Koll's Patent Lock-joint Wood Staved and Turned Columns

EASTERN OFFICE
NEW YORK, N. Y.
6 East 39th Street

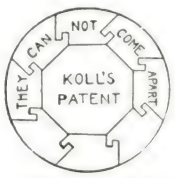
MAIN OFFICE AND FACTORY
2155-2187 Elston Avenue
CHICAGO, ILL.

PACIFIC COAST BRANCH
A. J. Koll Planing Mill
LOS ANGELES, CAL.

Products

Koll's Patent Lock-joint Wood Stave Column for exterior and interior use: Hardwood Staved and Veneered; Pilasters and Square Columns to match; Composition Ornamental Capitals.

Also manufacturers of Pergolas, Lattice Work, Sundials and Garden Accessories.



TRADE-MARK

Architects' Details

Columns conform accurately to any detail, are of the best materials, and at as reasonable rates as are consistent with good work.

Our Patent Correct Entasis

Correct Entasis Secured in Forming Stave Itself—The staves in all columns manufactured *under Koll's patent* are, in order to secure the proper entasis, *straight one-third and swell-tapered upper two-thirds,* so that when shaft is formed the correct entasis is obtained, securing sufficient stock at top and bottom of shaft to permit turning to detail without cutting too close to joint.

Columns furnished with any style of fluting or reeding desired.

Spliced Butt Joint

In addition to the perfect lock joint of the staves, a joint has been devised to splice the butts of the staves should the length of column call for material longer than can be secured in one piece. In this process joints are put together with screw pressure and cold-water waterproof glue, another feature which adds to make these columns mechanically perfect.

Steel Reinforcement

A corrugated steel band or ferrule reinforcement is applied to the bottom end of all Doric columns. The steel band, while adding considerable strength to the shaft, permits some flexibility so that no injury can be done by moisture that may be absorbed. This reinforcement is also added to both ends of all large column shafts.

Waterproof Glue

All columns are glued with cold-water, waterproof, vegetable glue.

The staves of all columns and all exterior work produced by us are put together with waterproof glue. The inside of all columns and pilasters above 14 in. is waterproofed with a special waterproof compound.

Thickness of Stock

As the price of the column is regulated by the amount and kind of lumber that enters into its construction, it is very important to state in the specifications the thickness of stock of which columns are to be made.

Our experience as specialists in column construction has demonstrated that the thickness of stock for the various sizes, as called for in the table on the following page, provides enough material to carry out properly the architectural detail and to afford the required strength. Should an unusual load be placed on the columns, they can be reinforced by inserting a timber or iron column. When necessary to incase a structural timber or iron column already in place, columns can be made in halves and doweled or rail bolted as desired.

Flashings

The entire top of all wood and ornamental caps should be flashed with either galvanized iron, copper or sheet lead to protect the same from the weather. These flashings will be furnished when the specifications call for them.

Facts in Regard to Protection Before Installation

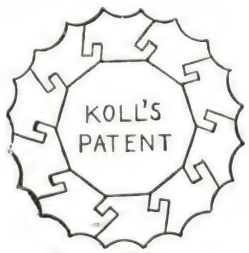
Columns are primed with one coat of white lead and oil at the factory before shipment. If for any reason they can not be used immediately or if roof is not in position, the ends of the column should be temporarily covered with weatherproof paper. When laying columns down care should be taken not to allow them to get in contact with the soil.

Iron Plinths

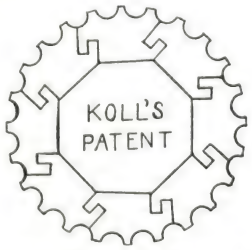
When columns rest on cement or brick floor, the use of cast iron ventilated plinths is recommended. The company is prepared to furnish these in all sizes.

Catalogues

Catalogue No. 47-8 on wood columns, and Catalogue No. 33-8, showing new designs for pergolas and garden accessories—lattice fences, garden houses and arbors—will be sent on request.



Doric Fluting Columns, 195, 195⅔, 215 and 215⅔



Ionic Fluting Used on All Other Fluted Columns Shown in Catalogue

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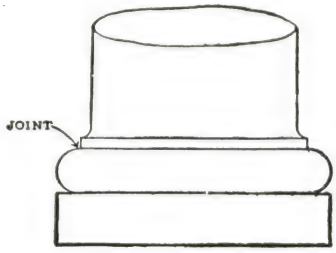
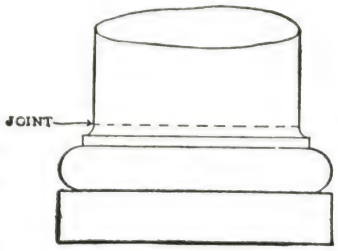
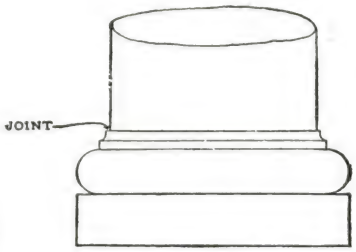


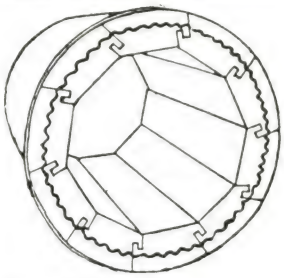
STYLE A COVE



STYLE B COVE



STYLE C COVE

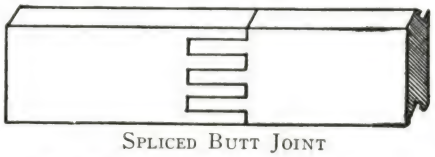


STEEL REINFORCEMENT

KOLL'S PATENT WOOD COLUMNS

	2-in. stock	2½-in. stock	3-in. stock	4-in. stock
WITH COVE ON SHAFT LIKE STYLE A				
Plain shaft, in.	up to 18	19 to 22	23 to 30	31 and up
Doric and Ionic fluted, in.	up to 16	17 to 19	20 to 27	28 and up
Doric fluted, No. 195, in.	up to 22	21 to 28	29 to 39	40 and up
COVE PLANTED ON LIKE B, OR MADE A BASE MEMBER LIKE C				
Plain shaft, in.	up to 22	23 to 30	31 to 40	41 and up
Ionic fluted, in.	up to 22	23 to 28	29 to 38	39 and up

NOTE—Before ordering columns, it would be well to examine detail closely and note whether the cove is to be part of the shaft, or whether this can be planted on. This company can make the column either way, but of course must be guided by what specifications and details call for.

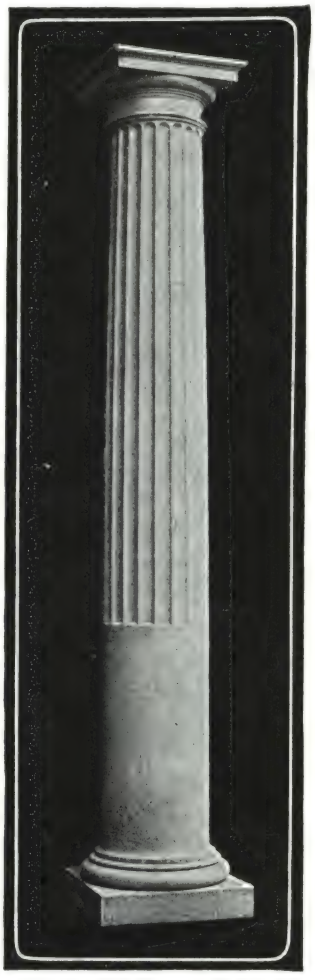


SPLICED BUTT JOINT

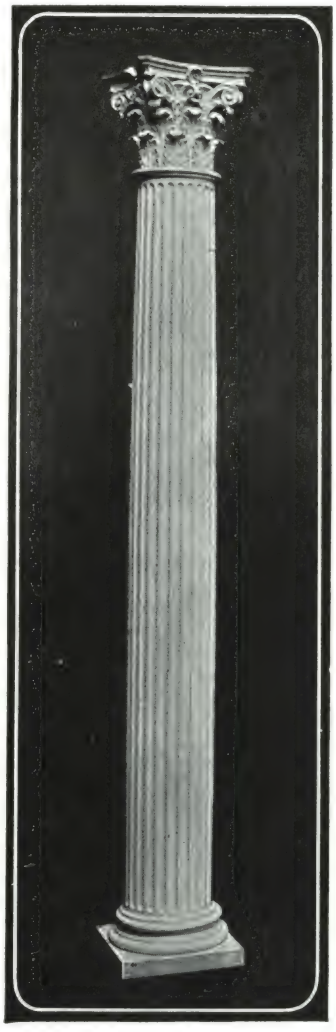
GATE ENTRANCE

PERGOLA BUILT WITH KOLL'S PATENT LOC-JOINT WOOD COLUMNS

H. S. Co. No. 220



H. S. Co. No. 215⅔



H. S. Co. No. 255

H. S. Co. No. 310

EXAMPLES OF PLAIN AND FLUTED COLUMNS UP TO 54 IN. IN DIAMETER AND 35 FT. LONG

TRIUMPH COLUMN COMPANY, INC.

Manufacturers of Patented Lock-joint Wood Stave Columns

MAIN OFFICE
257-263 East 133rd Street
NEW YORK, N. Y.

Product

TRIUMPH PATENT LOCK-JOINT WOOD STAVE COLUMNS for exterior and interior use.

TRADE-MARK

Executing Work to Details

We specialize in building columns to architects' details and especially solicit this class of business. We do not make the ordinary "stock" columns but offer a list of selected standard designs for customers' convenience. Unless details are furnished, standard designs are made to conform to the Architectural Standards of Vignola. Columns are made turned, either plain or fluted, and square, either plain, fluted or panelled. Pilasters can be supplied to match any column. Full dimensions for all details of standard designs are given in our complete catalogue.

Triumph Lock-joint Wood Stave Columns

Lock-joint—Particular attention is called to the patented lock-joint used to lock the staves of our columns. The design of this joint is such that it gives an unusually large area of contact between glued surfaces, thus giving increased security against opening up of the joints. Waterproof, cold water glue is used in putting together all columns, pilasters, caps and bases to prevent the destructive effect of moisture on joints.

Stock and Thickness—Unless otherwise specified, all columns are made of white pine expressly selected for our use. However, we are prepared to furnish any wood desired. It is important that the desired thickness of stock be specified, as this determines the price to a large degree. Stock 1½ to 4 in. thick is used, depending on size of column and load to be carried. In general the following proportions are used:

Diameter of column	up to 22 in.	22 to 28 in.	28 in. up
Thickness of stock	2 in.	2½ in.	3 in.

For unusual heights or loading please consult us for specifications.

Guarantee—All columns are absolutely guaranteed as to material, workmanship and durability. Any defects due to inferior materials or workmanship will be rectified without question.

Entasis—All staves are formed to correct entasis in the rough, thus securing maximum amount of stock. Staves are made one-third straight, upper two-thirds tapered, unless otherwise specified.

Caps and Bases—Columns can be furnished with wood caps and bases, or with composition caps of any style desired. Special detail capitals of either composition or carved wood can also be furnished. Where desired, we are prepared to furnish cast iron plinths in all sizes.

Flashing—When erecting, cap must be entirely covered with flashing of sheet lead or copper. Architects should see that this important feature is not overlooked in their specifications.

Reinforcing—The bottom of all columns without bases and the bottom and top of all large columns are reinforced with a heavy corrugated steel band.

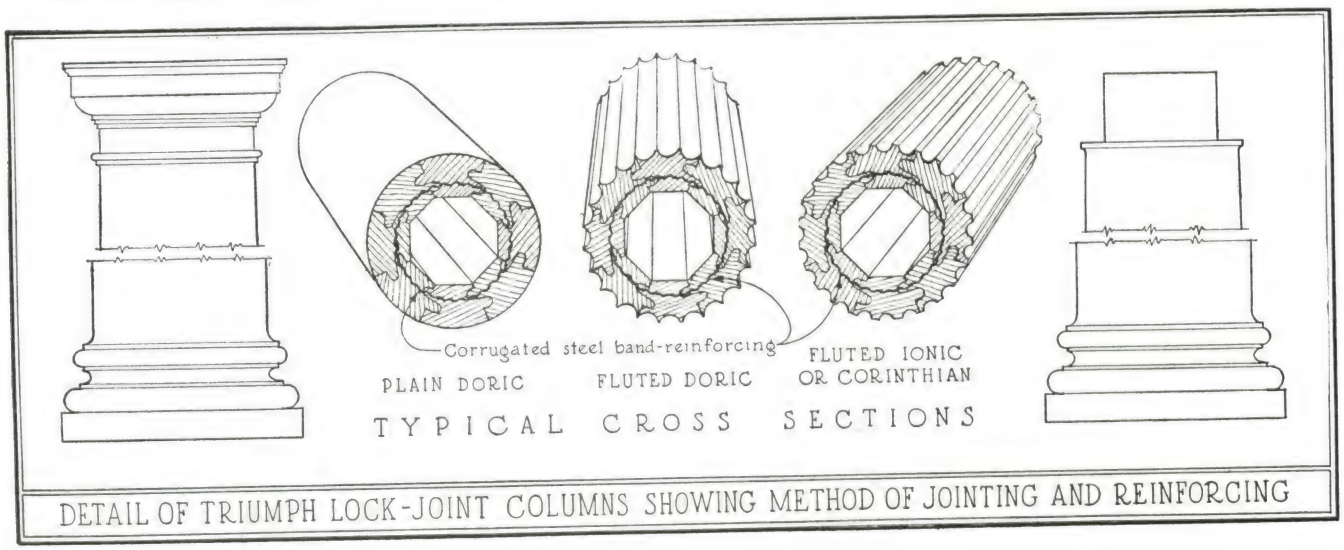
Waterproofing—The inside of all columns 16 in. in diameter and over are painted with a special waterproofing paint.

Priming—Unless otherwise specified, all columns and pilasters are given two priming coats of a paint specially designed to give protection but easily covered by the finish coat.

Shipping and Deliveries

Our location in the center of the largest manufacturing district in the country enables us to make prompt shipments to any part of the country.

We can also make truck deliveries to jobs located within a radius of over 100 miles from New York City.

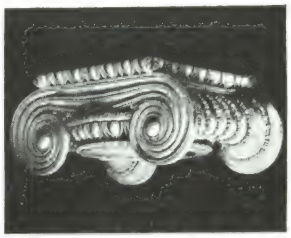


DETAIL OF TRIUMPH LOCK-JOINT COLUMNS SHOWING METHOD OF JOINTING AND REINFORCING

Continued on next page

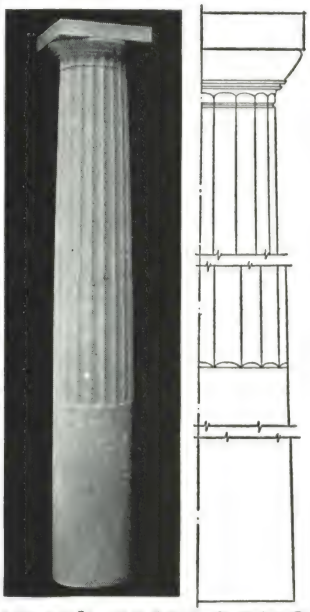
A-SCAMOZZI CAPITAL

B-ROMAN IONIC CAPITAL

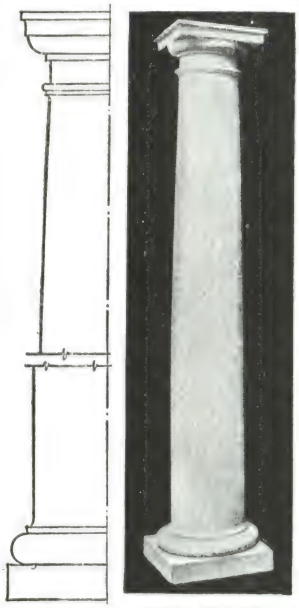


C-GREEK IONIC CAPITAL

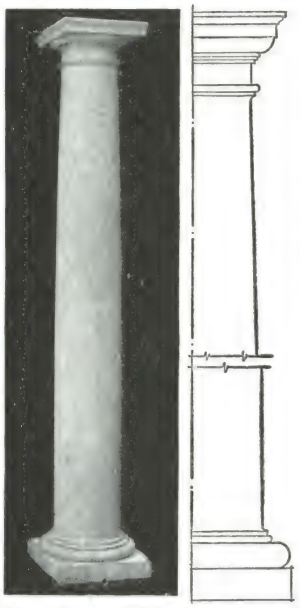
G-GREEK ERECHTHEUM CAPITAL WITH NECKING



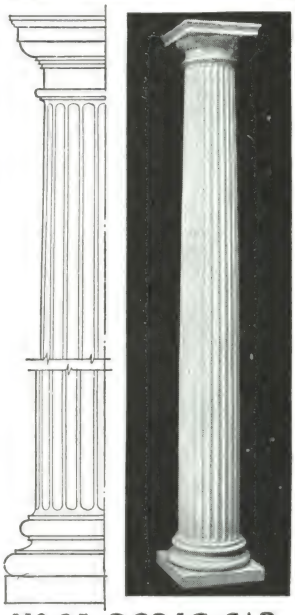
Nº 65⅔-GREEK DORIC
Fluted ⅔
Nº 60 Similar but without flutes



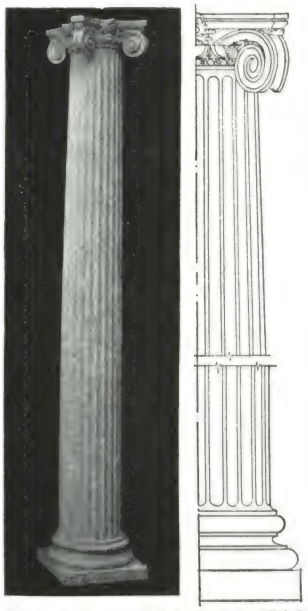
Nº 70-TUSCAN
Plain
Nº 75 Similar but with flutes



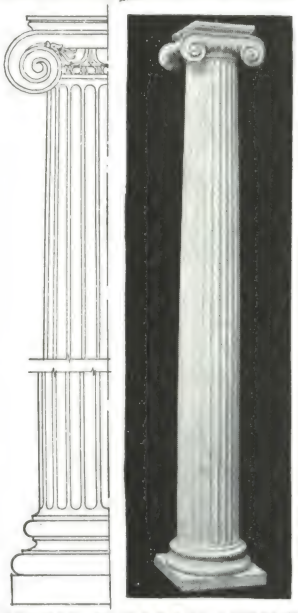
Nº 80-ROMAN DORIC
Plain
Nº 85 Similar but with flutes



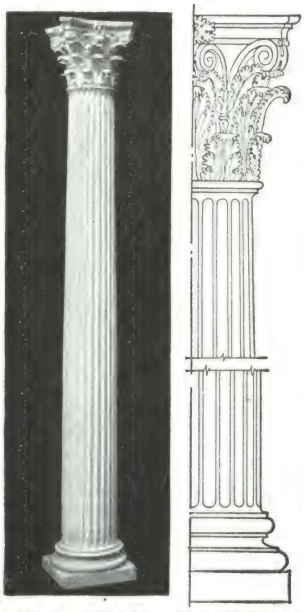
Nº 95-DORIC CAP
ATTIC BASE Fluted
Nº 90 Similar but without flutes



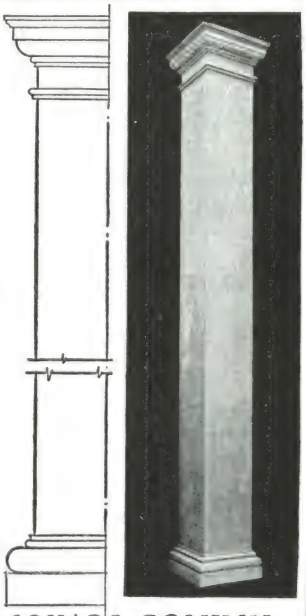
Nº 105-SCAMOZZI CAP
ATTIC BASE Fluted
Nº 100 Similar but without flutes



Nº 115-ROMAN IONIC
Fluted
Nº 110 Similar but without flutes



Nº 135-ROMAN CORINTHIAN
Fluted
Nº 130 Similar but without flutes



SQUARE COLUMN
Fluted, Plain or Paneled

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	TRIUMPH LOCK-JOINT COLUMNS	NOT DRAWN TO SCALE DATE: FEB.-21	DRWG 1

ESTABLISHED 30 YEARS

A. F. SCHWERD MFG. COMPANY

Specialists in Wood Columns

MAIN OFFICE AND FACTORY

3181-3225 McClure Avenue

PITTSBURGH, PA.

Product

SCHWERD'S QUALITY WOOD STAVED COLUMNS.

Schwerd's Columns

Schwerd columns are built up of tongued and grooved staves held together by glue. The gluing surfaces meet absolutely flush at every point and are pressed together so tightly that all glue is either forced into the wood or from the joint. This, together with the high quality of the glue used, makes the joint stronger than the wood itself. The staves are tongued and grooved merely to facilitate assembling.

Architectural Details—Columns conform to the minutest detail.

Proper Entasis—By means of our special stave-machines, the proper entasis (straight one-third and swell tapered upper two-thirds) is obtained in the rough staves before the column shaft is turned. This provides uniform thickness throughout the shaft with very little loss in turning.

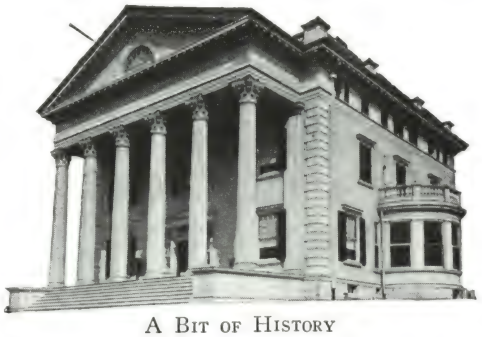
Glue—We have been manufacturing our own glue for 15 years. It is exceptionally tough and strong, and has proved its durability under all conditions.

Lumber—Air dried stock is used exclusively. The accompanying table gives thickness of stock for various diameters and types of columns.

Priming—All columns are primed with lead and oil before shipment.

TRADE-MARK

Registered



A BIT OF HISTORY

The columns shown were made in our factory and furnished for W. H. Taylor at Scranton, Pa., in 1899. No stronger argument can be made for the superiority of our product than the fact that these columns are in first class condition today after being in an extremely exposed position for 23 years

Crating for Shipment—Columns are provided with solid heavy crating to protect ends of shaft, and substantial strips covering the face, wired in place. This is an important feature to insure against marring in shipment.

Installation of Columns

Protection—When erecting, ends of shaft, top and bottom of all cap and base members, also floor should be given a coat of white lead. As we only prime columns, they should be painted immediately. If for any reason the columns can not be immediately used, they should be covered and kept off the ground.

Flashings—The entire top of all wood and ornamental caps should be flashed with either galvanized iron, copper or sheet lead to protect the inside from the weather.

Ventilation—We recommend the ventilation of columns throughout. When desired, cast iron ventilated plinths can be furnished.

Composition Capitals

Can be furnished in classic and modern designs.

THICKNESS OF STOCK AND DIAMETER OF COLUMNS

	2-in. stock	2½-in. stock	3-in. stock	4-in. stock
Plain shaft, in	up to 18	19 to 22	23 to 30	31 and up
Doric and Ionic fluted, in	up to 16	17 to 19	20 to 27	28 and up
Doric fluted, in	up to 22	21 to 28	29 to 39	40 and up

TURNING AND FLUTING 40-IN. DIAMETER COLUMNS

We have special machinery for producing columns of any size

S. CHENEY & SON

Cast Iron Porch Column Base

MANLIUS, N. Y.

Product

Manufacturers of the ZIMMERMAN CAST IRON PORCH COLUMN BASE (C. E. Zimmerman patent).

Advantages

A wood column or wood base set on a porch floor always decays in a few years, because of the constant moisture in the joint. This means regular repair bills to the property owner. The Zimmerman patent base does away with these repair bills, because it stops decay. It is set directly on the floor and the column on top of it, leaving no joint for moisture to collect in.

Superiority

The superiority of the Zimmerman base over other porch column bases lies in its central bearing, in addition to the four corner bearings. Bases 24 x 24 in. and upward have four corner and four inside bearings which are planed level and all bear alike, relieving the casting of any strain, and carry the weight without causing corner supports to sink into floor.

It is necessary that the turned wood base have an open center a trifle smaller than opening in column to ventilate column shaft. Our base is no experiment, but an economic necessity which has been on the market for years and has given absolute satisfaction.

Model

A miniature nickeled base will be mailed free on application. Write today and see for yourself the merit of this base.

Sizes and List Prices

On orders, state whether floor is wood or stone, and give diameter of turned wood base, as this determines the size of iron base required. This also applies to square column when separate wood base is used.

IRON BASES, ROUND COLUMNS

8 x 8 x 1⅞	in.	$ .60
9 x 9 x 1⅞	in.	.65
10 x 10 x 2	in.	.80
11 x 11 x 2⅛	in.	.95
12 x 12 x 2⅛	in.	1.20
13 x 13 x 2⅛	in.	1.40
14 x 14 x 2¼	in.	1.60
16 x 16 x 2½	in.	2.10
17 x 17 x 2½	in.	2.25
18 x 18 x 2½	in.	2.35
20 x 20 x 2¾	in.	3.50
22 x 22 x 3	in.	3.70
24 x 24 x 3⅛	in.	6.00
26 x 26 x 3¼	in.	7.50
28 x 28 x 3⅜	in.	9.75
30 x 30 x 3½	in.	11.50
32 x 32 x 4	in.	14.00
36 x 36 x 4½	in.	16.75
39 x 39 x 6	in.	18.00
42 x 42 x 5½	in.	26.00
48 x 48 x 6	in.	50.00
50 x 50 x 6	in.	55.00

Bases must be ordered 2 in. larger than the column they are to support—a 10-in. round column requires a 12x12-in. base.

IRON BASES, SQUARE COLUMNS

4	in.	$ .25
5	in.	.35
6	in.	.45
7	in.	.55
8	in.	.70
9	in.	.75
10	in.	.80
11	in.	1.05
12	in.	1.10
13	in.	1.30
14	in.	1.60
16	in.	2.10

These sizes are ready to ship.

Other sizes made to order.

Write for discounts.

Method of Installation

First screw the turned wood base to the iron base; then screw the iron base to the floor, and fit the column upon the wood base.

Before fastening the column, paint the end of the column and paint up in; also, paint the wood block upon which the column rests. Where base is used on stone it should be set in cement. Paint base before using.

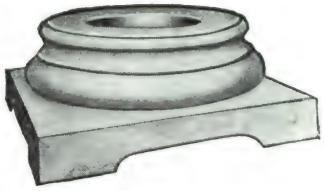
When the iron base is used on tin or canvas floors, place a rubber packing between the iron base and tin or canvas through which the screw will pass. When screwed down it will be watertight.

TOP VIEW OF BASE

BOTTOM VIEW OF BASE
Showing bearings on sizes from 24x24 in. and upward

FOR HALF SQUARE PILASTER

FRONT VIEW OF BASE



OPEN CENTER OF TURNED WOOD BASE

THE UNION METAL MANUFACTURING CO.

Columns, Pergolas, Lighting Standards and Garden Fixtures

CANTON, OHIO

REPRESENTATIVES IN ALL PRINCIPAL CITIES

UNION
METAL COLUMNS
TRADE-MARK

Products

UNION METAL COLUMNS and PILASTERS (patented) for exterior and interior architectural use on porches, pergolas, facades, mantels, conservatories, etc.; UNION METAL LAMP STANDARDS (patented) of Pressed Steel, Pressed Copper, and Bronze for streets, parks, boulevards and business entrances; UNION METAL GARDEN FIXTURES, NEWELS, WALL BRACKETS, etc., for general decorative use.

Columns

Union metal columns are made of pressed steel, which overcomes the disadvantages of splitting, rotting and warping met with in wood columns.

Entasis and Stopped Flutes—These characteristics of the classic column are strictly observed. The flute is stopped at both the cap and base. The machinery and dies for fluting and tapering these steel shafts are patented and can be used only by THE UNION METAL MANUFACTURING CO.

Variety of Design—Columns are made in three sections: base, shaft and cap. Furnished in ten classical designs and to architects' detail.

Construction — Shafts, of best grade open hearth steel galvanized especially for this purpose, up to and including a base diameter of 14 in., are made of one-ply No. 22 gage; over 14 in. of two plies of No. 22 gage, pressed and fluted together.

Steel is rolled especially for this purpose and is tight coated with spelter, which adheres perfectly to the metal, fully protecting it from action of the elements. All steel shafts are further protected with an application of galvanized iron primer. Cast iron parts coated with high grade metalastic paint just before leaving the factory, insuring finishing coats of paint from peeling or cracking. Seams securely locked and always turned on inside of shaft. Caps and bases fit shafts firmly and squarely, insuring a strong surely aligned support in columns.

Erection—Easily handled in installation because of their comparatively light weight.

STANDARD SIZES OF UNION METAL COLUMNS

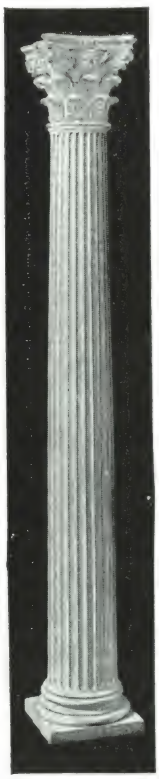
Diam. base of shaft, in.	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
DESIGNS: 212, ROMAN CORINTHIAN; 237, MODERN IONIC; 224, ROMAN DORIC; 200, PLAIN DORIC															
Diam. top of shaft, in.	6½	8	10	12	12	14	16	18	20	22	22	24	26	28	30
Size of square base, in.	10⅝	13¾	16	18⅝	20¾	23	27½	28¾	32⅛	34⅛	37	39	41½	43	45½
Height, over all	Every foot from 5 ft. to 32 ft.														

DESIGN 700, GREEK DORIC

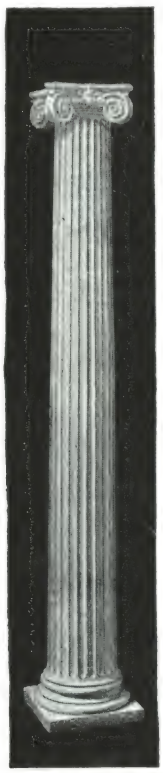
Diam. top of shaft, in.	7½	9	11	12	14	15	17	18	20	22	24	24	28	28
Size of square base, in.	12¼	14⅜	16⅝	18⅞	20⅛	23⅜	25½	27½	30	32½	35	37	39¼	42
Height, over all	Every foot from 5 ft. to 32 ft.													

DESIGN 240, ALL STEEL (DORIC)

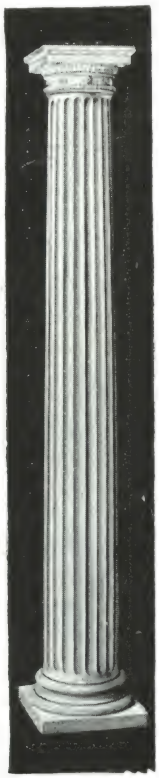
Diam. top of shaft, in.	6½	8	10	12
Size of square base, in.	11	13¼	16	18½
Height, over all	Every 6 in. from 5 ft. to 10 ft.			



DESIGN NO. 212
ROMAN
CORINTHIAN

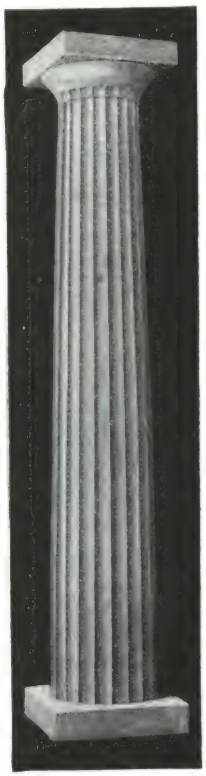


DESIGN NO. 237
MODERN
IONIC

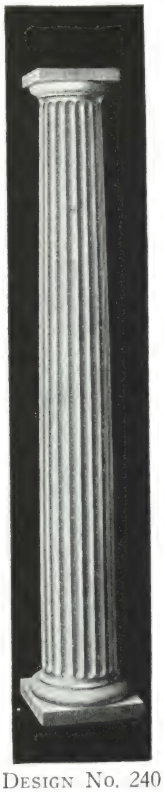


DESIGN NO. 224
ROMAN
DORIC

DESIGN NO. 200
PLAIN
DORIC



DESIGN NO. 700
GREEK
DORIC



DESIGN NO. 240
ALL-STEEL
DORIC

Continued on next page

Advantages—(1) Architecturally correct.
(2) Clean cut, highly ornamental and stately.
(3) Will not rot, check or open at joints, as will all wooden columns.
(4) Have entasis and stopped flutes.
(5) Strongest porch columns manufactured.
(6) Not experimental, but used in thousands of representative buildings in the United States and abroad.
(7) Indestructible and will last a lifetime; suitable for all climates and temperatures.

Specifications—The fluted columns and pilasters used in this building shall be Union metal columns with entasis and stopped flutes, manufactured by THE UNION METAL MANUFACTURING CO., Canton, Ohio. The design, number and size of columns to be used as indicated on the drawings.

Catalogues—Our portfolio of designs and installations gives full particulars concerning the construction of Union metal columns and shows many buildings where they have been used. Ask for Column Catalogue No. 18 and Pergola Catalogue No. 15 P.

Lamp Standards and Garden Fixtures

Entrance standards, wall brackets and exterior newels are extensively used to light and decorate entrances to churches, schools, libraries, office buildings, apartments, garages and all types of public buildings.

They are popular for bridge lighting, for installation around gasoline filling stations and for the lighting of public grounds, parks and estates.

Entrance standard and bracket lighting has become so popular and necessary that on new buildings provision is usually made in the architect's specifications for this material. Likewise, we are supplying a heavy demand from buildings of all kinds, already erected, that feel an increasing need for better lighting effects.

Union Metal and Its Products

THE UNION METAL MANUFACTURING CO. was the pioneer manufacturer of ornamental lighting standards and is today the largest producer and distributer of this class of material in the world.

During its fifteen years of specialization in the manufacture of ornamental street lighting standards and architectural building columns, the company has developed hundreds of standards and brackets to meet varying lighting conditions.

Assisted by prominent members of the electrical and architectural professions, we have selected from these hundreds of designs, the most popular ones to list on this page. If we have not shown the designs that exactly meet some special requirement, our engineering department will prepare sketches with the idea of meeting the particular need. Our entrance Standard Catalogue S-102 also shows many designs not listed here.

DESIGN NO. 833
SUNDIAL

DESIGN NO. 696
EXTERIOR NEWEL

DESIGN NO. 764
WALL BRACKET

DESIGN NO. 78
WALL BRACKET

DESIGN NO. 768
WALL BRACKER

DESIGN NO. 792
STREET LAMP STANDARD
With G.-E. Form 9 Novalux Lighting Unit

DESIGN NO. 874
RESIDENTIAL STANDARD
With G.-E. Form 8 Novalux Lighting Unit

ENTRANCE STANDARD,
DESIGN NO. 811
3 LIGHTS
DESIGN NO. 754
5 LIGHTS

ENTRANCE STANDARD,
DESIGN NO. 749
5 LIGHTS

ENTRANCE STANDARD,
DESIGN NO. 735
7 LIGHTS

ENTRANCE STANDARD,
DESIGN NO. 721
9½-IN. SHAFT
DESIGN NO. 837
7-IN. SHAFT

THE LOUIS BLOOM STUDIOS

Manufacturers of Carian Art Marble Columns

1429 Arch Street
PHILADELPHIA, PA.

NEW YORK, N. Y., 516 West 25th Street

ATLANTIC CITY, N. J., 1410 Atlantic Avenue

Products

CARIAN ART MARBLE COLUMNS, PILASTERS, WAINSCOTING and PANELING for use in the architectural treatment of hotels, banks, churches, stores, residences and buildings in general where a decorative effect is desired.

Columns and Pilasters

Carian art marble columns and pilasters are made of cement composition, colored and polished in a manner that reproduces faithfully, any desired marble. The base, shaft and capital are cast separately 1-in. in thickness and can be readily erected around steel or wood structural columns, or they can be used where a column effect is desired but where there is no structural feature. These columns and pilasters are made to conform to the five standard orders—plain or fluted, with capitals to match. They may also be had in straight types or in accordance with special designs.

Erection

Easily erected by any skilled mechanic.

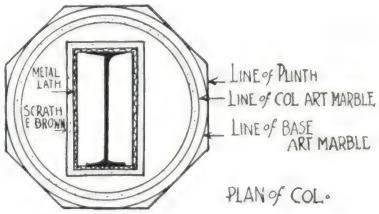
Advantages

Duplicate the decorative effects of costly natural marble at a moderate price. As readily applied as wood or plaster with greater lasting qualities than either. Can be shipped anywhere; light in weight and not affected by climatic or atmospheric conditions. Has a smooth, sanitary surface, easy to keep clean. Will not warp, rot or deteriorate. Our products have been successfully used throughout this country for the past 40 years.

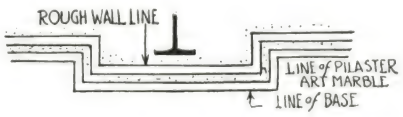
Catalogue

Our illustrated catalogue, together with specifications and other information mailed on request.

DORIC COLUMN



PLAN of COL.



PLAN of PILASTER

AN EXAMPLE OF THE APPLICATION OF CARIAN ART COLUMNS
LIT BROTHERS DEPARTMENT STORE, PHILADELPHIA

CORINTHIAN COLUMN

MINNESOTA AND ONTARIO PAPER CO.

INSULITE DIVISION

MILLS AND GENERAL OFFICES

INTERNATIONAL FALLS, MINN.

MINNEAPOLIS OFFICE, 1100 Builders Exchange

CHICAGO OFFICE, 737 Conway Building

Product

UNIVERSAL INSULITE, an INSULATING and SOUND DEADENING BOARD.

TRADE-MARK

Universal Insulite

Universal Insulite is of the highest type thermal insulating material in board form manufactured, strong and durable, high in tensile strength, thoroughly waterproofed and will not disintegrate. Manufactured from the resinous wood fibers, felted into large, clean sheets of sufficient standard size to assure economical application.

Uses—Universal Insulite combines the highest insulating value in board form (saws and cuts like lumber), a plaster base, a wall board, a sheathing, and remarkable acoustical medium.

Used successfully in all construction, stationary and railroad refrigeration, hospital and public building design, Pullman car and steamship insulation for the exclusion of both heat and cold.

Plaster Base—When applied to the face of the studding or ceiling joists, it produces a tight job and provides insulation and plaster base combined, assuring by far a stronger wall than with wood lath, much less liable to cracks.

Wall Board—As a wall board, the beautiful texture of Insulite is unsurpassed. Many and varied surface treatments can be accomplished by sizing and at the same time produce a wall with improved acoustical properties.

Sound Deadener—As a sound deadener, Universal Insulite has proven its value in many large structures; being of cellular construction, prevents reverberations.

Sheathing—As a sheathing, its moistureproof qualities, size of sheet, ease of application, great strength, and decorative possibilities appeal as a real economy.

Decorating—Mural decorators have found in Universal Insulite a medium which not only lends itself to the artistic, but is of structural and acoustical value as well.

Farm Buildings—To the farmer this material economically lends itself to the erection of all types of out buildings and the insulation of barns, hog houses and silos. Used in the farm house itself, old walls and ceilings become bright and attractive; drafty rooms, warm and comfortable.

Tests—Thermal Value tests conducted by the U. S. Bureau of Standards rate Universal Insulite at 7.1 B.t.u. per 24 hours, 1 in. thick, per sq. ft. per degree Fahr., the highest rating of any insulating material of this character.

Weight—The weight of Universal Insulite is practically the same as cork.

Standard Mill Sizes and Weights—Herewith is given data for standard sizes. Special sizes can be furnished.

STANDARD MILL SIZES AND WEIGHTS, UNIVERSAL INSULITE

Thickness, in.	Widths, in.	Lengths, ft.	Sheets per bundle	Weight per 1,000 sq. ft., lbs.
¼	32, 48	8, 8½, 9, 9½, 10	8	525
½	32, 48	8, 8½, 9, 9½, 10, 12	6	670

Specifications

Plaster Base—*Walls*—From floor to ceiling apply ½-in. Universal Insulite (the burlap side out) in 4 ft. 0 in. widths, and wherever possible in a continuous vertical sheet. Nail every four (4) in., directly to studding on 16-in. centers, with 1½-in. galvanized or coated nails, ⅜-in. head. Keep sheets of Insulite ⅛ to ¼ in. apart. Cut in cross headers where necessary and nail ends of sheets as above. Use galvanized metal corner beads from floor to ceiling.

Ceilings—Apply Insulite as above, sheets parallel with floor timbers.

Plaster—Apply scratch coat, standard hard prepared plaster to thickness of grounds with straight and even surface. Finish coat as specified.

Painting and Staining—Size all surfaces of Universal Insulite one (or two) heavy coats of glue size made as follows: Dissolve 2 lbs. shell or chip glue in 1 gal. of boiling water; apply within 8 hours of mixing and after cooling. Use bleached glue for all light finishes.

Staining—Use alcohol stain, color as selected, over two coats of size and where directed finish with shellac and varnish.

Painting—Use two coats of best linseed oil, lead and zinc paint over two heavy coats of size.

Calcimine—Use ½ lb. chip glue to gal. of water, and mix with calcimine.

Sound Deadening—*Floors*—On top of floor timbers lay pads of Universal Insulite full width and length of joist; on top of these pads lay the rough floor. Between rough and finished floor lay one course of ½-in. Insulite.

Ceilings—Apply pads to under side of floor timbers and the ceiling course of Insulite to receive plaster, directly to the joist pads.

Outside Finish—Apply Universal Insulite over rough siding, nailing every 4 in. with nail heads driven with set, below surface of sheet. (Finish as directed for painting, or brush coat, with paint, of approved mineral coating.)

Outside Sheathing—Nail directly to studs, as for plaster base, and cut in headers where necessary. (Finish as directed for painting, or brush coat, with paint, of approved mineral coating.) Joints on all outside Insulite application to be covered with wood or metallic batten strips (width as approved), securely nailed flush with finish and painted two heavy coats lead and oil.

Ice House and Creamery Construction—In center of studding furr with 1x1-in. cleat on each side of which apply ½ in. of Insulite securely nailed between studs. Apply ½-in. Insulite to each face of studs (inside and outside) under siding.

Ship Lap Outside Finish—Over the entire outside walls of the building lay ½-in. Universal Insulite in strips 10 in. wide (may be wider or narrower) lapped 2 in. and securely nailed top and bottom directly to the studding; nails 4 in. apart. (Same specification when laid over regular siding.) All ends square butted to corner boards and casings. Vertical joinings of laps to be avoided whenever possible and when unavoidable to be cut in a 90 degree bevel and filled with lead and oil putty. Joinings to be double nailed.

Note: All the above details to conform to the manufacturers' standard directions and specifications.

Further Information

Samples, literature and special information furnished on request.

ASBESTOS SHINGLE, SLATE & SHEATHING CO.

Asbestos Building Lumber

MAIN OFFICE AND FACTORY

AMBLER, PA.

BRANCH OFFICES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
CINCINNATI, OHIO
BUFFALO, N. Y.
CHICAGO, ILL.
CLEVELAND, OHIO
MINNEAPOLIS, MINN.
PHILADELPHIA, PA.
WILKES BARRE, PA.
MILWAUKEE, WIS.
NEW YORK, N. Y.
PITTSBURGH, PA.
WASHINGTON, D. C.
DETROIT, MICH.
MONTREAL, QUE.
TORONTO, ONT.

SOUTHWESTERN DISTRIBUTOR: R. V. Aycock, Kansas City, St. Louis, Tulsa, Houston

WESTERN DISTRIBUTER: J. A. Drummond, San Francisco, Los Angeles, Fresno

Products

Ambler Asbestos Building Lumber, for exterior and interior fireproof construction; Ambler Linabestos (Asbestos) Wall Board for interior fireproof sheathing and lining.

For Asbestos Shingles and Corrugated Sheathing, see pages 902-903.

Ambler Asbestos Building Lumber

Ambler asbestos building lumber is an absolutely fireproof material made of selected asbestos fiber and portland cement in sheets ⅛ to 1 in. and greater thicknesses if desired, in 42-in. widths and lengths of 48 and 96 in. Special sizes will be cut and furnished by the factory at a nominal charge.

Manufacture—Ambler asbestos building lumber is made by the same process used in manufacturing all Ambler Asbestos building products.

The selected asbestos fibers and portland cement are scientifically united in water and laminated up to the required thickness. The material is then subjected to a hydraulic pressure of 3000 lbs. per sq. in. and then dried and seasoned.

Cutting—Ambler asbestos building lumber may be cut and worked with ordinary carpenters' tools when new, but because it becomes harder and tougher with age it is necessary to cut it with a machine saw after time has hardened it.

It is readily punched or drilled and nails can be driven through it close to the edge without cracking it.

Some Installations of Ambler Asbestos Building Lumber on Exteriors

Continued on next page

Underwriters' Approval—Ambler asbestos building lumber is approved by the Underwriters' Laboratories, Inc. and bears a standard "fire" rating. It cannot burn.

The permanent non-cracking and fireproof material for exterior half timber construction.

Construction—Ambler asbestos building lumber applied over sheathing and one-ply waterproof roofing paper, with all horizontal joints flashed, preferably with copper, and all joints covered with batton strips, gives a half timber effect that is artistically beautiful and is immeasurably superior to stucco, since it will not crack nor split, and is permanently free from need of any attention. The ¼-in. thickness is ordinarily used for this work and weighs 2⅔ lbs. per sq. ft. $\frac{3}{16}$-in. may be used and is of course more economical.

Color—Ambler asbestos building lumber is a natural cement gray and requires no painting. It can be painted, however, and readily takes a good finish in any color.

Interior Uses—Ambler asbestos building lumber is used extensively for interior fireproof and sanitary lining in bathrooms, kitchens, closets, gymnasiums, storerooms, elevator shafts, stairways, dry kilns, laboratories, paint and oil rooms, refrigerator rooms, smokehouses, moving picture booths, garages, locker rooms, and in a multitude of places where it is desired to form a fireproof, rotproof, sanitary lining that is waterproof and immune to vermin.

Only Tools Necessary for Erection of Ambler Asbestos Building Lumber

Ceiling and Floors—Ambler asbestos building lumber can be used either on ceilings or floors for the same purpose as on walls and in the same manner.

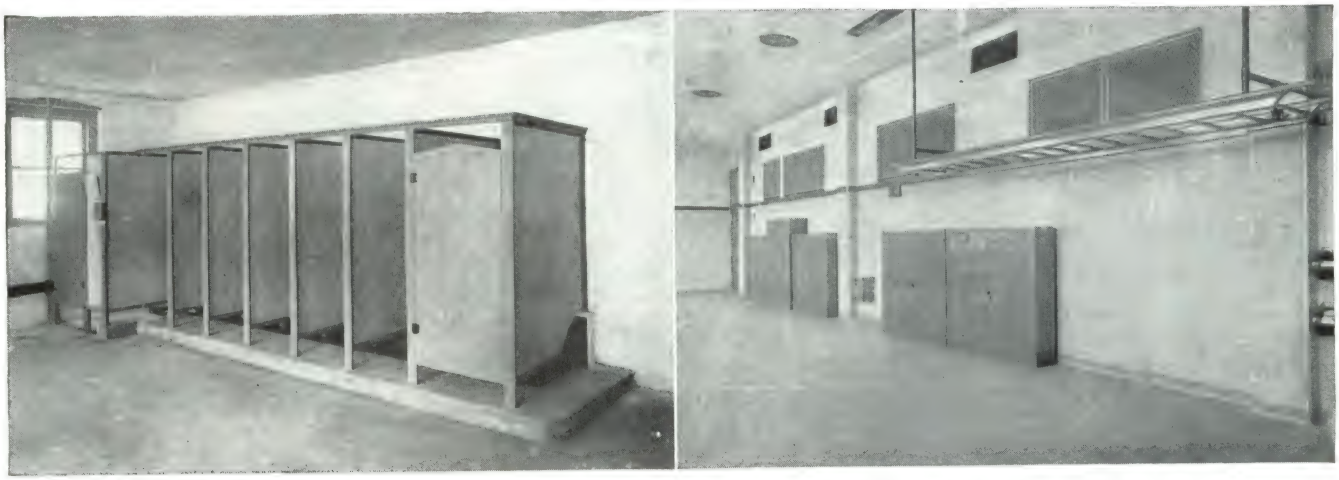
Insulating Qualities—Because of its dialectric properties Ambler asbestos building lumber is used in place of marble or slate for electrical switchboards, fuse boxes, etc.

Insurance—Rates for insurance are appreciably reduced where Ambler asbestos building lumber is used.

Ambler Linabestos (Asbestos) Wall Board

Ambler Linabestos wall board made $\frac{3}{16}$ in. thick and in sizes 48x48 in. and 48x96 in. is less expensive than Ambler asbestos building lumber, and is recommended for all interior linings where a flameproof, fire resisting wall board is required.

It is furnished in a permanent buff color that is very attractive and requires no painting, although it may be papered over, painted, sandpapered and worked with ordinary carpenter's tools.



Installations of Ambler Asbestos Building Lumber for Interiors

THE CELOTEX COMPANY

Manufactured Lumber

Conway Building
CHICAGO, ILL.

PLANT
NEW ORLEANS, LA.

NORTHWEST SALES OFFICE, McKnight Building, MINNEAPOLIS, MINN.

BRANCH REPRESENTATIVES

NEW YORK, N. Y., W. M. Crombie & Co., Inc., 101 Park Avenue
BOSTON, MASS., Lumber Sales Corporation, 89 State Street
BALTIMORE, MD., Ryland & Brooks Lumber Co., 811 American Building
HUNTINGTON, W. VA., Tri-State Exhibit Co.
DETROIT, MICH., Wolverine Lumber Co.
CHICAGO, ILL., Union Insulating & Construction Co., Great Northern Building
MILWAUKEE, WIS., McClymont Products Co.
SIOUX CITY, IOWA, Edwards & Bradford Lumber Co.
ST. LOUIS, MO., Huttig Sash & Door Co.
KANSAS CITY, MO., Arkansas Bridge Co.
LINCOLN, NEBR., National Supply Co., First National Bank Building
NEW ORLEANS, LA., J. W. Thompson, 708 Canal-Commercial Building
JACKSON, MISS., John I. Pierce
DALLAS, TEX., S. W. Nichols Co., 1915 Main Street
LOS ANGELES, CAL., Western Celotex Co.
MINNEAPOLIS and ST. PAUL, MINN., O. W. Buss Co., Minneapolis

Product

Celotex Insulating Lumber, a manufactured lumber for various applications in building construction.

CELOTEX
INSULATING LUMBER
TRADE-MARK

Qualities

Celotex is made from cane fiber, the longest and strongest fiber obtainable for board manufacture. The fiber is firmly matted and interlaced, forming a tough board of great strength—a strength derived wholly from its structure and not dependent on any adhesive. Celotex is of uniform structure throughout, and is not built up of layers.

Uses

Sheathing—For the inside or outside of buildings, Celotex is applied like lumber, directly to the studding. Tests show that when applied as a sheathing Celotex produces a more rigid structure than ordinary wood sheathing. It is treated to resist the absorption of water. Celotex, being a combined insulation and sheathing, gives the advantages of both, eliminating the cost of one.

Exterior Finish—Celotex is admirably adapted for exterior finish on frame buildings. It is applied directly to the studs and serves as sheathing and the exterior surface. Batten strips are applied to form suitable paneling. Celotex can be painted any color desired.

Interior Finish—Celotex is used as an interior finish for walls and ceilings of houses, factories or stores. It is splendidly adapted for use where paneling is desired. Its color is a light, pleasing tan, suitable for the finish in many situations, or it can be stained or painted in any color desired.

Plaster Base—Celotex as a plaster base on partitions, walls and ceilings will conserve more heat than two thicknesses of ordinary lath and plaster. It is especially adapted to this use because of its fibrous surface, strength, and insulating value. All standard interior plasters form a perfect bond with Celotex. Celotex makes better and stronger walls; insures against leakage around openings.

Roof and Other Insulation—Celotex resists the passage of heat and cold like a heavy woolen blanket, and is the most durable and efficient, strongest and lightest board-form of insulation. It lies flat on the roof without warping and is not easily injured in working over it. It is water resisting—a big factor in roof insulation. It is mopped on to concrete or nailed directly to the wood deck in as many thicknesses as are necessary, and any standard roofing is then mopped directly on to it. (See specifications.) Celotex reduces fuel consumption in winter, keeps off the heat in summer, and protects against condensation.

In most applications Celotex is as efficient in insulating value as cork. It is the most practicable insulating material on the market.

Sound Deadening and Acoustical Correction—Celotex is effective as a sound deadener in floor construction and partitions. It absorbs about one-third of the sound waves which strike against it. This makes it effective for eliminating echoes and reducing reverberation in auditoriums and schoolrooms; and in greatly reducing the noise in rooms where a large volume of sound is generated, such as schoolhouse corridors, restaurants, telegraph rooms, and offices where adding machines, typewriters and other mechanical apparatus are used.

Sizes and Weight

Thickness, approximately $\frac{7}{16}$ in.; width, 4 ft. (cut scant to allow for $\frac{3}{16}$ in. joints); lengths, 8, 8½, 9, 9½, 10 and 12 ft.

Weight, 60 lbs. per 100 sq. ft.

Summary of Advantages

1000 sq. ft. of Celotex covers 1000 sq. ft. of surface.

Celotex is easily and conveniently handled; cost of application is about one-half as much as cost of applying lumber. Requires no special tools; can be sawed like lumber.

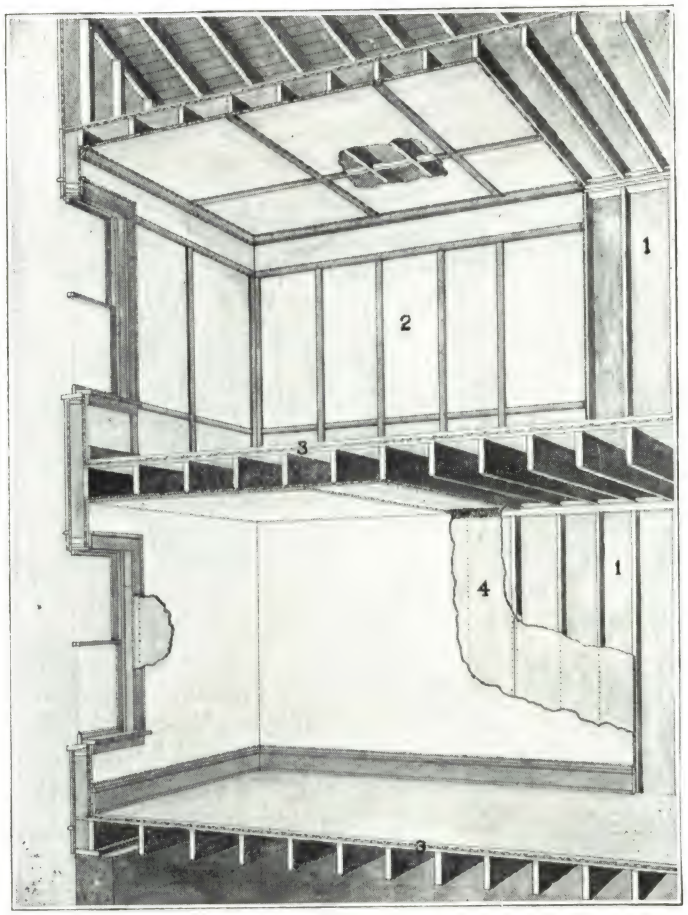
Serves as insulation and sheathing, replacing lumber. Serves as insulation and plaster base, eliminating lath.

Weighs only 60 lbs. per 100 sq. ft., effecting saving in the cost of freight, hauling and handling. More economical than other materials for the same purpose. Is more efficient than other materials similarly used.

When used as interior finish saves cost of plaster. When used as exterior finish saves siding, stucco or brick veneer.

Any good carpenter can apply it.

Continued on next page



APPLICATIONS OF CELOTEX
(1) An efficient sheathing, replacing lumber. (2) For interior decoration. (3) An effective sound deadener between floors. (4) An inside lining or plaster base

Tests

Tests made by Robt. W. Hunt & Co., Engineers, Chicago, show the following results:

Tensile Strength—Tests made on three pieces of Celotex, each 2 in. wide, showed an average tensile strength of 373 lbs. per sq. in.

Transverse Strength—A test on Celotex board 6 in. wide, with supports 12 in. apart, showed a deflection of $\frac{11}{16}$ in. under a load of 32 lbs. A test on Celotex board 12 in. wide, with supports 16 in. apart, showed a deflection of $\frac{13}{16}$ in. under a load of 158 lbs.

Stiffness in Wall Sections—Tested as a sheathing material applied to studs, in comparison with sheathing of 7/8x6 in. (yellow pine boards), Celotex showed six times as much resistance at the point of initial deflection and nearly twice as much load at the point of failure.

Plaster Bond—Six tests were made to determine the plaster bond, using Celotex board 6x6 in. coated with wood fiber plaster to a thickness of 1/4 in.; the average breaking load was 216 lbs. per test, which equals 864 lbs. per sq. ft. of surface.

Insulation — *Standard Heat Transmission* — Tests made by G. F. Gebhardt, Mechanical Engineer of the Armour Institute of Technology, Chicago. The flat plate method was used. It gives surface to surface conductivity, and the results are indicative of the true insulating quality of the material:

Material	*Conductivity*
Celotex Insulating Lumber	7.91

Tests conducted by the U. S. Bureau of Standards covering thermal conductivities of various materials show:

Corkboard (pure)	7.4
Rock Cork	8.3
Pulp Board	10.4
White Pine	19.

The results are expressed in terms of b. t. u. transmitted per square foot of surface per degree Fahrenheit difference in temperature per 24 hours for 1-in. thickness. The above comparison shows the exceptional insulating value of Celotex insulating lumber.

Details of tests furnished on request.

General Specifications

Framing—The sills, studs and plates shall be framed as in ordinary frame house construction, taking precaution, however, to space the studs 16 in. on center. Any odd space required to make the over-all length should be located at one end or near the middle. Wherever it is necessary to have a horizontal joint in the Celotex, a 2x2-in. or 2x4-in. header shall be cut in between the studs. No special framing or bracing is necessary other than is usual in frame construction.

Application—The Celotex boards shall be applied vertically directly to the wood framework without the use of wood sheathing and set in place so as to have a bearing for nailing along all edges. Start nailing sheets at top to intermediate studs, then on outside studs. When necessary to use more than one sheet of Celotex to secure desired height of building, vertical joints should not meet on the same stud.

Leave $\frac{3}{16}$-in. space between adjoining sheets, also at top and bottom of sheets. Around window and door frames, or where a snug joint is desired, the Celotex shall be brought to moderate contact. *Do not force into place.*

Nailing—Nail sheets of Celotex beginning at top to intermediate studs; then entirely around all edges of each sheet to studs, sills, plates or headers. Use standard 1½-in. roofing nails with 3/8-in. heads. Space nails 4 in. apart, driving nails until the heads are flush with the surface of the Celotex. Nails shall be placed approximately 3/8 in. in from the edge of the sheets.

Detailed Specifications

The following detailed specifications on Celotex construction will be furnished on request:

No. 1. As an exterior sheathing and insulation for frame building with wood siding or shingle finish.
No. 2. As an exterior finish for frame buildings, serving at the same time as sheathing and insulation.
No. 3. As an exterior sheathing and insulation for frame buildings having a stucco finish. Stucco applied to lath.
No. 5. As sheathing and insulation for brick veneer buildings.
No. 6. As roof insulation placed on the underside of wood rafters.
No. 7. As roof insulation placed on top of wood rafters.
No. 8. As roof insulation over wood deck.
No. 9. As roof insulation over concrete deck.
No. 10. As a plaster base and insulation for frame buildings including partitions and ceilings.
No. 11. As a plaster base and insulation for masonry walls.
No. 12. As interior finish.
No. 13. For sound deadening in buildings with wood joists.
No. 14. For sizing, painting, staining or tinting Celotex.

THE BEAVER BOARD COMPANIES

ADMINISTRATION OFFICES

BUFFALO, N. Y.

THOROLD, ONT. LONDON, ENGLAND

DISTRICT SALES OFFICES

NEW YORK, N. Y. BUFFALO, N. Y. CHICAGO, ILL. ATLANTA, GA. KANSAS CITY, MO.

Products

BEAVER BOARD, an all-spruce fiber Wall Board; BEAVER BLACKBOARD, silica and carborundum surface, black or green; BEAVER BOARD TILED, Beaver Board with raised tile surface.

For Vulcanite Asphalt Shingles and Roll Roofings, see page 914.

TRADE-MARK

Beaver Board

Its Uses—Beaver Board, the pioneer wood-fiber wall board, is used for walls and ceilings in every kind of building, in new construction and in repair and remodeling.

It also finds extensive use as sheathing in building small homes, garages, sheds, etc., where great heat and cold insulation is desired.

Many architects are specifying it to replace ordinary deadening felt in floors, and as extra sheathing in large buildings.

Beaver Board is the ideal material for remodeling the old room; it is applied directly over the old cracked walls and ceilings. For finishing off the attic or other waste space in the home, it offers the quick, economical way.

It is widely used for store ceilings, built-in offices, window backgrounds, and other business uses.

Its Advantages—Beaver Board comes in light, strong panels, $\frac{3}{16}$ in. thick, 32 or 48 in. wide, and in lengths of 6, 7, 8, 9, 10, 12, 14, and 16 ft. They are built up from the fibers of spruce as they come from the log; no other basic material is used in the manufacture of Beaver Board. Hence its superior quality.

It will not crack, chip, nor fall.

It is firmly bonded into a practically homogeneous board with the advantages of its 4-ply construction.

It is thoroughly sized, front and back, by the famous "Sealtite" process, to protect it against moisture and provide an excellent painting surface.

Jars and vibration do not affect Beaver Board.

It is an exceptionally good insulator against heat, cold and sound.

It is repulsive to vermin and fire retarding.

Its Application—Beaver Board is nailed directly over old plaster, matched lumber or other lining; over furring strips on brick or concrete; direct to the studding and joists in the new frame building. It is then painted with any good flat wall paint and decorative strips or mouldings are put over the panel intersections.

The decorative trim largely determines the appearance and cost of the finished job. By using flat wall

Over Wood Framing

Fit 2x4 in. headers between studding and joist to provide for nailing ends of panels. Nail centers first with 3d finishing nails at intervals of 12 to 16 in. Nail edges with 3d flat head nails from 6 to 8 in. apart and at least $\frac{3}{8}$ in. from edge

Over Plaster

Even up surface with scraps of Beaver Board and nail panels with longer nails to allow for thickness of plaster

Over Brick or Concrete

Fur walls with wood strips at least 2 in. wide and $\frac{7}{8}$ in. thick

Decoration

Paint panels before applying the strips. Use any good flat oil or water paint. Two coats are preferable. Before painting, fill nailholes in center of panels with plaster of paris. Spot the filled holes when dry with shellac

Decorative Strips

Use wood strips at least $\frac{3}{8}$ in. thick and 2 in. wide. If to be stained, apply the stain before nailing over panel intersections. Fill nailholes with stain colored putty. If to be painted, apply priming coat before nailing in place

APPLYING BEAVER BOARD

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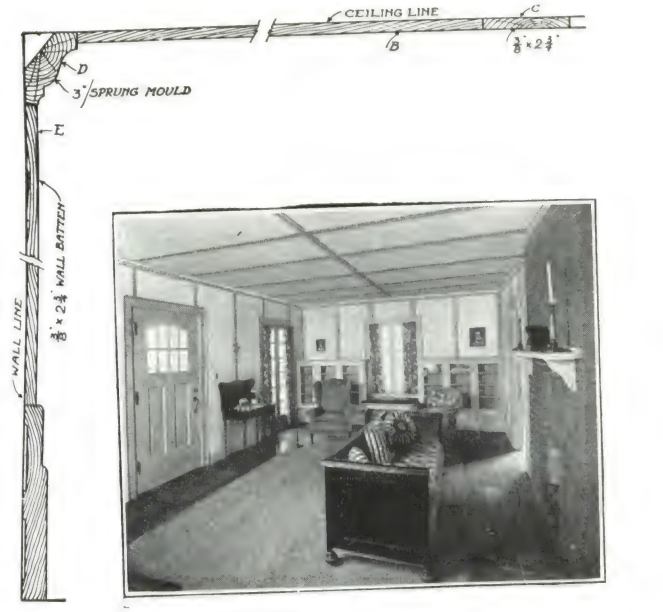
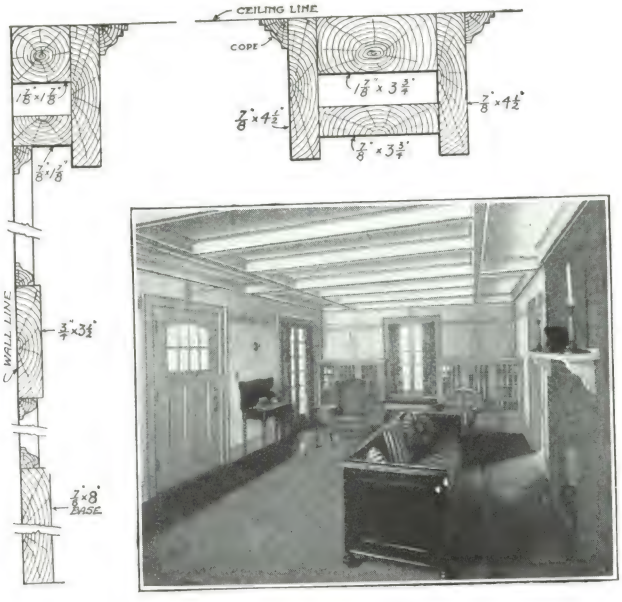


PLAN A

Flat wall battens and ordinary crown mouldings make a simple inexpensive treatment



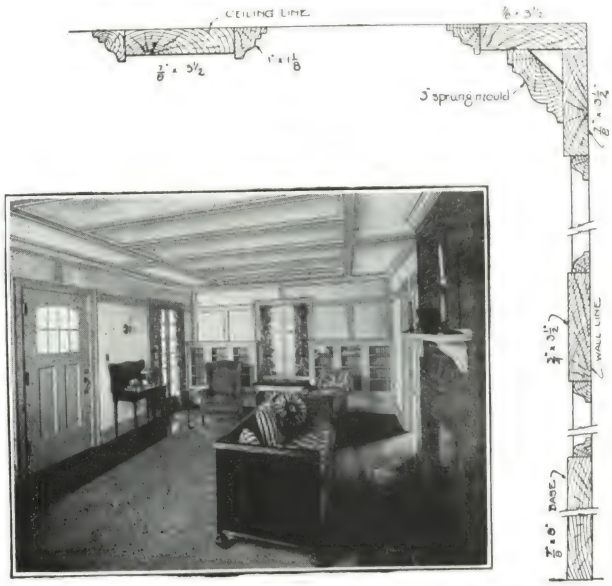
PLAN C

The same room with box beamed ceiling. Note how trim has improved the appearance of entire interior

battens and ordinary crown mouldings, as shown in Plan A, the Beaver Board can be given a simple, inexpensive treatment, especially suitable for store ceilings, factories and other places where service is the first consideration.

Where a more elaborate effect is desired, Plan B, with panel moulds for ceiling and wall battens, is the treatment most suitable. This gets away from the plain batten effect and is used where beauty as well as permanence is desired.

The box beamed ceiling, shown in Plan C, is the most elaborate treatment and is best adapted where a heavier, more substantial and stately result is required.



PLAN B

The same room shown in Plan A with the panel mould flat beam ceiling. Note the difference in appearance

Literature—Write the nearest District Sales Office for copies of "Beaver Board and Its Uses" and "The Application and Decoration of Beaver Board." These two illustrated books will more fully show you the possibilities of Beaver Board.

Beaver Blackboard

Beaver Blackboard comes in two colors, black or green. It is made in slabs ¼ in. thick and in standard blackboard widths of 3, 3½, and 4 ft., and in lengths of 6, 7, 8, 9, 10, 12, 14, and 16 ft.

It is built up on a 5-ply Beaver Board base, with a hand rubbed and hand plated surface. Carborundum and silex are used to develop a durable writing surface that will not grow gray nor pit with age.

Samples and literature gladly furnished on request.

Beaver Board Tiled

Beaver Board Tiled is regular Beaver Board, blocked off by indentations to represent tiling.

It is furnished in panels 48 in. wide and in lengths of 6, 7, 8, 9, 10, 12, 14, and 16 ft. The tiling is blocked off lengthwise of the panels and the panels are applied lengthwise around the room.

It comes in the regular cream color of Beaver Board and it is enameled after application to give it as high a finish as desired. It is nailed over any form of construction, new or old, the same as regular Beaver Board.

Additional Information

Architects who wish additional information about Beaver Quality products are invited to write to the nearest District Sales Office or directly to the Administration Offices at Buffalo, N. Y.

All inquiries will be given prompt attention.

CORNELL WOOD PRODUCTS CO.

Manufacturers of Cornell-Wood-Board

GENERAL OFFICES

190 North State Street

CHICAGO, ILL.

MILLS
CORNELL, WIS.

BRANCH OFFICES

NEW YORK, N. Y. MINNEAPOLIS, MINN. DENVER, COLO. LOS ANGELES, CAL.

Product

CORNELL-WOOD-BOARD.

Cornell Wood Board
TRADE-MARK

Standards

Cornell-Wood-Board is manufactured in two widths, 32 and 48 in. and in lengths of 6, 7, 8, 9, 10, 12, 14 and 16 ft. The 32-in. usually gives the most pleasing panel effects in rooms where studding is on 16 in. centers.

Services

A thoroughly equipped decorative service department is maintained which will co-operate to the fullest extent in suggestions of panel treatment and proved color effects.

Characteristics of Cornell-Wood-Board

Insulation—Cornell-Wood-Board is a good insulator. Actual measurements show that Cornell-Wood-Board is many times more efficient as an insulator than other wall boards on the market.

Because of the large sized sheets and the small number of joints, Cornell-Wood-Board almost entirely eliminates air leakage through the walls to which it is applied.

Cornell-Wood-Board is composed entirely of ground wood but not compressed. The fiber is a non-conductor and is absolutely uniform throughout, which permits the retention of the maximum number of dead air spaces, and at the same time eliminates any sacrifice of necessary strength or rigidity. Unfinished attics sealed with Cornell make lower rooms cooler in summer and warmer in winter.

Rigidity—Cornell-Wood-Board is so rigid that the application of the largest panels may be accomplished with ease, and at the same time, the rigidity is not carried to the extreme that would result in detriment to such properties as strength, insulation or surface finish.

Dustproofness—As all Cornell-Wood-Board is mill primed and triple sized, Cornell construction should be used wherever dust is a factor. Closets lined with Cornell-Wood-Board are hermetically sealed. Cornell partitions in the cellar or attic are dust-proof. Cornell on basement ceiling keeps coal dust from entering rugs.

Strength—The process of manufacture by which this pure ground wood is finally built up into the finished board is such that the maximum required strength is always obtained without the sacrifice of any of the other properties which are necessary to the finished product.

Expansion and Contraction—Cornell-Wood-Board is built up entirely of pure ground wood pulp with the result that it is homogeneous throughout. In its process of manufacture, the individual fibers, all of which are exactly alike, are so treated chemically that the finished sheet possesses such a low rate of change in volume, on account of changing atmospheric conditions, that, from every practical consideration, the effects of expansion and contraction have been eliminated. Cornell-Wood-Board is guaranteed, when properly applied, not to warp, buckle or pull away from its fastenings.

Appearance—The CORNELL WOOD PRODUCTS CO. has been successful in developing a surface finish that has met with universal favor—the absolute uniformity of the pure ground wood fiber permits the attainment of this result.

The *oatmeal finish* of Cornell-Wood-Board, mill primed and surface sized, is obtained without the sacrifice of a single other valuable property, and presents an appearance that, by contrast to the surface finish of other wall boards, may be looked upon as a triumph in manufacturing skill.

Weight and Caliper—Cornell-Wood-Board is $\frac{3}{16}$ in. thick and weighs 500 lbs. per 1000 sq. ft. This relation between weight and thickness in Cornell-Wood-Board is the result of careful work that was done to obtain a ratio of weight to thickness that would insure maximum insultation with requisite density and without loss of any other essential property.

Bundling—Every panel of Cornell-Wood-Board is receiver by the purchaser in perfect condition as it comes finished from the machines. Each bundle of 10 panels is reinforced at the corners, bound with steel bands, held by patent fasteners and projected from dust and blemish by the strong "Cornell Jute" wrapper.

Specifications

Air Seasoning—Always separate Cornell-Wood-Boards 24 hours before using, to insure proper seasoning.

Headers—All studs and joists are to be lined up. Headers are to be inserted between joists and studs so as to give nailing surface for each edge and end of every panel. Headers are to be used at top of baseboard and at the junction of ceiling and sidewall; behind plate rails, chair rails, and picture moulds. All headers are to be firm, even and straight, presenting perfectly true nailing surface for the board.

Moisture Conditions—Board is not to be used over green or wet lumber. All brick or cement walls must be perfectly dry and coated with dampproof paint, tar or asphaltum and then furred.

Nailing—All boards are to have at least $\frac{3}{8}$ in. between all edges and ends of boards. No boards to be butted. Either 2d casing nails or 1-in. No. 15 gauge brads, spaced 9 in. apart, beginning at the top are to be used in nailing to all joists or headers completely covered by the board. Edges and ends of board are to be nailed on 3-in. spacing with 3d common wire nails. Care must be exercised in nailing so that no hammer marks are shown.

Brick and Cement Walls—After dampproofing, furring strips 1x2 in., spaced 16 in. on centers, to be fastened to the wall.

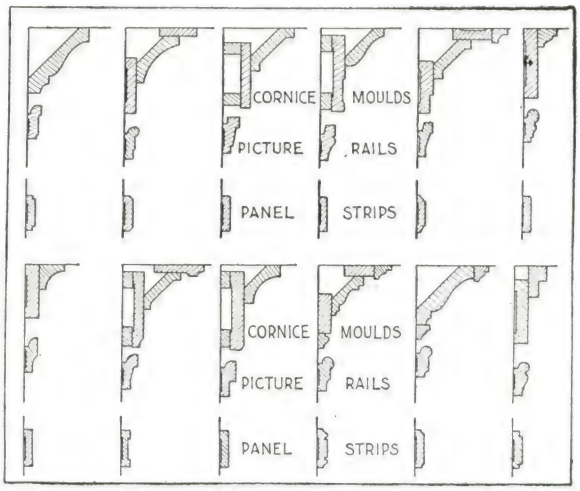
Continued on next page

Headers on furring strips are to be inserted for all end joints in the board.

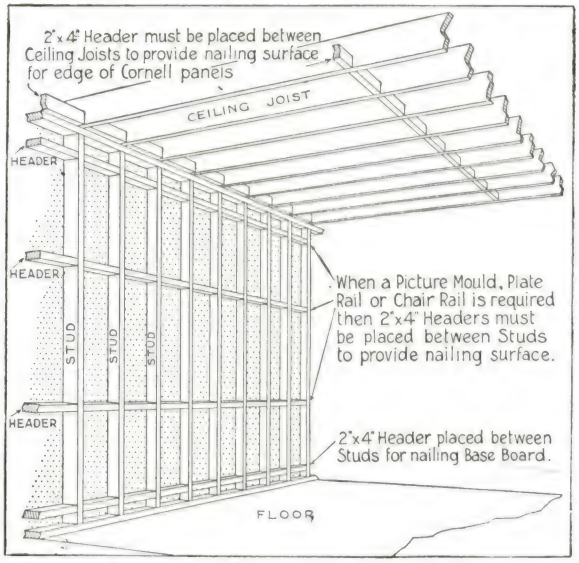
Decoration—Before painting or calcimining all surfaces are to be gone over carefully and all irregularities are to be filled with putty or filler. Filler to be made of 2 parts plaster of paris to 1 part of Dextrine. As Cornell-Wood-Board is thoroughly surface sized no priming coat is necessary for either paint or calcimine. Where board is used in bathrooms or other moisture exposed places, all surfaces are to be varnished after painting.

Wall paper may be applied on Cornell-Wood-Board provided panel strips are placed over the panel joints after paper has been applied. The use of wall paper does not eliminate the necessity for panel strips.

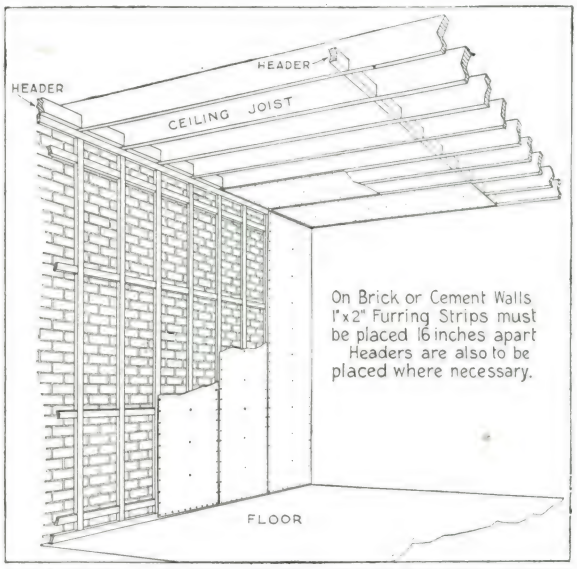
Paneling—Decorative strips not less than 2 in. wide and ⅜ in. thick are to be used to cover all joints between boards. Where ceiling strips are used, they are to be the same color as the finished board; where strips are varnished all nailholes are to be filled with putty, tinted with varnish; where cornice moulds, picture moulds, plate rails or chair rails are shown in detail, paneling strips are to meet them in a workmanlike manner. Decorative strips are to be applied only after wall board has been painted or calcimined.



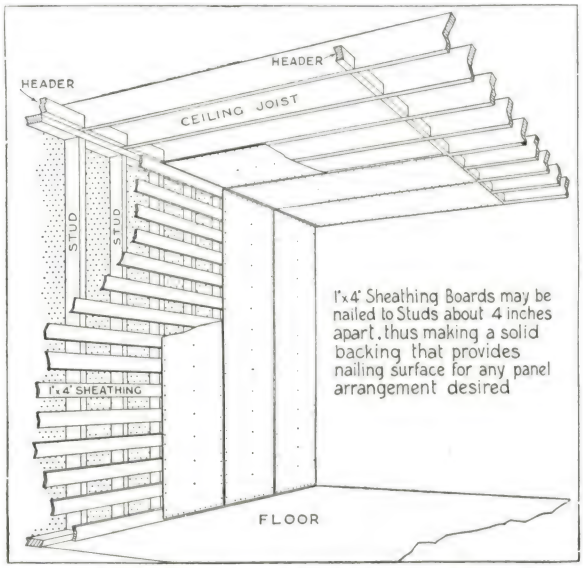
Suggestions for Cornice Moulds, Picture Moulds and Decorative Panel Strips Used With Cornell-Wood-Board



Typical 2x4-in. Header Detail in Sidewall and Ceiling to Provide Proper Nailing Surfaces for Mouldings and Cornell Panel Effects

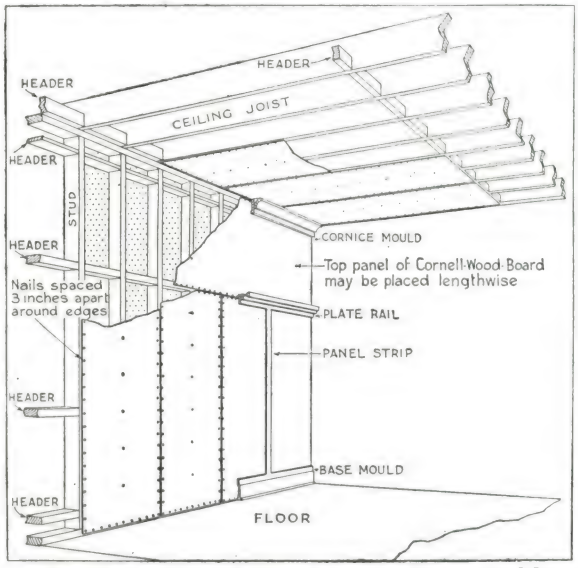


Approved Cornell Construction Over Brick Walls, Showing Furring Strip and Header Details



Cornell-Wood-Board Applied Over Sheathing Boards Spaced About 4 in. Apart

A popular Cornell construction used extensively in the south. Permits any panel arrangement



Typical Cornell Detail Showing Header Construction Where Cornice Mould, Plate Rail and Base Mould Are Used

DETAILS OF CORNELL-WOOD-BOARD CONSTRUCTION

THE UPSON COMPANY

Manufacturers of Wall Board and Various Fiber Specialties

FACTORY AND GENERAL OFFICE

10 Upson Point
LOCKPORT, N. Y.

CABLE ADDRESS:
"UPSON-LOCKPORT"

DISTRIBUTING AGENCIES IN ALL PRINCIPAL CITIES

Products

UPSON SUPER-SURFACE PROCESSED BOARD; UPSON-FIBER-TILE; UPSON-FIBER-STRIPS; UPSON SELF-CLINCHING FASTENERS; UPSON "INTO-STAY" NAILS.

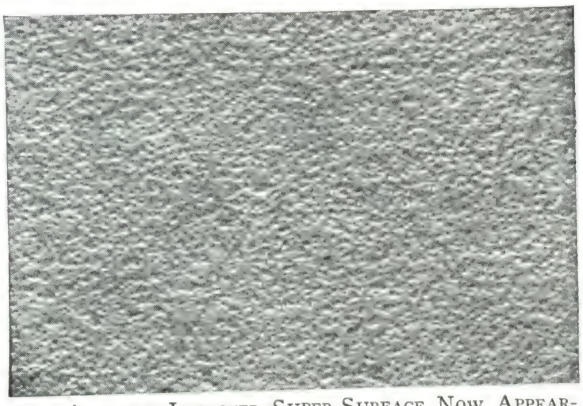
Also makers of Special Boards for Commercial and Industrial Uses.

Upson Processed Board

Description—Upson Board is a solid, homogeneous wall board, frequently called "refined lumber." The panels are made of long, wiry, *shredded* wood *fibers,* principally spruce, *compressed* under great force and then built up into large, strong, *rigid* panels of light weight that are easily and quickly handled. Plies are put together with a fire and water resisting mineral adhesive. Panels come ready for immediate application and decoration. Can be applied direct to studding, over old plaster, or on skeleton frames for partitions.

Upson Board is a good non-conductor of sound, heat and cold; is sanitary; and can not crack, crumble or fall like plaster. It is also better than *brittle* plaster board, which usually shows a waste loss of 5% to 10% from handling, fitting and applying, and which must be applied with large headed nails which can not be concealed. It is likewise cheaper and quicker to apply and decorate than plaster board. Being chemically treated all the way through, it will not absorb or hold moisture like plaster or plaster board.

Upson Board weighs about one-fifth as much as plaster, and one-quarter as much as plaster board; therefore, load imposed on structural members is reduced to a minimum.



THE ARTISTIC, IMPROVED SUPER-SURFACE NOW APPEARING ON ONE SIDE OF ALL PANELS OF UPSON BOARD
The other side is smooth and fuzzless, especially adapted for enamel. Either side can be used

By the original Upson method of processing, every panel is *kiln cured* to minimize expansion and contraction; *waterproofed* with neutral oils and gums to resist penetration of dampness and water; and *surface filled* in addition to being chemically treated throughout, to afford a perfect painting surface.

Upson board has the enviable record of less than one complaint to every 4,000,000 ft. sold and used.

Distinctive Features—*Upson board is different.* It is *stronger,* harder and stiffer than other boards, and its improved super-surface makes it also the most beautiful board on the market. It holds to the nails where soft, spongy boards pull away. It also minimizes waste in cutting and fitting.

Smooth and Non-absorbing Surface—Eliminates expensive priming coat required by most boards and takes less paint per coat and fewer coats of paint. Ordinarily Upson Board costs from $5.00 to $15.00 per 1,000 sq. ft. *less* to decorate.

Compact—Upson Board is compact and woodlike in character.

Durability—Upson Board is *long-lived* because it is made of *highest grade* ground wood and chemical fiber (cellulose) whereas boards made of "rosin-loaded," coarse, ground wood or ground wood screenings deteriorate rapidly with age and become weak and brittle. The beautiful "mat" or pebbled surface is permanent—will never come out. This makes Upson Board the most beautiful, as well as the most dependable board.

Uses—Upson Board can be used in every kind of building, new or old, in the city or country. Splendidly adapted for remodeling or repairs. Nothing better for re-covering unsightly or unsafe plastered surfaces. Does away with the muss, dust and confusion of plaster and can be applied in *one-third* the time.

Application and Decoration—No material offers so wide a latitude for artistic effects. Paneling is essentially good architecture, affording a splendid background for furnishings. Panels can be finished in soft, dainty tints or deep, rich shades, while hand painted friezes or stencils can be applied to obtain unusual decorative effects.

Specifications for Applying and Decorating—Studs and joists should be straight and true with centers 12 or 16 in. apart for $\frac{3}{16}$-in. boards. ¼-in. Upson Board can be applied on 18-in. centers. Place headers so that panels can be nailed on *all four sides.* Centers of panels should first be fastened to studs or joists with Upson self-clinching fasteners. These fasteners eliminate disfiguring nailholes in centers of panels, and *costly* and unsatisfactory countersinking of nails and filling of nailholes—both operations seldom well done. For edges of panels, use 1-in. flat head barbed nails, nailing ½-in. back from edge every 8 in. In repairs or remodeling, Upson Board can be applied over old plaster or wood, using 2-in. nails for centers and edges. Where old surface is uneven, or where walls are of brick, surface should be furred with strips of wood 2x⅞ in. made level to afford an even nailing surface.

Panels should be given a coat of paint before applying battens or decorative strips. Apply first coat of paint as it comes from can, reduced by adding one-third quantity of hard drying, medium-priced varnish, allowing coat to dry 24 hours. For second coat, use paint as it comes from can. Stippling gives a soft, even, velvety effect. Oil paints or enamels may be used by following directions of the maker.

Upson board can also be stained with *pigment* stains diluted with linseed oil. Penetrating stains can not be so successfully used on wall board.

Sizes—Upson Processed Board is made in four thicknesses: ⅛, $\frac{3}{16}$, ¼ and ⅜-in.

¼-in. Upson Board is ideal material for walls and

Continued on next page

ceilings of every kind of building when cost is not the prime consideration. It is made 48-in. wide and 6, 7, 8, 9, 10, 12, 14 and 16 ft. long. $\frac{3}{16}$-in. Upson Board is made 32, 48 and 64 in. wide, in lengths from 4 to 16 ft.

Comparative Costs—It is impossible to give an accurate comparison between cost of Upson Board and other lining materials, as cost of these materials varies in different localities. In most sections, Upson Board costs less than plaster or plaster board, and considerably less than steel or lumber.

Guarantee—Each panel of Upson Board is guaranteed to be equal in quality to any sample and to give satisfactory results when applied according to this company's printed directions.

Upson-Fiber-Tile

Description—A beautiful and inexpensive lining for bathrooms, kitchens, hospitals, restaurants, or wherever a white, washable, sanitary surface is desired. Upson-Fiber-Tile is made of the same high grade materials that go into Upson Processed Board, but has a harder, smoother surface with deep, permanent indentations of tile patterns.

Finishing—Finished like wood with 2 or 3 undercoats of white with 1 or 2 coats of enamel. Proper rubbing between coats will make a high-grade, lasting surface which can be washed with soap and water and which will withstand the usage of the ordinary kitchen or bathroom for years.

Sizes — Upson - Fiber - Tile comes in 2 designs: oblong ½x4 in.; and square, 4x4 in. Panels are made only in 48-in. widths and in lengths from 6 to 16 ft.

PHANTOM VIEW OF HOW THE UPSON SELF-CLINCHING FASTENER HOLDS UPSON BOARD SECURELY FROM THE BACK WITHOUT NAILMARKS

Dotted lines show how curved prongs clinch as they are forced into Upson Board. Straight center prong keeps board from slipping to either side. Prongs on the right show normal position before board is applied

Upson-Fiber-Strips

Strips made of Upson Board to be used as battens or decorative strips in covering panel edges and for other purposes in place of wooden strips. Furnished in 3 widths: 2, 3 and 4 in. wide; 3 thicknesses: $\frac{3}{16}$, ¼ and ⅜ in.; and in even foot lengths from 6 to 12 ft.

Upson Self-Clinching Fasteners

Small steel devices for holding panels of wall board securely to studs or joists, without disfiguring marks. They do away with the biggest objection to the use of wall board—nailholes in centers of panels. The fasteners are first nailed to studs or joists every 9 or 10 in. Wall board panel is hung over them. A piece of 2x4 is laid on the panel over the fasteners to protect the board. The fasteners clinch into the back of board when board is driven down hard on them by means of heavy hammer blows on the 2x4. One fastener is as strong as 10 finishing nails driven into the sq. in.

Upson "In-to-Stay" Nails

Specially made 1-in. flat head nails for applying Upson self-clinching fasteners and nailing edges of panels to studs or joists. Will not pull out easily like ordinary nails.

Where Obtainable

Upson products are sold in nearly every city of the United States by one or more *discriminating* dealers. If unable to locate the local distributer, the manufacturers will gladly give name of nearest dealer.

Co-operative Service and Literature

The Upson Company has prepared interesting and instructive architectural drawings showing proper methods of applying Upson Board. In addition, the company also has a beautiful portfolio showing suggestive paneling in modern homes, offices, stores, hospitals and other places in which Upson products have been actually applied.

The Service Department of The Upson Company is always glad to give information, estimates and suggestive panel schemes without obligation on the part of the architect. Genuine Upson Processed Board can be quickly identified by its famous *blue* center and the Upson "sun" trade-mark on the edge of each panel.

INTERIOR WITH CURVED CEILING AND SIDE WALLS OF UPSON BOARD

UNITED STATES GYPSUM COMPANY

Sheetrock Wallboard
205 West Monroe Street
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 1170 Broadway
BUFFALO, N. Y. Ellicott Square
BOSTON, MASS., 77 Summer Street
WASHINGTON, D. C., 410 Bond Building
BALTIMORE, MD., 910 American Building
PHILADELPHIA, PA., 107 Empire Building
PITTSBURGH, PA., 1723 Oliver Building
CLEVELAND, OHIO, 646 Hanna Building
ATLANTA, Ga., 358 Williams Mill Road
CINCINNATI, OHIO, 52 Blymyer Building
DETROIT, MICH., 1360 Penobscot Building
MILWAUKEE, WIS., Grove and Oregon Streets
MINNEAPOLIS, MINN., 650 Builders Exchange
ST. LOUIS, MO., 1339 Syndicate Trust Building
KANSAS CITY, MO., 523 Bryant Building
OMAHA, NEBR., 301 Peters Trust Building
DENVER, COLO., 401 Boston Building
LOS ANGELES, CAL., 902 Citizens National Bank Building

Product

SHEETROCK, a Wallboard; SHEETROCK FINISHER.

For Pyrobar Floor Tile, Partition and Furring Tile, and Column Covering, see pages 166-167; for Plaster Board and Plaster Board Partition Systems, see pages 307-309; for Gypsum Plasters and Finishes see pages 368-371; for Reinforced Roof Tile and Monolithic Roof, see pages 899-901.

Description of Sheetrock

Sheetrock consists of gypsum plaster moulded between two sheets of tough paper. The paper is folded *squarely* over the edges by a patented process; this provides a very strong edge for nailing and insures a permanently tight, flush joint. Sheetrock is made in lengths of 6, 7, 8, 9 and 10 ft., widths of 32 and 48 in., and in uniform thickness of ⅜-in.

Durability—A rock product, Sheetrock positively can not warp, shrink nor buckle. It combines strength and rigidity with a quality of toughness, so that it can be quickly nailed to the studding or sawed to fit.

Fire Resistive—Sheetrock will not burn and is a low conductor of heat. As a result of tests, the Underwriters' Laboratories, Inc., have included it in their List of Inspected Mechanical Appliances.

Insulation—Because of its composition, thickness, and permanently tight joints, Sheetrock is far superior to other unit wall materials in its resistance to heat, cold, and sound.

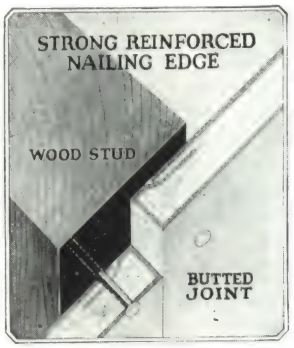
Takes all Decorations—Due to the fact that Sheetrock will not warp, bulge, nor shrink, and to the fact that the joints can be concealed by the use of Sheetrock Finisher, Sheetrock walls can be decorated in any manner desired—wall paper, paint, calcimine, in either flat surface or paneled effects.

SHEETROCK CAN BE SAWED AND NAILED LIKE LUMBER
Takes all decorations, wall paper, paint, calcime or panels

Sheetrock Finisher

This is a powdered material developed expressly for use in treating Sheetrock joints and nail-heads. It is to be mixed with water, and can be very quickly applied by the decorator, by the use of a scraper-knife. After application, it does not expand or contract; it bonds perfectly with the covering of Sheetrock and binds the boards together into a strong, smooth wall. It does not discolor the wall decorations.

Full directions for its application are on the package.



SHEETROCK PATENTED REINFORCED EDGES WHICH PERMIT OF TIGHT, FLUSH JOINTS AND GIVE GREAT NAILING STRENGTH
Made of gypsum, Sheetrock is rigid, non-warping, fireproof

Specification for Sheetrock

Care on the Job—Sheetrock shall be piled flat on the floor in center of rooms and protected so as not to become scratched.

Framing—Studs and joists shall be surfaced. They shall be set perfectly straight and true, 16 in. on centers. Headers shall be provided so that all sides and ends of Sheetrock can be nailed.

Ceilings—Ceilings shall be erected before sidewalls, boards being applied parallel with joists. Tack a strip of wood along the top of studs, ½ in. from ceilings, to hold edge of Sheetrock until applied. Make a "T" of 2x2's to hold Sheetrock in place on ceilings while nailing. All cross joints shall be broken. To cut Sheetrock, place trade-mark side downward and use a sharp saw, supporting board close to sawing edge.

Walls—Sheetrock shall be applied full length up and down, and must be fitted tightly against ceiling boards and against adjoining boards, scribing and sawing when necessary.

Nails and Nailing—3d countersunk or fine flathead nails, cement coated, shall be used, driven straight in, heads slightly below surface. On intermediate supports, nails shall be spaced 6 in. apart on ceilings and 9 in. apart on walls. Nails shall be spaced 3 in. apart at all edges, and ⅜ in. from edges. All edges shall be butted tightly together. First drive a few nails at joining edge; then completely nail first intermediate support; then second intermediate support; then nail edges; lastly nail ends.

Decorating—(Note to Architects) Sheetrock takes any form of decoration. See description of "Sheetrock Finisher" above. Before wall papering or calcimining, a varnish size should be used; before painting, a size made by mixing equal parts of varnish sizing with the first coat of paint.

ESTABLISHED 1795

BIRD & SON, INC.

Manufacturers of Roofings, Building Papers and Wall Board

MILLS AND GENERAL OFFICES

EAST WALPOLE, MASS.

CHICAGO OFFICE AND PLANT: 1472 West 76th Street
NEW YORK OFFICE: 200 Fifth Avenue
CANADIAN OFFICE AND PLANT: HAMILTON, ONT.

Products

BIRD'S ROOFS, WALL BOARD and BUILDING PAPERS, including NEPONSET BLACK BUILDING PAPER.

Bird's Neponset Black Building Paper

Bird's Neponset Black Building Paper is the standard among architects and contractors, because it stays waterproof, keeps out drafts and dampness, lasts as long as the building, and saves fuel.

It is absolutely the highest grade of waterproof building paper (made by BIRD & SON, inc.) manufactured and recommended for satisfactory results wherever waterproof building paper should be used.

The ordinary non-waterproof paper absorbs moisture and can not keep the interior of buildings dry and free from drafts any more than wet clothing can protect the wearer.

Bird's Neponset Black Building Paper stands the severest waterproof test it is possible to conceive. Put a piece of Neponset Black Building Paper in water; leave it there. The paper will not disintegrate or soak up water.

Here are just 7 of its many uses: (1) Under asphalt, metal, slate shingles or tile. (2) Behind clapboards and shingles back of stucco on the walls of buildings. (3) Between floors. (4) Between double floors that extend over an open porch. (5) Within walls of house, store or factory in place of back plaster. (6) Cellar lining. (7) For storage and cold storage work.

Bird's Neponset Black Building Paper is of strong stock, waterproofed throughout with asphalt compound. It is always uniformly strong, dependable, and ready for any service to which a building paper can be put, whether for new buildings, or for rebuilding, or repair work.

Put up in rolls 36 in. wide, containing 500 sq. ft., weight about 45 lbs. per roll.

Specifications—(For applying building paper under finished surfaces of frame outside walls).

(1) (a) Cover the entire outside surface of the sheathing with 1 thickness of Neponset Black Building paper, manufactured by BIRD & SON, inc., East Walpole, Mass., as follows: Where sheathing boards are applied horizontally, the paper is to be applied vertically; where sheathing boards are applied diagonally, the paper is to be applied horizontally. In all cases the paper is to be so applied as to make the entire surface windtight and weathertight. Wherever paper is applied it shall be lapped at least 2 in. both vertically and horizontally, and shall be carried up under all finish, frieze, cornices, window and door casings, water table, etc. and reinforced around all openings in the wall. All paper to be sufficiently nailed and held in place until the shingle or other finished surface has been applied.

(b) Wherever paper is applied directly to wood studs, it is to be placed at right angles to them, and all joints or laps are to come directly over studs.

A Complete Line of Building Products All Under One Trade-mark

ASPHALT SHINGLES, RED OR GREEN SLATE SURFACED

Bird's Neponset Twin Shingles. 20x12¾ in., absolutely the highest quality asphalt shingle made
Bird's American Twin Shingles. 20x10 in., the highest quality 10-in. shingle made
Bird's Proslate Shingle, Individual. 8x12¾ in., highest quality and heavy

ROLL ROOFINGS, RED OR GREEN SLATE SURFACED

Bird's Paroid Roofing. The "old stand-by" of ready roofings. Heavily surfaced with red or green crushed slate. One weight: 90 lbs. per 108 sq. ft. 36 in. wide
Bird's Shingle Design Roofing
Bird's Art Craft Tile Design
Bird's Slate Surfaced Roofing 80 lbs. per square

ROLL ROOFINGS, SMOOTH SURFACED

Bird's Paroid Roofing. Two weights: 50 and 60 lbs. per square
Bird's American Ready Roofing. Three weights: 35, 45 and 55 lbs. per square

ROLL ROOFINGS, MINERAL SURFACED

Bird's Granitized Roofing. Two weights: 45 and 56 lbs. per square

BUILDING PAPERS

Bird's Neponset Black Building Paper
Bird's Saturated and Coated Building Paper
Bird's American Waterproof Building Paper

WALL BOARD

Bird's Neponset Board. Cream White
Bird's American Wall Board

SPECIALTIES

Bird's Neponset Asphalt Felt
Bird's Asphalt Built-up Roof for Factory Building
Bird's Plastic Cement
Bird's Neponset Roofing Paint, red and black
Bird's Neponset Floor Covering
Bird's Neponset Rugs
Bird's Neponset Rug Border
Bird's Neponset Fiber Shipping Cases
Bird's Press Board

Experience and Facilities

BIRD & SON, inc., was established in 1795. Bird's products are carried in stock by thousands of local building material supply dealers, and can be obtained from them when and as required. In case of necessity, Bird's products can always be shipped on short notice from the nearest mill.

Bird's products have been distributed and applied to buildings of every description throughout the entire world. BIRD & SON, inc. mills are the last word in modern equipment, and absolutely the highest manufacturing standard is maintained.

FLAXLINUM INSULATING COMPANY

Manufacturers of Flaxlinum and Flaxlinum Keyboard

ST. PAUL, MINN.

NEW YORK, N. Y., L. E. NEWPORT, INC., 50 Union Square
DETROIT, MICH., FREE PRESS BUILDING
CLEVELAND, OHIO, BUILDERS EXCHANGE
KANSAS CITY, MO., BUNTING HARDWARE CO.
CINCINNATI, OHIO, GEO. C. RAMSEY, 206 W. Court Street
LOS ANGELES, CAL., BOHN & MOYER, 309 Terminal Sales Building
CHICAGO, ILL., BUILDING MATERIAL EXHIBIT, 15 E. Van Buren Street
SALT LAKE CITY, UTAH, INSULATION MANUFACTURING CO., Templeton Building
MILWAUKEE, WIS., 220 Third Street
OMAHA, NEBR., 1616 Farnam Street
INDIANAPOLIS, IND., VONNEGUT HARDWARE CO.
ROCHESTER, N. Y., BUILDING MATERIAL CORP.
GRAND RAPIDS, MICH., S. A. MORMAN & CO.

Products

FLAXLINUM INSULATION; FLAXLINUM KEYBOARD INSULATED SHEATHING.

Flaxlinum Insulation

Purpose—Flaxlinum is a thermal and sound insulation, for use in residences, apartments, churches, schools, industrial buildings, icehouses, cooling rooms, potato and fruit storage warehouses, barns, and in any type of construction requiring protection against heat or sound transmission.

Description—Flaxlinum is a semi-rigid self-sustaining felt manufactured solely from chemically purified flax fiber.

Flaxlinum is a semi-board form of insulation. Its structural strength depends on no covering or envelope. It is inherent in the long, tightly felted fibers of the material itself. Flaxlinum is flexible enough to take up all the movement which can result from the shrinkage of lumber or the settlement of a building; yet its toughness or rigidity is absolutely guaranteed against pulling apart or falling out after installation.

Flax fiber is the toughest and longest lived of vegetable fibers. It is the basis for linen and for commercial oakum. It is extensively used in the upholstery of furniture, in the manufacture of rugs, and wherever toughness, freedom from rot and decay and length of fiber is essential.

Thicknesses and Sizes—Flaxlinum is made ¼, ½, ¾ and 1 in. thick. ¼-in. Flaxlinum is made in sheets 32 in. wide by 8, 9 or 10 ft. long. This thickness of Flaxlinum is intended primarily for deafening purposes, to be laid between rough and finished floor in apartments to prevent the passage of sound.

½-in. Flaxlinum is made 16½ in. wide by 8, 9 or 10 ft. long for frame residence insulation. Each side is "flanged" or scored 1¼ in. from each edge so that when forced in between studdings set 16 in. on centers it makes an airtight joint with the studding on each side. (See specification for residence insulation.) Flanged Flaxlinum can also be had for studdings set 24 in. on centers. ½-in. Flaxlinum is also made 32 or 48 in. wide by 8, 9 or 10 ft. long for deafening below the ceiling joists, for insulation on brick or brick veneer buildings or for ceiling insulation. (See specifications for details of application.)

¾-in. and 1-in. Flaxlinum is made in sheets 32 in. wide by 8 and 9 ft. long. These thicknesses are intended primarily for roof insulation and for special jobs that require insulation in excess of the ½-in. thickness. (See specifications for the insulation of residence and apartment roofs.)

Flaxlinum may be had cut to special sizes to meet any requirement. A detailed list of stock sizes follows:

FLANGED FLAXLINUM
(To fit between studs set 16 or 24 in. on centers)
½-in. flanged.....16½ or 24½ in. by 8, 9, 10 ft.

FLANGED FLAXLINUM JOIST HEADERS
(To fit between joists set 16 in. on centers)
½-in. flanged.....16½ by 8, 10, 12 in.

FLANGED FLAXLINUM DEAFENING HEADERS
(To fit below ribbon or joist and on top of rough floor)
½-in. flanged.....16½ by 4 or 6 in.

FLAXLINUM FLAT SHEETS
1 -in. flat sheets.....32 in. by 8, 9 ft.
¾-in. flat sheets.....32 in. by 8, 9 ft.
½-in. flat sheets.....32 in. by 8, 9, 10 ft.
¼-in. flat sheets.....32 in. by 8, 9, 10 ft.

FLAXLINUM DEAFENING JOIST PADS
½-in. flat sheets.....3 in. by 3 ft.

FLAXLINUM DEAFENING PLATE PADS
½-in. flat sheets.....4 or 6 in. by 3 ft.

Flanged Insulation Versus Flat Sheets—The study of heat transmission has developed the fact that as heat leaves or enters any substance it encounters a surface resistance in addition to its resistance as it actually passes through the material. The use of "dead air spaces" for insulation rested on the fact that each time heat approached one of the wood divisions of such a space it encountered such a "surface drop." It is apparent that if additional exposed surfaces give additional efficiency, insulation flanged in between the studding has a greater efficiency than insulation next to either sheathing or plaster. That is the principle behind the Flaxlinum specification for flanged Flaxlinum. It can be checked by reference to Willard and Harding or other reliable investigators.

Efficiency—There have been many tests, some conducted by reliable engineers, upon the conductivity of various insulating materials. The great variation which any investigator will find between B. t. u. figures given out by different sources is due to varying methods of testing, different apparatus, different temperature ranges through which tests were conducted and variation in samples tested.

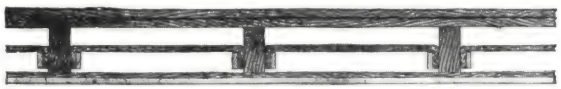
There has been, however, a very definite ratio established by which the value of insulation may be ascertained. The FLAXLINUM INSULATING COMPANY will be glad to furnish any practicing architect with working data, guaranteed by the experiments of thoroughly reliable engineers, for figuring heat loss in B. t. u.'s or in pounds of coal or to submit, without obligation, the completed set of figures on any particular job.

A study of many house plans has shown that Flaxlinum for residence work actually saves from 25% to 40% of the annual fuel bills. These figures are not estimates. Authority will be furnished for any job figured. Flaxlinum is equal to 4 times its thickness in solid pine lumber, to 17 times its thickness in brick, or to 27 times its thickness in concrete.

Specification for the Insulation of a One- or Two-story House with Flaxlinum Insulation

Sidewall Insulation—*Materials*—Thermal insulation for all outside walls shall be ½-in. flanged Flaxlinum, manufactured by the FLAXLINUM INSULATING COMPANY, St. Paul, Minn.

Application—½-in. flanged Flaxlinum sheets shall be applied between studding from lower to top plate. Top and bottom of



TOP VIEW OF FLANGED FLAXLINUM APPLIED BETWEEN STUDDING

sheets shall be notched and flanged into place. Furring strips (lath) shall be securely nailed through flanged edges and top and bottom of Flaxlinum sheets to studdings and plates (to insure airtight joints). In gables, blocks of studding dimension shall be inserted between studding flush with bottom edge of ceiling joists. Insulation shall be run to these headers and fastened to them with lath.

Roof Insulation—*Materials*—Thermal insulation for the roof shall be 1-in. Flaxlinum flat sheets, manufactured by the FLAXLINUM INSULATING COMPANY, St. Paul, Minn.

Application—1-in. Flaxlinum flat sheets shall be applied to the underside of top floor ceiling joists. Insulation shall be furred out with 1x2's under joists to receive lath and plaster. At all end joists of Flaxlinum insert wood headers and nail both sheets to these headers to insure airtight joints.

Sound Deafening

The principles of correct sound deafening are just as clear and definite as those governing all other problems in construction. In order to grasp the why and wherefore of a deafening specification suitable for any particular building, it is necessary to understand something of these principles and their application.

Continued on next page

Apartments can not be made quiet just by inserting some quilted felt, in a haphazard manner, somewhere between the floors and in the walls. The problem has to be studied in the light of knowledge of the nature of sound and of the materials and methods available to stop its passage.

Sound vibrations are governed by the substance in which they are set up and the substances through which they travel. Thus, some substances are better conductors of sound than others. Moreover, the ease with which sound is transmitted from one point to another is directly proportional to the amount of resistance to the vibrations making up that sound. Thus, if a sound generated on a wood floor can travel along the joists through the plate and into the studdings below, without ever leaving the wood, there has been practically no resistance to its passage. The same principle, applied to a column of air, makes possible the speaking tube. The length of the space to be traveled is relatively unimportant.

The above explanation makes clear the futility of the common type of suspended ceiling as a barrier to sound transmission. Direct contact between floor and ceiling has been cut off but sounds set up in the wood of the floor above can travel without hindrance through the joists to the plates and along the joists laid below. There is a continuous wooden transmitter for the sound.

To correctly deafen between two floors it is necessary to cut one floor off from the other with some non-conductor of sound. To place a layer of sound absorbing material between rough and finished floor helps some, of course, but there is still a continuous transmission through the studdings, plates and joists. This transmission must be broken up before a satisfactory job of deafening can be secured.

Sound transmitted to a material is (1) reflected, (2) transmitted, (3) absorbed. Therefore, it is possible that while a material may be extremely low in transmission it may be very high in reflection, eliminating it as an efficient sound deafener. The test is in the absorbing quality, coupled, of course, with those qualities which are inherent in every good building material —strength, durability and ease of application.

According to the tests of Dr. F. R. Watson, associate professor of experimental physics, University of Illinois, ½-in. Flaxlinum transmits 6.5% of the sound conveyed to it and reflects 26.2%, leaving an absorption of 67.3%. By comparing this high absorption and low transmission with 59.7% transmission and 34.3% absorption for ½-in. hair felt (by the same tests), one can arrive at the approximate value of Flaxlinum as a deafener. These tests are relative and not absolute values.

Write for specifications No. 3A, 5A, 7A.

Flaxlinum Keyboard

Purpose—Flaxlinum Keyboard is an insulated sheathing for stucco homes. It replaces shiplap or D & M fencing, waterproof paper and insulation by combining a strong sheathing with insulation and the finest grade of wood lath. Keyboard saves labor and makes possible the most reasonable insulation for stucco homes.

Description—Flaxlinum Keyboard is built up of ½-in. sheets of Flaxlinum to which are secured a thickness of asphalt saturated waterproof paper and a No. 1 Pine beveled or dovetailed wood lath. The quality of the lath insures against buckling and the dovetailed key provides a mechanical bond from which stucco can never chip or fall away.

Strength of Keyboard Construction—Keyboard is applied direct to the studding. Its strength against wind stress has been thoroughly tested by the company engineers upon sections 8x10 ft. and 10x12 ft., and the rigidity curves of Keyboard have been determined to run over 200% higher than those of wood sheathing. These tests have been thoroughly checked by Dr. W. F. Holman of the University of Minnesota, under whose direction the tests were made. They have received the approval of the building inspectors in practically all of our large cities.

Thousands of Keyboard homes have been erected during the last 10 years and many have undergone severe natural tests, such as exposure without stucco for 3 years, the presence of gales which dislodged the roof, etc. None have ever developed a weakness in the building. The Government during 1916 and 1917 built cooling rooms with 20-ft. studdings as large as 150 ft. long, sheathing them all with Flaxlinum Keyboard. On these buildings the stucco gave perfect satisfaction and the sheathing has held them absolutely true to line. Copies of Dr. Holman's tests, and tests made by reliable architects as to Keyboard construction, will be furnished on request.

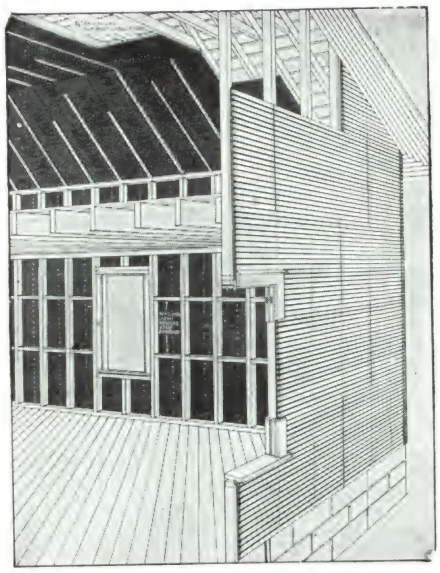
Sizes—Flaxlinum Keyboard is made in two sizes and two forms to meet the requirements of magnesite and portland cement stucco.

Magnesite Keyboard (also used for interior plaster) has its lath spaced ¼ in. apart and beveled to a 20° angle. Portland Keyboard lath are set ½ in. apart and beveled to a 30° angle. Either style comes in sizes 32x36 in. or 48x36 in., allowing for breaking joists every 3 vertical feet without cutting the Keyboard.

Specifications for Applying Keyboard Sheathing

Sheathing and Insulation—*Materials*—Sheathing shall be [Magnesite] [Portland] Flaxlinum Keyboard Sheathing, manufactured by the Flaxlinum Insulating Company, St. Paul, Minn.

Application—Before applying sheathing, horizontal headers, stud dimension, shall be placed between studding every 3 vertical feet (to form nailing base for end joints of Keyboard sheathing and to form heat and fire stop in walls). Sheets of Keyboard sheathing shall be butted tight (there will be no expansion). Vertical joints shall be broken every 3 ft. by using one-half Keyboard 36x32 in. and one-half 36x48 in. (two sizes eliminate waste in cutting). Sheathing shall be nailed through each lath into every stud and to each header at 4-in. intervals with 6d coated siding nails. On corners, sheets on one side are to be extended ¾ in. beyond studding and Keyboard sheets on adjoining side are to be butted tight against this projection. All corners and exposed edges shall be covered with a No. 18 gauge ½-in. mesh galvanized wire cloth, well stapled to Keyboard. Stucco shall be mixed and applied according to the specifications of the manufacturer. Rough and finish coats shall be not less than ½ in. thick over the face of lath.



Miniature of Specification for Keyboard Sheathing

Roof Insulation—The insulation of the roof of a Keyboard house should carry the same specification as for the roof of a sided house.

Samples

Samples and literature covering any phase of insulation will be sent on request.

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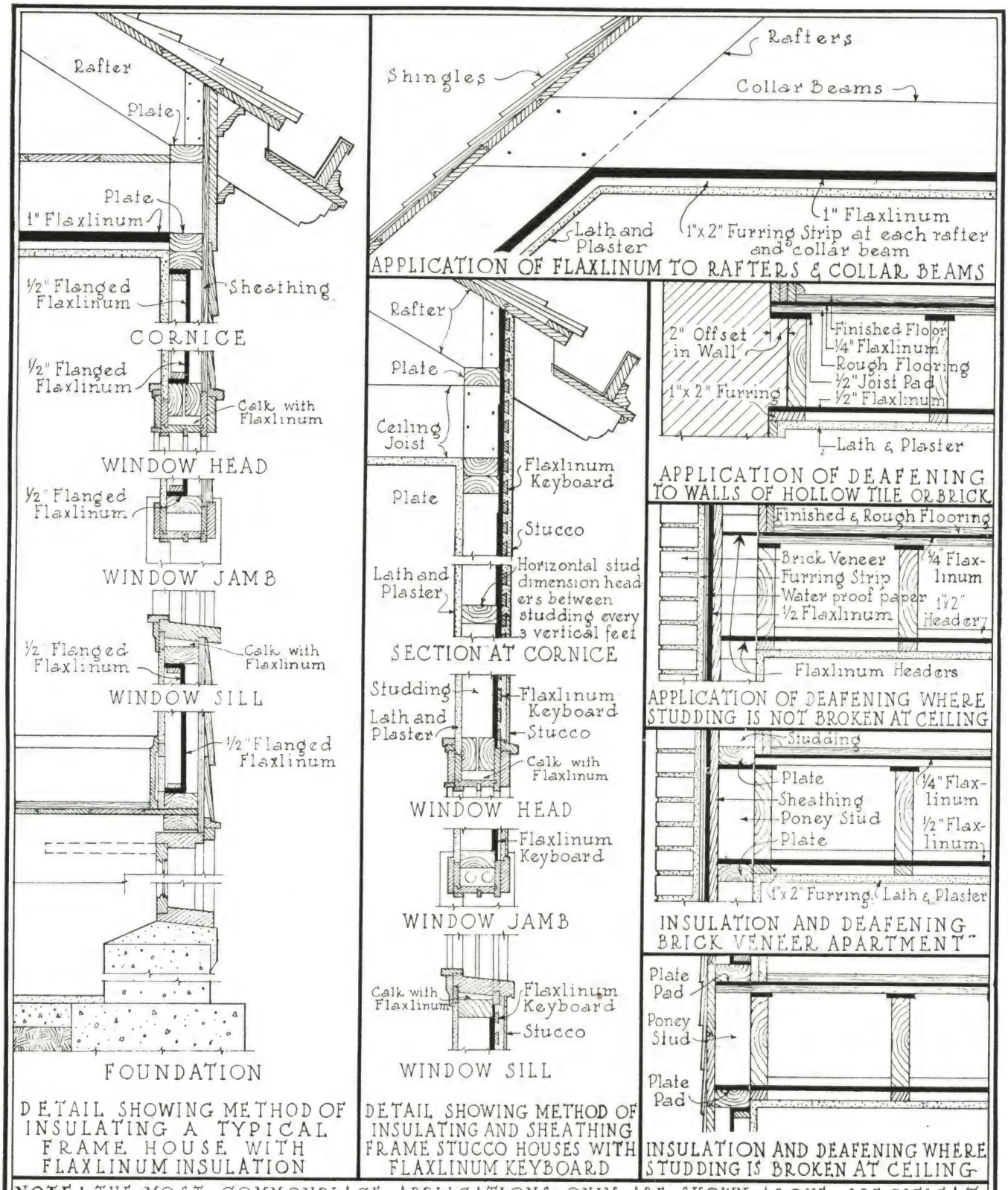

DETAIL SHOWING METHOD OF INSULATING A TYPICAL FRAME HOUSE WITH FLAXLINUM INSULATION

DETAIL SHOWING METHOD OF INSULATING AND SHEATHING FRAME STUCCO HOUSES WITH FLAXLINUM KEYBOARD

NOTE: THE MOST COMMONPLACE APPLICATIONS ONLY ARE SHOWN ABOVE, SPECIFICATIONS FOR BRICK AND BRICK VENEER HOUSES INDUSTRIAL ROOFS, COOLERS, ICE HOUSES, POTATO WAREHOUSES AND OTHER SPECIAL TYPES OF CONSTRUCTION WILL BE SENT UPON REQUEST

DRAWN BY SWEETS CATALOGUE SERVICE INC.	DETAILS SHOWING A FEW INSTALLATIONS OF FLAXLINUM INSULATION & KEYBOARD	SCALE 3/4" EQUALS 1' DATE AUG 22	DRWG 1

C. S. GARRETT & SON CORP.

"Garrettite" Building, Sheathing and Insulating Papers

TELEPHONES
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PHILADELPHIA, PA.

Products

RAWHIDE WATERPROOF BUILDING, SHEATHING and INSULATING PAPERS; LIBERTY BLACK INSULATING PAPERS; ASPHALT SHINGLES.

TRADE-MARK

Rawhide Waterproof Building Paper

The C. S. Garrett Rawhide is a high grade rope paper made of old manila rope stock, drawn out with a long fiber to give the best strength to the paper. The paper is treated with the Rawhide secret process to procure its waterproof qualities. It is odorless.

ROLL OF RAWHIDE

Rawhide is put up in 36-in. rolls.

Made in two standard colors No. 200 Buff weighing 50 lbs. per roll, and No. 215 Red, weighing 60 lbs. per roll of 500 sq. ft. The No. 200 is the grade generally used for ordinary insulation. It has sufficient body to produce satisfactory results under ordinary conditions; but if the test is exceptionally severe the No. 215 is recommended.

For Use on Frame and Stucco Houses—When used under slate, clapboards, shingles and stucco, Rawhide waterproof building paper is equal to a course of sheathing boards in protecting from cold and dampness.

In the accompanying illustration two types of stucco construction are shown. Type A has been given the only perfect permanency rating in the progress report of the United States Bureau of Standards. No sheathing boards are used in this construction, the windproofing and weatherproofing being provided by waterproof building paper tacked in between the studs. For this purpose there is no better paper made than No. 215 Rawhide waterproof building paper.

Type B has furring and lath applied over sheathing, covered with waterproof paper. Either No. 200 or No. 215 Rawhide waterproof paper will give satisfactory results for this purpose.

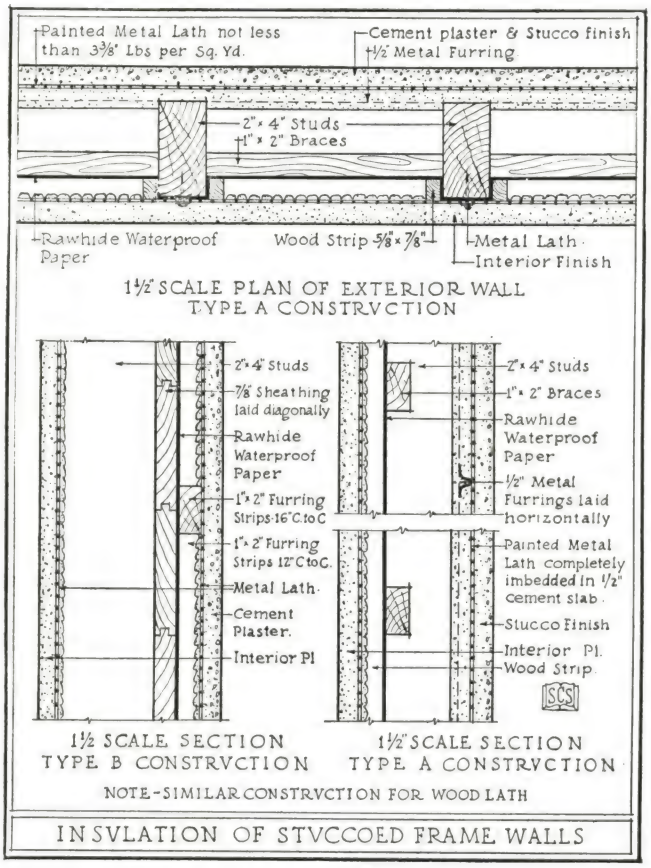
Specifications—*Building or Insulating Paper*—All material for insulating exterior walls and roofs shall be C. S. GARRETT & SON CORP. Rawhide Waterproof Building Paper. All sloping roof and deck surfaces and all sheathing on exterior walls shall be covered with No. 200 Rawhide Waterproof Paper. (Note:—where shingle strips are specified, building or insulating paper should be omitted.) All surfaces shall be completely covered in such manner as to make the building windproof and weatherproof subject to the approval of the architect. All joints of the paper shall be lapped not less than 2 in. and nailed with tin capped nails set not over 6 in., center to center. Carry paper into all window and door openings and under all window sills and exterior trim.

Type A Construction—The interior of all exterior studs shall have No. 215 Rawhide Waterproof Paper applied as follows: The paper shall be nailed with tin capped nails, spaced not over 6 in. center to center, to the inside face of the studs and secured to sides of the studs with vertical strips securely nailed to the studs after paper is applied. The paper shall be applied to the interior of all exterior wall surfaces in such manner as to make the building windproof and weatherproof subject to the approval of the architect.

For Cold Storage Insulation—Rawhide waterproof papers, on account of being odorless and impervious to dampness and moisture, are especially adapted for the insulation of cold storage houses, refrigerators, refrigerator cars and for all other purposes where a dependable waterproof paper is required. Samples will be sent on request.

Liberty Black Insulating Papers

Fiber stock, thoroughly waterproofed, evenly surface coated on both sides of the sheet. The heavy weighs 35 lbs., and extra heavy 50 lbs. per roll of 500 sq. ft. Recommended for good service where cheaper material than Rawhide is desired.



Garrettite Asphalt Shingles

The body of the Garrettite is wool fiber, made under our own formula and special supervision. We guarantee its uniformity. The felt is thoroughly asphalt saturated. It is then coated with a heavy layer of pure Gilsonite Asphalt; into which at high temperature is imbedded a heavy coat of red or green non-fading crushed slate. Made in two types:

Strip Shingles—32-½ in. long and 10 in. wide, notched 4 in. deep, 4 shingles to a strip.

Hexagonal Shingles—These shingles are 12 in. square. They are double thickness at the butt, thereby giving the roof a more definite outline. The lower corner is turned under and nailed down, making them absolutely non-curling.

Guaranteed for 10 years without maintenance of any sort.

UNION FIBRE CO., INC.

Manufacturers of Insulation Materials

WINONA, MINN.

BRANCH FACTORY: YORKTOWN, IND.

AGENTS IN EVERY LARGE CITY

Products

LINOFELT, a heat resisting quilt, for sheathing buildings, deadening sound, and for general insulating purposes; FIBROFELT, a light, self-sustaining, flexible, insulating felt, in board form, for heat and sound insulation; WATERPROOF LITH, a standard insulating slab for refrigerating plants, cold storages, packing houses, creameries, ice storages, etc.; UNION LITH PIPE COVERING, for ice water, brine, and refrigeration pipe lines, and fittings; MINERAL WOOL, a woollike rock fibre fireproof, for general insulating purposes.

Linofelt

Linofelt prevents the passage of heat or sound through walls, floors and ceilings. It is made of chemically treated flax fibre, immune from decay, made into batting, like cotton batting, and firmly stitched or quilted between layers of tough, brown Kraft paper, or waterproof paper, as required. Linofelt is even and uniform in thickness and quality, germproof and verminproof, and the most efficient heat and sound insulation in practical form, on the market.

CUTTING LINOFELT FROM ROLL

Styles—Linofelt is made in numerous sizes and styles adapted for most convenient use. Frostproof Linofelt, for use between studdings, floor joists, and rafters, is furnished in suitable widths and thicknesses. Sheathing Linofelt, for use under flooring, over sheathing, or on the face of studdings, joists and rafters, is furnished in standard widths to conform to ordinary building construction.

RETTED LINOFELT

Waterproof Linofelt—For purposes requiring moisture resisting insulation, Linofelt is furnished with waterproof paper in lieu of Kraft, and in this form is largely used for insulating domestic refrigerators, vegetable warehouses under stucco or plaster, and in refrigerator cars. Millions of feet are used annually in the construction of railway refrigerator cars, for prevention of spoilage in transporting perishable food products.

Frostproof Linofelt—Placed between studdings, rafters and joists. Provided in widths to allow for 2-in. fold on each edge of Linofelt for nailing lap, which is fastened to studding, under nailing strip. In ordering specify distance from center to center of studdings.

Acoustic Linofelt—Special types of Linofelt, bound in muslin or burlap, in various thicknesses to provide definite degrees of sound absorption, are furnished for scientific acoustic correction of churches, auditoriums, theaters, conservatories, etc. Applied to interior wall surfaces, ceilings, panelling, etc., in panels, and then covered, for decorative treatment, with standard acoustic membranes of various types stretched evenly over the fibre.

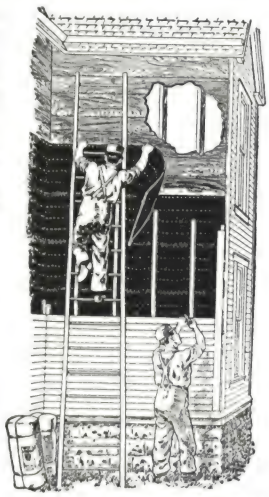
Experienced acoustic engineers and construction men are at the service of customers for such work.

Sizes and Weights—Linofelt is made in thicknesses of ⅜, ⅝, and ¾ in.; in widths of 18, 36, and 48 in. or other special widths up to 118 in., and is furnished in rolls of various sizes to contain, usually, 100 sq. ft. per roll of ⅝-in. thickness, 200 sq. ft. per roll of ⅜-in. thickness, etc. Lists of stock sizes, and prices, quoted on application.

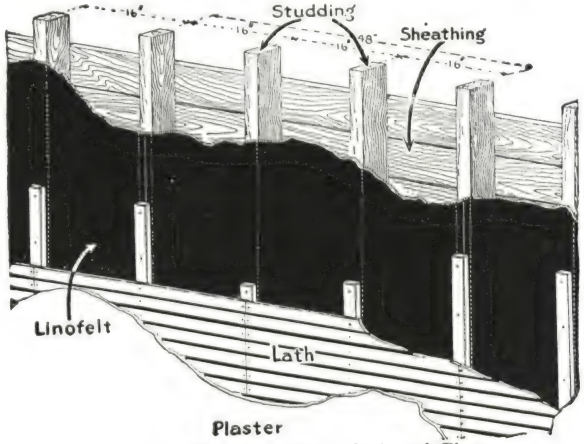
Specifications—For sheathing houses the Linofelt is simply rolled upon the rough sheathing, nailed at intervals with roofing nails, applying ordinary lath over studdings, as nailing surfaces for siding, metal lath, or other exterior finish. Edges should be butted together, not lapped.

For use under floors use similar method over rough floor, but for better results, Fibrofelt strips are recommended between floor joists and rough flooring.

Frostproof Linofelt as Backplaster



Linofelt for Sheathing Houses



Linofelt on Studding next to Lath and Plaster

HOW TO APPLY LINOFELT

Continued on next page

Fibrofelt

Fibrofelt is a flexible insulating felt, manufactured in board form for use as a general thermal insulator. It is equal to 30 layers of ordinary building paper in insulating value. Fibrofelt is made entirely of selected vegetable fibres, treated to remove the woody parts of the fibre and pressed into indestructible boards. It is odorless, clean, sanitary and absolutely verminproof. It can be installed in all types of buildings, adds approximately 2% to the total building cost, is readily applied by ordinary workmen, and when once installed is a permanent, indestructible component part of the building.

To prevent condensation in roofs of concrete or other construction Fibrofelt has no equal. Applied under roofing or to ceilings on the interior, it absorbs the difference of temperature, and condensation is eliminated. Under ordinary conditions, one layer of 1-in. thickness is sufficient.

For elimination of vibration in factories, due to operating machinery, Fibrofelt or Lith, applied under the base of such machinery, deadens the vibrations so destructive to the buildings and minimizes noise, preventing its transmission to the floors beneath.

Sizes and Weights—Fibrofelt is manufactured in various thicknesses: 3/8, 1/2, 3/4, 1 and 1 1/2 in., in sizes up to 3x10 ft.; also in flanged boards to fit between regular studding.

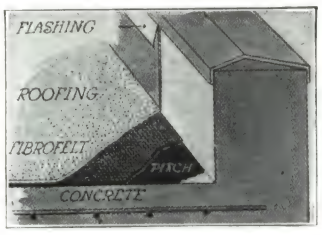
	Weight per sq. ft. Uncrated	Crated
3/8-in. thickness	.35 lbs.	.45 lbs.
1/2-in. thickness	.65 lbs.	.75 lbs.
3/4-in. thickness	.95 lbs.	1.05 lbs.
1 -in. thickness	1.25 lbs.	1.35 lbs.

Specifications—*For the Application of Flanged Fibrofelt between Studding in Place of Back Plaster*—Apply flanged Fibrofelt between studding set at 16 or 24 in. on centers. Over flange place wood strips or lath nailed to studs, so the Fibrofelt will be held firmly in place and joints sealed.

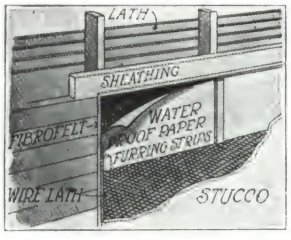
For the Application of Fibrofelt in Walls, on Studding—Apply 32-in. wide sheets of Fibrofelt on studding set at 16 in. on centers, the joints coming together on studs. Apply sheathing boards over Fibrofelt. Same method can be used in applying Fibrofelt on roof rafters.

For the Application of Fibrofelt in Walls to Deaden Sounds—Apply 32-in. wide sheets of Fibrofelt on studding set 16 in. on centers, the joints coming together on the studs. Strip with 7/8-in. strip and finish room with lath and plaster or wall board. If this method is followed the window and door jambs should be 6 7/8 in. deep if 1/2-in. Fibrofelt is used, or 6 7/8 in. if 3/8-in. Fibrofelt. The advantage of this method is that you save heating the space between the studs, which is about 5% of the total area to be heated.

For the Application of Fibrofelt under Floors for Deadening Purposes—On rough floor, lay sheets of Fibrofelt, edges butted carefully together. Over Fibrofelt lay 1x2-in. strips, 16 in. on centers, strips to be lightly nailed at ends only to hold in place. Lay finished floor on strips, using nails that will not reach through strip and Fibrofelt. A floating floor, that is, a floor nailed to strips only, will give the best results. For additional protection lay Fibrofelt strips 3 or 4 in. wide over floor joists before rough floor is laid. This breaks the sound conduction between floor and joists, greatly assisting in making a satisfactory job.



Plans for Application of Fibrofelt on Concrete Roof



Plans for Application of Fibrofelt on Exterior Walls of Building to be Finished in Stucco

Waterproof Lith

Waterproof Lith

Waterproof Lith is a widely used standard refrigeration insulation. The substances used in manufacture, except waterproof compound, are flax fibres and limestone rock wool, from which all shot has been mechanically removed. This rock wool, specially treated, comprising by volume 40% of Waterproof Lith, contains 8% stone fibres and 92% entrapped air. Dried cork, for which Waterproof Lith is a substitute, contains only 53% entrapped air. The vegetable fibres provide tensile strength to a degree not found in any other cold storage insulation.

Quality—The Union Fibre Co., Inc., hereby *guarantees that the insulating efficiency of Waterproof Lith insulation will equal, under like conditions, the same thickness of any other insulation manufactured in board form. This means that there will not be transmitted through Waterproof Lith insulation a greater number of heat units than through any other insulation manufactured.*

Waterproof Lith is strong, durable, hygienic and cleanly, non-hygroscopic, fire resisting and reasonable in price. Its heat transmission per 1-in. thickness per sq. ft. per degree difference in temperature per 24 hours is 5.98 B.t.u.'s.

Sizes and Weights—Dimensions of all Lith boards 18x48 in.; thickness only differs.

Weight per sq. ft.	Weight per sq. ft.
1 -in. thickness, 1 1/8 lbs.	2-in. thickness, 2 1/4 lbs.
1 1/2-in. thickness, 2 lbs.	3-in. thickness, 3 1/2 lbs.

Union Lith Pipe Covering

Union Lith pipe covering is made of the same materials as Waterproof Lith, but is denser in order to provide superior strength to meet the more difficult requirements.

Sizes—It is made in 3 thicknesses for different service conditions.

Regular Brine Thickness—For brine and ammonia pipes where the refrigerant is at a temperature of zero to 25° Fahr.; averages about 2 1/2 in.

Heavy Brine Thickness—For brine and ammonia pipes where the refrigerant is at a temperature below zero, particularly if the pipe lines pass through rooms of high temperature; averages 3 1/2 in.

Ice Water Covering—For pipe lines carrying cold liquids where the temperatures are between 25° and 50° Fahr.; averages 1 3/4 in.

Sectional covers for straight pipes are 48 in. long.

Mineral Wool

Union rock wool, manufactured at the specially equipped factory at Yorktown, Ind., is made under patented processes by which the fiber is oiled, annealed and rendered noticeably more tough and pliable, hence more durable and efficient, than ordinary rock or slag wool. Yet its price is as low and often lower than that of ordinary grades, due to elimination of dust which renders ordinary processes unhealthy and expensive.

Standard Specifications

We have standard specifications, for our products, printed on thin paper for blue printing, which we will gladly mail on application. We can also supply real data on roof insulation.

THE W. J. BAKER COMPANY

All-metal Window Screens and Metal Weather Strips

NEWPORT, KY.

Products

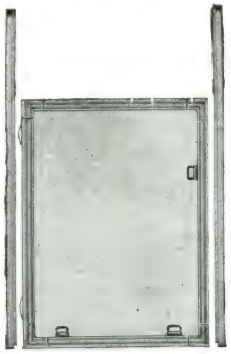
BAKER'S IMPROVED ALL-METAL WINDOW SCREENS and METAL WEATHER STRIPS.

Also manufacturers of high grade Door Screens.

Services and Facilities

Twenty-nine years of experience in the manufacture of screens together with the facilities of a modern, fully equipped screen factory and choice stocks of material are at the service of the architect, builder and home owner.

Baker's All-metal Window Screens



SLIDING SCREEN
Showing guides

Baker's improved all-metal window screens are designed to replace the old style, inconvenient and unsightly wood frame screens. They are made to order only, to fit openings.

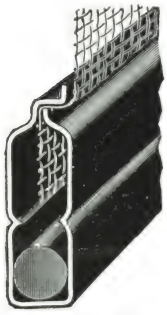
These screens are so constructed that the greatest possible strength is secured without excessive weight. The frames are made of heavy cold rolled steel well galvanized with pure zinc, or of hand drawn copper. Metal runs or guides are secured to the window frames to hold screens in place and allow them to slide up and down easily. Wire cloth is of highest grade copper wire.

Their neat narrow frames, practically invisible in the window, admit a free passage of light and air. No shrinkage, swelling or warping; slide easily; are quickly removed; always fit the window perfectly.

They are made in the two types (with lapping edge and with rewireable feature), described and illustrated below.

Lapping Edge Screen

This is an exclusive, patented type of screen in which the moulding is formed in angles, supplying great strength and forming a square end that insures perfect fit in the guides. The moulding is then clamped about a one-piece frame made of ¼-in. galvanized rod, which gives a solid support. In clamping, the shape of the moulding causes one edge to overlap the other and the wire cloth which passes between the edges is stretched perfectly tight and held as in a vice, allowing the cloth no chance to sag. The edges of the moulding, which come in contact with the cloth, are rounded perfectly to prevent any possibility of the cloth being cut.



LAPPING EDGE SCREEN
Actual size

This type of construction makes the moulding more rigid, gives an "inside" and "outside" appearance to the screen, forms a perfect watershed and effectively seals the moulding from water and dirt.

Rewireable Screen

In the rewireable type of screen, the ¼-in. galvanized rod is placed on the outer surface of the screen and can be easily taken out when new cloth is needed. The rod which encircles the entire frame holds the cloth secure and greatly strengthens the corners.

In all other details the construction of this screen is similar to that of the lapping edge type described above.

REWIREABLE SCREEN
Actual size

Wire Cloth

The standard size of wire cloth furnished with Baker's all-metal screens is 16 mesh, or 16 openings to the inch. For special work or in the South, 18 mesh is furnished. For places from which it is necessary to exclude fine particles of dust, 24 to 40 mesh, as the case may demand, is furnished.

This cloth is made of unalloyed copper. It is tough and durable, will not rust or corrode, requires no paint or lacquer, affords clear passage of light and air, is uniform in color and so delicately shaded as to be almost invisible. This wire has resiliency and strength equal to that of steel wire.

Baker's Metal Weather Strip

Baker's metal weather strip for double hung windows is extremely simple in construction and efficient in operation. It consists of a strip of zinc folded lengthwise into a T shape so that the upright portion fits into a groove made in the wood of the sash. The sashes run on this zinc track, which holds them true and steady in place and completely eliminates rattling, entrance of dust or cold air, and frictional resistance of the surrounding woodwork. Being made of zinc, it can not rust, and is permanent and will last as long as the house stands.

BAKER'S METAL WEATHER STRIP
For double hung windows

Baker's Extruded Brass Channel Bars

Positively rainproof equipment for casement windows. The heavy hook strip is placed on the bottom of the sash and engages the brass channel, making it impossible for rain to beat in. The only satisfactory weather strip for use on casements opening in.

The brass threshold and hook for doors operates on the same principle as the channel bar.

BRASS THRESHOLD AND HOOK

CHANNEL BAR
For casement windows

THE E. T. BURROWES CO.

Manufacturers of Wood or Metal Frame Rustless Screens for Windows, Doors and Porches

GENERAL OFFICES AND FACTORIES
PORTLAND, ME.

REPRESENTATIVES EVERYWHERE; OFFICE AND TELEPHONE ADDRESS OF NEAREST REPRESENTATIVE ON REQUEST

Products

INSECT SCREENS with WOOD or METAL REWIRABLE FRAMES for windows, doors, ventilators and other openings, including porches, outdoor sleeping rooms, loggias, etc.

Also, All-metal Weatherstrips; Screen Netting; Grilles and Guards for screen doors; Wire Safety Guards for basement windows.

Co-operative Service

Maintained direct with architects through local salesmen equipped to extend expert screen service in harmony with architect's plans. Drawings, samples, illustrations and estimates furnished promptly on receipt of particulars. Every proposal is regarded as a new screen problem to be worked out in a way to supplement and complete the architect's conception.

THE E. T. BURROWES CO. especially solicit unusual and difficult work, either in wood or metal, requiring long experience, a trained organization and modern equipment.

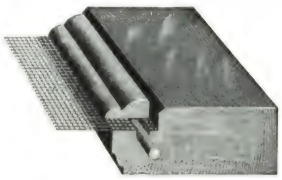
Screen Installations

Screens made to measure only and guaranteed to fit *corresponding numbered openings*. All materials thoroughly tested for efficiency and durability—qualified to stand hard usage for many seasons—the standard screen for 50 years.

Sash runs are numbered when measured and screens are built and numbered at factory, to correspond. Window screen stock is finest selected kiln dried pine or white cedar, unless otherwise specified. Doors and interior screens may be selected hardwood, finished to match surroundings. All screens finished to specifications.

Porches, outdoor sleeping rooms and loggias specially treated for best appearance inside and out; made in sections for easy installation, and separated by astragals to close joints.

All wood frame screens, for windows, doors or porches, are wired with spline and groove, drawing the netting even and taut. See illustration.



SECTION OF WINDOW SCREEN STOCK
Reduced size

Burrowes Nettings

Unless otherwise specified, 14-mesh. Finer or coarser meshes if ordered.

Burrowes "Copbronze" netting is 93% pure copper, practically indestructible.

Burrowes "Enameled Galvanite" netting is high grade, far superior to the average; wire is galvanized before weaving, heavily enameled and japanned.

Burrowes Hardware

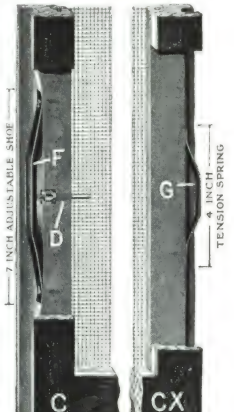
Excellent quality hardware included with all orders. Special designs in standard finishes to order. Hardware attached to ordinary sliding window screens at factory. Hardware for doors and special screens carefully packed with full directions.

"New Century" Spring Sliding Screens, Wood Frames

Recommended for double hung windows. Made with well constructed wood frames with grooved stiles for sliding screen on full length moulded runs. Left-hand groove is fitted with two adjustable shoes or bearings and right-hand groove with two arched steel balance springs, to hold screen in any desired position, for top or bottom ventilation.

These bearings and springs, as shown in lettered diagrams, form the only points of contact between screen and screen runs. They assure ease of operation with minimum of friction, and overcome inequalities in window frames, such as unequal widths at top and bottom or sagged sills.

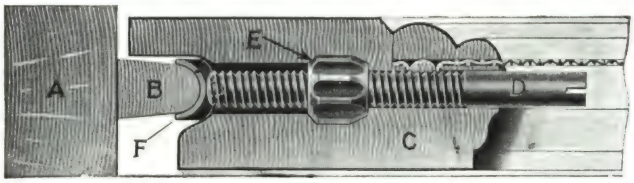
Once adjusted in position, "New Century" screens require no attention whatever. No interference with window sash, draperies or blinds. Installed either inside or outside of sash. Frames finished to match surrounding trim.

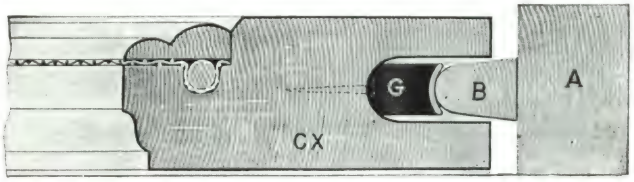


LEFT AND RIGHT STILE "NEW CENTURY" ADJUSTABLE SLIDING SCREEN

Patent Spring Sliding Screens, Wood Frames

Made like the "New Century" without the adjustment. Springs in groove hold screen in any desired position. Shallow groove in left-hand stile.





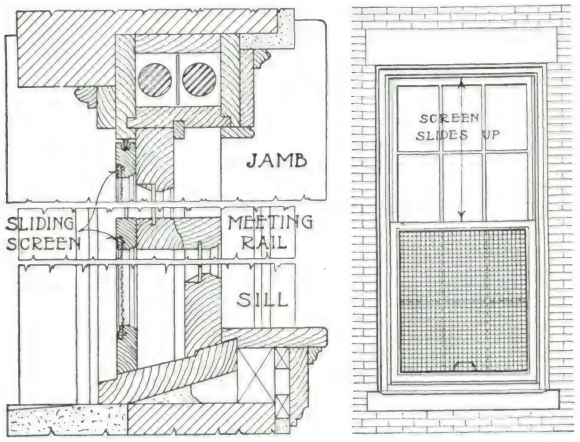
FULL SIZE SECTION "NEW CENTURY" ADJUSTABLE WOOD FRAME WINDOW SCREEN

(A) Blind stop. (B) Slide moulding. (C) Left-hand screen stile. (CX) Right-hand screen stile. (D) Bronze screw bolt through (E) Stationary nut operating (F) Adjustable shoe or bearing. (G) Elliptical tension spring for perfect balance

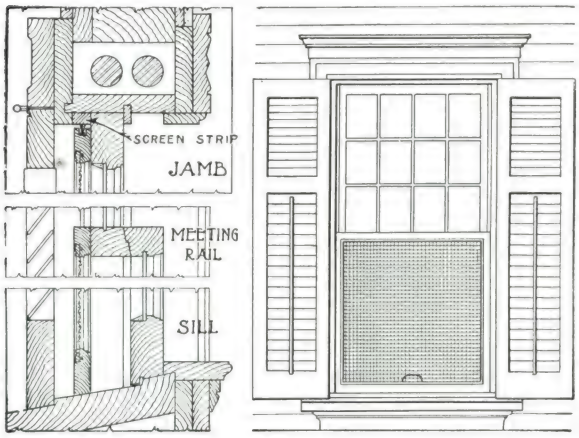
Continued on next page

Structural Diagrams

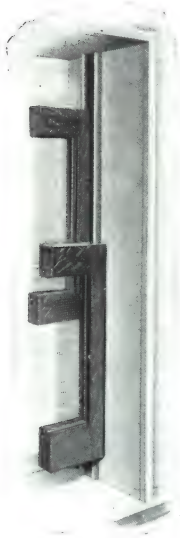
Following are diagrams showing various applications of Burrowes screens to common types of windows, where the architect's design makes ample allowance for screens. We solicit difficult work—screening problems entirely out of the ordinary—involving odd shapes or requiring expert handling for satisfactory screening.

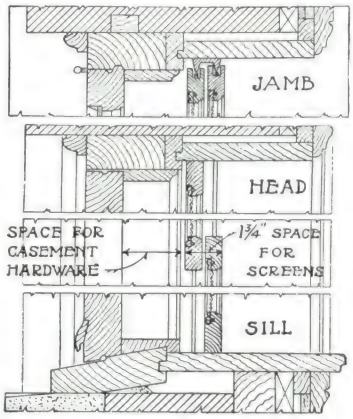


Detail of Window Frame Construction for Applying Burrowes Wood Frame Window Screen to Blind Stop, on Building without Blinds. Screen stock, unless otherwise ordered, finished to $\frac{13}{16}$ in. thick



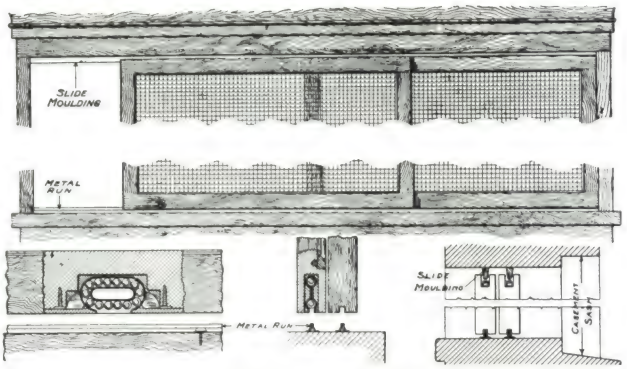
Detail of Window Frame Construction Showing How Extra Space May be Provided by the Architect for Screens and Blinds or Shutters, by Inserting a Screen Strip (width determined by conditions) Inside of Blind Stop



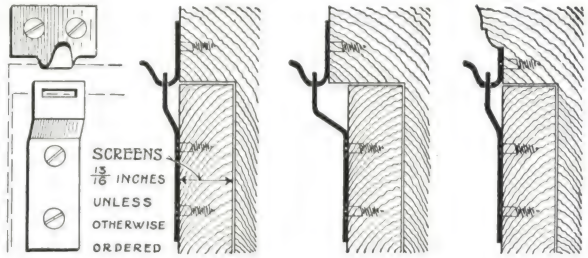


Detail of Casement Window Construction, with Burrowes Wood Frame Twin Sliding Screens (at the left) Applied Inside of Sash

DETAILS SHOWING APPLICATIONS OF BURROWES WOOD FRAME SCREENS



Ball Bearing Horizontal Sliding Screens for Wide Casements or Porch Openings above the Rail
Allow 1¾ in. total width on stool

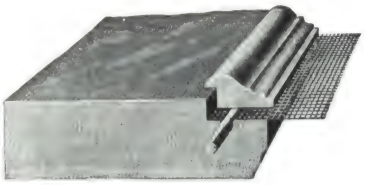


Burrowes Top Hung Full Length Screen Applied to Casements and Other Windows
Note offset on hangers for various depths or rabbet

DETAILS SHOWING APPLICATIONS OF BURROWES WOOD FRAME SCREENS

Burrowes Screen Doors, Wood Frames

Always made to order from Burrowes' own or architect's designs; finished to harmonize with house door.

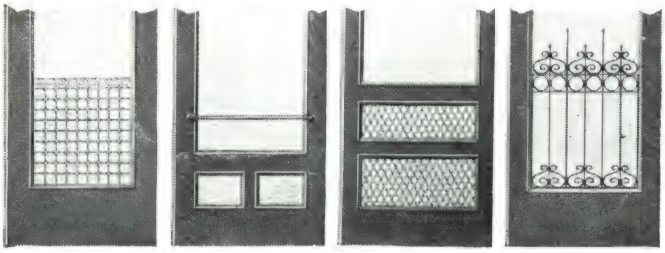


SECTION OF SCREEN DOOR STOCK
Reduced size

Burrowes doors are very strong; made with greatest care from best selected kiln dried lumber, either straight grained pine for painting, or hardwood finished to match submitted samples. The netting is much heavier than window screen netting. Note lock-strip method of wiring; every strand held taut and even.

Beautiful, substantial hardware, in standard finishes, adds to the distinctive character of Burrowes doors. Lower panels may be reinforced with heavy 3-mesh guard, 1¼-in. diamond mesh guards or plain or ornamental grilles of bronze or iron.

Note: Burrowes screen doors are unusually thick and strong. They adjust themselves readily to architect's plan if the rabbet on outside of door frame is at least 1⅛ in. wide, with proper allowance between doors to clear house door hardware.



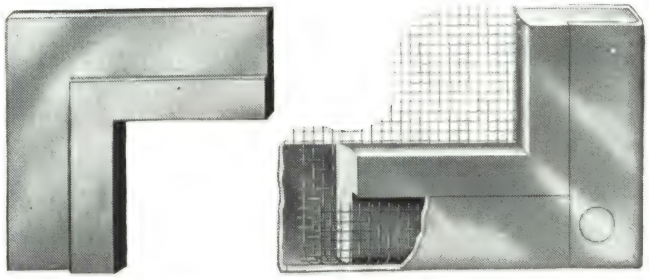
No. 24-C 5 No. 26-D No. 39-D. G. No. 24-C Special

A FEW SUGGESTIONS FOR SCREEN DOOR TREATMENT

Continued on next page

"Regis" Metal Screen

Strong, rigid inner frame, electro-welded at corners, over which netting is drawn taut and held by outer casing secured by bronze rivets; easily re-wired. All steel parts thoroughly sherardized (best known process of protecting steel from rust) and enameled any color; baked at high temperature—will not chip. Made of solid bronze if desired. Neat U-guides of metal, equipped with springs for sliding screens.



CORNER SECTION OF "REGIS" SCREEN ASSEMBLED
Full size

"Primus" Metal Screen

Has a one-piece continuous solid metal frame with electro-welded corners, sherardized, painted and enameled. Made of solid bronze if desired. The netting is firmly and smoothly soldered to face of frame.

Adapted for every shape of window, including circles, ovals, gothic arches and irregular openings.

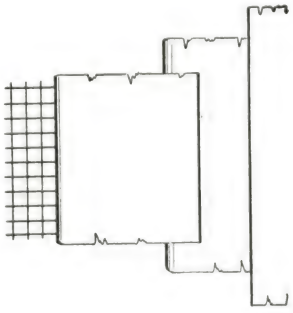
"PRIMUS" METAL SCREEN FOR CIRCULAR OPENINGS

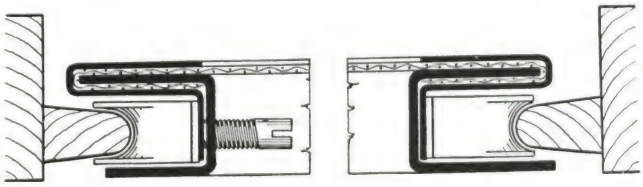
SECTION THROUGH "PRIMUS" SOLID METAL FRAME SCREEN

"Climax" Metal Screen

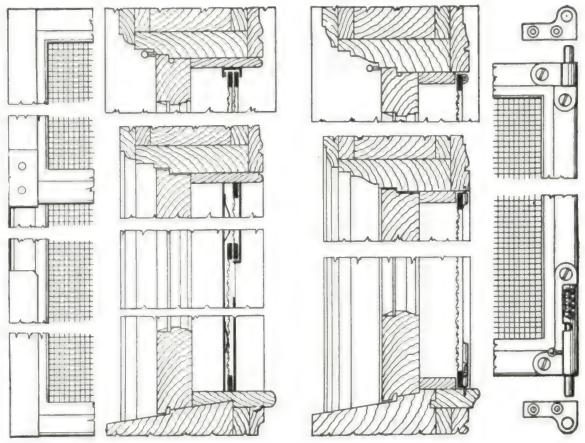
Continuous metal frame of rolled steel in the form of a channel beam, with electro-welded corners, sherardized and enamel finished; baked at high temperature—will not chip. Netting drawn taut and held with steel casing, fitted closely over outer lip of frame, and returning against adjacent side. Casing riveted to wire-supporting frame. Screen slides on full length round-nosed wood moulding on blind stop. Used inside of sash if desired.

May be equipped with "New Century" adjustment bearings and arched steel balance springs (see description under wood screens) or may have outer casing in left-hand groove moulded for easy sliding contact on screen run, with balance springs in right-hand groove. Cross section below, full size, shows construction and application to blind stop.





DETAILS OF "CLIMAX" METAL SCREEN



DETAILS SHOWING APPLICATION OF BURROWES METAL SCREENS TO CASEMENT WINDOWS

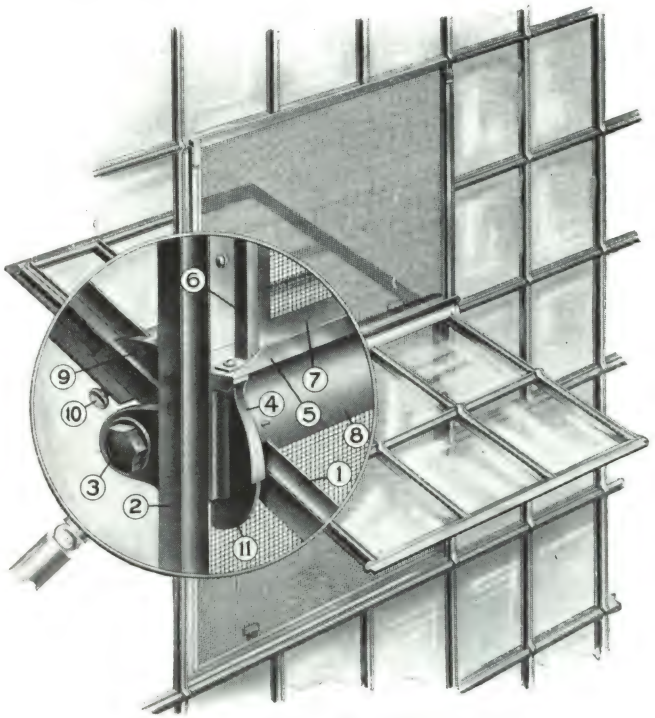
Left-hand diagram shows Burrowes twin sliding metal frame screen applied to casement inside the sash. Similar construction, with U-guides reversed, is applied outside on blind stop.

Right-hand diagram shows Burrowes full length side-pivoted metal frame screen applied to casement. Metal keepers for pivot at top and spring-actuated pivot at bottom for easy insertion or removal

Screens for Steel Sash Ventilators

The Burrowes patents applied to all types of steel sash ventilators guarantee insectproof screening without cages. Note numbered parts (from outside looking in) showing one style of ventilator screened with "Burrowes."

Various methods employed for screening all types steel sash ventilators.



SCREEN FOR STEEL SASH VENTILATORS
Note magnified parts

Ventilator (1) is pivoted at (3) in sash (2). Bronze casting (4) supports bottom guide (5) and side guides (6). These guides support and hold upper screen (7) in contact with sash. Sheet metal roll (8) screwed to ventilator through casting (9) centered on pivot (3) and rotates in contact with lower edge of guide (5). Roll (8) fitted around muntins and butts against glass, completely closing opening below upper screen.

Opening over lower screen is closed by "T" shaped cap (not visible) held by thumbscrews (10) to rotate with ventilator in closing contact with upper edge of lower screen. Pivot cover (11) fast to ventilator is drawn up through hollow casting (4) to close small opening over pivot—every opening absolutely insectproof.

Upper screen is narrower than ventilator opening, and removed from inside by raising to clear guide (5). Lower screen (on inside) removed by detaching cap held by thumbscrews (10).

THE CINCINNATI FLY SCREEN CO.

Gest and Evans Street

CINCINNATI, OHIO

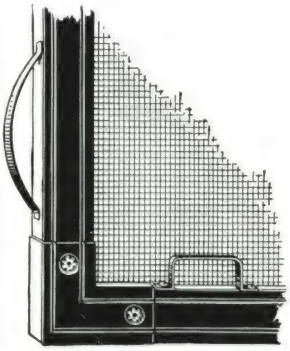
Products

CINMANCO ALL-METAL RE-WIREABLE FLY SCREENS; SCREEN DOORS and "EZ" WOOD FRAME SCREENS.

Cinmanco All-metal Screens

Manufactured of best materials obtainable; assembled on correct mechanical principle, in a variety of types and finishes for required conditions.

Features — Re-wireable. Bronze wire cloth held by rounded corners. Detachable springs, easily removed and renewed. Solid copper bearings, smooth operation. Free ventilation, unpainted cloth, and small frame. Reinforced by metal angles. Turned edges on guide. Furnished hinged, twin sliding, basket, circle, segment top, bow, bullseye, or any shape desired, of any mesh from 14 to 60, to fit all or part space. Made and stay true. Easily raised by bronze direct lifts. Steel frames specially galvanized, not sherardized.



CORNER SECTION CINMANCO ALL-METAL RE-WIREABLE FLY SCREEN

Note detachable spring, open rivets, and location of stationary bronze direct lift

Types—*Window Screens*—Finish A: Solid copper frame, statuary bronze finish, bronze wire cloth.

Finish B G: Galvanized black enameled steel frame, with galvanized corners and galvanized guides bronze wire cloth.

Finish B C: Galvanized black enamel steel frame, with copper corners and copper guides, bronze wire cloth.

Finish C G: Galvanized black enamel steel frame, with galvanized corners and galvanized guides, galvanized black enamel wire cloth.

Finish C C: Galvanized black enamel steel frame, with copper corners and copper guides, galvanized black enamel wire cloth.

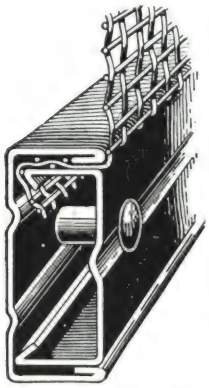
Steel frames have copper content.

Frames can be made in any finish desired.

Screen Doors—Finish quartered oak in golden, natural, antique, or English.

Finish pine in light slate, Colonial white, cherry stain, Tuscan brown, natural bronze green, oak grained, ivory white, pure white, dead black, mahogany stain.

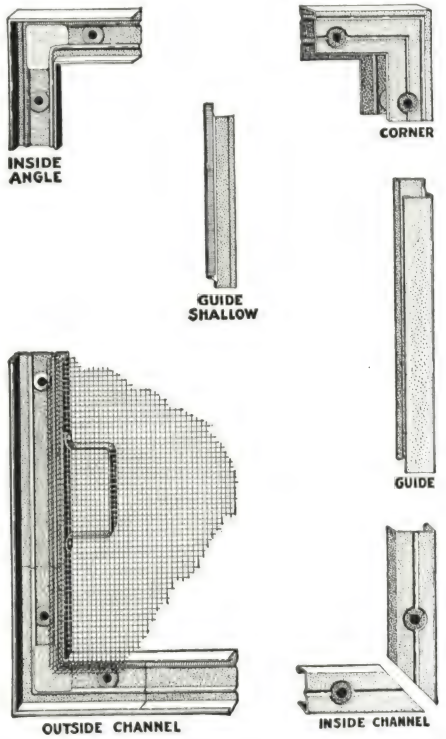
Wire Cloth—Cinmanco genuine 90% copper, rustless, bronze wire cloth. Meshes true; 14-mesh regularly furnished. Meshes from 16 to 60 or galvanized black enameled wire cloth when specified. Also Monel metal cloth can be had, if desired.



SECTIONAL DETAIL SHOWING ASSEMBLY ALL-METAL SCREEN

Construction—The accompanying illustrations show construction details, method of securing wire cloth and the absence of cutting edges.

Two rectangular grooved channels are fitted one inside the other. The cloth is secured firmly without use of solder, rods or splines. Heavy pressed metal inside angle swedged and countersunk in addition to outside corner.



CONSTRUCTION DETAILS CINMANCO ALL-METAL SCREENS

Cinmanco Sliding Screen

Covers lower sash. Operates full height of frame on copper or galvanized guides.

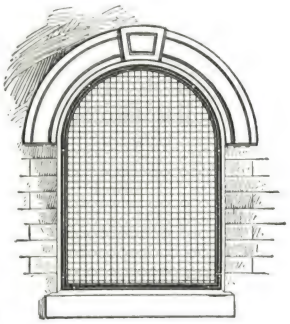
Cinmanco Hinged Screen

For casement or pocket windows.

Hung from either side, or top, by stationary rod and an inside operating sliding rod from frame. Rods rest in bronze sockets secured to window frame. On ½-in. rabbet use Cinmanco flush latch.

Cinmanco Special Screens

The construction of the frame of the Cinmanco Screen is such that we are able to make a perfect screen without marring the frame in either basket, circle or segment top, bow, bullseye, or any shape which may be necessary to thoroughly screen a building with all-metal screens.



CINMANCO SCREEN ADAPTED TO SPECIAL WINDOW

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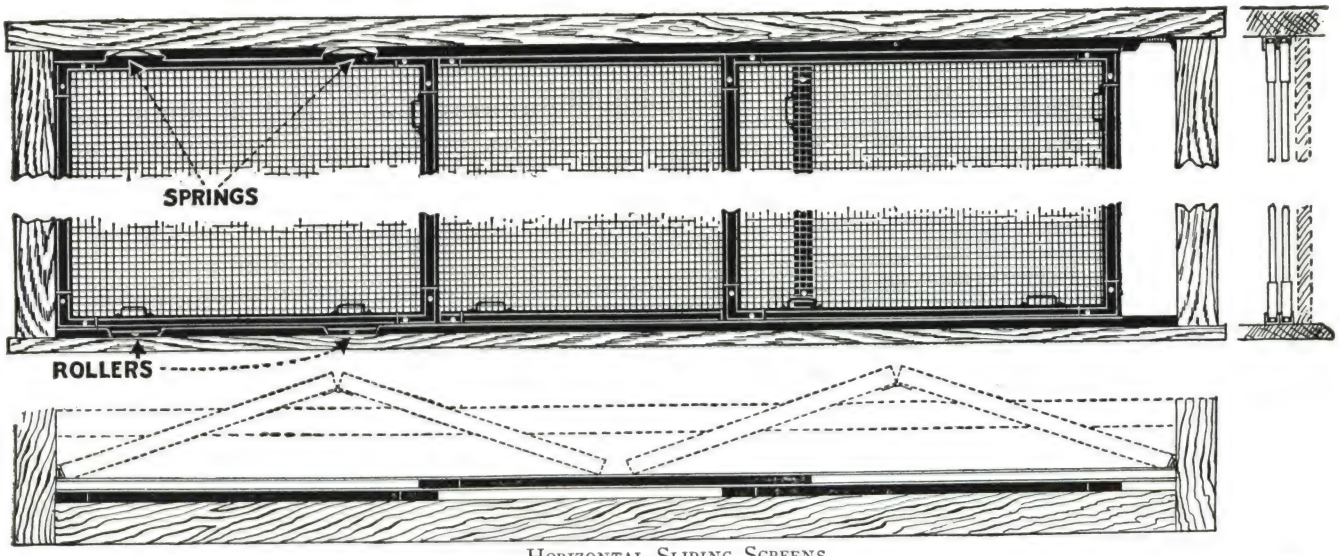


HORIZONTAL SLIDING SCREENS

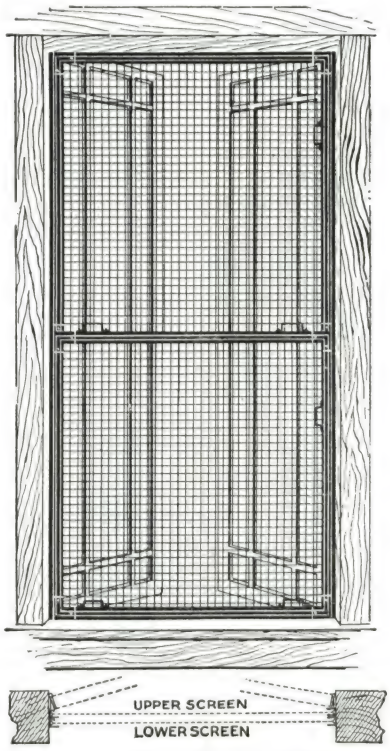
Cinmanco treatment for wide casement or porch openings, resting on sill or rail. Roller bearing allows 1¼-in. for metal frame screens and 1¾-in. for wood frame screens in total width on stool

Cinmanco Twin Sliding Screens for Casement Sash

We recommend twin sliding screens in preference to hinged screens, as they do not interfere with the curtains or draperies, and it is not necessary to open the whole screen to operate the sash or awnings.

The lower screen can be raised part way and the sash hardware adjusted easily, giving less opportunity for insects to enter.

These screens operate like a double hung window.



CINMANCO TWIN SLIDING SCREENS FOR CASEMENT SASH

Screen Doors

We make our doors from carefully selected well seasoned lumber, white pine, oak, cherry, mahogany, walnut and other woods that may be specified.

All doors are 1⅛ in. thick, unless otherwise ordered, mortised, glued and wedged. Special care is given to produce a superior door in every respect. The best paint, stains and varnishes are used, all carefully rubbed down.

Screen Door Grilles

Our catalogue shows for selection a large variety of screen door grilles.

Screen Door Hardware

The best hardware to be had has been selected carefully. Mortise door latch is all bronze and comes in various finishes. Five knuckle, steel bushed, loose pin bronze butts, or sherardized steel plated butts can be had.

"EZ" Slide Wood Frame Screens

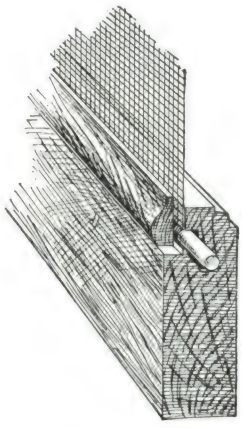
Construction—The corners of the "EZ" slide wood frame screens are securely framed together by interlocking concealed mortise and tenon joints, glued and securely wedged. This construction gives the greatest possible strength and makes the joints impervious to the weather.

The springs used in the wood frame screens are elliptic in shape; made of steel clock spring, they will last as long as the screen itself.

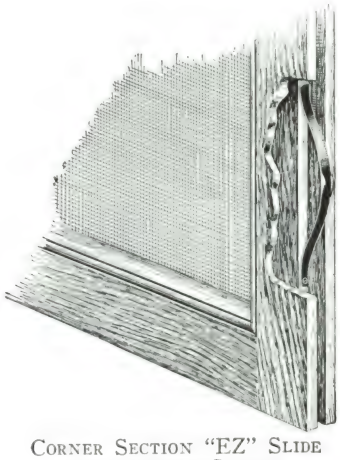
The wire cloth is attached to the screen frame by means of a groove and lock strip that keeps it perfectly tight and smooth. Its holding powers are equal to the strength of the wire itself. By this method the screens are easily rewired.

Duplicate numbers are furnished to be put on window sills, thus making it a simple matter to return the screens to their proper places.

Zinc metal or wooden guides are furnished with this equipment.



CROSS SECTION WOOD FRAME SCREEN, SHOWING GROOVE AND LOCK STRIP



CORNER SECTION "EZ" SLIDE WOOD FRAME SCREEN

Sleeping Porch or Solarium Screens

Made to harmonize with the surroundings .

THE HIGGIN MANUFACTURING CO.

Window and Door Screens

NEWPORT, KY.

SALES AGENCIES IN FIFTY OF THE LARGER CITIES THROUGHOUT THE COUNTRY

Look up our Local Office in Telephone Directory, or write to Newport, Ky., for information

Products

Manufacturers of HIGGIN WOOD FRAME WINDOW and DOOR SCREENS, ALL-METAL WINDOW SCREENS, all of which are made to order.

For All-metal Weatherstrips, see page 1179.

Service

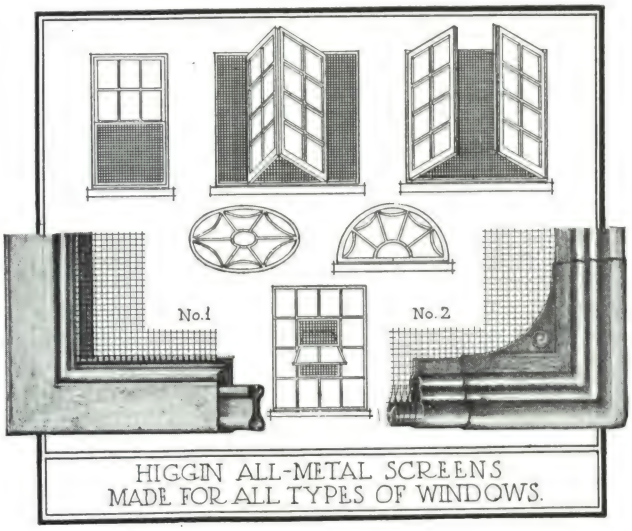
This company has developed through years of experience a highly specialized field service with headquarters in the principal cities. These men are near at hand to render expert service in assisting the architect in meeting his special problems in the screen and weatherstrip lines.

In addition, thoroughly competent fitting organizations are continuously maintained, insuring the installation of the work in the most thorough and workmanlike manner.

Estimates of cost are cheerfully furnished from any of these local offices or from the home office.

Facilities

The extensive plant of THE HIGGIN MANUFACTURING CO. is centrally located, and prompt deliveries can therefore be made to all parts of the United States. Facilities are constantly being increased to meet the growing demand for their products.



HIGGIN ALL-METAL SCREENS MADE FOR ALL TYPES OF WINDOWS.

Wood Frame Screens

This company manufactures high grade wood frame screens of standard construction, to measurements only.

Wood frame screens are made of selected straight white pine or of hardwood if desired. Standard construction, 7/8 in. thick, 1 7/8 in. side, top and bottom rails. Screens 1 1/8 in. thick have 2-in. side and top rails and 2 1/2-in. bottom rail. Screens of other dimensions furnished if specifically called for. Wood screens have double lock joint carrier construction and wire cloth is forced into a groove and held with a rattan spline covered with a flush moulding. All screens are finished with an oil and lead paint finish of any color desired.

Screen Doors

A full line of high grade screen doors of pine, quartered oak, cherry, mahogany, etc., is made to order.

All doors have mortised, glued and tenoned joints and wire cloth is forced into a groove and held in place with a rattan spline, covered with a flush moulding. Standard thickness is 1 1/8 in., but heavier doors are made if required. Rails and stiles are ordinarily made to match those of corresponding house doors so that no change in architectural effect is apparent.

The finish is any color or specification desired, the best of paints, stains, and varnishes being employed.

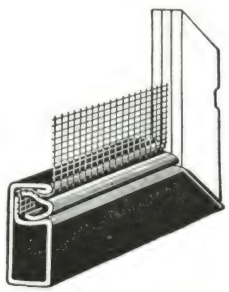
Doors are fitted, as required, with guard wire protection, or with copper grille; these are made in a variety of styles.

Higgin All-metal Window Screens

The Higgin Metal Frame Window Screens are of two types as illustrated below and numbered 1 and 2.

All Higgin metal frame screens are made of galvanized steel, enameled both inside and outside so that all unsupported and exposed surfaces of the metal are protected. Frames are also made of solid rolled copper or bronze.

Screens illustrated as No. 1 have frames of hollow construction, so made that no solder is used, thus making it possible to thoroughly enamel the inside as well as the outside of the steel frame and bake it at the high temperatures necessary. The surfaces are plain and smooth. The end corner is reinforced on the inside with two corrugated steel angles locked mechanically, the outside moulding or frame being neatly mitered. This results in frames of extreme strength and rigidity.



Sectional View Showing Construction

Corner Section Showing Lift and Side Spring

CONSTRUCTION DETAILS OF RE-WIRABLE SCREEN

Continued on next page

The netting is held in the groove by means of a cam shaped non-resilient spline so formed as to roll into place and lock. This spline can be removed for the purpose of rewiring the screen without damage to either spline or frame.

There are no sharp edges to cut the netting, which comes in contact with rounded surfaces only.

Screens illustrated as No. 2 are made with an inside frame of ¼-in. galvanized steel or copper clad rod. Around this rod the wire netting is drawn, stretched perfectly tight, and held securely there by the outside mouldings. The netting can not pull out or get loose, and there are no sharp edges bearing against it with a tendency to cut it, as it expands or contracts with changes in the atmosphere.

In the "Higgin" screen only round surfaces bear against the netting. The mouldings are made from open hearth basic steel thoroughly galvanized and finished in baked enamel, which may be black or in color; or from copper or bronze in various finishes.

Wire Netting

The netting used in both screens and doors is made of solid bronze wire and is usually 14-, 16- or 18-mesh.

For special work, such as office or bank windows, laundry dry rooms, varnish rooms, etc., 20, 24, 40, or even finer mesh netting will be furnished, if desired.

Monel wire is furnished when specifically called for.

Double Hung Window Screens

Screens for double hung windows may be half sliding or full height hinged.

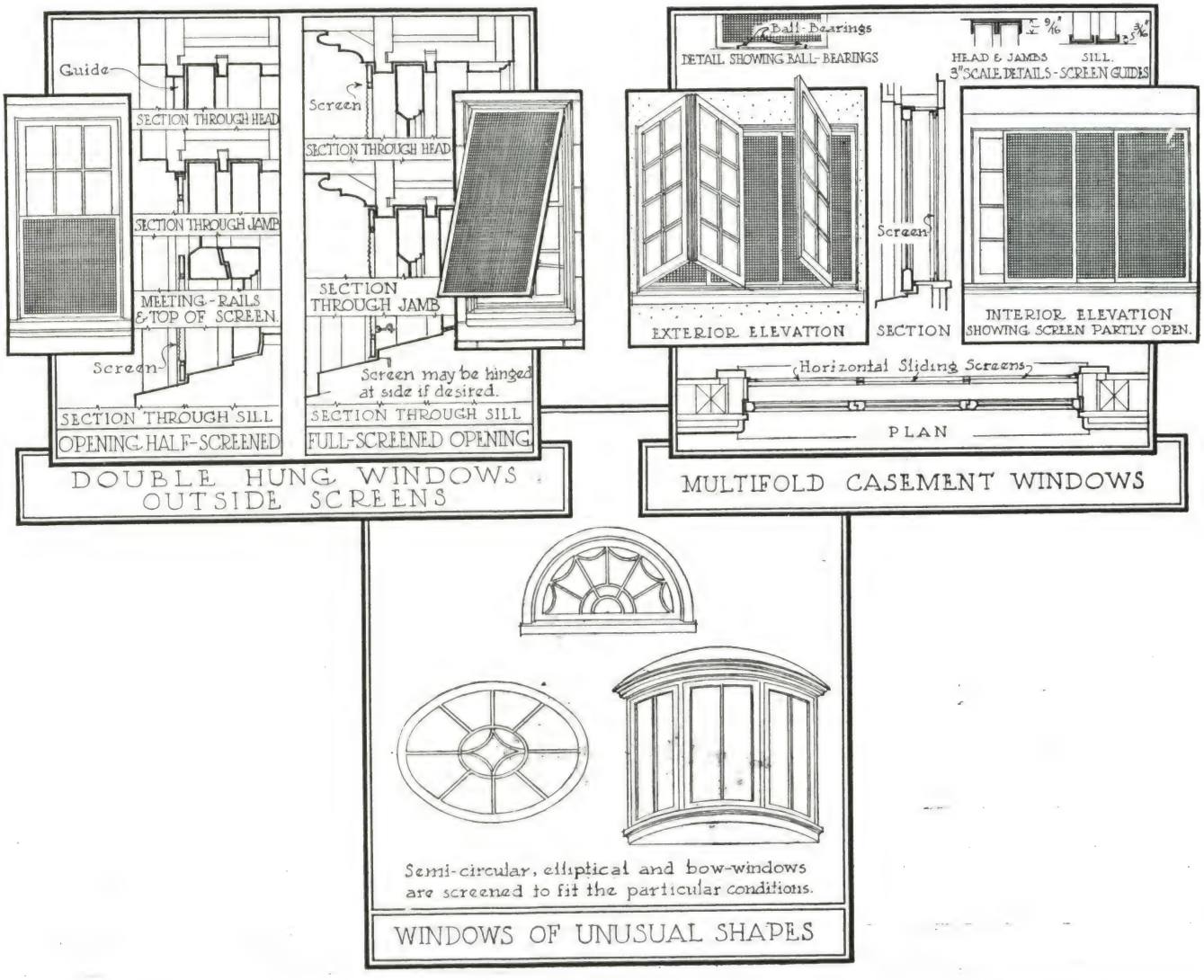
Half sliding screens are set in metal channels placed on outside stop beads and extending full height of window.

Full height screens may be hinged at top or side. They are hung on concealed pivots and locked with spring bolts. Extension arms provided for top hinged screens. Hinged screens set in outside rabbet which should be ½ in. deep and not less than ½ in. wide.

Casement Window Screens

Screens for casements opening out may be full height stationary set in guides, double sliding or hinged. If double sliding, 1⅛-in. space is required for double guides. Casements opening out may be screened with hinged screens opening in, or with vertical or horizontal double sliding screens. Hinged screens single or in pairs as conditions demand. With hinged screens a rabbet ½ in. deep and not less than ½ in. wide should be provided.

With double sliding screens, 1⅛-in. space is required for double guides. Horizontal sliding screens have roller bearings on bottom so they can be moved with perfect ease.



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Windows of Whitney, Hoffman, and similar types screened with horizontal sliding screens with roller bearings on the bottom. Screens may be divided into as many sections as necessary and run in one set of double guides. Space required for double guides is 1⅛ in.

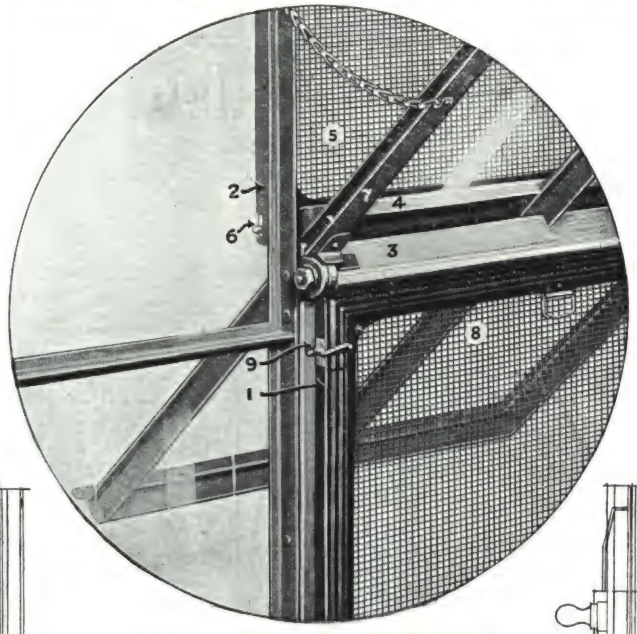
Higgin All-metal Screen Equipment for Pivoted Sash

Consists of straight metal frame screen, placed at top of opening on outside and a like screen at bottom on inside (see illustration). These screens set in angle frames permanently attached to window frame with machine screws. Metal contact rolls attached to ventilator at center close up spaces between ventilator and screens.

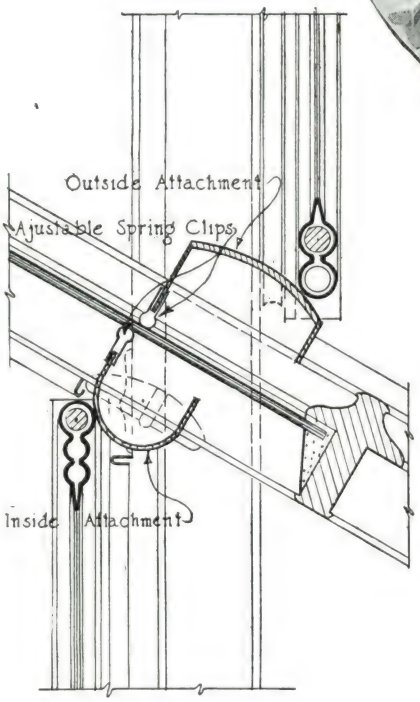
Patented features of Higgin equipment insure positive contact between rolls and screens at all times, no matter at what angle ventilator is set. Rolls and angles become a permanent part of window but screens may be easily removed and replaced. Higgin equipment is adaptable to any type or make of either metal or wood pivoted sash. We study each individual problem and make installations right on job, giving personal, expert supervision. Screens, rolls and angles are made to measure for each individual opening.

Strong Points of Higgin All-metal Equipment—The circular illustration shows in detail the following mechanical features:

(1) Angle frame for holding lower inside screen.
(2) Angle frame for holding outside screen.
(3) Contact roll between sash and lower screen.
(4) Contact roll between sash and upper screen.
(5) Upper outside screen.
(6) Spring pivot securing upper screen.
(7) Steel sash ventilator.
(8) Lower inside screen.
(9) Movable latch holding lower inside screen in place.

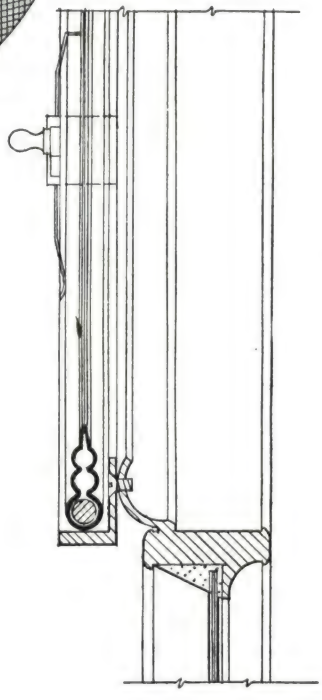


DETAIL OF CONSTRUCTION



PIVOTED SASH & SCREEN ATTACHMENT

PHOTOGRAPH SHOWING INSTALLATION



SCREEN ATTACHMENT AT BOTTOM OF PIVOTED SASH

DETAILS OF CONSTRUCTION FOR HIGGIN ALL-METAL EQUIPMENT FOR PIVOTED SASH

MORRISON-SKINNER COMPANY

Manufacturers of Window Screens and Elevator Fire Doors

WAKEFIELD, MASS.

(10 Miles North of Boston)

Products

"WAKEFIELD" WOOD and METAL FRAME WINDOW, DOOR and PORCH SCREENS.

"WAKEFIELD" COUNTERBALANCED TIN CLAD ELEVATOR FIRE DOORS.

"WAKEFIELD" LIGHT STEEL GARAGES and STORAGE BUILDINGS.

Manufacturing and Shipping Facilities

Thirty years of manufacturing experience and a thoroughly modern plant assure the production of goods of the highest quality.

Being located within a few miles of the Boston docks and railroad yards enables prompt shipments of all "Wakefield" products.

"Wakefield" Screens

"Wakefield" screens are carefully constructed on principles proved right by long experience. Screens are constructed so that every strand of wire cloth is held tight.

New improvements make these screens absolutely free from common sticking and binding, and allow their easy removal or installation in any kind of weather.

SECTION OF "WAKEFIELD" SCREEN—SHOWING CONSTRUCTION

Screens are made with wood or metal frames. Our metal frame screen is one of the strongest screens to be found—proven by actual tests.

Screens can be furnished to conform to any detail.

Counterbalanced Tin Clad Elevator Fire Doors

These doors are designed to prevent both fire and accidents, and occupy a minimum amount of space.

"Wakefield" doors offer real protection and enduring service, the kind necessary when the acid test comes.

"WAKEFIELD" COUNTERBALANCED TIN CLAD ELEVATOR FIRE DOOR

Steel Frame Garages and Storage Buildings

Steel frame garages and light manufacturing or storage buildings can be fabricated quickly. Single and two car garages are carried in stock.

ORANGE SCREEN CO.

Manufacturers of Rustless Screens for Windows, Doors and Porches; Glass Enclosures of All Types

515 Valley Street
MAPLEWOOD, N. J.

Products

INSECT SCREENS for all types of door, window and porch openings, designed, constructed and installed to specifications; WINDOW and DOOR GRILLES

COMBINATION GLASS and SCREEN PORCHES complete or for converting open porches to sun parlors sleeping porches, conservatories, etc., designed for new or old residences.

GLASS VESTIBULES for Entrance Protection.

METAL WEATHERSTRIPS for all types of door, and window openings.

Also Special Sash.

Scope of Operations and Services

Orsco products are sold and installed all over the United States, through local representatives, sales agents and direct mail order service.

The company maintains a staff of experts, equipped by years of experience and intimate knowledge of screen requirements, to complement architects' details and ideas and otherwise assist in the solution of screen problems.

Installation

Particular stress is laid on the installation of all Orsco products. Skilled mechanics, under the supervision of an installation foreman, are adequately prepared and equipped to complete all work with a high degree of satisfaction.

Screens

Frames—Designed and constructed to fit any and all types of windows, doors, transoms or porches. For outside exposed work, selected, clear, white pine thoroughly seasoned and kiln dried at the company's own factory is recommended and used, except where other woods are specified.

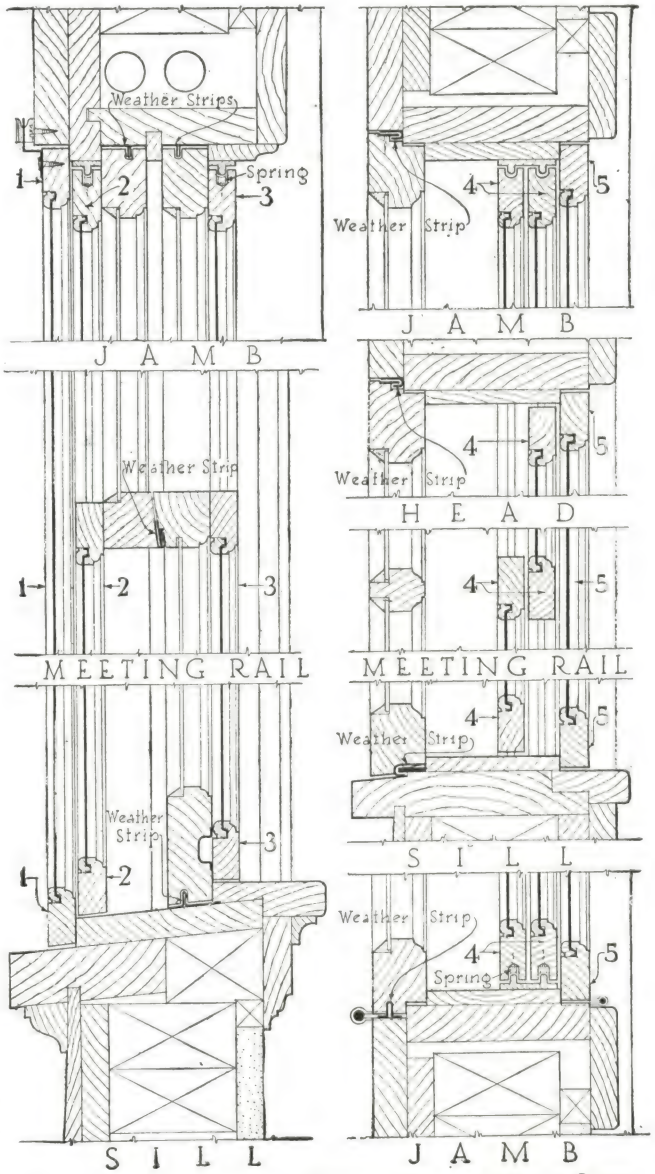
Designs include all the many pleasing forms preferred by people of refined taste.

Wire Mesh—Orsco screens are made with special rustless copper bronze wire cloth in 14-, 16- and 18-mesh. Because it will maintain its rustproof wearproof and timeproof qualities through years of excellent service, this wire mesh cloth is standard for screen work.

For other conditions the company furnishes other grades of wire such as galvanized and galvanized enameled.

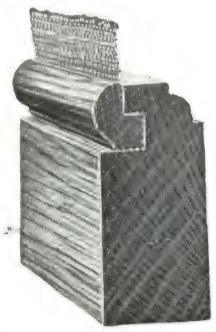
Where local atmospheric conditions demand a non-corrosive wire, the use of monel metal cloth is recommended for its excellence as a resistant to corroding influences,

Rewireable—The rewireable feature of a screen is an important one. Orsco screens are designed, constructed and installed primarily for permanence, but if rewiring becomes necessary through accidental causes, this may be done easily by any man using ordinary tools. The correct design of Orsco screens assures an absolutely tight insect seal which remains perfectly snug during and after any change in the wire mesh.



DETAILS OF CONSTRUCTION SHOWING APPLICATION OF ORSCO SCREENS AND WEATHERSTRIPS

(1) Outside full screen. (2) Outside sliding screen. (3) Inside sliding screen. (4) Twin sliding screens. (5) Casement screen



SECTIONAL VIEW SHOWING ORSCO METHOD OF ATTACHING WIRE TO FRAME

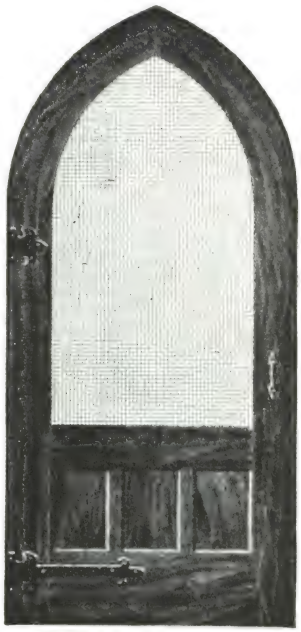
Finish—All work is finished in workmanlike manner. Inside work is accurately matched in wood and finish to surrounding trim, well painted, stained or grained as directed, or otherwise finished to harmonize with any architectural scheme.

Continued on next page

Paints are made of strictly pure white lead and linseed oil mixed with the highest grade colors to secure desired shades. Stains are made with pure pigments, possessing a penetrative quality to insure permanent, uniform color.

Corners—In the manufacture of Orsco screens, great care is exercised in securing a corner joint that is at once rigid and permanent. All corners are mortised and tenoned with mathematical accuracy, then glued firmly and finally pinned with barbed steel dowels.

Door Corner Construction and Wiring Method



Orsco Screen Door

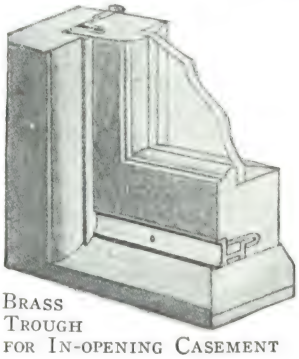
Hardware—Orsco screens are fitted with high grade hardware in standard finishes and designs in keeping with the high grade quality of the product. Solid bronze or brass and steel plated and sherardized hardware is supplied according to the requirements or specifications.

Screen Doors—Orsco screen doors are made to harmonize with their surroundings. The selection of the proper style door for your home or building is important because of its natural prominence.

Weatherstrips

Made from high grade zinc rendered impervious to moisture by special treatment. The metal is stamped to form a rigid tongue which engages perfectly with corresponding grooves in wood on double hung or casement windows, as well as all types of doors, making a positive acting, tight seal against the elements.

Brass Threshold



Brass Trough for In-opening Casement

Installed by a force of skilled Orsco mechanics, Orsco weatherstrips give unqualified satisfaction and lasting service.

Orsco Glass Porch Enclosures

Orsco porches are made of carefully selected materials in the Orsco factory and designed to conform to the style of the home.

Glass and Screen Enclosure with Sliding Sash
Indoor restfulness plus outdoor breezes

The illustration above shows one of the many ways in which Orsco enclosed porches are utilized. Porches of similar construction are also built for sleeping apartments.

Grilles

Ornamentation and protection in one. Heavy grille guard, made from flat rolled brass rods, scrolled at top. Admirably adapted for cellar windows and lower panels of doors.

Orsco Mortise and Tenon Screen Corner for Windows

Orsco Vestibules

Made in a great variety of styles to conform in design and finish to residence on which they are installed.

These enclosures are adapted for residences where vestibules are not built into the house. They extend out from the front door making a most desirable entrance in both architectural effect and service.

One of a Large Variety of Styles of Orsco Vestibules, Made to Specifications

PHENIX MANUFACTURING CO.

Screens and Awnings, Storm Sash, Screen Hardware

022 to 044 Center Street
MILWAUKEE, WIS.

Products

PHENIX WINDOW and DOOR SCREENS, and SCREEN ENCLOSURES; PHENIX COMBINED WINDOW SCREENS and AWNINGS; PHENIX HANGERS and FASTENERS (Patented) for screens, storm windows and doors.

Also Phenix Storm Sash and Enclosures.

Phenix Window and Door Screens and Enclosures

Made to order to fit any opening.

Material—Window and door screens and storm sash made from thoroughly seasoned white pine, wired with either rustproof or copper bronze wire cloth. Hardware finishes in steel, galvanized finish and solid brass.

Full Length Top Hung Screen—Fastening and locking device No. 102 for cleaning of windows and for ventilation.

Top Hung, Swinging Half Screen—Fits in between outside casings, with shut-off stop at meeting rail, and provided with inside locking device No. 30.

Side Hung, Half or Full Length Screen—Swings out like a door; hung by "Phenix" loose joint, self-locking hinges No. 130 and locked with No. 30 fastener, permitting hanging or removal from inside and the ready cleaning of windows.

Corner Joints—Joined by special dovetail hardwood dowel set in glue—superior to any mortise and tenon in carrying strength. Dowel pins form perfect wedge lock.

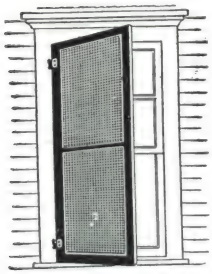
Method of Wiring—No tacks used. Note wedge-grip manner of wiring; every strand of wire held perfectly taut and secure.

Screen Doors—Furnished complete with all necsary hardware, ornamental grilles and guards for special wire protection.

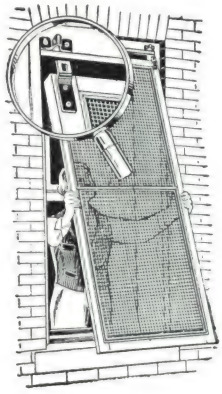
Veranda Enclosures—Made in convenient sized sections and held together with Phenix Nos. 60, 70 and 75 flush and corner locking devices.

Phenix Combined Screens and Awnings

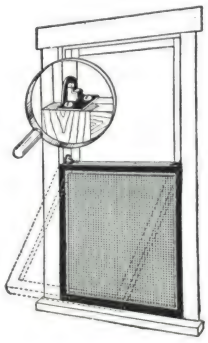
A two-in-one combination. Screen covers entire window with awning attached to same, awning being raised and lowered from inside without disturbing screen.



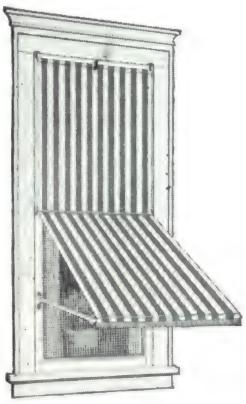
SIDE HUNG, FULL LENGTH SCREEN



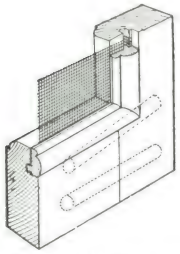
PHENIX FULL LENGTH TOP HUNG SCREEN



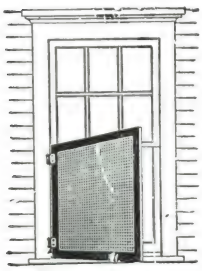
TOP HUNG, HALF LENGTH SCREEN



PHENIX COMBINED SCREEN AND AWNING
Awning raised and lowered without opening screens. Full length screen makes ventilation possible.

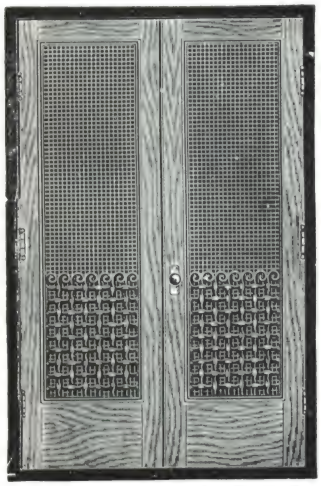


PHENIX WEDGE-GRIP AND CORNER JOINT
Showing method of wiring without tacks. Holds every wire taut.



SIDE HUNG, HALF LENGTH SCREEN

PHENIX VERANDA SCREEN ENCLOSURE



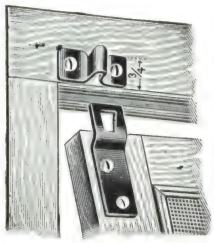
PHENIX SCREEN DOOR

Continued on next page

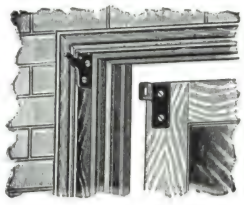
Hangers and Fasteners

Complete line of hangers, hinges and fasteners adaptable for all requirements to hang and fasten storm sash, full and half length window screens. So designed as to be easily hung or removed from inside, and fastened at bottom with lock that draws sash firmly to building. Screens or storm sash may, for cleaning of window or ventilation, be extended outward. Made of wrought steel, galvanized finish or wrought brass.

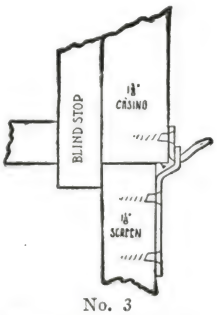
See illustrations of various styles of hangers and fasteners and their applications.



No. 114
Designed for Flush Casings
Strong, simple, unbreakable; retain form for years



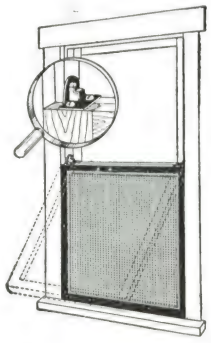
No. 20
For Brick Frame Construction
Part AA screwed on edge of casing, part BB on face of sash. Part AA can be sunk in, or its equivalent taken off edge of sash

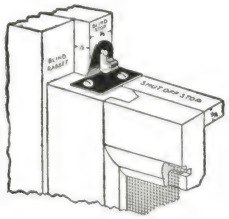


No. 3
Shows sash 1⅛-in., casing 1⅜-in., difference in thickness ¼ in. B part required in this case offset ¼ in.

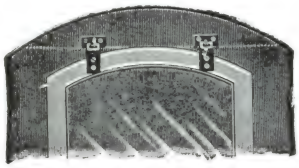
PHENIX QUALITY
TRADE MARK
Phenix Mfg. Co., Milwaukee

TRADE-MARK

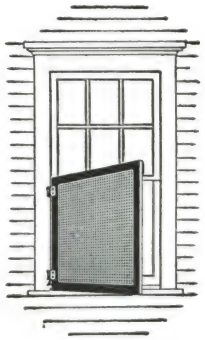




Phenix Top Swinging Half Length Screen Hanger No. 112
Adjustable to any thickness of sash or stop. So constructed that half screen can not be raised, blown or pushed from its pivots

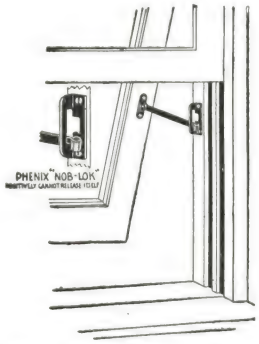


Method of Hanging Segment Head Screens

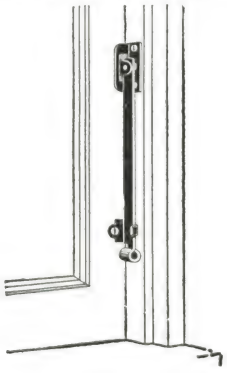


No. 130
Phenix Side Swinging Loose Joint Self-locking Hinge for Half Length Screens

APPLICATIONS OF PHENIX SCREEN AND STORM SASH HANGERS TO ALL CONSTRUCTIONS OF WINDOW FRAME

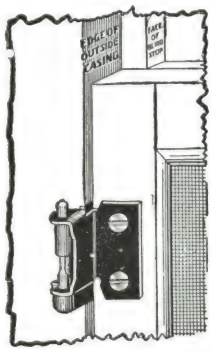


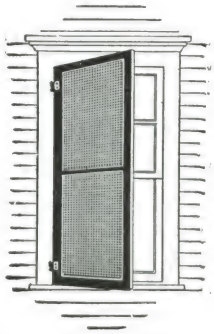
Extended for Ventilation or Cleaning of Window



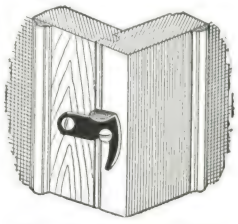
Window Closed

Phenix "Nob-Lok" Fastener No. 102
Draws sash up tight and secure to building at all points. When sash is extended for ventilation, automatically locks and can not accidentally become unfastened

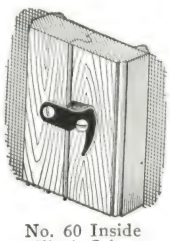




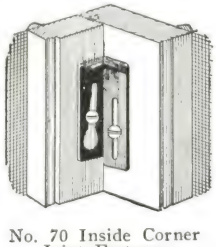
No. 130 Phenix Side Swinging Loose Joint Self-locking Hinge for Full Length Screens



No. 60 Outside Corner Joint Fastener

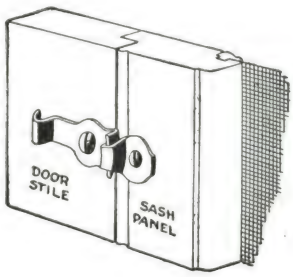


No. 60 Inside Flush Joint Fastener

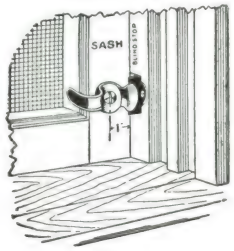


No. 70 Inside Corner Joint Fastener

For clamping veranda screen and storm enclosure sections (either flush or corners) into solid joints. Joints are rigid, sections are easily separated



No. 75 Rabbet Joint Fastener



No. 30 Fastener
For all full and half length screens, storm sash, basement screens and storm sash, porch enclosures

PHENIX FASTENERS AND LOCKS FOR STORM SASH, WINDOW SCREENS AND PORCH ENCLOSURE JOINTS

WATSON MANUFACTURING COMPANY

Manufacturers of Metal and Wood Frame Window, Door and Porch Screens

EXECUTIVE OFFICE AND FACTORY
JAMESTOWN, N. Y.

Products

INSECT SCREENS (made-to-order) of Bronze, Steel and Wood, for windows, doors, porches, hospital terraces, railroad cars, steel factory sash, etc.

For Metal Office Furniture, see pages 2036-2037.

TRADE-MARK

The Watson Manufacturing Company and Facilities

For nearly thirty years, this company has specialized in the manufacture of insect screens. Beginning with the simplest form of wood frame screens, its product has extended to cover the highest quality of bronze, steel and wood screens in various forms of flat and irregular shaped frame and roll screens.

The factory is equipped with the most modern machinery, much of it specially designed for the satisfactory production of our work. Due to central location, good shipping facilities are provided.

Service and Installation

On accepting an order we assume all responsibility for the successful and satisfactory screening of the building. Our selling representatives in various parts of the country are experts and will confer with and advise architects as to the most satisfactory method of screening. They take all measurements, carefully observing special details and conditions, and screens are installed under their supervision.

Watson Engineering Department

Architects are invited to make use of our Engineering Department. Inquiries in regard to special conditions cheerfully considered and practical suggestions and recommendations made. Inquiries should be sufficiently complete to enable us to fully understand conditions and result desired.

Patents

Nearly all details of construction which make our work of such superior quality are covered by patents controlled and used only by this company.

Screens Should Be Considered During Preparation of Working Drawings

Insect screening is a recognized necessity of the greatest importance which unfortunately often receives little or no consideration in preparation of building plans. It is safe to assume, whether or not insect screens are included in the architect's plans or in general contract, that they will eventually be required; therefore, design and construction should be arranged to allow for future use of screens in an economical and satisfactory way.

A Separate Screen Contract

Because of the highly specialized nature of screen work and installation, it is advised that screens be made the subject of a separate contract and not included in general contract. General contractors frequently see only price and lose sight of the quality, adaptability, efficiency, appearance, etc., contemplated by the architect, which results in ultimate dissatisfaction.

Object of This Catalogue

In this catalogue our endeavor is to convey, through constructive and reliable information and suggestion, confidence in the superior merit of the Watson product and service. We manufacture all types of roll, flat, cage or irregular metal and wood frame screens, therefore are not influenced by factory limitations or corporate interests, and in all particulars, this catalogue is unprejudiced. Our desire is to give the architect the best of our experience. With this end in view, description and drawings have been prepared to show only the most satisfactory and practical methods for installing screens under usual conditions. Occasional special and unusual conditions present no serious difficulties to successful screening.

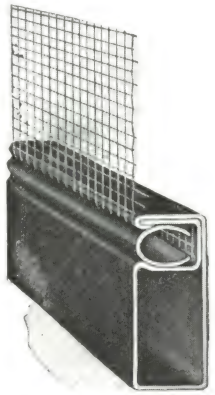


FIG. 1. WATSON METAL FRAME SCREEN

FIG. 2. WATSON WOOD FRAME SCREEN

Fundamental Rules

In a general way, difficulties experienced in applying insect screens to window, door and porch openings are the result of failure to observe two fundamental principles.

First, provide suitable framework or surface at top, bottom and sides of openings for reception of screens.

Second, arrange all sash, blinds, shutters, doors, flower boxes, curtains, draperies, electrical fixtures and other accessories and hardware connected therewith so as not to encroach on space provided for screens or to prevent proper swinging of casement screens and screen doors.

Frame versus Roll Screens

Except that roll screens are particularly desirable for inside use with casement sash opening out, frame screens are usually more practical, cheaper, give longer service and greater satisfaction. We believe our roll screens are the best it is possible to make—many users having found them entirely satisfactory.

When Screens Should Be Installed

All insect screening should be completed before building is occupied, regardless of the season of the year. This avoids not only annoyance to occupants and possible injury to floors, rugs, draperies, etc., but also frequent and serious delays because of congested condition of screen factories in the spring. Early installation may also provide protection during interior finishing, wall decorating and furnishing.

Wire Cloth

Although furnished on special order, the use of

Continued on next page

painted and galvanized steel wire cloth is not advised. Our standard 16-mesh copper bronze wire cloth is generally sufficiently fine to exclude all insects and is of exceptional and satisfactory durability. Under some special conditions 18-mesh or finer is used. Under conditions of exceptional exposure, as along the seacoast and some inland regions, monel metal wire cloth is recommended.

Hospital Screening

Hospital screening demands frequently extend to more or less structural work around partly enclosed or open pavilion terraces, sun rooms, etc. We are particularly well equipped through our engineering department and complete machinery equipment for sheet metal construction work, to handle work of this character with exceptional success; in fact, to furnish any special framework of metal or wood needed for proper installation of window frames and doors under any circumstances.

Hardware

Practically all the hardware referred to in this catalogue is manufactured in our own plant. We can furnish hardware other than is shown in this catalogue to meet special conditions when necessary.

Specifications

Except as generally described and shown in drawings, we are making no attempt to suggest specifications which vary greatly according to circumstances of each job. We shall be glad at any time to assist architects to prepare specifications if requested.

Cost

There is such a wide difference in quality of material, workmanship, adaptability, utility, efficiency, manner of application, etc., as well as standing and experience of the manufacturer and the sales representatives, that all details of proposals should be carefully considered before awarding contracts. In absence of uniformity, price is not the only consideration.

Classification of Window Screens

Screens naturally divide themselves into two classes:

Frame Screens—May be full height, covering entire opening; or part height, covering part of opening. Full height screens are made stationary, top hung (top hinged or pivoted), side hung (hinged or pivoted), two- or three-part sliding screens (vertical or horizontal) cage screens, screens for pivot sash, screen doors and porch screens. Part height screens may be single sliding, stationary, top hung (top pivoted, side hinged or side pivoted).

Roll Screens—May be full size, covering entire opening; or half size, covering part of opening.

Schedule and Detail Drawings

The following schedule indicates type of screen recommended for various types of windows, doors, porches, etc. Reference numbers refer to drawing numbers on pages following. Drawings illustrate the most usual conditions; but no attempt has been made to cover innumerable special conditions, in the working out of which we will gladly assist.

Relationship of screens to doors, sash, shutters, curtains, draperies and hardware, is shown. While a certain construction is suggested, details may be varied, providing proper relationship of window details is preserved.

TYPES OF WINDOWS / TYPES OF SCREENS	SPECIAL SCREENS Wood or Metal.	WOOD SCREENS: Full Height Screens, stationary.	Full Height Screens, hung at top.	Full Height Casement Screens, hinged or pivoted.	Vertical Sliding Screens, twin or multiple.	Horizontal Sliding Screens twin or multiple.	Half Height Screens, exterior.	Half Height Screens, interior.	METAL SCREENS: Cage Screens.	Full Height Screens, stationary.	Full Height Screens, hung at top.	Full Height Casement Screens, hinged or pivoted	Vertical Sliding Screens, twin or multiple.	Horizontal Sliding Screens, twin or multiple	Half Height Screens, exterior.	Half Height Screens, interior.	Exterior Rolling Screens.	Interior Rolling Screens.
Basement.		6	6	6						6	6	6						
Wood Casements, opening in, with Shutters or with Outside Awnings.					6								6				6	
Wood Casements, opening in, without Shutters and without Awnings.		6	6	6						6	6	6						
Transoms.		6-13	6	10						6-8-13	6-8	8-10						
Wood Casements, opening out.			9	9	9						9	9	9					11
Double Hung Sash, with Shutters.							7	7							7	7		12
Double Hung Sash, without Shutters and without Awnings.			7	7			7	7			7	7			7	7		12
Multifold Wood Casements, opening in			10	10	10	10					10	10	10	10				
Multifold Wood Casements, opening out.					10	10							10	10				
Metal Casements, opening in, with Shutters.										8	8	8						
Metal Casements, opening in, without Shutters.												8	8					8
Metal Casements, opening out																		
Pivoted Ventilators in Steel Sash or Pivoted Windows	4								1									
PORCH OPENINGS		14-15	14-15	14-15	15					14-15	14-15	14-15	15					
DOORS AND FRENCH WINDOWS																		
Wood or Metal Screens, Wood Doors, opening in.				13								13						
Wood French Windows, opening in with Shutters.				13								13						
Wood French Windows, opening in without Shutters.				6								6						
Wood French Windows, opening out.				6-13								6-13						
SPECIAL OPENINGS	1	Practically all types of openings may be screened																

NOTE: The Numbers refer to the Drawing Numbers on pages following in which are detailed the recommended methods of screening the above described openings. When conditions warrant, any of the various methods of screening may be used.

INDEX FOR VARIOUS CONDITIONS OF WINDOWS WITH SCREENS

Continued on next page

Watson's Metal Frame Screens

The popular conception that metal frame screens are heavy is erroneous in the case of Watson screens which are no heavier than wood frame screens. The width and thickness are only one-half that of ordinary wood frames and they are therefore always neat and attractive in appearance, providing also larger openings for ventilation and light. Being comparatively inconspicuous, they do not interfere with the carefully designed plans of architects. They can often be used under circumstances that do not permit the use of wider and thicker wood frames.

Bronze Frame Screens (Rustproof) — The frames, as well as the various hardware and construction parts and the wire cloth, are bronze metal, and, not containing steel or iron, do not and can not rust. They are furnished in any of the various copper, bronze or brass finishes. Bronze frame screens are recommended for all localities, except in some localities of exceptional exposure to salt water where it appears desirable to use monel metal wire cloth. Bronze is a little more expensive than steel, the difference being more than made up through the greater durability and because no future painting or finishing is required. Bronze screens may be left exposed to the weather throughout the entire year if desired.

Nickel Alloy Metal—Nickel alloys, of which monel metal is an example, are being strongly advocated as of greater durability than bronze. These alloys, including monel, can be furnished at varying prices, all higher than bronze, but as bronze is sufficiently durable and entirely satisfactory in most localities, these alloys can not be urged except under conditions of exceptional exposure, generally along the seacoast.

Steel Frame Screens (Regalvanized) — Steel frame screens are manufactured from a special quality steel coated with a mixture of lead and tin and after complete fabrication the whole frame is electro-galvanized. The frames are finished in baked-on enamel or grained to match selected woods. The wire cloth is bronze. In many localities our regalvanized steel frames are of satisfactory durability. Steel frame screens, however, should be painted occasionally as conditions require.

Special Shapes and Bent Work—All curved work is bent and retains a perfectly smooth surface without crimping or distortions. Any shape, no matter how peculiar, is successfully made—screens with rounded tops, oval shapes, circles, cage screens, screens with bow shape—all are as practical and strong as shapes with straight sides and square corners.

Fig. 3

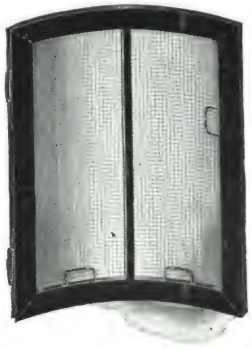


Fig. 4

Types of Irregular Shaped Metal Screens

Construction—Great strength and rigidity is provided through the well established principle of solid tubular construction, recognized as providing greatest strength and rigidity with a minimum weight. The strength of the screen frame depends on its corner construction.

Corner Construction — Our construction (Fig. 5) has interlocking lap joints and is further reinforced by corner braces or welded, the whole joint being solidly soldered together and the complete corner being without screws, rivets, plates or projections of any kind. This corner construction has been demonstrated by actual tests and practical experience to be of great strength and durability.

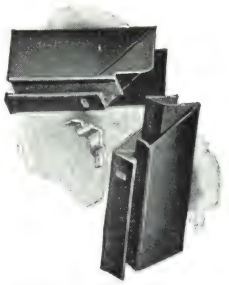


Fig. 5. The Parts Before Assembling to Form Corner Joint

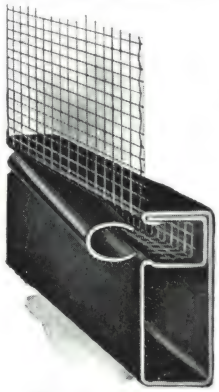


Fig. 6. Section Through Metal Frame

Shows patented tubular construction and method of *rewiring* screen

Method of Attaching and Renewing Wire Cloth—The wire cloth, 16-mesh bronze being the standard, is attached as shown in Fig. 6, the wire cloth being stretched over the rounded edges of the frame and firmly secured in the groove by the resilient slotted tube, every strand of cloth being firmly locked in place. Replacement of the wire cloth, if necessary, may be easily accomplished by removing the slotted tubes, replacing the old cloth by new and again forcing the tubes into the grooves. There being no screws, bolts, rivets or other fastenings, the work is easily accomplished in a few minutes without special tools or expert training.

Application to Window Openings and Hardware—Screens may be sliding, covering part of the window; or full sized, covering the whole window. Our sliding screens are the only metal screens manufactured having grooved edges and sliding on metal covered mouldings. This construction presents a much neater appearance than the usual channel slides and enables us to overcome the various difficulties incident to channels, our screens being brought close to the sash. The various types of full sized screens are attached to window openings by various items of hardware elsewhere illustrated. Particular attention is called to the pivot screen hardware shown in Figs. 7 and 8. Observe that the hardware is built into the frames, leaving the frame perfectly smooth and without defacement or projections. We are prepared to furnish special hardware to successfully meet special conditions.

Fig. 7. Stationary Pivot Hinge

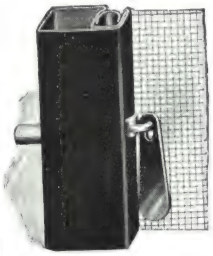


Fig. 8. Spring Pivot Hinge

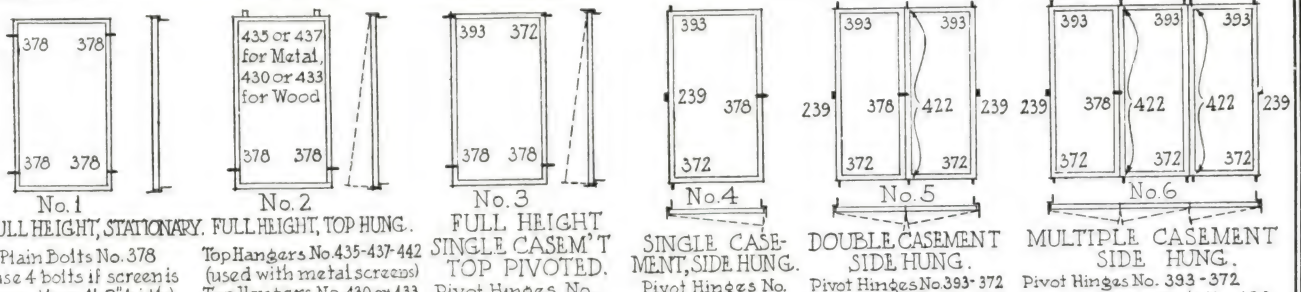
Identification—It being customary to remove the screens for winter storage, a means of identification is provided whereby the screens may be readily placed in the proper openings by permanently stamped numbers in the framework, the corresponding numbering tack being applied to the window frame, all as indicated by Figs. 9 and 10.

Fig. 9. Lift

Fig. 10. Tack

Identification Numbers

Continued on next page



FULL HEIGHT, STATIONARY. 2 Plain Bolts No. 378 (use 4 bolts if screen is more than 4'-0" high), or 4 or less Hooks & Eyes. Note-Half Height Stationary Screen may also be used.

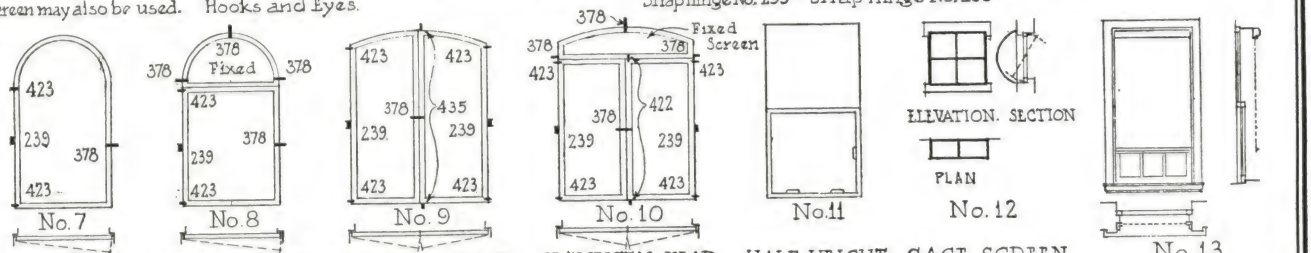
FULL HEIGHT, TOP HUNG. Top Hangers No. 435-437-442 (used with metal screens) Top Hangers No. 430 or 433 (used with wood screens). Plain Bolt No. 378 or Hooks and Eyes.

FULL HEIGHT SINGLE CASEM'T TOP PIVOTED. Pivot Hinges No. 393-372. Plain Bolt No 378

SINGLE CASEMENT, SIDE HUNG. Pivot Hinges No. 393-372 Plain Bolt No. 378 Strap Hinge No. 239*

DOUBLE CASEMENT SIDE HUNG. Pivot Hinges No. 393-372 Top & Bottom Bolt No. 422 Plain Bolt No. 378 Strap Hinge No. 239*

MULTIPLE CASEMENT SIDE HUNG. Pivot Hinges No. 393-372 Top and Bottom Bolt No. 422 Strap Hinge No. 239 *



CIRCULAR HEAD. Enclosed Pivot No. 423 Plain Bolt No. 378 Strap Hinge No. 239*

CIRCULAR HEAD FIXED TRANSOM Encl. Pivot No 423 Plain Bolt No. 378 Strap Hinge No. 239

SEGMENTAL HEAD CASEMENT. Enclosed Pivot No. 423 Plain Bolt No. 378 Top & Bot. Bolt No. 422 Strap Hinge No. 239 *

SEGMENTAL HEAD CASEM'T-FIXED TRANSOM. Enclosed Pivot No. 423 Plain Bolt No. 378 Top & Bot. Bolt No 422 Strap Hinge No. 239*

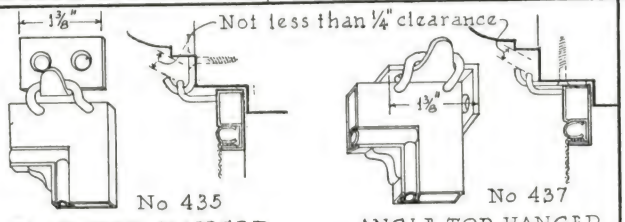
HALF HEIGHT SLIDING. MADE SINGLE OR TWIN. Also made to slide horizontally.

CAGE SCREEN FOR PIVOTED SASH. Made any size or shape.

No. 13 ROLL SCREENS. Roll Case & Side Guides may be visible or concealed Roll Case may be either at head or sill.

* NOTE-No. 239 STRAP HINGE WILL BE REGULARLY USED FOR METAL SCREENS WHEN HEIGHT OF SCREEN IS 72 INCHES OR MORE.

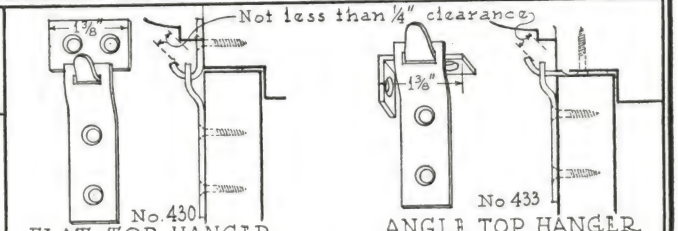
DIAGRAMS SHOWING METHODS OF HANGING SCREENS AND PROPER HARDWARE TO USE.



FLAT TOP HANGER

ANGLE TOP HANGER

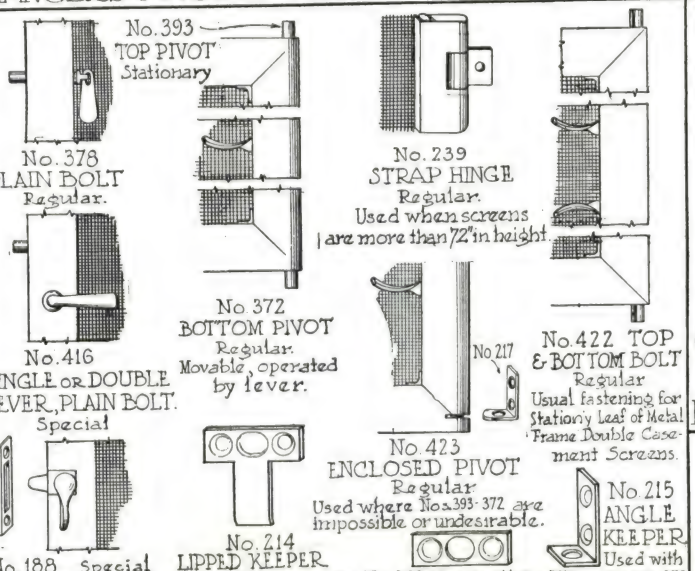
HANGERS FOR TOP HUNG METAL SCREENS.



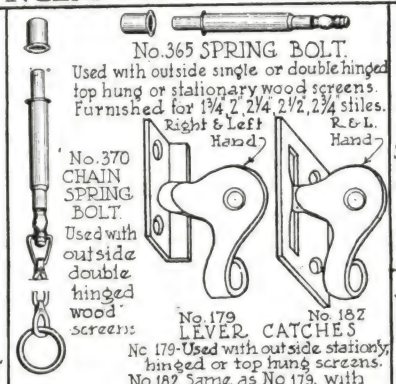
FLAT TOP HANGER

ANGLE TOP HANGER

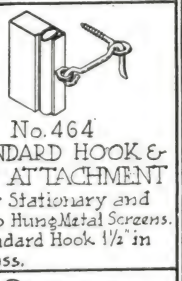
HANGERS FOR TOP HUNG WOOD SCREENS.

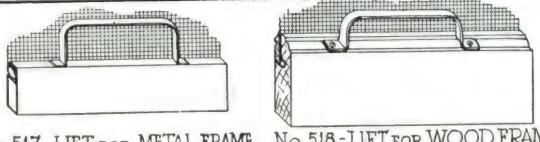


BUILT-IN HARDWARE FOR METAL SCREENS.



BOLTS & CATCHES FOR WOOD SCREENS.





LIFTS FOR METAL & WOOD SLIDING SCREENS.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DIAGRAMS SHOWING METHODS OF HANGING AND HARDWARE USED WITH WATSON SCREENS	NOT DRAWN TO SCALE. DATE, AUG. '21	DRW'G 1

Continued on next page

Watson's Wood Frame Screens

We manufacture a complete line of wood frame insect screens of all styles, sizes and shapes. The material is invariably the best and is thoroughly seasoned and kiln dried. All framework is properly proportioned in thickness and width to insure the best appearance and necessary strength for service. Wood frame screens are usually Michigan white pine, painted with the best quality of exterior enamel paint in any color required. We also make wood frame screens of any fine wood finished in natural or stained colors to match adjoining woodwork.

Corner Construction—In our corner construction we employ hardwood dowels, the rail being cope-cut to fit the moulding of the stile, providing a maximum gluing surface in addition to the extensive gluing surface provided by the proper number of dowels, which are entirely enclosed and not subject to injury from water. This construction has been demonstrated by tests and practical experience to be superior to all others.

Fastening Wire Cloth—The wire cloth is fastened by a groove and spline method shown in Fig. 11. The groove is placed to insure maximum strength of material. The wire cloth is held firmly in place by a rattan spline and is further held by a neat moulding, mitered at the corners and held in place by brass brads.

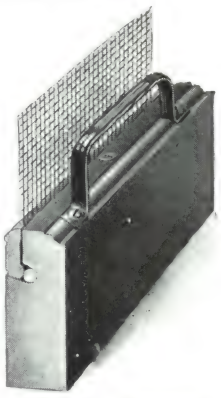


Fig. 11. Section Through Wood Frame
Shows patented method of attaching wire cloth

Finishing—Although prepared to make any finish required on wood or metal screens, it is frequently difficult to obtain satisfactory samples or to correctly interpret the general appearance of finished work from the usual small sample submitted. We recommend that the finishing of wood screen work be included in the general finishing contract, the screens being shipped from the factory unfinished or partly finished. This would insure screen finishing identically the same as the balance of the building. While this suggestion is a radical departure from generally accepted practice, in many cases it is worthy of consideration.

Identification—Identification of each screen with its proper opening is provided by duplicate numbering tacks, one being placed on the screen frame and the other on the window frame.

Hardware—We furnish with every screen brass or bronze hardware suitable for its installation. A considerable variety of special hardware applicable to usual and special conditions of hanging is provided.

Fig. 12. Wood Screen Corner

Corner Reinforcement—Fig. 12, in addition to showing the usual construction lifts, grooves and springs employed in regular sliding screens, shows a metal corner reinforcement which is furnished on special order and is a desirable addition to wood screens. It strengthens the corners and provides a metal wearing surface on the screen slides.

Watson's Roll Screens

While roll screens are not intended to replace the usual frame screen, they can sometimes be advantageously used. Fig. 13 illustrates the application to casement sash opening out, the roll screen being operated from the top and covering the entire window, giving accessibility to the sash and without interference with window curtains or draperies. The screen cloth rolls into a metal case, the edges of the cloth being contained in side guides or grooves and is held flat by spring tension. The screen will stay in any position without fastening. The screens are made in two sizes, the regular or small size being applicable for most window openings, and the larger size being provided for especially large openings.

Construction—Our construction is the result of exhaustive investigation and experience and no expense has been spared to make it as perfect as its inherent characteristics will admit. The Watson screen is adjustable to provide for unequal or unsymmetrical openings. The adjustment of the screen can not be destroyed by inadvertence or carelessness. The cross rails are narrow and inconspicuous. The construction is such as to provide maximum wear and utility with a minimum amount of difficulty experienced because of the peculiar characteristics of roll screens.

Material and Finish—The framework of roll screens is usually of alloy coated steel electro-galvanized after fabrication but in special cases may be made of bronze in any of the different finishes. Steel frames may be finished in any color of enamel or grained to imitate fine cabinet woods and finishes.

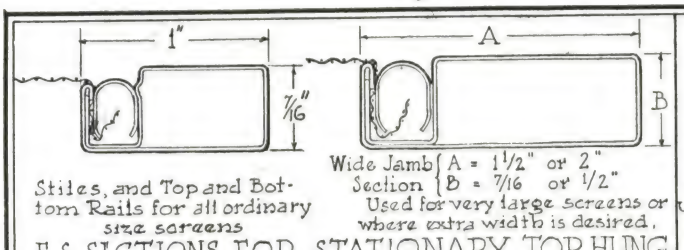
Wire Cloth—The wire cloth used is 16-mesh bronze, special weight, which rolls easily and smoothly.

Inspection—All roll screens are completely assembled, inspected and tested by actual operation to insure the screens being in perfect condition before shipment. After inspection, each screen is carefully braced and packed separately in tight boxes for shipment.

Details and Installation—Details of window frame construction for the proper reception and installation of roll screens will be found on pages 1162, 1165 and 1166.

Fig. 13. Roll Screen Used with Casement Window Opening Out

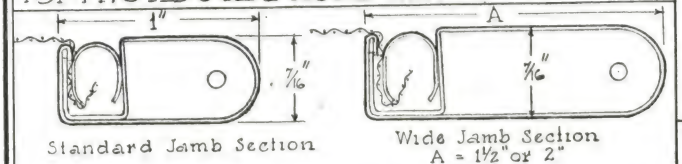
Continued on next page



Stiles, and Top and Bottom Rails for all ordinary size screens

Wide Jamb Section { A = 1½" or 2" / B = 7/16 or ½" } Used for very large screens or where extra width is desired.

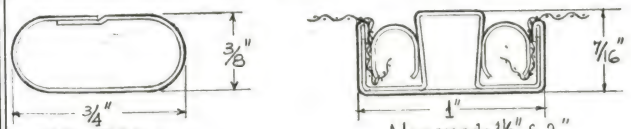
F.S. SECTIONS FOR STATIONARY, TOP HUNG TOP PIVOTED & SIDE HUNG METAL SCREENS.



Standard Jamb Section

Wide Jamb Section A = 1½" or 2"

F.S. SECTION, HINGE SIDE FOR METAL PIVOT HINGED SCREENS.



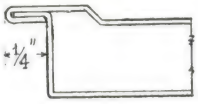
No. 555 ROUND EDGE BRACE Regularly used

Also made 1½" & 2"

No 290 SPECIAL WIRING CROSS BRACE.

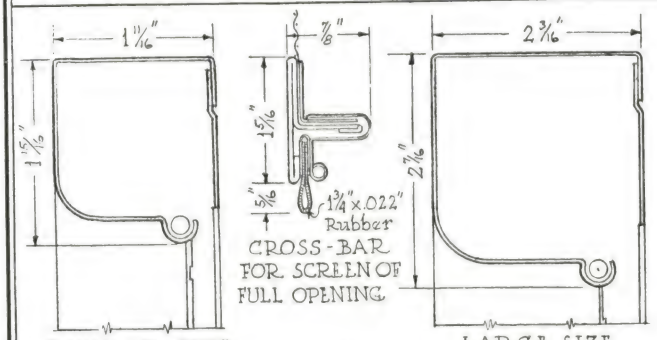
BRACING RULES FOR METAL FRAMES		HORIZ. BRACE	VERTICAL BRACE
	1"	60" high	50" wide
	1½"	72" "	60" "
	2"	90 "	72" "

F.S. DETAILS, BRACES USED WITH METAL SCREENS.



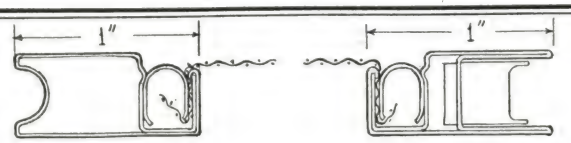
This Astragal is used with Double Casement Screens.

F.S ASTRAGAL USED WITH METAL FRAME SCREENS



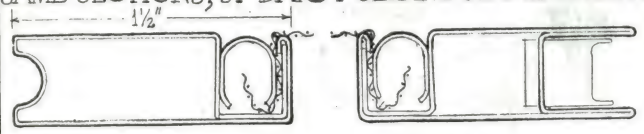
REGULAR SIZE: For windows up to 72" high & 48" wide.
LARGE SIZE: " " " 9'-0" " "60" "
For all windows more than 48" wide use large Frame Screens.

HALF FULL SIZE DETAILS OF ROLLING SCREENS.



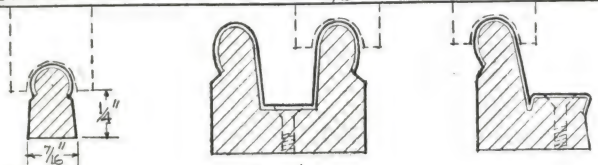
SHALLOW GROOVE DEEP GROOVE.

JAMB SECTIONS, ST'DARD 1" SLIDING METAL SCREENS



SHALLOW GROOVE DEEP GROOVE

JAMB SECTIONS FOR 1½" SLIDING METAL SCREENS

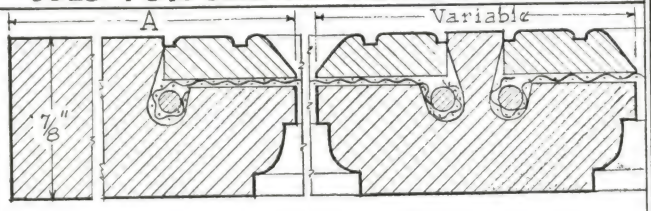


Regular No 478 For Single Sliding Screens

Regular No 486 Fo. Twin Sliding Screens. Used on wood or metal window frames

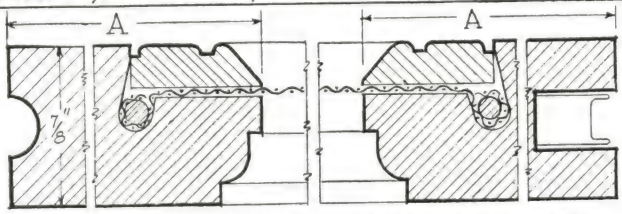
No 483 For Single Sliding Screen

METAL CAPPED SLIDES REGULARLY USED FOR SLIDING METAL SCREENS



STANDARD STILE & RAIL STANDARD WOOD BRACE

SECTIONS,-STATIONARY, TOP HUNG & HINGED WOOD SCREENS



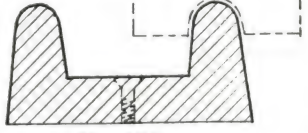
SHALLOW GROOVE JAMB DEEP GROOVE JAMB

HORIZONTAL SECTIONS OF SLIDING WOOD SCREENS

TABLE OF DIMENSIONS FOR ALL WOOD SCREENS

SIZE OF SCREEN		STILES	TOP RAIL	BOTTOM RAIL	WOOD BRACE
WIDTH	HEIGHT	Dim. "A"	Dim. "A"	Dim. "A"	Required for
To 48"	To 48"	1¾"	1¾"	2¼"	Screens more
48" to 72"	48" to 72"	2"	2"	2½"	than 60" wide
72" or more	72" or more	2¼"	2¼"	2¾"	or high

No 472 Regular Slides used with 7/8" Single Sliding Wood Screens.



No 474 For Twin 7/8" Wood Screens Attached to window frame by wood or machine screws

STANDARD WOOD SLIDES REGULARLY USED FOR SINGLE AND TWIN SLIDING WOOD SCREENS.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS FOR STATIONARY, TOP HUNG, TOP PIVOTED, SIDE HUNG & SLIDING SCREENS OF METAL OR WOOD	SCALE-F.S.- 6" EQUALS 1'-0" DATE-SEPT.'21	DRWG 2

Continued on next page

Watson's Metal Screen Doors

Light Metal Frame Doors—Our light frame metal screen doors have been carefully developed, through several years' practical investigation and experience, to cover the growing demand for a better,

FIG. 14. LIGHT METAL FRAME SCREEN DOORS

lighter, neater and generally more appropriate screen door for French windows or other small entrance openings to porches, loggias, terraces, breakfast rooms, etc., and is a product that we unqualifiedly recommend. Our light metal doors are well constructed to meet the demands of door openings and are worthy of the name "metal doors" and are much superior in all details to the ordinary large window screen frequently furnished under the mistaken name of "metal doors."

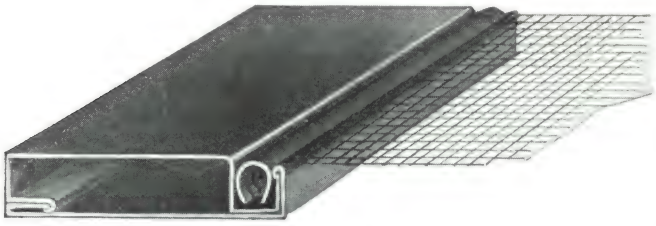


FIG. 15. SECTION THROUGH STILE OF LIGHT METAL FRAME DOOR
Showing construction and method of attaching wire cloth

Material and Construction—Metal screen doors are constructed of bronze in all of the different metal finishes or of steel enameled or grained. The frames are reinforced at all corners and at the location of latches, bolts, hinges, checks, etc., and in every manner we have provided as strong and rigid a construction as the weight and size will permit. We make all of the hardware in special designs applicable for these doors. Any of the various guards illustrated on page 1158 may be used.

FIG. 16. Chain Bolt

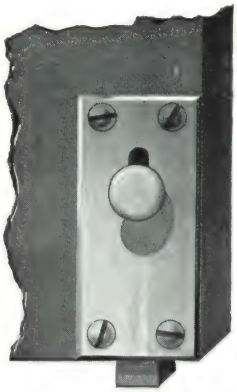


FIG. 17. Bottom Bolt

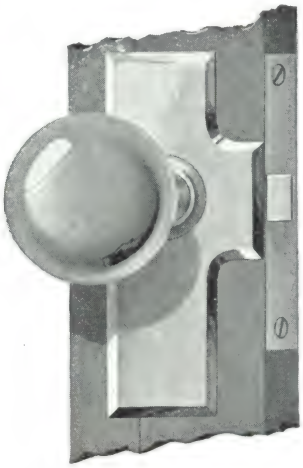


FIG. 18. Knob and Escutcheon

FIG. 19. Lever and Escutcheon

LIGHT METAL FRAME SCREEN DOOR HARDWARE

Heavy Metal Screen Doors—Our heavy metal doors are intended for use in large main entrance service doors or for openings where there is severe and continuous use. The framework is much wider and heavier than the light metal doors and somewhat different in construction as shown in Fig. 20. The construction is solid and substantial. The hardware is special and made heavier than that used for light metal doors. The details of material, finish, guards, wire cloth, etc., are similar to the light metal doors.

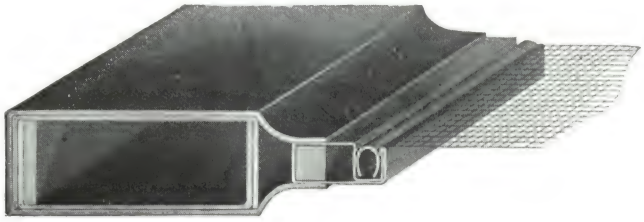


FIG. 20. SECTION THROUGH STILE OF HEAVY METAL FRAME DOOR

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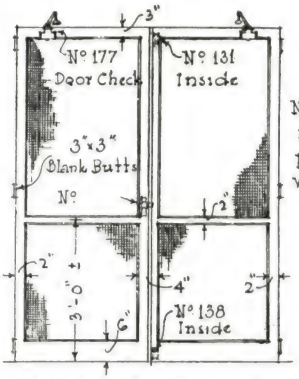
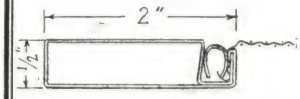
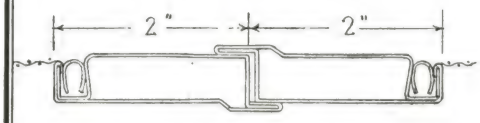


EXTERIOR ELEVATION SHOWING PAIR OF LIGHT METAL SCREEN DOORS OPENING OUT



SECTION THRU STILE

Cylinder lock requires 2¼" wide stile.

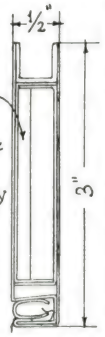


MEETING STILES WITH DOUBLE ASTRAGAL

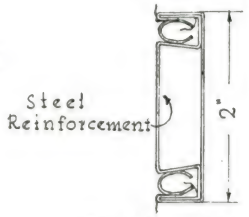
Extra Steel Reinforcement for Door Check

NOTE:- It is desirable that lower panel be protected by a heavy wire guard

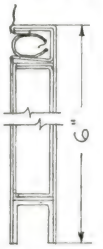
For Details see Sheet № 4



TOP RAIL

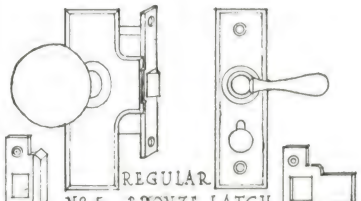


CROSS RAIL

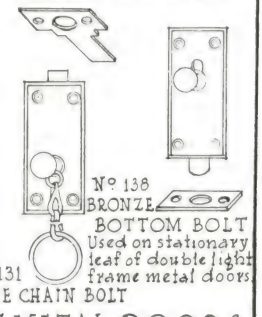


BOTTOM RAIL

LIGHT METAL DOORS FOR USE WITH FRENCH CASEMENTS OR SMALL ENTRANCE DOORS

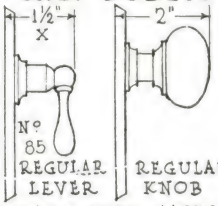


Knob and Lever both set from inside by slide stop Cannot be used in stiles less than 2" wide.



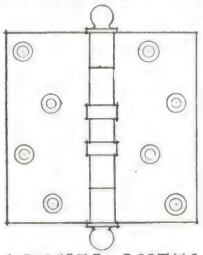
Used on stationary leaf of double light frame metal doors.

LATCHES & BOLTS FOR LIGHT METAL DOORS



SPECIAL LEVER CASES

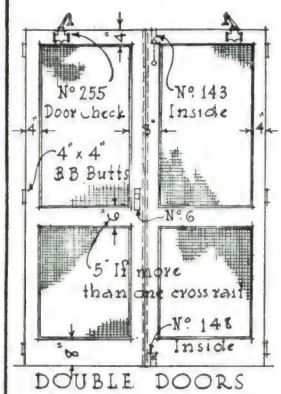
NUMBER	PROJ. X
76	5/8"
79	7/8"
82	1⅛"
85	1½" Std.



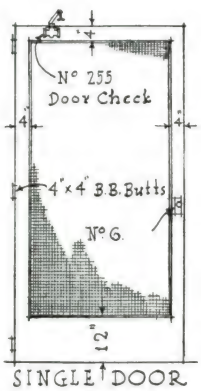
BRONZE BUTTS

LIGHT DOORS 3-3"x 3" LOOSE BRASS PIN
HEAVY DOORS 3-4"x4" BRONZE B.B.

KNOBS & LEVERS, & BUTTS USED WITH LIGHT & HEAVY DOORS

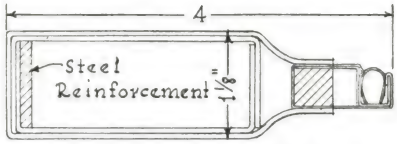


DOUBLE DOORS

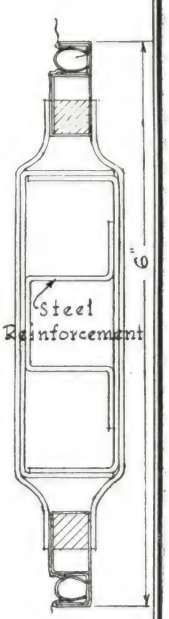


SINGLE DOOR

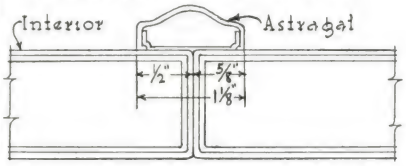
EXTERIOR ELEVATION SHOWING HEAVY FRAME METAL SCREEN DOORS OPENING OUT



SECTION THRU STILE

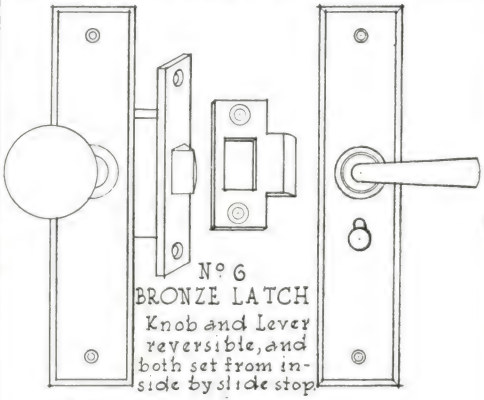


SECTION THRU MIDDLE RAIL

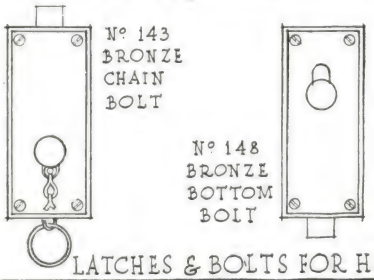


SECTION THRU MEETING STILES & ASTRAGAL

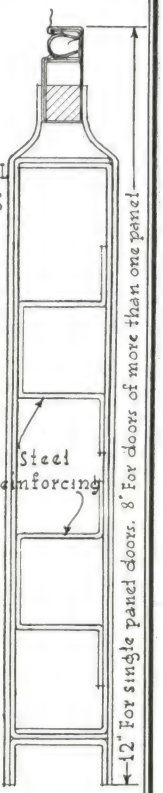
HEAVY METAL DOORS FOR LARGE OPENINGS AND CONTINUOUS OR HARD USAGE



Knob and Lever reversible, and both set from inside by slide stop



LATCHES & BOLTS FOR HEAVY METAL DOORS



SECTION THRU BOTTOM RAIL

IMPORTANT NOTE:-A RABBET AT LEAST EQUAL TO THICKNESS OF DOOR SHOULD ALWAYS BE PROVIDED AT HEAD, JAMB & SILL

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD CONSTRUCTION AND HARDWARE FOR WATSON LIGHT AND HEAVY METAL SCREEN DOORS	NOT DRAWN TO SCALE DATE-SEPT: 21	DRWG 3

Continued on next page

Watson's Wood Frame Screen Doors

FIG. 21. WOOD FRAME SCREEN DOOR

Wood frame screen doors are usually constructed of Michigan white pine painted with the best exterior enamel in any selected color, but may be made of any fine cabinet wood finished to correspond with the adjacent woodwork. Watson doors are symmetrical in appearance, and have as large an area of screen cloth as is consistent with the strength of the frame.

Materials and Construction—The framework is made of selected woods carefully seasoned and kiln dried. We have secured by our dowel corner construction great strength and rigidity. Hardwood dowels are used and being fully enclosed can neither shrink, swell nor loosen, as no moisture can come in contact with the dowels or glue. The rail is cope-cut to fit the mouldings of the edge of the stile, providing additional gluing surface. Broken door corners of this construction are unknown. The wire cloth is fastened in a grooved rabbet, the groove being located to retain the greatest amount of strength at the edge of the screen, and the wire cloth is held in the groove by a rattan spline, and further, the fastening is covered and strengthened by a neat moulding mitered at the corners—all as shown in Figs. 22 and 23.

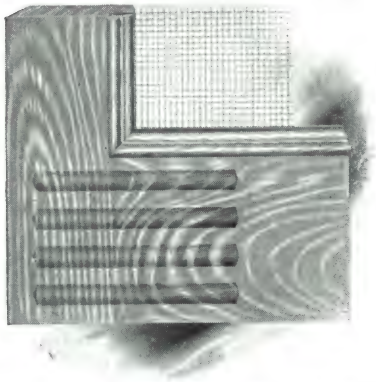


FIG. 22. DOWEL CORNER CONSTRUCTION USED IN ALL WOOD DOORS AND SCREENS

Hardwood Doors—We can furnish doors from any kind of hardwood of any finish to match the adjacent house doors or woodwork. Watson standard construction is a veneer as shown in Fig. 24, but solid doors can be furnished if required, in places of exceptional exposure to rain or dampness. The veneered doors are light, strong, and less liable to warp or twist out of shape than the solid doors.

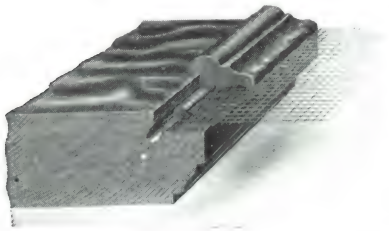


FIG. 23. METHOD OF SECURING WIRE CLOTH IN SOLID HARDWOOD DOORS

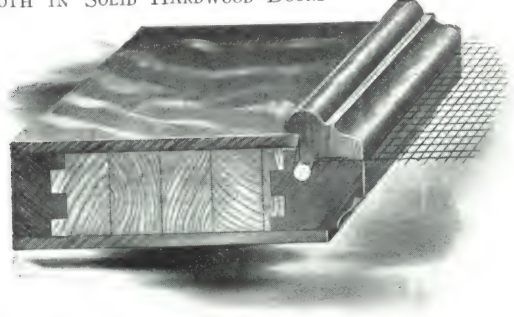


FIG. 24. METHOD OF VENEERING HARDWOOD DOORS

Hardware—Doors regularly equipped with solid bronze latches and hinges; other special hardware furnished. Guards provided for bottom panels as shown below and on page 1159.

FIG. 25. TOP BOLT WITH CHAIN PULL

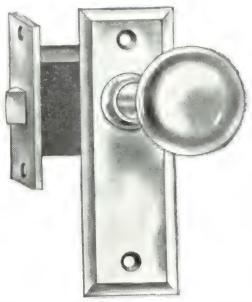


FIG. 26. OUTSIDE KNOB AND ESCUTCHEON

FIG. 27. INSIDE LEVER AND ESCUTCHEON

FIG. 28. BOTTOM BOLT

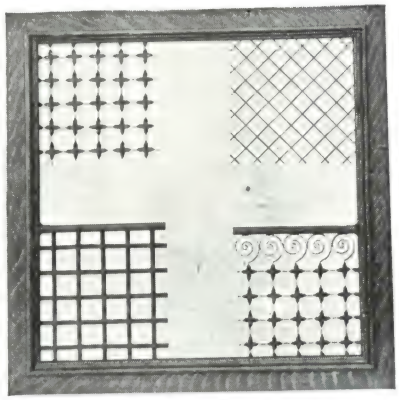
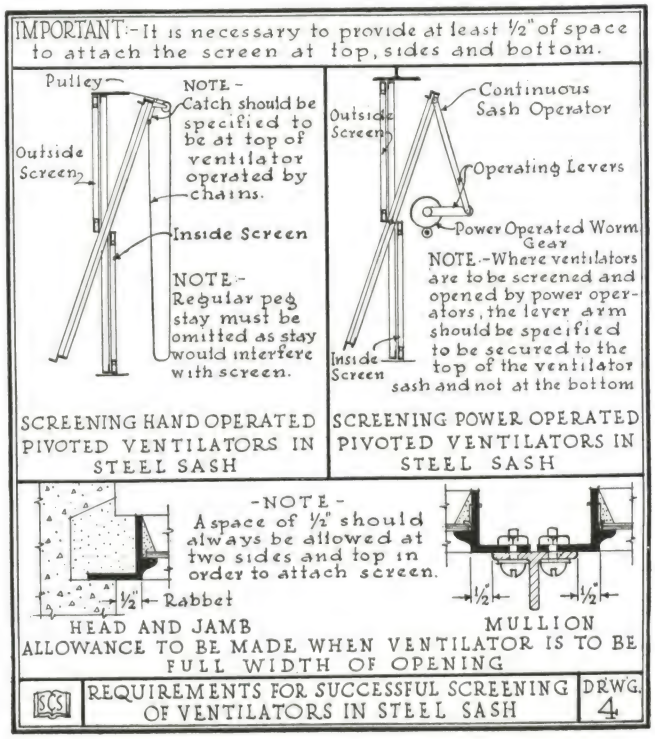


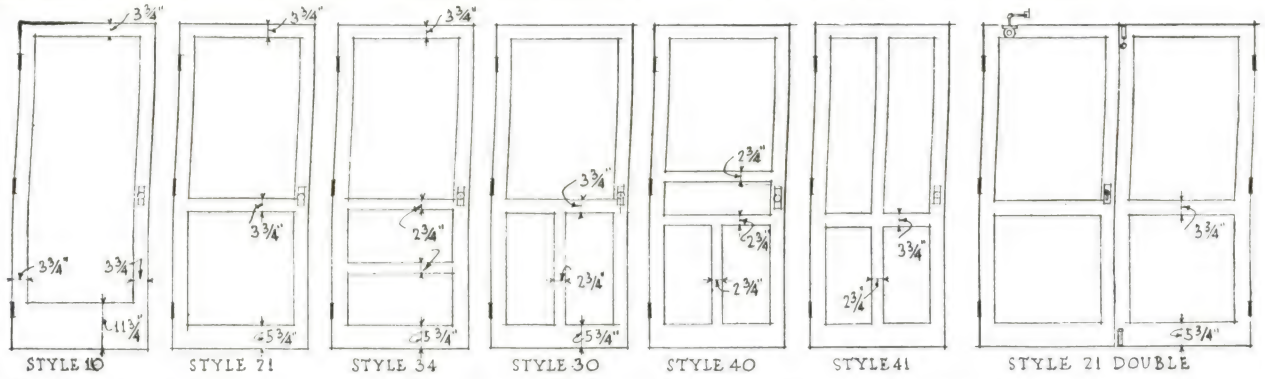
FIG. 29. GUARDS

WOOD FRAME SCREEN DOOR HARDWARE AND GUARDS

Styles of Doors—Made in a great many different styles of panel, usually to correspond to house door. Solid panels instead of guards sometimes used at bottom, but these are not recommended.



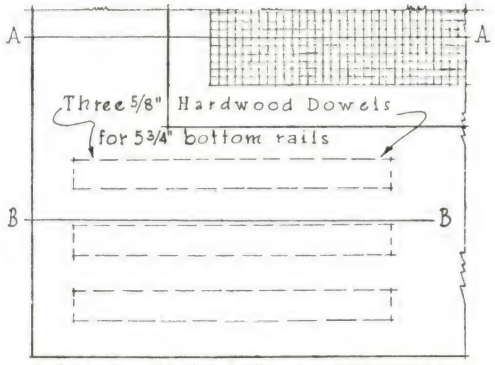
Continued on next page



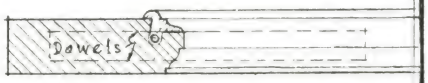
1" ELEVATIONS SHOWING TYPICAL STYLE OF WOOD FRAME DOORS

NOTES

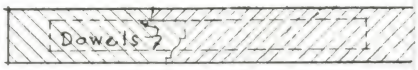
It is desirable that rabbet be provided to receive the top, sides and bottom of all screen doors. Rabbet must always be as deep as the thickness of door. Sufficient space must be allowed for hardware of both screen and house doors. An unobstructed swinging space must be provided, this especially refers to location of lighting fixtures. Stiles and top rails for French Doors may be 2¾" in width if standard latch is used. Special panel designs of any type may be made. Dimensions on stiles are standard for doors as shown can be varied but should never be made smaller.



3"SCALE ELEVATION SHOWING CORNER CONSTRUCTION



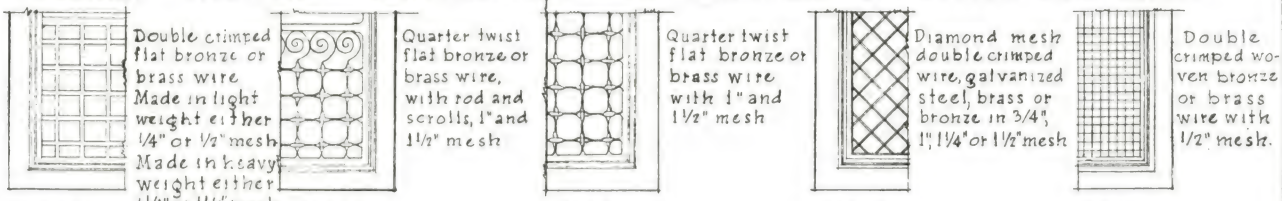
SECTION ON LINE "A-A"



SECTION ON LINE "B-B"

Note:-
Standard thickness of doors 1⅛"

DETAILS SHOWING CONSTRUCTION AT JUNCTION OF STILES AND RAILS



Nº 2 — Double crimped flat bronze or brass wire. Made in light weight either ¼" or ½" mesh. Made in heavy weight either 1¼" or 1½" mesh.

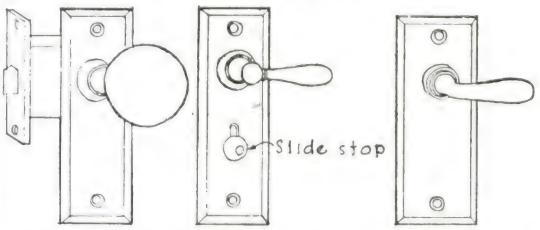
Nº 8A — Quarter twist flat bronze or brass wire, with rod and scrolls, 1" and 1½" mesh.

Nº 8 — Quarter twist flat bronze or brass wire with 1" and 1½" mesh.

Nº 23 — Diamond mesh double crimped wire, galvanized steel, brass or bronze in ¾", 1", 1¼" or 1½" mesh.

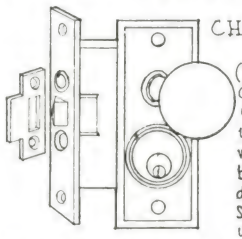
Nº 12 — Double crimped woven bronze or brass wire with ½" mesh.

VARIOUS DESIGNS OF GUARDS USED WITH WOOD FRAME DOORS



Nº 1

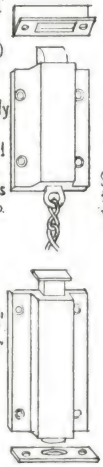
This latch regularly used on all doors and set from inside by slide stop used in 3¾" and wider stiles. No 1 Plain Latch in 3¾" stile No 2 Key Latch in 3¾" stiles No 3 Plain Latch in 2¾" stile No 4 Key Latch in 2¾" stiles



Nº 8

This cylinder lock may be masterkeyed with other cylinder locks. Doors must be not less than 1⅛" thick and stiles not less than 3¾"

Nº 205 COILED SPRINGS REGULARLY FURNISHED
Furnished in steel (never in brass or bronze). Door checks are special but their use is recommended

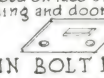


CHAIN BOLT Nº102 (Reversible) Chain Bolt (2½" case) used regularly with bottom bolt Nº9 for all double doors. Strike plate is used on stop.

BOTTOM BOLT Nº 96

CHAIN BOLT Nº113
Same as Nº111 Strike Plate designed to be used on T astragal transom bar

CHAIN BOLT Nº115
Same as Nº111 except designed to be placed on face of casing when casing and door are flush



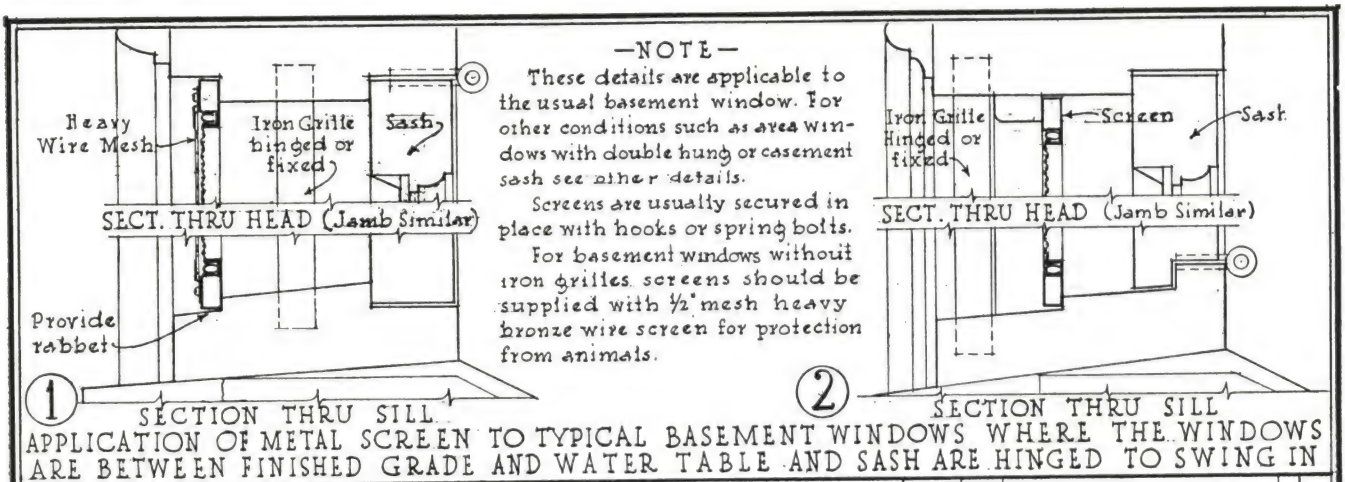
CHAIN BOLT Nº119
See note for Nº115

CHAIN BOLT Nº117
Same as Nº119 except the shape of keeper.

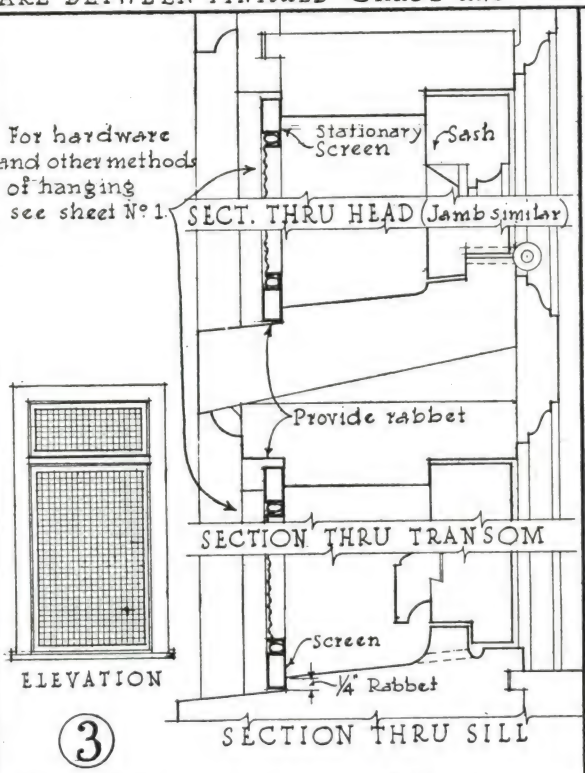
HARDWARE USED WITH WITH WOOD FRAME DOORS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD CONSTRUCTION AND HARDWARE FOR WATSON WOOD FRAME SCREEN DOORS	SCALE ¼" 3" EQUALS 1'-0" DATE-SEPT.'21	DRWG 5

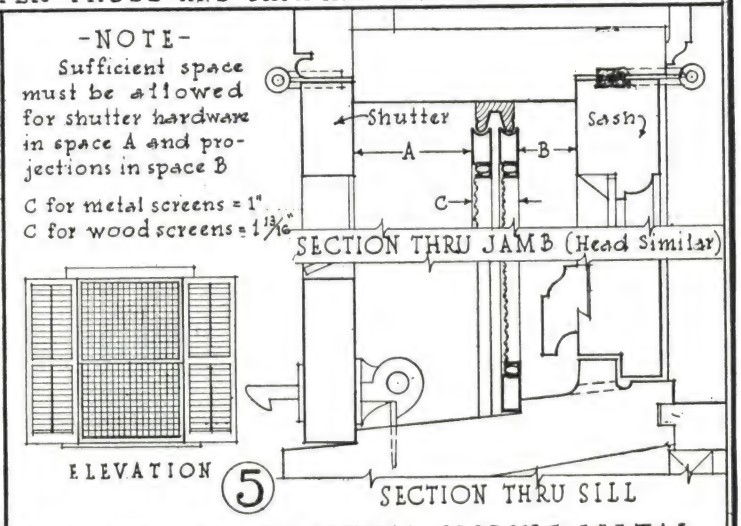
Continued on next page



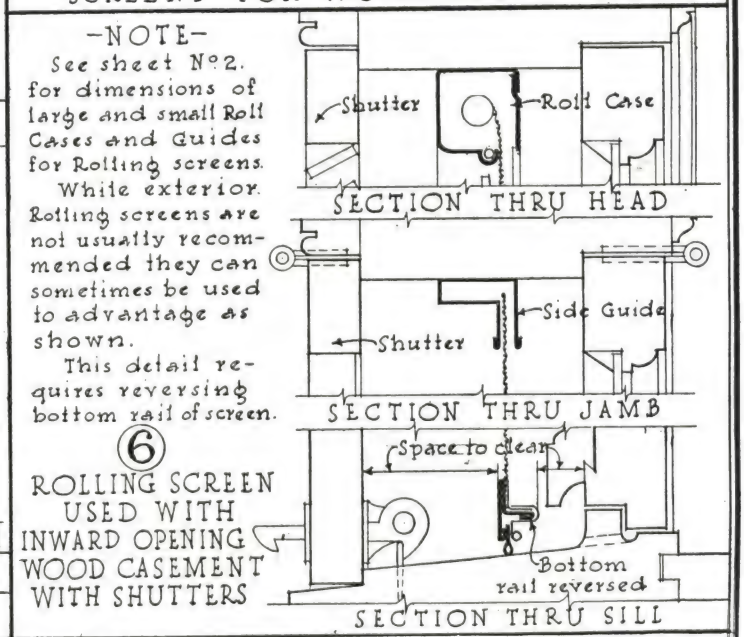
APPLICATION OF METAL SCREEN TO TYPICAL BASEMENT WINDOWS WHERE THE WINDOWS ARE BETWEEN FINISHED GRADE AND WATER TABLE AND SASH ARE HINGED TO SWING IN



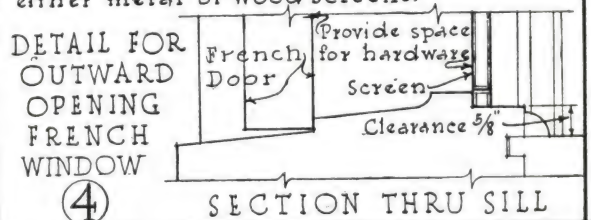
DETAILS OF FULL HEIGHT METAL CASEMENT SCREENS FOR INWARD OPENING WOOD CASEMENT WITHOUT SHUTTERS.



EXTERIOR TWIN VERTICAL SLIDING METAL SCREENS FOR WOOD CASEMENTS



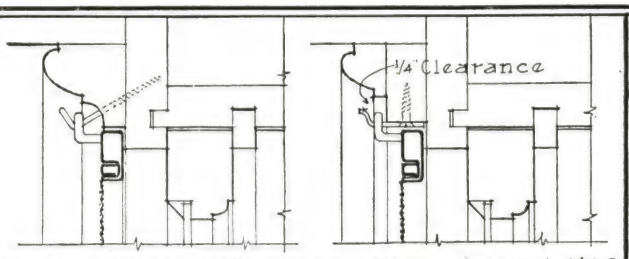
-NOTE-
Provide rabbets at sills, heads and jambs equal to at least the thickness of either metal or wood screens.



THESE DETAILS (EXCEPT FIG. 6), ALSO APPLY FOR WOOD SCREENS

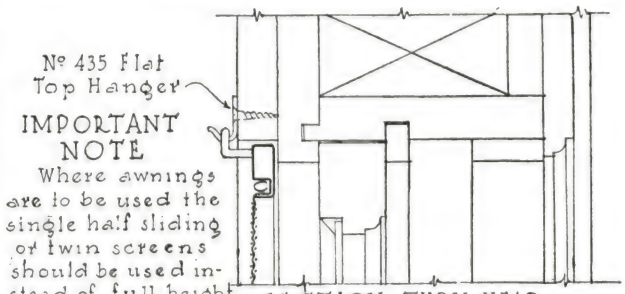
DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	SCREENS FOR BASEMENT WINDOWS AND WOOD CASEMENTS OPENING IN	SCALE 3" EQUALS 1'-0" DATE-JUNE-21	DRWG 6

Continued on next page



Nº 438 HANGER USED WHERE Nºs 435 AND 437 CANNOT BE USED TO ADVANTAGE.

Nº 437 ANGLE TOP HANGER.

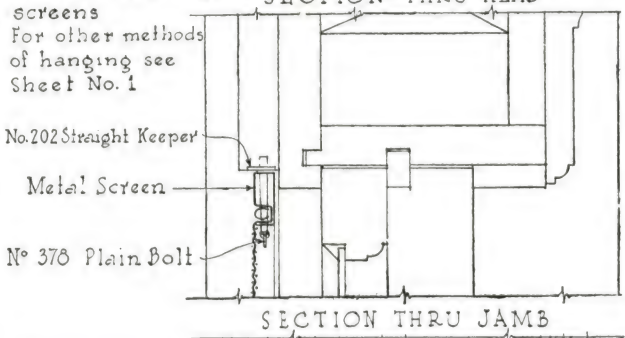


IMPORTANT NOTE

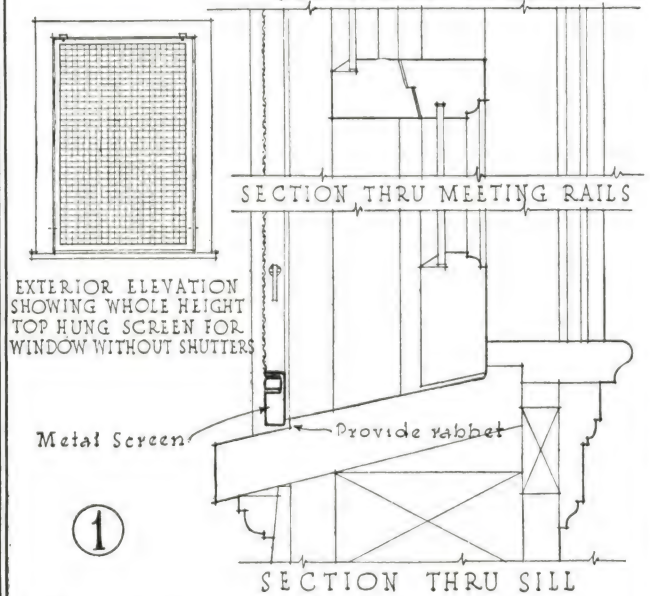
Where awnings are to be used the single half sliding or twin screens should be used instead of full height screens

For other methods of hanging see Sheet No. 1

SECTION THRU HEAD



SECTION THRU JAMB



SECTION THRU MEETING RAILS

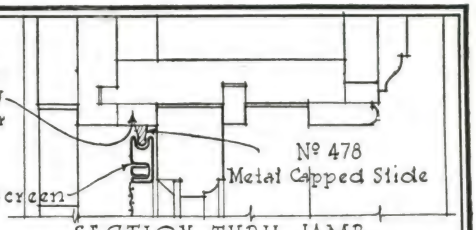
EXTERIOR ELEVATION SHOWING WHOLE HEIGHT TOP HUNG SCREEN FOR WINDOW WITHOUT SHUTTERS

SECTION THRU SILL

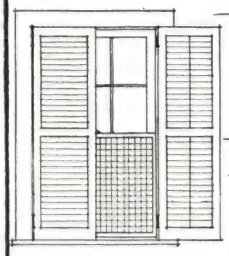
① FULL HEIGHT EXTERIOR TOP HUNG SCREEN FOR DOUBLE HUNG WINDOW WITHOUT SHUTTERS

-NOTE-

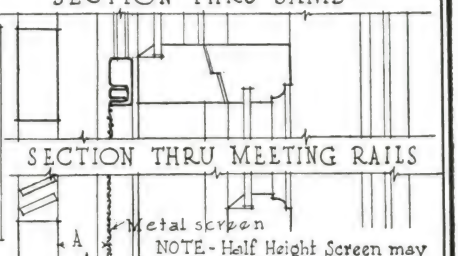
Provide extra width in pulley stile to allow for hardware on shutters



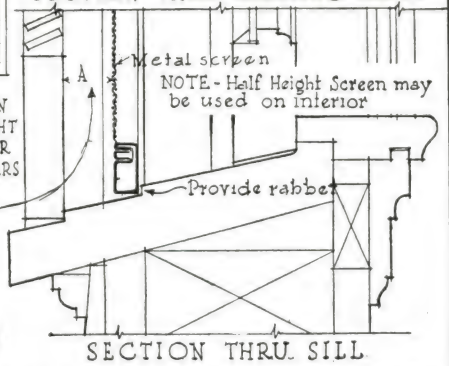
SECTION THRU JAMB



EXTERIOR ELEVATION SHOWING HALF HEIGHT SLIDING SCREEN FOR WINDOW WITH SHUTTERS



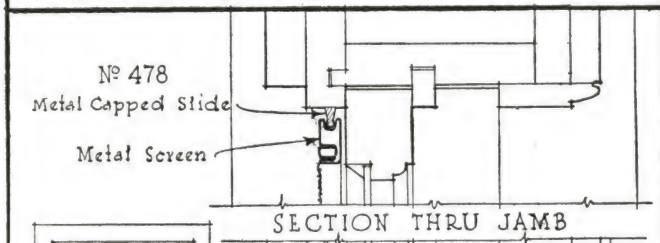
SECTION THRU MEETING RAILS



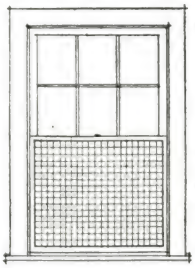
NOTE - Dimension 'A' depends on type of hardware selected.

SECTION THRU SILL

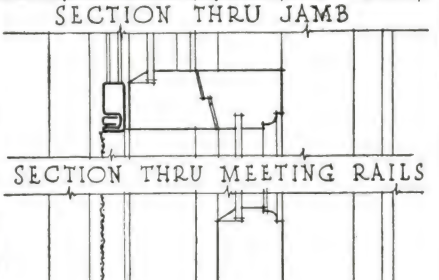
② HALF HEIGHT EXTERIOR SLIDING SCREEN FOR DOUBLE HUNG WINDOW WITH SHUTTERS



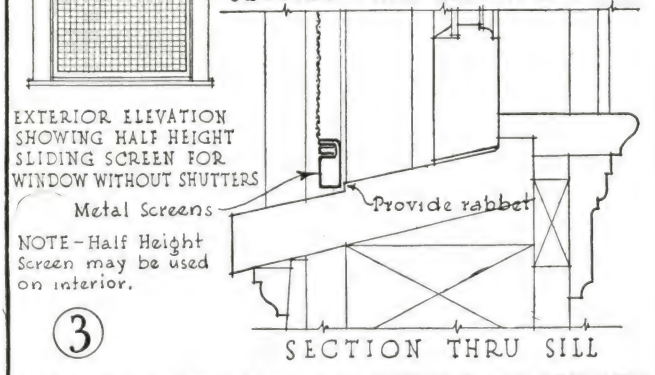
SECTION THRU JAMB



EXTERIOR ELEVATION SHOWING HALF HEIGHT SLIDING SCREEN FOR WINDOW WITHOUT SHUTTERS



SECTION THRU MEETING RAILS



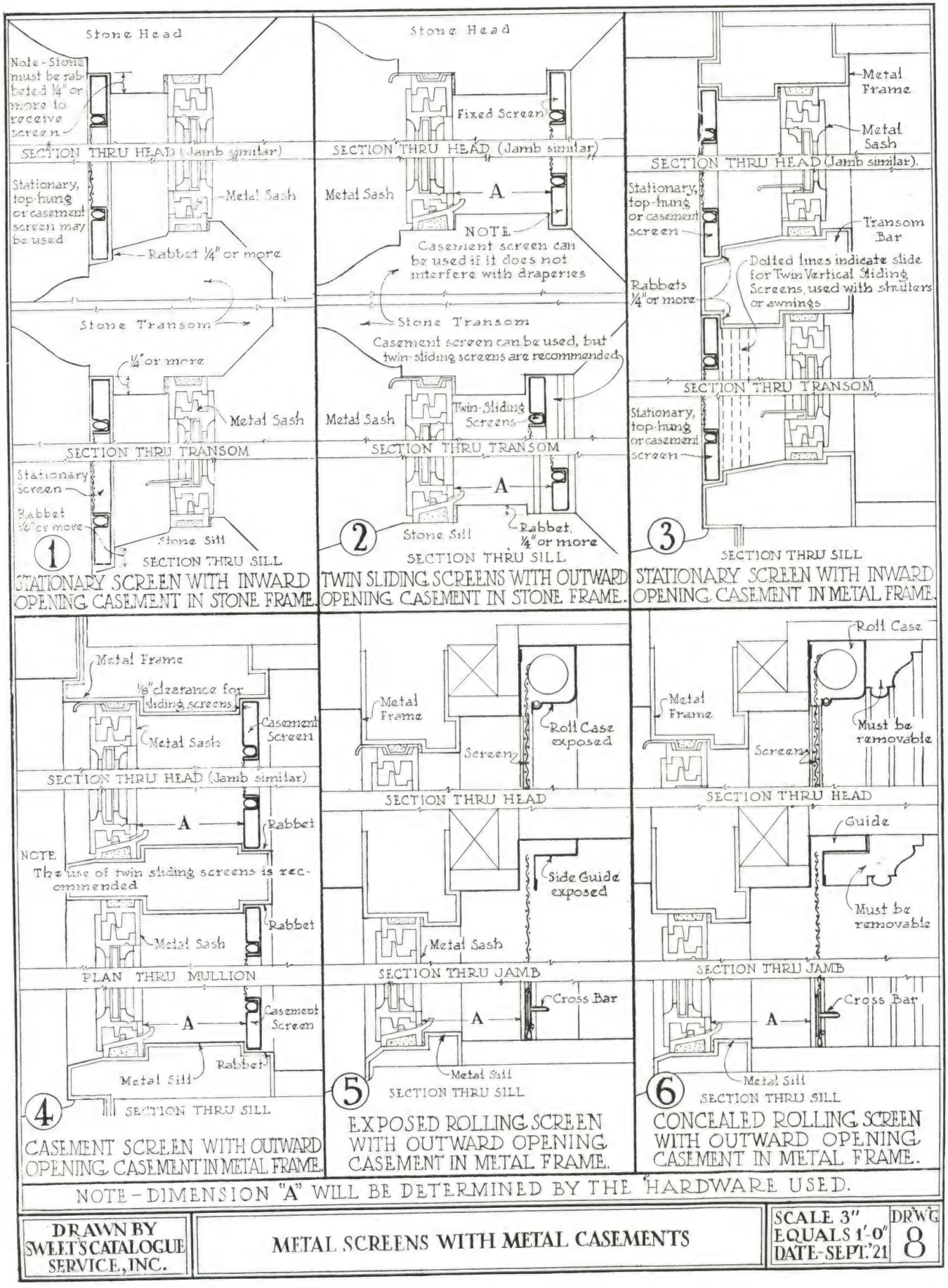
SECTION THRU SILL

③ HALF HEIGHT EXTERIOR SLIDING SCREEN FOR DOUBLE HUNG WINDOW WITHOUT SHUTTERS

DETAILS ALSO APPLY FOR WOOD SCREENS. FOR DETAILS OF SCREENS & HARDWARE SEE SHEETS Nºs 1&2

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	EXTERIOR FULL HEIGHT AND VERTICAL SLIDING SCREENS FOR DOUBLE HUNG WINDOWS	SCALE 3" EQUALS 1'-0" DATE-JUNE:21	DRWG 7

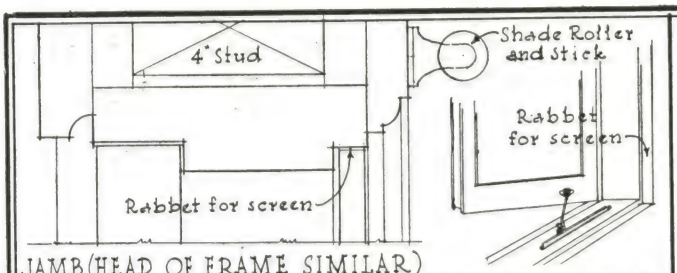
Continued on next page



NOTE - DIMENSION "A" WILL BE DETERMINED BY THE HARDWARE USED.

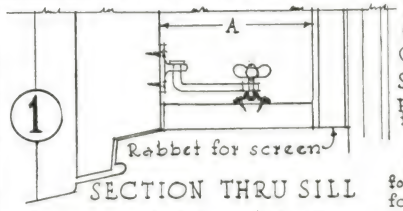
DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	METAL SCREENS WITH METAL CASEMENTS	SCALE 3" EQUALS 1'-0" DATE-SEPT.'21	DRWG 8

Continued on next page



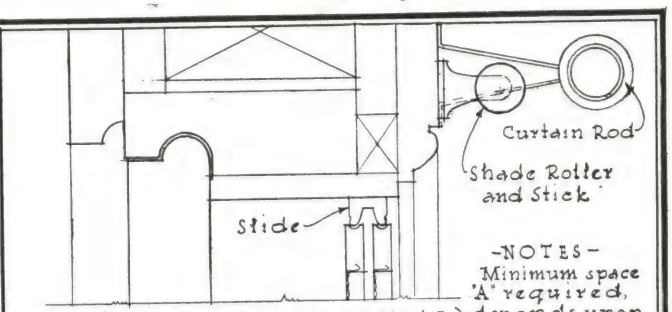
SKETCH SHOWING A COMMON FORM OF CASEMENT ADJUSTER
Sash locked in desired position by means of thumb screw on sill.

—NOTES—
For distance A allow 1¾" for turnbuckle and 3½" for cremone bolt on sash.
Rabbet stool below screen as shown to insure free swing for screen.
If wood, in place of metal screens, are used the rabbet should correspond to the thickness of the wood screen.
Shade roller and stick must be placed high enough to clear screen.

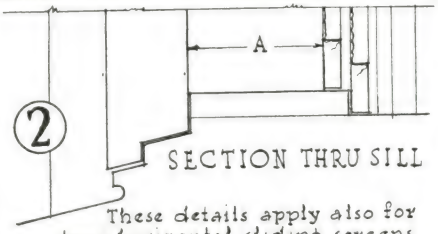


SECTION THRU SILL
Screen pivoted to swing. See Sheet No 1 for methods of securing screen in place. Not recommended if draperies are to be used. See Drwgs. 8 & 9 if draperies are to be used.

FULL HEIGHT METAL SCREEN FOR WOOD CASEMENTS OPENING OUT

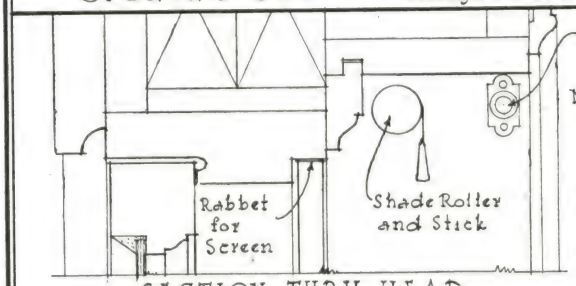


—NOTES—
Minimum space "A" required, depends upon type of hardware selected.
Wood screens can be used instead of metal screens, providing that proper distance "A" as noted above, is kept.

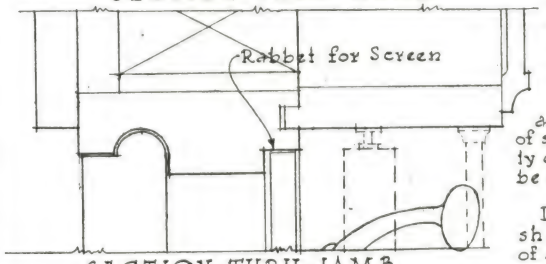


SECTION THRU SILL
These details apply also for twin horizontal sliding screens This permits use of both shades and draperies on interior trim.

TWIN VERTICAL SLIDING METAL SCREENS FOR WOOD CASEMENTS OPENING OUT



SECTION THRU HEAD



SECTION THRU JAMB

NOTES ON HARDWARE FOR CASEMENTS OPENING OUT

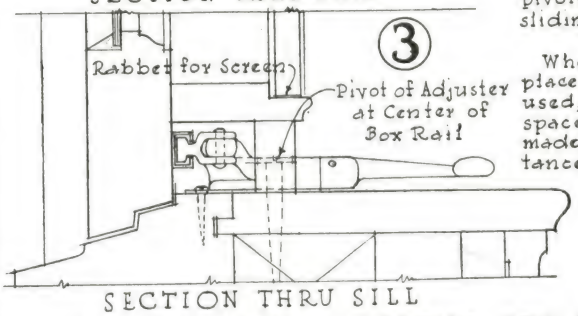
Consideration of the types of hardware used for this kind of window is of the utmost importance when installing screens.

All sash hardware should be placed below the sill or outside of the window opening where possible.

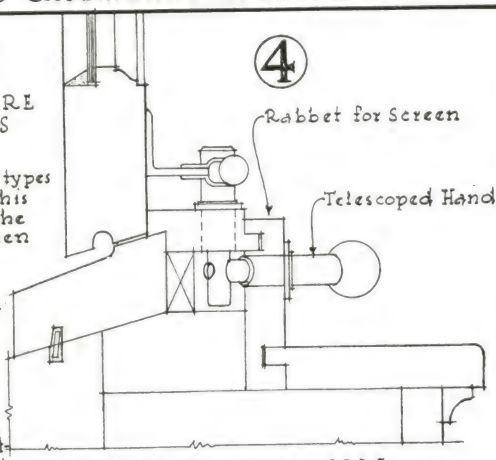
Any kind of casement adjuster placed on top of sill should be permanently enclosed and care must be taken to make it fly tight.

Details No 9, 10 and 11 show three different types of adjusters with which pivoted, side hung, or sliding screens may be used.

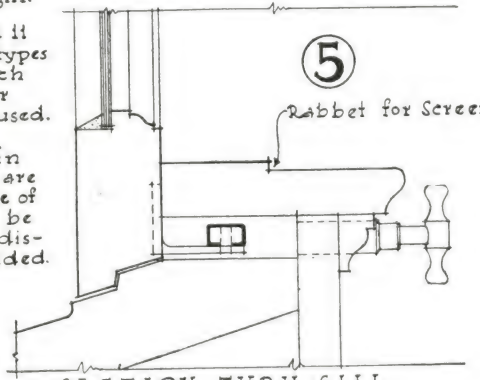
When wood screens in place of metal screens are used, proper allowance of space for rabbet must be made, also minimum distance A must be provided.



SECTION THRU SILL



SECTION THRU SILL



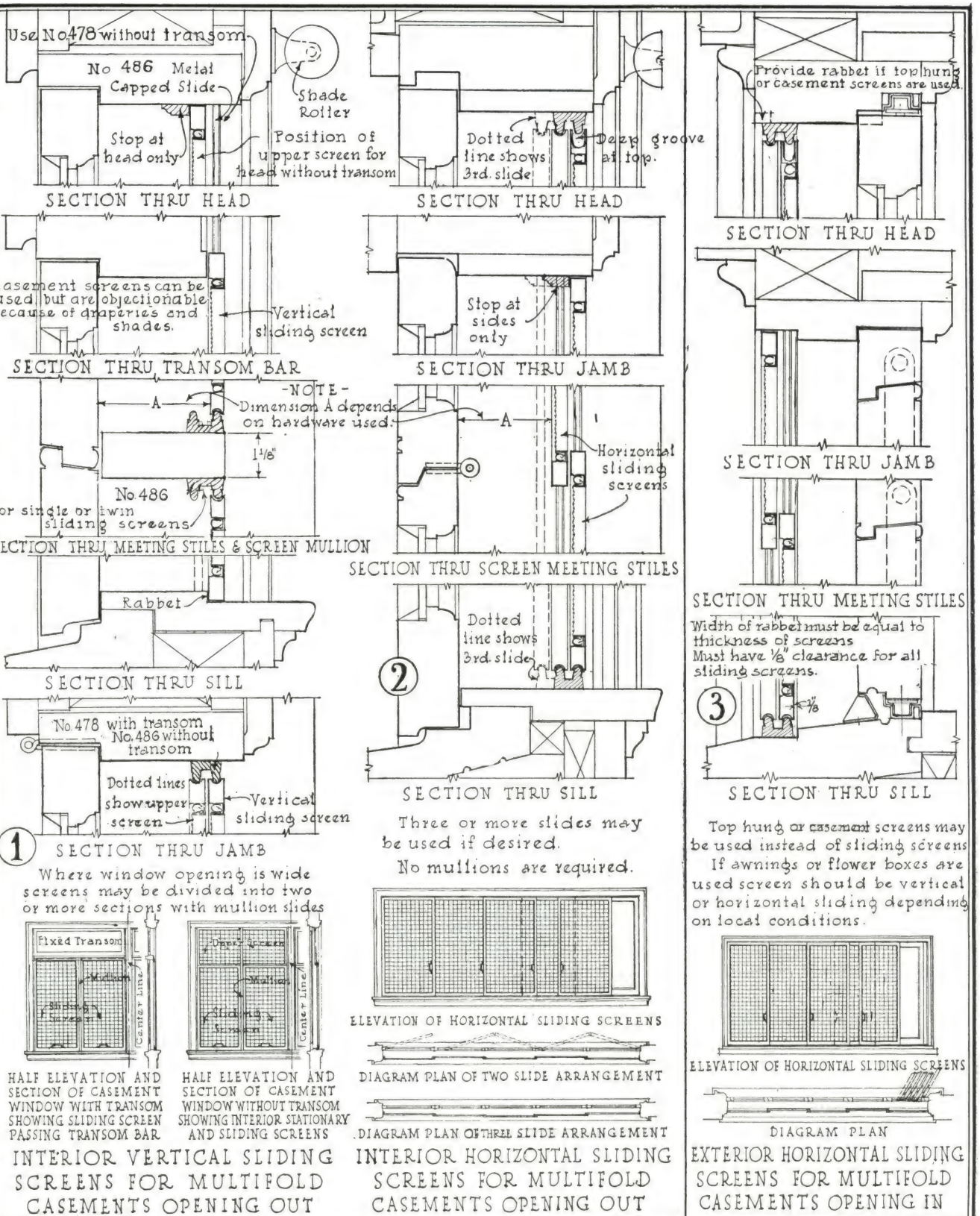
SECTION THRU SILL

FULL HEIGHT SCREENS FOR WOOD CASEMENTS OPENING OUT WHICH ARE EQUIPPED WITH PATENT ADJUSTERS
FOR METHOD OF HANGING SCREENS AND HARDWARE FOR SAME SEE SHEET No 1

NOTE:-SEE SHEET No 2 FOR DETAIL SECTIONS OF WOOD SCREENS AND HARDWARE

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	PIVOTED AND SLIDING SCREENS FOR WOOD CASEMENT WINDOWS OPENING OUT	SCALE 3" EQUALS 1'-0" DATE-SEPT 21	DRWG 9

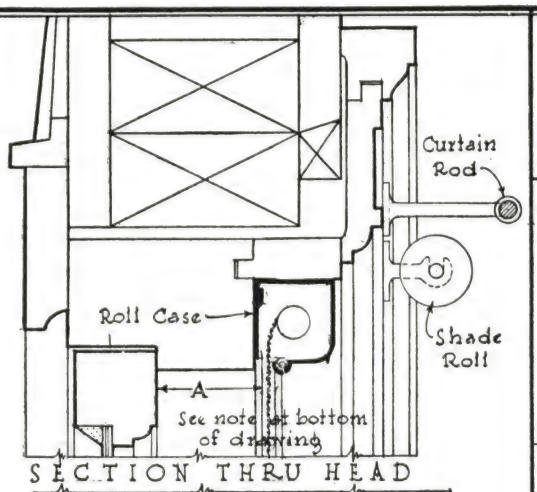
Continued on next page



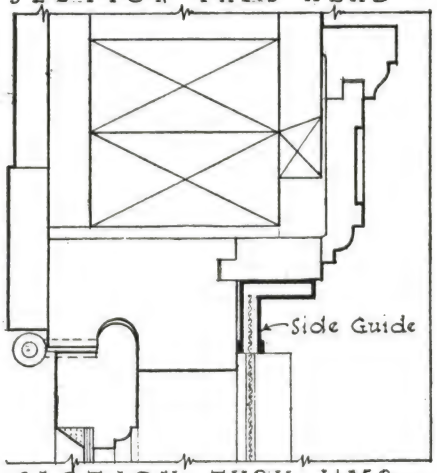
NOTE WOOD SCREENS MAY BE USED IN PLACE OF METAL SCREENS IF DESIRED
SEE SHEET N° 2 FOR DETAIL SECTIONS OF METAL AND WOOD SCREENS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	VERTICAL AND HORIZONTAL SLIDING SCREENS FOR MULTIFOLD CASEMENT WINDOWS	SCALE 3" EQUALS 1'-0" DATE-JUNE-21	DRWG 10

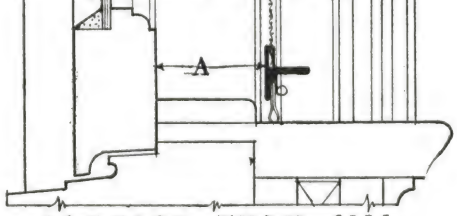
Continued on next page



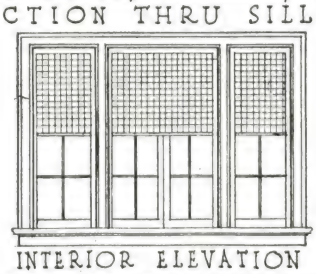
SECTION THRU HEAD



SECTION THRU JAMB



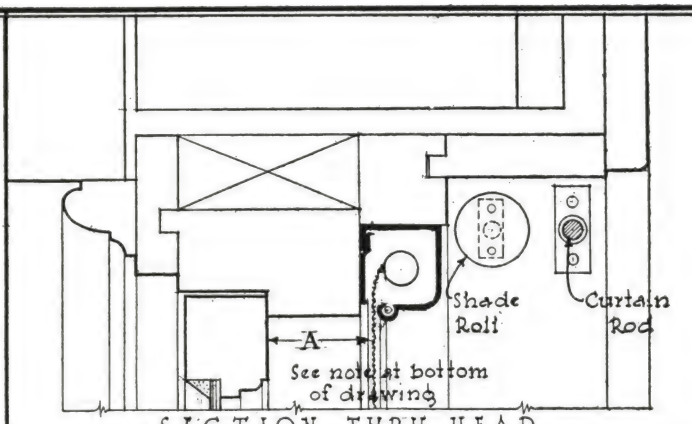
SECTION THRU SILL



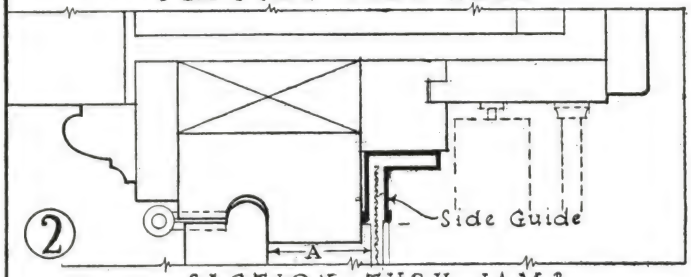
1 INTERIOR ELEVATION

SCREENS DRAWN PART WAY DOWN

FULL HEIGHT INTERIOR ROLLING SCREEN FOR CASEMENT WINDOW IN 4 IN. STUD WALL ROLL CASE AT HEAD OF WINDOW

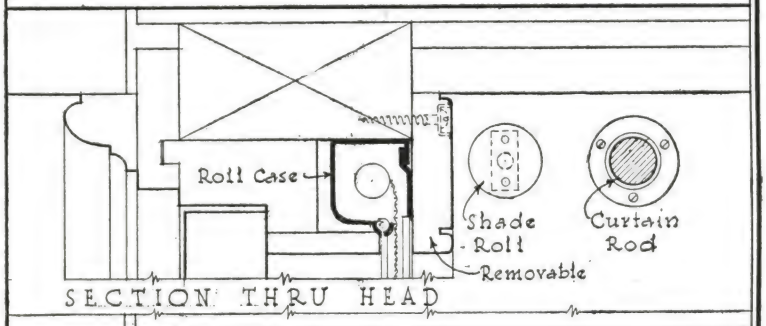


SECTION THRU HEAD

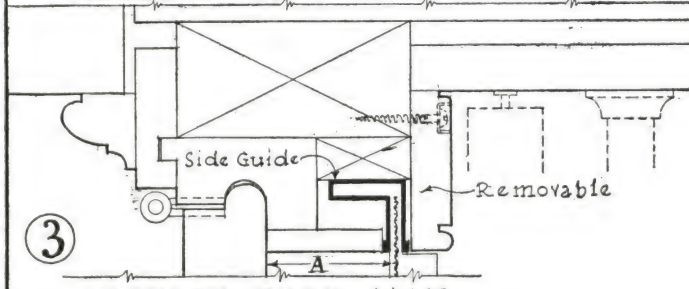


SECTION THRU JAMB

FULL HEIGHT INTERIOR ROLLING SCREEN FOR CASEMENT WINDOW IN MASONRY WALL ROLL CASE AT HEAD OF WINDOW



SECTION THRU HEAD



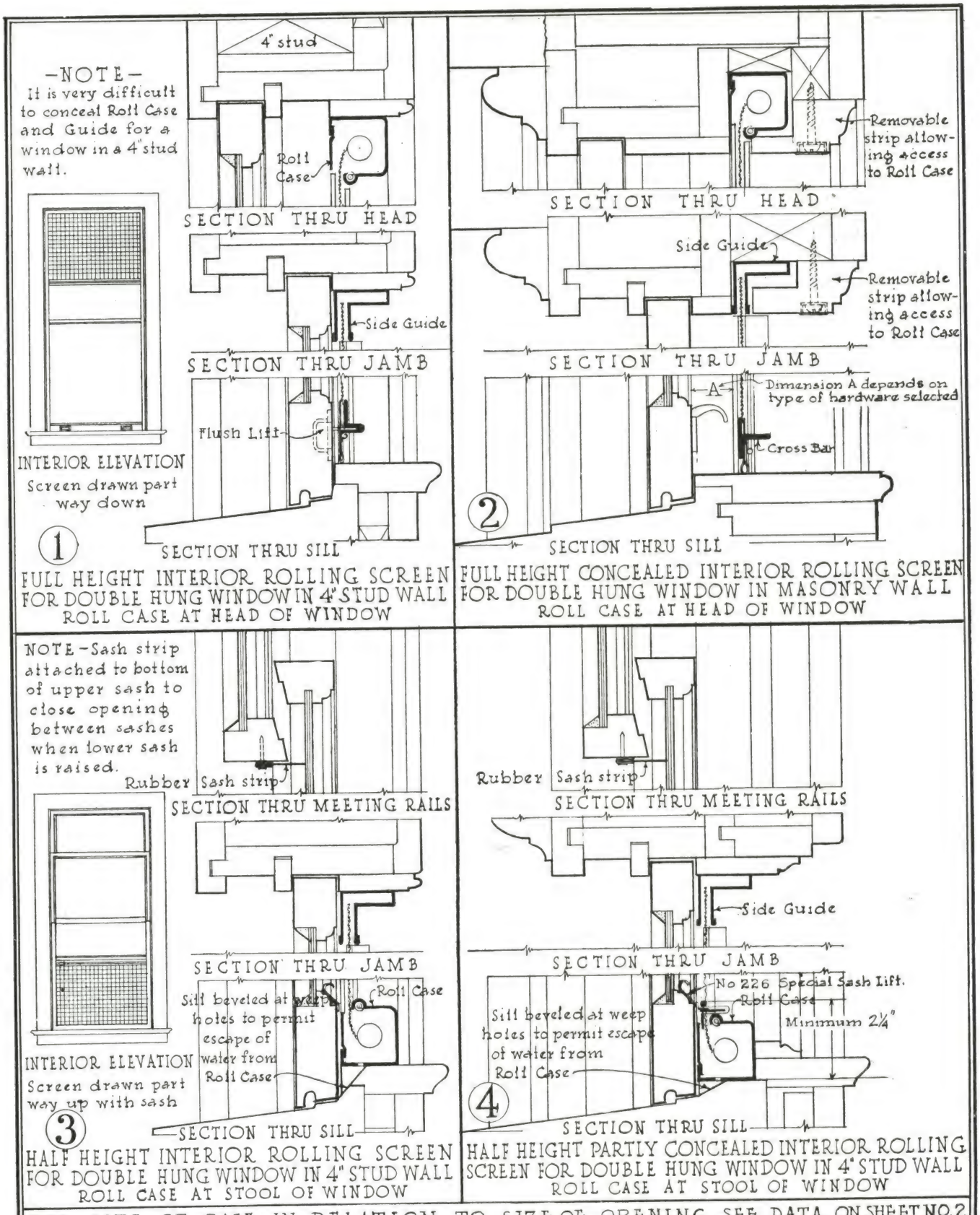
SECTION THRU JAMB

FULL HEIGHT CONCEALED INTERIOR ROLLING SCREEN FOR CASEMENT WINDOW IN MASONRY WALL ROLL CASE AT HEAD OF WINDOW

GENERAL NOTES EXCEPTING TWIN SLIDING SCREENS, THE ROLLING SCREEN IS THE MOST DESIRABLE METHOD OF SCREENING CASEMENTS OPENING OUT AS IT DOES NOT INTERFERE WITH DRAPERIES.
DIMENSION A WILL IN ALL CASES BE DETERMINED BY THE TYPE OF HARDWARE USED.
FOR SIZE OF CASE IN RELATION TO SIZE OF OPENING SEE DATA ON SHEET NO. 2.

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	EXPOSED AND CONCEALED ROLLING SCREENS FOR WOOD CASEMENTS OPENING OUT	SCALE 3" EQUALS 1'-0" DATE-JUNE-21	DRWG 11

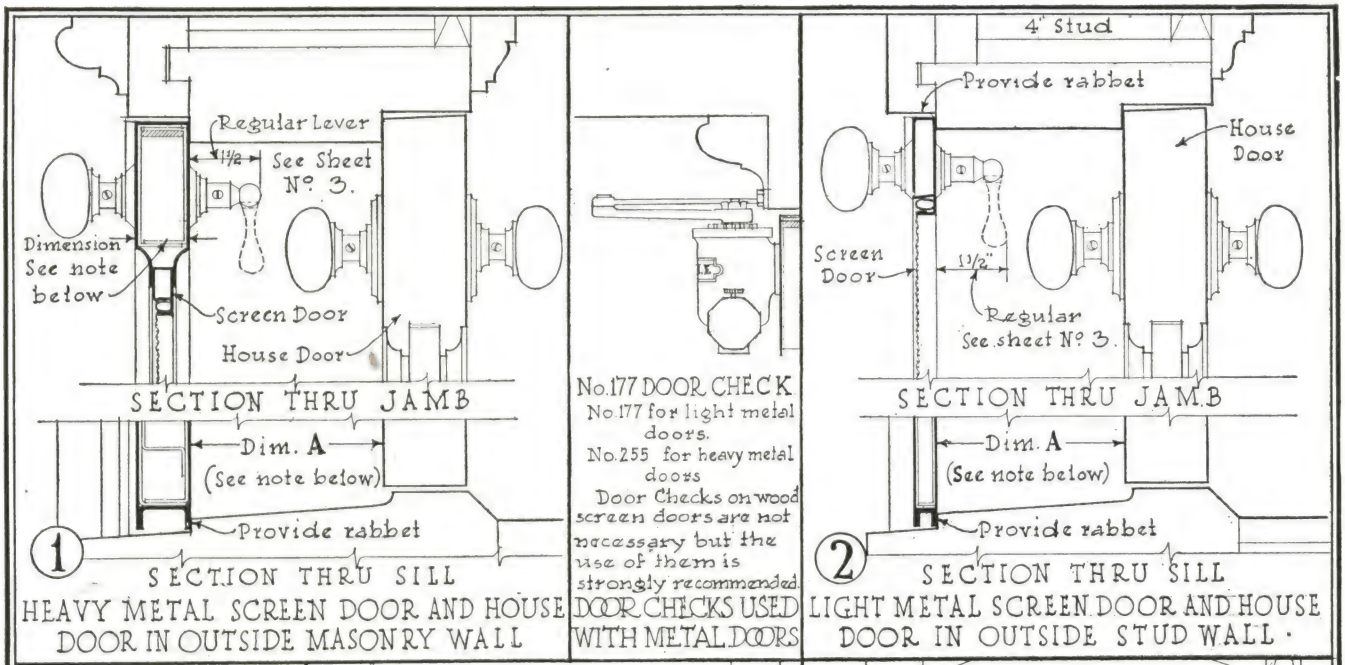
Continued on next page

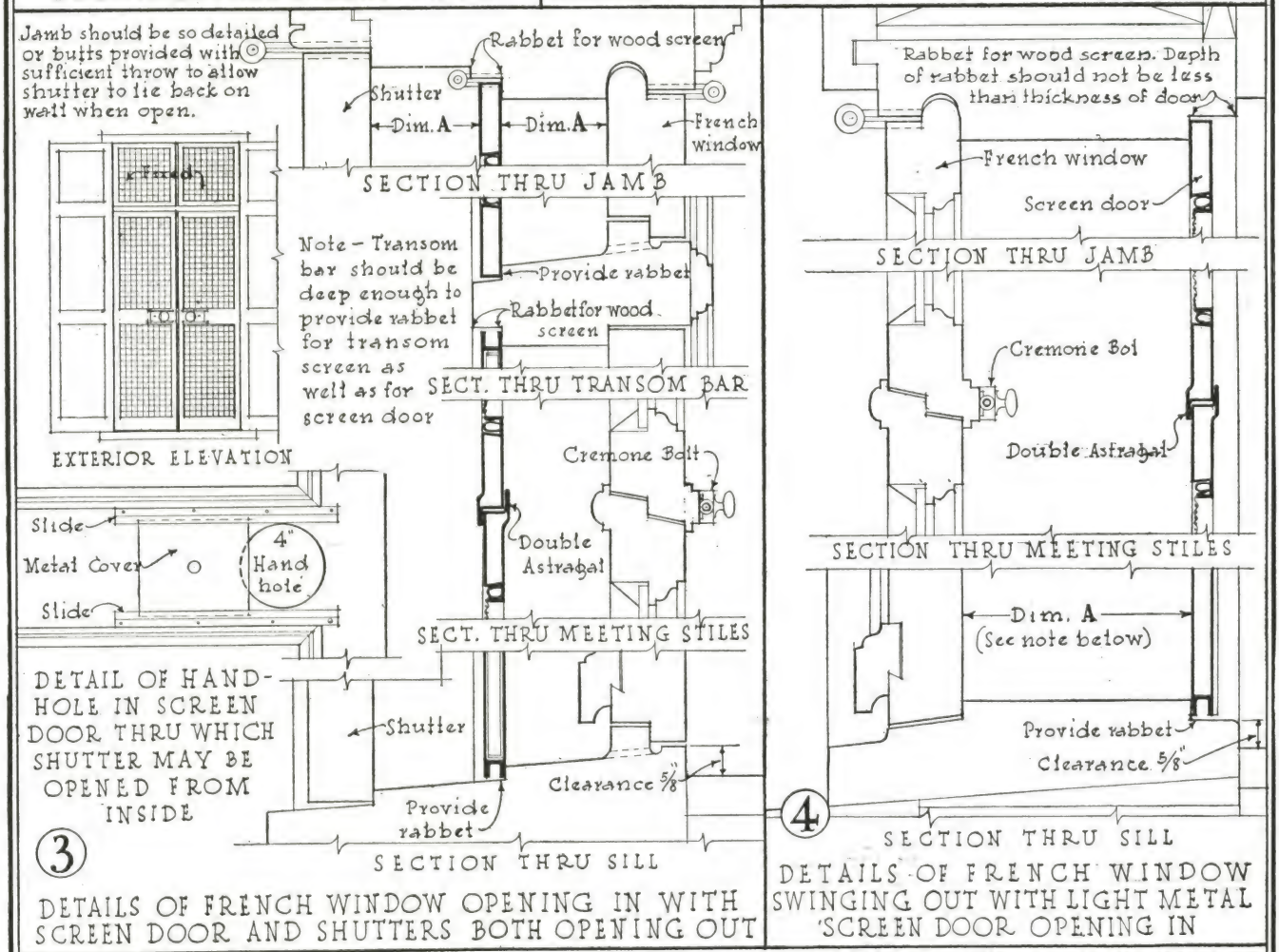


FOR SIZE OF CASE IN RELATION TO SIZE OF OPENING SEE DATA ON SHEET NO. 2

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	EXPOSED AND CONCEALED ROLLING SCREENS FOR DOUBLE HUNG WINDOWS	SCALE 3" EQUALS 1'-0" DATE-JUNE-21	DRWG. 12

Continued on next page

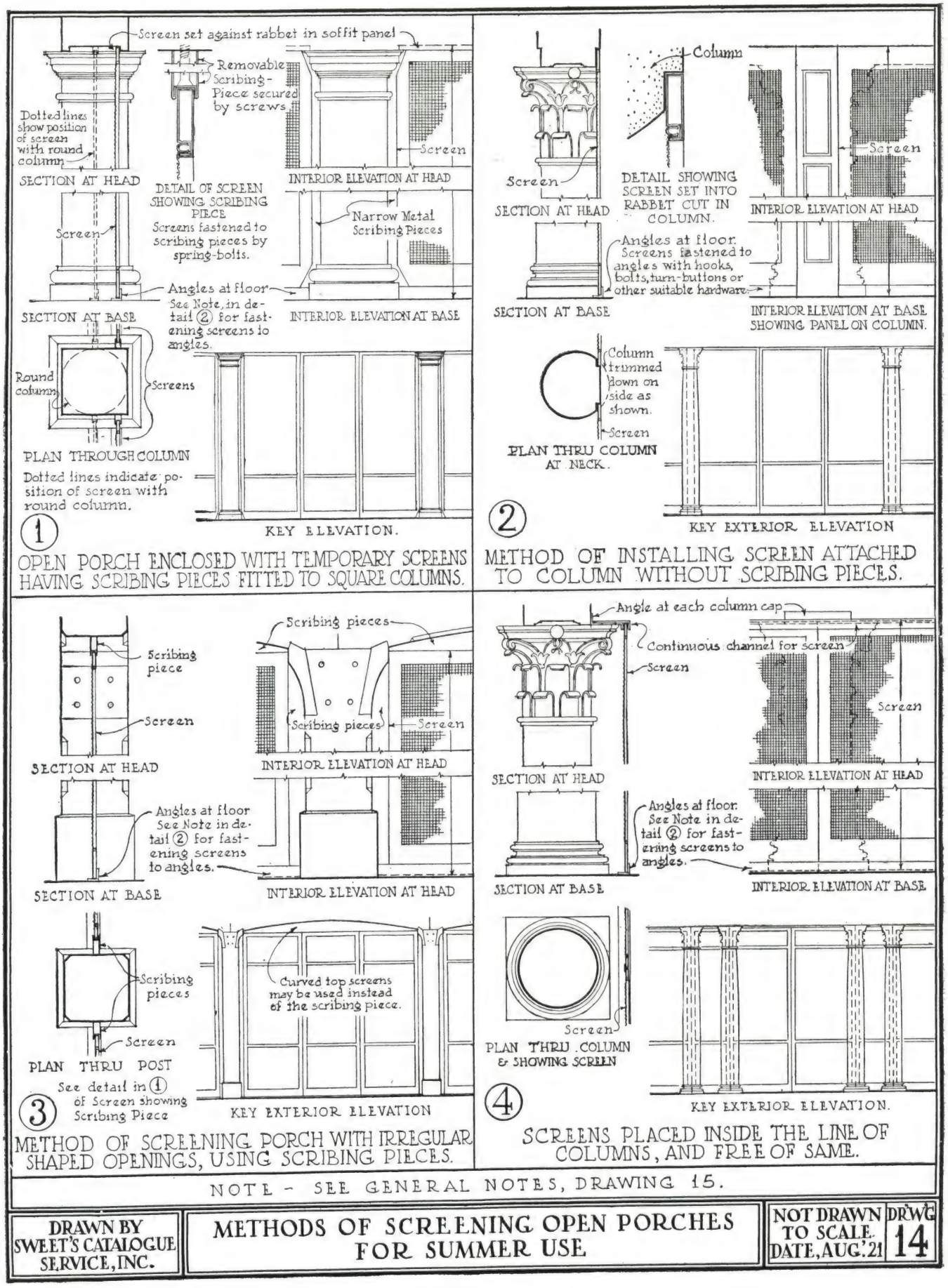




DIMENSION **A** IS GOVERNED BY KIND OF HARDWARE AND DOOR CHECK USED. FOR THICKNESS OF SCREEN DOORS AND HARDWARE SEE SHEETS NO. 3. IF WOOD SCREEN DOORS ARE USED INSTEAD OF METAL DOORS, PROPER ALLOWANCE MUST BE MADE FOR RABBETS

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	**HEAVY AND LIGHT METAL SCREEN DOORS WITH WOOD DOORS AND FRENCH WINDOWS**	SCALE 3" EQUALS 1'-0" DATE-JUNE-21	DRWG 13

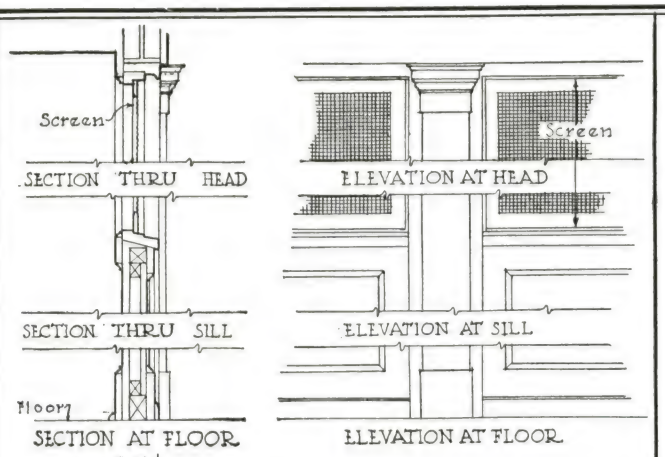
Continued on next page

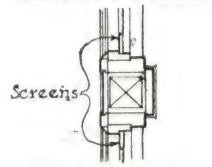


NOTE - SEE GENERAL NOTES, DRAWING 15.

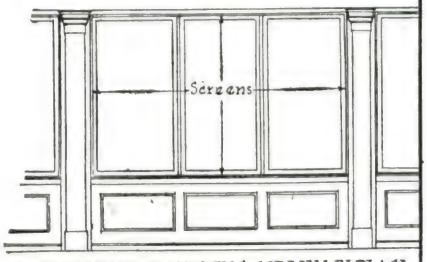
DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	METHODS OF SCREENING OPEN PORCHES FOR SUMMER USE	NOT DRAWN TO SCALE. DATE, AUG. '21	DRWG 14

Continued on next page

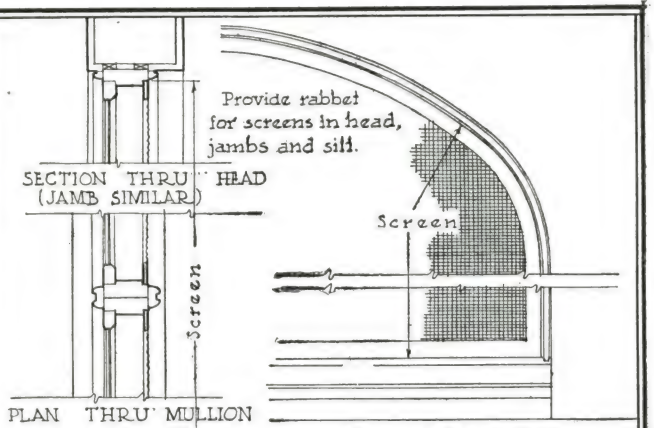


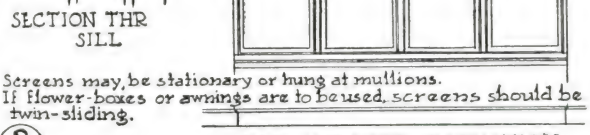


Screens may be stationary, or hung at top or side.



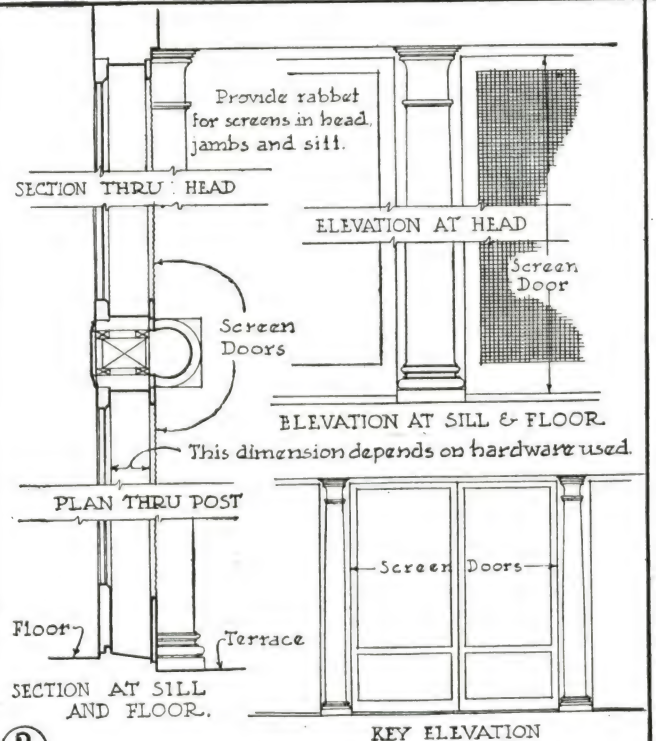
(1) ENCLOSED PORCH WITH INTERCHANGEABLE SCREENS AND STORM SASH.





Screens may be stationary or hung at mullions. If flower-boxes or awnings are to be used, screens should be twin-sliding.

(2) EXTERIOR SCREENS WITH INWARD OPENING CASEMENTS IN STUCCO OR MASONRY WALL.



(3) Lighting fixtures which will not interfere with the door-swings should be selected.

ENCLOSED PORCH WITH FRENCH GLAZED DOORS & SCREEN DOORS.

GENERAL NOTES.

Details on Drawings 14 & 15 show metal screens. Wood screens may be used in every case, instead of metal if desired.

Metal screens have the following advantages over wood screens — (1) They are stronger. (2) Having narrower stiles and rails, larger sight-openings are obtained, and there is less interference with the vision. This is particularly the case with the meeting-stiles and reinforcing-bars. (3) They require less room for storage.

For convenience in handling and storage, porch screen sections should not be made too large.

When detailing a porch, provision should be made for screens, whether they are to be installed when the building is erected, or left for future consideration.

For high-class work, and work in localities within reach of salt air, bronze screens should be specified in preference to steel, to prevent rusting and to eliminate necessity of repainting.

The essential requirement in designing is to provide some type of rabbet to receive the screen at head, jambs and sill, and to make a light-stop on all sides.

On straight surfaces angles may be used as rabbets instead of scribing-pieces.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	METHODS OF SCREENING ENCLOSED PORCHES FOR SUMMER USE	NOT DRAWN TO SCALE DATE, SEPT. '21.	DR'W'G 15

Continued on next page

ROLUP SCREEN COMPANY

MAIN OFFICE AND FACTORY
410 East 32nd Street
NEW YORK, N. Y.

Products

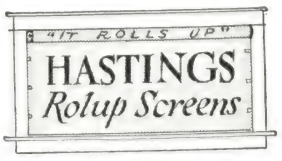
HASTINGS ROLUP WINDOW SCREENS.
Also manufacturers of Hastings Shayd-Awns.

Description

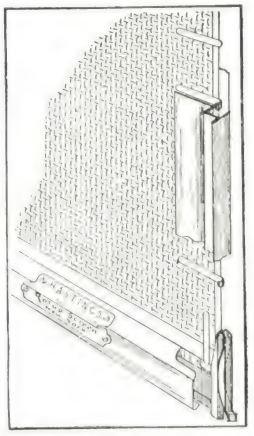
Hastings Rolup screens which roll up like a window shade, are designed to do away with the many troubles and expenses caused by the ordinary types of screens. They are the only rolling screens which lock screen cloth into the side of the frame. They are simply and strongly made; only non-rusting, corrosion resisting metals are used.

The roller is contained in an inconspicuous zinc box at the top of the window frame. At the sides of the window are placed brass side rails. These contain a groove into which the screen slides as it rolls up and down and from which it is impossible to pull the screen. Clips fasten the *monel metal screen* cloth to a ribbon of German silver which is fastened to the roller at the top and the bar across the bottom. All the strain in working the screen up and down is on this ribbon; there is no strain on the screen cloth.

Hastings Rolup screens are beautifully enameled to match the trim and are made to order for each particular window.



TRADE-MARK



SECTIONAL CONSTRUCTION

Advantages of Hastings Rolup Screens

They are as easily operated as a window shade and when rolled up, are out of the way.

They are made of non-rusting metals.

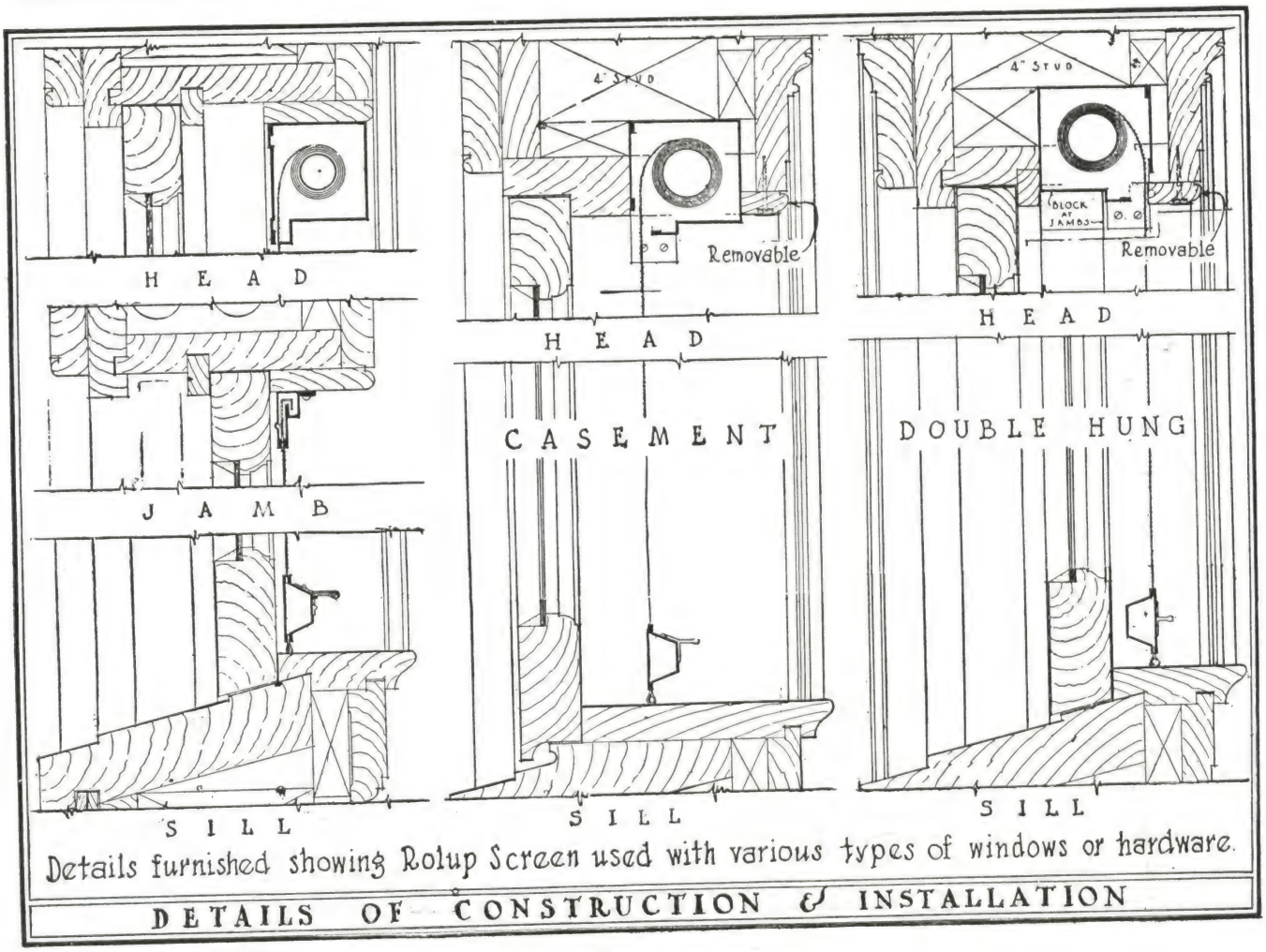
They absolutely answer the problem of screening casement windows.

They fit into practically *every* type of window construction.

They are permanent; the first cost is the last cost.

They can be put either on the inside or the outside of the window.

The detail drawings below are approximately one quarter (1/4) size.



COPPER AND BRONZE SCREEN CLOTH

COPPER AND BRASS RESEARCH ASSOCIATION
25 Broadway
NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928–935
Sash Chain	1187
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

Copper and Bronze—The Durable Metals for Screens

There has been an increasing demand for a wire cloth more durable than is usually found in hardware stores. It takes a comparatively short time for screens woven from ordinary metal wire to rust and become useless, even though painted or otherwise coated.

Copper and bronze screen cloth is non-corrosive, and under ordinary conditions will last as long as the building and does not have to be painted. It is especially suitable for installation near the seashore, where the action of the salt air is extremely corrosive.

Until copper and bronze screens were manufactured, home owners in this country wasted a large part of the $20,000,000 paid annually for screening which fell an easy prey to rust.

Copper and Bronze Screens Are Cheaper Because You Pay for Them Only Once

The expense of painting and renewals is avoided by the use of copper and bronze screen cloth. This saving more than offsets the higher first cost of from 60 to 80 cents per window.

Unobstructed Light and Vision

Requiring no protective coatings, light and air have an unobstructed passage through copper and bronze screen cloth. The incessant accumulation of rust and paint on ordinary metal screen cloth obstructs the vision and prevents the free passage of air.

Attractive Appearance of Copper and Bronze Screens

Copper or bronze screen cloth is permanently attractive in appearance, without treatment or painting. It may be obtained in either bright or dark finish.

Strength of Copper and Bronze Screen Cloth

Copper and bronze screen cloth is made of wire that is resilient and of high tensile strength, comparing favorably with all other kinds of screen cloth in this respect. For porch and door screens this is an important feature.

Meshes, Gauges, etc.

Copper and bronze screen cloth is usually specified in 14 or 16 mesh. It may be obtained in widths from 18 to 72 in. and in rolls of 100 lin. ft. 16 mesh will shut out the small insects.

Copper and Bronze Screen Frames

To avoid rusting, deterioration, painting and renewals, the frames of window, porch and door screens should be of copper or bronze. Copper or bronze costs more than steel or wood, but the difference in cost is more than made up through greater durability.

Bronze screen frames are little, if any, heavier than wood frames and can often be used under circumstances not possible with wider and thicker wood frames. They will not sag or swell. They are smaller in width and thickness than wood frames, are always neat and attractive in appearance, and provide larger openings for ventilation and light.

Screen Hardware Should Be Brass or Bronze

For harmony, durability, appearance and economy, it is essential that screen hardware (including hangers, hinges, fasteners, pulls, lifts, screws, hooks, etc.) be of brass or bronze.

Hardware made of plated, corrodible materials is not fully protected by the coatings, which soon fall prey to the destructive action of the elements. It is of the utmost importance that *solid* bronze or brass hardware be specified and installed.

Guard Against Substitutes for Copper and Bronze

Many imitations of copper and bronze are on the market, some made of highly corrosive metals coated so as to represent copper or bronze. Neither paint nor metal coating protects such screen cloth against rust. Guard against these substitutes by specifying *solid* copper or bronze.

ANCON HOSPITAL, PANAMA
All of the windows and porches of the buildings shown are screened with copper screen cloth

AMERICAN METAL WEATHER STRIP CO.

HOME OFFICE AND FACTORY
GRAND RAPIDS, MICH.

Branch Offices from Coast to Coast with All Sales and Installations Made Under Our Direct Supervision

Products

This company manufactures and installs "WINDUSTITE" AMERICAN METAL WEATHERSTRIPS for windows and doors of all types.

We make special effort to co-operate in meeting the requirements of architects and contractors.

REGISTERED TRADE-MARKS

"Windustite" American Metal Weatherstrips

All exterior openings of a building and inside closet doors of residences should be equipped with the American "Windustite" line, which renders the greatest protection to the occupants, draperies and decorations against the weather, dust and dirt.

Mechanical Construction

The "Windustite" patented equipment is so constructed as to eliminate wear or warping of the sash. It forms a perfect airtight joint on the sides and also at the corners where the side strips intersect with the cross pieces, and always affords easy operation.

Quality

Nothing but the very best metals obtainable are used (zinc, bronze and brass) in the construction of our equipment; every screw and nail used in its application is rustproof, which means long life and perfect operation.

Efficiency

Every architect has his own particular ideas or details of windows and doors, therefore each job and opening is treated according to its own peculiar conditions; the type of equipment most suitable is furnished and installed in such a manner as to render the highest efficiency possible.

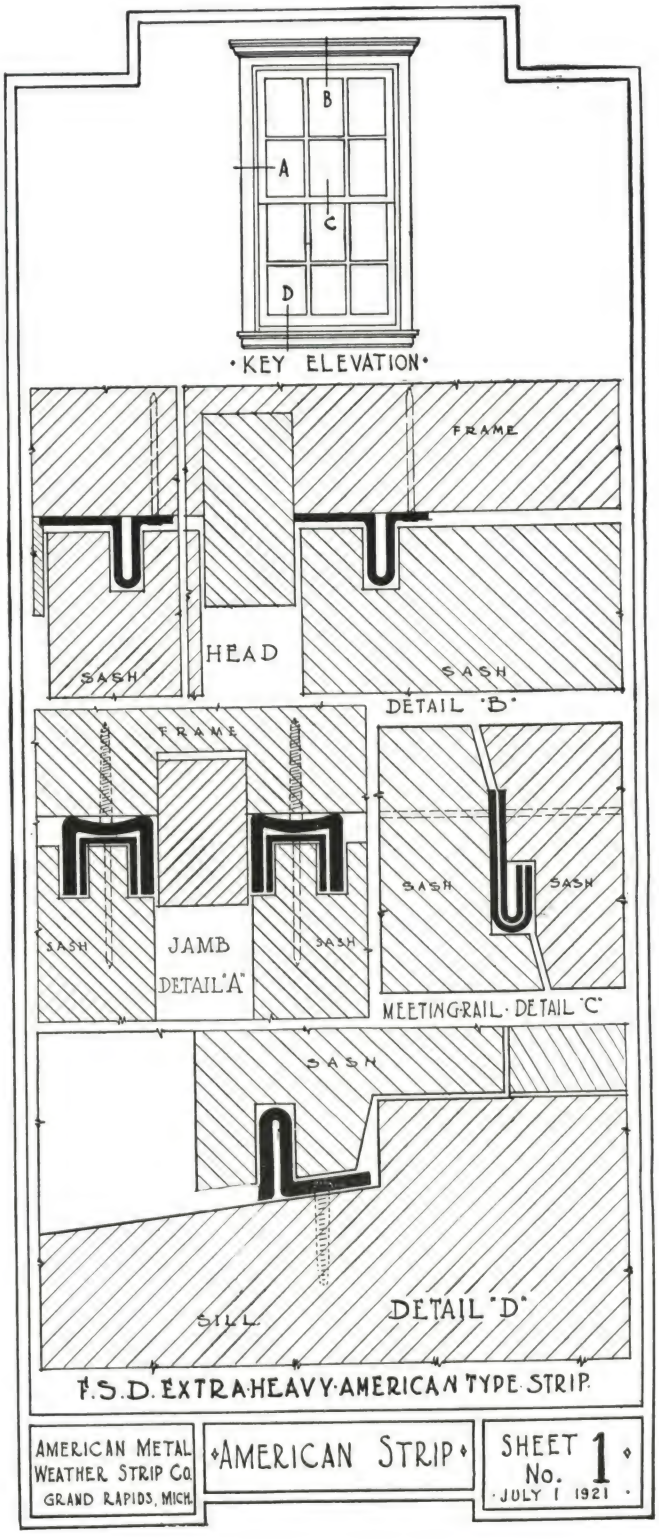
Workmanship and Co-operative Services

Our branch office managers and salesmen are of the type of men who will look after customers' interests in every respect. Only the best skilled mechanics are employed and they are capable of installing the most difficult work without injury to the woodwork, walls or decorations.

Blue Prints

Weatherstrips to meet all conditions are manufactured by the AMERICAN METAL WEATHER STRIP CO., including both single ribbed and double channel "metal to metal" equipment for pulley windows, interlocking equipment for casement windows and interlocking and flexible bronze equipment for both doors and casements, some of which are not shown by the accompanying detail drawings. Complete detailed blue prints will be mailed on request.

We solicit inquiries and opportunity to furnish bids to architects and contractors.



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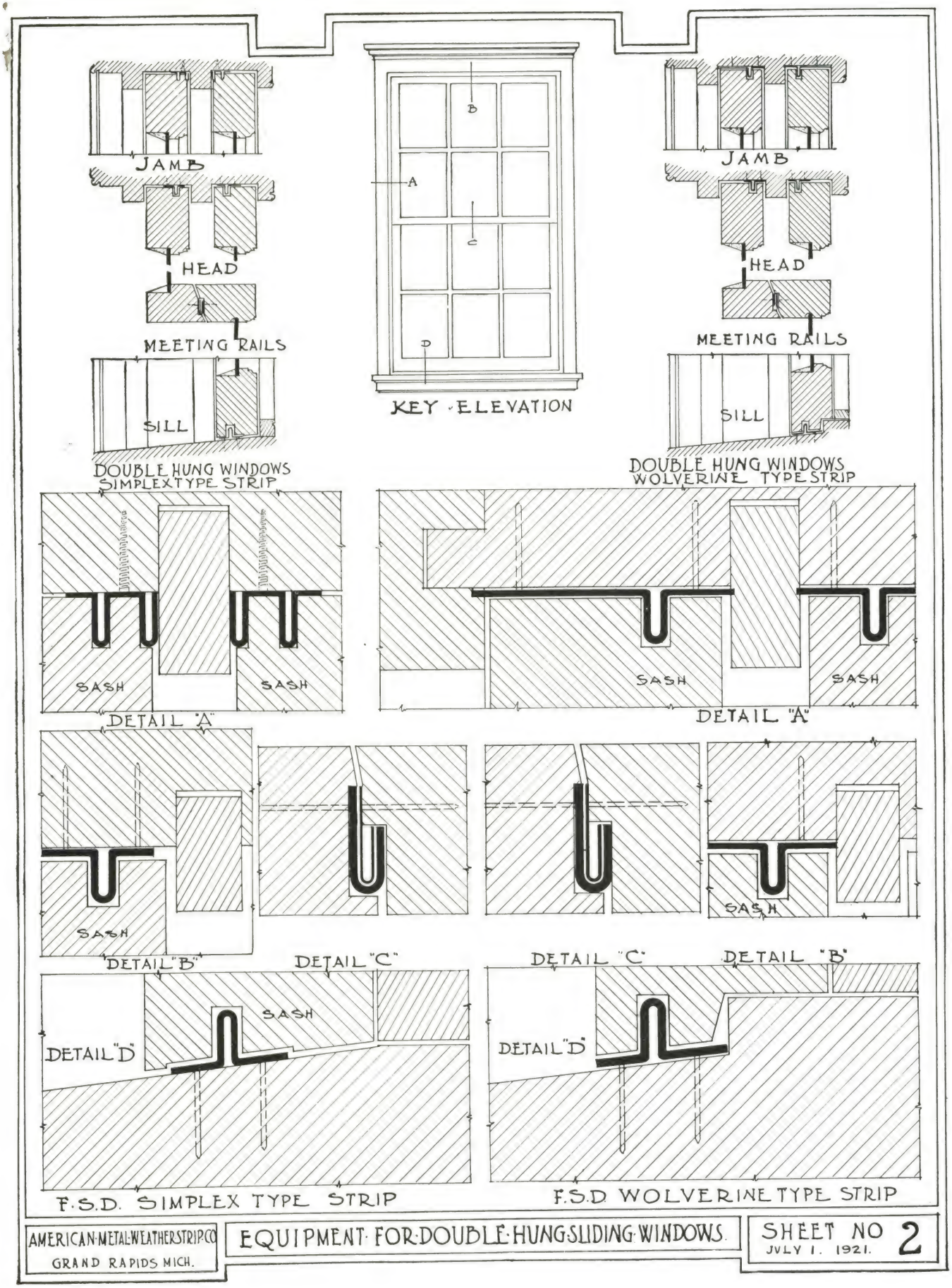

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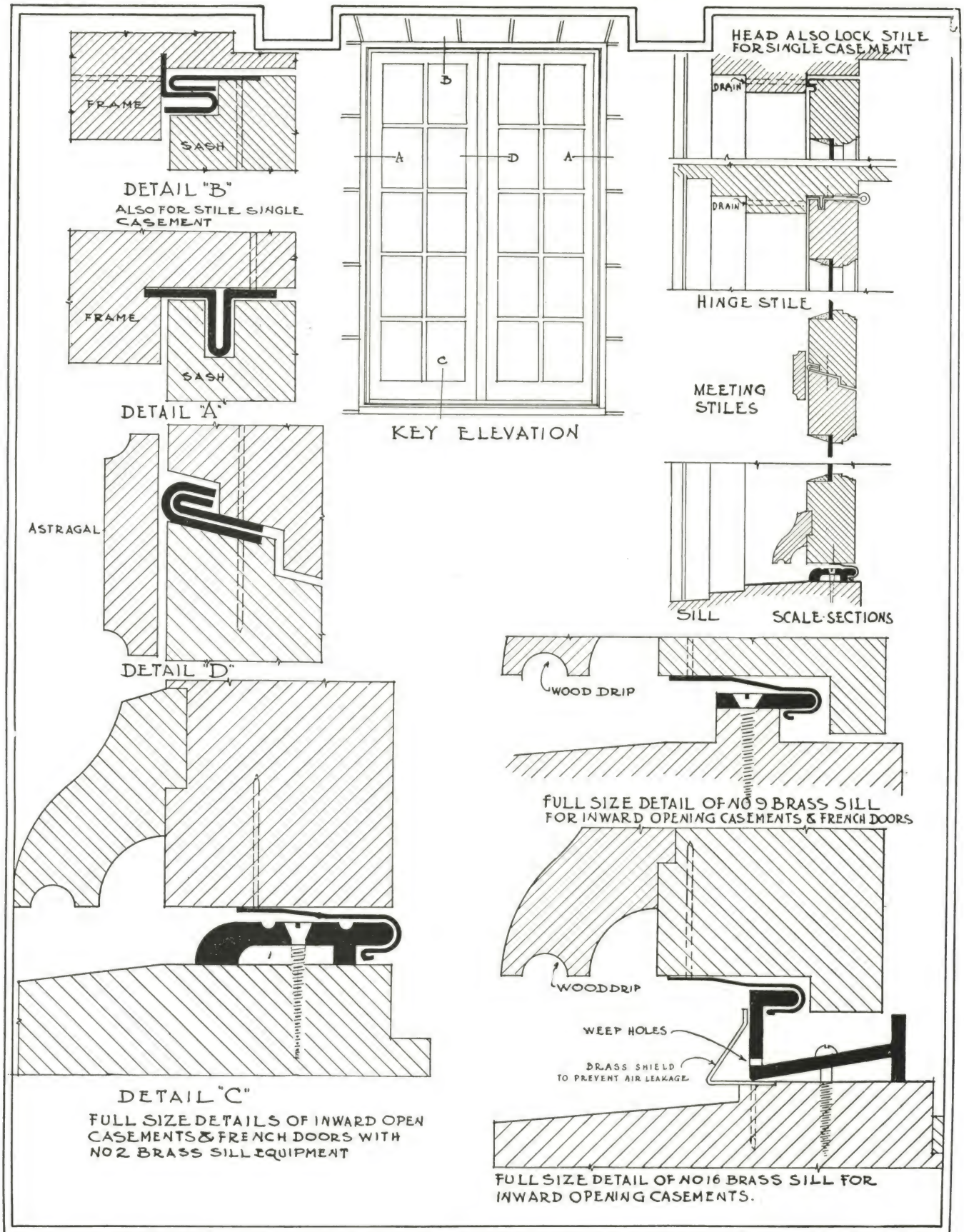
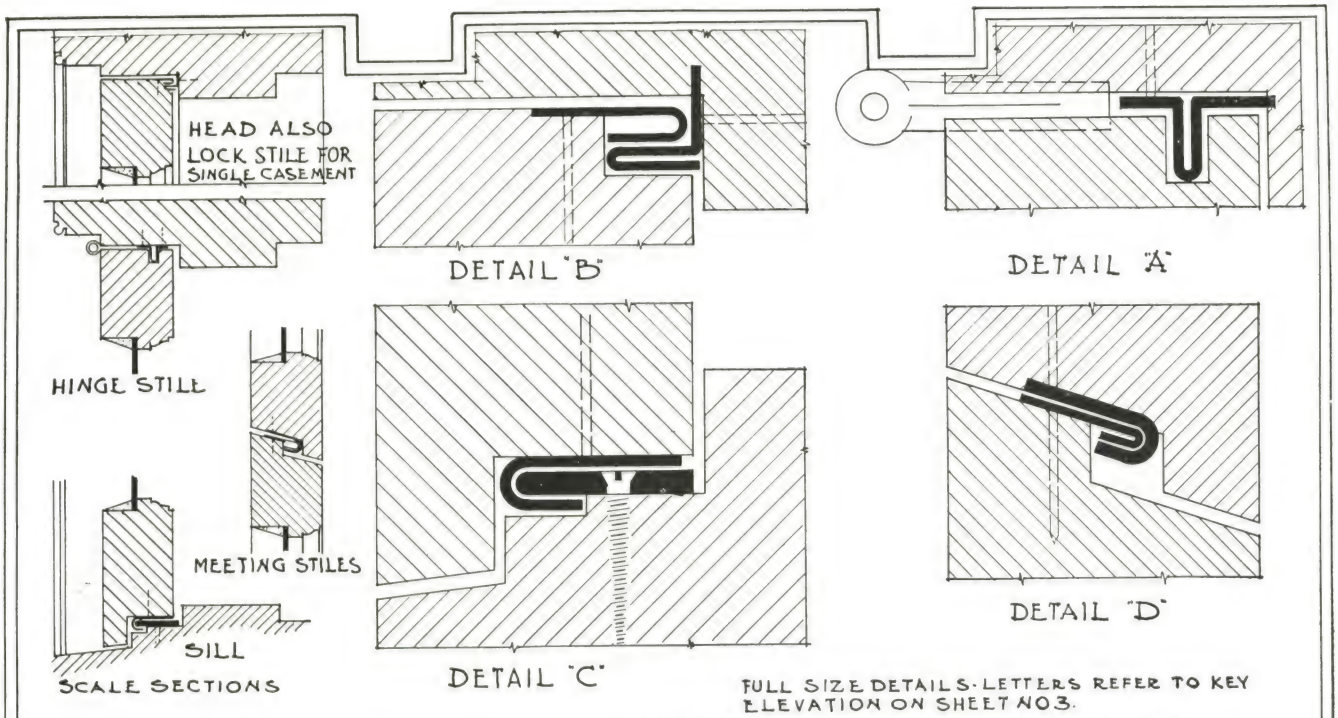
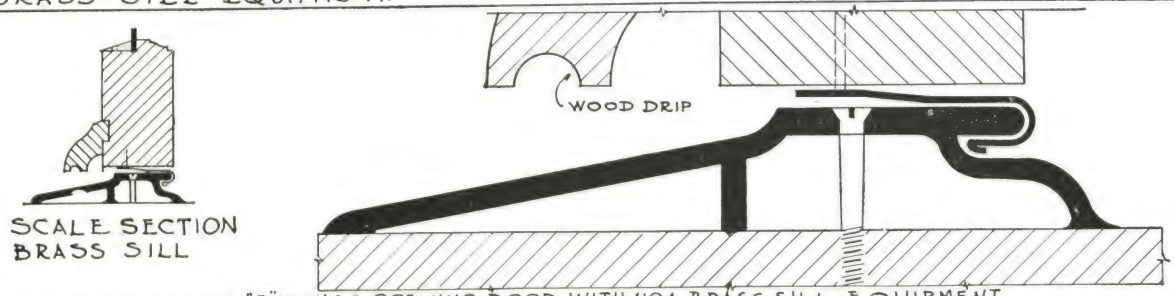


AMERICAN METAL WEATHER STRIP CO. GRAND RAPIDS. MICH.	DETAILS OF IN-OPENING CASEMENTS & FRENCH DOORS	SHEET NO 3 JULY 1. 1921.

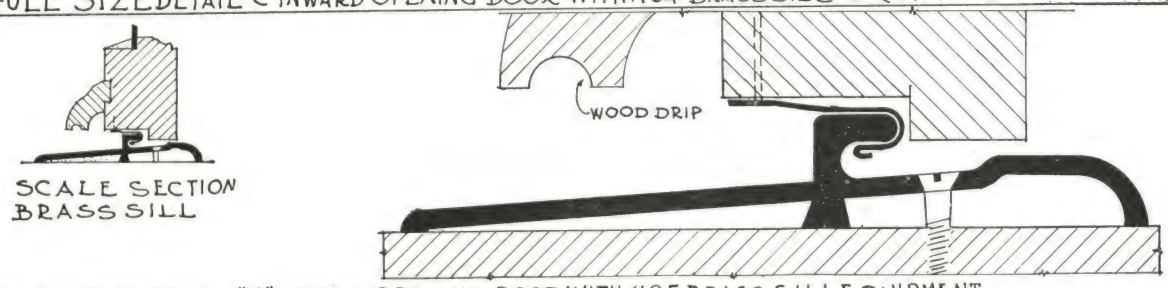
Continued on next page



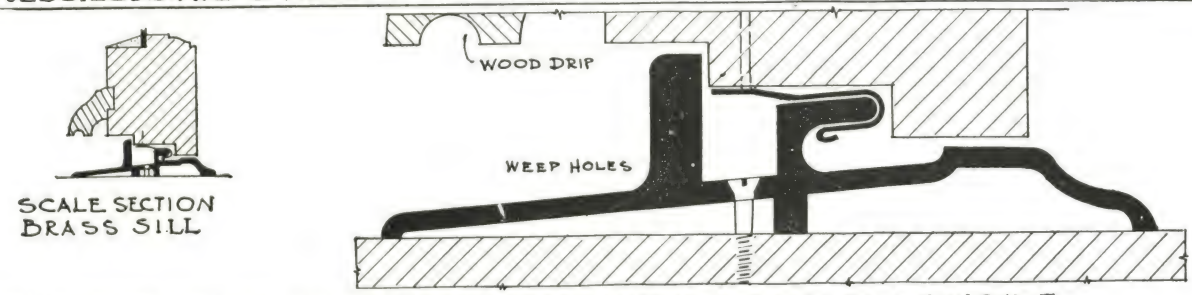
DETAILS FOR OUTWARD OPENING CASEMENTS & ENTRANCE DOORS WITH NO 9 BRASS SILL EQUIPMENT.



FULL SIZE DETAIL "C" INWARD OPENING DOOR WITH NO 4 BRASS SILL EQUIPMENT



FULL SIZE DETAIL "C" INWARD OPENING DOOR WITH NO 5 BRASS SILL EQUIPMENT



FULL SIZE DETAIL "C" INWARD OPENING DOOR WITH NO 6 BRASS SILL EQUIPMENT

AMERICAN METAL WEATHER STRIP CO. GRAND RAPIDS MICH.	DETAIL OF IN & OUT OPENING CASEMENT DOOR EQUIPMENT	SHEET NO 4 JULY 1. 1921.

ATHEY COMPANY

Cloth Lined Metal Weatherstrips

6035-6045 West 65th Street
CHICAGO, ILL.

BRANCHES AND AGENCIES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA
See Classified Telephone Directories

Products

Manufacturers of "ATHEY" CLOTH LINED METAL WEATHERSTRIPS.

For Window Shades, see page 2083.

Athey
TRADE-MARK

"Athey" Weatherstrips

Uses—For any window or door of either wood, metal or kalamein, or any sort of structural work where it is desired to make the openings weatherproof and dustproof—a strip to fit every condition that can be imagined.

Used successfully on the coaches of many railroads.

Advantages—The only device which excludes *all* dirt. The cloth lined channel acts as cushion guide for sash. Windows operate smoothly and can not rattle.

Makes tight casements. Reduces heating cost.

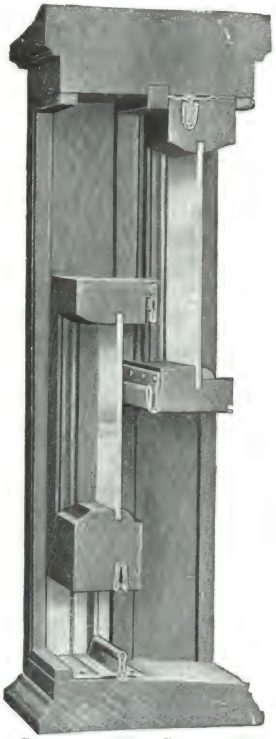
Dirtproof; saves labor in cleaning decorations and furniture; eliminates danger of filth and disease entering with draughts.

Noiseless, and practically without friction when applied to hollow metal windows.

Cloth is 3-ply windsor or billiard cloth with center ply of cotton web which will not stretch. It is chemically treated and impervious to moisture; will not rot, and the metal will not rust. Heavy cloth inserts back of material prevent back leakage.

Materials used when applied to metal sash prevent electrolytic action.

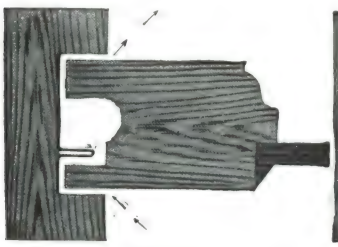
The results are positive at every point.



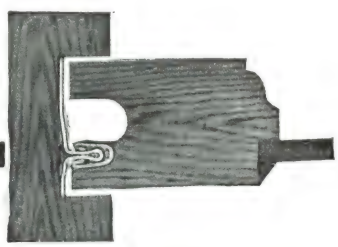
SECTION OF COMPLETE WINDOW MODEL FITTED THROUGHOUT WITH CLOTH LINED EQUIPMENT

Does away with storm sash in winter and allows outside air when desired.

Guarantee—The Athey cloth lining is chemically treated, making possible our guarantee against rot or mildew.



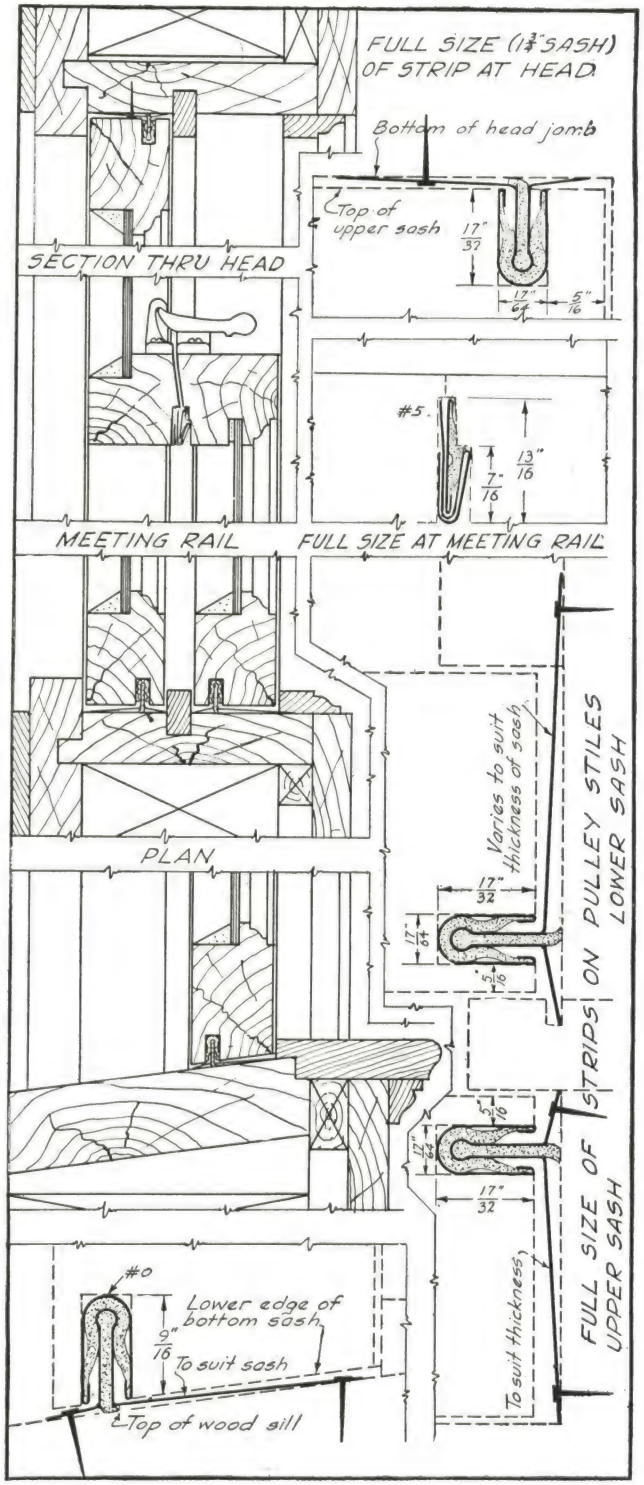
ORDINARY WEATHERSTRIP
Showing leakage without channel at sash cord groove



CLOTH LINED CHANNEL
No leakage possible even at sash cord groove

Co-operative Service

Samples, drawings and prices supplied on request.



3-INCH SCALE AND FULL SIZE DETAILS SHOWING STANDARD EQUIPMENT FOR DOUBLE HUNG SASH—ATHEY CLOTH LINED METAL WEATHERSTRIP, 1¾-IN. SASH

THE DIAMOND METAL WEATHER STRIP CO.

626 Kerr Street

COLUMBUS, OHIO

WESTERN FACTORY BRANCH, FT. DODGE, IOWA

AGENCIES IN ALL PRINCIPAL CITIES

Product

DIAMOND METAL WEATHERSTRIPS for Windows and Doors.

PRACTICAL METAL THE DIAMOND WAY WEATHER STRIPPING

TRADE-MARK
Registered U. S. Pat. Off.

Diamond Metal Weatherstrips

We manufacture the largest and most complete line of weatherstrips on the market, each different type designed to meet peculiar requirements.

Types—The types made include:

Six different types for double hung or sliding windows.

Five different types for doors.

Four different types for casement windows.

Special type for hollow metal sash and frames.

Materials—Weatherstrips are made of zinc, spring bronze, brass and aluminum.

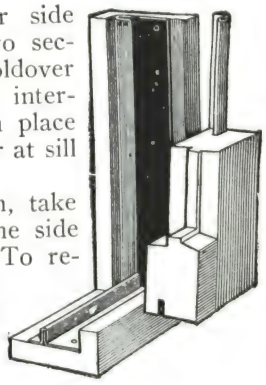
Special Features — *Flexibility* — Diamond metal weatherstrips are so made as to adjust themselves to meet and overcome the objections of sticking and binding, caused by the warping, swelling and shrinking of sash, and by the swelling of parting stops and dividing strips which are exposed to the weather.

Windows equipped with Diamond weatherstrips always slide easily.

Removable Feature—Weatherstrips for double hung or sliding windows have this feature.

The runway or side strip is made in two sections, a base with a foldover under which the rib interlocks and is held in place by a screw and miter at sill or top.

To remove sash, take out screw. Only one side need be removed. To replace sash, just reverse operation. After rib is removed, if it is necessary to get into weight pocket, it can be done without kinking or damage.



SECTION SHOWING REMOVAL OF SASH AND STRIP SIMULTANEOUSLY

REMOVABLE STRIP

Service

A practical engineering department is maintained for solving difficult problems in our particular line.

All material applied by skilled mechanics under personal supervision of our established agencies.

Shipments made immediately upon receipt of order.

Blue print details, specifications and descriptive circulars furnished architects and builders on request.

Estimates

Estimates will be cheerfully furnished by our nearest agency. Write home office for address.

Manufacturing Facilities

This company has been manufacturing and installing weatherstrips for 15 years.

Our plant is equipped with special machinery to turn out finished product in large volume accurately.

A high standard of efficiency is maintained both in the manufacturing and installation of our products.

Guarantee

All weatherstrips are guaranteed against imperfection in workmanship and material for a period of 10 years from date of installation.

Trade-mark

Our trade-mark is your protection against inferior material and workmanship, and assures of being scientifically correct in principle, practicability in use and efficiency in service.

Agencies

We have 468 territorial agents in 38 states and are adding to this number as we find proper representation.

References

Thousands of buildings in all parts of the United States and Canada have been equipped with our product. A list of installations in your particular section is yours for the asking.

X-RAY VIEW OF WINDOW, SHOWING DIAMOND METAL WEATHERSTRIP INSTALLED

EVELETH MANUFACTURING COMPANY

Metal Weatherstrips

12 Ashland Avenue

RIVER FOREST, ILL.

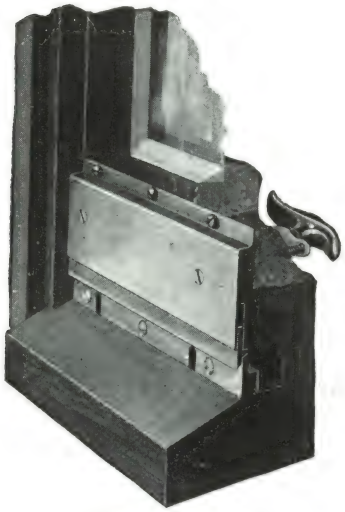
Products

EVELETH INSWINGING CASEMENT BOTTOM WEATHERSTRIP; DOOR BOTTOM WEATHERSTRIP.

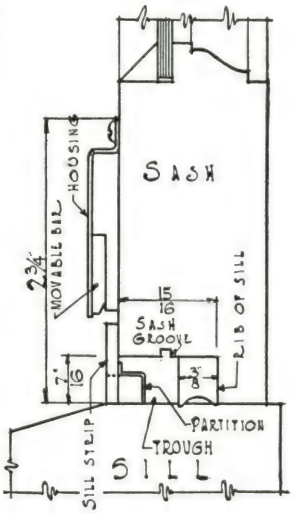
Inswinging Casement Weatherstrips

Construction—Sill piece and overlapping movable bar furnished in either brass or zinc. The housing member is made of non-rusting, coated steel and is unpainted. It can be given color of sash when sash is painted. Brass handle furnished in any finish desired.

Operation—When sash is opened the movable bar is within the housing. When sash is closed, a quarter turn of handle lowers bar so that it laps over the sill strip.

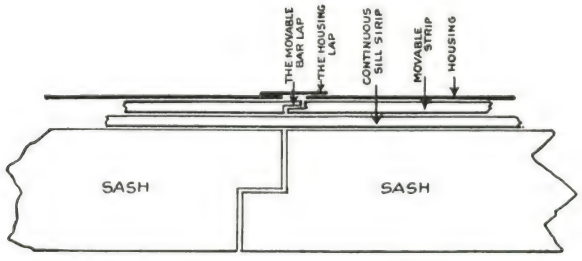


CASEMENT STRIP



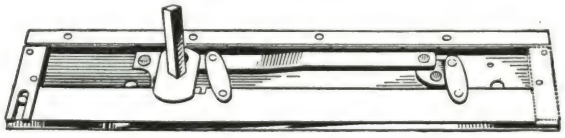
DETAIL OF CASEMENT STRIP

A hard maple rib is furnished, bored at close intervals for coated nails, which are also supplied. Rib is bedded in lead or putty when nailed down. If preferred, rib can be made at the mill an integral part of the sill



DETAILS OF INSWINGING CASEMENT WEATHERSTRIP

Showing movable bars and housing members of double sash. Strips overlap permitting no direct opening where double sash meet. This is a feature peculiar to the Eveleth weatherstrip



OPERATING PARTS OF INSWINGING CASEMENT WEATHERSTRIP

A man's entire strength can be applied to the handle without injury to levers or fulcrums

Sash groove arrests flow of water along sash, causing it to drop into trough from which it drains through the staggered weep holes of special design in partition and its outside strip.

Special Features—In the past, casement bottom strips have been installed under the sash. With such equipment, it has been extremely difficult to prevent driving storms from beating through, especially at the edges of sash.

The Eveleth strip is applied to the outside of sash beyond the vertical weatherstripping where the bottom strip must be to be most efficient.

Marking gages furnished with instruction sheets make the fitting of strip to sash very simple, so that when sash is closed, the ends of strip will hug close to the jambs, which, together with the overlapping feature, accounts for the remarkable resistance against driving rain.

Door Bottom Weatherstrips

A metal weatherstrip for use either under ordinary doors or bronze and ornamental iron doors. Has been in use for the past 8 years.

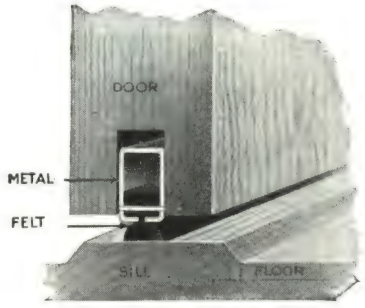
Advantages—(1) The felt is locked by the edges of the metal and riveted with brass rivets.

(2) Construction of strip causes hinge end to drop first and prevents free end from dragging. This permits little if any wear on the felt.

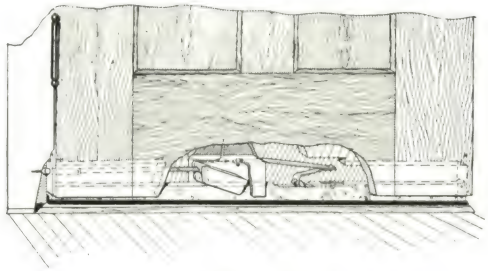
(3) The strip readily conforms to uneven spaces between the door and sill.

(4) The strip can be fitted over badly worn sills, as explained in directions for installing, so that light and wind are excluded.

(5) The threaded push rod permits of adjusting strip to take care of any space up to ⅝ in.



Sectional View



Phantom View

DETAILS OF DOOR BOTTOM WEATHERSTRIP

THE HIGGIN MANUFACTURING CO.

All-metal Weatherstrips

NEWPORT, KY.

SALES AGENCIES IN FIFTY OF THE LARGER CITIES THROUGHOUT THE COUNTRY

Look up our Local Office in Telephone Directory, or write to Newport, Ky., for information

Product

ALL-METAL WEATHERSTRIPS, made to order.

For Window and Door Screens, see pages 1142-1144.

Higgin All-metal Weatherstrips

Complete Equipment—The complete equipment for sliding windows (see illustration) consists of two strips, one of which is attached to the window frame and is made with a 3/8-in. tongue or raised portion that forms a track on which the sash slides. This track is usually made of zinc, but bronze may also be used.

The other strip, called the insert, is made of very light spring bronze, and is inserted in a groove made in the sash and slides on the track strip. The spring flanges of the insert lightly contact with the tongue of the track and effectually seal the aperture. As the insert is higher than the tongue of the track there is no chance for it to cut the insert.

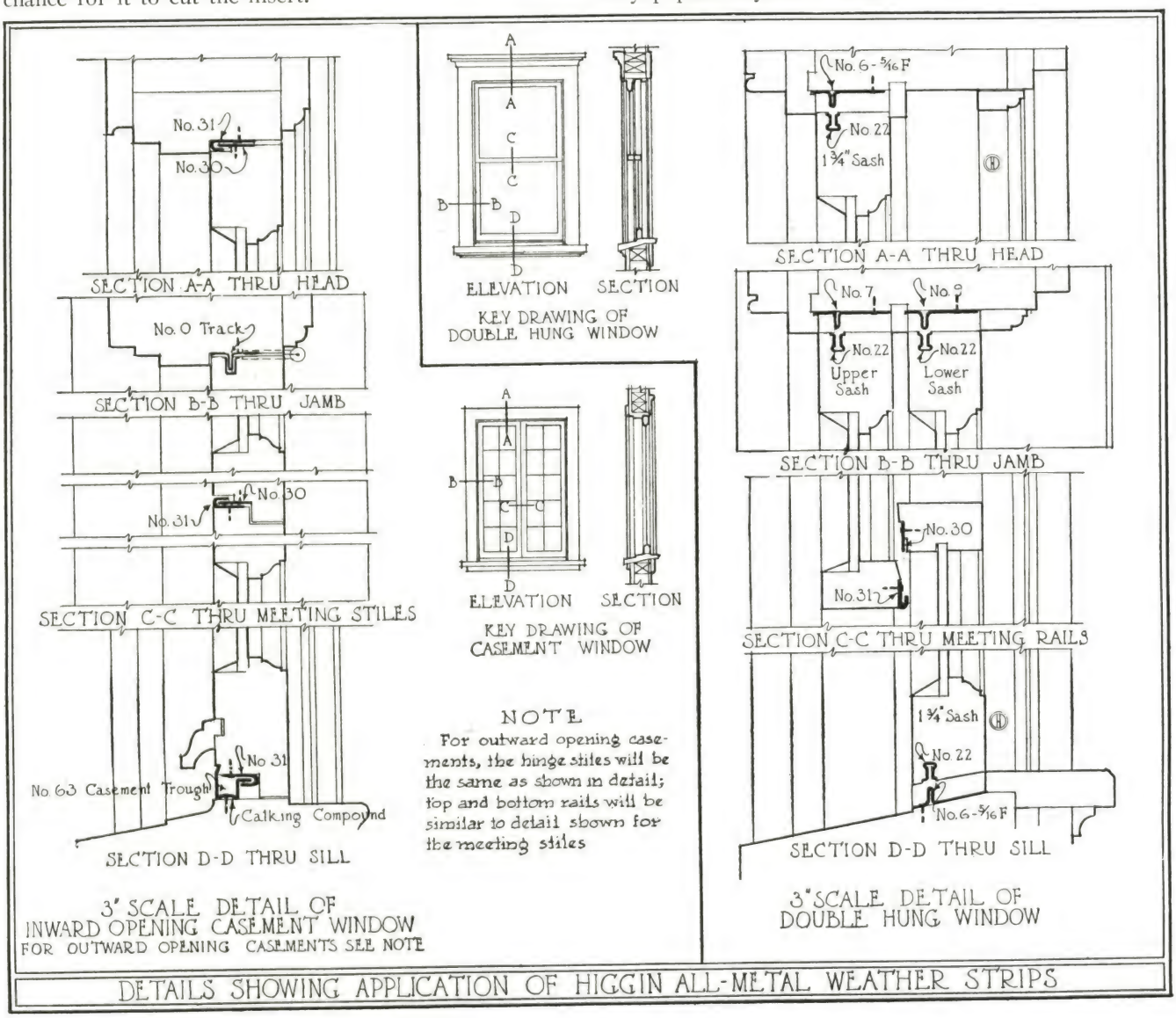
At the meeting rail a zinc strip is attached to the lower rail of the upper sash and a spring bronze strip to the upper rail of the lower sash in such manner that as the sashes are closed the strips interlock, sealing up the opening completely.

Plain Equipment—The plain equipment, consisting of the track strip only, can be furnished at less cost, if desired, but it is not so effective as when the insert strip also is used.

Casement Strip

We manufacture a number of strips specially designed to conform to the different conditions to be met on casement windows. Because of the difficulty encountered in the past in making casement windows watertight, particularly those opening in, some architects have not used them as often as they desired.

There no longer exists any reason for not using this very popular style of window.



DETAILS SHOWING APPLICATION OF HIGGIN ALL-METAL WEATHER STRIPS

NIAGARA METAL WEATHER STRIP CO.

GENERAL OFFICES AND FACTORY
37 West Tupper Street
BUFFALO, N. Y.

Products

Manufacturers of "Peace" Metal Weatherstrip for windows and doors; Craig Channel Bar and "Peace" Aluminum Channel Bar for sills of inward opening casements; "Peace" Brass Threshold Protection Strip and Brass Saddles for doors.

"Peace" Metal Weatherstrip, the Only Reinforced Metal Weatherstrip Made for Double Hung Windows

"Peace" metal weatherstrip, of which a full size section is shown below, is made of No. 26 U.S. standard gage zinc, reinforced with hardwood. On account of this wood reinforcing it will bear the weight of a heavy man without buckling. This is especially desirable on the sills of windows, as it is on the window sill that most weatherstrips collapse. It is however also used on the heads and jambs of double hung windows.

"Peace" Equipment for Weatherproofing Double Hung Windows

For the head, sill and the length of each sash on each jamb, specify "Peace" Reinforced metal weatherstrip.

For the meeting rails, specify "Peace" Non-collapsible Meeting Rail Strip. Note the double thickness of zinc at the contact surface of the meeting rail strip.

"Peace" Equipment for Weatherproofing Inward-opening Casements

For the head, lock side of jamb for single casements, and for meeting stiles of double casements, specify "Peace" Interlocking Bronze Hook and Flat. A cheaper zinc hook is also made but the flexible bronze hook is recommended.

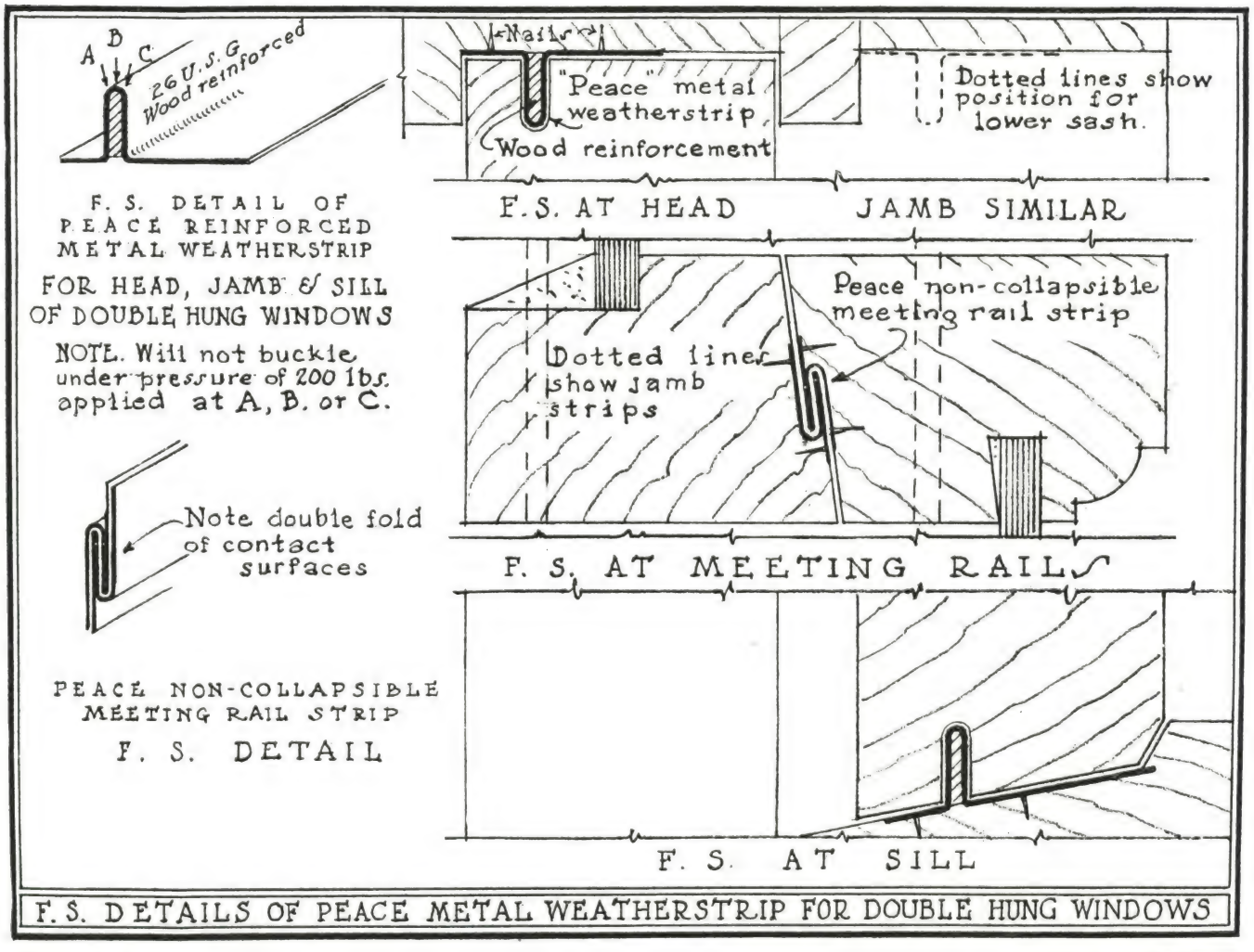
For the hinge side of jambs specify "Peace" Metal Weatherstrip.

For the sill, specify the Craig Zinc Channel Bar and Zinc Drip, or the "Peace" Aluminum Channel Bar and Bronze Hook. The Craig Channel Bar is slightly less expensive than the "Peace" Aluminum Bar.

"Peace" Equipment for Weatherproofing Doors

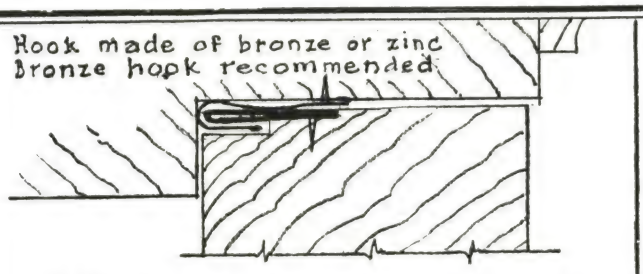
For the jambs and head specify "Peace" Spring Bronze Weathering, or if an interlocking equipment is desired specify same as for inward opening casements.

For the sill specify either the "Peace" Brass Threshold Strip or the Brass Saddle and the Brass Ell Weatherstrip, set according to details. The threshold strip is generally used with wood sills and the brass saddle with stone on concrete sills.



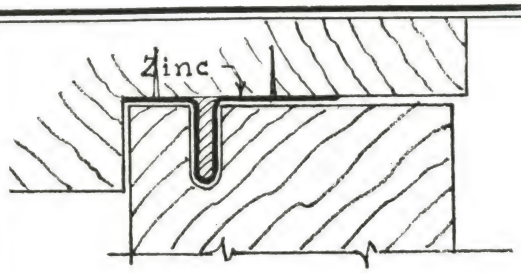
F. S. DETAILS OF PEACE METAL WEATHERSTRIP FOR DOUBLE HUNG WINDOWS

Continued on next page



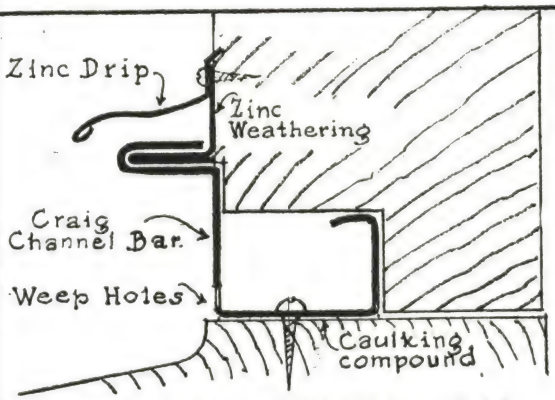
PEACE INTERLOCKING HOOK & FLAT

DETAIL FOR HEAD, LOCK SIDE OF JAMB & MEETING RAILS OF DOUBLE CASEMENT



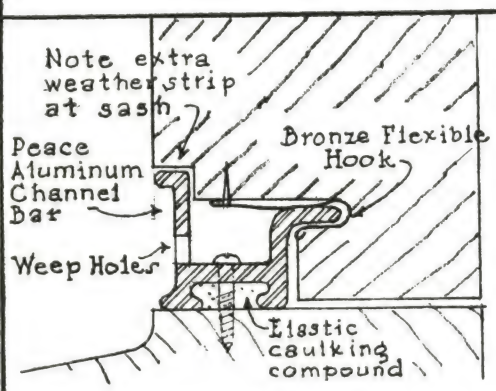
PEACE REINFORCED ZINC WEATHERSTRIP

DETAIL FOR HINGE SIDE OF JAMB



CRAIG CHANNEL BAR

SECTION THRU WOOD SILL

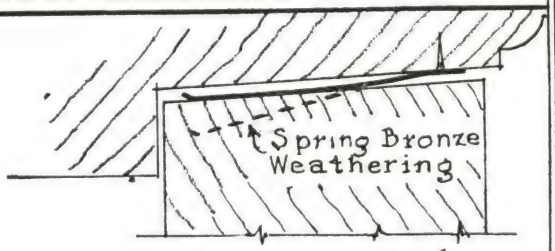


PEACE ALUMINUM CHANNEL BAR

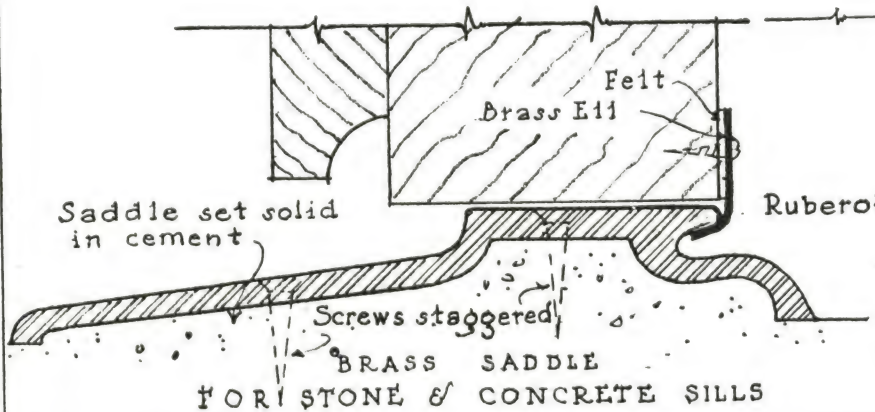
SECTION THRU WOOD SILL

F. S. DETAILS OF WEATHERPROOFING FOR WOOD CASEMENTS OPENING IN

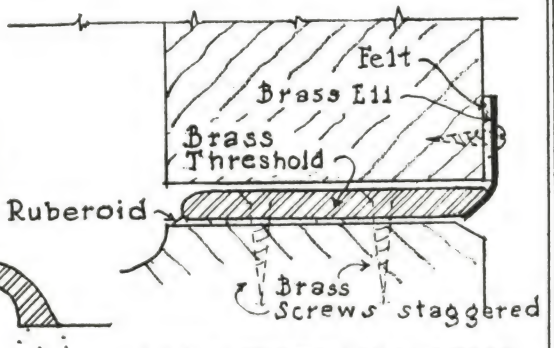
NOTE. Interlocking equipment for doors can also be supplied. Details similar to that used for casement above.



DETAIL FOR JAMB & HEAD



BRASS SADDLE FOR STONE & CONCRETE SILLS



BRASS THRESHOLD STRIP FOR WOOD SILLS

F. S. DETAILS OF BRASS SADDLES AND WEATHERPROOFING FOR DOORS

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	NIAGARA METAL WEATHERPROOFING FOR DOORS & CASEMENT WINDOWS OPENING IN	SCALE FULL SIZE DATE-JUNE'22	DRWG 2

SAGER METAL WEATHERSTRIP CO.

Manufacturers of Metal Weatherstrips

162 West Austin Avenue

CHICAGO, ILL.

Products

SAGER METAL WEATHERSTRIPS for doors and double hung and casement windows, including Sager All-metal Interlocking Parting Bead, and Sager Leakproof Casement Strip.

Also Solid Brass Door Thresholds.

Sager Metal Weatherstrips for Double Hung Windows

This equipment consists of an all metal interlocking parting bead. A zinc sill strip shown in Fig. No. 4; an interlocking meeting rail shown in Fig. No. 3; and a head strip similar to zinc sill strip.

All-metal Interlocking Parting Bead

This equipment for sliding windows consists of 2 members: the parting bead as shown complete in Fig. 1, which replaces the old parting bead, and a Z-bar, which is nailed securely to the back of the sash, locking the sash to the parting bead as in Fig. 2, in such manner that it is impossible for the sash to spread from the parting bead and leave a crack for air leakage.

Durability and Efficiency—It embodies every desirable feature of a weatherstrip, plus an exclusive method of operation and installation which has no equal. Nothing can wear out or get out of order.

The parting bead can not shift a fraction of an inch and will always control every movement of the sash. This is a very important feature, as many architects are advising the installation of metal weatherstrips after all shrinkage and warping has taken place.

Experience has shown that the ordinary type of strip which is insecurely fastened will be forced out of its original place by the continually raising and lowering of a sash that has become warped; thus permitting the leakage of air between the sash and the parting bead.

Exclusive Features—Both sash are tracked the entire height of the frame, making them rattleproof when open as well as when shut, a feature found in no other strip.

Strip readily removable to replace sash cord, etc. It is impossible to bend or kink this strip when removing it from the window.

The Sager parting bead provides effective protection for the entire vertical height of the sash. This is not true of the groove type which fails to make the window tight at the point where rabbet is provided for the sash cord.

Casement Strip

"Sager" brass trough bottom equipment is the result of years of study on the troublesome problem of water leakage on this style of window. This equipment is absolutely waterproof and foolproof. A metal tongue is attached to the bottom of the sash in such manner as to contact with the outer splash fence. This outer fortification will hold back the water in the hardest storm. Should a few drops of water leak over the splash fence, they will drop into the trough and run out through the weep holes. The water can not reach the bottom of the sash from the tongue on account of the drain behind it.

Catalogue

Catalogue and samples sent on request.

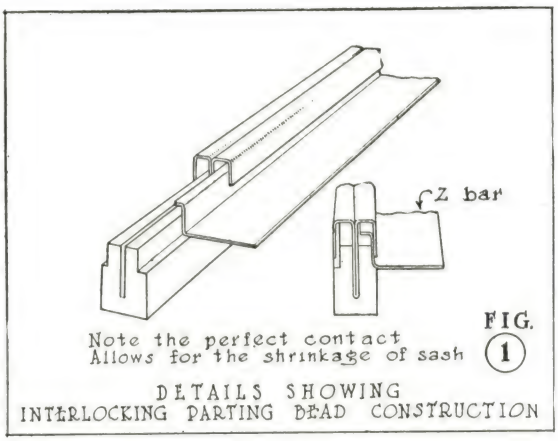


FIG. 1

DETAILS SHOWING INTERLOCKING PARTING BEAD CONSTRUCTION

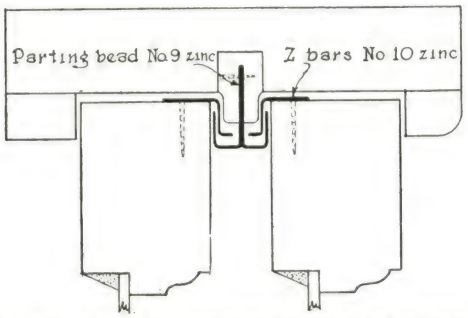


FIG. 2

JAMB SECTION SHOWING APPLICATION OF SAGER NO 1 INTERLOCKING PARTING BEAD

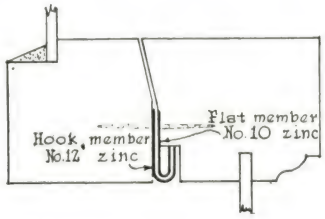


FIG. 3

INTERLOCKING MEETING RAIL

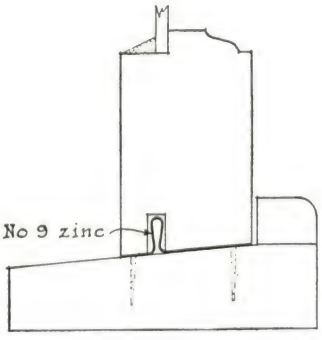
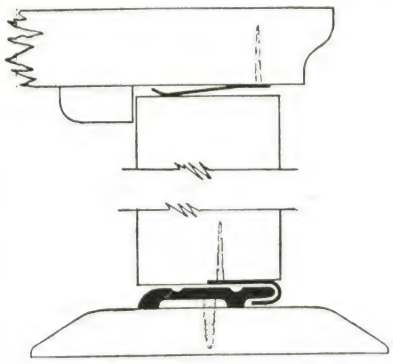


FIG. 4

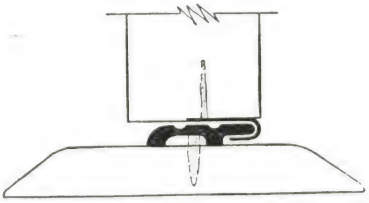
SILL STRIP

DOUBLE HUNG WINDOW EQUIPMENT

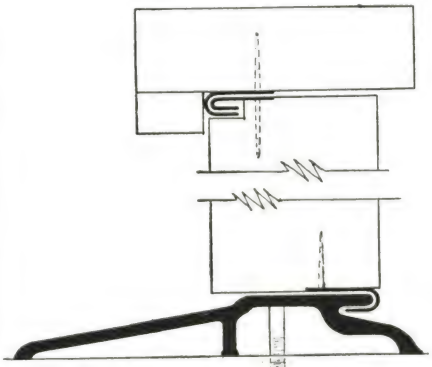
Continued on next page



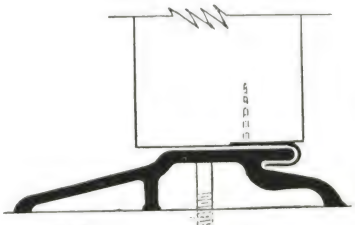
SPRING BRONZE STRIP AT TOP AND SIDES WITH 1½" SOLID BRASS INTERLOCKING THRESHOLD



1⅛" SOLID BRASS INTERLOCKING THRESHOLD

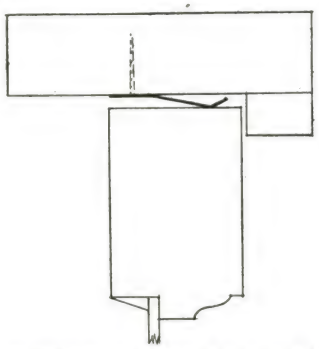


ZINC INTERLOCKING STRIP AT TOP AND LOCK SIDE, RID STRIP AT HINGED SIDE AND 4¼" INTERLOCKING THRESHOLD

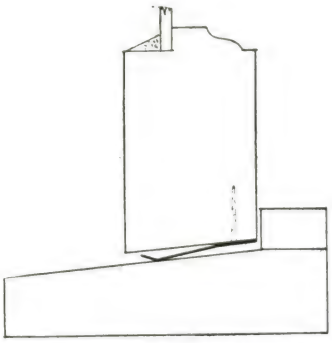


3½" SOLID BRASS INTERLOCKING THRESHOLD

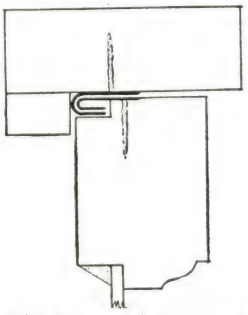
DOOR EQUIPMENT



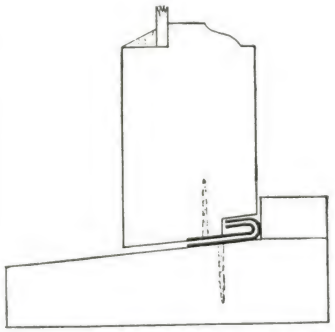
SPRING BRONZE STRIP FOR TOP & SIDES OF CASEMENT WINDOWS & DOORS



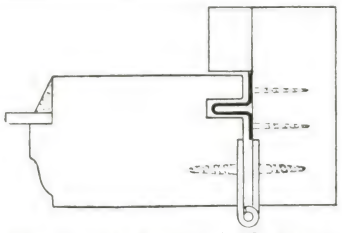
SPRING BRONZE STRIP FOR BOTTOM OF OUTSWINGING CASEMENTS



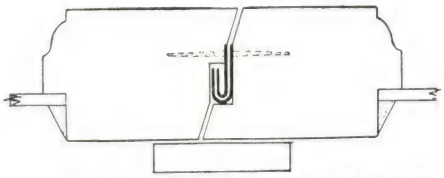
ZINC INTERLOCKING SYSTEM FOR TOP & LOCK SIDE OF CASEMENT WINDOWS & DOORS



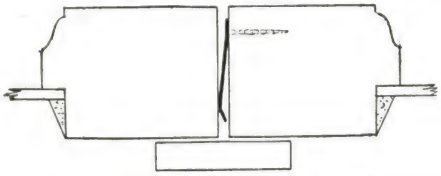
ZINC INTERLOCKING SYSTEM FOR BOTTOM OF OUTSWINGING CASEMENTS



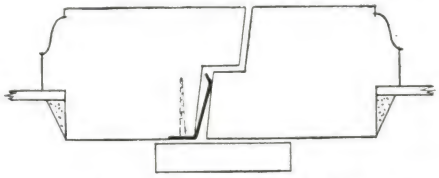
RID STRIP FOR HINGED SIDE OF CASEMENTS & DOORS



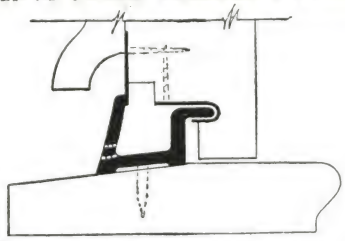
ZINC INTERLOCKING SYSTEM FOR CENTER OF DOUBLE CASEMENTS & DOORS



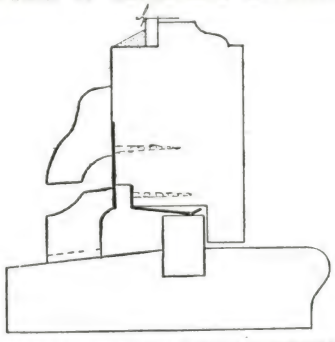
SPRING BRONZE STRIP FOR CENTER OF DOUBLE CASEMENTS & DOORS



SPRING BRONZE STRIP FOR CENTER OF DOUBLE CASEMENTS & DOORS



SOLID BRASS EQUIPMENT FOR BOTTOM OF INSWINGING CASEMENTS



WATERPROOF BOTTOM EQUIPMENT FOR INSWINGING CASEMENTS

CASEMENT WINDOW EQUIPMENT

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF SAGER METAL WEATHERSTRIP FOR DOORS AND CASEMENT WINDOWS.	SCALE: 6" EQUALS 1'-0" DATE - AUG. '22	DRWG 1

NATIONAL METAL PRODUCTS CO.

Manufacturers of Metal Weatherstrips

OFFICES AND WAREHOUSE
North Side
PITTSBURGH, PA.

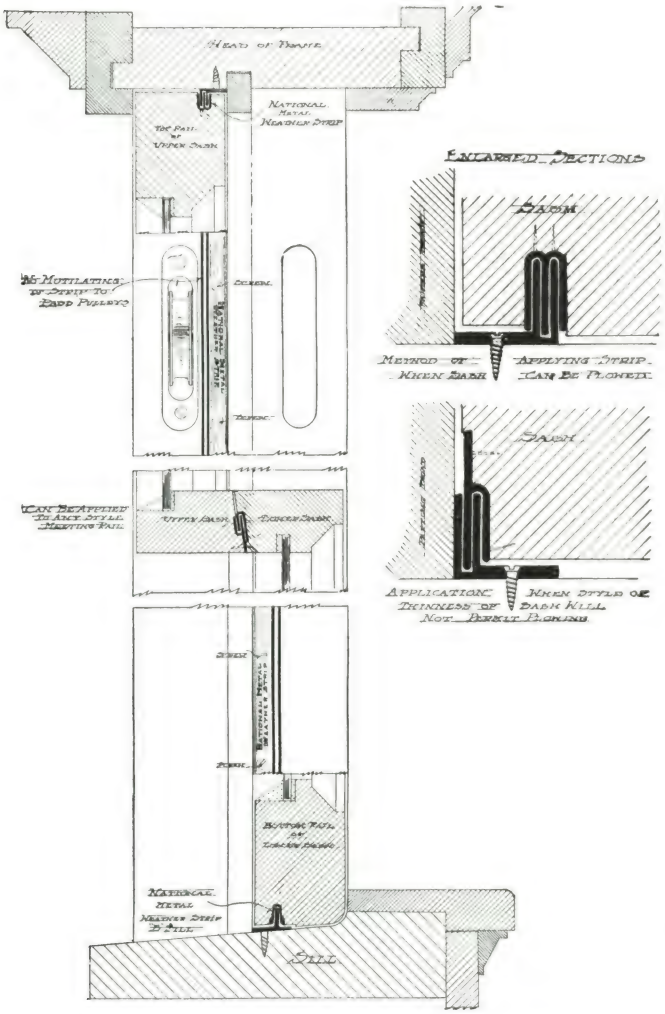
Product

METAL WEATHERSTRIPS.

Description

National No. 2—One of the heaviest metal weatherstrips manufactured. Made with double walls and double interfitting members, thus affording most complete protection. In its manufacture the metal used is cut crossway of the grain, thereby adding greatly to its strength.

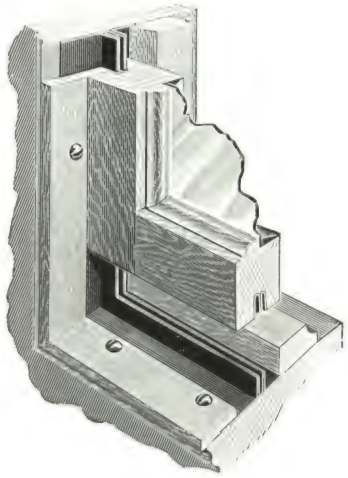
The frame member of the weatherstrip is made of heavy gauge metal, each of the double interfitting sides being of a single thickness. The base of the frame member is doubled back on itself and thus allows the use of countersunk screws. This permits of removing the weatherstrip at any time, without inconvenience and without damage to window or weatherstrip.



NATIONAL NO. 2 WEATHERSTRIP APPLIED TO DOUBLE HUNG WINDOW

National No. 1—Made on the same principle as the National No. 2 but is of a lighter metal and covers the entire run of the window frame. One edge of the frame member enters the parting bead and the other, or inner, edge extends under the inside bead of the frame. Fastened to frame with small nails which are entirely concealed by the inside frame bead.

The interfitting sides of the frame member are doubled, instead of being single thickness as in the National No. 2.



SECTION SHOWING NATIONAL NO. 1 WEATHERSTRIP APPLIED TO WINDOW

Columbia No. 1—A strip more simple in construction than the National strips described.

Consists of a frame member with flat bases and a raised rib designed to enter the bare groove in the sash.

Being so simple in itself, the cost of manufacturing is considerably lessened, hence it is a strip that is somewhat lower in cost than the National strip.

Special Features of the National Metal Weatherstrip

May be installed completely on old as well as new windows.

Makes windows airtight, keeping out all cold air and thus saving considerable fuel in winter.

Prevents dust entering through windows.

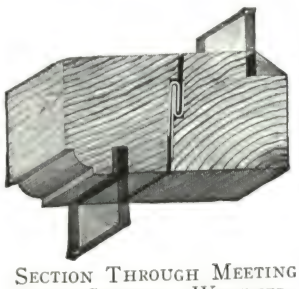
Quiets all rattling.

Enables the window to slide with ease.

Does not disfigure the sash, nor mar the window.

Will never wear out.

The first, and only, cost is moderate.



SECTION THROUGH MEETING RAILS SHOWING WEATHERSTRIP

Section is same for National Nos. 1 and 2 and Columbia No. 1 weather strips

E. F. HODGSON CO.

Manufacturers of Portable Houses

BOSTON, MASS

OFFICES AND SHOWROOMS

BOSTON, MASS., 71–73 Federal Street

NEW YORK, N. Y., 6 East 39th Street

Product

HODGSON PORTABLE HOUSES.

Description

Hodgson portable houses have been used in all climates for thirty years, and have proved practical for many purposes throughout the year. Sides and roofs are of clear red cedar, floors of hard pine. They are made in sections, each section complete with doors and windows fitted with locks, etc. They are neatly finished inside and painted three coats outside. Sections are securely fastened together with wedge key bolts, there being no threads to rust, and are quickly assembled by unskilled labor.

They are attractive in appearance, practical for the purpose intended, and durable. They save much expense and annoyance of building.

Hodgson houses are used on the estates of the Ameses, Hunnewells, Fricks, Rockefellers, McAlpins, Carnegies, Astors, Fennos, Lowells, Vanderbilts, Bancrofts, Gardners, Belmonts, Goulds, Cranes, Iselins, Forbeses, etc., being used for overflow houses, play houses, garden houses, chauffeurs' houses, servants' houses, garages, poultry houses, kennels, etc.

It is impossible in this space to give detail and the many uses the Hodgson portable houses have been put to.

A catalogue will be supplied, and when architects are planning a country estate they will find clients will be interested in these houses for many different purposes.

HODGSON PORTABLE COTTAGE

Made in units of 6 ft. long and 12 ft. wide. They have different styles of porches, screened rooms, sun parlors, ells, valley roofs, etc., so that it is possible to make up many arrangements of rooms, porches, etc., and to add to them at any time. They are used as summer cottages, week-end, or overflow houses, chauffeurs' and servants' quarters, etc. Prices vary from $300.00 for one room to $2,000.00 for several rooms

HODGSON PORTABLE SCHOOLHOUSE

Very valuable to take care of overflows until permanent quarters are arranged for. Easily moved to another district. Used by many towns and cities. Made in one and two classrooms. Heated and ventilated to pass state laws. Our system of ventilating insures warm floors in classroom in winter, and a cool classroom during warm weather. Prices are from $2,000.00 up

HODGSON PORTABLE CLUB HOUSE

Made in sizes from one small room for a few members, costing about $300.00, to extensive buildings, with all necessary rooms to care for a large number of members, costing several thousand dollars. Used as permanent buildings; also as temporary buildings, perhaps after a fire or while a club house is being built

HODGSON PORTABLE GARAGE

Made in many sizes and styles and serve every purpose. The prices run from $400.00 for a small car garage to $1,000.00 for a garage for 4 cars. These garages are used on many summer and country estates, and will save the purchaser much expense and bother in erecting a more elaborate building

A GROUP OF HODGSON PORTABLE HOUSES USED BY MASSACHUSETTS PUBLIC SAFETY COMMITTEE ON BOSTON COMMON

ESTABLISHED 1847

WILCOX, CRITTENDEN & CO., INC.

Manufacturers of Hot Galvanized Nails

MIDDLETOWN, CONN.

Products

NEVERUST BRAND HOT GALVANIZED NAILS.

Also Job Galvanizing; Galvanized Iron Castings and Forgings; Brass Casting and Machine Work.

Label

Neverust label on every keg.

TRADE-MARK

Importance of Nails

Nails are the ties that bind a house together, but their importance is not appreciated as fully as it should be. The owner or architect will usually give a reasonable amount of attention to the lumber, the paint, the plumbing, and the heating system; but nails are often overlooked.

Inspect the old shingles being removed from some house in your neighborhood. You will find large holes where the little nails have been—some holes the size of a dime—the wood surrounding them black and rotten, but the greater portion of each shingle in fairly good condition. The decayed portion of the shingle lies around the nailhole—all due to having used nails that have since rusted.

Rustproof nails would have lengthened the life of the shingles. As for nails in the clapboards—houses with dirty brown rust streaks down their sides are plentiful, the rusty nails discoloring the paint and rotting the wood. The life of a frame house is largely determined by the durability of the nails used in its construction.

Very little investigation will convince any architect that there is an immense difference in the durability of the coatings applied to the nails which are sold as galvanized.

Galvanized Nails

To be sure many architects specify "Galvanized Nails" for the shingles at least; but just what does your client get in his roof? You intend to protect him; but under your specification he will be compelled to pay for the best grade galvanized nails, no matter what is supplied; and what he actually gets is largely a matter of chance.

Only one method of galvanizing (or zinc coating) can be depended on to make iron or steel rustproof for any length of time, namely, the Hot Dipped Galvanizing Process—that alone has survived the test of durability in active service.

Every piece of our regular standard goods is produced in the expectation that it will be used on or near salt water, which means that the highest quality of galvanizing is required to meet this severe test.

Uses for Neverust Hot Galvanized Nails

In wood, asbestos, composition slate and other types of shingles, ready roofings, siding, verandas, fences, and, in fact, anywhere where water or moisture either directly affects or penetrates, Neverust Hot Galvanized Nails should be used.

Non-ferrous nails such as copper are often specified. Although these metals are durable they have inferior holding power. The superior holding power of genuine galvanized nails is due to the fact that zinc is a wood preservative while copper nails for example throw off verdigris which accelerates the deterioration of wood and after twelve years the holding power is gone, or greatly reduced.

Hot Galvanized Nails in Stock

We carry in stock, galvanized, all standard sizes of cut and wire nails—common, fence, sheathing, casing, flooring, finishing, slating, roofing, etc. While we realize that many express a preference for wire nails, it seems advisable to call attention to the fact that official tests made at the United States Government Arsenal, Watertown, Mass., conclusively proved the average superiority of cut nails over wire to be 72.74%; that is, sizes being equal, 100 cut nails have a holding power equal to 172 wire nails.

Quantities and Sizes for Different Work

The length of nails is designated by pennies (d's). This classification originally represented the price in English pence per 100 nails, as 2d per 100, etc. In that sense it is now obsolete, but the term is still retained. The weights expressed in pennies run from two pennies to sixty pennies, the larger sizes being designated by fractions of an inch.

1000 shingles, allow 4 lbs. 2d; 5 lbs. 3d; 6 lbs. 3½d.
1000 laths, allow 8 lbs. 3d fine.
1000 sq. ft. flooring, allow 25 to 30 lbs. 8d; 30 to 35 lbs. 10d.
1000 sq. ft. sheathing, allow 20 lbs. 8d; 25 lbs. 10d.
1000 sq. ft. 1x2½-in. furring (12-in. centers), allow 9 lbs. 8d or 14 lbs. 10d.
1000 sq. ft. 1x2½-in. furring (16-in. centers), allow 7 lbs. 8d or 10 lbs. 10d.
1000 sq. ft. studding, allow 15 lbs. 10d or 5 lbs. 20d.
1000 sq. ft. beveled siding or clapboarding, allow 18 lbs. 6d common; 13 lbs. 5d; if box, 15 lbs. 6d; 9 lbs. 5d.

Specify Neverust Hot Galvanized Nails

The general specification "Galvanized Nails" is practically worthless. It is equivalent to inviting the imitations to a place in the roof, and in the long run they prove unsatisfactory guests. Specifying Neverust brand galvanized nails, however, will make it certain that your client's money will not be wasted in buying nails that carry just enough zinc to use the word "Galvanized" as a passport to a roof.

Celotex Nails

Neverust brand galvanizing is recommended for use with Celotex board. We stock for this purpose the special Celotex nail, in sizes 1¾ and 1½ in., barbed from head to point, with No. 9½ wire and ½ in. head.

BRONZE AND BRASS SASH CHAIN

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

Why Bronze or Brass Sash Chain?

To make the operation of a window permanently easy and certain it is necessary to install a sash suspension that will not rust or break. At some time or other, practically everyone has suffered the annoyance of having a window stick. The common cause is a broken sash cord or chain.

The life of sash cord is comparatively short. This is due to the natural weakening of the fiber, to the cutting of the cord by the pulley wheel flange and to the destructive abrasion of the cord when it becomes jammed between pulley wheel and housing. Sash chain made of quick-rusting metal—even though covered with paint, enamel or metal coating—rusts and breaks, necessitating replacement.

By specifying and installing bronze or brass sash chain, these troubles are permanently avoided.

Bronze and Brass Sash Chain for Permanence

Bronze and brass sash chain was developed after an insistent demand by architects for a sash suspension that would eliminate the costly repairs and replacements of sash cord and corrodible sash chain.

Bronze or brass sash chain not only gives better service, but in case of fire it will not burn like cord, and keeps the top sash closed. Insurance companies endorse bronze and brass sash chain for this reason.

Bronze and brass sash chain will not rust, rot, kink, knot or stretch, and will outlast several installations of sash cord and sash chain made of corrodible metals. It will operate smoothly and quietly over any pulley.

For durability, economy, strength, appearance and general satisfaction, bronze and brass sash chain is unexcelled.

Guard Against Substitutes

Many imitations of bronze and brass sash chains are on the market, some of which are made of highly corrodible metals so coated as to represent bronze or brass. Neither paint nor metal coating protects such sash chain against rust.

For permanent results, specify and install *solid* bronze or brass sash chain.

Millions of Feet in Use

Bronze and brass sash chain have won preference with architects, engineers, builders and home-owners everywhere on account of their permanent efficiency and economy. Millions of feet are in continuous use in all classes of buildings.

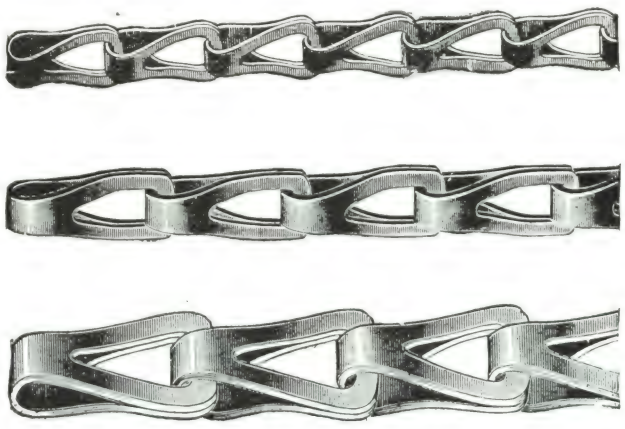
Bronze and Brass Sash Chain Sizes

Bronze and brass sash chain is made in standardized sizes to correspond with various weights of sash. The sizes suitable for any sash will be found in the manufacturers' catalogue. The COPPER AND BRASS RESEARCH ASSOCIATION will gladly supply additional information on request.

Sash Pulleys

Sash pulleys with plain brass or bronze face and wheel give best results. Such pulleys, with roller bearings, cost a little more, but they give permanent satisfaction, dependable service and never need replacement.

A type of pulley in which the wheel runs free upon a fixed axle will give longer wear than one in which the axle turns in a hole bored in the housing.



BRASS AND BRONZE SASH CHAINS

AMERICAN CHAIN COMPANY, INC.

GENERAL SALES OFFICE
BRIDGEPORT, CONN.
DISTRICT SALES OFFICES

NEW YORK, N. Y., Grand Central Terminal
PITTSBURGH, PA., 644 Union Arcade Building
BOSTON, MASS., 132 High Street
CHICAGO, ILL., 208 So. La Salle Street
PORTLAND, ORE., 422 Oregon Building
PHILADELPHIA, PA., 147-49 No. 7th Street
SAN FRANCISCO, CAL., 837 Pacific Building
CANADA: Dominion Chain Company, Ltd., Niagara Falls, Ont.
LONDON OFFICE: 8 White Street, Moorfields, London, E. C.

FACTORIES

BRIDGEPORT, CONN. (Weldless Chain Plant) BRADDOCK, PA. READING, PA. ADRIAN, MICH. YORK, PA. (Electric Welding Plant) WATERBURY, CONN. MONESSEN, PA. COLUMBUS, OHIO TERRE HAUTE, IND. MANSFIELD, OHIO WEST PULLMAN, ILL.

Products

Manufacturers of Welded and Weldless Chain: Niagara, American, Tenso and Lock Link Steel Wire Chains in more than 100 sizes; Approved (Guaranteed) Steel, Galvanized and Bronze Sash Chains; Hercules Sash Chain; Galvanized Arc Light Chain.

"Acco" Round Cord Pulley Chain.

Sole manufacturers of the Campbell Hammerlock Self-spreading Cotter Pins.

Also, the celebrated American Flat Steel Chains in 26 sizes; Safety, Furnace, Register, and Plumbers' Chains; Niagara Pipe Hanging Chains; S-hooks, 8-hooks and Special Shapes of all kinds in Flat or Round Wire; "S. R. P." Finish Porch Swing and Hammock Chains.

Scope

Largest chain manufacturers in the world.

Approved American Sash Chain and Fixtures, Guaranteed

Steel, Hot Galvanized—American guaranteed hot galvanized steel sash chain is manufactured from high grade steel, galvanized by our own special hot process, insuring a uniform, heavy, rustproof coating—with links perfectly free—running smoothly and noiselessly over the smallest pulleys. Unquestionably the strongest sash chain made. Also furnished in any finish desired.

American Guaranteed Hot Galvanized Steel Sash Chain

Number	80	100	130	250
For double hung sash weighing..	80 lbs.	100 lbs.	130 lbs.	250 lbs.

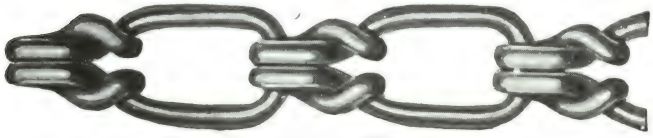
Bronze—American guaranteed bronze sash chain is made from our own special rich bronze composition, insuring the hardest and best wearing bronze chain possible to obtain.

Hercules Sash Chain

Wherever a chain is required to harmonize with interior finish, guaranteed Hercules sash chain is recommended. It is made of high grade steel, hot galvanized, with a heavy electro-copper plate over the galvanizing, which makes a rich bronze color. The price is less than one-half that of bronze chain. Being made of steel, it is stronger than any alloy chain, and in case of fire will maintain its load at a temperature 50% greater than bronze chain of any mixture.

Chain for Fireproof Folding Doors, Rolling Doors and Shutters

Lock Link sprocket chains; 17 sizes to fit any pitch sprocket. This chain is standard for hand chain on fireproof folding doors and steel rolling doors and shutters. Furnished in hot galvanized, or any other finish desired.



Lock Link Steel Wire Chain

American Galvanized Arc Light Chain

Especially designed for arc and incandescent lamp suspension; heavily galvanized and positively rustproof. Ice or sleet does not interfere in any degree with its operation and it is superior to rope or cable in point of operation and wear. It has been on the market for nearly 20 years and millions of feet are in use. It has been adopted by a vast majority of all street lighting companies. Made in 3 sizes.

We supply arc lamp hooks to easily connect lamp and chain, also a strong ring which can be attached to pole end of chain with connecting hook.

American Galvanized Arc Light Chain

No. 31 and No. 33 for suspending arc lamps and No. 35 for suspending incandescent lamps

"Acco" Round Cord Pulley Chain

Made of the best steel obtainable, blanked and assembled on specially designed automatic machines. Strength is uniform throughout, will not kink, knot, stretch, rot, or burn. Guaranteed to operate freely and smoothly over any common cord pulley, and is stronger and more economical than sash cord. "Acco" round cord pulley chain is easily handled and will not deteriorate in stock. Packed in strong cloth bags containing 100 ft. of chain with 40 weight fixtures, enough for five double hung sash. Three finishes: coppered steel, "S. R. P." (special rustproof), and hot galvanized.

Other Types of Chains

A few patterns of other types of chains manufactured by this company are shown here.

Niagara Pattern

American Pattern

Tenso Pattern

Cotter Pins

Sole makers of Campbell hammerlock self-spreading cotter pin, patented March, 1912, and various automobile specialties.

Campbell Cotter Pin

Co-operation

Submit chain problems to our Experimental Department. Experts in this department devote all their time to the solution of customers' difficulties.

THE BRIDGEPORT CHAIN COMPANY

Flat Metal and Weldless Wire Chain

495-505 Bunnell Street
BRIDGEPORT, CONN.

Products

FLAT METAL and WELDLESS WIRE CHAIN: "TRIUMPH" SPROCKET CHAIN; "MONARCH" BRONZE, STEEL and BRASS SASH CHAIN; STEEL, BRONZE and BRASS PLUMBERS', SAFETY and FURNACE CHAIN; BROWN PATTERN CHAIN; TRANSOM CHAIN. HOOKS and FASTENERS.

Also manufactuers of "Triumph" Coil Chain, Wire Rings, Fixtures and Attachments for Chain, Wire Specialties, Metal Stampings.

Catalogues and Samples

Catalogues, samples, blue prints, etc., furnished on request.

Finishes

All Bridgeport Chain products furnished in any desired finish—plain bright, copper, brass, nickel-plated, sherardized, galvanized, oxidized or verde.

"MONARCH" BRONZE, BRASS AND STEEL SASH CHAIN
Made in 6 sizes and 6 finishes

	For sash weighing not over, lbs.						
Chain No.....	2/0	0	1	2	2½	3	4
Bronze or Brass.	50	100	175	250	...	400	425
Steel.....	...	100	175	200	250	300	400

"TRIUMPH" SPROCKET CHAIN

BROWN PATTERN CHAIN

SAFETY CHAIN
Safety, plumbers' and furnace chain supplied in brass, bronze and steel, in 6 sizes, with all necessary attachments

SASH CHAIN FASTENERS
Nos. 0 and 1

TRANSOM CHAIN

WIRE S HOOK
Nos. 3 and 4

WELDLESS HOOK AND EYE

QUARTER TURNED S HOOK

THE CHAIN PRODUCTS COMPANY

CLEVELAND, OHIO

DISTRICT SALES OFFICES

NEW YORK, N. Y., 150 Chambers Street
SAN FRANCISCO, CAL., Atlas Building, 604 Mission Street
LOS ANGELES, CAL., San Fernando Building
SEATTLE, WASH., L. C. Smith Building
CHICAGO, ILL., 208 North Wabash Avenue
PORTLAND, ORE., Corbett Building
SALT LAKE CITY, UTAH, 553 Hollywood Avenue
DENVER, COLO., 723 Colorado Building
ST. LOUIS, MO., 622 Merchants Laclede Building
BALTIMORE, MD., 405 West Redwood Street
ST. PAUL, MINN., 420 Endicott Building
DETROIT, MICH., Ford Building

REPRESENTATIVES IN ALL PRINCIPAL FOREIGN COUNTRIES

Product

HODELL SASH CHAIN.

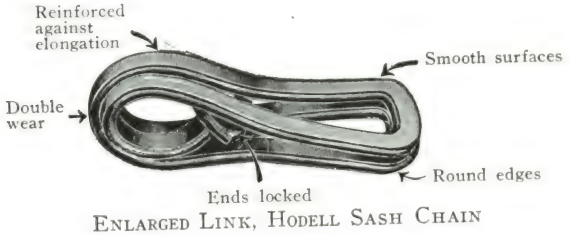
Also manufacturers of a complete line of Weldless Chain, including Bulldog, Samson, Cleveland, Noweld and Cepeco; Steel and Brass Wire Chains in more than 100 sizes and 7 finishes; also a full line of General Purpose Chains, S Hooks, Screw Hooks and special shapes in all varieties of flat and round wire.

Description of Hodell Sash Chain

A revolutionary improvement in sash chain manufacture has produced a unique, patented type. Elimination of 60% waste in its construction brings cost to a level where it can be economically specified for every type of building.

Hodell sash chain was developed after an insistent demand by architects for a sash suspension that would eliminate those costly replacements of sash cord or ordinary flat link chain.

Hodell sash chain is made from a narrow ribbon of cold rolled polished steel, woven by automatic machinery

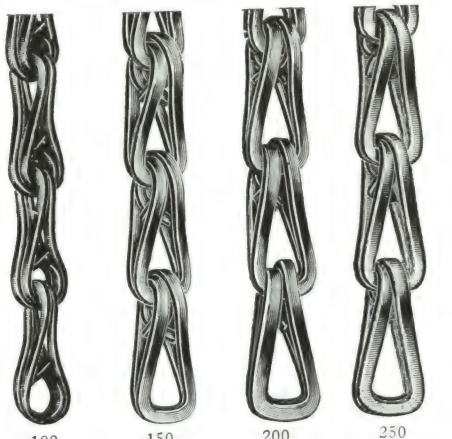


ENLARGED LINK, HODELL SASH CHAIN

to the type of link illustrated above. The saving in material over the old method of blanking out links is utilized to purchase a higher grade stock.

Hodell sash chain is identical in length and outside diameter to ordinary sash chain. Fits standard pulleys and runs more smoothly than any other type. Wears twice as long because of double metal at eye.

In tensile strength tests, *Hodell* sash chain will be found to be from 10% to 15% stronger than the ordinary flat pattern. It also possesses absolute uniformity of every link, freedom from improperly formed blanks common to stamped chain, smooth polished surfaces with all rounded edges.



TYPES OF HODELL SASH CHAIN

Approval

Hodell sash chain is approved by the Underwriters' Laboratories, Inc.

Fittings

Standard type of fittings are supplied. Furnished regularly in two sizes, one for light and medium, the other for heavy and extra heavy sash.

Further Information and Co-operative Service

Send for specially designed folder adapted to standard construction classification of American Institute of Architects. Attractive sample display cards showing all sizes and grades and convenient data gladly sent to architects and builders. If you have any chain problems, our Experimental Department is at your service.

GRADES, WEIGHTS AND STRENGTHS OF HODELL SASH CHAIN

Grade	No.	For sash weighing, lbs.	Tensile strength, lbs.
Phosphor bronze	125-B 175-B 275-B 400-B	Up to 75 Up to 125 Up to 175 Over 250	475 575 650 800
Red bronze	100-R 150-R 225-R 300-R	Up to 60 Up to 100 Up to 150 Over 200	400 450 500 700
Mock bronze	100-M 150-M 200-M 250-M	Up to 60 Up to 100 Up to 150 Over 200	425 500 560 650
Luminized steel	100-L 150-L 200-L 250-L	Up to 60 Up to 100 Up to 150 Over 200	425 500 560 650
Coppered steel	100-C 150-C 200-C 250-C	Up to 60 Up to 100 Up to 150 Over 200	425 500 560 650

PROPER SIZES, GRADES AND WEIGHTS OF HODELL SASH CHAIN FOR VARIOUS TYPES OF BUILDING CONSTRUCTION

	Light	Medium	Heavy	Extra Heavy
For sash having plate glass area. *For sash weighing*	*Up to 6 sq. ft.* *Up to 60 lbs.*	*Up to 10 sq. ft.* *Up to 100 lbs.*	*Up to 15 sq. ft.* *Up to 150 lbs.*	*15 sq. ft. and upward* *Over 200 lbs.*
Federal, state, county, municipal buildings, banks, hotels, offices, libraries, residences ($10,000 and up)	125-B	175-B	275-B	400-B
Theaters, hospitals, railroad stations, schools, churches, high grade apartments, clubs	125-B or 100-R	175-B or 150-R	275-B or 225-R	400-B or 300-R
Mercantile buildings, apartments (4 to 6 suites), stores, residences ($5,000 to $10,000)	100-R 100-M or 100-L	150-R 150-M or 150-L	200-R 200-M or 200-L	250-R 250-M or 250-L
Temporary construction, frame houses and stores, factories, mills	100-L or 100-C	150-L or 150-C	200-L or 200-C	250-L or 250-C

Note: The sizes of chain above recommended are intended to provide strength many times in excess of that required to handle the respective sizes of sash and will insure permanent satisfaction.

THE SMITH & EGGE MFG. CO.

Manufacturers of Chain

BRIDGEPORT, CONN.

BRANCH OFFICES

NEW YORK, N. Y., H. W. Kelley, 258 Broadway
CHICAGO, ILL., H. H. Munger, 112 West Lake Street
PHILADELPHIA, PA., H. A. Terry, 527 Commerce Street
ST. LOUIS, MO., Seidel Mfg. Co., Boatmen's Bank Building
SAN FRANCISCO, CAL., Rawlins & Smith, 604 Mission Street

Products

Sash Chain; Cable Chain.

"Giant Metal"
"Red Metal"
REGISTERED TRADE-MARKS

Experience and Quality of Products

This company originated sash chain as a substitute for cord for hanging windows more than 40 years ago, and has maintained an unbroken record for quality which is equalled by none.

In all this time, The Smith & Egge Mfg. Co.'s sash chains have been recognized by the leading architects throughout the country as the standard of quality and excellence.

Description

"Giant Metal" Sash Chain—Four sizes—A, 1, 2 and 0. Composed of a special phosphor bronze mixture and is entirely free from zinc or any impurities. It has greater tensile strength and durability than any other sash chain produced and retains its strength under continuous use and exposure to the elements.

"Giant Metal" Sash Chain

"Red Metal" Sash Chain—Four sizes—A, 1, 2 and 0. Composed of a special copper mixture and next to "Giant Metal" is superior to all other sash chains made. This is the universally accepted bronze sash chain used in modern construction.

"Red Metal" Sash Chain

Steel Sash Chain—Four sizes—A, 1, 2 and 0. Made of the best cold rolled steel, which gives it the finest appearance, greatest strength and wearing qualities of any steel chain on the market. This chain can be copper plated or sherardized as desired.

Steel Sash Chain

00 Steel Sash Chain—One size only. Made of the best cold rolled steel and furnished in plain steel, copper plated and sherardized finishes. Designed for use with sash up to 100 lbs. and very popular with architects and contractors for apartment house construction.

00 Steel Sash Chain

Cable Chain—Eight sizes. Made in both copper and steel, these chains are especially recommended for use where a heavy weight is required, and are especially adapted for use on elevator or fire doors, safety gates, etc. During the war we furnished thousands of feet of copper cable chain to the U. S. Government for use on the emergency fleet.

Cable Chain

Prominent Installations

To hang the several thousand windows in the Woolworth Building, New York City, 50,300 ft. of "Giant Metal" sash chain was required. The Singer Building, Park Row Building, Postal Telegraph Building, and the United States Post Office required about the same quantity of chain as was necessary for the Woolworth Building alone. While the Woolworth Building is a comparatively recent installation, the other buildings have had the service from our chain for a greater number of years, and in all these New York skyscrapers the "Chain of Quality" has stood the test.

The Edison Building of Chicago, Ill., and the Bellevue-Stratford Hotel of Philadelphia, Pa., are also equipped with our sash chain, besides many other better grade buildings too numerous to mention. The United States Government has been a continual user of Smith & Egge sash chain in post offices and other government buildings for over 40 years.

Below is a list of buildings recently completed, or under construction, for which we furnished our sash chain:

Marinouchi Building, Tokio, Japan—51,000 ft.
Pacific Mutual Life Insurance Building, Los Angeles, Cal.—28,000 ft.
Whitney Central Bank Annex, New Orleans, La.—14,000 ft.
New Bedford Hotel, New Bedford, Mass.—7,000 ft.
Engineering Building of the University of Saskatchewan, Saskatoon, Canada—3,500 ft.

A partial list of other prominent buildings in which our chain was used, follows:

Adolphus Hotel, Dallas, Tex.
Germantown Central Telephone Exchange, Philadelphia, Pa.
Statler Hotel, Detroit, Mich.
Hotel Wisconsin, Milwaukee, Wis.
Pacific Finance Building, Los Angeles, Cal.
Balfour Guthrie Building, San Francisco, Cal.
American National Bank, San Francisco, Cal.
Commercial Union Insurance Building, San Francisco, Cal.
Metropolitan Life Insurance Building, San Francisco, Cal.

Catalogues

Our latest catalogue, booklet on sash chain, or samples of chains will be cheerfully mailed on request.

SAMSON CORDAGE WORKS

88 Broad Street

BOSTON, MASS.

Products

Manufacturers of BRAIDED COTTON CORD in all sizes and colors for all purposes, including SAMSON SPOT CORD, SAMSON WIRE CENTER CORD and other SASH CORDS.

Also manufacturers of Ventilator Cord, Curtain and Shade Cord, Awning Lines, Masons' Lines, Chalk Lines, Dumbwaiter Rope, Arc Lamp and Trolley Cord, Signal Cord, Clothes Lines, etc.

TRADE-MARK

Samson Cord

All goods bearing the trade-mark of Samson and the Lion are made of extra quality stock; are carefully inspected, and guaranteed free from the rough braiding and finishing which destroy common cords so quickly.

The SAMSON CORDAGE WORKS manufactures three grades of sash cord, but the lower grades are made for competing trade in cheap work and do not bear the Samson trade-mark. They do not fill specifications for Samson cord, which is much more economical in the end.

Samson Spot Cord

The colored spots on the cord which may be of any color, serve as a means of identification after the label is removed. Spot Cord will wear many times longer than chain or than the common cord, so often found on the market, made of inferior yarn roughly braided and poorly finished, causing early destruction by abrasion on the pulley.

Specifications—Architects' specifications should read:

"Windows to be hung with Samson Spot Cord; size of cord and size of pulleys to agree with manufacturer's list."

Sample Cards—Sample cards, showing proper sizes for use with different weights and pulleys, will be gladly sent to architects and builders.

Size No. 6. Diameter $\frac{3}{16}$ in.
About 18 lbs. per dozen hanks; about 66 ft. per lb. Suitable for weights of less than 5 lbs. Minimum diameter of pulley allowable 1½ in.

Size No. 8. Diameter ¼ in.
About 27 lbs. per dozen hanks; about 44 ft. per lb. Suitable for weights from 12 to 20 lbs. Minimum diameter of pulley allowable 2 in.

Size No. 10. Diameter $\frac{5}{16}$ in.
About 44 lbs. per dozen hanks; about 27 ft. per lb. Suitable for weights from 30 to 40 lbs. Minimum diameter of pulley allowable 2½ in.

Samson Wire Center Cord

Recommended for use in hanging heavy windows or where for any reason a metallic device is desired. It is made of the same extra quality cotton yarn as Samson Spot Cord with an enameled steel wire center, manufactured under specifications for running over pulleys and entirely different material from the twisted wire of commerce.

The weight of the window is borne chiefly by the wire center, the cotton cover merely acting as a cushion, thus avoiding contact of metal with metal which causes noise and wear.

It is carried in two sizes: Nos. 8 and 10.

No. 8 is suitable for weights up to 30 lbs. if used with pulleys not less than 2 in. in diameter, or for weights up to 50 lbs. with pulleys not less than 2½ in. in diameter.

No. 10 for weights up to 75 lbs. if used with pulleys not less than 2½ in. in diameter, or for weights up to 100 lbs. with pulleys not less than 3 in. in diameter.

SAMSON MAHOGANY WIRE CENTER SASH CORD
Carried in stock in mahogany color, and made to order for large buildings in other colors to match finish. List price of size No. 8, 5c per ft. List price of No. 10, 6½c per ft.

Special Cords

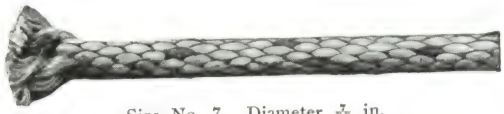
Cords made to order for any purpose, in special braid, finish or color.

Territory

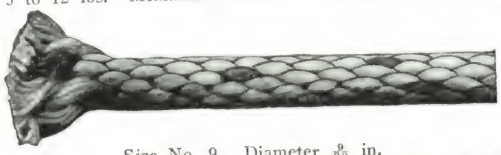
Samson Spot Cord and this company's other goods are sold all over the world, and are carried by most of the builders' hardware dealers in the United States.

Catalogues

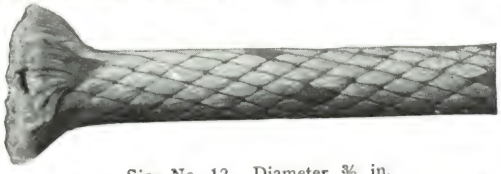
Send for catalogues and sample cards.



Size No. 7. Diameter $\frac{7}{32}$ in.
About 22 lbs. per dozen hanks; about 55 ft. per lb. Suitable for weights from 5 to 12 lbs. Minimum diameter of pulley allowable 1¾ in.



Size No. 9. Diameter $\frac{9}{32}$ in.
About 33 lbs. per dozen hanks; about 36 ft. per lb. Suitable for weights from 20 to 30 lbs. Minimum diameter of pulley allowable 2¼ in.



Size No. 12. Diameter ⅜ in.
About 60 lbs. per dozen hanks; about 20 ft. per lb. Suitable for weights from 40 to 50 lbs. Minimum diameter of pulley allowable 3 in.

SAMSON SPOT CORD
The number indicates the diameter in the 32ds of an inch

SILVER LAKE CO.

Manufacturers of Sash, Bell and Signal Cord

HEAD OFFICE AND FACTORIES

NEWTONVILLE, MASS.

BRANCH OFFICES

NEW YORK, N. Y., 105 Worth Street
PHILADELPHIA, PA., S. W. Cor. Market and Fifth Streets
BALTIMORE, MD., 405 West Redwood Street
CHICAGO, ILL., 241 East Illinois Street
SAN FRANCISCO, CAL., 604 Mission Street

Products

Manufacturers of "Silver Lake" Solid Braided Window Sash, Railroad Bell, Trolley, Signal, Curtain and Shade Cord; Arc Lamp, Dumbwaiter and Transmission Rope; Mason's Lines and Clothes Lines, and all kinds of Solid Braided Cordage.

Description of Solid Braided Cordage

We are the pioneer manufacturers of solid braided cordage. "Silver Lake" cords have been used for the best work since 1868 and have become known as the standard. "Silver Lake" solid braided sash cord is made of the best quality of selected cotton yarn; twice doubled and twisted, and then braided on solid braiding machines of our own design.

Advantages—"Silver Lake" cord costs less per pound than linen and other fine fibers, and its weight is so much less that it costs less per foot than cords that are cheaper per pound. Cotton is the only fiber that will stand constant bending over a pulley; consequently a cotton cord is more durable than one made of linen or hemp. It varies in diameter by thirty-seconds of an inch, and is adapted to all styles and sizes of weights and pulleys. Our process of finishing takes up all the stretch, so that "Silver Lake" cords do not lengthen as they wear, but maintain the weight at its original height.

Ordinary twisted cords kink badly in unwinding from the hank, and a great deal of time is required to straighten them out. "Silver Lake" braided cord comes out smoothly and makes it possible to hang more sash in a given time than when ordinary cords are used. "Silver Lake" cord is smooth in finish and can not work in between pulley wheel and case, a fact that precludes all possibility of broken sash cords. Our shade cords are extremely handsome in appearance and do not fray and break.

Guarantee—Furthermore, we issue a certificate of guarantee protecting every architect who specifies "Silver Lake A" sash cord against the breakage of same for a period of 20 years after installation.

Tests—Tests as made by the United States Government, Bureau of Standards, show that "Silver Lake" outwears many times chains and cheap cords. The hard braid and smooth finish also make it more fire resisting than chains.

Special Cords

All colors of wire center cord and a great variety of other braided cords for special purposes manufuctured to order. Estimates promptly furnished on any sample sent to us. Anything in the way of a solid braided cord, in any color or design, may be had.

Sizes, Weights, etc.

The table gives the sizes and weights of cords, and the weight which each size will safely carry.

Territory

Our cords are in use the world over, and are carried by dealers throughout the United States.

Orders of any size promptly filled.

Trade-marks

All hanks of genuine "Silver Lake" cord are bound with our label, bearing our trade-mark. As an additional protection and means of identification, every foot of cord is stamped with our name. Cord not so marked is not genuine "Silver Lake."

Reproduction of "Silver Lake" Cord with Trade-mark and Name
Registered in U. S. Patent Office

SIZES, WEIGHTS, LENGTHS, ETC., OF "SILVER LAKE" CORD

Size No.	Diameter, in.	Weight per dozen hanks, lbs.	Feet per pound, approximate	Minimum diameter, of pulley allowable, in.	Suitable for weights, lbs.
6	5/16	18	66	1 1/2	up to 10
7	7/32	23	52	1 3/4	10 to 15
8	1/4	27	44	2	15 to 25
9	9/32	33	36	2 1/4	25 to 35
10	5/16	44	27	2 1/2	35 to 45
12	3/8	60	20	3	45 and up

Prices on application.

THE AMERICAN PULLEY COMPANY

Manufacturers of Pressed Metal Sash Pulleys

BELL TELEPHONE
TIOGA 6980

4200 Wissahickon Avenue
PHILADELPHIA, PA.

BRANCH STORES CARRYING STOCK

NEW YORK, N. Y., 33-35 Greene Street
BOSTON, MASS., 165 Pearl Street
SAN FRANCISCO, CAL., 14 Natoma Street
CHICAGO, ILL., 114-116 South Clinton Street
SEATTLE, WASH., 536 First Avenue, South
LOS ANGELES, CAL., Sunset Terminal Warehouse

Products

AMERICAN PRESSED METAL SASH PULLEYS.

Also manufacturers of "Eagle," "Top Notch," "Merit," "Saw Tooth," and "Hollow Axle" Pressed Metal Sash Pulleys; Wrought Steel Belt Pulleys; Pressed Metal Sheaves; Pressed Steel Shapes of various designs.

American Pressed Metal Sash Pulleys

American sash pulleys are made throughout (with the exception of the axle pins) of pressed metal in various combinations of steel, bronze and brass.

Although designed and constructed to meet the exacting requirements of the highest class of work, the economy of the standardized patented construction and the lightness of material render them adaptable for use in work of moderate cost.

They are practically indestructible in use and there is no breakage in shipping or handling.

American sash pulleys have been installed in a large number of America's most prominent buildings, notably:

Metropolitan Building, New York, N. Y.
United States Post Office, Washington, D. C.
Custom House, New York, N. Y.
Hudson Terminal Building, New York, N. Y.
Also many others.

Wheels—Wheels are made in 3 types:

(1) Of steel, either coated with a rustless compound or electroplated in brass or bronze.
(2) Of solid bronze.
(3) Of solid brass.

They are made with a combination groove, serving equally well for either sash chain or sash cord.

In the steel wheels, the two main side pieces are electrically welded together.

The brass or bronze wheels are made of a patented design by which the two main side pieces are locked together all the way round, just under the groove, so as to make a wheel indissolubly one.

Bearings—American sash pulleys are manufactured with 3 styles of bearings: plain axle, roller bearing and ball bearings.

The plain axle wheel has a long, straight bearing of heavy metal, with hardened bushing. This bearing is recommended for work of moderate cost.

In the roller bearing wheels, the rollers travel between hardened steel thimbles and solid steel axles.

In the ball bearing wheels, the balls run between hardened steel cones and races.

The ball bearing and roller bearing wheels are particularly recommended where an especially dependable pulley is desired.

The present designs are the result of long experience and their excellence has been proved by many severe tests.

AMERICAN ROLLER BEARING SASH PULLEY

Housing—The housing is made entirely of pressed steel, electrically welded to the face plate, forming a rigid and indestructible protection for the pulley.

Axle pins of ample size are made of cold drawn steel and shouldered. The pin is riveted outside the housing, which is held between the rivet head and the axle shoulder.

Face Plate—Face plates are made of pressed steel, bronze or brass. Steel plates are finished with lacquer or with either brass or bronze electroplate.

AMERICAN PRESSED METAL SASH PULLEY

Sizes

All styles are furnished in 2¼-, 2½- and 3-in. sizes of wheel.

The plain axle is also made in a 2-in. size.

A 2½-in. diameter wheel for a sash of the usual size and a 3-in. wheel for an extra heavy sash is recommended.

Finish

All steel parts of American sash pulleys, unless otherwise specified, are coated with a compound which prevents rust.

For standard finishes of face plates and wheels, see price lists.

Continued on next page

Sample Pulleys

Architects and builders will be supplied with sample pulleys made with standard finish plates or with face plates finished to match any hardware.

Facilities and Shipments

The company is prepared to fill orders for American sash pulleys in any quantity, and, if special sash pulleys are required in large quantities, estimates will be furnished.

WEIGHT PER GROSS, PACKED FOR SHIPMENT

2-in. pulley	58 lbs.
2¼-in. pulley	67½ lbs.
2½-in. pulley	79 lbs.
3-in. pulley	127½ lbs.

AMERICAN SASH PULLEY

Method of attaching sides of housing to face. The points on the flange of the face register with the depressions in the housing sides, and at these points the parts are electrically welded together

Specifications

Unless the architect takes pains to specify the particular style and finish of pulleys he wishes used, he risks getting an inferior article. The following method of specifying is suggested.

"**Sash Pulleys**—All double hung windows shall be equipped with American sash pulleys as manufactured by THE AMERICAN PULLEY COMPANY.

Pulleys in master's portion shall be No. 8552½ or 8553 bronze face, bronze wheel, roller bearing pulleys.

Pulleys in service portion shall be No. 312½ or 313 bronze plated face, steel wheel, plain axle pulleys.

The wheels shall be of such size as to hang the weights in the center of the box, but in no case shall be less than 2¼-in. diameter."

Other Special Pulleys

Small guide pulleys with wood screw shanks find many applications in the modern house where it is desirable to control furnaces, dumbwaiters or other devices without running up and down stairs.

Special pulleys for steel sash will be made and samples and prices submitted to builders' specifications.

AMERICAN SCREW PULLEY

Write for Complete Catalogues

Discounts on application. Write for complete catalogue, showing all types of American sash pulleys and similar special equipment.

PRICE LIST AMERICAN PRESSED METAL SASH PULLEYS

2-INCH; PLAIN AXLE

No.	Face plate, 1⅛x5 inches	Per dozen
112	All-steel, lacquered face	$1.50
212	Brass plated face, steel wheel	1.80
312	Bronze plated face, steel wheel	1.90
412	Brass face, steel wheel	2.20
512	Bronze face, steel wheel	2.40
222	Brass plated face and wheel	2.00
332	Bronze plated face and wheel	2.10
422	Brass face, brass plated wheel	2.40
532	Bronze face, bronze plated wheel	2.50
442	Brass face, brass wheel	4.00
542	Bronze face, brass wheel	4.10
552	Bronze face, bronze wheel	4.20

PRICE LIST AMERICAN PRESSED METAL SASH PULLEYS—(CONTINUED)

PLAIN AXLE

No.	2¼-INCH; PLAIN AXLE Face plate, 1⅛x5½ inches	Per dozen	No.	2½-INCH; PLAIN AXLE Face plate, 1¼x5⅞ inches	Per dozen	No.	3-INCH; PLAIN AXLE Face plate, 1⅜x6 15/16 inches	Per dozen
112¼	All-steel, lacquered face	$1.64	112½	All-steel, lacquered face	$1.80	113	All-steel, lacquered face	$2.26
212¼	Brass plated face, steel wheel	2.00	212½	Brass plated face, steel wheel	2.20	213	Brass plated face, steel wheel	2.70
312¼	Bronze plated face, steel wheel	2.10	312½	Bronze plated face, steel wheel	2.30	313	Bronze plated face, steel wheel	2.84
412¼	Brass face, steel wheel	2.44	412½	Brass face, steel wheel	2.70	413	Brass face, steel wheel	3.50
512¼	Bronze face, steel wheel	2.60	512½	Bronze face, steel wheel	2.80	513	Bronze face, steel wheel	3.70
222¼	Brass plated face and wheel	2.24	222½	Brass plated face and wheel	2.50	223	Brass plated face and wheel	3.50
332¼	Bronze plated face and wheel	2.44	332½	Bronze plated face and wheel	2.80	333	Bronze plated face and wheel	3.70
422¼	Brass face, brass plated wheel	2.64	422½	Brass face, brass plated wheel	2.90	423	Brass face, brass plated wheel	4.00
532¼	Bronze face, bronze plated wheel	2.80	532½	Bronze face, bronze plated wheel	3.10	533	Bronze face, bronze plated wheel	4.40
442¼	Brass face, brass wheel	4.50	442½	Brass face, brass wheel	5.00	443	Brass face, brass wheel	6.80
542¼	Bronze face, brass wheel	4.70	542½	Bronze face, brass wheel	5.20	543	Bronze face, brass wheel	7.00
552¼	Bronze face, bronze wheel	4.96	552½	Bronze face, bronze wheel	5.50	553	Bronze face, bronze wheel	7.50

ROLLER BEARING

No.	2¼-INCH; ROLLER BEARING Face plate, 1⅛x5½ inches	Per dozen	No.	2½-INCH; ROLLER BEARING Face plate, 1¼x5⅞ inches	Per dozen	No.	3-INCH; ROLLER BEARING Face plate, 1⅜x6 15/16 inches	Per dozen
8112¼	All-steel, lacquered face	$2.14	8112½	All-steel, lacquered face	$2.30	8113	All-steel, lacquered face	$2.86
8212¼	Brass plated face, steel wheel	2.50	8212½	Brass plated face, steel wheel	2.70	8213	Brass plated face, steel wheel	3.30
8312¼	Bronze plated face, steel wheel	2.60	8312½	Bronze plated face, steel wheel	2.80	8313	Bronze plated face, steel wheel	3.44
8412¼	Brass face, steel wheel	2.94	8412½	Brass face, steel wheel	3.20	8413	Brass face, steel wheel	4.10
8512¼	Bronze face, steel wheel	3.10	8512½	Bronze face, steel wheel	3.30	8513	Bronze face, steel wheel	4.30
8222¼	Brass plated face and wheel	2.74	8222½	Brass plated face and wheel	3.00	8223	Brass plated face and wheel	4.10
8332¼	Bronze plated face and wheel	2.94	8332½	Bronze plated face and wheel	3.30	8333	Bronze plated face and wheel	4.30
8422¼	Brass face, brass plated wheel	3.14	8422½	Brass face, brass plated wheel	3.40	8423	Brass face, brass plated wheel	4.60
8532¼	Bronze face, bronze plated wheel	3.30	8532½	Bronze face, bronze plated wheel	3.60	8533	Bronze face, bronze plated wheel	5.00
8442¼	Brass face, brass wheel	5.00	8442½	Brass face, brass wheel	5.50	8443	Brass face, brass wheel	7.40
8542¼	Bronze face, brass wheel	5.20	8542½	Bronze face, brass wheel	5.70	8543	Bronze face, brass wheel	7.60
8552¼	Bronze face, bronze wheel	5.46	8552½	Bronze face, bronze wheel	6.00	8553	Bronze face, bronze wheel	8.10

BALL BEARING

No.	2¼-INCH; BALL BEARING Face plate, 1⅛x5½ inches	Per dozen	No.	2½-INCH; BALL BEARING Face plate, 1¼x5⅞ inches	Per dozen	No.	3-INCH; BALL BEARING Face plate, 1⅜x6 15/16 inches	Per dozen
9112¼	All-steel, lacquered face	$2.64	9112½	All-steel, lacquered face	$2.80	9113	All-steel, lacquered face	$3.36
9212¼	Brass plated face, steel wheel	3.00	9212½	Brass plated face, steel wheel	3.20	9213	Brass plated face, steel wheel	3.80
9312¼	Bronze plated face, steel wheel	3.10	9312½	Bronze plated face, steel wheel	3.40	9313	Bronze plated face, steel wheel	3.94
9412¼	Brass face, steel wheel	3.44	9412½	Brass face, steel wheel	3.70	9413	Brass face, steel wheel	4.60
9512¼	Bronze face, steel wheel	3.60	9512½	Bronze face, steel wheel	3.80	9513	Bronze face, steel wheel	4.80
9222¼	Brass plated face and wheel	3.24	9222½	Brass plated face and wheel	3.50	9223	Brass plated face and wheel	4.60
9332¼	Bronze plated face and wheel	3.44	9332½	Bronze plated face and wheel	3.80	9333	Bronze plated face and wheel	4.80
9422¼	Brass face, brass plated wheel	3.64	9422½	Brass face, brass plated wheel	3.90	9423	Brass face, brass plated wheel	5.10
9532¼	Bronze face, bronze plated wheel	3.80	9532½	Bronze face, bronze plated wheel	4.10	9533	Bronze face, bronze plated wheel	5.50
9442¼	Brass face, brass wheel	5.50	9442½	Brass face, brass wheel	6.00	9443	Brass face, brass wheel	7.90
9542¼	Bronze face, brass wheel	5.70	9542½	Bronze face, brass wheel	6.20	9543	Bronze face, brass wheel	8.10
9552¼	Bronze face, bronze wheel	5.96	9552½	Bronze face, bronze wheel	6.50	9553	Bronze face, bronze wheel	8.60

COLUMBIAN HARDWARE DIVISION

OF THE CONSOLIDATED IRON-STEEL MFG. CO.

CLEVELAND, OHIO

Products

"COLUMBIAN" SASH PULLEYS, for side and overhead hung window sash.

Construction

Case—Gray iron.

Face—Any finish on iron, also wrought bronze or cast bronze.

Wheels—Carefully turned and machined, accurately centered and true running, iron or bronze.

Bearings—Plain axle; roller bearing; ball bearing.

Axles—Cold rolled steel riveted in position; or brass.

Overhead Pulleys for Single, Double and Triple Windows

Used in mullion windows where insufficient space is provided between windows to take care of the weights; also where large area of glass is desired, and reduced width of mullion. Weights are carried at sides of windows and no weight or weight boxes are required in the center, one weight carrying each sash.

Due to pocket space saved, iron weights instead of lead weights may be used, thus reducing cost.

STANDARD SIDE SASH PULLEY

Specifying

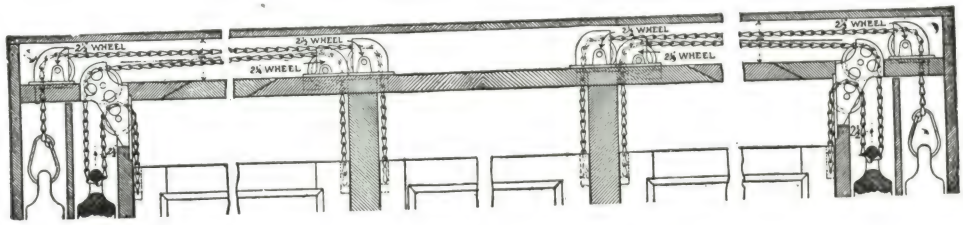
To insure perfect pulleys specify *"Columbian."*

The chart enables the architect to specify by number the style pulley best suited to the requirements.

"COLUMBIAN" SIDE SASH PULLEY DATA

2 -in. wheels for sash weighing up to 40 lbs.
2¼-in. wheels for sash weighing up to 100 lbs.
2½-in. wheels for sash weighing up to 150 lbs.
3 -in. wheels for sash weighing over 150 lbs.

Cat. number	Size of wheel, inches	Size of face, inches
PLAIN FACE		
C100	2	1⅛ x 5
C200	2¼	1⅛ x 5
C220	2¼	1⅛ x 5½
C300	2½	1¼ x 5¾
C320	2½	1¼ x 6
B400	2½ x ½	1¼ x 6
B420	3 x ½	1¼ x 6½
POLISHED AND LACQUERED FACE		
C102	2	1⅛ x 5
C202	2¼	1⅛ x 5
C222	2¼	1⅛ x 5½
C302	2½	1¼ x 5¾
C322	2½	1¼ x 6
C402	2½ x ½	1¼ x 6
C422	3 x ½	1¼ x 6½
ELECTRO BRONZE-PLATED FACE		
D103	2	1⅛ x 5
D203	2¼	1⅛ x 5
D223	2¼	1⅛ x 5½
D303	2½	1¼ x 5¾
D323	2½	1¼ x 6
D403	2½ x ½	1¼ x 6
D423	3 x ½	1¼ x 6½
WROUGHT BRONZE FACE		
D106	2	1⅛ x 5
D206	2¼	1⅛ x 5
D226	2¼	1⅛ x 5½
D306	2½	1¼ x 5¾
D326	2½	1¼ x 6
D406	2½ x ½	1¼ x 6
D426	3 x ½	1¼ x 6½



"COLUMBIAN" MULLION OVERHEAD PULLEYS

Overhead pulley can be furnished for single, twin and triple windows

CALDWELL MANUFACTURING CO.

Sash Balances and Door Holders

MAIN OFFICE AND FACTORY
8-10 Jones Street
ROCHESTER, N. Y.

BRANCH OFFICES
CHICAGO, ILL., 20 East Lake Street
PHILADELPHIA, PA., 521 Commerce Street

Products

Manufacturers of CALDWELL SASH BALANCES; VERTICAL, JUNIOR and EMPIRE DOOR HOLDERS.

Also other Hardware Specialties.

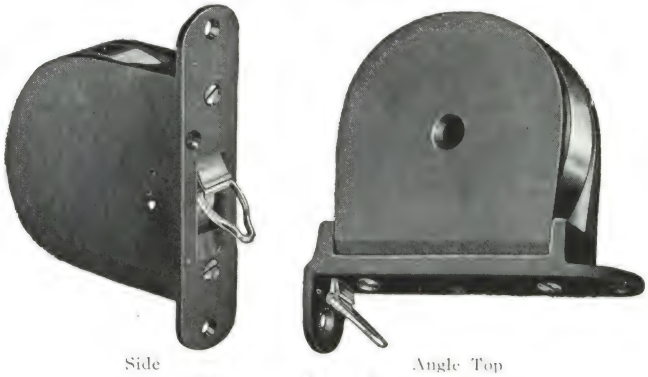
Caldwell Sash Balances

This company has made these sash balances during the past 35 years. They are made of the best material, by workmen thoroughly experienced in the art of producing sash balances with uniform tension, insuring a perfect counterbalance at all points of the sash.

Top Balance—Enables the architect to make the narrowest possible mullion, allowing the use of narrow trim, giving the effect of casements in rows of double hung sash.

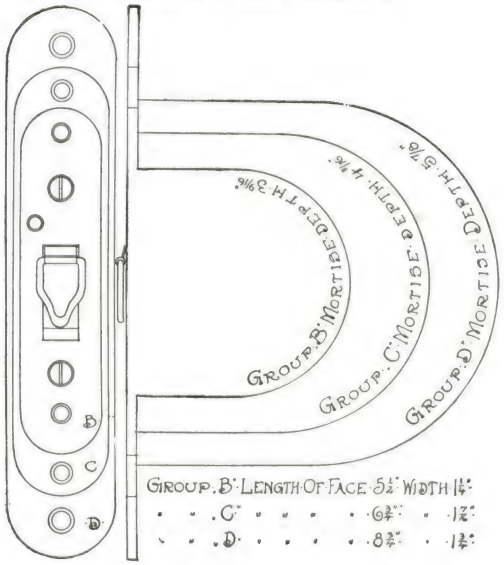
Uniform Mortises—Cut at the mill, reduce cost of installing.

Quality Proved—Is assurance that you can safely specify Caldwell sash balances.



Side Angle Top

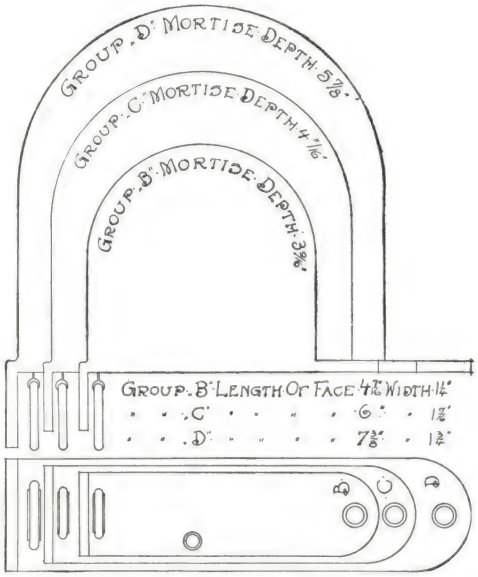
CALDWELL SASH BALANCE



SIDE BALANCE
Measurements on outline are full size

Guarantee—Caldwell sash balances are guaranteed for 15 years.

Literature—Send for catalogue, "Suggestions for the Present Day Architect."



TOP BALANCE FOR MULLION WINDOWS
Measurements on outline are full size

Caldwell Vertical Door Holders

Of strongest construction; made in all finishes; have no screw ears.

A bracket affixes the holder immovably to the door, and gives strength at the base of holder where it is most required. Our special large vertical door holder is recommended for use on heavy outside doors, particularly upon vestibule doors, which open over incline floors, such as theaters, moving picture entrances, etc. Made in cast brass and bronze metal only.

Pressers are made of cold rolled rods, ⅝ in. in diameter. The rubbers are the *original cup shape*, reinforced with hard leather gaskets, which prevent the rubbers from being cut and torn.

RUBBER FOR CALDWELL VERTICAL DOOR HOLDERS
(Full size)

Regular Size 1¼-in. Drop Special size 4¼-in. Drop

CALDWELL VERTICAL DOOR HOLDERS

PULLMAN MFG. COMPANY

Manufacturers of Unit Sash Balances

ROCHESTER, N. Y.

Products

PULLMAN UNIT SASH BALANCES, replacing cords or chains, pulleys and weights where used in modern buildings.

Also Special Balances: Tandem, for extra heavy windows; Cabinet, for show and wall cases; Pressed Brass, for marine work.

Unit Sash Balances
TRADE-MARK

All parts are fitted accurately, run smoothly and evenly and are almost noiseless. All moving parts are encased and practically indestructible.

What Pullman Unit Sash Balances Are and Why They Are Becoming the Standard

Pullman Unit Sash Balances can be used in all kinds of construction where cords or chains, pulleys and weights can be used. They are particularly adapted to double hung windows, permit very narrow mullions and do away with box frames.

They have been approved by the National Board of Fire Underwriters after exhaustive tests.

Special Advantages

They can be instantly installed or removed by means of the new Tape Hook device without disturbing stops, sash or frame (see cut below).

Pullman Ten Year Guarantee

Pullman Unit Sash Balances are guaranteed for 10 years against defective workmanship or material.

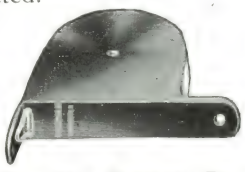
They last indefinitely and are less expensive than even the cheaper grades of weights, cords and pulleys when the complete installation is taken into consideration, the labor cost being at least one-third less.

Box frames and wide mullions can be eliminated, only plain plank frames and narrow mullions being required. An additional saving of labor, and lumber as well, is thereby effected.

Principle of Construction

The balance consists of a pressed steel casing enclosing a rustproof steel tape, wound on a revolving drum and operated by a clock spring of the finest steel. The loop in the end of the tape is hooked on to the tape hook on the sash. The balances are made in various sizes, the strength of the spring varying with the weight of sash to be operated.

UNIT SASH BALANCE, SIDE PATTERN



THE TOP PATTERN BALANCE, FITTED IN THE HEAD OF FRAME

TAPE HOOK

UNIT SASH BALANCE, SHOWING INTERIOR CONSTRUCTION

Types and Sizes of Units

There are 2 patterns of balances: side pattern for standard use on jamb, and head or top pattern for narrow mullions (see details on following page). Each Pattern is made in 3 different sizes—*Units* K, L and M. For various capacities of these *Units* see table on following page. Two balances required for each sash, each balance taking half the weight of the sash.

AN ORDINARY NAIL INSERTED IN BALANCE HOLDS SPRING WHILE TAPE IS BEING ATTACHED TO SASH

Easily and Quickly Installed

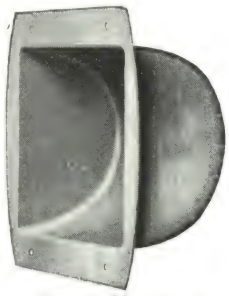
Face plates and cases being uniform for a given size of *Unit,* frames may be mortised at the mill as cheaply as for ordinary pulleys. At least *three* windows can be equipped with Pullman balances in the time it takes to equip *one* with weights and cords.

Specification Data

Finishes—Dull black lacquer is the regular finish for Pullman face plates. Special finishes; solid bronze or brass plates—*Unit* K, $1.10, *Unit* L, $1.50 and *Unit* M, $1.95 net per set extra; electroplated face plates—brass, bronze, nickel or copper, *Unit* K, 60¢, *Unit* L, 90¢ and *Unit* M, $1.10 net per set extra.

How to Order—Specify exact weight by scales of each individual sash. The mill usually so marks the sash. Upper and lower sash often vary. Therefore, never give weight of entire window. Estimated weights, except for mortising purposes, always cause trouble. Sash of same dimensions likewise differ in weight. Be sure sufficient space is left for balances. Use top pattern if no room in side jamb. Note the regular run of tape scheduled on next page for each serial number of balance. If additional run of tape (travel of sash within a given opening) or extra length (to simply locate balances higher up or farther away from the sash) is required, please consult us before ordering.

Steel Housing for Balances for Use in Concrete Work



STEEL HOUSING

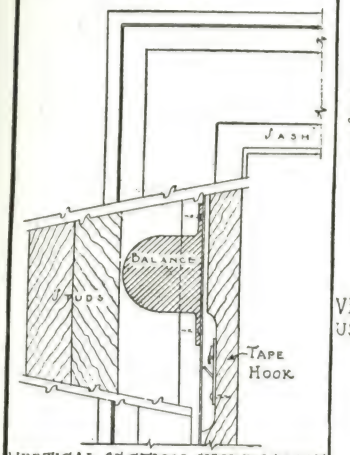
This device provides a convenient and economical way of making the recess for the balances in concrete buildings. The frame being set into the wall, the concrete flows around the housing, embedding it in the mixture, and helps to hold the window frame in place.

Illustrated Catalogue and Blueprints

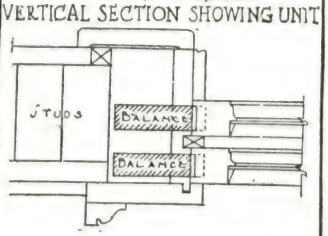
For further details, illustrations and references write for illustrated catalogue with accompanying blueprints. The operation and advantages of the new Tape Hook are fully described therein. This remarkable invention is revolutionary in scope.

Continued on next page

FIG. A

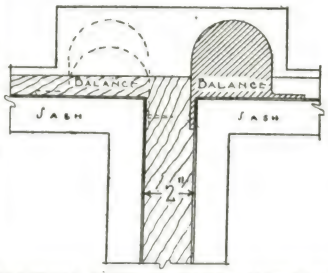


VERTICAL SECTION SHOWING UNIT

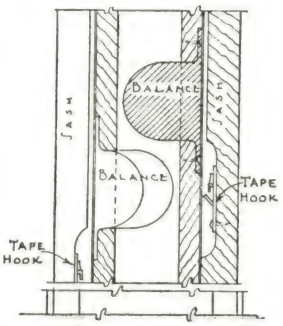


SECTION THRU JAMB
STANDARD SIDE APPLICATION

FIG. B

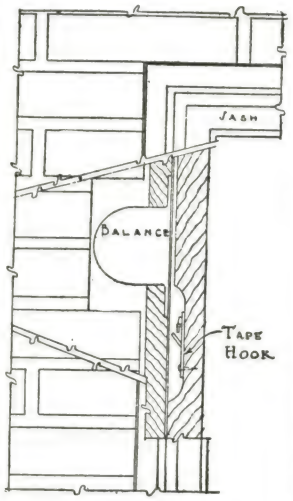


VERTICAL SECTION-NARROW MULLION
USING TOP PATTERN BALANCES



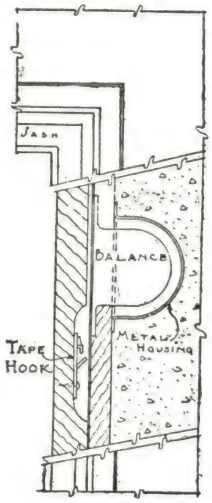
SECTION THRU MULLION
SIDE BALANCES STAGGERED

FIG. C



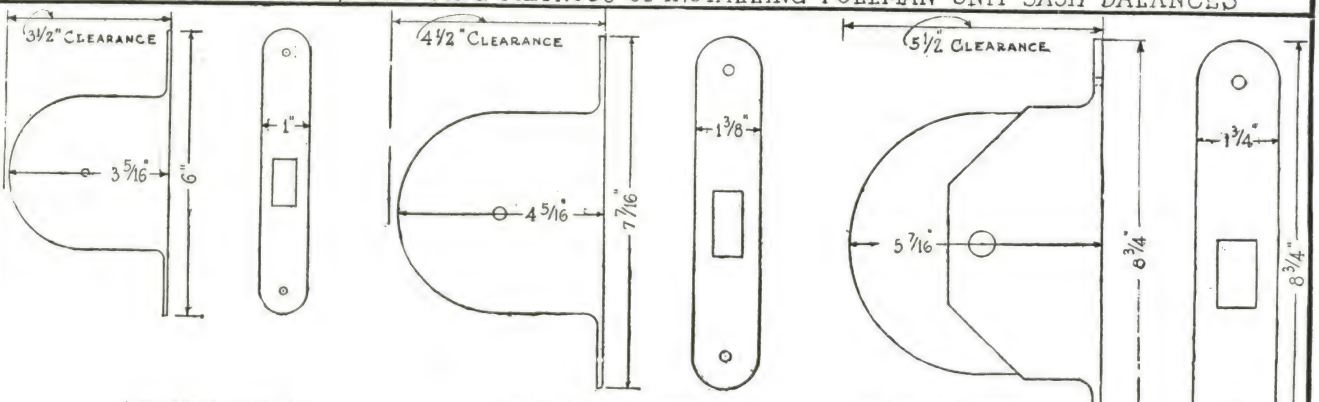
VERTICAL SECTION
SHOWING RECESS IN BRICK
WALL FOR PULLMAN
BALANCE WHEN PLANK
FRAME IS USED

FIG. D



VERTICAL SECTION
SHOWING METAL HOUSING
FOR PULLMAN SASH
BALANCES USED WITH
CONCRETE CONSTRUCTION

1½ IN SCALE DETAILS SHOWING METHODS OF INSTALLING PULLMAN UNIT SASH BALANCES



SIZE "K" UNIT
FOR SASH WEIGHING 4 TO 32 LBS.

SIZE "L" UNIT
FOR SASH WEIGHING 10 TO 48 LBS

SIZE "M" UNIT
FOR SASH WEIGHING 24 TO 105 LBS.

3" SCALE DETAILS OF "K" "L" & "M" SIZES OF PULLMAN UNIT SASH BALANCES

APPLICATION AND DETAILS OF PULLMAN UNIT SASH BALANCES

PRICES, ETC., OF PULLMAN UNIT SASH BALANCES

UNIT "K," FOR 4-LB. TO 32-LB. SASH
Depth of unit "K" balance 3 5/16 in.

Balance No.	Weight of each sash, lbs.	Length of tape, in.	Code word	Per set of 4 balances for 2 sash
0-K	4 to 5	30	Kale	$2.25
1-K	6 to 7	30	Kalif	
2-K	8 to 9	30	Kaolin	
3-K	10 to 11	46	Keck	
4-K	12 to 13	46	Kedge	
5-K	14 to 15	46	Keel	
6-K	16 to 17	46	Keg	2.60
7-K	18 to 19	46	Keep	
8-K	20 to 21	46	Kern	
9-K	22 to 23	46	Ketch	
10-K special	24 to 26	46	Key	
11-K special	27 to 29	46	Kick	3.00
12-K special	30 to 32	46	Kidnap	

UNIT "L," FOR 10-LB. TO 48-LB. SASH
Depth of unit "L" balance 4 5/16 in.

Balance No.	Weight of each sash, lbs.	Length of tape, in.	Code word	Per set of 4 balances for 2 sash
3-L	10 to 11	46	Label	
4-L	12 to 13	46	Labor	
5-L	14 to 15	46	Lace	
6-L	16 to 17	46	Lack	$3.75
7-L	18 to 19	46	Lactic	
8-L	20 to 21	46	Lacona	
9-L	22 to 23	46	Lacteal	
10-L	24 to 26	54	Laddie	
11-L	27 to 29	54	Lade	
12-L	30 to 32	54	Lading	
13-L	33 to 35	54	Ladle	4.00
14-L	36 to 38	54	Lady	
15-L	39 to 41	54	Lag	
16-L	42 to 44	54	Laggard	
17-L	45 to 48	54	Lagging	

UNIT "M," FOR 24-LB. TO 105-LB. SASH
Depth of unit "M" balance 5 7/16 in.

Balance No.	Weight of each sash, lbs.	Length of tape, in.	Code word	Per set of 4 balances for 2 sash
10-M	24 to 26	54	Mace	
11-M	27 to 29	54	Machine	
12-M	30 to 32	54	Mackerel	
13-M	33 to 35	54	Madam	$7.00
14-M	36 to 38	54	Madly	
15-M	39 to 41	54	Madonna	
16-M	42 to 44	54	Magic	
17-M	45 to 48	54	Magnate	
19-M	49 to 52	60	Magnet	
21-M	53 to 56	60	Magnify	
23-M	57 to 60	60	Magnolia	8.00
25-M	61 to 64	60	Magpie	
27-M	65 to 68	60	Mahogany	
29-M	69 to 72	60	Maiden	
31-M	73 to 76	60	Mail	9.25
33-M	77 to 80	60	Maintain	
35-M	81 to 84	60	Majestic	
37-M	85 to 88	60	Major	
39-M	89 to 92	60	Maker	
41-M	93 to 96	60	Malady	10.50
43-M	97 to 100	60	Malice	
45-M	101 to 105	60	Malign	

Side and Top Pattern Balances are the same price.
Side Pattern is always sent unless Top Pattern is Specified.

GRANT PULLEY AND HARDWARE COMPANY

Sash Pulleys and Casement Window Hardware

Architects Building, 101 Park Avenue
NEW YORK, N. Y.

TELEPHONE CONNECTION

Agents in all the principal cities of the United States and Canada, and our Name will be found listed in the Telephone Directories

Products

Manufacturers of SASH PULLEYS and CASEMENT HARDWARE:

"Grant," "Queen" and "Lee" Sash Pulleys; "Grant" and "Queen" Overhead and "Lee" Cast Iron Side Sash Pulleys for wood and metal frames, made in all sizes, finishes and bearings; "Grant" Casement Hardware; "Grant" Antifriction Vertical Pivot Lifts; "Turner" (Patent) Antifriction Drawer Slides and Supports; "Grant" Ball Bearing Door Sheaves and Flush Track; "Grant" Sash Chain and Fixtures; "Grant" Friction Sash Centers; "Queen" Friction Casement Adjusters.

MOREWOOD STANDARD SAFETY WINDOW CLEANING DEVICES.

For "Grant" Wood Rolling Partitions, see page 1090; for Revolving Window Devices, see page 1293; for Door Hangers and Bar Locks, see pages of Reliance-Grant Elevator Equipment Corp.

Selling Agents for:

"American" steel sash pulleys; "Von Duprin" safety exit devices; "Howarth" reversible sash centers; "Grant" tubular ball bearing door hangers.

Details

Full size details of all our specialties will be sent on request.

"Grant" Overhead Pulleys

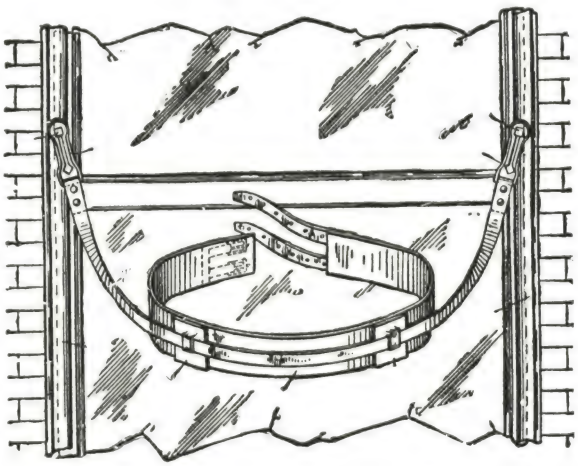
On account of additional pocket room gained by use of "Grant" pulleys, iron instead of lead weights can be used for heaviest plate glass windows, thus materially reducing cost. Frames are cut for "Grant" pulleys by regular pulley machine.

"Grant" overhead pulleys are also made for triple, quadruple and quintuple windows.

Morewood Standard Safety Window Device

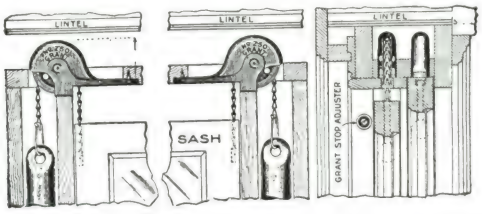
This device efficiently insures safety for outside window cleaners.

Consists of adjustable safety belt connected to the window frame and fastened on to either an anchor or bolt embedded in the framework.

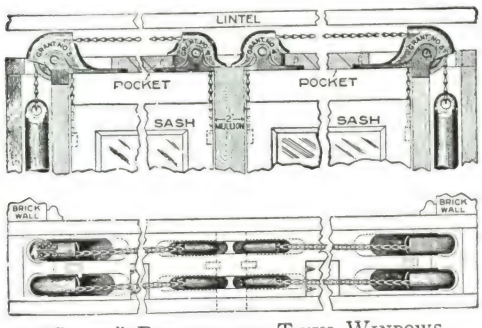


ADJUSTABLE SAFETY BELT CONNECTED TO WINDOW FRAME

The anchor is best inserted in the masonry while the building is under construction, as the cement will bind through the cut out parts. This anchor does away with all cutting by the mason. The heads are machined, thus insuring uniform size.



SINGLE FRAME WINDOW AND SECTION OF FRAME



"GRANT" PULLEYS FOR TWIN WINDOWS

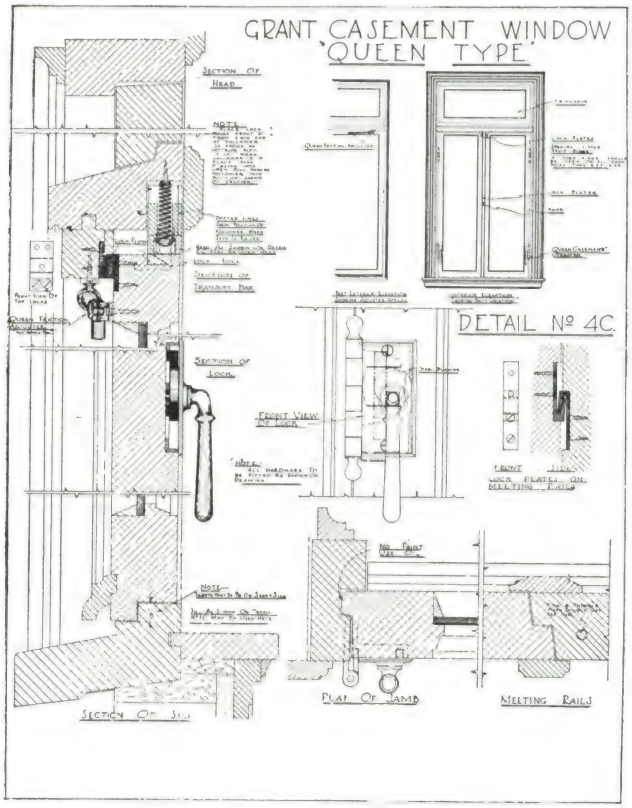
LATEST PATTERN UNIVERSAL BRONZE ANCHOR
The cement binds through cut-out parts

TOBIN BRONZE BOLT FOR WOOD OR METAL COVERED FRAMES

Continued on next page

"Grant" Casement Hardware

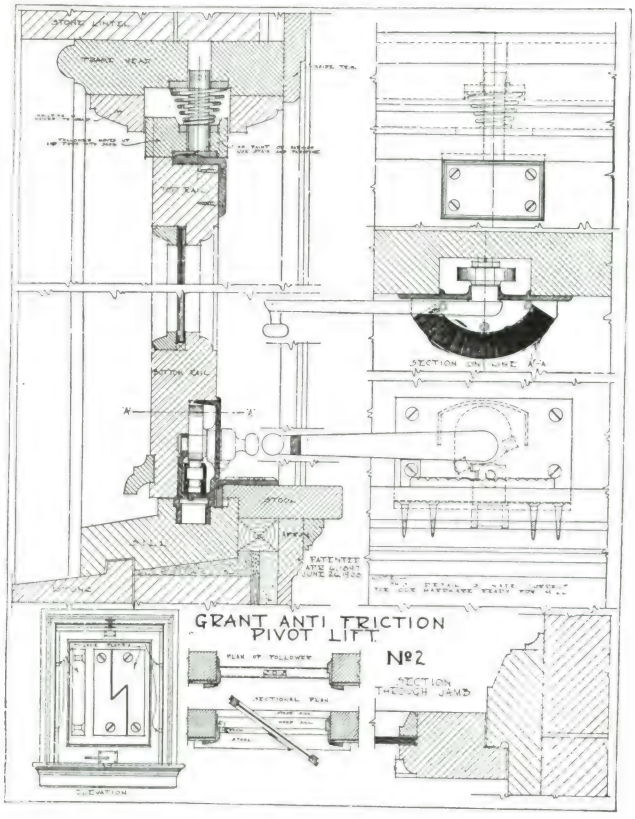
A casement window, opening into room fitted with this hardware, gives, without changing the natural appearance, an inexpensive and weatherproof casement window.



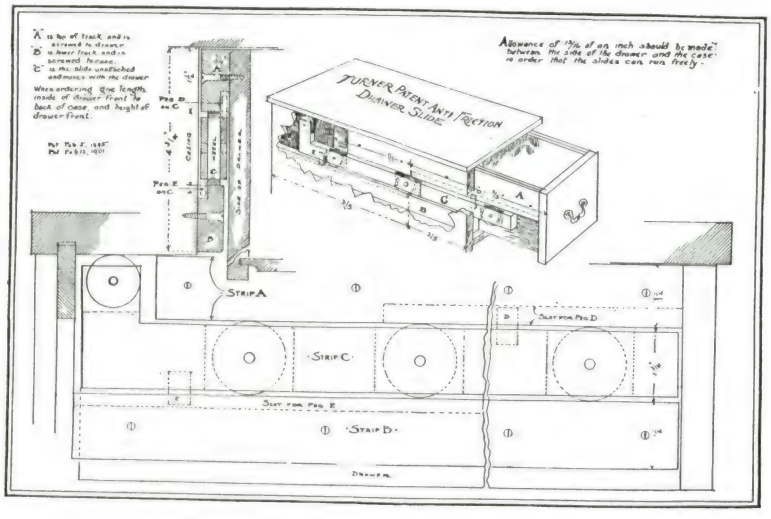
DETAILS, "GRANT" CASEMENT WINDOW
Showing application of hardware

"Grant" Antifriction Vertical Pivot Lifts

The "Grant" antifriction pivot lift, when applied to sash pivoted top and bottom, can be quickly and easily opened for ventilation.



DETAILS, PIVOT WINDOWS
Equipped with "Grant" antifriction lifts



DETAILS "TURNER" (PATENT) ANTIFRICTION DRAWER SLIDES

"Turner" (Patent) Antifriction Drawer Slide

The "Turner" antifriction drawer slide and support are noiseless. When fitted with the "Turner" attachment a drawer can not fall from the case when pulled out suddenly; nor can it sag, if heavily loaded, when opened to its limit.

References

This company will furnish as references, on request, the names and locations of buildings in all large cities in the United States and Canada where its products are in use. These products are giving such satisfaction that the company can refer to all the users.

AMERICAN SAFETY DEVICE COMPANY

Manufacturers of Window Cleaners' Safety Devices

TELEPHONES:
MONROE 3426, 4725

673 West Madison Street
CHICAGO, ILL.

BRANCH OFFICE: 254 South Broadway, LOS ANGELES, CAL.

Product

WINDOW CLEANERS' SAFETY DEVICES.

Dependable Safety Devices for Window Cleaners

"American" window cleaners' safety devices efficiently assure safety for outside window cleaners, and are suitable for installation in every class of building construction—wood, brick, stone, terra cotta, etc. They will outlast the building in which they are installed.

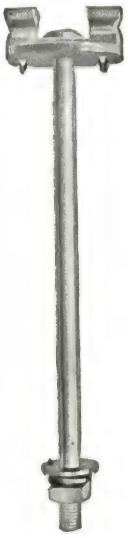
All "American" devices are approved by the Underwriters' Laboratories, Inc., and constitute a dependable high grade line. They are being specified and installed in all parts of the United States and are indorsed by leading architects and contractors.

Our stock is complete and quick shipments are assured. Samples sent to architects and contractors on request.

"AMERICAN" MASON JAMB ANCHOR No. 1

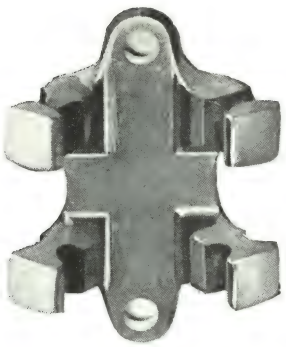
"AMERICAN" MASON JAMB ANCHOR No. 2

"AMERICAN" SAFETY BELT No. 1



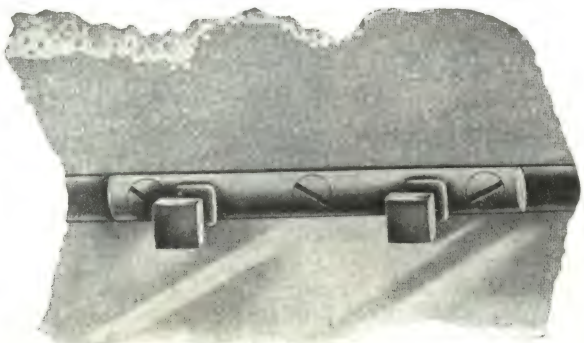
"AMERICAN WOOD FRAME ANCHOR No. 1

"AMERICAN" WOOD FRAME No. 2



"AMERICAN" DOUBLE-HEAD 4-BOLT BRONZE DRILL PLATE No. 2

"AMERICAN" SINGLE DOUBLE-HEAD BRONZE DRILL PLATE No. 1



"AMERICAN" HOLDFAST FOR HOLLOW METAL FRAMES AND MULLIONS

"AMERICAN" SPECIAL DUPLEX TERMINAL

AINSWORTH BUCK

Manufacturer of "Whitner" Window Cleaners' Safety Devices

TELEPHONE
BARCLAY 5887

22 Vesey Street
NEW YORK, N. Y.

Products

WINDOW CLEANERS' SAFETY DEVICES.

Absolute Safety for Window Cleaners

Absolute safety and practicability are essential features embodied in "Whitner" window cleaners' safety devices, which are made of the best materials obtainable. They are offered as high quality products that will outlast the building in which they are installed.

There is a distinct style of "Whitner" device for every class of building construction—wood, brick, stone, concrete, terra cotta, etc. Placed in the window reveals (two on a side in the 4-bolt system and one on a side in the 2-bolt system) they can be built in while the building is being constructed or attached to finished structures.

"Whitner" devices are approved by the Underwriters' Laboratories, Inc. and by the Labor Department of the New York State Industrial Commission.

Special devices made to meet architects' requirements.

A Few Representative Installations

"Whitner" devices are installed in buildings of every character in practically every city, a few of which follow:

NEW YORK—Equitable Bldg.; Hotel Pennsylvania; Yale Club; Vanderbilt Concourse Bldg.; Public Schools; Y. M. C. A. Bldgs.; New York & New Jersey Telephone Bldgs.; New York Central Mail Service Bldgs.; New York Stock Exchange; Canadian Pacific Bldg.; Chas. Fletcher Bldg.; Wurlitzer Bldg.; Western Electric Bldgs.; Lord & Taylor Bldg.; Arnold Constable Bldg.; General Electric Bldgs.; Capitol Theater; Strand Theater; Loew's State Theater; Hecksher Foundation for Children; Morton F. Plant Residence; Textile Bldg., Bush Terminal Bldg.; Metropolitan Club.
HARTFORD—Phoenix Mutual Life Ins. Co. Bldg.; Travelers Insurance Co. Bldg.; Hartford, Conn., Trust Co. Bldg.
PHILADELPHIA—Ritz-Carlton Hotel; Stock Exchange; Pennsylvania R. R. Bldgs.; Atlantic Refining Co. Bldg.; University of Pennsylvania Bldgs.; Drexel Bldg.; Ford Service Bldg.; Gimbel Bros.; City Hall.
PITTSBURGH—Wm. Penn Hotel; Mellon National Bank.
SAN FRANCISCO—Southern Pacific Bldg.
BALTIMORE—Southern Hotel; Public Service Bldg.
HARRISBURG, PA.—State Capitol.
DETROIT—First & Old National Bank; General Motors Bldg.
CLEVELAND—Fischer-Body Ohio Bldg.
BOSTON—United Drug Co. Bldg.; Wm. Filene & Sons Co.; Boston City Hospital; Nurses' Home.
SEATTLE—Sears Roebuck Bldg.
WILMINGTON—Industrial Bank; Delaware Trust Co. Bldg.
WASHINGTON, D. C.—Interstate Commerce Commission Bldg.; Chamber of Commerce Bldg.; Grace Dodge Hotel
BILTMORE, N. C.—Vanderbilt Mansion.
MACON, GA.—Union Station.

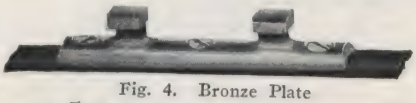


Fig. 4. Bronze Plate
For attachment to hollow metal window frames. Can be used on cast iron frames without reinforcement plate

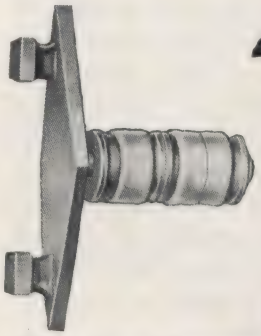


Fig. 1. Bronze Expansion Bolt
Cinch system of expansion

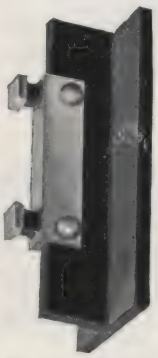


Fig. 5. Bronze Straddle Mullion Fitting
For use on T-bar mullion, either 2- or 4-bolt system

Fig. 6. Bronze Anchorage
For use on wood or kalamein frames

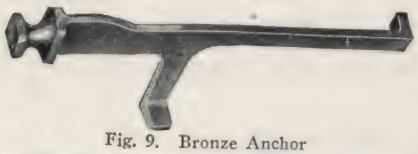


Fig. 9. Bronze Anchor
For installation in brick, stone, concrete or terra cotta construction. To be built into masonry jambs by mason contractor while building is in course of construction, 51 in. above sill or in nearest joint to this height

Fig. 2. Bronze Anchor
For installation in brick, stone or terra cotta. To be built into masonry jambs by mason contractor while building is in course of construction, 51 in. above sill or in nearest joint to this height

Fig. 7. Lag Screw
For installation in wood or kalamein window frames. Made of Tobin bronze or sherardized steel. One placed on each side of window frames for 2-bolt system (2 on each side for 4-bolt system) 48 to 51 in. above sill and installed so as to have a secure hold in pulley stile

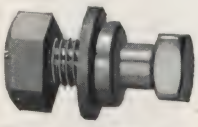


Fig. 10. Bronze Attachment for Cast Iron Frames or Mullions

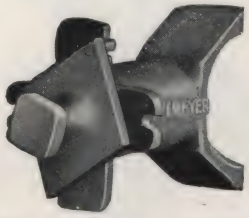


Fig. 11. Concrete Insert and Bronze Fitting
Havemeyer insert used

Fig. 3. Bronze Fitting
For use on Lupton's Sons Co. or Campbell metal window frames

Fig. 8. Leather Safety Belt for Window Cleaners
Belts are also furnished in canvas

Fig. 12. Bronze Belt Terminal for 4-bolt System

"WHITNER" WINDOW CLEANERS' SAFETY DEVICES
All of the above devices are furnished for either 2- or 4-bolt system

NATIONAL SAFETY WINDOW DEVICE CO., INC.

62-64 West Washington Street
CHICAGO, ILL.

Products

WINDOW CLEANERS' SAFETY DEVICES.

Advantages of Royal Safety Devices

This company has spared no expense in designing and perfecting Royal window cleaners' safety devices, which have met with universal approval.

Royal devices afford absolute safety, are neat appearing, very easily installed, simple in operation and are made in a sufficient number of designs to meet all conditions of various types of sash and construction.

Solid steel sash can be equipped with Royal devices at such a surprisingly low cost that the latter is entirely eliminated by the saving afforded in future window cleaning and accident prevention.

Each design is stocked in large quantities for the convenience of those who have standardized them and to enable us to make deliveries on jobs on very short notice.

How Royal Safety Devices are Installed

Royal Bronze Anchor No. 1—Built into jamb or reveal of wall and set so as to engage seam back of second brick. It is unnecessary to cut brick. There is no left or right to this anchor. Installed at height to conform with local laws and regulations.

Royal Bronze Anchors No. 4A—Set at same height as No. 1. Bore one 7-16-in. hole through pulley stile, ream out hole to fit conical part of anchor, set anchor in place, attach plain and lock washer, turn nut up tight and batter end of bolt before placing the finish board. Let head of anchor incline toward glass.

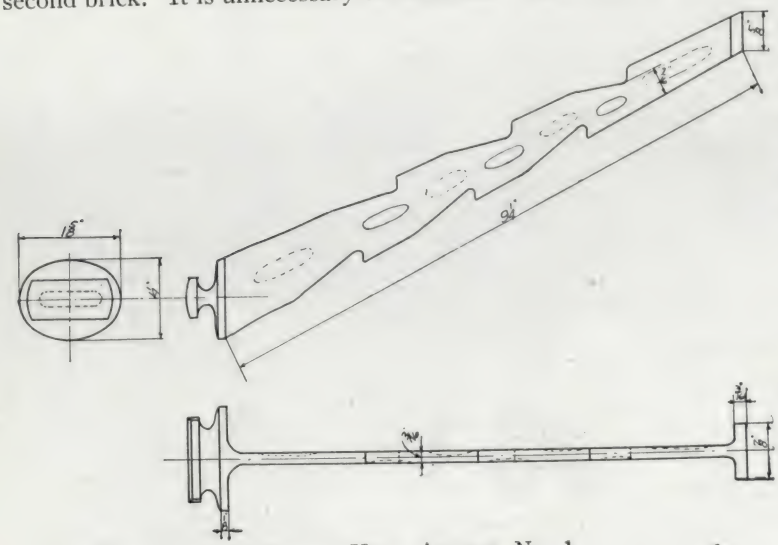
Royal Bronze Anchor No. 6—An especially designed anchor for setting in solid concrete columns. Wedged into a 1¼-in. hole bored into concrete form. After concrete sets, form can be removed over head of anchor without injuring board. Eliminates costly preparations for holding anchor in place while concrete is being poured. Set at same height as Nos. 1 and 4A.

Royal Twin Head Bronze Anchor No. 44—Designed especially for installing on wood mullions. Wherever practical, install one No. 44 instead of two No. 4A, thereby saving the expense of boring an extra hole.

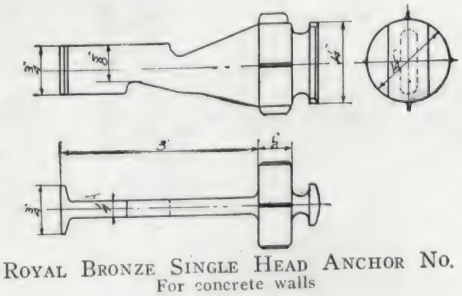
Official Approval

Royal safety devices have been approved in strength tests conducted by the Underwriters' Laboratories, Inc., and by building departments and insurance companies.

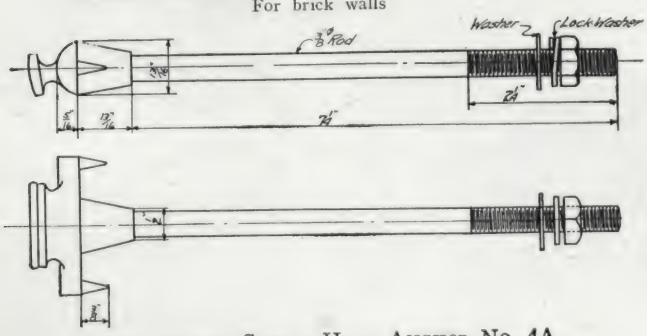
These strength tests showed that in order to break the terminal fixtures of anchor bolts or tear them from window frame or walls, they must be subjected to a load exceeding 2000 lbs., which is about five times as great as the load imposed when a window washer slips, under working conditions, and is caught by the belt.



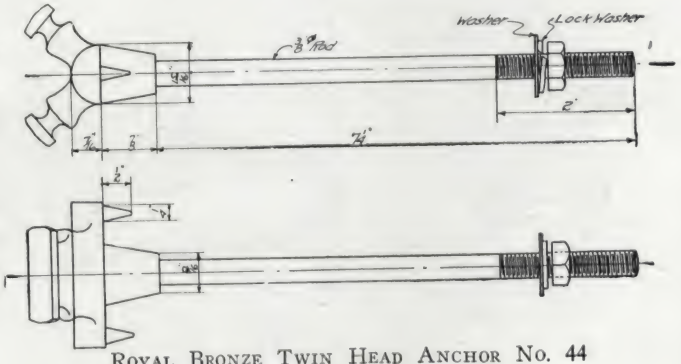
ROYAL BRONZE SINGLE HEAD ANCHOR No. 1
For brick walls



ROYAL BRONZE SINGLE HEAD ANCHOR No. 6
For concrete walls



ROYAL BRONZE SINGLE HEAD ANCHOR No. 4A
For wood sash and mullions



ROYAL BRONZE TWIN HEAD ANCHOR No. 44
For wood sash and mullions

THE DETROIT WORKS

Manufacturers of Sash Centers or Pivots and Iron Kick Plates

922 East Larned Street
DETROIT, MICH.

Products

Sole manufacturers of PATENT ROLLER FRICTION SASH CENTERS or PIVOTS.

Also Iron Kick Plates, rustproof finish, Casement Hangers and Adjusters.

Sash Centers or Pivots for General Use

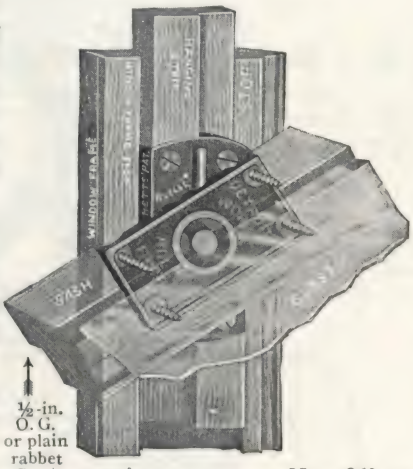
These patent roller friction sash centers or pivots are automatic and hold the window at any angle. Absolutely weatherproof.

For use on *double hung windows* with hanging stile allowing the window to slide up and down for ventilation, or reverse inside out for ventilating and permitting cleaning of both sides of window from the inside.

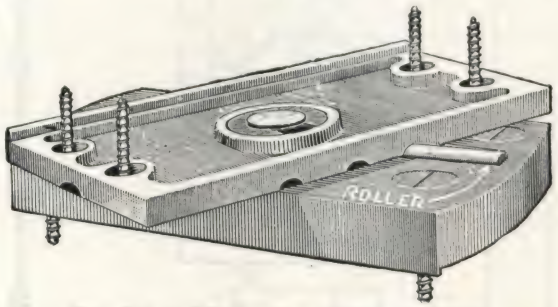
Also suitable for *single side hung sash* or *single top and bottom hung sash,* inside or outside transoms, holding them at any angle desired.

These centers are suitable for monitor sash or factory windows and can be operated by a cord from floor.

Nos. 860 to 866 — Especially suitable for double hung windows.



SHOWING APPLICATION OF NOS. 860 TO 866 ON DOUBLE HUNG SASH



NOS. 860 TO 866 SASH CENTERS OR PIVOTS

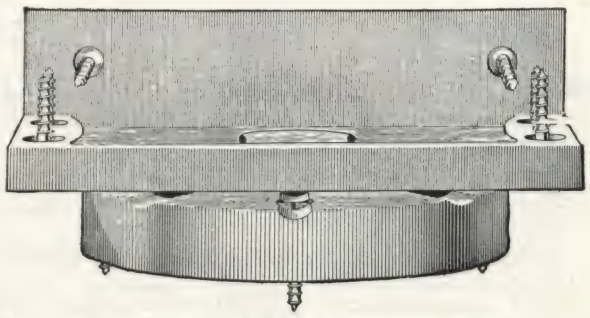
No.	860	861	862	863	864	865	866
Thickness of sash, in.	1⅜	1¾	2	2¼	2½	2¾	3
Material and finish	Iron, dead black						

NOTE—Prefix "C" to number indicates brass. No mortising necessary for spring or spring post. Specify if light spring is desired for small transom sash.

Directions for Installing Nos. 860 *to* 866—For double hung sash, screw sash center or pivot on sash and hanging stile. Fit sash with hanging stile attached to opening same as the ordinary sash. Have sash manufacturers apply centers or pivots to double hung sash.

For single sash, screw center or pivot to sash, slide sash in place and screw center to frame, reverse sash and plant stops on frame.

Nos. 960 to 965—Patent roller friction sash centers or pivots (shown at top of right hand column) are especially suitable for heavy outside or inside windows, top and bottom hung.



NOS. 960 TO 965 SASH CENTERS OR PIVOTS

No.	960	961	962	963	964	965
Thickness of sash, in.	1⅜ to 1½	1¾ to 1⅞	2 to 2⅛	2¼ to 2⅜	2½ to 2⅝	3
Material and finish	Iron, dead black					

NOTE—Prefix "C" to number indicates brass. No mortising necessary for spring or spring post.

Directions for Installing Nos. 960 *to* 965—Screw center or pivot on sash, slide sash into place, close sash and screw center to head and sill, reverse sash and plant stops on frame. Do not fail to apply drip strip to bottom of sash.

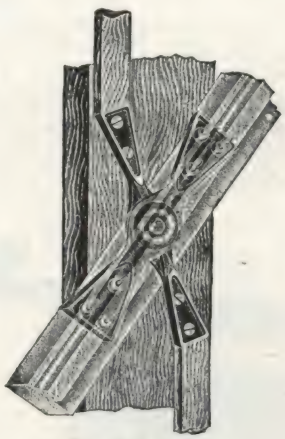
Sash Centers or Pivots for Factory Windows

For windows where operated in battery or single.

Directions for Installing Nos. 460 *to* 462—Screw sash center or pivot on sash and stand sash in frame, screw center to frame, swing sash open and put on stops ½x⅞ in.

Sash does not need rabbeting as with No. 560 type.

Directions for Installing Nos. 560 *to* 562—Screw center or pivot to stile and sash, then screw stile to window jamb and nail stops on each side of stile.



NOS. 460 TO 462

NOS. 560 TO 562

SASH CENTERS OR PIVOTS

No.	460	461	462
Thickness of sash, in.	1⅜	1¾	2¼
Material and finish—iron, dead black			

NOTE—Prefix "C" to number indicates brass.

No.	560	561	562
Thickness of cash, in.	1⅜ to 1½	1¾ to 2	2¼ to 2½
Material and finish—iron, dead black			

NOTE—Prefix "C" to number indicates brass.

Catalogue

Write for catalogue or details.

THE McCABE HANGER MFG. CO.

Sliding Door Hangers

425-427 West 25th Street
NEW YORK, N. Y.

Products

All types of SLIDING DOOR HANGERS, including:
ELEVATOR DOOR HANGERS.
PARLOR DOOR HANGERS.
ACCORDION DOOR HANGERS.
FOLDING DOOR HANGERS.
BARN DOOR HANGERS.
BRACKETS for Hangers.
Also manufacturers of Combination Floor Guide and Weatherstrips, Vertical Bar Elevator Door Locks, Overhead Carrying Devices, Expansion Bolts, etc.

No. 5 Elevator Door Hanger

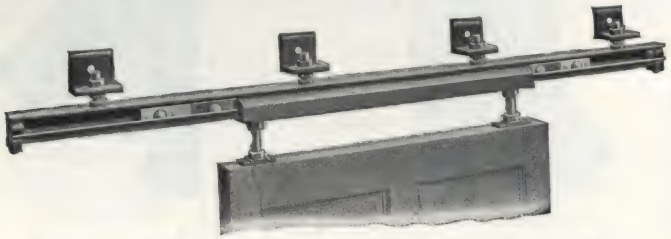
The track is a self-cleaning type, simple in construction, having three working parts, namely: hanger track, carriage track and ball retainer. It is made of No. 10 gage cold rolled steel, has a smooth rolling surface for the bearings and is of sufficient thickness and strength to insure long and efficient service.

The bearings consist of ¾-in. hardened steel balls. These balls are the largest size in any elevator door hangers. Balls are spaced 3-in. centers which gives 17 balls to a 3-ft. door. The balls, as noted on full size cross section, having only four points of contact, reduce the friction to a minimum, and easy running and quiet operation is the result.

The length of the hanger track is equal to the full travel of the doors. The carriage track is equal to the width of the door less the distance required for track stops. The ball retainer is three-fourths of the full travel of the door. There is no cantilever action, as the weight is always traveling on the balls. This ball retainer also acts as a cleaner in the track.

These hangers are suitable for doors weighing up to 300 lbs. On doors of heavier weight we supply track of heavier gage steel and 1-in. balls.

Doors may be adjusted laterally or vertically without difficulty.



DETAIL OF "McCABE NO. 5" ELEVATOR DOOR HANGER FOR SINGLE DOOR

Elevator door hangers and tracks can be furnished for three different types of arrangements of doors, namely: single door type; two-door type with doors sliding in opposite directions; and two-door type with doors sliding in the same direction.

How to Specify—Equip elevator doors with "McCabe No. 5" Elevator Door Hangers and "McCabe" Vertical Bar Locks.

McCabe "Blue Book"—This book on elevator door hangers sent on request.

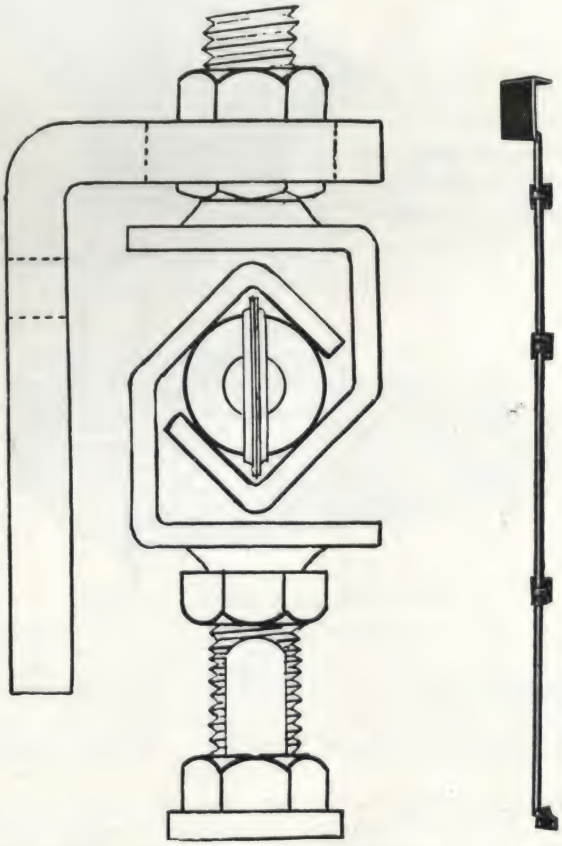
Single Bar Swing Device

Used for sliding swinging doors in connection with No. 5 single hanger where transom bar is stationary.

SINGLE BAR SWING

No. 5 Hanger for Single Door

This arrangement is the most simple and is such that the door can slide in either direction. Angle brackets are furnished with all hangers as illustrated.



CROSS SECTION OF "McCABE NO. 5" ELEVATOR DOOR HANGER FOR SINGLE DOOR
Scale, full size

BAR LOCK

McCabe Bar Lock

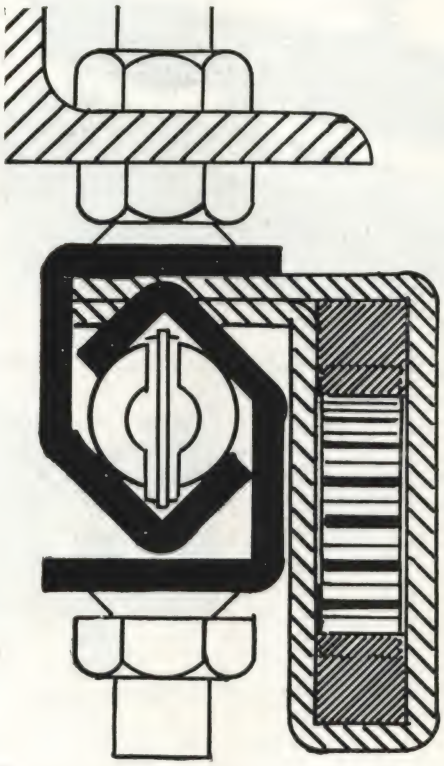
Spring type made from seamless steel tubing, black oxidized finish or any other specified.

Continued on next page

No. 5 Hanger with Two Doors Sliding in Opposite Directions

Both doors slide on a single track. A pinion and two racks are so arranged that when either door is opened or closed the other door automatically opens or closes.

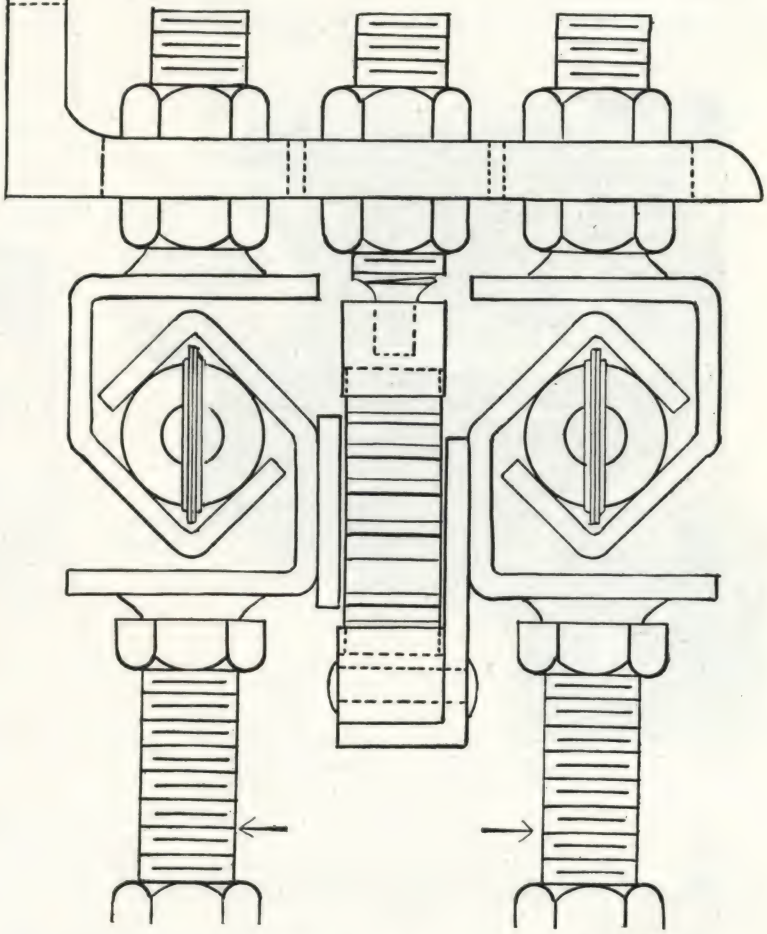
All the hangers are furnished with angle brackets as shown.



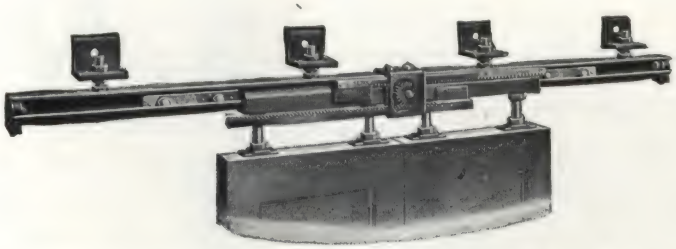
Cross Section of "McCabe No. 5" Elevator Door Hanger With Pinion and Rack Adjustment for Two Doors Sliding in Opposite Directions
Scale, full size

No. 5 Hanger with Two Doors Sliding in the Same Direction (Two-speed Type)

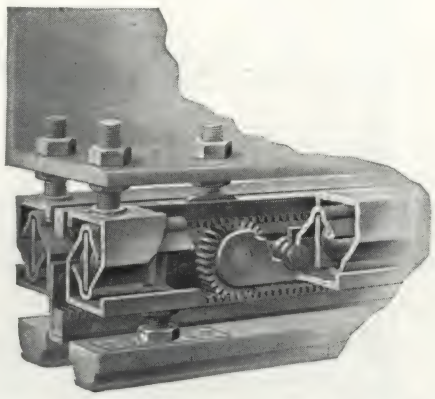
Two sets of tracks are required for this arrangement, each door sliding on a separate track. A pinion and two racks are so arranged that one door slides twice as fast as the other. Thus both doors reach the side jamb at the same time. Hangers are furnished with a 2x4-in. continuous angle for full travel of the doors, on which is mounted the rack and pinion operating device.



Cross Section of "McCabe No. 5" Elevator Door Hanger With Pinion and Rack Adjustment for Two Doors Sliding in the Same Direction
Scale, full size



Detail of "McCabe No. 5" Elevator Door Hanger With Two Doors Sliding in Opposite Directions
Showing pinion and rack adjustment



Detail of "McCabe No. 5" Elevator Door Hanger With Two Doors Sliding in the Same Direction
Showing pinion and rack adjustment

Continued on next page

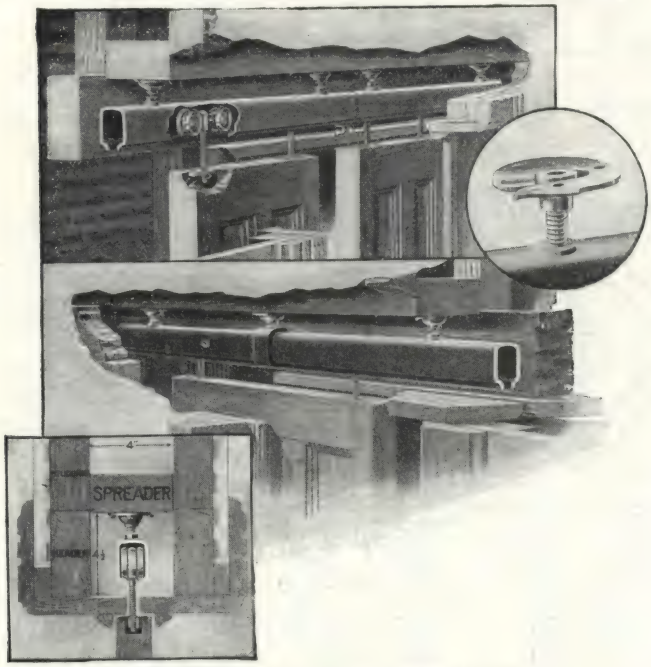
Parlor Door Hangers

"McCabe No. 10" is a simple, durable and noiseless device. Track is made of No. 13 gage cold drawn steel, and carriages have drop forged frames and ball bearing fiber wheels. Track and carriages are adjustable, so that any inequalities of spreader or door may be remedied.

The illustration shows method of installing. Headroom required, 4½ in.

"McCabe No. 10" parlor door hangers are for doors weighing from 300 to 400 lbs.

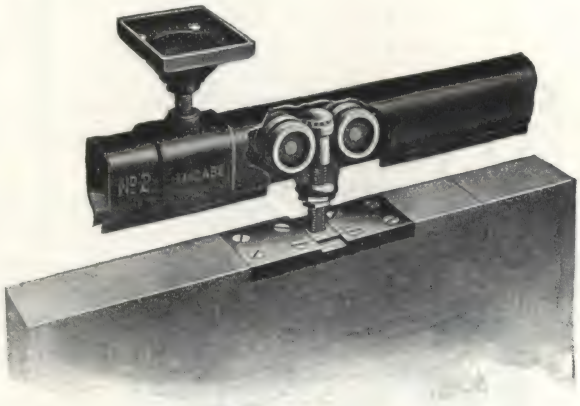
How to Specify—All interior sliding doors shall be hung with "McCabe No. 10" Parlor Door Hangers.



"McCabe No. 10" Parlor Door Hanger

Accordion and Folding Door Hangers for Accordion or Folding Partitions

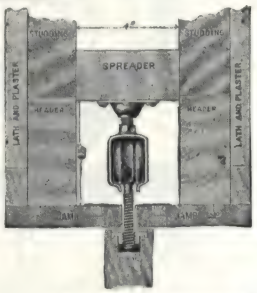
Track is made of No. 13 gage cold drawn steel, and swiveled carriages have drop forged frames and ball bearing wheels. One carriage only is used on each alternate door, placed in the exact center of the door as shown. If possible, doors should not exceed 3 ft. in width, or 100 lbs. in weight.



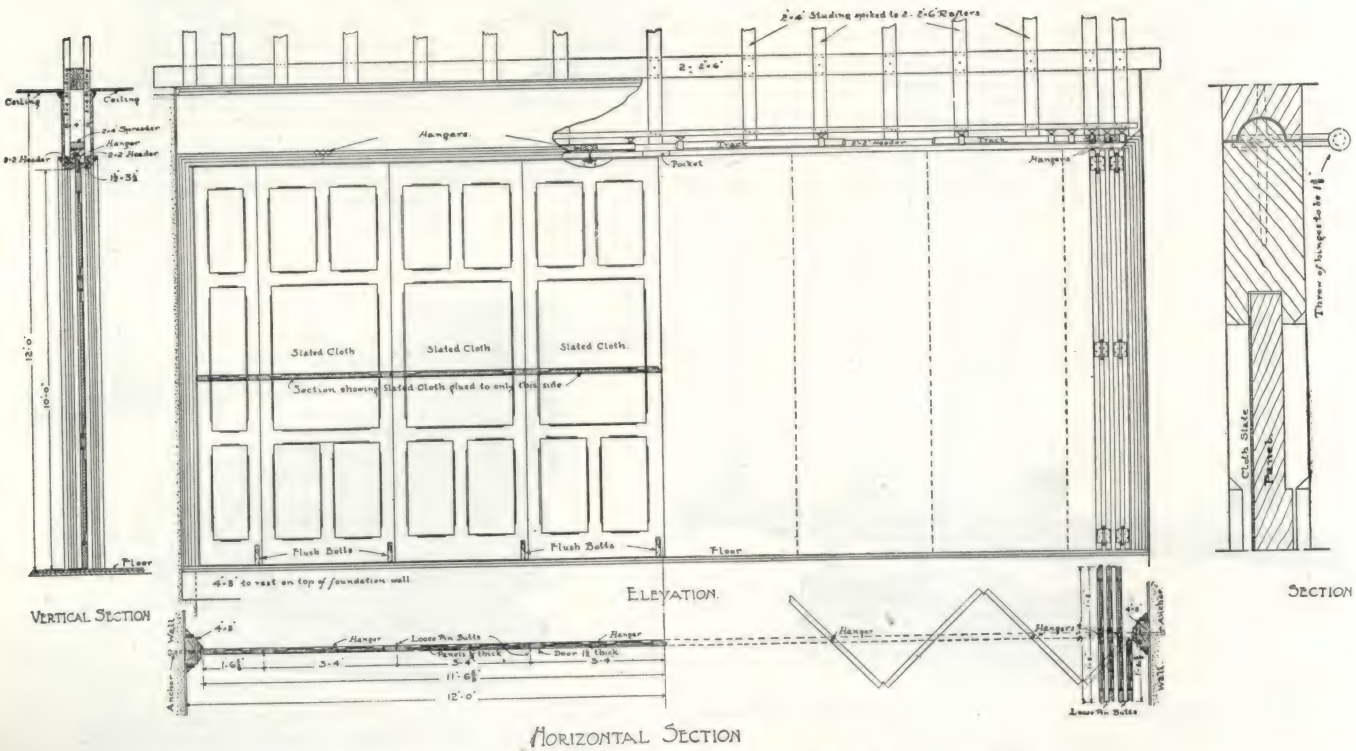
"McCabe" Accordion Door Hanger with No. 2 Track and No. 72 Carriage

HEADROOM REQUIRED FOR ACCORDION DOOR HANGERS

Carriage No.	Headroom, in.
71	4½
72	4½
73	6½



Section Through Head



Vertical Section

Elevation

Section

Horizontal Section

Standard Details of Accordion Doors as Hung With McCabe Hangers

Continued on next page

Any number of doors may be placed in an opening, commencing with a half door hinged to the jamb at either side, as per illustration. This half door must be exactly one-half the width of the full doors, less the throw of the hinge.

How to Specify—Folding doors and partitions shall be equipped with "McCabe" Accordion Door Hangers.

Note: For 1½-in. or 1⅜-in. doors, specify Track No. 1 and Carriage No. 71. For 1¾-in. doors, specify Track No. 2 and Carriage No. 72. For 2-in. to 2½-in. doors, specify Track No. 3 and Carriage No. 73.

McCabe Special Folding Door Hangers Nos. 402 and 405

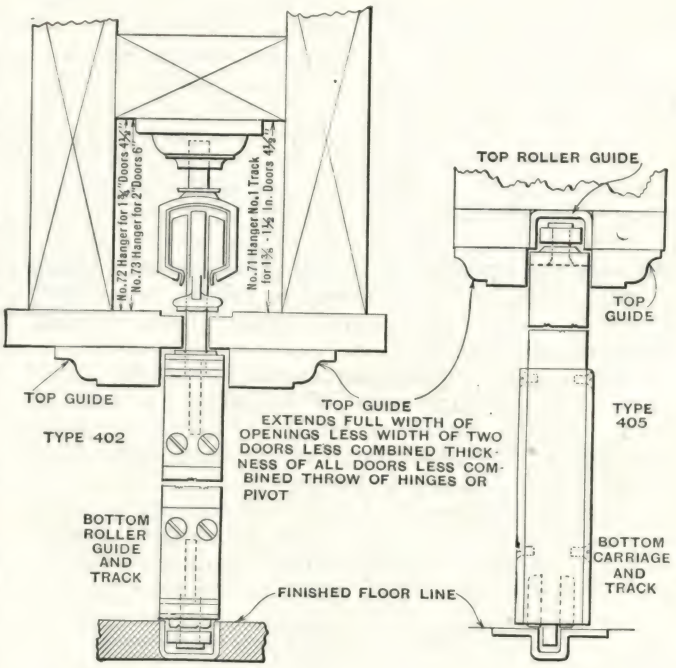
Type No. 402—Used on doors where the regular accordion hanger can not be used. On this type door the carriage is placed at the end of the door, instead of the center as in the accordion type. The accordion track is used at the top with the accordion carriage; the bottom of the door has a ball bearing guide which runs in special pressed steel channel in the floor.

The doors will fold back as noted on plan and elevation sketch at the bottom of the page. It will be noted that all the doors are hinged together, making the opening and closing of the partition much quicker for the reason that the operator stands at the jamb side of the opening where the doors fold up and is able from this position to open and close the doors, saving the extra walking back and forth across the opening.

Type No. 405—Used on doors the same as the No. 402 type with the exception that the doors roll on the floor and guide overhead. This type is used where overhead construction is not strong enough to carry doors.

See cross section for headroom on both types of hanger.

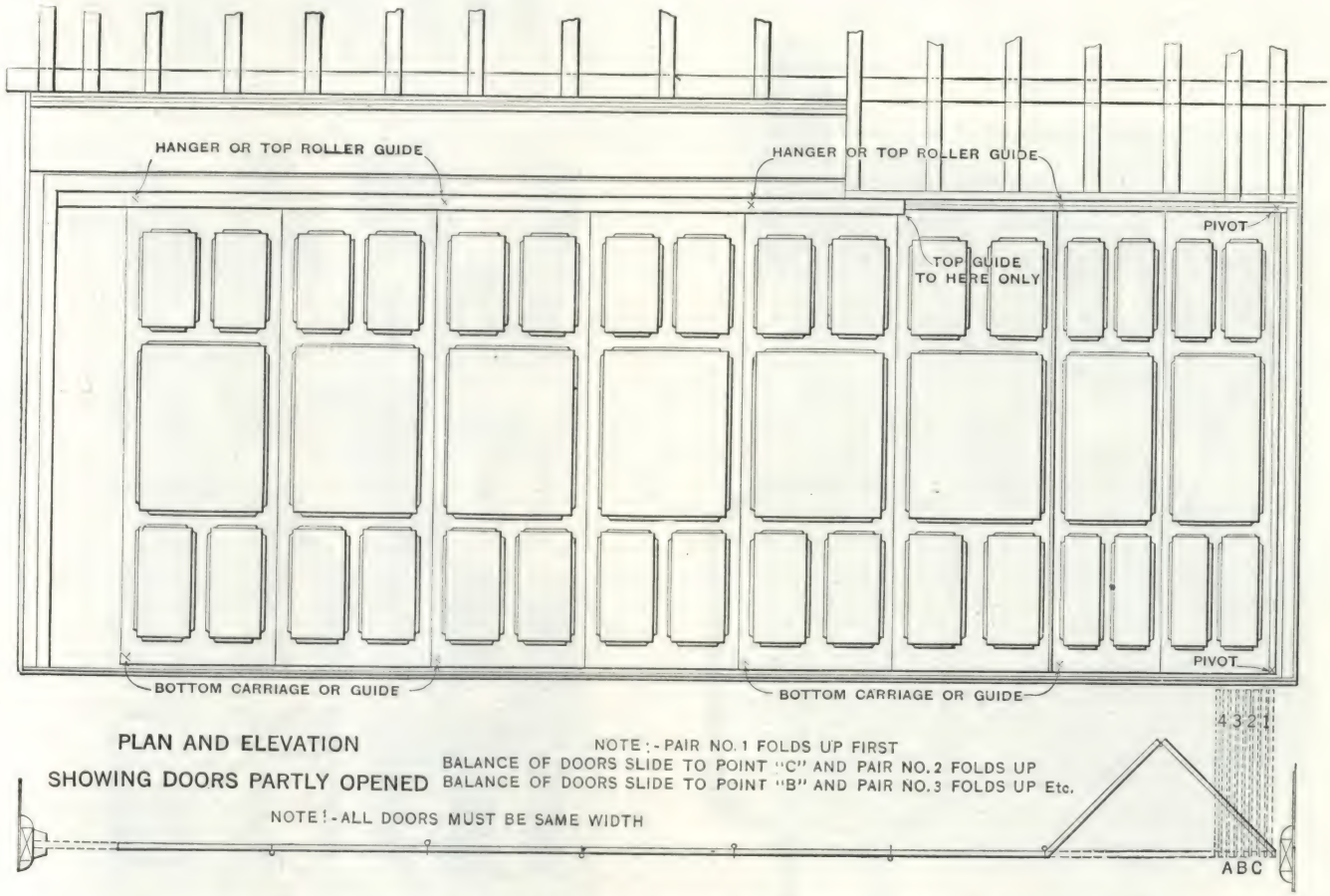
How to Specify—Folding partitions to be hung with McCabe No. 402 or McCabe No. 405 Special Folding Hangers.



Type No. 402
Weight of door carried at top. Doors guide at floor

Type No. 405
Weight of door carried on floor. Doors guide overhead

SECTIONS THROUGH MCCABE SPECIAL FOLDING DOOR HANGERS AND GUIDES



STANDARD DETAILS OF FOLDING DOORS AS HUNG WITH MCCABE SPECIAL FOLDING DOOR HANGERS

Continued on next page

Barn Door Hangers

The "McCabe" No. 20 barn door hangers with No. 2 track are suitable for doors weighing 300 lbs. or under. Brackets spaced 4 ft. apart. No. 18 malleable apron has adjustment of 1¾ to 2¼ in. (thickness of doors).

The "McCabe" No. 30 barn door hangers with No. 2 track are suitable for doors weighing 300 to 500 lbs. Brackets spaced 2 ft. apart. No. 19 malleable apron has adjustment of 2⅜ to 3 in. (thickness of doors).

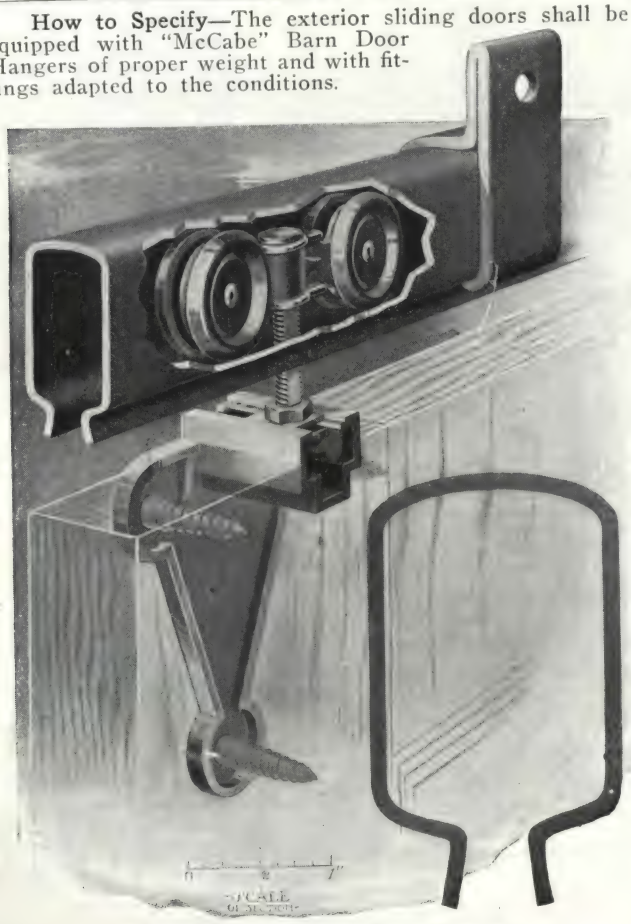
The "McCabe" No. 60 and No. 3 barn door hangers are the best hangers on the market for barns, garages, warehouses, piers, and like structures. Track is made of No. 12 gage cold drawn steel, and the carriages are equipped with ball bearing steel wheels, all parts thoroughly hardened to insure long wear. Apron No. 19 allows for both vertical and horizontal adjustments of the door.

No. 3 track, with brackets spaced every 2 ft., will carry doors weighing from 500 to 700 lbs.; and No. 4 track, similarly supported, will carry doors weighing from 800 to 1000 lbs. For heavier doors, use more brackets and double-tree carriages.

Door Weights—The following table may be used to determine the weights to the doors for the purpose of selecting a hanger of the proper strength. Use full thickness of door, regardless of paneling:

Material	Weight in pounds of each square foot of door for various thicknesses								
	1 in.	1½ in.	1¾ in.	2 in.	2¼ in.	2⅜ in.	2⅝ in.	3 in.	3½ in.
White pine	2.083	3.12	3.64	4.16	4.68	4.95	5.47	6.25	7.29
Oak and ash	4.000	6.00	7.00	8.00	9.00	9.50	10.50	12.00	14.00
Chestnut	3.417	5.13	6.03	6.83	7 69	8.12	8.97	10.25	11.96
Cypress	5.333	8.00	9.33	10.66	12.00	12.66	14.00	16.00	18.66
Whitewood	2.417	3.63	4.23	4.83	5.44	5.74	6.34	7.23	8.46

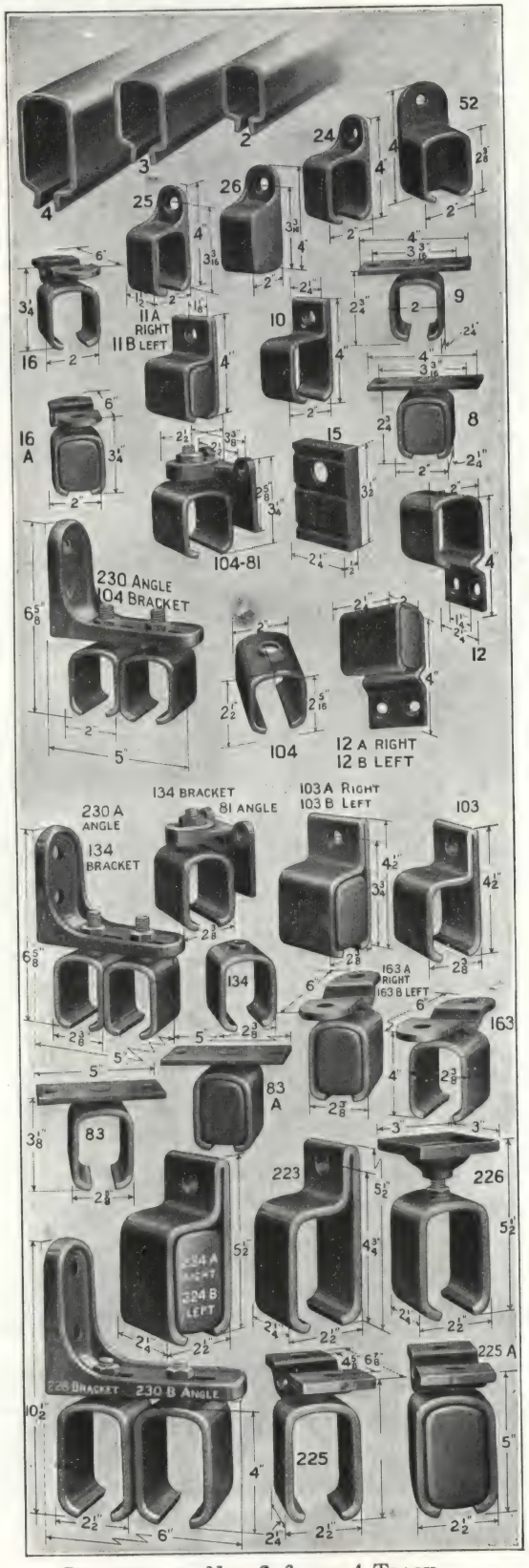
How to Specify—The exterior sliding doors shall be equipped with "McCabe" Barn Door Hangers of proper weight and with fittings adapted to the conditions.



"McCabe" No. 3 Barn Door Hanger

Brackets

The following illustration shows the various forms of brackets used for hanging track to the structural member of door opening. Fittings in upper half of illustration are for Nos. 20 and 30 hangers, No. 2 track; the 6 fittings at bottom are for No. 60 hangers, No. 4 track; and the remaining fittings are for No. 3 track.



Brackets for Nos. 2, 3 and 4 Track

ELEVATOR SUPPLIES COMPANY, INC.

SUCCESSOR TO ELEVATOR SUPPLY AND REPAIR CO. and BURDETT-ROWNTREE MFG. CO.

Manufacturers of Elevator Door Hangers, Closers and Locks

MAIN OFFICE AND WORKS

HOBOKEN, N. J.

BRANCH OFFICES

CHICAGO, ILL., 111 South Jefferson Street SAN FRANCISCO, CAL., 186 Fifth Street ST. LOUIS, MO., Railway Exchange Building
CLEVELAND, OHIO, 1039 Walnut Avenue PHILADELPHIA, PA., 1716 Ludlow Street

Product

ES ROLLER BEARING ELEVATOR DOOR HANGERS; NORTON ELEVATOR DOOR CLOSERS and POSITIVE ELECTRIC INTERLOCKS.

For Signals and other Accessories for Elevators, see page 1971.

ES
TRADE-MARK

ES Roller Bearing Elevator Door Hangers

The exclusive feature of the ES Roller Bearing Elevator Door Hanger, to which is largely due its superiority over other hangers, is the use of rollers instead of balls as a bearing medium.

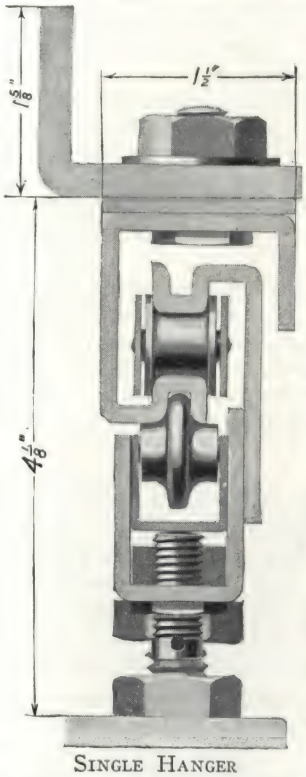
In its specific application to elevator door hangers, the roller bearing is more durable, silent and more nearly frictionless than the ball bearing.

As shown in the illustration, the door is directly suspended from a single track which is continuous over the full travel of the door. The advantage of the single track is that it allows the door to find its plumb, pendant position without friction or appreciable wear, even though the hanger itself is installed slightly out of plumb.

The tubular construction of the ES Roller Bearing Elevator Door Hanger protects it against entrance of dirt, and even though dust is introduced by air currents it can not find lodgment in the bearing members.

When specified in connection with doors that will also be equipped with Norton Elevator Door Closers, it is advisable to mention this fact when obtaining quotations.

When asking for prices give the width of each sliding section of the door; state whether they are single, center opening or two-speed and whether swinging devices are required.



SINGLE HANGER
Head room of 7 in. is required for installation of hangers

Information Required When Ordering Hangers

State actual width and thickness of doors, how much they lap at center and jamb, and whether they open to the right or left when looking from the inside of the car.

Mention whether the doors are steel, wood or kalamein, and also whether the hanger is to be attached to wood or steel so that the proper erection screws may be furnished.

Full size drawings and complete information furnished on request.

Norton Elevator Door Closer and Positive Electric Interlock

The Norton Elevator Door Closer is a device that automatically closes and locks the door and prevents all noise due to slamming. Its function is similar to the familiar door check that is used on swinging doors.

On each elevator is installed a car trip, by means of which the door at the first floor may be held open when the elevator is at rest there. When ready to start, the door is released by a foot button in the cab.

To make the operation of the elevator safe, the Positive Electric Interlock should be installed in conjunction with the Norton Elevator Door Closer.

The Positive Electric Interlock prevents the movement of the elevator if any door is open or unlocked.

In connection with all interlock installations an emergency release switch is provided in each elevator. This is enclosed in a "break glass" case, and its function is to permit the interlock to be temporarily disconnected in case of fire or other emergency.

When specifying Norton Door Closers, it is also advisable to specify ES Roller Bearing Hangers, as the combination of this equipment will insure absolutely quiet door operation.

NORTON ELEVATOR DOOR CLOSER AND POSITIVE ELECTRIC INTERLOCK

RELIANCE-GRANT ELEVATOR EQUIPMENT CORP.

Door Hangers and Bar Locks

TELEPHONE
VANDERBILT 0799

101 Park Avenue
NEW YORK, N. Y.

AGENCIES IN ALL LARGE CITIES

Products

RELIANCE and DIAMOND BALL BEARING DOOR HANGERS.
RELIANCE ELEVATOR DOOR LOCKS.
DIAMOND BAR LOCKS.
RELIANCE-GRANT ELEVATOR DOOR CONTROLLER.
R-G ELEVATOR DOOR CONTROLLER ACCESSORIES.
RELIANCE BALL BEARING DRAWER SLIDE.

For Rolling Partitions, see page 1090; for Pulleys and Window Cleaning Devices, see pages 1200-1201; for Revolving Window Fixtures, see page 1293.

Ball Bearing Door Hangers

The Reliance-Grant line of ball bearing door hangers (fully protected by patents) embraces practically every kind of ball bearing hanger required in moving doors by slide movement and especially for elevator doors. Made in two types—Reliance ball bearing door hangers and Diamond ball bearing door hangers—each of equally high grade material and construction, the only difference between the two types being in the slightly different principles of construction.

Reliance Ball Bearing Door Hangers—The principle of moving weights on steel balls running in grooved tracks is admittedly superior to other methods employed in door hanger construction. Reliance hangers have been on the market for 19 years, and in that time have built up a record of durability, ease of action, speed, and other essential door hanger requirements. See drawings Nos. 1 and 2 showing the various styles.

Construction—Reliance hangers are made either of drawn steel with rolled grooves (Style G) or of milled steel (other styles). In all cases there are at least two tracks of ball races, one at the top and one at the bottom with the balls fitted in between. These double races prevent any jumping or pounding of the doors. The hangers are made from special analysis steel, which is high carbon (very hard, strong and tough), compounded and rolled to our specifications. The grooves are milled—not rolled—and set to the proper gage by hand, so that the balls roll perfectly free, with no binding at any point. The balls are retained in their respective places by spacers best adapted for the purpose. The hangers are made to suit the weight of the doors and have a very large factor of safety.

Installation—Hangers should not be secured to brick, terra cotta or concrete with expansion bolts, but should have steel or wood backing. The details on the following pages show a few suggestions as to the best manner of securing a good installation job.

All doors should be *stopped* with rubber bumpers. The hanger should not act in this capacity as it is not made for this.

Finish—All hangers are painted black unless otherwise ordered.

Swing Device—The swing device shown for Style "C-A" hanger (Drawing No. 1) can be applied to any of our standard hangers either single- or two-speed.

Styles—Made in 7 general styles. See Drawings Nos. 1 and 2.

Style "G-G"—Drawn metal hanger for single doors. Designed for light grill doors, for bank work, etc.

Style "C-A"—Milled steel hanger for single doors 1¾ in. thick, weighing up to 200 lbs.

Style "D"—Milled steel hanger for single doors 1 to 1½ in. thick.

Style "D-A"—Milled steel hanger for single doors. For doors 1⅝ in. or over in thickness and from 200 to 500 lbs. Doors are supported by hanger bolt and thin steel apron.

Style "H"—For center closing doors 1 to 1½ in. thick, up to 200 lbs.

Style "L"—Two-speed hanger for doors 1¼ in. thick, weighing not over 150 lbs. each.

Style "K-A"—Two-speed hanger for doors 1¼ to 1⅜ in. thick, weighing 150 lbs. each.

Diamond Ball Bearing Door Hangers—For elevator enclosure doors; also for house, barn, fire or other doors where strong, durable, smooth running hangers are required.

Construction—The Diamond hanger is simple in construction, consisting of a tubular track, grooved bar, with balls placed equal distances apart, assembled and held in place in such a manner that there are no weak parts to wear out or get out of order. The best materials and workmanship are employed in the manufacture of this hanger.

It requires little space, is easily installed, and quickly adjusted. The balls, when in place, hold the carrying bar without any lost motion.

The balls, enclosed in a tubular course, turning on their tangent points, the tracks at an angle of 45°, make it impossible for dirt or dust to lodge in the hanger.

Styles—Diamond hangers are made in 4 general styles. (See Drawing No. 3 for details and dimensions.)

Style No. 2—For single doors up to 200 lbs. in weight.

Style No. 3—For center closing doors up to 200 lbs. each in weight.

Style No. 4—Two-speed hanger for doors weighing not more than 150 lbs. and operated by hand.

Style No. 5—Two-speed hanger; similar to No. 4 except that it is made for use with self-closing devices.

Ordering Hangers

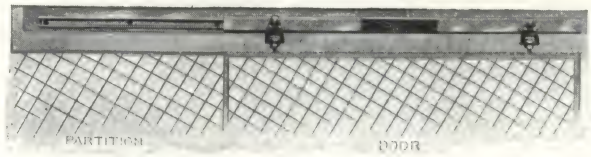
In ordering state actual width of door (not the opening), thickness and approximate weight, whether of wood, iron, or kalamein, as knees or plates for connecting to wood or kalamein doors are furnished.

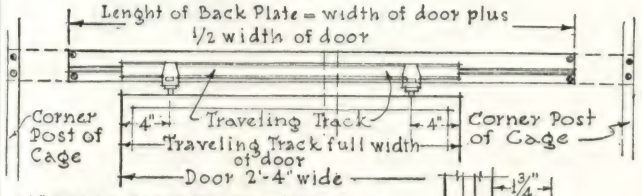
If double-speed hangers are desired, state which way doors close, looking from inside of elevator car. If opening device is to be used, give name of manufacturer.

Elevator Door Controller Accessories

Attention is called to Drawing No. 2, where several door holding, unlocking and safety devices are described and illustrated.

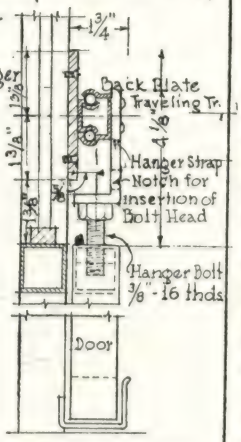
Continued on next page





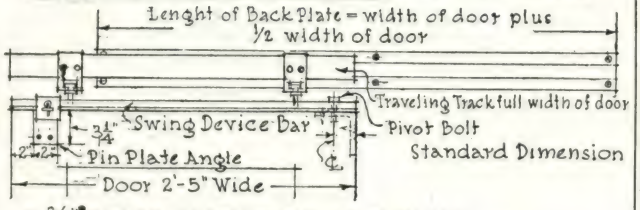
3/4" SCALE ELEVATION OF HANGER

For heavier door use style "G-G" Hanger
Hanger Bolts 20" on center
This Hanger designed for light grille doors, for bank work, etc.
Hanger may be pitched to be self closing.
When ordering direction of closing must be known
At small extra cost, the Back Plate of Hanger can be extended to corner posts of cage, as shown by dotted lines
A drawn metal Hanger of heavy material is also made.



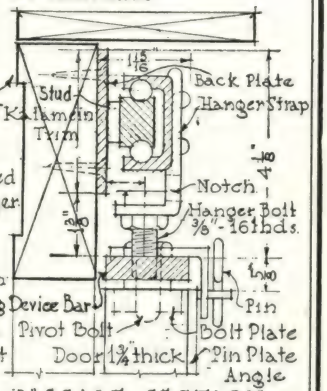
3" SCALE SECTION

STYLE "G" HANGER FOR GRILLES



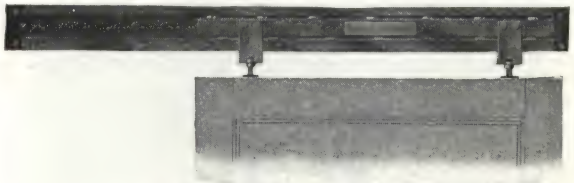
3/4" SCALE ELEVATION OF HANGER

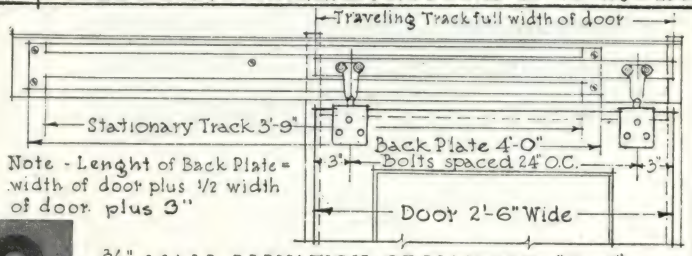
This Hanger suitable for doors up to 200 lbs in weight
Omit Pivot Bolt Plate on Hollow Metal Doors. Reinforce and tap doors for Pivot Bolt
Swing Device can be applied to any Reliance standard hanger
Provide drop bolt at bottom of door under Pivot Bolt, to prevent door from tilting when swung into hall.
Back Plate to be secured to support for entire lenght



3" SCALE SECTION

STYLE "C" & "C-A" HANGERS FOR DOORS UP TO 200 LBS.





Note - Lenght of Back Plate = width of door plus 1/2 width of door plus 3"

3/4" SCALE ELEVATION OF HANGER "D-A"
SPACING SIMILAR FOR BOLTS WITH HANGER "D."

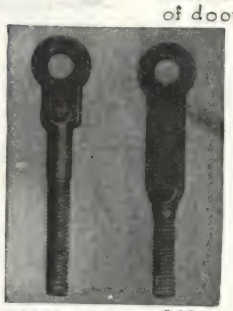
NOTE - Details shown on this sheet are for average conditions but hangers can be made to suit any conditions.

Style "D" Hanger suitable for doors 1" to 1 1/2" thick.

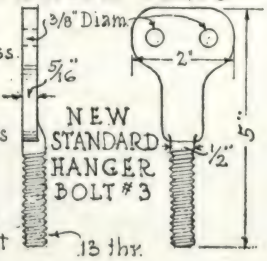
Style "D-A" shows use of bolts instead of hanger-strap, for connection to door. It also illustrates Thin Steel Apron for application to wood or kalamein doors. With this form of connection the door may be 1 5/8" or more in thickness.

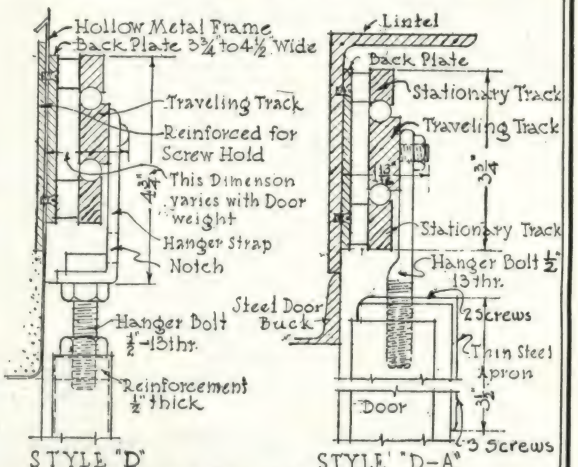
Hanger illustrated is for doors up to 200 lbs. in weight. For doors 200 up to 500 lbs, 1/2" to 3/4" more headroom is required

Style "D" Hanger suitable for doors 1" to 1 1/2" thick with straps to connect to top of door.



#113 #112 HANGER BOLTS





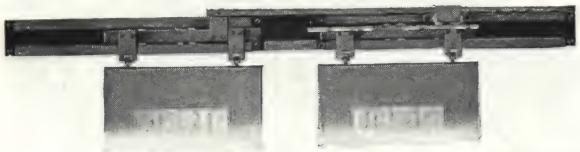
STYLE "D" STYLE "D-A"

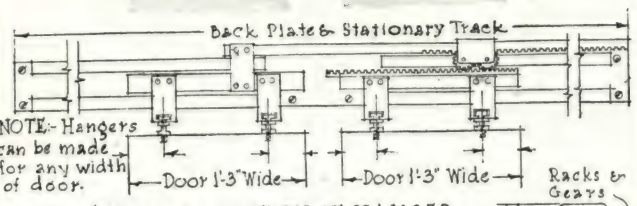
3" SCALE SECTIONS

STYLE "D" & "D-A" HANGERS FOR DOORS FROM 200 TO 500 LBS.

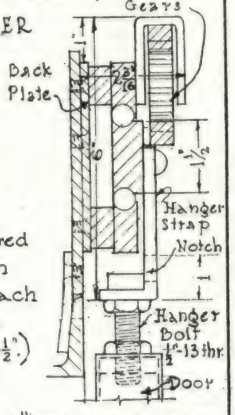
DRAWN BY SWEETS CATALOGUE SERVICE, INC.	RELIANCE BALL BEARING HANGERS	SCALE 3/4" & 3" EQUALS 1'-0" DATE JUNE 20	DRWG. 1

Continued on next page





3/4" SCALE ELEVATION OF HANGER



3" SCALE SECTION

This Hanger has double-gear opening device for moving two doors in opposite directions at the same time

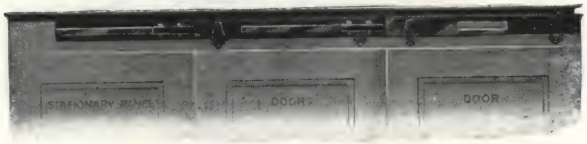
"H" Hanger is always made with gear on right hand side (facing door from car) unless otherwise ordered

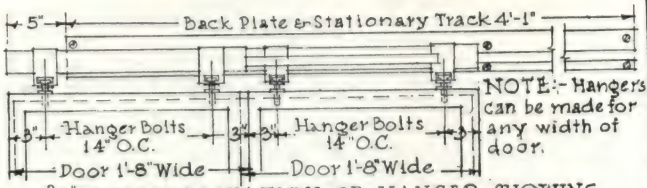
Can be used on doors 1" to 1½" in thickness weighing up to 200 lbs each

For heavier doors, increase the head-room & Depth of Back Plate (4" to 5½".)

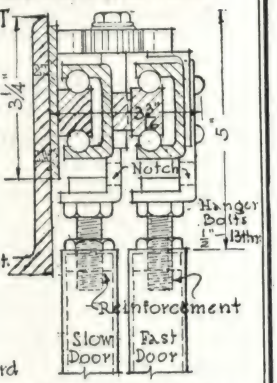
This Hanger can be furnished, if desired without racks and gears for parlor doors.

CENTER-CLOSING HANGER "H" FOR DOORS UP TO 200 LBS





3/4" SCALE ELEVATION OF HANGER SHOWING DOORS CLOSING TO THE LEFT



3" SCALE SECTION

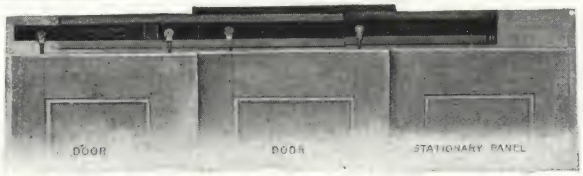
A "Two-Speed" Hanger is used for moving doors in same direction, one travelling at double the speed of the other

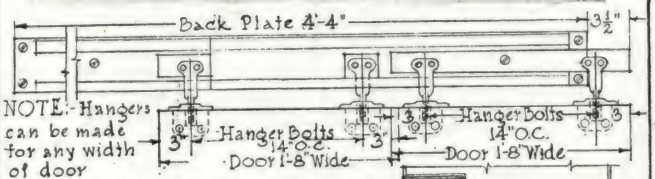
This Hanger can be used for doors 1¼" thick, and weighing not more than 150 lbs. each. Back plate size varies with weight.

Doors shown are Hollow Steel with reinforcement which should be at least ½" thick, to engage at least 6 threads of bolt, U.S. Standard bolt, 13 thread, is usual

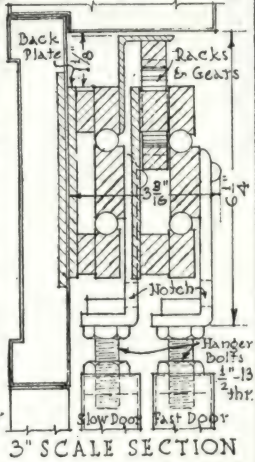
For thicker doors use hanger "L-A".

TWO SPEED HANGER "L" FOR DOORS UP TO 150 LBS.





3/4" SCALE ELEVATION OF HANGER SHOWING DOORS CLOSING TO RIGHT



3" SCALE SECTION

This Hanger is suitable for doors 1¼" to 1½" thick & weighing up to 150 lbs each. Depth of back plate 4" to 5" and varies with weight of door.

About 3/4" is required between top of door and bottom of lower track where hanger bolts are used; and about 2" when hanger straps are used

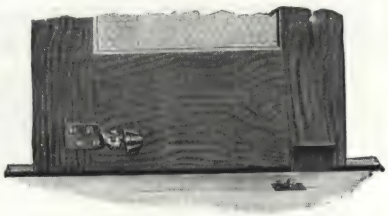
Hanger also used with self-closing device but Gears are eliminated.

Hangers can be made for any width of door.

For thicker doors use hanger "K-B"

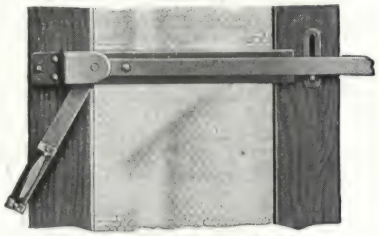
TWO SPEED HANGER "K-A" FOR DOORS UP TO 150 LBS

The door-holder automatically engages the door when fully open, & holds it until released by pressure on the foot button, or until it is automatically released, as the car leaves the platform.



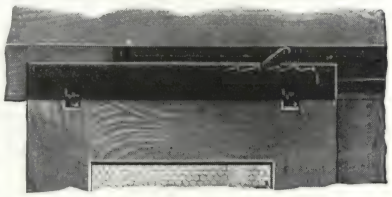
DOOR HOLDING DEVICE

Used in connection with any controller for unlocking door from hall side. The tapered key is inserted underneath the arm raising same from dead center thus permitting opening of the door.



UNLOCKING DEVICE

This device is useful where no electric switch is installed and is designed to prevent re-opening of door while the door is in the act of closing, and after car has left the landing.

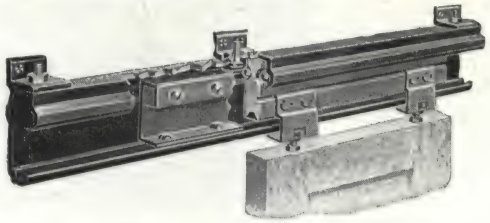


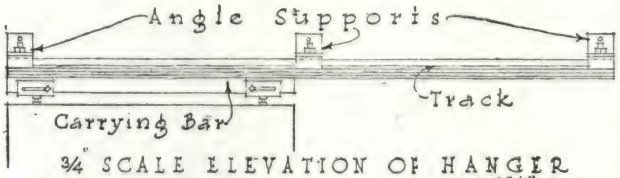
SAFETY DEVICE.

R-G ELEVATOR DOOR CONTROLLER ACCESSORIES

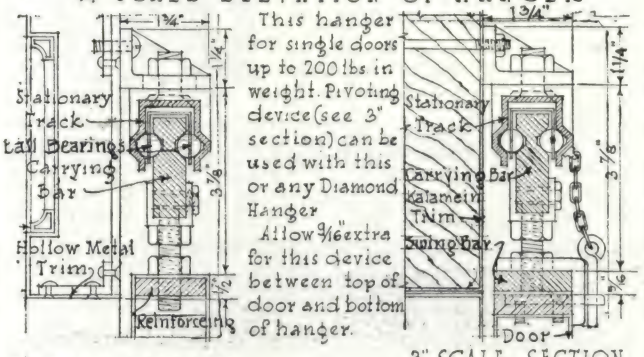
DRAWN BY SWEETS CATALOGUE SERVICE, INC.	RELIANCE BALL BEARING DOUBLE & SINGLE TWO SPEED HANGERS	SCALE 3/4" & 3" EQUALS 1'-0" DATE JULY 20 DRWG 2

Continued on next page





3/4" SCALE ELEVATION OF HANGER



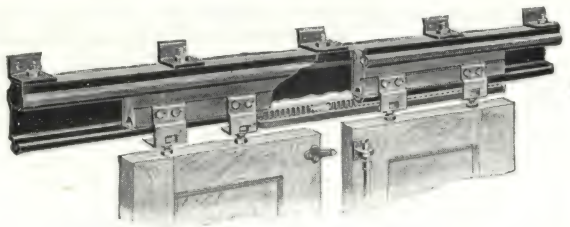
This hanger for single doors up to 200 lbs in weight. Pivoting device (see 3" section) can be used with this or any Diamond Hanger

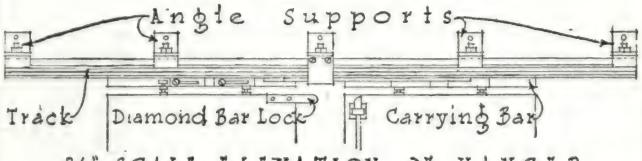
Allow 3/16" extra for this device between top of door and bottom of hanger.

3" SCALE SECTION

3" SCALE SECTION WITH PIVOTING DEVICE

No 2 SINGLE HANGER FOR 200 LB. DOORS



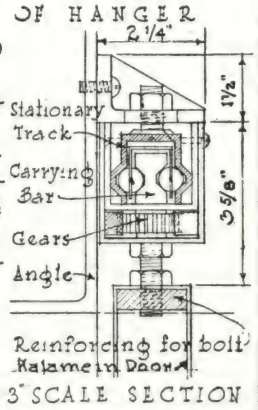


3/4" SCALE ELEVATION OF HANGER

This Hanger for doors up to 200 lbs. in weight A similar hanger is made of heavier material for heavier doors

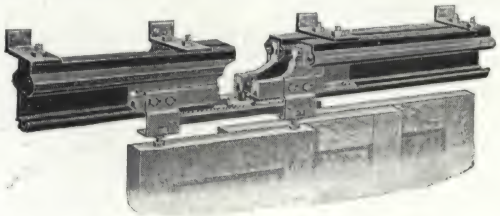
Tubular track extends entire travel of both doors, with balls evenly distributed over width of each door. Sliding bars are connected with a compensating gear for moving the two doors in opposite directions at the same time.

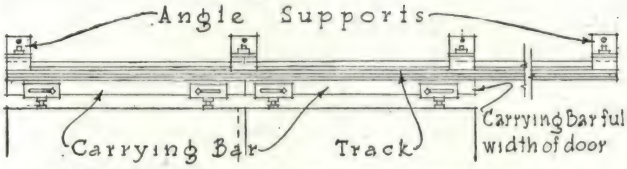
This hanger requires less space than any other double hanger.



3" SCALE SECTION

No 3-DOUBLE HANGER, FOR CENTER-CLOSING DOORS





3/4" SCALE ELEVATION OF HANGER

Door Laps may vary

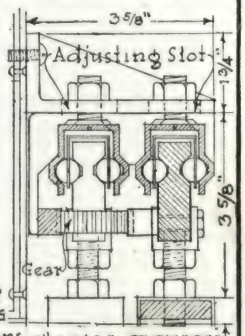
See Reliance Hanger Type "L", Drawing No 2 for definition of Two Speed Hanger

This Hanger is for doors operated by hand and weighing not more than 150 lbs. each.

The illustration shows two doors and stationary panel; the doors opening to the left.

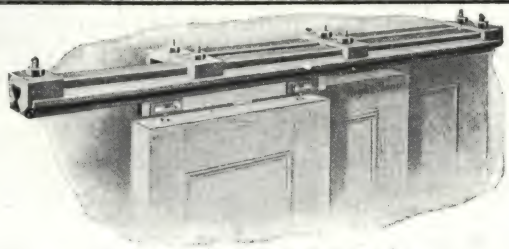
NOTE:-

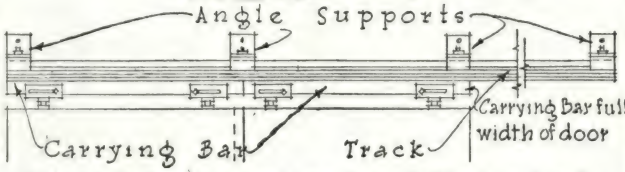
Details shown on this drawing are for average conditions but hangers can be made to suit any conditions



3" SCALE SECTION

No 4 TWO SPEED HANGER FOR DOORS OPERATED BY HAND



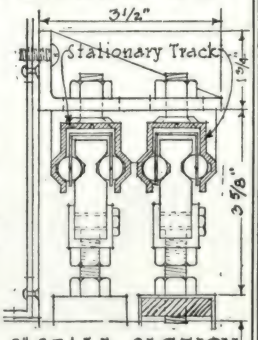


3/4" SCALE ELEVATION OF HANGER

This Hanger is similar to No 4 except that it is made for use with self closing devices that control the movement of the doors without use of rack and pinion.

Heavier types of both No 4 & No 5 are made if desired for heavier doors.

NOTE:-Details shown are for average conditions. Hangers may be made to suit any condition



3" SCALE SECTION

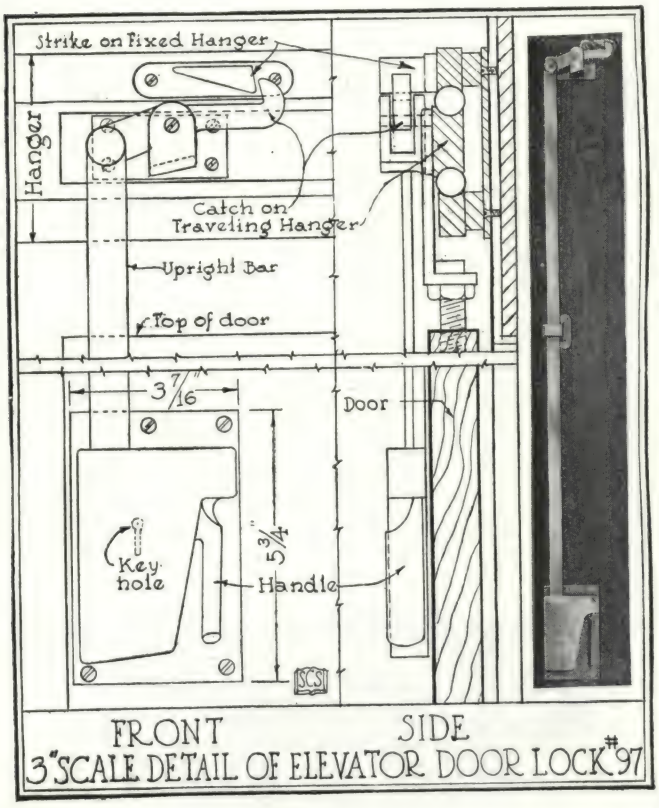
No 5 - TWO SPEED HANGER FOR SELF CLOSING DEVICES

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DIAMOND DOOR HANGERS	SCALE 3/4 & 3" EQUALS 1'-0" DATE-JULY-20	DRWG 3

Continued on next page

Reliance Lock No. 97

Does not require a spring of any kind. A slight pressure on the handle causes the upright bar to lift and unlock, and the same motion naturally opens the door. When the pressure is removed the bar drops of its own weight. Can be placed on the front or rear stile of the door. Requires only 1 in. from face of door. Finish of statuary bronze or black oxidized. Can be unlocked from hall side with key.



Bar Lock

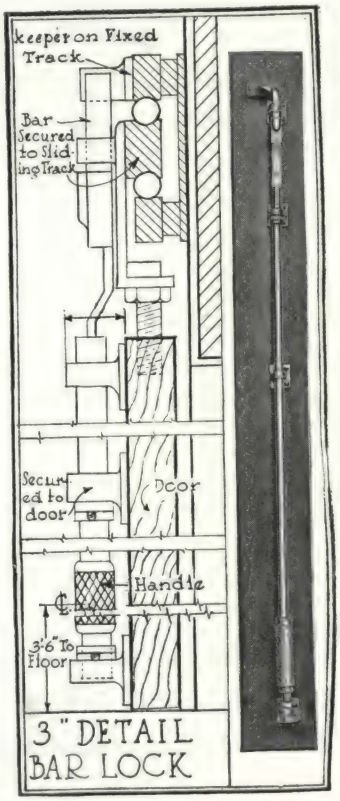
Made of steel tubing and has knurled handle with a spring concealed therein.

The lock is made of the proper length to bring the center of the handle 3 ft. 6 in. from the floor.

Can be furnished with brackets to bring the center of the lock ¾ or 1 in. from the face of the door and will require either 1⅜ or 1⅝ in. from the door.

Finished black oxidized unless ordered in statuary bronze.

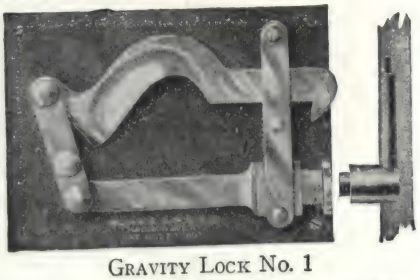
One key device is furnished to each shaft for unlocking from the hall side.



Reliance Gravity Door Locks

Gravity Lock No. 1—Illustration shows door open and right-hand lock. Back plate, 6½x 4½ in. Thickness of lock, ⅞ in.

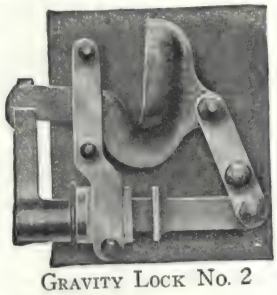
Finished black oxidized only. Arranged to unlock with key from hall.



Gravity Lock No. 1

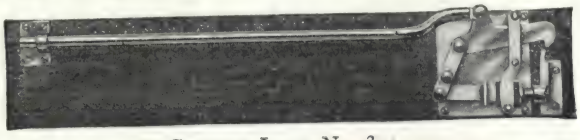
Gravity Lock No. 2—Illustration shows door closed and left-hand lock. Back plate 4½x5½ in. Thickness of lock ⅞ in.

Finished black oxidized only. Arranged to unlock with key from hall.



Gravity Lock No. 2

Gravity Lock No. 3—Has extension rod across door. Back plate 4½x5 in. Thickness of lock, 1¼ in. Can be furnished with flat bar handle in place of rod, making thickness ⅞ in. Arranged to unlock with key from hall.



Gravity Lock No. 3

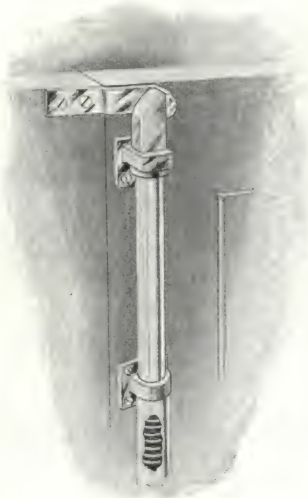
Cup Escutcheon with Handle—Can be furnished with gravity lock No. 2 for use on push button elevator doors, so the lock can be operated from both sides.

No. 1 black oxidized only. No. 2, polished brass.

Cup Escutcheon No. 1

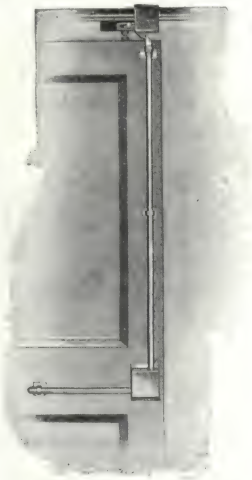
Diamond Bar Locks

The very best workmanship and material obtainable are used in the manufacture of these bar locks, which have proved their efficiency through service under various and exacting conditions.



Diamond Bar Lock No. 2

Drop lock applied to doors opening in opposite directions



Diamond Bar Lock No. 4

With cross bar to be used where vertical lock is out of reach of operator

Continued on next page

Reliance-Grant Elevator Door Controller

A practical and effective device for the prevention of accidents in connection with elevator service.

Frequent accidents of the most serious nature have created the necessity for perfect safety appliances on all doors leading to elevators.

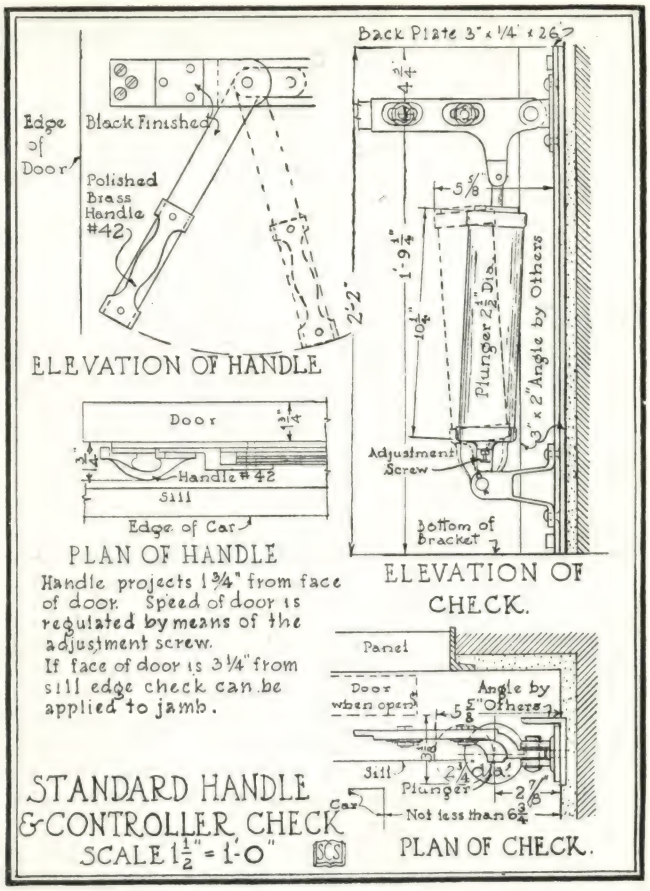
To fill this requirement this company has perfected and is offering the device shown. It is thoroughly efficient, reliable and a positive safeguard.

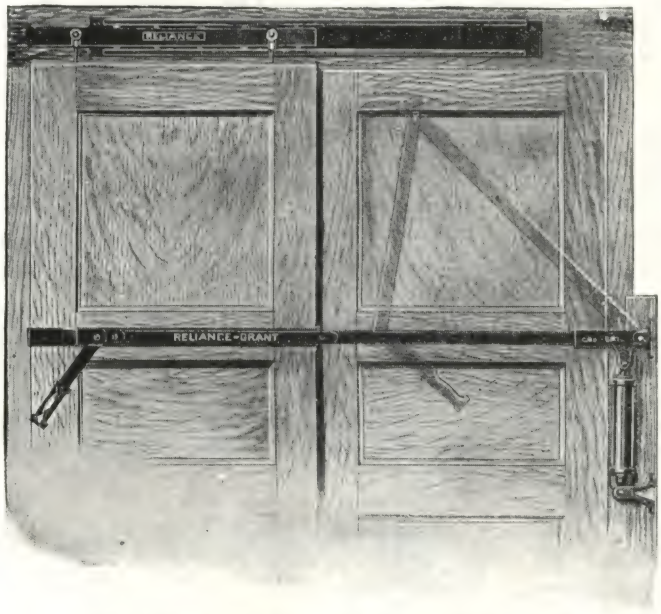
When released, the action of the doors is rapid until within a few inches of the closing point. The liquid checking device then takes control, checks the rapid movement, and brings the doors to a noiseless, slamless stop.

These elevator door controllers can be manufactured to meet almost any conditions.

They are made for single, center closing, two-speed, and combination slide and swing doors.

For holding, unlocking and safety devices, see page 1214.



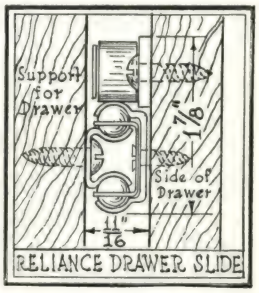


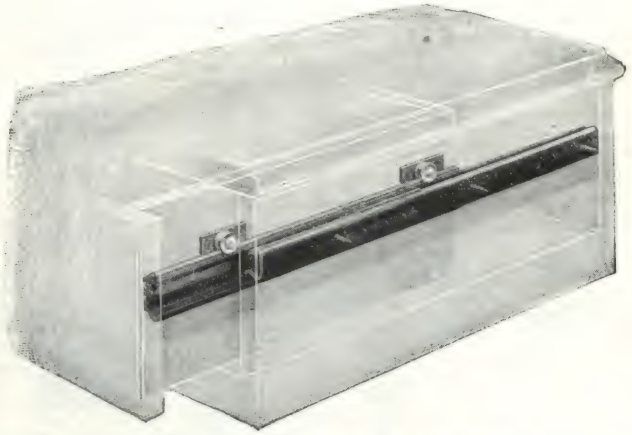
RELIANCE-GRANT ELEVATOR DOOR CONTROLLER FOR SINGLE DOOR

RELIANCE-GRANT ELEVATOR DOOR CONTROLLER FOR DOUBLE-SPEED DOORS

Reliance Ball Bearing Drawer Slide

This slide is designed for use in connection with built-in linen drawers, cedar drawers, etc., which contribute so much to convenience in the modern residence. It is also especially suitable for banks, libraries, hospitals and other large institutions. The illustration clearly shows the device in relation to the drawer. It is very easily installed. The slide will not only operate with ease (at the slightest pull of the finger) irrespective of the weight of the drawer or its contents, but will also permit the drawer to pull out all the way—its entire depth.





RELIANCE BALL BEARING DRAWER SLIDE

WAGNER MANUFACTURING COMPANY

Door Hangers and Hardware Specialties

CEDAR FALLS, IOWA

SALES AGENCIES IN ALL LARGE CITIES

Products

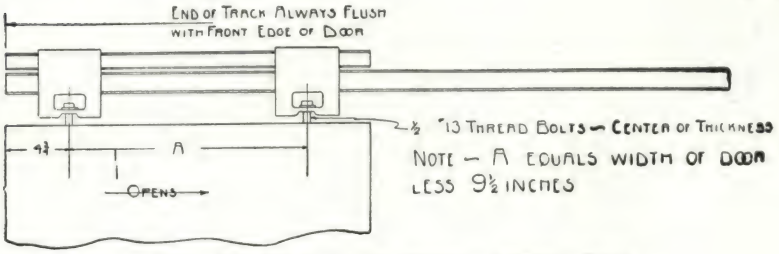
BALL BEARING ELEVATOR DOOR HANGERS.
BAR LOCKS for Sliding Elevator Doors.
GARAGE DOOR HARDWARE.
Also manufacturers of Door Hangers and Track for Sliding Doors; Overhead Carrier Systems; and Fire Door Fixtures.

Wagner Ball Bearing Elevator Door Hangers

Track is formed of 2 channels riveted together, with $\frac{3}{16}$-in. spacers between. Hanger bar has spacer rolled in channels. Ball races are ground after riveting, insuring a true and perfectly straight race. $\frac{5}{8}$-in. balls, four point bearings, are held in properly spaced position by a floating retainer bar. Points of contact always positive even after years of service.

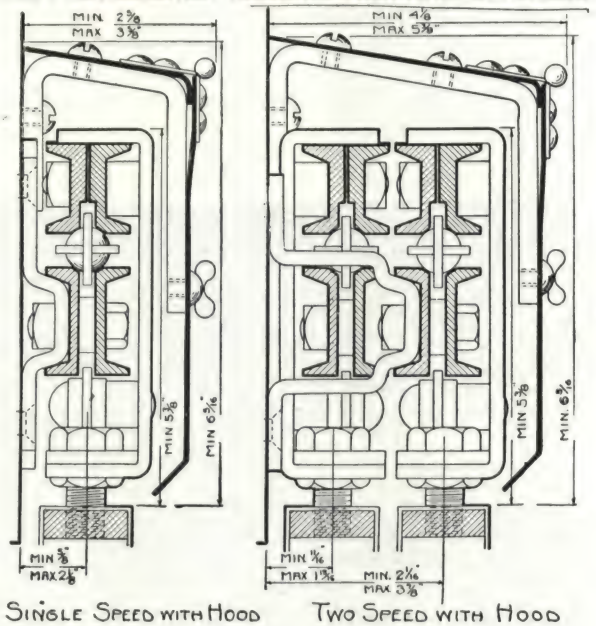
Track extends full travel of door. Hanger bar has bearing on balls its full length of travel. Guide rollers below track prevent door raising or jumping.

Pendant bolts adjustable vertically for raising or lowering door without removing from hanger and adjustable laterally for plumbing doors; slabbed bolts make it impossible for doors to become disengaged from hanger and drop in shaft.



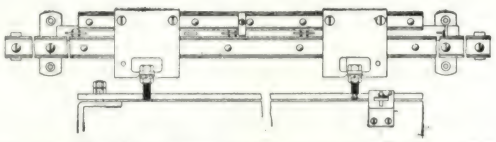
TYPE 100 HANGER FOR SINGLE SLIDING DOOR

NOTE — ILLUSTRATING USE OF HINGED HOODS TO PROTECT HANGERS FROM DUST, PARTICLES OF PLASTER, LINT, ETC. HOODS MADE TO FIT ANY CONDITION.
DIMENSIONS SHOWN AS APPLIED TO STANDARD LINE OF HANGERS — HANGERS CAN BE FURNISHED TO MEET ANY CONDITION RESULTING FROM HATCH-WAY OR DOORS.



SINGLE SPEED WITH HOOD TWO SPEED WITH HOOD

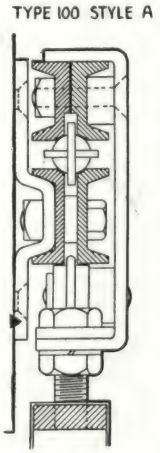
HINGED HOODS FOR PROTECTING HANGERS
Furnished extra, not as part of hangers



TYPE 100 HANGER—SINGLE SLIDING DOOR WITH PIVOTING DEVICE

Type 100 for Single Sliding Doors—For doors weighing up to 200 lbs. Length of track is twice width of door, minus back lap. Length of hanger bar same as width of door. Headroom required is 5⅜-in. with pendant bolt adjusting up to 6 in. Brackets on track vary to meet requirements; wall to center line of track, ⅞, $1\frac{1}{16}$, 1¼, 1¾-in.

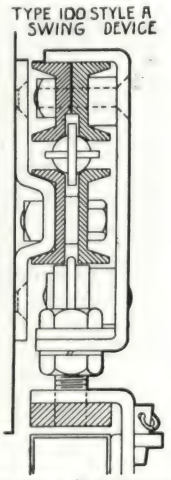
Type 103 for Single Sliding Doors—For doors weighing from 200 to 400 lbs. Similar to Type 100.



SECTION THROUGH TYPE 100

Single Sliding Door Type with Pivoting Device—To secure full opening, Type 100 can be used with pivoting device as illustrated above for sliding door, and hinged panel. Plain pivot pin, or pivot pin riveted in angle to be built into door, furnished as requested. Headroom same as for Type 100. Order as Type 100 or Type 103 with pivoting device.

When swing transom bar is used to obtain full opening, the track, transom bar, sliding door and hinged door all swing out as one unit and do not require pivoting device.



SECTION THROUGH TYPE 100 WITH PIVOTING DEVICE

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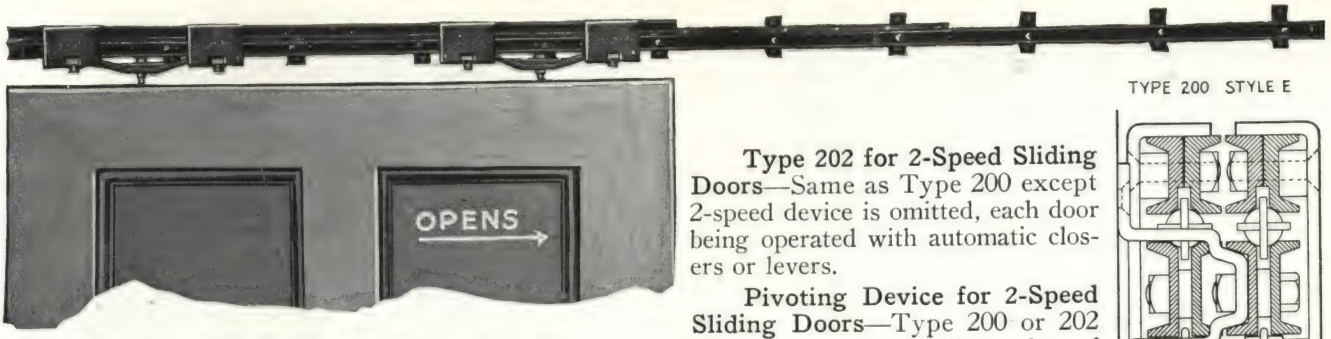


TYPE 104 HANGER FOR SINGLE SLIDING HEAVY DOORS

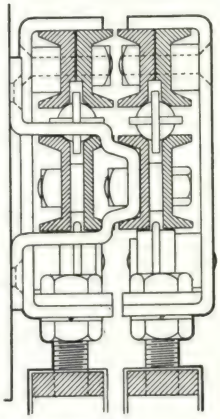
Type 104 for Single Sliding Heavy Doors—For doors weighing from 400 to 600 lbs. Pendent bolts are attached to hanger bar with "brackets in tandem," distributing the load over entire length of hanger bar.

Brackets for pendent bolt also made of heavier material to carry doors weighing up to 2000 lbs.

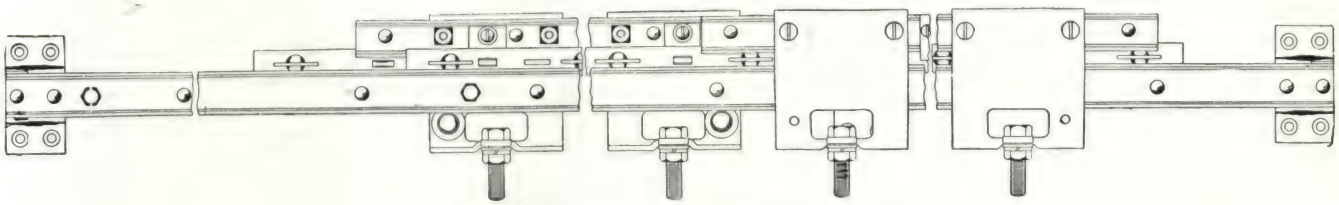
Type 202 for 2-Speed Sliding Doors—Same as Type 200 except 2-speed device is omitted, each door being operated with automatic closers or levers.

Pivoting Device for 2-Speed Sliding Doors—Type 200 or 202 can be used where full opening of front is required, using swinging transom bar, when track, fast door, slow door and hinged panel all swing out as one unit; or use pivoting device with track attached to stationary header and both sliding doors pivot to swing out, also hinged panel.

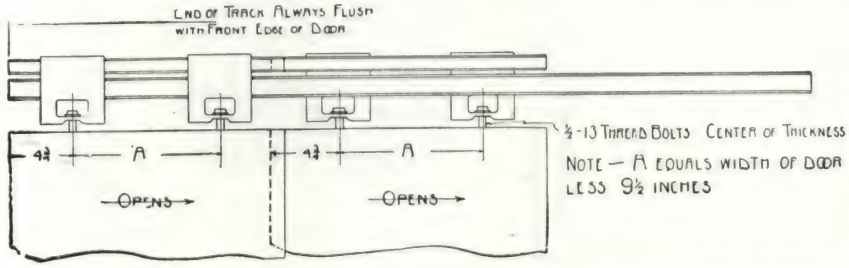
TYPE 200 STYLE E



SECTION THROUGH TYPE 200



TYPE 200 HANGER FOR 2-SPEED SLIDING DOORS



TYPE 200 HANGER FOR 2-SPEED SLIDING DOORS

Type 200 for 2-Speed Sliding Doors—Track full width of opening plus width of widest sliding door provides bearing for balls the entire length of travel; no overhang. Varying track brackets, together with spacers between track, bring door directly under center of track.

The patented feature of Wagner ball bearing elevator door hanger provides a 2-speed movement without the use of rack and pinion or levers.

Absolutely noiseless and free from wearing parts requiring constant replacement.

Types for Center Parting Doors—

Type 400—For doors weighing up to 200 lbs. each. Equipped with rack and pinion operating both doors simultaneously.

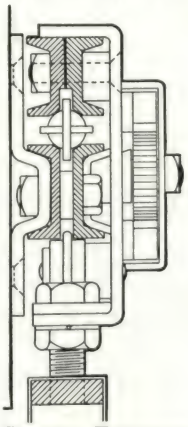
Type 403—For doors weighing from 200 to 400 lbs. each. Same operation as Type 400.

Type 500—For doors weighing up to 200 lbs. each. Furnished with silent chain drive instead of rack and pinion.

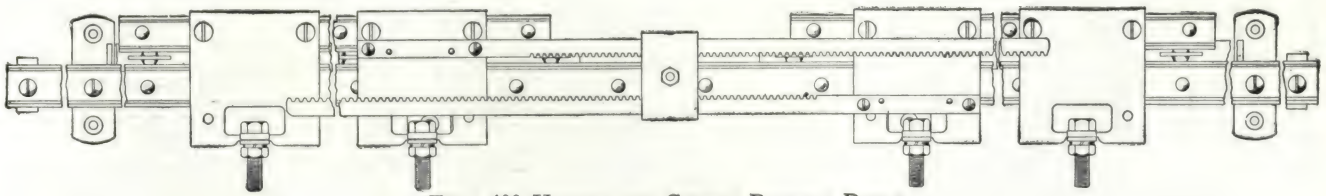
Type 503—For doors weighing from 200 to 400 lbs. each. Same operation as Type 500.

Type 504—For doors weighing 400 lbs. or more each. With pendent bolt brackets tandem, distributing the load evenly over full length of hanger bar. This type is generally furnished without rack and pinion, each door being operated separately. Largely used for main entrances.

TYPE 400 STYLE A



SECTION THROUGH TYPE 400



TYPE 400 HANGER FOR CENTER PARTING DOORS

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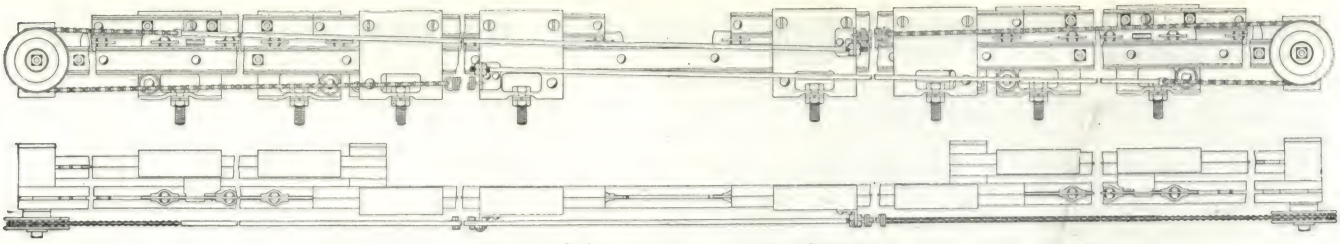
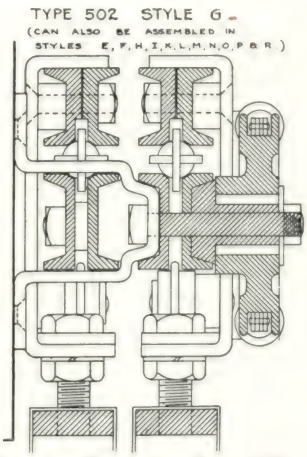


TYPE 502 HANGER FOR 4-DOOR OPENING

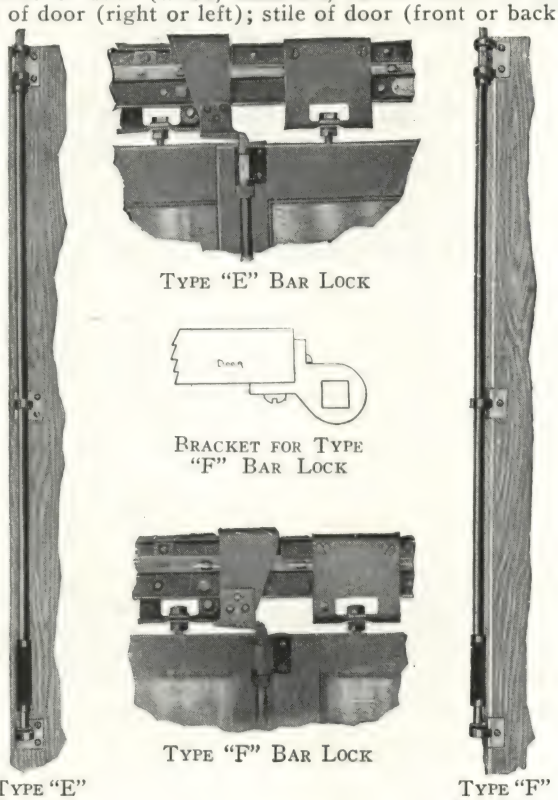
Types for 4-Door Openings—Type 502—For two sets 2-speed (1 right, 1 left-hand), center parting doors. Silent chain drive operating 2 fast doors and Wagner 2-speed patented device operating 2 slow doors simultaneously. This 4-door type furnishes the maximum elevator opening and represents 100% efficiency in loading and unloading.

Type 402—Same as Type 502, except that fast doors are operated by rack and pinion instead of chain drive.



SECTION THROUGH TYPE 502

Information Required in Ordering—Type (E or F) finish; kind of door (wood, kalamein, hollow metal or iron); hand of door (right or left); stile of door (front or back).



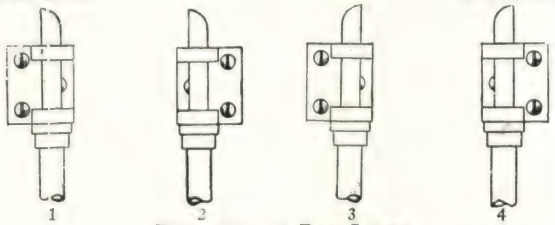
TYPE "E" BAR LOCK

BRACKET FOR TYPE "F" BAR LOCK

TYPE "F" BAR LOCK

TYPE "E" BAR LOCK

TYPE "F" BAR LOCK



POSITIONS OF BAR LOCKS

NOTE—Hand of doors is determined by standing *in* elevator looking *out;* hand is then determined by direction of travel of door to *open.*

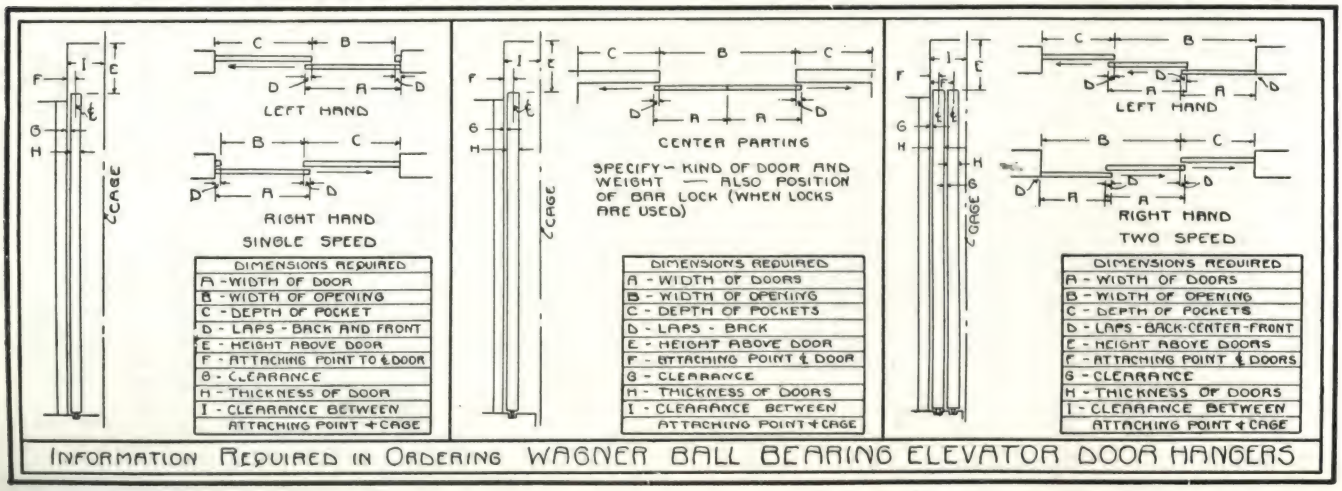
Wagner Bar Locks for Elevator Doors

Construction—Bar locks attached to back stile of fast door on 2-speed hanger have catch built as integral part of hanger and increase headroom required for hanger ⅜ in. When bar locks are installed on front stile of door, catch is attached from under side of track. ⅝-in. steel or brass tubing with ⅞-in. knurled handhold and concealed spring. Brackets are heavy brass castings. Upper bracket has 2 lugs, furnishing rigid support for square steel latch end. Furnished in black oxidized finish and polished brass. Projection from face of door, 1¼ in. for type E lock. Type F lock is same as above except bracket fits on corner of door with bar setting back from edge of door; designed for back stile and limited clearance. Projection from face of door, ¾ in.

POSITIONS OF BAR LOCKS

Front stile		Back stile	
For left-hand use	For right-hand use	For left-hand use	For right-hand use
HOLLOW METAL OR IRON DOORS			
No. 2	No. 3	No. 1	No. 4
WOOD OR KALAMEIN DOORS			
No. 1	No. 4	No. 2	No. 3

Positions 1, 2, 3 and 4 are illustrated at right.



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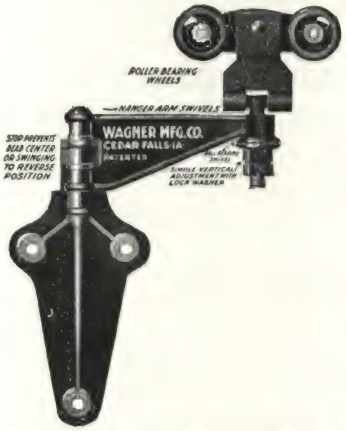
Wagner Cloztite Folding-Sliding Garage Door Sets for Openings Having from 2 to 10 Doors



WAGNER CLOZTITE HANGER No. 58
"The Universal Hanger"

No. 58 Cloztite Hanger—For doors not over 1⅝ in. thick. Used with No. 15 track. Combined weight of doors not to exceed 600 lbs., *8½-in. headroom required from top of door.

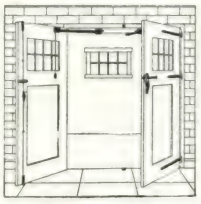
No. 59 Cloztite Hanger—Same as No. 58, except that it has longer arm for doors 2½ in. thick. *8½-in. headroom required from top of door.

**Note*: 12-in. headroom required for all sets on which No. 6E brackets are used.

The Cloztite hanger plate and arm is made of *malleable iron.* Has *roller bearing tandem trolley* with *drop forged bolt* and *ball bearing swivel,* which is connected to door plate by a pivoted arm. Track is attached to wall without the use of adjustable brackets, and the same hardware may be used to hang doors to open in or out.

Set No. 1570

4 Cloztite hangers No. 59.
2 6-ft. pieces track No. 15
4 8-ft. pieces track No. 15.
4 track brackets No. 13E.
6 track brackets No. 6E.
20 lag screws, ⅜x2½ in.
5 cremone bolts for 8-ft.-0 in. doors, or foot and chain bolts.
2 No. 131 hinges, 18 in.
4 No. 131 hinges, 24 in.
6 offset surface hinges or butts.
18 surface hinges or butts.
2 tie rods No. 1511-2
1 latch No. 112.

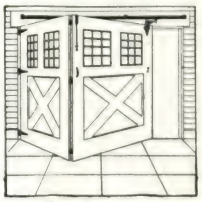


Set No. 1130

4 angle offset hinges No. 130, 24 in.
2 angle offset hinges No. 130, 12 in.
1 latch No. 112.
2 door holders No. 114.
1 top and bottom bolt No. 1512.
1 barrel bolt.

Set No. 1569

4 Cloztite hangers No. 59.
2 6-ft. pieces track No. 15.
4 8-ft. pieces track No. 15.
6 track brackets No. 6E.
4 track brackets No. 13E.
20 lag screws, ⅜x2½ in.
4 cremone bolts for 8 ft.-0 in. doors, or foot and chain bolts.
2 No. 131 hinges, 18 in.
4 No. 131 hinges, 24 in.
6 offset surface hinges or butts.
15 surface hinges or butts.
2 tie rods No. 1511-2.
1 latch No. 112.



Set No. 1552

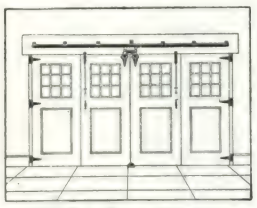
1 Cloztite hanger No. 58.
9 ft. No. 15 track.
4 track brackets No. 5E.
4 lag screws, ⅜x2½ in.
1 chain bolt No. 151.
3 tee hinges No. 88.
3 loose pin butts, 4x4 in.
1 door pull No. 85.
1 hook and staple, 5 in.

Set No. 1558.

1 Cloztite hanger No. 58.
7 ft. track No. 15.
3 track brackets No. 5E.
3 lag screws, ⅜x2½ in.
1 chain bolt No. 151.
1 foot bolt No. 152.
6 tee hinges No. 88.
3 loose pin butts, 4x4 in.
1 door pull No. 85.
1 latch No. 140.

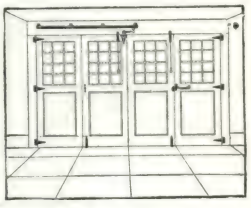
Set No. 1554-0

2 Cloztite hangers No. 59.
2 9-ft. pieces track No. 15.
3 track brackets No. 5E.
3 track brackets No. 13E.
1 track bracket No. 6E.
11 lag screws, ⅜x2½ in.
2 chain bolts No. 151.
2 ornamental hinges, 18 in., No. 130.
4 ornamental hinges, 24 in., No. 130.
6 loose pin butts, 4x4 in.
2 door pulls No. 85.
1 door guide No. 60 with expansion shields for cement floor.



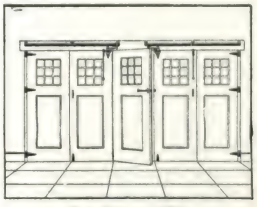
Set No. 1554

2 Cloztite hangers No. 58.
2 9-ft. pieces track No. 15.
3 track brackets No. 5E.
3 track brackets No. 13E.
1 track bracket No. 6E.
11 lag screws, ⅜x2½ in.
2 chain bolts No. 151.
6 tee hinges No. 88.
6 loose pin butts, 4x4 in.
2 door pulls No. 85.
1 door guide No. 60 with expansion shields for cement floor.



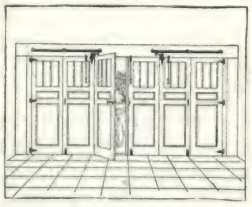
Set No. 1564

1 Cloztite hanger No. 58.
9 ft. track No. 15.
4 track brackets No. 5E.
4 lag screws, ⅜x2½ in.
2 chain bolts No. 151.
2 foot bolts No. 152.
6 tee hinges No. 88.
6 loose pin butts, 4x4 in.
1 door pull No. 85.
1 latch No. 140.



Set No. 1555

2 Cloztite hangers No. 58.
2 8-ft. pieces track No. 15.
6 track brackets No. 5E.
6 lag screws, ⅜x2½ in.
2 chain bolts No. 151.
2 foot bolts No. 152.
6 tee hinges No. 82.
9 loose pin butts, 4x4 in.
2 door pulls No. 85.
1 latch No. 140.



Set No. 1556

2 Cloztite hangers No. 58.
2 8-ft. pieces track No. 15.
6 track brackets No. 5E.
6 lag screws, ⅜x2½ in.
3 chain bolts No. 151.
3 foot bolts No. 152.
6 tee hinges No. 88.
12 loose pin butts, 4x4 in.
2 door pulls No. 85.
1 latch No. 140.

Set No. 1567

3 Cloztite hangers No. 59.
1 7-ft. piece track No. 15.
1 6-ft. piece track No. 15.
2 8-ft. pieces track No. 15.
3 track brackets No. 5E.
3 track brackets No. 6E.
2 track brackets No. 13E.
13 lag screws, ⅜x2½ in.
3 cremone bolts for 8-ft.-9 in. doors, or foot and chain bolts.
2 No. 131 hinges, 18 in.
4 No. 131 hinges, 24 in.
3 offset surface hinges or butts.
13 surface hinges or butts.
2 tie rods No. 1511-2.
1 latch No. 112.

Set No. 1568.

3 Cloztite hangers No. 59.
1 7-ft. piece track No. 15.
1 6-ft. piece track No. 15.
2 8-ft. pieces track No. 15.
3 track brackets No. 5E.
3 track brackets No. 6E.
2 track brackets No. 13E.
13 lag screws ⅜x2½ in.
4 cremone bolts for 8-ft. 9 in. doors, or foot and chain bolts.
2 No. 131 hinges, 18 in.
4 No. 131 hinges, 24 in.
3 offset surface hinges or butts.
15 surface hinges or butts.
2 tie rods No. 1511-2.
1 latch No. 112.

WAGNER GARAGE DOOR SETS
All bolts and screws for attaching hardware furnished with sets

ALLITH-PROUTY COMPANY

SUCCESSOR TO ALLITH MFG. CO., CHICAGO, ILL., AND T. C. PROUTY CO., LTD., ALBION, MICH.

Manufacturers of Door Hangers, Garage and Fire Door Hardware

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Products

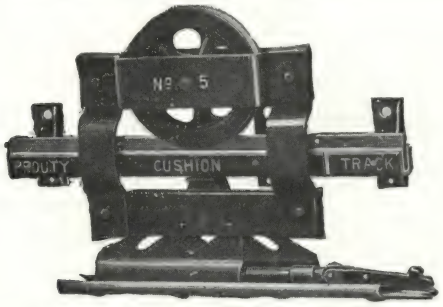
PROUTY NO. 5 HOUSE DOOR HANGER; FOLDING SLIDING GARAGE DOOR HARDWARE; "ELECTROMATIC" ELECTRICAL DOOR CONTROL; ACCORDION DOOR HANGERS; STRAIGHT SLIDING GARAGE, BARN and WAREHOUSE DOOR HANGERS; PARALLEL DOOR EQUIPMENT; "APPROVED" SLIDING and SWINGING FIRE DOOR HARDWARE.

Also manufacturers of Spring Hinges; Overhead Carriers, and Rolling Store Ladders.

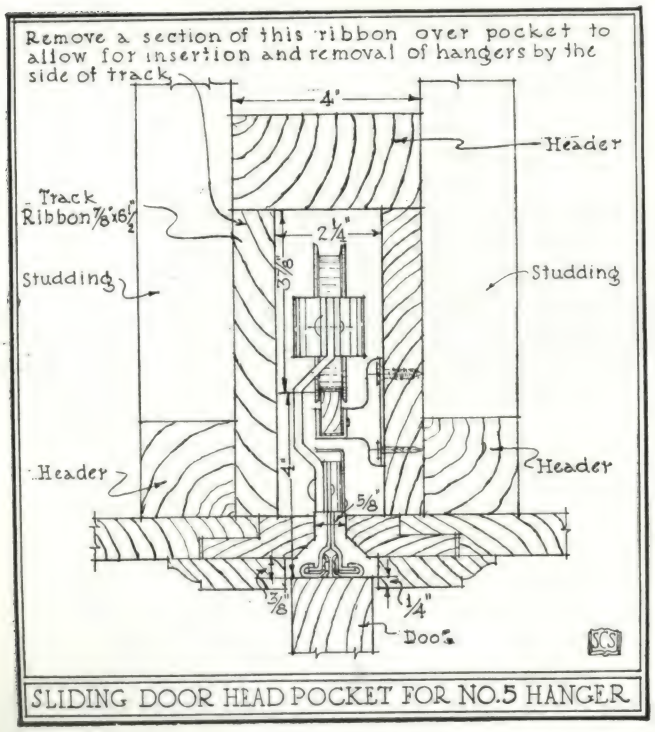
TRADE-MARK

Prouty No. 5 House Door Hanger

The construction throughout prevents rattling and rumbling and guarantees durability and efficiency.



PROUTY NO. 5 HOUSE DOOR HANGER



SLIDING DOOR HEAD POCKET FOR NO.5 HANGER

Hanger Wheels—Are fitted with special noiseless bearings, and tread is turned true to fit the track. The axle is hardened, and sound deadening felt compression washers, carefully protected by steel stationary washers, prevent the wheel from side play or rattle.

Adjustment—The special locking adjustment on the hanger for raising or lowering the door is positive; for it is designed with horizontal adjusting screw, which does not carry the weight of the door but is used for adjustment only. It prevents the door from sagging, and keeps it in place.

Cushion Track—The hard maple rail is thoroughly kiln dried and mounted in a felt cushion, supported by a metal casing, which is made in 1-ft. sections, so that any vibrations that might penetrate the felt are confined to one piece of steel and not distributed along the entire track.

Folding Sliding Garage Door Hardware, No. 1080

This hardware is designed for folding sliding doors, allowing the doors to fold back at any angle up to 180°, and for use on openings from 6 to 18 ft. wide, depending upon the number of doors used. Single tracks are required for 3, 4, 5 or 6 doors.

With these outfits doors are hinged together and hung to the jambs and are supported at the upper outer corner by a ball bearing swivel hanger, sliding in a trolley track. This arrangement prevents sagging of doors and permits the use of all or part of the opening at one time. Space required between the inside wall and car when doors swing open or shut is governed by the width of one door only. When closed, doors fit against the stops in the same manner as a house door, making the opening weatherproof. This equipment may be applied to the outside of an opening though protection for the doors when open should be arranged for.

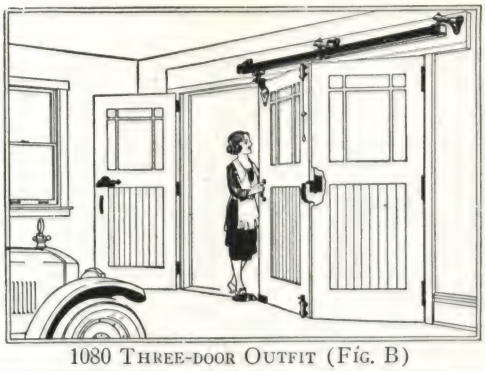
No. 60-X track with adjustable brackets is regularly furnished with No. 1080 equipment. The hangers are of malleable iron construction with vertical and horizontal adjustment, roller bearing metal wheels and ball bearing swivel.

Nos. 71-X or 67-X tracks with heavier brackets and hangers are furnished for extra heavy doors.

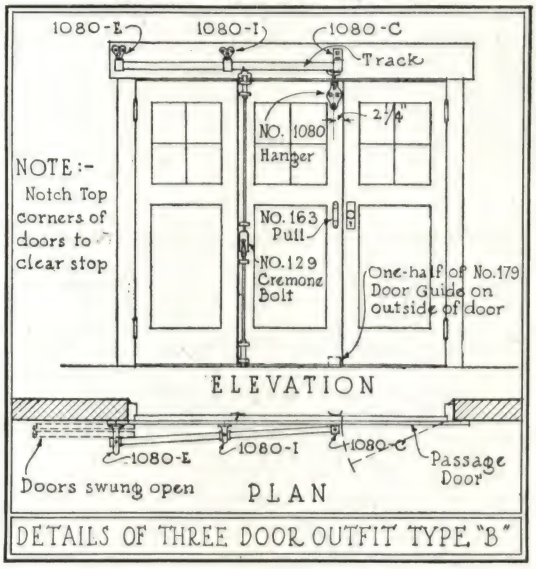
Three-door Outfit Type "B"—For openings 6 to 9 ft. wide. Two doors hinged together and attached to one jamb, while the third or passage door is hinged to the opposite jamb.

Four-door Outfit—For openings 8 to 12 ft. wide. Made in two combinations as follows:

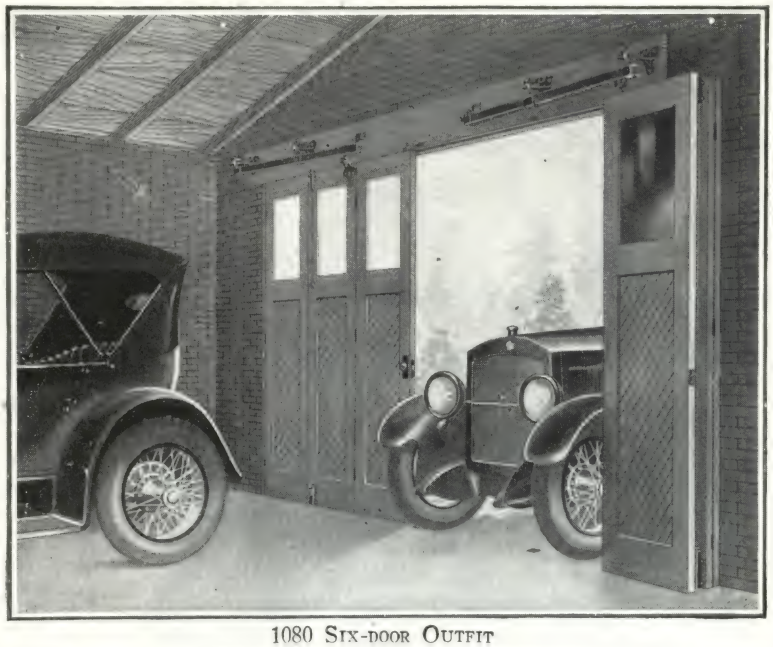
Continued on next page



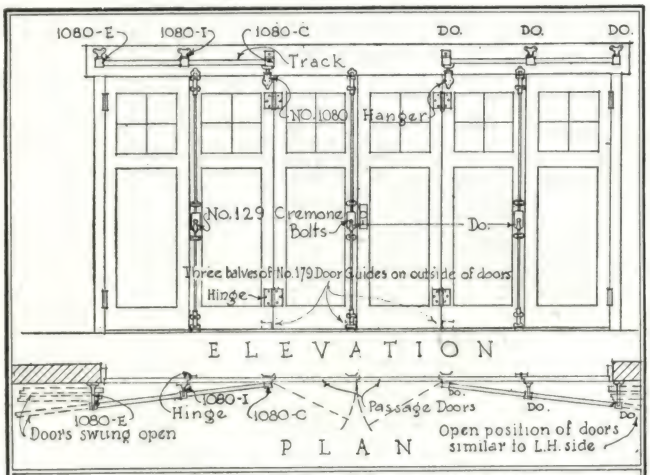
1080 Three-door Outfit (Fig. B)



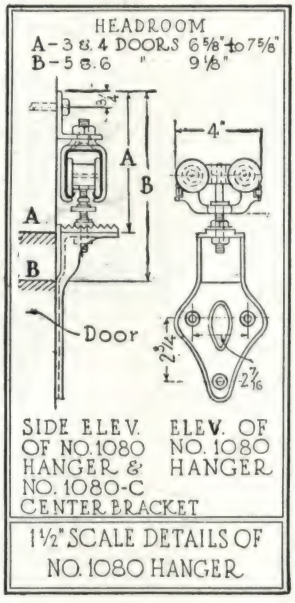
DETAILS OF THREE DOOR OUTFIT TYPE "B"



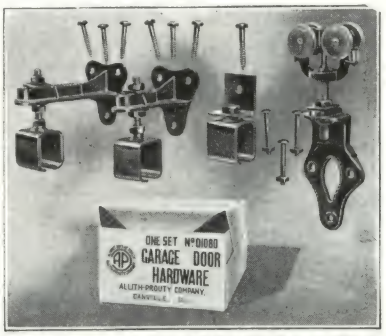
1080 Six-door Outfit



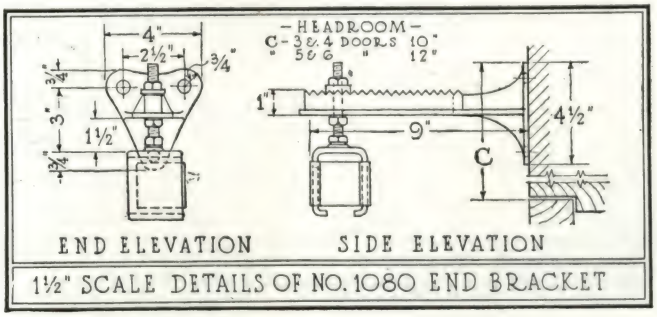
DETAILS OF SIX DOOR OUTFIT



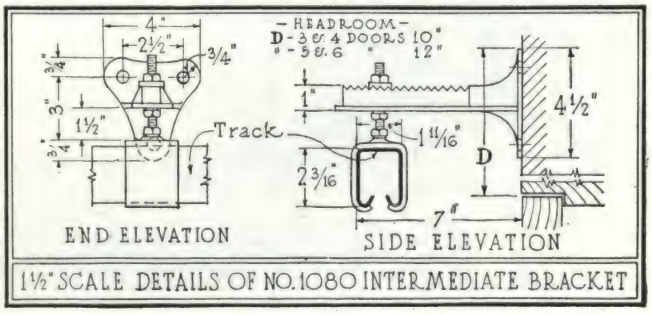
1½" SCALE DETAILS OF NO. 1080 HANGER



No. 01080. Folding Sliding Garage Door Hardware Set



1½" SCALE DETAILS OF NO. 1080 END BRACKET



1½" SCALE DETAILS OF NO. 1080 INTERMEDIATE BRACKET

Continued on next page

Two doors hinged to each jamb, or three doors hinged to one jamb and one door hinged to opposite jamb.

Five-door Outfit—For openings 10 ft. to 15 ft. wide. Two doors hinged together and hinged to one jamb and three doors hinged together and hinged to opposite jamb.

Six-door Outfit—For openings 12 to 18 ft. wide. Three doors hinged to one jamb and three doors hinged to opposite jamb.

"Electromatic" Electrical Door Control

Perfect, quick acting and dependable, labor and heat saving devices for the mechanical operation of driveway entrance and exit doors where the headroom is 16 in. or more.

Mechanism is controlled by two or more push button stations placed where desired. Pressing the opening button turns on the lights, unlocks the doors, and folds or swings them clear of the opening. Pressing the closing button reverses the operation. Pressing the initial button stops the doors instantly.

Accidents to persons or machines standing in the opening after closing button has been pressed is prevented by a special *inbuilt* safety device. Action of safety device also saves the mechanism and doors from damage.

Push button stations when placed outside of buildings may be protected by a cylinder lock. Doors are mechanically connected so that opening of one section also opens the other, excepting on the No. 1022 which can be wired to operate as separate units for the control of two doors at a time.

Adoption of the "Electromatic" should be considered for use on openings on the following basis:

No. 1020—To be used with four doors of the sliding folding type—maximum width of opening 12 ft.

No. 1022—To be used with four doors of the sliding folding type. Built up of two separate and distinct devices, each of which controls two sliding folding doors—maximum width of opening 20 ft. Wiring may

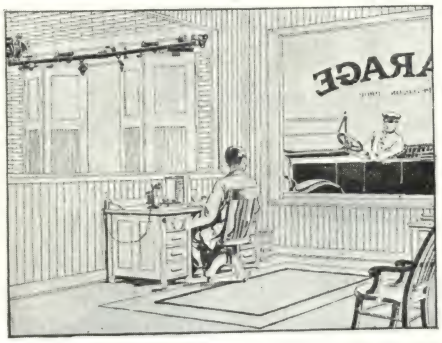
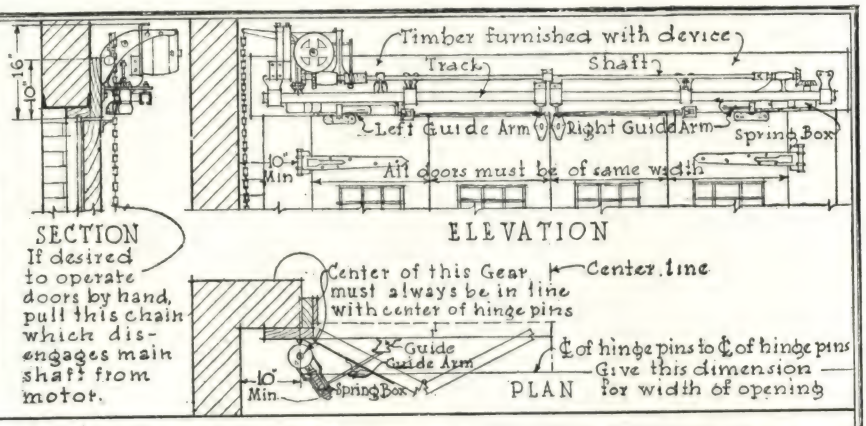
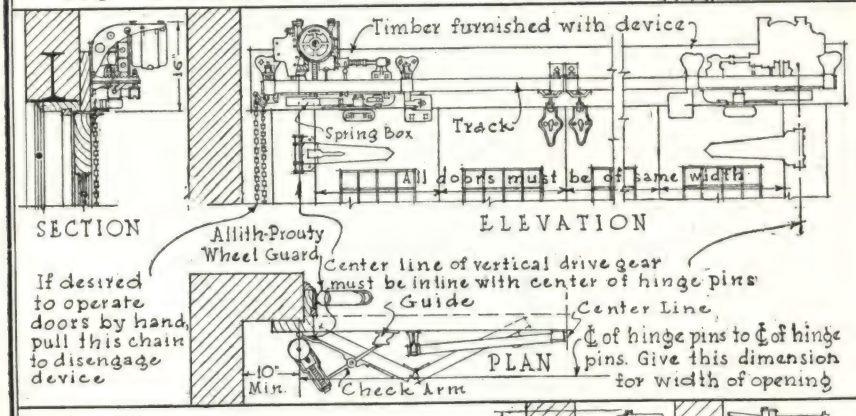


Diagram at Right Shows No. 1020





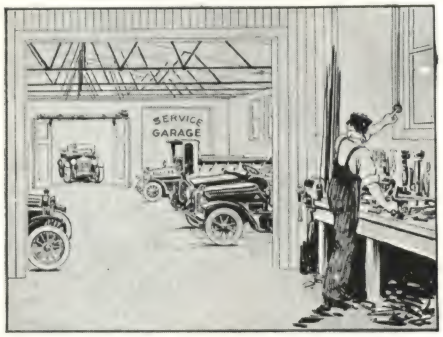
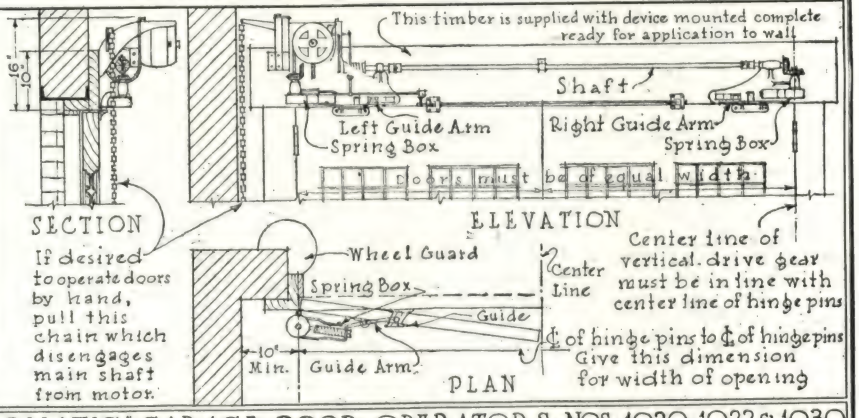


Diagram at Left Shows No. 1022

Diagram at Right Shows No. 1030



3/8" SCALE DETAILS OF "ELECTROMATIC" GARAGE DOOR OPERATORS NOS. 1020-1022 & 1030

Continued on next page

be arranged to have both units operate simultaneously, or if desired they can be arranged to operate as separate units. Advantages of the separate unit operation are that heat is saved in opening but one-half of the 20-ft. span to allow a small car to enter.

No. 1030—To be used with two doors of the hinged swinging type—maximum width of opening 10 ft.

To Specify or Order—Garage doors shall be equipped with ALLITH-PROUTY COMPANY'S "Electromatic" Door Control No. .... arranged to mechanically operate doors and lights as shown on drawings. Operating switches shall be located as shown on drawings.

Accordion Door Hangers, No. 69

The hangers have non-breakable malleable iron frame, roller bearing wheels, ball bearing swivel, anti-friction guide rollers and vertical adjustment.

Made with four wheels, No. 69; and two wheels, No. 1069; for doors 2 in. thick and under. For heavier doors, use Nos 64 and 1064. The four-wheel hangers are over twice as strong as the two-wheel and should be used in preference to two-wheel hangers where conditions permit.

General Directions—All of the doors can be folded to one side, or they can be divided at the center, and half the doors folded to each side of the opening. A half door is required adjoining the jamb toward which the doors fold; when divided at the center two half doors are required.

The half doors must be exactly one-half the width of the full size doors, less the distance from the center of jamb strip to center of butt pins. The full size doors must all be of the same width, top and bottom with edges parallel.

When all doors fold to one side, length of the track is 8 in. less than the width of the opening. If divided at center to fold to each side, leave a space of 1 ft. at center.

These spaces in the track are used for inserting or removing the hangers from track.

Four-wheel hangers should be applied to each alternate door beginning with the door next to the half door.

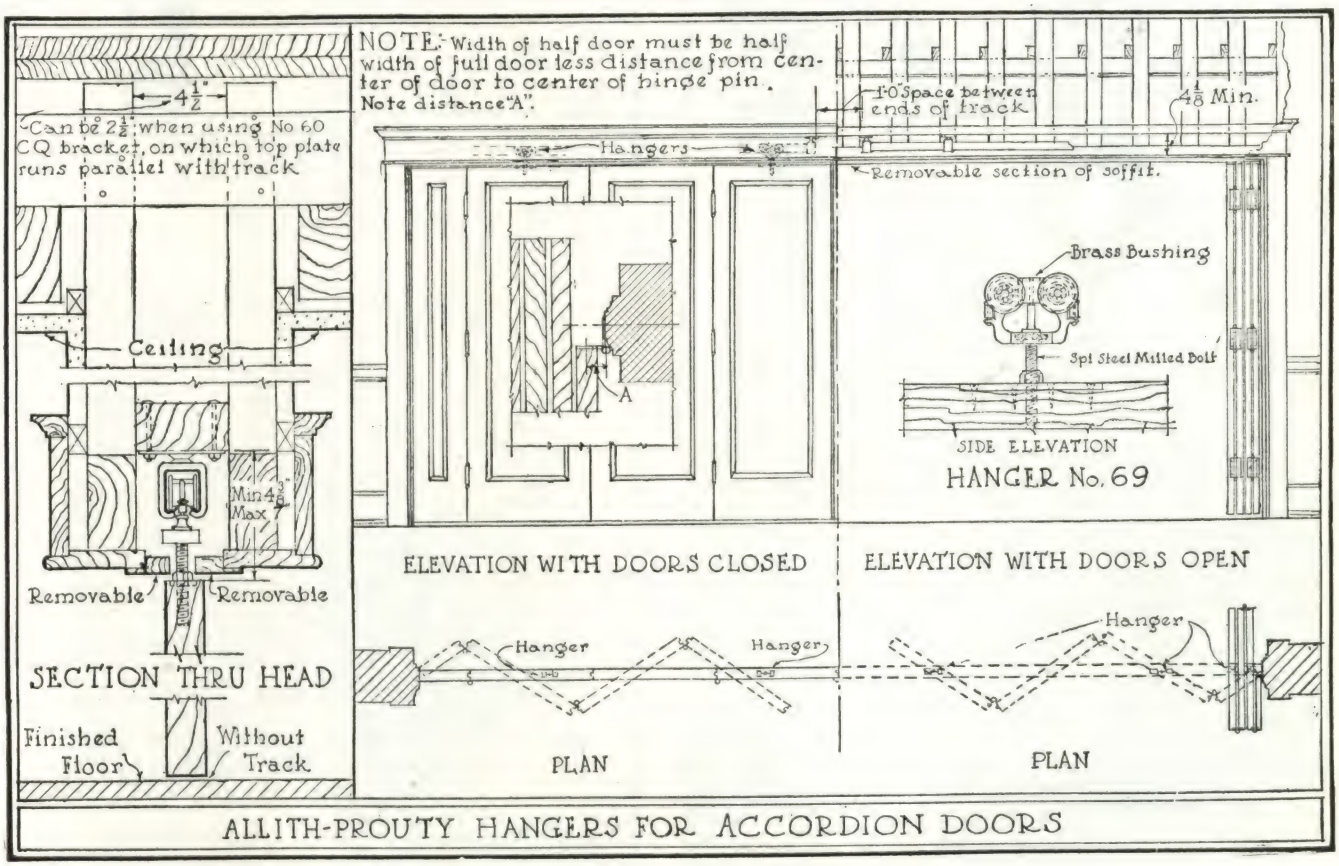
If desirable to apply a hanger to each door the two-wheel hanger is required. Half doors require no hanger.

Locate all the butts so the hinge pins will be the same distance from the edge of the door.

If thickness of doors is less than 1¾ in., the distance from center of hinge pin to edge of door must be ⅜ in.

Brackets should be spaced to suit the load, generally not over 30 in. apart.

ILLUSTRATING THE APPLICATION OF ACCORDION DOOR HANGERS No. 69



Continued on next page

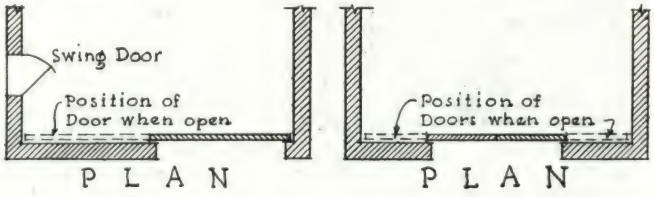
Straight Sliding Garage, Barn or Warehouse Door Hangers, Reliable Nos. 1, 2 and 3

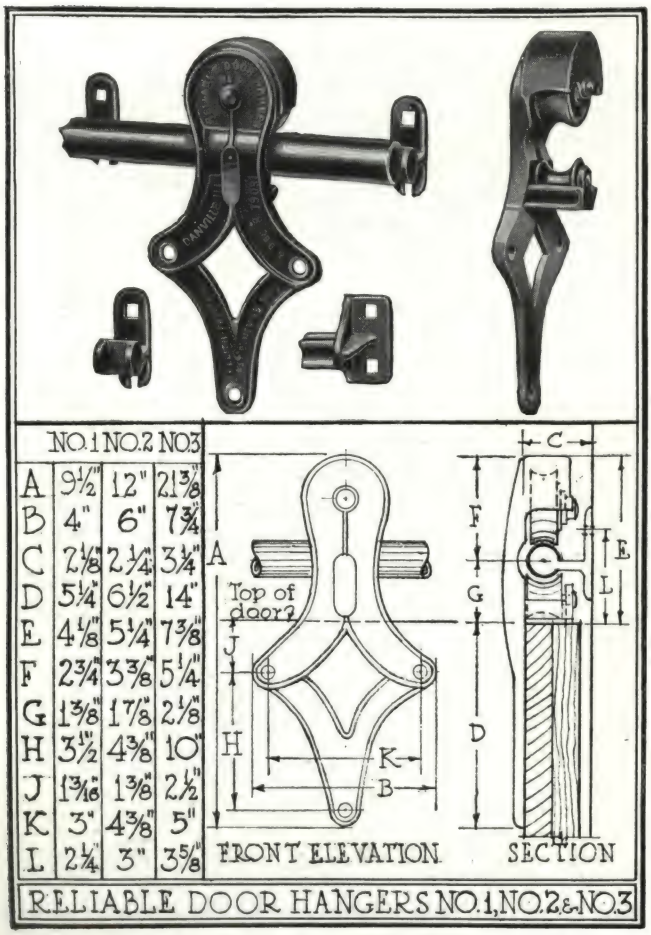
For round tracks. The track, original with us, is a high carbon, heavy, round steel tube, with a slot in the back, allowing the insertion of the track brackets. This shape makes it much stronger and more rigid than other styles of track and provides a perfect bearing for the wheel with no side friction. It can not get out of line or sag.

The hanger frame is made of thoroughly annealed malleable iron of one solid piece, ribbed and reinforced, and is so constructed that it protects the upper wheel and bearings. The upper wheel, with machine turned tread, has hardened steel axle, washers, and round end roller bearings packed in the highest grade graphite lubricant, making the hanger absolutely antifriction and very durable. The lower wheel, by contact with the track should the door be raised, prevents derailing or binding.

Reliable No. 1 Door Hanger—For use on light weight doors or gates. Approximate capacity, 250 lbs.

Reliable No. 2 Door Hanger—For use on medium weight doors. Approximate capacity, 500 lbs.





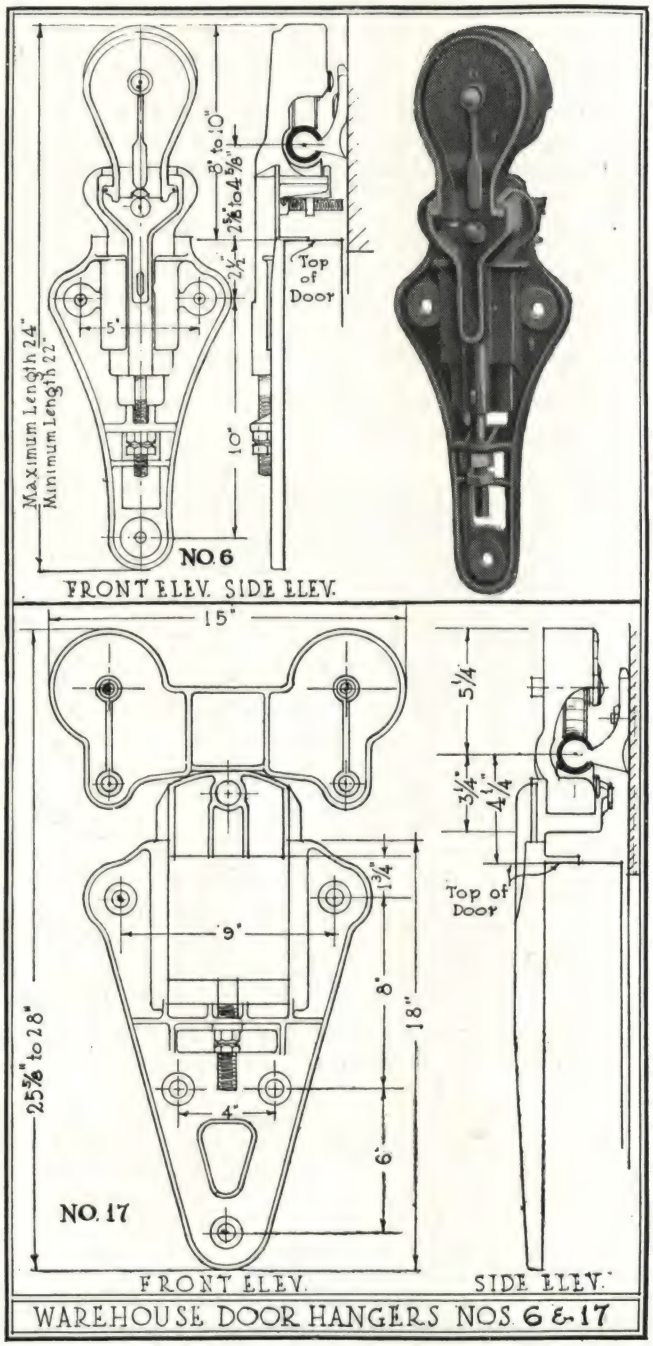
Reliable No. 3 Door Hanger—For heavy weight doors. Approximate capacity, 1000 lbs.

Always give thickness of doors in ordering.

Straight Sliding Warehouse Door Hangers, Nos. 6 and 17

No. 6 Double Adjustable Hanger—Approximate capacity, 1000 lbs. For doors 1¾ to 3⅜ in. thick. These hangers have a vertical adjustment of 2¼ in. and a horizontal adjustment of 1½ in. The hanger is made of the same high grade, non-breakable malleable iron as Reliable No. 3, and fitted with the same large, easy running, roller bearing upper wheel. Used on freight stations, garages, warehouses, etc., it has no equal.

No. 17 Double Adjustable Tandem Hanger—Approximate capacity, 2000 lbs. For doors 1¾ to 3½ in. thick. The hanger frame is 15 in. wide by 28 in. long; wheels 4¾ in. in diameter with hardened steel bushings and roller bearings. The axles are fitted with



Continued on next page

grease cups. The hanger is adjustable in and out and up and down.

In ordering, always specify thickness of doors.

Parallel Door Equipment

This outfit is designed for insuring perfect movement of continuous parallel doors such as are used in freight stations, warehouses, public garages, etc. It is arranged to permit an opening at any place desired.

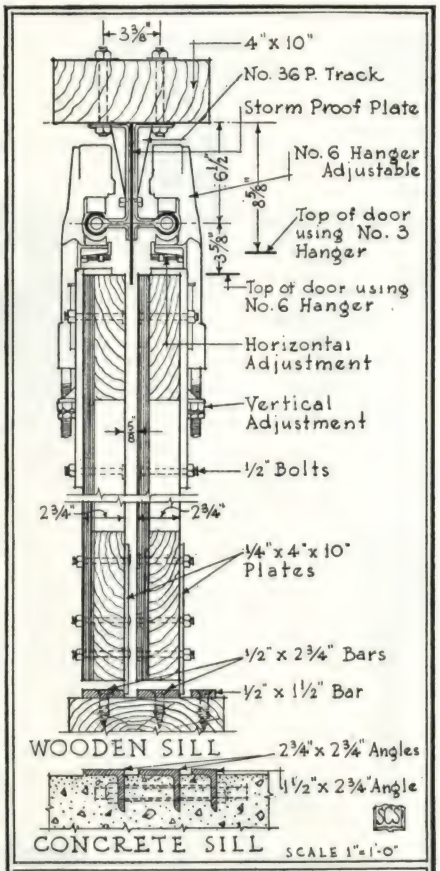
Nos. 2, 3, 6 and 17 hangers, as hereinbefore described, are used to accommodate doors of different styles, weights and thicknesses.

The track shown in illustration is assembled complete in sections to accommodate different openings. It is suitable for attaching to any construction.

Installation is simple and alignment perfect.

The parting strip fastened between the brackets and extending below top of door makes the equipment stormproof as well as the strongest.

For wooden floors, ½ in. thick bars are used as floor guides and for concrete floors, 2½ x 2½-in. angles.



"Approved" Sliding and Swinging Fire Door Hardware

Allith "Approved" fire door hardware is regularly inspected and labeled under the supervision of the Underwriters' Laboratories, Inc., under direction of the National Board of Fire Underwriters, and is also approved by the inspection department of the Associated Factory Mutual Fire Insurance Companies. With knowledge of the requirements, recommendations will be gladly made and guarantee given of the acceptance of Allith hardware by any inspection authorities.

Allith "Approved" fire door equipment throughout is simple of construction, easy and economical to apply, showing the highest degree of efficiency, strength and durability, and is altogether the most satisfactory hardware made.

All cast parts are made of refined malleable iron, possessing twice the strength of gray iron castings and greater efficiency than wrought iron. The steel used in such parts as are made of steel is all carefully selected for the purpose intended.

Rigid test and inspection service insures uniform and superior quality.

Horizontally sliding fire doors, inclined track rather than level track, are preferable to swinging doors, for they occupy practically no room, and the openings for their successful operation are easily kept clear and free from obstruction.

Types—Allith "Approved" sliding and swinging fire door hardware is furnished to meet practically every requirement.

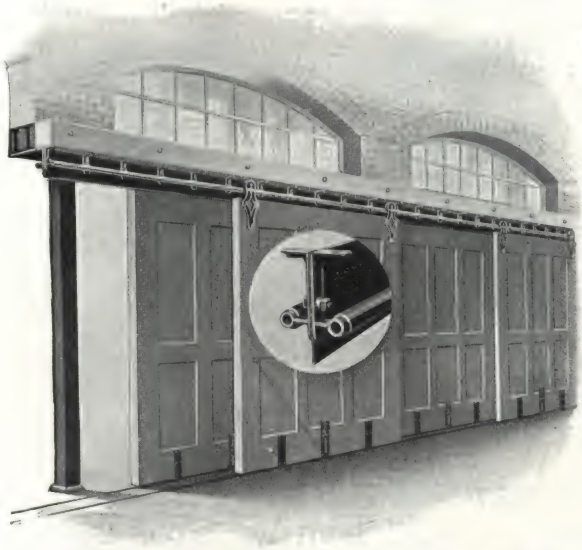
Fixture sets include all necessary counterbalance weight, wall bolt washers, bolts and screws for attaching parts to door; wall bolts are not included.

Unless otherwise specified, hangers, track brackets and fixtures will be sent for 3-ply (2⅝-in.) doors.

For detailed information on firedoor hardware see Catalogue No. 87.

Note No. 1—If opening is square top, 12-in. headroom is required at the edge of the opening towards which the door slides in closing and ¾ in. more for each foot of track beyond that point.

Note No. 2—If opening is arched top, 12-in. headroom is required above the top of the arch and ¾ in. more for each foot the track extends beyond the center.



Showing Application of Parallel Door Equipment

Inclined Track, Style No. 500

COBURN TROLLEY TRACK MFG. CO.

Sliding Door Hardware

HOLYOKE, MASS.

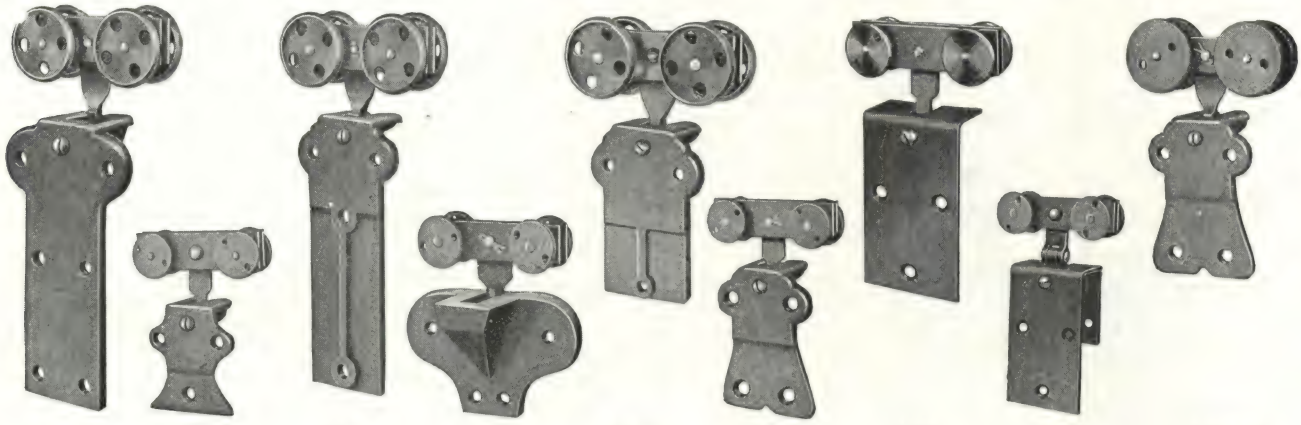
WAREHOUSES

NEW YORK, N. Y., 44-46 Duane Street CHICAGO, ILL., 220 North Wabash Avenue BOSTON, MASS., 108 Broad Street
PHILADELPHIA, PA., 422 Commerce Street CLEVELAND, OHIO, 1009 Oregon Avenue

Products

Manufacturers of COBURN FOLDING SLIDING GARAGE DOOR HARDWARE; COBURN BARN and GARAGE DOOR HANGERS and TRACK.

For Metal Covered Doors and Finish, see pages 700-702; for Tin Clad Doors and Shutters, see pages 723-727.

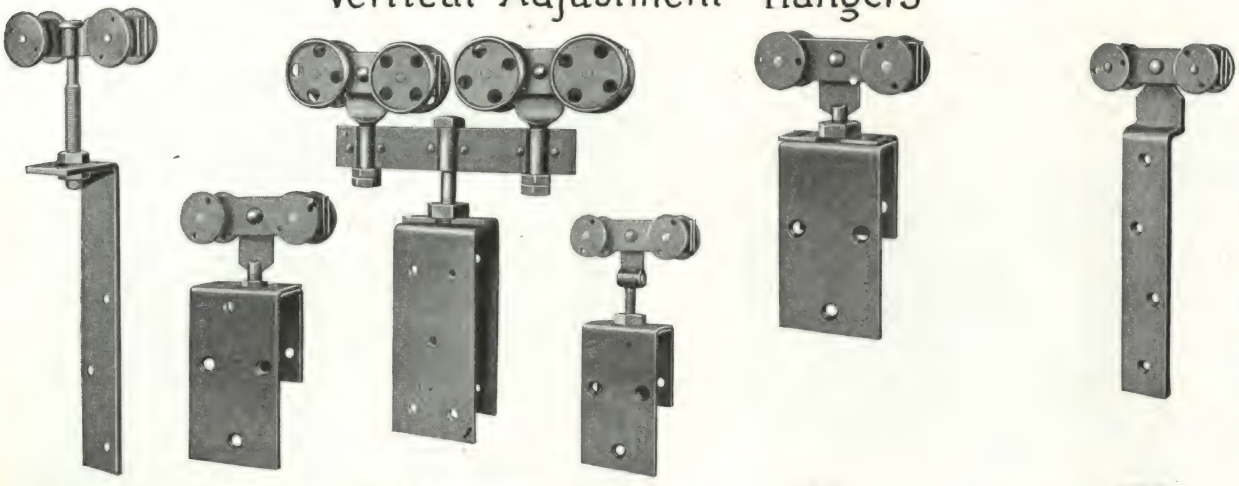


140 119 130 190 124 120 121 138 122½

Lateral Adjustment Hangers

196 198 160-161 194 610 197 150 195 600 185

Vertical Adjustment Hangers

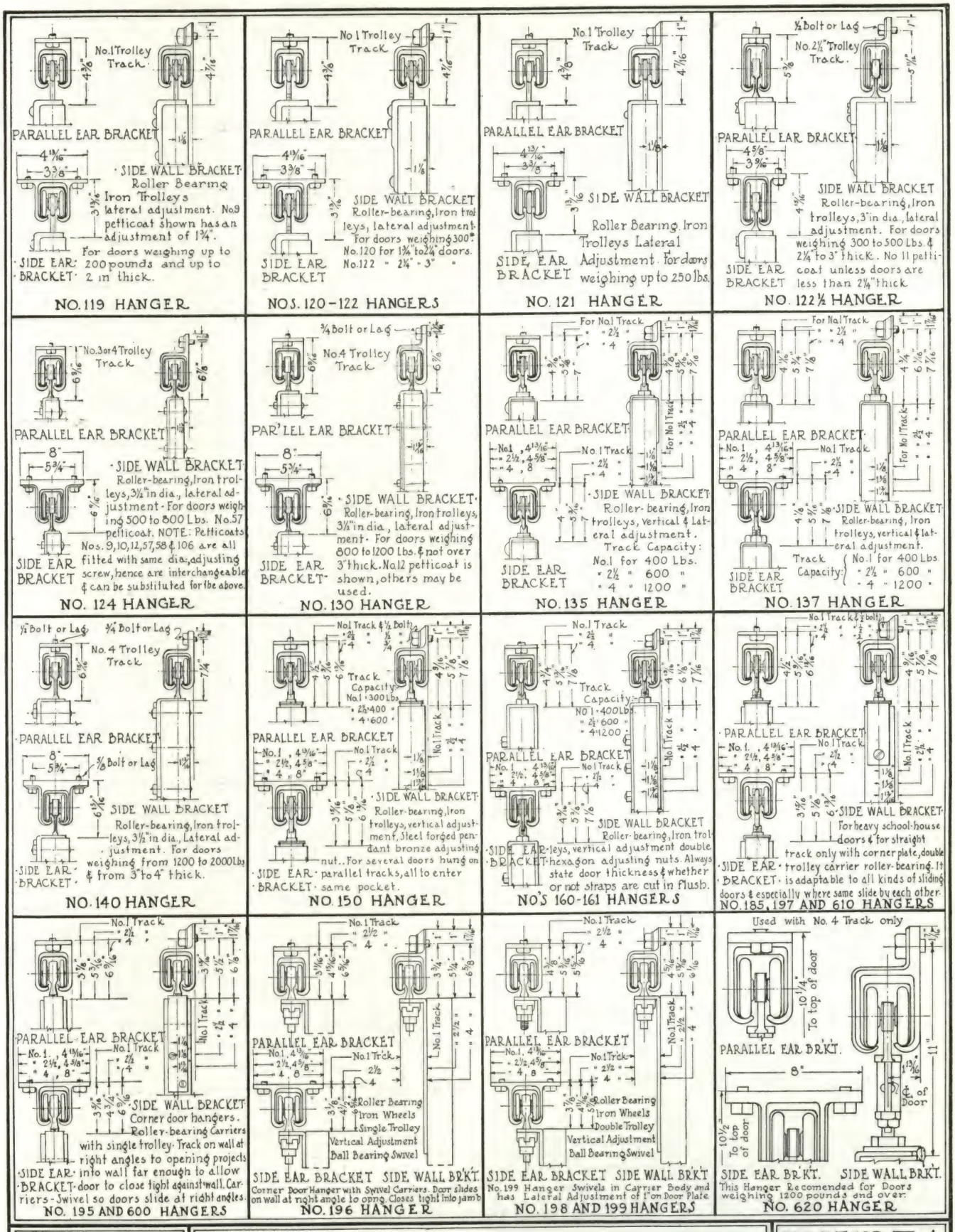


199 135 620 139 137 170

Lateral and Vertical Adjustment Hangers Non Adjustable Hanger

ROLLER BEARING IRON WHEEL DOOR HANGERS

Continued on next page



DRAWN BY SWEET'S CATALOGUE SERVICE, INC.

COBURN HANGERS FOR SLIDING DOORS

SHEET NO. E1 NOT DRAWN TO SCALE

Continued on next page

Coburn Sliding Door Hangers for Garage and Warehouse Doors

These are a complete line and are made to suit various requirements.

In specifying track, hangers and brackets, always give the thickness of doors.

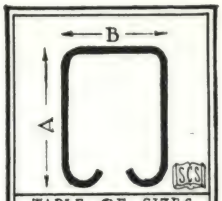


TABLE OF SIZES

No	GAUGE	A	B
1	16	2 1/16	1 1/16
2½	16	3 3/8	1 1/16
3	16	3 1/16	2 1/16
4	13	3 5/16	2 1/16

DIMENSIONS OF COBURN TROLLEY TRACK

Track—For doors 300 lbs. or less use No. 1 track; 500 lbs. or less use No. 2½ track; 1200 lbs. or less use No. 4 track. Doors exceeding 1200 lbs. require special track. Tracks Nos. 1 and 2½ are No. 16 gage steel; No. 4 is No. 13 gage steel.

Curved tracks are furnished on correct radius for clearance of corner doors of different width.

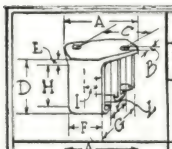
COBURN "ROUND TROUGH" TROLLEY TRACKS

No. of track	Used with hanger No.	Longest length made, ft.
1	119, 120, 122, 132a, 133a, 134a 135a 137a 138a, 139a, 150a, 160a 161a, 170a 185a, 190a, 193a, 194a, 195a, 196a, 197a, 198a, 199a, 600a 610a	10
2½	122½, 132b, 133b, 134b, 135b, 137b, 138b, 139b, 150b, 160b, 161b, 185b, 190b, 193b 194b, 195b, 196b, 197b, 198b, 199b, 600b, 610b	10
3 and 4	124, 130, 133c, 134c, 135c, 137c, 138c, 139c, 140, 150c, 160c, 161c, 170c, 185c, 190c, 193c, 194c, 195c, 196c, 197c, 198c, 199c, 600c, 610c, 620	8

NOTE—Only racks Nos. 1, 2½ and 4 can be furnished in curved sections, from 2 ft. 6-in. radius as a minimum.

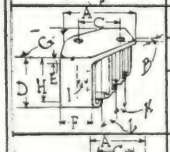
Brackets—Should be placed 4 to 5 ft. on centers. For parallel runs of track "double run" wall brackets or "triple run" wall brackets should be used, except where storm shields are required. Where attached to outside of a building a hood should be used to protect the top of the door.

When storm shields are required use "single run" wall brackets with cast pads as shown.



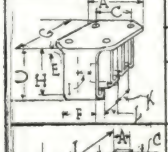
DOUBLE PARALLEL EAR BRACKET

No	A	B	C	D	E	F	G	H	I	J	PATTERN No CENTER	PATTERN No END
1	4 5/8	9/16	3 1/4	3/8	3 7/16	2 1/16	4 1/2	3 3/16	1 5/16	2 1/8	2691	2691 E.
2½	5	9/16	3 1/2	3/8	4 1/2	2 3/16	4 3/4	4 1/4	1 3/16	2 1/4	2692	2692 E.
4	6 3/16	9/16	4 3/4	5/8	5 1/16	3	7 1/4	5 1/4	1 3/16	3 3/8	2693	2693 E.



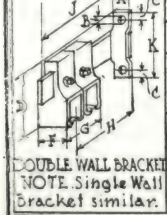
TRIPLE PARALLEL EAR BRACKET

No	A	B	C	D	E	F	G	H	I	J	PATTERN No CENTER	PATTERN No END
1	4 5/8	9/16	3 1/4	3/8	3 7/16	2 1/16	6 5/8	3 3/16	1 3/16	2 1/8	2694	2694 E.
2½	5	9/16	3 1/2	3/8	4 1/2	2 3/16	6 7/8	4 1/4	1 3/16	2 1/8	2695	2695 E.



TRIPLE PARALLEL EAR BRACKET FOR NO. 4 RAIL

No	A	B	C	D	E	F	G	H	I	J	PATTERN No CENTER	PATTERN No END
4	6 3/16	9/16	4 3/4	5/8	5 1/16	3	10 1/4	5 1/4	1 3/16	3 1/4	2696	2696 E.



SINGLE WALL BRACKET ADJUSTABLE

No	A	B	C	D	F	G	H	J	K	PATTERN No CENTER	PATTERN No END
1				5 3/4	2 5/8	2 1/4	4 7/8	6		55	56
2½				7 3/8	2 5/8	2 3/8	4 13/16	6		70	71
4	2 1/2	17/32	1	9 5/16	3 5/8	3 3/4	4 7/8	6	9	93	94

DOUBLE WALL BRACKET ADJUSTABLE

No	A	B	C	D	F	G	H	J	K			PATTERN No CENTER	PATTERN No END
1	2 1/2	13/32	1	5 3/4	2 5/8	4 1/2	7 7/8	9	7 1/2			55	56
2½	2 1/2	13/32	1	7 3/8	2 5/8	4 3/4	7 13/16	9	8			70	71
4	2 1/2	17/32	1	9 5/16	3 5/8	7 1/2	7 1/8	9	9			93	94

DOUBLE WALL BRACKET NOTE. Single Wall Bracket similar.

COBURN TRACK BRACKETS

Coburn Folding Sliding Garage Door Hardware

For hanging garage doors in the manner shown on Drawings Nos. G-1 and G-2 on the following pages. The doors are hinged to the jamb and supported at upper outer edge by roller bearing swivel hangers sliding in a trolley track. For openings from 6 to 18 ft. wide. With this outfit the doors fold and slide inside the building, fit perfectly tight and will not warp or sag. A novel and practical outfit easily applied and operated.

Two types of hangers are used—No. 195 hanger which is cut into the corner of the door, and No. 196 hanger which is screwed into the face of the door.

Drawing No. G-1 shows the application of Nos. 195 and 196 hangers used with standard trolley track brackets in which the track is set parallel with the wall. With this combination the doors will open to an angle of only 90° from the closed position, in which case, it will be noted, the doors overlap the opening when the doors stand in the open position. This combination is used only where conditions prevent folding the doors further back than 90° to the opening.

Drawing No. G-2 shows the application of No. 196 hanger used with adjustable trolley track brackets in which the back end of the trolley track sets away from the wall. This combination allows the doors to fold back against the wall, thus providing a clear opening when the doors are in the open position.

Made in sets for 3, 4, 5, and 6 three-foot (or less) doors for one opening as shown.

Equipment—The standard equipment consists of hangers, steel trolley track, brackets and No. 195 binder or binders as required.

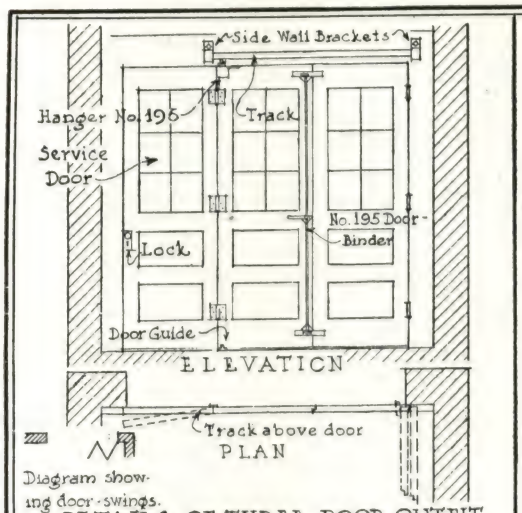
No. 195 binder is shown in detail on Drawing No. G-2. The advantage of this binder is its ability to hold the door tight against the opening or against stops under all conditions. Also it does not connect in any way with the floor, ceiling or header but is entirely on the doors. The binding action is secured by cams acting on iron pieces in such a way as to tend to turn the door inside out, thereby pushing it hard against the guides.

In case a service door is used the ordinary lock will be required as shown, and if two service doors or swinging doors are used as in the 6-door outfit a cremone bolt or top and bottom bolt may be used. In all other combinations except the 6-door outfit no cremone bolt or top and bottom bolt will be required.

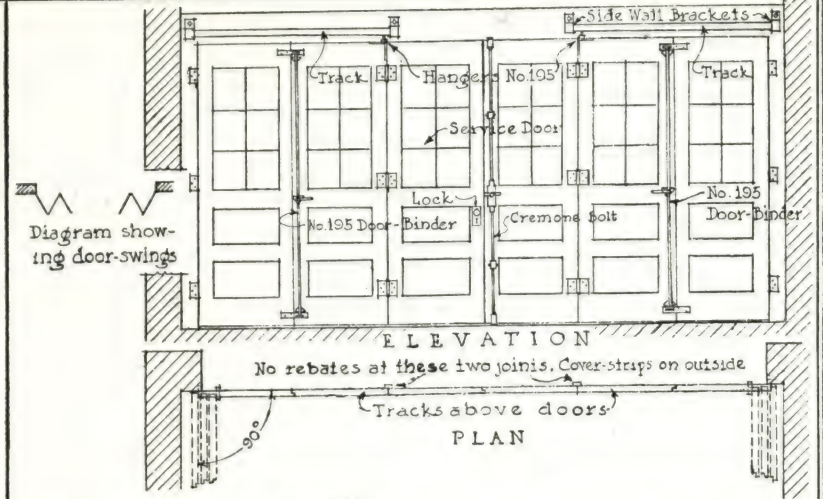
In the case of the regular 4-door outfit the binders are the only means of locking required, and where it is impossible to have a service door elsewhere, access to the binder may be had through a hinged panel in the door as shown on detail of 4-door outfit. The COBURN TROLLEY TRACK MFG. Co. can furnish butts, locks and all hardware required to make a complete equipment, or if desired these items can be purchased elsewhere, the COBURN TROLLEY TRACK MFG. Co. furnishing only the track, supports and hangers.

The No. 195 door binder is a product exclusively of Coburn manufacture and has patent applied for.

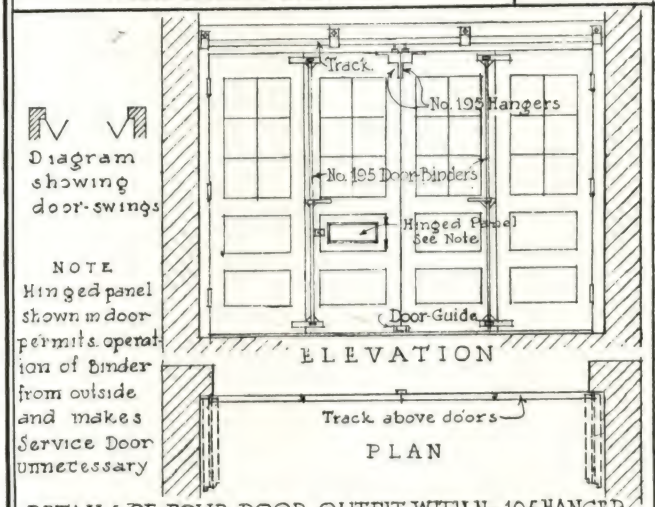
Continued on next page



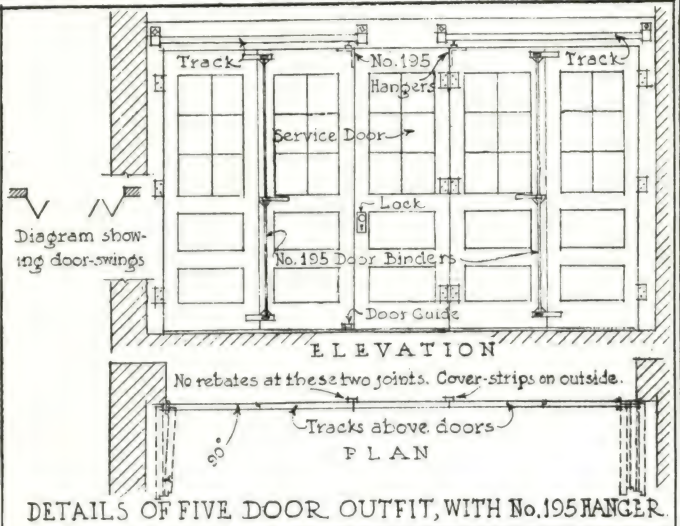
DETAILS OF THREE-DOOR OUTFIT WITH No. 195 HANGER.



DETAILS OF SIX-DOOR OUTFIT, WITH No. 195 HANGERS.

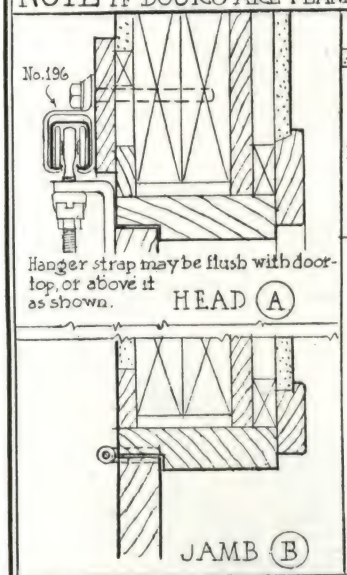


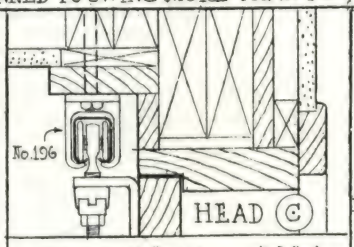
DETAILS OF FOUR DOOR OUTFIT WITH No. 195 HANGER.



DETAILS OF FIVE DOOR OUTFIT, WITH No. 195 HANGER.

NOTE No. 195 OR No. 196 HANGER MAY BE USED. SEE DETAILS BELOW. IF DOORS ARE PLANNED TO SWING MORE THAN 90°, USE ADJUSTABLE BRACKETS SHOWN ON DRAWING NO. G2.





KEY TO 1½" DETAILS "A"-"E"

A - Door Head, frame building, No. 196 Hanger, side wall bracket

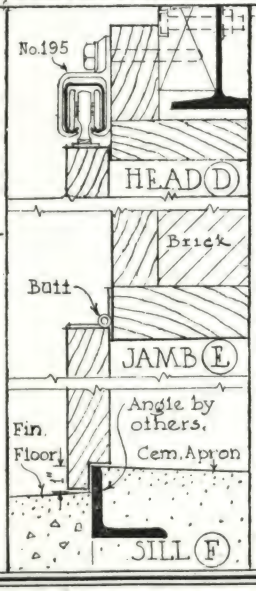
B - Door Jamb for "A" & "C"

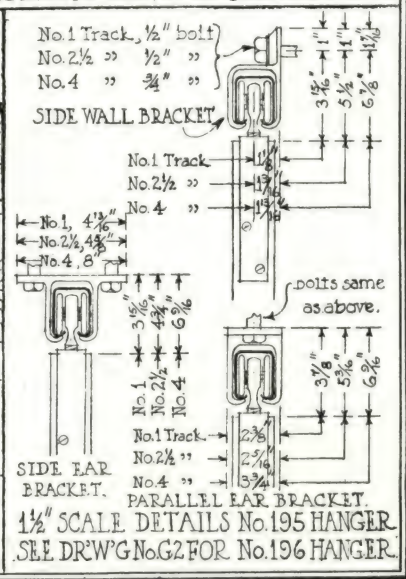
C. - Door Head, frame building No. 196 Hanger, parallel ear bracket, used where ceiling height is limited.

D - Door Head, brick building No. 195 Hanger, with side wall bracket.

E. - Door Jamb for "D"

F - Suggested Door-Sill.





DRAWN BY SWEET'S CATALOGUE SERVICE INC.	FOLDING SLIDING GARAGE DOORS USING STANDARD BRACKETS WITH Nos. 195 & 196 COBURN HANGERS.	SCALE 3/16" & 1½" EQUAL 1'-0" DATE, MAY 21.	DRWG G1

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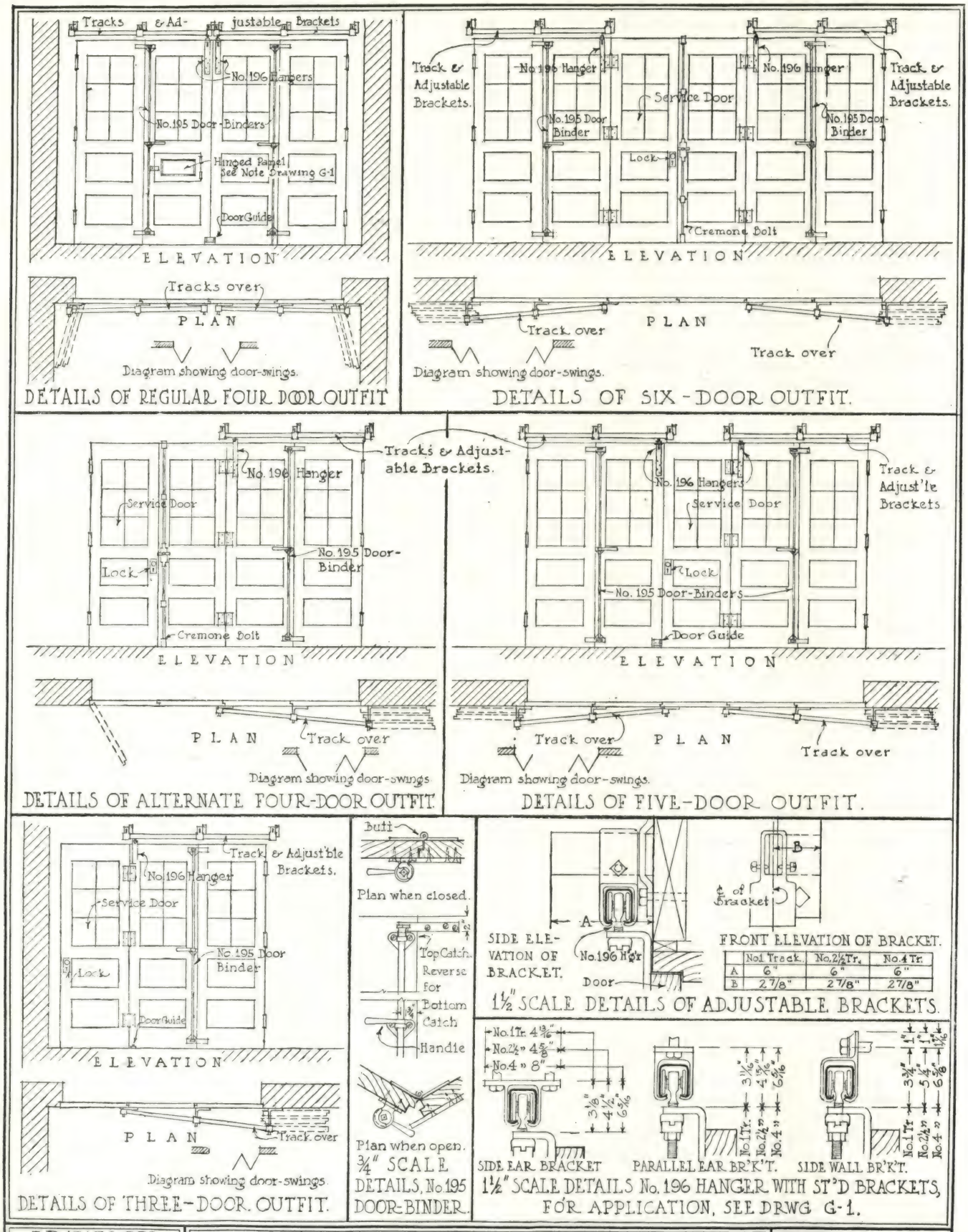


DRAWN BY SWEET'S CATALOGUE SERVICE INC.	FOLDING SLIDING GARAGE DOORS USING ADJUSTABLE BRACKETS WITH No. 196 COBURN HANGERS.	SCALE 3/16", 3/4", & 1½" EQUAL 1'-0" DATE, MAY 21	DRWG G2

McKINNEY MANUFACTURING COMPANY

Garage Door Hardware

MAIN OFFICE AND FACTORY

Liverpool and Metropolitan Streets

PITTSBURGH, PA.

WESTERN OFFICE, 702 Wrigley Building, CHICAGO, ILL.

SALES REPRESENTATIVES

NEW YORK, N. Y., JOHN H. GRAHAM & Co., 113 Chambers Street BALTIMORE, MD., HENRY KEIDEL & Co., 405-407 West Redwood Street
PACIFIC COAST, JOHN T. ROWNTREE, INC., LOS ANGELES, CAL.

Products

GARAGE DOOR HARDWARE, including Sliding-folding, Swinging and Around-the-corner Door Sets: Hinges, Holders, Latches, Hangers, Track, and Foot and Chain Bolts.

For Hinges and Builders' Hardware, see pages 1286-1287.

Garage Door Hardware

McKinney garage door hardware covers every requirement; it is the most complete line of hardware especially designed for garage use. There are hinges and butts for swinging doors, hangers and track of all kinds for sliding doors, and special complete sets and articles for sliding-folding garage doors and accordion doors.

McKinney garage door hardware is packed in efficient, convenient, complete sets (including track, bolts, screws, etc., but not locks), or can be specified item by item.

Other items of garage door hardware in addition to hinges and hangers are: latches, door bolts, bolts, handles, door holders, etc., for use on brick, stucco, metal and wooden garages.

3-Door Sliding-folding Set No. 9010

Set No. 9010 contains complete hardware, except lock, for a 3-door sliding-folding garage entrance, for openings 6 to 9 ft. wide. This entrance is attractive, even on elaborate garages. It closes absolutely weathertight into rabbet or weatherstripped door frames, just like a residence door. This insures a warm garage with no fuel waste.

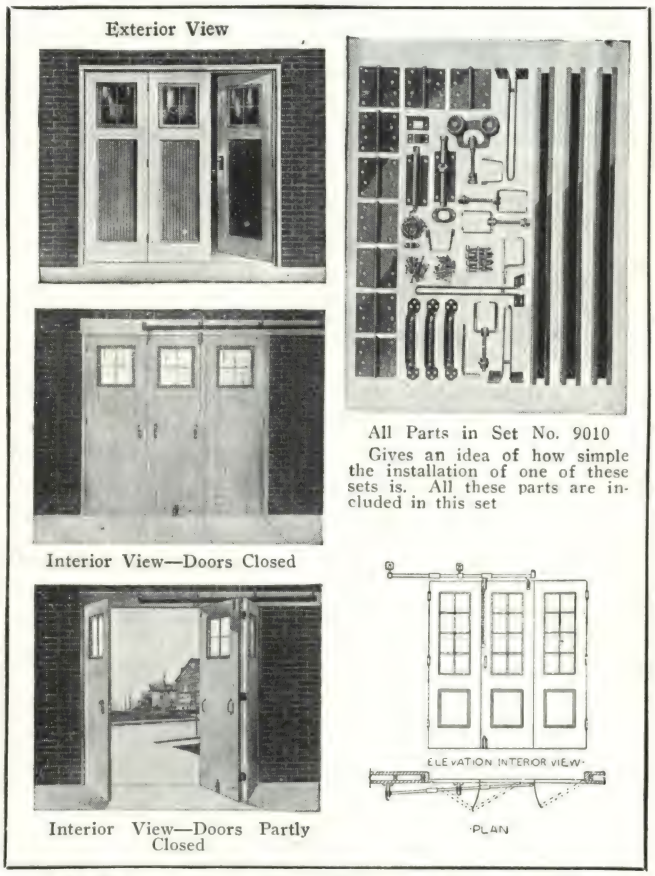
The three doors must be of equal width, not exceeding 3 ft. each. A minimum headroom of 8 in. must be allowed for track between the top of door opening and roof on the inside.

The items included in this set are shown in the illustration herewith. Directions and drawings for installing are included in each set. The track sections, assembled, are as strong as one single piece, and can not work loose. The hanger is adjustable to the thickness of the doors and has a vertical adjustment. Doors can be raised or lowered as the building settles, or if frost raises the floor.

Two doors are hinged together and attached to a side jamb. These doors, equipped with a sliding hanger, fold inside the garage out of the way. The third door is hinged to the opposite jamb to swing independently. All three doors can be hinged together as a unit if desired. The weight of the doors is carried by the sliding hanger; there is no sagging or sticking.

This entrance should swing in. All hardware is then protected from the weather, and it is not necessary to shovel snow away in winter before the door can be opened.

Doors may be swung out, but this is only necessary when inside floor space is insufficient. The maximum clearance required is only 3 ft., so outswinging installation is seldom necessary. If doors can not be hung to swing in, the use of an Around-the-corner set is recommended. (Sets Nos. 9020, 9023, and 9025.)



McKINNEY GARAGE DOOR HARDWARE SET NO. 9010

4-Door Sliding-folding Set No. 9015

This set contains complete hardware, except lock, for a 4-door sliding-folding garage entrance, for openings 9 to 12 ft. wide. It can be installed in any type of garage requiring four doors of equal width not exceeding 3 ft. each. Headroom allowance and floor clearance, etc., are the same as for the 9010 set except that in this 4-door set the fourth door must never be hinged to the other three—three doors being hinged together as one

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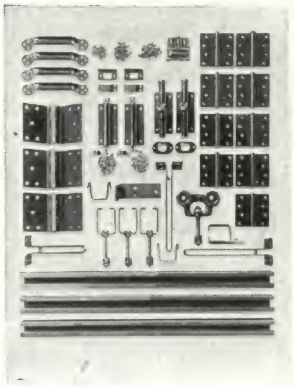
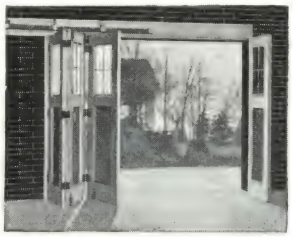
Exterior View—Service Door Open

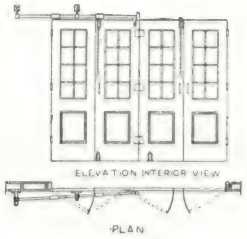


All Parts in Set No. 9015
Extra parts shown are necessary because of the four doors. Installation as simple as Set 9010

Interior View—Doors Closed

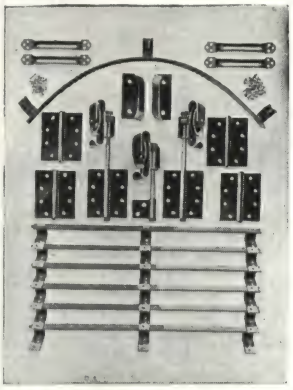


Interior View—Doors Partly Open



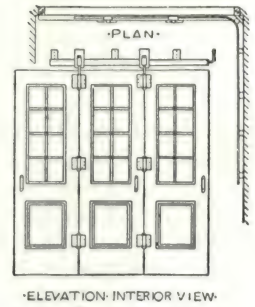
McKinney Garage Door Hardware Set No. 9015

Exterior View



All Parts in Set No. 9020
Note curved track section permitting entire garage door to slide along adjoining sidewall of garage

Interior View—Service Door Open



Interior View—Doors Open

McKinney Around-the-corner Garage Door Hardware Sets No. 9020 and No. 9023

unit, the fourth hinged to the opposite jamb. Details of the set and installation are illustrated herein.

3-Door Around-the-corner Set No. 9020, for Openings 6 to 8 ft. Wide

The 3-door Around-the-corner entrance can be used to close the entire garage front from wall to wall. No inside floor space for clearance is required. Three doors are hinged together as a unit. Equipped with swivel hangers they can be rolled on a continuous track around the corner, along one of the sidewalls, resting flat against the wall on the inside of the garage when open. This leaves the entrance perfectly clear. The doors round the corner in such a way that a car can stand within 5 or 6 in. of the doorway.

While doors may extend from wall to wall, it is necessary to have a small jamb, not less than 2½ in. wide, at each side against which doors may rest securely when closed. These jambs, overlapped by the doors, prevent snow, rain and cold from sweeping in. Doors overlap at the top, but to insure a complete weathertight entrance, a weatherstrip along the floor of the entrance just inside the closed doors, serving also as a floor guide, would aid. Minimum headroom of 8 in. must be allowed between the top of door opening and the roof on the inside of the garage for track.

Complete set No. 9020 contains all hardware, including track, but not lock, necessary to install a 3-door entrance as illustrated. Directions and drawings are included. The corner piece of track is machine turned and perfectly symmetrical. The swivel hangers are provided with vertical adjustment for raising or lowering doors to maintain proper floor clearance.

The track sections, attached to the inside of the garage form a continuous runway. Two sections are placed along the head jamb above the door opening, while the other two are attached to the adjoining wall. Both straight runs join the curved piece in the corner. The entrance is locked to one of the side jambs. The single door with the lock swings inward as any ordinary door for use as a service door.

By using two complete sets, this set can be used to close a 2-car garage; one unit slides to one sidewall, the other unit to the opposite wall. The two units meet in the center when closed, and are locked as any pair of swinging doors. A post or pillar can be placed in the center of doorway if space permits. This set is also recommended for multiple garages with separate stalls.

3-Door Around-the-corner Set No. 9023, for Openings 8 to 10 ft. Wide

This set is practically identical with set No. 9020, except that more track is included. In this set the maximum width of each door section is 3 ft. 4 in.

4-Door Around-the-corner Set No. 9025, for Openings 10 to 13 ft. Wide

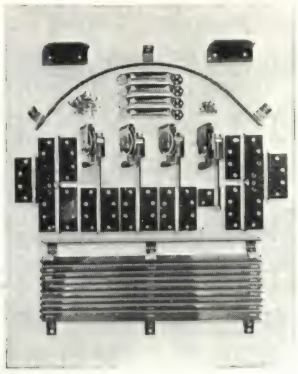
This set is similar to the preceding sets, Nos. 9020 and 9023, except that it provides track and hangers for four door sections. As in the other sets, no lock is provided.

Clearances, both floor and overhead, jambs, weatherstrips, etc., are the same.

The 4-door Around-the-corner set is the most practical for use on narrow garages, for either one or two cars. It is also well suited for use on garages of the

Continued on next page

Exterior View

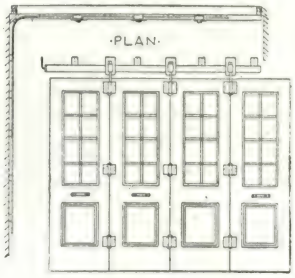


All Parts in Set No. 9025

Easy to install and makes possible the swinging of a four-door entrance around corner inside the garage

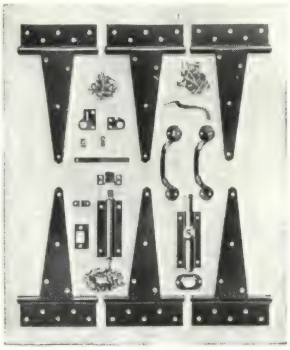
Exterior View—Doors Open

Interior View—Service Door Open



McKinney Around-the-corner Garage Door Hardware
Set No. 9025

Exterior View

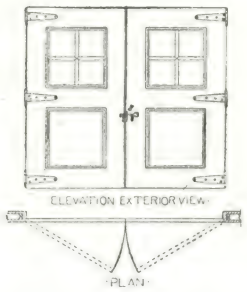


All Parts in Set No. 1922

Note comparative size and construction of hinges, foot bolt, chain bolt and inset handle making this an ideal installation for this type of opening

Interior View

The McKinney hinges provided with this installation prevent doors from sagging. Their use assures easy swinging and perfectly aligned doors. Foot and chain bolts and door latch operate easily permitting doors to be opened without trouble



McKinney Double Swinging Garage Door Hardware
Set No. 1922

multiple type. When used on this type, however, the separate stalls must be divided by partitions which can be used as jambs.

Double Door Swinging Entrance Set No. 1922

A very simple and attractive entrance easily and quickly installed on any type of garage. It fits in equally well on plain or the more elaborate type garages. When used on more than one-car garage, it is necessary to use a separate entrance across space taken up by each car stored.

Set No. 1922 contains all hardware required for this simple installation, except a padlock.

Garage doors equipped with this set swing easily at all times and close weathertight. The 10-in. extra heavy T-hinges have reversed pads mortised to jambs. The thumb latch comes with two padlock keepers or eyes for securing. The handle and foot and chain bolts of wrought steel, designed especially for this type building. All items finished in dead black japan.

Garage Door Holder No. 1930

Holder No. 1930 automatically locks garage doors open and holds them there, secure against the strongest wind, protecting the car as it enters or leaves, a safeguard and economy every garage owner appreciates.

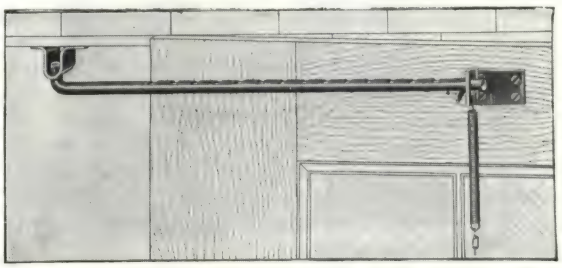
Separate Items of Garage Door Hardware

All items included in the sets described herein may be obtained separately. Special heavy garage door hinges with antifriction washers (No. 1840) are also furnished, with 10-, 18-, and 24-in. straps.

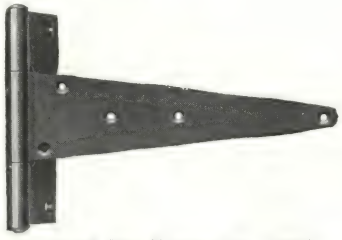
Catalogue sent on request. In writing please indicate nature of catalogue desired.

Foot Bolt No. 1960

Chain Bolt No. 1965



Garage Door Holder No. 1930



Reversed Pad T-hinge No. 1809½

McKinney Hardware for Sliding and Swinging Doors

FRANTZ MANUFACTURING CO.

Manufacturers of Builders' Hardware

STERLING, ILL.

Products

GARAGE and BARN DOOR HARDWARE; DOOR BOLTS and LATCHES; WINDOW HARDWARE; STORM SASH HANGERS; DOOR and WINDOW SCREEN HARDWARE.

"Glide" Sliding Door Hangers and Track

No. 1 "Glide" Barn Door Hanger and Track—The original watershed track. A combined track and cover in one piece. Absolutely birdproof. Impossible to derail hanger. No lateral adjustment is required, as the hanger is fastened to the back or inside of door, hence it makes no difference what thickness of door is used; all that is necessary is to use bolts of proper length. This feature eliminates the necessity of blocking out the track for thick doors.

"Glide" hangers have larger wheels, axles and steel roller bearings than other enclosed hangers, all of which make for ease of operation and durability. They are japanned before assembling. The wheels are machined on the tread to make them perfectly true, and are drilled and reamed after japanning which insures perfect and easy running. For details, see page 1237. Note the wide, free runway for wheels. It is virtually the same as a flat surface. This does away with friction and prevents any chance of wheels binding in track.

Packed 1 pair in a box, complete with bolts, lag screws, socket wrench, name plates, direction sheet and end stops for track; 12 pairs in a case.

Weight per dozen pairs, 87½ lbs.

No. 2 "Glide" Barn Door Hanger and Track—"Glide" hangers require no lateral adjustment, as they are fastened to inside of door, and all doors are carried just the right distance from the building, hence the necessity for lateral adjustment is avoided.

There are times, however, when a vertical adjustment is desirable, which is our reason for building this construction. The adjusting nut is inside of the building away from the weather, which can not be said of any other adjustable hanger. This insures an easy adjustment at all times, as the nut will not rust tight on the bolt like it would if it were placed on outside of door and exposed to weather conditions. For details, see page 1237. Note the door is carried just the right distance from the building and is coupled up close to track. This prevents any drip on top of door.

Everything is furnished for a complete job, there being no brackets to look after and the lags, end stops and socket wrench are packed in paper carton containing hangers, thus eliminating errors or shortages.

Packed 1 pair in a box with bolts, lag screws, socket wrench, name plates, directions, end stops for track, steel adjusting wrench and paper template for guidance in attaching to door; 12 pairs in a case.

Weight per dozen pairs, 87½ lbs.

No. 0 "Glide" Barn Door Hanger—Rigid and non-adjustable. Designed for those who do not care for the flexible feature. It can be used with "Hi-Lo" track where price is a consideration. Like both No. 1 and No. 2 "Glide" hangers, the drop strap of No. 0 hanger is fastened to inside of door, permitting hanging of any thickness of door with perfect ease. The track is same as used in No. 1 "Glide" hanger and is as strong, easy running and durable. For details, see page 1237.

Packed 1 pair in a box, with bolts, lag screws, socket wrench, name plates, directions and end stops for track, 12 pairs in a case.

Weight per dozen pairs, 85 lbs.

"Hi-Lo" Sliding Door Hangers and Track

"Hi-Lo" Track for Single or Double Folding Garage Doors—Patented June 20, 1921. A semi-watershed roofed type of track large enough to carry all styles of "Glide" hangers. Strong enough for the average barn door, but does not furnish the weather protection that "Glide" track gives. A one-piece track, telescoping at joints, requiring no brackets; birdproof. When used with No. 0 "Glide" hangers, a medium priced outfit can be secured. There is an oilhole in each piece of track, so hangers can be readily oiled if desired. For details, see page 1237.

Furnished in 6-, 8- and 10-ft. lengths, bundled for shipping as follows:

6-ft. lengths	4 pieces	24 ft.
8-ft. lengths	4 pieces	32 ft.
10-ft. lengths	4 pieces	40 ft.

Weight, 145 lbs. per 100 ft.

No. 6 "Hi-Lo" Swivel Hanger for Single or Double Folding Doors—Patents pending. Designed principally for garage work and particularly for heavy doors, but can be used for factory or warehouse doors on straight runs. Can be used with "Hi-Lo" track for inside work or with "Glide" track for outside jobs.

By using "Hi-Lo" track and No. 6 "Hi-Lo" swivel hanger, any combination of doors may be hung, either inside or outside of building, fitting in jamb like a hinged swinging door. For details, see page 1239. Note adjusting nuts and lock washer. These, in addition to adjusting brackets, make a very convenient arrangement in cases where building sags or where floors are raised by frost.

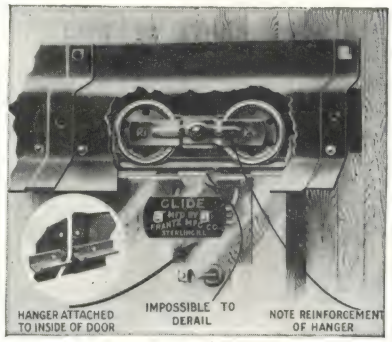
Packed 1 pair in a box, with bolts, lag screws, socket wrench and directions.

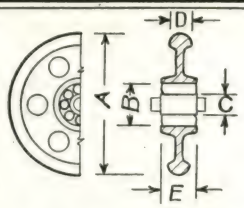
Weight per dozen pairs, 102 lbs.

No. 60 "Hi-Lo" Swivel Hanger for Double Folding Garage Doors—Patent applied for. Made entirely of steel, excepting wheels, which are same as used in "Glide" hangers. Designed for "Hi-Lo" track, but "Glide" track can be used if desired. Amply strong for heavy doors. With this hanger, the track is fastened to building in same manner as ordinary sliding door track. No brackets required.

No. 60 "Hi-Lo" swivel hanger, while very substantial, is simple in construction. Takes no expert to hang doors. Provides an economical installation. For details, see page 1239. Note vertical adjustment for raising or lowering doors, which is kept from loosening by lock washer.

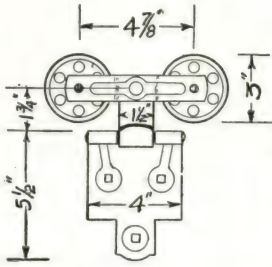
Continued on next page



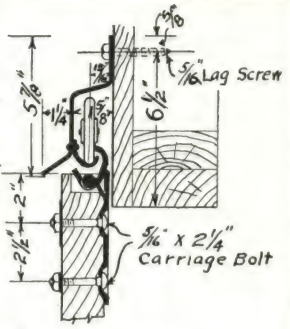


	GLIDE	RUNWEL	ROLLAWAY
A	3"	2¼"	1¾"
B	⅞"	¾"	9/16"
C	7/16"	⅜"	5/16"
D	1/16"	11/32"	¼"
E	¾"	9/16"	7/16"

WHEEL DETAILS

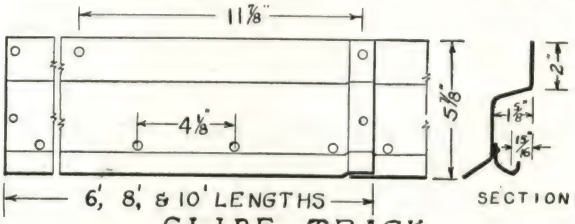


1½" SCALE ELEVATION



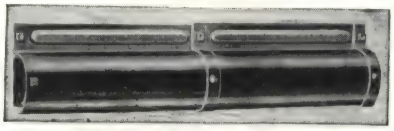
1½" SCALE SECTION THRU SET-UP

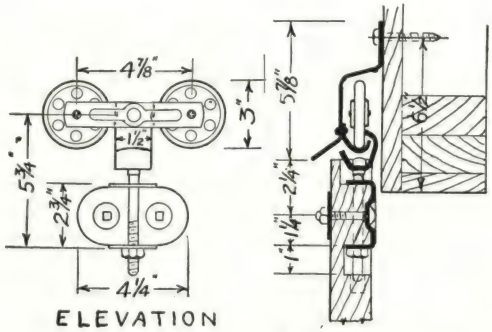
GLIDE NO. 1



SECTION

GLIDE TRACK

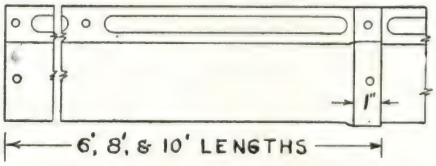




ELEVATION
1½" SCALE

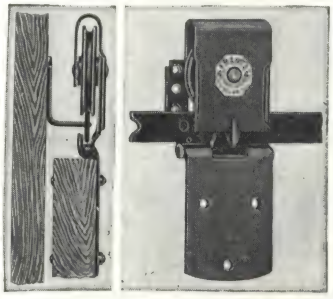
SECTION THRU SET-UP

GLIDE NO. 2

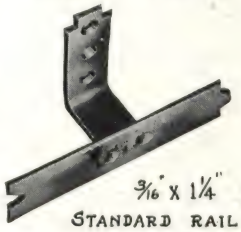


SECTION

NI-LO RUNWEL ROLLAWAY TRACK

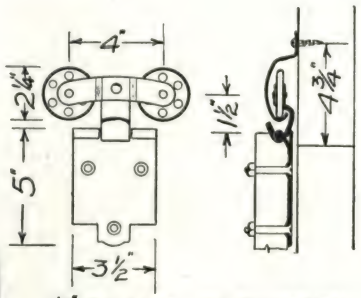


No. 44
DIAMETER OF TREAD 3"

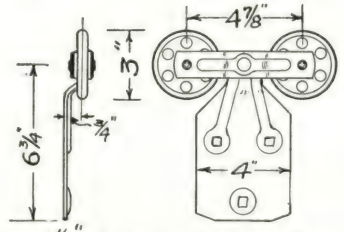


STANDARD RAIL

No. 33
SAME WHEEL AS No. 44

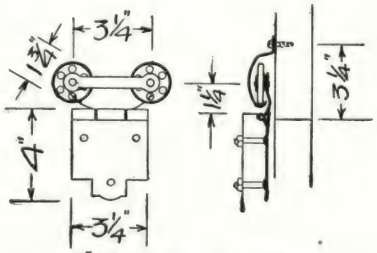


1½" SCALE ELEVATION
NO. 12 RUNWEL



1½" SCALE ELEVATIONS

GLIDE NO. 0.



1½" SCALE ELEVATION
NO. 3½ ROLLAWAY.

FRANTZ MFG CO. STERLING, ILL	GLIDE, HILO, RUNWEL, ROLLAWAY & STANDARD TRACK & HANGERS	SHEET 2 SCALE 1½"=1'-0"

Continued on next page

Packed 1 hanger only in paper carton with bolts, directions, end stops and lag screws for track. Not sold in pairs.

Weight per hanger, 4½ lbs. (See No. 60 E-Z garage set.)

"Runwel" Sliding Door Hangers and Track

No. 12 "Runwel" Hanger and Track—Patented June 20, 1921. A trolley track with semiwatershed, made of one piece of steel, telescoping at joints, doing away with the expense and annoyance of brackets. For details, see page 1237.

Made of good heavy steel and strong enough for the average barn door. Absolutely birdproof. Impossible to derail hanger. "Runwel" track is fastened to building with lag screws 1 ft. apart. The lag screws are packed in a paper carton containing hangers. There is an oilhole in each section of track, so hangers can be readily oiled if desired.

Like the "Glide," the "Runwel" hanger does not require lateral adjustment, as it is fastened to back or inside of door, which permits hanging of any thickness of door with perfect ease.

"Runwel" hangers have roller bearings, wheels and axles machined, which in addition to free runway for wheels, insures perfect and easy running. When door is in normal position, it is carried just the right distance from building. Hanger is perfectly rigid and there is no vibration of door as in other flexible hangers. At the same time, the hinge joint allows door to swing out at bottom, in case anything should bump against it.

Weight, 140 lbs. per 100 ft.

Packed 1 pair in a box, with bolts, lag screws, socket wrench, directions and end stops for track; 12 pairs in a case, weighing 51 lbs.

"Runwel" track is made in 6-, 8- and 10-ft. lengths and is bundled for shipping as follows:

6-ft. lengths	4 pieces	24 ft.
8-ft. lengths	4 pieces	32 ft.
10-ft. lengths	4 pieces	40 ft.

No. 15 "Runwel" Swivel Hanger for Single or Double Doors—Patents pending. Constructed along lines of No. 6 "Hi-Lo" hanger. Designed to run in "Runwel" track where it is desired to carry door around corner using "Runwel" curve. Can also be used for a square turn job, single or double doors. For details, see page 1239. Also adapted for hinged folding doors. Apply strong for the average garage door.

Packed 1 pair in a box, with bolts, lag screws, socket wrench, directions and end stops for track. Also packed, if desired, in No. Y and No. Z garage sets.

Weight per dozen pairs, 52 lbs.

No. 50 "Runwel" Swivel Hanger for Double Folding Doors—Patent applied for. Of same general construction as No. 60 "Hi-Lo" hanger. Wheels same as used in other styles of "Runwel" hangers. No. 50 "Runwel" hanger is designed to run in "Runwel" track. Strong enough for ordinary garage door. Can be used on any warehouse or store door where two or more doors are hinged together, operates on straight track folding back parallel with front of building when opened. No brackets required. For details, see page 1239.

Note adjusting feature. Doors can be raised or lowered as desired. Adjustment kept in position by lock washer.

Packed 1 hanger only in a paper carton with bolts, directions, end stops and lag screws for track. Not sold in pairs.

Weight per hanger, 3¾ lbs.

"Runwel" Corner Curve—Permits door to run back and away from opening any distance desired. See page 1238.

It is not absolutely necessary to use it as the No. 15 "Runwel" hanger will throw door back clear of opening, even if only straight pieces of track are used. It is simply an additional convenience.

The curve is embossed on one end same as straight track and telescopes, making a neat and complete joint. No joint brackets required. There is an oilhole in each curve for convenience in oiling hangers.

Curve can be used on double doors equally as well as on single doors. Doors can be made solid or may be divided and hinged together. Any number of doors can be hinged together and run in one direction or two curves may be used, running one-half the doors in one direction and the other half in the other direction. In other words, by using corner curve, one may have as simple or elaborate job as desired.

"Rollaway" Sliding Door Hangers and Track

No. 3½ "Rollaway" Hanger—Rigid and flexible. For details, see page 1237. When door is in normal position, the hanger is perfectly rigid and there is no vibration of door as in other flexible hangers. At the same time, the hinge joint allows door to swing out at bottom in case anything should bump against it.

No. 3½ "Rollaway" hangers, like the "Glide" hangers, are attached to inside of door, so that any thickness of door may be used. No adjustment is necessary.

Packed 1 pair in a box, with bolts, lag screws, socket wrench and end stops for track; 12 pairs in a case.

Weight per dozen pairs, 31½ lbs.

No. 5 "Rollaway" Swivel Hanger for Single or Double Garage Doors—Patents pending. Designed to run in "Rollaway" track. Constructed like No. 6 "Hi-Lo" and No. 15 "Runwel" hangers. Used with No. 5-Y and No. 5-Z garage sets. For details, see page 1239.

Intended for light doors and in making up an inexpensive outfit.

Packed 1 pair in a box, with screws, lag screws, socket wrench, end stops for track and directions; 12 pairs in a case.

Weight per dozen pairs, 40 lbs.

"Rollaway" Track—Patented June 20, 1921. A one-piece slip joint roofed track of the semiwatershed type, designed especially for garage work. Requires no brackets. Telescopes at joints. A combined track and cover in one piece. There is an oilhole in each section of track so hangers can be readily oiled if desired. For details, see page 1239.

"Rollaway" track is made in 4-, 5-, 6-, 8- and 10-ft. lengths and is bundled for shipping as follows:

4-ft. lengths	6 pieces	24 ft.
5-ft. lengths	4 pieces	20 ft.
6-ft. lengths	4 pieces	24 ft.
8-ft. lengths	4 pieces	32 ft.
10-ft. lengths	4 pieces	40 ft.

Weight, 90 lbs. per 100 ft.

Sliding Door Garage Sets

No. 15-Y Three-door Set—Patents pending. Details on page 1241 show how it is applied and what an ideal job is obtainable through its use.

The separate passage door is especially desirable, as the rolling door need only be moved when taking car in or out. Doors can be hung to fit snugly in jamb, assuring a weatherproof job. Very little space required in operating doors. Furnished in japan finish.

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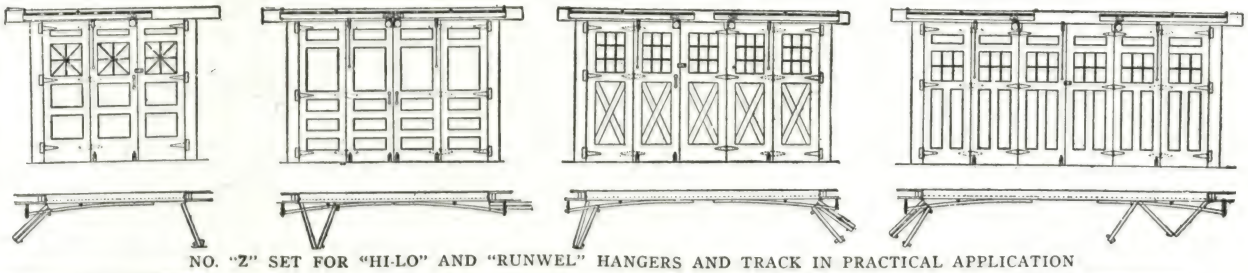
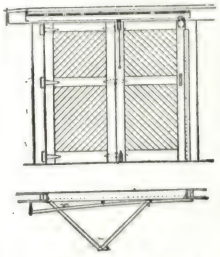
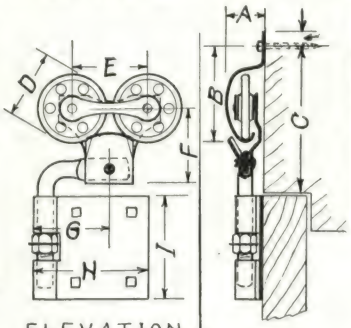


NO. "Z" SET FOR "HI-LO" AND "RUNWEL" HANGERS AND TRACK IN PRACTICAL APPLICATION



NO. "Z" SET FOR "HI-LO" AND "RUNWEL" HANGERS AND TRACK

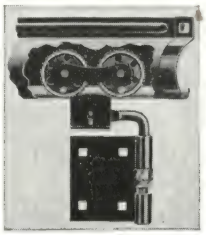
NOTE
ALL GLIDE AND HI-LO HANGERS AND TRACK ARE INTERCHANGEABLE



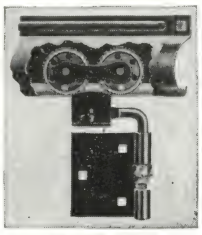
ELEVATION

SECTION THRU HEAD OF DOOR

DETAILS OF SWIVEL HANGER



NO. 6 HI-LO

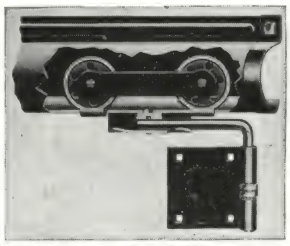


NO. 15 RUNWEL

NO. 5 ROLLAWAY

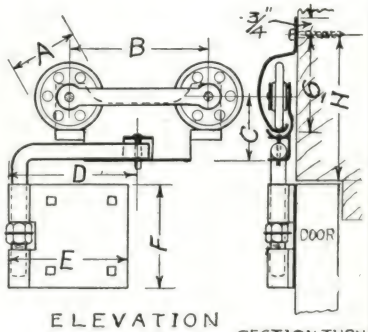
DIMENSIONS

	A	B	C	D	E	F	G	H	I
HI-LO NO. 6	1¾"	4¼"	6"	3"	3⅛"	3"	3¼"	5"	4½
RUNWEL NO. 15	1½"	3½"	5¼"	2¼"	2⅜"	2½"	2⅜"	3⅜"	4"
ROLLAWAY NO. 5	1⅛"	2⅝"	4¼"	1¾"	1⅞"	2"	2"	2⅝"	4"



NO. 60 HI-LO

NOTE
E-Z SETS WORK WITH TRACK FLAT ON IN- OR OUT-SIDE OF BUILDING



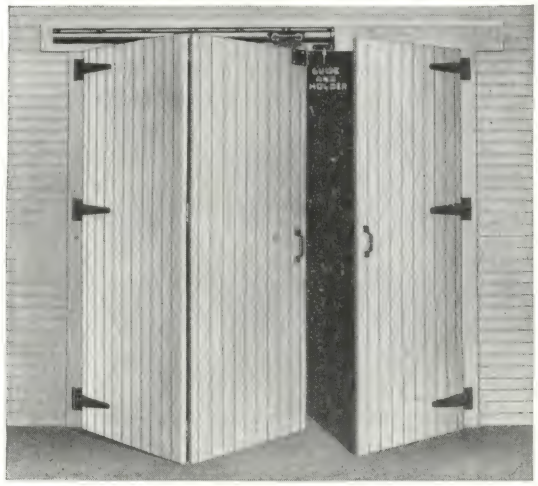
ELEVATION

SECTION THRU HEAD OF DOOR

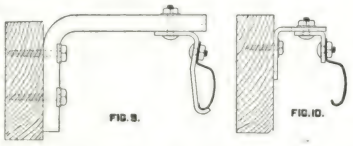
1½" SCALE DETAILS OF NO. 50 & 60 SWIVEL HANGER

DIMENSIONS

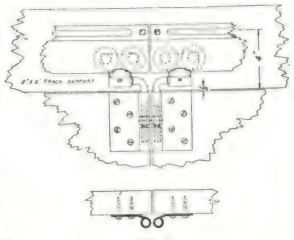
	A	B	C	D	E	F	G	H
HI-LO No. 60	3"	5⅞"	2⅞"	5½"	5"	4½"	4¼"	6"
RUNWEL No. 50	2¼"	5⅞"	2½"	5½"	5"	4½"	3½"	5¼"



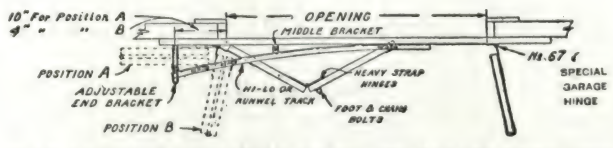
THREE DOOR No. 50 or 60 "E-Z" SET IN ACTUAL USE



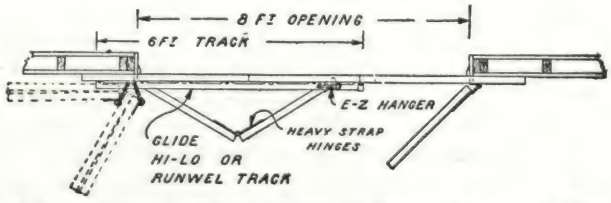
End and Center Brackets for "Z" Sets.



Position of Hangers for 4 Doors



PLAN SHOWING OPERATION OF NO. "Z" GARAGE DOOR SETS



PLAN SHOWING OPERATION OF "E-Z" GARAGE DOOR SETS

FRANTZ MFG. CO., STERLING, ILL	"Z" & "E-Z" GARAGE SETS	SHEET - 3 SCALE 1½" = 1'-0"

Continued on next page

The following items go to make up this set, exclusive of "Runwel" track and curve:

3 only No. 15 "Runwel" hangers with bolts
3 only 8-in. No. 67 special garage hinges with screws
3 only 6-in. heavy strap hinges with screws
2 only No. 205 floor guides with bolts
2 only No. 31½ door pulls with screws
2 only end stops for "Runwel" track
19 only ⅜ by 1½-in. coach screws for "Runwel" track
1 only socket wrench for coach screws

Packed one 3-door set in a strong box, complete, including directions.

Weight per set, not including "Runwel" track and curve, 18½ lbs.

No. 15-Z Two-door Set—In rare instances it may be desired to have but 2 doors in an opening as shown on page 1239. This method is, of course, less expensive, as it requires less hardware as well as less labor in erecting. This job requires the following fixtures in addition to track.

1 only No. 15 "Runwel" swivel hanger with bolts
3 only 8-in. No. 67 special garage hinges with screws
3 only 6-in. heavy strap hinges with screws
1 only No. 625 chain bolt with screws
1 only No. 650 foot bolt with screws
1 only No. 15-Z end bracket for track with bolt and clips
1 only No. 15-Z center bracket for track with bolts and washers
1 only No. 31½ door pull with screws
5 only coach screws for track and brackets

No latch furnished with this set.

Furnished in japan finish. Set packed complete in paper carton, not including track.

For large and heavy doors use No. 6-Z set, which can be furnished by substituting No. 6 "Hi-Lo" hangers and track, and larger hinges. For light doors and an inexpensive outfit use "Rollaway" hangers and track. Length of track on this 2-door job should be 10 in. more than door opening. Reversible loose pin tee hinges may be used if desired.

No. 15-Z Three-door Set—For details, see page 1239, for 3-door job (2 folding doors with separate passage door). This manner of installation requires the following fixtures in addition to track:

1 only No. 15 "Runwel" swivel hanger with bolts
6 only 8-in. No. 67 special garage hinges with screws
3 only 6-in. heavy strap hinges with screws
1 only No. 625 chain bolt with screws
1 only No. 650 foot bolt with screws
1 only No. 205 floor guide with bolts
1 only No. 15-Z end bracket for track with bolts and clips
1 only No. 15-Z center bracket for track with bolts and washers
3 only No. 31½ door pulls with screws
1 only No. 22 "Positive" latch with screws
5 only coach screws for track and brackets

Furnished in japan finish. Set packed complete in a paper carton, not including track.

For large and heavy doors use No. 6-Z set, which can be furnished by substituting No. 6 "Hi-Lo" hangers and track, and larger hinges. For light and inexpensive outfit, use "Rollaway" hangers and track.

Length of track on this 3-door job should be at least 10 in. more than total width of 2 folding doors. Reversible loose pin tee hinges may be used if desired.

No. 15-Z Four-door Set—For details, see page 1239, for 4-door job without separate passage door. This job requires the following fixtures in addition to track:

1 pair No. 15 "Runwel" hangers with bolts
3 pairs 8-in. No. 67 special garage hinges with screws
3 pairs 6-in. heavy strap hinges with screws
2 only No. 625 chain bolts with screws
2 only No. 650 foot bolts with screws
1 only No. 205 floor guide with bolts
2 only No. 15-Z end brackets for track with bolts and clips
2 only No. 15-Z center brackets for track with bolts and washers
2 only No. 31½ door pulls with screws
10 only coach screws for track and brackets

No latch furnished with this set. Length of track should be 20 in. more than width of door opening.

Furnished in japan finish. Set packed complete in paper carton, not including track.

For large and heavy doors use No. 6-Z set, which can be furnished by substituting No. 6 "Hi-Lo" hangers and track, and larger hinges. For light and inexpensive outfit, use "Rollaway" hangers and track. Reversible loose pin tee hinges may be used if desired.

No. 15-Z Five-door Set—For details, see page 1239, for 5-door job (2 sets of hinged folding doors with separate passage door). With this plan, but very little space is consumed at rear of machine. This job requires following fixtures in addition to track:

1 pair No. 15 "Runwel" hangers with bolts
9 only 8-in. No. 67 special garage hinges with screws
3 pairs 6-in. heavy strap hinges with screws
2 only No. 625 chain bolts with screws
3 only No. 650 foot bolts with screws
1 only No. 205 floor guide with bolts
2 only No. 15-Z end brackets for track with bolt and clips
2 only No. 15-Z center brackets for track with bolts and washers
3 only No. 31½ door pulls with screws
1 only No. 22 latch with screws
10 coach screws for track and brackets

Furnished in japan finish. Set packed complete in a paper carton, not including track.

For large and heavy doors use No. 6-Z set, which can be furnished by substituting No. 6 "Hi-Lo" hangers and track, and larger hinges.

For light and inexpensive outfit, use "Rollaway" hangers and track.

Length of track should be 20 in. more than width of 4 folding doors. Reversible loose pin tee hinges may be used if desired.

No. 15-Z Six-door Set—For details, see page 1239, for 6-door job for extra large opening (2 sets of folding doors, 3 to each set). In this plan, either of the 2 center doors may be used as a passage or entrance door. This job requires following fixtures in addition to track:

1 pair No. 15 "Runwel" hangers with bolts
6 pairs 8-in. No. 67 special garage hinges with screws
3 pairs 6-in. heavy strap hinges with screws
3 only No. 625 chain bolts with screws
3 only No. 650 foot bolts with screws
2 only No. 15-Z end bracket for track with bolts and clips
2 only No. 15-Z center brackets for track with bolts and washers
4 only No. 31½ door pulls with screws
1 only No. 22 latch with screws
10 only coach screws for track and brackets

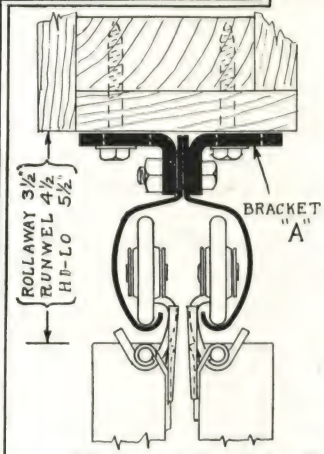
Furnished in japan finish. Set packed complete in paper carton, not including track.

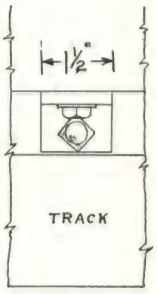
For large and heavy doors use No. 6-Z set, which can be furnished by substituting No. 6 "Hi-Lo" hangers and track, and larger hinges. For light and inexpensive outfit, use "Rollaway" hangers and track. Length of track should be 20 in. more than width of 4 folding doors. Reversible loose pin tee hinges may be used if desired.

No. 60 E-Z Three-door Set—The last word in garage construction. Easy to erect; easy of operation. With this construction, a perfect installation is assured. As weatherproof as any swinging door job and doors can be hung in any combination desired.

Doors can be used inside or outside of building and opened at any angle as conditions require. No

Continued on next page

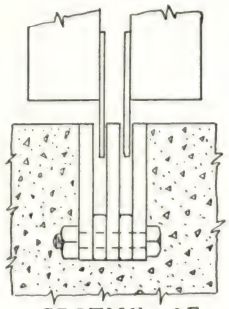




ELEVATION

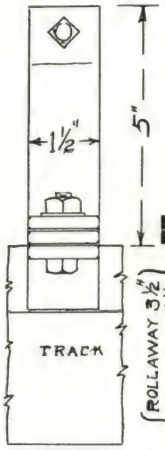
DETAILS OF BRACKET "A"

NOTE- GLIDE TRACK ALSO USED WITH BRACKETS "A" & "B"



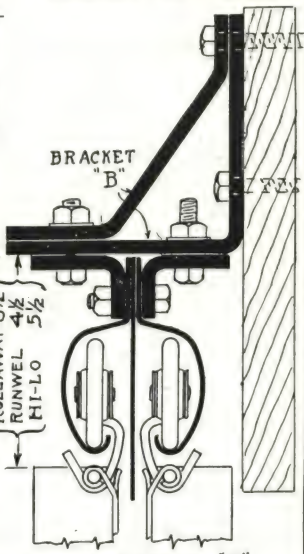
SECTION OF FLOOR GUIDE

BRACKETS FOR PARALLEL TRACK

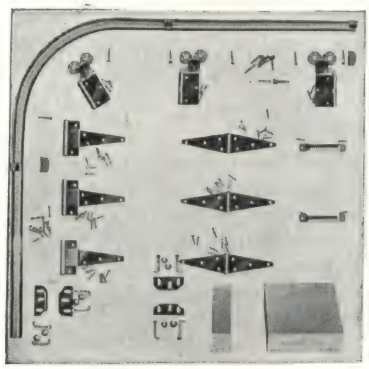


ELEVATION

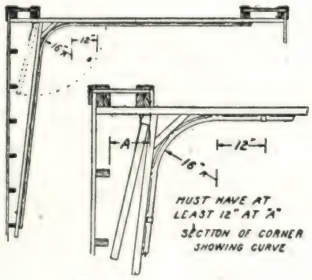
3" SCALE



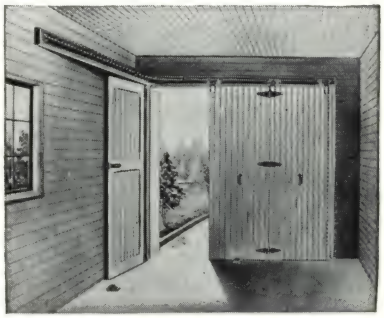
DETAILS OF BRACKET "B"



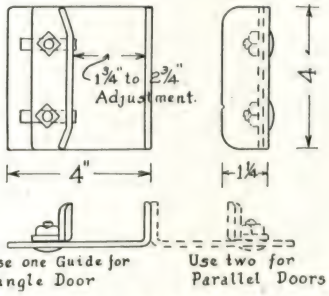
NO. 5Y—SET AS PACKED—NO. 15Y



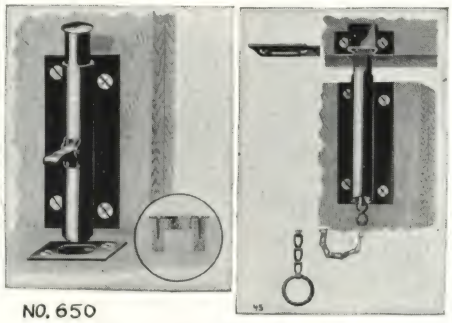
PLAN OF "Y" SET



"Y" SET IN OPERATION
NO. 5Y—NO. 15Y

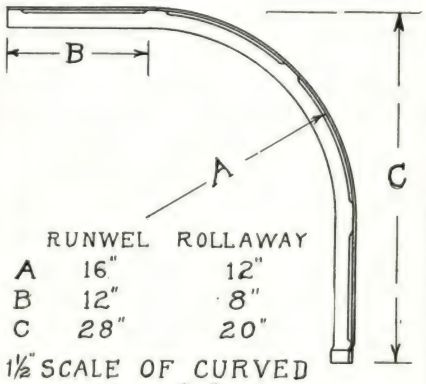


No 206 FLOOR GUIDE



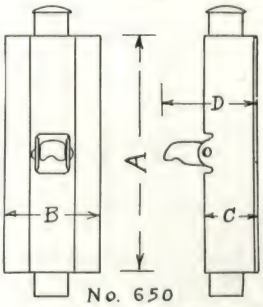
NO. 650

NO. 625

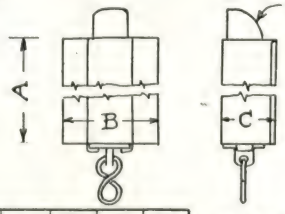


	RUNWEL	ROLLAWAY
A	16"	12"
B	12"	8"
C	28"	20"

1½" SCALE OF CURVED TRACK FOR "Y" SETS



No. 650
FOOT BOLT

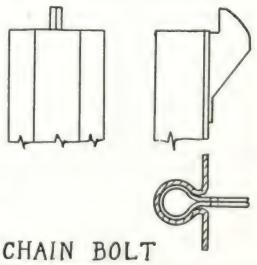


SIZE OF BOLT	A	B	C	D
6 inch	5"	2"	1⅛	2
9 inch	7½	2½	1¼	2¼

No 625
CHAIN BOLT

6" and 9" FOOT and CHAIN BOLTS

NOTE- This bolt is used with the No 50 & 60 E-Z Garage Sets



MADE IN 6" & 9" SIZES

OFFSET CHAIN BOLT

FRANTZ MFG CO. STERLING ILL	FRANTZ PARALLEL TRACK, "Y" GARAGE SETS, FLOOR GUIDES AND FOOT AND CHAIN BOLTS.	SHEET 4 SCALE 1½" & 3" = 1'-0"

Continued on next page

brackets necessary. Track is fastened against wall of building. For details, see page 1239.

This equipment is more satisfactory for barns than the regular sliding door, as it keeps the barn much warmer and requires less track.

Packed one 3-door set in a strong box as follows:

1 only No. 60 "Hi-Lo" hanger with bolts
3 pairs 10-in. No. 67 special garage hinges with screws
3 only 8-in. heavy strap hinges with screws
1 only No. 625 chain bolt with screws
2 only No. 650 foot bolts with screws
2 only No. 29 door pulls with screws
Lag screws and complete directions for erecting

Furnished in japan finish.

Weight per set, not including track, 26 lbs.

Track Brackets

For details, see page 1239. One end bracket and one center bracket packed with every "Z" garage set. Intermediate brackets or combination of end and center brackets furnished, if desired, for extra wide doors or for long run of track.

Instructions for Hanging Parallel Track with "Frantz" Parallel Track Brackets

No. B sidewall bracket is used in connection with No. A bracket in hanging "Glide," "Hi-Lo," "Runwel" and "Rollaway" track parallel, as shown on page 1241.

It is sometimes desirable to hang parallel doors on side of wall, which can be placed either inside or outside of building, as illustrated. Brackets used in illustration are combination of No. A and No. B. Brackets should be placed every 2 ft. for average door; every foot for extra heavy doors. Lag screws for fastening bracket to building will be found in carton containing hangers. Parting strip furnished in 6-, 8- and 10-ft. lengths.

Floor guide furnished if desired. Prices and full description on request. In writing, mention width of opening, etc.

Swinging Door Garage Hinges

No. 67 Special Garage Hinge—For details, see page 1247. The special object of No. 67 is to swing door back entirely clear of opening. It can be used without mortising by having door flush with casing.

Furnished in japan and dead black japan finishes.

Packed 1 pair in a box, with screws. Made in 4 sizes: length of strap, 8, 10, 14 and 18 in.; weight, 26¼, 40, 69 and 78½ lbs. respectively. All sizes are embossed, adding greatly to their strength.

No. 76 Extra Heavy "T" Hinge—For use in any place where a loose pin hinge is desired. For details, see page 1247. The smaller sizes are especially adapted for doors on hog stalls in hog houses, where doors are only used part of the time and must be removable. Larger sizes used extensively in garage work and particularly in swinging door sets. Very desirable in brick or stone construction to reverse pad on hinge, which can be done by simply removing pin.

Furnished in bulk or 1 pair in a paper carton, with screws. Made in following sizes: 5, 6, 8 and 10 in.; weight, 11¾, 22¾, 32 and 45 lbs. respectively.

No. 670 Offset Garage Hinge—Made of extra heavy steel. Especially designed for larger garage doors. Allows use of entire opening as door is swung back out of the way. For details, see page 1247. It is easily applied. Mortising unnecessary. Note the bronze roller bearing washers fitted between hinge joints. This causes heaviest door to open and shut with perfect ease. Leaf of hinge is embossed, which not only adds to its strength, but to its ornamentation as well. Holes in leaf of hinge have combination countersink and either carriage bolts, lag screws or wood screws can be used in fastening hinge to door. Holes in pad countersunk for wood screws.

Made in 2 sizes: length, 12 and 24 in.; weight per pair, 6½ and 9 lbs. respectively.

Furnished in japan and dead black japan finishes.

Packed 1 pair in a package, with screws.

No. 760 Garage Hinge—Exceptionally strong and able to carry the heavier doors. This is done with perfect ease, as the roller bearings avoid any friction. For details, see page 1247. The long leaf, in addition to the embossing, gives this hinge exceptional strength and prevents door from sagging.

Time and labor are saved in hanging doors on these hinges, as jamb only is mortised, door put in place and surface leaf applied to face of door with either carriage bolts, lag screws or wood screws. Holes in leaf have combination countersink. Holes in pad are countersunk for wood screws.

Made in 2 sizes: length, 10 and 24 in.; weight per pair, 6 and 9 lbs. respectively.

Furnished in japan and dead black japan finishes.

Packed 1 pair in a package, with screws.

Swinging Door Garage Sets

No. 400 Garage Door Set—Designed for medium priced outfit. Doors hung with 8-in. No. 67 special garage hinges. These should be put on surface and used as full surface hinges. For details, see page 1247. Set consists of the following:

3 pairs 8-in. No. 67 special garage hinges
1 only No. 22 "Positive" door latch
1 only No. 30 door pull
1 only No. 625 chain bolt
1 only No. 650 foot bolt

Furnished in japan and dead black japan finishes.

Packed 1 set in a box, with screws.

Weight per set, 10½ lbs.

No. 28 garage latch can be furnished with this set, if desired, at small additional cost.

No. 401 Garage Door Set—Same as No. 400 except 10-in. No. 67 special garage hinges are packed in place of the 8-in. hinges.

Weight per set, 13½ lbs.

No. 28 garage latch can be furnished with this set, if desired, at small additional cost.

No. 410 Garage Door Set—Using our 8-in. No. 76 reversible "T" hinge. Can be used as full surface hinge or can be reversed and mortised in jamb when used on brick building. For details, see page 1247.

Set consists of the following:

3 pairs 8-in. No. 76 reversible "T" hinges
1 only No. 22 "Positive" door latch
1 only No. 625 chain bolt
1 only No. 650 foot bolt
1 only No. 30 door pull

Furnished in japan and dead black japan finishes.

Packed 1 set in a paper carton, with screws.

Weight, 11½ lbs. per set.

No. 28 garage latch can be furnished with this set, if desired, at small additional cost.

No. 410-A Garage Door Set—Same as No. 410, except pad is reversed on No. 76 hinge. Packed right and left pairs.

Weight. 11½ lbs. per set.

No. 411 Garage Door Set—Same as No. 410, only 10-in. hinges are used in place of 8-in. hinges.

Weight, 16¼ lbs. per set.

Continued on next page

No. 411-A Garage Door Set—Same as No. 410, except pad is reversed on No. 76 hinge and 10-in. hinges are used in place of 8-in. hinges. Packed right and left pairs.

Weight, 16¼ lbs. per set.

No. 760 (2-24-10) Garage Door Set—Using No. 760 garage hinge (2 pairs of 24-in. and 1 pair 10-in.). For details, see page 1247. In brick, concrete or stone construction, the No. 760 swinging set is recommended. Designed principally for the heavier doors; hinge being equipped with bronze roller bearings allows heaviest door to be handled with perfect ease.

Time and labor are saved in hanging doors on these hinges, as the jamb only is mortised, the door put in place and surface leaf applied to face of door with either carriage bolts, lag or wood screws. Doors may be hung with hinges all of one length or in combination. Set consists of the following:

2 pairs 24-in. No. 760 garage hinges
1 pair 10-in. No. 760 garage hinges
1 only No. 28 garage latch
1 only No. 29 door pull
1 only 9-in. No. 625 chain bolt
1 only 9-in. 650 foot bolt

Furnished in japan and dead black japan finishes. No. 500 garage door holder recommended for this set.

No. 670 (3-24) Garage Door Set—Using No. 670 offset garage hinge (3 pairs 24-in.). For details, see page 1247. The purpose of this hinge is to swing the door clear of the opening; it allows room for getting car in and out. It is easily applied, as mortising is unnecessary. A combination of 2 pairs of 24-in. and 1 pair of 12-in. hinges can be used if desired.

Set consists of the following:

3 pairs 24-in. No. 670 offset garage hinges
1 only No. 28 garage latch
1 only No. 29 door pull
1 only 9-in. No. 625 chain bolt
1 only 9-in. No. 650 foot bolt

Furnished in japan and dead black japan finishes. No. 500 garage door holder is recommended for this set.

Combination 670 (3-12) 760 (3-10) Garage Door Sets—For details, see page 1247. One door is hung with three 10-in. No. 760 garage hinges, showing how this can be done on brick, stone or concrete construction. The other door is hung with three 12-in. No. 670 offset garage hinges, showing frame structure. No mortising required. Door can be swung back clear of opening. Either one of these numbers can be furnished in complete sets, if desired.

Furnished in japan and dead black japan finishes.

Ornamental Garage Door Sets Nos. 760 and 670—For details, see page 1247. Door holder folds back against top of door, out of the way, when door is closed. We recommend the use of No. 500 door holder on every swinging door job.

No. 500 Garage Door Holder

For details, see page 1245. A steel channel 32 in. long, with trigger pivoted inside near one end, which is easily operated by a slight pull on chain. Does away with danger of door whipping in the wind. Holds door open securely and avoids possibility of damage in taking car in or out. Entirely automatic in operation as door is opened. Folds back against top of door out of way when door is closed. Car be used on right- or left-hand doors, either single or double, with or without glass sash. Amply strong for any size or weight of door. Chain is 26 in. long, with 1-in. ring attached. Packed 1 pair in a corrugated paper shipping case, with screws and guide staple for chain.

Weight per pair, 6⅜ lbs.

Furnished in japan and dead black japan finishes.

Barn Door Hangers and Rails

Standard Hinge Hanger Steel Rail—Bracket is extra long, affording ample bearing surface against side of building. For details, see page 1237. Has countersunk holes for screws above and below, and one straight hole in center for lag screw or bolt. Brackets are double riveted and close together, there being one bracket for each foot of rail. Any open track hanger will run upon it.

Made 1¼ by $\frac{3}{16}$ in. in 4-, 6-, 8- and 10-ft. lengths. Eight pieces of any one of these lengths are packed in a bundle. Weight per 100 ft., 97 lbs.

No. 44 Barn Door Hanger—Rigid and flexible. Antifriction steel roller bearings. For details, see page 1237. When door is in normal position, hanger is perfectly rigid and there is no vibration of door as in other flexible hangers. At the same time, the hinge joint allows door to swing out at bottom in case anything should bump against it. Positively can not jump the track. Easy to attach and carries door up closer to track than any other open track hanger. Extra large wheel, axle and roller bearings. Axle galvanized to prevent rust. Hangers are japanned before assembling. Wheels are drilled and reamed after japanning, which insures perfect and easy bearing, free from japan. Axle is shouldered on end to prevent wheel housing from pressing together and binding hub of wheel. Will run on any standard hinge hanger track.

Packed 1 pair in a box, with bolts; 12 pairs in a case.

Weight per dozen pairs, 80 lbs.

No. 33 Barn Door Hanger—Moderate in price but very strong and serviceable. For details, see page 1237. The corrugations in the frame make it very rigid. The pin riveted to frame acts as a stay to prevent wheel from derailing and also answers as a guide for attaching hanger to door. Has same size wheel, axle and steel roller bearings as No. 44 hanger. Width of frame, 4 in. Will run on any 1¼-in. flat rail.

Packed 1 pair in a box, with bolts; 12 pairs in a case.

Weight per dozen pairs, 60 lbs.

No. 87 Gable Door Fixtures—For double sliding doors. For illustration of parts, see page 1244. Designed for use in connection with "Runwel" hangers and track, but can be used with the "Glide," if desired, or any other kind of hanger and track. Hang track parallel with slope of roof. Attach one pair of hangers to each door in usual manner. Counterbalance each door with weight attached to steel cable passing over 2 iron pulleys above each door. Concrete is recommended for weights, although any other convenient material may be used. Steel pipe fastened to building with brackets at each end and in center acts as a guide for doors and holds them against building. Pulleys have steel roller bearings for easy operation. Furnished in 2 sizes:

10-ft. opening (two 5-ft. doors)
12-ft. opening (two 6-ft. doors)

Each set consists of the following parts:

50 ft. steel cable, $\frac{3}{16}$ in. diameter; 20 ft. steel pipe (two 10-in. pieces) or 24 ft. steel pipe (two 12-ft. pieces) with 2 end brackets and 1 center bracket; two No. 8 steel door stops or bumpers; 4 iron pulleys with steel frames.

Furnished in japan finish.

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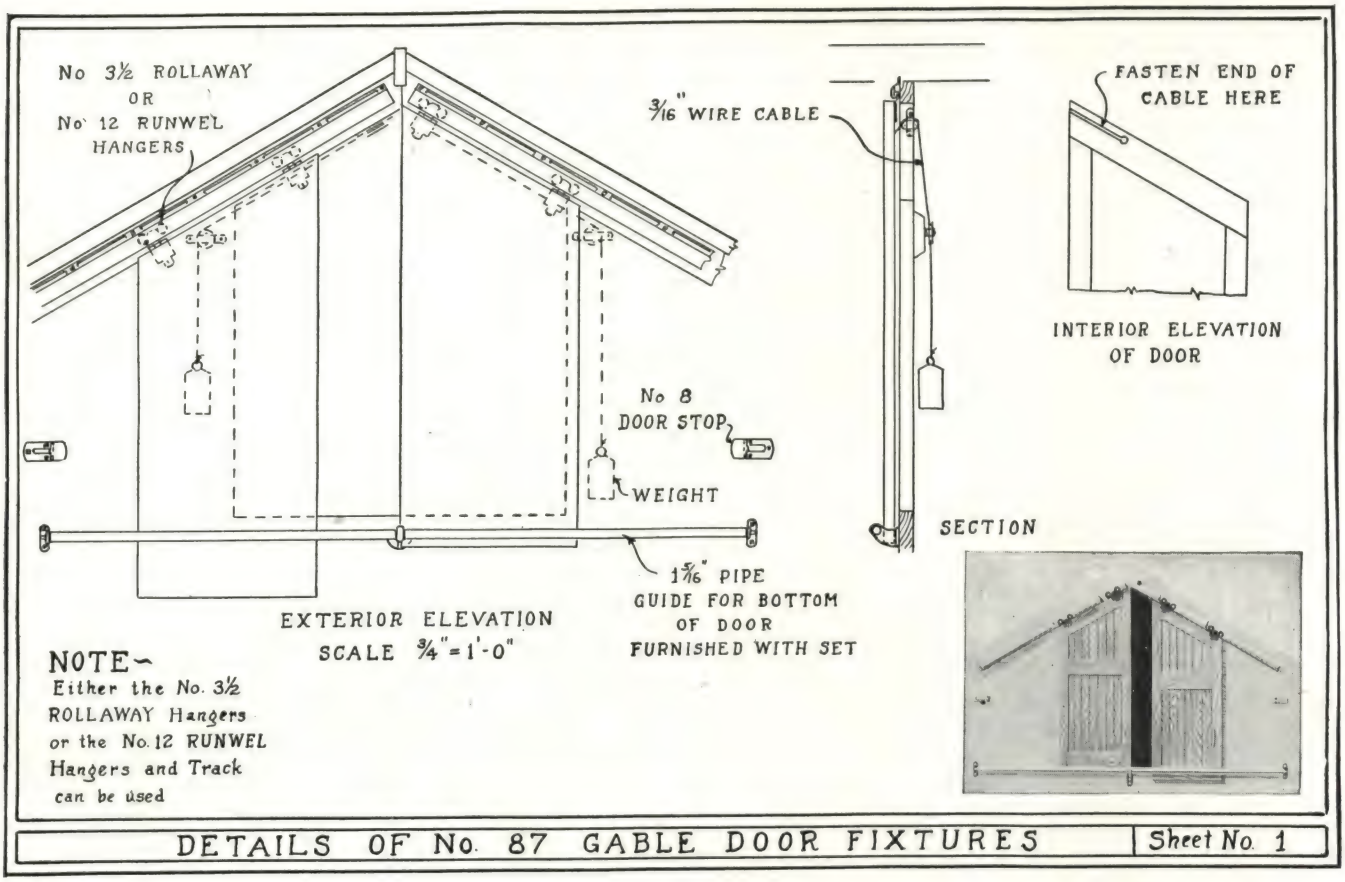

Packed one set in a paper carton, complete with lag screws, socket wrench, staples and directions.

Weight per set, including pipe, 32 lbs.

Door Bolts

No. 625 Chain Bolt—Round steel case with ¾-in. bolt which can be easily and quickly reversed, if desired. For details, see page 1241. Equipped with duplex steel safety chain with 1-in. steel ring at bottom end.

Packed 6 in a box, with screws, staple for chain guide and 2 strikes, one for doors swinging out and one for doors swinging in. Furnished in japan and dead black japan finishes. Made in 2 sizes: 6 and 9 in.

Weight per dozen, 11 and 20 lbs. respectively.

No. 650 Foot Bolt—Round steel case with ¾-in. bolt, which is held in position (when raised) by brass coil spring. This prevents rusting and breaking. Spring can not become displaced. For details, see page 1241. Action of bolt when raised by toe lever, is positive. Note the insert which illustrates how floor plate can be fastened in cement floors. Holes are drilled in the cement and wooden plugs driven, into which plate can be fastened with screws, which are furnished.

Packed 6 in a paper carton, with screws.

Furnished in japan and dead black japan finishes.

Made in 2 sizes: 6 and 9 in.

Weight per dozen, 10 and 21½ lbs. respectively.

Door Latches

No. 28 Swinging Door Latch—Made entirely of steel for garage, mill or heavy doors. No cast parts to break or give way nor complicated parts to get out of order. It is simplicity itself. For details, see page 1245. Handles are made of ⅜x1 3/16-in. steel, neatly rounded on edge. A part of handle passes through escutcheon plate at top and is thoroughly riveted on underside. A ⅜x⅝-in. oval head rivet is used at bottom. Escutcheon plates are 12 in. long by 3 in. wide, made of good strong steel, formed with bevel edge, which gives plate the appearance of being ¼ in. thick. The holes in escutcheon plates are countersunk for 1¼-in. No. 11 countersunk oval head screws.

Furnished in japan and dead black japan finishes.

Packed 1 latch in a paper carton, with screws; 12 latches in a case.

Weight per dozen latches, 60 lbs.

No. 25 "Positive" Door Latch—Patented Jan. 9, 1912. All steel, japanned. Suitable for all sizes of swinging doors, either right or left hand. Guaranteed to latch every time and hold door either closed or open as desired. For details, see page 1245. Easy and quick to attach. Paper template packed with each latch, so any one can set it correctly. No chiseling or cutting required; simply bore hole for thumb piece and drive screws home. Can be locked with padlock if desired, and by using 3/16-in. flat head stove bolts of proper length in place of screws which are regularly furnished, a burglarproof job is assured.

Packed 1 latch in a paper carton, complete with screws and directions; 24 in a case.

Weight per dozen latches, 16½ lbs.

No. 22 "Positive" Door Latch—Same as No. 25, except that we furnish a pull riveted on latch bar; a convenience in case of extra thick doors or where door sticks or binds.

Packed 1 latch in a paper carton, complete with screws and directions; 24 in a case.

Weight per dozen latches, 17½ lbs.

No. 26 Cottage Door Latch—Patented Jan. 9, 1912. All steel, japanned. For details, see page 1245.

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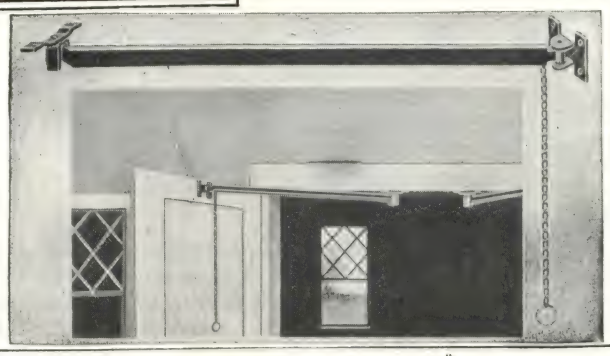
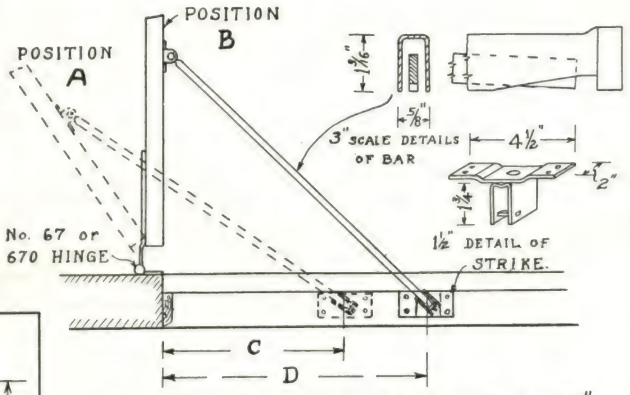
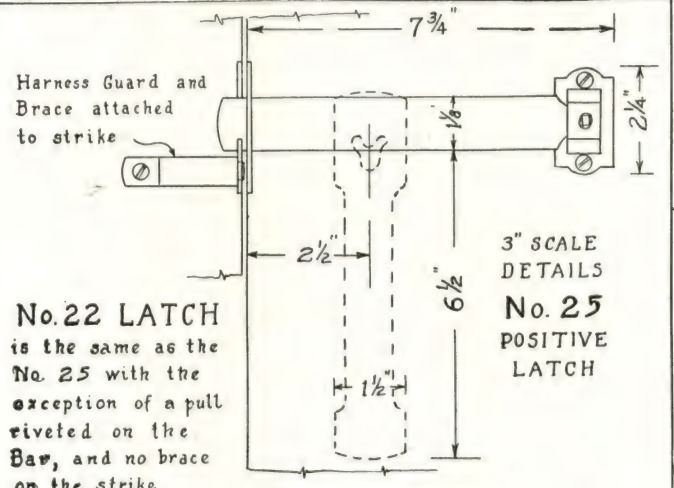




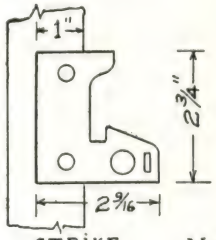
For POSITION	A	With	No. 67	HINGE	C = 18"
" "	A	"	Common	"	C = 22
" "	B	"	No 67	"	D = 22
" "	B	"	Common	"	D = 26



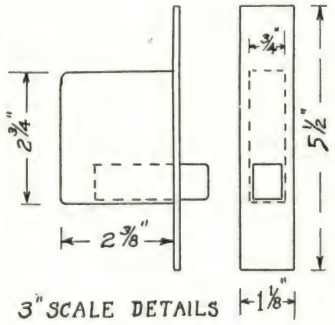
3" SCALE DETAILS

No. 25 POSITIVE LATCH

No. 22 LATCH is the same as the No. 25 with the exception of a pull riveted on the Bar, and no brace on the strike

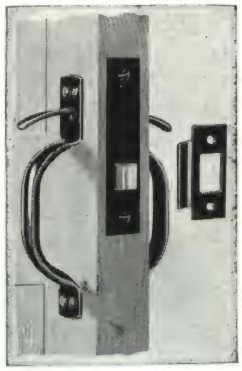


Nos. 22 & 25 POSITIVE LATCH

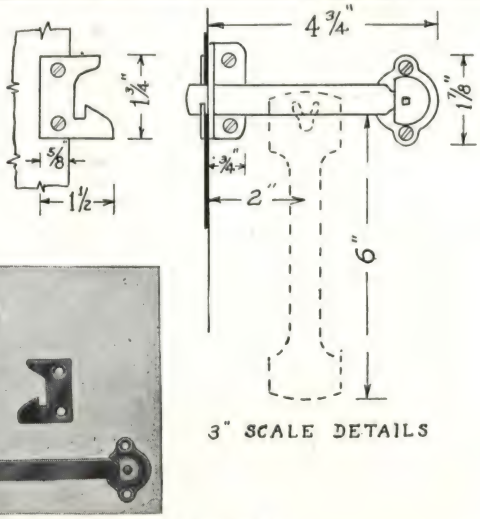


3" SCALE DETAILS OF LATCH CASE

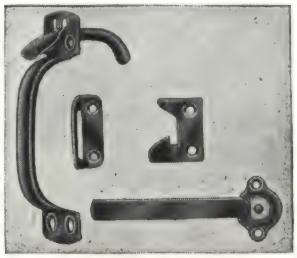
NOTE – The handles for this latch are the same as the handles on the No. 25



No. 2528 LATCH

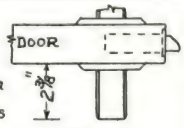


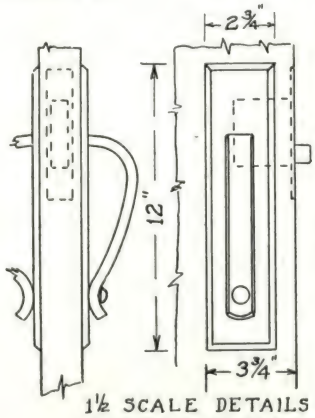
3" SCALE DETAILS



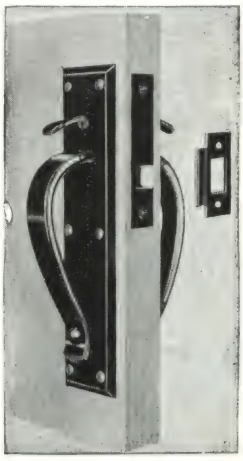
No 26 LATCH

NOTE – The Case for this latch is the same as detailed above





1½ SCALE DETAILS ESCUTCHEON PLATE



No 28 LATCH

FRANTZ MFG. CO., STERLING, ILL	FRANTZ LATCHES Nos. 22, 25, 26, 28 & 2528 No. 500 DOOR HOLDER	SHEET 5 SCALE 1½ & 3" = 1'-0"

Continued on next page

Suitable for storm and screen doors, gates, etc. Has same positive latching feature as No. 25. Easy and quick to attach. No cutting required. Unbreakable and an ornament to any door.

Packed 1 latch in a paper carton, complete with screws; 36 in a case.

Weight per dozen latches, 6 lbs.

No. 2528 Mortise Latch—For details, see page 1245. Made entirely of steel; no cast parts to break or give way. No complicated parts to get out of order. Reversible for right- or left-hand doors. Adjustable for doors 1⅛ to 2¼ in. thick.

Furnished in japan and dead black japan finishes.

Packed 1 latch in a paper carton, complete with screws and directions for attaching; 12 latches in a case.

Weight per dozen latches, 20 lbs.

No. 183 Cellar Window Set

Patented Oct. 10, 1916. Japanned. For details, see page 1247. Hinges are so constructed that 3 different positions of window may be obtained and they automatically hold window firmly and rigidly in either position. This does away with the necessity of a hook or other device to hold window open. The combination lock and handle is a new and unique device. When turned to the right, it locks the window tightly, so that there is no vibration or rattle due to the wind. When it is desired to open window, a slight turn to the left releases lock and if window should stick, it can be forced loose with a further turn of handle to the left.

Packed 1 set in a carton, with screws and directions; 12 sets in a container; 144 sets in a case.

Weight per dozen sets, 9 lbs.

No. 187 French Window Lock

Japanned or plated. When desired, the above lock can be furnished packed separately. Can be used on almost any style of hinged window or screen. Something entirely new and unique. It is in fact a combination of lock and handle. Can not be tampered with from outside.

Packed 12 in a box, with screws.

Weight per dozen, 2½ lbs.

No. 180 Storm Window Adjuster

All steel, japanned. For details, see page 1247.

Can be used with any design of sash hanger. No screws disturbed in hanging or taking down windows. It is notched so that 2 different positions of window may be obtained. Acts as a lock when window is closed and prevents it from being tampered with from outside. The rib, which is embossed in the arm, adds great strength and makes it very rigid. Use 2 on each window.

Packed 1 complete set (2 arms and slides) in an envelope, with screws; 12 sets (24 arms and slides) in a box.

Weight per dozen sets, 5 lbs.

No. 275 Window Screen and Storm Sash Hanger

For window screens and storm windows. Japanned. For details, see page 1247. In hanging screen, slide screen up; hanger engages automatically. Pull screen in at bottom and fasten with hook. No ladder needed as work is all done easily from inside the building. In attaching hangers, fasten hook on casing first, with bottom hook about ⅛-in. above opening. Then place screen in position, drop hanger over hook and fasten to screen.

Considerable side play is provided for. Extra bottoms for storm windows can be furnished, so the exchange can be made without disturbing any screws.

Packed 1 set (4 pieces) in an envelope, with screws; 12 sets in a box. Extra bottoms packed 1 set (2 pieces) in an envelope, with screws; 12 sets in a box.

Weight per dozen sets, 3½ lbs. Weight of extra bottoms per dozen sets, 2 lbs.

Screen Door Hinges

No. 80 "Perfection" Detachable Screen Door Hinge—All steel, japanned. Patented May 30, 1916. For details, see page 1247. No screws to drive or withdraw. Simply raise wire bail and door can be lifted away. Hinge remains on door and nothing is left on casing except a small plate. In hanging door, the process is simply reversed. A woman or child can do the work easily.

Packed 12 pairs in a box, without screws.

Weight per dozen pairs, 8¼ lbs.

No. 164—Surface Hinge—Loose pin, all steel; japanned. For details, see page 1247. An especially handsome design. An offset effect is obtained by reversing one leaf of each hinge.

Packed 6 pairs in a box, with screws.

Weight per dozen pairs, 5¾ lbs.

No. 264 Detachable Hinge—For screen and storm doors. All steel, japanned. For details, see page 1247. No screws, pin or lever to disturb. Simply swing door about two-thirds open and lift off. Reverse the process to hang door. Extra plates furnished for storm doors if desired, so the exchange can be made without removing any screws. Adapted for use on hinged window screens or cellar windows if desired. Packed 12 pairs in a box, with screws.

Weight per dozen pairs, 7¼ lbs. Weight of extra plates per dozen pairs, 4 lbs.

No. 505 All-Steel Spring Hinge—Non-adjustable tension, japanned. For details, see page 1247. Substantially constructed throughout. Has broad bearings and a covered spring, making a durable and attractive article for screen door use. Packed 12 pairs in a box, without screws.

Weight per dozen pairs, 6⅔ lbs.

Screen Door Sets

No. 86 Screen Door Set—All steel, japanned. Patented May 30, 1916. For details, see page 1247. Set consists of 1 pair No. 80 detachable hinges with pull, hook and eye, and all necessary screws. Packed 1 set in a carton.

Weight per dozen sets, 9½ lbs.

No. 150 Screen Door Set—All steel, japanned. For details, see page 1247. Hinges are 3x2½ in. and are fitted with loose pins, hence screws are not disturbed when door is removed. An offset effect is obtainable by reversing one leaf on each hinge. The pull is especially neat and very strong. No. 4 springs are packed with this set instead of No. 3.

Packed 1 set in a carton, with screws; 12 sets in a container.

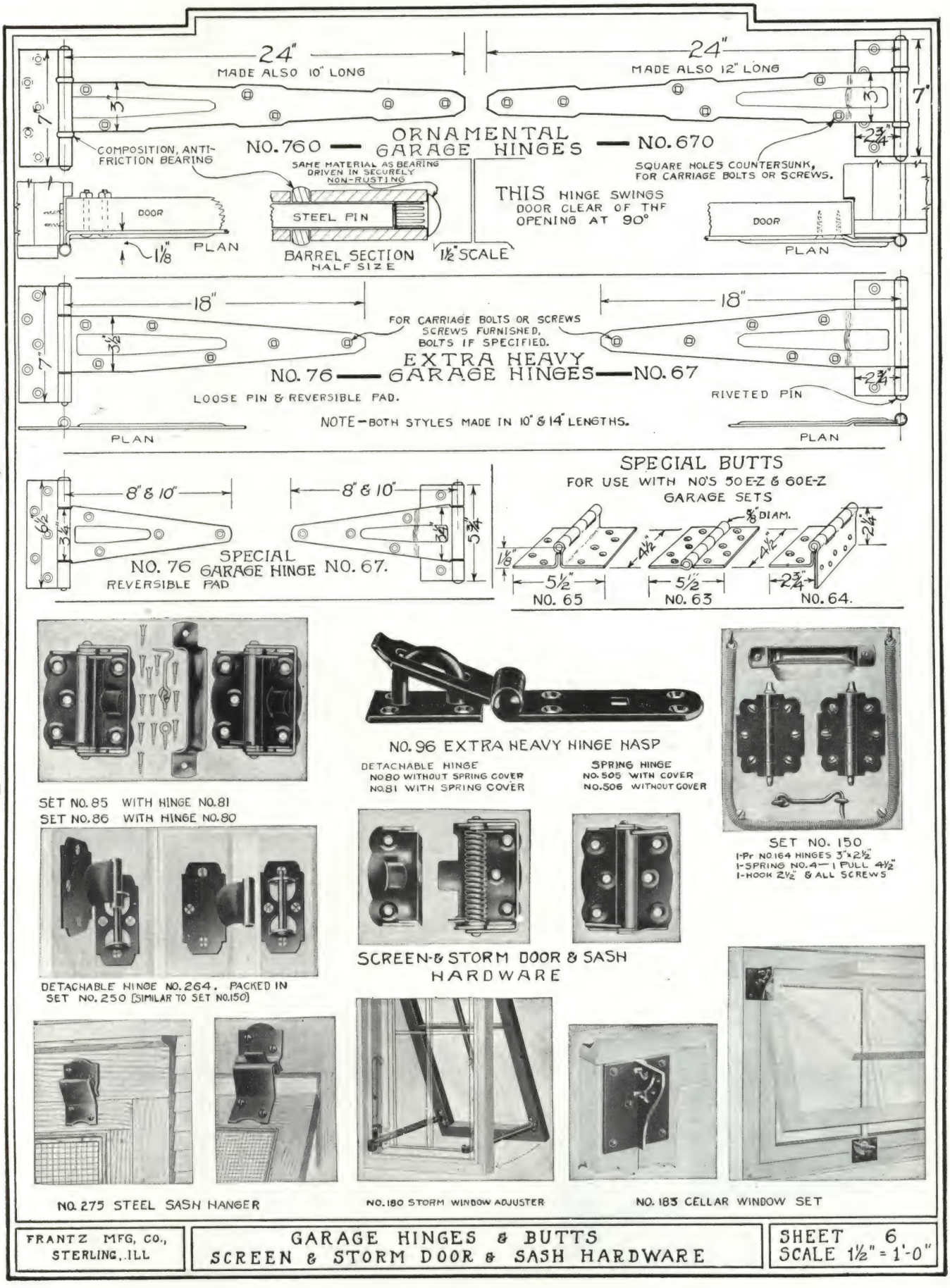
Weight per dozen sets, 10 lbs.

No. 250 Screen Door Set—All steel, japanned. For details, see page 1247.

Set consists of No. 4 spring, 2½-in. hook, No. 32 pull and No. 264 detachable hinges. Packed 1 set in a carton, with screws; 12 sets in a container; 144 sets in a case.

Weight per dozen sets, 11 lbs.

Continued on next page



FRANTZ MFG. CO., STERLING, ILL.	GARAGE HINGES & BUTTS SCREEN & STORM DOOR & SASH HARDWARE	SHEET 6 SCALE 1½" = 1'-0"

THE F. E. MYERS & BRO. COMPANY

Manufacturers of Door Hangers

ASHLAND, OHIO

Products

DOOR HANGERS: Garage, Barn, Warehouse, etc.; Sliding and Sliding-folding; STORE LADDERS.

For Pumps, see pages 1473-1475; for Hay Tools, see page 1339.

TRADE-MARK

Myers Door Hangers for Best Results

Myers door hangers fulfill the demand for hangers that stay on the track and which are durable and easy to push or pull. They are manufactured in numerous styles by skilled mechanics and offer many practical patented features not to be found in other hangers.

Sold by dealers everywhere.

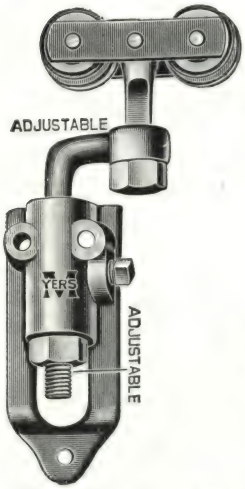


FIG. 2066. SIMPLEX ADJUSTABLE TANDEM DOOR HANGER

FIG. 1426. SIMPLEX END BRACKET

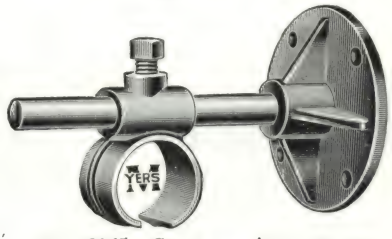


FIG. 2065. SIMPLEX ADJUSTABLE BRACKET

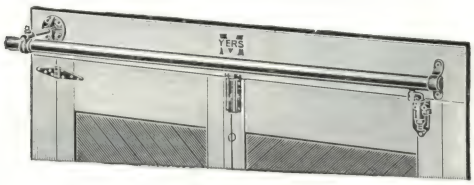


FIG. 2064. SIMPLEX TWO-DOOR INSTALLATION

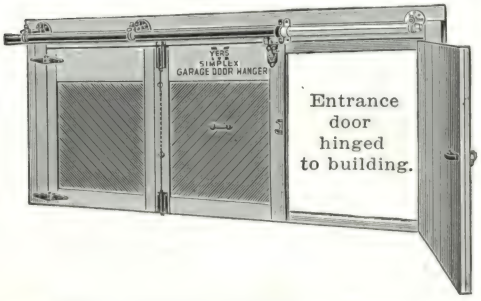


FIG. 2063. SIMPLEX THREE-DOOR INSTALLATION

Track in outline above entrance door illustrates how it can be extended for use on double doors.

Myers Simplex Adjustable Tandem Door Hanger for Sliding-Folding Doors

Especially suitable for garages, but is also recommended for barns, as the door can be fitted under a header, thus fitting the door flush at the top, affording complete protection from the weather.

This hanger has both vertical and lateral adjustment and can be used on doors of any thickness. Rollers are made of machine turned steel and revolve on hard steel roller bearings and steel axle.

Hanger runs in New-Way tubular girder track described on third page following.

Fittings for Complete Installation—The following fittings are required for a complete installation. We furnish hangers, adjustable brackets, and brackets and track only.

THREE-DOOR OPENINGS

(Two Sliding-folding doors and one hinged entrance door)

8-ft. Opening

6 ft. New-Way track
1 Fig. 2066 Simplex hanger
1 Fig. 2065 adjustable bracket
1 Fig. 1426 end bracket
Six 6-in. strap hinges
2 door bolts with chain
2 door pulls
1 hasp and staple or lock
Hinged entrance door should be 30 in. wide; rolling doors each 33 in. wide

10-ft. Opening

8 ft. New-Way track
Other fittings same as for 8-ft. opening
Rolling doors should be 45 in. wide

FOUR-DOOR OPENINGS

(Two 2-door sets attached to and opening toward opposite jambs)

11½-ft. Opening

12 ft. New-Way track (two 6-ft. lengths)
2 Fig. 2066 Simplex hangers
2 Fig. 2065 adjustable brackets
1 center bracket
Six 6-in. strap hinges
4 door bolts with chain
2 door pulls
1 hasp and staple or lock
4 doors 34½ in. wide

15½-ft. Opening

16 ft. New-Way track (two 8-ft. lengths)
Other fittings same as for 11½-ft. opening except doors should be 46½ in. wide

Myers Right Angle Garage Door Hangers

Designed especially for garages, but are equally suited for barns, warehouses, etc. Suitable for either

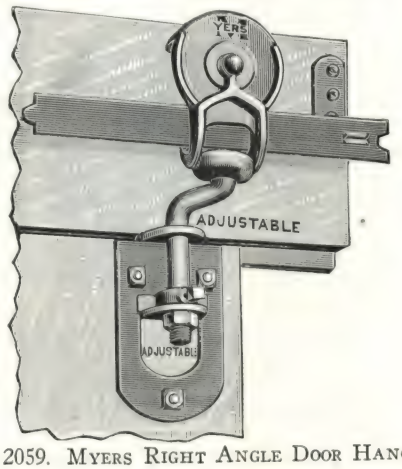


FIG. 2059. MYERS RIGHT ANGLE DOOR HANGER

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FIG. 1793. CURVE IN TRACK TO PERMIT DOOR TO PASS AROUND CORNER

O.K. STEEL TRACK

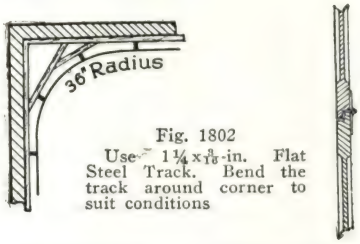


Fig. 1802
Use 1¼x$\frac{3}{16}$-in. Flat Steel Track. Bend the track around corner to suit conditions

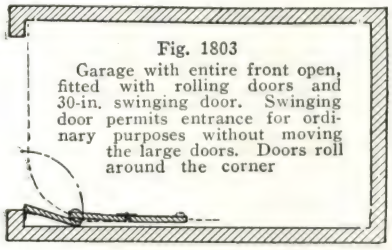


Fig. 1803
Garage with entire front open, fitted with rolling doors and 30-in. swinging door. Swinging door permits entrance for ordinary purposes without moving the large doors. Doors roll around the corner

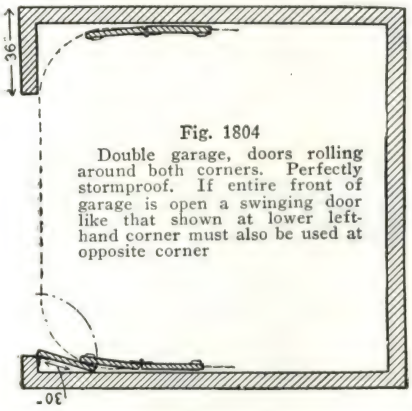


Fig. 1804
Double garage, doors rolling around both corners. Perfectly stormproof. If entire front of garage is open a swinging door like that shown at lower left-hand corner must also be used at opposite corner

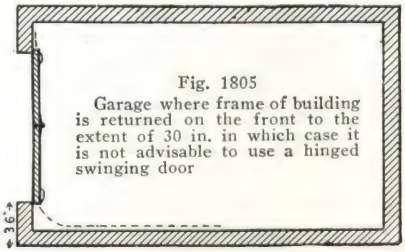


Fig. 1805
Garage where frame of building is returned on the front to the extent of 30 in. in which case it is not advisable to use a hinged swinging door

GARAGE DETAILS

right angle sliding or sliding-folding doors as shown.

For Sliding Doors—When used for right angle sliding doors, these hangers operate on track hung on the inside of the building with a curved section in one corner so that the doors slide entirely out of the way. In this manner the entire door opening can be utilized as 2, 3, 4 or more doors can be hinged together and operated satisfactorily. If desired, a swinging entrance door can be used independent of the sliding doors as shown.

These hangers are provided with vertical and lateral adjustment, and may be used on doors of any thickness. The "Stay-on" feature prevents doors from jumping the track. They operate on any 1¼x$\frac{3}{16}$-in. flat steel track and can be easily and quickly installed by any mechanic. Myers "O. K." steel track is furnished in lengths of 4, 6, 8, and 10 ft.

Frame of hanger is made of heavy malleable iron which completely covers the large tandem rollers, which operate on steel roller bearings and steel axles.

Fittings for Complete Installation—The following fittings are required for complete installations as shown in Figs. 1789, 1790 and 1802. We furnish hangers, adjustable brackets, end brackets and track only.

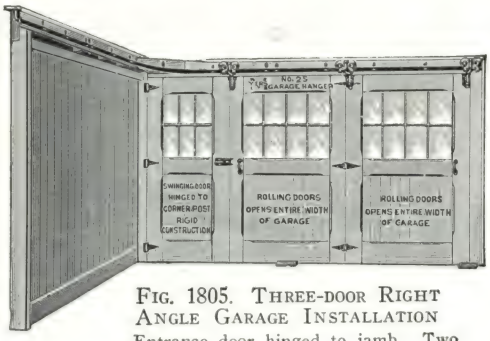


FIG. 1805. THREE-DOOR RIGHT ANGLE GARAGE INSTALLATION
Entrance door hinged to jamb. Two sliding doors roll around corner on curved track

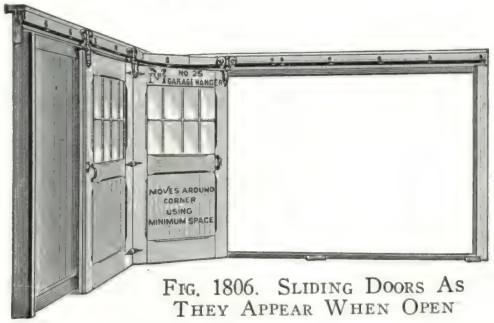


FIG. 1806. SLIDING DOORS AS THEY APPEAR WHEN OPEN

10-ft Opening	9-ft. Opening
1 set of 3 hangers	Same fittings as for 10-ft. opening, except 18 ft. of track is used (one 4-ft., one 6-ft. and one 8-ft. length)
Six 6-in. strap hinges	
2 door pulls	
1 hasp and staple or lock	
20 ft. 1¼x$\frac{3}{16}$-in. track (one 8-ft. length and two 6-ft. lengths)	
Hinged entrance door to be 30 in. wide; rolling doors each 45 in. wide	Hinged entrance door to be 30 in. wide; rolling doors each 39 in. wide

For Openings of Other Widths—Change width of rolling doors and length of track accordingly. Length of track required will be twice the width of the opening. Where hinged entrance door is not used (Fig. 1804), the opening must not be closer than 30 in. from the sidewalk at side where track is carried.

For Sliding-folding Doors—The Myers right angle door hanger described above is also suitable for sliding-folding doors as illustrated below. Doors hung with these hangers fold up like an accordion, opening

Fig. 2060

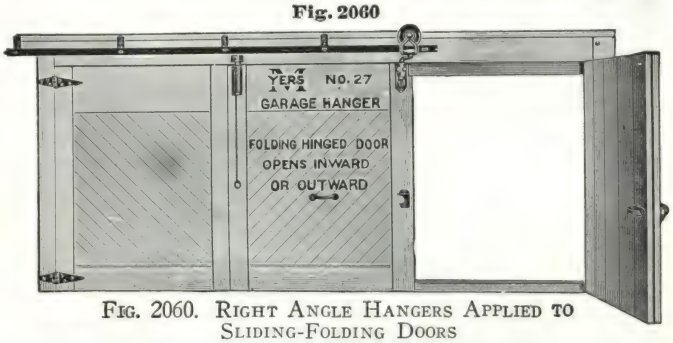


FIG. 2060. RIGHT ANGLE HANGERS APPLIED TO SLIDING-FOLDING DOORS

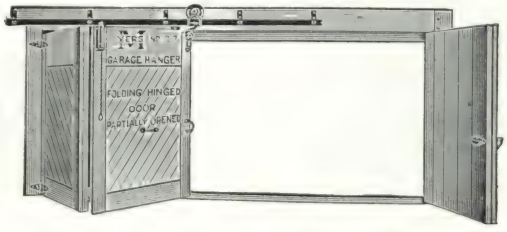


FIG. 2061. SLIDING-FOLDING DOORS PARTLY OPEN

Continued on next page

either inward or outward, and can be folded back against the sidewall or parallel to the front of the building. Any $1\frac{1}{4}$x$\frac{3}{16}$-in. flat track may be used.

FIG. 1810. TOP VIEW OF TRACK FOR SLIDING-FOLDING DOORS

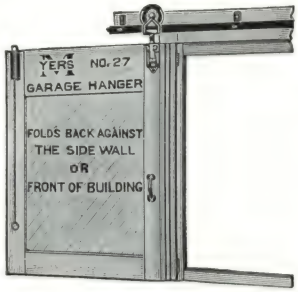


FIG. 2062. SLIDING-FOLDING DOORS WHEN OPEN

Myers Faultless Adjustable Tandem Door Hanger and Self-cleaning Track

A hanger of the very latest type, unexcelled for high class sliding door service. It can not leave the track.

Wheels are turned from steel shafting and revolve on hard steel roller bearings. Trolley is pivoted in center, allowing it to oscillate and adjust itself to any variation in track.

Lateral adjustment permits attaching to different thicknesses of doors and bringing door closer to building. Vertical adjustment permits raising or lowering of door (see illustration).

Self-cleaning track for above hangers is made of high grade steel, being fastened to building at upper edge by lag screws or spikes and extends downwards and outwards to a point below tops of doors, completely covering track and trolley and protecting them from the weather. Track has interlocking lugs which register perfectly. Track proper is a flat hard steel bar attached to cover by steel stud rivets, leaving an opening between track and cover through which all dirt will naturally fall, insuring a clean runway for the trolley at all times.

Track furnished in lengths of 4, 6 and 8 ft., with bolts, joint splices (clamps) and end stops.

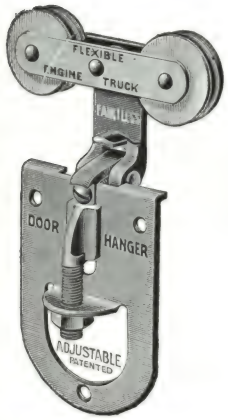


FIG. 1774. FAULTLESS ADJUSTABLE TANDEM DOOR HANGER

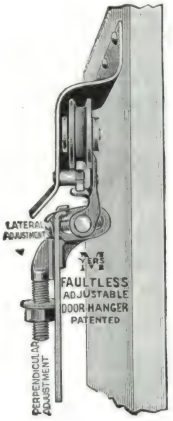


FIG. 1773. VERTICAL AND LATERAL ADJUSTMENT

FIG. 1776. FAULTLESS END STOP

FIG. 1778. SELF-CLEANING FEATURE

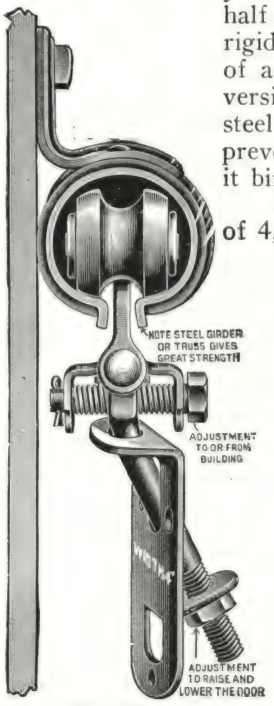


FIG. 1511. VERTICAL AND LATERAL ADJUSTMENT OF GIANT HANGER

Myers Giant Adjustable Tandem Door Hangers and Tubular Girder Track

This combination affords absolute protection from the weather and is so named because of size, strength and carrying power.

Giant hangers are suitable for doors from $1\frac{1}{2}$ to 3 in. thick or more. They are provided with both vertical and lateral adjustment. Flexible turned steel trolley has hard steel roller bearings and heavy steel axle.

Construction lessens vibration, allows door to pass uneven surfaces on the building without binding and insures easy and fast operation.

Myers Giant tubular girder track is made of high carbon stiff steel, so constructed as to carry a much heavier load than other styles of tubular track. It is so shaped that no dirt or moisture can collect in it, thus is clean at all times and permits free movement of trolleys. Track is supported every 4 ft. by heavy pressed steel brackets held by lag screws. Joint is made by ends of track meeting half way in the bracket, producing a rigid splice which equals the strength of any other part of the track. Reversible end brackets of heavy pressed steel securely holds track in position, preventing it from slipping and makes it birdproof.

Giant track is furnished in lengths of 4, 6 and 8 ft.

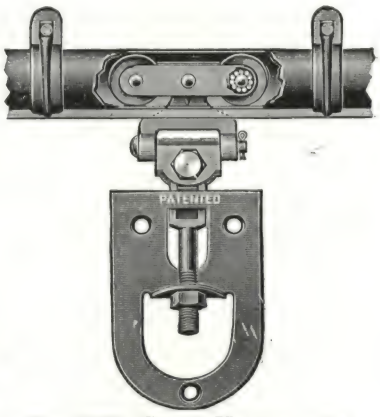


FIG. 1608. GIANT HANGER AND TRACK COMBINED

FIG. 1775. GENERAL CONSTRUCTION OF SELF-CLEANING TRACK

FIG. 1777. JOINT SPLICE

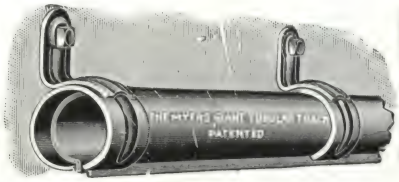


FIG. 1512. SECTION OF GIANT TRACK, 4-, 6- AND 8-FT. LENGTHS

FIG. 1513. INTERMEDIATE BRACKET

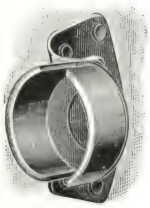


FIG. 1514. GIANT END BRACKET

Continued on next page

Myers New-Way Adjustable Tandem Door Hanger and New-Way Tubular Girder Track

The New-Way hanger and track are similar to the Giant hanger and track but are slightly lighter and smaller. They have all of the other features embodied in the Giant with the exception of the brackets which are malleable iron instead of pressed steel. Lower in price than the Giant.

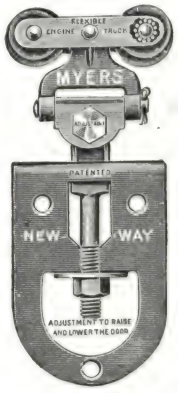


FIG. 1420. NEW-WAY ADJUSTABLE TANDEM DOOR HANGER

FIG. 1425. NEW-WAY INTERMEDIATE BRACKET

FIG. 1426 NEW-WAY END BRACKET

FIG. 1424. SECTION OF NEW-WAY TRACK

Myers Stayon Adjustable Tandem Door Hanger

This hanger has both vertical and lateral adjustment and is provided with a device which positively prevents doors from leaving the track. Hasp is composed of two pieces of steel plate, which permits its use on doors of any thickness without bridging or cutting. Flexible feature is provided by a joint between hasp and hanger proper, which allows top of door to move away from building when passing over uneven surfaces or when door or boards are warped so as to cause an obstruction.

Frame is of heavy malleable iron and covers the wheels as shown.

Steel wheels revolve on hard steel roller bearings and a large drawn steel axle, insuring easy operation.

Track is of high carbon stiff steel, $1\frac{1}{4}$x$\frac{3}{16}$ in., supported by steel brackets and is furnished in lengths of 4, 6, 8 and 10 ft.

Myers "O. K. Stayon" Flexible Covered Door Hanger

A single wheel hanger, light and easy running. Has a heavy malleable iron frame extending over and covering the wheel. Frame is reinforced by two ribs, greatly increasing the carrying power.

The "Stayon" feature prevents the hanger from leaving the track. Steel wheels revolve on hard steel roller bearings and a drawn steel axle.

Track is of high carbon steel, $1\frac{1}{4}$x$\frac{3}{16}$ in., supported by steel brackets and is furnished in lengths of 4, 6, 8 and 10 ft.

FIG. 998

FIG. 999

FIG. 997

FRONT, BACK AND SIDE VIEW RESPECTIVELY OF "O. K." STAYON FLEXIBLE COVERED DOOR HANGER
"A" shows Stayon device

Myers Noiseless Cushion Tire Store Ladder

Makes wall and shelf space to the ceiling safely available for the storage and handling of all kinds of merchandise. Also adapted for factory stockrooms, casting sheds, repair departments and similar places where large stocks of different parts must be stored.

Ladder is constructed of best clear Georgia pine, natural finish. Has 5-in. open panel sides. Steps have $5\frac{1}{2}$-in. tread. Width over all, 12 in.

Track is double angle, steel rail and is suspended from ceiling by lag screws, either jointed or rigid, or by flanged plates and wood screws.

Trolley is self-adjusting, and is fitted with turned steel bearings and 3-in. anti-rattler, rubber tired wheels.

Floor travelers are 5 in. in diameter with rubber tires. Axle is steel.

Desirable Features—Easy and safe to ascend or decend. No vibration. Permits use of both hands when placing or removing stock. Ample strength to carry heavy loads with safety. Noiseless, safe, light running. Easy to install. Occupies small space.

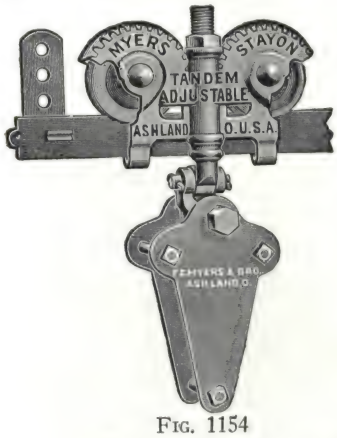


FIG. 1154

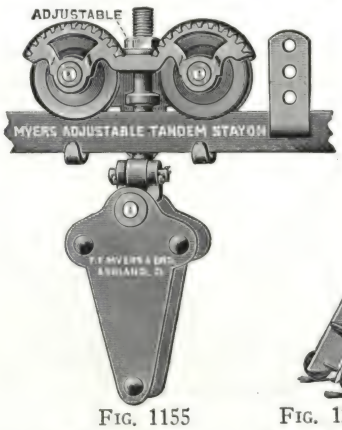


FIG. 1155

STAYON ADJUSTABLE TANDEM DOOR HANGER

FIG. 1256. MYERS LADDER
Track hanger hooks, end stop, upper and lower trolleys and ladder

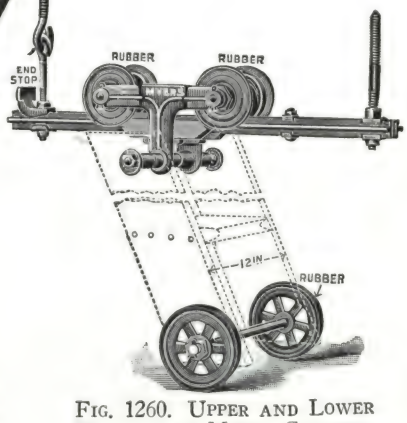


FIG. 1260. UPPER AND LOWER TROLLEYS OF MYERS CUSHION TIRE STORE LADDER

NATIONAL MANUFACTURING COMPANY

Manufacturers of Builders' Hardware

STERLING, ILL.

Products

RIGID STORMPROOF DOOR HANGERS (Patented).
FLEXIBLE STORMPROOF DOOR HANGERS (Patented).
ADJUSTABLE STORMPROOF DOOR HANGERS.
"BIG 4" FLEXIBLE DOOR HANGERS (Patented).
STORMPROOF and "BRACED" RAILS.
BALL BEARING FLOOR HINGES.
GARAGE DOOR HARDWARE including Complete Sets, Hangers, Latches, Holders, etc.

Also manufacturers of Barn Door Bumpers; Door Latches; Stay Rollers; Door Pulls; Screen and Storm Sash Hangers and Adjusters; Hasps of various kinds; Staples; Ball Tip, Light, Light Narrow and Parliament Butts; Ornamental Butts and Hinges; Plain Hinges of various kinds; Washers; Corner Irons; Mending Plates; Angles; Braces; Cellar Window Sets; Foot Scrapers; Door Plates; Push Plates; Sash Locks; Iron Wire Hooks and Eyes; Cupboard Turns.

Erection Instructions

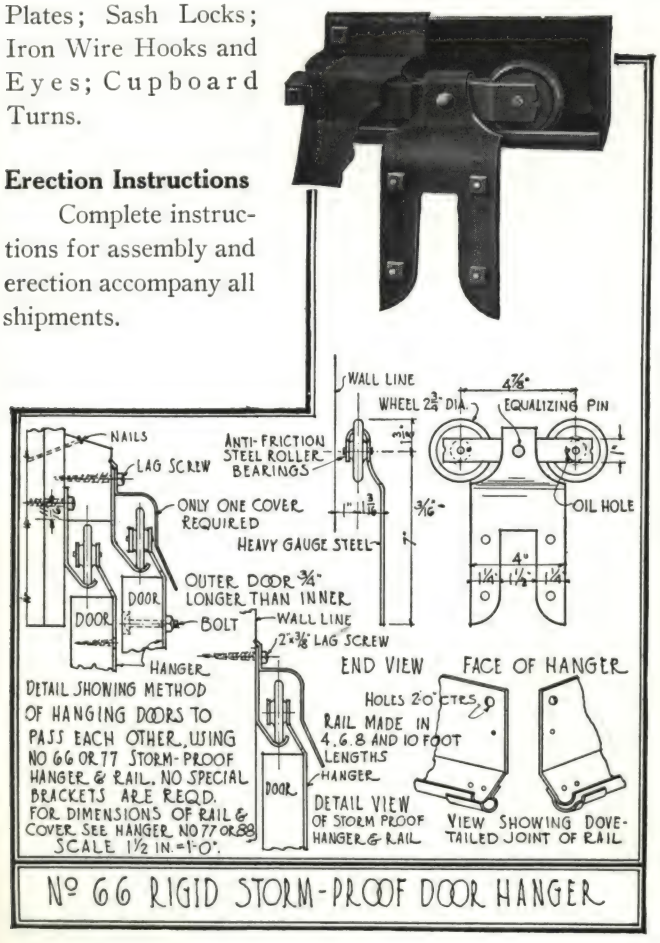
Complete instructions for assembly and erection accompany all shipments.

No. 66 Rigid Stormproof Door Hanger (Patented)

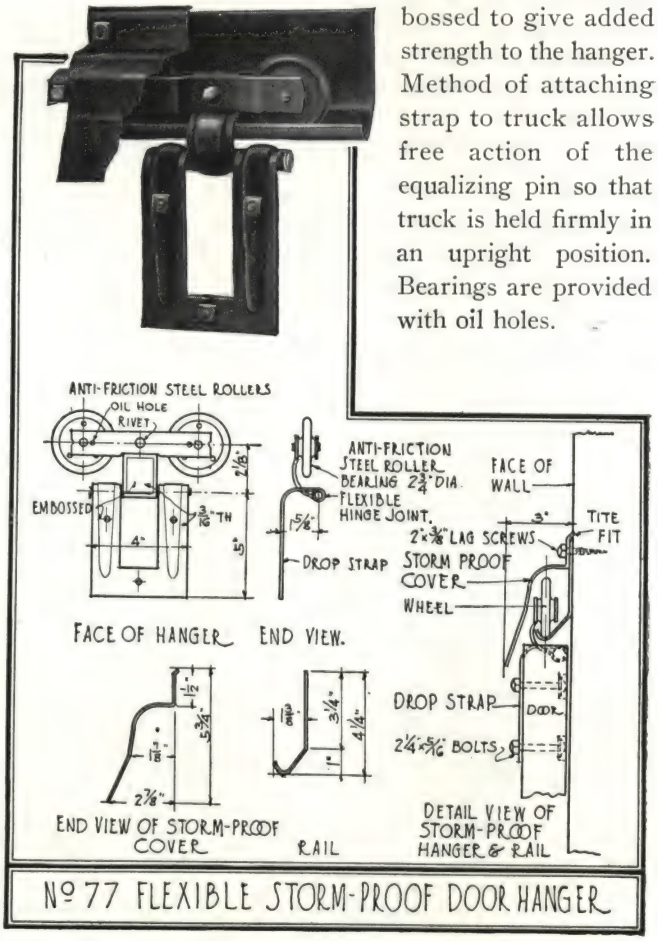
Of very simple construction, strong and made of heavy gage steel. Two wheels (tandem) with steel roller bearings. Wheel treads are of sufficient width to insure easy rolling. Attaching to door is very simple; the equalizing pin in center of wheel trucks puts half the load on each wheel. Bearings are free from japan; wheels and frames are japanned before assembling and wheel is reamed out after japanning.

No. 77 Flexible Stormproof Door Hanger (Patented)

Incorporates all the excellent features of No. 66 and has flexible hinged joint. When door hangs straight down there is no vibration, but when anything bumps against the door the hinge joint allows the door to swing out. Connecting strap and drop strap are heavily embossed to give added strength to the hanger. Method of attaching strap to truck allows free action of the equalizing pin so that truck is held firmly in an upright position. Bearings are provided with oil holes.



Nº 66 RIGID STORM-PROOF DOOR HANGER



Nº 77 FLEXIBLE STORM-PROOF DOOR HANGER

Continued on next page

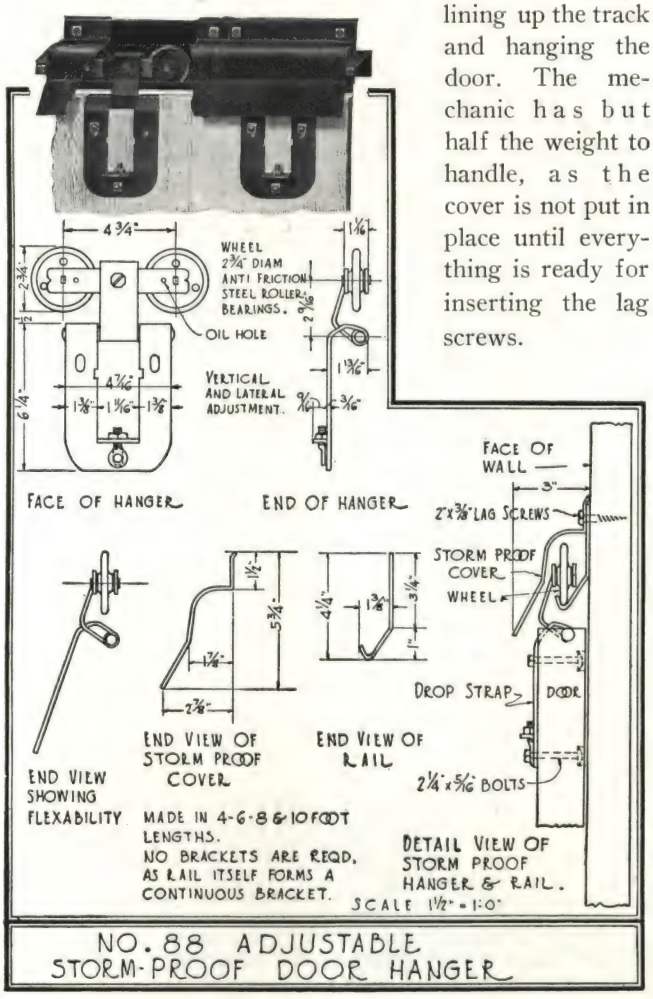
No. 88 Adjustable Stormproof Door Hanger

Constructed same as No. 77 except that it has both vertical and lateral adjustment. It allows the door to be carried close to the rail.

Stormproof Rail

The cover is long enough to protect the opening between the top of door and bottom of rail. No cover splice is needed as the ends of cover sections dovetail together and make a strong and weatherproof construction. An end cap is provided which closes the openings in ends of rail and it is unusually wide at the base for additional bracing. Rail fits closely against the building and is held in place by a lag screw 2 in. long by ⅜ in. thick. No brackets are needed, the rail itself being a continuous bracket and it is sufficiently strong to carry all the weight imposed. Nails hold the rail in position until lag screws are inserted. Holes for lag screws are 2 ft. apart. Rail is in two pieces, track and cover and the cover can be removed when desired for painting the inside.

The two-piece rail is particularly convenient in the important operation of properly lining up the track and hanging the door. The mechanic has but half the weight to handle, as the cover is not put in place until everything is ready for inserting the lag screws.



NO. 88 ADJUSTABLE STORM-PROOF DOOR HANGER

"Big 4" Flexible Door Hanger (Patented)

Built on heavy lines with the simplest of construction. Hood is embossed to insure great strength. There are no complicated parts and the hanger is made entirely of steel.

It is both flexible and rigid; has roller bearings, and is rigid and without vibration when the door hangs in normal position, but when anything bumps against the door, a flexible device permits of its swinging out and rising.

The door is held close to the track. A shoulder keeps the wheel housing from being pressed together and binding on the hub of the wheel. *The axles and rivets are sherardized.*

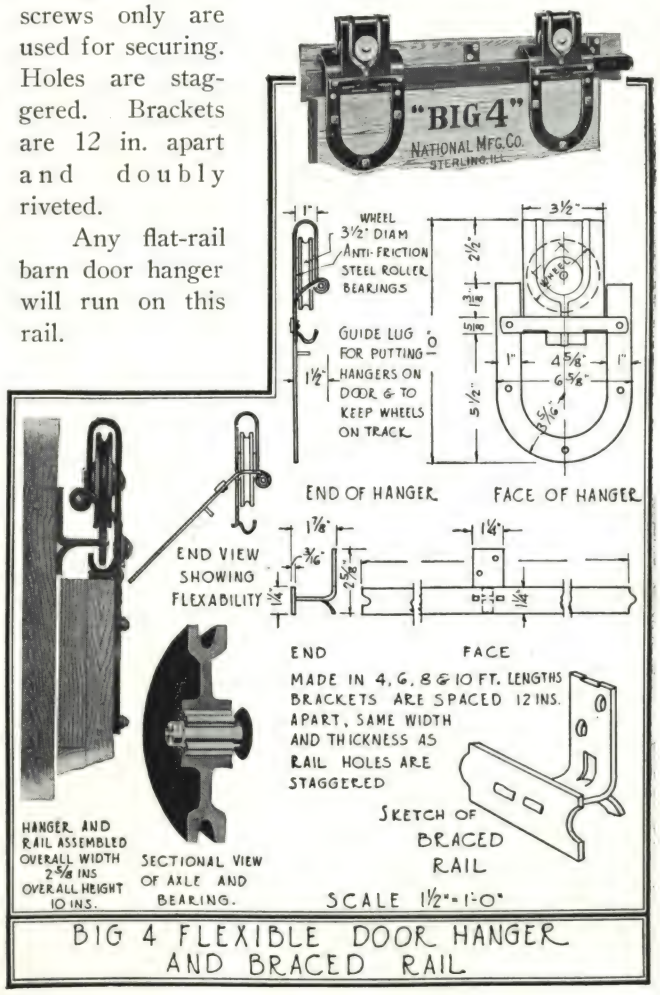
Japanning and reaming are the same as in making the No. 66 hanger.

Two studs, together with the hook turned under the rail, prevent the hanger from jumping the track; they also serve as guides when the hanger is being adjusted to the door.

"Braced" Rail

Used with "Big 4" hangers. Brackets are same thickness and width as rail. Bracing provides three times as much strength as when screws only are used for securing. Holes are staggered. Brackets are 12 in. apart and doubly riveted.

Any flat-rail barn door hanger will run on this rail.



BIG 4 FLEXIBLE DOOR HANGER AND BRACED RAIL

Continued on next page

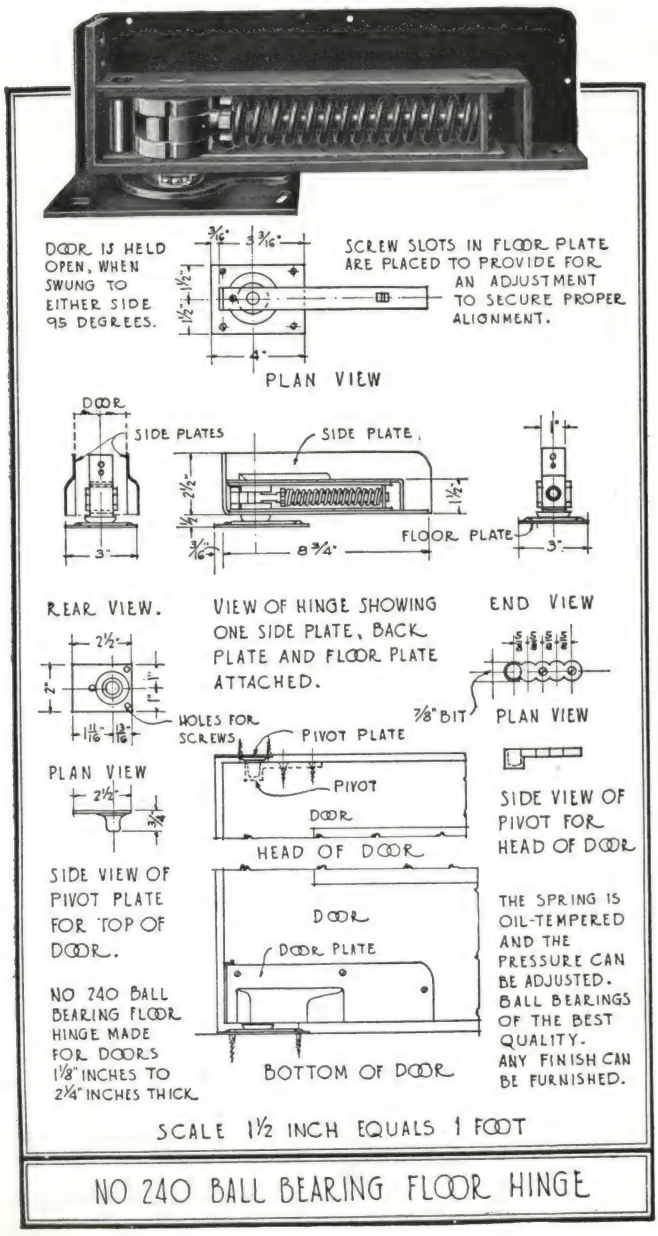
No. 240 Ball Bearing Floor Hinge

Construction is radically different from others. The spring-closing features and part that bears the weight of door are independent of each other. In No. 240 hinge, the pressure of the spring is not against the hinge bearing which carries the door, but it is against a 1-in. casehardened roller; this prevents wear on the hinge bearing, and when the door is at rest, the hinge keeps it firmly in the center of the opening. The door when swung to either side is held open 95°. The pressure on this bearing is but 10 lbs. and the saving in wear in favor of this hinge over other types is in the ratio of 30 lbs. to 1.

Spring is oil tempered and pressure is adjustable. Ball bearings are of the best. No chiseling is necessary to attach pivot to top of door.

The construction of pivot plate for head jamb is unique. To place bearing portion in right position, it is necessary simply to place end of plate against head jamb and insert three screws. No mortising or measuring is required.

Finish—This hinge is furnished in any finish desired.



NO 240 BALL BEARING FLOOR HINGE

No. 810 Garage Door Holder for Swinging Doors

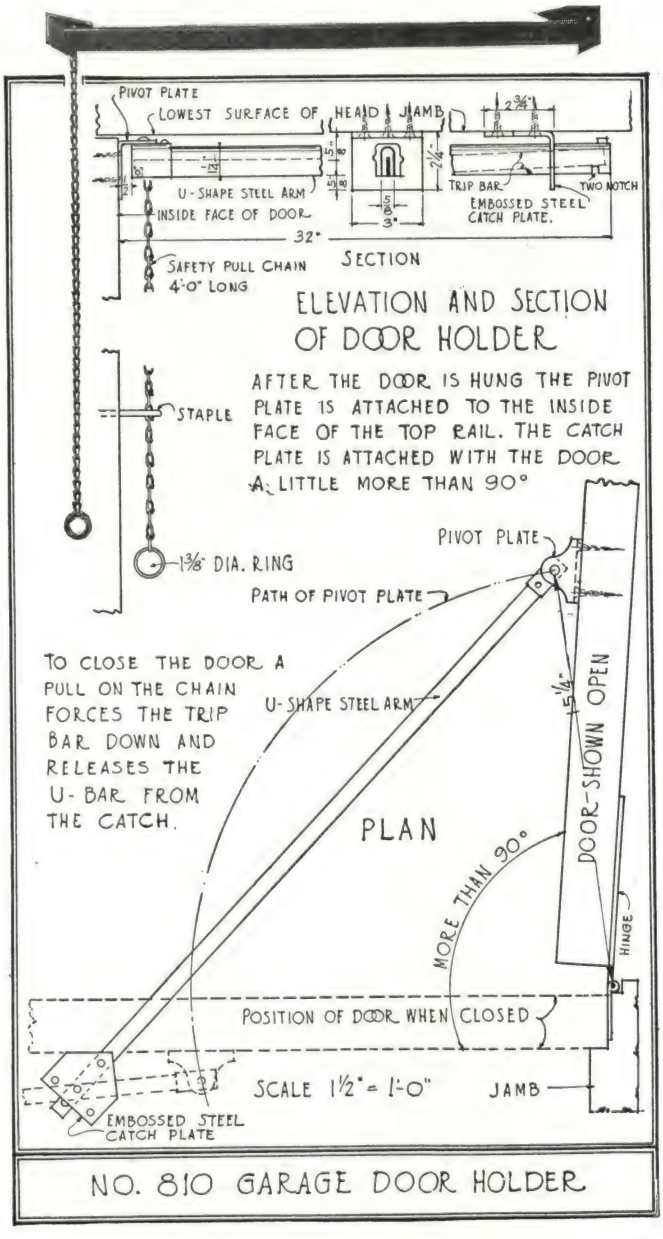
This device holds the doors securely open and keeps them from damaging a car when it enters or leaves the garage. It has a rigid U-shaped steel arm 32 in. long which, when door is opened, slides through an embossed steel catch plate until two notches at its inner end catch in the plate and hold the door open. To close the door it is necessary only to pull lightly on a safety chain that lifts the arm so that the notches can no longer hold it. Then the arm slides back through the plate. A swivel joint allows the arm to fold back along the head jamb when the door is closed. Made throughout of heavy gage steel, and strong enough for any door.

Regular stock finishes are japan, dead black japan, sherardized, sherardized and dead black japan.

No. 27 Garage Door Latch for Swinging Doors

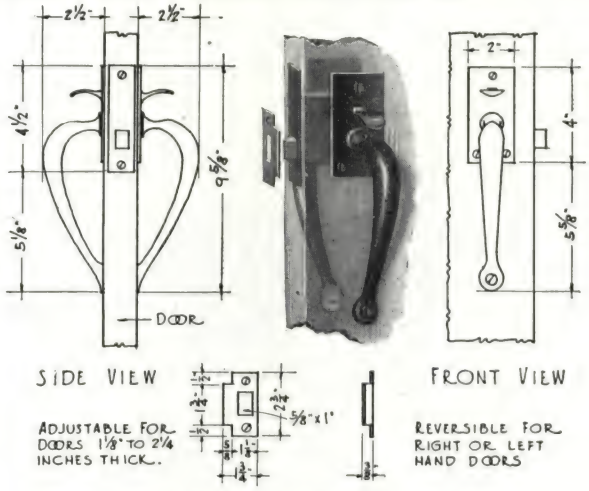
Handles have long graceful lines, equal to door locks of the higher grade. The mechanism is simple. Latch is reversible.

Regular finishes are japan, dead black japan, sherardized and plated any finish.

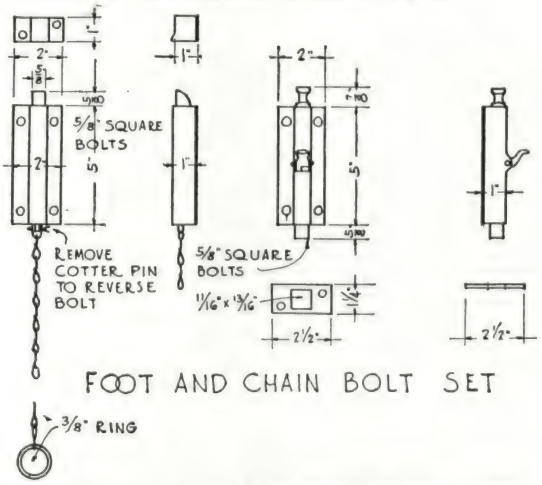


NO. 810 GARAGE DOOR HOLDER

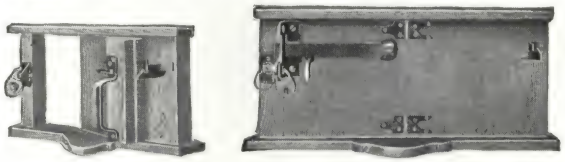
Continued on next page

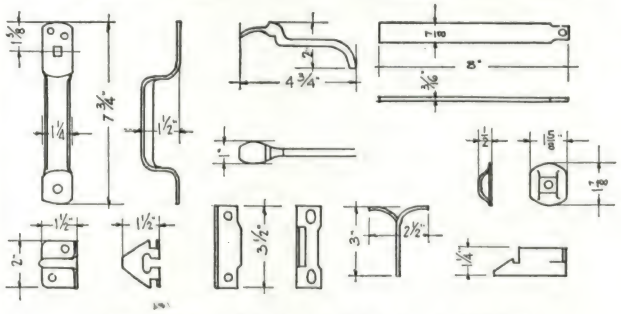


NO-27 SWINGING DOOR LATCH



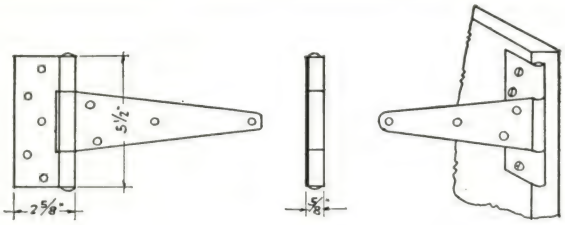
FOOT AND CHAIN BOLT SET





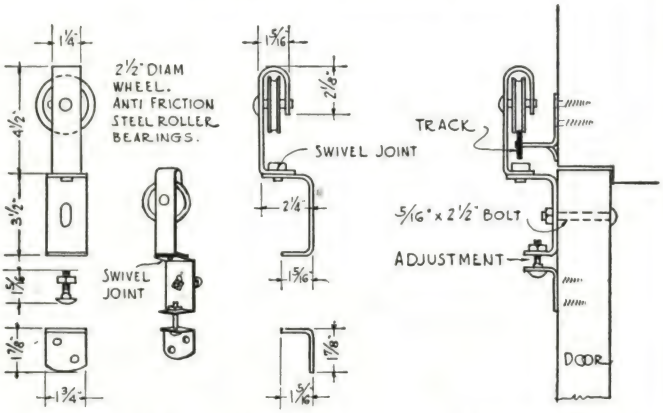
NO-29 ALL STEEL LATCH

OWING TO THE CONSTRUCTION OF THIS LATCH, HARNESS CANNOT CATCH ON IT. THE STRIKE IS MADE WITH A GUARD, AND THE BAR EXTENDS BUT 3/8 INCH BEYOND EDGE OF DOOR, MAKING A SLIGHT PROJECTION ON WHICH HARNESS CANNOT POSSIBLY CATCH. WHEN NOT IN USE PADLOCK CAN BE HUNG ON STRIKE, AS ILLUSTRATED.

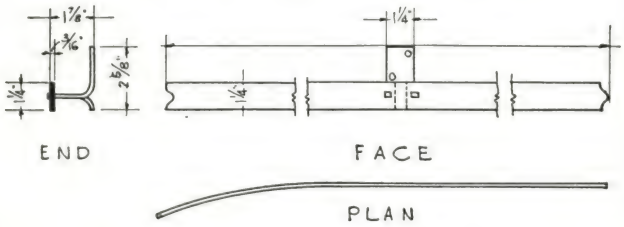


NO. 840 REVERSIBLE 'T' HINGE

MADE IN 6-8-10 INCH SIZES

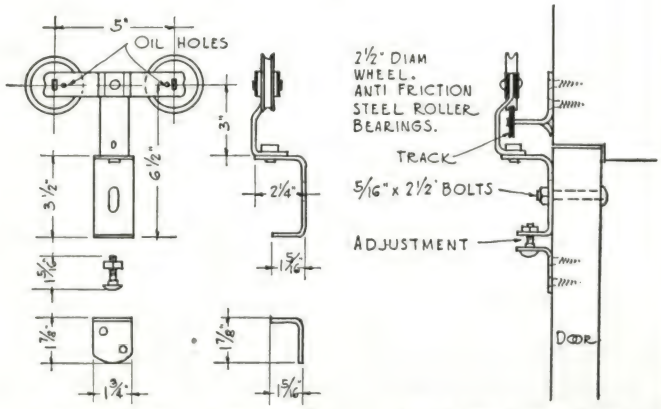


NO. 851 SWIVEL HANGER



MADE IN 4, 6, 8 & 10 FOOT LENGTHS. BRACKETS ARE SPACED 12 INCHES APART; SAME WIDTH AND THICKNESS AS RAIL. HOLES ARE STAGGERED.

BRACED RAIL.



NO. 850 SWIVEL HANGER

SCALE - ONE & ONEHALF INCH EQUALS ONE FT.

GARAGE DOOR HARDWARE

Continued on next page

Garage Door Sets

Packed in strong cartons. Stock finishes are japan, dead black japan, sherardized, sherardized and dead black japan.

No. 800 Garage Door Set—For two-door openings, doors to swing on hinges. This set has loose pin, reversible T-hinge; can be used as a full surface hinge or reversed and mortised in jamb when used on brick building.

Set consists of: 3 pairs No. 840 reversible T-hinges, either 8 or 10 in.; 1 only No. 820 chain bolt; 1 only No. 830 foot bolt; 1 only No. 5 door pull; 1 only No. 29 all-steel latch. No. 800A, same as above, except 3 pairs 10-in. No. 841 hinges are used. No. 800B, same as No. 800A, except No. 842 hinges are used. Set No. 801, same as No. 800, except that No. 27 latch and one pair No. 40 padlock eyes are used instead of No. 29 all-steel latch. No. 801A, same as No. 800A, except No. 27 latch is used. No. 801B, same as No. 800B, except No. 27 latch is used.

No. 804 Garage Door Set—For four-door openings. This set works as freely and easily as any house door, and produces an absolutely weathertight job.

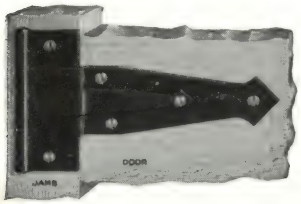
Set consists of: 2 only swivel hangers (one-wheel); two 6-ft. pieces "braced rail"; 6 pairs 4x4-in. No. 505 japanned tight pin butts; 2 only No. 820 chain bolts; 2 only No. 5 pulls; 1 pair No. 40 padlock eyes. Furnished in japan finish only. Weight with 12 ft. of rail, 29½ lbs.

No. 805 Garage Door Set—Doors equipped with this set swing into jamb against stops and are absolutely weathertight. One of the doors can be opened without disturbing the other two. Doors are adjustable in case of swelling or raising of cement floors. Adjustable feature prevents sagging. Furnished regularly with 6 ft. braced rail for 8-ft. opening. When larger doors are used, same should be specified.

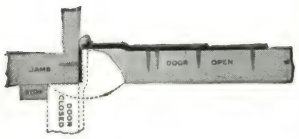
Set No. 805 includes: No. 29 latch; 1 only swivel hanger; 6-ft. braced rail; 4½ pairs 4x4-in. japan No. 505 tight pin butts; 1 only No. 820 chain bolt; 1 only No. 830 foot bolt; 1 only No. 5 pull; 1 pair No. 40 padlock eyes. All necessary bolts and screws. Set No. 805A, same as above, except 1½ pairs No. 505 butts and 3 pairs 10-in. No. 841 hinges are used.

Set No. 805B, same as No. 805A except No. 842 hinges are used.

Set No. 806, same as No. 805, except No. 27 latch is used. Set No. 806A, same as No. 805A, except No. 27 latch is used. Set No. 806B, same as No. 805B, except No. 27 latch is used.



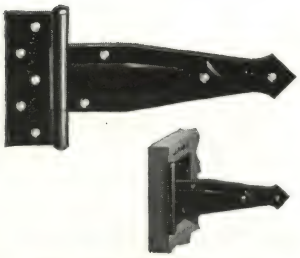
No. 841. Offset Garage Hinge



No. 841. Offset Garage Hinge

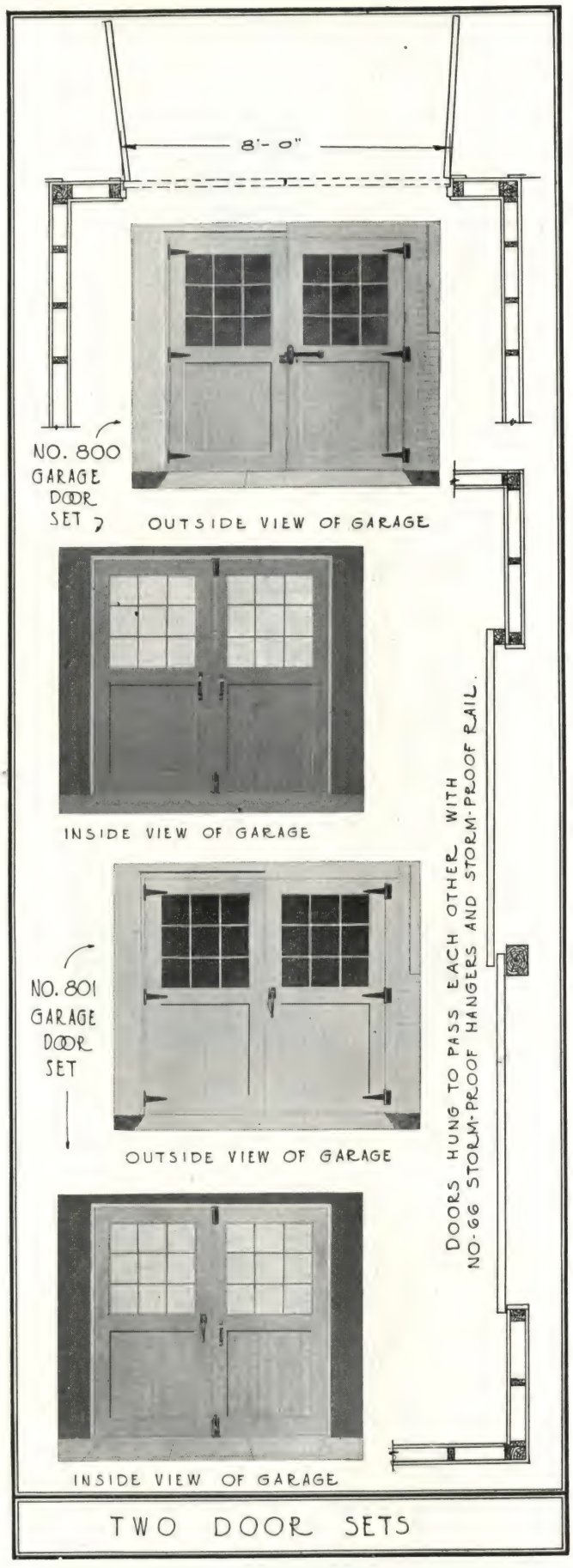
No. 841 Offset Garage Hinge—Made with offset to swing doors clear of opening. See lower illustration. Embossed leaf adds to attractiveness and strength of hinge. Packed one pair in a box with screws, Japan finish only.

Size, 10 in. Weight per dozen pairs, 43½ lbs.



No. 842. Ornamental Garage Hinge

No. 842 Ornamental Garage Hinge—Made with a loose pin so that the "T" part can be reversed and used as a full surface hinge or mortised into the jamb when brick construction is used. The embossed leaf adds to the attractiveness and strength of the hinge. After hinge is placed in position, the end of pin can be slightly riveted to prevent its removal. Packed one pair in a box with screws. Japan finish only. Size, 10 in. Weight per dozen pairs, 43¾ lbs.



TWO DOOR SETS

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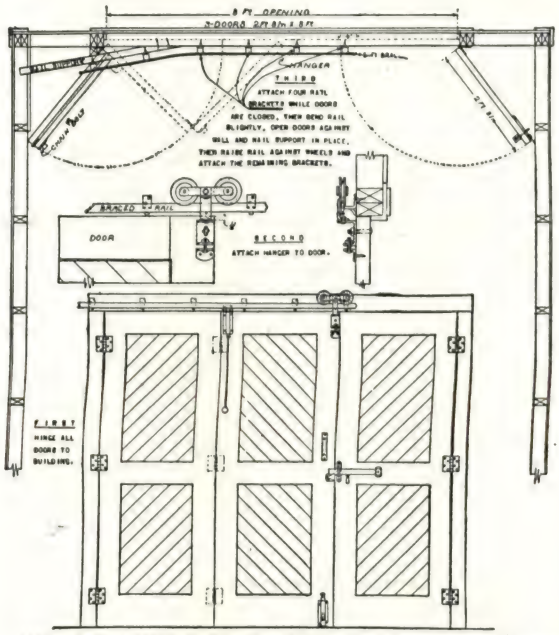
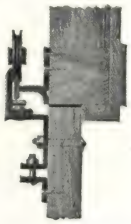


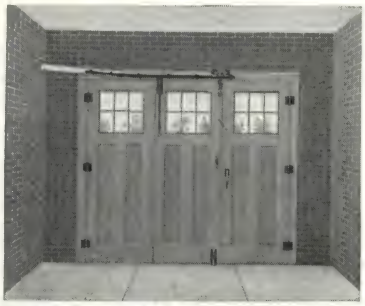
METHOD OF HANGING DOORS WITH NO 805 & NO 806 GARAGE DOOR SETS

OUTSIDE

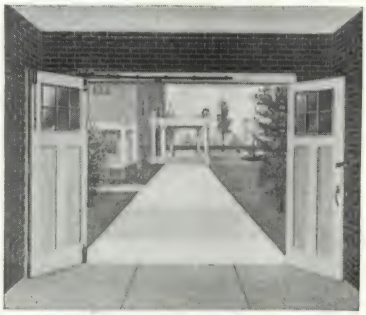


SECTIONAL VIEW OF NO 850 SWIVEL HANGER

NO. 850 HANGER OPERATES ON A SWIVEL AND TURNS BACK EASILY



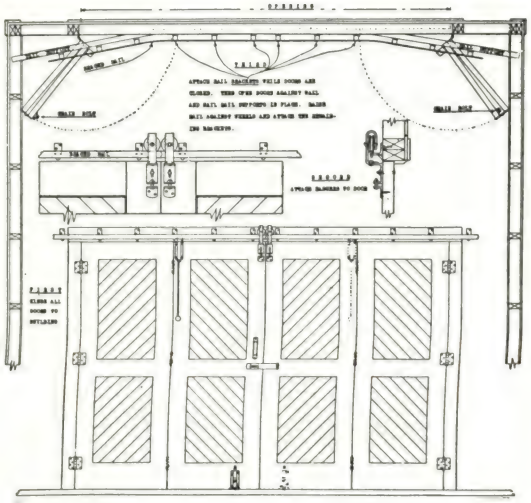
INSIDE WITH DOORS CLOSED



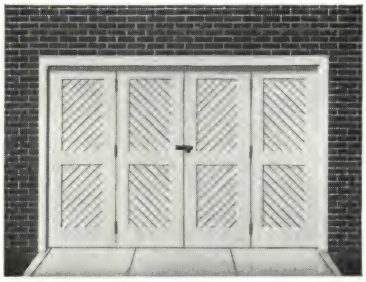
INSIDE WITH DOORS OPEN.

NOS 805 AND 806. SLIDING AND SWINGING GARAGE DOOR SETS WORK EASILY AND WITHOUT BINDING OR FRICTION

THREE DOOR SETS



METHOD OF HANGING WITH NO 804 GARAGE DOOR SET.



OUTSIDE VIEW

NO. 851 SWIVEL HANGER

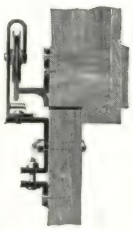
THE HANGER IS SO CONSTRUCTED THAT THE DOORS SWING INTO THE JAMB AGAINST STOPS.

THE DOORS ARE HUNG ON THE INSIDE AND FOLD AGAINST THE INNER WALL, REQUIRING ONLY MINIMUM SPACE IN OPENING.

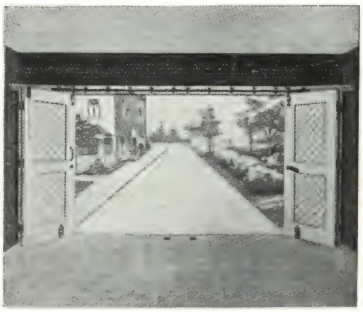
THE EQUIPMENT IS PROTECTED FROM THE WEATHER

FOUR DOORS ARE REQUIRED IN THIS COMBINATION

DOORS ARE SECURELY HUNG WITH 4"x4" BUTTS WITH A STRONG, ADJUSTABLE, ROLLER BEARING HANGER ON THE OUTER END, WHICH ABSOLUTELY PREVENTS THE DOORS FROM SAGGING.



SECTIONAL VIEW OF NO 851 SWIVEL HANGER



INSIDE VIEW

FOUR DOOR SETS

RICHARDS-WILCOX MANUFACTURING CO.

INCORPORATED

Manufacturers of Door Hangers and Hardware Specialties

CABLE ADDRESS
"RICHWILCO, AURORA"

AURORA, ILL.

CANADIAN FACTORY
LONDON, ONTARIO

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CLEVELAND, OHIO, 459 Hippodrome Annex
ST. LOUIS, MO., 1735 Boatmens Bank Building
INDIANAPOLIS, IND., 423-24 Occidental Building
MINNEAPOLIS, MINN., 321 Plymouth Building
LOS ANGELES, CAL., 503 Equitable Building
SAN FRANCISCO, CAL., 626 Underwood Building
LONDON, ONT., RICHARDS-WILCOX CANADIAN CO., LTD.

Products Page

R-W GARAGE DOOR HANGERS and OUTFITS:
R-W "SLIDETITE" SLIDING-FOLDING DOOR OUTFITS.....1258
R-W "SLYDASYDE" RIGHT ANGLE SLIDING DOOR OUTFITS.....1261
R-W STRAIGHT SLIDING DOOR OUTFITS....1261
R-W TROLLEY DOOR HANGERS for Garages, Barns, Warehouses and Factories.....1263
R-W STANDARD SIZE TROLLEY TRACKS.....1263
R-W STANDARD TROLLEY TRACK BRACKETS..1263
R-W HOLDTITE STAIR RAIL BRACKETS.....1272
R-W BOLTS, LOCKS, FLOOR GUIDES, etc., for Sliding Doors 1264
R.W. "IDEAL" ELEVATOR DOOR HANGERS....1266
R-W "IDEAL" ELEVATOR DOOR CONTROLLER.1266
R-W ELEVATOR DOOR LATCHES, BOLTS and LOCKS 1266
R-W DOOR CONTROLLER and CHECK.....1266
R-W HOUSE DOOR HANGERS.....1267
R-W SLIDING PARTITION DOOR HARDWARE..1267
R-W STANDARD FIRE DOORS, HARDWARE, FRAMES and SILLS.....1271
R-W HORIZONTAL TURNOVER DOOR HARDWARE 1272
R-W LIFT WAREHOUSE DOORS 1273

Also manufacturers of "OveR-Way" Monorail Conveying Equipment.

For Multifold Window Hardware, see pages 1316-1317.

R-W Garage Door Hangers and Outfits

The R-W line of garage door hangers and outfits consist of three general types, as follows:

(1) R-W "Slidetite" Sliding-folding Door Outfits, No. 435 and No. 1035.

(2) R-W "SlydaSyde" Right Angle Sliding Door Outfits, No. 235, to open door against side wall, inside building.

(3) R-W Straight Sliding Door Outfits, including single and parallel track types.

R-W "Slidetite" Sliding-folding Door Outfits (Nos. 435 and 1035)

Combination hinged, folding and sliding type for openings from 8 to 30 ft. wide. Doors are hinged at jamb on inside of building with one of each pair of doors supported at outer edge by No. 435 roller bearing sliding door hangers. Space requirement between doorway and car equals approximately the width of one door where No. 435 hardware is used, or the width of one door plus offset of hinge where No. 1035 hardware is used.

"Slidetite" doors fit perfectly tight, are weatherproof, can not sag, and will not warp. All of the openings may be used at one time.

Styles—"Slidetite" outfits are made in two styles—No. 435 and No. 1035; the designating numbers referring to the style number of hinge used, the No. 435 hinge being a butt hinge while No. 1035 is an offset strap hinge.

With the No. 435 hinge, the doors when standing at right angles to the opening project into the opening to a distance equal to the combined thickness of the doors. With the No. 1035 hinge, doors swing clear of opening.

Sizes—"Slidetite" outfits No. 435 and No. 1035 are each made in three sizes:

No. 435x31 or No. 1035x31 for light doors up to 125 lbs.
No. 435x232 or No. 1035x232 for medium doors from 125 lbs. to 200 lbs.
No. 435x33 or No. 1035x33 for heavy doors over 200 lbs.

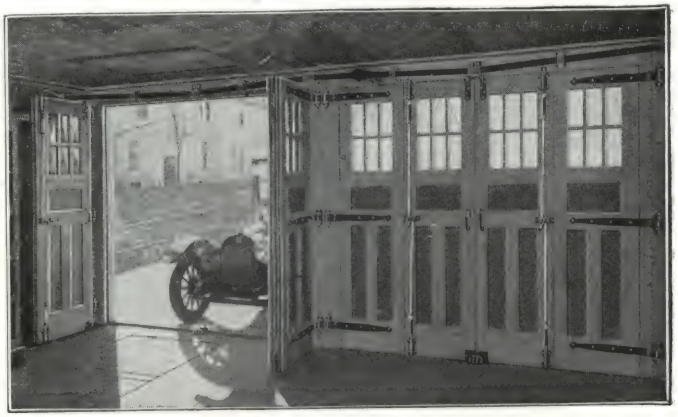
Thickness of Doors—For private garages, doors 1¾ in. thick should give satisfactory service. For public garage doors, subject to hard usage, doors 2¼ in. thick should be used. Hardware is made to handle doors up to 2½ in. thick.

Equipment—All necessary hardware is furnished with each "Slidetite" outfit, including: track, hangers, brackets, hinges, bow handles, top and bottom bolts and all screws and bolts necessary to erect. Lock for entrance door not furnished with sets, but should be specified separately (see illustration on page 1264).

Intermediate and end brackets are adjustable. Hangers have metal wheels, vertical adjustment and ball-bearing swivel pendants.

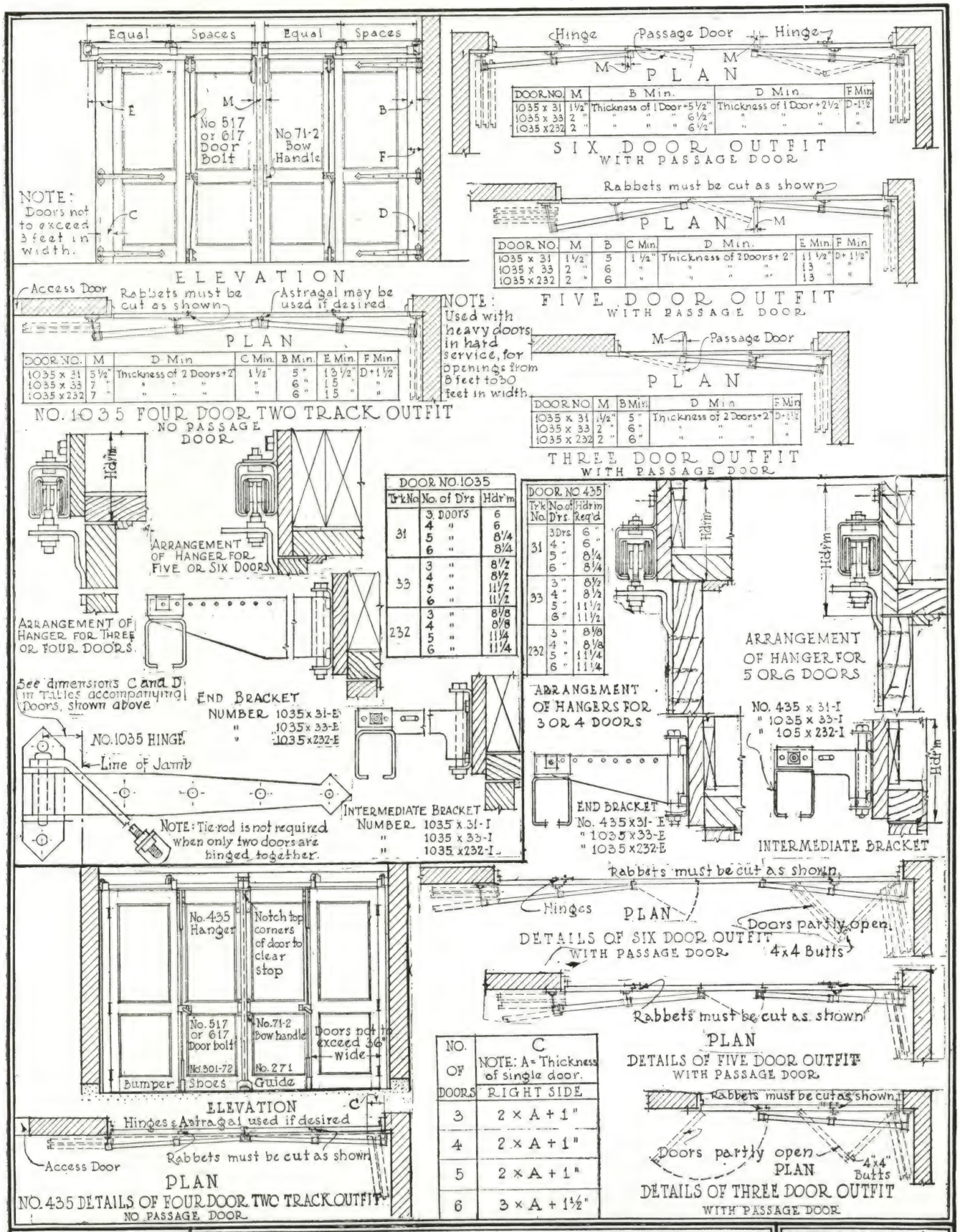
No. 517 or No. 617 top and bottom Cremone bolts are required to lock the doors in place (see page 1264). Floor guides are furnished where necessary and two bumper shoes are attached to lower corner of door to prevent chafing by guide.

Locking—If no separate entrance door is available (1) hang the doors so one door near the center of the opening will be hinged free to serve as passage door,



INTERIOR OF GARAGE EQUIPPED WITH TWO 4-DOOR R-W "SLIDETITE" OUTFITS
No. 1035 offset hinges used

Continued on next page



DOOR NO.	M	B Min.	D Min.	F Min.
1035 x 31	1½"	Thickness of 1 Door + 5½"	Thickness of 1 Door + 2½"	D - 1½"
1035 x 33	2 "	" " " 6½"	" " "	"
1035 x 232	2 "	" " " 6½"	" " "	"

DOOR NO.	M	B	C Min.	D Min.	E Min.	F Min.
1035 x 31	1½"	5	1½"	Thickness of 2 Doors + 2"	11½"	D + 1½"
1035 x 33	2 "	6	"	" " " "	13 "	"
1035 x 232	2 "	6	"	" " " "	13 "	"

DOOR NO.	M	B Min.	D Min.	F Min.
1035 x 31	1½"	5"	Thickness of 2 Doors + 2"	D + 1½"
1035 x 33	2 "	6"	" " "	"
1035 x 232	2 "	6"	" " "	"

DOOR NO.	M	D Min.	C Min.	B Min.	E Min.	F Min.
1035 x 31	5½"	Thickness of 2 Doors + 2"	1½"	5 "	13½"	D + 1½"
1035 x 33	7 "	" " "	"	6 "	15 "	"
1035 x 232	7 "	" " "	"	6 "	15 "	"

DOOR NO. 1035		
Trk No.	No. of Drs	Hdr'm
31	3 DOORS	6
	4 "	6
	5 "	8¼
	6 "	8¼
33	3 "	8½
	4 "	8½
	5 "	11½
	6 "	11½
232	3 "	8⅛
	4 "	8⅛
	5 "	11¼
	6 "	11¼

DOOR NO. 435		
Trk No.	No. of Drs.	Hdr'm Req'd
31	3 Drs.	6 "
	4 "	6 "
	5 "	8¼
	6 "	8¼
33	3 "	8½
	4 "	8½
	5 "	11½
	6 "	11½
232	3 "	8⅛
	4 "	8⅛
	5 "	11¼
	6 "	11¼

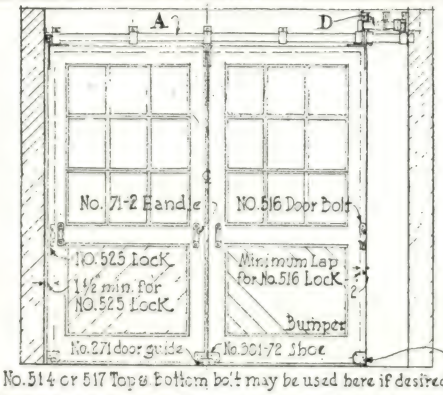
NO. OF DOORS	C NOTE: A = Thickness of single door. RIGHT SIDE
3	2 × A + 1"
4	2 × A + 1"
5	2 × A + 1"
6	3 × A + 1½"

DRAWN BY SWEETS CATALOGUE SERVICE, INC.

R.W. "SLIDETITE" GARAGE DOOR OUTFITS NO. 1035 AND 435.

SHEET NO. 1
SCALE 3/16" & 1½" EQUALS 1'-0"

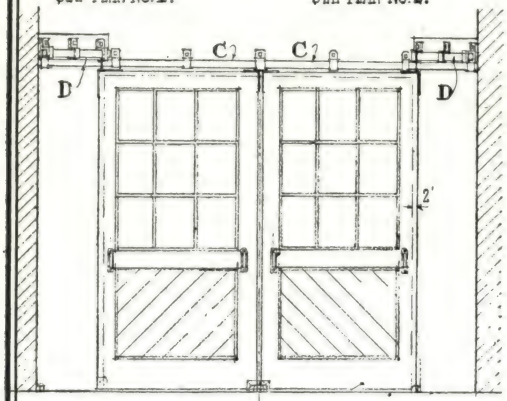
Continued on next page



No. 514 or 517 Top & Bottom bolt may be used here if desired

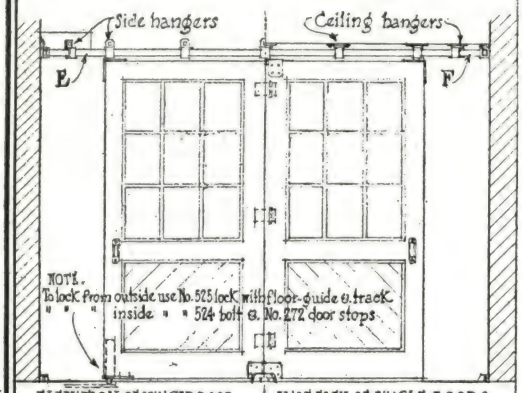
HALF ELEV. OF DOUBLE DOORS WITH USE OF CORNER BRACKET SEE PLAN NO. 1.

HALF ELEV. OF DOUBLE DOORS WITH USE OF RAISED R.A. SIDE TRACK. SEE PLAN NO. 2.



ELEV. OF SINGLE DOOR WITH USE OF RAISED SIDE TRACK SEE PLAN NO. 3.

HALF ELEV. OF DOUBLE DOORS WITH USE OF RAISED SIDE TRACK. SEE PLAN NO. 2.



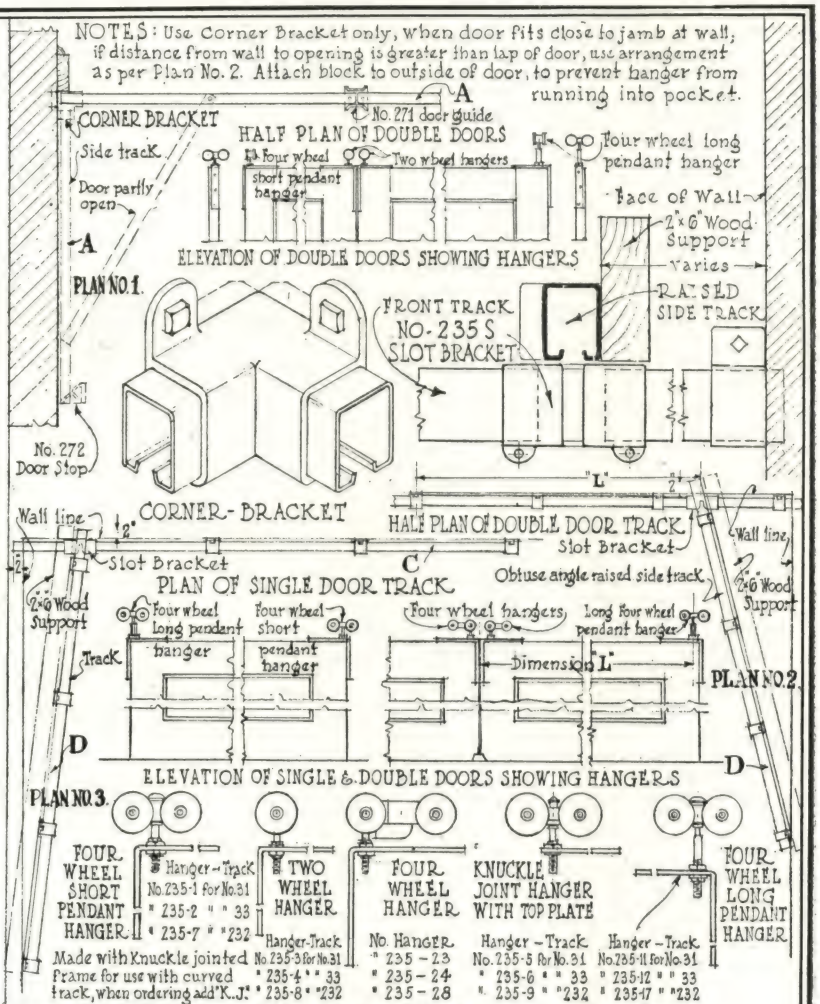
ELEVATION OF HINGED DOOR WITH USE OF SINGLE CURVED TRACK & KNUCKLE JOINT HANGER. SEE PLAN NO. 4.

HALF ELEV. OF SINGLE DOORS SEE PLAN NO. 5.

MINIMUM HEADROOM REQUIRED ABOVE TOP OF DOOR (NOT OPENING).

DOOR THICKNESS	TRACK NO.	DIA. WHEELS	BRACKET BOLT	FRONT TRACK WITH SIDE BRACKET	FRONT TRACK WITH CEILING BRACKET	RAISED SIDE TRACK WITH SIDE BRACKET	RAISED SIDE TRACK WITH CEILING BRACKET	CURVED TRACK WITH SIDE BRACKET	CURVED TRACK WITH CEILING BRACKET
1¾ to 2"	31	2⅛	½"	5¾ to 6¾	4½ to 5⅛	7¾ to 8¾	7" to 8"	5⅜ to 6⅜	4½ to 5½
2¼ • 3	33	3"	¾"	7⅛" • 8½"	6" • 7¼"	10¾" • 12"	9½" • 10⅜"	7⅛" • 8½"	6" • 7¼"
2" • 2½	232	3"	⅝"	6⅞" • 8⅛"	5⅝" • 6⅞"	10⅜" • 11⅝"	9⅛" • 10⅜"	6⅞" • 8⅛"	5⅝" • 6⅞"
AS SHOWN IN FIG.				A C		D		E	F

NOTES: Use Corner Bracket only, when door fits close to jamb at wall; if distance from wall to opening is greater than lap of door, use arrangement as per Plan No. 2. Attach block to outside of door, to prevent hanger from running into pocket.



DRAWN BY SWEETS CATALOGUE SERVICE, INC.

"R-W" RIGHT ANGLE SLIDING DOOR OUTFITS NO. 235 WITH AND WITHOUT CORNER BRACKET

SHEET NO. 2
SCALE 3/16, 3/8 & 1½" EQUALS 1'-0.

Continued on next page

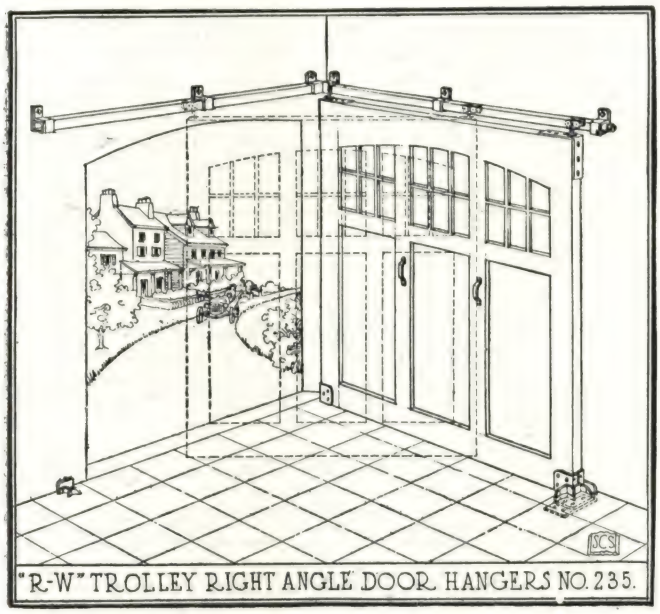
or (2) specify No. 1125 outside lock with No. 617 Cremone bolt inside (see plans on page 1259; and illustration on page 1264).

To Specify or Order—Give (1) type of outfit (No. 435 or No. 1035); (2) number of doors; (3) size of hardware (435x31, 1035x31, 435x232, 1035x232, 435x33, or 1035x33); (4) size of opening.

R-W No. 235 "SlydaSyde" Right Angle Sliding Door Outfit

This well-known type of door is usually called a corner or right angle door, from the fact that the doors, in opening, *slide around the corner* to a place inside the building at right angles to their closed position.

These doors are designed for use where, on account of lack of wall space, straight sliding or parallel sliding doors can not be used.



"R-W" TROLLEY RIGHT ANGLE DOOR HANGERS NO. 235.

The outfits are adaptable to various conditions as shown by plans Nos. 1 to 5, inclusive, Sheet No. 2, page 1260.

Types—Where door opening is adjacent to the side wall, No. 235 right angle corner bracket is used as shown at Plan No. 1, Sheet No. 2, page 1260. When the distance from the jamb to the door opening exceeds the lap of the door, the side track is placed across the corner of the building above the front track as shown in plans Nos. 2 and 3. When the distance from jamb to side wall is 26 in. or more, the side track is hung flat against the wall and connected to the front track by a curved track in the corner of the building, as shown in plans Nos. 4 and 5, page 1260.

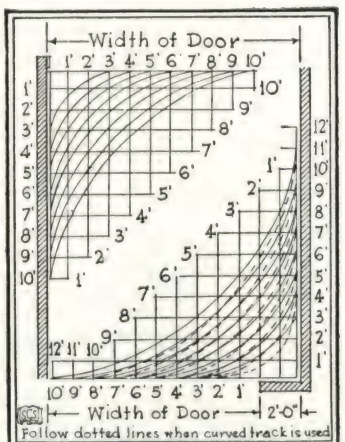


DIAGRAM SHOWING CLEARANCE REQUIRED FOR RIGHT ANGLE GARAGE DOORS EQUIPPED WITH R-W NO. 235 FIXTURES

Hangers—Hangers for straight track are built with rigid frames, and hangers for curved track are built with knuckle-jointed frames.

Floor Guides and Stop—No. 272 end stop will hold the front end of a single door in place when closed, and the back end of single or double doors when open. No. 271 center floor guide used with double doors, or two pairs of doors will hold the doors in place at the center of the opening. Continuous floor guides, No. 635, are required only with pairs of doors hinged together which are locked from the outside.

Locks—To lock from the inside, specify No. 524 cane bottom bolt or No. 516 parallel door bolt. To lock from the outside, use No. 525 lock.

To Specify or Order—Give (1) type of outfit (single door sliding one way; pair of doors, one sliding to the right and one to the left; pair of doors hinged together, both sliding one way; four doors hinged together in pairs, one pair sliding to the right and one pair to the left); (2) size of hardware (No. 235x31 for doors weighing up to 300 lbs. each; No. 235x232 for doors weighing from 300 to 500 lbs. each; No. 235x33 for doors weighing from 500 to 800 lbs. each); (3) size of opening; (4) distance from jamb to side wall; (5) thickness of doors; (6) method of locking.

R-W Straight Sliding Door Outfits

R-W straight sliding door outfits have been especially developed to meet any requirements either of the single track type or the parallel track type of sliding doors for garages, barns, warehouses and factories.

Single Track Type—For single or double sliding doors (see two plans on page 1262, first column).

Equipment of Single Doors—*Hangers and Tracks*—See description of R-W trolley hangers and R-W standard size trolley tracks on page 1263.

Brackets—No. 1 side center bracket; No. 2 side right or left end bracket.

Locks—R-W No. 525 "Faultless" sliding door lock, or R-W No. 510 "Nobreak" sliding door lock.

Stay Rollers—R-W No. 54 stay roller for light doors; R-W No. 154 stay roller for heavy doors.

Floor Stop and Guide—R-W No. 272 floor guide and stop.

Door Guide and Weatherstrip—R-W No. 736 door guide and weatherstrip for heavy doors (over 500 lbs.), or R-W No. 737 door guide and weatherstrip for light doors. (Stay rollers and floor stop and guide are not required when door guide and weatherstrip are used.)

Equipment for Pairs of Doors—Hangers, tracks and brackets same as for single doors excepting that No. 12 center stop brackets should be provided in addition to center and end brackets.

Locks—R-W No. 525 "Faultless" Sliding Door Lock.

Stay Rollers—Same as for single doors.

Floor Stop and Guide—R-W No. 271 Adjustable floor center door guide with No. 301-72 steel bumper shoe for center of opening.

Door Guide and Weatherstrip—Same as for single doors.

Equipment for Parallel Track Type Doors—For various combinations, see details on page 1262, second column. Double or triple tracks may be used as required. A steel weatherstrip is placed between the tracks to close the space between the tracks and at the top of the doors. This extends from the header to an inch or two below the top of the doors.

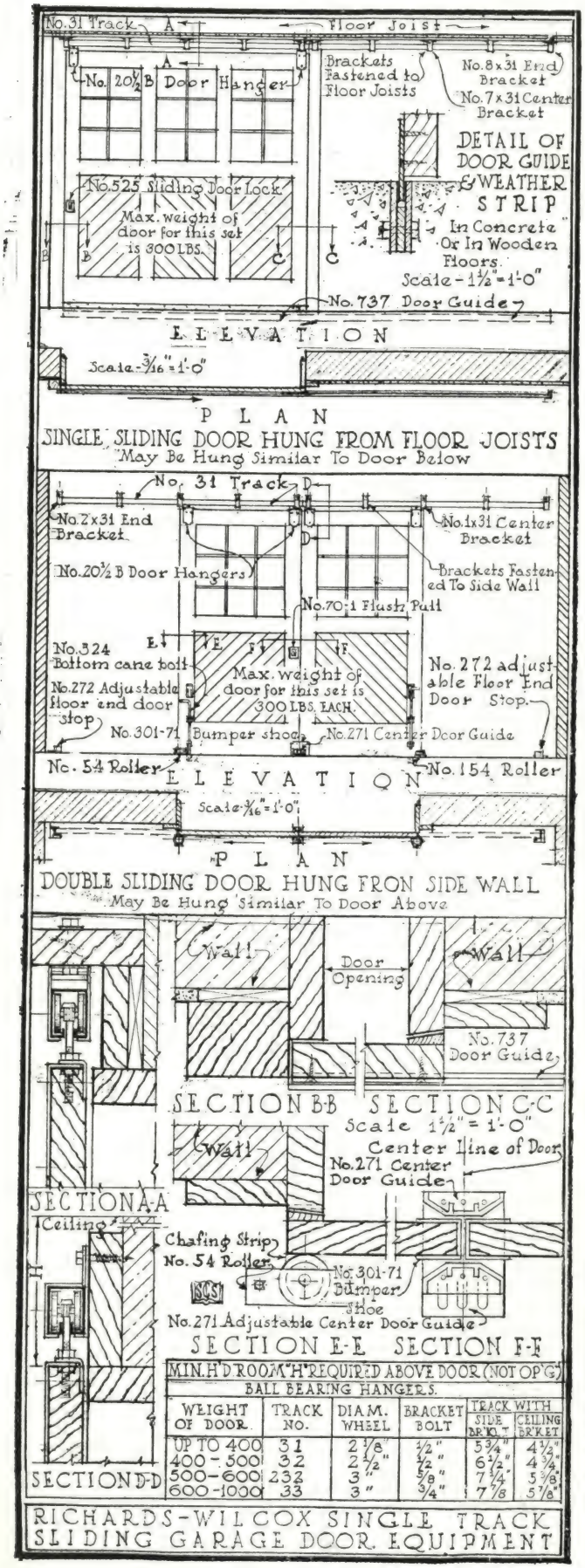
Hangers—See description of R-W trolley hangers on page 1263.

Tracks—Nos. 256, 257, 258 and 259—R-W parallel door tracks assembled with weatherstrips and brackets for *side wall* attachment. Made respectively for the following size tracks—Nos. 31, 32, 33 and 232.

Locks—For jamb locks use R-W No. 525 "Faultless" sliding door lock, or R-W No. 510 "Nobreak" sliding door lock. For locking doors together when they overlap, use R-W No. 516 parallel door bolt and lock, or, R-W No. 518 parallel door bolt for heavy warehouse doors 2½ in. thick.

Bottom Bolts—No. 524 R-W cane bottom bolt, or R-W No. 519 Parallel door gravity bolt.

Continued on next page



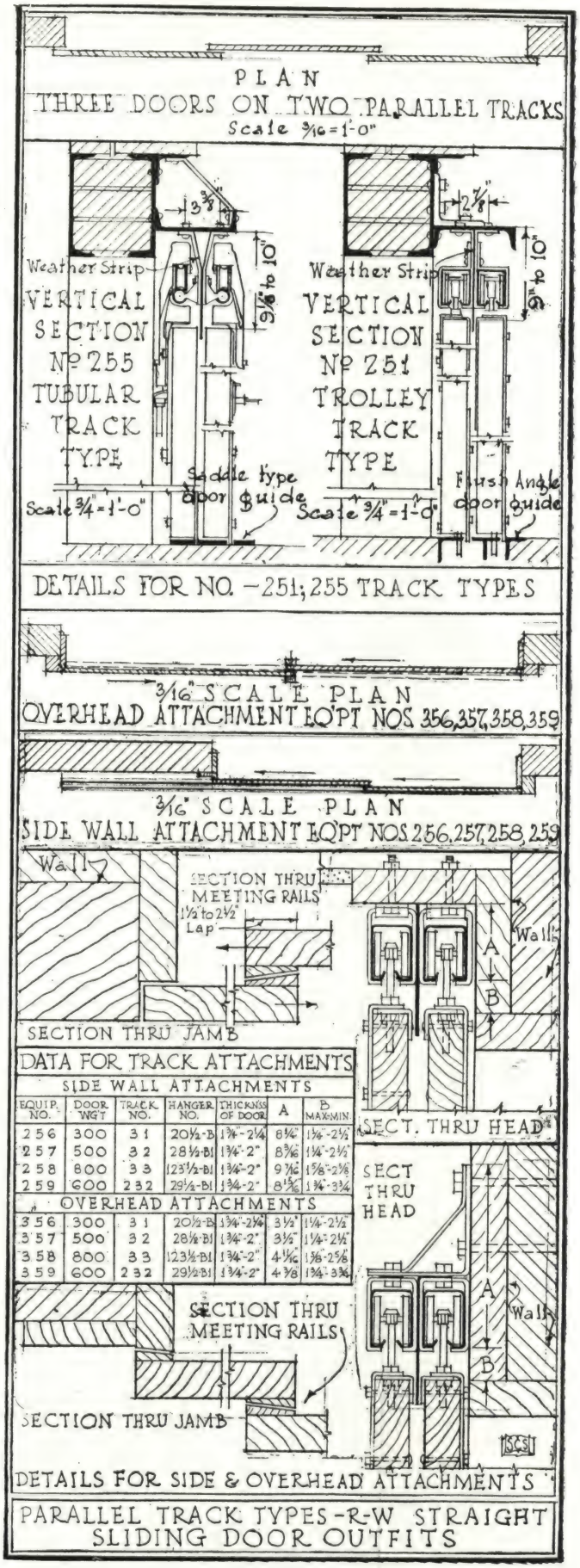
MIN. H'D ROOM "H" REQUIRED ABOVE DOOR (NOT OP'G)

BALL BEARING HANGERS.

WEIGHT OF DOOR	TRACK NO.	DIAM. WHEEL	BRACKET BOLT	TRACK WITH SIDE BRKT.	TRACK WITH CEILING BRKT.
UP TO 400	31	2 1/8"	½"	5¾"	4½"
400 - 500	32	2½"	½"	6½"	4¾"
500 - 600	232	3"	⅝"	7¼"	5⅜"
600 - 1000	33	3"	¾"	7⅞"	5⅞"

RICHARDS-WILCOX SINGLE TRACK SLIDING GARAGE DOOR EQUIPMENT

Single Track Sliding Doors



DATA FOR TRACK ATTACHMENTS

SIDE WALL ATTACHMENTS

EQUIP. NO.	DOOR WGT	TRACK NO.	HANGER NO.	THICKNESS OF DOOR	A	B MAX-MIN.
256	300	31	20½-B	1¾"-2¼"	8⅛"	1¼"-2½"
257	500	32	28½-B1	1¾"-2"	8⅜"	1¼"-2½"
258	800	33	123½-B1	1¾"-2"	9⅛"	1⅝"-2⅝"
259	600	232	29½-B1	1¾"-2"	8⅛"	1¾"-3¼"

OVERHEAD ATTACHMENTS

356	300	31	20½-B	1¾"-2¼"	3½"	1¼"-2½"
357	500	32	28½-B1	1¾"-2"	3½"	1¼"-2¼"
358	800	33	123½-B1	1¾"-2"	4⅛"	1⅜"-2⅝"
359	600	232	29½-B1	1¾"-2"	4⅜"	1¾"-3¾"

DETAILS FOR SIDE & OVERHEAD ATTACHMENTS

PARALLEL TRACK TYPES - R-W STRAIGHT SLIDING DOOR OUTFITS

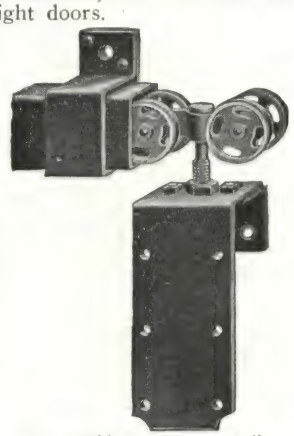
Parallel Track Sliding Doors

Continued on next page

Flush Pulls—No. 70 steel flush pulls.

Door Guide and Weatherstrip—R-W No. 736 door guide and weatherstrip for heavy doors (over 500 lbs.) or R-W No. 737 door guide and weatherstrip for light doors.

If floor guide weatherstrips are not desired, use No. 172 adjustable floor center door guide.



No. 29½-B "NOFAULT" TROLLEY DOOR HANGER

R-W Trolley Hangers for Garages, Barns, Warehouses and Factories

The RICHARDS-WILCOX MANUFACTURING CO. makes hangers as listed below with ball bearings or roller bearings having lateral and vertical adjustment and of sizes to meet practically all standard requirements for doors weighing from 300 to 2500 lbs.

DATA, TROLLEY HANGERS

Hanger number, lateral adjustment	Hanger number, lateral and vertical adjustments	Hanger name	Track number	Door thickness, in.	Weight, lbs.	Bearings in hangers	Distance, in.	
							Top of door to bottom of track	Bottom of track to center of hole in bracket
20		R-W Gem	31	1¾ to 2½	300	Roller	1⅛	3¾
	*20½B	R-W Stayrite	31	1¾ to 2½	300	Ball	⅞ min. 2⅜ max.	3¾
24		R-W Superior	31	†1¾ to 2¾	300	Roller	1⅛	3¾
	25	R-W Peerless	31	†1¾ to 2¾	300	Roller	1¼ min. 2½ max.	3¾
	*27½B	R-W Expansion	31	†1¾ to 2¾	300	Ball	⅞ min. 2⅜ max.	3¾
28L		R-W Acme	32	†1¾ to 2¾	500	Roller	1¼	4¼
	28V	R-W Premium	32	†1¾ to 2¾	500	Roller	1⅝ min. 2⅝ max.	4¼
	*28½B	R-W Supreme	32	†1¾ to 2¾	500	Ball	⅞ min. 2 max.	4¼
29L		R-W Hercules	232	†1¾ to 2¾	600	Roller	1⅛	4 11/16
	29V	R-W Economy	232	†1¾ to 2¾	600	Roller	1¾ min. 3¾ max.	4 11/16
	*29½B	R-W Nofault	232	†1¾ to 2¾	600	Ball	⅞ min. 1¾ max.	4 11/16
120		R-W King	33	†1¾ to 3	800	Roller	1¼ min.	5
	121	R-W Samson	33	†1¾ to 3	800	Roller	2⅛ min. 3¾ max.	5
	*123½B	R-W Victor	33	†1¾ to 3	800	Ball	1⅜ min. 3 max.	5
	150	R-W Jumbo	33	†1¾ to 3½	1000	Roller	2⅛ min. 3¾ max.	5
	*150½B	R-W Overall	33	†1¾ to 3½	1000	Ball	1⅜ min. 3 max.	5
	149–1		145	1¾ to 2¼	2500	Ball	1¾ min. 3¼ max.	6
	149–2		145	2⅛ to 3¾	2500	Ball	1¾ min. 3¼ max.	6

*Can be furnished with knuckle joint for curved track. When so specifying, add the words "knuckle joint."

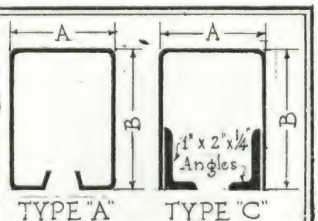
†For doors 1¾ to 2 in. thick, specify No. 1 size hanger. For thicker doors, specify No. 2 size hangers.

R-W Standard Size Trolley Track, Nos. 31, 32, 232, 33 and 145

Made in five sizes, for doors of the following weights: No. 31 for 300 lbs.; No. 32 for 500 lbs.; No. 232 for 600 lbs.; No. 33 for 1000 lbs.; No. 145 for 2500 lbs. (See table for weight and gauge.) For heavy doors, brackets should be spaced not over 2 ft. on centers.

SIZES FOR TYPE "A"				
TRACK	GAUGE	WGT LBS. PER FT.	A	B
31	16	1⅓	1⅞"	2⅜"
32	14	2	2 1/16"	2 15/16"
33	13	4	2⅞"	3½"
232	14	3	2 1/16	3 7/16"

SIZES FOR TYPE "C"				
TRACK	GAUGE	WGT LBS. PER FT.	A	B
145	11	10	3¼"	4⅝"

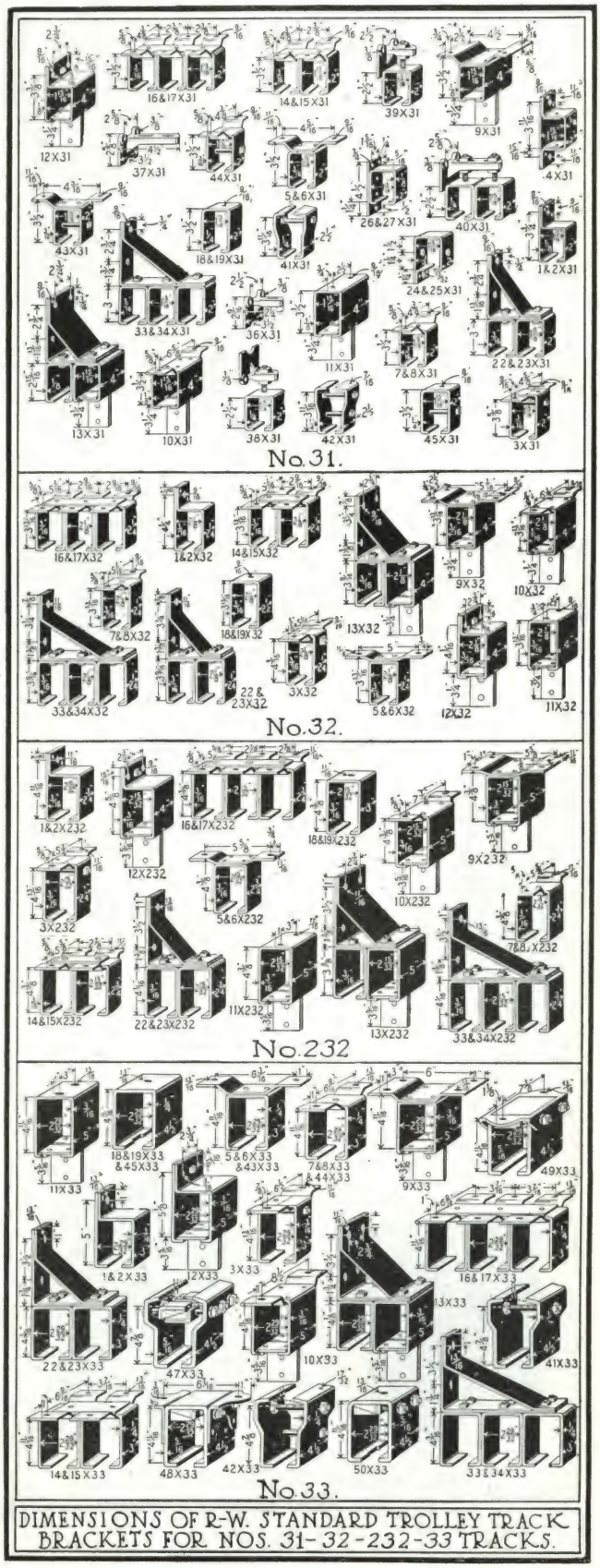


NOTE: Tracks furnished in lengths up to 10'-0" Brackets furnished to suit requirements.

R.W. STANDARD SIZE TROLLEY TRACKS

R-W Standard Trolley Track Brackets

In ordering, always specify number of track for which brackets are desired. Brackets are made to fit practically any condition (see plate below).



DIMENSIONS OF R-W. STANDARD TROLLEY TRACK BRACKETS FOR NOS. 31-32-232-33 TRACKS.

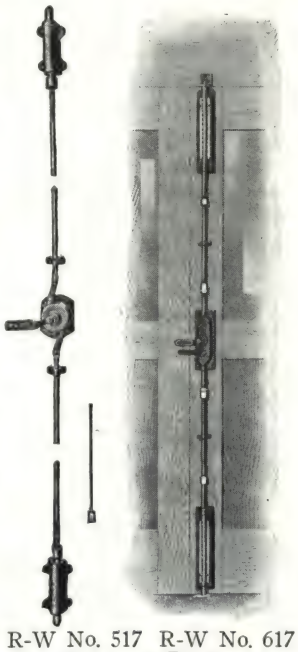
Continued on next page

Sliding Door Bolts, Locks, Floor Guides, etc.

R-W No. 517 Garage Cremone Bolt—Locks doors at both top and bottom with one movement of the lever handle. Maintains its position by gravity and can not be changed except by moving the lever handle.

R-W No. 617 Garage Cremone Bolt—Especially designed for doors equipped with "Slidetite" folding-sliding garage door hardware. It is made of steel finished in black enamel. Base plate of the center section is 12¾x3⅜ in.; top and bottom sections 17½x2⅞ in.

R-W No. 1125 Lock—For use in locking the No. 617 door bolt from the outside. Size of plate 4x4½ in. Made of steel, finished in black enamel.



R-W No. 517 R-W No. 617 Cremone Bolts

R-W No. 1125 Lock

Locks and Latch with Two Handles—The handles illustrated may be applied to No. 550 cylinder lock, No. 450 three-tumbler lock or No. 350 latch. Each lock or latch is furnished with one handle for each side of the door. Handles furnished in polished brass or japan.

R-W No. 550 Cylinder Lock—Is made with one or two cylinders. Face of the lock is 7¾x1¼ in.

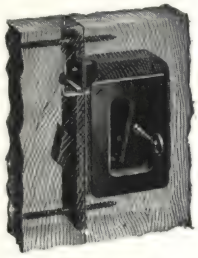
R-W No. 450 Three-tumbler Lock—Locks door from both sides. Face of the lock is 6½x1⅛ in. Furnished with two handles same as illustrated for No. 550.

R-W No. 350 Latch—Japan finish. Face plate 4½x1 in. Furnished with two handles same as illustrated for No. 550.

R-W No. 525 "Faultless" Sliding Door Lock—Lock, latch and flush door pull combined. Operated from either side of door. For single or double doors. Latch is released and door pulled open by same movement. Finish is rustless dead black.

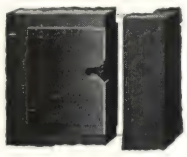
R-W No. 510 "Nobreak" Sliding Door Lock—Made flush with the door on both sides and can be operated from both inside and outside. Closing the door latches it. Serves as lock, latch, and door pull combined. No. 1 size adjustable for doors 1¾ to 2¼ in.; No. 2, 2½ to 3 in. thick. Width of lock, 5⅛ in.

R-W No. 550 Cylinder Lock Handles and Lock Installed



R-W No. 525 "Faultless" Sliding Door Lock

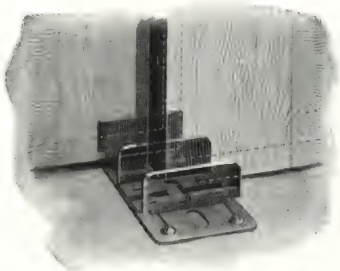
R-W No. 171 Cast Floor Center Stop



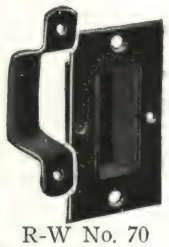
R-W No. 510 "Nobreak" Sliding Door Lock

R-W No. 524 Cane Bottom Bolt
No. 1 size, ⅝x18 in.; No. 2 size, ¾x24 in.

R-W No. 514 Top or Bottom Spring Bolt
Housing, 5½ in. long; chain, 24 in. long

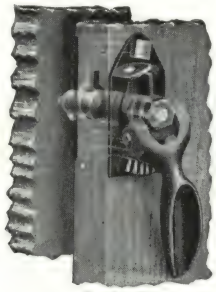


R-W No. 172 Adjustable Parallel Door Floor Guide



R-W No. 70 Flush Door Pull and No. 71 Bow Handle

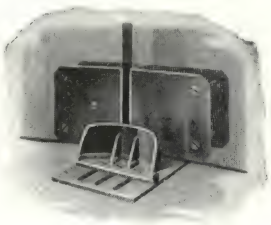
Unlocked



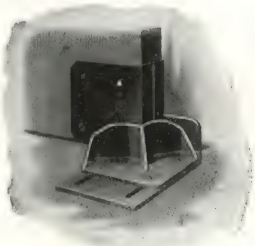
Locked

R-W No. 516 Parallel Door Bolt and Lock

For doors 1¾ to 3 in. thick. Made of malleable iron and steel. When used on outside of building, a padlock can be attached. Doors should lap each other or jamb at least 2 in.



R-W No. 271 Adjustable Floor Center Door Guide



R-W No. 272 Adjustable Floor End Door Stop

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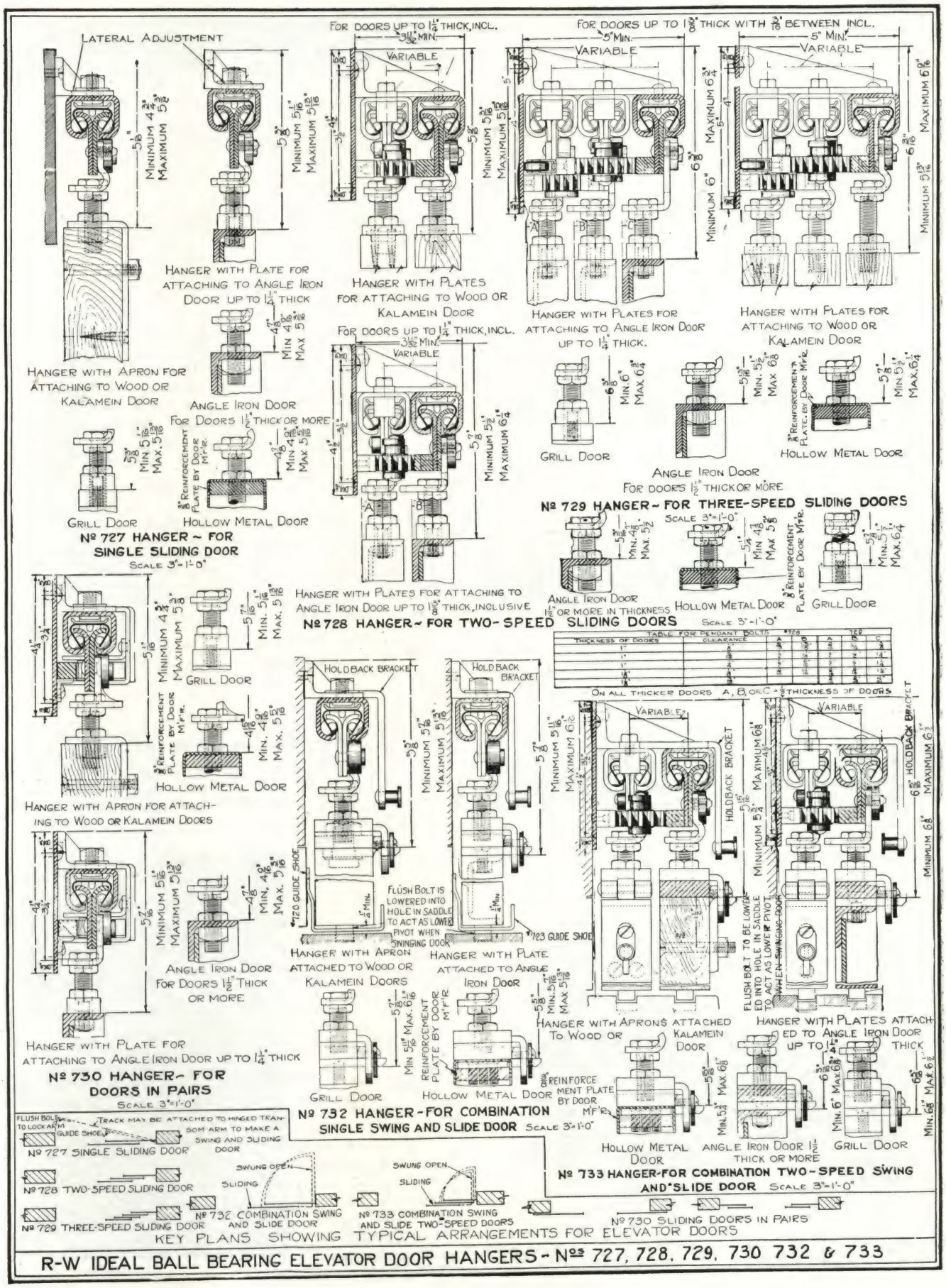


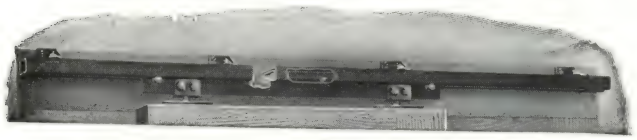
Continued on next page

R-W "Ideal" Elevator Door Hangers

For passenger and freight elevator service. Length of hanger is equal to the width of door, providing a long bearing, evenly distributing weight of door over a long section of track, insuring smooth, steady motion, and easy running. The weight of the door is carried on two rows of ½-in. high duty steel balls, kept equal distance apart by a retainer. Limit rollers provided to prevent doors from jumping or raising.

Track is rectangular shaped tube made of very heavy gauge steel, and is drawn to form two parallel runways for steel balls upon which hanger rolls. The track is dustproof and dirtproof.

Styles—Made in 5 styles: (1) for single doors; (2) for two-speed doors; (3) for 3-speed doors; (4) for doors in pairs; (5) for combination swing and slide doors.



No. 727 for Single Doors Weighing up to 200 Lbs.

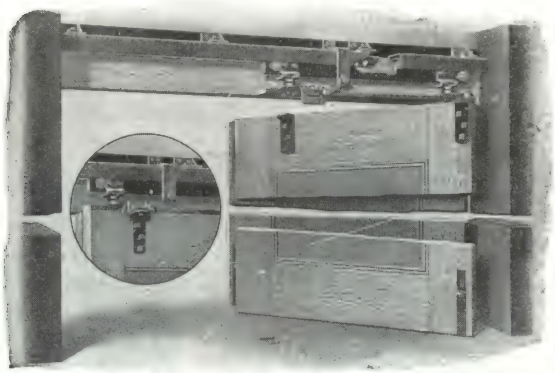
Track furnished with brackets for side wall attachment. Track has lateral and hanger has vertical adjustment

No. 728 for 2-speed Doors Weighing up to 150 Lbs. Each

Made with rack and pinion attachment for operating two doors in same direction, one door moving at twice the speed of the other. Has a 4⅜-in. width wall plate to which complete fixture is assembled

No. 729 for 3-speed Doors Weighing up to 150 Lbs. Each

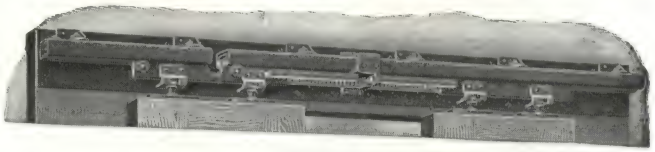
Made with rack and pinion attachment for operating three doors in same direction, the fast door at three times the speed, the intermediate door at twice the speed of the slow door. Fixture assembled complete to wall plate 5 in. wide



No. 732 for Combination Swing and Slide Doors Weighing up to 200 Lbs.

Used when stationary door is hinged and it is desirable to swing both doors open so as to use full width of elevator opening, and yet it is not practicable to swing transom bar to which track is attached. Usually more satisfactory to arrange to swing transom bar, if possible. Can be furnished for 2-speed doors when required

STYLES OF R-W "IDEAL" ELEVATOR DOOR FIXTURES



R-W "IDEAL" ELEVATOR DOOR FIXTURE

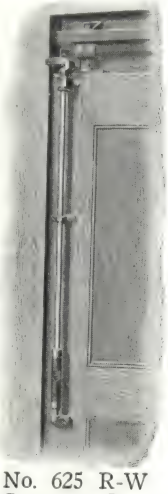
No. 730 for doors in pairs weighing up to 200 lbs. Made with rack and pinion attachment for simultaneously operating both doors in opposite directions. Fixture assembled complete to wall plate 4¼ in. wide

R-W Straight Bar Elevator Door Bolt No. 625

A reliable lock, strongly made, attractive in appearance. Locking spring enclosed in knurled handle, protecting it from dust and possible damage. Length, 3 ft. 6 in. Maximum projection from door, 1⅜ in. Cushion washers between all contacting parts make the bolt noiseless in operation. Can be arranged to unlock from corridor side. Keeper, as shown, regular. Special keeper furnished as required. Regular finish, dead black. Special finish, dead black with solid brass handle and door brackets. Packed, wrapped, with screws. Weight, 3¼ lbs.

In Ordering State—(1) Whether door brackets are to be attached to wood, kalamein or metal doors; (2) Whether keeper is to be attached to wood, metal or masonry; (3) Send sketch showing manner in which keeper is to be attached or space available for attaching keeper.

Can be furnished for attaching to narrow frames of metal doors. Right or left hand.



No. 625 R-W STRAIGHT BAR ELEVATOR DOOR BOLT

"Ideal" Elevator Door Controller and Check No. 743

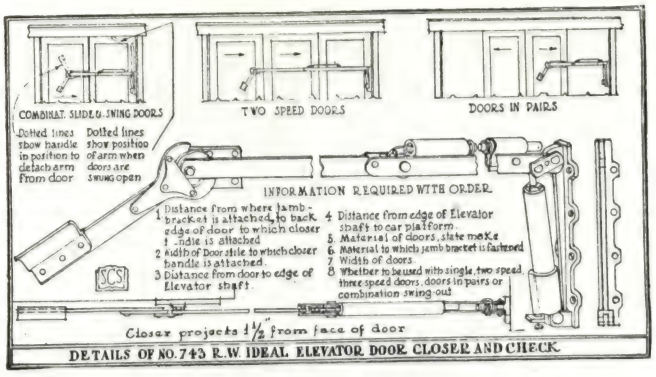
Automatically closes doors positively and easily; eliminates accidents, noise and slamming of doors. Can be used with any standard hanger; single, 2-speed, 3-speed, doors in pairs, or combination swing out.

The long lever handle starts the doors easily. The spring can not be overwound. The spring and checking mechanisms are separate and can be readily regulated independent of each other to suit the varying conditions. Made right or left hand.

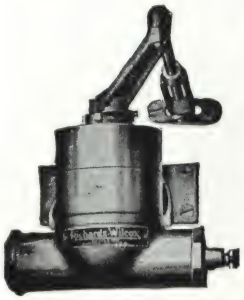
When so ordered, equipped with electric interlocking attachment giving the added feature of preventing operation of car until door is closed.

"IDEAL" ELEVATOR DOOR CONTROLLER AND CHECK

Continued on next page



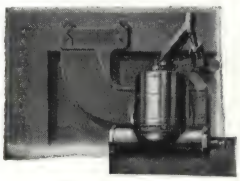
DETAILS OF NO. 743 R.W. IDEAL ELEVATOR DOOR CLOSER AND CHECK

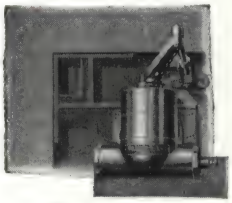

DOOR CLOSER AND CHECK
Attached with regular casing bracket

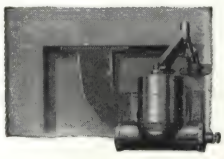
R-W Door Closer and Check No. 643

In this device, the crank and pitman principle is improved and simplified. All working parts in checking cylinder made of steel drop forgings. While tension of spring can be adjusted to suit conditions by pawl and tooth dog, overwinding is impossible. Not necessary to remove check from door to remove spring. This liquid check is leakproof. The only truly reversible check. Parts are interchangeable. No special tools required in assembling or winding up spring. Flush, soffit or corner brackets furnished extra when required.

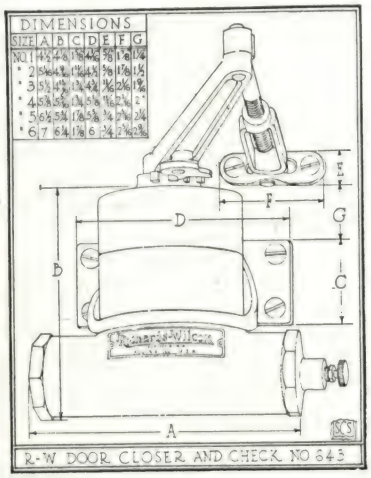
Approved by National Board of Underwriters.


Flush Bracket


Corner Bracket


Soffit Bracket

TYPES OF BRACKETS FOR R-W DOOR CHECK



R-W DOOR CLOSER AND CHECK NO. 643

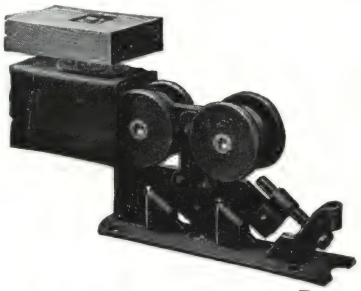
DOOR CLOSER AND CHECK

Size		
1	For screen and very light doors	6 lbs.
2	For light interior doors not over 3 ft. wide and vestibule doors not over 2 ft. 6 in. wide	7½ lbs.
3	For medium weight interior doors not over 3 ft. wide, or light outside doors not over 2 ft. 6 in. wide	10 lbs.
4	For heavy interior doors or medium weight outside doors not over 3 ft. wide	12 lbs.
5	For heavy outside doors not over 3 ft. 6 in. wide	15 lbs.
6	For extra heavy outside doors and large doors operated against very strong drafts	18 lbs.

Extra heavy doors or doors subject to strong drafts require check one size larger than specified. Checks furnished regularly in gold bronze. Checks furnished in silver bronze or ivory black at same prices. Special finishes to order.

R-W Hangers for Vanishing Doors

Made in two general types: (1) fiber wheels for all-steel track, Nos. 16, 19 and 4; (2) metal wheels for wood lined steel track, No. 221.


No. 16 R-W TWIN TROLLEY BALL BEARING HOUSE DOOR HANGER

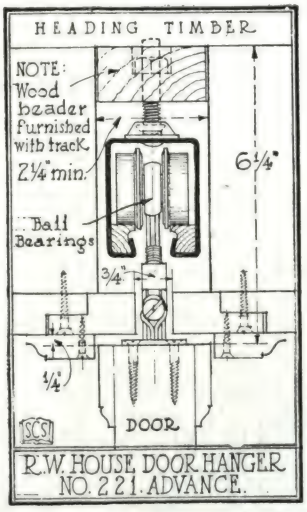
R-W No. 16 "Twin" Hanger—A popular tandem trolley for wide house doors. Track, No. 16 gauge steel, No. 19 type, adjustable, furnished with wood header as illustrated. Four wheels vulcanized fiber, 2⅛ in. in diameter. Bearings, steel balls.

No. 221 R-W ADVANCE BALL BEARING TROLLEY HOUSE DOOR HANGER

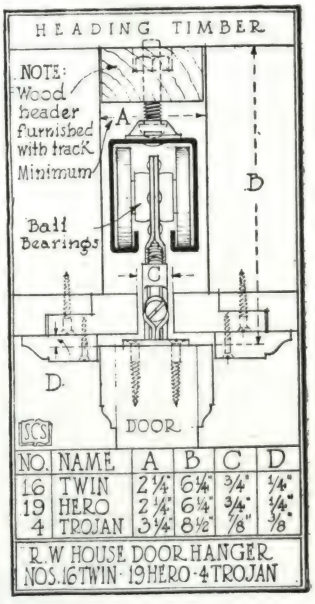
R-W No. 19 "Hero" Hanger—A popular trolley hanger for homes of moderate cost. Not recommended for doors over 5 ft. in width. Similar to No. 16 but has only two wheels.

R-W No. 4 "Trojan" Hanger—Designed for extremely heavy doors and especially adapted for post office and other government work. Track, No. 14 gauge, No. 4 type, adjustable, furnished with wood header. Four wheels, vulcanized fiber, 3 in. in diameter, for indoor service; metal, 3 in. in diameter, for outside service. Bearings, steel balls.

R-W No. 221 "Advance" Hanger—A noiseless 4-wheel hanger. Track, No. 16 gauge steel, hard maple lined, No. 221 clincher type, furnished with wood header, adjustable as illustrated. Wheels, malleable iron, lathe turned, 1⅞ in. in diameter. Steel frames. Ball bearing.



R.W. HOUSE DOOR HANGER NO. 221 ADVANCE.



NO.	NAME	A	B	C	D
16	TWIN	2¼"	6¼"	¾"	¼"
19	HERO	2¼"	6¼"	¾"	¼"
4	TROJAN	3¼"	8½"	⅞"	⅜"

R.W HOUSE DOOR HANGER NOS. 16 TWIN · 19 HERO · 4 TROJAN

R-W Sliding Partition Door Hardware

Designed for three types of sliding door partitions: (1) sliding flush; (2) sliding parallel; (3) sliding accordion. For churches, schools, auditoriums,

Continued on next page

clubs, Y. M. C. A. rooms, libraries and other public buildings.

Sliding Flush Door Hangers—Doors are flush when closed. When doors are open, they are concealed in pockets, or partition may be composed of one stationary door and a number of sliding doors, all when opened occupying position along side of stationary door.

Specification Data—Width of doors not limited by equipment, but all doors should be same width except first and last doors. Outer stiles of these doors should be slightly wider to allow for lap over jamb. Flush door bolt should be used at bottom of each door at side farthest from pocket. When desirable, wicket passage door may be built in one of sliding doors. In that case, steel bar threshold should be used.

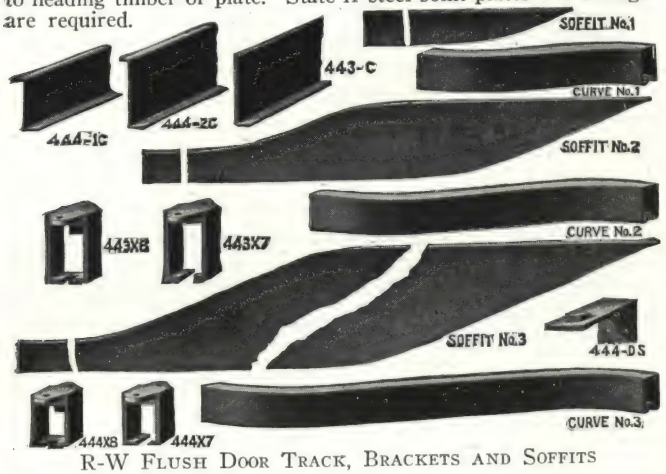
Hangers regular for doors 2½ in. thick, but can be furnished for doors of any thickness. Hangers No. 443 for No. 164 track, or No. 444-1 for No. 75 track, will accommodate doors up to 500 lbs. For heavier doors No. 444-2 hanger and No. 164 track.

Brackets, malleable iron, tapped to receive screws used in attaching casing and soffits. Steel casing and soffits take less space and are neater in appearance than wood. Meeting stiles of doors should be fitted with male and female astragal.

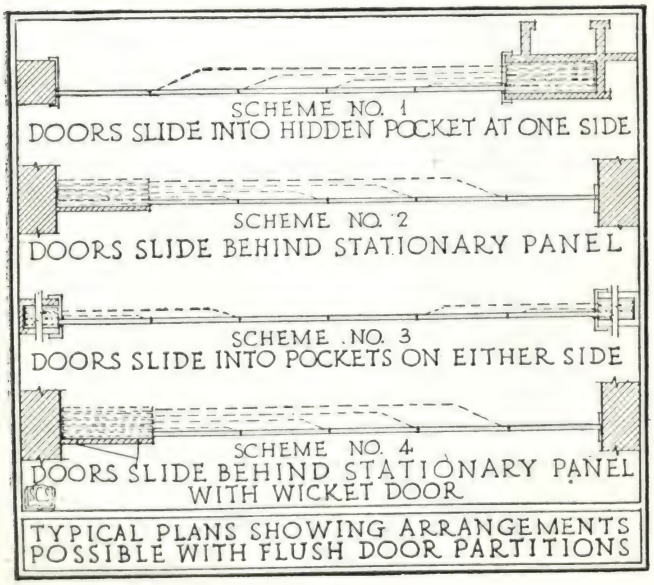
Directions for Ordering—In ordering, state number of doors, width of opening between finished jambs, and thickness of doors, width of each door, approximate weight of doors, if all slide toward one side or if one-half of doors slide toward each side, when open.

State whether doors slide back into wall pockets or along side of a stationary panel when open; state depth of pocket or width of stationary panel. When doors 2½ in. or less in thickness close into a pocket, always allow 3 in. pocket width for each door. State distance first and last doors lap the jambs or stationary panels when doors are closed.

Describe style and thickness of header to which brackets are attached. Always specify if bolts are desired to attach brackets to heading timber or plate. State if steel soffit plates and casings are required.



R-W Flush Door Track, Brackets and Soffits



Always send sketch showing layout of track and dimensions so we can determine whether curves are right or left hand.

Note: Compound curves and soffit plates increase in size according to number of doors in opening. Soffits are trimmed to approximate shape, but screw holes in soffits and casings must be punched by contractor on the job.

Sliding Parallel Door Hangers—Doors slide parallel to each other, with separate track for each door. Number of doors is not limited, but a better appearance is obtained by using not more than two or three doors sliding in same direction. Pockets may be provided for doors, or, instead, a stationary panel or door used. Floor guides may be used to steady bottoms of doors. Door locks may be employed, and flush bolts to secure bottoms of doors to floor.

Detailed information given on receipt of floor plan with measurements and statement of requirements.

Sliding Parallel Door Installation in Sunday School Room

SLIDING PARALLEL DOOR HANGERS

Thickness of door, in.	Max. weight of door, lbs.	Hanger number	Bearings	Wheels	Track number	Bracket number	Min. track centers, in.	Distance top of soffits to bottom of header, in.	Distance top of door to top of soffit, in.	
									⅞ in. soffit	1⅛ in. soffit
1⅜	200	126	Ball	Metal	30½	7x30½	1⅞	2⅞	1⅛	1⅜
1¾ to 2¼	300	226	Ball	Metal	31	7x31	2⅝*	3¾	1⅛	1⅜
1¾ to 2¼	300	626	Ball	Metal	526†	7x31	2⅝*	3¾	1⅛	1⅜
1¾ to 2¼	300	140–1	Roller	Metal or fiber	31	7x31	2⅝*	3¾	1⅛	1⅜
2½	500	140–2	Roller	Metal or fiber	33	7x33	3⅜	5⅛	1⅛	1⅜

†Wood lined track. *2½ in. for 2¼ in. doors.

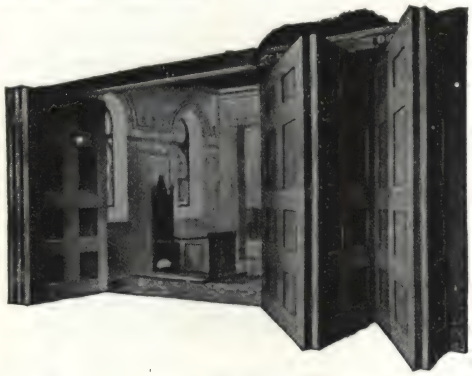
Brackets should be spaced 2- to 3-ft. centers. Space brackets 2-ft. centers for maximum weight doors on each size track.

Note: See left-hand illustration Page 1270.

Sliding Accordion Door Hangers—All doors can be folded to one side or they may be divided at center and half the doors folded to each side. A half door is required adjoining jamb toward which the doors fold. Doors should not exceed 3 ft. in width.

Service includes the furnishing of illustrations, plans, drawings and special instructions.

Number of Hangers Required—Four-wheel hangers, Nos. 135 and 335 accordion door hangers are preferable, and, when used, one hanger is applied to each alternate door, beginning with door farthest from half door. If desirable to install hanger on each door, No. 137 accordion door hanger, a two-wheel hanger can be used. Hangers have ball bearing swivel and vertical screw adjustments.



Sliding Accordion Door Partitions

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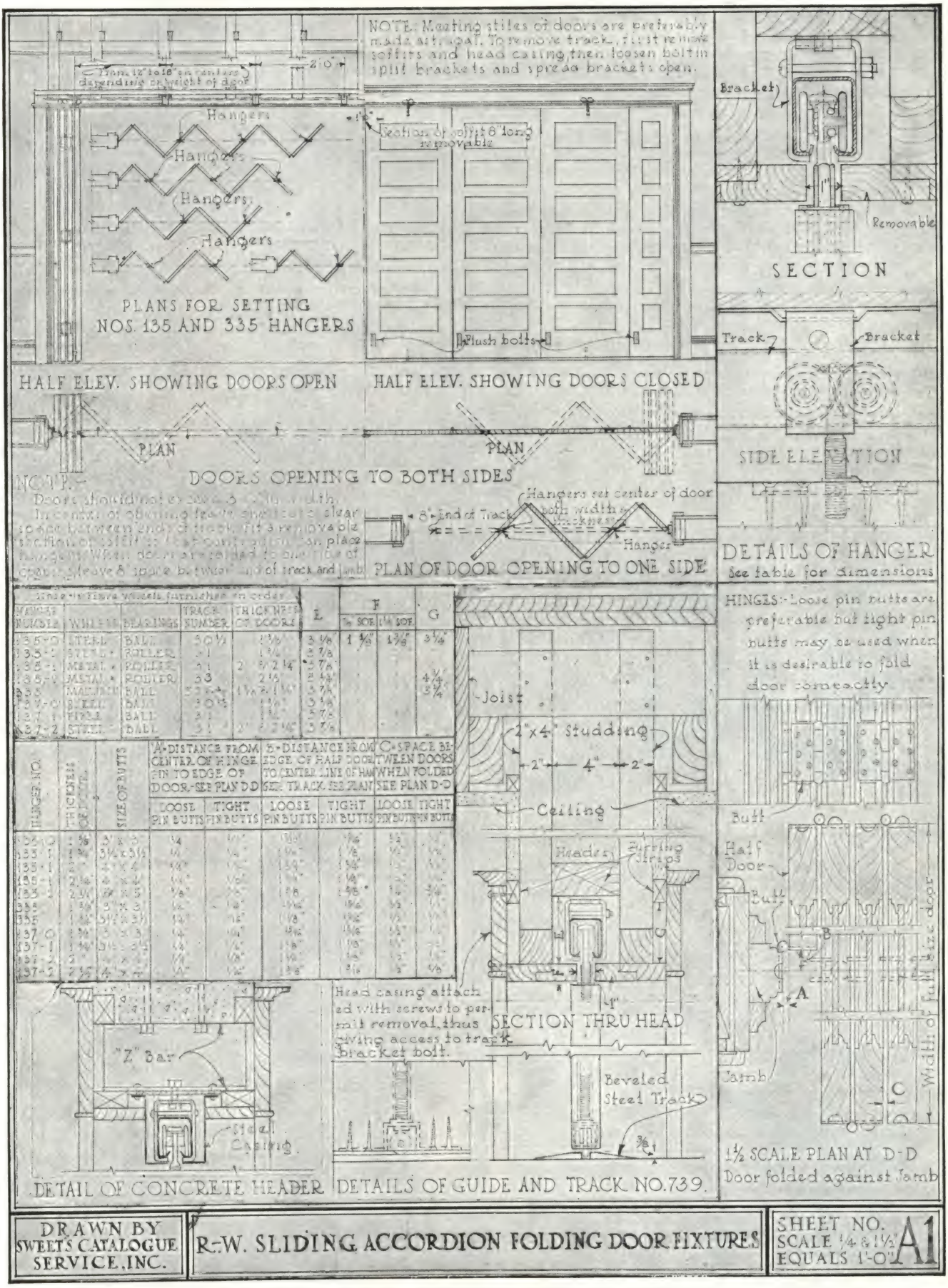


Under-hung fibre wheels furnished on order

HANGER NUMBER	WHEELS	BEARINGS	TRACK NUMBER	THICKNESS OF DOORS	L	F 7/8 SOF	F 1 3/4 SOF	G
135-0	STEEL	BALL	50½	1⅜	3 1/8	1 ⅛	1⅜	3¼
135-1	STEEL	ROLLER	51	1¾	3 7/8			
135-1	METAL	ROLLER	51	2	3 7/8			
135-0	METAL	ROLLER	53	2⅛	4¼			4¼
135	MALLEABLE	BALL	53½	1¾	3 7/8			3¼
137-0	STEEL	BALL	50½	1⅜	3 1/8			
137-1	STEEL	BALL	51	1¾	3 7/8			
137-2	STEEL	BALL	51	2	3 7/8			

HANGER NO.	THICKNESS	SIZE OF BUTTS	A-DISTANCE FROM CENTER OF HINGE PIN TO EDGE OF DOOR-SEE PLAN D-D		B-DISTANCE FROM EDGE OF DOOR TO CENTER LINE OF HAN SEE TRACK SEE PLAN		C-SPACE BETWEEN DOORS WHEN FOLDED SEE PLAN D-D	
			LOOSE PIN BUTTS	TIGHT PIN BUTTS	LOOSE PIN BUTTS	TIGHT PIN BUTTS	LOOSE PIN BUTTS	TIGHT PIN BUTTS
135-0	1⅜	3" x 3"	¼					
135-1	1¾	3½ x 3½	¼					
135-1	2	4" x 4"	¼					
135-1	2⅛	4" x 4"	¼					
135-2	2¼	5" x 5"	⅜					
335	1⅜	3" x 3"	¼					
335	1¾	3½ x 3½	¼					
137-0	1⅜	3" x 3"	¼					
137-1	1¾	3½ x 3½	¼					
137-1	2	4" x 4"	¼					
137-2	2¼	4" x 4"	¼					

Continued on next page

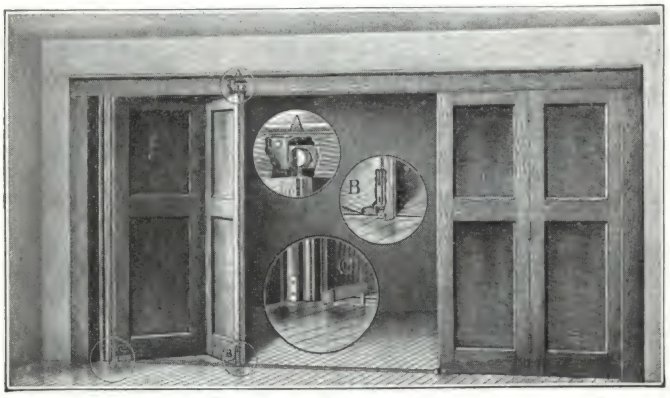
No. 237 Folding Partition Door Hardware

Developed for use where it is desired to have all of the doors in a partition of equal width. It is also especially adapted for use where the doors must be drawn past columns before they are folded or where it would be objectionable to have part of the doors extend beyond the wall line on one side, as is necessary, when using the regular accordion folding doors. The doors are hinged together in pairs and only two doors are moved at a time. Generally, the doors nearest the jamb toward which the doors fold, are pivoted to the floor and head jamb, but where it is desired to close the doors into a pocket or have them stand behind a projection of the partition wall, each pair of doors may be fitted with hangers at both ends. One hanger and one floor guide is required for each door. When the first door is pivoted, pivots are used instead of the hangers for that door. The doors should not exceed 3 ft. in width.

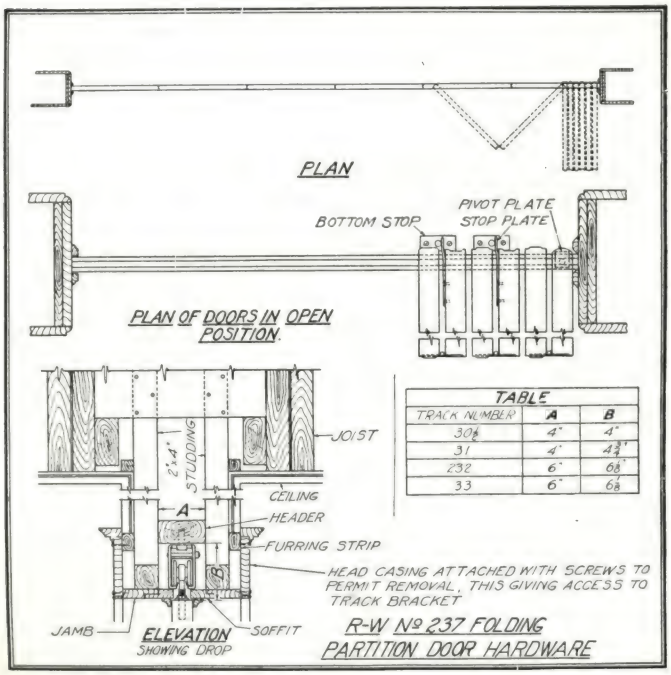
In Specifying—Give: (1) width of opening; (2) number of doors; (3) thickness of doors; (4) are all of the doors to fold toward one side or are they to divide at the center, half folding each way; (5) on small size doors using either Nos. 237-0 or 237-2 hangers, state which type of floor guide track is wanted, No. 739-2 or 739-3.

FOLDING PARTITION DOOR HARDWARE

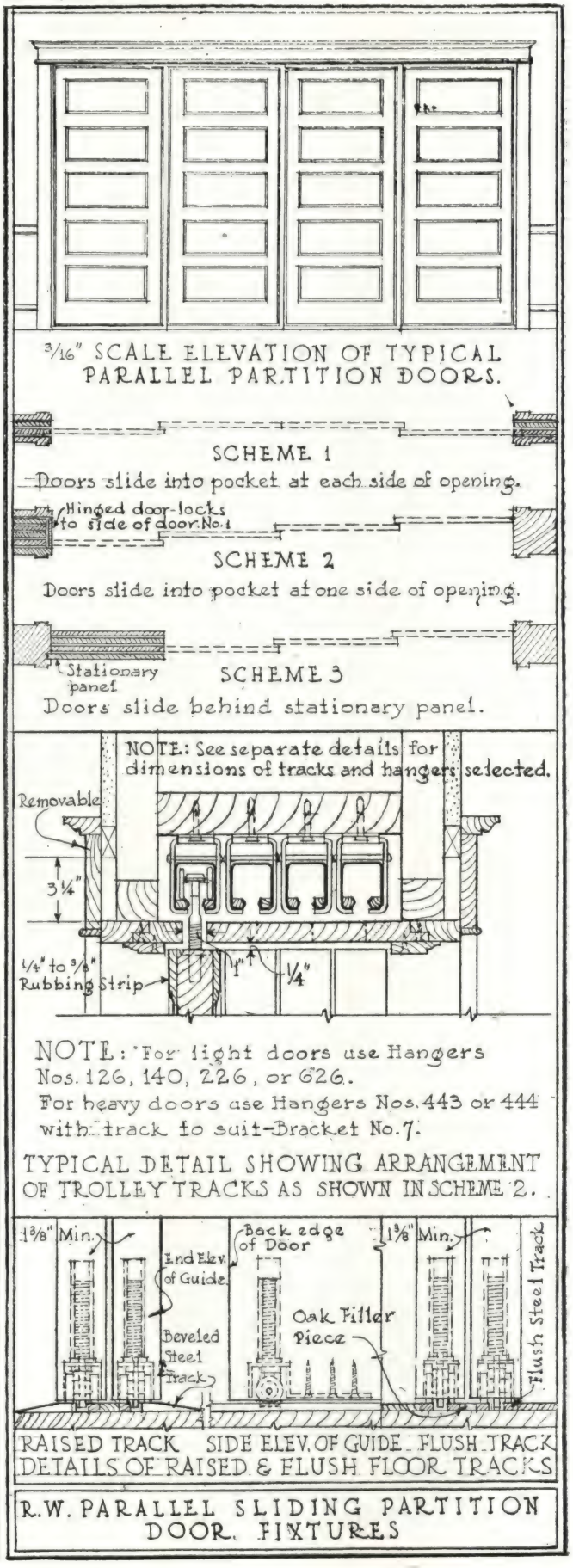
Hanger No.	Thickness of doors, in.	Track No.
237-0	1⅜	30½
237-2	1¾ to 2¼	31
237-3	2 to 2¾	33
237-4	1¾ to 2½	232



Detail of Installation



R-W No. 237 Folding Partition Door Hardware



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R-W No. 237 Standard Fire Doors and Shutters

R-W standard fire doors and shutters are constructed in accordance with the rules and requirements of the National Board of Fire Underwriters and are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc.

Two thicknesses of tin clad fire doors meet practically all requirements for openings in fire walls as follows:

3-Ply or Standard Door—This has a 3-ply wooden core and double lock joints in the tin covering. Thickness of door, 2⅝ in.

For openings in first class fire walls between two buildings or large sections of the same building, one 3-ply door is required on each side of wall.

For openings in second class fire walls between important rooms or enclosing some special hazard, one 3-ply door is required on one side of wall.

2-Ply Door—This has a 2-ply wooden core and double lock joints in the tin covering. Thickness of door, 1¾ in.

For openings in third class fire walls (minor division walls and partitions, stair and elevator walls, belt towers, etc.) one 2-ply door is required on one side of wall.

Standard fire shutters for use on the outside of buildings to protect window openings are made in the same manner as 2-ply doors.

"FyeR-Wall"—Corrugated Sheet Metal Fire Doors—Made in one thickness only (2½ in.) and are suitable for protecting all kinds of fire hazard openings.

Lap of Doors—Sliding doors when shut must overlap the sides and top of opening 4 in., and should have the top built on a pitch of ¾ in. per ft., when designed to close by gravity.

Swinging doors should preferably shut into angle iron door frames, but may be made to overlap the opening 4 in. on two sides and top.

Shutters may either overlap or fit close inside the window opening. Single swinging shutters furnish the best protection, although those made in pairs may be used on large openings.

Sliding shutters are not recommended because accumulation of snow and ice on the track and sill prevent closing in spite of shields arranged as a protection.

R-W Fire Door and Shutter Equipment

The R-W line of fire door and shutter equipment includes outfits and combinations for all requirements of the National Board of Fire Underwriters and local insurance requirements. Complete equipments are furnished for inclined and level track sliding doors, single and double swinging doors, vertical sliding and horizontal sliding doors.

Also fire shutter and trap fire door fixtures.

Type of Equipment to Select—The selection of the proper type of equipment to meet a particular requirement depends principally upon the space requirements at side of opening and the height of ceiling.

When headroom over opening is 3 ft. or more, the two-link R-W No. 102 "Monarch-A" type is recommended. Where headroom is less than 3 ft., one-link, R-W No. 201 "Monarch-A" type is recommended for openings in first-class fire walls and R-W No. 301 "Monarch-A" for openings in second-class fire walls.

No. 204 for double sliding doors is for use when space at side of opening is not sufficient for single sliding doors. Either flat track or round track types can be furnished.

Directions for Ordering or Specifying—In ordering or specifying state (1) number of openings and number of doors; whether doors are on one side or both sides of wall; (2) width and height of opening (mention width first); (3) thickness of doors, whether 2-ply (1¾ in.) or 3-ply (2⅝ in.); (4) thickness of wall; (5) distance from edge of opening to wall at right angles, if any, to provide sufficient space for wall binders; state distances from highest points of openings to nearest obstructions overhead; (6) whether opening is square or arched top.

FIRE DOOR FIXTURES

Type of door	Fixture number	Round or flat track	Clearance above top of opening, in.	Clearance required at side of opening, in.	
				Where doors slide or swing	Opposite side
Incline track sliding door	102*	Flat	14†	Width of opening + 22	13½
	201*	Flat	14†	Width of opening + 19	13½
	645*	Round	12†	Width of opening + 18	13½
	646*	Round	12†	Width of opening + 15	13½
Level track sliding door	303	Flat	14†	Width of opening + 19	19
	304	Flat	9†	Width of opening + 19	19
Sliding doors in pairs	204	Flat	14†	Width of opening + 19	
	604	Round	12†	Width of opening + 15	
Single swing doors	206		9	10	3½
	406*		9	11	3½
	606		none	3½	3½
Swing doors in pairs	306		10	10	10
	506*		10	11	11
	706		3½	3½	3½
				Side wall required	
				Doors under 300 lbs.	Doors over 300 lbs.
Vertical sliding doors	203*	Flat	Height of opening +19	15 and 21	21 and 28
	603	Round		16 and 22	22 and 29

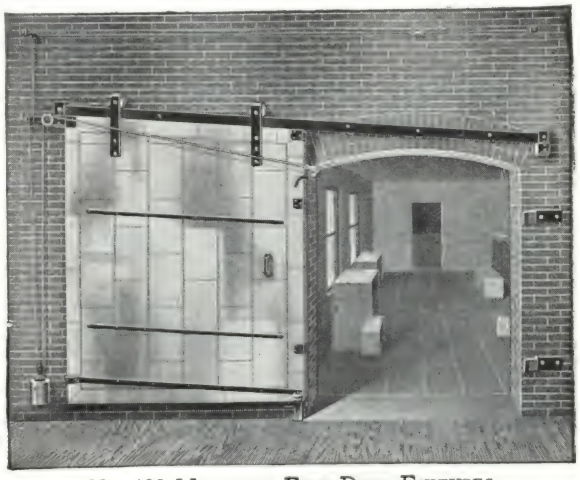
Adjustable hanger can be furnished with Nos. 102, 201, 204, 303, 645, 646 and 604 fixtures, and requires 3 in. more headroom above top of opening than rigid hangers.

*Approved and labeled under directions of National Board of Fire Underwriters.

†For arched top openings add ¾ in. for each foot of track back of the center of the opening, to the dimension given. For square top opening add ¾ in. for each foot of track back of edge of opening towards which the door slides in closing, to the dimension given.

When hardware is wanted for "FyeR-Wall" corrugated sheet metal fire doors, prefix 1 to catalogue numbers above. Example: No. 201 hardware for sheet metal doors becomes No. 1201.

R-W Corrugated Sheet Metal Door



No. 102 Monarch Fire Door Fixtures

Recommended where headroom exceeds 3 ft. Two fusible links, one in opening and one near ceiling. Door closes by gravity

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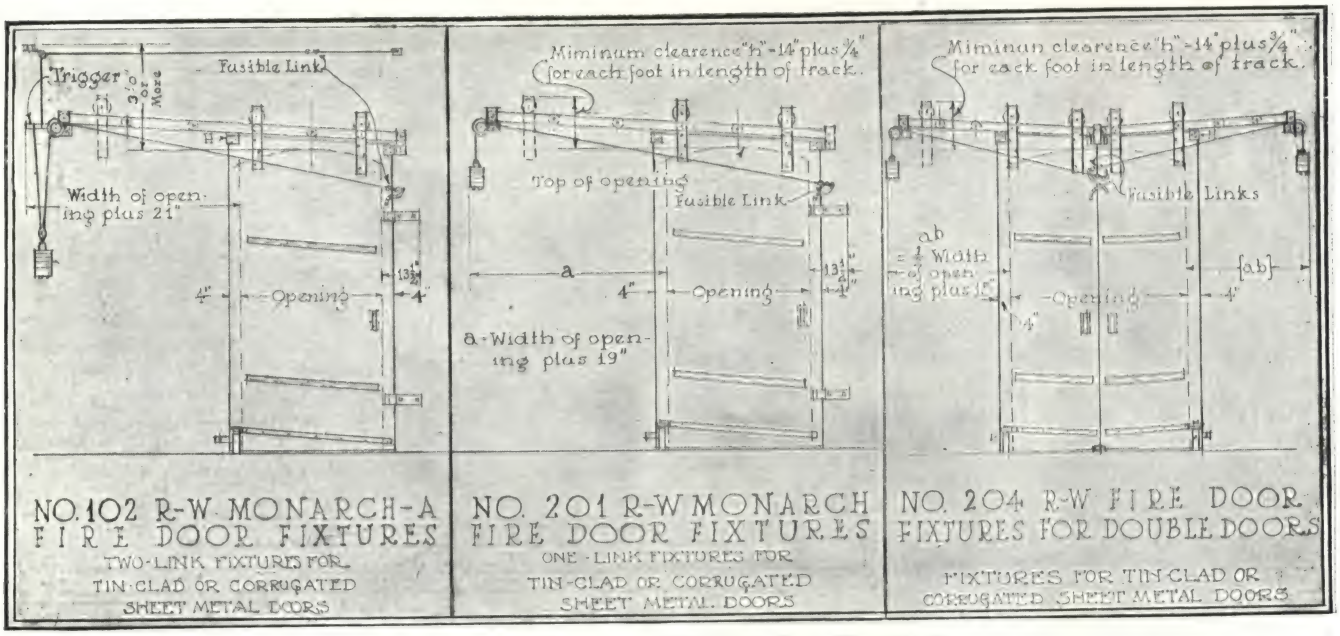
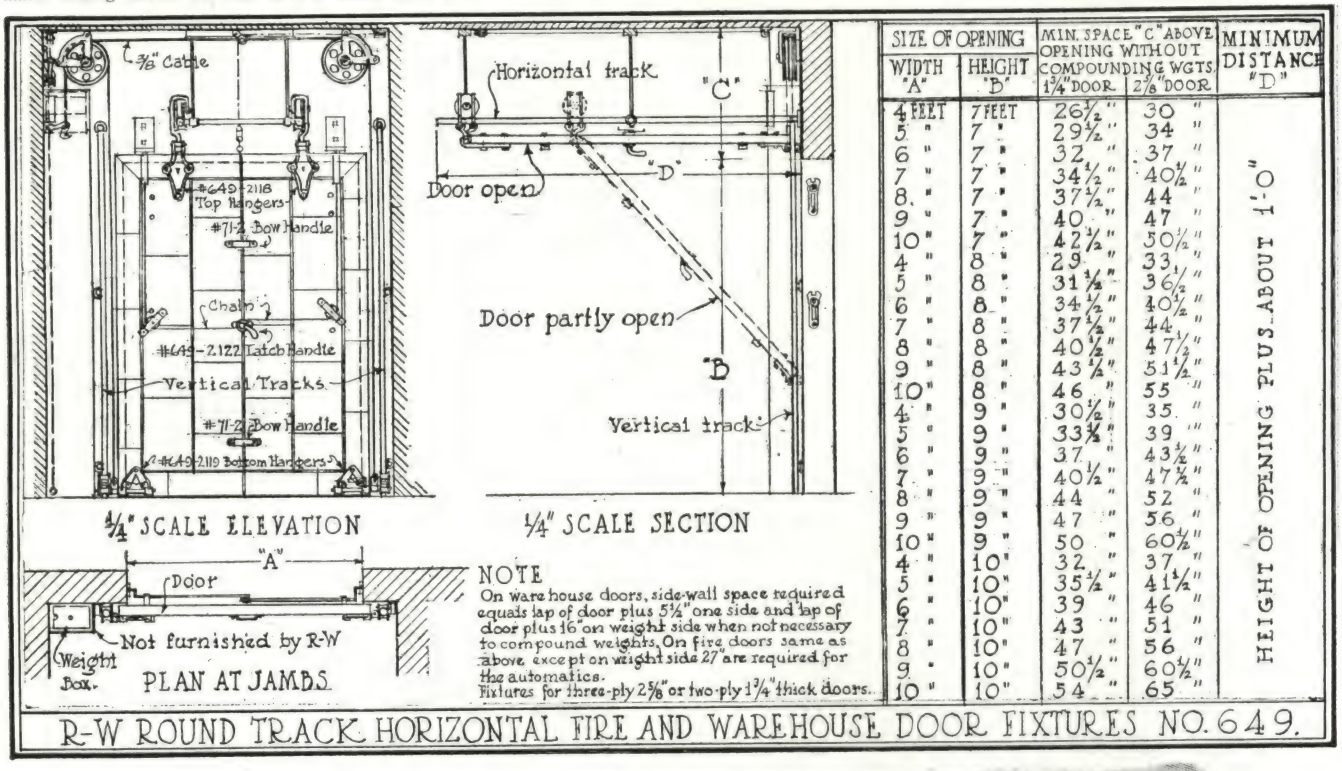


R-W No. 649 Horizontal Turnover Door Hardware

For warehouse doors not over 10 ft. high. Doors opened by pulling directly on door, without use of a hand chain hoist. Furnished with automatic closing device for use as fire doors when required. Hardware for any thickness of doors from 1¾ to 2⅝ in. thick



SIZE OF OPENING WIDTH "A"	SIZE OF OPENING HEIGHT "B"	MIN. SPACE "C" ABOVE OPENING WITHOUT COMPOUNDING WGTS. 1¾" DOOR	MIN. SPACE "C" ABOVE OPENING WITHOUT COMPOUNDING WGTS. 2⅝" DOOR	MINIMUM DISTANCE "D"
4 FEET	7 FEET	26½"	30"	HEIGHT OF OPENING PLUS ABOUT 1'-0"
5 "	7 "	29½"	34"	
6 "	7 "	32"	37"	
7 "	7 "	34½"	40½"	
8 "	7 "	37½"	44"	
9 "	7 "	40"	47"	
10 "	7 "	42½"	50½"	
4 "	8 "	29"	33½"	
5 "	8 "	31½"	36½"	
6 "	8 "	34½"	40½"	
7 "	8 "	37½"	44"	
8 "	8 "	40½"	47½"	
9 "	8 "	43½"	51½"	
10 "	8 "	46"	55"	
4 "	9 "	30½"	35"	
5 "	9 "	33½"	39"	
6 "	9 "	37"	43½"	
7 "	9 "	40½"	47½"	
8 "	9 "	44"	52"	
9 "	9 "	47"	56"	
10 "	9 "	50"	60½"	
4 "	10"	32"	37"	
5 "	10"	35½"	41½"	
6 "	10"	39"	46"	
7 "	10"	43"	51"	
8 "	10"	47"	56"	
9 "	10"	50½"	60½"	
10 "	10"	54"	65"	

R-W ROUND TRACK HORIZONTAL FIRE AND WAREHOUSE DOOR FIXTURES NO. 649.

R-W No. 666 Holdtite Stair Rail Bracket

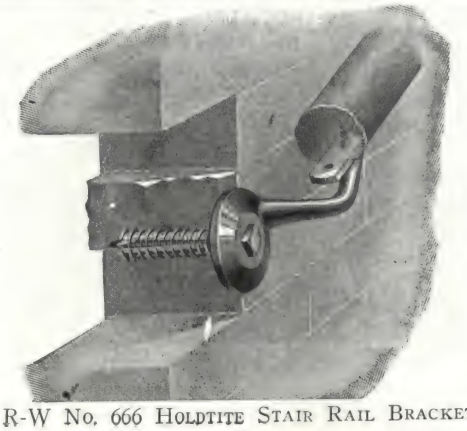
Made of malleable iron. The 3-in. base assures a good bearing on the wall, and the bracket is securely held by a ½x4-in. expansion bolt.

Head of lag screw finished to match bracket. The projection is 3 in.

Finishes: Black enamel or plated in bronze, antique copper, lemon or antique brass, also made in either brass or malleable iron.

Packed 12 in a box with expansion bolts.

Weight, malleable iron, 14¼ lbs.; brass metal 15¾ lbs.



R-W No. 666 Holdtite Stair Rail Bracket

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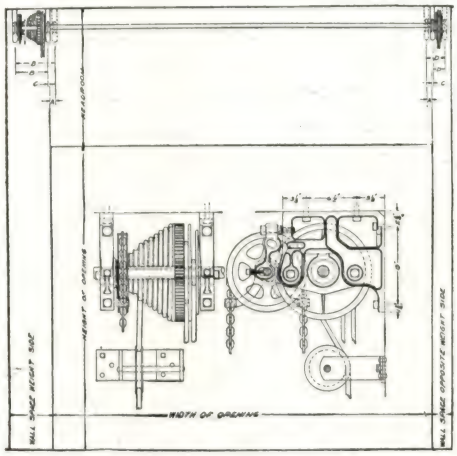
Lift Warehouse Doors

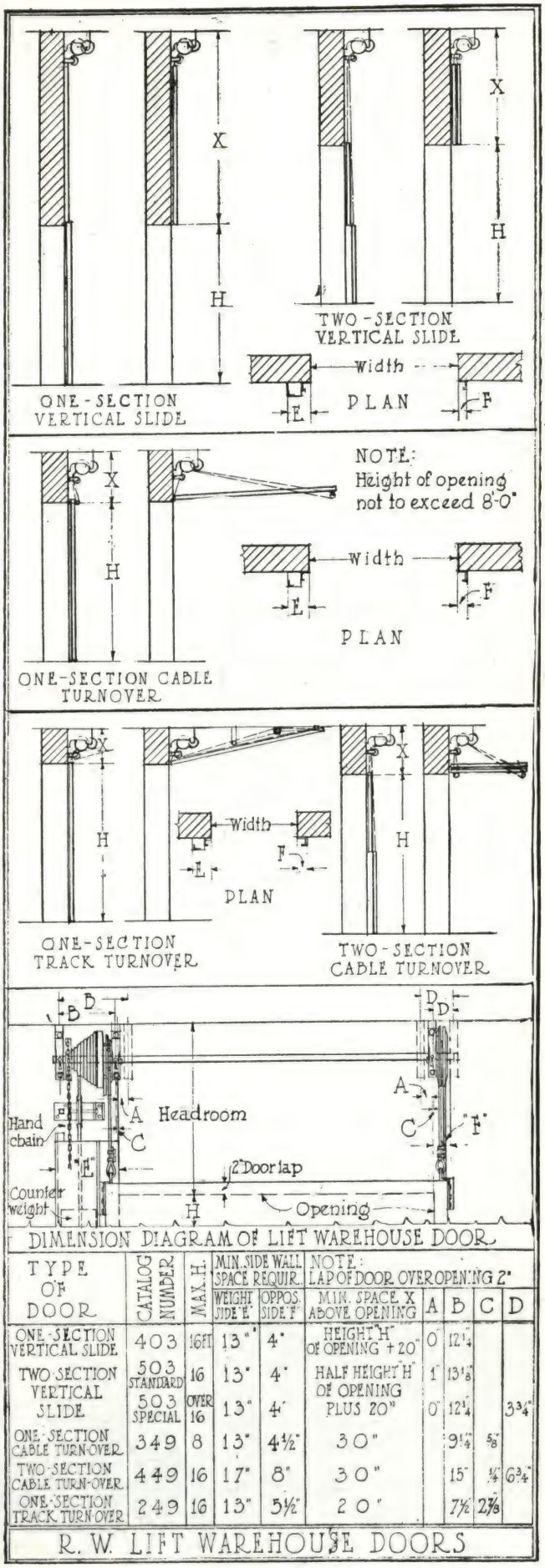
Kinds of Doors—One-section turnover door with track supporting top of doors; one-section vertical door; two-section vertical door as illustrated; two-section turnover door. Counterbalanced and operated with geared hand chain hoist.



DIMENSION DIAGRAM LIFT WAREHOUSE DOOR

Type of door	Catalogue number	Max. height of opening, ft.	Lap of door over opening, in.	Minimum side wall space required, in.		Min. space above opening, in.	A in.	B in.	C in.	D in.
				Weight side	Opposite side					
One-section vertical slide	403	16	2	13	4	Height of opening plus 20	0	12¼		
Two-section vertical slide	503 standard	16	2	13	4	Half height of opening plus 20	1	13⅛		
	503 special	Over 16	2	13	4		0	12¼		3¾
Two-section cable turn-over door	449	16	2	17	8	30		15	¼	6¾
One-section track turn-over door	249	16	2	13	5½	20		7½	2⅞	

No. 503 Two-section Vertical Slide Door



DIMENSION DIAGRAM OF LIFT WAREHOUSE DOOR

TYPE OF DOOR	CATALOG NUMBER	MAX. H.	MIN. SIDE WALL SPACE REQUIR.		NOTE: LAP OF DOOR OVER OPENING 2"				
			WEIGHT SIDE "E"	OPPOS. SIDE "F"	MIN. SPACE "X" ABOVE OPENING	A	B	C	D
ONE-SECTION VERTICAL SLIDE	403	16ft	13"	4"	HEIGHT "H" OF OPENING + 20"	0	12¼		
TWO-SECTION VERTICAL SLIDE	503 STANDARD	16	13"	4"	HALF HEIGHT "H" OF OPENING PLUS 20"	1	13⅛		
	503 SPECIAL	OVER 16	13"	4"		0	12¼		3¾"
ONE-SECTION CABLE TURN-OVER	349	8	13"	4½"	30"		9¼	⅝	
TWO-SECTION CABLE TURN-OVER	449	16	17"	8"	30"		15"	¼	6¾"
ONE-SECTION TRACK TURN-OVER	249	16	13"	5½"	20"		7½	2⅞	

R. W. LIFT WAREHOUSE DOORS

SHARON HARDWARE MANUFACTURING CO.

SHARON, PA.

Products

GARAGE and BARN DOOR HARDWARE (Patented).

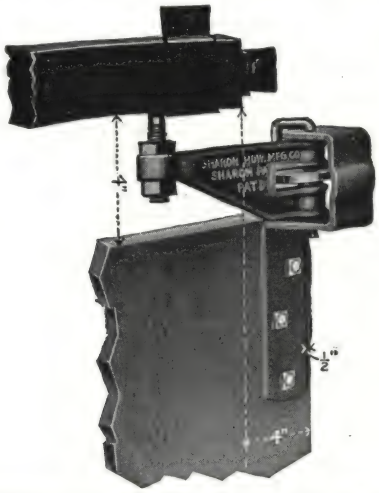
Sharon Garage and Barn Door Hardware

The doors slide in accordion fashion, folding back parallel with the front of the building when opened, giving the benefit of the full width of entrance.

There are no adjusting brackets or built-out arrangement of track to permit the doors to fold back; this is accomplished by our patented hanger.

The doors close into the casement, making them stormproof and sagproof. They do not slide in the threshold, but swing clear of the sill before the sliding begins.

The track is fastened in the same manner as any other sliding door track. The length of track required



RELATIVE POSITIONS OF NO. 9 PATENTED HANGER, TRACK AND DOOR

corresponds with the width of the sliding doors; that is, an 8-ft. opening (2-door arrangement) requires 8 ft. of track, or a 9-ft. opening (3-door arrangement) requires 6 ft. of track.

Suitable for a 2-, 3- or 4-door combination, sliding inside or outside of the building. Use standard size trolley track—our No. 15.

Solid steel wheels, ball bearing swivel, roller bearing axles. All bearings protected from weather.

Sharon No. 9 Two-door Garage Set

Doors are hinged together and attached to one jamb with hinges or butts. Hanger is attached to free end. Set consists of:

One patented trolley door hanger	One 6-in. foot bolt
	One 6-in. safety hasp
Six 4x4-in. tight pin butts	Two handles
One 6-in. chain bolt	Two end stops for track

All bolts and necessary screws

For heavy doors, three 10-in. extra heavy tee hinges and three 8-in. heavy strap hinges are furnished instead of the butts, when specified.

Sets sold without hinges when specified.

Sharon No. 9½ Three-door Garage Set

Two doors are hinged together and attached to jamb. The third or passage door is hinged to opposite jamb. Set consists of:

One patented trolley door hanger	One 6-in. safety hasp
	One handle
Nine 4x4-in. tight pin butts	One thumb latch
One 6-in. chain bolt	Two end stops for track
One 6-in. foot bolt	All bolts and necessary screws

For heavy doors, six 10-in. extra heavy tee hinges and three 8-in. heavy strap hinges are furnished instead of the butts, when specified.

Sets sold without hinges when specified.

Sharon No. 9 Four-door Garage Set

Doors are hinged together in pairs, each pair hinged to a jamb, sliding and folding right and left.

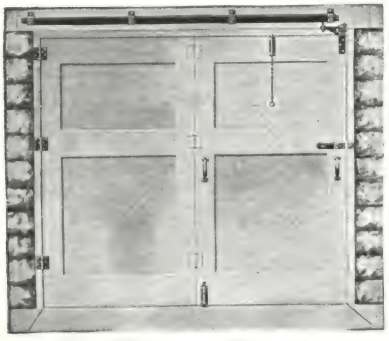
Equipment for this arrangement requires 2 two-door sets.

Note that same type of hanger is used for both right- and left-hand doors.

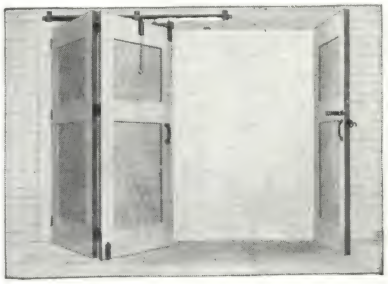
For heavy doors we recommend the use of 10-in. extra heavy tee hinges and 8-in. heavy strap hinges instead of the tight pin butts listed for 2-door sets.

Where extra high doors are used, four hinges to a door are advised.

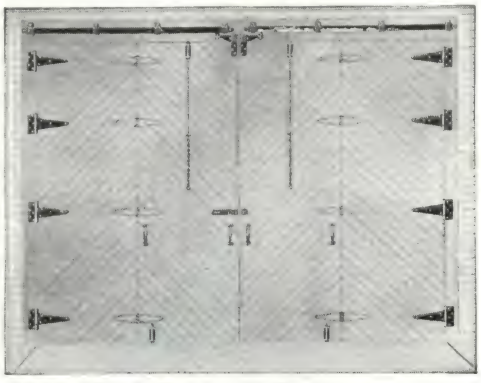
Sets sold without hinges when specified.



NO. 9 TWO-DOOR EQUIPMENT



NO. 9½ THREE-DOOR EQUIPMENT



NO. 9 FOUR-DOOR EQUIPMENT

THE W. IRVING FORGE

Hand Forged Colonial Hardware

TELEPHONE
MURRAY HILL 8536

326-328 East 38th Street
NEW YORK, N. Y.

Products

COLONIAL HARDWARE of HAND FORGED WROUGHT IRON: Door and Shutter Fixtures, Lighting Fixtures, Fireplace Fittings, reproduced from authentic hand forged specimens in the W. Irving collection and from original designs in the Colonial spirit.

TRADE-MARK

Description

Two things must be present in a true piece of Colonial hardware—design and craftsmanship. Only when Colonial designs are *faithfully reproduced by the same methods* the smiths of Colonial times used in creating them, can the product be honestly called Hand Forged Colonial Hardware. When the design alone is copied the result is merely imitative and not real.

Preserving the True Colonial Character

Here at THE W. IRVING FORGE something is done which we do not believe is being done elsewhere today. Hand forged Colonial hardware is made just as it was made a century and a half ago by unhurried smiths in the Irving way and the result justifies all the extra trouble it may take. The holly leaf trade-mark is the pledge of this painstaking execution—"free from the hall-mark of a rolling mill."

W. IRVING HINGE No. 94

W. IRVING SCONCE No. 1103

W. IRVING KNOCKER No. 613

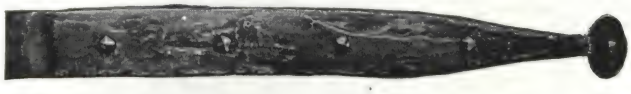
W. IRVING THUMB LATCH SET No. 161

W. IRVING KNOCKER No. 615

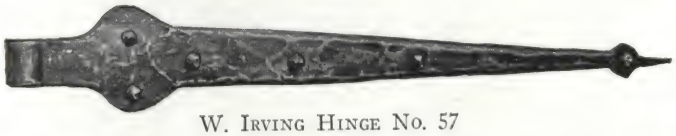
W. IRVING THUMB LATCH SET No. 156

W. IRVING HINGE No. 60

W. IRVING HINGE No. 55



W. IRVING HINGE No. 65



W. IRVING HINGE No. 57

W. IRVING THUMB LATCH SET No. 149

W. IRVING LANTERN No. 912

W. IRVING THUMB LATCH SET No. 162

W. IRVING HINGE No. 41

BRASS AND BRONZE HARDWARE

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER and BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Pipe	1455–1457
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

The Value of Good Hardware

No other detail of construction gets harder, more constant use than hardware; and perhaps no other part of a building is more conspicuous.

For this reason, plated hardware, which invariably assumes an unsightly appearance under use, with the added unsightliness of corrosion in exposed places, materially detracts from the appearance of an otherwise attractive structure.

Rust-stained wood and stone, pitted, ugly knobs and escutcheons, creaking, heavy-moving hinges, and locks sealed with rust, are among the unsatisfactory results which follow the use of plated hardware.

Brass, bronze or copper hardware costs more, but the added cost is really a sound investment, for this permanently satisfactory hardware will remain attractive, without repair or renewal, during the life of the structure.

Hardware attracts the eye because in color and material it furnishes an element of contrast, making harmony absolutely essential. The decorative effect of brass or bronze hardware permanently enhances the appearance of the building.

Incidentally, bronze or brass butts have self-lubricating qualities which minimize noisy operation.

Solid Brass and Bronze versus Plated Hardware

1. Iron and steel, due to their rapid corrosion in air, are electro-plated with some metal, i. e., brass, copper or nickel. The deposit of these metals offers very little protection against corrosion, due to the fact that such coatings are more or less porous and the iron and steel under the coatings inevitably rusts. Electro-depos-

RUSTED STAINED PAINT RESULTING FROM USE OF PLATED HARDWARE

Continued on next page

ited zinc is often used, but on account of its color is not generally acceptable. It has not been found possible successfully to deposit nickel, brass or copper upon a zinc-coated surface.

2. Electro-plated deposits are necessarily thin and light in weight. This is due to the fact that heavy coatings would destroy the fine lines of ornamentation and destroy the beauty of the article. The thinner the deposit, the less protection offered against atmospheric conditions.

3. Polished metal, especially brass, copper or nickel silver is very attractive. Polished steel or iron do not present such a good appearance.

A large number of fancy finishes, such as the commonly known copper oxidized finish, is done at the expense of the electro-deposited metal. If a coating of .001 in. of copper was put upon a piece of steel and given a copper oxidized finish, it is quite possible that the finish would destroy at least half of the thickness deposited, the sulphide decomposing part of the copper deposit.

4. Japan and lacquer finishes are also used for coating steel and iron hardware, but these offer only temporary protection against corrosion. The japans wear off, are easily scratched and the base metal exposed, and then the corrosion will creep under the coating of japan and lift it.

5. Lacquer enamels, due to the pigment with which it is necessary to load up a lacquer in order to obtain the necessary color, become brittle with age. It requires only a few months before the lacquer enamel coating becomes so brittle that hitting it very lightly with a sharp instrument will chip it and expose the base metal. Lacquer enamels can only be used upon electro-plated articles and there is no successful method for using them upon steel, although it is often tried.

Design and Finish

Brass and bronze hardware is made in cast, wrought, stamped and struck designs and in finishes appropriate for all the different schools of architecture. The finish is classified in two groups, (1) the texture of the surface and (2) the color of the surface.

The common textures of surfaces are as follows:

Unpolished surface (as it comes from the mould or die).

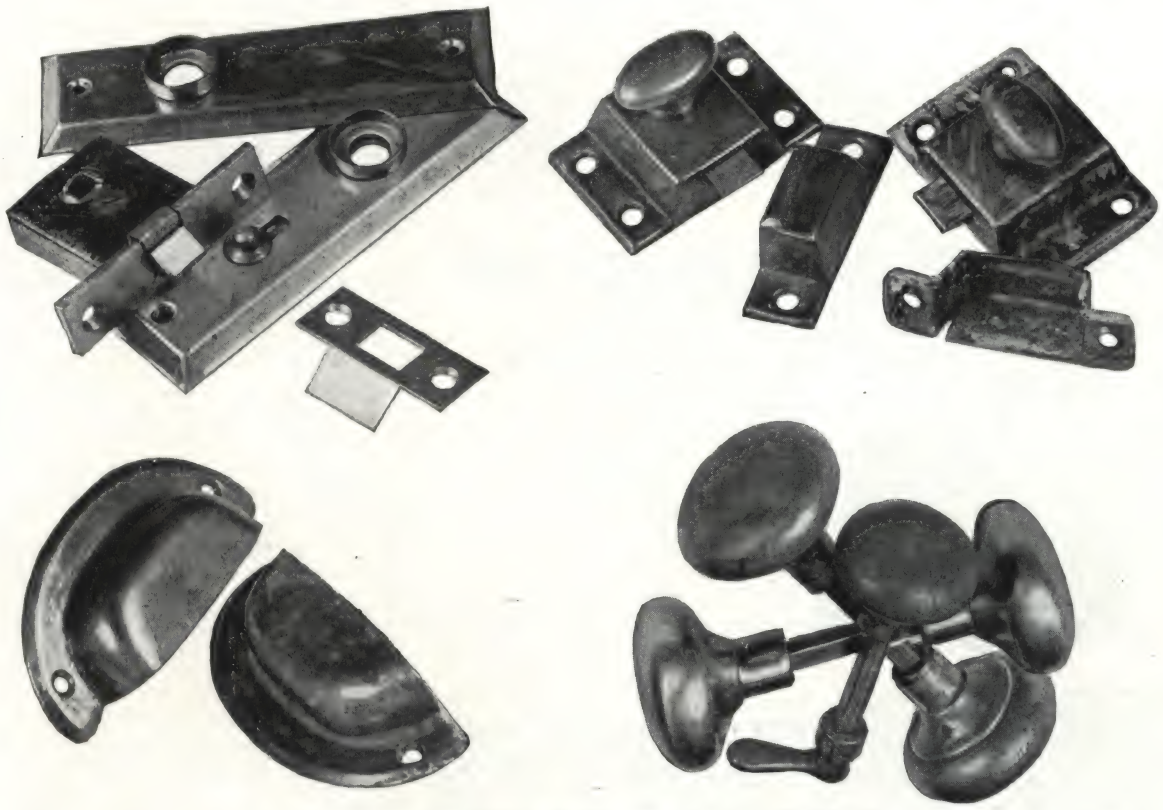
Buffed surface (bright and highly polished).

Wheeled finish (polished but not buffed).

Sanded finish (with fine grain, as from statuary moulding).

Dead smooth finish (without bright polish).

The colors of surfaces available are too numerous to enumerate here, but it may be safely said that brass and bronze hardware can be obtained to harmonize with any color scheme or to enhance any decorative design.



COMPARISON OF SOLID BRASS AND PLATED HARDWARE

All of the hardware shown above was in use for the same length of time under identical conditions of service. The plated hardware is pitted and ugly, while the brass is entirely unaffected by exactly similar use

THE SHELBY METAL PRODUCTS COMPANY

Floor Hinges

SHELBY, OHIO

Product

KLOZ-E-Z CHECKING FLOOR HINGE for double acting interior doors.

Description

Kloz-E-Z checking floor hinges close double acting doors at any desired speed. A distinctive feature is that the spring is in the door and the check is in the floor. This eliminates the necessity of making a large opening in the floor.

All parts are strongly made from the best obtainable materials. These hinges can be installed on any type of doors and in any kind of floors.

TRADE-MARK
Reg. U. S. Pat. Off.

Mechanical Details

A post and cam act as the door is opened upon the plunger and against the spring, the reaction of which tends to return the door to its natural or closed position. The checking device consists of a piston provided with a ball check valve, operating in an oil filled cylinder, permitting the passage of oil from chamber into cylinder in rear of piston.

On the return movement of the piston effected by the closing of the door, under action of the spring, the closing is retarded by the slow escape of oil from a port at the top of the cylinder. A screw valve extending up through the floor plate regulates the size of the post and thereby determines the speed at which the door closes.

Purpose of the Hinge

A double acting spring hinge and a door check are combined in one unit in the Kloz-E-Z checking hinge. The door swings in either direction as readily and as easily as an unchecked swing door, but the return of the door to the central position is controlled by the checking device. At an angle of 95° or more the door remains open.

The door closes gently, firmly and silently. The speed of closing is regulated by simply turning a valve screw in the base plate.

Principle of Design

The checking mechanism of the Kloz-E-Z hinge is below the floor and there is no disfigurement of the door itself.

The design is simple. The hinge consists of a powerful spring controlled by a piston working in a cylinder. The cylinder is filled with a non-freezing liquid which lubricates all moving parts.

This door can not swing idly to-and-fro or violently slam. When it reaches the center of the jamb it stops steady and true.

Installation

The simplicity of design is equaled by the ease of installation. The checking mechanism is set into the floor. The hinge rib is attached to the bottom of the door; the top pivot is secured to the head jamb and the socket in the top of the door.

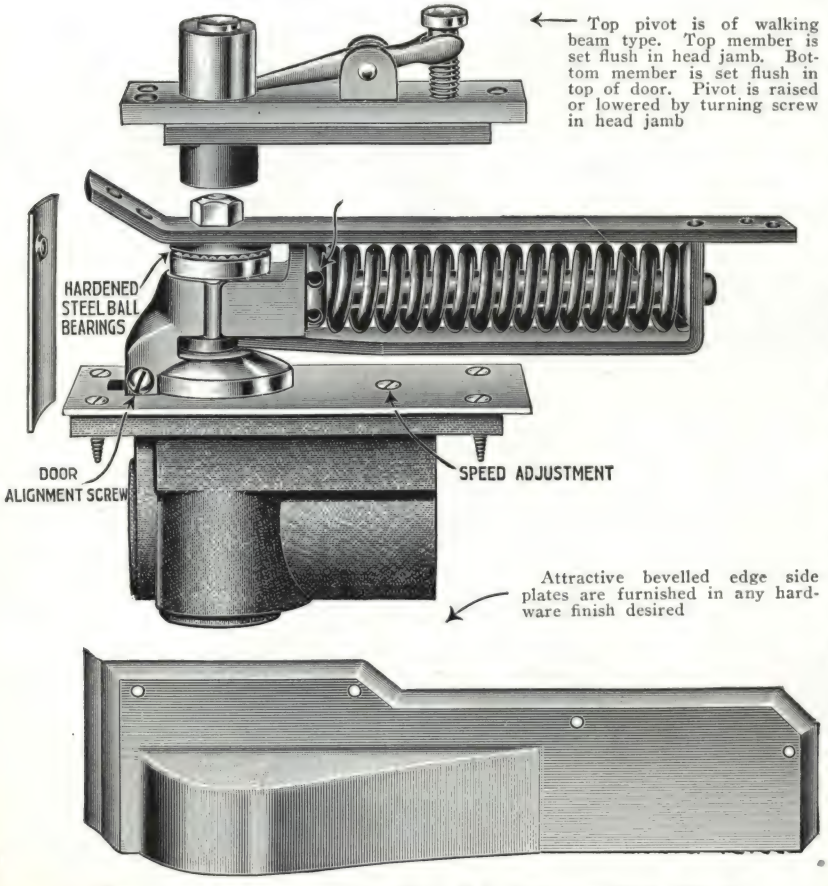
The base plate and the side plates are attached, one twist of the adjusting screw and—that's all.

Ten Years in Use

Actual usage has demonstrated the correctness of the principle and design and the worthiness of the construction of the Kloz-E-Z Hinge.

Apart from the effectiveness of the Kloz-E-Z checking hinge it has the advantage of being almost unnoticeable on a swing door. The neat appearance of any swing door is preserved and actually enhanced by the small floor plate and side plates furnished in practically all finishes.

A touch of the fingers will open a swing door equipped with the Kloz-E-Z checking hinge because the weight of the door rests on the ball bearings. The bearings are off the floor, away from dirt and dampness. Ten years' usage has disclosed no faults, but has shown the genuine worthiness and durability of a checking hinge that can be safely recommended.



COMPLETE ASSEMBLY OF THE KLOZ-E-Z CHECKING DOOR HINGE

Specifications

For double acting interior doors 1¼ to 1¾ in. thick and not more than 2 ft. 8 in. wide and not over 55 lbs. in weight, specify Kloz-E-Z Type No. 16. For double acting interior doors 1¾ to 2¼ in. thick, more than 2 ft. 8 in. wide and over 55 lbs. in weight, specify Kloz-E-Z Type No. 17.

When to be installed in tile or cement floors specify Kloz-E-Z cement boxes.

Either of the above types can be furnished in any hardware finish.

CHICAGO SPRING BUTT COMPANY

Spring Hinges and Pivots

GENERAL OFFICES AND WORKS
1500 Carroll Avenue
CHICAGO, ILL.

EASTERN OFFICE AND WAREHOUSE
23 Warren Street
NEW YORK, N. Y.

Products

Manufacturers of a complete line of PATENT SPRING HINGES, including "Chicago" Spring and Springless Butt-hinges; "Triplex" Spring Butt-hinges; "Relax," "Premier" and "Ajax" Spring Pivot-hinges; "Triplex" Lavatory Spring Hinges; "Sagless" Lavatory Spring Hinges; Lavatory Door Bolts, Latches and Stops; "Triplex" Gate Spring Butt-hinges; "Sagless" Gate Spring Pivot-hinges; "Sanitex" Closet Seat Spring Hinges.

TRADE CHICAGO MARK
SPRING HINGES

TRADE CHICAGO TRIPLEX MARK

Registered U. S. Pat. Office

The body is made of one integral piece, giving a maximum of strength and rigidity. The broad steel bearings, hardened lug bushings and disassemblement features are characteristics of this product. Springs are made of the best tempered steel wire, in ample proportions for the most excessive requirements.

Single acting hinges can be furnished with reverse springs to throw door open when released. These hinges also supplied with a wide sweep to clear a hand rail on office gates.

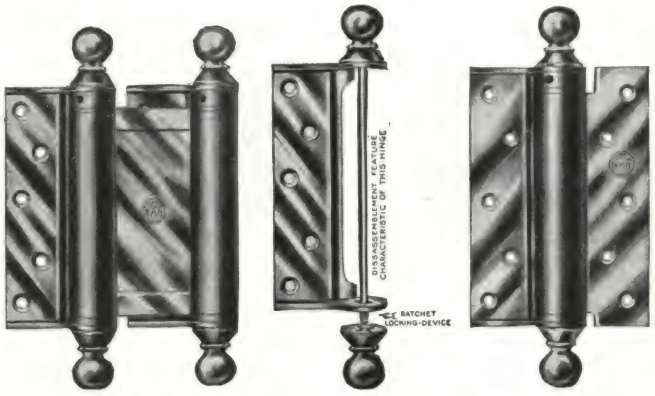
Ordering

In specifying, designate article by number, size and finish. Hardware dealers are supplied with lists, prices and complete data pertaining to the "Chicago" spring hinge products. Made in standard sizes and all standard finishes. Any special finish can be furnished promptly.

Prices

Prices are comparative with those of standard grades and quality.

Quotations on special goods and finishes supplied on request.



Type No. 2001
"TRIPLEX" DOUBLE ACTING SPRING BUTT-HINGE

Type No. 2002
"TRIPLEX" SINGLE ACTING SPRING BUTT-HINGE

"Chicago" Double Acting Spring Butt-hinges, Type No. 1½

"Chicago" spring butt-hinges are constructed in a most substantial manner. The spring power, effected by both a torsion and leverage principle, produces a positive action as well as an easy movement of the door.

General construction and mechanical action of this hinge produce best results obtainable in operating doors subject to excessive and violent use.

For doors of the following thicknesses:

⅞ to 1 in.	1¾ to 2 in.
1⅛ to 1¼ in.	2¼ to 2½ in.
1⅜ to 1½ in.	2¾ to 3 in.

Type No. 1½
"CHICAGO" SPRING BUTT-HINGE

"Chicago" Double Acting Springless Butt-hinges, Type No. 3½

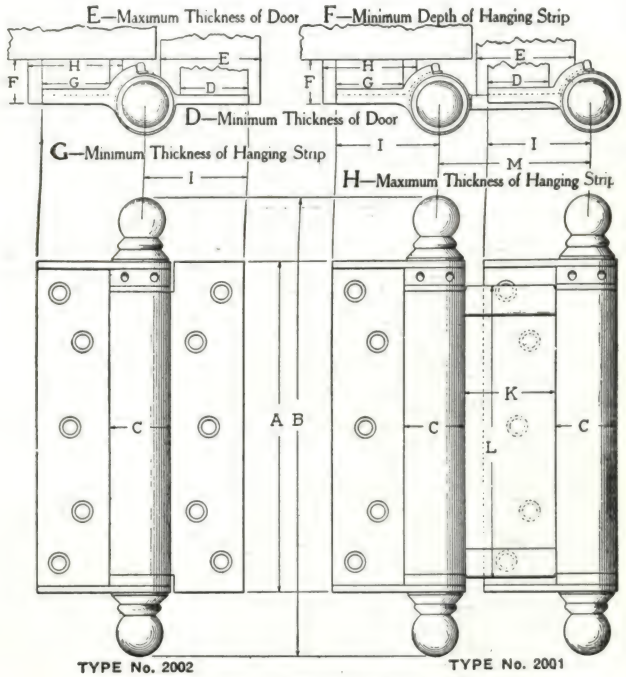
"Chicago" springless butt-hinges can be used advantageously in combination with a "Chicago" spring hinge where doors are light or narrow.

This combination not advisable on outside doors subject to draughts, where a pair of spring hinges should be used.

Type No. 3½
"CHICAGO" SPRINGLESS BUTT-HINGE

"Triplex" Spring Butt-hinges—Double Acting, Type No. 2001; Single Acting, Type No. 2002

The Chicago "Triplex" (Three Leaf) spring butt-hinge is constructed on scientific and practical principles.



DETAIL, "TRIPLEX" SPRING BUTT-HINGES

Continued on next page

DIMENSIONS, "TRIPLEX" SPRING BUTT-HINGES

Single Acting									Double Acting											
A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	K	L	M
3	4 11/16	7/8	3/4	1	5/8	3/4	1	1 1/4	3	4 11/16	7/8	3/4	1	5/8	3/4	1	1 1/4	1	2 3/8	1 7/8
4	5 5/8	7/8	7/8	1 1/4	5/8	7/8	1 1/4	1 7/16	4	5 5/8	7/8	7/8	1 1/4	5/8	7/8	1 1/4	1 7/16	1 1/4	3 7/16	2 1/8
5	7 3/16	1	1 1/8	1 1/2	5/8	1 1/4	1 1/2	1 3/4	5	7 3/16	1	1 1/8	1 1/2	5/8	1 1/8	1 1/2	1 3/4	1 1/2	4 5/16	2 1/2
6	8 5/16	1 3/32	1 1/4	1 3/4	3/4	1 1/4	1 3/4	1 7/8	6	8 5/16	1 3/32	1 1/4	1 3/4	3/4	1 1/4	1 3/4	1 7/8	1 3/4	5 1/4	2 7/8
7	9 9/16	1 7/32	1 3/8	2	7/8	1 3/8	2	2 5/16	7	9 9/16	1 7/32	1 3/8	2	7/8	1 3/8	2	2 5/16	1 13/16	6 1/8	3
8	10 13/16	1 3/8	1 1/2	2 1/4	1	1 5/8	2 1/4	2 9/16	8	10 13/16	1 3/8	1 1/2	2 1/4	1	1 1/2	2 1/4	2 9/16	2 1/8	6 7/8	3 7/16
10	13	1 9/16	1 3/4	2 3/4	1 1/4	1 3/4	2 3/4	2 13/16	10 N	13	1 9/16	1 3/4	2 1/2	1 1/8	1 3/4	2 1/2	2 13/16	2 3/8	8 13/16	3 15/16
12	15 11/16	1 3/4	2 1/4	3	1 1/4	2 1/4	3	3 7/16	10W	13 11/16	1 1/2	2 1/4	2 3/4	1 1/8	2 1/4	2 3/4	3 3/16	2 7/8	8 15/16	4 7/16
									12	15 11/16	1 3/4	2 1/4	3	1 1/4	2 1/4	3	3 7/16	3	10 13/16	4 13/16

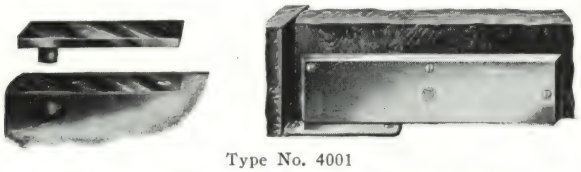
GATE SPRING HINGES

Single Acting (Type G2002)									Double Acting (Type G2001)											
A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	K	L	M
5	7 1/4	1	1 1/4	2 1/2	5/8	1 15/16	2 1/2	2 3/4	6	8 5/8	1	1 1/4	2 1/2	5/8	1 3/4	2 1/2	2 3/8	2 11/16	5 1/4	3 3/4

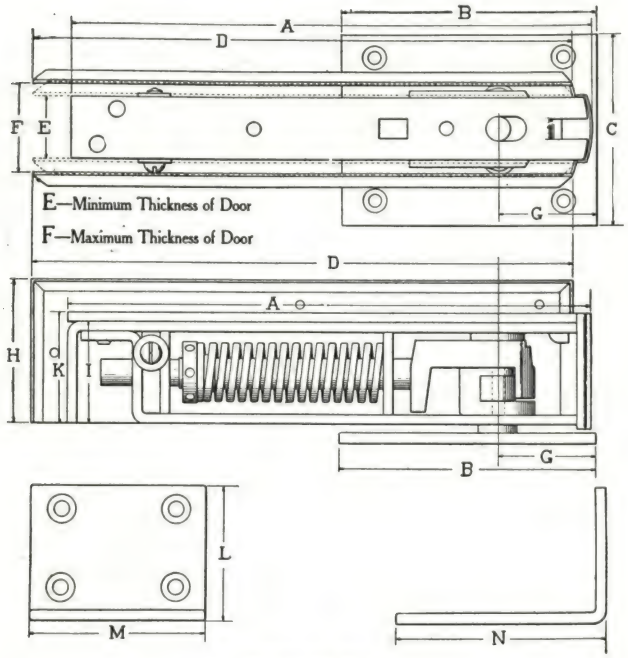
Dimensions in inches.

Chicago "Premier" Spring Pivot-hinges

Spring pivot-hinge (Type No. 4001) is applied to surface of floor. Mechanical action eliminates the tendency of wear in bearings. Action is compression; spring is made of best tempered steel flat wire; tension is readily adjusted. With this hinge, door will remain open if swung beyond 90°. No hanging strip required. Jamb edge of door is slightly rounded. For tile or concrete floors specify jamb attaching plates.



Type No. 4001
CHICAGO "PREMIER" SPRING PIVOT-HINGE



TYPE No. 4001

DETAIL, CHICAGO "PREMIER" SPRING PIVOT-HINGE

For doors	A	B	C	D	E	F	G	H	I	K	L	M	N
1 1/8 to 1 3/4	9 1/8	4	3	9 9/16	1 1/16	1 3/4	1 1/2	2 1/2	1 1/2	1 5/8	2 3/8	3	3 11/16
1 3/4 to 2 3/4	10 1/4	4 1/2	3 3/4	10 5/16	1 3/4	2 3/4	2 1/16	2 5/8	2	2 3/16	3 3/16	3 3/4	4 3/4

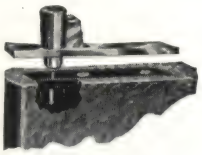
Dimensions in inches.

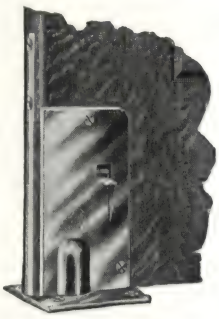
No hanging strip is required. Jamb edge of door is slightly rounded.

Hinge is furnished, when so specified, with a special "Jamb Attaching Plate" for concrete floors, as shown in detail dimensions "L," "M" and "N." It is applied to door casing. These plates are a part of hinge and can not be supplied individually for regular hinges.

Chicago "Relax" Spring Pivot-hinges

Chicago "Relax" spring pivot-hinge (Type No. 6001) is adapted to highest class requirements. It is applied to surface of floor, thereby avoiding cutting into same or possible interference with girders or iron beams. The tension is adjustable. The spring action is readily released, allowing door to be placed open at any desired position; a great convenience, and eliminates the tendency of springs to lose their power as a result of remaining fixed at high tension when doors are held open by door holders.

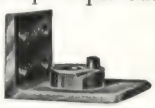




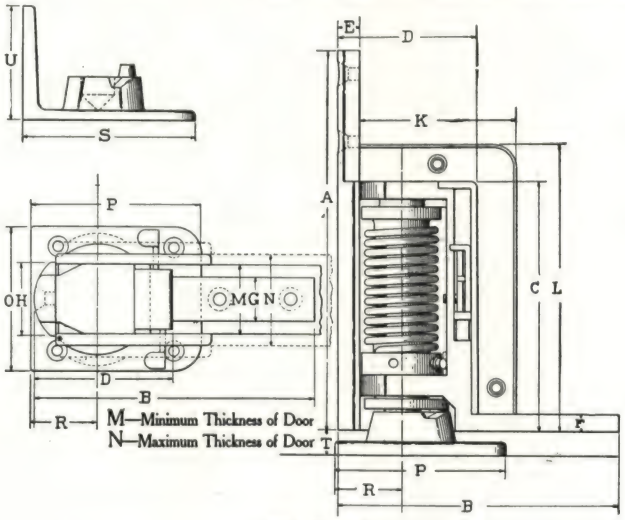
Type No. 6001
CHICAGO "RELAX" SPRING PIVOT-HINGE

Weight of door is carried on ball bearings located in the top of hinge, being protected from dirt and moisture. Plunger top pivot furnished with this hinge permits door to be fitted closely to top casing and to be taken down readily without removing any screws. No hanging strip required. Jamb edge of door is slightly rounded.

For tile or concrete floors specify jamb attaching plates.



JAMB ATTACHING PLATE



TYPE No. 6001

DETAIL, CHICAGO "RELAX" SPRING PIVOT-HINGE

For doors	A	B	C	D	E	F	G	H	K	L	M	N	O	P	R	S	T	U
1 1/8 to 1 1/2	8 1/8	5 7/8	5 3/8	2 3/4	3/8	3/8	3/4	1 1/4	3 1/16	6 1/4	1 1/8	1 1/2	2 13/16	3 1/2	1 3/8	3 13/16	7/16	2 1/2
1 1/2 to 2	8 3/8	6 1/8	5 1/2	3 1/16	7/16	3/8	1 5/16	1 9/16	3 7/16	6 5/16	1 1/2	2	3 1/4	3 3/4	1 1/2	4 1/16	1/2	2 1/2
1 3/4 to 2 3/4	10	7 3/4	7 1/16	4	5/8	3/8	1 3/8	2 1/16	4 1/8	7 7/8	1 3/4	2 3/4	3 15/16	4 1/2	2 1/8	4 3/4	1/8	3 1/4

Dimensions in inches.

No hanging strip is required. Jamb edge of door is slightly rounded.

Hinge is furnished, when so specified, with a special "Jamb Attaching Plate," for concrete floors, as shown in detail dimensions "U" and "S." It is applied to door casing.

Chicago "Sagless" Gate Spring Pivot-hinges

The Chicago "Sagless" gate spring pivot-hinge (Type No. 6007) is the pivot type, so that if the gate is wide or heavy it cannot sag. The spring does not carry the weight of the gate, and a very light tension may be applied, which is usually desirable on office gates.

This hinge is suitable for gates 7/8 in. to 2 1/2 in. thick and with a hand rail as wide as 2 1/2 in.

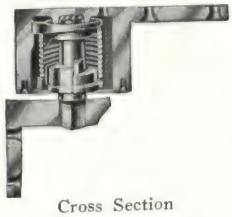
The attaching plates are 2 1/4 in. high by 1 1/2 in. wide. Pintle center to surface of post 1 1/2 in.

Continued on next page

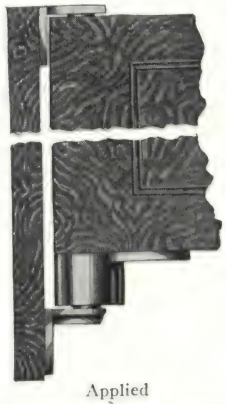
Application is extremely simple, as it is applied to the surface of the post and gate. Top socket may be applied to the surface of the gate, thereby avoiding all mortising, which is particularly desirable on metal gates.

Although not usually required, the brackets may be mortised into the post, thereby reducing the space between the edge of gate and post.

The "Sagless" gate hinge is also made with attachments for application to marble partition. See illustration below.



Cross Section



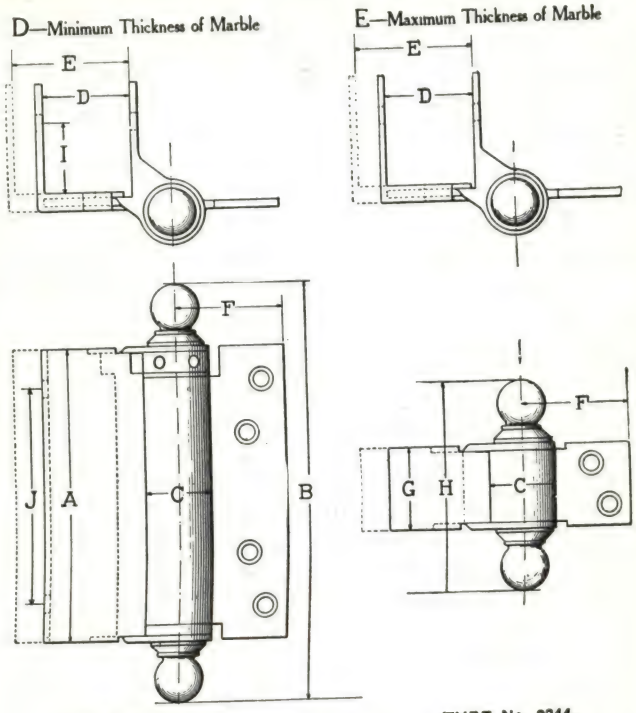
Applied

TYPE No. 6007, CHICAGO "SAGLESS" GATE SPRING PIVOT-HINGE

"Triplex" Lavatory Spring Hinges

Chicago "Triplex" lavatory spring hinges, as illustrated, are made in bronze, brass, nickelplated or nickeline metal for marble thickness as specified. The flanges are 4 in. Nos. 2242, 2244, 2246, and 1247 have adjustable box flanges, adjustable ⅛ in. over and under the following sizes by which they are specified: 1 in., 1¼ in., 1½ in., 1¾ in. and 2 in.

Single acting lavatory hinges can be used in combination with a springless hinge, where doors are very narrow or light weight, as shown by articles No. 2244 and No. 2444. Where doors swing out and occupancy indicator is not desired, a checking springless hinge, No. 2246 or No. 2446, can be used, which holds door ajar when not bolted shut. Where doors swing in, hinges can be furnished with reverse springs to hold door open.



TYPE No. 2242 TYPE No. 2244

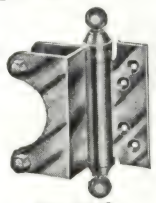
DETAIL, CHICAGO "TRIPLEX" LAVATORY SPRING HINGE

*Marble thickness, in.	A	B	C	D	E	F	G	H	I	J
1	4	5 5/8	7/8	7/8	1 1/8	1 7/16	1 1/8	2 7/8	15/16	2 7/8
1 1/4	4	5 5/8	7/8	1 1/8	1 3/8	1 7/16	1 1/8	2 7/8	15/16	2 7/8
1 1/2	4	5 5/8	7/8	1 3/8	1 5/8	1 7/16	1 1/8	2 7/8	15/16	2 7/8
1 3/4	4	5 5/8	7/8	1 5/8	1 7/8	1 7/16	1 1/8	2 7/8	15/16	2 7/8
2	4	5 5/8	7/8	1 7/8	2 1/8	1 7/16	1 1/8	2 7/8	15/16	2 7/8

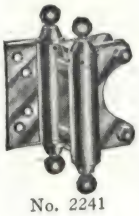
Dimensions in inches.

*Box flange of hinges is adjustable ⅛ in. over and under this marble thickness.

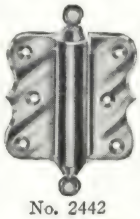
When so specified, hinges will be furnished with reverse springs to throw the door open.



No. 2242



No. 2241



No. 2442

No. 1247F

No. 2244

No. 2246

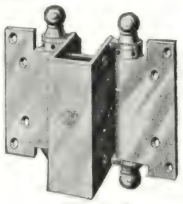
No. 2444

No. 2446

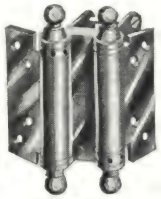
No. 1244

CHICAGO "TRIPLEX" LAVATORY SPRING HINGES, STOPS AND BOLTS

No. 2842



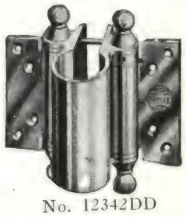
No. 2642



No. 2342

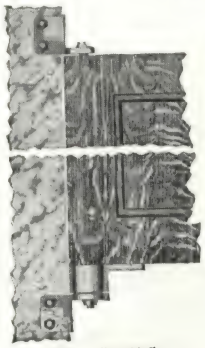
No. 2742

No. P2222



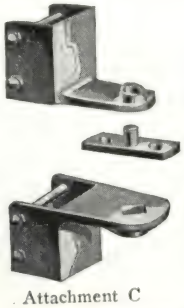
No. 12342DD

Pipe Standard Hinges



No. C6227S
Surface Type

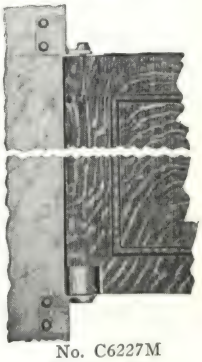
Attachment P



Attachment C

Attachment F

CHICAGO "SAGLESS" LAVATORY SPRING HINGES



No. C6227M
Mortise Type

ESTABLISHED 1876

BOMMER SPRING HINGE COMPANY

Spring Hinges and Pivots

TELEPHONE
PROSPECT 7600

251-271 Classon Avenue
BROOKLYN, N. Y.

Products

SPRING HINGES and PIVOTS; STRIKES, BOLTS and LATCHES for Lavatory and Hospital Doors; DOOR HOLDERS.

Quality and Prices

Standard for 46 years, and steadily improved, retaining superiority over all others.

Prices are guaranteed to be no higher than those for goods of corresponding type.

Specifications and Catalogues

Architects, in specifying these products, should use the word "Bommer" and in addition thereto, if possible, number of the article and finish. Hardware dealers and lock manufacturers can include them in their contracts.

Complete catalogue of the BOMMER SPRING HINGE COMPANY'S line forwarded on application. For projects requiring special spring hinges, details of construction are solicited.

Bommer Spring Butt Hinges

Bommer spring butt hinges are made of wrought steel, bronze and brass, in all finishes. They all have steel bearings throughout.

Bommer double acting spring butt hinges are the only faultless and technically correct double acting spring butt hinges. They have the weight supporting bearings located so as to entirely relieve both adjustable spring holders from supporting the weight of the door, enabling both coil springs to respond freely and evenly in the barrels of the hinge when the door is opened in either direction, increasing durability.

Bommer spring hinges, exclusively, have an efficient lubricating system by which all bearings as well as the springs and the inner surface may be lubricated.

TRADE MARK
BOMMER
Reg. U. S. Pat. Office

BOMMER
Reg. U. S. Pat. Office

TRADE-MARKS

DOUBLE ACTION HINGE — SINGLE ACTION HINGE

REQUIREMENTS, SPRING HINGES

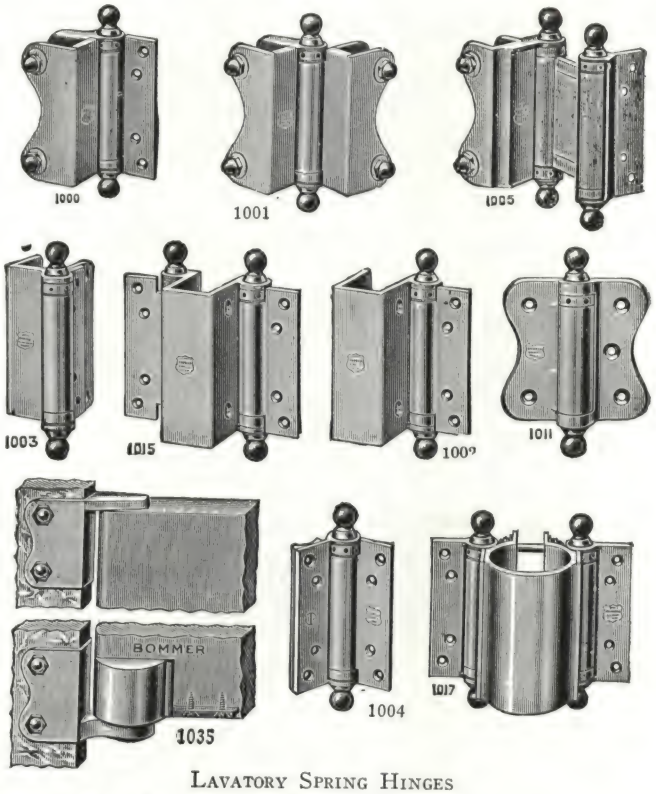
Always use the largest size hinge the thickness of door will permit

Size of hinge in inches	For doors of following dimensions — Minimum	For doors of following dimensions — Maximum	Thickness of hanging strip, inches
3	¾ in. x 2 ft. 2 in.	1 in. x 2 ft. 0 in.	½
4	⅞ in. x 2 ft. 4 in.	1¼ in. x 2 ft. 2 in.	⅝
5	1⅛ in. x 2 ft. 6 in.	1½ in. x 2 ft. 3 in.	⅝
6	1¼ in. x 2 ft. 8 in.	1¾ in. x 2 ft. 4 in.	¾
7	1⅜ in. x 2 ft. 9 in.	2 in. x 2 ft. 6 in.	⅞
8	1½ in. x 2 ft. 10 in.	2¼ in. x 2 ft. 8 in.	1
10	1¾ in. x 3 ft. 0 in.	2½ in. x 2 ft. 10 in.	1⅛
12	2¼ in. x 3 ft. 2 in.	3 in. x 3 ft. 0 in.	1¼

Bommer Lavatory Spring Hinges

The illustrations show a complete line of box flanged spring hinges for clamping lavatory doors on to marble or slate partitions and are suitable for all public comfort stations, bathhouses, and hospital work. Made of nickelplated brass or highly polished bronze and adaptable to all conditions met with in such work.

In most styles illustrated the box flanges are adjustable ⅛ in. each way, but the thickness of both marble and door must be stated when specifying. Regularly made to close the door, but the single action can be furnished with reverse springs to hold it open if so ordered. The flanges are 4 in. in length.



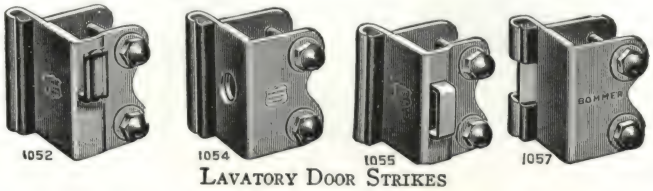
LAVATORY SPRING HINGES

Blanks for Lavatory Hinges

For extra light and narrow lavatory doors, if close economy is essential, blanks can be furnished for use in connection with single acting lavatory spring hinges.

Strikes for Lavatory Doors

Adjustable strikes, having rubber bumper, to clamp to the marble, for use with lavatory spring hinges in connection with any style of bolt or latch, can be furnished.



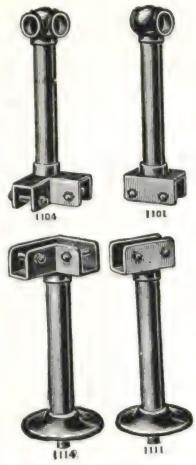
LAVATORY DOOR STRIKES

Continued on next page

Fittings for Lavatory Stalls

A complete line of fittings for setting of marble or slate stalls, urinals and showers. The thickness of marble backs, partitions and stiles must be specified. Top and bottom standards are 12 in. high, unless otherwise specified. Ball fittings for 1⅛-in. outside diameter tubing. Posts 1⅛-in. tubing.

Also made for wood partitions.



FITTINGS FOR LAVATORY STALLS

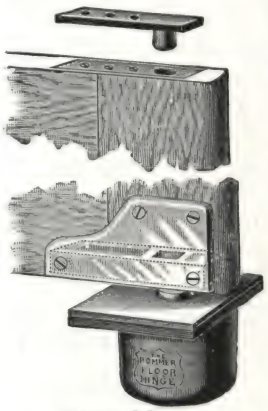
Bommer Door Holder

Is the best, easiest to apply, and most effective device for holding open doors of public or office buildings and residences. A light pressure of the foot will either throw or retract the bolt. The rubber tip prevents marring of floor. Will reach 1½ in. from door to floor. Furnished in wrought steel or bronze metal, in all finishes.

DOOR HOLDER

Bommer Mortise Spring Pivots

The Bommer floor mortise spring pivot supports the weight of the door on tool steel ball bearings set upon a raised centerpost, giving an easy movement to the door. The ball bearings are protected from water and dirt. Only the best oil tempered steel springs are used. These spring pivots can be furnished with an invisible socket bar and adjustable top pivot instead of side plates if preferred.



FLOOR MORTISE SPRING PIVOT

CAST IRON BOX

Suitable for setting all sizes of floor mortise pivots into tile or cement floors

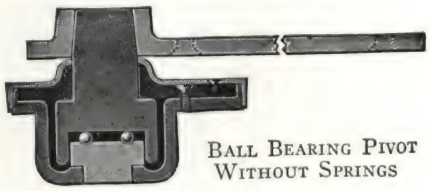
The tension of the spring is adjustable. These floor spring pivots are double acting; but by using a stop-bead, they work equally well single acting.

REQUIREMENTS, MORTISE SPRING PIVOTS

Thickness of door, in.	Use size	Dimensions of top plate, in.	Depth of cup, in.	Distance from center of spindle to door casing, in.
⅞ to 1½	2	3¾ x 5⅛	3	1⅝
1⅜ to 2	4	3⅞ x 5⅝	3½	1¾
2 to 2½	6	4½ x 6½	3¾	2
2½ to 3½	8	4½ x 6½	3¾	2

Bommer Ball Bearing Pivots without Springs

These pivots are durable, noiseless, work smoothly and permit the heaviest doors to be used with but slight exertion.



BALL BEARING PIVOT WITHOUT SPRINGS

REQUIREMENTS, PIVOTS WITHOUT SPRINGS

Thickness of door, in.	Use size	Dimensions of top plate, in.	Depth of cup, in.	Distance from center of pivot to door casing, in.
⅞ to 1¼	26	1 x 4	1⅛	⅝
1¼ to 2¼	27	4 x 3¼	1⅝	1½
2 to 4	28	5½ x 5¼	3¼	2¼

Bommer Vertical Spring Pivot with Release Feature

Permits door to stand open at any angle by pressing down either side pedal with the foot. The spring tension automatically re-engages itself when door is closed. The floor plate is fastened to the floor surface, obviating the need of cutting holes in the floor. The weight of the door is carried on ball bearings located in the upper part of the pivot frame away from water and dust. The top pivot has a spring actuated plunger which permits the door to be taken down quickly without removing the screws. For tile or concrete floors a special right angle floor plate can be furnished instead of the floor plate shown in the illustration.

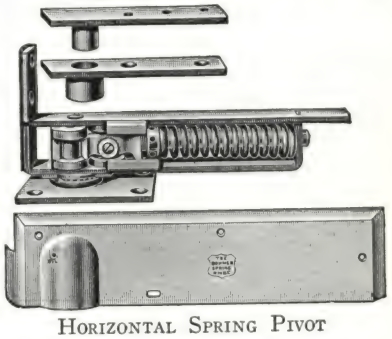
VERTICAL SPRING PIVOT

REQUIREMENTS, VERTICAL SPRING PIVOTS

Thickness of door, in.	Use size	Dimensions of floor plate, in.	Distance from center of spindle to door casing, in.
1⅛ to 1½	20	2¾ x 3⅝	1¼
1½ to 2	22	3 x 3½	1½
1¾ to 2¾	24	3½ x 4⅜	2

Bommer Horizontal Spring Pivot with Holdback Feature

Will hold the door open when swung back 90°. It has an efficient alignment feature; the tension of the spring is adjustable. The floor plate is screwed to the floor surface, obviating the need of cutting holes in the floor. The weight of the door is carried on ball bearings. All moving parts can be lubricated through a hole in the side plate.



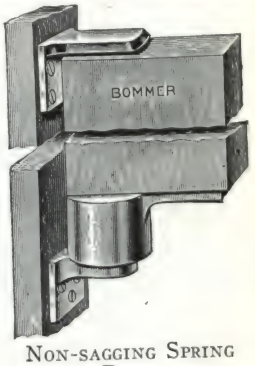
HORIZONTAL SPRING PIVOT

REQUIREMENTS, HORIZONTAL SPRING PIVOTS

Thickness of door, in.	Use size	Dimensions of floor plate, in.	Distance from center of spindle to door casing, in.
1⅛ to 1¾	18	2¾ x 3½	1½
2 to 2½	19	4 x 5	2⅛

Bommer Non-sagging Spring Pivots for Office Gates

These office gate spring pivots are suitable for either double action or single action gates. No need to mortise brackets into gate or door post, although they can be mortised if so preferred. They are adapted to either wood or metal gates and railings. Easy to apply, save labor, and allow close fitting. Workmanship and finish unsurpassed.



NON-SAGGING SPRING PIVOT

REQUIREMENTS, NON-SAGGING SPRING PIVOTS FOR OFFICE GATES

Maximum width of hand rail, in.	Thickness of gate, in.	Distance from center of spindle to back of bracket, in.	Dimensions of bracket, in.	Diameter of cup, in.
2½	1⅛ to 2½	1½	2¼ x 2	2½

LAWSON MFG. COMPANY

Manufacturers of Spring Hinges

TELEPHONE
SUPERIOR 6589

228-230 West Superior Street
CHICAGO, ILL.

Products

The complete Lawson line includes LAWSON "NU" JAMB SPRING HINGES; LAWSON "UNIVERSAL" PIVOT SPRING HINGES for lavatory doors and office gates; LAWSON SURFACE FLOOR HINGES; MATCHLESS FLOOR SPRING HINGES for factory doors.

A full line of Lavatory Hardware, including LOCKS, STRIKES and BOLTS.

For Rite-Way Garment Fixtures, see pages 2059-2061.

Lawson "Nu" Jamb Spring Hinges

The "Nu" jamb spring hinge does not require the use of a hanging strip. It fastens directly to the jamb and thus gives a far more solid support for the door than if a hanging strip were used.

It is more easily and quickly applied than any other type of jamb hinge. Where hanging strips are already installed, this hinge can also be used.

Made of the best materials obtainable, this hinge is stronger and more durable than any other on the market. It is guaranteed free from imperfections in material and workmanship.

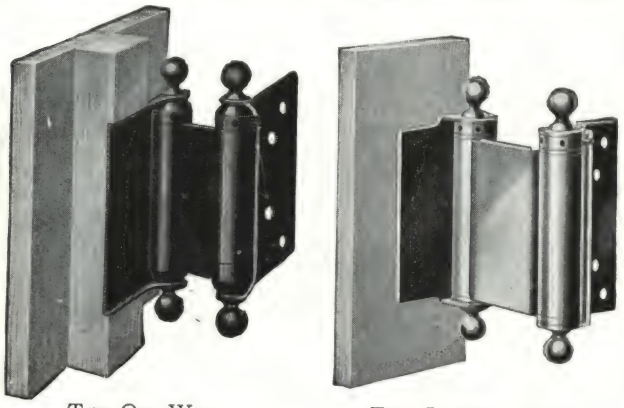
The "Nu" jamb spring hinge costs no more than any other high grade jamb hinge.

SCHEDULE FOR SELECTING CORRECT SIZE OF LAWSON "NU" JAMB SPRING HINGES

Size of hinge	For doors
3″	¾″ thick x 2′ 3″ wide or 1″ thick x 2′ 0″ wide
4″	1″ thick x 2′ 6″ wide or 1¼″ thick x 2′ 0″ wide
5″	1⅛″ thick x 2′ 6″ wide or 1½″ thick x 2′ 3″ wide
6″	1¼″ thick x 2′ 9″ wide or 1¾″ thick x 2′ 3″ wide
7″	1⅜″ thick x 2′ 9″ wide or 2″ thick x 2′ 6″ wide
8″	1½″ thick x 3′ 0″ wide or 2¼″ thick x 2′ 6″ wide
10″	2¼″ thick x 3′ 0″ wide or 2¾″ thick x 2′ 6″ wide

For outside doors subject to draft, wide or heavy doors of hardwood, metal covered doors, or doors weighted with heavy plate glass or hardware, use the largest size hinge the thickness of the door will permit.

Wide doors require larger size hinges than narrow doors.

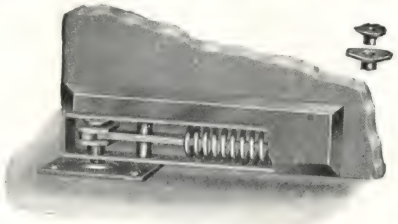


THE OLD WAY — THE LAWSON WAY

Lawson Surface Floor Hinges

The series No. 800 surface floor hinge is made for doors from 1⅛ to 1¾ in. thick and of standard size, weighing under 55 lbs. Furnished with square beveled edge side plates which are reversible.

The ball bearing is at the top of the hinge where it should be to carry the weight. This arrangement also keeps it up out of the dirt. The hinge has a smooth, snappy action at all times. Wear is reduced to a minimum by having all moving parts hardened by a special process. Easily and quickly applied.



NO. 800 SURFACE FLOOR SPRING HINGE

The series No. 600 surface floor hinge is of heavier construction and has the working parts enclosed in a grease chamber which keeps out the dirt and prevents wear. For 1⅛- to 1¾-in. doors.

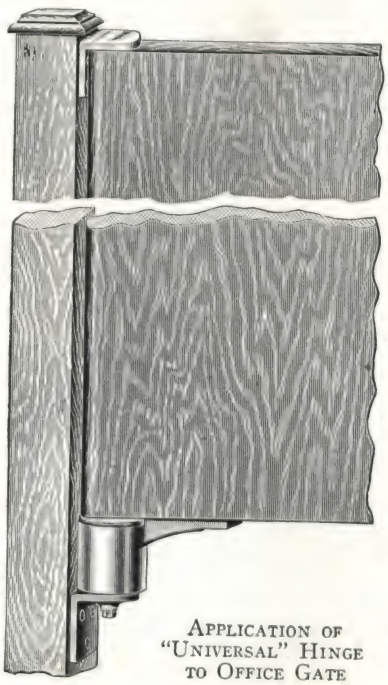
The series No. 900 surface floor hinge is for heavier doors from 1¾ to 2½ in. thick.

Lawson "Universal" Pivot Spring Hinge for Office Gates

As applied to office gates, Lawson "Universal" pivot spring hinges fasten directly to the jamb without a hanging strip and require no mortising—absolutely prevent sagging.

DIMENSIONS OF "UNIVERSAL" SPRING HINGES FOR OFFICE GATES

Maximum width at hand rail	Thickness of gate	Diameter of cup	Dimensions of brackets
2″	1″ to 2″	2″	2″ x 1⅛″ wide



APPLICATION OF "UNIVERSAL" HINGE TO OFFICE GATE

Continued on next page

Lawson "Universal" Pivot Spring Hinge for Lavatory Doors

The only spring hinge that can be set to hold the door at any angle, either in or out.

For lavatory use it can be applied to either single or double acting doors, opening in or out, and swinging from either the right or left side.

Regular or reverse spring action may be obtained without dismounting the door.

The mechanical construction of the spring mechanism is guaranteed to give durable service.

The pivot bearings prevent sagging of the door.

Because of its general adaptability to any construction, architects and contractors find it wise to specify the Lawson "Universal" hinge as it insures against delays caused by last minute changes in plans or details.

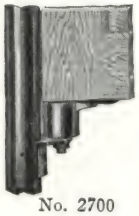
In ordering, specify thickness of door and marble.

No. 2434

No. 2534

No. 2834

No. 2234



No. 2700

ATTACHMENTS AND TYPES OF LAWSON "UNIVERSAL" PIVOT SPRING HINGE

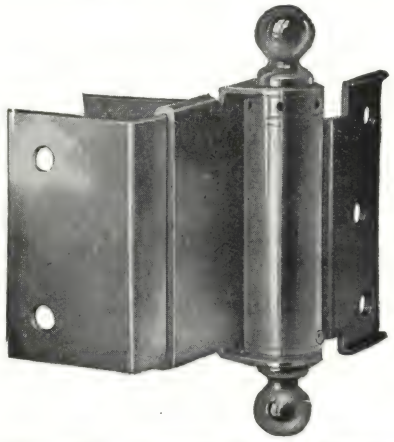
Reverse Spring Action Regular Spring Action

APPLICATION OF "UNIVERSAL" HINGE TO LAVATORY DOORS

Lawson "Nu" Jamb Spring Hinge for Lavatory Doors

As a lavatory hinge second only to the Lawson "Universal," we recommend the No. 1800 3-in. jamb spring hinge with box flange for marble. These hinges are furnished in pairs and we advise their use in place of the old style hinge and blank for doors up to 30 lbs. weight. They give a wider range of spring action, wear longer, give the door more solid support, and make a better looking piece of work.

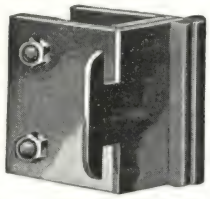
The box flange has an adjustment range from 1⅛ to 1½ in. covering all standard thicknesses of partitions.



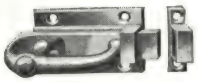
No. 1800. LAVATORY SPRING HINGE

Strikes, Bolts, etc,

Our line of strikes, bolts, locks, bumpers, etc., for lavatory door trim is complete.



Strike No. 1848



Bolt No. 1995

Bumper No. 1982

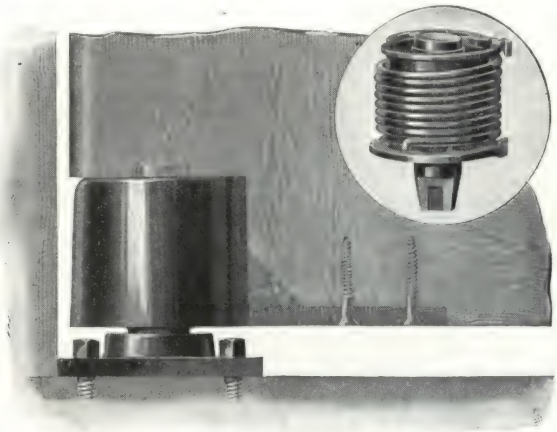
Matchless Floor Spring Hinge for Heavy Double Acting Factory Doors

This is the famous Matchless ball bearing floor hinge which has given such satisfaction for the past 20 years, with the exception that it is made to be used without cutting into the floor.

We recommend this hinge for all factory doors of over 2¼-in. thickness weighing up to approximately 500 lbs.

The floor plate is made so that it can be set to hold the door either closed or open at 90°.

Made only in iron dead black japanned finish.



No. 1700. APPLICATION OF MATCHLESS FLOOR SPRING HINGE

McKINNEY MANUFACTURING COMPANY

Hinges and Builders' Hardware

MAIN OFFICE AND FACTORY
Liverpool and Metropolitan Streets
PITTSBURGH, PA.
WESTERN OFFICE, 702 Wrigley Building, CHICAGO, ILL.
SALES REPRESENTATIVES
NEW YORK, N. Y., JOHN H. GRAHAM & Co., 113 Chambers Street BALTIMORE, MD., HENRY KEIDEL & Co., 405-407 West Redwood Street
PACIFIC COAST, JOHN T. ROWNTREE, INC., LOS ANGELES, CAL.

Products

WROUGHT STEEL HINGES and BUTTS of all kinds; SCREEN DOOR HARDWARE; CELLAR WINDOW SETS; DRAWER PULLS.

Also manufacturers of Hardware Specialties: Bolts, Latches, Handles, Shelf Brackets, Hangers for barn and mill doors, etc.

For Garage Hardware, see pages 1233-1235.

Distribution

McKinney butts and other hardware products are sold by the leading hardware jobbers, retailers and builders' hardware dealers; and, in addition, can be procured from lock manufacturers when so specified.

Identification

All McKinney butts are plainly stamped with the name McKinney. In a few instances, the catalogue numbers and special symbols are also stamped on the backs of the butts for proper identification.

Butt Numbers and Finishes

All McKinney hinges and butts are identified by a system of class numbers, by means of which the number applied to each line in bright steel is also used as the base for numbers of same line in other finishes. No. 701 is bright steel, while No. 1701 is the same butt japanned, and No. 2701 is planished and plated.

McKinney butts and hardware are made of cold rolled steel. Cold rolling hardens the steel and gives it a bright smooth surface, known as "Planished."

In the best work it is advisable to use "polished" butts. These butts are first highly polished, then plated and finished in various colors of brass, bronze, copper and many other special color effects.

The McKinney plating department is in charge of workmen who have had years of experience in finishing hardware, and who turn out work of the highest grade. Every variety of color and finish is produced.

The following table is shown to suggest what finish of the hardware harmonizes with the different kinds of wood trim. If followed carefully no glaring mistakes will be made in matching metal and trim.

WHITE ENAMEL	MAHOGANY OR CHERRY
Brass (BP)	Bronze or brass (B or BP)
Dull brass (OB)	Statuary brass
Dull gold	Dull brass (OB)
Goldplated	Dull gold
Satin silver (PX)	Goldplated
Nickelplated (N)	Silverplated (P)
OAK, MAPLE, CHESTNUT OR CYPRESS	Satin silver (PX)
Antique copper (AC)	FLEMISH OR MISSION OAK
Antique brass (MB)	Bronze or brass (B or BP)
Statuary copper (XC)	Antique brass (MB)
Bower-barff (black) (BB)	Dull brass (OB)
Statuary bronze (YL)	Statuary brass
Bronze plated (B)	Goldplated
Olive green	Bower-barff (black) (BB)
Verde-antique (V)	Verde-antique (V)

Specification Data for Butts

In specifying butts use the name McKinney with the size, catalogue name and number. The catalogue number of the butt must be followed by the symbol designating the finish desired—as: All butts to be "McKinney" 4½x4½ antifriction butts No. 3741B.

All butts should be of sufficient size, and so applied that they will carry the door, when opened back, clear of the side trim.

It is always advisable to specify three butts for each door. Instead of two large butts it is better to use three butts of smaller size. All-metal doors should be hung with three butts.

Finish of all butts should harmonize with finish of other hardware in same room.

For all exterior doors and vestibule doors use three No. 2472 antifriction butts, the size being determined by the weight of doors, and the desired throw. When these butts are galvanized and plated, they are as durable as need be, and less costly than butts of other metals. For all interior swing doors, use No. 2714 loose pin, ball tip butts, three to each door. In all better class work, use No. 2742 for all doors.

Transoms should be hung with tight pin butts No. 2705 harmonizing in finish with the other metal trim. To hang casement windows, use light loose pin ball tip butts, No. 2718.

Kitchen and pantry cupboard doors should be hung with No. 2722 light narrow loose pin butts, or ornamental surface butts No. 2726 to 2731½ as desired.

Antifriction Butts

These butts are recommended for use on all doors in public buildings and places where heavy doors are kept in more or less constant use. They are used also in better class residences.

They are made of heavy wrought steel, as are all McKinney butts, and equipped with special metal washers at the joints. The washers reduce friction to a minimum and permit the heaviest doors to swing easily, freely and quietly for years. Butts will not wear down at the joints. Require no adjustment—need no oiling—and have no small or delicate parts to become deranged and lost.

Antifriction butts are made in two series: No. 742 (illustrated) with ball tip, non-rising pin; and No. 765, similar except that it has button tip loose pin.

Sizes—2½x2½, 3x3, 3½x3½, 4x4, 4½x4½, 5x5, and 6x6 in.

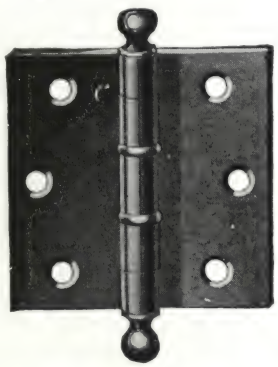
Nos. 2742 and 2765—Planished and plated.

Nos. 3742½ and 3765½—Polished and plated.

No. G5742—Galvanized and nickeled.

No. 5765—Planished and nickeled.

Nos. 6742½ and 6765½—Polished and nickeled.



ANTIFRICTION BUTT
No. 2742
No. 2765 has button tip

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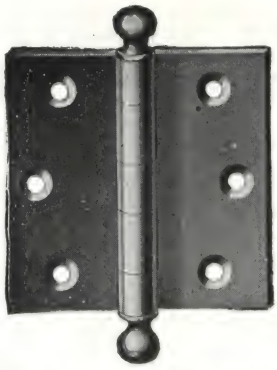
Loose Pin Butts, Ball Tips



Loose Pin Butt No. 2714

These butts are similar to the antifriction butts except they are not equipped with antifriction metal washers. Made in two weights: regular, No. 714 series; and light, No. 718 series.

Sizes—2x2, 2½x2½, 3x3 in. for both series; and for No. 714 series only, 3½x3½, 4x4, 4½x4½, 5x5, 5½x5½, 6x6, 6x4, 6x5, 6x7, and 6x8 in. All finishes.

Nos. 2714 and 2718—Planished and plated.
No. G2714—Galvanized and plated.
Nos. 3714½ and 3718—Polished and plated.
No. G3714½—Polished, galvanized and plated.
Nos. 6714½ and 6718—Polished and nickeled.

Half Mortise Beveled Edge Butts

Half Mortise Butt No. 2745

These butts are becoming more and more popular for use in hanging doors in bathroom, kitchen, pantry and other rooms having white wood trim. The mortise leaf of the butt is applied to the jamb and the beveled edge to the face of the door. Plugs at the bottom are slotted for the screwdriver; thus the butts can be used either on right- or left-hand doors.

Made in three styles: No. 745 series, ball tip; No. 775 series, button tip; and No. 785 series, button tip with antifriction washers.

Sizes—2, 2½, 3, 3½, 4, and 4½ in. in all series, and 1 and 1½ in. in No. 745 series.

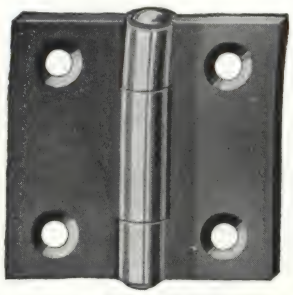
Nos. 1745 and 1775—Japanned.
Nos. 2745, 2275 and 2785—Planished and plated.
Nos. 5745, 5775 and 5785—Planished and nickeled.

Template Butts for Metal Doors

The increased use of metal doors in modern construction work makes it necessary, oftentimes, to have the holes in the butts drilled to template, so that they will match the holes in the metal doors. Templates for use in drilling these holes are furnished when desired. The following butts are most commonly called for in template work:

No. T2714—Ball tip, loose pin.
No. T2742—Ball tip, loose pin with antifriction washers.
No. T2745—Half-mortise beveled edge, ball tip.

Transom Butts



Broad Butt No. 2705

For this purpose, No. 705 series, tight pin broad butts are recommended. Made in all standard sizes from 2x2 to 6 in. and the following finishes:

No. 1705—Japanned.
No. 2705—Planished and plated.
No. 4705—Galvanized with brass pins.
No. 6705—Polished and nickeled.

Cupboard Door Butts

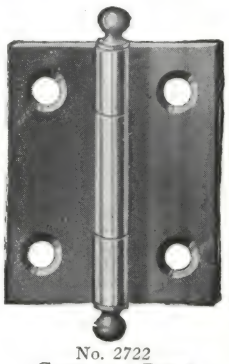
For all cupboard door work in kitchen and pantry, the following types are recommended:

No. 722 series, light narrow ball tip butt with loose pin; Nos. 726, 727 and 728 series, ornamental surface hinges, with tight pin; Nos. 726½, 727½, and 728½, ornamental surface hinges, ball tip pins; Nos. 730, 730½, 731 and 731½ series, half mortise ornamental butts, with loose pin.

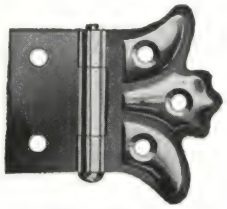
Sizes—No. 722 series, 1½, 1¾, 2, 2¼, 2½, 3, 3½, and 4 in.

Other series, one standard size only.

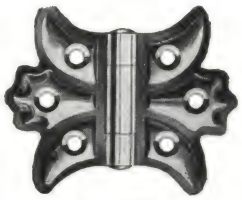
Finishes—Japanned, planished and plated, and planished and nickeled.



No. 2722
Cupboard Butt



No. 2730



No. 2726

Cupboard Hinges

Screen Door Sets

Best quality and finish. Made in two styles: No. 751 series, standard, and No. 749 series, lighter and smaller. These sets consist of one pair No. 752 series screen door ball tip loose pin reversible butts, ornamental pressed steel handle, steel wire spring, No. 754 series, carefully tested, together with hook and screw eyes.

Nos. 1749 and 1751—Japanned.
Nos. 2749 and 2751—Planished and plated.
Nos. 4749 and 4751—Galvanized.

Separate—These butts, springs, handles, etc., are also supplied separately, as follows:

Butts—Nos. 1752 (japanned), 2752 (plated), and 4752 (galvanized); sizes 2½x2½ and 3x3 in.

Handles (Screen Door Pulls)—Nos. 1753 (japanned), 2753 (plated), and 4753 (galvanized); sizes: 5¼, 6¾ and 7¾ in.

Steel Springs With Screw Eyes—Nos. 1754 (japanned), and 2754 (plated); two weights: light, No. 2; heavy, No. 3.

Cellar Window Sets, Series 761

Sets consist of one pair 2½-in. light narrow butts, one hook and eye, one sash lock, and 16 screws.

No. 1761—Japanned.
No. 4761—Galvanized.

Pressed Steel Drawer Pulls

Four Styles—No. 870 series, square; No. 871 series, crescent shaped; No. 872 series, ornamental; No. 874 series, ornamental, with beveled edges.

Finishes—No. 1870, etc., japanned; No. 2870, etc., planished and bronzed; No. 2870 AC, etc., antique copper.

THE STANLEY WORKS

Builders' Hardware

MAIN OFFICE AND FACTORY
NEW BRITAIN, CONN.
BRANCH FACTORIES: NILES, OHIO; BRIDGEWATER, MASS.
BRANCH OFFICES
NEW YORK, N. Y., 100 Lafayette Street
SAN FRANCISCO, CAL.
CHICAGO, ILL., 73 East Lake Street
LOS ANGELES, CAL.
SEATTLE, WASH.

Products

WROUGHT STEEL and BRONZE BUILDER'S HARDWARE and STANLEY GARAGE HARDWARE, including: Loose Pin, Non-detachable Ball Bearing Butts and Hinges, Latches, Handles, Bolts, Storm Sash and Screen Hardware, Blind Hardware, and Heavy Hardware for mills and factories.

STANLEY S.W.
TRADE-MARK

Territory

Stanley products can be obtained from any of the leading builders' hardware dealers.

Builders' finishing hardware manufacturers will furnish Stanley products whenever they are specified by name and catalogue number.

Identification

All Stanley products are stamped with Stanley trade-mark. Numbers, designating certain types of butts, and symbols, designating certain finishes, are also stamped on the back of each butt, as described under specific headings.

How to Specify

Use the name, THE STANLEY WORKS, together with the size, catalogue name and number, and proper symbol for the finish desired, thus: "All butts to be wrought bronze, ball bearing Stanley No. 180A, 5x5." For additional specification data, see succeeding pages.

Finishes

Stanley wrought steel products are manufactured from cold rolled steel, which is made in THE STANLEY WORKS' own steel mills.

On the better grade of Stanley butts, a heavy coating of copper is deposited on the polished steel with an additional plating of the finish required placed upon the copper base.

COMPARATIVE LIST OF FINISHES

THE STANLEY WORKS	Description	Yale & Towne Mfg. Co.	Russell & Erwin Mfg. Co.	P. & F. Corbin	Sargent & Company
A	Standard light bronze	B Z 10	11	B	P
C	Brass plate	A Z 10	10	A	B
D2	Copper oxidized, light mottled	C Z 17	7½	R	A B
F	Dull brass	A Y 22	9	D A	O B
G	Bower-barff, rustless	F X 80	46	F	B B
H	Dead black electroplate	B X 16	06	K F	B N
N	Nickel	N Z 10	4	E	N
S F2	Brass oxidized, mottled, sand finish	A X 17	09½	S H A	R K
S F4	Dull brass, slightly oxidized, sand finish	A X 24	09 C	S H A	R D
Z	Stanley Sherardized				

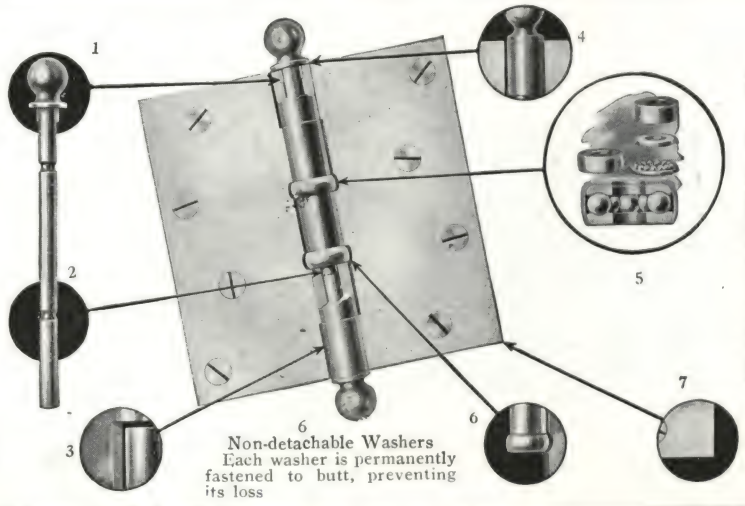
NUMBER AND SIZE OF BUTTS TO USE ON DOORS

Door Dimensions	Weight of door, lbs.	Size of butts, in.
Cupboards		2½
⅞-in. and 1⅛-in. screen door	30	3x3
1⅜ in. thick and less than 2 ft. 8 in. wide	30 to 50	3½x3½
1⅜ in. thick and 2 ft. 8 in. or more in width	50 to 60	4 x4
1¾ in. thick and less than 3 ft. wide	60 to 75	4½x4½
1¾ in. thick and 3 ft. or more in width	75 to 100	5x5
2 in. thick and less than 3 ft. wide		
2 in. thick and over 3 ft. in width	100 to 150	6x6
2¼ in. thick and not over 4 ft. wide		
2½ in. thick and not less than 3 ft. 9 in.		

Note: Solid or hollow metal doors require 3 butts to evenly distribute weight of door. Third butt holds edges of door in alignment and prevents warping and helps latch bolt to properly engage with strike.

Sherardizing—An antirust finish, called "Stanley Sherardized." This finish is recommended for all steel articles exposed to the weather when expenditure does not permit use of bronze metal.

Sherardizing is done before assembling, and may be electroplated in various finishes. "Stanley Sherardized" products are stamped with the letter "Z" on the back of butt at the top near the joint.



1
Non-rising Loose Pins
Wings on pins fit into corresponding grooves in knuckle of butt. Pin can be easily taken out and put back, but is non-rising under action of door. Ball tip and pin are made in one piece

2
Self-lubricating Pins
These grooves hold lubricant, preventing wear on inside of knuckle and insuring silent action of butt

3
Beveled Edges
Inner edges of leaves conform to curve of barrel and make a closely fitting joint

4
Square Shoulders
Square shoulders of ball tip are flush with knuckle. Joints are clean and true

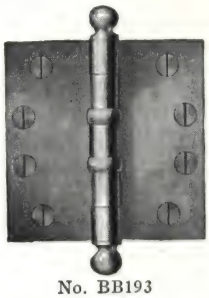
5
Stanley Ball Bearing Washers
Stanley non-detachable ball bearing washers are always in place. Construction of closely fitted hardened steel raceways holds ball bearings intact at all times. These bearings will each sustain a running load of 1000 lbs. without any indication of wear. Copper jackets prevent dust and moisture from entering bearing. When assembled, washers are packed with a non-fluid oil and need no further attention

6
Non-detachable Washers
Each washer is permanently fastened to butt, preventing its loss

7
Square Corners
Clean cut square corners add to the general uniformity

SOME OF THE FEATURES OF A STANLEY BALL BEARING BUTT

Continued on next page



No. BB193

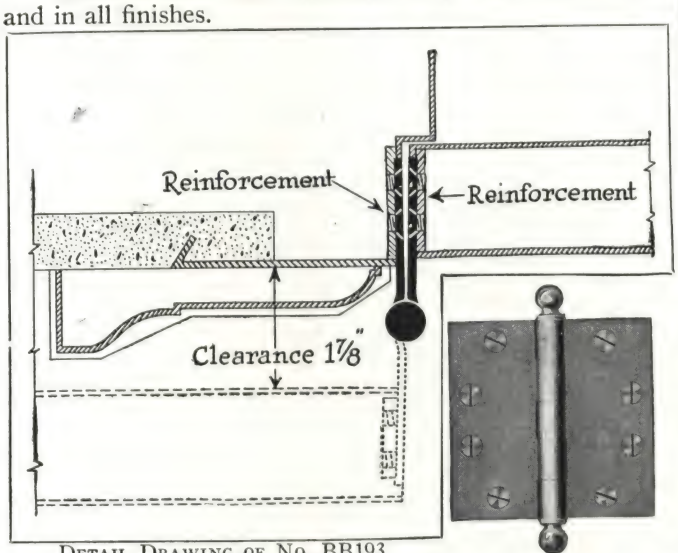
Wrought Bronze Metal Template Ball Bearing Butts

No. BB193—Wrought bronze metal, highly polished, heavily plated ball bearing template butts. For the seven features, see preceding page.

Made in sizes 4½x4½, 5x5, 6x6 in. and in all finishes.

No. 194—Wrought bronze metal, highly polished, heavily plated template butts with steel bushings at each joint. For features 1, 3, 4 and 7 of this butt, see preceding page.

Made in sizes 3x3, 3½x3½, 4x4, 4½x4½, 5x5 in. and in all finishes.

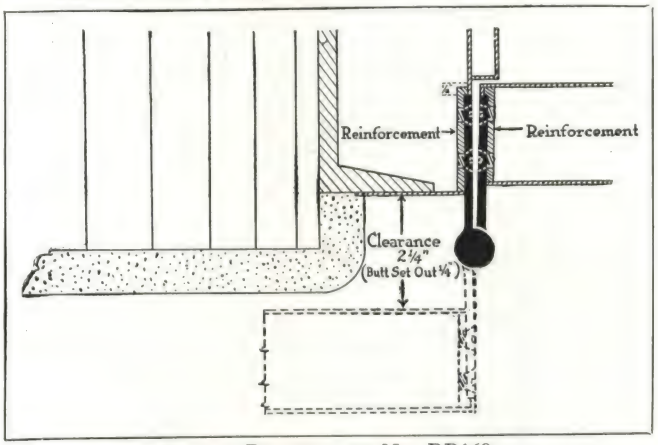


DETAIL DRAWING OF NO. BB193
Butt No. BB193. 5x5 in. on 1¾-in. hollow steel door and pressed steel jamb

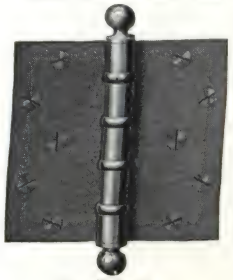
No. 194

No. BB169—Extra heavy wrought steel, highly polished and heavily plated ball bearing template butt. For the seven features of this butt, see preceding page.

Made in sizes 6x4, 6x5, 6x6 in. and in all finishes.



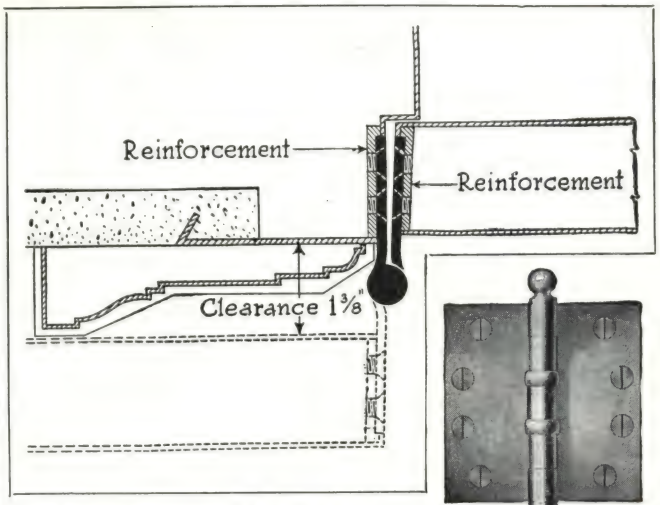
DETAIL DRAWING OF NO. BB169
Butt No. BB169. 6x6 in. on 2-in. hollow steel door and metal jamb



No. BB169

No. BB174—Wrought steel highly polished, heavily plated ball bearing template butts. For the seven features of this butt, see preceding page.

Made in sizes, 2½x2½, 3x3, 3½x3½, 4x4, 4½x4½, 5x3, 5x4, 5x5, 6x5 in. and in all finishes.



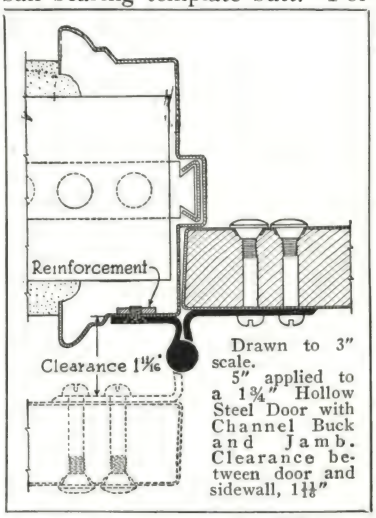
DETAIL DRAWING OF NO. BB174
Butt No. BB174. 4½x4½ in. on 1¾-in. hollow steel door and pressed steel jamb

No. BB174

No. BB170—Wrought steel full surface highly polished, heavily plated ball bearing template butt. For the seven features of this butt, see preceding page.

Made in sizes 4½ and 5 in. and in all finishes.

No. BB170

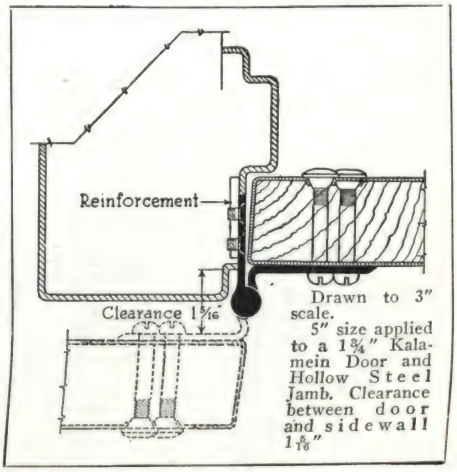


DETAIL DRAWING OF NO. BB170
Butt No. BB170. 5 in. on 1¾-in. hollow steel door with channel buck and jamb

No. BB172—Wrought steel full surface highly polished, heavily plated template ball bearing butt. For the seven features of this butt, see preceding page.

Made in sizes 4½ and 5 in. and in all finishes.

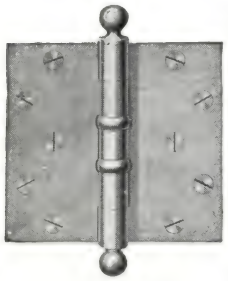
No. BB172



DETAIL DRAWING OF NO. BB172
Butt No. BB172. 5 in. on 1¾-in. kalamein door and pressed steel jamb

Continued on next page

Wrought Bronze Metal Loose Pin Butts

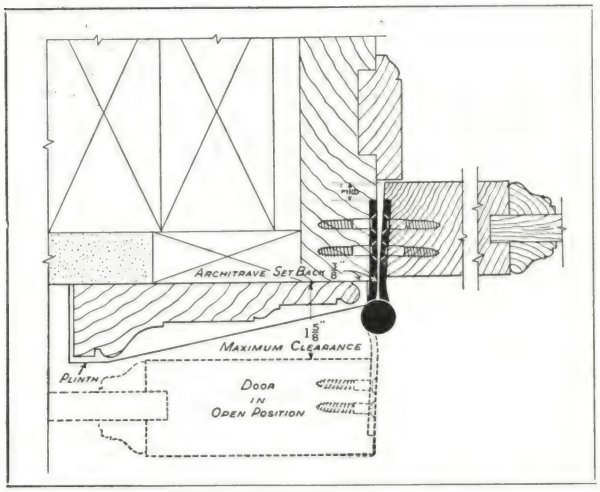


No. 180

No. 180—Wrought bronze metal highly polished, heavily plated ball bearing butt. For the seven features of this butt, see second preceding page.

Made in sizes 3x3, 3½x3½, 4x4, 4½x4½, 5x5 and 6x6 in. and in all finishes.

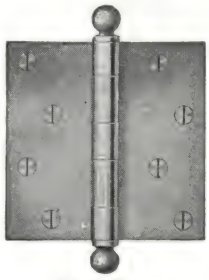
No. 181—Extra heavy wrought bronze metal ball bearing butt. Made similar to No. 180.



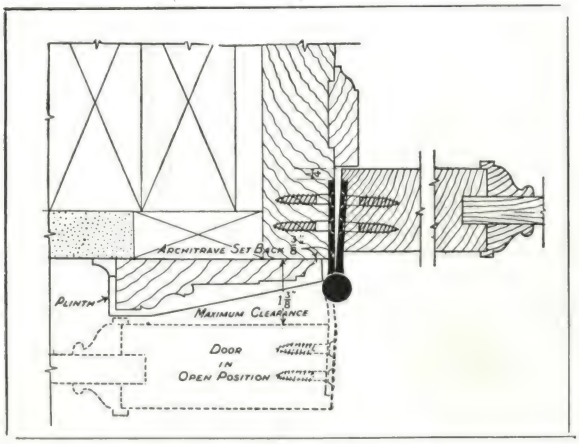
Detail Drawing of No. 180
Butt No. 180. 5x5 in. on 2-in. door of wood

No. 175—Wrought bronze metal highly polished. Heavily plated ball bearing loose pin butt with steel bushings at each joint. For features 1, 3, 4, 5 and 7, see second preceding page.

Made in sizes 2½x2½, 3x3, 4x4, 5x5, 6x6 in. and in all finishes.

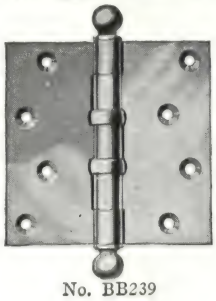


No. 175



Detail Drawing of No. 175
Butt No. 175. 4½x4½ in. on 1¾-in. door of wood

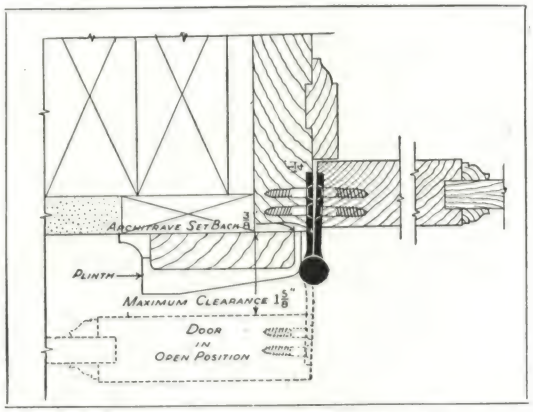
Wrought Steel Loose Pin Ball Bearing Butts



No. BB239

No. BB239—Wrought steel highly polished, heavily plated ball bearing loose pin butts. For the seven features of this butt, see second preceding page.

Made in sizes 2½, 3, 3½, 4, 4½, 5 and 6 in. and in all finishes.



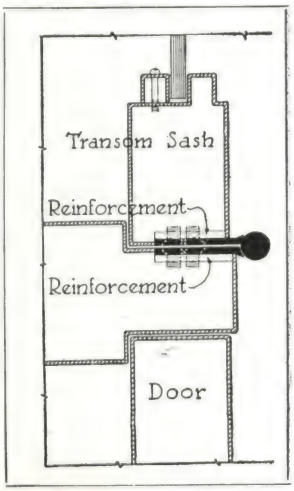
Detail Drawing of No. BB239
Butt No. BB239. 4x4 in. on 1⅜-in. door of wood

Wrought Bronze Metal Transom Butts

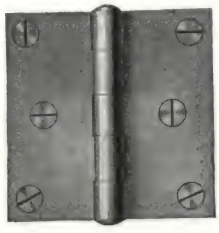
No. 196½ — Wrought bronze metal template transom butts, highly polished, heavily plated with fast pin. For features 3 and 7, see second preceding page.

Made in sizes 3x3 and 3½x3½ in.

No. 176 — Wrought steel. Made similar to No. 196½ in sizes 2½x2½, 3x2½, 3x3, 3½x3½, 4x4 in. and in all finishes.



Detail Drawing of No. 196½
Butt No. 196½. 3½x3½ in. on 1¾-in. metal transom

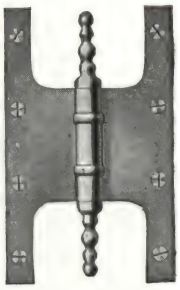


No. 176

Wrought Steel Loose Pin Ball Bearing Paumelles

No. 5345—Highly polished, heavily plated ball bearing paumelles. For features 1, 2, 3, 5, 6 and 7, see second preceding page.

Made in sizes 7½x3½, 7½x4½ in.



No. 5345

Continued on next page

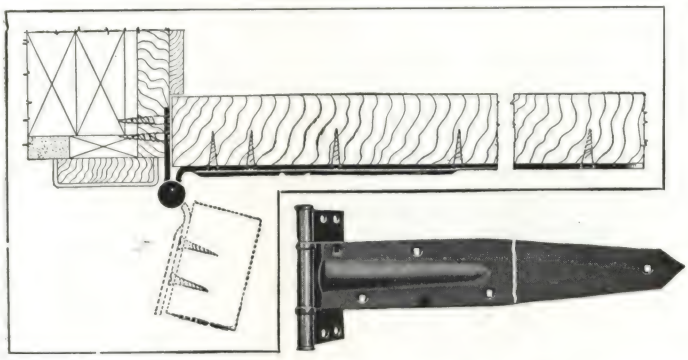
Stanley Garage Hardware

THE STANLEY WORKS were the first to manufacture a complete line of swinging door garage hardware equipment for brick, concrete, frame, mill and factory garages.

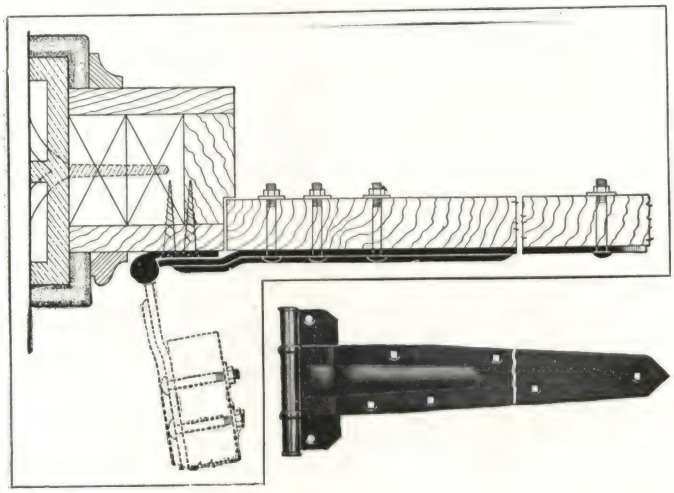
This hardware is sold in complete sets such as ball bearing hinges, bolts, latches, hasps and door holders.

Stanley Ball Bearing Garage Hinges

Furnished in japanned, dead black japanned, sherardized, sherardized dead black japanned finishes.



DETAIL DRAWING OF NO. 1458, 36-IN.
Width of strap, 4 in. Length of joint, 8 in. Offset, 1 1/16 in. Throw, 2 1/8 in. Width of pad, 4 in.
Also made in 12, 18 and 24 in. sizes



DETAIL DRAWING OF NO. 1456, 24 IN.
Width of strap, 4 in. Length of joint, 8 in. Width of pad, 3 1/4 in.
Also made in 12 and 18 in. sizes

Wrought Steel Foot and Chain Bolts

No. 1055 Chain Bolt—Made in 2-, 3-, 6-, 8- and 10-in. sizes.

Furnished in japanned, dead black japanned, sherardized, sherardized dead black japanned and plated finishes.

No. 1056 Foot Bolt—Made in 2-, 3-, 6-, 8- and 10-in. sizes.

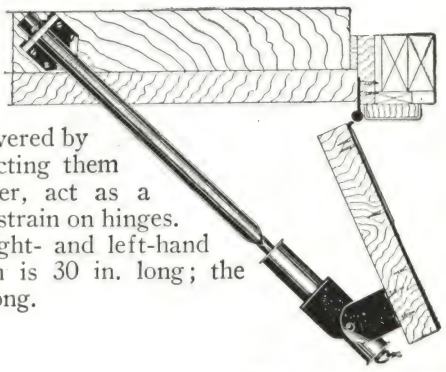
Furnished in japanned, dead black japanned, sherardized, sherardized dead black japanned and plated finishes.

NO. 1055. 10-IN. CHAIN BOLT

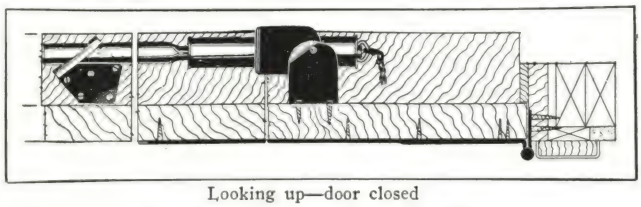
NO. 1056. 10-IN. FOOT BOLT

Stanley Garage Door Holders

No. 1773 Cushion Type—For private, public or factory garages. Very heavy springs, covered by a cylinder, protecting them from the weather, act as a cushion relieving strain on hinges. Reversible for right- and left-hand doors. The arm is 30 in. long; the chain is 44 in. long.



Looking up—door open



Looking up—door closed

NO. 1773. GARAGE DOOR HOLDER

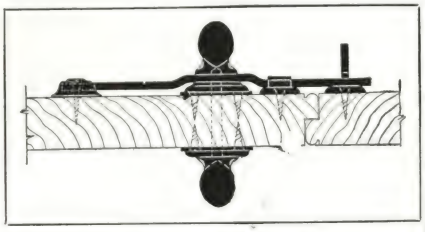
Wrought Steel Garage Bolts

No. 1052—Fastens the top and bottom of the door at one operation of the lever handle. Lever handle is brass; rod is sherardized steel; plates are wrought steel.

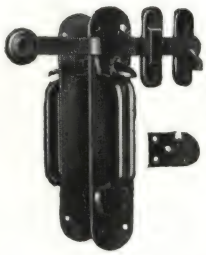
Made in 7-, 7½-, 8-, 8½- and 9-ft. lengths.

Wrought Steel Duplex Latch

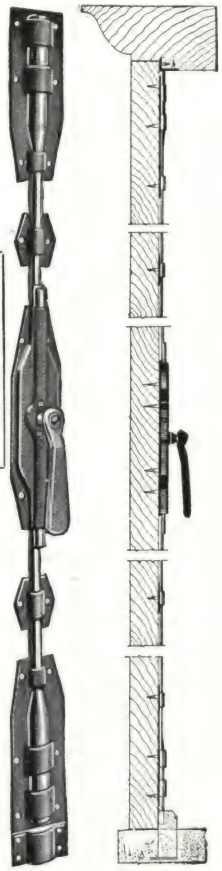
No. 1264—Operated by a thumb latch on both sides of the door. Plate 14½ in. long, 2¾ in. wide, adjustable for doors from 1¾ to 2¼ in. thick.



DETAIL OF NO. 1264



NO. 1264. LATCH



Front View Details
NO. 1052. GARAGE BOLT

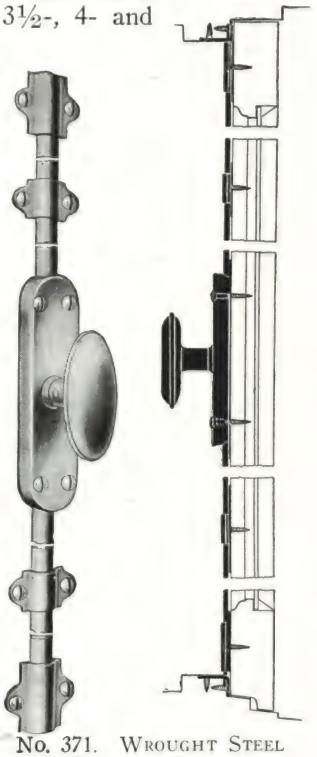
Continued on next page

Wrought Steel Cremone Bolts

No. 371—The bolts are wrought steel except the knobs which are cast brass. The rod is half round. Made in 3-, 3½-, 4- and 4½-ft. lengths and all finishes.

No. 372—Made similar to No. 371 except the guides and strikes are box shaped.

No. 373—Made similar to No. 372 except it has a lever handle.



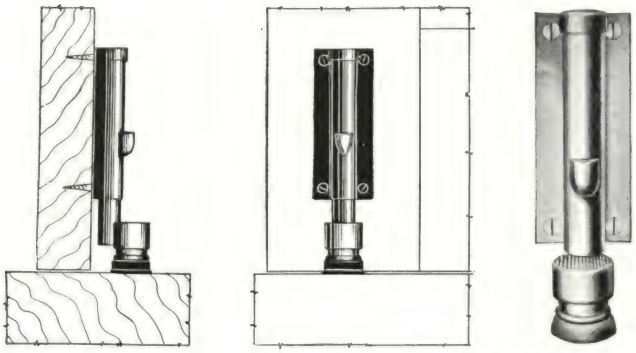
No. 371. Wrought Steel Cremone Bolts

Wrought Steel Door Holder

No. 456—Applied on the door near the floor requiring little pressure to operate.

A strong spring in the foot plate prevents the composition rubber tip from slipping on polished floors; also allows holder to operate on uneven floors.

Plates are 5 in. long and 2 in. wide.



No. 456. Wrought Steel Door Holder

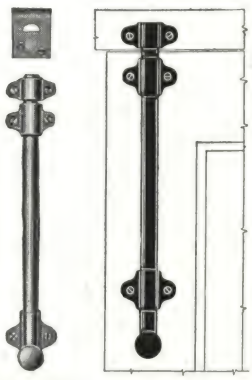
Wrought Steel Surface Bolts

No. 381—This bolt has ½x¼-in. half round steel rods.

Bolt has ⅞-in. throw.

Made in sizes 6, 9, 12 and 18 in. and in all finishes.

No. 367—Similar to No. 381 except made in solid brass.

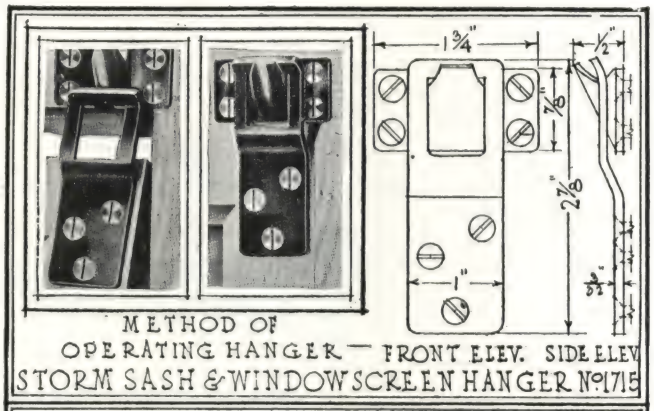


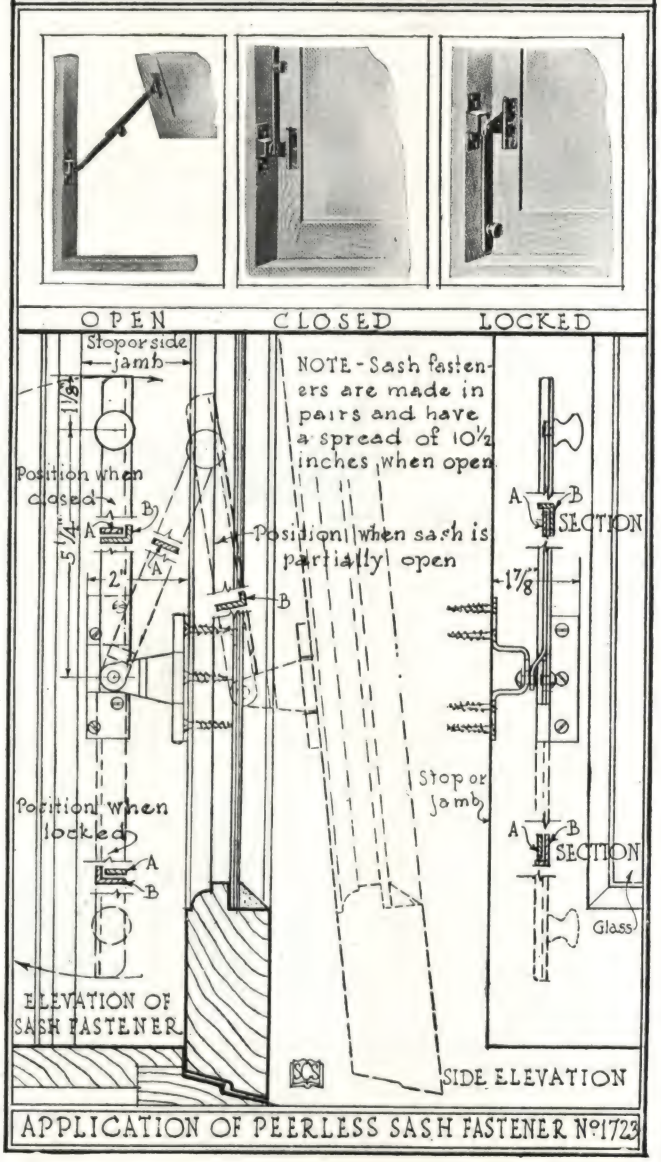
No. 381. Wrought Steel Surface Bolts

Stanley Storm Sash and Window Screen Hangers and Fasteners

Stanley sash hangers and fasteners furnish a practical, simple, and safe method of hanging storm sashes or screens. Once these fixtures are applied, it is an easy matter to hang or to remove the screen or sash. They are finished in high grade japan or Stanley sherardized.

The full line is illustrated and described in The Stanley Works' general catalogue. This line includes No. 1715 hanger and No. 1723 fastener which are here illustrated.





GRANT PULLEY AND HARDWARE COMPANY

SUCCESSORS TO TABOR SASH FIXTURE COMPANY

For the Manufacture and Sale of the Tabor Window Strips and Revolving Fixtures

Architects Building, 101 Park Avenue

TELEPHONE CONNECTION NEW YORK, N. Y.

Agents in all the Principal Cities of United States and Canada, and our Name will be found listed in the Telephone Directories

Products

TABOR WINDOW STRIPS and REVOLVING FIXTURES. For Wood Rolling Partitions, see page 1090; for Sash Pulleys and Window Cleaning Devices, see pages 1200-1201; for Door Hangers and Bar Locks, see pages of Reliance-Grant Elevator Equipment Corp.

Tabor Style "A"

This is an equipment that makes it possible to pivot an ordinary double hung window.

Its installation is quick and simple. All that is required is the regular standard box frame with the sash 2 in. narrower than the frame opening, omitting plough and bore. Sash stiles are then grooved; Tabor strip and fixtures attached; and sash is ready to be hung the same as any weighted window sash.

TABOR STYLE "A"

Each strip is slightly curved; and when drawn to the sash at the pivotal point, this curve forms a spring of the strip itself, making a tight and permanent contact between sash and strip. One edge of the strip fills the entire space between the jamb and the sash. Corrugations on the pivot plates hold the sash, when pivoted, at various positions for ventilation.

Tabor Style "D"

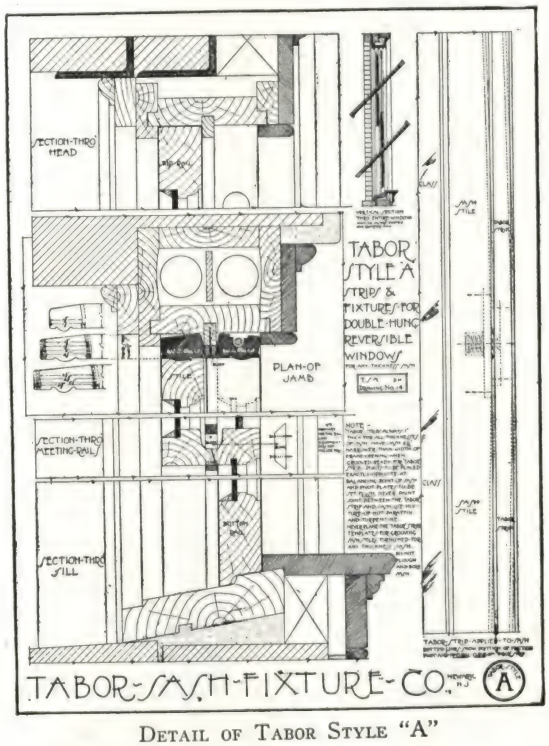
The Tabor Style "D" is the Tabor strip applied on plank or solid frame construction. Its ideal utility is for schoolhouses, and office building equipment, and for buildings where it is not necessary to screen windows. It eliminates the cost of box frames, weights and chains, thereby offering increased efficiency at a very low cost. The plank frame construction, equipped with the Style "D" fixture, allows a greater light area, particularly in mullion windows, and a more complete control of ventilation without draft than any other form of construction.

Accessibility for cleaning and "safety first" precautions are the same considerations as in the selection of our Style "A" fixture. Since it is not necessary with Style "D" to slide the sash, same can be fitted very tightly, and assures a more weatherproof construction than the regular double hung. Window shades, being attached directly on the sash, provide a perfect substitute for awnings.

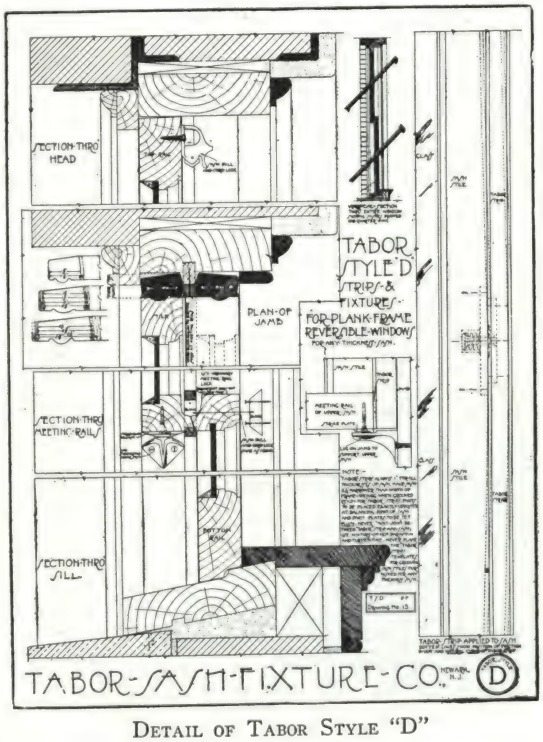
TABOR STYLE "D"

Catalogue, etc.

Catalogue and full size details of all our specialties will be furnished on request.



DETAIL OF TABOR STYLE "A"



DETAIL OF TABOR STYLE "D"

AUSTRAL WINDOW CO.

Architects Building
101 Park Avenue
NEW YORK, N. Y.

Products

Manufacturers of AUSTRAL WINDOW HARDWARE for Austral Balanced Windows.

Applicability of Austral Window Hardware

Austral hardware is applicable to Austral wood, kalamein, rolled steel and hollow metal windows for public buildings, offices, schools, hospitals, libraries, etc.

The one-plane solid steel window equipped with Austral balance is designed for use in high grade buildings where special architectural effects are desired.

Types of Austral Window Hardware

The types of Austral hardware supplied by this company and applied to Austral wood or metal windows are as follows:

For Application to Austral Wood Windows— *Type 2B Hardware*—A set consists of 2 balance arms, 4 sash guide pins, 2 parting strip bolts and screws for attaching. Standard finish, electrogalvanized. Finish hardware consists of automatic solid bronze sash fast No. 200 (or malleable iron bronze plated sash fast No. 7200½) and 1 pair of solid bronze offset pulls No. 300 (or malleable iron bronze plated pulls No. 7300½). Shade pulleys furnished when specified.

Type 2C Hardware—A set consists of 2 balance arms, 2 sash guide pins, 2 spring sash guide pins, 2 parting strip bolts and screws for applying. Standard finish, electrogalvanized. Finish hardware consists of 1 pair of solid bronze turnbuckles No. 400. Shade pulleys furnished when specified.

For Application to Austral Metal Covered and Hollow Metal Windows—*Type 2E and 2F Hardware*—Each set consists of 2 balance arms, 4 sash guide rollers, 2 parting strip bolts and screws for applying.

Type 2F is approved by the National Board of Fire Underwriters.

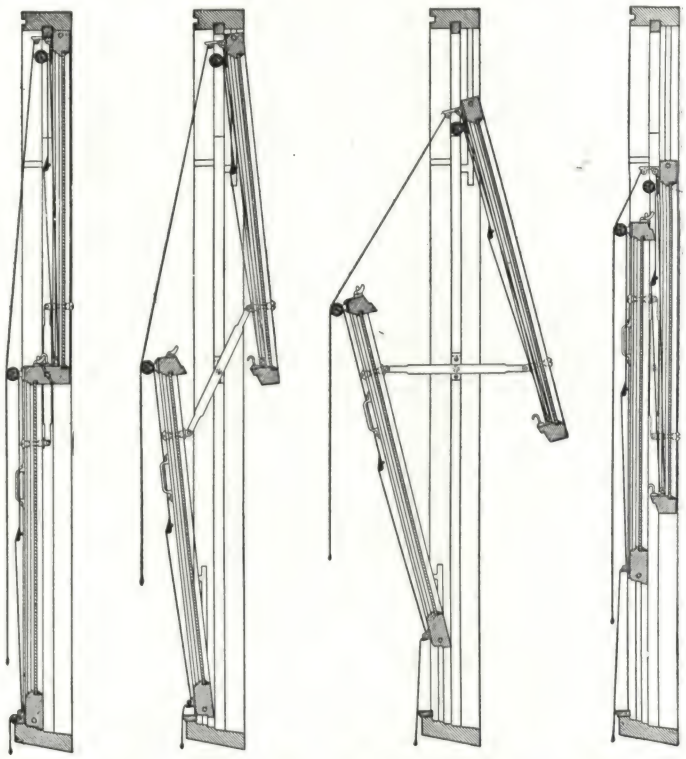
Advantages of Austral Windows

(1) Permit free ventilation and circulation of air without draft. (2) Absolute control of light. (3) Reversible for cleaning and reglazing. (4) Exterior awnings eliminated. (5) Plank frames only are used, affording additional light area. (6) Austral mullions are made about half the width required for double hung windows. (7) Windows adjusted by slight pull on lower sash. (8) *Extreme simplicity in construction and operation.*

Description of Austral Windows

A simple balanced window construction is obtained through the use of Austral hardware, which eliminates sash weights, cords, pulleys, weight boxes, window cleaner bolts, and attendant disadvantages.

AUSTRAL WINDOW EQUIPPED WITH AUSTRAL FIXTURES



VERMONT SECTIONS THROUGH AUSTRAL WINDOWS, SHOWING SASH IN VARIOUS POSITIONS

Continued on next page

Austral kalamein, rolled steel and hollow metal windows are built by licensed manufacturers under the supervision of this company. Weatherstripping is integral with frame and sash. Wood frames and sash built by any mill according to Austral details.

Operation—Austral sash are counterbalanced on pivot bars attached to the center of frames, with sash guide pins or rollers attached to lower corners of lower sash and upper corners of upper sash. Guide pins or rollers operate in vertical grooves or along parting strip, permitting free adjustment of sash (see illustrations).

When Ordering or Writing for Estimates—Furnish width and height of masonry openings, thickness of sash and type of window and finish hardware desired.

Specifications for Wood Windows with Type 2B Austral Hardware (Suitable for Office Buildings, Schools, etc.)

Frames—All exterior frames shall be made from clear white pine, well seasoned. Head and sides shall be formed of 2x5-in. plank; sill of 3x6-in. plank.

Head and sides shall be grooved to receive Austral hardware (see schedule on Austral blueprint No. 1, dated Sept., 1916 for length of these grooves for various masonry openings). Parting strips shall be made of straight grained white pine 1x1-in. in cross section.

Bracing—Frames are to be braced with two diagonal braces at head and one brace placed horizontally in center of frame, all to be left in position until sash are to be hung.

Anchoring—Frames are to be anchored to metal or wood anchors placed at intervals of 24 in. on sides and to an anchor in center of head of frame.

Sash—Sash shall be 1¾ in. thick, made of clear, straight grained white pine, well seasoned. They shall be made true to required size and moulded as per detail.

Glazing—Care must be used in glazing to keep sash of equal weight, as all sash must be in perfect balance.

Hardware—Above frames and sash shall be fitted with type 2B Austral hardware as made by the Austral Window Co., 101 Park Avenue, New York, N. Y., whose working drawings and instructions shall be considered part of this specification.

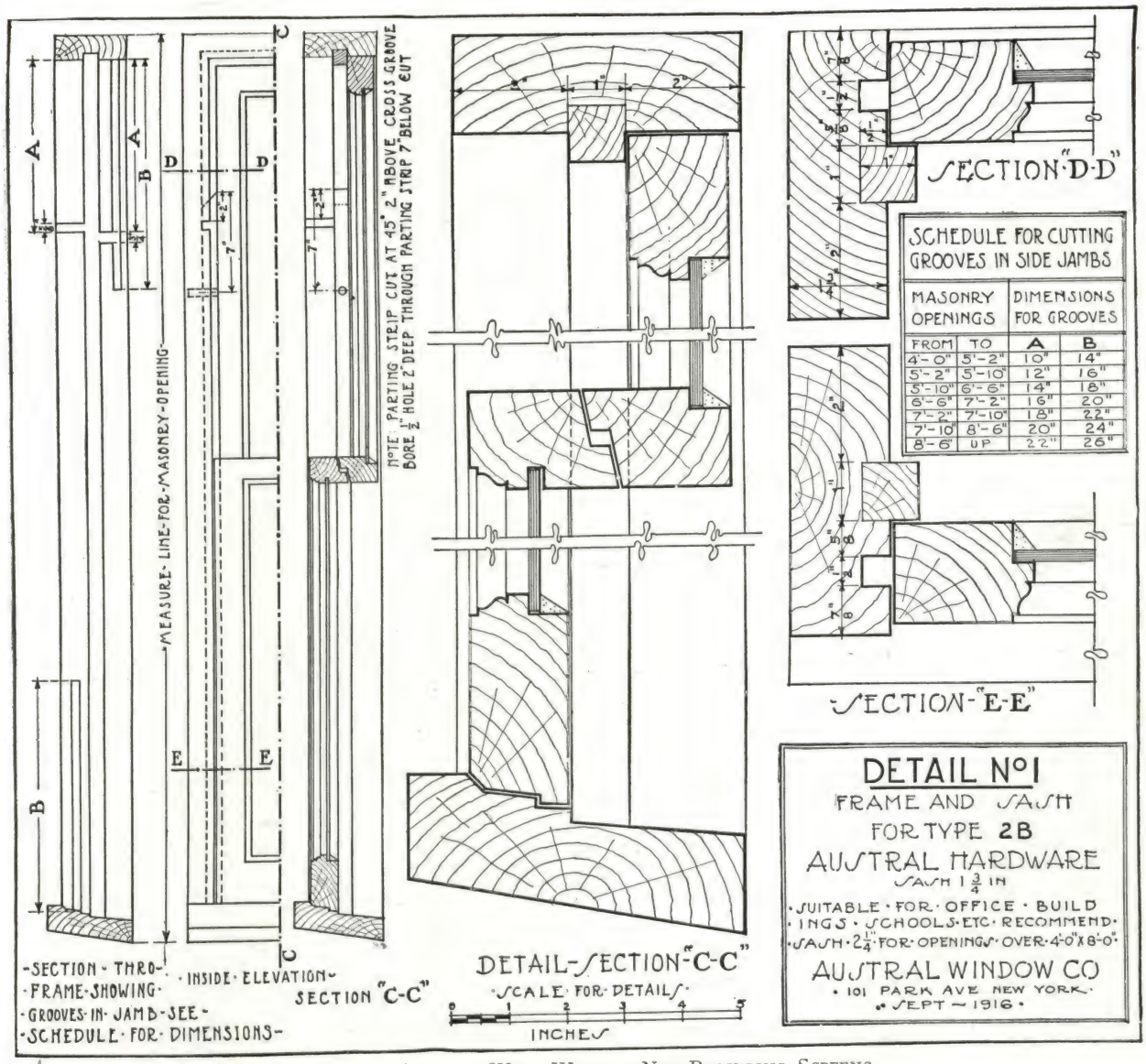
Finish Hardware—Each pair of sash shall be fitted with one Austral automatic solid bronze sash fast No. 200, to be placed at the center of the meeting rails, also one pair of solid bronze Austral offset pulls No. 300, placed on side rails of lower sash.

Note: For sash openings exceeding 4 ft. 6 in. x 8 ft., dimensions of frame and sash should be as follows:

Head and sides of frames	2x7-in. plank
Sill	3x8-in. plank
Sash	2⅜ in. thick

Demonstration Card Model

Our new demonstration card model will be mailed on request.



Details of Austral Wood Window Not Requiring Screens

THE TWIN-PLEX REVERSIBLE WINDOW CO.

Manufacturers of Reversible Window Devices

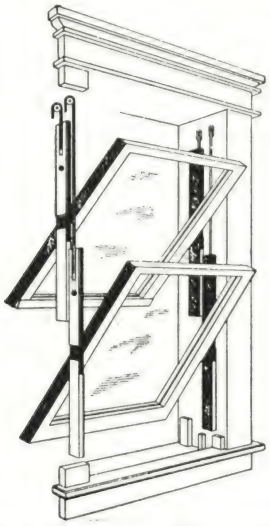
BUFFALO, N. Y.

Product

TWIN-PLEX REVERSIBLE WINDOW DEVICES made from 16- and 18-gauge Monel Metal, Brass or Galvanized Iron (applicable to hollow metal, Kalamein or wood sash).

Type A Reversible Window Device

Type A devices are proof against oscillation, so designed to easily apply to any ordinary double-hung window making it *also* reversible without in any way affecting its efficiency as a double-hung window. Window cleaning is thereby facilitated without the use of ladders or safety belts and at a great saving in expense. From the inside, and without changing his position, the window washer washes the inside and outside of both top and bottom sash.



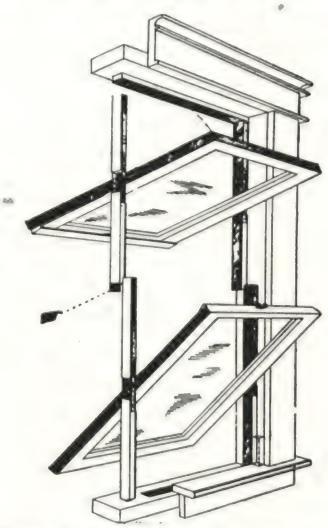
TYPE A REVERSIBLE WINDOW DEVICE

Equipment includes devices only or sash with devices attached and made ready for hanging.

Type B Reversible Window Device

We especially recommend this plank frame construction, pivot type of window for schools or where screens are not necessary. It is designed for tightness—is fitted with interlocking weatherstripping at top, bottom and sides—the meeting rails meet against an asbestos-felt packing that renders it proof against dust and weather. It usually costs less to fill an opening with this kind of window than with the ordinary double-hung type. In this day of forced ventilating systems, windows are of necessity kept closed, so why buy weights, pulleys and chains when you can not use them?

Equipment includes devices only or sash with devices attached and made ready to be set in frame.



TYPE B REVERSIBLE WINDOW DEVICE

Type E Reversible Window Device

For vertical type of single sash, pivot windows. Recommended for loft buildings, mezzanine floors and second story store fronts. They are also designed for tightness—are fitted with interlocking weatherstripping at top, bottom and sides. No special frame construction necessary—no floating heads, etc. No expansion of device away from sash when window is opened.

Equipment includes devices only or sash with devices attached and made ready for setting in the frame.

TYPE E REVERSIBLE WINDOW DEVICE

Continued on next page

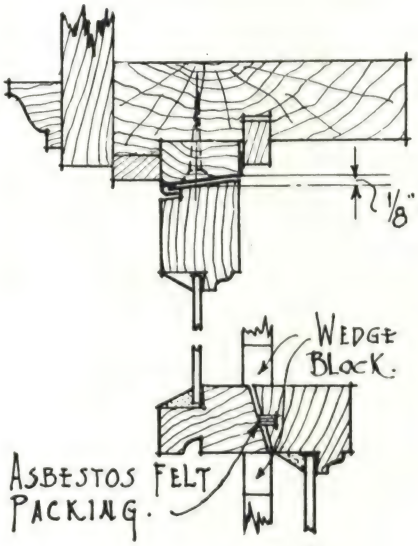
Twin-Plex Reversible Window Devices

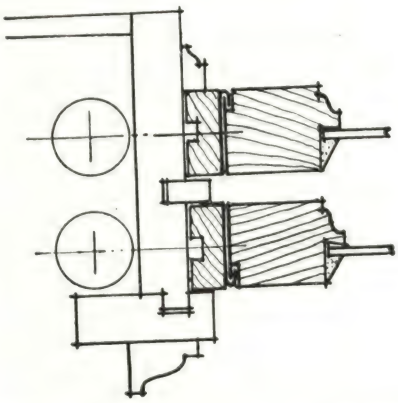
Twin-Plex Reversible Window Devices are made to withstand wear. They are guaranteed for the life of the sash against defective workmanship and material and under ordinary use will outlast the sash. They are so constructed as to permit the sash to fit snugly against the jambs as there is no expansion of the device away from the sash when the window is tilted open. *Never do we use a lighter material than an 18 gauge metal* which binds the sash and prevents it from warping. When devices are made from iron or steel, all the galvanizing is done after all machine work is completed. The wood used in the channel of the device is always a hard wood—either oak, walnut or chestnut. The pivot bolt is ⅜ in. and works in a metal bearing which prevents the pivot hole from wearing to an oblong shape. No special frame construction is necessary to accommodate any type of sash or device we make. Rather, we make them to accommodate your wants.

References and Users

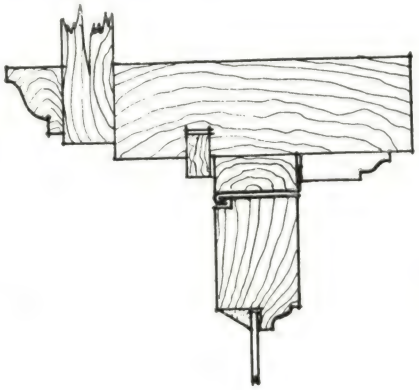
Below are listed a few of the buildings equipped with Twin-Plex devices:

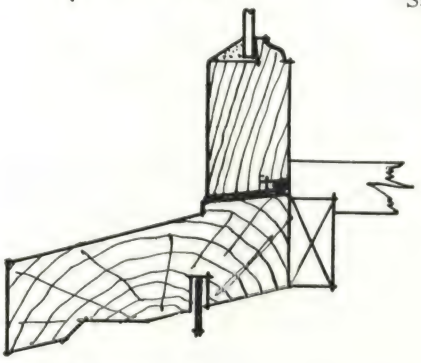
Live Stock Exchange Building, Kansas City, Kans.
Immaculate Heart Academy, Frazer, Pa.
S. S. Kresge General Office Building, Detroit, Mich.
Fire Association Building, Philadelphia, Pa.
Buffalo Gas Building, Buffalo, N. Y.
St. Jerome's Hospital, Batavia, N. Y.
St. Joseph's Hospital, Pittsburgh, Pa.
Jenkins Arcade Building, Pittsburgh, Pa.
Cova Building, New York, N. Y.

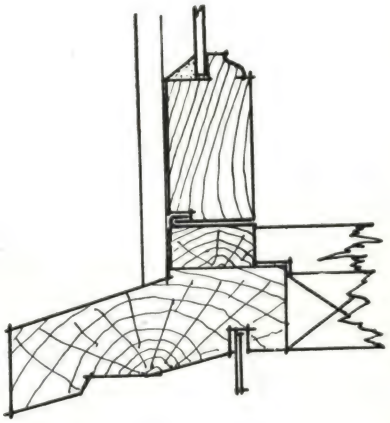


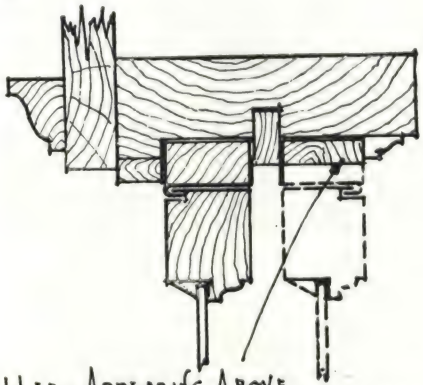


SECTION THROUGH SIDE JAMB SHOWING TYPE A DEVICE APPLIED TO DOUBLE HUNG WINDOWS
Scale, 3 in. equal 1 ft.



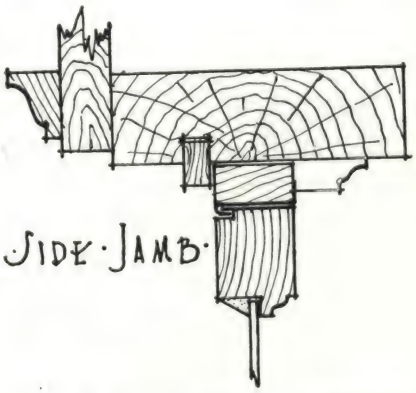






TYPE B DEVICE APPLIED TO PLANK FRAME WINDOW
Scale, 3 in. equal 1 ft.

DETAIL OF PIVOTING DEVICE WHEN ASSEMBLED



TYPE E DEVICE APPLIED TO WINDOW
Scale, 3 in. equal 1 ft.

UNIVERSAL SALES COMPANY

Distributers of Awning and Reversible Casement Windows

GENERAL SALES OFFICE
512 Pacific Building
OAKLAND, CAL.

Product

FIXTURES and FINISHED HARDWARE for Universal Awning Windows.

Advantages of Universal Operated Windows

That the Universal Window is a distinct advance in modern fenestration is shown by the following summary of facts:

(1) It can be operated with ease by a child, the lower sash being a manual for all the sashes.

(2) It eliminates the window pole and the heavy hand lifting and pulling.

(3) It provides ideal ventilation—ranging from air- and weather-tightness to a 100% opening.

(4) It is easily cleaned from the inside.

(5) It may be used as an awning, allowing light and air, while affording perfect sun protection by placing the window shades on the inside and upon the sash.

(6) It will assure better ventilated rooms and more healthful living conditions, effecting thereby an economy in the partial or total elimination of the mechanical ventilating systems in schools, hospitals, factories, office buildings, apartment houses, etc.

Operation of Universal Windows

The trunnion hinges are fastened to the stiles of the sash within the rabbets and are connected to the arms or links by means of countersunk rivets. One pin of each trunnion hinge slides in channel and the other pin is connected to a flat round edged traveling bar which moves vertically as the sashes are opened or closed.

All sashes open and close simultaneously as all sash trunnion hinges are connected with this vertically moving bar. *The lower sash is the manual of operation.* Each sash has a trunnion hinge on either side. The bar occurs on each side of the window back of the side stops. Side stops are shaped out so the bar may be disengaged from the lower trunnion hinge pin. This is done by means of a small grip or clutch which is formed around the bar permitting the bar to pass through it until the clutch is put into use. This is accomplished by turning up a small eccentric lever. This movement pulls on the clutch which grips the traveling bar, disengaging the bar from the pin.

The fixtures are made of steel sherardized or of solid bronze, as may be required. The traveling bar of cold rolled steel. The clutch lever and escutcheon plates are of brass. When the sash are closed all parts are concealed from the weather back of sash rabbets. Bar and channels are concealed back of stops.

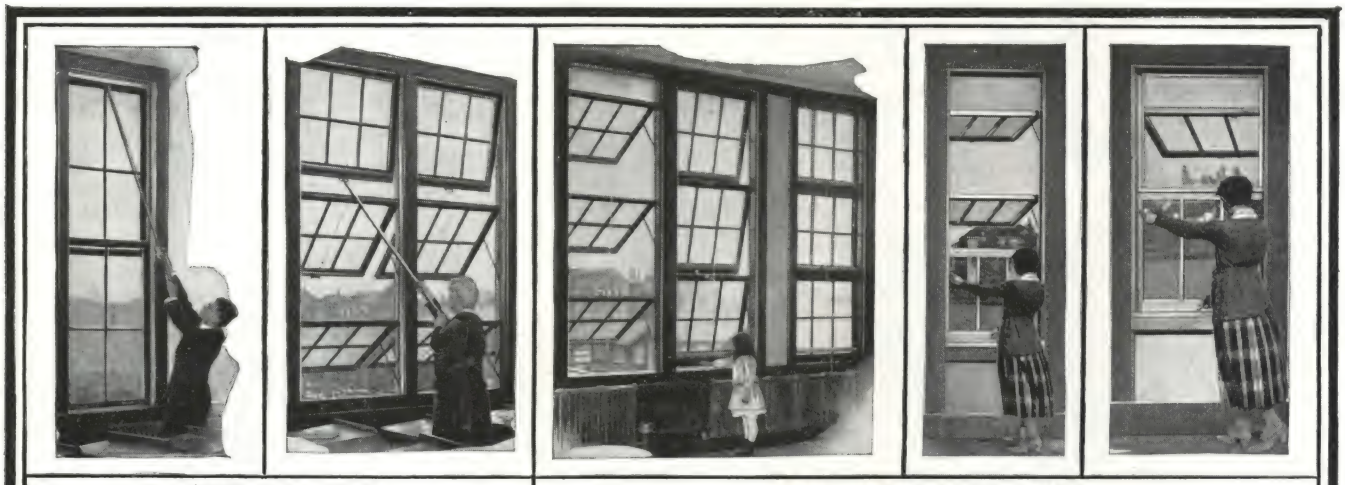
Ease of operation is due to the fact that the points of support and the hinge and arm rivets lie in the same plane as the center of gravity of the sash, consequently, easiness of movement occurs similar to the movement of a door hung upon its hinges. The clutches serve as brakes to the traveling bars holding the sashes open at any desired angle.

Specifications

Unless otherwise indicated or mentioned, all windows throughout the building shall be equipped with Universal Window Fixtures and Finish Hardware for the Awning Type and shall be installed by the UNIVERSAL SALES COMPANY or their authorized representatives.

All sash shall be not less than 1¾ in. in thickness. The stops shall be grooved out and shaped according to details. The finished side stops shall be not less than 1 in. in thickness and not less than 2⅛ in. in width.

Mill details and full information will be furnished by the UNIVERSAL SALES COMPANY.



THE OLD WAY		THE UNIVERSAL WAY		
Opening Double Hung Windows	Awning Type Other Than Universal	A small child can open wide the three sash Universal window by a gentle push on the lower sash or close and lock all sash in one simple motion	Closing the lower sash while leaving the upper ones open	Screened 2-sash Universal window opened by the operation of the lower sash, without touching the screen

THE UNIVERSAL SALES COMPANY

THE UNIVERSAL WINDOW ELIMINATES THE WINDOW POLE

ORGANIZED FOR SERVICE

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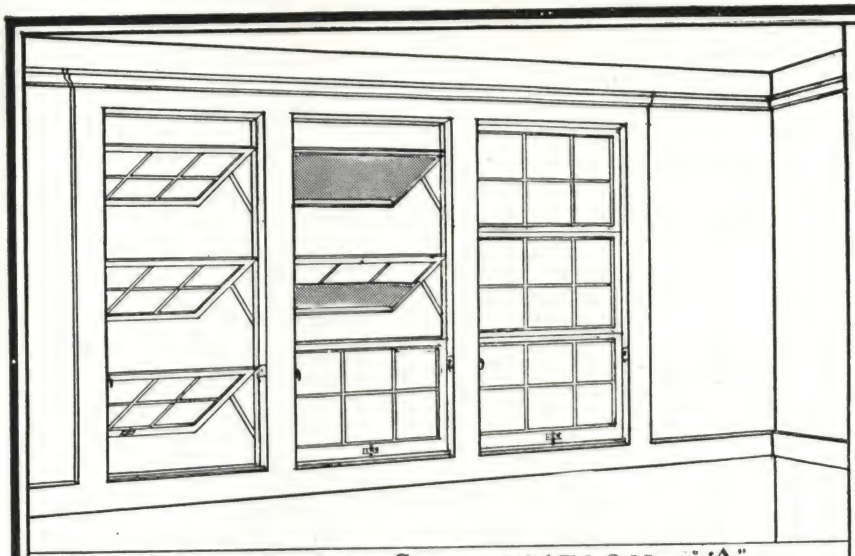
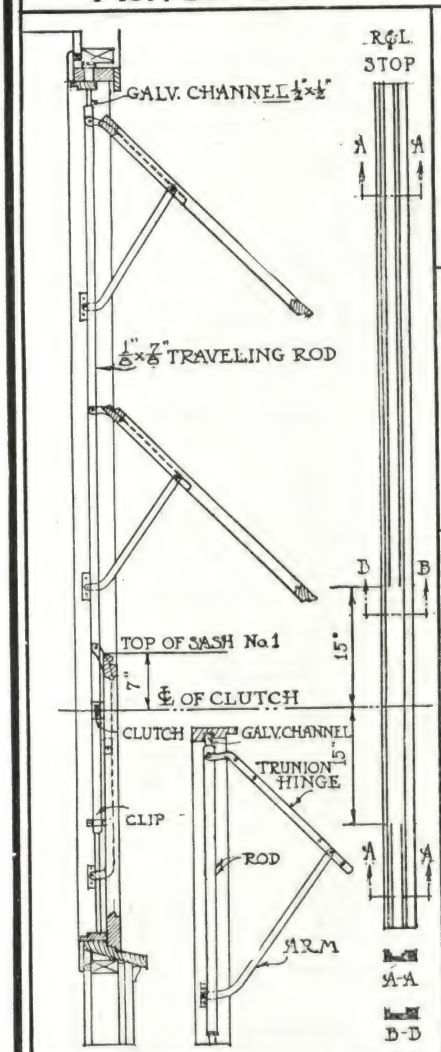


TRIPLE · SASH · COMBINATION · "A"



DETAILS SHOWING OPERATION OF SASH
THE LOWER SASH IS THE MANUAL FOR ALL

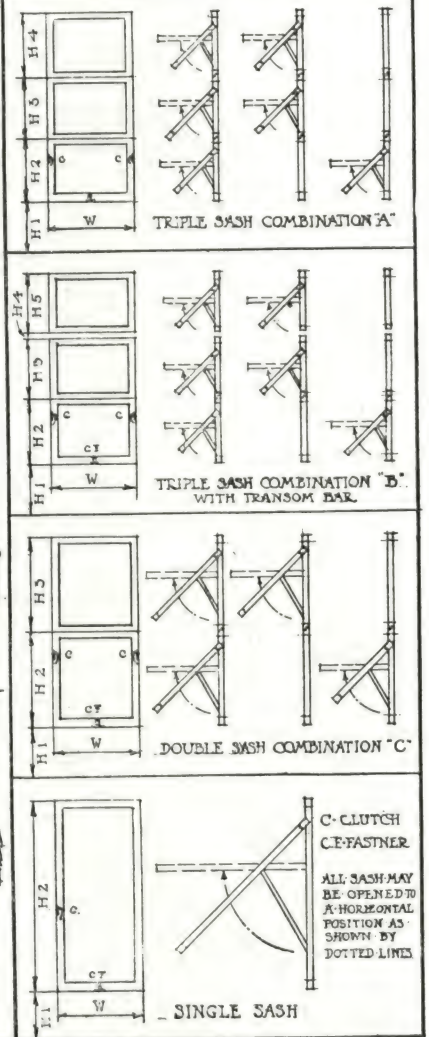
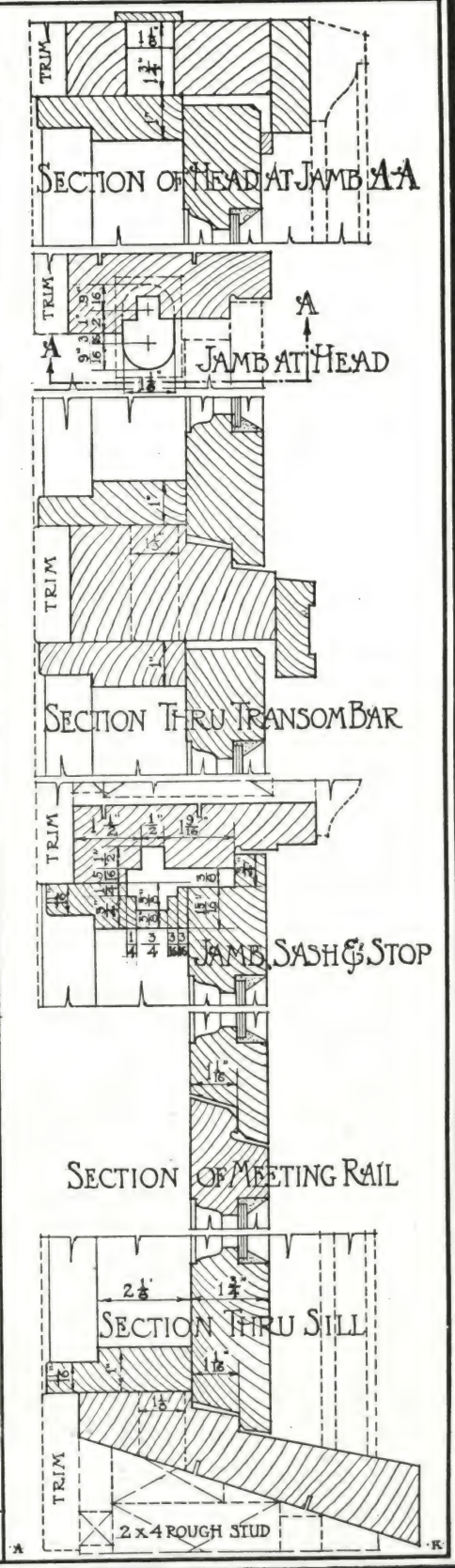


DIAGRAM SHOWING COMBINATIONS OF
SUPERPOSED SASH & FINISHED HARDWARE



THE UNIVERSAL SALES COMPANY

THE UNIVERSAL WINDOW
FURTHER INFORMATION & F.S. MILL DETAILS SENT UPON REQUEST

ORGANIZED FOR SERVICE

HETTS DETROIT REVERSIBLE WINDOW FIXTURE CO.

903-913 Dime Bank Building

DETROIT, MICH.

Products

HETTS DETROIT REVERSIBLE WINDOW FIXTURES for Double Hung and Plank Frame Windows.

Also manufacturers of Reversible Window Fixtures for Balanced Pivoted and Sliding Pivot Windows; Special Fixtures for Jail Windows where permanent bars are placed.

Where Used

The Hetts Reversible Window Fixture is adaptable for all double hung and plank frame windows for office buildings, hotels, hospitals, schools, public buildings, jails and residences.

Ease in Cleaning

An enormous saving is made possible where our fixtures are used, due to the fact that *both lower and upper sash can be cleaned inside and out from inside of building,* the saving on this item alone amounting to two-thirds of the former *time* and *expense* of window cleaning. This item is greatly appreciated where a large number of windows has to be cleaned. It also eliminates entirely the undesirable and dangerous feature of men climbing out on window sills and hooking life belts to the window frame.

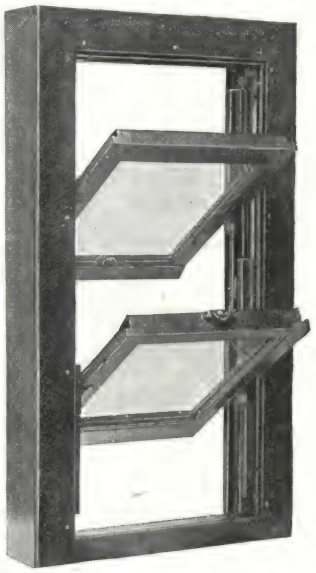
Perfect Ventilation

Windows that are equipped with our reversible window fixtures afford a perfect method of window ventilation. By tilting the window slightly, air enters with an upward movement caused by the window being tilted and is held in place at any degree by our special automatic noiseless roller friction pivot.

Positive Control

Our strips, which are attached to and mesh into the sash by means of reversed O. G. construction, are held together by our automatic noiseless roller pivot. Our pivot which is of special design controls the sash at any degree and gives 1 to 100% ventilation and is so made and installed that it holds the window whether open or closed *absolutely positive.*

Our fixtures can be used on all double hung windows, (they raise and lower and tilt in and out) or plank frame windows.



WINDOW EQUIPPED WITH HETTS DETROIT REVERSIBLE WINDOW FIXTURES

Our staff of experts install our fixtures.

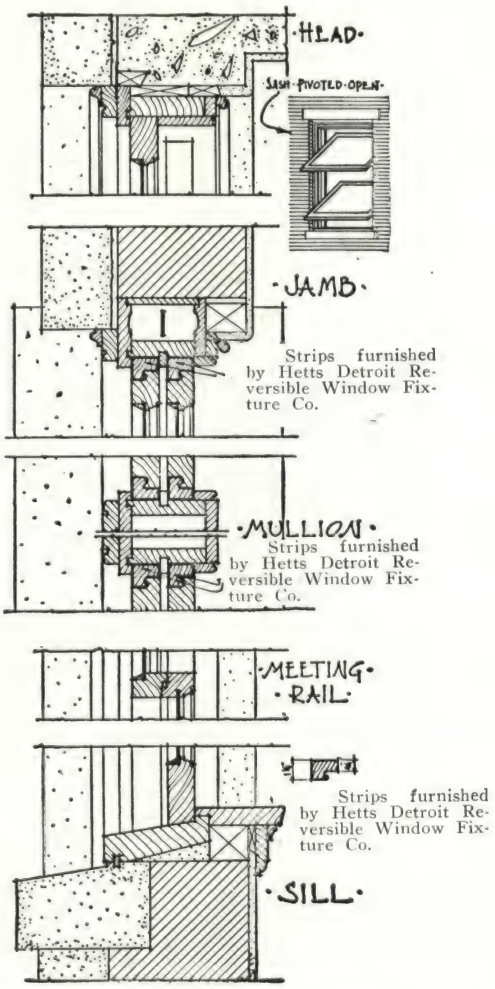
We use a wood strip of well seasoned hard maple, furnished in lengths required for sash and attached to this strip are the famous Hetts automatic roller friction pivots, which are fully guaranteed.

The pivots take all the wear and not the sash or strips as in other makes.

We can furnish window hardware (locks, lifts, sockets, and poles) if desired, but this is not absolutely necessary as the regular hardware can be used.

Specification

"All double hung windows shall be equipped with Hetts Detroit reversible fixtures consisting of Hetts reversible side strip with automatic roller friction pivots. Fixtures shall be furnished and installed by the HETTS DETROIT REVERSIBLE WINDOW FIXTURE CO., Detroit, Mich. This includes fitting and installing sash after weights are strung."



DETAILS OF WINDOW EQUIPPED WITH HETTS DETROIT REVERSIBLE WINDOW FIXTURES

THE WILLIAMS PIVOT SASH CO.

Reversible, Pivoted and Casement Window Fixtures

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., W. S. Ely, 601 West 130th Street
CHICAGO, ILL., M. R. Duffy, 1119 Chamber of Commerce Building
PHILADELPHIA, PA., J. H. Windell, 1112 Sansom Street
CHARLOTTE, N. C., D. F. Hoover, Box 224
DETROIT, MICH., T. B. Rayl Co., Woodward and Grand River Avenues
PITTSBURGH, PA., J. R. Colclough, 1425 Dagmar Avenue (Beechview)
KANSAS CITY, MO., John J. Russell, 303 Finance Building
CINCINNATI, OHIO, Geo. C. Ramsey, 206 W. Court Street

Products

Williams Reversible Window Fixtures for Double Hung and Plank Frame Windows.

Williams Stormproof Subsill for Casement Windows.

Williams Window Fixtures for Vertically Pivoted Windows.

Adaptability of Reversible Window Fixtures

Double Hung—Williams fixtures for double hung windows are adaptable for use on windows in office buildings, hotels, hospitals, schoolhouses, and public buildings.

Plank Frame—Williams fixtures for plank frame windows are adaptable for use on windows in schoolhouses and factories.

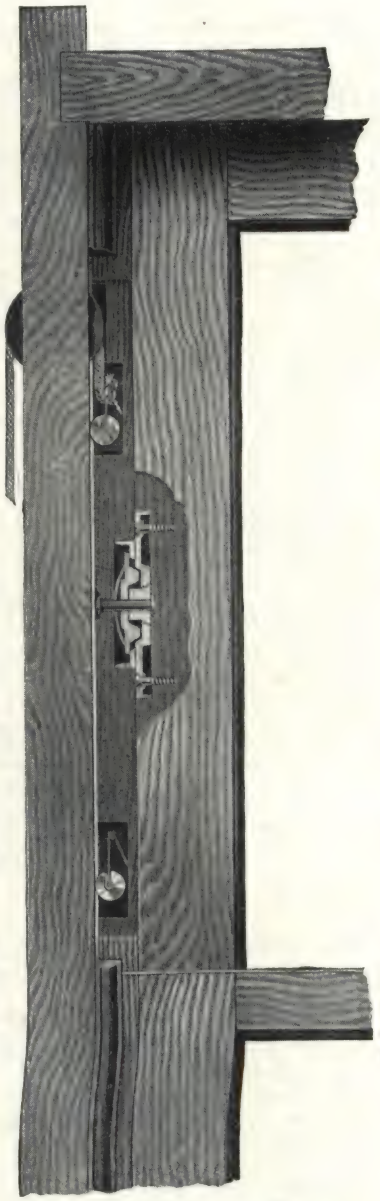
Advantages of Reversible Window Fixtures

Windows equipped with Williams reversible fixtures afford overhead ventilation without draft. Roller springs prevent rattling and insure ease of operation.

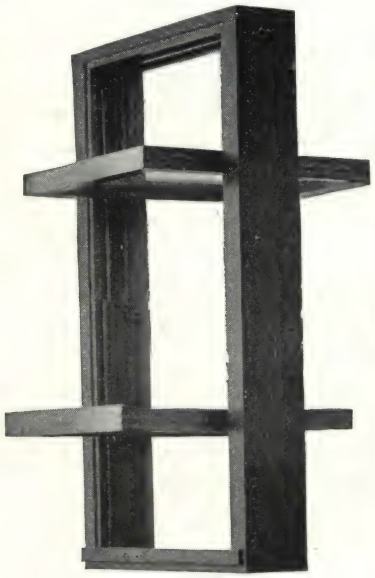
Outside of both sash can be cleaned from the floor with the opening closed in one-half the time ordinarily occupied, on account of both hands being available for cleaning. This insures rapid, safe and economic cleaning. Many managers of hotels and office buildings recognize this device as a factor in the economic management of the building.

Weatherstrips may be used if desired.

Plank frame windows, in schoolhouses especially, have the added advantage of the *elimination of weights, cords and pulleys.* A plank frame is substitued for a box frame and it is possible to provide a more weathertight window than can be obtained by an ordinary double hung window not provided with weatherstripping. On mullioned windows a greater light area is obtained.



Section of Sash and Frame
Showing strip, roller spring and pivot



Double Hung
Showing 100% opening

Plank Frame
Showing overhead ventilation

Installation

A staff of expert mechanics is maintained to install Williams fixtures.

This service includes fitting and hanging of sash as well as the application of fixtures. This fixes the responsibility for successful operation. Twenty years of experience stand back of these fixtures.

Small orders sold f. o. b. Cleveland, if desired.

Williams Double Hung Reversible Window Fixtures

The Williams double hung reversible window fixtures require no special construction of frames or sash. The sash are merely to be made 1¾ in. narrower than inside width of frame.

Continued on next page

The sash are operated the same as an ordinary double hung window with the additional advantage that each sash can be completely reversed at any position, or raised and lowered at will.

The Williams fixtures to be applied to double hung windows are the Williams Corrugated Side Strip with Truncated Cone Pivot and Spring Rollers.

Williams Corrugated Side Strip—A wood strip of well seasoned hard maple, 7/8 in. thick, of width equal to thickness of sash, corrugated on the sash side. Furnished in length required for sash. Affixed to this strip are:

Truncated Cone Pivot—A reliable and effective sash pivot is assured by application of the truncated cone as a pivot. Weight of sash is automatically used to draw reversible strip and sash together tightly, thereby firmly nesting corrugations in strip and sash. The pivot holds sash in any position when open, without the aid of transom lift or chain. Made of cast iron with parts carefully fitted.

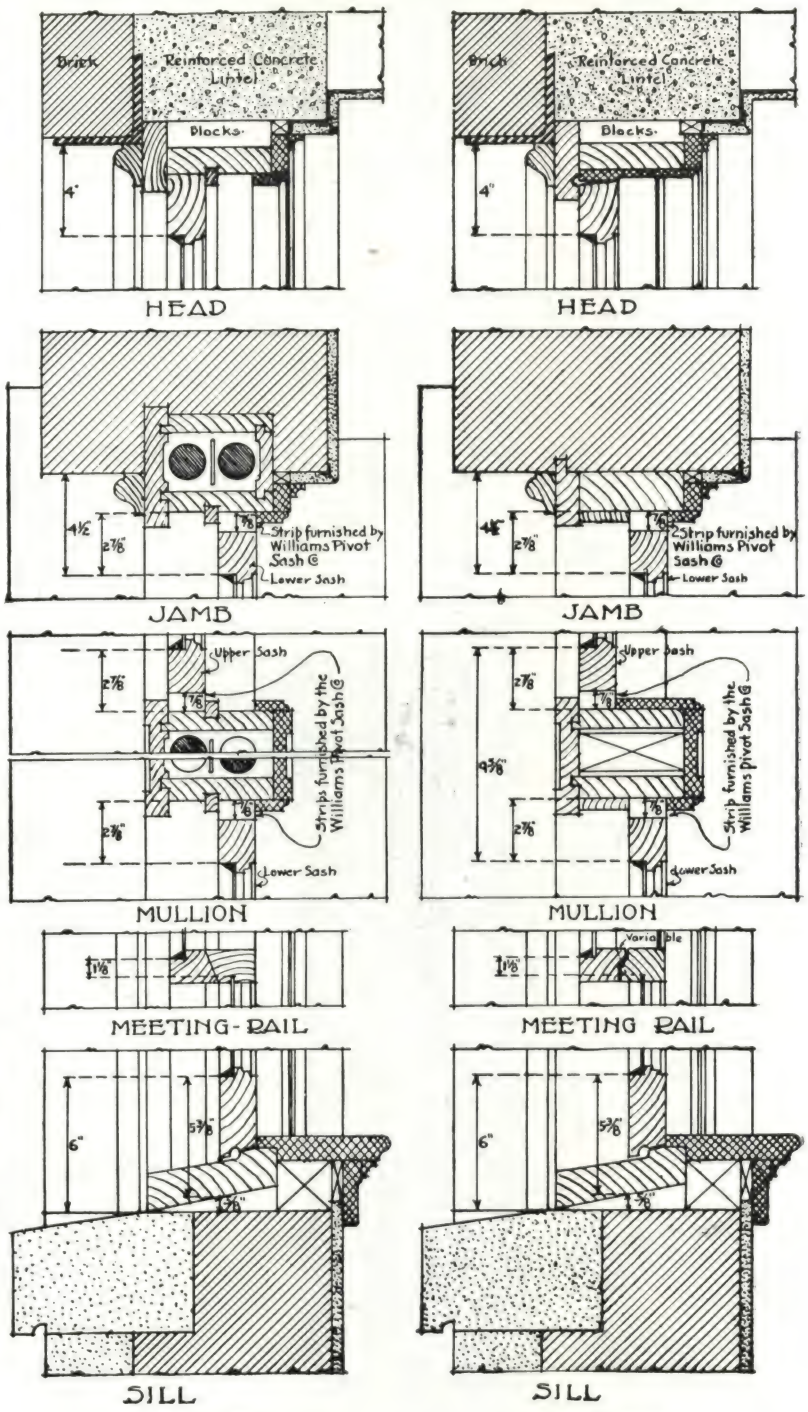
Spring Roller—A roller and spring device, the constant contact of which with the jambs allows free sliding movement, and keeps strip in snug contact with sash when in closed position. Prevents sash rattling.

Hardware—This company will furnish window hardware (locks, lifts, sockets and poles) if desired, but this is not essential, as the regular hardware may be used. However, a ring socket which will permit the top sash to be tilted without the window pole binding in the socket is recommended.

Specification—All double hung windows shall be equipped with Williams Reversible Fixtures consisting of Williams Corrugated Side Strips with Truncated Cone Pivots and Spring Rollers. Fixtures shall be furnished and installed by The Williams Pivot Sash Co., Cleveland, Ohio. (This includes fitting and installing sash after weights are strung.)

References—The following buildings are equipped with the double hung fixtures; the number of openings is also given:

First & Old Detroit National Bank, Detroit, Mich.—1589
Berman Apartments, Detroit, Mich.—1746
Hotel Tuller Addition, Detroit, Mich.—467
Hotel Cleveland, Cleveland, Ohio—1229
Hotel Winton, Cleveland, Ohio—589
Hotel Olmsted, Cleveland, Ohio—220
Hotel Statler, St. Louis, Mo.—788
Hotel Ten Eyck Addition, Albany, N. Y.—529
Hotel Savery, Des Moines, Iowa—442
Canadian Westinghouse Co., Hamilton, Ont.—361
Niagara Life Building, Buffalo, N. Y.—199



Details of Windows Equipped With Williams Reversible Window Fixtures

Williams Plank Frame Reversible Window Fixtures

No special construction of frame required.

Sash to be made 1¾ in. narrower than jamb opening.

The Williams fixtures to be applied to this type of window are:

Williams Corrugated Side Strip—Same as described under double hung windows.

Specification—All plank frame windows shall be equipped with Williams Reversible Fixtures consisting of Williams Corrugated Side Strips with Truncated Cone Pivots and Spring Rollers. Fixtures shall be furnished and installed by The Williams Pivot Sash Co., Cleveland, Ohio. (This includes fitting and installing the sash.)

References—The following schools are equipped with the plant frame fixures; the number of openings is also given:

High School, Canton, Ohio—849
High School, Huntington, W. Va.—491
High School, Bethlehem, Pa.—524
High School, Harrisburg, Pa.—488
State Normal School, Potsdam, N. Y.—265
Firestone School, Akron, Ohio—273
Moorehead School, Durham, N. C.—174
Jackson School, York, Pa.—64

Continued on next page

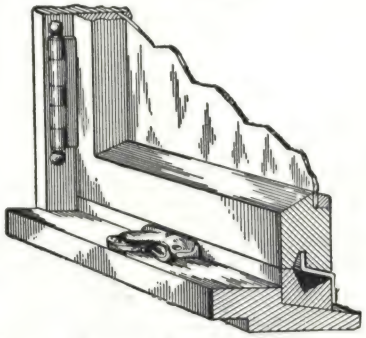
Williams Stormproof Casement Fixture

A perfect weatherproof casement window sill.

No special construction of header, sill or side jambs required.

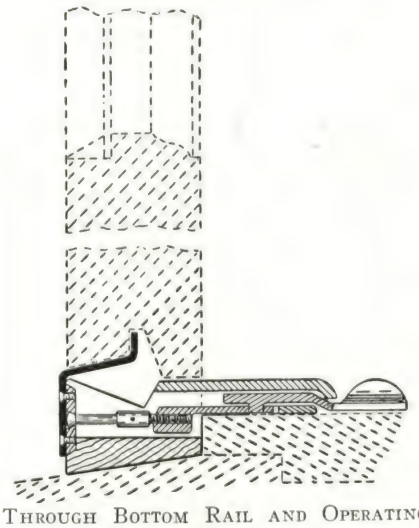
Double casement fixture made with divided closure bar providing for independent operation of each sash if desired. Subsill and closure bar furnished with operating devices attached.

Use the ordinary butt hinge.



SECTION THROUGH BOTTOM RAIL, SUBSILL, STOOL AND SILL
Sash and closure bar in closed position

SECTION THROUGH BOTTOM RAIL, SUBSILL, STOOL AND SILL
Sash and closure bar in open position



SECTION THROUGH BOTTOM RAIL AND OPERATING DEVICE
Showing stool plate, eccentric lever, threaded adjusting rod, and closure bar engaged in groove in sash when closed

Specifications—All casement or hinged sash to be equipped with THE WILLIAMS PIVOT SASH CO.'s Stormproof Subsill and Closure Bar. Sash shall be made to conform to THE WILLIAMS PIVOT SASH CO.'s detail.

This company is to furnish the wood subsills, closure bars, stool plates and operating devices.

All finished hardware shall be equal to other hardware used in building in metal and style of finish.

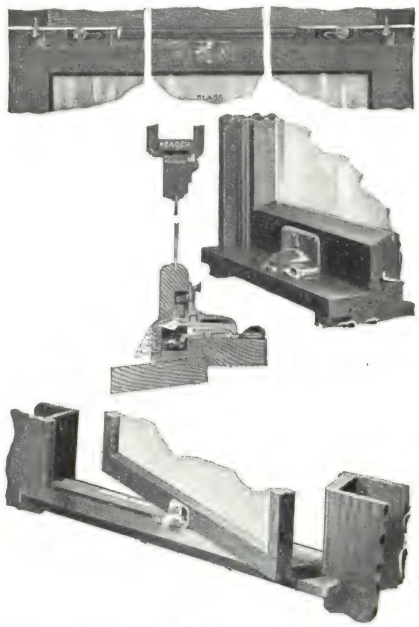
Sash details and description may be seen at the office of the architects, or, by applying to THE WILLIAMS PIVOT SASH CO., Cleveland, Ohio.

Williams Vertically Pivoted Window Fixtures

By raising and lowering the closure bar, sash is locked and unlocked; the necessity of lifting the sash to reverse for cleaning is eliminated.

With the closure bar and follower strip a perfectly tight sill and header are guaranteed. An effective stop is provided to hold the sash at different angles.

The follower and wood subsill are furnished with closure bar; all parts fitted and equipped with hardware in any material or finish desired. Subsill and closure bar furnished to conform to thickness of sash.



WILLIAMS VERTICALLY PIVOTED WINDOW FIXTURES

Specifications—All vertically pivoted sash to be equipped with THE WILLIAMS PIVOT SASH CO.'s Vertical Sash Fixtures. Sash shall be made in width and height to conform to THE WILLIAMS PIVOT SASH CO.'s detail.

This company is to furnish the hardware, etc., necessary to equip all vertically pivoted windows specified, such as wood subsills, follower strips, closure bars, pivot plates, operating devices, spring rollers, guide screws and sash handles.

All finished hardware shall be equal to other hardware used in building in metal and style of finish.

Sash details and description may be seen at the office of the architect, or by applying to THE WILLIAMS PIVOT SASH CO., Cleveland, Ohio.

In General

THE WILLIAMS PIVOT SASH CO. is one of the pioneers in reversible windows. The original basic principle of this device—the use of a truncated cone pivot utilizing the weight of the sash to hold the strip and sash tightly together—has been retained.

The practice of including the erection has also been a strong factor in keeping this equipment on the market for twenty years. Trained workmen are sent to the building to fit and hang the sash and apply the reversible equipment. These men are responsible directly to the main office and are not working under any of our agencies. This definitely fixes the responsibility for the proper operation of the equipment.

References

References can be furnished to almost any number desired—extending over many years.

CARRIER ADJUSTER COMPANY

Manufacturers of Casement Window Hardware

ASHEVILLE, N. C.

Product

Owners and sole manufacturers of CARRIER QUADRANT ADJUSTER (C. Q. A. Hardware) for out-swinging casement type windows.

C Q A

TRADE-MARK

Design

Big leverage is the underlying principle of the design. The distance from the pivot point to the teeth on the quadrant is 5½ in., while the crank has 3½-in. leverage, giving a total of 9 in. The window is balanced on the upper and lower pivots which are of steel ball bearing construction.

The complete equipment (with the exception of the half-inch steel ball which forms the pivot bearing and is protected from the weather) is made of solid cast bronze and, therefore, climatic conditions will have no deteriorating effect.

Installation

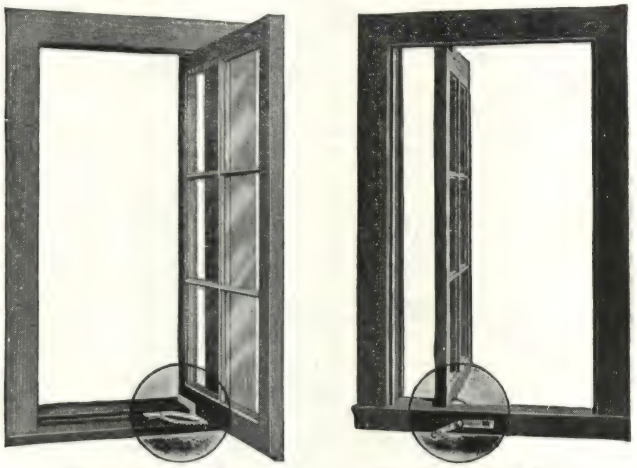
Owing to simplicity of application, the Carrier Quadrant Adjuster is admirably designed for quick and easy installation on any standard casement sash, whether single, in pairs or in multiple of four or more. Height of window does not affect operation of this hardware, but where height exceeds 5 ft. or width 2 ft. it is recommended that the automatic "pull to" top pivot be used. Maximum width of sash not to exceed 34 in.

Hardware is manufactured in two standard sizes for windows of 1⅜-in. and 1¾-in. sash. For greater widths, mortise the bottom and top of the sash to permit the metal lip of the adjuster to fit snugly.

Simple directions furnished with hardware enable any competent carpenter to install it. Complete installation can usually be made in forty-five minutes to one hour.

Operation

Adjuster is operated by turning a small control lever, which, by means of a quadrant worm gear, opens and closes the window. The teeth of the gear are sufficiently strong to withstand tons of pressure without shearing, and gears being always in mesh constitute a positive burglarproof lock. A small child can easily operate the control lever.



No. 1. Looking In No. 2. Looking Out

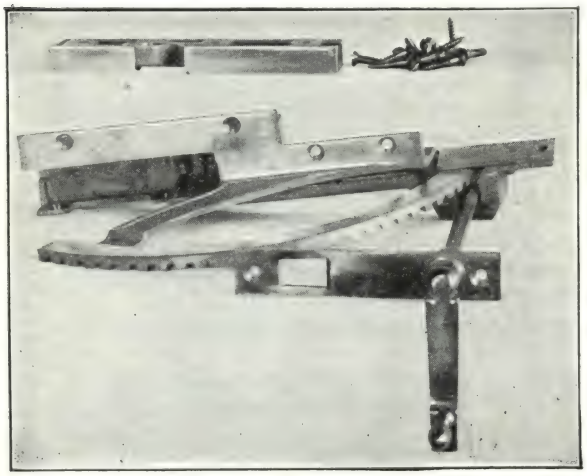
WINDOW EQUIPPED WITH CARRIER QUADRANT ADJUSTER

No. 1. Bronze quadrant fixed firmly to window frame and sash, locking in any position and preventing any possibility of rattling

No. 2. Quadrant adjuster control lever which operates smoothly and with the least effort

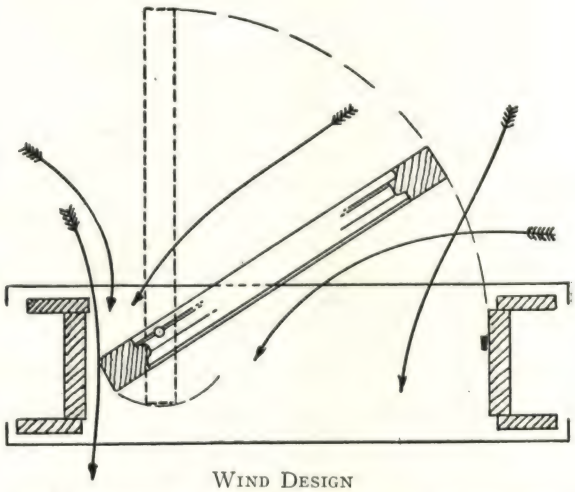
Adaptability

The simplicity of the Carrier Quadrant Adjuster, the ease with which it can be operated, and the absolutely snug locking device make it the ideal adjuster for all out-swinging casement type windows, whether in public buildings, schools, sanitariums, hospitals, banks, residences or fine office buildings, as well as for sun parlors and sleeping porches.



CARRIER QUADRANT ADJUSTER

Twelve screws are all that is necessary for installation



WIND DESIGN

100% ventilation, wind may be diverted in three directions

Continued on next page

Not Affected by Windstorms

Wind can not slam the window as the adjuster securely locks it in any position and, on account of its deflecting the wind into the room, wind pressure is reduced to a minimum.

No Rattling

Rattling is entirely and positively eliminated as, the worm gear being always in mesh, the only opportunity for wear is in the gear itself which has such small frictional wear that only years of service could make rattling possible.

Ventilation

Maximum ventilation is possible, and the window may be opened so that the breeze will not blow directly into the room but be diverted to any desired degree. Or the window may be firmly set to deflect almost any breeze into the room. Breezes may be deflected from three directions.

Waterproof

Windows when closed lock automatically top and bottom, thus weatherproofness is assured. Moreover, if necessary, under extreme conditions, it is possible to apply weatherstrips successfully. No water can lodge in any part of the Carrier Quadrant Adjuster.

Cleaning and Repairing

The window being pivoted to one side permits washing of outside and inside of glass from within the room. The opening is 4 in. from the frame which gives plenty of room for the cleaner's arm to reach through to the extremity of the window sash.

Where window lights are accidentally broken, sash is easily removed by unscrewing it from hardware, top and bottom. Sash can then be lifted out and glazed. Position of hardware is not affected.

No Interference with Screens, Draperies, etc.

Insect screens and storm sash are placed on the inside, and are not disturbed when operating window. Screen and storm sash are fitted to a groove in the window frame, are interchangeable, easily fitted in and out and require no hardware.

The operation of the window in no way interferes with shades, curtains, draperies, Venetian blinds, or shade and drapery fixtures.

Details

Architectural drawings, which have been approved by prominent architects, are given in the next column showing construction that has been used in connection with casement windows.

It is suggested that if architects and designers consult these details, adjusting them to suit their own particular ideas as to mouldings, etc., satisfactory results will be obtained.

Specifications

(1) Furnish all casement out-swinging windows, where shown or noted on the drawings, with Carrier Quadrant Adjuster, manufactured by the Carrier Adjuster Company, Asheville, N. C., in strict accordance with the following specifications and directions, and with the detailed drawings furnished by the manufacturer.

(2) All adjusters shall be solid cast bronze for window sash 1⅜ in. thick [1¾ in.] (sash shall be grooved for larger thickness sash).

(3) Single window shall be right- [left-] hand opening.

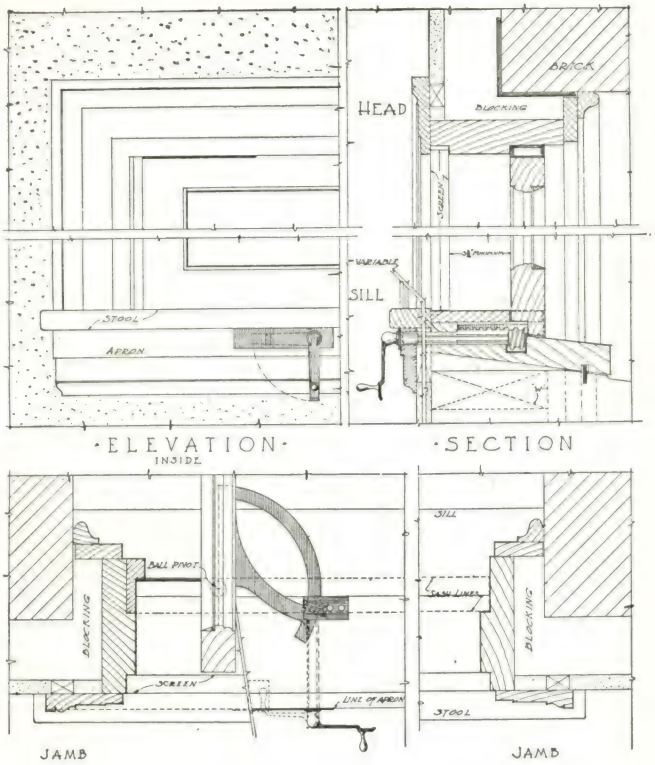
(4) Casements over 5 ft. in height, 20 in. in width, shall have Automatic "Pull to" Pivot for locking top of sash.

(5) Double windows shall be right- and left-hand opening.

(6) Multi double windows shall be right- [left-] hand opening.

(7) Storm sash are not to be hinged, but set in a groove in accordance with Carrier Adjuster Company's drawings.

(8) Window screens shall be standard and set in accordance with Carrier Adjuster's drawings.



Standards of General Details for Installing Carrier Quadrant Adjuster For 1¾-In. Sash

Slight changes in dimensions made for other size sash. Adjuster furnished for any wall

Cost

The cost is no greater and is usually less than the combined cost of hinges, latches, hangings, guides, springs, weights, cords, pulleys, cremone bolts, and screen and storm sash hardware.

Information Required with Orders

(1) Sash thickness; (2) approximate height is desirable but not necessary; (3) If single sash is to be used state whether it swings to the right or left; or if pairs of sash, state whether right or left opening, or both right, or both left (hand should be taken from inside).

Shipment

Carrier Quadrant Adjusters are shipped in strong boxes with complete installation data in each container.

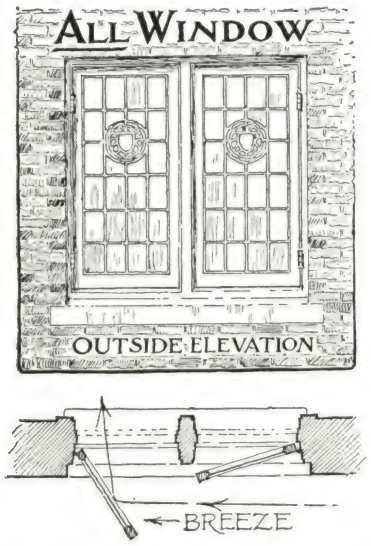
THE CASEMENT HARDWARE CO.

Manufacturers of Patent Casement Hardware
230 East Ohio Street
CHICAGO, ILL.
NEW YORK REPRESENTATIVE: Architects Samples Co., 101 Park Avenue

Win-Dor
TRADE-MARK

Products

Patent ADJUSTERS or OPERATORS to control out-opening English casements entirely from inside of, and without moving, insect screens or storm sash; POLE OPERATED ADJUSTERS for similar control of out-opening side hinged transoms; WIN-DOR ADJUSTERS; "BULL-DOG" ADJUSTERS.



General Advantages

The true side hinged casement is the only outward opening casement which may be operated from inside of screens. Win-Dor adjusters can not be used with sliding and folding windows nor with projecting cleaning hinges. By swinging casements in alternating directions and avoiding excessive dimensions they may be easily cleaned, and at the same time equipped for convenient operation with Win-Dor adjusters.

Facilities and Service

Seventeen years specialization in casement equipment has enabled us to develop improved standards. The new Win-Dor adjusters are made in types and materials to suit closely the several classes of structures using casements and the legitimate variations in detail. We maintain an architectural department which is well equipped to criticize drawings and specifications applying to our field.

New Improvements

An entirely new mechanical principle (improved Spencer patents) which permits the attainment of artistic design and reduces construction to the minimum of strong, simple parts. Automatic locking.

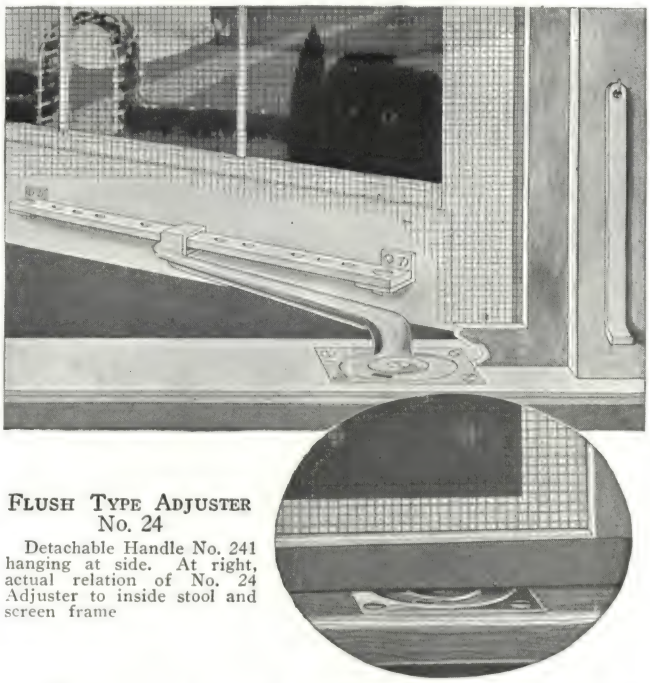
The improved Spencer principle is a direct acting bent lever constructed for vertical movement through the pivot. Slight downward pressure on the operating handle lifts the sash arm out of its normal truss-locking engagement and allows it to swing the sash on its easy bearing guide. This separation of the locking and sliding bearings makes possible a very rigid locking without danger of friction resistance when swinging window. This principle also effects a great reduction in number of parts, strengthening those subject to strain, and eliminates awkward mechanical appearance.

Use of Win-Dor Adjusters with Metal Casements

On residential or screened structures inside operated adjusters are as necessary with metal as with wood casements. The new Win-Dor adjusters are particularly designed both for mechanical adaptation and harmony of design with this class of work.

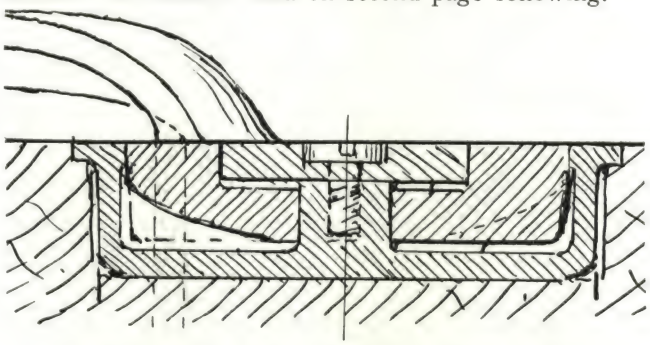
Flush Win-Dor Adjuster No. 24

In this adjuster the entire pivot is contained in a round cup with square flanged top plate, which is let down and countersunk flush in stool. No hardware projects above inside stool, but all parts are readily accessible and no special "concealed" construction is necessary. All cutting of screens is eliminated.



FLUSH TYPE ADJUSTER
No. 24
Detachable Handle No. 241 hanging at side. At right, actual relation of No. 24 Adjuster to inside stool and screen frame

The No. 24 has only 4 parts. Standard attachment for wood sash; readily applied to metal casements of standard section. Standard detachable handle as shown; special ornamental handles to order. Made entirely of cast and wrought bronze. This adjuster should be used on all fine buildings where appearance as well as structural features are especially important. Right or left handed. Installation data on second page following.

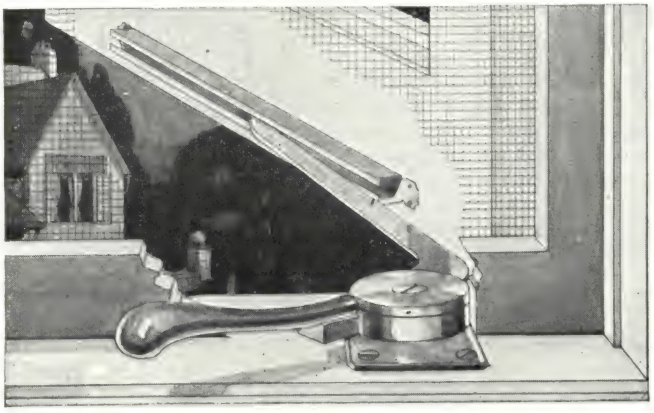


SECTION NO. 24 ADJUSTER PIVOT IN WOOD STOOL
(SLIGHTLY REDUCED)
Diameter of cup, 2¾ in.; top plate 3⅛ in. sq.; detachable handle 7¼ in. long

Continued on next page

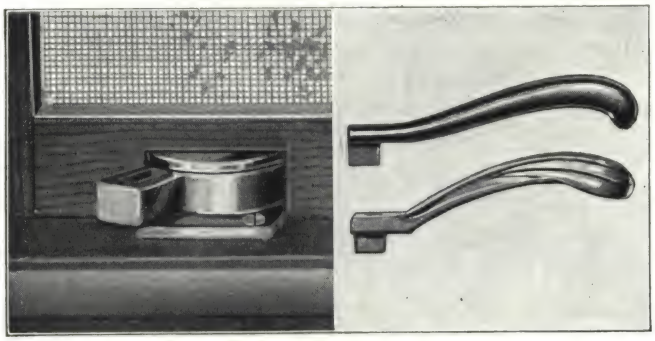
Win-Dor Surface Adjuster No. 2

Principle same as No. 24. A bronze adjuster to meet requirements for permanently attached or removable handles and cases where flush type is not applicable.



SURFACE ADJUSTER NO. 2
Standard Handle No. 200 in working position

Requires only straight notch in screen frame. With fixed handles and hinged screens filler strip should be used. Standard detachable handle No. 200. Ornamental cast bronze handle No. 202; other special handles to order. Right or left handed.

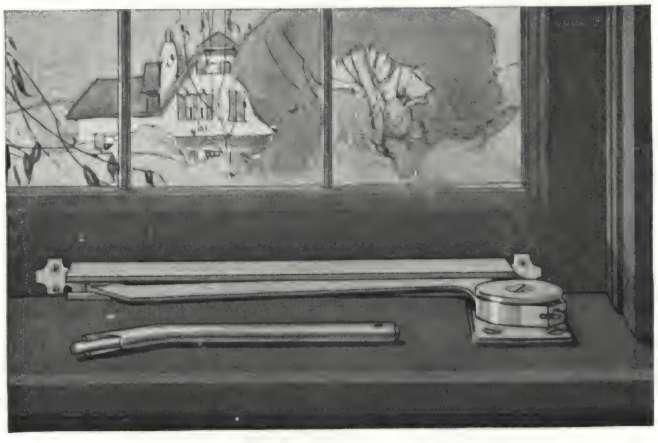


SURFACE ADJUSTER NO. 2
Showing neat appearance with screen in place, handle detached

HANDLES FOR NO. 2
Above, No. 200 Standard. Below, No. 202 Special Ornamental

Cottage Type Adjuster No. 1

Operation and construction similar to No. 2. Made in iron with detachable handle and connection designed for economical production to meet the need for a good inexpensive operator. Neat in appearance. Recommended for small houses, inexpensive apartments, outbuildings and porches, etc. Standard finish, electro-galvanized. This adjuster allows of being painted to match sash or trim, which makes a neat harmonious appearance and effectively protects adjuster against weather. Right or left handed. Installation data on next page.



COTTAGE TYPE ADJUSTER NO. 1
With Detachable Handle No. 101

Prominent Installations of Win-Dor Casement Hardware, Improved Spencer Patent

Cyrus H. McCormick, Jr., Lake Forest, Ill., country house alterations; W. H. Holgate, Lake Forest, Ill., Builders.

"219 Lake Shore Drive" Apartments, Chicago, Ill.; Fugard & Knapp, Architects; McLennan Construction Co., Builders.

J. H. Peterson, residence, Ottawa Hills, Ohio; Trowbridge & Ackerman, New York, N. Y., Architects.

Group of residences for Jos. E. Jones Co., Oak Park, Ill.; Trowbridge & Ackerman, New York, N. Y., Architects.

Burt Barry, residence, Winnetka, Ill., and Fred A. Sager, residence, Glencoe, Ill.; K. H. Sheldon, Chicago, Ill., Architect.

Security National Bank, Sheboygan, Wis.; Brust & Phillip, Milwaukee, Wis., Architects.

H. H. Rosenberg, residence, Homewood, Ill.; Wm. Betts, Chicago, Ill., Architect.

Other Installations—"BULL-DOG" and other patent adjusters made by THE CASEMENT HARDWARE CO., are installed in over 16,000 buildings, and have demonstrated excellent serviceability. Many installed in 1906-10 are still in perfect working order.

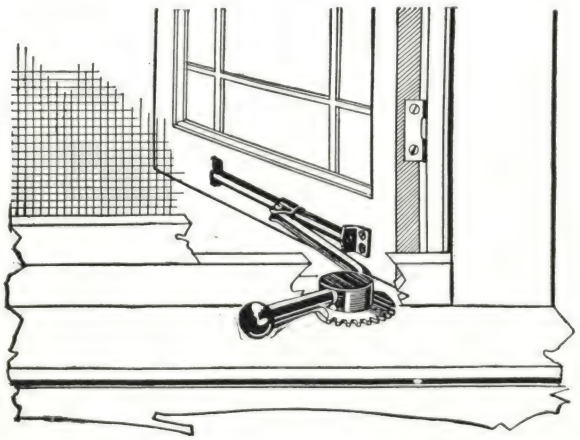
"Bull-Dog" Adjuster

Has permanently attached operating handle which telescopes, combining great leverage with compactness. Locks by manual engagement of handle in locking plate. Installation data same as Win-Dor, next page.

All "BULL-DOG" adjusters are reversible for right or left hand.

Improved traveler type "BULL-DOG" (as per illustration): No. CB40, all solid brass metal. No. CB30, outside friction parts brass, balance plated steel.

Original sash plate type: No. CB20, all solid brass. No. CB10, combination brass and steel plated. Standard size sash plates for 2 in. between screen and sash. "Standard long" plates must be specified for 2¼ to 2¾ in.

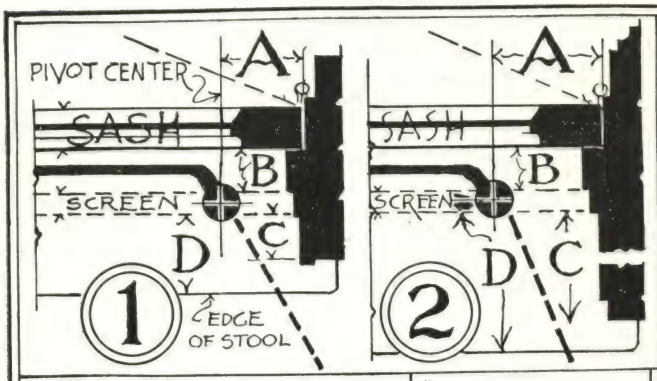


IMPROVED TRAVELER TYPE "BULL-DOG" ADJUSTER NO. C. B. 30
Showing filler strip which would be used with permanent handle adjusters when screens are hinged

Operator for Side Hinged Outside Transoms

No. 50, a new operator for overhead casements; works on same principle as Win-Dor adjusters, but operated from floor by means of special pole. See next page for detail.

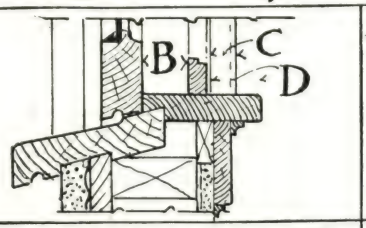
Continued on next page



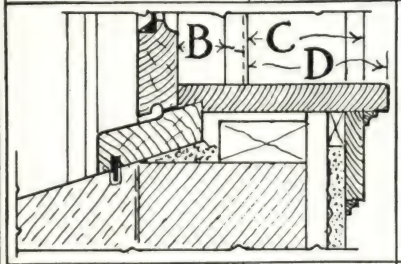
INSTALLATION DATA FOR ALL TYPES.

1	C ≈ NOT OVER 2" D ≈ 2" OR MORE	A ≈ 3½" TO 4" B ≈ 2" TO 3"
2	C ≈ OVER 2" D ≈ " "	A ≈ 4½" B ≈ 2" TO 3"

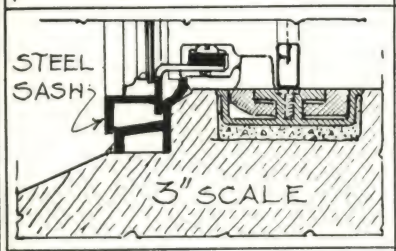
~1/4" SCREEN STOP ON STOOL FOR SPECIAL PIVOT TYPE.



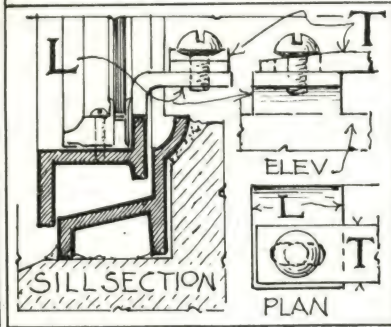
"WIN-DOR" TYPICAL SILL SECTION — STUD WALL (AT 1½" SCALE)



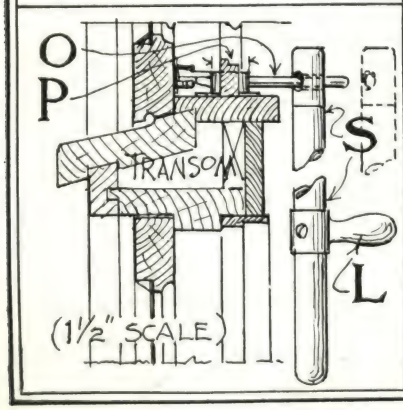
DITTO MASONRY WALL (SAME SCALE)



"WIN-DOR" NO 24 SILL SECTION (STEEL SASH) PIVOT BEARING SUNK FLUSH IN STONE SILL



"WIN-DOR" NO'S 2 & 24 SHOWING "L" STEEL LUGS L WELDED TO SASH AND ADJUSTABLE END CONNECTION OF TRAVELER-BAR "T" (HALF FULL SIZE)



"WIN-DOR" TRANSOM SILL SECTION
"P" ≈ ADJUSTER PIVOT
"O" ≈ OPERATING ARM · (NO. 50)
"S" ≈ SASH-POLE WITH HOLE IN TOP FERRULE
"L" ≈ POLE LEVER

Installation Diagrams

Above are master diagrams for all our adjusters, both new Win-Dor and "Bull-Dog" types.

Rebated screen stop on stool should be avoided where possible.

When necessary surface adjusters may be blocked up with cork linoleum.

Flush type adjusters must be ordered with "special stool offset," to fit standard ¼-in. rebate as shown above.

Sash Dimensions

Standard Win-Dor adjusters are applicable to minimum width of 16 in., with construction as per Fig. 1. "Bull-Dog" adjusters, minimum 18 in.

With installation as per Fig. 2, 1 in. more is required.

Mechanically ideal widths for casements are 20 to 24 in.

Wood casements, to function properly, must be made strong of clear white pine, cypress or fir, 1¾ in. thick by 2½ in. to glass rebate, except bottom rail to which add 1 in. in depth (1¾x3½ in.).

Cleaning

With alternating swing, casements are easily cleaned by reaching through. Where necessary to use a single sash specify reversing or cleaning hinges.

Finishes

Win-Dor adjusters are furnished to match any of the hardware trade finishes.

Specifications

Adjusters, Wood Sash—Equip each out-swinging casement window with one Win-Dor (or "Bull-Dog") adjuster No. ——, made by The Casement Hardware Co., Chicago, Ill.

Overhead (Transom) Casements—Equip each out-opening transom casement and provide one operating pole, No 60, by the same manufacturer for each room in which No. 50 operators are indicated.

Adjusters, Metal Casements—Out-opening metal casements as indicated shall be equipped with Win-Dor adjusters made by The Casement Hardware Co., Chicago, Ill. Proposals for this work shall state whether or not they include these fittings. Contractor for metal sash shall provide steel lugs welded to lower sash rail for attachment of Win-Dor adjusters in accordance with that manufacturer's drawings.

Samples

Mounted samples on display with most metropolitan dealers in building hardware. Write home office for name of nearest representative or dealer.

H. E. HOLBROOK COMPANY

Whitney Casement Window Hardware

444-447 Massachusetts Trust Building
BOSTON, MASS.

Product

WHITNEY CASEMENT WINDOW HARDWARE; made for single, double, triple, and multiple windows.

Only the patented hardware is made or sold by the manufacturers, and any style of sash or frames may be adapted to the use of Whitney Casement Window Hardware.

For Venetian Blinds, see page 1078.

Description and Features

Description—Whitney casement window hardware consists of a heavy interlocking sill track, with sliding bronze shoes, connected to the lower inner corners of the sash with substantial pivot hinges. The inner top corners of the sash are held by pivot plates and rollers working in a $1\frac{1}{16}$x$\frac{3}{4}$-in. groove in the head of the window frame.

Hinges are used to connect the two sash of a double casement window. The lower hinge is equipped with a handle for pulling the window shut.

Single windows have an arm connected to one side jamb and center of the sash top and bottom. In openings containing an odd number of sash, the odd sash operates as a single window.

Fasteners are provided for all windows.

Each window, single or double, works independently of the others.

Features—Casement windows, when properly fitted with this unique patented hardware, are tight and weatherproof when closed.

Are self-adjusting, open outward, work easily, and stay placed in any part of the opening.

Do not rattle in either open or closed position.

Give greater control of ventilation and protection from drafts than is possible with any other type of window.

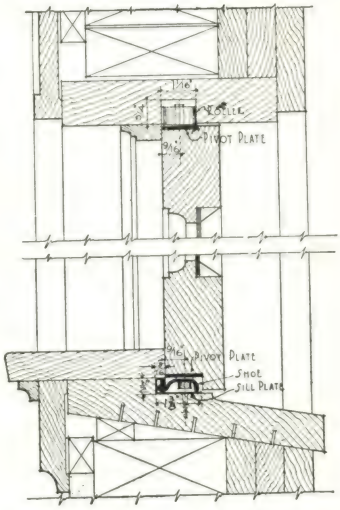
Do not interfere with curtains, shades or draperies.

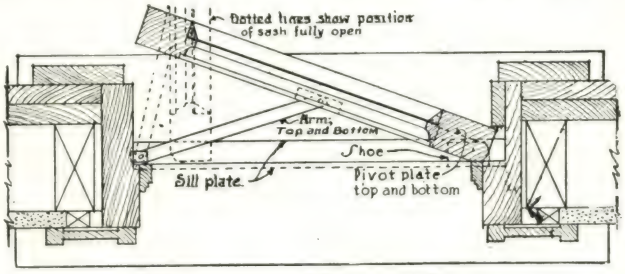
Are easily washed on both sides from the inside, eliminating the use of ladders or life belts, and the dangers and inconvenience of washing windows from the outside.

Operation

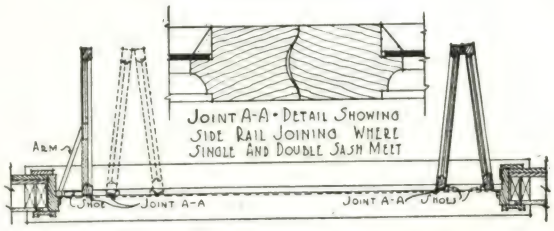
To open a single Whitney casement window, it is only necessary to unfasten and push window to any desired position.

Double windows operate the same way except that they can be pushed to either side of the opening when there is more than one double window in an opening; all or any number of pairs can be moved to either side, or all to one side, or placed in any part of the opening.



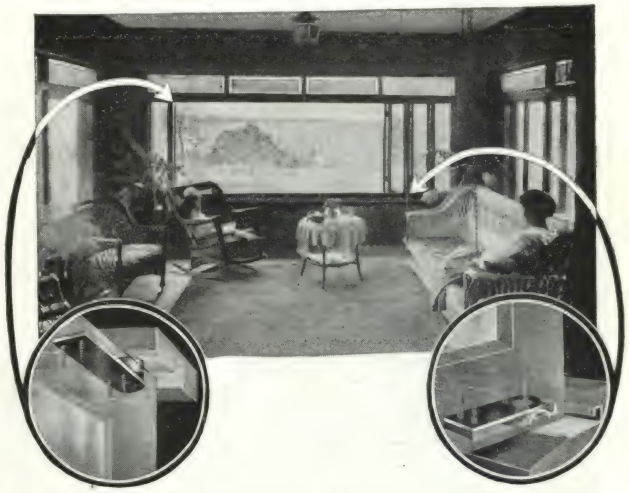


DETAILS OF THE WHITNEY WINDOW



PLAN OF TRIPLE SASH OPENING
Single sash may be situated at either side

RESIDENCE OF HARRY FLUHART, DAYTON, OHIO
HARRY CONWAY GRIFFITH, Architect



WHITNEY CASEMENT WINDOW HARDWARE
From the inside looking out; note the unobstructed view. Circular illustrations are phantom views of hardware installed on sash

ANDREW HOFFMAN MFG. CO.

Casement Window Hardware

905 Steger Building

CHICAGO, ILL.

DISTRIBUTERS IN ALL LARGE CITIES

Products

CASEMENT WINDOW HARDWARE.
CEILING LIGHT HARDWARE.

Casement Window Hardware

Description—Hoffman casement fixtures (United States and foreign patents) are for outward opening windows up to a maximum size of 2 ft. 6 in. x 7 ft. per sash. They support the sash entirely from the head and they are not hinged to either jamb, which method provides many advantageous features.

Advantages—(1) The sash are firmly attached to the frame at all points of opening by brass rollers engaging in a metal channel track.

(2) Top support prevents binding from swelling sash because sufficient clearance is left at the sill without affecting weathering.

(3) Stops both inside and outside at the jambs and three butts prevent warping and aid weathering.

(4) All cleaning is done from inside.

(5) The windows are weathertight.

(6) Ventilation. By slightly opening the window, a flue is created that draws out all impure air which is automatically replaced with fresh air without any direct draft.

(7) The sashes may be opened to any position up to the entire size of the frame at either jamb or at any point between the jambs and need no adjusters because one sash acts as a stay or brace to the other.

(8) The windows are designed by the architect and specified under carpentry or millwork the same as any other window. This company furnishes hardware only.

(9) Sash in series may be used in frames of any width omitting all mullions, providing head is securely bolted to lintel to prevent sagging. (We have a special detail sheet suggesting several methods of head support).

(10) Sash in even numbers may be 1⅜ in., 1¾ in., or 2¼ in. thick. Single sash or sash in odd numbers must be 1¾ in. or 2¼ in. thick.

Adaptability—Hoffman casement fixtures are strong and serviceable, will outlast ordinary window hardware, installation is simple and because windows so equipped combine all good features of all other types of windows they are adapted for typical use in any building, public or private.

Hardware Furnished—The fixtures are packed in complete sets containing all necessary hardware for sash in pairs or for single sash. Track is included up to 2 ft. for each sash. Wider sash require extra track.

Grades and Prices—All prices f.o.b. Chicago. Distribution through agencies.

No. 1—Galvanized tracks; galvanized top hangers with brass wheels; galvanized bottom guides with brass swivel pins; *plated iron* butts, fasteners and handle. Stay arms for single sash, galvanized. For pairs of sash, per set—$5.00. For single sashes, per set—$4.50.

No. 2—Same as No. 1 excepting butts, fasteners and handle are solid brass, tumbled finish (not hand polished). For pairs of sash, per set—$7.00. For single sashes, per set—$6.00.

No. 3—Same as No. 2 excepting that sill track is *solid brass,* and butts, fasteners and handle are *solid brass,* hand polished. For pairs of sash, per set—$9.00. For single sashes, per set—$8.00.

No. 4—All parts *solid brass.* For pairs of sash, per set—$12.00. For single sashes, per set—$10.50.

Information required with orders—(1) Exact width of opening *jamb to jamb* (not between stops); (2) number of sash in each opening; (3) if single sash are used, state whether they swing to the right or left when facing them from inside the room. (4) Give grade of hardware and finish desired. (5) Sash thickness and approximate height is desirable but not necessary.

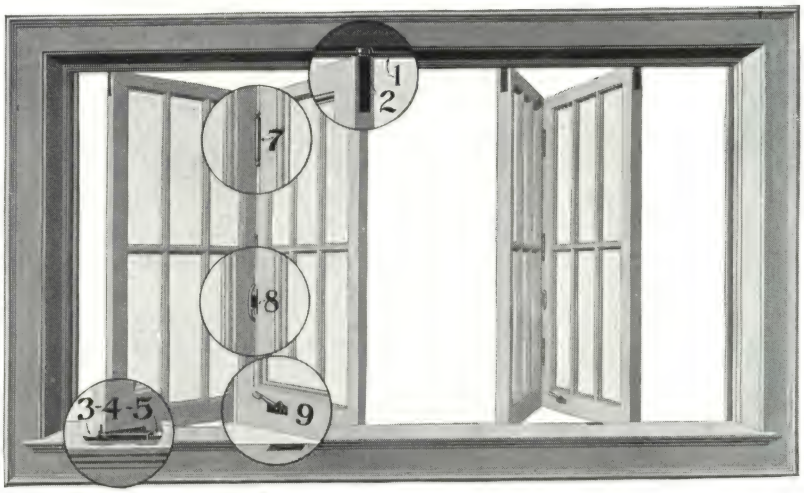
Specification form—All window frames and sash shall be milled according to details and the contractor shall exercise particular care to set the frames perfectly level and square and shall bolt the head to the lintel at intervals not exceeding 4 ft. wherever the span is greater than 4 ft.

The sash shall be hung with Hoffman casement fixtures (here insert grade number) as manufactured by the ANDREW HOFFMAN MFG. CO., 905 Steger Building, Chicago, in exact accordance with details and directions furnished by the manufacturers.

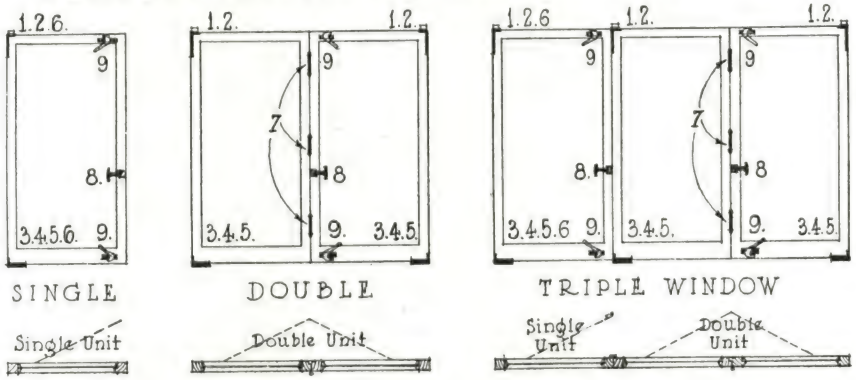
SOLDIERS' HOSPITAL USING HOFFMAN CASEMENTS THROUGHOUT

HOFFMAN CASEMENTS AS USED IN SCHOOLS

Continued on next page

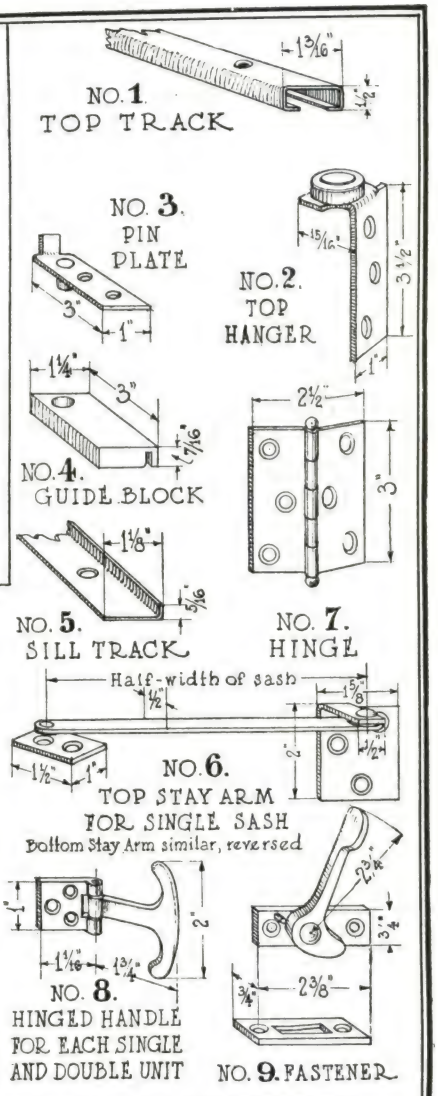


PERSPECTIVE SHOWING HARDWARE APPLIED

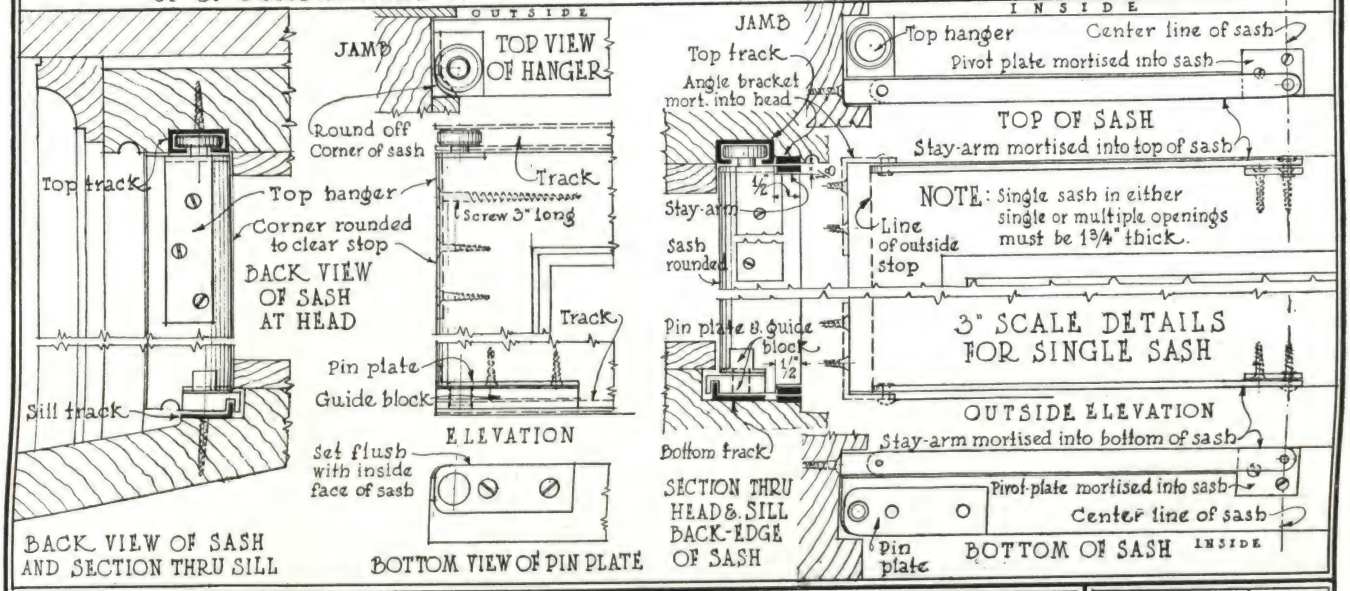


KEY PLANS AND ELEVATIONS
SHOWING OPERATION OF VARIOUS COMBINATIONS OF SASH

NOTE: WHEN THERE ARE MORE THAN THREE SASH, THEY ARE MADE UP OF COMBINATIONS OF DOUBLE AND SINGLE SASH UNITS



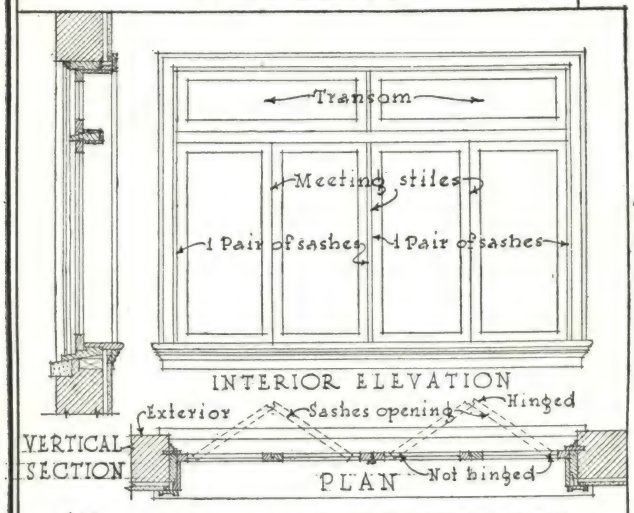
DETAILS OF HARDWARE



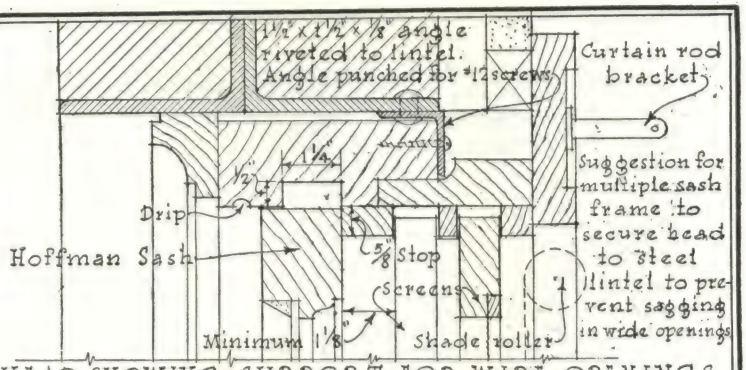
DRAWN BY SWEETS CATALOGUE SERVICE, INC.	DETAILS OF HOFFMAN CASEMENT HARDWARE ANDREW HOFFMAN MFG. CO.	SCALE 3"&1/4" EQUALS 1'-0" DATE-APR.22	DRWG 1

Continued on next page

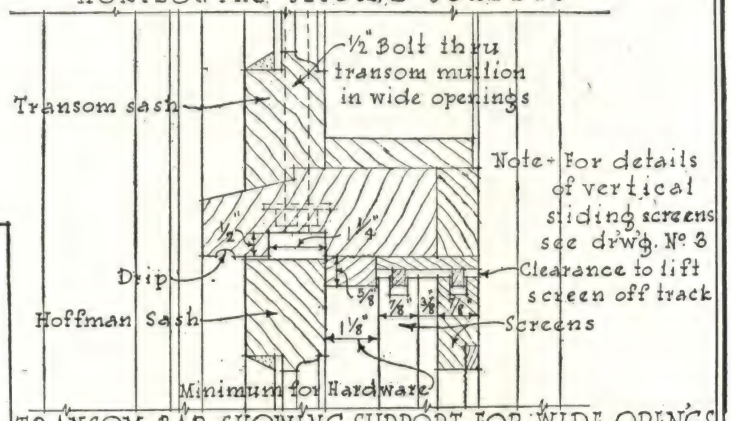
HOFFMAN CASEMENTS INSTALLED IN PORCHES



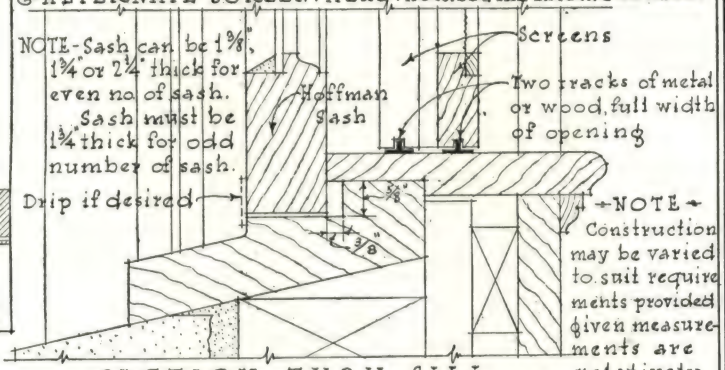
¼" SCALE DETAIL OF FOUR SASH WINDOW WITH MEETING STILE & TRANSOM



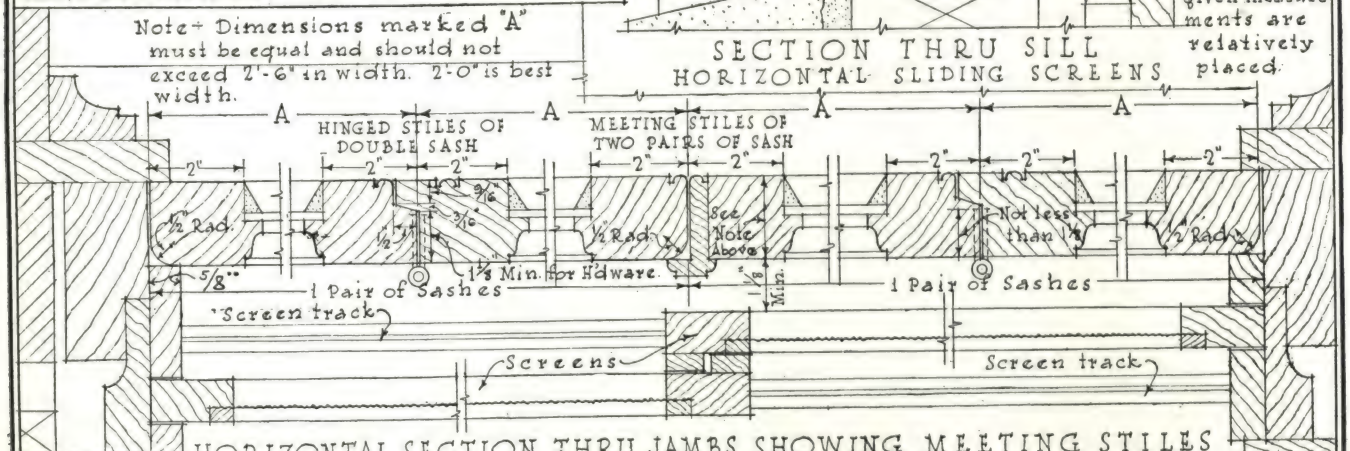
HEAD SHOWING SUPPORT FOR WIDE OPENINGS HORIZONTAL SLIDING SCREENS



TRANSOM BAR SHOWING SUPPORT FOR WIDE OPENGS & ALTERNATE SCREEN HEAD-HORIZONTAL SLIDING SCREENS



SECTION THRU SILL HORIZONTAL SLIDING SCREENS

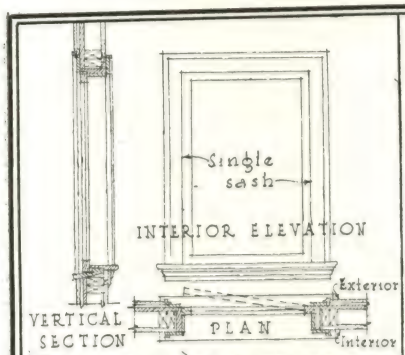


HORIZONTAL SECTION THRU JAMBS SHOWING MEETING STILES

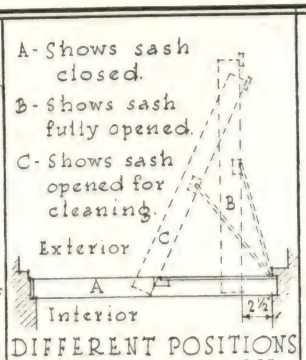
THESE DETAILS FOR EVEN NUMBER OF SASH ONLY. SEE DRWG. #3 FOR ODD NO. OF SASH

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF MILLWORK FOR HOFFMAN CASEMENTS AS INSTALLED IN MASONRY WALL	SCALE ¼" & 3" EQUALS 1'-0" DATE-JULY-20	DRWG 2

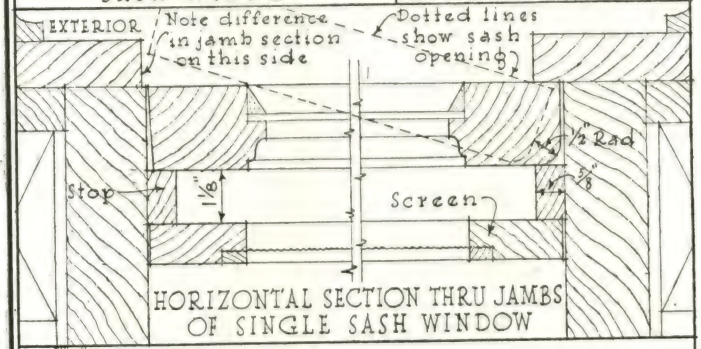
Continued on next page



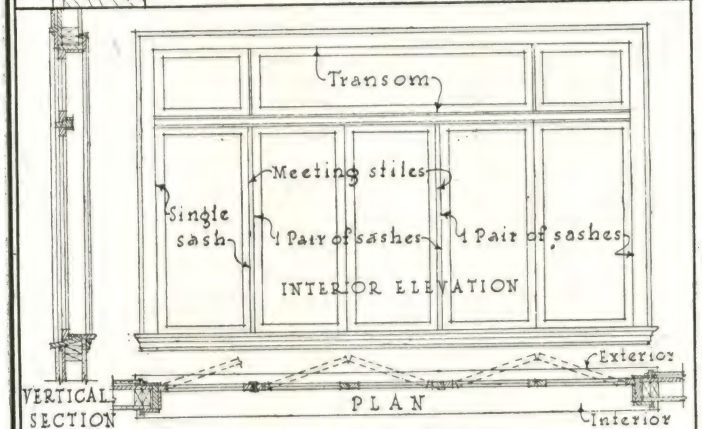
¼ SCALE DETAIL OF SINGLE SASH WINDOW



DIFFERENT POSITIONS OF SINGLE SASH OPEN AND CLOSED



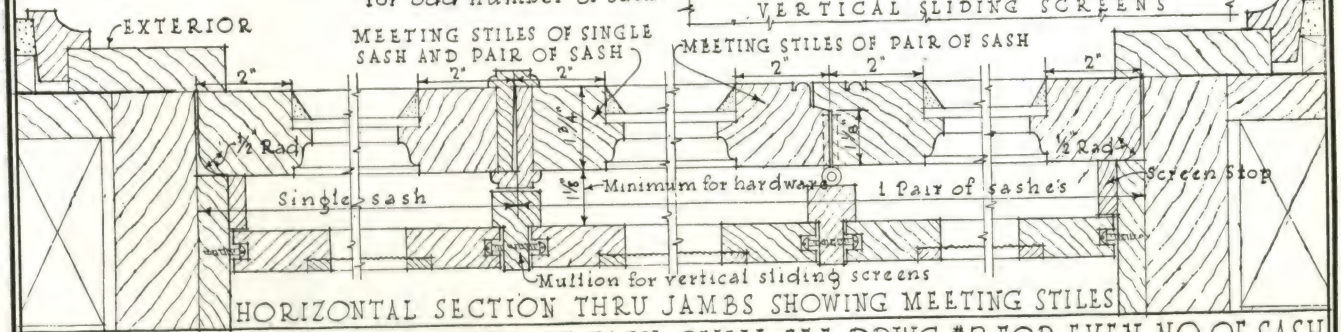
HORIZONTAL SECTION THRU JAMBS OF SINGLE SASH WINDOW



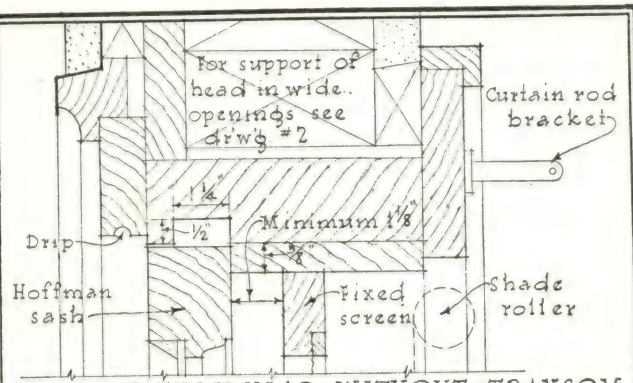
¼" SCALE DETAIL OF FIVE SASH WINDOW WITH MEETING STILES & TRANSOM

NOTE - For detail of meeting stiles of two pairs of sash see drawing #2.

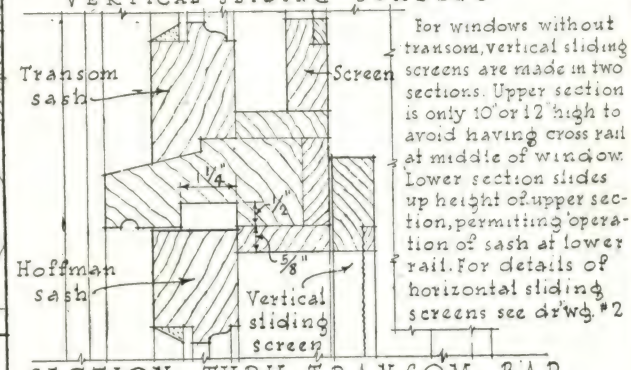
Sash can be 1⅜", 1¾" or 2¼" thick for even number of sash. Sash must be 1¾" thick for odd number of sash.



HORIZONTAL SECTION THRU JAMBS SHOWING MEETING STILES

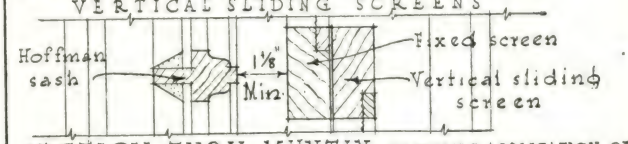


SECTION THRU HEAD WITHOUT TRANSOM VERTICAL SLIDING SCREENS

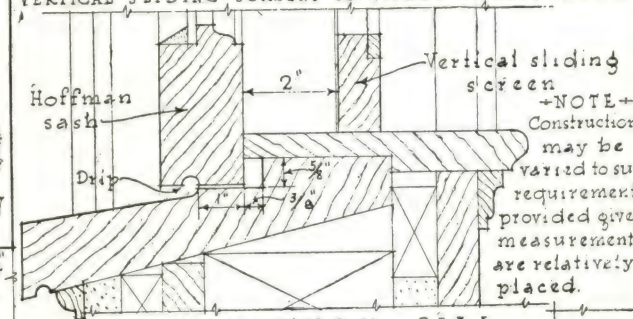


For windows without transom, vertical sliding screens are made in two sections. Upper section is only 10" or 12" high to avoid having cross rail at middle of window. Lower section slides up height of upper section, permitting operation of sash at lower rail. For details of horizontal sliding screens see drw'g #2

SECTION THRU TRANSOM BAR VERTICAL SLIDING SCREENS



SECTION THRU MUNTIN SHOWING APPLICATION OF VERTICAL SLIDING SCREENS TO WINDOW WITHOUT TRANSOM



+NOTE+ Construction may be varied to suit requirements provided given measurements are relatively placed.

SECTION THRU SILL VERTICAL SLIDING SCREENS

THESE DETAILS FOR ODD NUMBER OF SASH ONLY. SEE DRWG. #2 FOR EVEN NO. OF SASH

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	DETAILS OF MILLWORK FOR HOFFMAN CASEMENTS AS INSTALLED IN FRAME WALL	SCALE ¼" & 3" EQUALS 1'-0" DATE-JULY-20	DRWG 3

Continued on next page

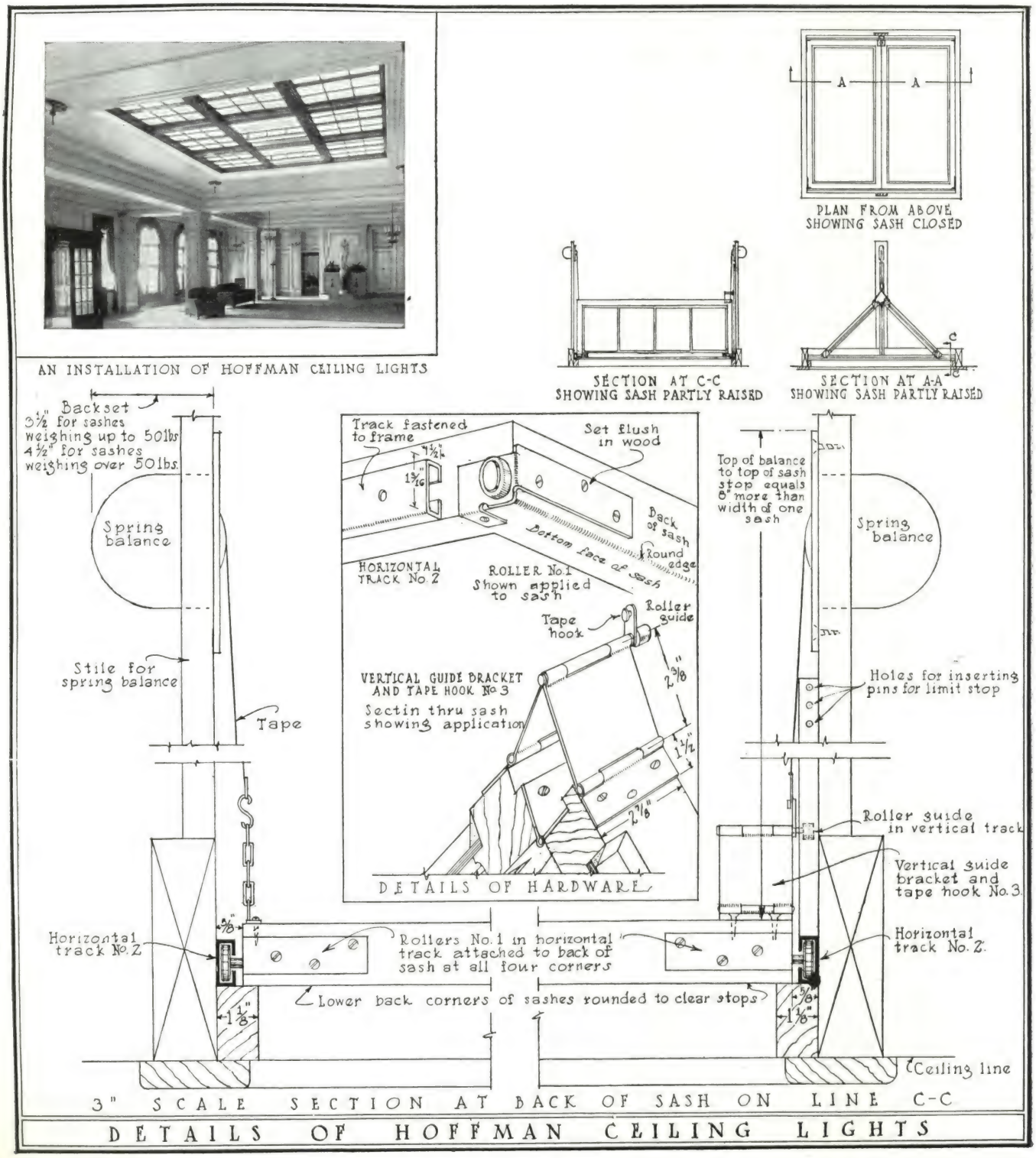
Hoffman Ceiling Lights

Description—Fixtures for hanging and operating ceiling light sash, consisting of rollers attached to the corners of each pair of sash operating in horizontal channel tracks in conjunction with a guide roller engaging in a vertical track at the hinged point and balancing the sash in any open position by means of spring balances. Sashes are opened by pushing upwards with an ordinary window pole and closed by pulling down.

Advantages—(1) No hardware in sight from below except butt knuckles. (2) Sashes may be opened for ventilation without exposing skylight above. (3) Cleaning may be done from beneath if other access is inconvenient. (4) Sash can not fall into room because supported by stops on all sides. (5) Operation is simple and without exertion.

Millwork—Sashes should be 1¼ in. shorter than the frame dimension to permit placing the tracks unless tracks are mortised in the frame. Sash may be 1⅜ in., 1¾ in. or 2¼ in. thick. Cross framing between each pair of sash may be omitted if desired and the sash installed in series. Provide a vertical stile for upright guide track and balances at each end of each pair of sash.

Information Required With Orders—Exact width across ends of sash and weight of sash, glazed.



DETAILS OF HOFFMAN CEILING LIGHTS

THE LUNDELL-ECKBERG MANUFACTURING CO.

Casement Window Hinges

JAMESTOWN, N. Y.

Product

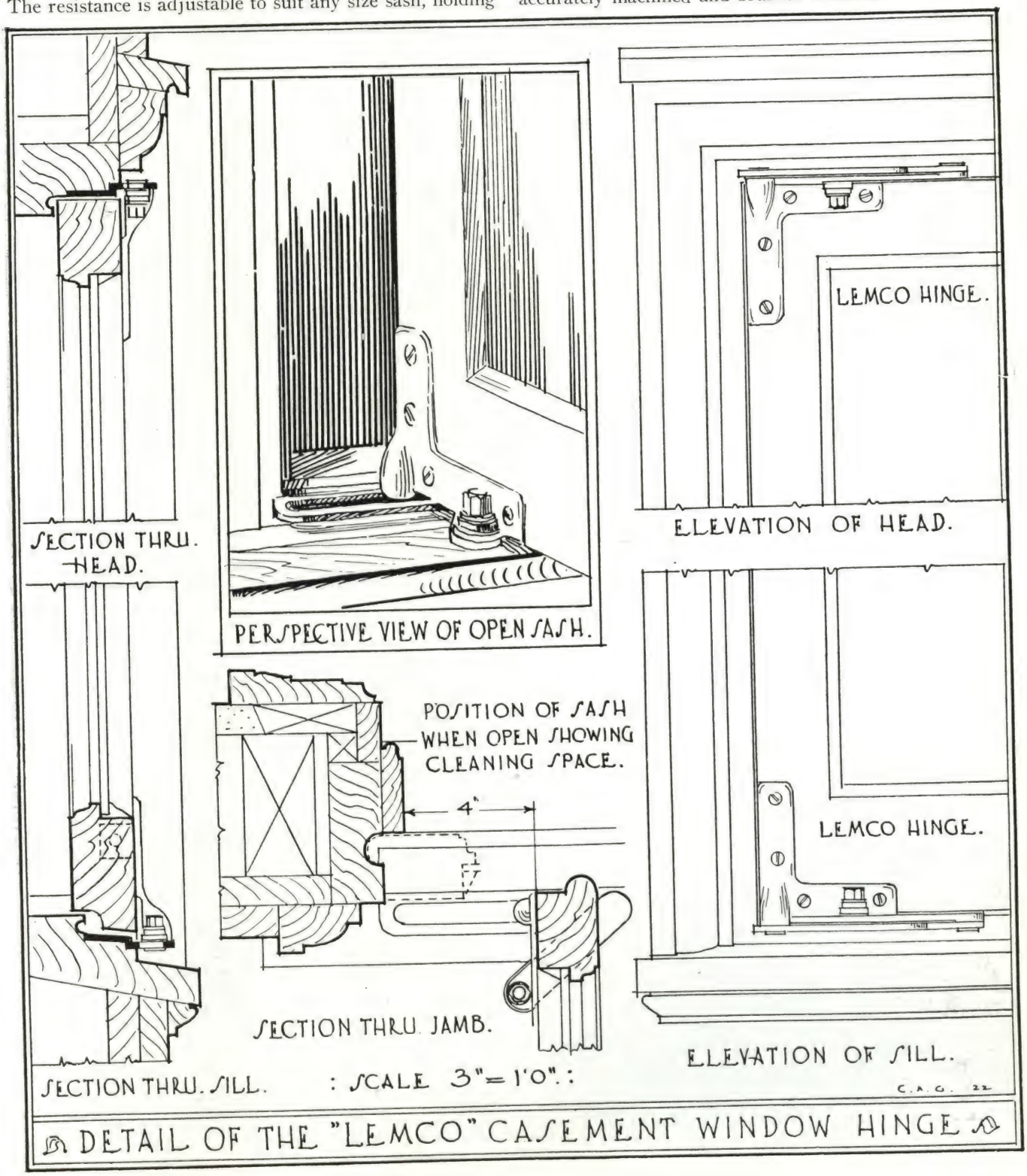
LEMCO CASEMENT WINDOW HINGE (patented).

Description

Permits cleaning outside of sash from within; provides a space between sash and jamb when open at 90°. The resistance is adjustable to suit any size sash, holding it at any desired angle, and eliminates necessity of any other adjuster. Adaptable to all types of outward opening casements in wood or metal.

Material

These hinges are a high class product, manufactured only in cast brass or bronze; all working parts are accurately machined and brushed finished.



DETAIL OF THE "LEMCO" CASEMENT WINDOW HINGE

RICHARDS-WILCOX MANUFACTURING CO.

INCORPORATED

Manufacturers of AiR-Way Multifold Window Hardware

CABLE ADDRESS
"RICHWILCO, AURORA"

AURORA, ILL.

CANADIAN FACTORY
LONDON, ONTARIO

BRANCH OFFICES

NEW YORK, N. Y., 85 Walker Street
CHICAGO, ILL., 166-68 West Lake Street
PHILADELPHIA, PA., 507 Arch Street
BOSTON, MASS., 132-34 Pearl Street
CLEVELAND, OHIO, 459 Hippodrome Annex
ST. LOUIS, MO., 1735 Boatmens Bank Building
INDIANAPOLIS, IND., 423-24 Occidental Building
MINNEAPOLIS, MINN., 321 Plymouth Building
LOS ANGELES, CAL., 503 Equitable Building
SAN FRANCISCO, CAL., 626 Underwood Building
LONDON, ONT., RICHARDS-WILCOX CANADIAN CO., LTD.

Products

R-W MULTIFOLD WINDOW HARDWARE.

For Door Hangers and Hardware Specialties, see pages 1258-1273.

RICHARDS-WILCOX R-W AURORA TRADE MARK

R-W No. 312 "AiR-Way" Multifold Window Hardware (Patented)

AIR-WAY TRADE-MARKS

Affords perfect ventilation and light; closes weathertight, keeps out wind and storm.

For sun parlors, sleeping porches, bungalows—any multiple window to be opened entirely. Especially suitable for residences, hotels, hospitals, sanitariums, schools, libraries, clubs, apartments and flats.

"AiR-Way" equipped windows open inside, permitting their being washed readily and removing the danger and inconvenience connected with washing windows from outside.

"AiR-Way" windows do not interfere with screens or storm windows, which may be applied to them in same way as to ordinary windows operating vertically. This inside-opening feature also precludes damage to windows from banging in the wind.

It is usually advisable not to hinge more than four sash together to be folded in one direction.

Height of window does not affect operation of this hardware, but the hardware is designed for sash not more than 12 sq. ft. in area, and maximum width of sash not to exceed 24 in.

It is advisable to keep each opening within the limitation of a span 11 ft. in width for windows having transom sash when this company's standard design of transom bar is used, or 16 ft. for windows having no transom sash, and a total vertical sash height of 6 ft. Spans can be kept down to this size conveniently by the use of solid mullions.

Sash must be constructed according to special details shown on next page.

Directions furnished with hardware enable any competent carpenter to install these windows.

"AiR-WAY" LETS THE OUTDOORS IN

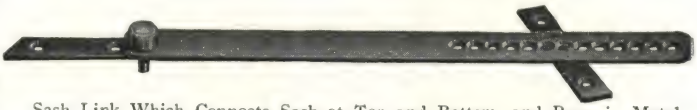
Ventilation

"AiR-Way" hardware gives opportunity to throw open the entire window frame, or one sash at any particular point in string of sash (see illustration); or any number of sash desired.

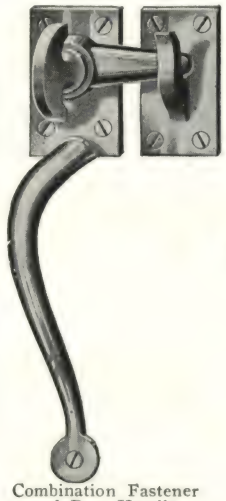
The windows may be placed in such position that the wind will not blow directly into the room, by opening that section of the string which faces against the wind.

Windows may be constructed with stationary mullion or moving split mullion, part moving to the right and part to the left; or they may be arranged to move all in one direction.

The sash fold together when wide open and at an angle against the casing at the edge of the window, leaving practically all of the window opening clear of obstructio-



Sash Link Which Connects Sash at Top and Bottom, and Runs in Metal Tracks Used as Top and Bottom Guides

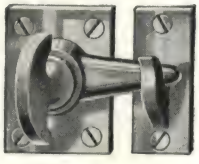


Combination Fastener and Bow Handle

Chafing Plate

Rubber Stop

Safety Lock



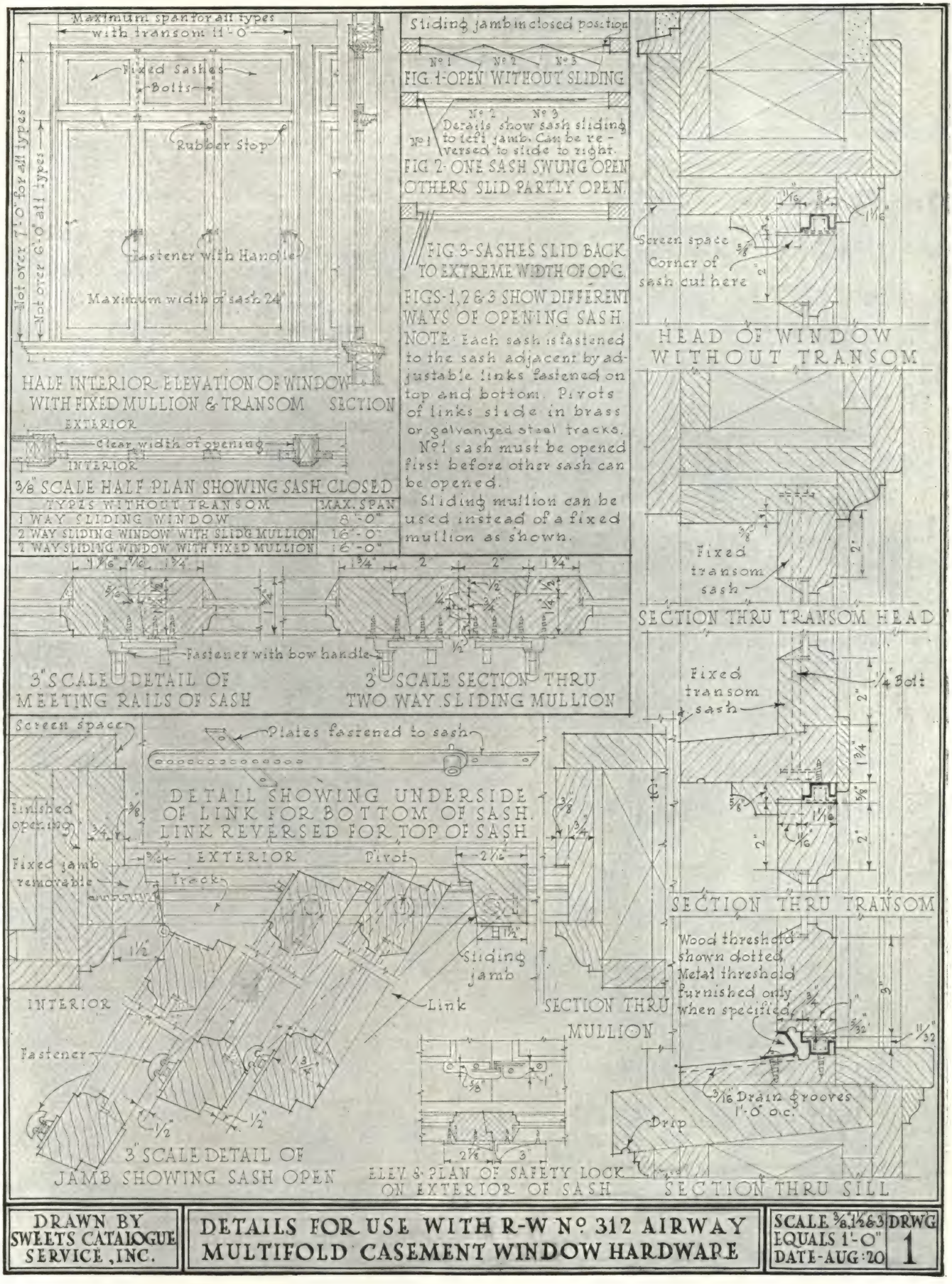
Finger Grip Fastener

HARDWARE FOR "AiR-WAY" MULTIFOLD WINDOWS

Two types of fasteners and handle are employed, one with bow handle and one without. For high windows it is advisable to use 2 fasteners for each sash, the bow handle near the bottom and the finger grip type near the top.

"AiR-Way" is furnished in 3 regular finishes; solid brass, brush brass finish; brass plated, brush brass finish; and dull black imitation bower-barff

Continued on next page


Maximum span for all types with transom 11'-0"
Fixed Sashes
Bolts
Rubber Stop
Fastener with Handle
Maximum width of sash 24"
Not over 7'-0" for all types
Not over 6'-0" all types
HALF INTERIOR ELEVATION OF WINDOW WITH FIXED MULLION & TRANSOM SECTION
EXTERIOR
Clear width of opening
INTERIOR
3/8" SCALE HALF PLAN SHOWING SASH CLOSED
TYPES WITHOUT TRANSOM | MAX. SPAN
1 WAY SLIDING WINDOW | 8'-0"
2 WAY SLIDING WINDOW WITH SLIDG MULLION | 16'-0"
2 WAY SLIDING WINDOW WITH FIXED MULLION | 16'-0"
Sliding jamb in closed position
No 1
No 2
No 3
FIG. 1-OPEN WITHOUT SLIDING
No 2
No 3
No 1
Details show sash sliding to left jamb. Can be reversed to slide to right.
FIG 2- ONE SASH SWUNG OPEN OTHERS SLID PARTLY OPEN.
FIG 3-SASHES SLID BACK TO EXTREME WIDTH OF OPG.
FIGS-1,2 & 3 SHOW DIFFERENT WAYS OF OPENING SASH.
NOTE: Each sash is fastened to the sash adjacent by adjustable links fastened on top and bottom. Pivots of links slide in brass or galvanized steel tracks.
No 1 sash must be opened first before other sash can be opened.
Sliding mullion can be used instead of a fixed mullion as shown.
Fastener with bow handle
3" SCALE DETAIL OF MEETING RAILS OF SASH
3" SCALE SECTION THRU TWO WAY SLIDING MULLION
Screen space
Plates fastened to sash
DETAIL SHOWING UNDERSIDE OF LINK FOR BOTTOM OF SASH. LINK REVERSED FOR TOP OF SASH
Finished opening
Fixed jamb removable
EXTERIOR
Track
Pivot
Sliding jamb
INTERIOR
Link
Fastener
3" SCALE DETAIL OF JAMB SHOWING SASH OPEN
ELEV. & PLAN OF SAFETY LOCK ON EXTERIOR OF SASH
Screen space
Corner of sash cut here
HEAD OF WINDOW WITHOUT TRANSOM
Fixed transom sash
SECTION THRU TRANSOM HEAD
Fixed transom sash
1/4" Bolt
SECTION THRU TRANSOM
Wood threshold shown dotted. Metal threshold furnished only when specified.
3/16 Drain grooves 1'-0" o.c.
Drip
SECTION THRU SILL
SECTION THRU MULLION
DRAWN BY SWEETS CATALOGUE SERVICE, INC.
DETAILS FOR USE WITH R-W No 312 AIRWAY MULTIFOLD CASEMENT WINDOW HARDWARE
SCALE 3/8, 1 1/2 & 3 EQUALS 1'-0" DATE-AUG 20
DRWG 1

W. E. PUTNAM

Manufacturer of Casement Window Adjusters

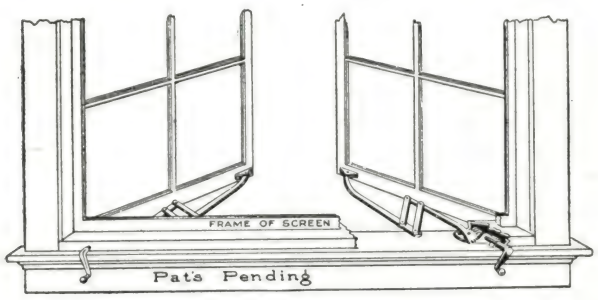
134 Exchange Street
WORCESTER, MASS.

Product

CASEMENT WINDOW ADJUSTERS.

Everlock Casement Window Adjuster

The Everlock is a successful solution of the troublesome problem of operating out-swinging sash.



CASEMENT SASH ADJUSTER APPLIED

This is a rack, worm and lever device, whose mechanism is concealed and is operated by a handle protruding from the inside face of the trim. It automatically locks at any position of the window and works positively at all times. This device opens the window to a full right angle. It is easily installed in any new or old building without cutting.

This device has long been needed as it operates from the inside without disturbing the screen, draperies, etc.

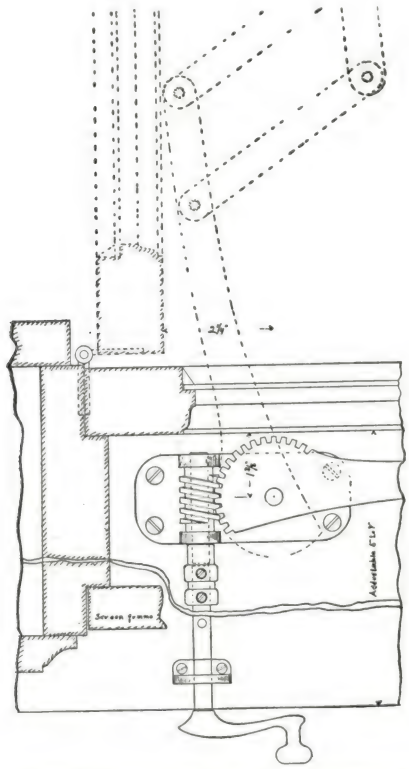
Screen can be made to cover the entire opening and need not be removed until the fly season is past.

Construction

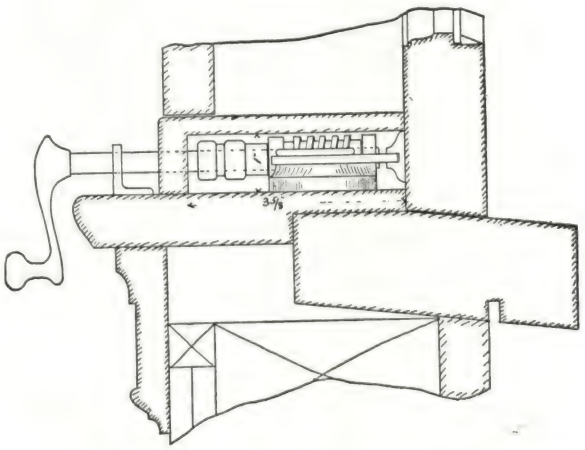
The Everlock adjuster is made of cold rolled steel, electro-galvanized. The operating shaft handle and guard bracket is made of solid bronze or brass. Our standard finish of handle is dull brass.

The standard size is suitable for sash 18 in. wide and over. For sash less than 18 in., a special size is furnished. The operating shaft is made adjustable to fit any stool from 5 up to 7 in. wide, but can also be furnished for any width stool. The adjuster should be placed on the stool so that the center of the pivot, on which the geared arm swings, will be 2¼ in. from face of sash when opened at right angles and 1⅜ in. when closed.

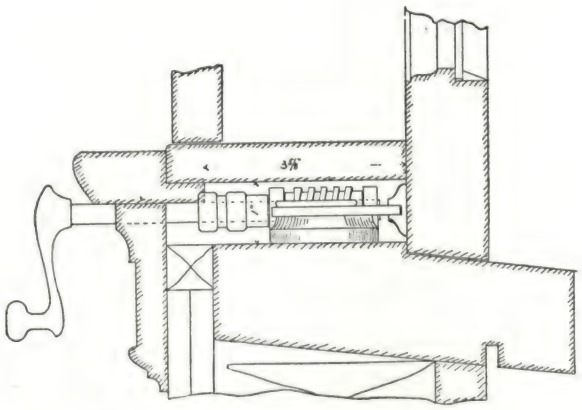
Sash should be hung with narrow butts and set as near flush with outside of sash as possible.



Section through side jamb, and showing location of adjuster on stool



Section showing adjuster on top of stool entirely concealed, except handle



Section showing adjuster below stool entirely concealed, except handle

DETAILS OF EVERLOCK CASEMENT WINDOW ADJUSTER

GEORGE LESTER WILKINS

Manufacturer of Casement Adjusters

1775 Lunt Avenue

CHICAGO, ILL.

Products

CASEMENT ADJUSTERS for Out-swinging Casement Windows.

Casement Windows

The practicability of casement windows depends on two fundamental conditions. First, the design of the sash and frame, and second, the practicability of the casement adjuster used. Casement windows have been, are being, and will be designed and used satisfactorily in all classes of building work, which is convincing evidence of their popularity.

Details—Architectural drawings are given on the following pages, showing satisfactory construction that has been used in connection with casement windows. It is suggested that if architects and designers consult these details, adjusting them to suit their own particular ideas as to moldings, etc., in designing casements, satisfactory results will be obtained. Adjusters may be concealed if desired. Details suggesting concealed adjusters are also shown on the following pages.

Wilkins Casement Adjusters

Made of best manganese bronze, with locking device of best case hardened steel. Adjuster block should be so placed that the sash will swing out nearly to a right angle, but not past it. Finished as desired, and to match other manufacturers' hardware.

Style A, Size 1—For general use on sash 12 to 28 in. wide, where distance between screen and sash is not less than 1¾ in. nor more than 3 in. The most satisfactory result is obtained when distance between screen and sash is 2 in. and greatest width of sash does not exceed 26 in. Placing butts so pin is as close to sash and jamb as possible aids in making a satisfactory job.

Style A, Size 2—For use on sash 18 to 36 in. in width, where distance between screen and sash is not less than 1⅞ in. nor more than 5 in. Normal distance is about 2¼ in.

Style B, Size 1—Used on same size sash as Style A, Size 1, but minimum distance between screen and sash may be as narrow as ⅞ in. This distance between screen and sash is considered too close except for very special cases.

Style B, Size 2—Used on same size sash as Style A, Size 2, but minimum distance between screen and sash may be as narrow as 1⅛ in.

Details of Application, Style A—*Size 1*—Length of tube or track on sash, 12 in. Lever 7¾ in. from center of hub to end. Handle 4⅞ in. from end to center of hub. Block 4⅝ in. long over all, 1 in. wide and ⅞ in. high.

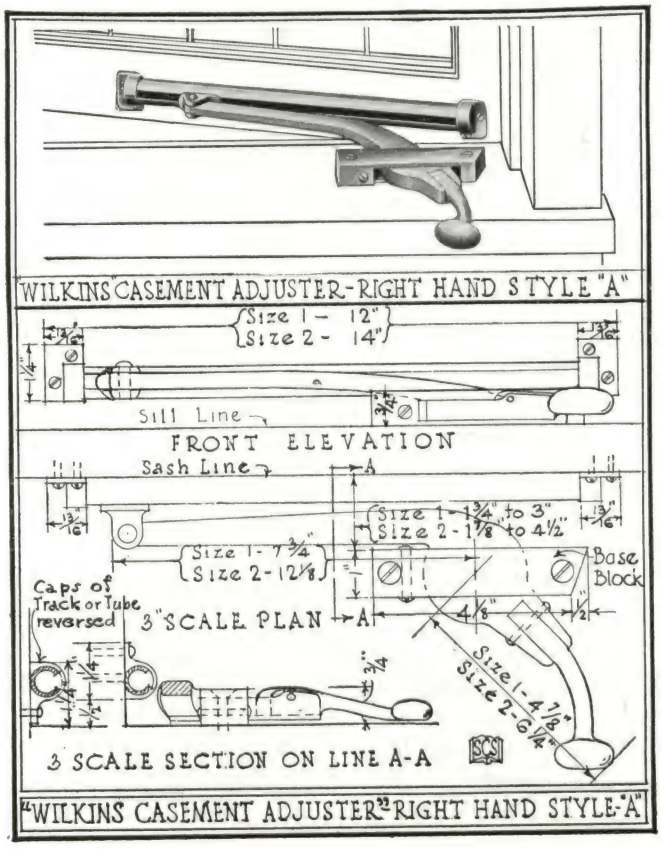
Size 2—Length of tube or track on sash, 14 in. Lever 12⅛ in. from center of hub to end. Handle 6¼ in. from end to center of hub. Block same as Size 1.

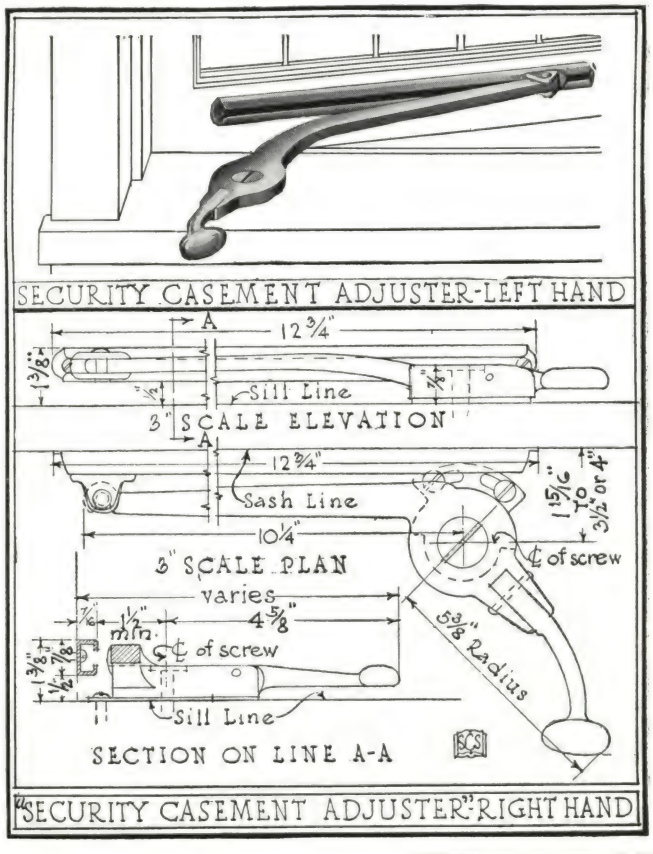
Security Casement Adjusters

The Security casement adjuster is a modification of the Wilkins casement adjuster, both operating on the same principle although they are not exactly alike.

Costs less than Wilkins adjusters. Malleable iron, with slide and guide tube of steel. One style for sash not less than 15 in. wide, and where space between screen and sash is not less than 1¾ in. Adjuster should be so placed that sash can not swing beyond a right angle; or opening in lower rail of screen should be cut, so that adjuster can not swing farther. Finished as desired and to match other manufacturers' hardware.

Any further measurements or details will be furnished on request.





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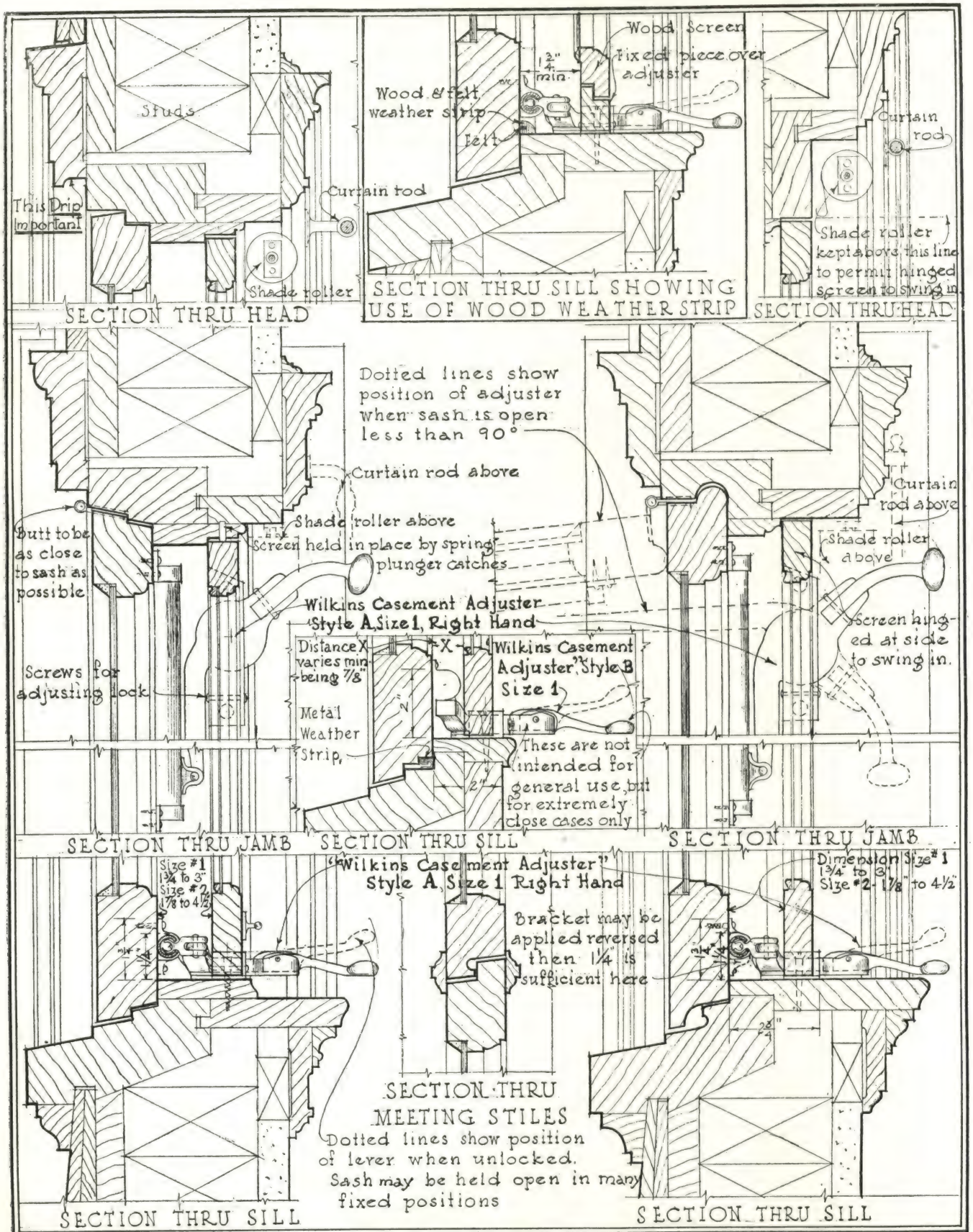

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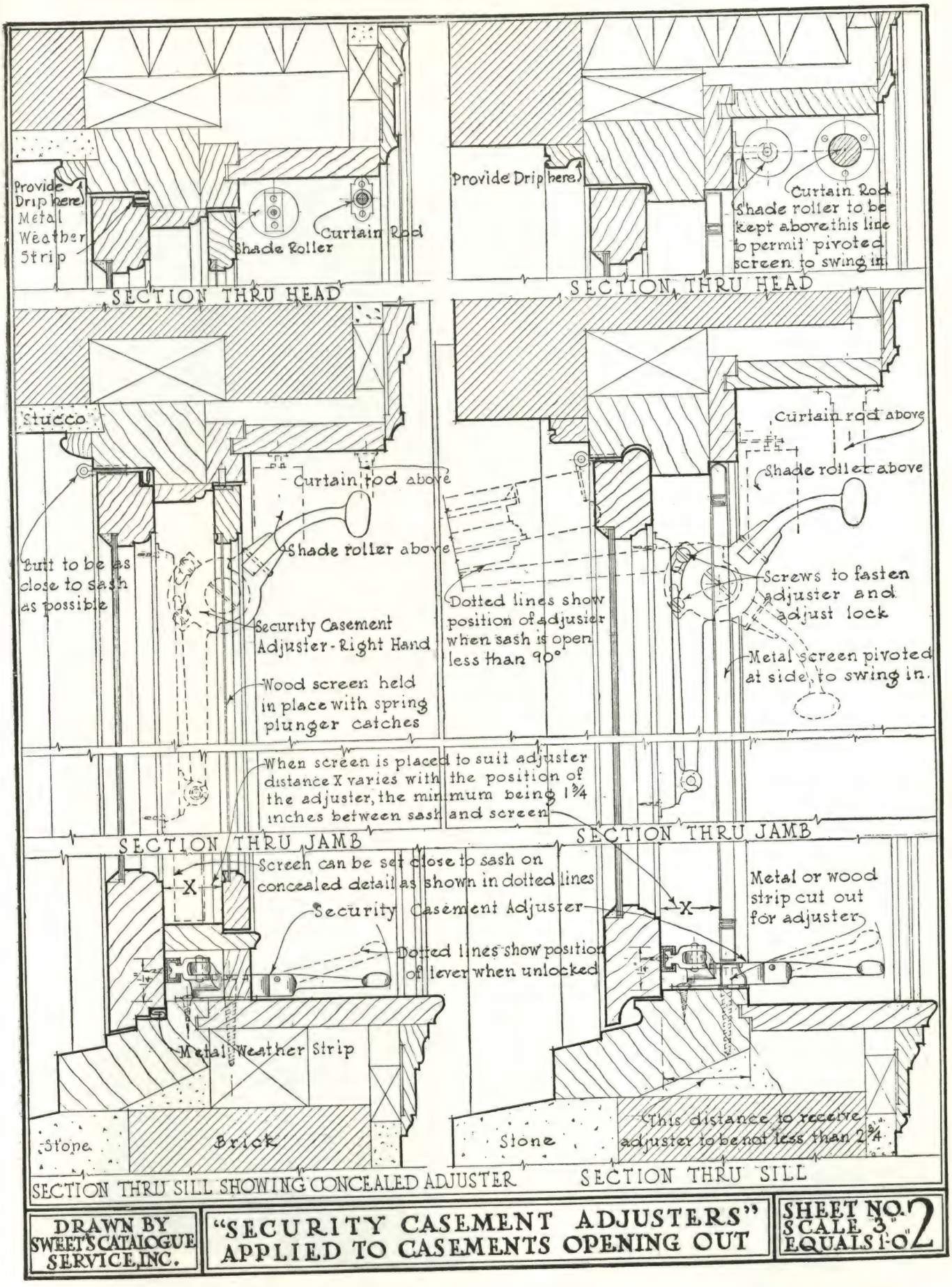


DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	"SECURITY CASEMENT ADJUSTERS" APPLIED TO CASEMENTS OPENING OUT	SHEET NO. 2 SCALE 3" EQUALS 1'-0"

VAN KANNEL CORPORATION

Manufacturers of Automatic Exit Devices

250 West 54th Street
NEW YORK, N. Y.

DISTRIBUTED THROUGH HARDWARE TRADE AND MANUFACTURERS' AGENTS

Product

VAN KANNEL AUTOMATIC EXIT DEVICES.

For Revolving Doors, Building Directories and Bulletin Boards, see pages 788-789.

Patents

Several patents granted and pending.

Van Kannel Devices

Van Kannel automatic exit devices are made for any type of building and insure instant opening upon the slightest pressure of hand or body on releasing bar or plate.

The Van Kannel plate control is especially valuable in school use as no obstruction can get between plate and door to make lock inoperative.

Doors and casement windows should be absolutely secure, but the possibility of fire or panic demands that they give instant freedom.

Slogan

"Security and Freedom."

Description

Van Kannel automatic exit devices are: standardized in construction; simple in mechanism; easily applied and insure perfectly operated doors; reversible and can be applied to either right- or left-hand doors without the necessity of ordering locks to suit special conditions; are equipped with special dogging devices to hold the bolts in retracted position permitting doors to swing freely without looking. The dogging devices release with a key or simple catch when desired, and can be used in connection with knob or latch combination of any standard hardware, either surface or mortise type.

Van Kannel automatic gravity exit devices are positive in action, operating without springs.

Materials—Furnished in brass, bronze or iron.

Finishes—Standard finishes are polished brass or bronze, iron painted enamel. Regular hardware standard finishes extra.

Uses—Van Kannel automatic exit devices are used on double and single doors, on double and single casement windows, interior and intercommunicating doors. The same device can be used on active or standing doors.

Indorsements

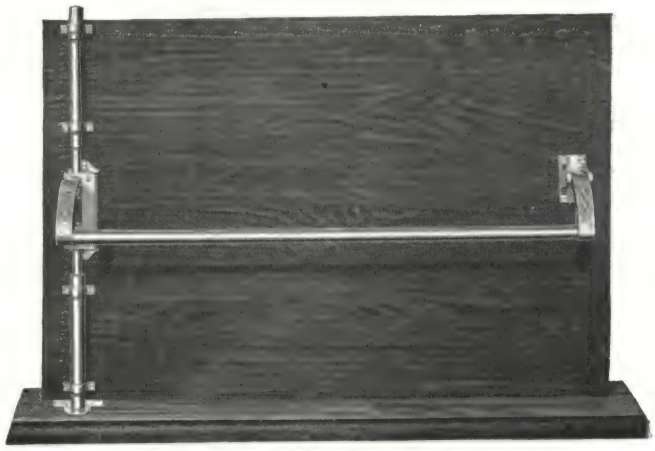
Underwriters' Laboratories, Inc., of Chicago.
Board of Standards of New York City.
Fire Department, New York City.
Aetna Fire Insurance Company.
Fidelity & Casualty Company, and others.

Prices

Prices are list, f.o.b. New York. Terms, 2% for cash in ten days. Distribution through agencies and hardware dealers. Prices alike to all.

Styles

Style A, 3-way bolt, plate control.
Style B, 2-way bolt, plate control.



STYLE "E" 2-WAY BOLT BAR CONTROL

Style C, 1-way bolt, plate control.

Style D, 3-way bolt, bar control.

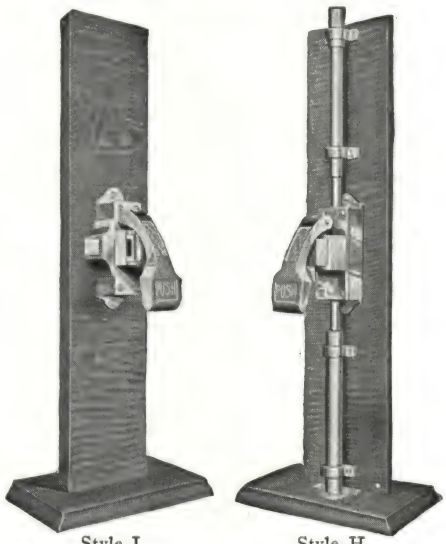
Style E, 2-way bolt, bar control.

Style F, 1-way bolt, bar control.

Style G, 3-way bolt, push handle control.

Style H, 2-way bolt, push handle control.

Style I, 1-way bolt, push handle control.



Style I Style H

PUSH HANDLE CONTROL

STYLE A. 3-WAY BOLT PLATE CONTROL

VONNEGUT HARDWARE CO.

Manufacturers and Distributers of Von Duprin Self-releasing Fire Exit Devices

INDIANAPOLIS, IND.

BRANCH OFFICES

UNITED STATES OF AMERICA

BALTIMORE, MD., Geo. E. Sponsler, 506 Title Annex Building—Telephone, St. Paul 3571
BIRMINGHAM, ALA., C. S. Caldwell, 1920 Third Avenue—Telephone, Main 3000 and 115
CHICAGO, ILL., J. C. Bold & Co., Conway Building, Clark and Washington Streets—Telephone, Franklin 4888
CLEVELAND, OHIO, Harrie E. Weed, 1279 Ethel Avenue—Telephone, Lakewood, 432
DENVER, COLO., W. H. Clark, Interstate Trust Building—Telephone, York 3591
EL PASO, TEX., C. C. Gaines, 359 First National Bank Building—Telephone, 463
HOLYOKE, MASS., James E. Bronner, 143 Sargent Street
LOS ANGELES, CAL., W. H. Steele, 600 Metropolitan Building—Telephones, F-6450 and Main 5225
NASHVILLE, TENN., Geo. W. Ruth & Company, 61 Arcade—Telephone, Main 2565
NEW YORK, N. Y., Grant Pulley & Hardware Company, 101 Park Avenue—Murray Hill 778
OMAHA, NEBR., Earl S. Lewis & Co., 602 Paxton Block
PEORIA, ILL., H. F. Kircher & Co.
PHILADELPHIA, PA., T. B. Hendrickson Company, 521 Commerce Street—Both telephones
PORTLAND, OREGON, D. E. Fryer & Co., Gasco Building
SAN ANTONIO, TEX., T. J. Thornhill, 507 Bedell Building—Telephone, Main 3141
ST. LOUIS, MO., W. E. Way, 825 Chemical Building—Telephone, Olive 3777
TACOMA, WASH., D. E. Fryer & Co., 501 Provident Building
SAN FRANCISCO, CAL., Abeel-Jensen Co., New Call Building—Telephone, Sutter 4122
SPOKANE, WASH., D. E. Fryer & Co., 1023 Paulson Boulevard—Telephone, Main 4453
TACOMA, WASH., D. E. Fryer & Co., 1124 National Realty Building—Telephone, Main 1782
WASHINGTON, D. C., T. B. Hendrickson Company, 521 Commerce Street, Philadelphia, Pa.—Both telephones
WATERLOO, IOWA, Iowa Building Material Co., 410-411 Blackhawk Building—Telephone, 1387

DOMINION OF CANADA: BELLEVILLE, ONT., Springer Lock Mfg. Co.

FOREIGN

ENGLAND and the UNITED KINGDOM: LONDON, H. Wright & Co., 59 Caversham Road, Kentishtown, N. W. 5
FRANCE: H. Wright & Co., 59 Caversham Road, Kentishtown, N. W. 5, London, Eng.
AUSTRALIA: F. Lindsay Thompson, 52 Sydney Arcade, King Street, Sydney, N. S. W.
NEW ZEALAND: F. Lindsay Thompson, 52 Sydney Arcade, King Street, Sydney, N. S. W.
JAPAN: TOKYO, F. W. Horne Company, 6 and 7 Takiyamacho Kyobashiku
INDIA: AMRITSAR, Habib Ullah & Sons, P. O. Box 75

UNITED STATES FACTORIES, CHICAGO, NORTH CHICAGO, ILL., AND INDIANAPOLIS, IND.
CANADIAN FACTORY, BELLEVILLE, ONT.

Products

Von Duprin Self-releasing Fire Exit Devices

Von Duprin Automatic Door Holders.

Von Duprin
TRADE-MARK
(Registered U. S. Pat. Off., No. 85021)

Patents

Patented in the United States and Canada. Other patents pending.

Von Duprin Self-releasing Fire Exit Devices

These fire exit devices represent a simple and effective solution of the problem of eliminating the danger of persons being trapped in burning buildings through difficulty in opening the doors.

Principal Features—A substantial brass bar passes across the full width of the door, on the inside, about waist high. This bar projects from the door and connects directly with the mechanism of the locking devices.

A slight pressure on the double acting cross bar, toward or from the door, at any point, will instantly release deadlock and latches.

During a panic the rush of people will unavoidably press the bar, and thus open the doors to safety.

A child can operate it without difficulty.

The usual hardware trim is applied to the outside of the door. Made in brass or bronze only.

Self-releasing Fire Exit Latch
For standing door of double entrance doors, or both doors of double exit doors

Continued on next page

Simple, Strong, Symmetrical, Durable—Parts subject to hard service are made *very extra heavy*. Elementary parts are made uniformly light, in order to avoid the necessity for extra heavy hinges and door checks. Von Duprin devices need no heavier door checks than are ordinarily used with reguar locks.

All vertical rods are *solid brass or bronze*.

These devices can not be blocked by accident or design.

Perhaps not the cheapest, but by far the best, and consequently the cheapest in the end.

Slogan

"Safe Exit is a Universal Demand."

Prices

Prices are list, f.o.b. cars, factories, Indianapolis, Ind., Chicago, North Chicago, Ill., or Belleville, Ont.

Terms—*2%* for cash in 10 days.

Canadian architects will please use Canadian list.

Note: For sale by all hardware dealers (*insuring legitimate competition*) with whom a *special contract* is made, *with prices alike to all.*

Competitive Devices

We make a complete line of cheaper devices *only for competitive work*. Nothing can be said for them except that they are lower in price than the Von Duprin line and *are better than any other devices at the same price*.

They are not illustrated, for it would only confuse the architect, as it is assumed that architects using "Sweet's Architectural Catalogue" want nothing but highest grade, commendable goods.

Approvals

United States Government (War Department) Ordnance Department, appropriation for armament of Fortifications 'C," hospitals, etc.

United States Government (Municipal Department), Snowden Ashford, Architect

United States Government (Treasury Department), Bureau of Engraving and Printing Building

Australian Government, Geo. McRae, Government Architect, N. S. W.

New York Board of Standards (N. Y. City Fire Dept.), Deputy Fire Commissioner

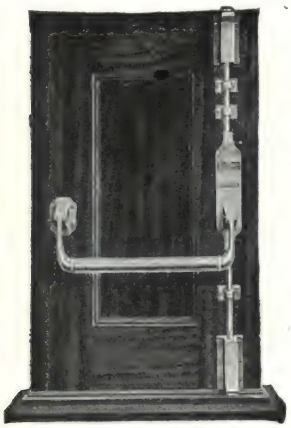
New York Board of Fire Underwriters, New York, N. Y.

New York Bureau of Buildings (Borough of the Bronx), New York, N. Y.

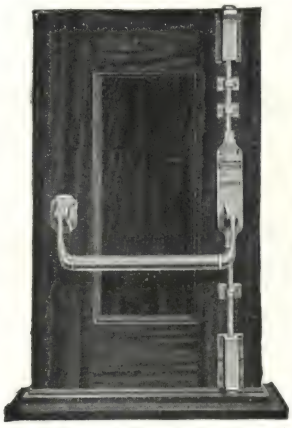
National Board of Fire Underwriters, Chicago, Ill.

Members of International Association of Building and Factory Inspectors

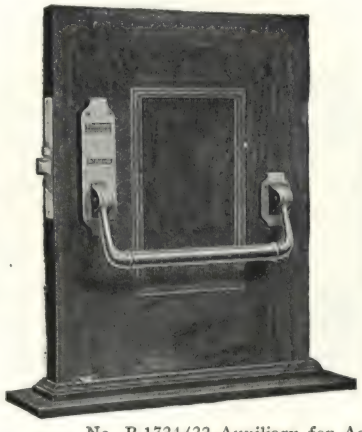
London, England, Canadian Red Cross Society, especially approved and used for hospitals



No. B-1127, Type "B" for Standing Door
With top and bottom strikes

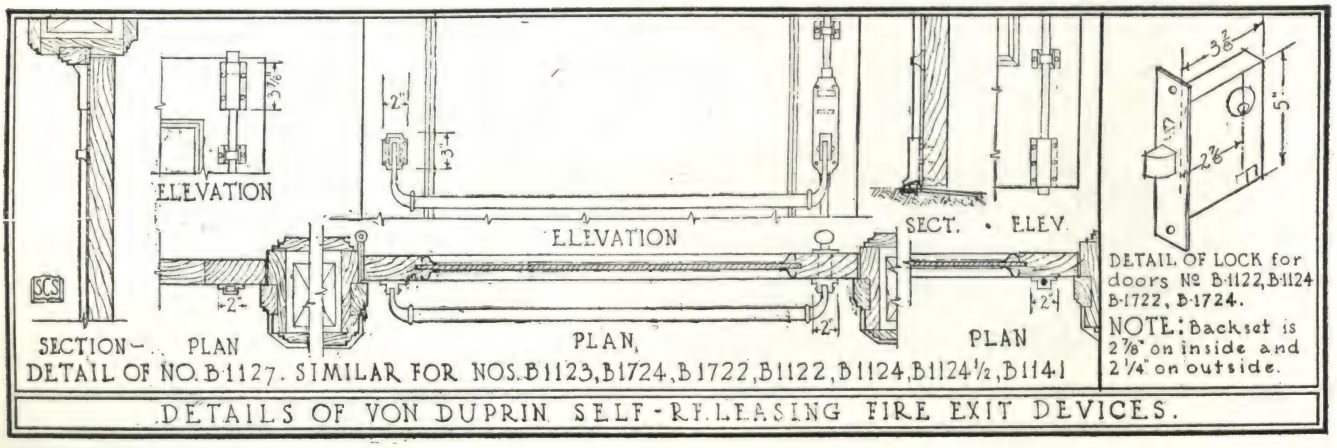


No. B-1123, Type "B" for Active Door
With knob and escutcheon, (top and bottom strikes)



No. B-1724/22 Auxiliary for Active Door
With grip and thumb piece, and open throat strike

Von Duprin Self-releasing Fire Exit Devices



DETAILS OF VON DUPRIN SELF-RELEASING FIRE EXIT DEVICES.

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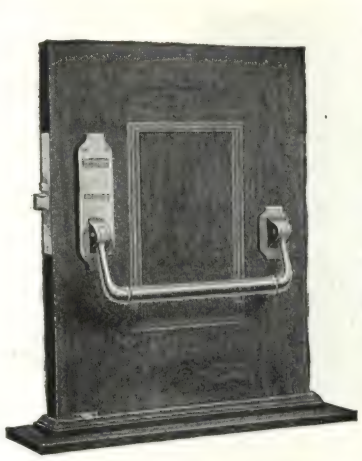


No. B-1722/22 Auxiliary Type "B" for Active Door
With knob and escutcheon, and open throat strike

No. B-1141 Type "B" for Active Door
With cylinder and open throat strike

No. B-1124/22 Type "B" for Single Door
With grip and thumb piece, and guarded strike

VON DUPRIN SELF-RELEASING FIRE EXIT DEVICES

Specifications

Note to Architects—To secure *"Von Duprin Service,"* we strongly suggest adopting the following specifications, which give the advantage of our newest type cross bar action, which is "to-or-from" the door; likewise, the new symmetrical vertical type of lock case, which eliminates many elementary parts heretofore used, simplifying the working parts, *thereby insuring the highest possible efficiency.*

These specifications are particularly adaptable to schools and theaters.

Door Stiles—Door stiles for mortise lock should be 4½ in. or wider.

Astragal—To obtain the feature of "independent-acting" double doors (which is a very important factor in quick release), specify astragal shown on this page.

Threshold Strikes—Our No. 1 is standard. We make strikes for all conditions (see next page for standard thresholds by leading architects).

COMBINATION NO. 1—NO. B-1127 AND B-1123, WITH DOG FEATURE

For Double Entrance Doors—

Furnish for standing door, No. B-1127 Von Duprin, Type "B" (Self-latching bolt heads), Self-releasing Fire Exit Device.

Furnish for active door, No. B-1123 Von Duprin, Type "B," Self-releasing Fire Exit Device.

Keys to be alike, and master-keyed under.....[City] Master Key System.

Each device to be equipped with No. B Von Duprin Dogging Device, with lock attachment.

All strikes to detail.

Price per set, complete, polished brass or bronze.....$68.10
Price per set, complete, standard finishes..... 72.30

COMBINATION NO. 2—NO. B-1127 AND B-1724/22 AUXILIARY, WITH DOG FEATURE

For Double Entrance Doors—

Furnish for standing door, No. B-1127 Von Duprin, Type "B" (Self-latching bolt heads), Self-releasing Fire Exit Device.

Furnish for active door, No. B-1724/22 Auxiliary Von Duprin, Type "B," Self-releasing Fire Exit Device, with grip and thumb piece and cylinder lock, open throat strike and buffer.

Keys to be alike, and master-keyed under.....[City] Master Key System.

Each device to be equipped with No. B Von Duprin Dogging Device, with lock attachment.

All Strikes to detail.

Price per set, complete, polished brass or bronze.....$62.90
Price per set, complete, standard finishes..... 66.10

COMBINATION NO. 3—B-1127 AND B-1722/22 AUXILIARY, WITH DOG FEATURE

For Double Entrance Doors—

Furnish for standing door, No. B-1127 Von Duprin, Type "B" (Self-latching bolt heads), Self-releasing Fire Exit Device.

Furnish for active door, No. B-1722/22 Auxiliary Von Duprin, Type "B," Self-releasing Fire Exit Device, with knob and escutcheon and cylinder lock, open throat strike and buffer.

Keys to be alike, and master-keyed under.....[City] Master Key System

Each device to be equipped with No. B Von Duprin Dogging Device, with lock attachment.

All Strikes to detail.

Price per set, complete, polished brass or bronze.....$62.35
Price per set, complete, standard finishes..... 65.55

COMBINATION NO. 5—NO. B-1124/22

For Single Entrance Doors—

Furnish with No. B-1124/22 Von Duprin, Type "B," Self-releasing Fire Exit Device, with grip and thumb piece and cylinder lock, and No. B Von Duprin Dogging Device with lock attachment.

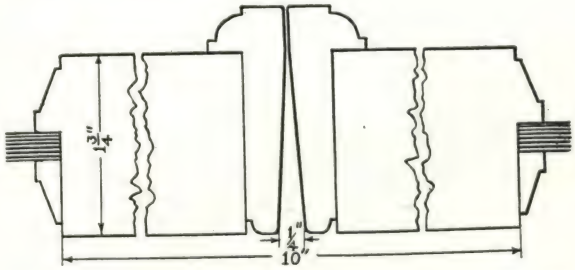
Keys to be alike, and master-keyed under.....[City] Master Key System.

Price complete, polished brass or bronze.....$32.40
Price complete, standard finishes..... 33.75

COMBINATION NO. 6—NO. B-1122/22

For Single Entrance Doors—

Furnish with No. B-1122/22 Von Duprin, Type "B," Self-releasing Fire Exit Device, with knob and escutcheon and



DETAILS OF VON DUPRIN ASTRAGAL FOR INDEPENDENT ACTING DOORS

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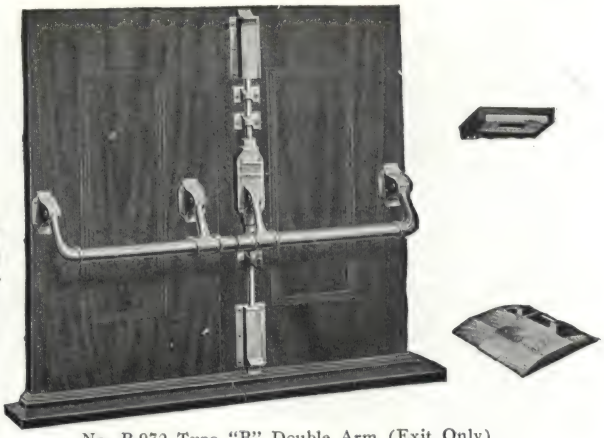
No. B-1122/20 Type "B" for Single Door
With knob and escutcheon, and guarded strike

No. B-1124½ Type "B" for Single Door
With guarded strike



No. B-972 Type "B" Double Arm (Exit Only)
With top and bottom strikes

VON DUPRIN SELF-RELEASING FIRE EXIT DEVICES

cylinder lock, and No. B Von Duprin Dogging Device with lock attachment.

Keys to be alike, and master-keyed under.....[City] Master Key System.

Price complete, polished brass or bronze.....$31.85
Price complete, standard finishes..... 32.20

COMBINATION No. 7—No. B-1124½V

For Single Emergency Exit Doors Adjacent to Entrance Doors (not regularly used as Entrance but for Emergency Exit only)—

Furnish No. B-1124½V Von Duprin, Type "B," Self-releasing Fire Exit Device (no hardware outside), with control for retracting the latch bolt to reverse locked position.

Price complete, polished brass or bronze.....$20.30
Price complete, standard finishes..... 21.10

COMBINATION No. 8—No. B-1127 AND B-1141, WITH DOG FEATURE

For Double Emergency Exit Doors (used only as Emergency Exit, but to be under key control to gain entrance from outside)—

Furnish for standing door, No. B-1127 Von Duprin, Type "B" (Self-latching bolt heads), Self-releasing Fire Exit Device.

Furnish for active door, No. B-1141 Von Duprin, Type "B," Self-releasing Fire Exit Device, with cylinder lock (no outside trim).

No. B Von Duprin Hook Dogging Device, with lock attachment, to be used in connection with No. B-1127 Device.

Keys to be alike, and master-keyed under.....[City] Master Key System.

Price per set, complete, polished brass or bronze.....$58.00
Price per set, complete, standard finishes..... 60.70

COMBINATION No. 9—No. B-1124½V

For Single Fire Escape Doors—

Furnish No. B-1124½V Von Duprin, Type "B," Self-releasing Fire Exit Device, with control for retracting the latch bolt to reverse locked position.

Price complete, polished brass or bronze.....$20.30
Price complete, standard finishes..... 21.10

COMBINATION No. 10—No. B-972

For Double Doors (Exit Only) for Theaters—

Furnish No. B-972 Von Duprin, Type "B" (Self-latching bolt heads), Double Arm Self-releasing Fire Exit Device, with No. B Von Duprin Dogging Device with lock attachment.

Price complete, polished brass or bronze.....$44.40
Price complete, standard finishes..... 47.10

COMBINATION No. 12—No. B-1127

For Double Exit Doors (with overlapping Astragal) for Theaters—

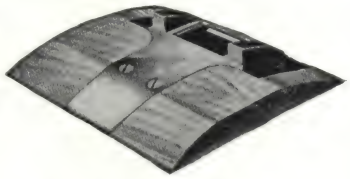
Door having the astragal, and which opens first, to be provided with No. B-1127 Von Duprin, Type "B" (Self-latching bolt heads), Self-releasing Fire Exit Device, with No. B Von Duprin Dogging Device with lock attachment.

Price complete, polished brass or bronze.....$30.30
Price complete, standard finishes..... 32.15

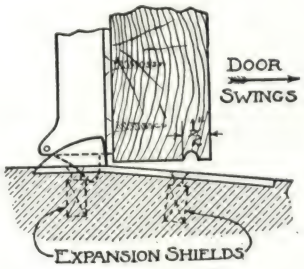
Von Duprin Sill or Threshold Strikes

No. 1 bottom strike, showing threshold. 5/8-in. clearance.

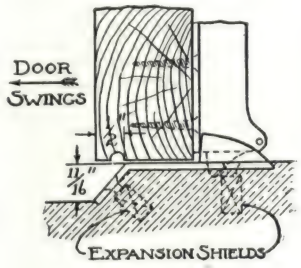
This style strike furnished on all orders, unless otherwise specified.



No. 1. BOTTOM STRIKE

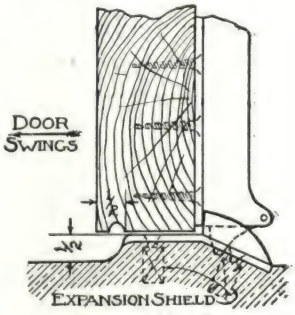


STRIKE No. 2



STRIKE No. 3

STRIKE No. 4



STRIKE No. 5

Von Duprin Latch Dogging Device

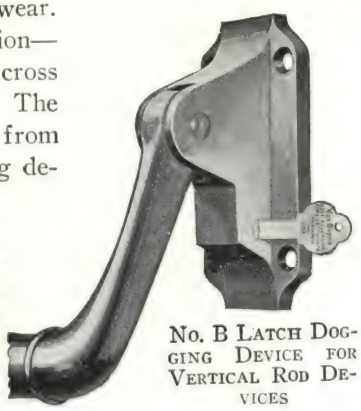
The Von Duprin latch dogging device, which is now furnished on all Von Duprin self-releasing fire exit devices, transforms the door action into a push and pull type. By locking the latches in a retracted posi-

Continued on next page

tion, it eliminates spring wear.

It is simple in operation—simply press down the cross bar and turn the key. The key cylinder is hidden from view, making the dogging device meddleproof.

This dogging device can not be set while the latch or bolt is in the locked position—neither by accident nor design can it prevent the operation of the safety device.



No. B Latch Dogging Device for Vertical Rod Devices

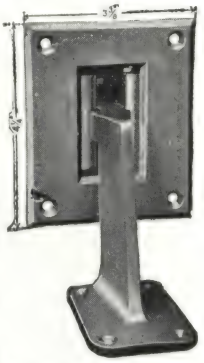
Von Duprin Automatic Door Holder

A high class device, very extra heavy, designed to engage the door at the farthest terminal from the closing point without the necessity of engaging and disengaging same by foot or hand pressure.

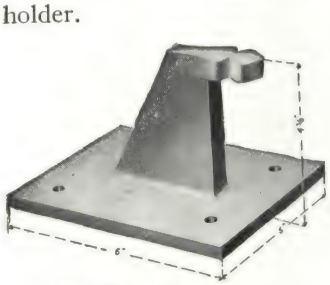
Nothing projecting from the door upon which clothing can be caught.

Made for wall or floor. For concrete or stone.

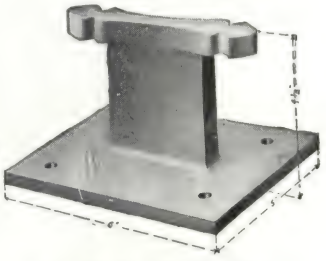
Made in bronze or brass metal only. Acts as a buffer as well as holder.



Elevation Showing Plate and Base Engaged



No. 238 Ex (Single Door)



No. 239 Ex (Double Door)

Elevations Showing Door Holders for Floor

Packed with ⅜x3½-in. bronze bolts with expansions. Also made 6½, 9½ and 10¾ in. high, 238A and 239A

PRICE LIST, VON DUPRIN AUTOMATIC DOOR HOLDERS

No.	Height, in.	Polished brass	Standard finish
238	4⅜	$14.75	$15.00
238A	6½	18.85	19.10
238A	9½	24.20	24.50
238A	10¾	26.95	27.25
239	4⅜	18.35	18.65
239A	6½	22.30	22.60
239A	9½	27.65	27.95
239A	10¾	30.60	30.80

Installations

A partial list of cities in which every school entrance door is equipped with Von Duprin self-releasing devices or which have 200 or more sets in use in schoolhouses:

Aurora, Ill.
Baltimore, Md.
Beardstown, Ill.
Beaver Dam, Wis.
Bloomington, Ill.
Butte, Mont.
Centralia, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ind.
Davenport, Iowa
Dayton, Ohio
Denver, Colo.
Detroit, Mich.
Dover, Ohio
Duluth, Minn.
East Chicago, Ind.
East Orange, N. J.
Effingham, Ill.
Elkhart, Ind.
El Paso, Ill.
Fargo, N. D.
Fond du Lac, Wis.
Goshen, Ind.
Grand Forks, N. D.
Grand Rapids, Mich.
Hannibal, Mo.
Hobart, Ind.
Hoopeston, Ill.
Indianapolis, Ind.
Indiana Harbor, Ind.
Ionia, Mich.
Joliet, Ill.
Joplin, Mo.
Kankakee, Ill.
Kansas City, Mo.
Kendallville, Ind.
Kenosha, Wis.
La Fayette, Ind.
Lakefield, Minn.
Lincoln, Ill.
Logansport, Ind.
Los Angeles, Cal.
Mankato, Minn.
Massillon, Ohio
Mattoon, Ill.
Minneapolis, Minn.
Missoula, Mont.
Moline, Ill.
Momence, Ill.
Muncie, Ind.
New Orleans, La.
Newport, R. I.
North Chicago, Ill.
Norfolk, Nebr.
Oberlin, Ohio
Omaha, Nebr.
Ottawa, Ill.
Pana, Ill.
Peru, Ill.
Philadelphia, Pa.
Pittsburgh, Pa.
Pittsfield, Ill.
Plymouth, Ind.
Pontiac, Mich.
Portland, Ore.
Port Clinton, Ohio
Quincy, Ill.
Richmond, Ind.
Ripon, Wis.
Rochester, Pa.
Rockford, Ill.
St. Louis, Mo.
St. Paul, Minn.
Salem, N. J.
Seymour, Ind.
Sheyboygan, Wis.
Sioux Falls, S. D.
South Bend, Ind.
South Omaha, Nebr.
Streator, Ill.
Taylorsville, Ill.
Terra Haute, Ind.
Traverse City, Mich.
Trenton, N. J.
Urbana, Ill.
Vancouver, B. C.
Vineland, N. J.
Washington, D. C. (United States Government)
Washington, Pa.
Waterloo, Iowa
Watseka, Ill.
Waukegan, Ill.
Waukesha, Wis.
Wheaton, Ill.
Wilmington, Del.
Winchester, Ind.
Woodstock, Ill.
Youngstown, Ohio

A few of the many American industrial plants equipped with Von Duprin self-releasing fire exit latches:

Auerbach Candy Co., New York, N. Y.
American Can Co., all plants in United States
American Mfg. Co., Philadelphia, Pa.
American Wire & Steel Co., Cleveland, Ohio
Bemis Bag Co., all plants in United States
Bevo Plant (Anheuser-Busch Co.), St. Louis, Mo.
Carnegie Steel Co., Farrell, Pa.
Cleveland Twist Drill Co., Cleveland, Ohio
Continental Can Co., Clearing, Ill.
Edison Lamp Works, San Francisco, Cal.
Falk Economizer Building, Milwaukee, Wis.
Federal Cartridge & Machine Co., Anoka, Minn.
Firestone Tire Co., Akron, Ohio
Fleisher Building Manufacturing Plant and Powerhouse, Philadelphia, Pa.
General Motors Co., St. Louis, Mo.
Gensel Iron Works, Philadelphia, Pa.
Girls Hotel, Viscose Co., Roanoke, Va.
Goodyear Tire & Rubber Co., Balloon Testing Plant, Akron, Ohio
Heineman Silk Factory, Chicago, Ill.
Kahn Tailoring Co., Indianapolis, Ind.
Kelly-Springfield Tire Co., Main Building, Cumberland, Md.
Leedy Mfg. Co., Indianapolis, Ind.
Lewis Meier & Company, Indianapolis, Ind.
Missouri Can Co., St. Louis, Mo.
Morehead Knitting Mills, Harrisburg, Pa.
Nordyke & Marmon Factory, Indianapolis, Ind.
Northwestern Bag Co., Minneapolis, Minn.
Painters & Decorators of America Building, La Fayette, Ind.
Philadelphia Electric Co., Delaware Station, Philadelphia, Pa.
Phoenix Knitting Mills, Milwaukee, Wis.
Pitney Lamp Works, Cleveland, Ohio
Remey Electric Division, Anderson, Ind.
Reynolds Tobacco Co., Winston-Salem, N. C.
Safe-Cabinet Co., Marietta, Ohio
Sears, Roebuck Building, Philadelphia, Pa.
Shaffer Oil & Refining Co., Omaha, Nebr.
Shredded Wheat Company, Niagara Falls, N. Y.
Sidenberg Cigar Factory, Camden, N. J.
J. B. Stetson Hat Co., Philadelphia, Pa.
Susquehanna Silk Mills, Sunbury, Pa.
Taggart Baking Co., Indianapolis, Ind.
Textile Realty Co., Factory, Milwaukee, Wis.
U. S. Ammonium Nitrate Plant, Mussel Shoals, Ala.
U. S. Bureau of Printing & Engraving, Washington, D. C.
U. S. Post Office Parcel Post Building, Gary, Ind.
United Drug Co., Boston, Mass.
Vineland Scientific Glass Co., Vineland, N. J.
Westinghouse Airbrake Co., Wilmerding, Pa.
Willys-Overland Co., Toledo, Ohio, Buffalo, N. Y., and New York, N. Y.
Wilson Foundry & Machine Co., Toledo, Ohio
Winchester Repeating Arms Co., New Haven, Conn.
Wisconsin Food Products Co., Milwaukee, Wis.
Wyoming Central Office Building, Bell Telephone Co., Philadelphia, Pa.
Ypsilanti Reed Furniture Co., Ionia, Mich.

T. J. CALLAHAN CO.

Manufacturers of Mechanical Sash Operators

941 South Perry Street

DAYTON, OHIO

Products

MECHANICAL SASH OPERATORS, hand and electrically controlled, for steel or wood sash in factories, foundries, machine-shops, central stations, power-houses, schools, theaters, churches, etc.

Also lighter installations for overhead windows, heavy transoms, etc., in store fronts and offices. Special types for greenhouses.

Types

Type M is the Callahan motor drive with which many new opportunities for fresh air ventilation are offered to the architect. It combines all the advantages of automatic electric operation of worm or gear drive with the Callahan direct action principle of construction.

Type G is worm and gear drive designed for heavy duty hand control. This type is best adapted to runs of extreme length or sash of great weight.

Type S is our standard direct chain drive with hand wheel control. It is simple, strong, flexible and remarkably light running.

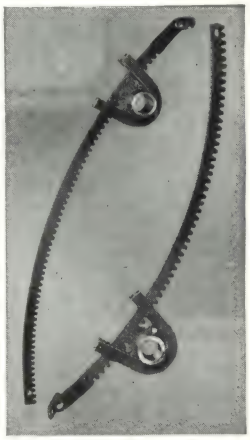
Type O is direct shaft drive for office or store use. It is light, neat appearing, and ample for smaller installations. May be finished to match the hardware.

Direct Action Principle

All Callahan sash operators are of the rack and pinion type and of patented design that embraces some very essential points of superiority.

Note that the rack is circular cut with the distance or leverage from the center of the pipe or line shaft always remaining constant. Thus the torque in the shaft is at all times a minimum regardless of length of rack. This gives Callahan sash operators a direct action that is a decided advantage in opening long lines of top hung, bottom hung or heavy center pivoted sash. And this, in turn, reduces the number of operating stations required to a minimum and enables them to be placed at the most convenient points.

This direct action principle produces a direct thrust which eliminates any tendency to wrench or twist the sash. The free rotary movement of the rack does away with the harmful strains and makes easier operation. It produces also an absolutely tight close down. Convenience, neatness, safety, economy, and ease of operation are unsurpassed in Callahan installations.



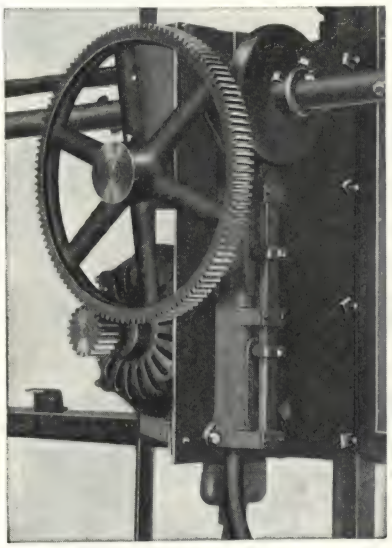
THE CALLAHAN ARM OR RACK

Made convex and concave. Concave arm may be attached to top of sash and arm will follow around with the arm projecting no farther than the sash, thus conserving space—an important advantage where there is crane or other interference. Arms made of different thicknesses of material to accommodate different weights of sash. Supported against pinion by steel rollers revolving on steel spacer rivets, thereby greatly reducing friction. Housings, mild steel; pinion gears, best grade iron castings

Motor Drive

This is the latest development in mechanical sash operators, by far the finest apparatus of its kind that can be purchased. It is remarkably simple and practically foolproof. Control features have been developed so that it requires no attention after once installed and primary adjustments made. Primary control is to be had by means of a push button station, conveniently located, and marked "open," "close," and "stop." Secondary automatic switches automatically limit the opening to 90° or any less predetermined stop, and insure a tight close.

A special feature is a master push button station, which may be centrally located. Equipped with "open," "close," "stop," and "safety" buttons, the master push button station affords a super control of an unlimited number of the above stations and a locked insurance against individual operation when desired.

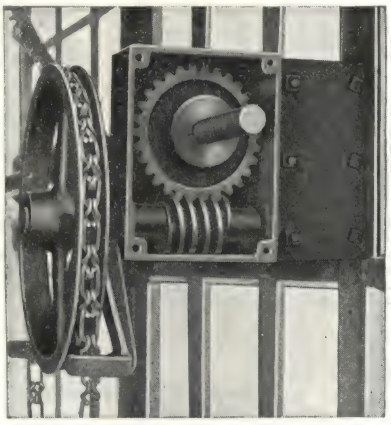


TYPE M DRIVE

The Callahan motor drive with housing removed. Compact and easily erected. Installation includes magnetic control switch and push button control station

Construction

Callahan construction is simple, neat in appearance and exceptionally strong. Fittings of mild steel are used wherever possible or desirable, and where castings are used, they are of the very highest grade.



TYPE G DRIVE

Interior view of worm and gear drive. Machine cut gears used exclusively. Furnished with either endless chain or shaft transmission

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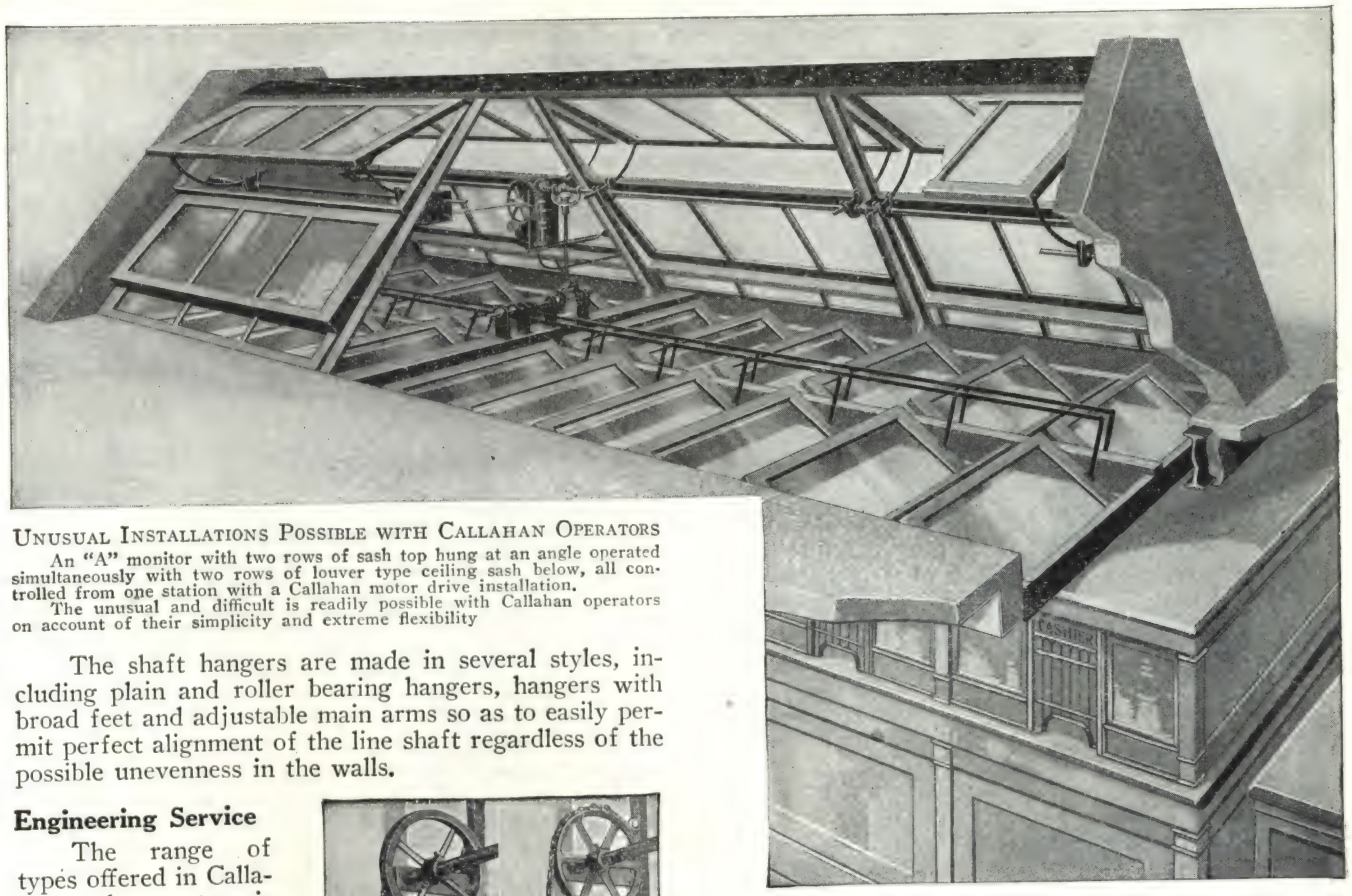


UNUSUAL INSTALLATIONS POSSIBLE WITH CALLAHAN OPERATORS

An "A" monitor with two rows of sash top hung at an angle operated simultaneously with two rows of louver type ceiling sash below, all controlled from one station with a Callahan motor drive installation.

The unusual and difficult is readily possible with Callahan operators on account of their simplicity and extreme flexibility

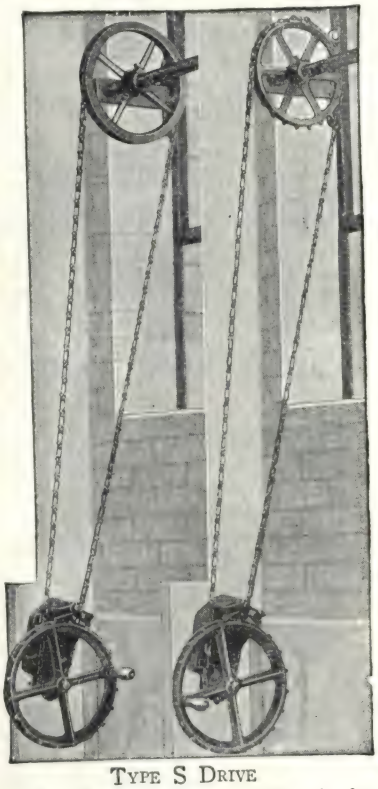
The shaft hangers are made in several styles, including plain and roller bearing hangers, hangers with broad feet and adjustable main arms so as to easily permit perfect alignment of the line shaft regardless of the possible unevenness in the walls.

Engineering Service

The range of types offered in Callahan sash operators is such as to fulfil the requirements of practically all installations. Our Engineering Department is at your service to lay out proper installations and suggest modifications or special designs. Complete instructions for erecting are furnished and installations can easily be made by any mechanic. However, in the case of large or unusually difficult installations, if it is desired, we are prepared to furnish a superintendent.

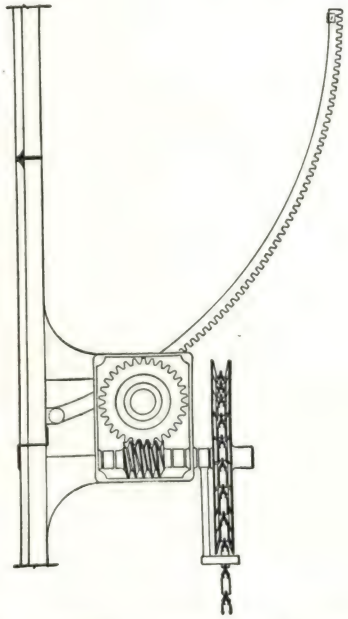
Catalogues

We publish two catalogues — one descriptive of apparatus for industrial plants and one of greenhouse ventilating equipment.



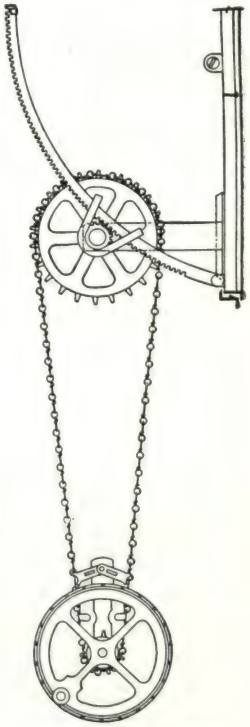
TYPE S DRIVE

The standard industrial drive is furnished with ordinary sprocket wheel (shown on the right) or with sheave wheel where longer transmission chain is necessary. This operator is of universal application, flexible, powerful and dependable, yet easy running, light and neat in appearance



SECTIONAL VIEW TYPE G DRIVE

Power transmitted through worm gear incased in cast iron housing and driven by endless chain or vertical shaft. Grease cup lubrication. Concave or convex arm may be used with any type of sash. Will control up to 320 ft. of center pivoted 3-ft. sash



SECTIONAL VIEW TYPE S DRIVE

Typical of the requirements of almost any sash operating problem. Ratchet on drive wheel locks sash in any position. Limit stops provided for open and closed positions of sash. Will control up to 180 ft. of center pivoted 3-ft. sash

Installations

Callahan sash operators are in use in many of the largest and finest factory buildings in this country. More than two miles of Callahan operators are in the National Cash Register buildings at Dayton.

METALLIC SASH-OPERATOR CO.

Geared Sash Operating Devices for Wood and Metal Sash

Twenty-third and Chestnut Streets
ST. LOUIS, Mo.

CHICAGO REPRESENTATIVES: UNIVERSAL STEEL PRODUCTS CO., 189 West Madison Street

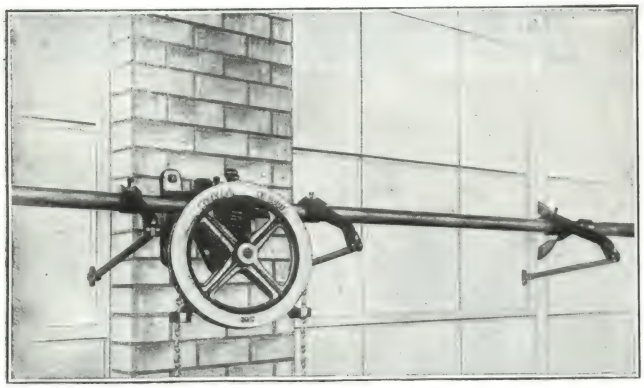
Products

"METALLIC" GEARED SASH OPERATING DEVICES, to control any style or arrangement of sash.

Geared Sash Operators

This company manufactures devices of especial strength and smooth operating characteristics—the result of long and thorough study. Several standard styles are illustrated, but in addition the company makes special styles, meeting every condition.

All styles embody worm and gear, thus automatically locking the sash in any position. Inquiries are invited for devices to meet special conditions not here provided for. Runs of extreme length and great weight have been easily handled by these devices—such installations giving continuous satisfaction.

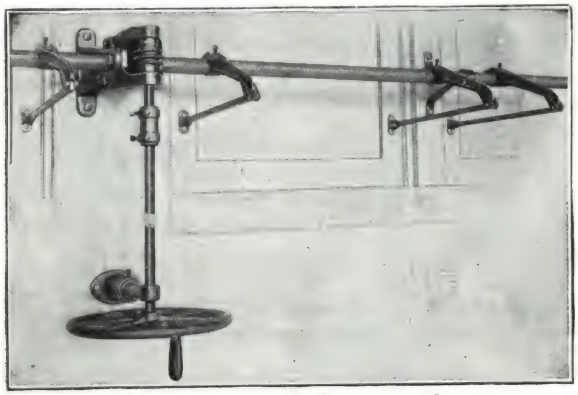


SASH OPERATOR, STYLE NO. 1

Controls side pivoted or top or bottom hinged sash of wood or metal.

Controls 100 ft. or less, depending upon weight and condition of sash. A continuous chain transmits power from the hand to the gear; all parts are of substantial construction.

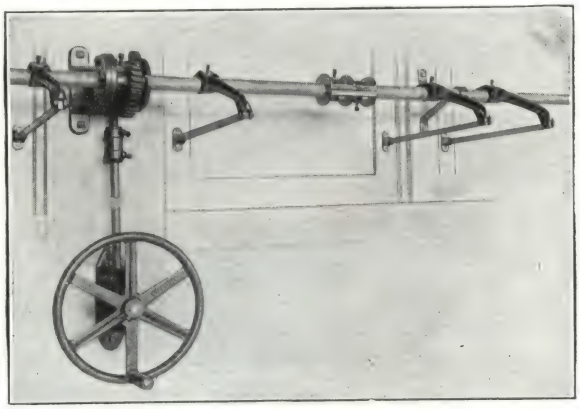
Gears are furnished in 4 different sizes, connecting arms in 3 sizes, and wrought shaft brackets can be provided in almost any desired length. Very practical and simple; will give permanent satisfaction



SASH OPERATOR, STYLE NO. 2

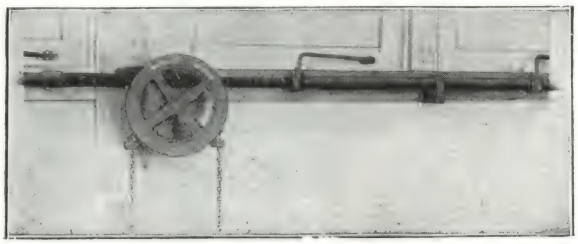
Same equipment as Style No. 1, excepting that power is transmitted by horizontal hand wheel through ¾-in. round steel rod

A large safety factor and especially easy working under severe conditions are two outstanding features of the devices.



SASH OPERATOR, STYLE NO. 3

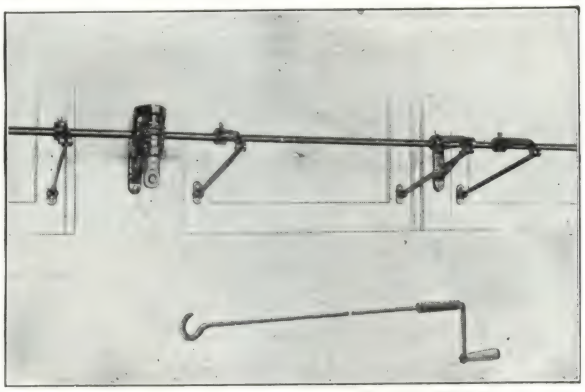
A bevel gear is here added to place the hand wheel in vertical position. Otherwise this style is identical with style No. 2



SASH OPERATOR, STYLE NO. 4

To meet conditions presented by runs of 100 ft. or less of side hinged, or top or bottom pivoted sash, in either wood or metal. Embodies a shaft supported by roller brackets, a gear station of heavy construction, and power transmission by endless chain

All wearing parts are designed to give maximum service and ease of operation



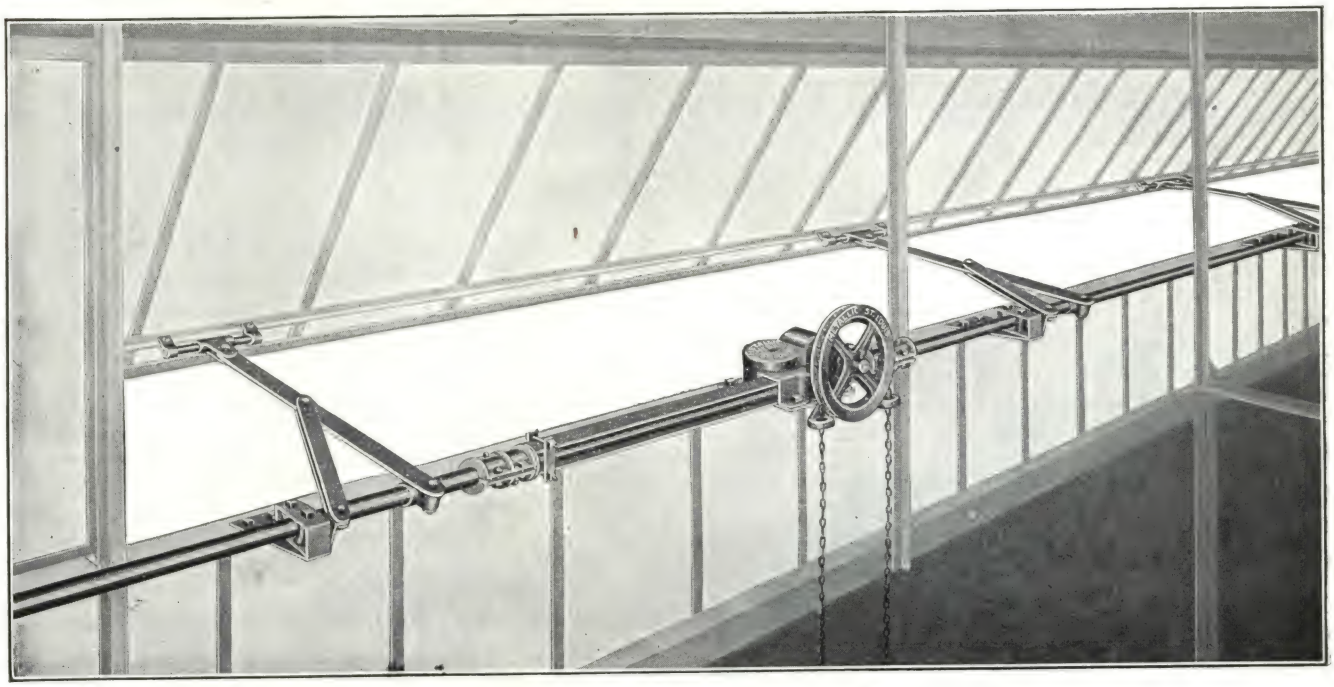
SASH OPERATOR, STYLE NO. 6

To control the sash over display windows. Will handle a run of 20 ft. of small pivoted sash, or hinged sash of suitable weight and position. The operating shaft is of solid steel, ¾ in. in diameter.

A detachable handle, furnished in lengths to suit conditions, transmits the power, or a dependent chain or rod with wheel or handle can be provided.

Another example of the special conditions which have been particularly studied, and exactly met. Also furnished in heavier types

Continued on next page



TENSION SASH OPERATOR, STYLE NO. 9
(Patented July 18, 1916, and October 9, 1917)

Tension Sash Operator, Style No. 9

This operator is designed to operate long runs of heavy, continuous top hung, or center pivoted sash. It can also be used to advantage on long runs of individual ventilators.

The power is delivered through a worm, worm gear, pinion, rack and thrust bearings connected to the shaft at either end of the rack. The shaft passes through the rack, thereby allowing free rotary movement of the shaft in conjunction with the opening of the sash.

The torsion developed by the thrust of the connecting arms on the sash is stopped at each individual arm, and is not delivered to the gear station in any way.

Thrust ball bearings insure easy operation.

All parts are made extra heavy and strong, to resist any possible strain.

This operator is ordinarily attached to the sill angle, but it can be readily fastened to any part of the building.

The operating gears are made in two sizes. The larger one has a connection which automatically stops the generation of power at the full open and closed positions of the sash, thereby preventing any breakage of the sash, or operator, at these positions.

The connecting arms are made in sizes up to 48 in. in length.

Co-operative Service

As practically every installation embodies some special conditions, the amount of engineering necessary becomes an important factor. The company's engineering organization is complete and fully experienced in sash operator design.

Economical and efficient arrangements will be suggested or laid out in detail by this co-operative service department, and requests are invited for this assistance.

Architectural Engineering Service

The METALLIC SASH-OPERATOR CO. is in the nature of an engineering organization with ample manufacturing facilities for executing the designs produced by its staff. Adequate experience in the production of sash operating devices for both wood and metal sash of every description, places the Company in a position to render valuable service.

Having been called upon to develop equipment for practically every sort of sash, our designs, which long experience and practical operation have proved to be best adapted to the work required of them, cover a wide range of applications all over the United States.

The Company possesses a manufacturing plant sufficient to guarantee prompt and dependable service, and to insure a quality of workmanship and materials which will be in every way satisfactory.

Some Typical Installations

The installations listed are necessarily limited in number by the space. They will, however, give a fair idea of the character of work this company has been entrusted with.

White Automobile Co., Cleveland, Ohio
Aluminum Ore Co., East St. Louis, Ill.
American Steel & Wire Co., Cleveland, Ohio, and Donora, Pa.
Goodyear Tire & Rubber Co., Akron, Ohio
Hoyt Metal Co., Granite City, Ill.
Santa Fe Shops, Albuquerque, N. M.
Holt Mfg. Co., East Peoria, Ill.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Missouri Pacific R. R. Roundhouses
Fairbanks, Morse & Co., Beloit, Wis.
Haughton Elevator Co., Toledo, Ohio
Springfield High School, Springfield, Ill.
Watervliet Paper Co., Watervliet, Mich.
Hooker Electro Chemical Co., Echote, N. Y.
Parish & Bingham Co., Cleveland, Ohio
Western Cartridge Co., East Alton, Ill.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Berlin Machine Co., Beloit, Wis.
Monsanto Chemical Works, St. Louis, Mo.
National Malleable Iron Co., Chicago, Ill.
Hupp Motor Car Co., Detroit, Mich.
Otis Steel Co., Cleveland, Ohio
Merchants Central Heating Co., Spokane, Wash.
Great Western Smelting & Refining Co., Chicago, Ill.
Tallahassee Power Co., Baden, N. C.
Busch-Sulzer Bros. Diesel Engine Co., St. Louis, Mo.
Union Drawn Steel Co., Detroit, Mich.

ESTABLISHED 1875

THE PAYSON MANUFACTURING COMPANY

Manufacturers of Sash Operating Devices and Builders' Hardware

2920 Jackson Boulevard

CHICAGO, ILL.

Products

SASH OPERATING DEVICES as follows:

Superior Operator, hand wheel control, for pivoted sash.

Ideal Operator, chain control, for pivoted sash.

Reliance Operator, chain or hand wheel control, for top or bottom hinged, or heavy pivoted sash.

Triumph Operator, hand wheel control, for pivoted sash, monitor type.

Peerless Operator, chain control, for top hinged continuous steel sash.

Signet Operator, screw type, for long runs of bottom hinged sash opening in; Crown Operator, screw type, for short runs of bottom hinged sash opening in; Duplex Operator, for heavy transoms; Victor Operator, chain wheel control, for vertically pivoted sash; Monarch Operator, for single vertically pivoted sash.

Also manufacturers of Simplex Transom Lifter, for all types of transoms; Payson No. 1 Casement Adjuster, for all types of casement sash; Payson Signal Sash Lock, for double hung windows; Payson No. 49 Concealed Transom Lifter, for transoms where concealed device is required.

Specifications

This list of Payson products is selected with the hope that it may be used freely by architects in writing specifications. The list contains standard articles that are guaranteed to give perfect satisfaction.

Torsion Operators

Detail drawings and cuts are shown of four of the most generally used of the many types of operators we manufacture. So far as general design is involved, one of these four is almost certain to fulfil the requirements of any sash operating problem. The Ideal is used where chain control is required; and chain control is recommended because of its simplicity and ease of erection. The Superior, where a hand wheel must be used. The Triumph, for all monitor work where a hand chain hanging straight down can not be used. The Reliance, for lifting heavy loads and giving maximum ventilation.

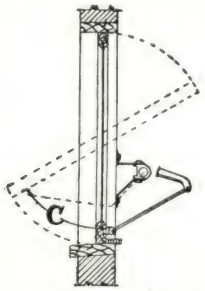
Tension Operators

Tension devices, Peerless "A" and "B," are fully described in our catalogue, which will be sent if desired. We have worked for a number of years on tension devices to operate long runs of sash, and have finally accomplished two things: that most dangerous of all makeshifts, the counterweight, has been eliminated and we have invented and perfected the only tension device where the leverage power increases as the load increases. If architects want these improvements embodied in tension devices, specify the "Peerless" manufactured by THE PAYSON MANUFACTURING COMPANY.

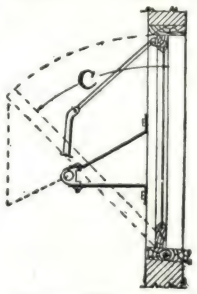
Service

Payson sash operating devices are *made to order,* using measurements taken from the plans and checked at the building. Every job is exhaustively studied by Payson engineers, and a drawing showing the scheme thought most satisfactory is prepared and submitted to the architect for approval as to layout and general design. After this approval is obtained, if there is any question as to measurements, drawings are forwarded to the building to be checked. Time is really saved in this way, because the operators can then be erected from the blue print with the certainty that every part will fit the place for which it is intended.

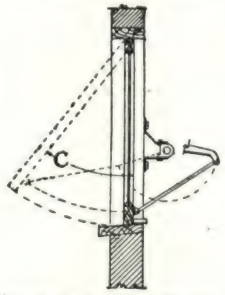
Architects should make liberal use of Payson service, as minor construction details often make it necessary to change entire layouts, even to altering type of operator. For example, interference by sway bracing may require change from Peerless operator to Reliance or Peerless "B." This should be determined, if possible, before specifications and plans have been sent out for estimates. By consulting with us the architect can be certain that the type of device specified will fulfil all requirements, and often slight changes in construction are suggested which result in lowering cost.



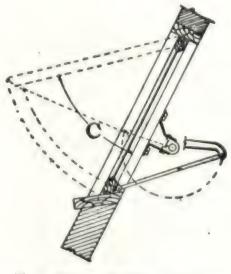
Horizontally Pivoted Sash



Bottom Hinged Sash



Top Hinged Sash Hung Vertical



Top Hinged Sash at an Angle

DUTY DETAILS OF TORSION SASH OPERATORS

X ft.	X in.	Standard A ft.	Standard B ft.	Standard C deg.	Extra Heavy A ft.	Extra Heavy B ft.	Extra Heavy C deg.
2	0	130	75	60	150	85	60
2	6	120	75	60	150	85	60
3	0	110	60	45	150	85	60
3	6	100	60	45	140	75	45
4	0	90	50	45	130	70	45
4	6	80	45	45	120	65	45
5	0	70	40	45	100	55	45
5	6	60	40	30	90	50	30

X ft.	X in.	Standard A ft.	Standard B ft.	Standard C deg.	Extra Heavy A ft.	Extra Heavy B ft.	Extra Heavy C deg.
2	0	60	40	50	90	55	50
2	6	54	40	45	81	50	45
3	0	48	30	30	72	48	30
3	6	40	25	30	66	36	30
4	0	30	20	30	50	30	30
4	6	24	15	25	40	25	25
5	0	16	10	25	28	16	25
5	6	12	6	20	21	12	20

X ft.	X in.	Standard A ft.	Standard B ft.	Standard C deg.	Extra Heavy A ft.	Extra Heavy B ft.	Extra Heavy C deg.
2	0	70	40	60	100	60	60
2	6	60	40	45	90	55	45
3	0	50	30	45	80	50	45
3	6	40	25	45	70	45	45
4	0	36	20	30	60	40	30
4	6	30	15	25	50	35	25
5	0	24	15	20	40	25	20
5	6	20	10	20	30	20	20

X ft.	X in.	Standard A ft.	Standard B ft.	Standard C deg.	Extra Heavy A ft.	Extra Heavy B ft.	Extra Heavy C deg.
2	0	40	20	60	60	40	60
2	6	34	20	45	50	40	45
3	0	30	20	45	44	30	45
3	6	26	15	45	40	30	45
4	0	22	15	30	36	25	30
4	6	18	15	20	30	20	20
5	0	14	10	20	24	16	20
5	6	10	10	20	20	10	20

X—Height of sash. A—Maximum length of run. B—Maximum distance from power to end of run. C—Standard opening in degrees.

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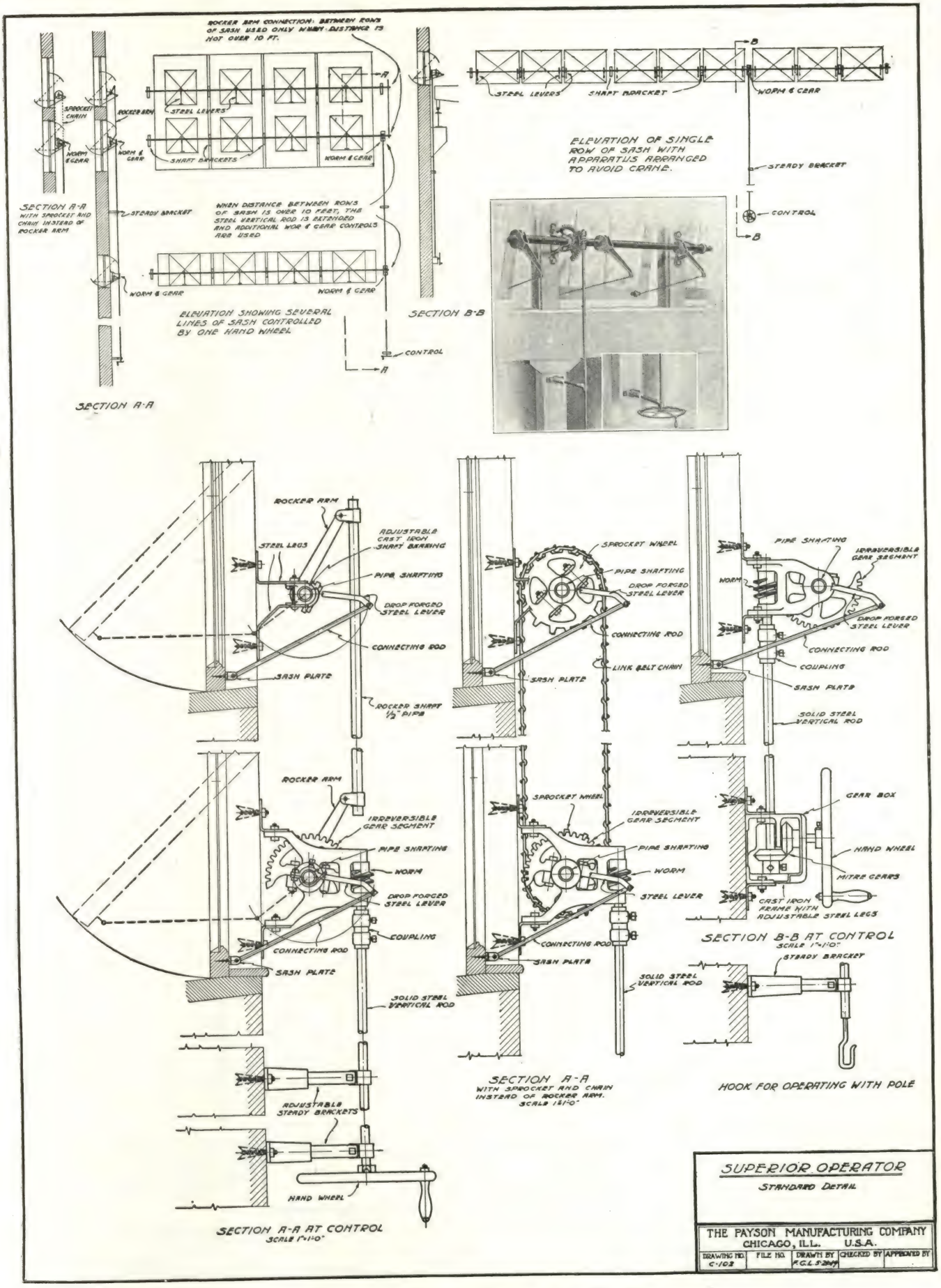
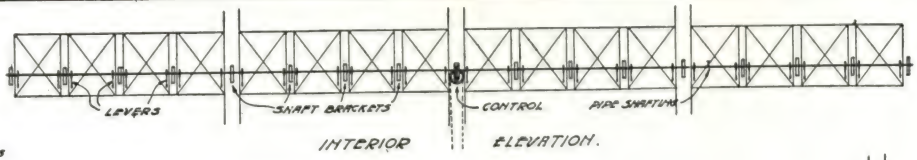


STANDARD DETAILS OF SUPERIOR SASH OPERATOR

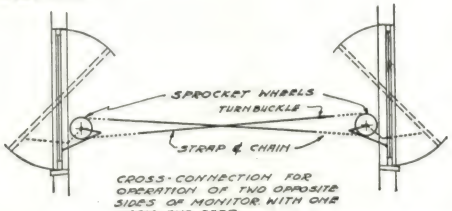
Continued on next page

THE IDEAL OPERATOR (CHAIN CONTROL) IS MORE WIDELY USED THAN ANY OTHER TYPE OF SASH OPERATING MECHANISM. IT CONSISTS MAINLY OF A WORM & GEAR CONTROL, IS SELF-LOCKING AT ALL POINTS - HORIZONTAL SHAFTING OF VARYING SIZES FROM ¾" TO 1½", ON WHICH ARE CLAMPED DROP FORGED STEEL LEVERS ATTACHED BY CONNECTING RODS AND SASH PLATES TO THE SASH. A LARGE NUMBER OF SLIGHTLY VARYING TYPES OF CONTROLS (WORM & GEAR POWERS) HAVE BEEN DEVELOPED WHICH ENABLES US TO MEET THE PECULIAR AND VARYING CONDITIONS WHICH ARE CONFRONTED THERE BEING OFTEN, ON THE SAME JOB, SEVERAL TYPES REQUIRED; THE SIMPLEST FORM IS ILLUSTRATED HEREWITH.

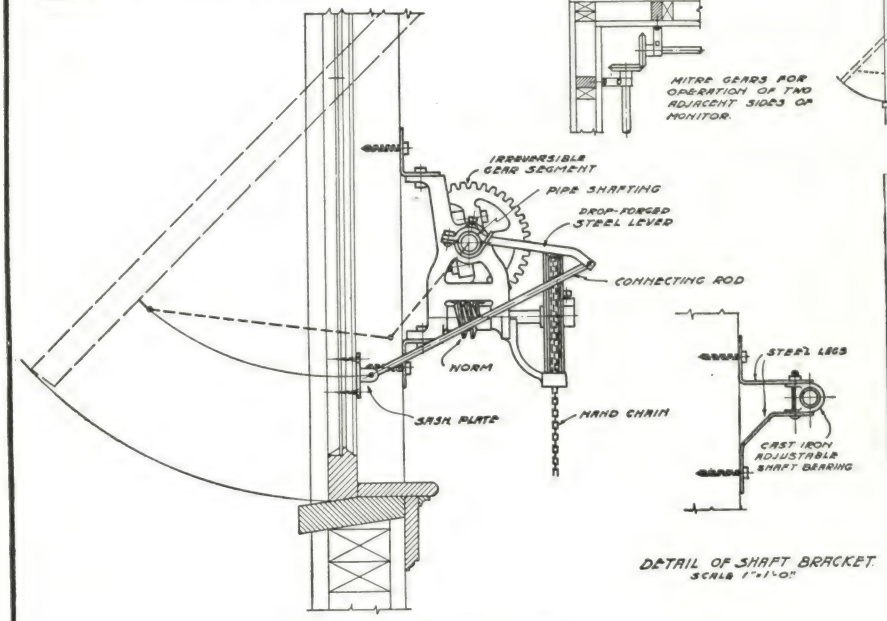


INTERIOR ELEVATION.

MITRE GEARS FOR OPERATION OF TWO ADJACENT SIDES OF MONITOR.

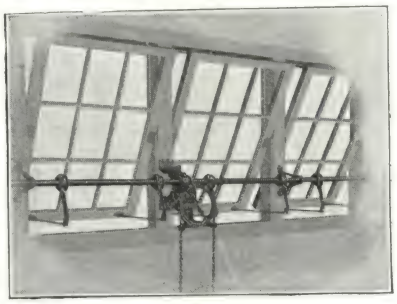


CROSS-CONNECTION FOR OPERATION OF TWO OPPOSITE SIDES OF MONITOR WITH ONE WORM AND GEAR.



VERTICAL SECTION AT CONTROL.
SCALE 1"=1'-0"

DETAIL OF SHAFT BRACKET
SCALE 1"=1'-0"



IDEAL OPERATOR
STANDARD DETAIL

THE PAYSON MANUFACTURING COMPANY
CHICAGO, ILL. U.S.A.

DRAWING NO.	FILE NO.	DRAWN BY	CHECKED BY	APPROVED BY
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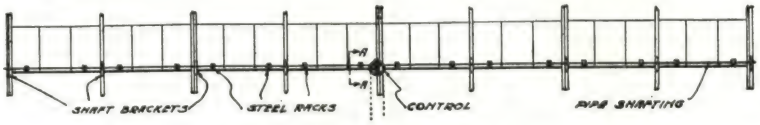
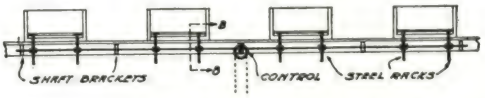


INTERIOR ELEVATION AT WALL SASH.



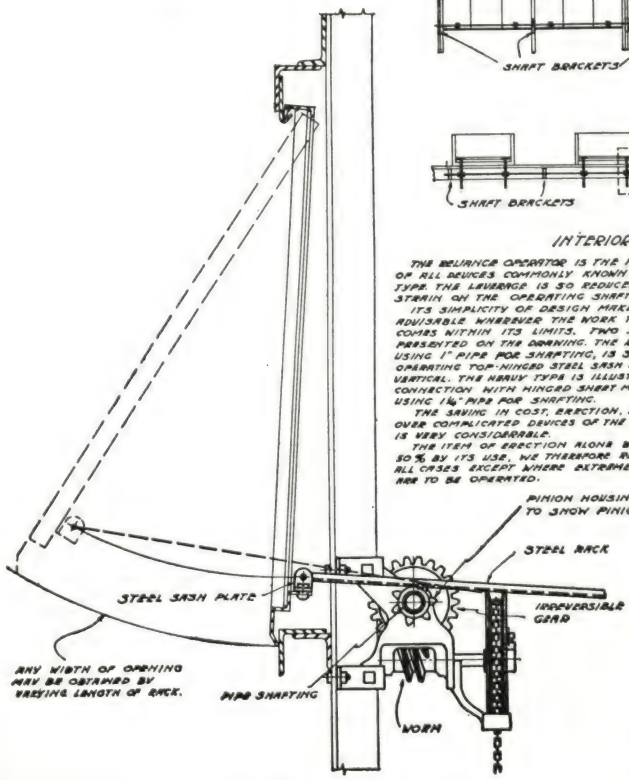
INTERIOR ELEVATION AT SKYLIGHT SASH.

THE RELIANCE OPERATOR IS THE MOST POWERFUL OF ALL DEVICES COMMONLY KNOWN AS THE TORSION TYPE. THE LEVERAGE IS SO REDUCED THAT THE STRAIN ON THE OPERATING SHAFT IS VERY SLIGHT.

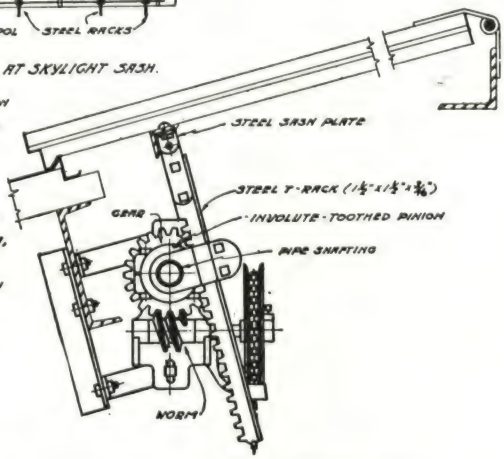
ITS SIMPLICITY OF DESIGN MAKES ITS USE ADVISABLE WHEREVER THE WORK TO BE DONE COMES WITHIN ITS LIMITS. TWO SIZES ARE PRESENTED ON THIS DRAWING. THE REGULAR 3/32, USING 1" PIPE FOR SHAFTING, IS SHOWN OPERATING TOP-HINGED STEEL SASH HANGING ON THE VERTICAL. THE HEAVY TYPE IS ILLUSTRATED, IN CONNECTION WITH HINGED SHEET METAL SKYLIGHTS, USING 1¼" PIPE FOR SHAFTING.

THE SAVING IN COST, ERECTION, AND MAINTENANCE, OVER COMPLICATED DEVICES OF THE TENSION TYPE, IS VERY CONSIDERABLE.

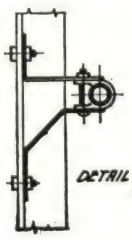
THE ITEM OF ERECTION ALONE BEING REDUCED 50% BY ITS USE, WE THEREFORE RECOMMEND IT IN ALL CASES EXCEPT WHERE EXTREMELY LONG RUNS HAVE TO BE OPERATED.



SECTION "A-A" AT WALL SASH
SCALE 1"=1'-0"



SECTION "B-B" AT SKYLIGHT SASH
SCALE 1"=1'-0"



DETAIL OF SHAFT BRACKET
SCALE 1"=1'-0"

RELIANCE OPERATOR
STANDARD DETAIL

THE PAYSON MANUFACTURING COMPANY
CHICAGO, ILL. U.S.A.

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STANDARD DETAILS OF IDEAL AND RELIANCE SASH OPERATORS

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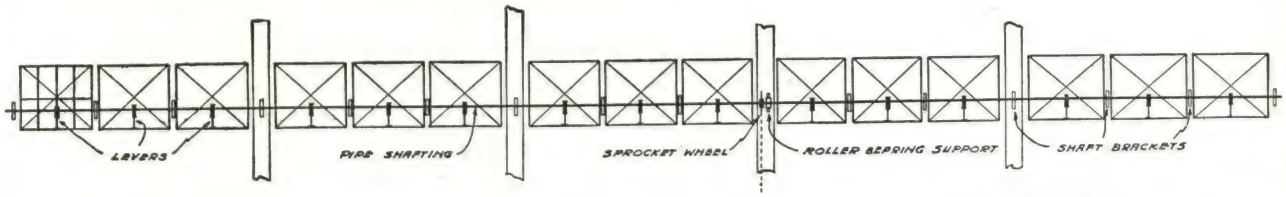
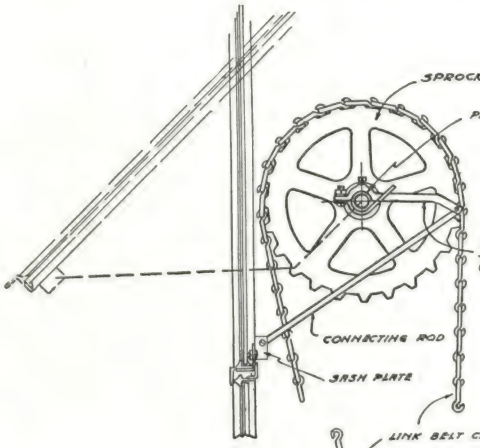
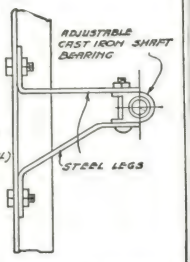
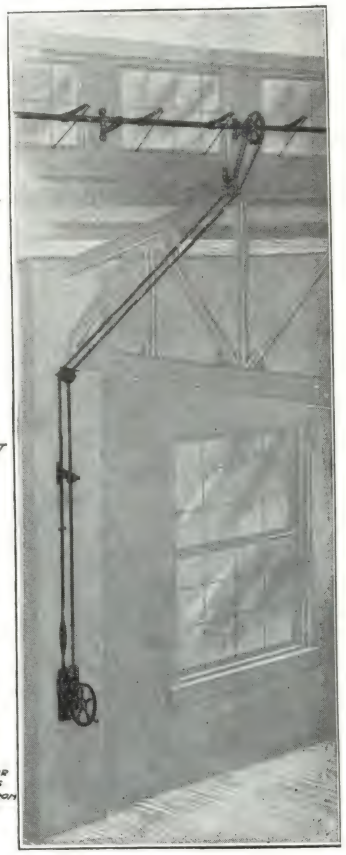


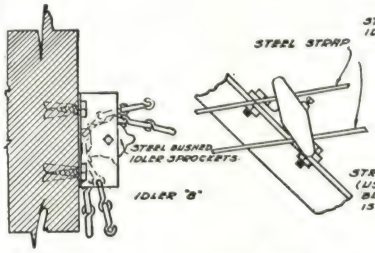
INTERIOR ELEVATION AT SASH

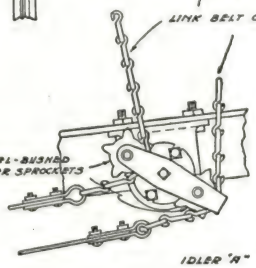


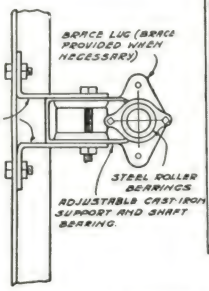


DETAIL OF SHAFT BRACKET
SCALE 1"=1'-0"

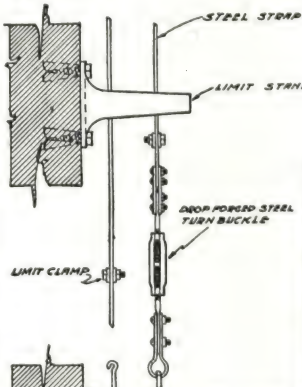




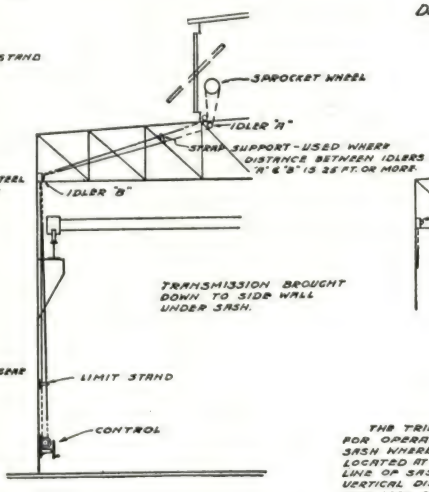




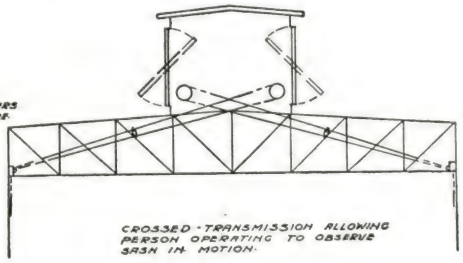
DETAIL OF ROLLER BEARING SUPPORT
SCALE 1"=1'-0"



VERTICAL SECTION AT CONTROL
SCALE 1"=1'-0"



TRANSMISSION BROUGHT DOWN TO SIDE WALL UNDER SASH.



CROSSED - TRANSMISSION ALLOWING PERSON OPERATING TO OBSERVE SASH IN MOTION.

THE TRIUMPH OPERATOR IS USED FOR OPERATING MONITOR OR CLERE-STORY SASH WHERE THE CONTROL MUST BE LOCATED AT A CONSIDERABLE DISTANCE FROM THE LINE OF SASH. LONG HORIZONTAL AND VERTICAL DISTANCES ARE TAKEN CARE OF WITH LESS COMPLICATION, AS FRICTION FROM REVOLVING RODS, UNIVERSAL JOINTS AND CORNER GEARS IS ELIMINATED. COST OF INSTALLATION IS GREATLY REDUCED.

IT PROVIDES THE SIMPLEST METHOD OF AVOIDING OBSTRUCTIONS SUCH AS CRANES, BOILERS, OVENS, ETC. OPERATES UNITS UP TO 120 FT. IN LENGTH WITH STANDARD CONTROL; HARDWARE SIZES FOR LONGER LENGTHS.

THE FLEXIBILITY OF THIS SYSTEM PERMITS ITS USE ON ALL TYPES OF PIVOTED SASH; WOOD, STEEL, OR SHEET METAL, REGARDLESS OF THEIR LOCATION AND INACCESSABILITY. ON SASH FOUR FEET WIDE OR OVER, TWO LEVERS ARE USED - WITH SASH PLATES LOCATED ON SIDE RAILS OF SASH.

TRIUMPH OPERATOR

STANDARD DETAIL

THE PAYSON MANUFACTURING COMPANY CHICAGO, ILL. U.S.A.				
DRAWING NO. C-103	FILE NO.	DRAWN BY D.R.R. 3-21-11	CHECKED BY	APPROVED BY

Standard Details of Triumph Roller Bearing Sash Operator

LORD & BURNHAM CO.

Manufacturers of Sash Operating Apparatus for Hinged and Pivoted Sash

IRVINGTON-ON-HUDSON, N. Y.

Products

SASH OPERATING APPARATUS in various styles and sizes for Operating Hinged and Pivoted Sash in factories, foundries, car barns, roundhouses, powerhouses, machineshops, steamers, banks, churches, prisons, greenhouses, also for Heavy Transoms in such places as store fronts, hotels, public buildings, etc.

For Greenhouses, see pages 2168-2169.

Rocker Shaft Apparatus

Our standard apparatus (Fig. 1) consists of a worm and gear to turn a rocker shaft, to which are attached arms that, in turn, act directly on the sash through suitable rods. Arms are secured to shaft by combined bolting and setscrew cap, or by setscrew only if desired.

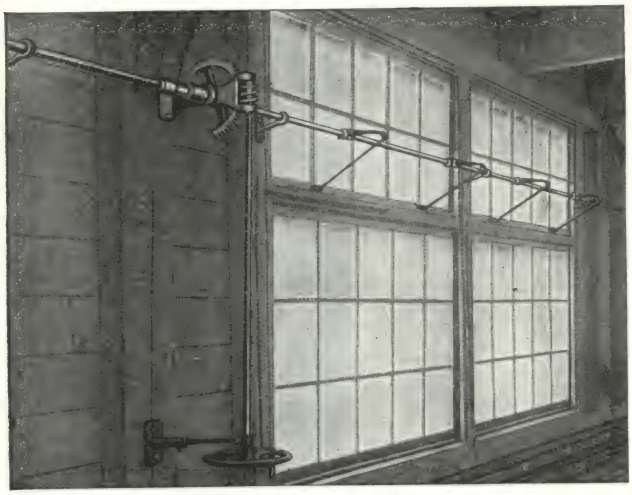


FIG. 1. ROCKER SHAFT APPARATUS

Rack and Pinion Apparatus

This type of apparatus (Fig. 2) is intended primarily for long runs of heavy hinged sash. On account of the small pitch radius of the pinion (1½ in.) the leverage on shaft is so much reduced that torsion in the shaft is reduced to a minimum. The simplicity of this apparatus is a strong point in its favor. The direct horizontal thrust given to the sash prevents all harmful strains.

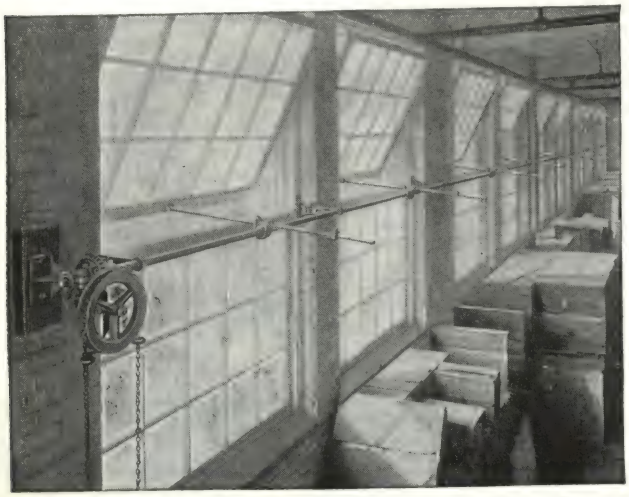


FIG. 2. RACK AND PINION APPARATUS

Screw Thread Transom Operators

Transom operators (Fig. 3) made in 2 sizes: No. 1 for heavy and No. 2 for extra heavy transoms. This apparatus consists of two enclosed miter gears, one of which is threaded and engages with a vertical rod linked to a rocker shaft at bottom of transom, thus allowing it to be supported by an arm and rod at either end, relieving it of all injurious strains, and holding it rigidly in position against wind pressure.

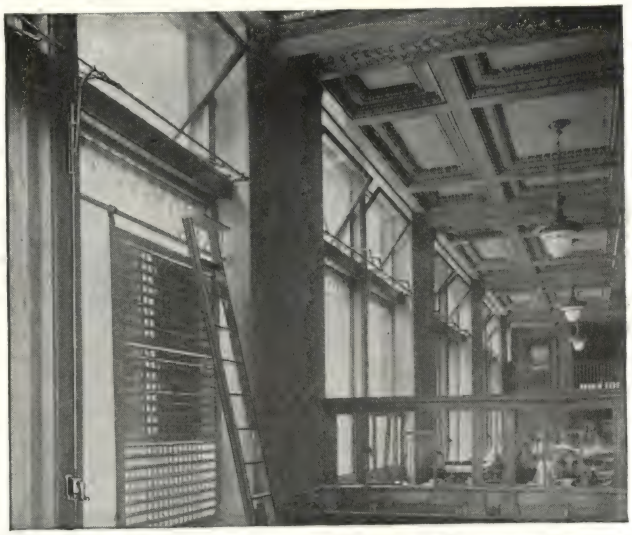


FIG. 3. SCREW THREAD TRANSOM OPERATORS

Tension Lever Apparatus

Fig. 4 for runs too long or too heavy for practical operation with either our rocker shaft or rack and pinion type. Special circular on request.

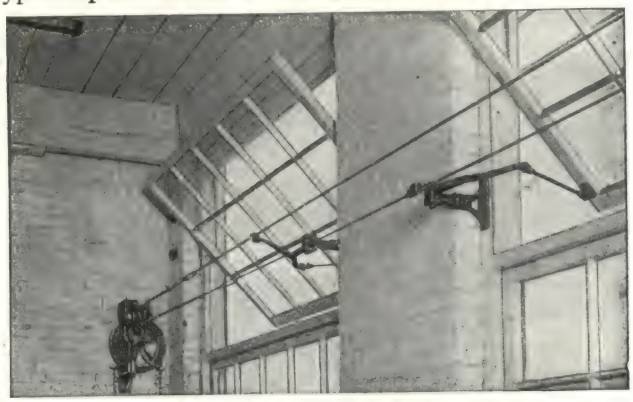


FIG. 4. TENSION LEVER APPARATUS

Erection

Full directions for erecting are sent with apparatus, so that it can be easily installed by any mechanic.

Estimates and Co-operative Service

On receipt of data giving description of sash and that part of the building where it is intended to install the apparatus, we will gladly submit sketches, suggestions, and estimates for furnishing our stock apparatus, or one specially designed to meet unusual conditions; also, estimates for erecting the apparatus when desired.

Catalogue

Catalogue giving full and detailed description of each apparatus sent on request.

IOWA GATE COMPANY

Barn Equipment and Wire Fencing

CEDAR FALLS, IOWA

DISTRIBUTERS IN ALL PARTS OF THE UNITED STATES

Products

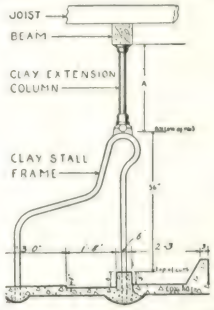
COMPLETE DAIRY BARN and HOG HOUSE EQUIPMENT; STATIONARY and REVOLVING ROOF VENTILATORS; ORNAMENTAL WIRE FENCING; AUTOMATIC DRIVEWAY GATES.

Also manufacturers of Overhead Carrying Systems; Revolving Clothes Dryers for Lawns.

Barn Service and Plans

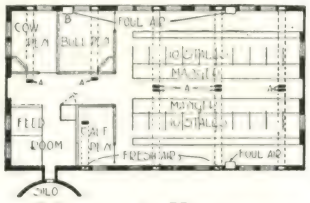
Architects and builders are invited to consult the service department with the certainty that the advice and plans submitted are the result of the experience of planning thousands of barn buildings in all parts of the country.

The housing for all animals on many of the best known country estates as well as the barns and hog houses of successful practical farmers and breeders are the product of the Clay service organization.



DETAIL OF CLAY STALL FRAME FOR DAIRY BARNS WITH CLAY EXTENSION COLUMN MOUNTED ON ARCH OF STALL FRAME MAKING A DEPENDABLE AND ECONOMICAL JOIST SUPPORT OVER ROW OF STALLS.

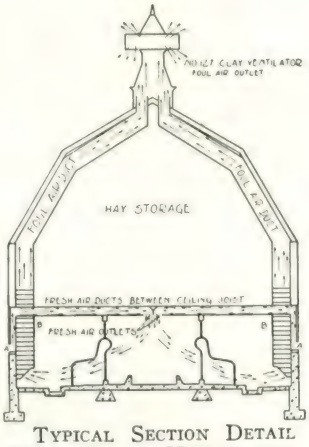
Does away with posts in alleyways and stalls



EXAMPLE OF VENTILATION —FLOOR PLAN FOR BARN 32x58 FT.

Ventilator Heads

Clay standard and Clay revolving head vacuum ventilators are the result of years of practical tests for greatest suction and capacity. Made of rust resisting copper bearing galvanized steel in large quantities. Rugged construction, perfectly braced and of pleasing design.



TYPICAL SECTION DETAIL COW BARN VENTILATION SHOWING ARRANGEMENT OF FLUES FOR COWS FACING IN

Clay Automatic Driveway Gate

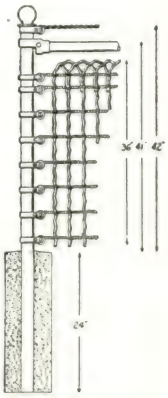
Clay automatic gate should always be used on front driveway. Opened or closed by giving hanging handle a little pull without getting out of machine or buggy.

Clay Ornamental Fabric

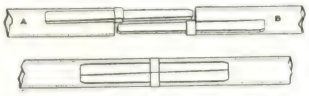
The fabric used in Clay complete fence is very durable and attractive. The horizontal cable wires have a triple twist between pickets, and is reversed on the picket instead of between them, making a positive lock on the picket. Pickets are even height and have an extra deep crimp, which locks the cables so they can not move up or down on the pickets.

All parts of Clay fences are electrogalvanized producing a lustrous finish of proved permanency. Clay Cumberland and Olympic complete fence are the heaviest ornamental wire fence on the market.

Our large manufacturing facilities make it possible to accept the largest contracts as well as for the bungalow fence at attractive prices. Clay Ornamental Fabric on wood posts with a 2 by 4 in. top rail makes a good fence at reasonable cost.

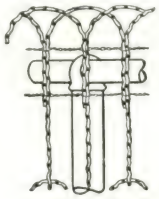


All Clay Ornamental Steel Fence Is Supplied with a Racket Stretcher for Every Lateral Wire in Fabric. It Never Slips

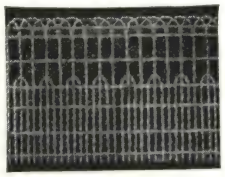


Detail of Coupler—Large End of Each Half Inserted in Rail First

A smooth connection with maximum rigidity

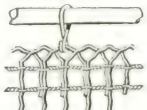


Stratford Single Line Post

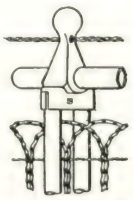


Galvanized Ornamental Fabric

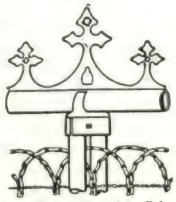
Height: 30, 36, 42, 48 and 54 in. Weight: 1¼, 1½, 1¾, 2 and 2¼ lbs. per sq. ft. Shipped 330 ft. per roll. All heights carried in stock for prompt shipment



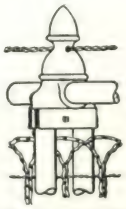
Fabric Supported to Top Rail by Two Wire Clips Between Posts



Detail Cumberland Double Line Post



Detail for Double Line Post for Cumberland Cresting Top Fence



Olympic Double Line Post

CLAY FENCING

ESTABLISHED 1867

THE LOUDEN MACHINERY COMPANY

Labor Saving Sanitary Barn Equipment
FAIRFIELD, IOWA

BRANCH OFFICES

CHICAGO, ILL., 1051-1059 West 35th Street
ALBANY, N. Y., 1047-1053 Broadway
ST. PAUL, MINN., 2282-2288 University Avenue
NEW YORK, N. Y., Grand Central Terminal
BOSTON, MASS., 34 Merchants Row
CANADA: GUELPH, ONT.

Products

BARN EQUIPMENTS: Cow Stalls and Stanchions; Bull, Cow, Calf and Hog Pens; Feed, Litter and Hay Carriers; Automatic Detachable Water Bowls; Milk Can and Harness Carriers; Spring Balanced Manger Divisions; Hay Forks; Hay Slings; Hog Troughs; Pig Guards; Gutter and Manger Drains; Bull Staffs.

BARN and GARAGE DOOR HANGERS.

Also manufacturers of Cupolas, Roof and Window Ventilators, Building Columns, Cork Brick, Power Hoists.

Co-operative Barn Planning Service

Architects are invited to make use of the Louden organization of Architectural and Agricultural Engineers both at the factory and the branches.

Many of the best known estates, breeding farms, and large dairies have been built and equipped on the plans and specifications of this department working in conjunction with architects and owners.

Louden engineers and architects are specialists on practical barn construction and can be depended on to furnish the latest developments in barn planning, both from the standpoint of the health of the animals and convenience in doing the chores. Where it is advisable, an architect will personally go over the building site in order to make such practical suggestions on arrangement, drainage, etc., as is best adapted to each project. The following are of standard Louden equipment and are used as typical of Louden construction.

Animal Pens

Louden pens are made for cows, calves, bulls and hogs. The fillers are high carbon tubular steel. Castings used to connect the uprights to top and bottom rails made out of malleable iron. Gates on all pens are easily operated and are strongly constructed.

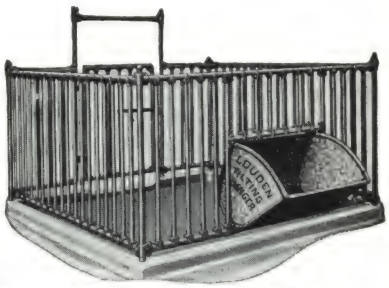
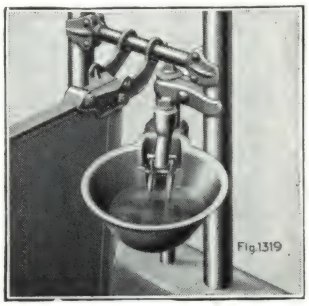


FIG. 996. LOUDEN COW PEN

Water Bowls

Automatic detachable water bowls are made of gray iron; valve rod, valve seat, valve spring and strainer through which all water passes are made of brass. Made to fit ¾-in. supply pipe. Can be attached to 1¼- or 1-in. pipe supports, or to wood posts.



AUTOMATIC DETACHABLE WATER BOWL

SENIOR HAY FORK CARRIER

Installations

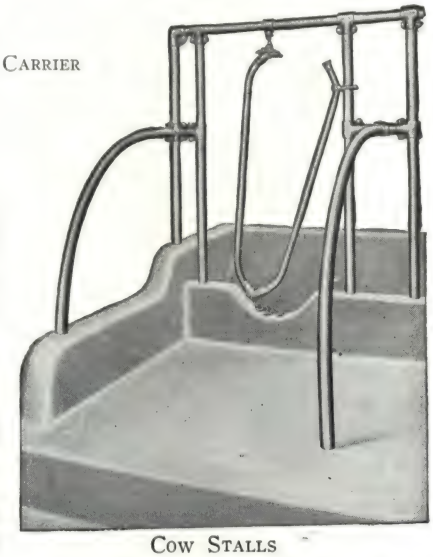
Complete instructions for the installations of Louden equipment accompany each shipment.

Estimates and Catalogues

Complete catalogues mailed on request. Itemized quotations and specifications cheerfully submitted.

Hay Carriers

Made for steel or wood track, around barns, field stacking, etc. May be had for fork or sling use. Each carrier is compact, durable and simple in construction. We make a complete line of hay forks, slings, pulleys; also a power hoist to assist in haying.



COW STALLS

Framework of high carbon steel tubing 1⅝ in. outside diameter. Stalls fitted throughout with overlapping, dustproof connections of certified malleable iron. Finished with heavy coat of silver gray enamel.

Stanchions, tubular steel and wood lined. Width of each stanchion, 7 in. inside. Length, not including chain, 4 ft. Latch and hinge of malleable iron

GARAGE DOOR HANGERS

Made in 3 sections, one section swings free as foot entrance. Slides around inside corner and lies flat up against sidewall when open. Track wheels are roller bearing. All hardware furnished. Easily operated, easily installed

LITTER CARRIER

For steel or rod track. Steel track carriers fitted with worm gear hoist—actual lifting power of 40 to 1. Watertight box of No. 20 gauge galvanized steel, ends of No. 16 gauge steel heavily reinforced with angle iron. 48 in. long, 27⅛ in. wide and 22 in. deep; capacity, 12 bushels

THE F. E. MYERS & BRO. COMPANY

Manufacturers of Hay Tools

ASHLAND, OHIO

Products

HAY UNLOADING TOOLS.

For Pumps, see pages 1473-1475; for Door Hangers and Store Ladders, see pages 1248-1251.

Myers Hay Tools

Myers hay tools have been recognized for over 30 years as standard for the unloading of hay and grain. The use of the best materials, the adoption of the latest improved methods and the adherence to rigid inspections have enabled us to produce high grade hay tools which insure speed, ease of operation, large capacity, uniform service and durability.

TRADE-MARK

Only a few of our leaders are illustrated below. Hay unloading tools for any condition may be selected from our complete line. Catalogue sent on request.

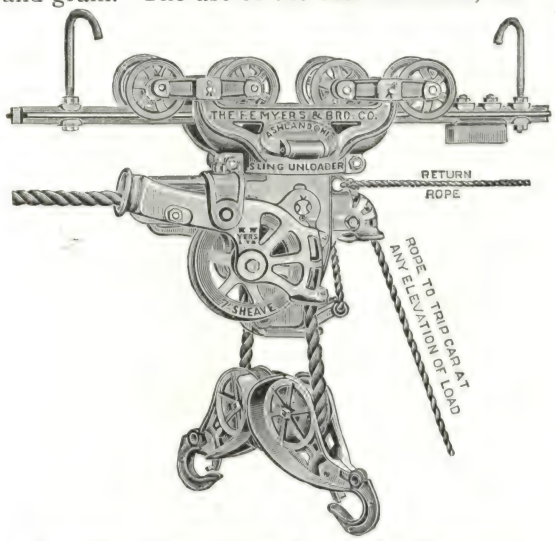
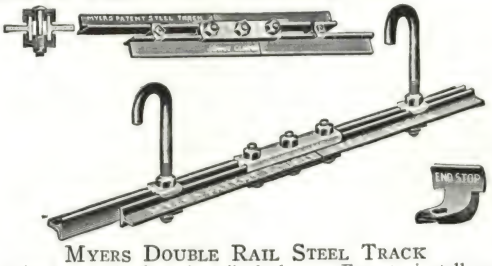


FIG. 2054. MYERS "SURE LOCK" HAY UNLOADER

Used with slings or forks. Operates on double rail steel track. Uses ¾ to ⅞-in. rope without adjustment. Elevates load to any height at right angles to track and discharges load parallel with load on wagon.

Operates automatically; has large capacity; easily operated; speedy; staunchly constructed; minimum labor required.

Heavy 18-in. wheel base; 8-wheel flexible trolley; 7-in. rope sheave with machined steel bearing. Rope lock arranged so that pressure on rope is proportioned to weight of load. Rope can not slip



MYERS DOUBLE RAIL STEEL TRACK

Used with hay unloaders described above. Easy to install and carries exceptionally heavy loads without distorting.

Consists of 2 steel T-rails rigidly held by malleable iron joint clamps and hanging hooks with space between so that hook can be placed where it coincides with rafter.

Furnished in 6- and 12-ft. lengths

FIG. 1120. Myers O. K. Knot Passing Pulley

Heavy frame, 1-in. loose pin, 1⅛-in. axle, swivel eye and 6-in. hard maple sheave

FIG. 1133. Myers O. K. Plain Pulley

Heavy ribbed cast frame, 1⅛-in. axle, swivel eye and 6-in. hard maple sheave

MYERS PULLEYS FOR BARN SERVICE

Many other types may be selected from a full line

FIG. 1315. MYERS DOUBLE HARPOON HAY FORK

Made of open hearth spring steel. Strong and stiff. No cross bar. Easily tripped from any direction

FIG. 671. MYERS LOCK LEVER HAY FORK

Made of spring steel. Has 50% greater capacity than the Harpoon fork. Easily tripped from any direction

FIG. 1438. MYERS PERFECT AUTOMATIC GRAPPLE FORK

Made of high carbon spring steel; 4 or 6 tines.

Trips easily from any direction.

Closes and locks itself before returning to load.

Handles loose or baled hay.

Width of head, 19 in.; spread when open, 55 in.

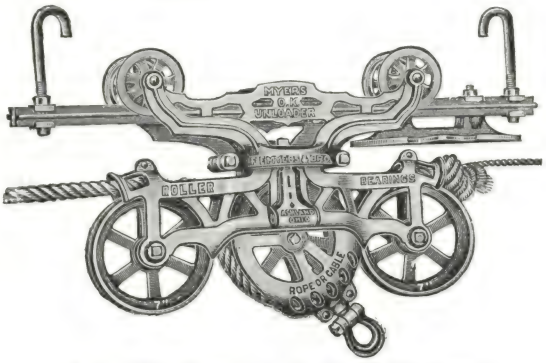


FIG. 1652. MYERS O. K. HAY UNLOADERS

Combination reversible and swivel. Used with slings or forks and with either rope or cable draft. Operates on double rail steel track. Extra long truck distributes load on track, lessening strains and allows use of 2 slings or forks.

Has double lock. Wide open mouth permits fork pulley to enter when swinging at any angle. Large capacity; easily operated; speedy; exceptionally strong.

Heavy 16-in. wheel base; 7-in. rope sheaves with extra wide hubs and long bearing on axles; 3¼-in. track wheels and ⅞-in. turned steel axle

FIG. 1728. Myers 3-Rope Center Trip Adjustable Hay Sling

Has 4-ft. sticks and adjustable end rings. Rope fitted and trips from center lock

FIG. 1308. Myers Double Lock Adjustable Hay Sling

Has 6-ft. sticks, adjustable end rings, 4 ropes with 2 cross sections. Handles extra large drafts

MYERS HAY SLINGS

Made of well seasoned hardwood. Ropes or cables securely attached by strong hook bolts. Malleable iron lock connects two halves of sling at center and is guaranteed to trip easily from any angle

ESTABLISHED 1876 INCORPORATED 1895

ARMITAGE VARNISH CO.

Manufacturers of Varnishes, Enamels and Flat Finish Paints

MAIN OFFICES AND WORKS
NEWARK, N. J.

Products

ARMORITE FLAT WALL FINISH.

ARMORITE GOLD SEAL GLOSS WHITE ENAMEL.

Also Armitage Fine Varnishes and Architectural Finishes.

TRADE MARK

Armorite Flat Wall Finish

Armorite Flat Wall Finish is an interior wall and trim coating. Its most admirable feature is its subdued, soft-toned finish, which, under all conditions, makes it most restful to the eye, and gives a quiet air of refinement to all surroundings wherever it is used.

Composition—Armorite Flat Wall Finish is made from the highest grade of specially refined oils, prepared under our own secret formula, scientifically combined with the highest grades of pigment.

Advantages—Armorite Flat Wall Finish flows perfectly under the brush. It weighs about 20 lbs. to the gallon. Can be reduced—1½ gal. of thinner to 5 gal. of Armorite—and still has the finest of covering properties. These features alone enable the painter to produce the highest grade results in the most economical manner. It can be used for undercoat work with the Gloss White Enamel without sanding, due to the fact that being very finely ground it produces a perfectly smooth surface. When left in the can exposed to the air, there is no tendency to skin. Where properly applied, Armorite has never been known to check or flake and always hides fire cracks perfectly.

Adaptability—Armorite Flat Wall Finish is adaptable to any plan of color harmony, for it is made in a wide variety of colors and tints, as well as in a pure unchanging white.

It can be used on any kind of plaster or composition surface, all kinds of wood, burlap, wall paper, all metal surfaces and also window shades. It is particularly suitable for use in hospitals, schools, hotels and other public buildings as well as residences due to the fact that it can be washed with soap and water. Finger marks and other unsanitary or unsightly marks can be removed as often as desired without impairing the finish in any way.

Mixing—Armorite Flat Wall Finish does not harden in the can even after long periods of standing, and can be easily and readily mixed and thinned with any good thinning material.

Armitage Long Oil Surfacer—Designed for use in connection with Armorite Flat Wall Finish. To be used as a priming coat on new walls or any surface which has not been previously coated.

Armorite Gold Seal Gloss White Enamel

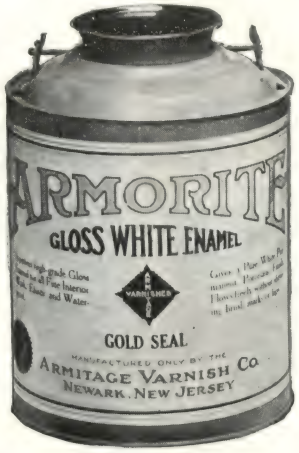
A perfect high grade gloss white enamel for all fine interior and architectural work. Produces a pure white porcelain finish. It flows freely under the brush without showing laps or brush marks and has the highest degree of elasticity and durability.

Specifications

Armorite Flat Wall Finish—On new walls, apply one coat of Armitage Long Oil Surfacer; three coats of Armorite Flat Wall Finish. For quick jobs where time must be saved, most satisfactory work can be obtained by using first one coat of Armitage Long Oil Surfacer; second, one coat mixed half Armorite Flat Wall Finish and half Long Oil Surfacer, and finish with one coat of Armorite Flat Wall Finish flowed on freely.

Armorite Gold Seal Gloss White Enamel—On woodwork, apply one coat of Armorite Flat Wall Finish and two or three coats as desired of Armorite Gold Seal Gloss White Enamel.

ARMORITE FLAT WALL FINISH CONTAINER



ARMORITE GOLD SEAL GLOSS WHITE ENAMEL CONTAINER

CARTER WHITE LEAD CO.

CHICAGO, ILL.

DISTRIBUTING POINTS

NEW YORK, N. Y.	DALLAS, TEX.	RICHMOND, VA.	SAN FRANCISCO, CAL.	ALBANY, N. Y.
PHILADELPHIA, PA.	ST. PAUL, MINN.	JACKSONVILLE, FLA.	OMAHA, NEBR.	MILWAUKEE, WIS.
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DETROIT, MICH.	BOSTON, MASS.	SAVANNAH, GA.	MINNEAPOLIS, MINN.	HOUSTON, TEX.

Products

Manufacturers of STRICTLY PURE WHITE LEAD and RED LEAD.

Also manufacturers of Litharge.

TRADE-MARK

Carter White Lead

Carter White Lead is a high grade and standard product, noted for its extreme whiteness, fineness, superior body, uniformity and great durability, because it is perfectly corroded by the only modern and scientific process in the white lead industry.

Architects should not fail to specify "Carter" when white paint or soft, clear tints are desired.

Carter Coach and Car Lead

Carter Coach and Car Lead is a particularly high grade product, especially ground in bleached oil with reference to interior and surfacing work. It is extremely white and fine. It flats and dries well. Equally good for exterior work.

Red Lead

Carter Dry Red Lead contains no adulterants and conforms to government specifications.

Distribution

Carter White Lead is widely distributed through jobbers, and is retailed by local dealers in every locality. It is thus easily obtainable in every state and territory.

Architects may specify "Carter" to be used on a building anywhere and the contractor can secure it.

Prices

Prices are governed by the fluctuations of the metal market.

Carter Lead is sold for about the same price as other standard brands.

White Lead Specifications

White Lead for Exterior—Before any paint is applied, woodwork to be thoroughly dry. Apply no paint when raining or snowing. All knots and sappy places to be varnished with best grain-alcohol shellac.

Priming Coat—To be a thin coat of Carter Strictly Pure White Lead, linseed oil and turpentine, properly brushed into the pores. On some kinds of siding, a mixture of red lead and white lead is necessary to secure the best anchorage and insure a tenacious foundation for succeeding coats.

All nailholes, joints and other defects in surface to be puttied thoroughly after priming coat is dry.

Second and Third Coats—To be Carter Pure White Lead, pure, well-settled linseed oil, pure turpentine and drier, mixed to proper consistency and colored to suit.

All new lumber requires 3 coats to produce a durable job.

White Lead for Interior Woodwork—Surface to be put in proper condition for paint; all dust, dirt, loose paint, etc., removed; all knots and sappy places to be varnished with pure grain-alcohol shellac varnish.

Priming Coat—To be a thin coat of Carter White Lead (Coach and Car preferred), pure linseed oil, turpentine and white turpentine japan drier, thoroughly mixed and properly applied.

Putty all nailholes, cracks and other defects with linseed oil putty, composed of equal parts of Carter Lead and whiting, after priming coat is thoroughly dry.

Second and Third Coats—Paint to be Carter White Lead (Coach and Car preferred), thinned with either Flatting Oil, pure turpentine or pure linseed oil and pure turpentine white drier, to produce eggshell, flat or a full gloss finish, and colored as desired. Architect to specify the finish desired.

White Lead for Interior Walls

White Lead, Flatting Oil and oil colors are used for the finest decorating on canvas, plaster or compo walls. While the first cost of such decorating may exceed other methods a little, the ultimate cost is less. White Lead thinned with Flatting Oil and tinted with oil colors produces clear and delicate tints which are truly washable.

Decorating of this character is good for long service; in fact, until a change in color is wanted. These walls may be washed as often as need be to keep them fresh and clean.

"The Carter Paint Calculator" gives specifications in detail for plaster walls.

Important to Architects

We recommend letting the painting contract separate from the general contract, and that estimates be asked only from competent and reliable contracting painters.

In order to insure the carrying out of the specifications we have stamped the name "Carter" on the side of every keg. When the head is removed, the superintendent can still identify the package.

Guarantee

Carter White Lead is sold under the following guarantee, which is printed on every package:

This package contains 8% linseed oil, 92% carbonate of lead. The CARTER WHITE LEAD CO. will pay $100.00 if adulterant is found in this package.

Useful Information

Every architect should have "The Carter Paint Calculator." Sent on request, no charge. It contains the answers to most paint questions, a complete list of the manufacturers of pure linseed oil and much other authoritative paint information.

DETROIT GRAPHITE COMPANY

Makers of Paints in all Colors for all Purposes

DETROIT, MICH.

ATLANTA, GA.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
COLUMBUS, OHIO
EL PASO, TEX.
GREENVILLE, S. C.
HOUSTON, TEX.
HUNTINGTON, W. VA.
KANSAS CITY, MO.
NEW ORLEANS, LA.
NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
SALT LAKE CITY, UTAH
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
SPRINGFIELD, MASS.

Products

SUPERIOR GRAPHITE PAINT:
Metal Protective Coating

STA-WHITE:
Pure White Oil Paint for Industrial Interiors

Also manufacturers of:

Degraco:
Acid Resisting Paints
Machinery Enamels
Flat Machine Colors
Iron Filler
Wood Preservative
Pipe Joint Cement
Boiler Graphite
Lubricating Graphite
Gas Holder Paint

DEGRACO-TONE:
A Flat Wall Finish

DEGRACO BRICK and CONCRETE PAINT

ANTI-AQUA:
Dampproof Coating

Degracorin:
Concrete Floor Hardener
Degraco House Paints
Degraco Varnishes

Cemtex:
Portland Cement Paint

Enamels:
Exterior and Interior

Distribution of Warehouse Stocks

DETROIT GRAPHITE COMPANY'S products are sold through branch offices with warehouse stocks in all principal cities.

Superior Graphite Paint

SUPERIOR GRAPHITE PAINT
Is Pyrocoat Kept
TRADE-MARK

Lake Superior Amorphous Graphite ore, a natural combination of graphitic carbon and silica, is the base of Superior Graphite Paint.

The ore is ground to extreme fineness and has a greater affinity for linseed oil than commercial graphites. Its inert nature prevents chemical action between pigment and vehicle.

Large covering capacity, opacity and ease of application make for economy in the use of Superior Graphite Paint. Durability (proven in service) results in low ultimate cost.

Superior Graphite Paint has established its reputation as the leader among metal protective paints through service records covering a long period of years. Manufactured in black, brown, red and green, also stack black.

Brown is generally used as a shop coat; black for first field coat and olive green as a finish coat, a combination that assures complete coats being applied. Other colors or combinations may be used with equal success.

Specifications—Remove all scale, dirt and foreign matter from structural steel before any painting is done in the shop.

Covered surfaces, surfaces in contact and surfaces enclosed and all parts of riveted members shall receive one coat of Superior Graphite Paint (color and number) after pieces are punched and before assembled.

All finished members shall receive one coat of Superior Graphite Paint (color and number) before taken from shops or exposed to weather. Foundation beams and connections shall receive one coat in shop. All bolts used in erection and remaining permanently in the structure shall be dipped in Superior Graphite Paint. All pins or bored pin holes or other planed surfaces shall be coated with white lead and tallow before leaving shop. All surfaces accessible after erection shall receive 2 coats of Superior Graphite Paint (colors and numbers) after being placed in position. All paints shall be made by the DETROIT GRAPHITE COMPANY and shall be delivered to erection site in unbroken packages, subject to inspection and approval of architect or engineer.

Repainting Specifications—All metal work and other exposed surfaces to be repainted shall be thoroughly cleaned with steel brushes and, where necessary, all loose scale shall be removed with a three cornered steel scraper and hammer. No paint shall be applied until all dust, mud and grease have been carefully removed, nor shall any paint be applied during wet or foggy weather or upon a wet surface.

First coat shall be Superior Graphite Paint (color and number) applied as soon as parts are cleaned. Any part of structure liable to hold moisture shall be cleaned and slushed with the paint.

Second coat shall be Superior Graphite Paint (color and number) and shall be applied after first coat has been allowed to dry for a period of one week.

All paint used shall be that manufactured by DETROIT GRAPHITE COMPANY.

Degraco-Tone

DEGRACO-TONE
A FLAT WALL PAINT
TRADE-MARK

Degraco-Tone is an oil paint in flat finish for interior use on plaster walls, cement, brick, wallboard, burlap, metal ceilings, radiators, etc. It produces that soft, velvet finish so much desired for interior decoration, and may be washed without injury. It is the ideal paint for use on walls and ceilings in office buildings, schools, hotels, hospitals, residences, public buildings, etc.

Specifications—*Plaster, Brick and Concrete*—Allow sufficient time for new walls to become sufficiently hard and thoroughly dry before painting. Seal all cracks and uneven places with plaster of Paris.

The first or priming coat shall be Degraco-Tone Sealer, a transparent size.

The second and third coats shall be Degraco-Tone as furnished.

Wallboard—First or priming coat should be Degraco-Tone Sealer. Second and third coats shall be Degraco-Tone as furnished.

Wood Work—The surface shall be sanded until thoroughly smooth. The first coat shall be Degraco-Tone thinned with 1 qt. of linseed oil to a gallon of paint. Second and third coats as furnished.

Burlap—The first or priming coat shall be a mixture of 3 parts Degraco-Tone Sealer and 1 part Degraco-Tone. Second and third coats shall be Degraco-Tone as furnished.

Metal—Two coats of Degraco-Tone shall be applied, thinning the first coat with 1 pt. linseed oil and a little turpentine to the gallon.

Repainting—This shall be done on dry surfaces which have been washed and grease spots removed. One or two coats of Degraco-Tone (depending on condition of the surfaces) and first coat with ½ pt. turpentine substitute to gallon of paint.

Drying Time—At least 24 hours shall be allowed between coats.

Application—A 4- or 5-in. wall brush shall be used constantly keeping a wet edge to avoid showing laps. Keep the paint well stirred. If Degraco-Tone becomes a little thick from exposure, thin slightly with turpentine or turpentine substitute.

All paint used shall be that manufactured by DETROIT GRAPHITE COMPANY.

Sta-White

STA-WHITE
MAKES THE DIFFERENCE
TRADE-MARK

Sta-White is a pure white oil paint for industrial interiors with unusual light reflecting qualities. It contains no lead, glue or other harmful or easily affected ingredients, bleached oil or pigments, and consequently shows

Continued on next page

no tendency to turn yellow. It will not chip, flake or peel.

Recommended for interior painting of mills, factories, offices, public buildings, schools, hospitals, theaters, hotels, restaurants, etc.

May be used on wood, concrete, metal plaster, brick and other surfaces. When, after a period of years, Sta-White becomes soiled, covered with dust or other settlings, the original whiteness and reflecting qualities are easily restored by washing without injury to the finish.

Sta-White will give maximum service that is expected of highest grade of interior white, both as to light reflecting qualities and durability.

Furnished in high gloss enamel, eggshell or flat finish.

WALLS, CEILINGS AND PILLARS PAINTED WITH STA-WHITE

Specifications—*General*—Surfaces to be painted shall be dry and free from dust and loosely attached matter such as old paint, rust, scale, etc. All oil spots shall receive a coat of shellac.

Concrete, Brick and Plaster—First coat shall be Sta-White Primer thinned (according to the porosity of the surface) with a mixture of equal parts raw linseed oil and turpentine or approved turpentine substitute and allowed to dry hard before application of the second coat.

Second coat: Sta-White Primer shall be thinned to a good brushing consistency with pure turpentine or turpentine substitute. Ample time shall be allowed for drying before application of the finish coat.

Third coat: Sta-White shall be applied as received. If paint has thickened somewhat from exposure, a small quantity of turpentine or approved turpentine substitute may be added. In no case shall linseed oil or varnish be used for thinning.

Wood, Wall Board and Metal Surfaces—First coat: Sta-White Primer shall be thinned to a good brushing consistency with pure turpentine or turpentine substitute.

Second coat: Sta-White Primer, thinned as above. This coat shall be allowed to become thoroughly hard and dry before application of the finish coat.

Third coat: Sta-White Finish shall be applied as received. If the paint has thickened somewhat from exposure, a small quantity of turpentine or approved turpentine substitute may be added. In no case shall linseed oil or varnish be used for thinning.

Application Over Cold Water Paint—First scrape all loose paint and dirt from the surface, using wire brushes. Clean the surface carefully with a broom. Apply Sta-White Primer liberally, thinned with raw linseed oil. Allow 3 or 4 days for drying time and then apply second and third coats as outlined above.

Two-coat Work—On account of the unusual opacity of Sta-White Primer and Finish, it is possible in many cases to secure a satisfactory solid white finish with 2 coats. In such cases, the second or intermediate coats (as outlined above) may be omitted.

Repainting—On surfaces which have been previously painted, the above recommendations covering two coats should be followed. In certain cases where the previous coat of paint is white and in good condition, satisfactory results can be secured by carefully cleaning the surface and applying 1 coat of Sta-White Finish as received.

Spray Application—Sta-White Primer and Sta-White Finish may be applied by spraying, as well as brushing.

Buildings in which painting is done should be warm and well ventilated. Surfaces should be thoroughly cleaned before application of paint, and all wood surfaces should have knots and sappy places properly shellaced. Surfaces should be free from all forms of moisture before paint is applied.

All paint must be well stirred in the package to insure uniform consistency. When thinning, proper stirring is necessary to incorporate properly the additional thinner.

All paints used shall be that manufactured by DETROIT GRAPHITE COMPANY, Detroit, Mich., and shall be delivered to the job in unbroken packages, subject to inspection and approval of the architect or engineer.

Anti-Aqua—Dampproof Coating

Anti-Aqua is a dampproofing and waterproofing paint recommended for the following uses:

As a coating on the exterior of stone, brick and concrete foundations to prevent seepage of water; as a coating on the interior of stone, brick and concrete walls to exclude dampness; as a coating for the unexposed surfaces of marble, granite or other fine stone used in buildings; to prevent seepage and staining; as a coating between concrete walls and exterior tile or face brick of buildings; as a plaster bond.

Anti-Aqua is a liquid bituminous paint of ordinary brushing consistency which dries within a few hours and when applied to stone, brick or concrete surfaces, enters into and seals up the pores. On account of its penetration, the coating cannot be destroyed by abrasion during back filling of foundations.

Two coats of Anti-Aqua may be applied on concrete or brick walls and then followed by rough plaster. When used in this way Anti-Aqua acts as a waterproofing paint and at the same time eliminates the use of furring and lathing. The use of Anti-Aqua as a plaster on *ceilings* is not recommended.

Anti-Aqua is supplied in the proper consistency for application, but if for any reason thinning is necessary, *only Anti-Aqua* thinner should be usel.

Degraco Concrete Floor Paint

Degraco Concrete Floor Paint is a durable paint that prevents dusting and crumbling of concrete floors by producing a hard film that stands up under constant wear.

Unaffected by water, oil or dirt and can be washed repeatedly without injury.

Specifications—*Unpainted Floors*—First coat should be Degraco Concrete Floor Primer, same color as finish. On hard, non-porous floors, the priming coat should be thoroughly brushed out in a light even coating. On soft, porous floors, a fairly heavy coat of Primer should be applied.

The priming coat enters and seals up the pores of the concrete and forms a perfect surface for the finish coat.

Finish coat should be Degraco Concrete Floor Paint, applied after priming coat has been allowed to dry at least 48 hours.

Repaintings—For repainting omit the primer. Apply 1 or 2 coats of Degraco Concrete Finish.

Do not use soap or soap powders for cleaning that contain alkali or chemicals, which are destructive to any paint.

Degraco Concrete Wall Paint

Degraco Concrete Wall Paint is furnished in gloss or flat as desired. Applied in the same manner as floor paints above.

Degraco Paints in General

Degraco paints are made in all colors for all purposes and complete sets of color cards and recommendations will be furnished on request. Special data also furnished on acid resisting paints and other special coatings for unusual service conditions.

ESTABLISHED 1888

GOHEEN CORPORATION

OF NEW JERSEY

Paint Engineers

NEWARK, N. J.

WAREHOUSES AND BRANCHES

NEW YORK OFFICE
149 Broadway

FACTORY
NEWARK, N. J.

PHILADELPHIA, PA. PITTSBURGH, PA. CHICAGO, ILL. DALLAS, TEX.

Products

GOHEEN'S PRODUCTS include Protective Coatings for iron and steel; Interior and Exterior Wood Paints; Enamels; Dampproofings and Waterproofings for concrete and masonry surfaces; Concrete Floor Paints and Hardeners; Canvas Waterproofings; Wood Floor Preservatives; Shingle Stains.

THE GOHEEN CORP'N
PAINT ENGINEERS
SINCE 1888

TRADE-MARK

Goheen's Galvanum

Goheen's Galvanum is the only paint that adheres permanently to galvanized iron. The process of galvanizing leaves the sheets with a film of basic zinc chloride, which causes the ordinary paint to peel and blister off in a short time. The use of Galvanum eliminates the necessity of washing the metal with solutions to neutralize this acid film, or to allow the metal to weather before painting.

Galvanum is applied directly to new or old galvanized iron without the use of a primer. Galvanum acts both as a primer and finishing coat.

Goheen's Highway Red

Highway Red is a chemically combined red lead paint which has a spreading capacity of 800 sq. ft. per gal. and spreads freely and smoothly, giving a very uniform coat throughout. The base of Highway Red is pure red lead, combined with certain inert materials, which combine with the vehicle and lead to prevent the red lead from separating and settling to the bottom, which accounts for the large spreading capacity and uniform coating.

Highway Red is a product which combines all of the merits of red lead without its deficiencies.

Goheen's Carbonizing Coating

Carbonizing Coating is an inhibitive and protective coating for iron and steel. Carbonizing Coating will give from 7 to 10 years' service under normal conditions. It covers about 1000 sq. ft. per gal., reducing cost far below the ordinary metal coating, and at the same time doubling the service given. It has the same co-efficient of expansion as the metal, dries uniformly throughout and is therefore less liable to peel. It is a non-conductor of electricity, will not re-act with the steel and prohibits electrolytic action.

Goheen's Concrewaltum

A paint for dampproofing and beautifying masonry surfaces; prevents efflorescence and staining of walls; where used on concrete floors it prevents dusting and sanding of the surface and presents a neat and clean appearance. It is particularly recommended for use on concrete floors which have been treated with a chemical floor hardener, such as Goheen's Rockote.

Rockote

Rockote is a chemical hardener to be applied to new or old concrete floors. Rockote dissolves the surface of the floor and re-crystalizes same on drying to a hard, permanent rocklike surface. There is no change whatever in the color or general appearance of the floor, but it positively eliminates any dusting or sanding of the surface.

Rockote is more economical than other floor hardeners, because it is concentrated and permits dilution with water before use; only 2 applications of Rockote are necessary where other hardeners require 3 or more.

The floors will dry out within an hour after each application of the Rockote, and they can be used without harm between applications, after surface has become dry, provided they are swept clean before each subsequent application.

Other Products

Goheen's Old Honesty—Where the highest grade paint for exterior and interior wooden surfaces is desired, Old Honesty is recommended. This is a combination of lead, zinc and linseed oil and is recommended particularly where a high grade outside white is desired. Made in all colors, and has a covering capacity of 600 to 700 sq. ft. per gal. under normal conditions.

Goheen's Asbestos Ore Paint—A fire retardant wood preservative coating for wooden tipples, trestles, fences, shaft houses, etc. Made in reds, browns, greens, black and special colors. Covers 400 sq. ft. per gal.

Goheen's Hydrolite—A concentrated paste for waterproofing concrete. Readily miscible with the gauging water. Can be thrown directly into the mixer; no skill required. 7 lbs. waterproofs 1 cu. yd. of mass concrete. Costs less than any other good waterproofing on the market.

Goheen's Flat Wall Finish—A sanitary washing flat paint which dries with a rich velvet effect. Covers 600 sq. ft. per gal. Hides in 1 coat.

Goheen's Mill White—A high grade mill white for factories, public buildings, schools, hospitals, dairies, etc. Increases lighting efficiency. Retains its gloss and whiteness indefinitely.

Goheen's Enamelette—A white enamel that stays white. Absolutely sanitary. Can be washed without harm. Equal to highest grades of imported enamels and more economical.

Goheen's Surfalox—A liquid that comes ready for use. It has a tendency to harden the wall and prevent chalking. It seals the pores of the surface and absolutely prevents dampness from coming through. It does not allow the alkali to burn the paint. It can be used on new or old plaster and gives excellent results on any kind of wall board.

Goheen's Thermokote—A paint for stacks and hot surfaces that will withstand a temperature of 700° Fahr. It is free from coal tar or asphalt.

Goheen's Special Acid and Heat Resisting Paint—Resists combined effect of chemical fumes, heat and steam on exterior exposure. For interior conditions, use Goheen's Oxidized Carbon Cement R. No. 1.

Literature

Literature and further information gladly supplied on these and other Goheen products.

HAMPDEN PAINT & CHEMICAL CO.

MAIN OFFICE AND WORKS
SPRINGFIELD, MASS.
BRANCH OFFICES
BOSTON, MASS. NEW YORK, N. Y.
Address all correspondence to Main Office

Product

HAMPDEN PAINT COATINGS.

Hampden

TRADE-MARK

Hampden Sunray Mill White

A white, oil paint having extraordinary diffusing qualities, used extensively for interior walls and ceilings of mills, factories, and industrial plants of all kinds. May be applied on wood, brick, or concrete surfaces. Does not chip or scale and spreads easily without leaving brush marks. A permanent washable paint. Supplied in 3 finishes.

Sunray Mill White Gloss—For uses in rooms free from moisture. Insures permanent high gloss. Exceptional ease of spread and covering capacity.

Sunray Mill White Eggshell—A pleasing finish between that of flat and gloss. Great covering capacity, and opaqueness combined with ease of spread.

Sunray Mill White Flat—For interior use where moisture and steamy conditions exist, a permanent, velvety finish, pleasing to the eye.

Specifications—*For New Surfaces*—Surfaces must be dry and free of all loose particles. All knots and sappy places in woodwork should be coated with shellac of good body.

For Old Surfaces—Surfaces must be dry, and cleaned of loose particles. Previous applications of whitewash or similar coatings removed and the surface left clean. Grease and oil stains removed and surface coated with shellac.

First Coat—Concrete, brickwork, and plastered surfaces given 1 coat Hampden Concrete Primer brushed well into pores. Allow at least 24 hours drying time.

Unpainted galvanized surfaces given 1 coat Hampden Galvanized Iron Primer. Woodwork given 1 coat Hampden Sunray Mill White Undercoat. Allow at least 48 hours drying time.

Second Coat—1 coat Hampden Sunray Mill White Undercoat. Allow at least 48 hours drying time.

Third Coat—1 coat Hampden Sunray Mill White—Flat, Eggshell or Gloss, as desired.

All paints, when necessary, to be made workable by addition of Hampden Sunray Mill White Thinners in proportion not greater than 10%.

Note: Hampden paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass., and delivered on the job in the original packages.

Hampden Interior Flat Finish

This is an unexcelled sanitary, washable, oil base flat finish for old and new plastered surfaces, metal ceilings, composition board and woodwork. Excellent as an undercoat for enamel finishes. Particularly adapted for interiors of hospitals, offices, public buildings and residences. Made in 10 standard tints, also black and white, and special shades when quantity warrants. A slow setting paint, which permits ease of application, and prevents the appearance of brush marks or laps on finished surface.

Covering capacity, approximately 1 gal. for 500 to 700 sq. ft. 1 coat, according to surface to be painted.

Specifications—*Preparation and First Coat*—New woodwork, brick and concrete surfaces must be dry and clean. Priming coat Hampden Interior Flat Undercoat thinned with kettle boiled linseed oil in proportion not greater than 20%. Allow at least 48 hours drying time. Putty all nailholes; coat with Hampden White Lead Putty and sandpaper smooth.

New plaster surfaces must be dry. Holes and cracks filled neatly with plaster of paris, which is to be allowed to set hard. Apply 1 coat Hampden Interior Flat Undercoat, thinned with kettle boiled linseed oil in proportion not greater than 20%. Allow at least 48 hours drying time.

Metal surfaces must be dry and cleaned of all loose particles, grease, etc. Galvanized surfaces treated with 1 coat Hampden Galvanized Iron Primer.

Second Coat—1 coat Hampden Interior Flat Finish (color to be selected).

Third Coat—1 coat Hampden Interior Flat Finish (same shade as second coat); flowed on with as little brushing out as possible. Paint to be thinned to easy working consistency with pure turpentine, in proportion not greater than 10%.

Note: Hampden coatings specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass., and delivered on the job in the original packages.

Conservative Covering Capacity Over Primed Surfaces—On wood 50 sq. yds. per gal. Brick and concrete 30 sq. yds. per gal.

Hampden No. 502 Structural Gray

A paint with a base of sublimed blue lead. This pigment has unequaled protective and rust inhibiting qualities. Made in 3 colors, natural, medium and dark gray. In addition to No. 502 Structural Gray, other structural paints are manufactured of somewhat different composition and relatively lower cost. These are known as No. 300 Structural Red, No. 400 Structural Green, No. 303 Structural Brown, No. 500 Structural Black and No. 307 Structural Graphite.

Specifications for Preparing and Painting Metal Surfaces with Hampden Structural Paint—*Shop Work*—All metal surfaces shall be thoroughly scraped and cleaned of all rust, mill scale, dirt and dust, either with sand blast or steel scrapers and stiff wire brushes. All grease is to be removed by the use of gasoline. Then use a stiff brush and dust off the surface to be painted. After cleaning, apply 1 heavy coat of Hampden Structural Paint No. 502, Natural Gray. All inaccessible and any exposed surfaces shall receive 2 coats of the same paint before assembling.

Erection—After erection, all rust spots and all places where the paint is rubbed off shall be thoroughly cleaned. All edges, rivets, nuts and bolt heads to receive an extra coating of the above paint.

Finishing Exterior Work—Apply 2 coats of Hampden Structural Paint No. 502 (of the same shade or of shade as selected) allowing from 3 to 5 days for the first coat to dry thoroughly. Nothing but strictly pure settled raw linseed oil shall be used in reducing and in no greater proportion than 5%.

Exposed Interior Work—Apply 1 coat of Hampden Structural Gray No. 502, or if a white finish is desired, use Hampden Sunray Mill White specification.

When Steel Is Enclosed Within Brick and Concrete—Apply 1 coat of Hampden Structural Bituminous Black No. 500, to be used as received in the container.

Note: The Hampden paints specified are to be obtained from the manufacturers, HAMPDEN PAINT & CHEMICAL CO., Springfield, Mass., and delivered on the job in the original packages.

Hampden Pipe Enamel

This enamel is adapted for hot or cold interior piping, and forms a permanent coating for the preservation of metal pipe. Made in shades adopted by the American Society of Mechanical Engineers.

Publications

Bulletins and pamphlets describing the different paints, also complete specifications covering Hampden Paint Coatings, will be furnished to architects and engineers on request.

THE HOCKADAY COMPANY

Manufacturer of Interior Wall Paints

MAIN OFFICE AND FACTORY
1823 Carroll Avenue
CHICAGO, ILL.

BRANCHES AND WAREHOUSES IN PRINCIPAL CITIES

Product

HOCKADAY SEMIGLOSS WALL PAINT.

Hockaday Semigloss Wall Paint

Hockaday is a non-porous interior wall finish which can be washed like tile. Surfaces finished with Hockaday 7 to 10 years ago are still in good condition, although they have been washed at least annually.

Only two coats of Hockaday are required except white, which requires three coats.

No size or primer are necessary when applying Hockaday—at least one-third material and one-third labor are saved. It is not necessary to brush out Hockaday; it levels itself, dries without lapping, takes less time to apply and spreads 10% to 15% further than other paints.

Hockaday comes in two parts—body and reducer.

Hockaday is known as "the cure for wall troubles." It will positively prevent the old prevalent eyesores—peeling, air checking, suction spots and lime burning. Nothing is left to chance when Hockaday is used; sure and positive results are always obtained.

Specifications for Applying Hockaday Semigloss Wall Paint

No. 1. *Smooth Putty Plaster Coat and Smooth Keene's Cement.—First Coat: One part body, one part reducer. Covering capacity, approximately 500 sq. ft. per gal., mixed.

Second coat: Apply body only. If too heavy, thin with ⅛ gal. reducer. Covering capacity averages 600 sq. ft. per gal. To cover 100 sq. ft. two coats, requires approximately ⅓ gal. of body and ⅛ gal. of reducer.

Use 4½-in. brush.

No. 2. *Smooth Putty Plaster Coat Previously Painted or Sized (Walls from Which Kalsomine Has Been Washed or Paper Removed)—First coat: One part body, one part reducer. Covering capacity approximately 550 sq. ft. per gal., mixed.

Second coat: Apply body only. If too heavy, thin with ⅛ gal. of reducer. Covering capacity approximately 650 sq ft. per gal. To cover 100 sq. ft. two coats requires approximately ⅓ gal. of body and ⅛ gal. of reducer.

No. 3. *Compo or Wall Board, Sized or Unsized—All nailholes must be puttied and an even surface established.

First coat: Equal parts of body and reducer. Covering capacity, approximately 650 sq. ft. per gal., mixed.

Second coat: Apply body only. If too heavy thin with ⅛ gal. of reducer. Covering capacity, approximately 700 sq. ft. per gal. To cover 100 sq. ft. two coats requires approximately ⅜ gal. of body and ⅛ gal. of reducer.

Use 4½-in. brush.

No. 4. Smooth Concrete, Brick, Cement and Sand Finished Plaster Walls—First coat: One part body, two parts reducer. Covering capacity, approximately 300 sq. ft. per gal., mixed, for medium colors. For light colors, use equal parts of body and reducer.

Second coat: Apply body only. If too heavy, thin with ⅛ gal. of reducer. Covering capacity, approximately 325 sq. ft. per gal. To cover 100 sq. ft. two coats requires approximately ½ gal. of body and ¼ gal. of reducer. If stipple finish is wanted, allow last coat to set medium and then stipple.

Use 4½-in. brush.

No. 5. Steel Ceilings, Doors and Windows; Radiators; Interior Metal Work—All brazed or rusted surfaces must be scraped and touched up. The surface must be dry and solid.

First coat: Apply body only. If too heavy, thin with ½ gal. of reducer. Covering capacity, approximately 700 sq. ft. per gal. To cover 100 sq. ft. two coats requires approximately ⅜ gal. of body and ⅛ gal. of reducer. Hockaday can be applied on hot piping and gives a baked enamel effect.

Use 3-in. brush.

No. 6. Pine, Poplar and Cypress—Sandpaper rough spots. Putty nailholes, coloring putty to match color of paint to be applied.

First coat: Three parts of body, one part reducer. Covering capacity, approximately 700 sq. ft. per gal., mixed. To cover 100 sq. ft. two coats requires approximately ⅓ gal. of body and ⅛ gal. of reducer.

Use 3½-in. brush.

Include in All Specifications—All air cracks, water and suction spots must be completely overcome by the first coat. All cracks and damaged places must be repaired and put in first class condition before the foundation coat is applied. The surface must be dry and solid. When painting is completed, the surface must be of such a nature that indelible pencil marks, ink stains, match scratches or grease spots can be removed by washing with an abrasive soap or powder without harm to the semigloss finish.

Linseed oil, benzine, turpentine, floss oil or any other liquid or pigment must not be used with Hockaday.

All opened packages must be kept covered when not in use. In tinting, only colors ground in linseed oil should be used. When preparing Hockaday for use, open container and pour off all the liquid; mix body thoroughly and then slowly add the liquid which was poured off.

Tint undercoat 20% darker than top coat.

Hockaday white is not blued, therefore the white should be blued with a small quantity of Prussian blue in oil.

*When stipple or eggshell finish is desired, use Hockaday with ⅛ gal. of reducer on the finish coat. Allow sufficient time to set medium and then stipple.

Our Service

A specialized service department is at your command. Let us help you. Ask for our new book "Paint Mileage." It will help in solving painting problems. At the same time ask us to send a panel of beaver board in order that Hockaday can be given a severe test.

A Few of the Many Buildings Finished with Hockaday

Wrigley Building, Chicago, Ill.
Department of Interior, Washington, D. C.
Field Museum, Chicago, Ill.
Lumber Exchange, Seattle, Wash.
Tivoli Theater, Chicago, Ill.
St. Luke's Hospital, San Francisco, Cal.
Grant Hospital, Chicago, Ill.
Cincinnati General Hospital, Cincinnati, Ohio
Over 75 other hospitals
Pacolet Mfg. Co.
Also 66 other mills.
Forty-Second Street Building, New York, N. Y.
Fifty Minneapolis public schools
Planters' Hotel, Chicago, Ill.

*Where stipple or eggshell finish is desired use last paragraph of specification.

ESTABLISHED 1887

McDOUGALL-BUTLER CO., INC.

Manufacturers of Paints, Varnishes, Enamels, Colors and Stains

MAIN OFFICE AND FACTORY

Evans, Water and Norton Streets

BUFFALO, N. Y.

NEW YORK CITY BRANCH, 10 Christopher Street

Products

A complete line of Buffalo Quality Architectural Finishes, including:

MATTONA FLAT WALL FINISH.
ZANZITE ENAMEL.
FLOOROLEUM FLOOR VARNISH.
FINEST SPAR VARNISH.
PERMANITE WOOD FINISH.

Also manufacturers of Buffalo Quality House Paint, Concrete and Cement Finishes, Colors in Oil, Oil Stains, Japan Colors, etc.

TRADE-MARK

Mattona Flat Wall Finish

Mattona is a true mat finish. It is an oil paint which has the depth of color necessary to rich interior decoration. It is made in white and 16 pastel shades to be used on walls, ceilings and woodwork and on interior metal work where a flat finish is desired. Mattona is not to be confused with the ordinary flat wall finish, because it lends a quality of permanency and refinement that is peculiar to itself. It withstands frequent washings.

Specifications—All porous surfaces, such as plaster, paper or wallboard, should first be given a priming coat of Mattona Sealer. (For priming new wood surfaces, see specifications for Zanzite Enamel.)

Over the primed surface apply 2 coats of Mattona Flat Wall Finish.

Before each succeeding coat sand the surface lightly with fine sandpaper. On old work omit the priming coat.

Zanzite Enamel

Zanzite is the lily among white enamels. It provides a finish comparable to the oldest and finest porcelain. It is extremely elastic and when dry displays no brush marks. Zanzite is made in 2 shades—white and ivory; and in 2 finishes—gloss and eggshell. We warrant Zanzite to retain its original tone. It will not turn yellow. Zanzite undercoat for foundation coats completes our Zanzite group.

Specifications—On new work apply a priming coat of McDougall-Butler Buffalo Quality No. 81 Outside White Paint thinned in the proportion of 1 pt. of pure turpentine to 1 gal. of Outside White Paint.

Over the primed surface apply 2 coats of Buffalo Quality Zanzite Enamel Undercoat followed by 2 coats of Buffalo Quality Zanzite Enamel.

Before each succeeding coat sand the surface lightly with fine sandpaper. On old work omit the priming coat.

Flooroleum Floor Varnish

A varnish as clear, clean and hard as Chinese amber, Flooroleum gives the maximum toughness, luster and durability in floor finishes. The natural gloss may be rubbed to a beautiful dull finish if desired. It will not mar white and is indifferent to thorough scrubbing with soap and water. By using Flooroleum on hardwood floors treated first with Buffalo Quality Whitelex Paste Wood Filler, effects can be produced which have the flavor of originality and unusual beauty.

Specifications—Apply Buffalo Quality Oil Stain of desired shade to obtain other than natural finish.

On open grain woods apply desired shade of Buffalo Quality Whitelex Paste Wood Filler. Follow with 3 coats of Flooroleum Floor Varnish. On close grain woods omit the filler.

Rub the last coat lightly with Pumicestone and oil to produce a beautiful dull finish. The finish may be left in the gloss if desired.

Finest Spar Varnish

Finest Spar was evolved to provide a superior finish for exterior woodwork such as spars, cabins and decks, doors, frames, window sills, vestibules and halls, where wear and weather have full play. It dries with a brilliant luster and its quality is recognizable at first glance.

Specifications—Apply Buffalo Quality Oil Stain of desired shade to obtain other than natural finish.

On open grain woods apply desired shade of Buffalo Quality Whitelex Paste Wood Filler. Follow with 3 coats of Buffalo Quality Finest Spar Varnish. On close grain woods omit the filler.

Before succeeding coats sand the surface lightly with fine sandpaper.

Permanite Wood Finish

Permanite is an ultra-durable varnish for all interior work in public and private buildings where quality is the prime consideration. The richness and depths of mahogany and walnut can best be brought out by the use of Permanite Wood Finish. Permanite can be rubbed and polished.

Specifications—Apply Buffalo Quality Oil Stain of desired shade to obtain other than natural finish.

On open grain woods apply desired shade of Buffalo Quality Whitelex Paste Wood Filler. Follow with 3 coats of Buffalo Quality Permanite Wood Finish. On close grain woods omit the filler.

Before succeeding coats sand the surface lightly with fine sandpaper.

Architects' Service

We maintain an experimental laboratory in charge of chemists experienced in research work on behalf of architects. Our policy is to avoid rawness and crudity in paints and to work for mellowness, harmony and reliability.

We place our staff and plant at your command.

ESTABLISHED 1833

OLIVER JOHNSON & CO., INC.

Manufacturers of Paint

PROVIDENCE, R. I.

Products

OJACO FLAT MILL WHITE; OJACO GLOSS MILL WHITE; OJACO EGGSHELL MILL WHITE; OJACO INTERIOR KON-KRETE-KOTE, OJACO EXTERIOR KON-KRETE-KOTE, for protection of concrete etc.; OJACO RESIST-A-FUME, a moisture and acid resisting pure white paint; OJACO CHROM-OXID, a Metal Protective Paint; OJACO DEC-O-KOTE, SANITARY FLAT WALL FINISH; OJACO DADO ENAMELS; OJACO GRAPHITE PAINT; OJACO PURE LINSEED OIL OUTSIDE MIXED PAINT; OJACO No. 1071 STEEL SASH PUTTY; OJACO 33⅓% WHITE LEAD PUTTY.

Also manufacturers of Ojaco Pipe Enamels; Ojaco Gloss Opaque; Ojaco Structural Paint.

Ojaco Flat Mill White (Interior)

This is a heavy bodied paint of intense whiteness intended principally for use as an undercoat for Ojaco Gloss Mill White, but it can be used with excellent success for finishing coat, if a gloss finish is not desired.

Ojaco Flat Mill White can be used on wood, brick, concrete, and metal. We advise, however, a priming coat of Ojaco Kon-Krete-Kote for brick and concrete, and a priming coat of Ojaco Light Gray Chrom-Oxid on metal.

Covering Capacity—Approximately 50 sq. yds. to the gallon, 1 coat on wood; 30 sq. yds. on brick; 25 sq. yds. on concrete.

Ojaco Gloss Mill White (Interior)

After years of experimenting at great expense, we have eliminated the defects of ordinary mill whites, and have confirmed our reputation as manufacturers of only the highest grade paints by producing Ojaco Gloss Mill White.

We have, therefore, in Ojaco Gloss Mill White, an enamel paint for interior millwork which excels in original whiteness, in permanency of that whiteness, in the ease with which it spreads, and in general wearing qualities. These are statements the correctness of which has been demonstrated over and over again by competitive tests on a large scale.

Covering Capacity—Approximately 50 sq. yds. to the gallon, 1 coat on primed wood surface; 30 sq. yds. on brick; 25 sq. yds. on concrete.

Ojaco Eggshell Mill White (Interior)

Original experiments with Mill White convinced us that eggshell finish was ideal for mill work, and the most elaborate scientific experiments have recently shown this contention to be correct.

For this reason the use of eggshell finish is recommended more strongly than ever, as its light reflecting value is fully equal to that of the glaring high gloss paint.

Covering Capacity—Approximately 50 sq. yds. to the gallon, 1 coat on primed wood surface; 30 sq. yds. on brick; 25 sq. yds. on concrete.

Ojaco Kon-Krete-Kote

Ojaco Kon-Krete-Kote is a scientifically developed paint for the protection and decoration of brick, concrete, plaster, etc. It is made from an essentially non-saponifiable vehicle; is practically immune from the attacks of alkalis, and is recommended as a waterproofing and priming paint for undercoats on brick and concrete, wherever moisture is prevalent, as a first coater and surfacer on concrete floors.

Covering Capacity—Approximately 25 to 30 sq. yds. to the gallon, 1 coat on brick; 20 to 25 sq. yds. on concrete.

Ojaco Resist-A-Fume (Interior)

A pure white paint that is highly resistant to moisture and the various fumes found in paper mills, chemical factories, dye houses, laboratories, finishing plants, etc. Made of the most stable pigments and vehicles treated by our private process to make them nearly immune from acid, alkali and sulphurous fumes.

Ojaco Flat Resist-A-Fume is intended for all undercoat work on wood, brick, concrete or metal. Ojaco Gloss Resist-A-Fume should always be used for a finishing coat because it is the tough, durable film of this product that makes it dependable and serviceable where ordinary paints fail.

Covering Capacity—Approximately 50 sq. yds. to the gallon, 1 coat on wood; 30 sq. yds. on brick; 25 sq. yds. on concrete.

Ojaco Chrom-Oxid

Selecting a paint for structural iron and steel is an exceedingly important matter and protective results should be the sole factor in selecting such a paint.

Ojaco Chrom-Oxid is a paint high in oxide and reinforced with a chromate, a pigment which is one of the best known rust inhibitors. A thoroughly practical paint for structural iron and steel. The most perfect protection which it is possible to give metal work is assured to the user of Ojaco Chrom-Oxid Paint.

Shop coat, as well as field coat, should be Ojaco Chrom-Oxid.

It is made regularly in 6 standard shades: natural red, orange red, lead color, gray, bronze green, black.

Covering Capacity—Approximately 3 tons to the gallon on 16-in. I-beam.

Ojaco Pure Linseed Oil Paint

In the manufacture of this paint, the best pigments have been selected to insure durability, covering capacity and permanency of color. Only pure linseed oil and high grade liquid dryers and turpentine are used in grinding and thinning this paint, thus producing a most economical paint, because of its great spreading and wearing qualities.

During the many years that we have manufactured Ojaco Mixed Paint, we have had many opportunities to observe the results from its use in cities, by the seashore

Continued on next page

and in the mountains, and have never found an instance where it failed to give the utmost satisfaction.

Made regularly in 28 attractive shades, or furnished in special colors on quantity orders.

Covering Capacity—Ojaco Pure Linseed Oil Paint will cover from 50 to 60 sq. yds. per gallon, 1 coat on wood, or from 30 to 40 sq. yds., 2 coats.

Ojaco Dado Enamels

Ojaco Dado Enamels are made for use on walls and posts for dado work. They are tough, durable, and elastic, and withstand the hard usage common in mills today. Regular colors as follows: F. A. red, bright green, bronze green, moss green, machinery gray and seal brown.

Covering Capacity—Average covering capacity over brickwork primed with Kon-Krete-Kote, 30 sq. yds. to the gallon, 1 coat.

Ojaco Graphite Paint

This is an exceptionally finely ground paint mixed with pure linseed oil for painting all kinds of structural metal after the priming coat. It is so fine and works so freely that it covers a large area per gallon, and is an exceptional water shedding paint. Natural color is black, but can be furnished in various shades if desired.

Covering Capacity—A gallon will cover from 50 to 60 sq. yds., 1 coat.

Ojaco Dec-O-Kote, Sanitary Flat Wall Finish

Dec-O-Kote is a flat paint in liquid form ready for use, not a calcimine or water finish. It meets the demand of the modern physician, surgeon and scientist for the interior decoration of office and public buildings like theaters, churches and stores, and particularly for the interior decoration of homes. Dec-O-Kote makes a hard, elastic, durable flat wall finish that may be washed or cleaned with soap and water, producing a surface non-porous, non-absorbent, and germproof, cleanly and sanitary.

It is made in 12 attractive colors, also white and black, producing decorative effects that are rich, deep and clear in tone, extremely pleasing to the eye and restful to the mind.

Dec-O-Kote works easily under the brush, flows on and levels up well, is very opaque, and dries absolutely flat.

Covering Capacity—A gallon covers approximately 50 sq. yds., 1 coat, or 30 sq. yds., 2 coats.

Ojaco 33⅓% White Lead Putty

For heavy sash, sawtooth roofs, and general mill construction, Ojaco 33⅓% White Lead Putty is recommended. For purposes of identification, this grade is tinted a peculiar blue color, which minimizes deception and assures closer obedience to specifications.

One lb. of 33⅓% Putty will glaze 200 in. of ordinary mill sash, the putty extending ¼ in. on to glass and wood, or 3½ lbs. will glaze 12 lights, 12x18 in.

Ojaco No. 1071 Steel Sash Putty

In glazing steel sash it is essential that the putty set up quickly and very hard, otherwise proper adhesion will not result.

Ojaco No. 1071 Steel Sash Putty contains sufficient hardening materials to produce the proper setting and drying for best results. It is absolutely sure in all temperatures.

Specification for Painting a Brick, Steel and Wood Manufacturing Building (Slow Burning Mill Construction).

Exterior—All exterior woodwork including sash, window frames, doors, etc., and all exposed metal work usually painted, shall receive 2 coats of Ojaco Pure Linseed Oil Paint, color to be selected, in addition to priming coat.

Interior—*Woodwork*—All interior wooden ceilings and beams and all window sash and frames, exclusive of office portion, shall be painted as follows: first coat Ojaco Flat Mill White; second coat Ojaco Flat Mill White; third coat Ojaco Gloss Mill White.

All wooden posts, stair rails, partitions, and all other standing woodwork usually painted and not otherwise specified, shall also be painted as above to a line 6 ft. from the floor. From this line to the floor, they shall receive 2 coats of Ojaco Dado Enamel, color to be selected, over a priming coat of lead and oil.

Brick and Concrete—All brick and concrete side walls to a line 6 ft. from the floor shall be painted as follows: first coat Ojaco Kon-Krete-Kote; second coat Ojaco Kon-Krete-Kote; third coat Ojaco Gloss Mill White or Eggshell Mill White.

The 6-ft. dado shall receive 2 coats of Ojaco Kon-Krete-Kote tinted, and 1 coat of Ojaco Dado Enamel, color to be selected.

Structural Steel—All exposed steel beams, posts, etc., in addition to priming coat, shall be painted as follows: first coat Ojaco Gray Chrom-Oxid; second coat Ojaco Flat Mill White; third coat Ojaco Gloss Mill White.

Stock Bins, Racks, etc.—All bins for stock or racks for tools, etc., shall receive 3 coats of Ojaco Pure Orange Shellac.

Toilet Enclosures—All North Carolina pine toilet enclosures shall be finished on both sides as follows: 1 coat of Ojaco Liquid Wood Filler and 2 coats of Ojaco Interior Spar Varnish left in the full gloss.

Sprinkler Pipes—All sprinkler pipes shall receive 2 coats of Ojaco Pipe Enamel.

Specification for Application of Dec-O-Kote Flat Wall Finish

Woodwork—Sand smooth and shellac all knots and sappy places.

Dec-O-Kote must be stirred to uniform consistency before applying and painter should flow on as he would apply varnish. If necessary to thin, except as specified below, use turpentine sparingly.

First Coat—Ojaco Pure Linseed Oil Mixed Paint of shade similar to finishing coat. Putty all nailholes.

Second Coat—Ojaco Dec-O-Kote as received.

Third Coat—Ojaco Dec-O-Kote as received.

Plaster Walls—Do not paint until plaster is dry.

First Coat—Ojaco Dec-O-Kote thinned one-quarter with pure linseed oil.

Second Coat—Ojaco Dec-O-Kote as received.

Third Coat—Ojaco Dec-O-Kote as received.

Specification Forms

We will gladly furnish, on application, form of specification for any Ojaco product applicable to any specific building project.

Where Sold

Ojaco paints can be bought direct from the manufacturers, Oliver Johnson & Co., Inc., Providence, R. I., or authorized agents.

Trade-mark

No paint should be accepted as an "Ojaco" product unless the package bears the trade-mark shown.

References

A list of satisfied users will be furnished to architects, engineers and other interested persons, and requests for detailed information about any or all Ojaco paints will be given prompt and careful attention.

ESTABLISHED 1883

BENJAMIN MOORE & COMPANY

Manufacturers of High Grade Paint Products

231 Front Street
BROOKLYN, N. Y.

FACTORIES

NEW YORK, N.Y. CHICAGO, ILL. ST. LOUIS, MO. CLEVELAND, OHIO CARTERET, N. J. TORONTO, CAN.

TRADE-MARK

Products

Complete line of PAINTS, ENAMELS and WALL FINISHES, including such specialities as: SANI-FLAT; MOORAMEL; MURESCO; IMPERVO SURFACER.

Also Varnishes for all purposes.

Sani-Flat

A washable flat oil paint for interior use. Manufactured in white and 20 beautiful shades, which may be intermixed to obtain modifications of the standard colors. It is durable, and when properly treated may be washed repeatedly without fear of injury. It will produce a beautiful flat finish with a minimum amount of material, the number of coats necessary to obtain a satisfactory finish depending upon the condition of the surface.

Sani-Flat, ordinarily, will cover an average of approximately 600 sq. ft. to the gallon on plaster surfaces, and 500 sq. ft. on wood surfaces.

Specifications—*New plastered walls and ceilings (smooth plaster).*—Large breaks and patches should be attended to by a competent mason before any painting is attempted.

Cracks—Cut out all cracks that are of any importance in a V-shape, so that the point of the V is on the surface and the widest part inside the plaster body. This will prevent the filling from coming out. Dampen the cracks thoroughly with water before puttying with a stiff mixture of plaster paris and Sani-Flat. The Sani-Flat in this mixture to be of the same color as used for the finishing coat.

Sizing—When this has thoroughly dried, paint the entire wall or ceiling with a size made of 1 part of Impervo Surfacer and 1 part of Sani-Flat of the same color as finishing coat, to which mixture add 1 pt. of linseed oil to the gallon.

Second Coat—This should be Sani-Flat of the desired shade, thinned with 1 pt. of linseed oil to the gallon of paint.

Third Coat—This should be straight Sani-Flat of the desired shade, used as received in the package.

If a stippled or rough finish is desired, a heavy coat of Sani-Flat should be flowed on and allowed to partially set, when it should be pounced with a stippling brush. Stippling brushes should be kept clean by frequent washing in a suitable petroleum spirit or other solvent.

It is important that each coat of paint should thoroughly dry before applying subsequent coats. Ordinarily, Sani-Flat will dry thoroughly in 24 hours. Atmospheric conditions may necessitate a longer time.

SANI-FLAT CONTAINER

Mooramel

An oil enamel of beautiful whiteness and permanence of color, which can be used for both interior and exterior decoration, and which may be tinted to any desired shade by the proper addition of color. Mooramel works easily, flows out freely and dries with a high luster, which may be rubbed when an eggshell finish is required. Will not yellow perceptibly with age, will hold its luster and will not alligator, check, or crack.

Specifications—On new wood such as maple, birch, whitewood, etc.

Priming Coat—Moore's White Enamel Underbody to which has been added 1 pt. of linseed oil to the gallon.

Second Coat—Moore's White Enamel Underbody as received in the package.

Third Coat—One-half Moore's White Enamel Underbody and one-half White Mooramel.

MOORAMEL CONTAINER

Fourth Coat—Mooramel Enamel as received in the package.

For three-coat work the second coat may be omitted.

Muresco

Combines beauty of color and texture with great durability, unusual hiding power and extreme ease of application. It is perfectly sanitary and highly economical.

Muresco is a dry powder and is prepared for use by mixing with boiling water. It is so easy to prepare and apply that even the unpracticed can get first class results.

It produces the ideal, flat, soft, velvety finish. The colors have that peculiar richness and depth that is found only in the best water colors. It brushes so freely and sets so slowly that large surfaces can be worked without danger of showing laps or brush marks. It contains no free alkali or other ingredient that might injure the brush. It is also adapted for applying with a spray.

The hiding power of Muresco is truly remarkable. It covers perfectly with 1 coat. If, however, it is desired to add a second coat it will be found that this will adhere as perfectly as if it were one with the first. It has exceptional durability and presents a surface which will not crack, chip nor peel. It positively will not rub off on clothing or disintegrate into powder with the action of time. The colors, too, are lasting and will retain their strength of tone indefinitely. When soiled, it can be cleaned with wall paper cleaning dough, or can be readily washed off altogether from walls and ceilings if considered desirable.

Muresco can be stencilled or stippled, and is unexcelled for fresco and relief work. Muresco Fresco Colors are particularly recommended for work of this character.

Muresco is offered in a pure white (XX White), a Tinting White, and a wide range of practical and artistic colors. The XX White is intended for use where a pure, clear, permanent white is desired. It will retain its purity and clearness indefinitely. The Tinting White is used for toning down the other colors to the desired tint. The Tinting White, the Muresco Tints and the Muresco Fresco Colors can be mixed in any proportions to obtain an infinite variety of tints and shades.

MURESCO CONTAINER

Muresco can be used on plaster, brick, concrete, wood or metal. On smooth surfaces 1 lb. will cover from 50 to 75 sq. ft.; on rough surfaces from 35 to 50 sq. ft.

To secure the best results on newly plastered walls, these should first be sized. For this purpose we recommend Moore's Muresco Dry Size, or Moore's Impervo Surfacer.

Package Sizes—330-lb. barrels, 200-lb. half barrels, 100-lb. kegs, 25-lb. bags and 5-lb. cartons. Cases contain twenty 5-lb. cartons.

Impervo Surfacer

A liquid paint for preparation of plaster walls before application of finishing paints or enamels.

ESTABLISHED 1848

THE NEW JERSEY ZINC COMPANY

Manufacturer of Paint Pigments

160 Front Street

NEW YORK, N. Y.

REPRESENTATIVES

MINERAL POINT ZINC COMPANY

1111 Marquette Building

CHICAGO, ILL.

CLEVELAND, OHIO, THE NEW JERSEY ZINC SALES CO., 1138 Guardian Building

PITTSBURGH, PA., THE NEW JERSEY ZINC SALES CO., 1439 Oliver Building

SAN FRANCISCO, CAL., THE NEW JERSEY ZINC SALES CO., 1205 Merchants' Exchange Building

Products

PAINT PIGMENTS: Zinc Oxide and "Albalith."

For Rolled Zinc, see page 953.

New Jersey Zinc TRADE-MARK

Introduction

Zinc Oxide—Briefly, Zinc Oxide's value as a paint pigment, for both exterior and interior jobs, is found in these qualities:

1. It prolongs the life of the luster. 2. It reduces chalking when used in combination with other pigments; and when used alone, it does not chalk. 3. It assures a smooth, clean surface. 4. It increases the durability of paint. 5. It reduces fading tendencies. 6. It does not darken on exposure.

"Albalith"—A light resisting lithopone and brilliantly white. It possesses characteristics rendering it especially valuable for use in wall tints, flat finishes, and other painting work of the most exacting nature.

Interior and Exterior Finishes

Interior wall paints consisting of these pigments in accordance with the following specifications are unequaled for purity of tints, finish and appearance, sanitation (that is, they are washable), and do not darken.

Exterior paints containing 40% to 50% of Zinc Oxide are unequaled for durability and retention of gloss and color.

Paint Specifications

The paint accepted shall be subject to tests to be prescribed by the architect for light resistance, opacity, brushing qualities, drying, and purity of color.

Interior Flat Finish—Pigment portion shall consist of not less than 75% of "Albalith," not less than 10% of Florence Brand, French Process Zinc Oxide, or "XX" American Process Zinc Oxide and not more than 15% of inert pigment (preferably asbestine). Liquid portion shall consist of treated oils and volatile thinners, or varnishes which produce a satisfactory washable flat finish.

Undercoater for Enamel Finishes—Pigment portion shall contain not less than 75% of "Albalith," not less than 5% of Florence Brand, French Process Zinc Oxide or "XX" American Process Zinc Oxide, and not more than 20% of inert pigment (preferably asbestine). Liquid portion shall consist of treated oils and volatile thinners, or varnishes which produce a satisfactory undercoat.

Oil or Gloss Finish—Pigment shall consist of a minimum of 25% or a maximum of 75% of "Albalith" and a minimum of 25% of Florence Brand French Process Zinc Oxide or "XX" American Process. In every case the sum of Zinc Oxide and Albalith shall be 100%. Liquid portion shall be pure linseed oil (refined linseed oil if paint is white) with the necessary volatile thinners and dryers. The dryer shall be the best grade lead-free oil dryer.

Enamel Finish—The undercoat, or in the case of 4-coat work or over, the first 2 coats shall be as specified under "Undercoater for Enamel Finishes."

The succeeding coats shall be of an approved high grade enamel containing no pigment except French Process Zinc Oxide, Florence Brand (preferably White Seal.) Liquid portion shall consist of high grade varnish or treated oils with such volatile thinners as are necessary. It shall be capable of being rubbed without softening, to a gloss, eggshell or flat finish. (The finish desired to be specified by the architect in each particular instance.)

Floor Paint—(Tinted, not applicable to browns, reds, greens, etc.) The pigment portion shall contain not less than 75% of "Albalith" not less than 10% of "XX" American Process Zinc Oxide or "Standard" Zinc Oxide, and not more than 15% of inert pigment (preferably asbestine). Liquid portion shall consist of varnishes or such combination of oils and varnish as is necessary to produce a satisfactory, hard, tough, rapid-drying floor paint.

Exterior Paint—Pigment portion shall contain 30% to 55% of Florence Brand French Process Zinc Oxide or "XX" American Process Zinc Oxide, 45% to 65% of white lead, and not more than 15% of inert pigment. Or when exterior paint of superior whiteness and assurance against possible discoloration is desired, the pigment portion shall contain 40% "XX Black" American Process Zinc Oxide, 40% "Albalith" and 20% of either Barytes or whiting.

Liquid portion shall contain not less than 90% pure linseed oil, with proper amount of dryer and volatile thinners to produce a satisfactory paint. Content of water shall not be over 1%.

Note: Paints and enamels as described above, are available as standard products of many of the reputable paint manufacturers of the United States.

Application of Paints

Suggestions affecting the manner of applying interior finishes are given below. These are submitted for the consideration of architects, and are designed to aid them in issuing instructions to those who may be engaged to do the actual painting work.

General—All surfaces shall be thoroughly dry before applying paint. The work shall be thoroughly cleaned, sandpapered and dusted before applying paint.

Unless otherwise specified, the priming coat shall have the same pigment formula as the subsequent coats of paint, but shall differ from them in pigment-vehicle ratio. It shall be well and thoroughly brushed into the surface.

After priming, all nailholes, open joints and other imperfections shall be solidly and smoothly filled with pure linseed oil (whiting or white lead) putty. After the putty has dried, 2 additional coats of paint of the color selected shall be applied and if a superior job is desired, the specification should call for 3 instead of 2 coats in addition to the priming coat. Each coat shall be thoroughly dry before the succeeding coat is applied.

Interior Woodwork—If wood to be painted is new yellow pine, priming coat shall contain 1½ pts. of pure wood or gum turpentine to 1 gal. of paint in addition to other thinners used.

If wood to be painted is new cypress, priming coat shall contain in addition to other thinners used 1 pt. of solvent naphtha, benzol, or toluol to 1 gal. of paint ready for the brush.

Plaster and Cement Surfaces (Except Floors)—If surface to be painted has stood less than a year, it shall be treated before painting with a solution of zinc sulphate (4 lbs. of zinc sulphate crystals to 1 gal. of water). Surface shall be thoroughly coated with this solution, applied by a broad, soft brush (a kalsomine brush) and allowed to stand not less than 48 hours before painting.

Cement or Concrete Floors—In painting new cement or concrete floors, first close all cracks and other surface imperfections with plaster or cement. After drying, apply to entire surface a solution of zinc sulphate dissolved in water (4 lbs. of zinc sulphate crystals to 1 gal. of water); allow 48 hours for drying, then apply 4 coats of paint. For priming coat, approved high grade cement primer may be used. Floor paint may be thinned as specified by the manufacturer.

Exterior Work—If extra thinning of paint is required, equal parts of pure linseed oil and turpentine should be used. This thinning is necessary for priming coat on wood.

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Products

Manufacturers of PAINTS and VARNISHES for all purposes, including:

PATTON'S SUN-PROOF LIQUID PAINT.
PATTON'S VELUMINA INTERIOR FLAT WALL PAINT.
PATTON'S IRONHIDE STEEL PROTECTIVE PAINT.
PITCAIRN AGED MAST SPAR, for exposed work.
PITCAIRN AGED FINISHING SPAR, for fine interiors.
PITCAIRN AGED FLOOR SPAR, for fine floors.
PITCAIRN AGED FLAT FINISH.
PITCAIRN TECTOR, an undercoat for all purposes.
PITCAIRN WOOD STAINS, for all wood tinting.
PITCAIRN BANZAI ENAMEL, for all white work.

Also, Patton's Alba-Lux Mill White, Patton's Porchite Porch Paint, Tor-on Shingle Stain, Princess Florhide, Cement, Concrete and Wood Floor Paint, Graphite, Paste Wood Filler 17th Century Wax; Pitcairn Aged Church Pew and Seat Finish, for church and school seats, desks, chairs, etc.

Patton's Sun-Proof

Patton's Sun-Proof Liquid Paint is made from white lead, oxide of zinc, silica and coloring matter, ground in strictly pure linseed oil, and specially prepared drier.

Sun-Proof Paint contains the maximum quantity of linseed oil consistent with good paint, and the quantity of linseed oil is in the proper relative proportion to the pigment to produce a tough, durable wear resisting paint film—a paint that can be spread uniformly and a paint that is suitable for all general purposes.

PATTON'S SUN-PROOF PAINT CAN

Patton's Velumina

Patton's Velumina is, first of all, a practical flat paint. It is an oil paint, covering the walls with a tough, oil paint film, at once durable, washable and therefore sanitary. An interior decorated with Velumina adds refinement and distinction to the surroundings.

Pigments are smooth in texture, possess extreme opacity or hiding properties, and liquids used are free from varnish and resinous substances. Being an oil base paint, it works easily and can be spread and brushed without showing brush marks or laps. Dries with a smooth, tough, washable, elastic coat which will not readily collect dust or dirt.

PATTON'S VELUMINA CAN

Patton's Ironhide

Patton's Ironhide (Inhibitive Red and Finishing Black) is a liquid paint, ready for use, for painting and preserving iron and steel work, inside and outside. Suitable for structural steel, bridges, gas holders, smokestacks, railway cranes, oil tanks, iron or steel wire or light poles, coal loaders, steel cars, tank cars, air drafts, metal silos, fire hydrants, cranes, ventilating fans, etc.

PATTON'S IRONHIDE CAN

Continued on next page

Distinctive Finishes

These sealed packages bear the Pitcairn label and trade-mark for customer's protection. They guarantee *quality as represented* and insure the economical securing of results that will be most satisfactory and creditable to all concerned.

No painstaking care or expense has been spared in bringing these wood finishes to their present state of perfection. Their excellence is vouched for. They are freely used by a large part of the most critical architects and contractors in America on many of the finest structures.

Following is a brief description of each; and on the following page, specifications will be found.

PITCAIRN PACKAGE

Pitcairn Aged Mast Spar

Possesses the maximum of durability obtainable in exterior finishing varnish. Use on all surfaces subjected to severest exposure, whether marine finishing, outside doors, window casings, signs, etc., on new or old work. It has great elasticity and wear resisting qualities. Will not scratch or mar white, dries dust free in 10 to 12 hours and hardens in 48 hours.

Covers 550 to 600 sq. ft. to gal.

Pitcairn Aged Finishing Spar

For finest interiors. Rich and lasting. Use on new or old work, whether full gloss, rubbed dull or polished. It is unexcelled in brilliance, body, working qualities and durability. Insures style and individuality to the work. Dries dust free in 8 to 10 hours, hardens in 2 days and may be rubbed the third day.

Covers 550 to 600 sq. ft. to gal.

Pitcairn Aged Floor Spar

For finest floor finishing. Withstands severest wear. Use on new or old work. It has wonderfully free, easy working qualities, extraordinary permanence, toughness, brilliance and elasticity. Dries dust free in 6 to 8 hours and hardens in 24 hours.

Covers 550 to 600 sq. ft. to gal.

Pitcairn Aged Flat Finish

For artistic interior work, producing rich, silky-dull rubbed effect. Use for mission finish and in place of hand rubbing. This varnish dries with an even flat finish that has the appearance of being rubbed. Has the body of gloss varnish, protects perfectly the surface to which it is applied, and may be used on either new or old work. One coat is sufficient to produce a dull rubbed effect on old work or over an undercoater of gloss varnish for new work. Two coats applied to new wood over filler will produce a silky, soft, mission effect. Works nicely under the brush; flows out well. Dries dust free in 2 hours and hardens in 24 hours. Contains no paraffin or beeswax, and therefore may be coated with a gloss varnish, or as many coats may be applied as are necessary.

Covers 650 to 700 sq. ft. to gal.

Pitcairn Tector (The Right Foundation)

Pitcairn Tector practically provides one undercoater for all purposes, interior and exterior.

Tector has a greater range of usefulness than any other undercoater. It may be used as an undercoater on any surface, interior or exterior—wood, metal, cement, plaster, burlap, canvas; and under oil paints, enamels, varnishes, flat wall paint, calcimine and floor wax.

Pitcairn Tector is a discovery of far reaching importance, imparting durability under conditions where finishing materials have never been durable before, and greatly multiplying durability of paints, enamels, stains and varnishes under all circumstances.

Note: A book of Tector specifications, demonstration panels, and test tins will be furnished on request.

Pitcairn Wood Stains

Excel in penetrating qualities, clearness and richness. Used on all kinds of wood, whether soft, spongy or the hardest close grain. They produce beautiful, deep, rich, soft, visual effects. They bring out the high lights and beauty of wood without obscuring the grain or causing cloudiness. They lend tone and impart an air of refinement to the surroundings. They do not raise the grain of wood nor affect thin veneers, being free from water, acid or alcohol. They may be mixed with the filler for tinting, or be reduced with turpentine or benzine. They set slowly, thus admitting of the surplus being removed from the surface with a cloth or sponge without showing cloudiness or laps. The work may be finished with wax or varnish as desired.

There are 14 beautiful colors in imitation of all popular woods and shades.

Covers from 800 to 1,000 sq. ft. to gal.

WOOD STAIN CAN

Note: Stain set, consisting of 20 wood panels, mounted on cloth, showing the color of Pitcairn wood stains on various kinds of wood, will be sent to all architects and their clients or to painters on request.

Pitcairn Banzai Enamel

Rich and permanent. Used for all white work whether natural gloss, rubbed dull, polished, or flat enamel finish. It is marvelously tough and elastic, approximately 50% more durable than ordinary enamels. Will not chip or crack, is stable in color and retains its immaculate, grainless surface regardless of frequency of washing or method of house heating.

The free flowing qualities of Banzai Enamel enable the work to be accomplished about 25% faster than with ordinary enamels.

BANZAI ENAMEL CAN

Continued on next page

Its splendid hiding qualities in many instances save the cost of work and time of an extra coat. Its great covering capacity and labor saving characteristics make it more economical to use than the cheaper ordinary enamels—not to consider its greater durability. Banzai Enamel furnishes a safety factor for the architect who demands flawless work, gives the decorator protection against blemishes, and reduces the labor costs; while the building owner gets a far greater durability than with the use of ordinary enamels. Dries dust free in 6 hours, and hardens in 48 hours.

Covers approximately 500 sq. ft. to gal.

Note: Portfolio showing reproductions of 30 modern white enamel interiors will be sent to architects or their clients, on request.

Paint Specifications

Wood Surfaces (Exteriors)—Surface must be clean and dry. Shellac knots and pitchy places before painting. Putty nailholes after first coat. Allow ample time for each coat to dry. Paint must be brushed in well.

First Coat—To each gallon of Sun-Proof, as it comes in the can, add 1 qt. strictly pure linseed oil and 1 pt. of turpentine.

Second Coat—Add 1 qt. strictly pure linseed oil and 1 pt. turpentine.

Third Coat—Sun-Proof Paint as it comes in the can.

Note: On porch floors and steps substitute Patton's Porchite.

Roofs—Dip all shingles two-thirds their length and, after laying, apply a brush coat of Patton's Tor-on Shingle Stain.

Stir frequently while using to keep mixture uniform.

Structural Iron Work—The surface to be painted must be free from oil, grease and rust. Rust must be removed by wire brushing, scraping or sand blast. Grease must be removed with gasoline or benzine.

All paint must be well brushed out, and nothing larger than a 3-in. oval brush used in applying paint. No paint is to be applied at a temperature below 50° Fahr., in damp or rainy weather, or to a damp or wet surface.

First Coat—Apply 1 coat of Patton's Inhibitive Red Ironhide as it comes in the container. Allow at least 3 days for drying.

Second Coat—Apply 1 coat consisting of a mixture of half red and half black Ironhide as it comes in container.

Third Coat—Apply 1 coat of Patton's Finishing Black Ironhide as it comes in the container.

Note: If 2 coats only are desired, specify as directed for first and third coats.

Interior Plaster Walls—Wash or scrape off all calcimine, loose paint, dirt, etc. Smooth or glossy paint should be roughened with steel wool or sandpaper. Fill cracks with a stiff paste made from Velumina and plaster of paris and allow at least 24 hours for drying.

Two-coat Finish—First Coat: Thin 1 gal. of Velumina with ¼ gal. of pure boiled linseed oil, except for new and exceedingly porous walls, where ½ gal. of oil is required. Under no circumstances use any leptyne, turpentine, or benzine on first coat. Allow at least 24 hours for drying, more time being required in cold or damp weather.

Suction, or so-called "hot spots," which may show through first coat, should be touched up with first coat mixture, allowing at least 24 hours for drying, otherwise these suction spots may appear in the following coat, due to imperfect priming, and then will require treatment as above before another coat of Velumina is applied. To insure perfect results, never apply finishing coat until first coat presents a uniform subdued gloss surface. Extremely bad walls may require an additional application of the first mixture to accomplish this; or if preferred, a coat of glue size may be applied over the first coat. Never apply glue or varnish size direct on the plaster, as it will prevent the proper penetration of the paint.

Finishing Coat: Use Velumina as it comes in the can. Do not use any of the material left over from first coat in the finishing coat, as it will impair the perfect flatness of Velumina. If too heavy, add leptyne or turpentine, not to exceed ⅛ gal. to 1 gal. of Velumina. Best results will be obtained by applying Velumina of good heavy body with a wide wall brush. After finishing coat has set for about 30 minutes it may be stippled, if this finish is desired.

Varnish Specifications for New Work

Fillers—*Open Grained Woods*—Oak, ash, chestnut, mahogany, etc. First fill with Silex Paste Wood Filler. When dry, putty all nailholes, matching color of wood.

Close Grained Woods—Maple, birch, Georgia pine, whitewood, poplar, pine, cypress, redwood, gum wood, sycamore. Require no filling. Apply varnish direct to wood. After first coat, putty all nailholes, match color of wood.

Note: All knots and sappy places should be coated with shellac to "kill" the pitch.

Varnishes—*Exterior or Exposed Surfaces*—When in condition to receive varnish, and after puttying nailholes, apply 3 coats Pitcairn Aged Mast Spar. Rub first and second coats when dry with curled hair.

Interior Finishing, Cabinet Work, etc.—After filling open grained woods and puttying nailholes, for regular work apply 2 coats Pitcairn Aged Finishing Spar; for extra finish 3 coats. Last coat natural gloss, rubbed dull or polished as desired. If dull rubbed effect is desired without the expense of rubbing, apply Pitcairn Flat Finish in place of last coat of varnish.

Note: For use on seats, pews, chairs, desks, etc., specify Pitcairn Aged Church Pew and Seat Finish.

Floors, Hard or Soft Wood—After filling open grained woods and puttying all nailholes, apply 3 coats Pitcairn Aged Floor Spar. Sand lightly between coats. Leave natural gloss or rub dull, as desired.

Note: Do not use liquid fillers, shellac or shellac substitutes on floors.

Wood Stains—*Close Grained Wood*—Apply Pitcairn Wood Stain, the shade desired, properly wiped after sufficient time has been allowed for stain to penetrate. After 24 hours, apply thin coat shellac and proceed with varnish coats.

Open Grained Wood—Apply 1 coat of Pitcairn Wood Stain of desired shade, removing excess by wiping after sufficient time has been allowed for proper penetration. After 6 hours, apply a thin coat of shellac. When dry, apply paste wood filler tinted with stain to match. Then proceed with varnish coats.

Mission or Dull Finish—Apply 1 coat Pitcairn Wood Stain, 1 coat white shellac for light tints and orange shellac for dark, 2 coats Pitcairn Flat Finish. Finish window seats and sills with 2 coats Pitcairn Aged Mast Spar. After 48 hours, rub to dull finish.

White Enamel Finish—*Wood Plaster and Stone Surfaces, Interior or Exterior—Priming Coat:* Shellac knots, apply a mixture of 1 gal. of Tector, 1 qt. of raw linseed oil and ½ gal. of turpentine, leptyne, or benzine.

Second and Third Coats: Banzai Undercoater as it comes in can.

Fourth Coat: Banzai Gloss or Eggshell Enamel.

Fifth Coat: Banzai Gloss. If an eggshell finish is desired, use Banzai Eggshell Enamel for fourth coat.

Note: Allow 48 hours between coats, and sandpaper lightly between coats. If enamel or undercoater is too heavy, thin with turpentine.

Where Purchased

These goods may be purchased from dealers everywhere, or from any of the warehouses of the Pittsburgh Plate Glass Co.

SIMMONS, GARDNER COMPANY

Decorative Wall Finishes

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Products

CRAFTEX, a Texture Wall Finish.

LACQUERSIZE, a size for use over Craftex or Plaster.

CRAFTCOAT, a Glaze for use over Craftex and Lacquersize, or, Rough Plaster and Lacquersize.

Craftex Decorative Wall Finish

Craftex is a decorative wall finish supplied in powder form to be mixed with warm water and applied with a brush; it is then manipulated to produce any desired texture.

Craftex finishes are permanent; they will not crack, craze nor chip; they become more attractive with age and can be repeatedly washed without detrimental effects. Craftex can be successfully applied to either skim or brown coats of plaster, concrete, hollow tile or gypsum blocks, brick or other masonry walls, wall board, wall paper, fabric or painted walls, galvanized ducts and water pipes.

Colors—The color of Craftex is white, and, after being mixed, can be tinted as desired by adding dry or oil colors.

Range of Effects—Craftex finishes were developed to meet the requirements of the modern tendency in interior wall finish toward the more individual, informal textured treatment.

An endless variety of Craftex finishes of remarkable beauty and durability may be obtained, ranging from the simplest one coat stippled washes to the most elaborate and beautiful blended color effects.

Craftex may be manipulated to produce appearance of antique Spanish, Italian and Colonial plasters and of various building stones or most informal and subtle color harmonies conceivable by designer.

Covering Capacity—Varies from ¾ yd. to 3 yds. per lb., according to texture required.

Lacquersize

Lacquersize is a powder which is dissolved in boiling water and used as a size over Craftex before the application of Craftcoat. It can be tinted with dry or oil colors. Stops the suction of Craftex, facilitates the spreading of the Craftcoat glaze and makes possible the many beautiful blended color effects of Craftcoat. Dries in about 2 hours.

Additional Uses—Lacquersize is designed for use as a bronzing liquid. For bronzing plaster or paper, it has no equal. Lacquersize and Craftcoat applied over rough plaster produce unusual decorative effects which are extremely economical.

Covering Capacity—One pound will cover from 50 to 60 sq. yds., according to the texture of the Craftex.

Craftcoat

Craftcoat is a smooth, transparent glazing medium for application over Craftex and Lacquersize. Prepared ready for use except for the addition of oil colors.

Dries in about 12 hours to a soft sheen, and blends with remarkable ease.

Covering Capacity—One gallon will cover from 40 to 50 sq. yds., depending on the texture to be covered.

Standard Specification

Work Included—The following surfaces (list locations) shall be finished with Craftex as supplied by the SIMMONS, GARDNER COMPANY, 7 Water Street, Boston, Mass., and in finishes as hereinafter specified.

Workmanship—The Craftex shall be applied in strict accordance with the specifications of the SIMMONS, GARDNER COMPANY and shall be finished to match sample (or samples) No. .... on file at the office of the architect.

Finish—In the case of more than one finish being required on the job, itemize in this paragraph the various areas followed by the sample numbers.

Some Craftex Installations

CLUBS

Architectural Club, Boston, Mass.
Engineers Club, Boston, Mass.

HOTELS

Westminster Hotel, Boston, Mass.
Hotel Wentworth, New Castle, N. H.

BANKS

Boylston Street Branch, Bay State Trust Co., Boston, Mass.
Brookline Trust Co., Brookline, Mass., Thomas M. James, Architect

PUBLIC BUILDINGS

Court Square Building, Springfield, Mass., E. C. & G. C. Gardner, Architects

LIBRARIES

Public Library, Wentworth, N. H., C. T. McFarland, Architect

RESTAURANTS

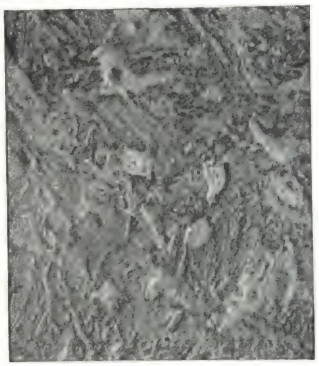
Biltmore Cafeteria, Boston, Mass., F. A. Norcross, Architect
Tea Room, Weston, Mass., Allen & Collins, Architects

RESIDENCES

George E. Keith, Campello, Mass.
Prof. Charles T. Burnett, Brunswick, Me., John Calvine, Archt.

Craftex Finish No. 4352-A2
Craftex is slow setting and can readily be modeled to any texture desired by the designer

Craftex Finish No. 4113-A0
Effective reproductions of English Bath Stone, caen stone and travertine marble have been produced with Craftex



Craftex Finish No. 6365-A0
A decorative texture obtained by modeling with a sponge

Craftex Finish No. 6233-A1
By adding sand and coloring pigment to the Craftex, colored plaster effects can be obtained in any texture and color desired

THE SHERWIN-WILLIAMS CO.

Paints, Varnishes, Enamels, Stains, Wood Preservatives, Dampproofings

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Products

Manufacturers of a complete line of PAINTS, VARNISHES, STAINS, FILLERS, ENAMELS, ENAMEL UNDERCOATERS, CONCRETE FINISHES.

Also, Waxes, Dampproofing, Plaster Bonds, Wood Preservatives and Concrete Hardener.

TRADE-MARK

Safeguarding of Quality

THE SHERWIN-WILLIAMS CO. is the largest manufacturer of paints, varnishes, stains, and enamels in the world. The business has grown from a small storeroom to its present proportions in 57 years. The one thing which has made this success possible, was the strict adherence to the Company's policy of "Quality First." The majority of the leading architects in the United States and the United Kingdom are specifying Sherwin-Williams Architectural Finishes, because they have the utmost belief in their quality.

Department of Architectural Service

The Department of Architectural Service is always ready to assist in any way with painting and finishing problems. It is an organized service of the highest type whose method of co-operation with architects and architectural engineers, it is said by many members of the profession, is of the greatest value.

Complete Specification Book

The Sherwin-Williams new Book of Painting and Varnishing Specifications is now ready. It is believed to be the most complete book of its kind which has ever been compiled. A copy of this book will be sent to architects or engineers without charge.

Painting of Structural Steel

For 57 years THE SHERWIN-WILLIAMS CO. has made an exhaustive study of metal protective paints. Test panels of every conceivable class of metal protective paint have been exposed to the elements for long periods of time on the Company's factory roofs, under the careful observation of the Research Department. As a result of these years of research work, they now manufacture a widely diversified line of metal protective paints, and where an architect or engineer is a particular believer in one certain type of material, they are in a position to supply the highest grade of paint in this class.

There is, however, one metal protective paint specification which the Company's experience with paints of this character causes them to recommend above all others as the ideal specification, and it is as follows:

Specification—*Preparation*—Before applying priming coat or shop coat, all mill scale shall be completely removed from the surface of the steel.

Priming Coat (or Shop Coat)—Sherwin-Williams Metalastic Gray applied in the consistency supplied by the manufacturer.

Second Coat (or First Field Coat)—Sherwin-Williams Metalastic Brown in the consistency supplied by the manufacturer.

Third Coat—Sherwin-Williams Metalastic Black in the consistency supplied by the manufacturer.

Painting Exterior Wood Surfaces

SWP (Sherwin-Williams Paint, Prepared) is the exemplification of the victory of science and machinery over handwork. It proves the advantage of scientific formula over human guesswork; certainty of matching colors against uncertainty; fine grinding against hand mixing and stirring. It makes it unnecessary to take chances on the quality of raw materials against the certainty of our scientific laboratory.

SWP is made from the purest white lead, zinc oxide, linseed oil, turpentine and japan drier. These ingredients are combined in the proportions which this Company's 57 years of the study of scientific paint-making has demonstrated will produce a paint which has the highest degree of wood preservative qualities, gloss, beauty, maximum covering capacity per gallon, and longest life. SWP is made in a complete line of colors which will meet all requirements. Full line of colors. Color card on request.

Specification—*Preparation*—All wood shall be thoroughly dry and all knots and pitchy places in the wood shall be given a coat of pure orange shellac before any paint is applied.

First or "Priming" Coat—SWP (Sherwin-Williams Paint—Prepared) in colors selected by architect. Thin with 1 gal. of pure raw linseed oil, and 1 qt. of pure turpentine to each gallon of SWP.

Note: For hard or resinous woods, such as pine or cypress, thin with 2 qts. of pure turpentine, and 1 qt. of raw linseed oil to each gallon of SWP.

Continued on next page

est quality. It possesses enough gloss or "sheen" to permit easy cleaning whenever necessary. It is very white and retains its whiteness.

Specification—*Preparation*—Before beginning the painting of the walls and ceilings, the contractor shall make sure, through careful inspection, that all surfaces to be painted are in proper condition for finishing.

First and Second Coats—Two coats of Sherwin-Williams Eg-Shel Mill White shall be applied to all interior walls, columns, ceilings, beams and girders above 5 ft. from the floor. Both coats shall be thinned with Eg-Shel Mill White Reducer in the proportion of 1 qt. of Reducer to 1 gal. of Eg-Shel Mill White.

Dado—A dado 5 ft. in height shall be painted with 2 coats of Sherwin-Williams Dado Enamel in color selected. A stripe 3 in. wide separating the dado from the wall finish shall be painted with Sherwin-Williams Dado Enamel in color selected.

Varnishing of Interior Floors

Sherwin-Williams Mar-Not Floor Varnish is made both to beautify and to wear. It will not crack, scratch, mar or turn white when rain or snow is tracked over it, or when radiators leak upon it. It has a beautiful fullness of body and gloss which lasts as long as the varnish. It is the kind of varnish that architects search for, that painters like to use, and that home owners swear by.

Specification—*Preparation*—The floors shall be sanded to a perfectly smooth surface and thoroughly cleaned of all dust, stains, etc., before any finish is applied. No finish shall be applied unless the floors are absolutely dry.

First Coat—(For open grain woods only.) Sherwin-Williams Paste Filler, Transparent (or color desired). Before filler has set, wipe off clean across grain with burlap or excelsior.

Second Coat—(On close grain woods this will be First Coat.) Sherwin-Williams Mar-Not Floor Varnish thinned with pure turpentine in proportion of 1 pt. to 1 gal. of varnish. When dry, sand lightly with No. 00 sandpaper.

Third and Fourth Coats—Sherwin-Williams Mar-Not Floor Varnish as it comes from the package, sanding third coat, when dry, with No. 00 sandpaper.

Staining and Varnishing Interior Trim

The specification "Sherwin-Williams Scar-not Varnish" for the finishing of interior trim, insures the application of the varnish of the right type. Scar-not Varnish is made especially for this class of finishing. It is very full in body, which makes it possible to build up a beautiful finish with the least number of coats. It is pale in color, dries dustfree in 4 hours and readily takes a beautiful, rubbed finish polish in 2 or 3 days. Scar-not Varnish is waterproof. Steam from a radiator or water falling upon a window sill will not affect it. It possesses years of life and will render the greatest service and satisfaction.

Specification—*Preparation*—All wood shall be dry, clean and smooth before any finishing materials are applied. All nail-holes, cuts, cracks and other defects shall be treated so as to render them unnoticeable.

First Coat—Sherwin-Williams Handcraft Stain in shade selected by architect.

Second Coat—Sherwin-Williams Paste Filler in color selected by architect. Wipe off across grain with burlap or excelsior, before filler has set, to remove excess filler. Allow 24 hours for drying.

Note: The use of filler should only be specified for open grain woods. Where close grain woods are to be finished, specify what is the third coat in this specification, as the second coat.

Third Coat—A *thin* coat of Sherwin-Williams Marvelac or pure shellac.

Fourth and Fifth Coats—Sherwin-Williams Scar-not Varnish. Sufficient time for thorough drying shall be allowed between coats. The third and fourth coats shall be lightly sanded before applying subsequent coats. (For rubbed finish, the last coat, when sufficiently hard, shall be rubbed with powdered pumicestone and oil or water to a dull finish.)

Note: Where an imitation rubbed effect is desired, Sherwin-Williams Velvet Finish Varnish should be specified as the sixth coat, or, where expense must be considered, may be substituted for the fifth coat.

Enamel Finish on Interior Trim

Old Dutch Enamel, American make, might well be called the aristocrat of the world's enamels. With whiteness and beautiful full body unsurpassed by any enamel, either domestic or imported, Old Dutch Enamel has won the favor of architect, client and painter alike wherever this unusual enamel has been used.

Old Dutch Enamel is made in the popular tints of Ivory and French Gray. Should an architect desire to secure some other tint, this can easily be done by the painting contractor or decorator, by tinting Old Dutch Enamel with Sherwin-Williams First Quality Oil Colors or in the case of very delicate tints, Sherwin-Williams Quick Drying Colors Ground in Japan can be used. In tinting, the color should be added to a small amount of Old Dutch Enamel, which after thorough mixing, should be added to the rest of the enamel, a little at a time, until the desired tint is obtained. Where the enamel is tinted, the undercoater should likewise be tinted to a similar color.

Specification—*Priming Coat*—Sherwin-Williams Flat-Rite Enamel Undercoater, thinned with pure linseed oil in the proportion of 1 pt. of oil to 1 gal. of undercoater, shall be applied.

Second and Third Coats—Flat-Rite shall be applied, in the consistency supplied by the manufacturer, allowing sufficient time for thorough drying between coats. The first and second coats shall be sanded to a smooth surface with No. 0 sandpaper; the third or last undercoat shall be sanded smooth with No. 0000 sandpaper.

Fourth Coat—Sherwin-Williams Old Dutch Enamel, Gloss, mixed equal parts with Flat-Rite Undercoater.

Fifth Coat—Old Dutch Enamel applied in the consistency supplied by the manufacturer, as soon as the fourth coat will permit.

For a Dull Finish—When sufficiently hard, the last coat shall be rubbed to a dull finish with powdered pumicestone and water.

Old Dutch Enamel is also made in the dull finish to imitate rubbed work. This material can be used for the final coat in the above specifications, where an imitation rubbed effect is desired.

Sherwin-Williams Architectural Paints and Finishes

A product for every surface:

Flat-Tone Washable Wall Finish.
Old Dutch Enamel for interiors and exteriors.
Mar-Not Varnish, a water resisting varnish for floors.
Scar-Not Varnish, for highest grade finishing of interior trim.
Velvet Finish Varnish, a final varnish coat for securing imitation rubbed effects on interior trim.
Rexpar, a spar varnish made especially to withstand the elements.
Sherwin-Williams Handcraft Stains, spirit penetrating in type. Will not raise the grain of the wood.
Oil Stains, for finishing of soft woods.
Acid Stains, for use on hard woods. Absolutely non-fading.
Prepared Wax, a hard wax finish for floors and interior trim.
Concrete and Cement Hardener, for hardening and dustproofing cement floors.
Concrete Floor Finish, for producing enamel-like finish on cement floors.
Metalastic, for protecting exposed metal and structural steel.
Concrete Wall Finish, for painting concrete, stucco or brick walls.
SWP, the scientifically prepared exterior paint for wooden buildings.
Plaster Bond, for dampproofing interior side of exterior walls above grade.
Antydamp, foundation dampproofing for use on exterior of foundation walls below grade before backfilling.
Preservative Shingle Stains, for staining and preserving shingles or rough wood siding.
Carbolicol, for preserving wood embedded in earth.
Floor-Seal-Oil, for preserving, hardening and sealing hard or soft wood floors of public buildings, schools or gymnasiums.

U. S. GUTTA PERCHA PAINT COMPANY

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PROVIDENCE, R. I.

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Products

Manufacturers of RICE'S PAINT SPECIALTIES: "BARRELED SUNLIGHT," THE RICE PROCESS WHITE—Gloss, Eggshell or Flat; RICE'S UNDERCOAT; GRANOLITH CONCRETE COATING; CHEMIC ENAMEL; FLOW-ON; RICE'S REINFORCED OUTSIDE PAINT; GLOSS-O-LITE; CHINALINE.

Also manufacturers of Rice's Piping Enamels, Flat Wall Paint, other Paints and Enamels for interior and exterior finish, structural and metal protection. Fillers and Paints for machinery of all kinds; Technical Paints for all purposes.

THE RICE PROCESS WHITE

TRADE-MARK

"Barreled Sunlight"—The Rice Process White

The oil paint with a smooth, lustrous finish. For ceilings and walls of industrial buildings, institutions, hotels, shops, homes, and in general wherever a sanitary, washable, light reflecting finish is desired.

Made by the "Rice Process" (using specially treated, colorless linseed oil) it is guaranteed to remain white longer than any other gloss paint applied under the same conditions—also not to flake or scale.

"Containing no varnish, "Barreled Sunlight" combines ease of application with unequaled "hiding" properties and covering capacity.

Tested and approved by the National Board of Fire Underwriters, Inc.—their report, "Retardant No. 926."

Though "Barreled Sunlight" is made in eggshell and flat we recommend gloss for industrial uses, as flat and eggshell finishes do not resist dust and dirt as well as the gloss, nor can they be as readily cleaned.

Rice's Undercoat

Used for priming under "Barreled Sunlight." Made to offset adverse conditions which paint is called upon to meet when lumber is sappy and unseasoned. See specifications on this page.

Rice's Granolith for Ceilings and Walls

A concrete, cement, plaster and brick coating. Retards dampness. Sometimes a single coat only is applied. Its larger use is as an undercoat on concrete, cement, brick and plaster for finishing coat or coats of "Barreled Sunlight." See specifications on this page.

"Barreled Sunlight" Specifications for Interior Use

Hard Finished Plaster and Gypsum Work—Neutralize lime and free alkali by applying zinc sulphate dissolved in water (4 lbs. of zinc sulphate crystals to 1 gal. of water); allow 36 hours for drying and proceed as follows:

First Coat—"Barreled Sunlight" Granolith. Reduce with equal parts of a mixture of 3 parts linseed oil and 1 part turpentine (or approved turpentine substitute), to which has been added sufficient drier to set the coat thoroughly hard.

Second Coat—"Barreled Sunlight" Granolith. This may be reduced to a proper brushing or spraying consistency with turpentine (or approved turpentine substitute).

Third Coat—"Barreled Sunlight," the Rice Process White (Gloss, Eggshell or Flat).

Concrete, Brick and Cement Plaster—Scrape excess mortar from all surfaces. When thoroughly dry, neutralize lime and free alkali by applying zinc sulphate dissolved in water (4 lbs. of zinc sulphate crystals to 1 gal. of water); allow 36 hours for drying and proceed as follows:

First Coat—"Barreled Sunlight" Granolith. This coat should be reduced with a mixture of equal parts of linseed oil and turpentine (or approved turpentine substitute), according to the porosity of the surface.

Second Coat—"Barreled Sunlight" Granolith. This may be reduced to a proper brushing or spraying consistency with turpentine (or approved turpentine substitute).

Third Coat—"Barreled Sunlight," the Rice Process White (Gloss, Eggshell or Flat).

Woodwork and Wall Board—Allow time for wood to season. Remove from surfaces anything detrimental to paint.

First Coat—"Barreled Sunlight" Undercoat. This may be reduced to a proper brushing or spraying consistency with turpentine (or approved turpentine substitute).

Second Coat—If knots or sappy spots show through priming coat, shellac these well and apply second coat of "Barreled Sunlight" Undercoat. Reduce if necessary as above.

Third Coat—"Barreled Sunlight," the Rice Process White (Gloss, Eggshell or Flat).

Iron, Steel and Metal Work—Scrape off all mill dew, rust or grease. Apply a coat of pure red lead paint.

First Coat—"Barreled Sunlight" Undercoat. This may be reduced to a proper brushing or spraying consistency with turpentine (or approved turpentine substitute).

Second Coat—"Barreled Sunlight" undercoat. Reduce if necessary, as above.

Third Coat—"Barreled Sunlight," the Rice's Process White (Gloss, Eggshell or Flat.)

Repainting—On a surface previously painted with an oil paint which is in good condition, a single coat of "Barreled Sunlight" is often sufficient. If two coats are required, use Undercoat as the primer. Send for special directions when painting over old cold water paint or whitewash.

Two-coat Work—The intense opacity of "Barreled Sunlight," the Rice Process White, and its economy makes it possible to obtain a solid white finish with two-coat work. On new woodwork, use "Barreled Sunlight" undercoat for the first coat. On new brick, concrete and plaster, use "Barreled Sunlight" Granolith for the first coat.

Rice's Chemic Enamel

For laboratories, bakeries, dye and bleach houses and other places where chemical fumes, excessive heat, steam or other discoloring agents may be prevalent. Gives a smooth, white, washable finish, similar to "Barreled Sunlight," but is reinforced to give white paint protection under such adverse conditions.

Specifications—Send for set of Chemic Enamel Specifications covering its application under your own prevailing conditions.

Rice's Flow-On, a Practical Flat Wall Paint in Semi-paste Form

Rice's Flow-On is made in semi-paste form (weighing 20 lbs. to the gallon), to enable the master painter to adapt it to his various needs. It is practically the lithophone counterpart of "lead and oil," combining the advantages of the latter with the greater capacity or hiding power of lithopone, and the flowing quality which our special process gives the oil.

Flow-On contains no varnish or china wood oil, is non-poisonous and washable, and flows freely and evenly, leaving a smooth finish without brush marks or laps.

Continued on next page

Rice's Flow-On Specifications for Interior Ceiling and Wall Painting

Hard Finish Plaster and Gypsum Work—Neutralize lime and free alkali by applying zinc sulphate dissolved in water, (4 lbs. zinc sulphate crystals to 1 gal. of water); allow 36 hours for drying, and proceed as follows:

First Coat—Mix the priming coat from 1 gal. Rice's Flow-On and 2½ gals. pure linseed oil, with sufficient dryer to set the coat thoroughly hard.

Second Coat—Rice's Flow-On. Reduce with equal parts pure linseed oil and turpentine. About one-third of this mixture to 1 gal. Flow-On.

Third Coat—Rice's Flow-On. Reduce with about 1 qt. turpentine to 1 gal. Flow-On.

Concrete, Brick and Cement Plaster—Scrape excess mortar from all surfaces. When thoroughly dry, neutralize lime and free alkali by applying zinc sulphate dissolved in water (4 lbs. zinc sulphate to 1 gal. of water); allow 36 hours for drying, and proceed as follows:

First Coat—"Barreled Sunlight" Granolith. Reduce with equal parts linseed oil and turpentine, according to porosity.

Second Coat—Rice's Flow-On. Reduce with equal parts linseed oil and turpentine. About ⅓ gal. of this mixture to 1 gal. Flow-On.

Third Coat—Rice's Flow-On. Reduce with about 1 qt. turpentine to 1 gal. Flow-On.

Wood and Similar Surfaces—*First Coat*—Rice's Flow-On. Reduce with equal parts linseed oil and turpentine. About 1 gal. of this mixture to 1 gal. Flow-On.

Second Coat—Rice's Flow-On. Reduce with equal parts linseed oil and turpentine. About ⅓ gal. of this mixture to 1 gal. Flow-On.

Third Coat—Rice's Flow-On. Reduce with about 1 qt. turpentine to 1 gal. Flow-On.

Rice's Gloss-O-Lite, Interior

Rice's Gloss-O-Lite produces an enamel gloss finish. Flows freely with intense body or opacity. Is pure white, washable and sanitary. Dries somewhat harder than "Barreled Sunlight."

Rice's Chinaline, Interior and Exterior

The finest enamel possible to make. It is superior to all domestic and imported enamels because it holds its pure white color better. The finish is like porcelain, for there are no brush marks or laps.

Rice's Chinaline contains no lead and is sanitary, non-poisonous and germproof, making it especially suitable for hospitals and other institutions. The finish is a beautiful luster. It can be rubbed and polished; but to save this labor Rice's Chinaline is made also in flat or eggshell finish. See specifications on this page.

Specifications for Interior Painting with Rice's Chinaline or Rice's Gloss-O-Lite

Hard Finish Plaster and Gypsum Work—Neutralize lime and free alkali by applying zinc sulphate dissolved in water (4 lbs. zinc sulphate crystals to 1 gal. of water), allow 36 hours for drying and proceed as follows:

First Coat—Mix a priming coat from 1 gal. Rice's White Enamel Primer and 2½ gals. pure linseed oil, with sufficient dryer to set the coat hard.

Second Coat—Rice's White Enamel Primer. Reduce with pure turpentine to proper working consistency.

Third Coat—Rice's White Enamel Primer, 3 parts; Rice's Chinaline, 1 part. Thoroughly mix together.

Fourth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Fifth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Concrete, Brick and Cement Plaster—Scrape excess mortar from all surfaces. When thoroughly dry, neutralize lime and free alkali by applying zinc sulphate dissolved in water (4 lbs. zinc sulphate to 1 gal. of water); allow 36 hours for drying, and proceed as follows:

First Coat—"Barreled Sunlight" Granolith. Reduce with a mixture of equal parts linseed oil and turpentine, according to porosity.

Second Coat—"Barreled Sunlight" Granolith. Reduce slightly with turpentine.

Third Coat—Rice's White Enamel Primer, 3 parts; Rice's Chinaline, 1 part. Thoroughly mix together.

Fourth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Fifth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Wood and Similar Surfaces—*First Coat*—Rice's White Enamel Primer. Reduce with linseed oil (with a trifle of dryer added), sufficient to penetrate and bind well.

Second Coat—Rice's White Enamel Primer. Reduce with pure turpentine to proper working consistency.

Third Coat—Rice's White Enamel Primer, 3 parts; Chinaline, 1 part. Thoroughly mix together.

Fourth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Fifth Coat—Rice's Chinaline (Gloss, Eggshell or Flat, as selected). Apply without reducing.

Note—For a less expensive finish which may be used for certain work, substitute Rice's Gloss-O-Lite for Rice's Chinaline. Descriptions, showing the difference in grade of these two finishing enamels, are given on this page.

Rice's Reinforced Paint, Exterior

A scientifically machine made paint, thoroughly and intimately blended, contains the proper percentage of lead, enough zinc to prevent chalking, enough additional reinforcing pigment to insure the most resistant coating, and pure linseed oil treated by a process that removes all objectionable constituents.

Send for color card giving complete details.

Rice's Equipment Service Paints

A group of special service paints for use in industrial plants, comprising Rice's Piping Enamels, Granolith for cement floors, Dado Paints and others.

Supplied in distinctive colors, these finishes make possible systematized painting of an entire building or plant.

Send for booklet on our service paints, entitled "Rice's Paint Products for Industrial Plants."

In General

For best results with any paint, allow time for plaster, concrete, cement and unseasoned lumber to dry, also allow time for each coat to dry thoroughly before succeeding coats are applied.

At all times have room where paint is being applied well ventilated in order to prevent condensation, and apply the paint, especially the finishing coat, when weather is free from moisture.

All paint to be delivered on the job in the original packages bearing the name of the manufacturers, U. S. Gutta Percha Paint Company, Providence, R. I.

Packages

All paints and enamels are shipped in churn-equipped barrels. By simply turning the crank the contents are kept thoroughly agitated and uniform results are assured.

Specification Forms

Architects and engineers will be furnished with specification forms and full descriptive matter on application if they will mention the finish desired.

The specifications will name the proper primers and give recommendations for the proper "building up" of a surface preparatory to receiving paints or enamels.

WADSWORTH, HOWLAND & CO., INC.

Manufacturers of Coatings, Paints, Varnishes, Enamels and Stains

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PAINTS, COATINGS and ENAMELS, which include "BAY STATE" BRICK and CEMENT COATING, a Sanitary, Damp and Fire Resisting Finish Coating for cement, concrete, brick, plaster and wood; "BAY STATE" CEMENT CRACK FILLER; "BAY STATE" CEMENT FLOOR HARDENER, a Cement Floor Filler, which hardens and makes concrete floors proof against wear, dust, water and oil; "BAY STATE" ENAMELS for applications where Gloss or Eggshell Finish is desired; WAHCOLITE, a White Paint for millwork; "BAY STATE" STEEL PROTECTIVE COATING; FELKIM ENAMEL.

THE BAY STATER TRADE-MARK (Reg. U. S. Pat. Off.)

"Bay State" Brick and Cement Coating

Composed of carefully selected pigments, carried in a volatile liquid which evaporates upon application, and when applied to concrete, cement, brick, plaster or interior wood, incorporates itself as a part of the material, resisting dampness, and thus affording protection to the surface upon which it is applied.

It contains no lead, glue, casein or water, and resists the attacks of alkalis, acid fumes, gases, steam, and extremes of temperature. It dries with a dull, uniform finish, and is made in white and in several soft, rich color tones.

The superiority of this, the original of all cement coatings, is also indicated in the facts that it is applicable to nearly all surfaces, even when somewhat moist, and that it will not turn yellow from exposure.

Before applying "Bay State" Brick and Cement Coating, all cracks should be filled with "Bay State" Cement Crack Filler. (See description on following page.)

"Bay State" Brick and Cement Coating is supplied in several modifications to particularly suit it for the services indicated below:

For Exterior and Interior Cement, Concrete, Porous Brick and Plaster Surfaces—In these applications "Bay State" Coating serves both as decoration and protection, and prevents exposed surfaces from absorbing and showing dampness after storms.

It has been effectively applied in cases of factories, hospitals, laboratories, laundries, mills, dwellings, light-shafts, cold storage, grain elevators and packing houses, office buildings, hotels, etc.

For Cement Floors—"Bay State" Cement Floor Coating overcomes the annoyance and damage occasioned by the dusting of cement floors. It provides a surface of exceptional wearing and sanitary qualities. Prevents staining and absorption and reduces traction noise.

Can be readily washed with soap and hot water.

Made in several special colors, and in first and second coats.

For Millwork, etc.—Its sanitary and fire resisting qualities find effective application in mill and factory interiors and in boiler and engine rooms. "Bay State" Coating for millwork protects the surface against disintegration and scaling, a feature valuable in the preservation of intricate machinery.

Its flat, velvety water-color finish reflects light very effectively.

Can be washed with soap and water.

For Dampproofing Above Grade—In this use, on exterior surfaces, "Bay State" Coating is characteristically effective. A sure bar against exterior moisture and will prevent hair cracking on exterior cement surfaces.

For Interior Woodwork—Can be used on interior woodwork by itself as a dull finish, and over such surfaces it serves as an approved fire retardant coating. Can also be used as an undercoat for "Bay State" No. 222 or Wahcolite Enamels.

Comparative Cost—"Bay State" Brick and Cement Coating costs less per gallon than lead and oil paint. While it covers slightly less surface in area, one coat covers better than two and frequently better than three coats of lead and oil or other paints, showing a reduction in cost of material, with a great saving of labor and time.

It being a permanent finish, it is not in the class with water paints which show rapid disintegration.

Application Data—Brick, cement, concrete, stucco and wood, unless excessively rough, porous and weather beaten, will ordinarily require but 1 coat of "Bay State" Brick and Cement Coating.

Interior plaster will require 2 or 3 coats of "Bay State" Brick and Cement Coating.

The following table shows requirements for first coat, under different conditions:

Continued on next page

On brick or concrete hard finish, 1 gal. to cover not over 18 sq. yds.

On brick, concrete, rough or porous or exterior rough plaster, stucco, 1 gal. to cover not over 15 sq. yds.

On plaster, interior, hard finish (over first coat), 1 gal. to cover not over 30 sq. yds.

"Bay State" Cement Crack Filler

A heavy paste suitable to be knifed into cracks before applying "Bay State" Brick and Cement Coating, thereby filling voids which paint could not be expected to do.

It is of a slightly porous nature and produces an elastic surface which is not likely to become brittle. Thoroughly tested out under adverse conditions, and has produced excellent results.

"Bay State" Cement Floor Hardener

An exceptionally effective cement hardener.

When applied to a concrete floor, a slight excess remains on top, forming a thin film which coats the surface. This film is not intended to resist abrasion; it is of such a nature that when subjected to wear it does not peel off, but is forced by the pressure of the wear into all pits and crevices of the surface, thereby producing a smooth, hard, wear resisting finish within the top part of the floor itself.

"Bay State" Cement Floor Hardener changes a soft, porous, dusting or pitting cement floor into a smooth, hard, wear resisting, and non-porous surface that will not dust or pit.

Felkim Enamel

For finishing coats. The whitest of all enamels for high grade work, either exterior or interior.

It flows smoothly under the brush and dries with an exceedingly high gloss, dust free in 12 hours and hard in 36 hours.

An undercoat of No. 111 should be used for best results.

"Bay State" Enamels No. 222 and No. 333

For finishing coats.

"Bay State" Enamel No. 222—Made for enamel interior finish over "Bay State" Brick and Cement Coating, and is adapted for use in office buildings, hospitals, engine rooms, bathrooms, kitchens, laboratories, etc.

Over undercoat of "Bay State" Brick and Cement Coating, 1 gal. to cover not over 30 sq. yds.

It can be washed without injury, and is a most durable enamel. It may be left full gloss, or rubbed with pumice and water to a porcelain finish.

Made in colors if desired. Samples on application.

"Bay State" Enamel No. 333—A high grade enamel for interior use, dries with an eggshell gloss, dispensing with the labor of rubbing.

Wahcolite

The perfect white finishes for walls and ceilings of mills, factories and warehouses are Wahcolite Flat, Wahcolite Semi-gloss, and Wahcolite Gloss.

Wahcolite Flat White—This mill paint gives a dull white, lasting finish. It has two distinct uses—as a finish coat on previously coated walls and as a first coat on interior woodwork, plaster, or brick or cement.

It is usually followed by Wahcolite Gloss, when it is used as a first coat, making an ideal wall covering. However, when a dull finish is desired, a Wahcolite Flat White wall is beyond rivalry. The unusual smoothness and whiteness are more than noticeable.

Wahcolite Flat White is a pure white paint—pure in color and ingredients. It has a remarkable permanency of color and can be readily washed. In fact, Wahcolite Flat White is a sanitary and light reflecting wall covering of highest quality. Besides having a wide use in mill and factory interiors, it is used in boiler and engine rooms.

If the walls (on which Wahcolite Flat White is to be followed by an enamel) are badly discolored, it is generally advisable to apply 2 coats of Flat White.

Wahcolite Gloss—This Gloss is specially prepared as a finish coat for use on wood, brick or cement for the interior of factories, mills and warehouses.

Its wonderfully white, glossy surface reflects the maximum of light and holds less dirt and dust than any other surface. When the walls become soiled, soap and water will make the plant look freshly painted.

Wahcolite Gloss is put up of the right consistency for use. If it is left open long enough to thicken, it may be thinned with a small quantity of turpentine. Too much turpentine will cause it to lose some of its gloss. Keep covered when not in use.

Be sure to use Wahcolite Gloss over Wahcolite Flat White. If used over ordinary paints containing lead, it will have a tendency to turn slightly gray.

Wahcolite Semi-gloss—Of the seven Wadsworth-Howland whites, Wahcolite sees most service. It gives walls and ceilings of mill interiors a pure white semi-gloss. Not a glary white but a white that magnifies and diffuses every bit of light to every corner of the room.

There is such a striking difference before and after Wahcolite is put on the job that it appears as if extra windows have been installed.

Besides this, Wahcolite has a remarkable permanence of color that defies time. No matter how old, Wahcolite keeps the same snow-white complexion it had when it left the brush.

Walls painted with Wahcolite are sanitary. They are washable. They are free from crevices that harbor dirt and dust.

On previously coated white walls only 1 coat of Wahcolite is necessary. But on new woodwork it should be preceded with a coat of Wahcolite Flat White. On cement or brick, use 1 coat of "Bay State" Brick and Cement Coating before applying Wahcolite.

"Bay State" Roofing Stain

"Bay State" Roofing Stain is a preservative and beautifier for asphalt shingles and composition roofings. This stain also acts as a binder. It cements the small particles that form the surface of some prepared roofings. It prevents peeling and scaling, and protects from weathering due to snowslides, rain, hail, sleet and sun.

Made in dark red and dark green.

"Bay State" Steel Protective Coating, a Metal Protective Paint

This metal preservative is the result of years of research and of many practical and laboratory tests. It is made from the purest pigments, and has proved, under actual severe exposure, a most effective rust inhibitive.

Continued on next page

It is adhesive, moistureproof and a resistant of acid fumes, such as are encountered in the atmosphere of railroad and manufacturing districts.

Test—All pigments used in this product have been thoroughly tested out on the Atlantic City and Washington Test Fences, where they were exposed for several years, and withstood the severest conditions.

Application—"Bay State" Steel Protective Coating is recommended for use on structural metal in buildings, bridges, subways, elevated railway structures, smokestacks, tanks, etc.

Its use should be preceded by a thorough cleaning of the surfaces to be protected, sand blasting being the most desirable method; in lieu of which method wire brushes and scrapers should be used. All scale, grease and rust spots should be thoroughly removed.

Covering Capacity—About 400 sq. ft. per gal., 1 coat.

Colors—"Bay State" Steel Protective Coating is prepared in 4 standard colors: rich brick red, dark green, dove gray and coal black.

For permanence where acid fumes are encountered, the coal black and dove gray are to be preferred.

Packages—Packed in barrels, half barrels, 5-gal. and 1-gal. cans. Samples sent on application.

Specifications

Clean off all loose particles from all surfaces before priming.

New Interior Plaster Walls—*Coat No. 1*—Apply 1 coat of "Bay State" Brick and Cement Coating for plaster, thinned with *pure* spirits of turpentine, not over 1 pt. to 1 gal. of coating.

Coat No. 2—Apply 1 good, flowing coat of Special Plaster Cement Coating for plaster, as taken from the original package.

Coat No. 3—If third coat is necessary, apply same as Coat No. 2.

Exterior Brick, Concrete, Cement and Stucco—*Coat No. 1*—Apply 1 flowing coat of Cement Coating with a wide wall brush, as taken from the original package.

(*Note:* This 1 coat should cover sufficiently well to give a good finish. If a more dense surface is desired an extra coat may be applied, allowing 24 to 48 hours between coats.)

Interior Brick, Concrete or Cement—*Coat No. 1*—Apply 1 flowing coat of Cement Coating with a wide wall brush, as taken from the original package.

(*Note:* This 1 coat should cover sufficiently well to give a good finish. If a more dense surface is desired an extra coat may be applied, allowing 24 to 48 hours between coats.)

Cement Floors—Always apply 2 coats of "Bay State" Cement Floor Coating; the first coat as a priming coat, which insures a proper foundation for the finish coat. "First coat" (a liquid of neutral color) to be tinted with a small quantity of the finish coat (about ¼ gal. to 1 gal.).

On cement floors of ordinary texture and condition, 1 coat of "Bay State" Cement Floor Hardener applied as it comes from the package is sufficient to produce satisfactory results.

On very porous and soft floors, 2 coats should be applied, the first coat thinned slightly with about ½ pt. of turpentine to the gal.

On very hard, close texture floors, only 1 coat is necessary, and should be thinned with about ½ pt. of turpentine to the gal.

General Interior Finish—*Priming Note*—"Bay State" Brick and Cement Coating or Wahcolite Flat will make an excellent ground coat for "Bay State" Enamel No. 222 or No. 333 or Wahcolite Gloss Enamel, as either dries perfectly flat and hard.

Enamel Finish—Sandpaper the primed surface thoroughly (see Priming Note above) and apply a good flowing coat of "Bay State" Enamel No. 222 [or No. 333 or Wahcolite Enamel]. Do not apply on surfaces which contain any dampness, as moisture will cause blisters and peeling.

Woodwork—Sandpaper the priming surface thoroughly (see Priming Note above) and apply 1 or 2 heavy coats of "Bay State" Enamel No. 222 [or No. 333 or Wahcolite Enamel]. (If 2 coats of enamel are used, sandpaper lightly the first coat.

(*Note:* Do not use "Bay State" Brick and Cement Coating on vitrified, granolithic or any other non-absorbent surface, nor over a surface that has been smoothed up with neat cement.)

Orders, Shipments and Payment

Order from nearest office, store or agent. Immediate shipment can be made. Terms, 60 days; less 2%, 10 days.

Satisfactory rating or references required.

HOMES THAT ARE FINISHED WITH BAY STATE BRICK AND CEMENT COATING

ESTABLISHED 1858

BERRY BROTHERS

INCORPORATED

Varnishes, Architectural Finishes and Shingle Stains

FACTORY AND MAIN OFFICE

DETROIT, MICH.

CANADIAN FACTORY: WALKERVILLE, ONT.
BRANCH OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD

Products

Manufacturers of Wood Finishes: Liquid Granite Floor Varnish, Luxeberry White Enamel, Luxeberry Wood Finish, Elastic Interior Finish, Luxeberry Spar Varnish, Lacklustre, Dulgloss, Luxeberry Wall Finish, Shingletint.

Liquid Granite

The most durable floor varnish made, combining the three principal requisites—elasticity, durability and appearance. It has stood actual test of severe service for over 30 years and is recognized by master painters as the best article of its kind. It has never been equalled, and there is more Liquid Granite in use today than any other floor varnish.

Specify—On open grained woods, 2 coats Liquid Granite applied over 1 coat Berry Brothers' Paste Filler. On close grained woods omit filler. Eliminate use of shellac and liquid wood fillers on all floor work.

Luxeberry Wood Finish, Light

Possesses exceptional qualities as a rubbing varnish. Extensively used for trim work, such as doors, casings, etc., in hotel buildings, office buildings and residential work. Luxeberry Wood Finish is the registered trademark name now used to designate the finish long and favorably known as "Berry Brothers' Hard Oil Finish."

Specify—On open grained woods, 1 coat Berry Brothers' Stain, 1 coat Berry Brothers' Paste Filler, 1 coat Berry Brothers' S. D. C. Shellac and 3 coats Luxeberry Wood Finish. On close grained woods omit filler. (Staining is optional.)

Elastic Interior Finish

For interior trim subjected to severe usage. It possesses great elasticity and durability, and will resist the action of hot water, soap, etc., to a greater degree than any other varnish.

Specify—On open grained woods, 1 coat Berry Brothers' Stain, 1 coat Berry Brothers' Paste Wood Filler, 1 coat Berry Brothers' S. D. C. Shellac, and 2 coats Elastic Interior. On close grained woods omit filler. (Staining is optional.)

Luxeberry Spar Varnish

For front doors, store fronts and exterior work subjected to severe exposure and changing weather conditions. The standard of quality with a reputation of 55 years. Made especially for use on all types of marine architecture, wherever a durable and lasting finish is desired. It can be used as both an exterior and interior varnish, as it is made to withstand severe wind, weather and water exposure and does not turn white.

Specify—On open grained woods, 2 coats Luxeberry Spar Varnish over 1 coat Berry Brothers' Paste Wood Filler. Omit filler on close grained woods.

Lacklustre

For general interior work where economy in labor is a consideration. This ideal one-coat finish accomplishes with one coat what heretofore necessitated a coat of stain and a coat of wax. The method of application is easy—apply with a rag and wipe off with a clean piece of cheesecloth, producing a soft and almost lusterless finish, as it contains no wax and has none of the disadvantages of a waxed finish. It will not collect dust, neither will it spot white, and varnish can be applied over it without the necessity of preparing the surface as in the case of wax.

Manufactured in the following colors:

Green Flemish	Mission	Golden
Brown Flemish	Light Weathered	Antwerp
Black Flemish	Dark Weathered	Forest Green
Silver Gray	Filipino	Bog

Special shades furnished on request.

Dulgloss

For interior trim work where a flat varnish is desirable. Produces in one coat an imitation rubbed effect over a varnished surface. It is light in color, flows freely under the brush, dries dust-free in about an hour, and hardens in 12 hours with a soft velvety finish so much in demand.

Specify—*For Imitation Waxed Effect*—1 coat Berry Brothers' Stain, 1 coat Berry Brothers' Paste Wood Filler, 1 coat Berry Brothers' S. D. C. Shellac and 1 coat Dulgloss.

For Imitation Rubbed Effect—On open grained woods, 1 coat Berry Brothers' Stain, 1 coat Berry Brothers' Paste Wood Filler, 1 coat Berry Brothers' S. D. C. Shellac, 2 coats Luxeberry Wood Finish and 1 coat Dulgloss. On close grained woods omit filler.

Luxeberry White Enamel

For bathrooms and bedrooms. Especially designed for the practical finisher and decorator. It possesses full body, flows very freely, and dries without showing brush marks. It will rub perfectly in 3 to 4 days, and can be polished on the fifth day to a piano finish. It can be used on the finest interior or furniture work. It is pure white in color and stays white.

Ivory, cream and gray tints, also blue, red and green furnished, when desired.

Specify—1 coat lead and oil (pure white lead mixed with equal parts turpentine and linseed oil to brushing consistency), 2 coats Luxeberry Enamel Undercoat, 2 coats Luxeberry Enamel —white or desired tint. Sand each coat lightly with 00 sandpaper before applying succeeding coats.

Luxeberry Wall Finish

For interior walls, ceilings and trim. May be applied to plaster, cement, wood, metal, burlap or canvas. Produces a soft velvety surface which can be washed without injury to the finish. It is permanent in color, is composed of oil colors of the highest grade, and the very best vehicle is used as a binder.

Specify—*On Plaster and Cement Walls*—To 3 parts of Luxeberry Wall Size add 1 part Luxeberry Wall Finish of the desired shade, allowing plenty of time for drying. Follow with 2 or more coats of Luxeberry Wall Finish, allowing sufficient time between coats for drying.

On Woodwork, Metal and Fiber Board—Apply 2 or 3 coats of Luxeberry Wall Finish of the desired shade, each coat being allowed at least 48 hours to thoroughly harden before the succeeding coats are applied.

Note—On interior trim, where wood is of a sappy nature, apply a thin coat of Berry Brothers' S. D. C. White Shellac to prevent the sap from working through and discoloring the final coat.

Literature and Information

Write Berry Brothers' Architectural Department for specification book, special finished wood samples, or technical information on the subject of wood finishing.

E. I. DU PONT DE NEMOURS & CO.

INCORPORATED

Paint and Varnish Division

3500 Gray's Ferry Road

PHILADELPHIA, PA.

BRANCH OFFICES

BOSTON, MASS., Everett Station (49)

CHICAGO, ILL., 2100 Elston Avenue

Products

PAINTS and VARNISHES which include:

Former Harrison Products:
- DU PONT PREPARED PAINT (Town and Country)
- DU PONT FLOWKOTE ENAMEL
- DU PONT FLAT WALL PAINT
- DU PONT ELASTIC WALL PRIMER
- DU PONT ENAMEL UNDERCOAT
- DU PONT ANTOXIDE (Rust Inhibitive)
- DU PONT DU-LITE

Former Bridgeport Products:
- DU PONT WHEELER'S PASTE WOOD FILLER
- DU PONT WHEELER'S LIQUID WOOD FILLER
- DU PONT PENETRATING STAIN
- DU PONT ACID STAIN
- DU PONT MAHOGANY PENETRATING STAIN SEALER
- DU PONT WONDERLAC
- DU PONT PREPARED WAX

Former Chicago Architectural Varnishes:
- DU PONT SHIPOLEUM INTERIOR FINISH
- DU PONT SUPREMIS FLOOR FINISH
- DU PONT CHI-VO
- DU PONT NAVALITE (Exterior)

TRADE-MARK

The Du Pont Line

This is a combination of three of America's best known lines, each famous for a certain class of products:

First, the former Harrison Bros. & Co., makers of high grade paints, oil colors and enamels for over a century.

Second, the former Bridgeport Wood Finishing Co., whose stains, fillers and finishes have been the standard for nearly 50 years.

Third, completing the circle, the Chicago Varnish Co., whose varnishes have been specified by architects for over 50 years.

Du Pont Wheeler's Paste Wood Filler

The original silex wood filler, and used by the leading piano and furniture manufacturers for over 40 years. It is specified by critical architects for all types of building construction, including the finest public and residential work.

Forms a permanent, unshrinkable, transparent foundation in the pores of the wood for the support of the finishing coats.

Supplied in Transparent, Walnut or Light Antique, Golden Oak, Mahogany, Mahogany N (for dark mahogany effects), Ebony and Special White.

(1) Specifications—Filler to be reduced with turpentine or benzine at the rate of 8 to 10 lbs. of filler to 1 gal. of reducer. Apply 1 brush coat of Du Pont Wheeler's ( ) Paste Wood Filler. Allow work to stand until the filler has set or become dull, then rub the filler well into the pores of the wood, wiping off the surplus with a cloth or sea moss, rubbing across the grain. Allow to dry at least 24 hours before finishing coats are applied.

Du Pont (Chicago) Architectural Varnishes

These varnishes have been specified by architects for the past 50 years, and are accorded first place in the varnish field.

The same identical varnishes are now sold under the Du Pont label.

There is a grade for each specific purpose:

Shipoleum Interior Finish—The very highest grade of interior varnish. Should be specified for use on fine residences, hospitals, asylums, public buildings, bathrooms, basements, stables, laundries and places exposed to the fumes of ammonia and dampness. It stands heat and moisture, is very elastic and never cracks. May be rubbed and polished.

Supremis Floor Finish—The first varnish put on the market especially for floors, and one that has always retained its leadership. It is a remarkable wood preservative, dries hard and elastic, is thoroughly waterproof and will not mark or scratch white.

When rubbed, it produces the soft eggshell luster of French polish.

Chi-Vo—Noted for its beautiful rubbed appearance without the labor and expense of rubbing. This is a distinctive varnish, made by a new process, and has a third more spreading capacity than ordinary varnishes.

Should be specified as a finishing coat over Shipoleum Varnish.

Navalite—This is the only spar varnish of good quality that will not turn white. Especially adapted for

Continued on next page

use on front doors, vestibules and any exterior surface subject to all kinds of weather conditions. It will retain its luster and elasticity under severe conditions and meets every requirement of drying, appearance and durability.

(2) Specifications—Apply 3 coats of Du Pont Architectural ( ) Varnish. Each coat to be sanded (except Chi-Vo) when thoroughly dry with No. 00 sandpaper, and dusted. Final coat to be rubbed to (flat, eggshell or polish), as desired.

Du Pont Penetrating Stain

For producing on practically all woods, with the possible exceptions of mahogany and walnut, clear toned stained effects.

These stains do not raise the grain of the wood or show laps. They penetrate the wood deeply, bringing out the full beauty of the grain.

Where economy of finish is a factor, the oak shades may be used as a 1-coat finish, but are generally finished over with shellac and wax, shellac and varnish, filler, shellac and wax, or filler and varnish. On close grained woods, the use of filler is not necessary.

The mahogany shades are generally used on such close grained woods as birch, gumwood, pine, fir, cypress and whitewood, and should be finished over with Mahogany Penetrating Stain Sealer and varnish coats.

Regularly supplied in the following colors:

Light Oak, Brown Oak, Golden Oak, English Oak, Flemish Oak, Light Mahogany, Dark Mahogany, Brown Mahogany, Mission Green, and Circassian Walnut (for gumwood only).

(3) Specifications—Apply brush coat of Du Pont ( ) Penetrating Stain. Allow work to stand for 4 or 5 minutes and wipe off surplus stain with a cloth. Allow work to dry 24 hours before applying further finishing coats.

Du Pont Wheeler's Liquid Wood Filler

A superior grade of liquid filler for use on standing trim, doors, etc., of close grained wood, where a natural varnish finish is desired.

This filler is not intended for use on floors.

(4) Specifications—Apply 1 brush coat of Du Pont Wheeler's Liquid Wood Filler and allow work to dry 24 hours. Sand smooth with No. 00 sandpaper and dust before applying varnish coats.

Du Pont Mahogany Penetrating Stain Sealer

A priming coat for Light, Dark, and Brown Mahogany Penetrating Stain when used on close grained woods.

This product is much superior to shellac for the purpose, as it prevents the stain from "bleeding" through the varnish coats. Do not specify the use of Mahogany Penetrating Stains without the use of Mahogany Sealer.

(5) Specifications—Apply 1 brush coat of Mahogany Penetrating Stain Sealer over Mahogany Penetrating Stain; allow to dry 24 hours and sand or hair lightly. Dust work before applying varnish coats.

Du Pont Acid Stain

Intended for use on all types of wood in producing the artistic effects not possible with any other type of stain.

The mahogany effects are generally used on genuine mahogany wood in connection with Wheeler's Paste Wood Filler, such effects being finished over with varnish coats. The Grays and Fumes are generally finished over with Wonderlac.

Regularly supplied in the following colors:

No. 1000 Dark Fumed Oak, Standard Gray, Satin Gray, Smoked Pearl, Mahogany, Dark Mahogany, Brown Mahogany.

(6) Specifications—Apply 1 brush coat of Du Pont ( ) Acid Stain. Allow work to dry thoroughly, about 12 to 24 hours, and sand surface smooth with No. 00 sandpaper. Dust work before applying further finishing coats.

Wonderlac

A dull lusterless finish adapted for use *only* over the Gray and Fumed Acid Stains. Does not change the color of the most delicate shades and forms a dampproof finish.

(7) Specifications—Apply 2 brush coats of Wonderlac over Standard Gray (or Fumed Oak) Acid Stain, allowing 8 hours between coats for drying.

Du Pont Prepared Wax

Used in producing the waxed effect on interior woodwork and floors.

(8) Specifications—Apply 2 coats of Prepared Wax. Apply with a cloth evenly over the entire surface; allow to stand 10 to 20 minutes and polish with a soft cloth. The second coat may be applied in the same manner 24 hours after the first coat has been polished.

Du Pont Enamel Undercoat

This is the proper undercoat for an enamel finish. Forms a hard, smooth finish, causing the enamel to stand out with full gloss and luster.

(9) Specifications—Apply 3 brush coats of Du Pont Enamel Undercoat as follows:

First Coat—Thin with linseed oil at the rate of 1 qt. of pure raw linseed oil to 1 gal. of Undercoat. For pine or cypress, substitute turpentine for linseed oil. Allow to dry 48 hours and sand with No. 00 sandpaper.

Second Coat—Apply Undercoat as it comes from the can. Allow to dry 48 hours and sand with No. 00 sandpaper.

Third Coat—Same as second coat. Dust work before applying enamel coats.

FlowKote Enamel

A high grade enamel that will not change color. Adapted for both interior and exterior work.

Supplied in White and Ivory, in both gloss and rubbed finish. The latter type gives the hand rubbed effect without the labor and expense of rubbing; and if rubbed finish is specified, no rubbing is necessary for the final coat.

(10) Specifications—Apply 2 coats of Du Pont FlowKote ( ) Enamel. Sand first coat when thoroughly dry with No. 00 sandpaper. Dust work and apply second coat. Final coat to be (left in gloss or rubbed eggshell) as desired.

Du Pont Prepared Paint

An exceptionally durable house paint made to withstand extreme weather conditions. Has exceptional durability and covers well.

Color card on request, showing 30 attractive colors.

Continued on next page

(11) Specifications—*Preparation*—Coat all knots and sappy streaks with shellac, to prevent showing through subsequent paint coats. Apply 3 coats Du Pont Prepared Paint ( ) as follows:

On very resinous knots the resinous matter should be "pulled out" of the surface by the use of the blow torch, followed by a brush coat of turpentine or benzole just before application of the priming coat. Apply 3 coats of Du Pont Prepared Paint ( ) as follows:

Priming Coat—Thin to priming consistency with equal parts linseed oil and turpentine. (For soft, open grained woods like white pine and poplar, thin with 3 parts oil and 1 part turpentine. On resinous woods, such as yellow pine, reduce with 1 part oil and 3 parts turpentine).

Second Coat—Thin to working consistency with 2 parts raw linseed oil and 1 part turpentine. Brush out well.

Third Coat—Apply without thinning, except when conditions warrant the use of a little linseed oil.

Du Pont Flat Wall Paint

A ready-to-use interior wall finish, producing a soft, matt surface that can be repeatedly washed. Covers exceedingly well and does not show brush marks.

Supplied in 10 colors and white. Send for color card, showing these colors in various combinations.

(12) Specifications—*First Coat*—Du Pont Flat Wall Paint, to each gallon of which has been added from a quart to a half gallon of Du Pont Elastic Wall Primer, depending on porosity of surface.

Second Coat—Du Pont Flat Wall Paint of package consistency.

Third Coat—Same as second coat.

Du-Lite

Three coats recommended for all new or unpainted work.

(13) Specifications for Use Over Cement, Concrete, Brick and Plaster—*Preparation*—All surfaces must be thoroughly dry and free from grease and dirt.

Finishing—First Coat—Du Pont Du-Lite Undercoater to which has been added equal parts of Du Pont Elastic Wall Primer.

Second Coat: Du Pont Du-Lite Undercoater.

Third Coat: Du Pont Du-Lite Gloss, Eggshell or Flat.

Where only 2 coats are used, the following specification is recommended:

First Coat: Du Pont Du-Lite Undercoater.

Note: Where brick and concrete surfaces are very porous, 1 qt. of Du Pont Elastic Wall Primer should be added to each gallon of Du-Lite Undercoater for first coat.

Second Coat: Du Pont Du-Lite Gloss, Eggshell or Flat.

(*Caution:* New or green surfaces particularly strong in alkalis, should first be washed with a solution made by dissolving 3 lbs. of zinc sulphate in 1 gal. of water.)

(14) Specifications for Use Over Wood and Wall Board—*Preparation*—All surfaces must be thoroughly dry and free from grease and dirt. Knots and sappy places in wood shall be shellaced before painting and all nailholes puttied after first coat.

Finishing—First Coat: Du Pont Du-Lite Undercoater reduced tc priming consistency with equal parts of pure raw linseed oil and spirits of turpentine or turpentine substitute.

Second Coat: Du Pont Du-Lite Undercoater.

Third Coat: Du Pont Du-Lite Gloss, Eggshell or Flat.

Where only 2 coats are used, the second coat may be omitted.

(15) Specifications for Use Over Structural Iron or Steel and All Metal Work (except Galvanized Iron)—*Preparation*—Metal surfaces shall be cleaned of all scale, dirt, rust and grease.

Finishing—First Coat: Du Pont Ferro-Keep Gray.

Second Coat: Du Pont Du-Lite Undercoater.

Third Coat: Du Pont Du-Lite Gloss, Eggshell or Flat.

Where only 2 coats are used, the second coat may be omitted.

Note: When galvanized iron is used, special treatment is required before painting. Special information will be furnished on request.

Antoxide (Rust Inhibitive)

A rust inhibitive paint with a varnishlike vehicle, that completely covers the surface and prevents moisture from attacking the metal and causing rust. It prevents the formation of rust beneath the coating as well as progressive oxidation where it has already begun.

This paint withstands acid fumes to a most unusual degree, therefore is peculiarly adapted for use around smelters, acid plants, paper and other mills. It is also used on water towers, inside and out, as it does not foul water.

(16) Specifications—*Preparation*—Surface to be free from grease, dirt and dust. Wire brush to remove scale.

Coats—Apply 2 coats Du Pont Antoxide ( ), allowing 24 hours between coats for drying.

Du Pont Elastic Wall Primer

The proper foundation for Du Pont Flat Wall Paint and Du-Lite. Stops the suction in plaster walls and prevents plaster burns from showing through subsequent coatings.

(17) Specifications—See Du Pont Flat Wall Paint and Du-Lite Specifications.

Special Note

For the convenience of the architect, each specification has been numbered, so that the proper paragraphs may be combined in his specifications. For example, if a stained and varnished effect is desired on an open grained wood, use paragraphs No. 2, No. 7 and No. 8, or other combination of paragraphs according to the effect desired.

These specifications as given are intended for new, unfinished work only. If detailed specifications are desired covering a particular project, complete information may be had by addressing, Architectural Service Bureau, Paint and Varnish Section, E. I. du Pont de Nemours & Co., 3500 Gray's Ferry Road, Philadelphia, Pa. This service is available for the asking and is entirely unobligative.

PECORA PAINT COMPANY

Enamels and Wall Finishes; Metal Sash Putty

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products

PECORA CUTICLE ENAMEL PAINT; PECORA MILL WHITE; PECORA METAL SASH PUTTY.

For Calking and Glazing Compound, see page 138; for Mortar Stains and Roofing Cement, see page 144.

Pecora Cuticle Enamel Paint

Uses—An elastic paint, drying hard, either flat or with a high gloss, as desired. Used for protecting and finishing all manner of plaster walls, wood and other interior finish, as well as for outside applications.

Advantages—Produced a number of years ago to equal the highest grade imported enamels, it has improved by research and by constant vigilance of the Pecora organization and still maintains its leadership.

Repeated washings do not affect it, and it is impervious to the action of bichloride of mercury, chloride of lime, peroxide of hydrogen, alcohol, ether and nitrate of silver (dilute). For this reason it is invaluable for hospital and laboratory use.

Properties—It is elastic, yet so tough, that, when thoroughly dry, the finger nail can not be forced into it.

It bends or dents with the surface painted, without cracking.

Color—Pure white, not blue white or yellow white; it always remains so and does not discolor.

Covering Capacity—It covers approximately 500 sq. ft. to the gal., 1 coat. Ease of application is such that the workman can cover large surfaces with a saving of about 25% in time.

Specifications—All woodwork and walls to be finished with Pecora Primer and Pecora Cuticle Enamel, manufactured by the PECORA PAINT COMPANY, Philadelphia, Pa.

Plaster, Interior—Size with any good varnish sizing, and apply 3 coats of Pecora Primer, letting dry 24 hours between coats; sandpaper first and last coats lightly. Then apply 2 coats of Cuticle Enamel (gloss or flat), allowing 3 days between coats, and lightly sandpaper first coat (see note below.)

Wood, Interior—Shellac all knots, then continue as with plaster, omitting size. The same rule applies to a less expensive finish, as mentioned in note below.

Note—If a less expensive finish is desired, 2 coats Primer and 1 coat Enamel will do. If 25% of Cuticle is added to last priming coat, it will give even better results.

Testimonial—

WOMAN'S HOSPITAL,
110th Street, New York City.

GENTLEMEN:

Enclosed please find an order which we would like filled as soon as possible.

We tested your sample of Pecora Cuticle Enamel with bichloride of mercury, chloride of lime, peroxide of hydrogen, alcohol, ether and nitrate of silver (dilute), any or all of which we would be apt to use on or near the article painted, and it stood the trial perfectly, when various other enamels were inadequate.

Our engineer wants to know if the "undercoating" is equally impervious to acids, etc.

Yours truly,
FRANCES E. FOWLER,
Superintendent.

Pecora Mill White

Uses—It is an *oil* coating for use on walls, ceilings and woodwork throughout industrial establishments and parts of all other buildings where surfaces should be sanitary and where light should be intensified.

Advantages—This sanitary film of brightness *preserves the health and eyesight* of workers, *reduces accidents, increases production* and causes satisfaction wherever applied.

That these are the actual results accomplished by using a coating of *permanent* whiteness is evidenced by the opinions, writings and publications of illuminating engineers, Workmen's Compensation Service Bureaus and other authorities, many of which will be found listed in the Structural Service Book of the American Institute of Architects.

Properties—Made by a secret process of oil manipulation, and, not being dependent on varnish gums, Pecora Mill White does not become brittle or crack.

For the same reason, vibration, the bugaboo of ordinary mill whites, can not break the tough and tenacious oil film of Pecora and nothing will cause it to *flake*.

It is a *white* that stays white and never looks blue or turns yellow of its own accord. It is perfectly opaque, thoroughly washable, and highly sanitary.

It is made in gloss, eggshell and flat finish, with a covering capacity per manpower that can not be exceeded.

It should always be applied in 2 coats.

Specifications—Brief reference to the manner of applying any Mill White will not always insure its being used at every place desired. The PECORA PAINT COMPANY will furnish suggestive specifications for application on request.

Pecora Metal Sash Putty

Uses—A specially prepared putty for use in metal sash only.

Advantages—Pecora Metal Sash Putty is the modern plastic product developed by this company to replace white lead, litharge and ordinary putties used in connection with metal.

It is a "special duty" putty, embodying the essential feature of retaining its elasticity and staying in place, regardless of the difference in coefficient of expansion between glass and steel.

Properties—It remains soft in the package, and on removal is immediately ready for use.

It is "long," therefore readily applied by the workman; and not requiring any manipulation enables the contractor to reduce his cost of installation.

Colors and Samples—The standard shade is dark red. Other shades are made to order. Sample on request.

Specifications—Be sure to specify Pecora Metal Sash Putty. It will be a trouble-saver as evidenced by the fact that thousands of pounds have been used with the greatest success.

References—A few of the large buildings where this material has been used by David Lupton's Sons Company of Philadelphia, Pa., are:

Bethlehem Steel Co., South Bethlehem, Pa.
General Electric Co., Schenectady, N. Y., and West Lynn, Mass.
Fore River Ship & Engine Building Co., Fore River, Mass.
Dayton Electric Company, Dayton, Ohio
S. L. Allen & Co., Philadelphia, Pa.
Central Railroad of N. J., Elizabethport, N. J.
Keokuk Electro Metals Company, Keokuk, Iowa

ESTABLISHED 1863

HILO VARNISH CORPORATION

FORMERLY MOLLER & SCHUMANN CO.

Manufacturers of Varnishes, Enamels, Fillers and Stains

Marcy and Flushing Avenues

BROOKLYN, N. Y.

CHICAGO, ILL., 2420-24 Washburne Avenue

BOSTON, MASS., 104 Hanover Street

Products

"HILO" VARNISHES, including MARINE SPAR, FLOOR FINISH, CABINET FINISH, FLAT FINISH, TRI-PROOF SPAR.

"HILO" MOLMANITE WHITE ENAMEL; COMPO COATING, a Flat Wall Enamel for Interior; WOODFILLERS; OIL STAINS.

TRADE-MARK

Quality

"Hilo" Varnishes, whether for interior or exterior work, floors, doors, woodwork, or furniture, are perfectly fitted for the work for which they are intended.

The special fitness of each "Hilo" Varnish or "Hilo" Enamel for the particular purpose mentioned in the description is due to the application of the knowledge of this company gained through 59 years of study in developing good varnish for finishing woodwork.

Guarantee

That your confidence in specifying "Hilo" Architectural Varnishes and Enamels may be further assured, we invite attention to the fact that these products carry our guarantee of "Satisfaction or your Money Back."

"Hilo" Marine Spar

"Hilo" Marine Spar is intended for the highest grade exterior work. Resists the most trying atmospheric changes. Used on yachts, outside doors, window casings and store fronts. Free flowing, lustrous, extremely elastic.

This varnish is made like the highest type carriage varnishes and assumes a slight bluish tinge when exposed to continued rain for several days (this is a proof of elasticity). It resumes its normal brightness as soon as dry.

"Hilo" Floor Finish

"Hilo" floor finish makes a durable tough coating that preserves the natural beauty of the wood.

It does not mar white. It is unaffected by water from leaky radiators, flower pots or wet umbrellas.

This is a pale varnish, and it stays pale on the work. It has a fair luster that does not dim with age. It sets free from dust in a few hours, and can be walked on after drying overnight.

"HILO" FLOOR FINISH CAN

"Hilo" Cabinet Finish

For use in finishing the finest interior woodwork and cabinet trim; also used extensively on very fine furniture. It preserves the natural beauty of the wood indefinitely.

It gives to the interior woodwork of the home an appearance equal to that of the finest furniture.

It dries with a fulness that allows close rubbing. It is extremely durable; will neither check nor crack and is not affected by spilled water, coffee, etc. Dries free from dust in 2 hours and may be rubbed in 36.

"Hilo" Flat Finish

This varnish is unequalled for use on interior woodwork where a dull rich finish is desired without the expense of rubbing. It is a high grade rubbing varnish; is absolutely free from wax to soften; and every drop dries with the same rich, velvety dullness. It is of the same uniform body from top to bottom of the can, no matter whether it is one week or one year old.

"Hilo" Flat Finish may be used over natural wood, stain, wood filler, shellac, varnish, or painted surfaces, and dries overnight.

"HILO" FLAT FINISH CAN

"Hilo" Tri-proof Spar

This is a general utility varnish that combines the virtues of many varnishes. It may be used on front doors, window sills, floors, woodwork, tables, autos, motor boats, etc. No matter where applied, inside or outside, it will give absolute protection; and its beauty of finish is lasting.

Water, boiling hot or icy cold, will not injure it. Ammonia, soaps, etc., used in cleaning, and alcohol, in perfumes, hair tonics, liquors, etc., do not affect it.

"Hilo" Tri-proof Spar sets dust free in 2 hours, and dries hard overnight. It may be rubbed to a very dull finish.

"HILO" TRI-PROOF SPAR CAN

Continued on next page

"Hilo" Molmanite White Enamel

A most durable, high grade white enamel for finest exterior and interior surfaces.

The pure white color and full deep luster of Molmanite give it a richness like that of old porcelain.

Molmanite has remarkable elasticity, which makes it very good for exterior use, as sudden changes of temperature have no effect upon it.

Warm water and soap, and the best known disinfectants, have no injurious effect upon Molmanite.

Molmanite may be used with very satisfactory results on public buildings, hospitals, hotels, steamships, yachts; for doors, windows, bathrooms, etc., and for all exterior and exposed surfaces where a durable enamel is required.

"Hilo" Molmanite Can

"Hilo" Compo Coating — Flat White

A superior white for producing a flat finish on interior walls, and ceilings of wood, metal or plaster.

It holds to the surface without flaking, dries hard and can be washed without affecting the appearance of the surface.

"Hilo" Compo Coating gives the walls that uniform soft tone, so restful to the eyes.

When "Hilo" Compo Coating is used as an enamel undercoat, sand the last coat before applying an enamel.

"Hilo" Compo Coating Can

"Hilo" Paste Woodfillers

These paste woodfillers are made from the finest pigments and pure colors, combined with a specially prepared and elastic varnish. They fill the pores of the wood completely, and leave the wood clear toned and entirely free from all smeared or muddy appearance.

"Hilo" Woodfillers dry hard and prevent the varnish coats from sinking into the pores.

Standard shades: Natural, Walnut, No. 95 Golden Oak, No. 345 Mahogany.

"Hilo" Oil Stains

These are penetrating stains. They do not contain pigment and will not settle in the can. The shades are transparent and bring out the natural beauty and grain of the wood.

Standard shades: Red Mahogany, Brown Mahogany, Dark Golden Oak, Dark Weathered Oak.

General Specifications for Wood Finishing

Filling, Staining, Varnishing — *Open Grained Woods*—Ash, chestnut, mahogany, oak, walnut, etc. First fill with "Hilo" Paste Woodfiller.

Close Grained Woods—Birch, cherry, cypress, gumwood, pine, poplar, etc., require no filling. Apply the varnish direct to the wood.

Knots should be coated with shellac to kill the pitch.

Exterior or Exposed Surfaces—Fill open grained woods with "Hilo" Paste Woodfiller. Sand smooth and apply 3 coats of "Hilo" Marine Spar or "Hilo" Tri-proof Spar, allowing 48 hours and sanding lightly between coats.

Interior Work, Cabinet Trim, etc.—On close grained woods apply "Hilo" Oil Stain of the color desired. After 24 hours apply a thin coat of "Hilo" White Shellac. For natural effect omit stain.

On open grained woods apply 1 coat of "Hilo" Oil Stain of the color desired.

After 5 hours apply "Hilo" Paste Woodfiller of the color selected and then a thin coat of "Hilo" White Shellac.

Sand surface smooth and apply 3 coats "Hilo" Cabinet Finish; allow 36 to 48 hours between coats. Sand each coat lightly except the last.

The last coat may be left in the gloss or rubbed to a dull finish with pumice-flour and water after 48 hours, or, 24 hours after rubbing the surface, can be polished with rottenstone and oil.

Floors, Hard or Soft Wood and Parquet—Fill open grained woods with "Hilo" Paste Woodfiller. Putty nailholes.

Sand smooth and apply 3 coats "Hilo" Floor Finish.

Mission or Dull Tone Varnish—Apply 1 coat of "Hilo" Oil Stain as selected, 1 coat of "Hilo" White Shellac and 1 coat of "Hilo" Flat Finish.

White Enamel Work—Surfaces to be coated should be clean and dry, and sanded perfectly smooth. All knots in woodwork should be killed with pure orange shellac.

Exterior—First prime with white lead in oil, reduced with linseed oil to a good brushing consistency; then apply 1 or 2 coats of "Hilo" Compo Coating. Followed by 2 coats of Molmanite.

Interior—Apply 2 coats of "Hilo" Compo Coating and 2 coats of Molmanite. Allow 2 days between undercoats, and 3 days between Molmanite coats.

Sand each coat except the last. For an exceptionally smooth finish, rub the first coat of Molmanite.

After 5 days Molmanite may be rubbed to an eggshell finish, with pumice and water.

MURPHY VARNISH COMPANY

Chestnut and McWhorter Streets
NEWARK, N. J.

50 West 22nd Street
CHICAGO, ILL.

CANADIAN ASSOCIATE: The Dougall Varnish Company, Limited, MONTREAL, QUE.

Products

Murphy Transparent Interior Varnish.
Murphy Nogloss Interior Varnish.
Murphy Semi-gloss Interior Varnish.
Murphy Transparent Floor Varnish.
Murphy Velvet Floor Varnish.
Murphy Transparent Spar Varnish.
Murphy Univernish.
Murphy Muronic White Enamel.
Murphy Muronic Semi-gloss Enamel.
Murphy Muronic Enamel Undercoating.
Murphy Konkreto.
Murphy Da-cote Engine Enamel.

TRADE SYMBOL

Scope

The Murphy Varnish Company has been in existence 58 years.

Most of the railways, the manufacturers of fine furniture, pianos, automobiles, and the other large consumers who are experts in the use of varnish are supplied by this company, which makes over 200 kinds of varnish and enamel—it being true today, as it always has been, that no one varnish or enamel can be used for all purposes.

Where Murphy Materials Can Be Obtained

Murphy finishing materials are for sale by dealers and jobbers everywhere; but if not easily obtainable in any locality, they will be shipped direct from the factory for any architectural work.

Architectural Varnishes

The varnishes and enamels described herein are those which time and experience have proved best for fine architectural work.

Murphy Transparent Interior Varnish

A fine transparent, lustrous varnish which brings out the grain of the wood, flows freely, covers a great deal of surface, rubs easily, and keeps its full beauty for many years. Used extensively in fine residences, hotels, public buildings, office buildings and wherever fine woodwork needs to be beautified, protected and made sanitary.

Murphy Nogloss Interior Varnish

This varnish, used for the final coat over Murphy Transparent Interior, gives a rubbed effect without the labor of rubbing. Beautifully shows the grain of the wood. Can be used alone by applying the proper number of coats.

Murphy Semi-gloss Interior Varnish

As the name implies, this varnish is half way between the Nogloss rubbed effect and the Transparent Interior (unrubbed) and gives a slightly rubbed appearance.

Murphy Transparent Floor Varnish

A fine free flowing varnish that rubs easily, producing a very smooth, beautiful surface. Does not flake off; is not affected by reasonable exposure to moisture, air, or water. It can be covered year after year with a new coat, whenever required, without removing the original coat. Stands the wear of passing feet; is not affected by heavy furniture rolled over it, and is, besides, the most enduring of floor varnishes.

Used in thousands of fine homes, hotels, office buildings, etc.

Murphy Velvet Floor Finish

For final coats only over Transparent Floor Varnish when a semi-gloss finish is desired. Has the effect of wax without the slipperiness, and requires no rubbing.

Murphy Transparent Spar Varnish

A fine durable outdoor varnish for all outside work except floors.

It is moistureproof, endures heat and cold, and resists grit and smut as long as any varnish possibly can. It lasts a long time and remains attractive as long as it lasts.

Murphy Univernish

A varnish for many uses—for inside and outside work and for floors. Proof against hot or cold water, steam, hot dishes, alkali, alcohol, ammonia, etc. Nothing turns it white. For these reasons, it is a particularly good varnish for kitchen sinks, bathrooms and all places which are unduly exposed to rough use.

While the name suggests its all-round use where these qualities are desired, it is not, and no one varnish can be, the best varnish for every technical purpose. Univernish does, however, approximate the good qualities of many fine varnishes and may be relied upon for elegant finish and durability.

Murphy Univernish stands the extremes of weather wonderfully, does not thicken in the can, nor clog the painter's brush; it works easily and flows out smooth. Do not apply Univernish over shellac or liquid fillers.

Murphy Muronic White Enamel

A pure white enamel of the finest grade and long life. Designed for use either indoors or outdoors—dries hard for indoors and wears wonderfully well for outdoors. Much quicker drying than our old style "Murphy White Enamel"—dries out of danger overnight. Can be tinted, of course.

Continued on next page

Murphy Muronic Semi-gloss Enamel

As a final coat over Murphy Muronic White Enamel, it produces a beautiful semi-gloss effect without the expense of rubbing.

Murphy Muronic Enamel Undercoating

Dense covering, flat drying. Is used for foundation coats for Murphy Muronic White Enamel. Much more suitable for this work than lead-and-oil.

If colored enamel surface is wanted, the second and succeeding coats should be colored to match the enamel.

Murphy Konkreto

For the sanitary treatment of concrete or cement floors, walls, or ceilings. Gives smooth surface. Prevents them from wearing, dusting and getting mouldy. Makes them as easy to clean and keep clean as tiling.

Murphy Da-cote Engine Enamel

A quick drying durable enamel for stationary engines. Furnished in colors.

Specification Guide for Varnish and Enamel

Below is a convenient reference guide to specifications for varnish and enamel. A copy will be sent to any architect who desires it.

It is urged that not only the maker be named, but the particular kind of varnish desired. It is not sufficient, for example, to say "Murphy Varnish." Many grades are made, each one the best for its special purpose, but no one the best for every purpose.

The use of the phrase "or equal" in any specification often results in the use of inferior varnish. The client's interest, the architect's interest, and each bidder's interest will be better served by specifying directly what is wanted, whether it is Murphy Varnish or some other make.

The slight difference in cost between good varnish and poor varnish is more than offset by the longer life of good varnish, by its saving of labor in application and the greater area covered, and a skillful painter, estimating on a definite basis, will always want the quality varnish.

Specifications for Wood Finishing

Interior Work—*Mahogany, Oak, White Mahogany, Walnut, Ash, Butternut and all Open Grained Woods*—To be properly filled with Murphy Varnish Company's Paste Filler, care being taken to have filler match the natural color of the wood or the color desired by owner or architect; to receive 1 coat of shellac (except on floors, and in bathrooms and laundries) and 3 coats of Murphy Transparent Interior Varnish or Univernish. Shellac coat, and first and second coats of varnish to be sandpapered with 00 sandpaper; the third coat of varnish to be carefully rubbed with pumicestone and water to a dead and even surface (finisher to use rubbing felt), then oiled and thoroughly wiped, where necessary. Where gloss finish is desired, omit rubbing on final coat.

Pine, Maple, Cypress, Whitewood, Cherry, Birch, Sycamore, Beech, Holly and all Close Grained Woods—To be finished same as above, except that the filler be omitted.

For a Dull Finish, Without Rubbing—Wood to be brought up same as above, except that 1 coat of Murphy Nogloss Interior is to be used in place of the final coat of Murphy Transparent Interior Varnish or Univernish.

For a Semi-gloss Finish, Without Rubbing—Wood to be brought up same as above, except that 1 coat of Murphy Semi-gloss Interior is to be used in place of the final coat of Murphy Transparent Interior or Univernish.

Floors and Bathrooms—All open grained, hardwood floors and bathrooms to be properly filled with Murphy Varnish Company's Paste Filler, and receive 3 coats of Murphy Transparent Floor Varnish or Univernish, the last coat to be rubbed lightly with oil and pumicestone. Thin the first coat with turpentine in the proportion of 1 pt. to 1 gal. of varnish. Pine, maple, cherry and all other close grained woods, used for floors, to be finished precisely as above, except that filler is to be omitted.

For a Dull Floor Finish Without Rubbing—Floors to be treated as above, except that 1 coat of Murphy Velvet Floor Varnish is to be used in place of the final coat of Murphy Transparent Floor Varnish or Univernish.

Enamel Work—*Treatment of White Enamel Work*—First, give the wood a thin coat of shellac, lightly sandpaper when dry, and follow with 3 coats of Murphy Muronic White Enamel Undercoating and 2 coats of Murphy Muronic White Enamel, the last coat to be rubbed down to a fine surface with either pumicestone and water, or rottenstone and water. Omit rubbing on final coat, if gloss finish is desired. If a special color is wanted, tint with Murphy Varnish Company's Japan Color.

For a Semi-gloss White Enamel Effect Without Rubbing—Treat work as above except that 1 coat of Murphy Muronic Semi-gloss Enamel is to be used instead of the final coat of Murphy Muronic White Enamel.

Exterior Work—The surface of all woods must be sandpapered smoothly and properly cleaned before finishing. No shellac to be used on outside work, inside sash, window sills, floors or other surfaces exposed to great dampness. Use 3 coats of Murphy Transparent Spar Varnish or Univernish for all the above work. The first coat to be applied directly on the wood, if it is close grained, or, after the wood is filled, on open grained wood.

Note: On all inside work, care must be taken to have premises properly heated and free from dampness to secure best possible finish.

For outside work a dry warm windless day is essential for best work.

Free Educational Murphy Books

Architectural Varnishes and Enamels. Pocket edition, alike helpful to architects, painters and owners.

Beautiful Floors and How to Care for Them.

Beautiful Boats and How to Care for Them. A handsome book illustrated in color indicating the uses of Murphy Transparent Spar Varnish—the brineproof varnish.

Murphy Univernish—the universal varnish.

Murphy Finishing System for Carriages and Motor Cars.

Murphy Da-cote Engine Enamels.

The Charm of Simplicity. Leaflet on the beauty of white enamel finish for interiors.

Write for a specially prepared set of illustrated leaflets on the subject of front doors, floors, bathrooms, and kitchens.

PRATT & LAMBERT—INC.

Varnish Makers

73-97 Tonawanda Street
BUFFALO, N. Y.

393-407 Freeman Avenue
LONG ISLAND CITY, N. Y.

320-330 West 26th Street
CHICAGO, ILL.

54 Courtwright Street
BRIDGEBURG, ONTARIO

Products

"61" Floor Varnish; "38" Preservative Varnish; "110" Cabinet Varnish; Fullcote Interior Varnish; Dulkote; Filtex; Spar Finishing Varnish; Impermalin; Palest Interior Varnish; Oil Stains; Acid Stains; Paste Fillers; Vitralite, the Long-Life Enamel; Vitralite Enamel Undercoating; Vitralite Cement Coating; Lyt-all.

Experience

In the following specifications this company has embodied the fruits of over 73 years' experience in studying wood finishing conditions and working out materials and methods which best fulfill the requirements. The attainment of success is evident from the use of Pratt & Lambert Varnish Products in finishing some of the world's best known buildings.

Co-operative Service

Sample panels showing standard effects obtainable with Pratt & Lambert stains, fillers and varnishes will be sent on request. If some distinctive finish is required, specify the wood to be used and the general color required, and the architect's ideas will be carried out on specially made up sample panels. Should information be desired on any wood finishing problem, the opportunity to be of service would be welcomed.

Address letters to the Architectural Service Departments, special departments in the Pratt & Lambert organization devoted entirely to the interests of architects.

Complete Specification Book

Most wood finishing problems are solved in the Pratt & Lambert Specification Book, which gives complete specifications for every kind of finish, and contains thorough, reliable treatises which cover the entire field of wood finishing. A request to the Architectural Service Department at the nearest office will bring it gratis.

The following products, embodied in the specifications on the opposite page, include a varnish, stain, filler or enamel for every architectural purpose, each the perfected result of more than 73 years of successful varnish making experience.

"61" Floor Varnish

The only floor varnish made by this concern, and considered the most durable finish made for the purpose. "61" is marproof, heelproof and waterproof.

"61" Floor Varnish, Dull Finish

Especially designed to provide a dull finish on floors, without the labor and expense of rubbing, and possesses the same degree of durability and waterproof qualities as does "61" Clear Gloss.

"38" Preservative Varnish

A pale, transparent varnish for use on interior trim, whether of open or close grain wood. It gives a smooth, even, natural gloss finish that does not grow dull; may be rubbed to a dull finish that will not sweat back to a gloss; takes and retains a high hand polished finish.

"110" Cabinet Varnish

Similar to "38" Preservative Varnish, but not quite as light in color, hence not as expensive. Dries in a high gloss finish and may be rubbed to a dull finish.

Fullcote Interior Varnish

An unusually full bodied varnish for general interior use. Is light in color, free flowing and dries hard with a good luster. May be rubbed to a dull finish. Excellent results are secured by specifying Fullcote on work where economy in first cost is essential.

Dulkote

A dull-drying varnish for interior trim that will not gloss up. Gives a semi-dull finish similar to a rubbed effect, but without rubbing. As it contains no wax, it may be finished over with gloss varnish, if at any time this is desired.

Filtex

A practical first coater which is elastic and durable, making it adaptable for a wide variety of uses. It produces a smooth, impervious coating which prevents suction and holds out the finishing coats to an unusual degree.

Spar Finishing Varnish

A weather resisting varnish for exterior work, such as front doors, porch ceilings, etc., and for interior work subject to moisture or frequent exposure.

Impermalin

An absolutely waterproof varnish for either outside or inside work, which dries more quickly than a regular "spar" varnish, making it especially suitable for work likely to be exposed to the action of dust or dampness. It is extremely durable and dries with a high luster.

Palest Interior Varnish

For interior use over white work or light colored woods. It is very pale in color and is recommended for finest work where there is not an extreme exposure.

Oil Stains

These non-fading oil stains give best results on the softer woods, such as pine and cypress, but may be used on any close grain wood. They are made in the following colors:

Light Oak	Mahogany
Dark Oak	Dark Mahogany
Walnut	Golden Oak
Cherry	Weathered Oak
Rosewood	Brown Mahogany
Forest Green	No. 21 Antique

Continued on next page

Acid Stains

The ideal stains for all hard close and open grain woods, as they in no way cloud or hide the grain of the wood. However, they are not suitable for soft woods, as they raise the grain of such woods, making it difficult to get a smooth varnish surface. Made in the following colors:

Silver Gray	English Oak
Fumed	Flemish Oak
Brier Green	Mahogany
Early English	Dark Mahogany
Antwerp Oak	Antique Mahogany

Paste Fillers

Used for filling open grain woods to give a smooth foundation over which to apply varnish and to impart the desired color either alone or in conjunction with acid stains. They are made in the following colors:

Light Oak	Golden Oak
Dark Oak	Fumed

Mahogany

As they are made from finely ground silex, they adhere to the wood and do not crumble, powder or perish. The colors are permanent.

Vitralite

The long-life enamel that lasts longer than paint outside or inside, on wood, metal, concrete, plaster, brick or stone. In addition to the white, which may be had in gloss or eggshell, there are five tints, as follows:

Gray, Ivory and Cream in gloss or eggshell, and Chinese Blue and Leaf Green in gloss only.

These tints are authoritative in color in that they harmonize perfectly with the prevailing modes in fabrics, wall coverings and upholstery. The white Vitralite will not turn yellow. Wherever the gloss is used it may be readily rubbed to a dull finish.

Vitralite Enamel Undercoating

An undercoating for Vitralite on wood, metal, plaster or Keene's Cement surfaces, which gives a smooth, opaque foundation in the fewest possible coats and holds out the finishing coats of enamel in full rich body. Has no tendency to turn the finishing coats of enamel yellow, like lead and oil.

Vitralite Cement Coating

An *alkali resisting* flat coating for cement, concrete, stucco, brick and stone, interior or exterior surfaces. Unexcelled for use as an undercoating for Vitralite, the long-life enamel, on these surfaces.

Lyt-all

Lyt-all is a better industrial wall coating—an enamel rather than a paint. It is made in flat, gloss, eggshell and cement coating. It can be sprayed or brushed on, dries quickly, and is easily cleaned. Lyt-all has a particularly wide use in all kinds of industrial plants and factories as well as a big general field where an all-around *inside* white is required.

Specifications

Exterior Work—*Open Grain Woods*—1 coat of paste filler of desired color; 1 coat of "61" Floor Varnish; 2 coats of Spar Finishing Varnish.

Close Grain Woods—If stain finish is desired, coat of oil stain of desired shade; for natural finish, omit stain. 1 coat of "61" Floor Varnish; 2 coats of Spar Finishing Varnish.

Interior Work—Natural—*Open Grain Woods*—1 coat of paste filler; 3 coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Close Grain Woods—1 coat of Filtex; 2 coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

One-tone Color Effects—*Close Grain Woods*—1 coat of oil stain; 1 coat of shellac; 2 coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Open Grain Woods—1 coat of paste filler of the required shade. If the desired depth of color can not be obtained with the colored paste filler, a coat of acid stain should be applied before the filler, followed when dry with a coat of paste filler of the same color. Over acid stain and paste filler, 1 coat of pure shellac and 2 coats of "38" Preservative Varnish, left in the gloss, rubbed dull or polished. Over paste filler only, 3 coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Two-tone Color Effects—1 coat of acid stain; 1 coat of shellac; 1 coat of paste filler of a different color than the acid stain; 1 coat of shellac; 2 coats of Palest Interior Varnish or "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Note:—Before applying the first coat, the wood should be sponged thoroughly with cold water; when completely dry, it should be sanded as smooth as posible. This is very important.

Two-tone effects can be procured only on open grain woods, such as oak, etc., and are produced by the combination of acid stains and a white or tinted paste filler of a different color. *Example:* For instance, the Pratt & Lambert Wood Finish Effect No. 7220 is a combination of a dark brown, English oak acid stain and special green paste filler. A thin coat of white shellac is applied over the acid stain, which is applied first. After this the green filler is applied. This coat of shellac allows the filler to "take" only in the porous part of the wood and the result is a beautiful combination of the brown and green.

Interior Work, Dull Finish, No Rubbing—Use the foregoing suggestions for specifications; substituting, however, 1 coat of Dulkote in every case where "38" Preservative Varnish or Palest Interior Varnish is specified, and omit rubbing.

Enamel Work—*Interior Work (Wood)*—1 coat of lead and oil; 2 coats of Vitralite Enamel Undercoating; 2 coats of Vitralite, left in the gloss or rubbed.

Eggshell or Dull Finish, Without rubbing (Wood)—1 coat of lead and oil; 2 coats of Vitralite Enamel Undercoating; 1 or 2 coats of Eggshell Vitralite Enamel.

If Vitralite tints are used, it will be advisable to tint the undercoating to the approximate shade of the tint selected.

Interior Work (Metal)—1 coat of lead and oil; 1 or 2 coats of Vitralite Enamel Undercoating; 1 or more coats of Vitralite.

Exterior Work (Wood, Metal)—2 coats of lead and oil; 1 coat of Vitralite.

Interior or Exterior Work (Cement, Brick, Concrete, etc.)—2 coats of Vitralite Cement Coating; 1 coat of Vitralite.

Interior Work (Plaster, Keene's Cement, etc.)—1 coat (bond coat) composed of 1 part Vitralite Enamel Undercoating, 1 part raw linseed oil and 1 part turpentine; 1 or 2 coats Vitralite Enamel Undercoating, and 1 or 2 coats Vitralite Enamel.

Floors—*Oak and All Open Grain Woods*—1 coat of paste filler, natural or of desired color, 2 or 3 coats of "61" Floor Varnish. For dull finish use one final coat of "61" Dull Finish in place of the last coat of "61" Clear Gloss.

Maple, Pine and All Close Grain Woods—If stain finish is desired, coat of oil stain of desired shade; for natural finish, omit stain, 2 or 3 coats of "61" Floor Varnish. For dull finish use one final coat of "61" Dull Finish in place of the last coat of "61" Clear Gloss.

Industrial Wall Work—Interior—*New Cement and Concrete Surfaces*—1 coat of Lyt-all Cement Coating; 1 coat of Lyt-all Gloss, Eggshell or Flat, as desired.

New Wood, Plaster and Brick Surfaces—I coat of Lyt-all Flat; 1 coat of Lyt-all Gloss, Eggshell or Flat, as desired.

Old White Painted Surfaces—1 coat of Lyt-all Gloss, Eggshell or Flat, as desired.

Old Discolored or Dark Painted Surfaces—1 coat of Lyt-all Flat; 1 coat of Lyt-all Gloss, Eggshell or Flat, as desired.

Note:—On very porous new surfaces it may sometimes be necessary to apply an additional coat of the same material as is specified for the first coat. Mixing Filtex with the first coat of Lyt-all Flat is recommended for porous wood or plaster surfaces.

RIPOLIN ENAMEL PRODUCTS

THE RIPOLIN COMPANY

HOLLAND FRANCE ENGLAND UNITED STATES CANADA

THE GLIDDEN COMPANY

NATIONAL HEADQUARTERS
CLEVELAND, OHIO

Associated with THE GLIDDEN COMPANY and its fourteen affiliated companies to whom manufacturing and distribution rights in North America have been granted

THE HEATH & MILLIGAN MFG. CO., Chicago, Ill.
ADAMS AND ELTING CO., Chicago, Ill.
CAMPBELL PAINT & VARNISH CO., St. Louis, Mo.
CAMPBELL PAINT & VARNISH CO., Dallas, Tex.
THE A. WILHELM CO., Reading, Pa.
T. L. BLOOD & CO., St. Paul, Minn.
AMERICAN PAINT WORKS, New Orleans, La.
TWIN CITY VARNISH CO., St. Paul, Minn.
THE FOREST CITY PAINT & VARNISH CO., Cleveland, Ohio
NUBIAN PAINT & VARNISH CO., Chicago, Ill.
THE GLIDDEN COMPANY OF MASSACHUSETTS, Boston, Mass.
THE GLIDDEN COMPANY OF TEXAS, Dallas, Tex.
THE GLIDDEN COMPANY OF CALIFORNIA, San Francisco, Cal.
THE GLIDDEN COMPANY, LIMITED, Toronto, Ont., Canada.

Product

RIPOLIN ENAMELS, including:

Gloss, Semi-gloss (Eggshell), Flat White and decorative tints; other tints are obtainable by addition of pure colors ground in Japan, or will be manufactured for quantity orders.

RIPOLIN

TRADE-MARK

Production

Ripolin is made in America by European experts and American workmen who have been taught the European methods. It is made under the direct supervision of "Ripolin, Limited."

Trade-marks

ANOTHER RIPOLIN MARK OF INTERNATIONAL FAME

Ripolin is known by the familiar "diamond" trademark shown here. This design appears on all Ripolin labels for identification purposes. Ripolin labels also carry the "three man" trademark, a mark of international reputation. All cans are sealed.

Specification Data and Distribution

Ripolin specifications for every conceivable purpose have been compiled in a convenient form for architects' handy reference. Copies will be gladly sent on request.

Following are specifications of most general use:

THE FAMOUS RIPOLIN BENDING TIN TEST

Description of Ripolin Enamel

Ripolin is the original Holland enamel, now made in Holland, France, United States and Canada. It was developed by a Dutch painter and chemist named Reip, more than 30 years ago, and since then has met with success in every civilized country.

It is made by a secret process.

It is for both exterior and interior uses and is little affected by salt water and atmospheric changes. It is easy-flowing, dries without brush marks and forms a tough, lasting film. Specifications for special conditions supplied upon request.

Specification No. 1

Specification for All Fine Grained Interior New Woodwork—(Including all fine grained woods, white pine, whitewood, bass wood, etc.)

Coat No. 1—A priming coat of Enamel Undercoating made specially for Ripolin work, thinned with ¼ gal. of raw linseed oil and $\frac{1}{16}$ gal. of pure turpentine to the gallon.

Coat No. 2—Full coat of Enamel Undercoating made specially for Ripolin work.

Coat No. 3—Full coat of Enamel Undercoating made specially for Ripolin work.

Coat No. 4—Enamel Undercoating made specially for Ripolin work re-enforced with ¼ gal. Gloss Ripolin added to the gallon to stop suction.

Coat No. 5—A good flowing coat of Ripolin. It is allowable to thin this coat with $\frac{1}{16}$ gal. of pure turpentine to the gallon.

Coat No. 6—A good flowing coat of Ripolin as it comes from the can. Do not thin finishing coat of Ripolin.

Notes: If expense is of prime importance, either coat No. 3 or Coat No. 5 (only one) may be omitted.

Care must be taken to sandpaper lightly each coat so that there will be absolutely no brush marks on the surface to which the Ripolin is to be applied. Ripolin in itself will show no brush marks, but will magnify brush marks left in the undercoats.

Scope of Use and Cost

For architectural, general, commercial, marine, railway and manufacturing purposes, where a permanent high grade, elastic enamel paint is required.

Ripolin is used largely throughout the United States in private residences, hospitals, hotels, etc.

Economical

Ripolin has much greater covering capacity than other enamels. Because of this fact and its wonderful opacity, and also owing to its easy and even flow under the brush, it is economical.

RIPOLIN CONTAINERS—EVERY PACKAGE SEALED

Continued on next page

Specification No. 2

Specification for Interior New Woodwork—(Cedar, cypress, hemlock, yellow and Georgia pine, and other heavy-grained, sappy woods; also birch and maple.)

Coat No. 1—A priming coat of Enamel Undercoating made specially for Ripolin work thinned with $\frac{3}{8}$ gal. raw linseed oil and $\frac{1}{8}$ gal. pure turpentine to the gallon.

Notes: After applying coat No. 1 all woodwork should be thoroughly rubbed down with fine sandpaper or steel wool. Give the whole surface a light coat of thin white shellac which has been strained through cheesecloth.

For coats Nos. 2, 3, 4, 5 and 6 proceed as in Specification No. 1.

Specification No. 3

Specification for New or Unpainted Plaster Walls—

Coat No. 1—A sizing coat made of 3 parts of alkali proof wall size and 1 part of Enamel Undercoating made specially for Ripolin work.

Coat No. 2—A full coat of 3 parts of Enamel Undercoating made specially for Ripolin work and 1 part of alkali proof wall size.

For coats Nos. 3, 4, 5 and 6 proceed as in Specification No. 1.

Specification No. 4

Specification for Imitation Tile on Keene's Cement, King's Windsor or Adamant Plaster—

Any of the above plasters are especially good for this purpose. The plaster should be troweled as smoothly as possible, and while wet scored to the depth of $\frac{1}{8}$ to $\frac{3}{16}$ in. as desired. The most popular and satisfactory size tile for this purpose has been the 6-in. square or the oblong tile, about the shape and size of building brick. These effects are sometimes attempted with plaster of paris, but we would advise against this as unsatisfactory, owing to the extreme brittleness of plaster of paris and its tendency to crack easily.

Notes: First wash the walls with weak vinegar or zinc sulphate to neutralize all free alkali present. Thoroughly dry before painting.

Coat No. 1—A coat of Enamel Undercoating made especially for Ripolin work, thinned with 1 qt. linseed oil and 1 pt. turpentine to the gallon.

Coat No. 2—One coat of Flat Ripolin to be applied as it comes from the can.

Coat No. 3—One coat of Gloss Ripolin which may be thinned with 1 qt. of turpentine to the gallon.

Coat No. 4—A good flowing coat of Gloss Ripolin as it comes from the can. The joints should be lined up with Flat Ripolin to give a cement effect.

The above method in bathrooms is more economical than tile and its resemblance to tile is most striking.

Specification No. 5

Specification for Concrete or Portland Cement—

Owing to the excess of free alkali and occasionally certain chemical conditions created by the process of manufacture of Portland Cement or concrete under various formulas, difficulty has been experienced in obtaining paints to adhere firmly to these surfaces.

The concrete or cement must be thoroughly dry. All new concrete should be washed with a 30% zinc sulphate solution.

Coat No. 1—Stucolor cement coating which may be thinned with about a quart of turpentine to the gallon.

Coat No. 2—The same approved cement coating.

Coat No. 3—A good full coat of Ripolin of the luster desired as taken from the can.

Notes: On a very rough laid cement an extra coat may be required to thoroughly cover the color of the surface, this being Enamel Undercoating made specially for Ripolin work. For much exposed surfaces it is well to add one more coat of Ripolin as it comes from the can. In case two coats of enamel seem necessary it is well to make the first coat Semi-gloss Ripolin, the finish coat to be of the luster desired.

Specification No. 6

Specification for Galvanized Iron Interior or Exterior—

Priming coats of lead should never be used on galvanized iron under Ripolin.

Wash surface with 10% solution of acetic acid; all trace of acid should be removed before painting.

Coat No. 1—Add 1 qt. of turpentine to a gallon of Gloss Ripolin. Apply a thin coat well brushed out. Allow this to dry at least 24 hours.

Coat No. 2—Semi-gloss Ripolin as it comes from the can.

Coat No. 3—A full coat of Ripolin of the luster desired as it comes out of the can.

For all exterior work the final coat should always be Gloss Ripolin as it is more weather resistant than the lesser degrees of gloss.

Specification No. 7

Specification for Exterior or Interior Iron Work—

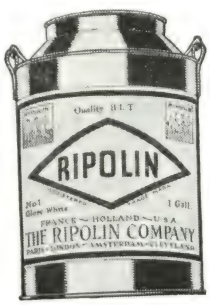
See that the surface of the iron is thoroughly clean and free from rust, grease and dirt.

Coat No. 1—Gloss Ripolin thinned with 3 pts. of turpentine to the gallon. This is used in this way to bond perfectly to the metal.

Coat No. 2—Semi-gloss Ripolin as it comes from the can.

Coat No. 3—Good full coat of Ripolin of the luster desired as taken from the can.

Dining Room Finished in Ripolin



Typical Ripolin Package

A Ripolin Finished Living Room

STANDARD VARNISH WORKS

443 Fourth Avenue

NEW YORK, N. Y.

CHICAGO, ILL., 2600 Federal Street
SAN FRANCISCO, CAL., 55 Stevenson Street
GRAND RAPIDS, MICH., 506 Oakland Avenue, S. W.

Products

ELASTICA VARNISHES; SATINETTE WHITE ENAMEL; KLEARTONE OIL STAIN; KLEARTONE ACID STAIN; KLEARTONE PASTE WOOD FILLER; STANVAR, a Wax-like Wood Finish; FLATTINE CABINET FINISH; KOVERFLOR, a Liquid Floor Covering for wood or cement floors.

Architectural Service Department

The purpose of this department is to give accurate information relating to the choice and use of finishing materials as applied not only to standard effects, but also to individual ideas. To this end, the preparation of finished samples has been made a feature of this department. We are always pleased to extend the benefit of our knowledge of the manufacture and use of wood finishes for we realize that architects are just as anxious to have their projects properly finished as we are to have our products properly used.

Specification Data

Complete specifications for varnishes, stains, fillers and enamel are given in our Architectural Reference Book, a readily accessible compilation of practical finishing information from which complete specifications can be written. It will be supplied promptly on request.

Standard Elastica Varnishes

This line of Elastica Varnish products represent a superior quality in varnishes, the very best it is possible to manufacture. There is a specific varnish for each specific requirement that will give the highest type of service and economy when used for the purpose for which it is intended.

Elastica Exterior Varnish

For all architectural outside work—front doors, sash, trim, etc.—where greatest durability and weather protection are necessary. It possesses maximum elasticity, dries dust free in 8 to 10 hours and sufficiently hard in about 5 days to admit of being rubbed.

EXTERIOR VARNISH
(Formerly called Elastica No. 1)

Elastica Interior Varnish

A varnish of extreme paleness and durability for interior woodwork. It produces a permanent gloss finish, dries free from dust in 4 to 6 hours and may be rubbed to a dull finish in from 3 to 4 days.

INTERIOR VARNISH
(Formerly called Elastica No. 2)

Elastica Floor Finish

This varnish is the one perfect floor varnish. It combines quick and hard drying properties, without sacrificing elasticity or durability in any degree; protects floors and linoleum under the most severe wear and frequent washing; does not mar, scratch white or spot; dries dust free in 4 to 6 hours and hardens overnight; may be rubbed in 48 hours.

FLOOR FINISH

Elastica Polishing Varnish

A high grade, hard drying rubbing and polishing varnish, that does not sweat or gloss up after rubbing; for all classes of interior trim work; dries free from dust quickly; can be rubbed within 3 days.

POLISHING VARNISH

Elastica White Polishing Varnish

An interior rubbing and polishing varnish of the highest quality; extremely light in color for use over light colored woods or tints.

WHITE POLISHING VARNISH

Elastica Seat Varnish

A very hard drying varnish for church and school seats, porch furniture, chairs, etc. Dries free from dust in from 2 to 3 hours, and hard overnight. May be rubbed in from 3 to 4 days.

SEAT VARNISH

Elastica Flat Varnish

For use where a rubbed effect is desired without the labor and cost of rubbing; over stained or natural woods, it produces an effect closely resembling a gloss varnish rubbed. Dries free from dust in from 3 to 4 hours and hard overnight.

FLAT VARNISH

Elastica Spar Varnish

This varnish is manufactured to meet the needs of those requiring an ultra-durable waterproof spar varnish for exterior or interior use of any kind. It is a protection for surfaces that come in direct contact with water or dampness, extreme exposure and excessive wear and tear, on which it gives a type of service heretofore unattainable with varnish. It possesses extraordinary resistance to hot, cold, fresh or salt water, and frequent washing with soap and water, and is serviceable on woodwork around sinks, in bathrooms, lavatories, laundries, etc., as it is on steamships, water-craft, etc. Dries free from dust in from 5 to 6 hours and hardens overnight with a brilliant gloss. It should not be applied over shellac, liquid fillers or patent first coaters.

SPAR VARNISH

Stanvar, the Wax-like Wood Finish

Superior to wax for wood finishing. It is applied with a rag; requires no polishing and is unaffected by water, while the surface after application is not slippery, but is a waxed effect.

Stanvar Undercoat—An undercoating for Stanvar on new work only. Applied with brush.

Continued on next page

Standard Flattine Cabinet Finish

TRADE MARK. FLATTINE

This product is intended for producing a dull, flat or mission effect. It is the one satisfactory pigment flat varnish. It dries hard overnight, contains no wax and surfaces well.

Satinette White Enamel

Satinette ENAMEL

An enamel of pure whiteness and ultra-durability that gives a perfect, smooth, washable finish to everything it covers; its economy in use makes it available for any grade of work.

Gloss White—Adaptable for interior or exterior work, produces a beautiful gloss finish—or may be rubbed with pumicestone and water to produce a semi-gloss finish.

Flat White—For interior work where a dead white enamel finish is desired.

White Rubbed Effect—For interior work where a rubbed finish is desired without the labor cost of rubbing.

Satinette Undercoat—For preparatory coats on woodwork to be finished with Satinette enamel.

Satinette Cement Undercoat—For preparatory coats on cement to be finished with Satinette enamel.

Standard Kleartone Oil Stain

STANDARD KLEARTONE TRADE MARK OIL STAIN

This stain is known as the *labor saving stain,* as it requires only one brushing operation and no wiping. It penetrates as deeply as acid stain, but unlike acid stain does not require that the wood be sponged first or sandpapered after staining. It does not show laps no matter how heavily applied and dries rapidly, lighter shades in about 12 hours, darker shades in about 24 hours. The shades are transparent and emphasize the natural beauty of the grain of the wood. They will not settle in the can, as Kleartone Oil Stain is a non-pigment stain. Always use Kleartone Sealers or Coaters in conjunction with Kleartone Oil Stain.

Standard Kleartone Acid Stain

STANDARD KLEARTONE TRADE MARK ACID STAIN

This stain is supplied to produce certain stained effects that are only obtainable with an acid stain. It is not injurious to the wood and the colors are absolutely fast. Always use Kleartone Sealers or Kleartone Coaters in conjunction with Kleartone Acid Stain.

Standard Kleartone Paste Wood Filler

STANDARD KLEARTONE TRADE MARK PASTE WOOD FILLER

For filling up open grained woods. It gives a satisfactory foundation over which to apply varnish, and is supplied in the following effects:

Antique; Antwerp; Forest Green; Fumed Oak; Golden Oak; Natural; Mahogany; White.

Koverflor

KOVERFLOR

Koverflor is a sound and economical development in floor treatment—a perfect floor covering scientifically prepared in solid covers for the preservation of interior and exterior floor surfaces of wood or cement. It combines attractive appearance, absolute protection and unusually long service at moderate expense.

Its characteristics of extraordinary merit are to be found in its super-resistance to water, weather, oil, grease, alkali, lime, dirt, and extreme hard wear.

For Wood and Cement Floors—There are no surfaces called upon to withstand such severe usage as wood and cement flooring, and if not thoroughly protected they become impaired, unsightly and costly to restore. If, on the other hand, wood and cement flooring, either inside or outside, are efficiently cared for with Koverflor, wear and tear are reduced to a minimum, repair expense eliminated, and the flooring material saved.

With particular reference to cement floor surfaces Koverflor makes them dustproof, washable, impervious to dampness, and sanitary; it also prevents the bad effects due to freezing. Being oilproof and waterproof, Koverflor is especially recommended for use on cement floors, which in use soon undergo a superficial disintegration, yielding a fine dust that is not only unsanitary and disagreeable, but very injurious to the delicate parts of electrical and other kinds of machinery—therefore it eliminates many expensive repairs.

Other Uses—Koverflor is just as serviceable on steamship and boat decks, and on railroad and street railway car floors, as it is on the cement floors of buildings.

Colors—All Koverflor colors, including the Ivory, White and Black, are alkaliproof and limeproof; therefore Koverflor prevents efflorescence on cement floors.

Covering Capacity—The covering capacity of Koverflor depends entirely upon the porosity of the surface and the thoroughness with which it is brushed into it; consequently only approximate averages can be quoted for estimating purposes, namely: on wood, 400 sq. ft. per gal.; on cement and concrete, 300 sq. ft. per gal.

Specifications—All wood or cement floor surfaces to be treated with Koverflor must be free from grease, dirt, absolutely dry, and all loose and disintegrating matter entirely removed.

Cement floors that have sodium silicate hardeners incorporated with the cement, or are strongly alkaline, should be scrubbed with hydrochloric acid, reduced to a 5% solution (five parts acid and ninety-five parts water). They should then be washed with clear, clean water to remove all trace of the acid and allowed to become thoroughly dry before applying the Koverflor.

Freshly made cement floors or those containing any substantial percentage of free lime should be treated with a neutralizing liquid made by dissolving 3 lbs. of zinc sulphate crystals in 1 gal. of water. This should be applied with a brush, and after allowing a period of approximately 24 hrs. for the thorough drying of cement, Koverflor may be applied.

Two coats of Koverflor should be applied. The first fills, seals and binds the pores of the surface, creating a proper foundation for the second coat. On some surfaces that are in a suitable condition to receive it, one application may be sufficient, which should be applied as directed below for second coat work. There are, however, surface conditions that must always receive two coats, i.e., new work, and old porous wood or cement floors.

First Coat—The Koverflor as received in the container must be thoroughly stirred to insure complete amalgamation of the content; it should then be thinned with turpentine, well stirred in, which should be added in the proportions of 1 to 2 qts. to each gal. of Koverflor, depending upon the porosity of the surface. It is important that the Koverflor employed for this coat thoroughly penetrates into the flooring material; when applying it brush the Koverflor well into the surface, and allow it ample time to become dry and hard before applying the second coat.

Second Coat—The Koverflor as received in the container should be thoroughly stirred to insure complete amalgamation of the content; it should then be thinned with turpentine, well stirred in, which should be added in the proportions of 1 pt. to each gal. of Koverflor. This coat should not be applied too heavy; therefore, it should be well brushed out.

VALENTINE & COMPANY

Architectural and Railway Varnishes, Stains, Enamels and Colors

TELEPHONE
MADISON SQUARE 8605

456 Fourth Avenue
NEW YORK, N. Y.

CHICAGO, ILL., Fisher Building
BOSTON, MASS., 49-51 Purchase Street
DISTRIBUTERS FOR PACIFIC COAST, W. P. FULLER & Co., SAN FRANCISCO, CAL.

Products

A complete line of ARCHITECTURAL FINISHES, including VALENTINE'S VALSPAR VARNISH, VALSPAR ENAMELS, VALSPAR VARNISH-STAINS, VAL-ENAMEL, VAL-ENAMEL UNDERCOATING, VAL-PRIMERS and VAL-FILLER.

Also manufacturers of Valsement, a paint for concrete floors; Colors in Oil, and Valentine's Superfine Japan Colors.

VALENTINE'S VALSPAR
The Varnish That Won't Turn White
TRADE-MARK

Valspar

The absolutely waterproof varnish. There are many varnishes which will stand a slight incidental wetting without turning white; but Valspar is the only varnish on which water, hot or cold, soapy or clear, has absolutely no chemical or physical effect.

Valspar is an original invention, entirely different from any other varnish and not successfully duplicated by any other manufacturer.

The unique waterproofness of Valspar has not been attained at the cost of any other varnish virtue. On the contrary, Valspar being a long oil varnish is more durable, tough and elastic than any interior varnish heretofore made. It is, in fact, the only long oil varnish which is quick drying enough to be used indoors. Valspar dries dust free in 2 hours and hard in 24 hours, regardless of the weather.

Valspar is ideally pale, easy flowing and of good body.

Valspar is the only varnish fit for kitchens, bathrooms, laundries and pantries, being the only one which will not be ruined under the soapy water exposure. Its waterproofness is also of importance for floors and wainscoting generally; wet feet in the hallway or vestibule, rain or snow from an open window, boiling water from a leaky radiator will do it no harm. *Its astonishing durability* compels its use in many places where the use of other varnishes is entirely impracticable.

The Valspar finish can be kept in condition by simply washing, and without resort to special oil polishes.

Valspar covers about 450 ft. to a gal. 1 flowing coat.

Exacting Examples of the Use of Valspar

For Office Buildings—The J. P. Morgan Building, New York, and the Curtis Publishing Company Building, Philadelphia, two of the most prominent office buildings, have used Valspar extensively.

On Store Fronts—The Woolworth and S. H. Kresge stores use it exclusively on their fronts and signs; so do many of the United Cigar stores.

In Department Stores—Macy's and Lord & Taylor's in New York are typical examples of great stores which use Valspar for their floors, trim, showcases, etc.

On Steel Cars and Locomotives—Over 300 railroads use Valspar on their equipment, inside and outside.

Specifications Varnish Should Meet for Floor Work

(1) Must be sufficiently pale in color not to discolor maple flooring. (2) Must work freely and flow out smooth. (3) Must dry free from dust in from 2 to 3 hours. (4) Must dry hard enough in 24 hours to receive the next coat. (5) Must dry hard enough in 24 hours to put in use. (6) Must be waterproof—not injured by frequent washing or by hot water from a leaky radiator. (7) Must have sufficient toughness not to scratch white or chip, even after being on the floor for 1 year. (8) Must dry hard enough to be rubbed down for a flat finish in 48 hours, and when rubbed must not sweat out. (9) Must dry out clear and bright after 20 minutes' immersion in boiling water or 10 minutes' immersion in standard soap solution (½ oz. Ivory soap dissolved in 1 gal. warm water).

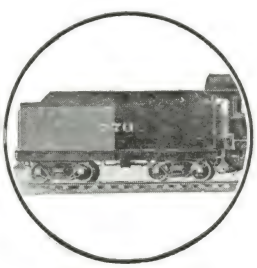
Specifications Varnish Should Meet for Exterior Work

(1) Must be sufficiently pale not to discolor light woods or colors. (2) Must dry free from dust in 2 to 4 hours. (3) Must dry hard enough in 24 hours to receive next coat. (4) Must be waterproof—not injured by dew or rain, no matter how long continued. Panel coated with the varnish must stand immersion in water for 1 week without turning white (test to be made over black surface). (5) Must dry hard enough in 48 hours to be rubbed down to a flat finish, and when rubbed must not sweat out. (6) When dry must be free from tackiness. (7) Must have sufficient elasticity and durability to stand at least 1 year's exposure.

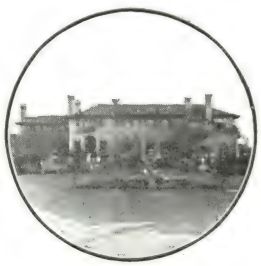
Specifications Varnish Should Meet for Interior Woodwork

(1) Must be sufficiently pale not to discolor light woods. (2) Must work freely and flow out smooth. (3) Must dry

R. H. Macy & Co., New York, N. Y.



Railroads, Cars and Tenders



Country House of H. H. Rogers, Southampton, L. I.

Astor Apartments, New York, N. Y.

King Edward Hotel 1000 rooms with bath

NOTABLE INSTANCES IN WHICH VALSPAR HAS BEEN SUCCESSFULLY USED

Continued on next page

free from dust in 2 to 3 hours. (4) Must dry hard enough in 24 hours to receive next coat. (5) Must be hard and free from tackiness, when dry. (6) Must be waterproof—must not be injured by frequent washing and must not turn white when wet. Panel coated with the varnish must stand 1 week's immersion without turning white (test to be made over black surface). (7) Must dry hard enough in 48 hours to be rubbed down to a flat finish, and when rubbed must not sweat out. (8) Must dry hard enough to be polished in from 4 to 6 days. (9) Must have sufficient toughness not to scratch white or show white when marred. (10) Must have elasticity and durability enough not to crack under changes in temperature.

Working Specifications for Valspar for Interior and Exterior Work, Floors, etc.

Caution: Shellac or other so-called first coaters should never be used as a primer or filler for surfaces exposed to the weather, or on floors. Ordinary shellac contains a large percentage of water which penetrates the wood and is liable to be brought out by a hot sun in the form of steam that will raise the best varnish into unsightly blisters.

Before varnishing, see that surface is perfectly clean and dry and free from oil, grease, or grit.

Natural Finish—(1) *Open Grain Woods: Oak, Ash, Walnut, Mahogany*—Sandpaper smooth; putty-stop all nailholes in best manner, using putty colored to match wood. Fill thoroughly with Valentine's Val-Filler, Wood; allow filler to set for a few minutes, then rub off clean, rubbing across grain. Allow 24 hours to harden, then sandpaper lightly with No. 00 sandpaper.

(1A) *Close Grain Woods: Cherry, Birch, White Wood, Maple, Pine, Cypress*—Sandpaper smooth; putty-stop all nailholes in best manner, using putty colored to match wood. Use no primer, filler or shellac.

(2) Then apply 3 coats of Valentine's Valspar Varnish, giving full, flowing coats. Allow at least 24 hours between coats. Rub first and second coats with curled hair or moss. Then apply the final coat of Valspar. This will give a bright gloss finish. (3) If an eggshell gloss or dull finish is desired, 48 hours after the final coat is applied, rub with powdered pumice and water. (4) For a polished finish after 6 days polish final coat with rottenstone and oil.

Stain and Varnish Finish—If staining is to be done, apply stain to bare wood before filler; in case of open grained woods, color the filler to match with stain.

If water stain is used, allow 24 hours for water to dry out of wood. If oil stain is used, see that it is thoroughly dry and hard before varnishing.

Old Work—*On Old Varnished Woodwork*—If surface is in good condition sandpaper down and apply Valspar direct; if in poor condition, scrape or burn it off, apply a light coat of Valentine's Val-Primer, Wood, and proceed with Valspar. For best results all previous coats should be removed.

On Metal Work—The process is same as for wood, except substitute Valentine's Val-Primer, Metal, for Wood Filler or Primer.

Valspar Enamels

These enamels being composed of pigments finely ground in Valspar possess all the desirable qualities of Valspar itself for interior and exterior work of all kinds.

Neither hot nor cold water, soap, liquids of any sort, nor even live steam, can dim the luster or impair the durability of Valspar Enameled surface.

VALENTINE'S
VALSPAR
ENAMEL
TRADE-MARK

They should be used just as they come from the can. They set free from dust in 3 to 5 hours and air-dry hard over night. The best results are obtained by applying the enamel over a surface produced with Celox Primers and Surfacers.

Val-Enamel

Val-Enamel is perfectly sanitary; it presents a non-porous surface that may be washed with hot or cold water. It will wear to better advantage than any other enamel, and stays white. Covering capacity, 700 sq. ft. per gal.

VALENTINE'S
Val-Enamel
TRADE-MARK

Enamel Specifications, Interior and Exterior Work

(1) **Open Grain Woods: Oak, Ash, Walnut, Mahogany**—Sandpaper smooth; putty-stop all nailholes in best manner. See that surface is perfectly clean and free from oil, grease, or moisture. Appy 1 coat of Valentine's Val-Enamel Primer-Filler, allowing at least 24 hours to dry.

(1A) **Close Grain Woods: Cherry, Birch, White Wood, Maple, Pine, Cypress**—Omit Primer-Filler, as called for above. (2) If necessary, sandpaper with No. 00 sandpaper. (3) Apply 3 coats of Valentine's Val-Enamel Undercoating, allowing at least 24 hours between coats. (4) Apply 2 coats of Valentine's Val-Enamel, allowing 3 days between coats. (5) For a rubbed finish, allow at least 1 week for drying, then rub with pumice and water.

Note—If a rubbed effect is desired, specify Val-Enamel Eggshell Gloss. If a flat effect is desired, specify Val-Enamel Mat.

Valspar Varnish-Stains

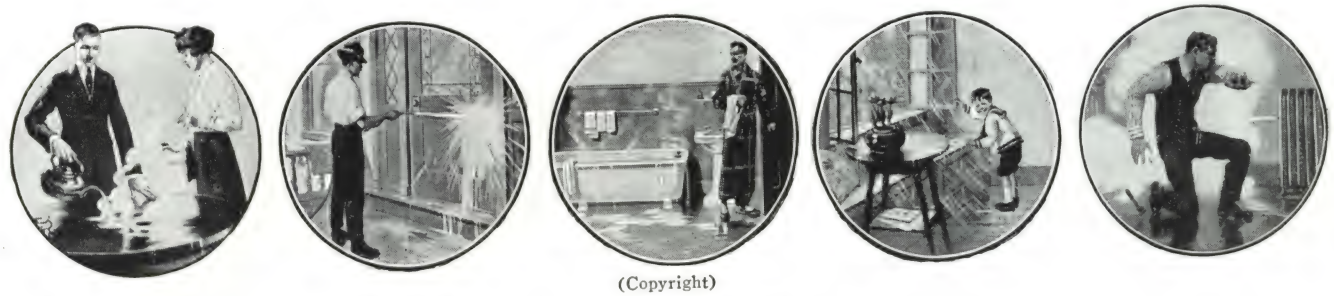
Experts worked for nearly four years in the Valentine laboratories to find a means whereby all the advantages of Valspar could be combined with color to produce varnish stains of the highest grade obtainable. The formula has finally been perfected and Valspar Varnish-Stains have recently been put on the market.

Valspar Varnish-Stains are made in six natural wood colors which never settle or become uneven. Absolutely waterproof and extremely durable, these stains are as unaffected by the famous Valspar tests as Valspar Varnish itself.

VALENTINE'S
VALSPAR
VARNISH-STAIN
TRADE-MARK

Samples

Samples and literature of Valentine's products will be sent to any architect for tests on request.



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TESTS THAT VALSPAR SUCCESSFULLY MEETS

ESTABLISHED 1874 INCORPORATED 1889

THOMSON WOOD FINISHING COMPANY

Enamels, Varnishes and Paints

829-835 North Third Street

PHILADELPHIA, PA

AGENCIES IN PRINCIPAL CITIES

Products

Inventors and manufacturers of TECHNICAL ENAMELS; PORCELITE ENAMEL and UNDERCOATS; SANATONE FLAT WALL FINISH; ZANZIBOLO VARNISHES; MILL WHITES.

Also manufacturers of Wood Fillers and Cement Coatings.

Technical Enamels

During 40 years of experimentation and specialization we have manufactured enamels—especially white—for every purpose. This includes baking, air drying, dipping, spraying, and brushing enamels for use on various metals, wood, leather, concrete, etc.

If you desire any information, address Department T. E.

Porcelite Enamel

Porcelite Enamel was the first high grade enamel made in this country. Since 1883 it has been admittedly the standard for enamel finishing. Porcelite dries by oxidation to a degree of hardness never attained by damar, long oil or imported enamels. A durable porcelainlike surface is obtained by the use of Porcelite, which can be rubbed to a dull finish or polished to a mirrorlike surface. It is impervious to steam, soap, acids and antiseptic solutions. Porcelite does not yellow with age, but retains its unexcelled whiteness indefinitely. It will not crack, chip nor craze.

Capacity—Porcelite covers from 500 to 600 sq. ft. to the gallon.

Advantages and Uses of Porcelite Enamel—Porcelite is sanitary, beautiful, durable. It can be used to advantage on dwellings and public institutions. Because it does not turn yellow, and withstands the most severe conditions, it has been used on such homes as Carnegie's and Gould's; on the New York Central Railroad, the Carnegie Steel Works, the United States Capitol, the Biltmore Hotel, the Vancouver Hospital, and innumerable other buildings.

Kinds of Porcelite—As no one enamel can meet all requirements, we manufacture various kinds of Porcelite:

PURPOSE	NAME OF MATERIAL
Interior gloss (rubbing—cold white)	Porcelite White
Interior gloss (rubbing—Colonial white)	Porcelite Special White
Interior Imitation (rubbed effect)	Porcelite Matte
Exterior use	Porcelite Exterior

Specifications for Porcelite—*Woodwork*—Cover knot holes with pure white shellac. Fill all holes, etc., with white lead putty. Apply 3 coats of Percelite Undercoat (sandpapering lightly), then 2 coats of Porcelite.

Rubbed Work—Last coat to be rubbed with pumicestone and water.

Polished Work—Last coat to be rubbed with rottenstone and water.

Plaster, Brick or Concrete—Dust down thoroughly, apply 2 or 3 coats of Porcelite Undercoat and 2 coats of Porcelite, following same directions as for wood.

Metal—2 Coats of Porcelite Undercoat and 2 coats of Porcelite, same specifications as for woodwork. Remove all grease before finishing.

Porcelite Matte—The same specifications, except specify "Porcelite Matte."

Zanzibolio Varnishes

Zanzibolio Varnishes are all made from the best possible ingredients and are used where the finest possible results are desired. Specify whether you want Zanzibolio Exterior Varnish, Zanzibolio Interior Varnish or Zanzibolio Floor Varnish.

Sanatone Mill Whites

Sanatone Mill Whites are made both in flat and in gloss. They are particularly well known for their great covering body and the permanency of their whiteness. They are for use on concrete, brick, plaster, woodwork or metal. We suggest a total of three coats but in many cases two coats are ample. Materials must not be thinned.

Sanatone

Sanatone is a washable, flat wall finish. It dries with a soft velvety luster. Can be used on any surface. When dry is thoroughly hard. More sanitary than wall paper, or calcimine. Made in 20 tints.

Sanatone for Schoolroom Walls—We have made a particular study of color combinations best fitted for the schoolroom from the standpoint of light reflection and color psychology.

Capacity—Sanatone covers approximately 500 sq. ft. to the gallon.

Literature and Samples

Handsome booklets, specifications, or samples of Porcelite, Zanzibolio Varnishes, and Sanatone will be forwarded on request to any architect or owner.

References

The character of our products may be judged by the reputation they have maintained for so many years and by the type of buildings on which they have been successfully used throughout the United States by leading architects and engineers.

THE MARIETTA PAINT & COLOR CO.

GENERAL OFFICE AND FACTORY
MARIETTA, OHIO

CABLE ADDRESS
MAPACO

BRANCH OFFICES
COLUMBUS, OHIO, 60-64 East Chestnut Street
HAVANA, CUBA, 116 Neptuno
SOUTHERN OFFICE AND FACTORY, HIGH POINT, N. C.

Products

MARIETTA SPARTAN ART WOOD STAINS; MACO NEW PRINCIPLE, NON-FADING STAINS; MARIETTA OIL AND WATER STAINS; SPARTANITE ENAMEL; "UNIFORMING" STAINS; SPARTAN ART WALL FINISH, a Flat Oil Paint with a satin sheen; AURORA MIXED PAINT; PASTE WOOD FILLERS; KOPALAC, a Spirit Varnish; MACO DYESTUFFS, for wood.

Also manufacturers of Marietta Interior Floor Paint; Marietta Porch and Deck Paint; "Albatone" Mill White; Marietta Endurance Enamels; Marietta Varnishes; and various Metal Finishing Specialties.

MARIETTA WOOD AND METAL FINISH SPECIALISTS

TRADE-MARK

Specialization

A quarter of a century ago, before becoming manufacturers, THE MARIETTA PAINT & COLOR CO. were large users of wood finishes. From a business of practical wood finishing, they developed into the manufacture of finishes required and used by others. An important asset from the very outset was the *real knowledge* of the finishes needed by the trade, acquired during long practical wood finishing experience. They have been constantly engaged in working out new problems of finishing, resulting in the creation of *new* products to meet the demands of an ever-widening field.

This policy has resulted in many valuable contributions to the art of wood and metal finishing.

Spartan Art Wood Stains

This trade-name applies to a full line of stains designed to produce a high class finish at a marked saving of labor. The stains penetrate without raising the grain of the wood and, therefore, require no sanding; they do not blister veneers nor bring out wind checks. Because of these facts, in addition to the saving of labor in sanding, they produce a first class finish with fewer coats. They are very fast to light.

Oil and water stains of every grade also made.

Maco Non-fading Stain

This is made in various shades of mahogany and walnut. It is made on a new principle by which it is given the non-fading quality of a water stain, the non-grain-raising quality of an oil stain and can be filled directly over, without wash-coating with shellac, like a spirit stain.

"Uniforming" Stains

These oil stains are made in mahogany and walnut and possess the unusual quality of giving a correct walnut or mahogany color on any of the cheaper woods, such as gum, birch, pine, etc. Where two or more woods are combined the result is one uniform, non-fading finish.

In these days of high cost and diminishing supply of the rarer woods, the advantage of these "uniforming" stains is obvious.

Spartanite Enamel

The highest grade Marietta enamel; made from French process zinc, ground impalpably fine with a strictly long oil white varnish, the yellowing tendencies of the oils having been overcome. On the market for years, its quality has stood every test.

It is sold in both gloss and eggshell finishes, in white, old ivory and assorted colors.

Spartan Art Wall Finish

A sanitary, washable, flat oil paint, of artistic beauty, with superior working and wearing qualities. It is the culmination of the best efforts of the company to produce the highest grade wall finish so far offered, regardless of price. Made in sixteen beautiful tints.

Aurora Mixed Paint

A high grade lead and linseed oil mixed paint, reinforced with proper inert pigments to give it good covering and long wearing qualities. It has been on the market for over twenty years.

Paste Wood Fillers

Marietta fillers are made from the finest silex, ground in pure linseed oil and linseed oil japan; they fill perfectly and wipe off flush with the surface of the wood; they dry overnight and form a hard, firm and permanent foundation for subsequent coats of finish.

Marietta fillers are made in all the standard shades, including mahogany; are thoroughly practical and can be recommended unreservedly for the highest grade work.

Kopalac

A spirit varnish, used extensively as a substitute for shellac. Used just like shellac, but is much less expensive.

Maco Dyestuffs for Wood

This is a characteristic Marietta line of dyestuffs, being made with especial reference to their adaptability for dyeing wood.

Co-operative Service

In solving wood finishing problems for the architectural profession, THE MARIETTA PAINT & COLOR CO. are better equipped to-day than ever before; their strong position as manufacturers of finishes for the furniture, piano and talking machine trades should appeal to every architect, because there is no more exacting field, and it makes it an easy matter for the company to match every standard furniture finish.

Specifications, Literature, etc.

Full information for specifications and directions for getting the best results from Marietta products will be furnished cheerfully to architects, contractors and interior finishers.

SAMUEL CABOT, INC.

Manufacturing Chemists

141 Milk Street
BOSTON, MASS.

NEW YORK, N. Y., 342 Madison Avenue

CHICAGO, ILL., 24 W. Kinzie Street

PRINCIPAL AGENCIES

ATLANTA, GA., Sciple Sons
BALTIMORE, MD., National Building Supply Co.
BIRMINGHAM, ALA., Moore-Handley Hardware Co.
BUFFALO, N. Y. (Quilt), M. A. Reeb Corporation; (Stains) Schuele & Co.
CINCINNATI, OHIO (Quilt), Moores-Coney Co.; (Stains) Saeger-Winstel Co.
CLEVELAND, OHIO, Cleveland Builders' Supply Co. and Cleveland Window Glass & Door Co.
COLUMBUS, OHIO, Marietta Paint & Color Co.
DALLAS, TEX., Lingo Lumber Co.
DAYTON, OHIO, Delscamp Paint & Glass Co.
DENVER, COLO., Colorado Builders' Supply Co.
DETROIT, MICH., United Fuel & Supply Co. and Rinshed-Gagnier Co.
DULUTH, MINN., Thomson-Williams Co.
GRAND RAPIDS, MICH., W. P. Williams Company
HOUSTON, TEX., W. L. Macatee & Sons
JACKSONVILLE, FLA., Gill & Mulholland
KANSAS CITY, MO., Robert O. Smith, Railway Exchange Building
KNOXVILLE, TENN., W. W. Woodruff Hardware Co.
LOUISVILLE, KY., National Roofing & Supply Co.
LOS ANGELES, CAL., Waterhouse-Wilcox-Pacific Co.
MEMPHIS, TENN., Fischer Lime & Cement Co.
MINNEAPOLIS, MINN., Merrill & Jackson
NEW ORLEANS, LA., Jahncke Service, Inc.
OMAHA, NEBR., Pioneer Glass & Paint Co.
PHILADELPHIA, PA., Samuel H. French & Co.
PITTSBURGH, PA., Houston Brothers Co.
PORTLAND, ORE, Cress & Co.
ROCHESTER, N. Y., W. Stuart Smith Co.
ST. LOUIS, MO., Hunkins-Willis Lime & Cement Co. and Scott-Sullivan Paint Co.
SAN FRANCISCO, CAL., Pacific Materials Co.
SEATTLE, WASH., S. W. R. Dally
SIOUX CITY, IOWA, Hansen Glass and Paint Co.
SPOKANE, WASH., H. G. Lanahan & Co.
SYRACUSE, N. Y., Alex. Grant's Sons
TAMPA, FLA., Knight & Wall Co.
TOLEDO, OHIO, Toledo Builders' Supply Co.
WASHINGTON, D. C., Lally & Rohlader

Products

Cabot's "Creosote" Shingle Stains; Old Virginia White; Old Virginia Tints; Double White; Waterproof Stucco Stains; Waterproof Brick Stains; Clear Brick and Clear Cement Waterproofing; "Conservo" Wood Preservative; Dampproofing; Protective Paints; Mortar Colors; Insulating and Deafening "Quilt."

Cabot's "Creosote" Shingle Stains

Cabot's "Creosote" Shingle Stains are the original shingle stains invented by Samuel Cabot nearly 40 years ago.

Uses—For coloring and preserving shingles, rough or dressed siding boards, half-timbering, cornice and trimmings of cement houses, etc.

Coloring Effects—Stains are made of the finest and strongest pigments, ground impalpably fine in pure linseed oil and suspended in a vehicle of specially refined creosote. The coloring effects are therefore soft and rich, and also transparent, so that the wood is beautifully colored without covering the grain.

The colors are guaranteed fast.

Wood Preservation—The creosote penetrates the wood and thoroughly preserves it against decay or insects.

"Creosote is the best wood preservative known."—Trautwein.

"Wood treated with it is not subject to dry rot or other decay."—Century Dictionary.

Imitations—Can be recognized by coarse pigments; tawdry, opaque colors; and the smell of kerosene, benzine, or similar cheapener.

Cabot's stains contain no petroleum distillate or other adulterant.

Application—Shingles may be dipped before laying; or dipped, and brushed once after laying (the most thorough method), or merely brush-coated twice after laying. The coloring effect is the same, but dipping preserves the shingles better. Other woodwork is stained with the brush.

Always use 2 coats, and 3 coats are advisable on smooth wood.

Covering Capacity—One gallon covers 100 sq. ft., 2 coats, on rough wood, or 200 to 250 sq. ft. on smooth wood; 2½ to 2¾ gals. will dip 1000 shingles two-thirds their length; 3 gals. will dip and brush-coat.

Residence of Ralph Peters, President L. I. R. R. Co.
Aymar Embury, II, Architect, New York, N. Y.

Shingles stained with Cabot's "Creosote" Stains; cement stucco stained with Cabot's Waterproof Cement Stains; walls lined with Cabot's Quilt for warmth

Samples—Samples of stained wood, showing the colors on cedar, will be furnished on request.

Special Colors—Special colors and shades will be made for architects who wish to produce special effects and will send samples to match or suggestions to follow.

Specification—Specify: "Cabot's 'Creosote' Shingle Stains, in original packages bearing Cabot's trademark. Color to be selected by architect or owner."

State whether work is to be dipped or brush-coated, or both, and that stains must be thoroughly stirred and be applied without dilution or adulteration to dry wood only. This will insure uniform color and durability.

Continued on next page

Cabot's Old Virginia White

Gives a clean, brilliant "whitewash effect," combining the soft, cool whiteness of whitewash with the wearing qualities of paint; but it is not opaque and heavy like paint. It is more transparent, covering the surface as a good coat of whitewash covers it, and not with the hard, veneering surface that paint forms. It

SHINGLED WALLS AND BRICK CHIMNEYS FINISHED WITH CABOT'S OLD VIRGINIA WHITE
JOHN RUSSELL POPE, Architect, New York, N. Y.

faithfully reproduces the peculiarly desirable qualities of whitewash; but is finer in tone and texture, simple and easy to apply, clean and lasting.

Many attempts have been made to obtain this result with paint, but without success, because the hard, cold "paintiness" of paint is so essentially different from the soft brilliancy of whitewash.

Cabot's Double White

For dressed lumber and finish where heavier coating is required. As brilliant as Old Virginia White, and of similar texture, but remarkably opaque. It has *nearly twice the hiding power of lead and oil paint.*

Cabot's Old Virginia Tints

The beauty of texture of the Old Virginia White has produced a large demand for delicate colors with the same texture. These are made by softly tinting the White. The color effects are almost pastellike in quality and most artistic.

Adaptability—Old Virginia White and Tints are used for shingles, siding, boards, and timbers, and for brick, stone and cement work. The White has been especially successful on brickwork, giving striking and picturesque effects that can be obtained in no other way. Old Virginia tints were used for the unique coloring of the court at Turtle Bay Gardens, New York.

Application—Apply with a brush or by dipping. If dipped, shingles should be brushed off when dipped and 1 or 2 brush coats applied after laying; or dip in White Shingle Stain No. 1166 and apply 2 brush coats of Old Virginia White.

Covering Capacity—One gallon covers 125 to 150 sq. ft., 2 coats, on shingles and other undressed wood and on brick or cement work, and it goes about twice as far on smooth wood.

Cabot's Waterproof Stucco and Brick Stains

Adaptability—These stains enter and seal the pores of brick, or concrete, making them rainproof and producing beautiful coloring effects without weakening the cement.

For evening up off-colored and mismatched brick, or restoring the color of old, faded and discolored walls, they are unequalled.

They sink into the surface, and form no skin, so that they can not chalk or peel like paints and other coatings. Being transparent, they show the variations

STAINED WITH CABOT'S STUCCO STAINS
BIGELOW & WADSWORTH, Architects, Boston, Mass.

of texture, tone and density of the concrete almost as perfectly as in its uncolored state.

Made in all colors.

Covering Capacity—One gallon covers from 100 to 250 sq. ft., 2 coats, depending upon the surface.

Cabot's Clear Brick Waterproofing and Cabot's Clear Cement Waterproofing

Transparent liquid waterproofings applied to the surface with a brush. They penetrate, and seal the pores, making the surface completely and permanently rainproof.

Covering Capacity—One gallon will cover from 200 to 300 sq. ft., 2 coats, on common brick or smooth concrete.

PIERS, HOBOKEN, N. J.
Waterproofed with Cabot's Clear Brick Waterproofing

Cabot's Dampproofing

For direct plastering on brick and concrete walls and stonebacking on marble and other delicate stones. A permanently waterproof and adhesive coating that forms a perfect bond between the plaster and the wall, making furring and lathing unnecessary. It penetrates both plaster and wall, knitting them firmly and permanently together.

Covering Capacity—One gallon covers 80 to 100 sq. ft., 2 coats. The first coat should stand 24 hours before the second is applied, and the second should stand 24 hours before the plaster is applied. This insures perfect adhesion and a complete bonding.

Cabot's Flexiblac Protective Paint

A chemically pure pitch paint, thoroughly clarified and refined, which forms an elastic non-oxidizable bituminous coating that permanently protects iron and steel from rust, electrolysis and corrosion. Linseed oil paints will not last on metal construction, because oxidation and electrolytic action destroy them. Cabot's Flexiblac will not oxidize, is not affected by acids or electrolysis, will not crack nor peel. It is permanent and a perfect protection, and costs only half as much as linseed oil paint.

Covering Capacity—One gallon covers 300 to 400 sq. ft., 2 coats.

Continued on next page

Cabot's "Conservo" Wood Preservative

For preserving all kinds of woodwork from decay, worms, and insects.

At a cost of 2c or 3c per stick, "Conservo" will almost double the life of piles, posts, sills; bridge, mine, wharf and dam timbers, and all kinds of planking.

It is as perfect a preservative as can be made with the present scientific knowledge of the subject. It gives a butternut brown tone.

Apply with a brush, as heavily as possible, or dip the lumber before using.

Covering Capacity—One gallon covers about 200 sq. ft. of dressed lumber with 2 coats.

Cabot's Mortar Colors

For 30 years the strongest and most durable colors for mortar.

Made in pulp form to insure uniform mixing and to save labor.

Cabot's "Quilt"

Purposes—For lining houses, stables, factories, etc., to make them warm in winter and cool in summer; for insulating cold storage and ice houses, breweries, refrigerators, etc., and for deadening sound in floors and partitions of schools, apartments, hospitals, lodges, etc.

Description—"Quilt" is a matting of cured eel grass stitched between 2 layers of very strong, tough paper.

It is so strong that a web of the "Quilt" will sustain a weight of almost 900 lbs.

The ribbons of eel grass cross each other at every angle and form innumerable small cells of "dead" air, so that the "Quilt" is a cushion of these air spaces.

It is therefore not a mere felt or paper, but a scientifically built structure similar to the plumage of a bird and gives the most perfect conditions for isolating heat and deadening sound.

The "dead" air can not circulate, so that heat conduction is prevented; and the sound waves are broken up and absorbed.

"Quilt" is made in a continuous web 3 ft. wide, which can be divided into narrower strips if desired and is shipped in rolls containing 250 sq. ft. each.

Rolls of "Quilt"

Grades—"Quilt" is regularly made in 5 grades, as follows:

Grade	Thickness, in.	Weight (Per roll of 250 sq. ft.), lbs.
Single-ply	⅛	40
Double-ply	¼	65
Triple-ply	¾	90
Asbestos (fireproof)	½	90
Waterproof	½	70

Efficiency—Actual scientific tests show that 1 layer of single-ply "Quilt" is equal to 28 layers of common, cheap building paper.

The double-ply is better than 40 layers. It is warmer and more permanent and much cheaper than back plastering.

As a sound deadener, the most exhaustive tests ever made (by Professor Norton for the New England Conservatory of Music) proved it to be far superior to all other methods, and also much cheaper, lighter, and more adaptable.

Why Eel Grass?—"Quilt" is made of eel grass because of the really wonderful qualities of this salt water plant, which no other fiber possesses, to wit:

It has a long, flat fiber, which, when matted in "Quilt," makes the "dead" air spaces (a round fiber like straw would make air circulation easy).

It is indestructible by decay.*

Old Pierce House, Dorchester, Mass.
Built about 1635

It repels moths and other insects and vermin.

It is almost non-inflammable, because it contains silicon in place of the carbon that is present in plants that grow in the air, and it is therefore an effective fire retardant.

It is very tough, and never loses its elasticity.

Application—"Quilt" can be applied in any way that any common felt or paper can be, and with vastly better results.

The drawings shown on the following page are merely suggestions of a few methods of heat insulation in dwellings, etc., and of sound deadening in floors and partitions.

Adaptability—Single-ply is sufficient for lining houses and for all other ordinary heat insulation.

Double-ply is for sound deadening, cold storage and similar insulation where the conditions are more severe.

Triple-ply is for cold storage and other work where unusual conditions prevail.

Asbestos "Quilt" is for work where fireproofing as well as insulation and deadening are required. It is the only deadener that is fireproof, and the only fireproofing that is an efficient deadener.

Waterproof "Quilt" is double-ply with waterproof paper.

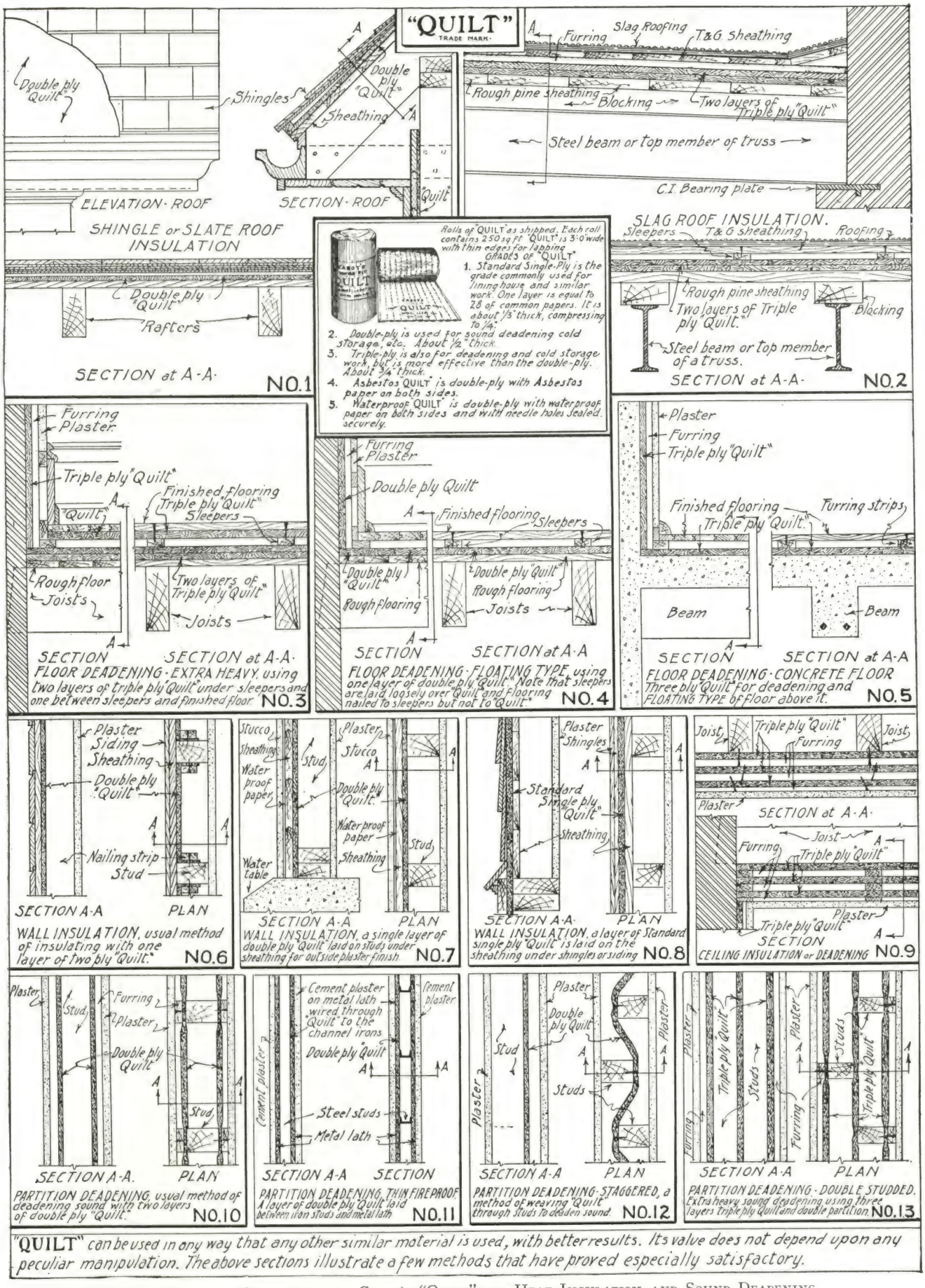
Specification—Specify Cabot's "Quilt," and state what grade shall be used.

Samples

Samples of all materials, with full information, promptly furnished on request.

* The walls of the old Pierce House, Dorchester, Mass., were stuffed with eel grass when the house was built, about 1635, and the grass is still in a perfect state of preservation. We have a sample of this 275-year-old eel grass in our office.

Continued on next page



Details Showing Application of Cabot's "Quilt" for Heat Insulation and Sound Deadening

CAPITAL AND SURPLUS OVER $300,000 RESOURCES OVER $500,000

THE CONRAD WOOD PRESERVING CO.

Manufacturers of Wood Preservers and Creosote Shingle Stains

112-121 Plymouth Avenue

MINNEAPOLIS, MINN.

DISTRIBUTING AGENCIES IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Products

CREOSEPTINE, a Wood Preserver.
CONRAD'S CREOSOTE SHINGLE STAINS.

Creoseptine

Creoseptine has been the standard wood preservative of America for more than 20 years.

On smooth lumber, 1 gal. will cover 200 to 300 sq. ft.; on rough lumber, from 120 to 150 sq. ft.

This preserver complies with all standard specifications of architects and engineers for open tank treatment or brush coating of structural timber and also all kinds of woodwork.

Conrad's Creosote Shingle Stains

Made of refined heavy creosote oil and chemically pure colors; do not fade or wash off. Shingles or siding treated with these stains will never warp, split or weather check. They penetrate shingles, follow the pores and grains in the wood up under the laps and absolutely prevent rot and decay.

Our bungalow brown and red stains are made of 100% pure heavy creosote oil (double refined), resulting in a product of heavy consistency and one which will last indefinitely.

Approximate Covering Capacity—On smooth finished siding, 1 gal. of bungalow brown or red stain will cover 200 sq. ft. or more.

One gallon of greens and other colors will cover 100 to 110 sq. ft., two brush coats. For dipping, about 2 to 2½ gallons are needed for every 1000 shingles; dipping and applying 1 brush coat after shingles are laid, 2¾ to 3 gal. per 1000 shingles. Only two-thirds the length of the shingle needs to be dipped.

While Conrad stains do exceptionally good 1-coat work, 2 coats should be applied if one desires a perfect job.

Guarantee

Preserver and stains guaranteed 5 years.

Samples and Prices

Samples and prices supplied on request.

NORTH HALF OF THE CONRAD WOOD PRESERVING PLANT

DEXTER BROTHERS CO.

Shingle Stains, Cement Coatings and Wall Finishes

105-107 Broad Street
BOSTON, MASS.

Products

DEXTER SHINGLE STAINS; PETRIFAX CEMENT COATING; DEXTONE FLAT WALL FINISH.

Dexter Shingle Stains

These stains are made of the very best ground colors, combined with penetrating and preserving oils. The finest pigments obtainable are used in their preparation.

TRADE-MARK

Leading architects throughout the country have used Dexter stains for over 25 years, and have found that they possess many superior advantages.

Advantages—(1) Retain brightness and full, strong color for an exceptionally long time. (2) Do not wash off or mildew. (3) Excellent wood preservatives. (4) Have no offensive odor, and are non-poisonous. (5) Shingles retain their natural "furze," giving a soft velvety appearance, which has great beauty. (6) Can be used on any kind of surface—smooth surface boards, all wood shingles, latticework, etc. (7) Cheaper than paint; ingredients used do not congeal and form a skin coat to retain water and cause shingle to rot on under or unprotected surfaces. (8) Unaffected by elements.

Colors—In great variety, including soft woodbrowns, greens, silver and weathered gray, whites, reds, mauve, and terra cotta, for exterior or interior use.

Weathered Gray—This effect, peculiarly pleasing and difficult to obtain, is now possible by the introduction of Dexter No. 54 Stain. This is similar to other Dexter stains excepting that it contains no pigments, and is perfectly transparent. Results are obtained at once. Such historic houses as the birthplace of Paul Revere, Boston, and Hawthorne's House of Seven Gables, Salem, Mass., have been refinished with this stain because of its perfect reproduction of the natural results of age. It can be used on all wood shingles except California redwood and cypress. Large sample shingle on request.

Old Colonial Whites—Popular for country homes and estates. Produces a whitewash effect but with a permanent and preservative stain. A large sample shingle sent on request.

Re-staining—Great care should be used in the selection of a stain color to be used for re-staining shingles. The best plan is to send a sample shingle showing the present condition of the old stain, which will permit of the proper selection of Dexter stain to produce the desired effect.

Samples—Sample stained boards will be sent when requested; but on account of their small size they give but a vague idea of what the final result will be.

Specification Data—*Brush Coat*—All surfaces to be given 1 brush coat of Dexter stain of color selected. Stain to be used exactly as received from manufacturer, delivered on the job in its original package, and to be kept well stirred while using.

Dipping—All shingles dipped two-thirds their length (butt end) in Dexter stain of color to be selected. Stain to be used exactly as received from manufacturer, and to be kept well stirred while using. All cut shingles to be retouched after they are laid.

Dipping and Brush Coat—All shingles to be dipped two-thirds their length (butt end) in Dexter stain of color selected. Stain to be used exactly as received from manufacturer, and to be kept well stirred while using. After shingles are laid they are to be given 1 brush coat of same color when directed.

One gallon will dip about 500 shingles two-thirds their entire length, or will brush about 125 sq. ft.

How to Dip Shingles—If stain is in keg or barrel, break in head and stir thoroughly before using. If stain is in can, cut out bottom, when possible, and dump contents into some larger container. It is always a good plan to arrange a sort of trough in which shingles may be placed after dipping, in such a position that surplus stain may drip back into container. Stain must be kept well stirred while using. Shingles are usually dipped about two-thirds their length. Do not soak them in stain, but dip in, and take out immediately, drawing across a piece of burlap which has been wound around a stick and fastened to head of barrel in such a way that it will brush stain into shingles. Place in trough and allow to dry.

Recommendation—It is a fact that shingles shrink, and if a brush coat only is applied, a white streak shows between the shingles after they have been laid. Dipping remedies this by coloring and preserving the shingle for two-thirds its length.

Frequently only a single brush coat of stain is given, or shingles may merely be dipped. For best results dipping shingles, following with a brush coat after they are on building, is strongly recommended. Shingles must be dry and free from dust.

When using No. 54, either dipping or 1 brush coat is sufficient.

Petrifax Cement and Brick Coating

Petrifax is manufactured from a mineral base and is carried into the pores of the cement or brick by a volatile liquid, which readily evaporates, leaving a hard surface that will not chip, crack nor peel off. To dampproof a wall, Petrifax should be applied to the pressure side.

Covering capacity variable according to the surface.

Dextone Flat Wall Finish

Dextone is a flat oil finish for plaster or wooden walls, being washable and sanitary.

Covering capacity about 350 sq. ft. per gal.

Made in white and colors.

IN NEW YORK SINCE 1887

PROTEXOL CORPORATION

SUCCESSOR TO CARBOLINEUM WOOD PRESERVING CO.

Wood Preservatives

37 Barclay Street

NEW YORK, N. Y.

WORKS: KENILWORTH, N. J.

LOCAL REPRESENTATIVES

PHILADELPHIA, PA., 149 North 13th Street
BOSTON, MASS., 6 Beacon Street
SAN FRANCISCO, CAL., Bass-Hueter Paint Co.
NEW ORLEANS, LA., 1024 Maison Blanche Building

SHIPPING DEPOTS

CHICAGO, ILL.
ST. LOUIS, MO.
PITTSBURGH, PA.
SAN FRANCISCO, CAL.
QUEBEC, CAN.
HAVANA, CUBA
HONOLULU, T. H.
SAN JUAN, P. R.

Products and Services

Protexol Wood Preservatives.
Neosote Wood Preservatives.
Protexide, the colorless preservative.
Also Creosote Oils, all standard grades.

Services include Experimental Work, Design and Layout, Estimates for Covering Capacity on submitted timber schedules, and all matters pertaining to Consulting Practice on the subject of Timber Preservation.

Protexol WOOD PRESERVATIVE
PRESERVES WOOD EVERYWHERE
TRADE-MARK

Uses—General

For brush, spray, or open tank treatments: To prevent the deterioration of wood placed in situations where decay is likely—as sills, foundation and floor timbers, roofs in mills, screeds or nailing pieces in concrete—or where woodwork is used in situations where an optimum moisture condition prevails.

As a permanent walnut stain for shingles, half timbers, trellises, arbors, etc.

Experience

Protexol has been successfully used for the surface treatment of timber to prevent its decay, by brush, spray or open tank application, for 46 years, under its former name. Protexol (protects all) represents value demonstrated by actual time tests—by results. The "Standard" wood preservative established by practice.

Technical Descriptions and Recommendations

Protexol Wood Preservative No. 1—A non-volatile, heavy oil derived from the highest boiling distillate of coal tar. Its constituents belong to the anthracene group, the permanent antiseptic properties of which are generally acknowledged. After filtration and refining, the oil is chemically treated to improve its character and to increase its efficiency. Made to the 46-year old standard of quality. For protecting timber against premature decay this grade is recommended as the very best preservative—specifically where only brush or spray treatments are to be given. Where inflammability of the treated timber is the important factor, we unreservedly recommend the use of Protexol Wood Preservative No. 1. Specific gravity, 1.10 to 1.115 at 38° C.

Protexol Wood Preservative No. 2—A straight run anthracene oil to meet the chemical standard for what is known as the carbolineum type. Whenever the higher cost of Protexol No. 1 does not appear justifiable, either owing to construction requiring a heavier open tank treatment, because the construction is not of a permanent character or for other sound reasons, Protexol No. 2 is recommended. Where waterproofing is the prime object sought to be attained, this grade is suggested. Specific gravity, 1.09 to 1.13 at 38° C.

Neosote Wood Preservative No. 1—A mixture of the lighter anthracene oils obtained in redistilling to produce Protexol Wood Preservatives and heavy creosote oils. Liquid at all temperatures. Neosote is recommended for heavy open tank treatments where depth of penetration only is considered the measure of preservation, or as a temporary preservative agent, or where the only object in using any preservative is high initial toxicity to destroy organisms on timber placed under conditions where decay is not likely if sound timber is used. Where the lowest cost compatible with a satisfactory return on the investment is sought, we advise Neosote. Specific gravity, 1.08 to 1.11 at 38° C.

Neosote No. 2—Heavy creosote oils of minimum specific gravity of 1.06 at 38° C.

Notes: It is worth bearing in mind that the item of labor cost will be substantially the same in the application of any one of the four grades. Equipment cost will likewise be substantially the same except where heavy open tank treatments are desired.

Protexol No. 2 and Neosote are more volatile and their use is not expected to insure the factor of safety to be had from the use of Protexol No. 1, except that a larger quantity of Protexol No. 2 and Neosote will probably give the same results as a smaller quantity of Protexol No. 1.

Complete chemical standards on request.

Protexide—A sodium fluoride preparation, colorless and odorless, applied in an aqueous solution of 3% to 5%. Specially suitable where treated surfaces require the subsequent application of varnish or decorative paint. Applied by brush, open tank or pressure.

Specifications for Use

These are designed to meet the requirements of each case and include a consideration of the conditions to be met and the kind and quality of timber to be used. See former editions of Sweet's Catalogues or Leaflet 23.

Literature

A list of all available bulletins and circulars will be sent on request. Each answers definite questions on wood preservation.

Leaflet 23—Suggested Specifications.
Circular 68—Deterioration of Timber and Its Causes.
Circular 89—The "How" of Surface Treatments.
Bulletin 40—The Annual Charge Against Treated Timber.
Bulletin 41—Maintenance Treatments.
Bulletin 42—Wood Preserving Terms.

THE BUTCHER POLISH CO.

Manufacturers of Floor Polish and Floor Wax

245 State Street
BOSTON, MASS.

Products

BUTCHER'S BOSTON POLISH (for Floors) or FLOOR WAX; BUTCHER'S LIQUID POLISH (WAX); BUTCHER'S No. 3 REVIVER.

Also, Butcher's Weighted Floor Finishing Brushes.

Scope and General Information

The products of this company, having been on the market for over 40 years and having given throughout that period consistent satisfaction, have become recognized as standard by architects, interior decorators and painters.

This is particularly true in the case of large institutions, hospitals, colleges, etc., which employ superintendents whose purchases are based on experience.

Butcher's Boston Polish (for Floors)

Butcher's Boston Polish is a perfectly transparent finish for floors, interior woodwork, furniture and linoleum.

BUTCHER'S BOSTON POLISH OR HARD WAX FINISH CAN
(1-lb. size)

It preserves the natural color and beauty of the wood, and as it is not brittle it will not scratch or deface like shellac or varnish, nor will it become soft and sticky like beeswax.

It has the reputation of being the best floor polish made and the only one without objectionable features, and is especially adapted for hardwood floors, bowling alleys and linoleum.

It is manufactured from pure materials perfectly blended so that it has great density and lasting qualities.

Its extreme density and high melting point result in a hard coating of considerable body, which can not be obtained with polishes manufactured with soft waxes and cheap highly volatile solvents.

Covering Capacity—After surface has been properly filled, 1 lb. of Butcher's Boston Polish will cover 300 sq. ft.

Butcher's Liquid Polish (Wax)

Butcher's Liquid Polish is a liquid wax polish used for repolishing floors, furniture or interior woodwork. After the floors or other woodwork have been properly finished with Butcher's Boston Floor Polish, and require freshening up, dampen a cloth with Butcher's Liquid Polish, rub over the surface and polish at once by rubbing with a dry, soft cloth.

BUTCHER'S LIQUID POLISH CAN
(1-qt. size)

Butcher's No. 3 Reviver

Floors of hard pine, maple, or other close grained woods will not take a filler. For such floors apply a coat of Butcher's No. 3 Reviver, which will give a warm and even color to the wood. It should be left overnight to dry and then treated with Butcher's Boston Polish according to the directions given herewith.

To restore the color of the parts of the floor where the finish is worn off and the wood looks gray and bleached, dampen a cloth with the Reviver and rub over the defaced portions; let it remain 10 or 12 hours to dry; then polish with Butcher's Boston Polish according to directions.

For kitchen, store, and piazza floors that need to be washed often, lay on a thin coat of Butcher's No. 3 Reviver, with an ordinary varnish brush, or dampen a cloth and go over as directed above, rubbing off well before leaving to dry. Repeat when the wood begins to look gray and worn.

BUTCHER'S No. 3 REVIVER CAN
(½-gal. size)

Covering Capacity—1 gal. will cover about 1200 sq. ft. of surface.

General Specifications

Do not specify "or equal" as this only leads to the use of inferior grades. Experience in actual use should be the determining factor in specifying a wax polish.

Floors (Without Varnish)—*(a) Open Grain Woods, Oak and Others*—The floors shall first be filled with a paste filler satisfactory to the architect, allowed to dry and thoroughly rubbed off.

After 24 hours a coat of Butcher's Boston Polish or Hard Wax Finish shall be spread evenly over the floor with a cloth and allowed to dry for ½ hour. The floor shall then be polished with a long handled weighted brush (25-lb.) rubbing first across the grain and then with the grain.

Just before the floors are put in use a second coat shall be applied and finished as the first.

(b) Close Grained Wood (Hard Pine, Maple, etc.)—The floors shall first receive a coat of Butcher's No. 3 Reviver applied with a cloth and allowed to dry for 12 hours.

Then apply Butcher's Boston Polish as above.

Note: In addition to the filler a thin coat of shellac may be laid on and sandpapered slightly before applying the finish coat of wax.

Varnished Floors—Insert varnish specification, then specification for 1 coat of Butcher's Boston Polish.

Interior Woodwork and Standing Finish—Specifications similar to the foregoing except that after applying Butcher's Boston Polish it shall be polished with a brush of the stiffness of a shoe brush and afterwards with dry soft cloths.

Kitchen and Piazza Floors—Shall be finished with a thin coat of Butcher's No. 3 Reviver laid on with a varnish brush.

Territory

Butcher's products are for sale everywhere by dealers in painters' supplies.

AMERICAN WINDOW GLASS COMPANY

Farmers Bank Building
PITTSBURGH, PA.

DOMESTIC OFFICES

NEW YORK, N. Y. | CHICAGO, ILL. | ATLANTA, GA. | NEW ORLEANS, LA.
BOSTON, MASS. | ST. LOUIS, MO. | SAN FRANCISCO, CAL. | MEMPHIS, TENN.

EXPORT OFFICES

MEXICO CITY, MEXICO | LIMA, PERU | BARRANQUILLA, COLOMBIA | HAVANA, CUBA
VALPARAISO, CHILE | BUENOS AIRES, ARGENTINA | BOGOTA, COLOMBIA

FACTORIES

JEANNETTE, PA. | MONONGAHELA CITY, PA. | BELLE VERNON, PA. | KANE, PA.
ARNOLD, PA. | HARTFORD CITY, IND.

Products

WINDOW (or SHEET) GLASS.

Process and Production

All of the glass manufactured by the AMERICAN WINDOW GLASS COMPANY is machine-made, thus insuring uniformity of thickness which can not be obtained by hand-blown manipulation. Production of this company is the largest in the world, the annual capacity being 300,000,000 sq. ft.

Sheet Glass—Description and Qualifications

Sheet glass is first classified as single thick or double thick. Each thickness is then further divided into three qualities, "AA", or first quality; "A", or second quality; "B", or third quality, according to its relative freedom from defects.

Grades and Qualities

"AA" or First Quality—This requires the best grade of glass, but it does not require perfect glass, or substantially perfect glass. Defects of various kinds are permissible in this quality, but they should be very slight, or not discoverable except on close inspection. This glass must be well flattened and have a fine polish. The defects permitted must not be grouped in one place, but scattered throughout the light. Only a very small number of slight defects are permissible in this quality.

In general, the center of each light must be free from defects. Each light must be viewed as a whole and not judged by single defects discoverable in different parts of the light. On casual inspection the glass should appear to be almost free from defects.

"A" or Second Quality—The defects permitted in this quality are faint strings or lines, slight burn, seeds, small blisters, and light scratches, but no light should contain all of these defects, nor such a portion of the different classes of defects as to mar the general appearance of the light as a whole. The defects permissible depend on the character of the defects, their location and number, and the size of the light.

No specific rule can be laid down as to the size of any defect permitted. A defect too large for a small light might be permitted in a much larger light. If the light contained only a single defect, that defect might be much larger than would otherwise be permitted if the light contained a number of other defects. A light of glass that is especially well flattened and has a fine polish would permit of single defects of larger size than a light of glass that is poorly flattened. The location of the defects also determines the number and size permitted. Seeds and small blisters that would not be permissible in the center of the light, would be permissible if remote from the center.

Neither can any rule be laid down as to how far apart these defects should be, as some of the defects might be so slight as not to be readily distinguishable even on close inspection. Defects that would be too close together in a small light of glass might be permitted in a much larger light. Defects would be permitted when scattered through a light that would not be permitted if grouped in one part of the light.

In general, the center of the light should be practically free from defects, and the appearance of the light as a whole should be such as, on casual inspection, will not cause the attention of the inspector to be focused on the defects rather than on the general appearance of the light.

"B" or Third Quality—This quality admits of the same kinds of defects as "A" Quality, but they may be heavier and more numerous, but no defects should be so heavy as to distort an object viewed through them at any reasonable angle, as is done in the case of very heavy cords or lines. Glass that contains heavy cords, lines or strings over its entire surface, a large number of blisters, or the surface of the glass practically covered with seeds or very heavy burn, is not permitted in this quality.

In general, the defects permitted in this glass are so prominent as to at once attract the attention of the casual inspector, but they should not be so numerous as to prevent a considerable portion of each light from being reasonably free from them.

Continued on next page

Further Information on Sheet Glass

Defects Prohibited in All Grades—Stones, heavy lines or cords that would cause breakage, raised blisters, wrinkles and deep scratches.

Dimensions—Maximum sizes: single strength, 30x50 in.; double strength, 64x84 in.

Thickness and Weight—*Single Strength*—The thickness measures between 10½ and 12 lights to the inch. Weight, approximately 18½ oz. to the sq. ft.

Double Strength—The thickness measures between 8 and 9 lights to the inch (average about 8½ lights to the inch). Weight, approximately 24½ oz. to the sq. ft.

Packing—All "AA" or first quality window glass is packed with paper between each light to prevent marring and scratching of the surface, specially labeled.

Advantages—Double Strength "AA" is uniform in thickness; specially flattened; exceptional packing; rigidly inspected and graded; comparatively free from imperfections. Can be furnished in limited amounts.

Adaptability—Possessing the above advantages, our Double Strength "AA" is particularly adaptable to glazing in fine residences, schools, hospitals and other buildings of character, where the highest type of window glass is desired.

Suggested Specifications—All the clear window glass glazed in this building shall be specially selected double strength of "AA" quality, paper packed and having the manufacturers' label on each light, and shall be the American Window Glass Company's make, or equal thereto.

Identification Label—Each light of double strength "AA" or first quality window glass of American Window Glass Company's manufacture is labeled as shown herewith (in red). This label identifies the genuineness of the quality.

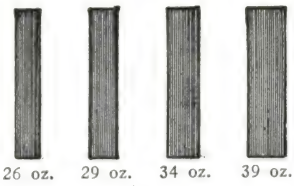
"A" and "B" grades are not labeled, but have a quality brand stamped on each original box.

RED LABEL

Crystal Sheet Glass

Description—A heavy blown glass, made by same process as window glass, in 26-oz., 29-oz., 34-oz. and 39-oz. weights (or $\frac{3}{16}$ in.). Uniform in thickness; thoroughly annealed and especially flattened. The term "ounce" in connection with crystal sheet glass indicates the weight per sq. ft. of each type of glass herein described.

Dimensions—Maximum sizes: 26-oz. and 29-oz., 60x84 in.; 34-oz. and 39 oz., 36 to 48 in. wide by 48 to 72 in. long, are the average dimensions obtainable.



APPROXIMATE THICKNESS OF CRYSTAL SHEET GLASS

Thickness	Leeways Allowable	
26 oz. Crystal sheet	.125 to .135	(.125 exact)
29 oz. Crystal sheet	.136 to .148	(.139 exact)
34 oz. Crystal sheet	.150 to .175	(.163 exact)
39 oz. Crystal sheet or $\frac{3}{16}$"	.176 and above	(.187 exact)

Our crystal sheet products are marketed through the window glass distributors in stock sheets, as they come from the factory. They re-cut these sheets to required sizes, and grade them to suit the requirements of the contractors, architects and builders.

Packing—Paper is placed between each light of 34-oz. and 39-oz. to prevent marring and scratching of the surface.

Adaptability—Suitable for glazing office buildings, hotels, municipal and other public buildings, and for French doors, windows, table tops and glass shelving, automobiles, car windows, etc.

Advantages—Crystal sheet glass possesses a brilliant surface, uniform thickness, and with the special care given in flattening this glass, it is the flattest window glass produced by any process, and approximates the flatness of plate glass.

It is an acceptable substitute for a great many uses and is relatively lower in price than polished plate. Being a lighter product than plate glass, approximately 25% of the cost of sash weights can also be saved.

While lighter in weight, it is stronger than the heavier plate glass, as will be noted by the following strength test:

Table 1—Results of Impact Tests

Nominal thickness of glass	Description	Average angle of fracture	Average energy at fracture ft. lbs.
$\frac{3}{16}$"	Plain	90.02°	2.46
$\frac{1}{4}$"	Plain	62.5°	1.35

Table 2—Results of Cross Bend Tests

Nominal thickness of glass	Description	Actual average thickness	Average load at failure, lbs.
$\frac{3}{16}$"	Plain	0.175"	36.0
$\frac{1}{4}$"	Plain	0.228"	44.5

Specialties

We produce the following specialties: Single strength ground glass, double strength ground glass; No. 1 process chipped, No. 2 process chipped glass.

(Chipped glass is made from double strength clear glass, and averages about 24½ oz. to the sq. ft.)

We also make 16-oz. picture glass, first and second qualities, photo camera glass, also lantern slide and X-ray thickness for diagnostic X-ray purposes.

HIRES TURNER GLASS COMPANY

Thirtieth and Walnut Streets

PHILADELPHIA, PA.

ROCHESTER, N. Y., Hague Street, South of Lyell Avenue

WASHINGTON, D. C.

ALBANY, N. Y., Tivoli Street, West of Broadway

Products

Polished Plate Glass.
Polished Plate Glass Mirrors.
Window or Sheet Glass.
Rolled Figured Glass.
Solid and Corrugated Wire Glass.
Actinic Glass.
"Safetee" Bulletproof Glass.
Prism and Prismatic Glass.
Opal Glass, Pressed Lens Glass.
Vault Light, Skylight and Floor Light Glass.
Bent Glass.
Ground, Chipped, Enameled, Sand Blasted, Embossed and Etched Glass.
Colored and Leaded Art Glass.
Copper Store Front Construction.

"LIGHTHOUSE" QUALITY GLASS
MADE IN AMERICA

Literature

"Glass for Every Industry," the only complete catalogue ever compiled of the flat glass industry is published by this company. It deals exhaustively with all kinds of glass for building construction. It is printed in English, Spanish, French and Portuguese.

A series of bulletins pertaining to glazing construction, furnish invaluable aid to architects, contractors and users of glass for every type of interior and exterior construction.

Catalogues and bulletins sent on request, without charge.

Service

Value of Correct Specification—The importance of specifying the correct glass and its proper installation for any particular condition cannot be overestimated.

The glass installed should correspond with the design and type of the edifice. Correct glazing, aside from its efficiency value is a direct asset in all edifices in which stability and integrity must be expressed throughout.

The Hires Turner Glass Company has therefore organized various service departments for the purposes stated below.

Organization—Our organization consists of several service departments working under one governing policy. Each department is in charge of an expert in his particular line, who is qualified to handle any glass problem that may confront the architect. These departments under one executive head form the organization of the Hires Turner Glass Company.

Scope of Service—The problems of the glass consumer are studied and investigated, with one end in view—to educate the consumer to a full understanding of the advantages secured by the use of the correct kind of glass for a particular condition.

The service department experts offer preliminary service in planning for glazing installations, solve all problems relating to the diffusion of light, and give advice pertaining to the economic utilization of glass so as to obtain the best results.

The services of these departments are at the disposal of architects and others without obligation. The recommendations of these departments assure the installation of correct glass for any condition.

When Writing for Information—Give the type and use of building and the exact sizes and nature of all openings to be glazed.

Samples—Samples of "Lighthouse" quality glass will be sent to interested persons on request.

Specify "Lighthouse" Quality Glass

In order to insure the highest quality glass obtainable, specify "Lighthouse" quality glass as supplied by Hires Turner Glass Company, Philadelphia, Pa.

Plate Glass, "Lighthouse" Quality

The registered trade-mark of this company is an assurance of the highest standard in the quality of glass purchased and that the grading is guaranteed as represented.

Plate glass enhances the appearance and value of the building; it affords accurate vision in all directions; it resists cold and retains heat better, reduces the chances of breakage, and its reduced cost places it within the reach of all who would use it.

Glazing Quality—While some defects may appear in the finished product, they in no way impair the value or durability of plate glass for ordinary use. Small seeds or bubbles, short-finish, reams or surface scratches are accepted as contingent with the regular run of plate glass, provided the plate is comparatively free from other defects and is of good color and finish.

The sash or rabbet for regular plate glass glazing should be made to accommodate glass full 5/16 in. thick.

Special Quality—When a particular quality is desired, a special selection is necessary. This often necessitates cutting down larger sizes to minimize defects inherent with the larger production and adds a proportionate extra cost.

Polished Plate Glass Mirrors, "Lighthouse" Quality

Mirrors are beveled and furnished in decorative designs the same as plate glass. They are limited only by the sizes and thickness in which plate glass is made.

"LIGHTHOUSE" QUALITY PLATE GLASS AND MIRRORS

*Thickness, in.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
Approx. net weight per sq. ft., lbs.	2	2 1/2	3 1/2	3 3/4	5	7 1/4	8 1/2	9 1/2	11	13	16	20

*Other thicknesses made specially and at increased cost.

Continued on next page

Window or Sheet Glass, "Lighthouse" Quality

Waves and other slight defects are accepted in all window glass, due to the process of making, which differs entirely from cast and polished plate glass. The quality of sheet glass has been very much improved by a modern method recently invented and the product, due to the sheet-drawing process, is superior to glass made by other processes for the following reasons:

(1) Thickness uniform and full weight throughout. (2) Perfectly flat; can be glazed with either side to the weather. (3) The most perfectly annealed glass made. (4) Fewer waves and other defects common to cylinder glass, due to the process of manufacture. (5) Color whiter or lighter than the usual cylinder glass.

Grades—This sheet-drawn glass is made in three thicknesses: single strength or 18 oz. which runs 11 to 12 lights to 1 in.; double strength or 26 oz. which runs 8 lights to 1 in.; 3/16 in. or 39 oz. which is heavier and is used extensively for windshields, car doors, and places where another weight glass was formerly used.

Sizes, Thicknesses and Weights — Single Strength—Is made as large as 24 by 60, 30 by 54, and 36 by 50 in., containing 10 to 12½ sq. ft. per light.

Double Strength—Is made as large as 60 by 90 in., is ⅛ in. thick, and weighs approximately 26 oz. to the sq. ft.

3/16 in. Thickness (frequently called Crystal Sheet)—Weighs 39 oz. to the sq. ft., and can be furnished as large as double strength.

Specifications for Qualities—"AA" or First Quality—Should be clear glass, free from any perceptible lines or blisters, scratches, cords or strings. It should have a good gloss or luster and an even plane surface which closely approaches the plane surface of plate glass. This quality should be free from any defect that would be noticeable when the sheet is glazed. This quality represents the highest type of sheet glass possible to produce.

"A" or Second Quality—Should be glass of good luster, free from noticeable scratches, cords or strings or any prominent defect. This quality should be specified for the best buildings.

"B" or Third Quality—Should be glass of good appearance which may have seeds and blisters of a limited number in a sheet, also may have slight wave or line. No heavy scratches or heavy cords should be found in this quality. This quality is used extensively for general glazing purposes.

Rolled Figured Glass, "Lighthouse" Quality

An obscure translucent material with attractive pattern essentially prismatic so as to admit, diffuse and distribute light.

"Solid" Wire Glass, "Lighthouse" Quality

This glass is fully described on the pages of the Pennsylvania Wire Glass Co. The Hires Turner Glass Company's service department collaborates with the engineers of the above company, and their services are available at any time. See pages 1416-1417.

"LIGHTHOUSE" QUALITY ROLLED FIGURED GLASS

Style	Thickness, in.	Maximum width, in.	Maximum length, in.	Approx. net weight per sq. ft., lbs.
Cobweb	⅛	54	120	2
	3/16	54	126	2½
	¼	62	120	3¾
	⅜	62	120	5
Aqueduct	¼	60	120	4½
	⅜	60	120	5¾
Pyramid Oriental	¼	48	132	3¾
Florentine and Moss	⅛	48	132	2
	3/16	48	132	2½
Mystic	⅛	44	132	2
	3/16	44	132	2½
Colonial	⅛	44	160	2
	3/16	44	160	2½
Cathedral	3/32	30	90	1½
Opal	⅛	30	40	1½
Rippled	⅛	30	90	1½

*"LIGHTHOUSE" QUALITY WIRE GLASS

Style	Thickness, in.	Maximum width, in.	Maximum length, in.	Approx. net weight per sq. ft., lbs.
Polished	¼	48	130	3¾
	5/16	48	130	4
	⅜	46	130	8
Mystic	¼	48	130	3¾
	⅜	48	130	5¼
Moss	¼	48	130	3¾
Cobweb	⅛	48	130	2
	3/16	48	130	2½
	¼	48	130	3¾
	⅜	48	130	5¼
Prism	⅜	42	138	5
Pyramid Oriental	¼	48	132	3¾
Aqueduct	9/32	48	132	4¼
Rough	⅛	48	130	2
	3/16	48	130	2½
	¼	48	130	3¾
	⅜	48	130	5¼
	½	48	130	7½
Ribbed	⅛	48	130	2
	3/16	48	130	2½
	¼	48	130	3¾
	⅜	48	130	5¼
	½	48	130	7½

*Sizes, thicknesses and weights of Corrugated Wire glass are given in text following.

Corrugated Wire Glass, "Lighthouse" Quality

An inexpensive form of construction for factories, warehouses and all buildings where maximum light is essential.

Sizes, Thicknesses and Weights—Furnished in two corrugations, deep or asbestos and shallow or iron. The former measures 2½ in. from ridge to ridge of corrugation and the latter 2 11/16 in.

Deep corrugation sheets measure 27¾ in. wide and the shallow corrugation sheets, 26½ in. wide. In these widths only.

Standard lengths of both are 42 and 63 in. May be obtained in any length up to 126 in. Standard lengths recommended.

Thickness is about ¼ to 5/16 in. and weight is 4¾ lbs. per sq. ft.

Corrugated
For roofs and sidewalls

Actinic Glass

Utilizing in a commercial way the principle so extensively employed by opticians, the soft neutral tint of Actinic glass transmits a pleasing, luminous light, easy to the eye.

It excludes 85% of the ultra-violet (injurious) rays and 55% of the infra-red (heat) rays. These are the invisible solar chemical rays that are so destructive to rubber fabrics, and are fatiguing to the eye.

It is suitable for skylights and sidewalls of factories, trainsheds, warehouses, and buildings of all kinds, including schools.

It is supplied in two surfaces, one a fine rib, the other a corrugation like corrugated iron, and also with or without wire mesh in it.

Continued on next page

Specifications for Wire Glass

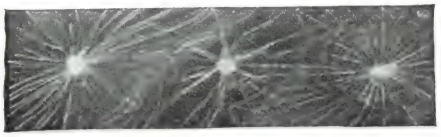
Specify all wire glass of the exact surface or design called for. The rules and regulations of the National Board of Fire Underwriters should be observed.

"Safetee" Bulletproof Glass, "Lighthouse" Quality

A perfectly solid sheet made of three pieces of polished plate, welded together. Will withstand the impact of a 45-caliber steel jacketed bullet fired at close range. Will not scatter irrespective of shock or compact. Adapted for bank screens, armored trucks, ticket windows, and all uses where protection against theft is required.

Approved by Underwriters' Laboratories, Inc., as standard for tensile strength.

Furnished in any size up to 28 by 50 in. Certain large sizes can not be made without having fine hair line appear, which is in no way objectionable. Approximate thickness, ¾ in. full.



ILLUSTRATING EFFECT OF THREE POWERFUL BLOWS ON "SAFETEE" BULLETPROOF GLASS

Prism Glass, "Lighthouse" Quality

Especially adapted for use in windows, transoms, skylights, etc.

Types: Sheet prism glass; prism plate glass, one side ground and polished, with the same strength and durability as plate glass; prism wire glass (approved by National Board of Fire Underwriters); pressed prism tiles, 4 by 4 or 5 by 5 in., for glazing in hard metal for transoms and ventilators.

"LIGHTHOUSE" QUALITY PRISM GLASS

Style	Thickness, in.	Maximum height, in.	Maximum length, in.	Approx. net weight per sq. ft., lbs.
Prism (sheet) Thin	¼	42	120	3½
Prism (sheet) Regular	5/16	60	138	4
Prism Wired Glass	¾	42	138	5
Imperial Prism-Plate	⅜	72	82	4½
Glazed Prism Tiles	5/16	.....	.....	5¼

Prismatic Glass, "Lighthouse" Quality

An ornamental plate glass, one side ground, the other polished, for partitions, door lights and bank fixtures, etc.

Opal Glass, "Lighthouse" Quality

A milk white glass with brilliant natural polish, annealed surface, non-porous, non-staining, impervious to acid or alkali and strictly sanitary. It is 42% harder than marble. Attached to walls with plastic cement, and is not broken by settlement of buildings. Can be treated, ground, beveled, chamfered, drilled and cut as readily as marble or plate glass.

OPAL GLASS

Thickness, in.	3/16	¼	5/16	7/16	½	9/16	⅝	¾	⅞	1
Maximum width, in.	45	55	57	57	55	55	50	57	48	50
Maximum length, in.	120	120	130	130	115	115	120	115	125	105
Approx. net weight per sq. ft., lbs.	2¾	3¼	4	5¾	6¾	7	8	10	12⅛	13

Pressed Lens Glass, "Lighthouse" Quality

Adapted for transom sash. It is a universal diffuser of light, is decorative, easily cleaned, removes the glare of sunlight and eliminates shades. Pressed lens, tile, glazed in hard metal, is attractive design for store front transoms.

Furnished 3/16 in. thick in any width up to 48 in. and in any length up to 120 in.; weighs approximately 2½ lbs. per sq. ft.

PRESSED LENS GLASS

Vault Light, Skylight and Floor Light Glass, "Lighthouse" Quality

This glass (square or circular), is embedded in reinforced concrete to secure substantial construction. Various forms of glass lenses are used for various conditions.

Bent Glass, "Lighthouse" Quality

Will furnish full information regarding this product upon receipt of pattern or template of sweep, also height.

Ground Glass, "Lighthouse" Quality

Can be furnished in double strength window glass, plate glass and rolled rough glass in any size.

Chipped Glass, "Lighthouse" Quality

Furnished in either double strength window glass, plate glass or rolled rough glass in any size, in either single or double process chipping. Any portion of the surface may be ground or chipped, leaving margin of clear glass, clear design or lettering, in ground or chipped glass.

Enameled Glass, "Lighthouse" Quality

Has a set pattern ground over the whole surface, and commonly upon window glass. When pattern is blasted leaving clear background, the glass is called clear enamel. The same process upon ground glass produces obscure enamel.

Sand Blasted Glass, "Lighthouse" Quality

Picture designs in stencils and combination chipped and sand blasted patterns made to suit any taste.

Embossed Glass, "Lighthouse" Quality

Embossed glass is effective and rich in appearance, translucent, yet not transparent. Extensively used for store and bank fixtures, windows, partitions, doors and vestibules.

Etched Glass, "Lighthouse" Quality

Plate glass can be etched in snow white effect, making the glass obscure. Appearance similar to sand blast or ground glass of fine texture. Designs of intricate detail may be worked upon the surface.

Colored and Leaded Art Glass, "Lighthouse" Quality

Designs and estimates submitted to suit any taste or color scheme desired.

Store Front Construction, "Zouri-Lighthouse" Quality

This company collaborates with the Zouri Drawn Metals Co. (See pages 1026-1033).

JOSEPH ELIAS & CO., INC.

Mirrors and Glass for All Purposes

LONG ISLAND CITY, N. Y.

GENERALLY SOLD BY GLASS DEALERS THROUGHOUT THE COUNTRY

Products

CRYSTALITE BRANDS of FLAT DRAWN SHEET or WINDOW GLASS; POLISHED PLATE GLASS; PLATE GLASS MIRRORS; WIRE GLASS; ROLLED and FIGURED GLASS.

Also distributers of Brasco Copper Store Fronts.

JOSEPH ELIAS & CO. INC. CRYSTALITE BRAND GLASS

TRADE-MARK

Flat Drawn Sheet Glass

Crystalite brand flat drawn sheet glass is the product of a *new process* in the manufacture of window glass—a process which eliminates the necessity of first blowing the glass into cylindrical form, in which form it has never been possible to flatten without resulting waves and bows.

In the flat drawn process the glass is made by being drawn into flat sheets directly from the tanks of molten glass into a lehr or annealing oven. This process produces a glass that is *absolutely flat, uniform in thickness, perfect in annealment, and with the wave reduced to a minimum.*

Advantages—(1) Absolute flatness, which means clear vision and minimizes the possibility of breakage after it has been glazed in the sash.

(2) Uniformity of thickness, and its high polish.

(3) Freedom from objectionable waves and other causes of distortion common to cylinder glass blown in cylinder form.

The glass has no bow and will bear evenly and firmly in the frame or sash, thereby preventing rattling or cracking.

Quality and Grade—This glass is put on the market under our trade-name and each sheet is labeled for identification.

Owing to the high quality of these products as compared with ordinary glass, a remarkable freedom from defects will be found. In other words Crystalite brand flat drawn sheet glass is, for all practicable purposes, of *one* quality, and architects may rest assured that whenever this brand is specified, a very superior glass will result.

Cost—This glass is sold in competition with ordinary window glass and, where quality is considered, it is cheaper.

Samples—This company will be pleased to submit samples of their brand or samples may be obtained from local dealers. A careful examination of this glass will offer convincing evidence of the superiority of this *new process* glass over glass produced by the old methods.

Thicknesses—Crystalite brand flat drawn sheet glass is made in 18-oz. and 26-oz. and $\frac{3}{16}$-in. thickness.

Maximum Sizes—18-oz., 36x48 in.; 26-oz., 72x84 in.; $\frac{3}{16}$-in. thickness, 72x84 in.

Specifications—All glass (mention location) shall be (18-oz., 26-oz. or $\frac{3}{16}$-in. thickness) Crystalite brand flat drawn sheet glass as supplied by JOSEPH ELIAS & CO., INC., Long Island City, N. Y.

Polished Plate Glass

A well assorted stock of polished plate glass of all sizes and thicknesses is carried, and prompt service can be guaranteed.

For general purposes there is only one quality of plate glass—Crystalite brand. This quality is ordinarily used and is comparatively free from defects.

When a particular quality is desired, a special selection is necessary and this is called *Selected Quality*. This necessitates cutting down larger sizes for purpose of selection and adds a proportionate extra cost.

Plate Glass Mirrors

Our mirrors are made from our Crystalite brand polished plate glass and are furnished either beveled or plain in desired thickness of glass.

As a guide to architects in specifying polished plate glass mirrors, the following specification which describes our method of manufacture is offered.

Specifications—All mirrors shall be Crystalite brand mirrors (mention whether to be beveled or plain) as manufactured by JOSEPH ELIAS & CO., INC., Long Island City, N. Y. To be free from scratches and bubbles, with a true reflection and covered on the back with three coats of silver, protected with best shellac and a coat of waterproof paint. To be guaranteed not to tarnish, peel or oxidize within 3 years.

Wire Glass

We carry a complete stock of the Western Glass Company's wire glass (also figured glass).

Furnished in thicknesses of $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. in sizes up to and including 48 in. wide x 132 in. long. It is made by a single pour process and the reinforcement is a special wire fabric with 3 twists and 5 loops at the vertical strand. This fabric is incorporated in the sheet of molten glass while it is being rolled, thus producing a finished product better able to stand severe strains and sudden temperature changes.

This product has stood the severe tests imposed by the Underwriters' Laboratories, Inc., and each sheet is labeled.

WIRE GLASS
Note the 5 loops in the vertical strand

Figured Glass

Designed for use in hallways, areas, interior partitions and similar constructions where the admission of light without transparency is desired. Made in the best materials obtainable and moulded in attractive patterns.

Designs—The figured glass is made up in a large number of designs, some of which are illustrated on the pages of the Western Glass Company.

Where Obtained

The JOSEPH ELIAS & CO.'s products may be obtained directly from the Company's plant in Long Island City, N. Y., or from glass dealers throughout the country. Correspondence is solicited.

MISSISSIPPI WIRE GLASS COMPANY

220 Fifth Avenue
NEW YORK, N. Y.

TELEPHONE
MADISON SQUARE 9370

BRANCH OFFICES

CHICAGO, ILL., 7 West Madison Street

ST. LOUIS, MO., 4070 North Main Street

Products

"WIRE GLASS"; VAULT LIGHTS.

Mississippi "Wire Glass"

The MISSISSIPPI WIRE GLASS COMPANY is the original manufacturer of solid "Wire Glass," and its product is universally recognized as the standard wire glass, being the material upon which the underwriters' standard was based in 1899.

By our process of manufacture, Standard "Wire Glass" is cast solid, and has an average of fewer imperfections than any other wire glass on the market.

"Wire Glass" is rolled plate glass having a wire netting embedded equidistant from either surface. This process is automatically effected while the glass is in a molten state and, therefore, insures homogeneous and solid wire glass. The quality of metal and process of manufacturing Standard "Wire Glass" produce the very highest quality, with a tensile and transverse strength second to none.

Evidence of Quality—The fact that Mississippi "Wire Glass" is installed in all the better class buildings is unquestionable evidence of its superior quality and uniformity of color. Factory facilities enable us to furnish glass without unnecessary delay. At all times prompt service will be given.

Adaptability—The object of "Wire Glass" is to afford perfect and constant fire protection at a minimum cost, at the same time admitting and diffusing the light. It is particularly suitable for use in windows, doors, transoms, monitors, skylights and all places where fire or breakage protection is required.

Light Diffusion—The light may be increased in a room 30 ft. or more deep to from 3 to 15 times its present effect by using Factrolite, Pentecor, Maze, Syenite or Ribbed "Wire Glass," instead of plain glass in the upper sashes.

Conducting Condensation—Pentecor, when installed in skylights set at a proper angle, will conduct condensation and prevent dripping.

Advantages of "Wire Glass"

When employed as above mentioned, "Wire Glass" may be fractured by severe heat or sudden shock, but the wire mesh will hold the shattered pieces in place, preventing their falling and causing serious injury or loss of life. It will also prevent draft and hold a fire within the bounds of its origin.

Underwriters' Requirements, Extract from Rules—1906

(2) **Size of Glass**—(a) The unsupported surface of the glass allowed shall be governed by the severity of exposure and be determined in each case by the underwriters having jurisdiction, but in no case shall it be more than 48 in. in either dimension or exceed 720 sq. in. (b) The glass to be of such dimensions, after selvage is removed, that the bearing in the groove or rabbet is not to exceed ⅛ in. less than the full depth called for in rules 7 and 8. (c) The glass to be retained by the structural part of the frame or sash independently of the material which may be used for weatherproof purposes. Only non-inflammable material to be used in setting glass in the sash.

THIS LABEL (PRINTED IN RED) APPEARS ON EVERY PIECE OF STANDARD MISSISSIPPI "WIRE GLASS"

Advantageous Sizes of "Wire Glass"

In considering the above extract, it is well to bear in mind the following sizes when planning window, door and partition openings, to be glazed with Standard "Wire Glass," as these are the most advantageous sizes where glass is not to exceed 720 sq. in.

15x48 in. 18x40 in. 20x36 in. 24x30 in.

THICKNESSES, MAXIMUM SIZES AND APPROXIMATE WEIGHTS OF MISSISSIPPI "WIRE GLASS" AND VAULT OR FLOOR LIGHTS

Type	Thickness, in.	Maximum width, in.	Maximum length, in.	Approximate weight per sq. ft., lbs.
"WIRE GLASS"				
Polished	5/16	43	130	4
Polished	5/8	30	72	8
Maze	1/4	48	130	3 3/4
Maze	3/8	48	130	5 1/4
Factrolite	1/4	48	130	3 3/4
Factrolite	3/8	48	130	5 1/4
Syenite	1/4	48	130	3 3/4
Rough	1/4	48	130	3 3/4
Rough	3/8	48	130	5 1/4
Ribbed	1/4	48	130	3 3/4
Ribbed	3/8	48	130	5 1/4
Pentecor	1/4	48	130	3 3/4
VAULT OR FLOOR LIGHTS				
Rough "Wire Glass"	3/4	30	72	9 3/4
Ribbed "Wire Glass"	3/4	30	72	9 3/4
Ground "Wire Glass"	3/4	30	72	9 3/4
Polished "Wire Glass"	3/4	30	72	9 3/4

Ordering

Glass being one of the last materials to go into a building, it is often not ordered far enough ahead to give the manufacturers opportunity to cut the glass to sizes and make shipment in time to enclose the building by the date desired.

It is therefore advisable to give this point consideration, as the tremendous demand for Standard "Wire Glass" necessitates orders taking their turn as they are received.

In "Wire Glass," the twist of the wire runs with the length of the sheet so when giving sizes, remember the first dimension is understood to be the width.

Continued on next page

How to Specify

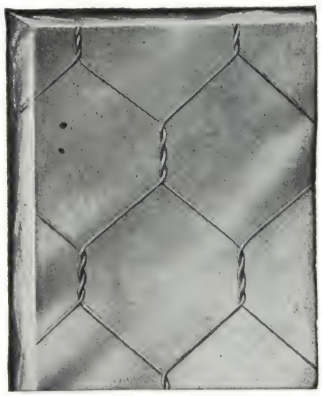
"Wire Glass" shall be installed in [specify location] and in all places marked "W. G." on plans and elevations.

The "Wire Glass" to have a thickness of at least ¼ in. at thinnest point. Wire mesh to be not larger than ⅞ in., and no wire used for such mesh to be smaller than No. 24 B. & S. gage. Plane of the wire mesh to be practically midway between the two surfaces of the glass.

Selvage shall be removed from glass before framing.

[State here type or types of glass to be used and where.]

Note: Where the recognized standard and perfected product is required, specifications should call for "'Wire Glass,' the product of MISSISSIPPI WIRE GLASS COMPANY."



—Width—

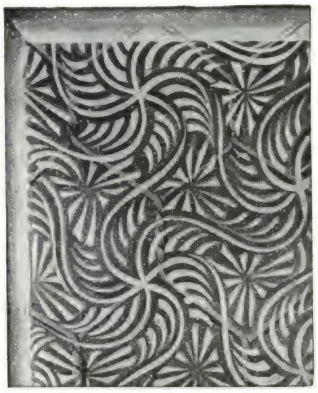
POLISHED "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thickness about 1/8 in.
Special ⅝ in. thick for port lights

—Width—

ROUGH "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thicknesses ¼ and ⅜ in.



—Width—

MAZE "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thicknesses ¼ and ⅜ in.

—Width—

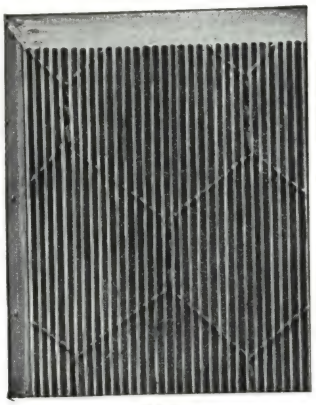
SYENITE "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thickness ¼ in.

—Width—

PENTECOR "WIRE GLASS"

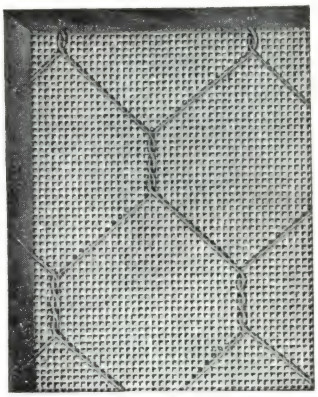
Sizes up to 48 in. wide and 130 in. long
Thickness ¼ in.



—Width—

RIBBED "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thicknesses ¼ and ⅜ in.



—Width—

FACTROLITE "WIRE GLASS"

Sizes up to 48 in. wide and 130 in. long
Thicknesses ¼ and ⅜ in.

WRIGLEY BUILDING, CHICAGO, ILL.

An example of the type of building in which Mississippi Polished "Wire Glass" is used

A. O. SMITH CORP. BUILDING, MILWAUKEE, WIS.

An ideal example of an industrial building in which thousands of square feet of Factrolite "Wire Glass" were used

Continued on next page

Factrolite for Industrial Buildings

Efficiency of Factrolite—The Mississippi Wire Glass Company has had practically every kind of glass tested to determine efficiency in light transmission and finds Factrolite to be far ahead of anything else suitable for installation in industrial buildings.

The accompanying report and plotting speak for themselves.

Test of Factrolite—The tests were made by measuring the distribution of light in two planes perpendicular with each other, with light from an incandescent lamp 3 ft. distant falling normally upon and passing through the glasses. The relative light intensities are recorded in per cent of the normal (0°—normal—equals 100%).

REPORT No. 24558
DISTRIBUTION OF LIGHT TRANSMITTED THROUGH FACTROLITE—INCIDENT LIGHT ON ROUGH SIDE OF GLASS—RELATIVE LIGHT INTENSITIES

Angles	First Plane		Plane Perpendicular to First Plane	
	Right	Left	Right	Left
0 (Normal)	100%		100%	
2½	60.5	86.5	85.2	75.4
5	41.8	51.8	41.0	28.9
7½	24.0	30.6	15.8	13.8
10	9.88	13.3	1.33	9.14
15	1.43	4.45	.39	1.31
20	.101	.81		

Total light transmitted through Factrolite incident light normal on rough side of glass: 84.5%.

Economy of Factrolite—Today, as never before, owners of industrial buildings are coming to realize that the utilization of daylight to its fullest extent by the use of proper glass means the conservation of energy required for artificial lighting, and the maximum production of the employees.

Whereas more heat is required to maintain a given temperature in a building with 80% of its wall area glass than is required for a wall area of 20% glass, this additional heat is required for only five months of the year, whereas with the 20% glass area, it is necessary to artificially light the building a large part of the time.

Factrolite breaks up the rays of the sun, diffusing the light and distributing it equally.

Inspection Invited—Before placing a contract for glass, those interested are urged to get a sample of Factrolite and compare it with every other make of glass recommended for industrial buildings.

Without a doubt, they will become convinced that Factrolite offers the maximum of lighting efficiency with the minimum of cost, thus reducing the overhead and cost of maintenance, and increasing the efficiency of manufacturing the commodities.

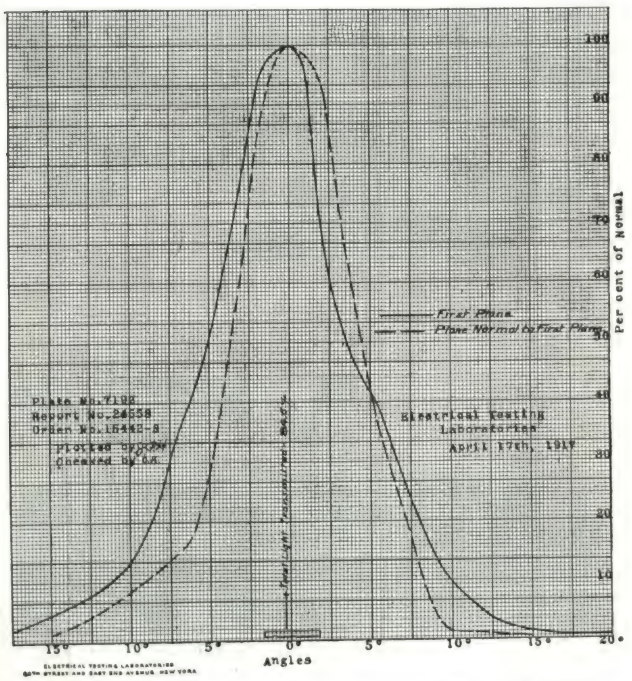


Chart Showing Efficiency in Light Transmission with Factrolite

Tests Made by the Electrical Testing Laboratories Showing Transmission and Illumination

Test Report No. 28482 rendered to the Mississippi Wire Glass Company on the distribution of illumination through figured sheet glass windows in a model room made by the Electrical Testing Laboratories of New York City.

Object—An investigation to study the distribution of daylight illumination in a room with various types of ¼-in. figured sheet glass used in the window.

Test Room—*Model*—Representing a room 50 by 100 by 14 ft.

Scale—1 ft. equals 25 ft. (24 by 48 by 7 in.)

Windows—Continuous on one side of room 3 ft. high, sill 4 ft. from floor.

Ceiling and Walls—White glass finish (commercial factory paint).

Floor—Brown linoleum (having reflection factor of average factory floor.)

Test Stations—Test stations in five lines, as shown.

Source of Light—Concentrated filament incandescent lamp, representing the sun at 30° from horizon. The intensity of the sun was approximately proportioned to the size of the room.

Sky uniformly bright within ± 20%.

Light within the room—direct sunlight, 80%; skylight, 20%.

Result of Tests—Transmission of light through glass samples, in per cent of clear glass, Clear Glass taken as 100%.

Rough wire	98%
Syenite	87%
Maze wire	82%
Factrolite wire	88%
Pentecor wire horizontal	90%
Pentecor wire vertical	94%
Ribbed vertical	96%
Ribbed horizontal	99%

Horizontal illumination of working plane, equivalent to 40 in. above floor.

Samples

Samples of the Mississippi Wire Glass Company's products are filed with the Architects Samples Corporation, New York City, or will be supplied direct by us upon request.

Continued on next page

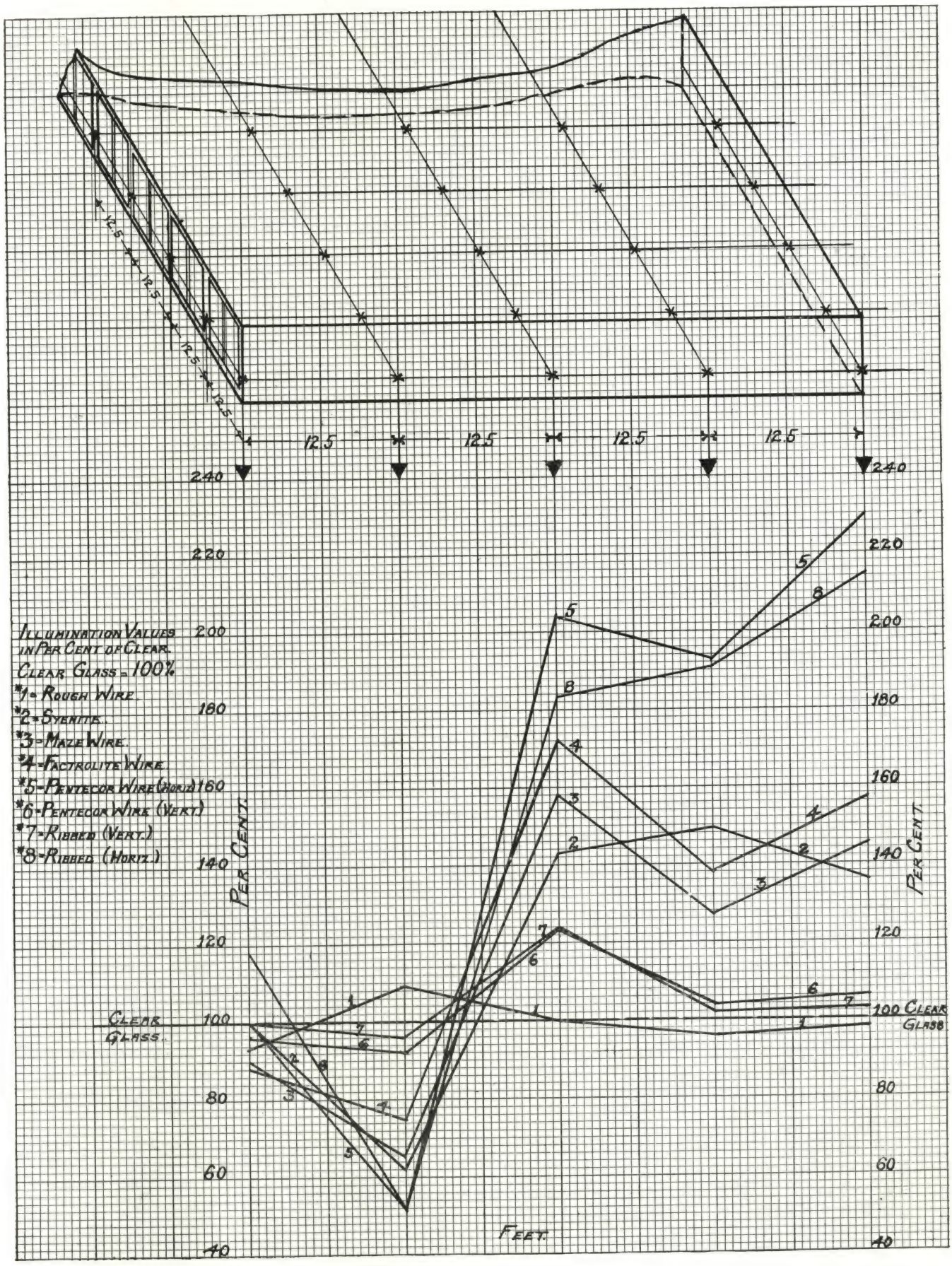


CHART OF ILLUMINATING VALUES OF MISSISSIPPI "WIRE GLASS"
Horizontal illumination on working plane equivalent to 40 in. above floor

PENNSYLVANIA WIRE GLASS COMPANY

WALTER COX, PRESIDENT
EXECUTIVE OFFICE
Pennsylvania Building
PHILADELPHIA, PA.
NEW YORK OFFICE, 150 Nassau Street

CABLE ADDRESS:
"WIRE GLASS, PHILADELPHIA"

WORKS
DUNBAR, PA.

Products

SOLID WIRE GLASS.

Also Glass without wire netting in various patterns and thicknesses to suit every requirement.

TRADE-MARK

Patterns and Thicknesses

Wire Glass—Rough, Ribbed, Figured (Cobweb and Florentine), Aqueduct (drip-proof), and Polished (transparent).

Thicknesses: $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$ in., etc. Also Corrugated Wire Glass, $\frac{5}{16}$ in. thick.

Wire Glass

Process—Solid wire glass made by Pennsylvania continuous process is formed complete by one pouring and one rolling. The only process that makes possible the manufacture of wire glass as thin as $\frac{1}{8}$ in.

Fire Protection—Wire glass is a valuable fire retardant—it prevents flames from attacking adjacent buildings.

Approval (Distinguishing Mark)—All of our wire glass $\frac{1}{4}$ in. and over in thickness has the full approval of the National Board of Fire Underwriters as a fire retardant, which requires a distinguishing mark to identify the glass. Our distinguishing mark is our Cabled Strand, appearing every 10 in. across the sheet and the full length of each sheet.

Service—We offer gratuitous engineering advice on all glass problems.

Samples—Samples, catalogue and circulars on request.

Specifications—Architects should always specify "Solid Wire Glass manufactured by the PENNSYLVANIA WIRE GLASS COMPANY."

Aqueduct drip-proof Glass

Aqueduct wire glass is a glass greatly in demand which prevents dripping from condensation. It has deep, supporting ribs or channels, and by capillary attraction, all condensation formed on the glass is held in the ribs and carried away, along the ribs, to the end of the sheet where it is taken care of.

It is a great diffuser of light, and is very much stronger than flat wire glass of like thickness.

Actinic Glass (Heat Intercepting)

Ultra violet and infra red rays of sun excluded by Actinic glass—a special glass manufactured by this company only.

Actinic glass tested by U. S. Bureau of Standards (report on request). This glass excludes 85% of the ultra violet and 55% of the infra red rays.

Surfaces and Thicknesses—Actinic glass is made in corrugated, and in various surfaces and thicknesses to suit requirements.

Protection—Actinic glass offers protection from these harmful rays, to the eyes as well as to materials, in course of manufacture, that are affected by these rays, such as silk, rubber and paper.

Such harmful effects are eliminated, and all Actinic advantages obtained by the use of our Actinic glass.

Corrugated Wire Glass (CWG)

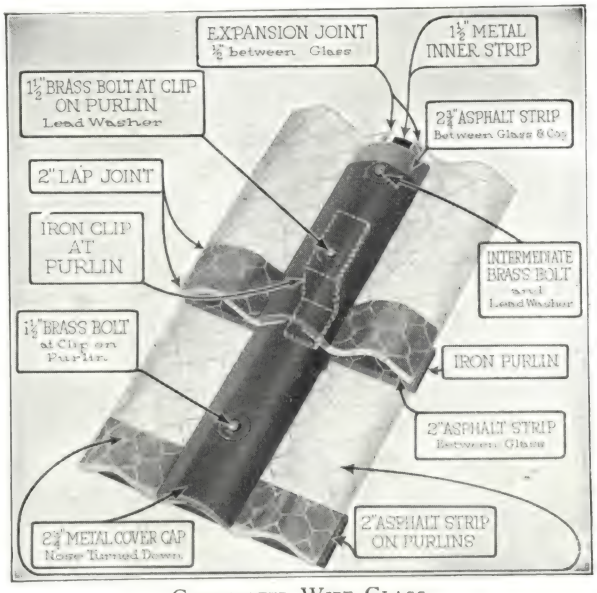
Corrugated wire glass is made to meet the demand for a substantial glass for an all-glass building and for use in connection with other corrugated materials, such as iron and asbestos.

Uses—CWG can be used in roofs, skylights, side walls, marquises, canopies and wherever *daylight* and *fire protection* are desired.

CWG is stronger than any other glass of like thickness, due to method of manufacture and to corrugations.

CWG admits maximum daylight and diffuses it, making a daylight building without glare or shadow.

CWG is self-cleaning, washing itself at every rainstorm. CWG is easily and quickly installed—no skilled labor required. When installed, there is ample room for contraction and expansion.



CORRUGATED WIRE GLASS
Shows parts required to install CWG. Note expansion joint feature

Weight—CWG weighs about 4½ lbs. to sq. ft.

Strength—CWG has strength seven times greater than any other glass of equal thickness. It will support itself without the aid of any special roof members.

Kinds—CWG made in deep angle (2½ in. c. to c. of corrugations) and in shallow angle ($2\frac{11}{16}$ in. c. to c. of corrugations).

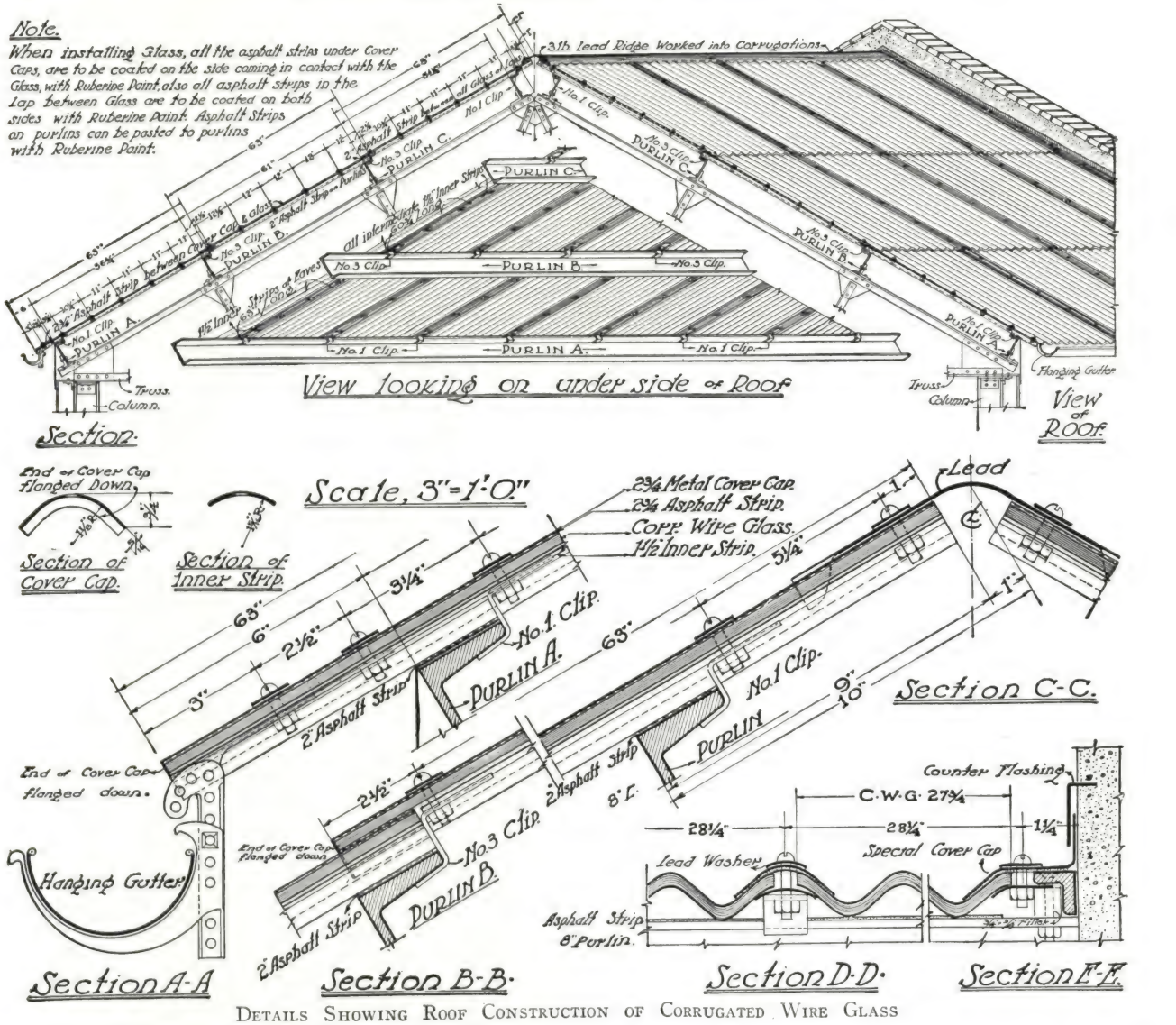
Standard Sizes—Deep angle, 27¾ in. wide by 42 and 63 in. long. Shallow angle, 26½ in. wide by 42 and 63 in. long. Special sizes to suit requirements.

Approval—CWG has the full approval of the National Board of Fire Underwriters and meets with their every requirement as a fire retardant glass. Its use on exposed openings reduces insurance.

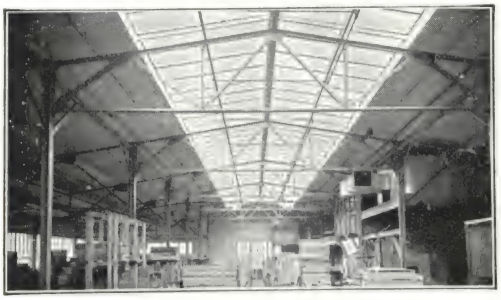
Specifications for installing CWG are shown, with details, on following page.

Send for circular D-1, showing how to install CWG.

Continued on next page

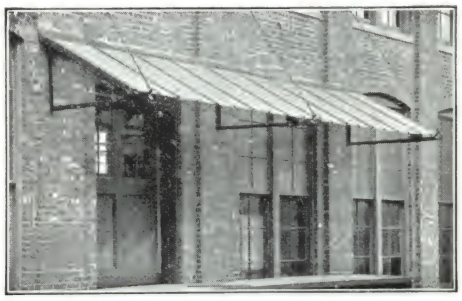


DETAILS SHOWING ROOF CONSTRUCTION OF CORRUGATED WIRE GLASS



CWG ROOF

CWG BUILDING
Note interior lighting effect



CWG CANOPY

Specifications for Installation of CWG

All glass shown or marked "CWG" on plans to consist of corrugated wire glass manufactured by the Pennsylvania "Solid" process. Roof purlins should be spaced 5 ft. 1 in. center to center if I-beams, or back-to-back if channels, which allows 2 in. for lap at end joints. For siding, the spacing of the T-iron girts should be 5 ft. 3⅝ in. center to center of supporting girts.

Method of Laying—Lay glass edge to edge and allow space between the sheets of glass. Cover joints with a 2¾ in. asphalt strip covered with protective paint on side next to glass, the full length of sheet of glass. Then cover with a 2¾ in. No. 24 gauge metal strip, full length of glass and underneath place a 1½ in. metal strip. The main fasteners to be hooked to purlins with reinforcing clips securely fastened with ¼x1½ in. rustproof stove bolts with lead washers placed on top of cover strip. Between the purlins or main fasteners, put in intermediate fasteners, not over 12 in. centers, consisting of rustproof ¼x1 in. stove bolts with lead washers securely screwed down. Tighten bolts snugly so as not to strain glass.

Roofing—Always have laps of glass come over purlins. Lay on purlins a 2 in. asphalt strip coated with Ruberine Paint; also lay a 2 in. asphalt strip, coated on both sides with Ruberine Paint, between glass at lap.

Accessories—Provide all metal caps and inner strips, bolts, washers, clips, protective paint, asphalt strips, etc., necessary to make a watertight and workmanlike job. Provide 2 coats of protective paint for all metal work.

Provide ridge roll, securely bolted to purlins; all spaces to be made watertight by filling in with elastic cement.

HIGHLAND GLASS CO.

WASHINGTON, PA.

SALES OFFICES

NEW YORK, N. Y., 100 Hudson Street CHICAGO, ILL., 186 North La Salle Street

Products

ROLLED GLASS, including Hammered Cathedral and Smooth Cathedral in plain colors and combination of colors; RIPPLE GLASS in white and colors; FIGURED GLASS in Colonial, Florentine, Moss, Mystic and Peerless in white and Colonial, Florentine and Moss in plain colors; PRISM GLASS; and ROUGH and RIBBED SKYLIGHT GLASS.

WIRE GLASS in Colonial, Florentine, Moss, Prism, Rough and Ribbed.

Also Polished Glass in Ideal and Wire Glass.

Production

This company produces the greatest variety of rolled glass products in the United States. Having four separate plants, a continuous supply of their product can be depended on at all seasons. They control their own sources of supply of raw materials, are situated on both the Pennsylvania and Baltimore & Ohio Railroads and have removed as far as humanly possible the fuel troubles of so many other plants; thus assuring a constant operation.

Esthetic Value

Highland products are recognized the country over for their superiority in brilliancy, color and durability, due to the proper selection of ingredients and careful workmanship throughout their manufacture.

Practical Value

For more than twenty years the products of this company have been recognized as standard. They excel in smooth surface, cutting qualities, flatness, durability and color.

Official Indorsement

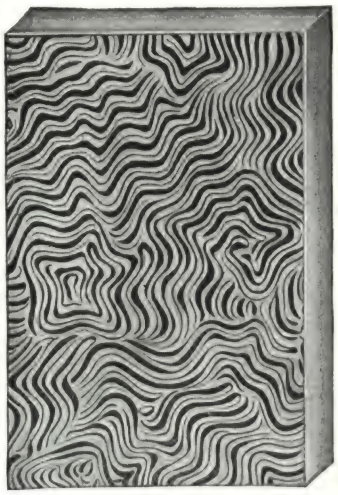
The production of the Highland wire glass is under the supervision of the National Board of Fire Underwriters, is tested and approved by them periodically and carries their official indorsement as attested by their having designated it as "Fire Retardant No. 295." Additional information can be had by reference to the National Board of Fire Underwriters.

Where Obtainable

HIGHLAND GLASS Co's. products may be secured from the leading jobbers of glass throughout the United States, Canada, Mexico, Cuba and Japan.

White Figured Glass

In 1/8-in. and 3/16-in. thicknesses; widths up to 44 in.; lengths up to 120 in. This company manufactures the largest variety of attractive patterns—clearly cut—giving the maximum diffusion of light.



COLONIAL FIGURED GLASS

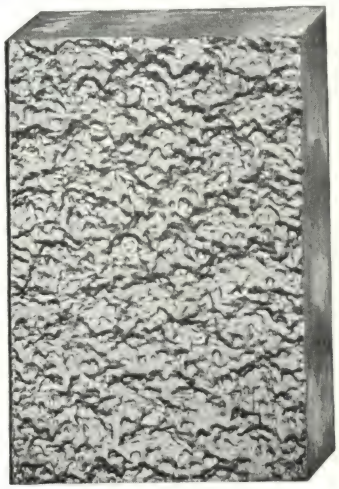
Prism Glass

The HIGHLAND GLASS Co's. prism glass has the smoothest surface of any rolled glass manufactured, the angles are scientifically designed to transmit the greatest quantity of light wherever it is desired. Widths up to 60 in. *high;* lengths up to 138 in.

Rough and Ribbed Skylight Glass Sizes

In 1/8-in., 3/16-in., 1/4-in. and 3/8-in. thicknesses; widths up to and including 44 in.; lengths up to 144 in.

FLORENTINE FIGURED GLASS



MOSS FIGURED GLASS

MYSTIC FIGURED GLASS

Continued on next page

Wire Glass Sizes

Colonial, Florentine, rough and ribbed, in ¼-in. and ⅜-in. thicknesses; widths up to and including 44 in.; lengths figured up to 110 in.; rough and ribbed up to 144 in.

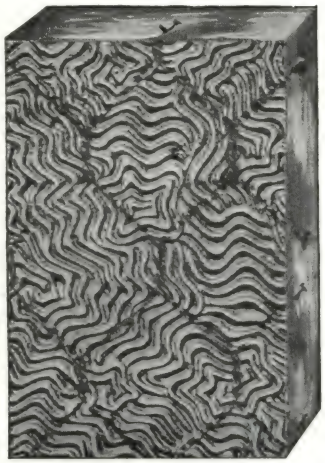
Prism wire glass is scant ⅜-in. thickness; widths up to and including 44 in.; lengths up to 144 in.

Colored Glass

Made in ambers, blue, wine and green, in hammered and smooth cathedral, rippled, ripple moss, Florentine and Colonial. Dense white opal made in hammered and smooth cathedral patterns, as well as in ⅛-in., $\frac{3}{16}$-in. and ¼-in. ribbed.

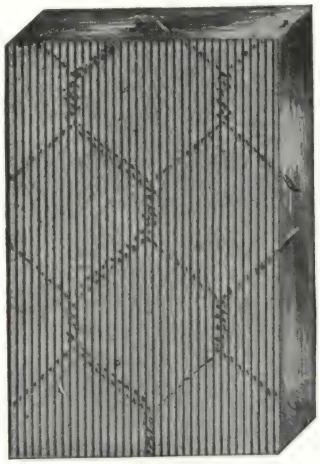
Widths 30 in.; lengths up to 90 in.

Mystic Wire Glass



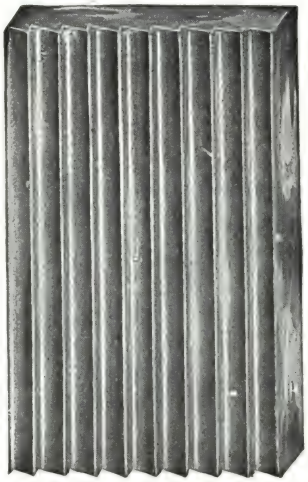
Colonial Wire Glass

Prism Wire Glass

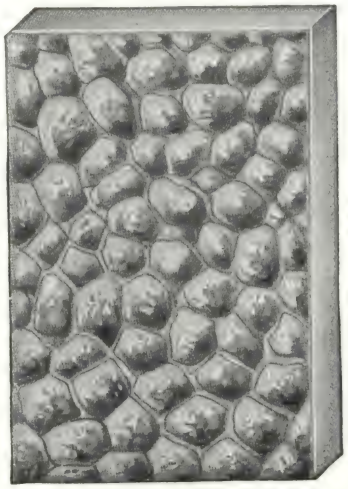


Ribbed Wire Glass

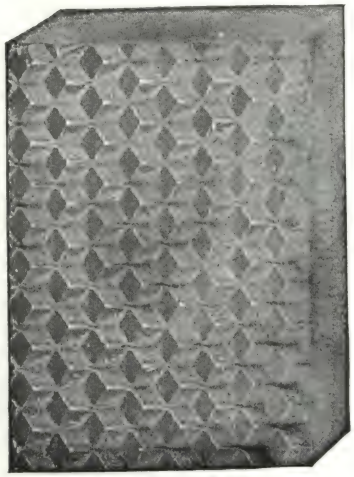
Rough Wire Glass



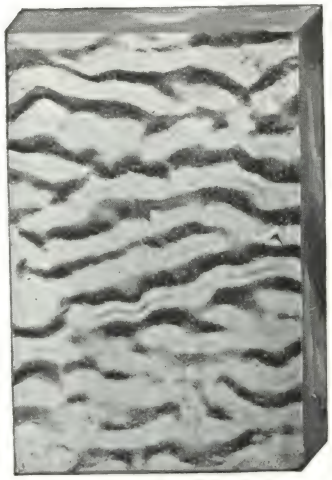
Prism Glass



Cathedral Glass



Polished Ideal Glass



Ripple Glass

MISSISSIPPI GLASS CO.

220 Fifth Avenue
NEW YORK, N. Y.

TELEPHONE
MADISON SQUARE 9370

BRANCH OFFICES

CHICAGO, ILL., 7 West Madison Street

ST. LOUIS, MO., 4070 North Main Street

Products

The best quality of FIGURED BUILDING GLASS and STANDARD ROUGH and RIBBED GLASS for Skylights.

Description

Apex is a very high quality figured glass with the smooth surface polished, making it most brilliant and desirable for high class work. All other patterns are figured rolled glass with a natural smooth surface.

Adaptability

Our various patterns make it possible while erecting a building to install a figured glass which correctly conforms with any style of architecture.

Advantages

Brilliance, strength, true cutting surface, power of light diffusion, uniformity of color, originality of design and excellence of manufacture, combined with moderate cost.

Light Diffusion

The experiments conducted by Prof. Charles L. Norton of the Massachusetts Institute of Technology, on behalf of the Associated Factory Mutual Insurance Companies of New England, demonstrated that a proper combination of glass surfaces insures for a given floor area a vastly increased efficiency of light over that to be had by plain glass. Factrolite and Pentecor, the most efficient patterns for industrial buildings, are the result of extensive laboratory work on distribution of light through glass.

POLISHED BACK AND PLAIN FIGURED BUILDING GLASS, STANDARD ROUGH AND RIBBED GLASS, FACTROLITE AND PENTECOR

Type	Thickness, in.	Maximum width, in.	Maximum length, in.	Approximate weight per sq. ft., lbs.
Apex (polished back)	1/4	50	100	4
Factrolite	1/8	48	130	2
Factrolite	3/16	48	130	2 1/2
Maze	1/8	48	130	2
Maze	3/16	60	130	2 1/2
Florentine	1/8	48	130	2
Florentine	3/16	60	130	2 1/2
Syenite	1/8	48	130	2
Syenite	3/16	60	130	2 1/2
Muranese	1/8	42	110	2
Ondoyant	1/8	30	100	1 3/4
Fig. No. 2	1/8	42	110	2
Fig. No. 2	3/16	42	110	2 1/2
Rough	1/8	48	130	2
Rough	3/16	48	130	2 1/2
Rough	1/4	48	130	3 3/4
Rough	3/8	48	130	5 1/4
Rough	1/2	48	130	7 1/2
Ribbed	1/8	48	130	2
Ribbed	3/16	48	130	2 1/2
Ribbed	1/4	48	130	3 3/4
Ribbed	3/8	48	130	5 1/4
Ribbed	1/2	48	130	7 1/2
Pentecor	1/8	48	130	2
Pentecor	3/16	48	130	2 1/2

LARGEST PRODUCER OF ROUGH ROLLED GLASS
MISSISSIPPI
GLASS COMPANY
220 FIFTH AVE.
NEW YORK

IDENTIFICATION LABEL

42D STREET AND MADISON AVENUE BUILDING, NEW YORK
All corridor doors and partitions glazed with Mississippi glass

Continued on next page

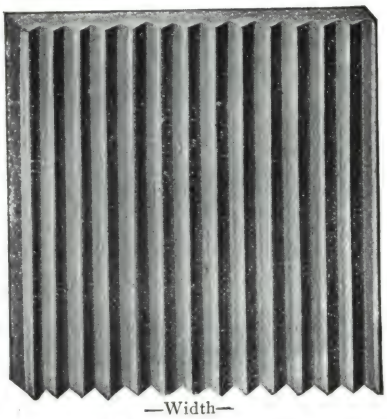
Ordering

Glass being one of the last materials to go into a building, it is often not ordered far enough ahead to give the manufacturer time to cut the glass to sizes and make shipment in time to enclose the building by the date desired. It is therefore advisable to give this point consideration in due time, as the tremendous demand for figured glass necessitates orders taking their turn as they are received.

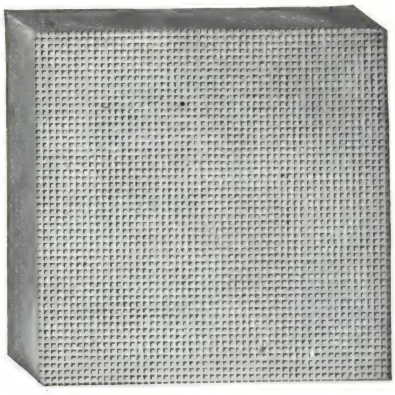
In ordering, always specify width first.

Specifying

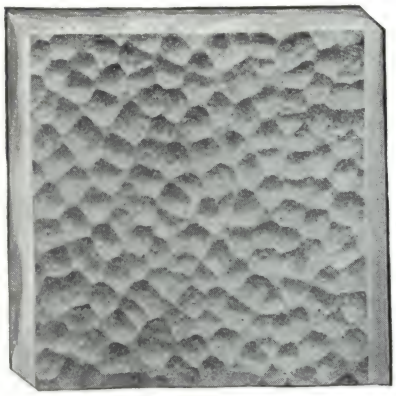
By specifying any of the patterns manufactured by the Mississippi Glass Co., the architect is insured against the substitution of inferior glass.



—Width—
Pentecor Glass



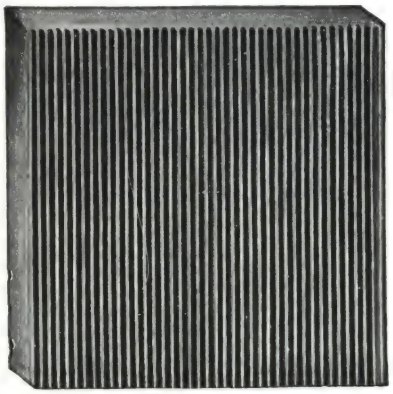
—Width—
Factrolite Glass



—Width—
Rough Glass

—Width—
Figure No. 2 Glass

—Width—
Muranese Glass



—Width—
Ribbed Glass

—Width—
Florentine Glass

—Width—
Ondoyant Glass

—Width—
Maze Glass

—Width—
Svenite Glass

THE WESTERN GLASS COMPANY

Manufacturers of Figured and Wire Glass

STREATOR, ILL.

Products

FIGURED GLASS; WIRE GLASS, Plain and Figured; ROUGH and RIBBED GLASS; SHEET PRISM GLASS; POLISHED WIRE GLASS.

Figured Glass

This is designed for use in hallways, areas, interior partitions, and similar constructions, where the admission of light without transparency is desired.

Made of the best materials obtainable and moulded in attractive patterns, it adds materially to the decorative effects of such installations.

Its distinctive advantages for this service have given it an established reputation.

RADIANT FIGURED GLASS

Designs—The figured glass is made up in a large number of designs, some of which are illustrated in the accompanying cuts. This glass can be supplied to match any style of architecture and to conform to architect's or builder's requirements.

Sizes and Weights—Made in thicknesses of 1/8, 3/16 and 1/4 in., with maximum dimensions of 48x120 in., and 48x132 in.

Rough and Ribbed Glass

Especially adapted for heavy service in skylights, partitions and factory windows.

Sizes—Made in thicknesses of 1/8, 3/16, 1/4, 3/8 and 1/2 in., with maximum dimensions of 48x120 in. for 1/8-in. thickness, and 48x132 in. for other thicknesses.

The 3/4-in. thick glass is furnished in rough glass or rough wire glass in cut sizes, not in stock sheets.

Solite Glass

Used where the maximum *diffusion* of light, as well as the maximum *amount* of light is required.

Nearly 200,000 sq. ft. of 1/4-in. Solite Wire Glass was specified and used in the Naval Supply Base building, Brooklyn, N. Y.

Special samples of Solite Glass sent on application.

Wire Glass

Wire glass can be furnished in any of the regular figured designs or in polished transparent sheets, as desired.

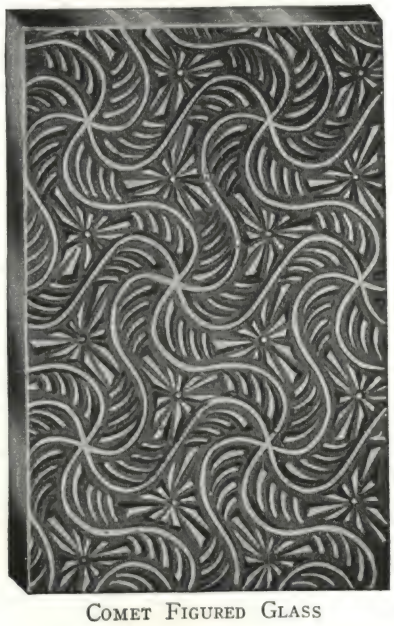
It is made by a single-pour process, and the reinforcement is a special wire fabric of our own design, with 3 twists and 5 loops at the vertical strand.

By our method of manufacture, this wire fabric is incorporated in the sheet of molten glass while it is being rolled. This makes the finished product better able to stand severe strains and sudden temperature changes. The wire strand used is so thin that it does not obstruct the light and is scarcely noticeable under ordinary conditions.

Fire and Accident Prevention—The main reason for using wire glass is the reduction of the fire and accident hazards. Properly installed, wire glass furnishes an effective barrier to the spread of flames through exposed windows and other openings.

MOSS FIGURED GLASS

CARNATION FIGURED GLASS



COMET FIGURED GLASS

Continued on next page

In this connection our product has stood the severe tests imposed by the Underwriters' Laboratories, Inc., and has been fully approved by the Fire Underwriters' Association.

Each sheet bears the identification marks of the Underwriters' Laboratories, Inc.

In windows subject to heavy wind pressures or liable to injury from carelessness or from flying bodies, the installation of wire glass insures against injury to pedestrians from falling glass and against the resulting damage suits.

Sizes—Made in thicknesses of ¼, ⅜ and ½ in., sizes up to and including 48 in. wide by 132 in. long.

Standard wire glass is made as near as possible to $\frac{5}{16}$ in. thick in accordance with the rules of the Underwriters' Laboratories, Inc., covering standard construction of fireproof windows and skylights.

All kinds of wire glass furnished in the standard ¼- and ⅜-in. thickness.

Wire glass is furnished in other thickness as called for by engineering requirements.

Sheet Prism Glass

Where it is desired to project daylight well back into an interior, our sheet prism glass is an effective glazing medium for producing the maximum lighting efficiency.

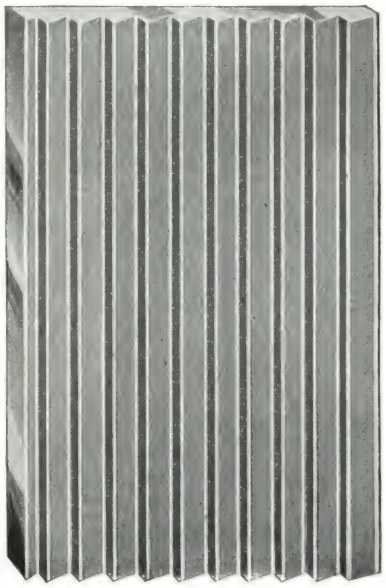
Furnished in standard thickness and in sizes up to 50 in. wide and 132 in. long.

WEIGHTS OF GLASS PACKED FOR SHIPMENT

Thickness, in.	⅛	3/16	¼	⅜	½	¾
Weight, lbs. per sq. ft.	2½	3½	4½	6	8	11

Solite Wire Glass

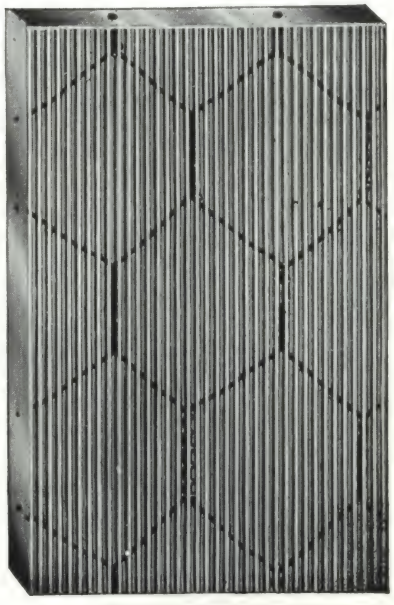
Rough Wire Glass



Sheet Prism Glass

Polished Wire Glass

Holly Wire Glass



Ribbed Wire Glass

PRESSED PRISM PLATE GLASS COMPANY

Manufacturers of Ornamental Polished Plate Glass Products

25 North Dearborn Street
CHICAGO

44 East 23rd Street
NEW YORK

Products

"IMPERIAL" PRISM-PLATE ORNAMENTAL GLASS in five styles; "IMPERIAL" PRISM-PLATE GLASS in large plates; "IMPERIAL" PRISM SKYLIGHT GLASS (unit plates 18x60 in.).

Description

The products illustrated are ground and polished *plate* glass in standard plate glass thickness and quality, having beautiful, clean cut, prismatic patterns *pressed* on one side.

Advantages

All these products are strong, durable and easily cleaned. The patterns are uniform and have none of the disfiguring waves or roller marks common to all other figured glasses. They harmonize, as no other figured glass can, with the plate glass windows which characterize modern building elevations and interiors.

"Imperial" Prism-Plate Ornamental Glass

Numerous installations of corridor doors, transoms, side lights, partitions, ceilings and fixtures in all kinds of buildings throughout the country indicate the adaptability of this beautiful product. The various patterns will harmonize with any style of finish and a wide range of modern architecture. Sizes up to 72x84 in.

"Imperial" Prism-Plate Glass

Supplied as it is in solid one-piece plates of any size up to 82x72 in., this is beyond question the most beautiful, efficient and sensible product ever devised for directing daylight into dark interiors.

"Imperial" Prism Skylight Glass

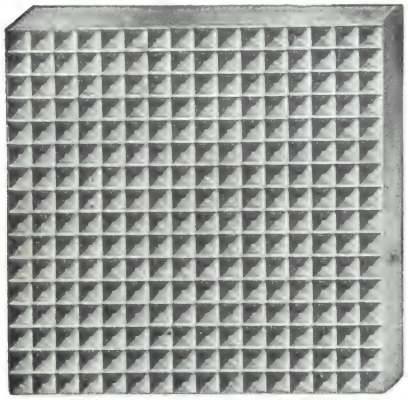
Maximum lighting and minimum leakage for store skylights, railway sheds, factory roofs, etc.

Samples and Quotations

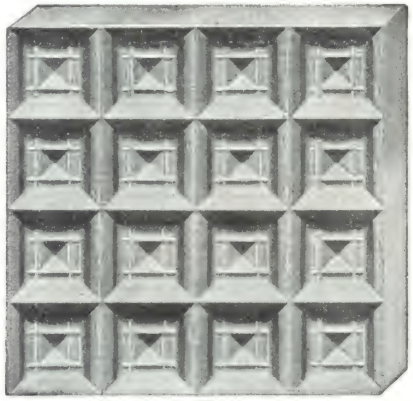
Plate glass jobbers carry these products in stock and will be glad to make prices. A card to either office will bring samples and further information.

Specifications

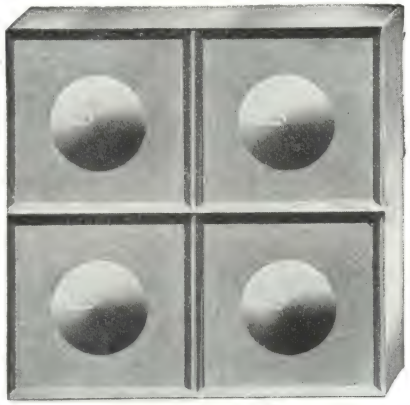
To preclude the possibility of substitution, always use the word "Imperial" in specifying.



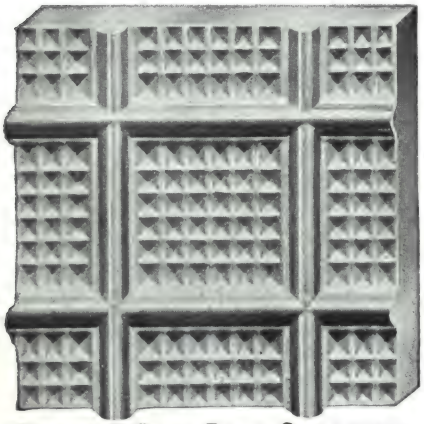
"IMPERIAL" PRISM-PLATE ORNAMENTAL, STYLE O-1



"IMPERIAL" PRISM-PLATE ORNAMENTAL, STYLE O-2



"IMPERIAL" PRISM-PLATE ORNAMENTAL, STYLE O-3 (TRANSPARENT)



"IMPERIAL" PRISM-PLATE ORNAMENTAL, STYLE O-4

"IMPERIAL" PRISM-PLATE ORNAMENTAL, STYLE O-5

"IMPERIAL" PRISM-PLATE GLASS

JACOBY ART GLASS CO.

Designers and Makers of Art Glass Windows

STUDIOS

2702 St. Vincent Avenue

ST. LOUIS, MO.

Products

STAINED GLASS in the ANTIQUE PAINTED STYLE for Churches and Residences.

LEADED OPALESCENT and CRYSTAL GLASS for all building purposes.

Special Designs

This organization will gladly prepare special water color sketches in the antique or opalescent style.

Ceiling Lights

For all buildings.

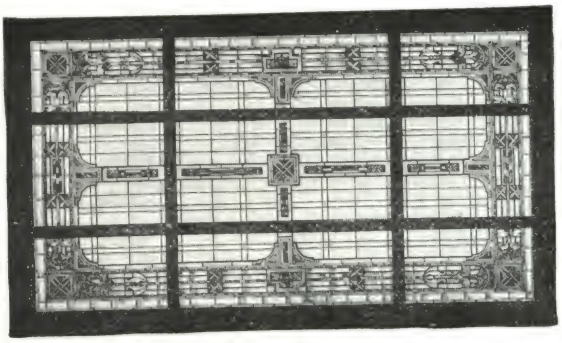
Memorial Windows

We are prepared to submit photographs of windows designed and executed in our studios.

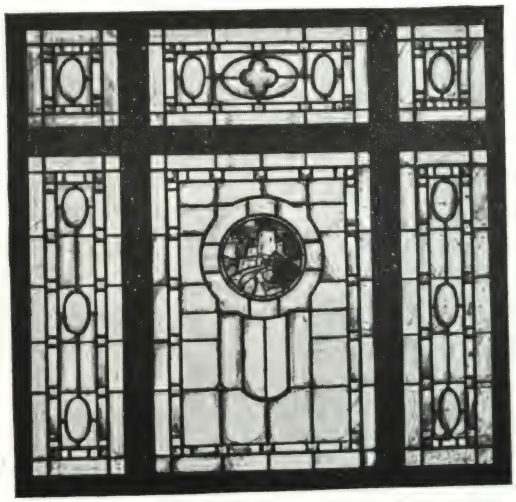
RESIDENCE LIGHT IN ANTIQUE GLASS

RESIDENCE WINDOW IN ANTIQUE GLASS

GRISAILLE PATTERN IN ANTIQUE GLASS



CEILING LIGHT



WINDOW IN OPALESCENT GLASS FOR RESIDENCE

MEMORIAL WINDOW IN ANTIQUE GLASS

BELKNAP-MORAN-ALLEN CO., INC.

Special Putties, Paints and Roofing Cement

5 Ainslie Street

BROOKLYN, N. Y.

Products

"BELKNAP'S" LEAD and ZINC PUTTY for wood sash, etc.

"HOLDFAST" PUTTY for metal sash, etc.

"NEW-TYNT," an Interior Oil Paint.

"BRITE-WITE," a specially treated White Enamel Paint for mills, factories, etc.

"KONKRETO," a Concrete Wall and Floor Waterproofing and Dustproofing Coating.

"KONKRETITE," a Waterproofing Paste (Integral).

"KONKRETEX," a Waterproofing Powder (Integral).

"DEHYDROLAC," a Black Waterproofing Compound ready for use.

"ELASTICO," a Glazing Compound.

"Belknap's" Lead and Zinc Putty

This putty, for wood sash, skylights, etc., is a combination of pure white lead-zinc oxide and whiting, mixed by machine to the proper consistency. After hardening, it holds the glass firmly in position, but with a flexibility which prevents disintegration at any time.

"Belknap's" Lead and Zinc Putty is warranted to give long and efficient service, under all conditions. Price is a little higher than that of the regular linseed oil putties.

"Holdfast" Metal Sash Putty

This putty is made from a formula which is the result of long research for a putty that is fire resistant and will meet all other requisites for metal sash service at a low cost.

It works as easily and smoothly as ordinary putty, reducing the cost to the metal sash glazing contractor. It adheres firmly to the sash without shrinking and hardens quickly without sagging or wrinkling.

Price is no more than ordinary putty; yet "Holdfast" is warranted efficient and durable under all types of service. Guaranteed to last as long as the glass.

"New-Tynt" Sanitary Interior Oil Paint

A modern, sanitary, light reflecting paint for plaster and brick walls, wood trim and metal work. It produces a rich, velvety surface that will not fade or turn yellow and that can be freely washed with soap and water.

Recommended for use in residences, schools, offices, factories, auditoriums, etc., also as undercoat for "Brite-wite" Enamel.

"New-Tynt" produces a satisfactory finish with 2 coats, and is warranted not to peel, chalk nor blister when properly applied.

Covering capacity, 500 sq. ft. per gal., 1 coat; 300 sq. ft. per gal., 2 coats.

"Brite-wite" Enamel

An oil paint enamel made of specially treated oil and the best white pigments known; very free flowing so that it may be either brushed or sprayed. One coat of "New-Tynt" primer and a finishing coat of "Brite-wite" is all that is necessary for a complete light reflecting finish. It saves at least 25% in the lighting costs and as a mill white it has no equal. Suitable for inside or outside use.

"Konkreto"

A liquid chemical compound (not paint) which reacts with the concrete, changing the porous nature of it to a hard, glasslike surface. (An insoluble silicate.) On new work it is used on the finishing or top coat to obtain the above results, making same waterproof, alkaliproof and impervious to oil and most acids.

It lowers the freezing point of concrete, also makes it proof against water pressure when used as per our specifications. One gallon will cover about 100 sq. ft., according to condition of concrete.

"Konkretite"

A waterproofing paste, recommended where a concrete mixer is used.

"Konkretex"

A waterproofing powder to be mixed with the dry cement before sand and water are added.

"DeHydrolac"

A black, waterproof tacky material, always elastic. Forms a perfect bond with plaster, saves cost of furring and lathing.

On the average surface, 1 gal. of DeHydrolac will cover from 75 to 100 sq. ft. When painting large surfaces it is more economical to use a spraying machine.

"Elastico" Glazing Compound

A putty that hardens only to the consistency of soft rubber and is waterproof under all conditions, expanding and contracting with the weather.

It adheres to glass, metals, concrete, stone, wood, expansion joints in steel, etc. 1 lb. will glaze about 12 ft. of ½-in. sash. Made in any shade.

Co-operation

We are always pleased to co-operate with architects or engineers on any of the above products or technical problems of any kind.

ESTABLISHED 1886

PENBERTHY INJECTOR CO.

Manufacturers of Automatic Cellar Drainers

DETROIT, MICH.

CANADIAN FACTORY: WINDSOR, ONTARIO, CAN.

Products

"PENBERTHY" AUTOMATIC CELLAR DRAINER.

Also manufacturers of "Penberthy" Automatic Injector; Auto-Positive Injector; "XL-96" Swimming Pool Heater; "XL-96" Ejector; Safeguard Water Gages; Water Heaters; Oil Cups; Grease Cups; Air Cocks; Carburetors; Flometers, Re-atomizers; Gasoline Gages; Radio Head Sets; Glass Lenses; etc.

TRADE-MARK

"Penberthy" Automatic Cellar Drainer

Advantages—(1) All parts are brass, except the copper float; all working parts are above water; no slime or corrosion.

(2) A foot valve in the strainer seals the suction pipe when the drainer stops working, holding the water in all the pipes, so that it is always primed ready to start instantly. Cellar can not flood with city water if for any reason the pressure is insufficient to operate the ejector.

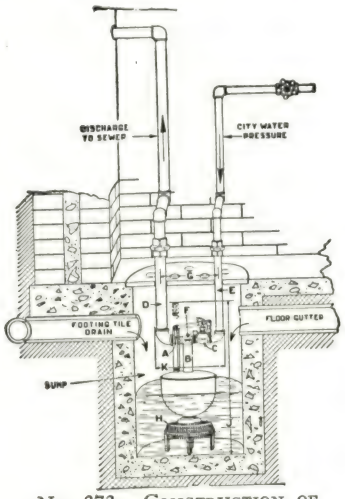
(3) It takes up half the space of other drainers.

(4) The operating valves open and close instantly by action of the water pressure.

(5) No leather washers used; leather dries and causes leaks.

(6) It is most efficient drainer on the market and costs no more.

"PENBERTHY" AUTOMATIC CELLAR DRAINER
E—Water pressure pipe
C—Water valve
D—Discharge pipe
F—Ejector
B—Suction pipe
H—Strainer



No. 373. CONSTRUCTION OF "PENBERTHY" AUTOMATIC CELLAR DRAINER

What It Is For and How Used—A device for transferring liquids from one level to another with water under pressure as power. The name, cellar drainer, is derived from its commonest use, that of pumping water from cellars, but its utility is not necessarily restricted to this usage.

The construction of the "Penberthy" automatic cellar drainer is admirably simple, being a highly efficient ejector or siphon jet, to which is attached a quick opening, float controlled valve, C. Nor is there anything complicated about its operation. Drainer is placed in sump or place where water or seepage collects, a line from the city water supply attached at one side, E (No. 373), and a line leading to discharge point (sewer, gutter or wherever it may be) to the other side, D (No. 373). Then turn on the water and forget it, for as water rises in the pit the float is raised and when the right height is reached the valve is opened instantly allowing the city water to flow through the ejector, causing a suction, and carrying the sump water with it to the discharge. As the water goes down, float follows, and when the low point is reached the valve closes to remain closed until enough water collects to again raise the float, when the whole operation is repeated.

Guarantee—All drainers absolutely guaranteed perfect in working and workmanship.

LIST PRICES

No. 1	No. 2	No. 3	No. 4	No. 5
$25.00	$40.00	$55.00	$80.00	$110.00

CAPACITIES AT DIFFERENT PRESSURES AND ELEVATIONS, DIMENSIONS, PIPE SIZES, WEIGHTS, ETC.

Size No.	Working head, ft.	Actual capacities in gallons of water per hour taken from sump and not total amount of discharged water				Pipe sizes, in.		Dimensions over all, in.		Shipping weight boxed, lbs.
		At 25 lbs. will elevate	At 40 lbs. will elevate	At 60 lbs. will elevate	At 80 lbs. will elevate	Supply	Discharge and suction	Height	Diam.	
1	3 6 9 12 18	230 200	400 350 285	530 480 420 360	650 580 490 420 340	½	1	20¾	9½	18
2	3 6 9 12 18	430 320	630 480 400	820 700 600 480	1050 840 780 620 450	¾	1¼	22½	11¼	22
3	3 6 9 12 18	660 520	1100 860 720	1440 1230 1050 840	1650 1440 1320 1040 760	1	1½	25⅜	15⅛	37

Note: Capacities are the *actual capacities of water taken from sump*, and not combined discharge of operating and drainage water as in most tables. For higher elevations than above, special drainers can be made; also low pressure drainers for operating pressure 10 to 30 lbs. Also made in sizes 4 and 5.

Specifications

Furnish and install in a suitable sized pit (see mason specification) in cellar of building a "Penberthy" automatic cellar drainer (made by the PENBERTHY INJECTOR CO., Detroit, Mich.) in accordance with directions furnished by the manufacturers, this outfit to be placed below the basement floor and conform to the following specifications:

Size No.	Power line iron pipe size	Discharge iron pipe size	Diam. of pit	Depth of pit

Additional Information—The pit should be placed so that all surplus water will drain to it, and it may be constructed of cement, brick, sewer crock or other suitable material. A cover should be provided that is not airtight and should be made in two pieces, these halves being cut out to fit around the pipes, D and E (No. 373). Below are given all necessary dimensions.

Size No.	E City water (or steam) line iron pipe size, in.	D Discharge line iron pipe size, in.	K Extreme diam. of drainer in.	J Height of drainer, in.	G Approximate centers of pipe cut-outs in cover, in.	Size sump suggested	
						Minimum diam., in.	Minimum depth, in.
1	½	1	9½	20¾	8	12	22
2	¾	1¼	11¼	22¼	9⅞	16	24
3	1	1½	15⅛	25⅜	13	20	28

Letters at top of columns refer to No. 373.
It is a good fault to have the pit a little larger than actually necessary.

ANSONIA SANITARY MFG. CO.

Manufacturers of Sewage Ejectors, Destructors and Oil Separators

TELEPHONE
WATKINS 6713

1133 Broadway
NEW YORK, N. Y.

Products

ANSONIA AUTOMATIC SEWAGE EJECTORS; ANSONIA HIGH TEMPERATURE DESTRUCTOR INCINERATORS.

Also manufacturers of Gasoline and Oil Separators, Oil Filters, Combination Water Heater and Garbage Destructors, Special Gas or Oil Fired Animal Destructors and Body Crematories.

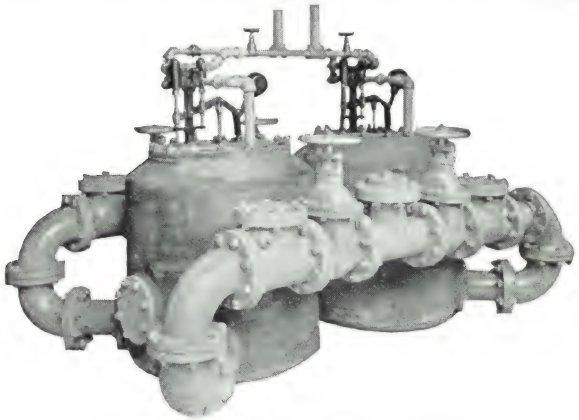
Ansonia Automatic Sewage Ejectors

Uses—Ansonia Automatic Sewage Ejectors are in use in buildings in United States, Canada and Europe, as a medium for elevating sewage from toilet rooms which are below the gravity sewer. Due to their utter disregard for pebbles, sand and small debris of any nature, they are especially suited for draining mines, and pumping town sewage, ground water and subsoil drainage. *Also for pumping waste from plumbing aboard ships.* In fact, Ansonia Automatic Sewage Ejectors are recognized by the highest authorities as the essence of pumping simplicity for elevating liquids of every description.

OPERATING VALVE OF ANSONIA AUTOMATIC SEWAGE EJECTOR

Operation—The machines are operated automatically by compressed air generated at a central power station or by individual plants located in the immediate vicinity. In addition, the air compressors may be operated by steam, gas or oil engines; or by any power most convenient or economical under the existing conditions. They will run every minute of the 24 hours, if required, and are always on duty.

Economy—The machines will run for months



ANSONIA AUTOMATIC SEWAGE EJECTOR
Made for Norwegian-American Building, Kristiana, Norway

with little or no attention or repairs. The highest rate of economy is obtained, as the amount of compressed air used is in proportion to the volume of liquid displaced. Every plant installed is fully guaranteed.

Specification for Ansonia Sewage Disposal Plant

(1) Furnish and install an Ansonia Automatic Sewage Ejector plant with the necessary ejector(s) air compressors(s) receiver(s) and all equipment necessary to make ejector plant complete and ready for service.

(2) Diagrams—To accompany these specifications furnish diagrams showing the arrangement of the ejectors and location of machinery and all piping and connections.

(3) Ejectors—The plant shall be equipped with extra heavy cast iron receiving tank(s) or pot(s) of ..... gals. capacity (each), furnished with the Ansonia automatic ejector operating valve and supplied with welded, galvanized iron float traveling on a float rod between two striking points. Suitable gate valves, check valves, flanges, ells, tees, gaskets, bolts and nuts shall be supplied as required.

(4) Air compressor shall be .. x .. and shall be of ample capacity for the work required to lift the sewage approximately .. ft. to the line of the gravity sewer. Compressor shall be connected .....

Note: Compressor may be operated by motor as specified below or may be connected to steam, gas or oil engine as conditions may require.

(5) Air tank shall be .. x .. tested to working pressure of 100 lbs. Tank shall be equipped with pressure gauge, drip cock and safety valve and trapped for proper size connections, and shall be connected to ejector(s).

(6) Furnish and set electric motor(s) of .... h.p. for the complete operation of the ejector plant.

(7) Furnish and set an automatic switchboard for automatic control and operation of the air pressure. All electrical work will be done by Electrical Contractor.

Note: Where more than one ejector tank is to be installed, use paragraph 8.

(8) Accessibility—The design of each ejector must be such that any unit can be cut out for repairs if necessary, without interruption of the operation of the other(s).

(9) Guarantee—The sewage ejector plant shall be guaranteed for a period of 1 year from the date of installation.

Notes: Provide, under Electrical Work, for wiring to be brought to the switchboard, controlling the operation of the sewage disposal plant, and from switchboard to motors.

Provide also, under the proper heading, for a pit of suitable dimensions to receive the ejectors. Proper dimensions for pit are given in the manufacturer's catalogue.

Water Lifting Plant—The Ansonia sewage ejector system can be installed also as a water lifting plant. Specifications for the latter are practically the same as the above, the wording being changed where reference is made to the sewage ejector plant.

Ansonia High Temperature Destructors

An approved appliance for the disposal of refuse and waste by fire. The Ansonia Destructor is designed and built of any desired capacity and is guaranteed as to durability, efficiency and sanitary performance. It can be furnished in sizes which adapt it equally well to the small domestic installation or the great city plants.

Domestic Installations—The Ansonia No. 1 Destructor is especially suited to apartment houses, dwellings, stores, restaurants, houses and camps. It is the ideal machine for conditions where the output of waste is not sufficiently large to warrant the maintenance of a continuous fire. It is compact, scientific, effective, and indorsed by architects and boards of health. The

Continued on next page

apparatus is strong and durable and can be operated by any person. It requires the minimum of attention.

Large High Temperature Destructors—This company is prepared to furnish destructors operating with or without forced draft and automatically stoked, for handling large quantities of waste. They can be erected within city limits, being smokeless, odorless, sanitary and without danger of nuisance. The heat from these destructors may be used for supplying steam power and the clinker obtained used for foundation work in road construction, concrete sidewalks, etc.

Prices and detailed information sent on request.

Specifications for Ansonia Destructors

Foundation—There shall be provided a foundation of concrete over the space occupied by the destructor.

Dimensions—The exterior of the destructor shall be ..... long, ... wide and ..... high (from concrete foundation).

Construction and Fire Brick Lining—The destructor shall be of brickwork or steel outer walls, lined with best refractory fire brick of special quality and make. Between the red brick walls and fire brick lining there shall be a space to take up without injury the expansion under heavy fire strain, filled with heat insulating material. The roof shall be of special fire clay blocks with special skewback.

The destructor shall be braced by angle irons at the corners and reinforced by heavy longitudinal angles at the spring of the roof arch, and on line of fire grate.

Charging Hole—The charging holes shall be of four sections of heavy special fire clay blocks with a circular opening, with suitable cover.

Buckstays—There shall be provided buckstays made of channel iron doubled, connected by tie rods at the top and set into the concrete foundation.

Doors—There shall be provided a heavy cast iron front carrying double fire doors above, with liners and dampers and double ash pit doors below.

Fire Grates—There shall be provided one special fire grate for combustion of fuel; adjoining this shall be provided a drying grate.

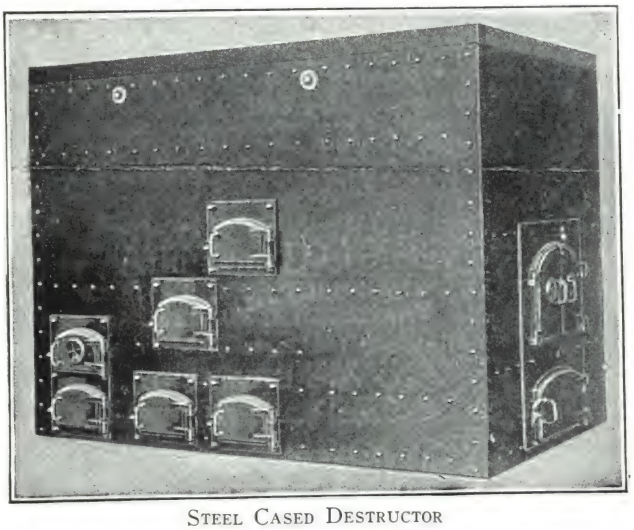
Guarantee—It shall be guaranteed that the destructor will destroy all garbage and refuse accumulated in the quantities specified, operating in a perfectly sanitary manner destroying the noxious odors and injurious gases efficiently and economically.

Typical Installations of Ansonia Destructors and Ejectors

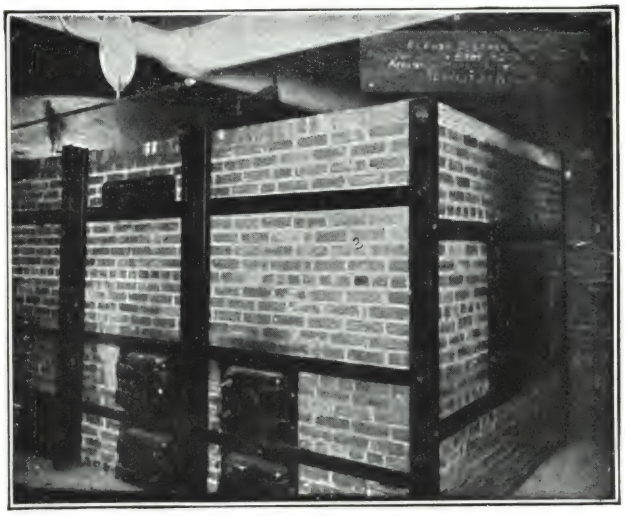
W. K. Vanderbilt, New York, N. Y.
Hudson and Manhattan Railroad Co., New York, N. Y.
McAlpin Hotel, New York, N. Y.
Equitable Building, New York, N. Y.
Stern Brothers Department Store, New York, N. Y.
Curtis Publishing Company, Philadelphia, Pa.
Philadelphia Rapid Transit, Philadelphia, Pa.
Public Crematory, Washington, D. C.
United States Bureau of Animal Industry, Washington, D. C.
United States Post Offices, Cleveland, Ohio, and New York, N. Y.
Larkin Company, Buffalo, N. Y.
City of Reading, Pa.
Municipal Pumping Station, Peterboro, Canada
New York Shipbuilding Corp., Camden, N. J.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Centralbanken, Kristiania, Norway
London, England, Tubes
Hebard Cypress Co., Waycross, Ga.

Ansonia Gasoline and Oil Separator

An appliance approved by the New York City Fire Department and guaranteed to separate gasoline and oils from drains in garages and prevent same from entering sewers.



Steel Cased Destructor



Brick Cased Destructor

Animal Destructor

CHICAGO PUMP CO.

Electric Pumping Machinery

2332 Wolfram Street
CHICAGO, ILL.

TELEPHONE
ARMITAGE 1286

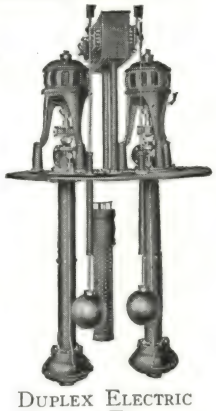
Products

Manufacturers of DUPLEX ELECTRIC SEWAGE EJECTORS; RETURN LINE VACUUM PUMPS for heating systems; HIGH and LOW PRESSURE AUTOMATIC CONDENSATION PUMPS and RECEIVERS; HORIZONTAL MULTISTAGE PUMPS; AUTOMATIC ELECTRIC BILGE PUMPS.

Also manufacturers of Turbine Air Line Pumps for heating systems; Pneumatic Water Supply Systems.

Duplex Electric Sewage Ejector

For pumping sewage from basements into sewer. Simplicity of design and construction are predominating features. All working parts are visible and of easy access. No climbing down into the pit to open or close valves or do any adjusting, oiling or repairing.



DUPLEX ELECTRIC SEWAGE EJECTOR

CAPACITIES, HORSEPOWER AND FLOOR SPACE, DUPLEX ELECTRIC SEWAGE EJECTOR

Unit No.	Type of pump and frame No.	Capacity, g.p.m.	Discharge, in.	Motor h.p.	Will pump against a total head, ft.	Floor space required, in	
						Diam. basin, single pump	Diam. basin, duplex set of pumps
S.H. 300	L-3	75	3	¾	8	36	42
S.H. 301	L-3	75	3	1	11	36	42
S.H. 302	L-3	75	3	1½	16	36	42
S.H. 303	L-3	75	3	2	22	36	42
S.H. 304	L-3	75	3	3	32	36	42
S.H. 305	L-4	75	3	5	40	36	42
S.H. 306	L-3	100	3	¾	7	36	42
S.H. 307	L-3	100	3	1	10	36	42
S.H. 308	L-3	100	3	1½	15	36	42
S.H. 309	L-3	100	3	2	21	36	42
S.H. 310	L-4	100	3	3	30	36	42
S.H. 311	L-4	100	3	5	38	36	42
S.H. 312	L-3	125	3	1	8	42	48
S.H. 313	L-3	125	3	1½	13	42	48
S.H. 314	L-3	125	3	2	17	42	48
S.H. 315	L-3	125	3	3	26	42	48
S.H. 316	L-4	125	3	5	37	42	48
S.H. 317	L-3	150	3	1½	11	42	48
S.H. 318	L-3	150	3	2	15	42	48
S.H. 319	L-3	150	3	3	23	42	48
S.H. 320	L-4	150	3	5	36	42	48
S.H. 321	L-3	200	3	2	12	42	48
S.H. 322	L-3	200	3	3	19	42	48
S.H. 323	L-4	200	3	5	32	42	48
S.H. 324	L-4	200	3	7½	34	42	48
S.H. 325	L-3	250	4	2	10	48	60
S.H. 326	L-3	250	4	3	16	48	60
S.H. 327	L-4	250	4	5	27	48	60
S.H. 328	L-4	250	4	7½	33	48	60
S.H. 329	L-4	300	4	3	14	48	60
S.H. 330	L-4	300	4	5	23	48	60
S.H. 331	L-5	300	4	7½	35	48	60
S.H. 332	L-5	300	4	10	45	48	60
S.H. 333	L-4	350	4	3	12	48	60
S.H. 334	L-4	350	4	5	21	48	60
S.H. 335	L-5	350	4	7½	31	48	60
S.H. 336	L-5	350	4	10	42	48	60

Duplex units include two pumps, two motors, duplex automatic control, strainer and cast iron cover but do not include basin.
All basins should be 48 in. deeper than lowest inlet.
Ejectors up to 1500 g.p.m. are also manufactured; write for complete catalogue.

Pumping Machinery

This company specializes in pumping machinery, catering particularly to the building industry. The science and engineering knowledge of a strong organization of practical pumping engineers are devoted to the production of the finest line of pumping equipment manufactured for this service.

Return Line Vacuum Pump

Direct connected centrifugal type.

For maintaining a vacuum on heating system and returning the condensation water direct to the boiler. No gear, pulleys, belts, valves, etc., in its construction.

A complete catalogue on vacuum pumps will be sent on request.

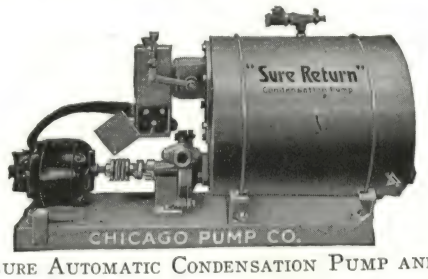
RETURN LINE VACUUM PUMP

CAPACITIES, HORSEPOWER AND FLOOR SPACE, RETURN LINE VACUUM PUMPS

Unit No.	Sq. ft. radiation	Motor h. p.	Approx. floor space required, in.
S.V. 1	8000	1	55 x 32
S.V. 2	16000	1½	60 x 34
S.V. 3	26000	2	62 x 35
S.V. 4	40000	3	65 x 37
S.V. 5	65000	5	68 x 40

Condensation Pumps and Receivers

These pump the heating returns into boiler from radiation, heating coils, cooking kettles, etc., that may be located below boiler level. They are simple in construction, have very few moving parts, and are quiet in operation. Come all mounted on one base, connected up ready for piping and wiring connections. A complete line of high pressure condensation pumps also manufactured.



LOW PRESSURE AUTOMATIC CONDENSATION PUMP AND RECEIVER

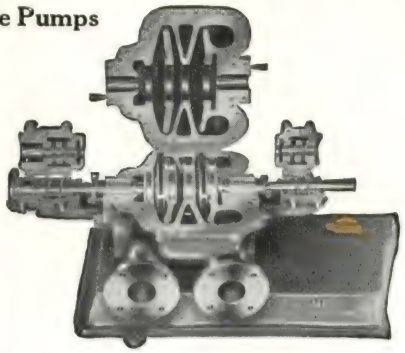
CAPACITIES, HORSEPOWER AND FLOOR SPACE, LOW PRESSURE AUTOMATIC CONDENSATION PUMP AND RECEIVER

Unit No.	Max. sq. ft. direct radiation	Motor h.p.	Approx. floor space required, in.	Highest water level in receiver from floor line, in.	Unit No.	Max. sq. ft. direct radiation	Motor h.p.	Approx. floor space required in.	Highest water level in receiver from floor line, in.
S.H. 650	3,000	¼	43x28	26	S.H. 654	20,000	¾	59x32	30
S.H. 651	6,000	½	43x30	26	S.H. 655	25,000	1	59x32	35
S.H. 652	10,000	½	55x30	30	S.H. 656	35,000	1	61x34	39
S.H. 653	15,000	¾	57x32	30	S.H. 657	50,000	1½	65x36	41

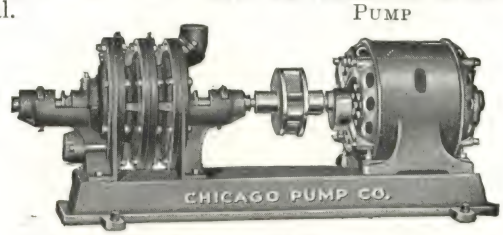
Continued on next page

Horizontal Multistage Pumps

Fitted with enclosed type balanced impellers and outer board ring oiled bearings. Best adapted for roof tank filling, hot and cold water circulating, pneumatic water systems, brine circulating; **in fact,** wherever a quiet running pump is essential.



TYPE HS HORIZONTAL MULTISTAGE PUMP



TYPE M HORIZONTAL MULTISTAGE PUMP

CAPACITIES, HORSEPOWER AND FLOOR SPACE, TYPES M AND HS HORIZONTAL MULTISTAGE PUMPS

Unit No.	Type of pump and frame No.	Suction and discharge, in.	Number of stages	Capacity, g.p.m.	Will pump against a total head, ft.	Motor h.p.	Approx. floor space required, in.
S.H. 19	MA	1¼	1	25	19	½	18 x 38
S.H. 21	MA	1¼	1	25	37	1	18 x 39
S.H. 23	MA	1¼	2	25	56	1½	19 x 44
S.H. 24	MA	1¼	2	25	71	2	19 x 45
S.H. 26	MA	1¼	3	25	115	3	19 x 50
S.H. 28	MA	1¼	4	25	192	5	24 x 56
S.H. 31	MA	1¼	1	35	18	¾	18 x 39
S.H. 32	MA	1¼	1	35	32	1	18 x 39
S.H. 35	MA	1¼	2	35	50	1½	19 x 44
S.H. 37	MA	1¼	2	35	64	2	19 x 45
S.H. 41	MA	1¼	3	35	110	3	19 x 50
S.H. 44	MA	1¼	4	35	183	5	24 x 56
S.H. 47	MB	1½	3	35	260	7½	24 x 59
S.H. 48	MB	1½	3	35	274	10	24 x 62
S.H. 51	MA	1½	1	50	20	1	18 x 39
S.H. 53	MA	1½	2	50	40	1½	19 x 44
S.H. 55	MB	1½	1	50	48	2	21 x 45
S.H. 56	MB	1½	1	50	72	3	21 x 48
S.H. 58	MB	1½	2	50	120	5	21 x 54
S.H. 59	MB	1½	2	50	170	7½	24 x 56
S.H. 60	MB	1½	3	50	230	10	24 x 62
S.H. 62	MB	1½	4	50	330	15	30 x 65
S.H. 66	MB	2	1	75	29	1½	21 x 44
S.H. 67	MB	2	1	75	39	2	21 x 45
S.H. 68	MB	2	1	75	58	3	21 x 48
S.H. 70	MB	2	2	75	98	5	21 x 54
S.H. 71	MB	2	2	75	146	7½	24 x 56
S.H. 72	MB	2	3	75	196	10	24 x 62
S.H. 74	MB	2	4	75	290	15	30 x 65
S.H. 79	MB	2½	1	100	30	2	21 x 45
S.H. 80	MB	2½	1	100	45	3	21 x 48
S.H. 81	MB	2½	1	100	75	5	21 x 51
S.H. 83	MB	2½	2	100	112	7½	24 x 56
S.H. 84	MB	2½	2	100	150	10	24 x 59
S.H. 85	MB	2½	3	100	224	15	30 x 62
S.H. 86	MB	2½	4	100	294	20	30 x 67
S.H. 106	MB	2½	1	150	31	3	21 x 48
S.H. 107	MB	2½	1	150	52	5	21 x 51
S.H. 109	MB	2½	2	150	78	7½	24 x 56
S.H. 110	MB	2½	2	150	104	10	24 x 59
S.H. 112	MB	2½	3	150	156	15	30 x 62
S.H. 114	MB	2½	4	150	208	20	30 x 67
S.H. 115	MB	2½	4	150	250	25	30 x 70
S.H. 842	HS	3	1	200	37	5	24 x 60
S.H. 843	HS	3	1	200	56	7½	24 x 62
S.H. 845	HS	3	1	200	112	15	30 x 65
S.H. 846	HS	3	2	200	150	20	30 x 70
S.H. 847	HS	3	2	200	187	25	30 x 72
S.H. 851	HS	3	1	250	32	5	24 x 60
S.H. 853	HS	3	1	250	64	10	24 x 65
S.H. 855	HS	3	1	250	128	20	30 x 68
S.H. 857	HS	3	2	250	192	30	30 x 72
S.H. 858	HS	3	2	250	225	35	30 x 76
S.H. 861	HS	4	1	300	27	5	24 x 60
S.H. 862	HS	4	1	300	40	7½	24 x 62
S.H. 864	HS	4	1	300	82	15	30 x 62
S.H. 866	HS	4	1	300	125	25	30 x 70
S.H. 867	HS	4	2	300	160	30	30 x 72
S.H. 869	HS	4	2	300	215	40	30 x 76
S.H. 871	HS	4	2	350	118	25	30 x 72
S.H. 873	HS	4	2	350	166	35	30 x 75
S.H. 874	HS	4	2	350	190	40	30 x 76

Send for catalogue giving information on pumps of larger capacities and higher heads.

Automatic Electric Bilge Pumps

For pumping water out of basements that are located below the sewer level.

They are the best that modern equipment and skill can produce.

They are fitted with oil lubricated bronze bearings every 5 ft., self-aligning ball thrust bearing, flexible coupling, a double carbon contact type float switch and a Square D main line switch, all mounted on one pedestal.

Automatic apparatus is totally enclosed.

TYPE L.G. AUTOMATIC ELECTRIC BILGE PUMP

CAPACITIES, HORSEPOWER AND FLOOR SPACE, AUTOMATIC ELECTRIC BILGE PUMPS

Unit No.	Type of pump and frame No.	Capacity, g.p.m.	Discharge, in.	Motor h.p.	Will pump against a total head, ft.	Floor space required, in.	
						Diam. basin single pump	Diam. basin duplex set of pumps
S.H. 200	LG	15	1	¼	10	30	42
S.H. 201	LG	15	1	½	19	30	42
S.H. 202	LG	15	1	¾	28	30	42
S.H. 203	LG	30	1¼	¼	7	30	42
S.H. 204	LG	30	1¼	½	14	30	42
S.H. 205	LG	30	1¼	¾	21	30	42
S.H. 206	LG	30	1¼	1	26	30	42
S.H. 207	L-3	30	1¼	2	40	30	42
S.H. 208	L-3	30	1¾	3	55	30	42
S.H. 209	LG	50	1½	½	12	30	42
S.H. 210	LG	50	1½	¾	18	30	42
S.H. 211	LG	50	1½	1	22	30	42
S.H. 212	L-3	50	1½	1½	28	30	42
S.H. 213	L-3	50	1½	2	38	30	42
S.H. 215	LG	75	2	½	8	36	42
S.H. 216	LG	75	2	¾	14	36	42
S.H. 217	LG	75	2	1	16	36	42
S.H. 218	L-3	75	2	1½	22	36	42
S.H. 219	L-3	75	2	2	30	36	42
S.H. 220	L-3	75	2	3	48	36	42
S.H. 222	LG	100	2½	¾	8	36	42
S.H. 223	L-3	100	2½	1	14	36	42
S.H. 224	L-3	100	2½	1½	18	36	42
S.H. 225	L-3	100	2½	2	25	36	42
S.H. 226	L-3	100	2½	3	38	36	42
S.H. 228	L-3	125	2½	1	10	36	42
S.H. 229	L-3	125	2½	1½	15	36	42
S.H. 230	L-3	125	2½	2	21	36	42
S.H. 231	L-3	125	2½	3	33	36	42
S.H. 232	L-3	125	2½	5	55	36	42
S.H. 234	L-3	150	3	1½	14	42	48
S.H. 235	L-3	150	3	2	19	42	48
S.H. 236	L-3	150	3	3	28	42	48
S.H. 237	L-3	150	3	5	48	42	48
S.H. 239	L-3	200	3	2	14	42	48
S.H. 240	L-3	200	3	3	22	42	48
S.H. 241	L-3	200	3	5	37	42	48
S.H. 242	L-3	200	3	7½	55	42	48
S.H. 244	L-4	250	4	2	12	42	48
S.H. 245	L-4	250	4	3	20	42	48
S.H. 246	L-4	250	4	5	34	42	48
S.H. 247	L-4	250	4	7½	50	42	48
S.H. 249	L-4	300	4	3	17	48	60
S.H. 250	L-4	300	4	5	28	48	60
S.H. 251	L-4	300	4	7½	44	48	60

Units include pump, motor, complete automatic apparatus, cast iron basin cover, but do not include basin.

All basins should be 36 in. deeper than lowest inlet.

Bilge pumps up to 1500 g.p.m. are also manufactured; write for complete catalogue.

Engineering Department

Our engineers will gladly determine the size and style pumps you require, prepare specifications, and give detail information covering pumps.

You will find this department a great help.

New Catalogue and Reference Tables

Our new catalogue in two colors with complete description of the full line, and with a large number of valuable tables giving engineering data on pumping equipment, will be sent on request.

SIMPLEX EJECTOR CO.

Manufacturers of Automatic Pneumatic Sewage Ejectors

MAIN OFFICE
176 North Carpenter Street
CHICAGO, ILL.

DISTRICT REPRESENTATIVES

NEW YORK, N. Y., The Provident Engineering Corp., 30 Church Street
PHILADELPHIA, PA., Walker & Davis, Coral and Valetta Streets
DETROIT, MICH., A. Harvey's Sons' Mfg. Co., First and Woodbridge Streets
ST. PAUL, MINN., J. W. Hildred & Co., 1019 Commerce Building
DALLAS, TEX., C. C. Carson, 303 North Texas Building
HOUSTON, TEX., Tennant-Lovegrove Co., Union National Bank Building
LOS ANGELES, CAL., Mitchell-Huff Co., 737 Terminal Building
PORTLAND, ORE., J. W. Luke, 1114 North Western Building

Product

"Simplex" Pneumatic Sewage Ejectors for discharging sewage of municipalities and all classes of buildings.

Simplex Sewage Ejector

"Simplex" Ejector

The "Simplex" ejector is operated by direct pressure of compressed air on the sewage.

The ejector can be furnished in a single unit or in duplex units.

Duplex units consist of single units connected as shown.

Single-stage air compressor of both the vertical or horizontal type may be used. As compression at low pressures is all that is required, either air cooled or water cooled compressors may be used.

Advantages of the "Simplex" Pneumatic Ejector

A few of the important advantages are herewith enumerated:

(1) No revolving parts are in direct contact with the sewage.
(2) There is no back surge due to stoppage or inability of the apparatus to take care of solids, cotton waste, etc.
(3) Inlet and outlet, full area of the pipes.
(4) No screening chamber.
(5) Smaller ejector pit.
(6) Accessibility and interchangeability of parts.
(7) Working parts are non-corrosive.
(8) Automatically controlled.
(9) No open sumps, the system is entirely sanitary.

Uses

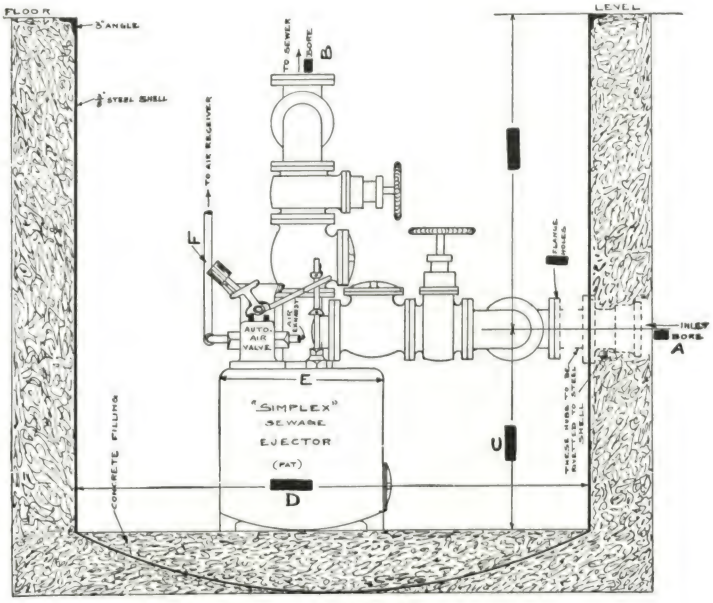
The "Simplex" ejector is suitable for the following purposes:

(1) For elevating sewage from lower level to elevation of main trunk sewer.
(2) As a booster to increase flow, thereby increasing sewerage capacity.
(3) For raising raw sewage or settled sludge at disposal plants.
(4) For ejection of sewage from basement of any building where drains are below the main sewer.
(5) For automatic raising of any kind of fluid or semisolids.
(6) Made in any capacity up to 1000 gals. per minute against any head up to 250 ft.

Data to Be Furnished

In asking for a layout or quotation, the following particulars are necessary:

(1) Nature of liquid desired to be raised.
(2) Maximum to be raised (gals. per min.)
(3) Vertical height from invert of inlet to point of discharge.
(4) Length of horizontal line on discharge side and bore of same if already in.
(5) If a single or duplex unit is required.
(6) Nature of power available for air compressor; if steam, what is minimum pressure carried on boiler.
(7) If more than one ejection station is required, a profile of the district to be covered should be furnished, also location of power station relative to ejector stations.



SECTIONAL ELEVATION
Duplex Unit

Continued on next page

The rated capacity of each ejector is based on one discharge per minute, but the ejectors will operate more often than this if called on to do so, providing sufficient air capacity is available.

Specifications for "Simplex" Sewage Ejector

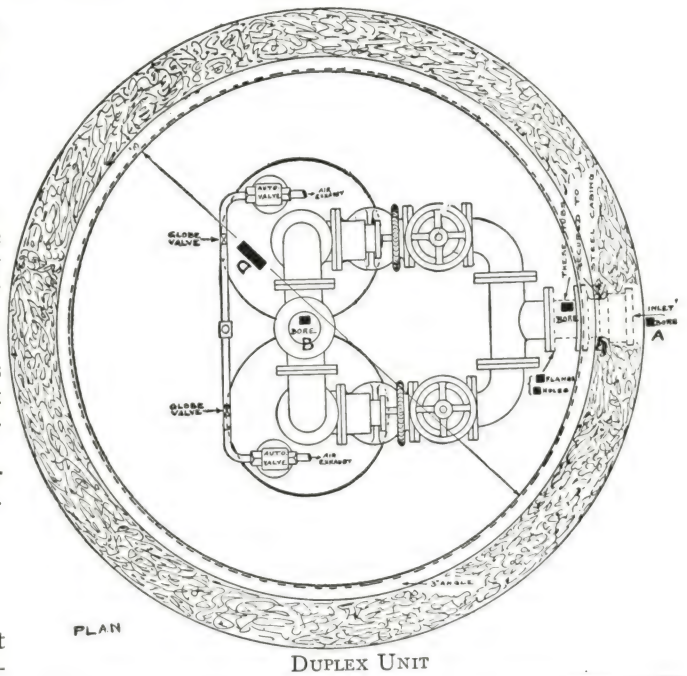
Furnish and install where shown on plan, one hydro-pneumatic automatic sewage ejector as made by the SIMPLEX EJECTOR CO., the same to be operated by compressed air and to include the said ejector together with the air receiver, air compressor, automatic control, and connections.

The whole equipment shall be automatic in all its phases, and shall on completion be subjected to a test at its maximum capacity for period of two hours without showing any weakness in any essential part.

The ejector shall have a capacity of .. gals. per minute, and to operate against a head of .. ft. measuring from the invert of the lowest drain.

Guarantees

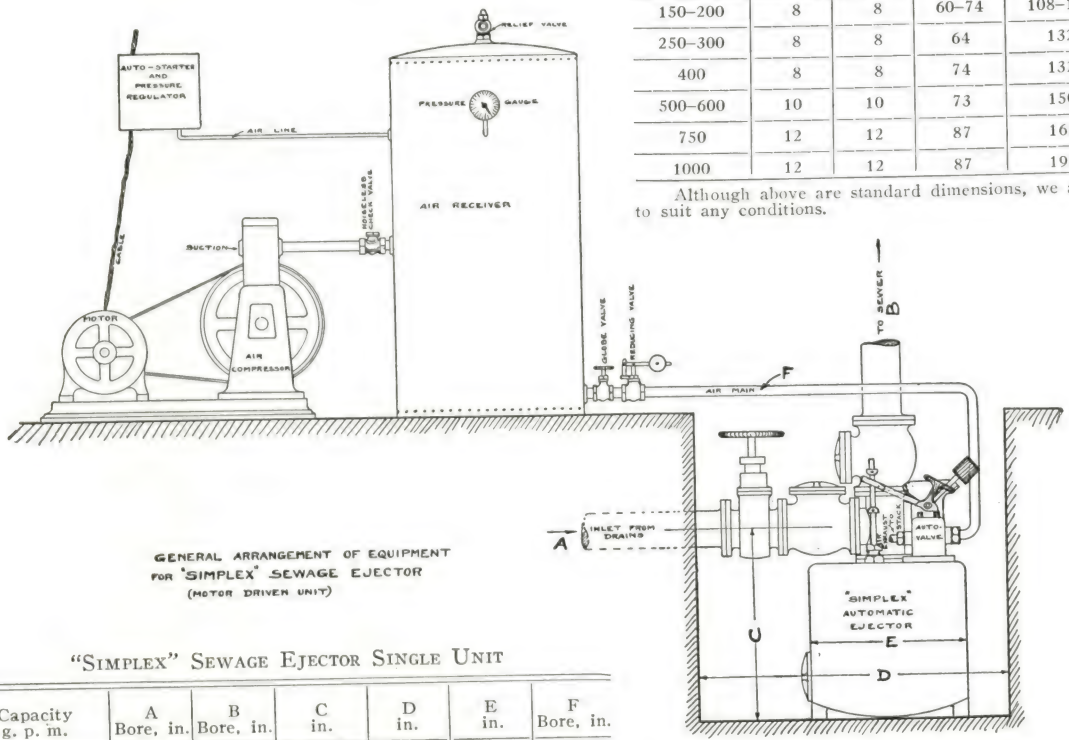
The SIMPLEX EJECTOR CO. guarantee all equipment furnished and installed by them to give successful operation at the specified capacity. We also guarantee to replace any part showing defect of material or workmanship during a period of twelve months from date of being set to work.



DUPLEX UNIT

Capacity g. p. m.	A Bore, in.	B Bore, in.	C in.	D in.	E in.	F Bore, in.
1– 35	4	4	38	90	30	¾
50– 75	4–6	4–6	39–41	96	38	1
100–125	6	6	48	96	38	1
150–200	8	8	60–74	108–120	38	1¼
250–300	8	8	64	132	48	1½
400	8	8	74	132	48	1½
500–600	10	10	73	150	60	2
750	12	12	87	162	60	2
1000	12	12	87	192	72	2

Although above are standard dimensions, we are able to alter patterns to suit any conditions.



GENERAL ARRANGEMENT OF EQUIPMENT FOR "SIMPLEX" SEWAGE EJECTOR (MOTOR DRIVEN UNIT)

"SIMPLEX" SEWAGE EJECTOR SINGLE UNIT

Capacity g. p. m.	A Bore, in.	B Bore, in.	C in.	D in.	E in.	F Bore, in.
1– 35	4	4	38	60	30	¾
50– 75	4–6	4–6	39–41	66	38	1
100–125	6	6	48	72	38	1
150–200	8	8	60–74	78	38	1¼
250–300	8	8	64	84	48	1½
400	8	8	74	84	48	1½
500–600	10	10	73	96	60	2
750	12	12	87	102	60	2
1000	12	12	87	108	72	2

References

U. S. Custom House, Newport, R. I.
U. S. Naval Training Station, San Diego, Cal.
Mandel Bros. Store, Chicago, Ill.
Great Northern Hotel, Chicago, Ill.
Western Union Building, Chicago, Ill.
McVickers' Theater, Chicago, Ill.
City Bank of Battle Creek, Mich.
Home Bank, Newark, Ohio
Security Bank, Sioux Falls, S. D.
Buhl High School, Buhl, Minn.
St. Hedwig Industrial School, Niles, Ill.

TABER PUMP COMPANY

295 Elm Street

BUFFALO, N. Y.

Products

SUMP PUMPS, CENTRIFUGAL BOOSTER PUMPS, DOUBLE SUCTION CENTRIFUGAL PUMPS.

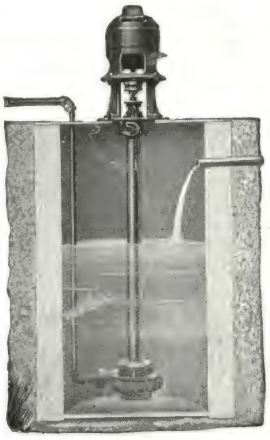
Also manufacturers of Rotary Pumps, and Centrifugal Pumps for all purposes.

Taber Sump Pumps

Taber sump pumps are built by *pump specialists* who build these to meet your specific needs. As they are built according to the requirements of each job, they will give a much superior service. The architect need not arrange his layouts to suit the pump. He may work up his layout so as to best suit his needs and then the pump is built to conform with them.

Construction—Taber pumps can be built of either iron or bronze.

The impeller of the Taber sump pump, together with the shaft, is supported by a ball thrust bearing which is submerged in a bath of oil or grease. The pump is fitted with a removable bearing and another is placed within the sump plate proper so that the pump shaft is well supported. When the sump is over six feet deep, an intermediate bearing is added. The motor is of the vertical type and is connected to the pump shaft through the medium of a flexible coupling.



TABER SUMP PUMP

RATING TABLE, TABER SUMP PUMPS
HORSEPOWER, CAPACITY, SPEED AND HEAD IN FEET

Unit No and type	Suc., in	Dis., in.	Rating at 1720 r p.m. Capacity, g p.m	Head, ft.	Horsepower req'd
V-1	1¼	1	10	30	¾
V-1	1¼	1	15	25	¾
V-1	1¼	1	30	18	¾
L-0	1¼	1	15	20	½
L-0	1¼	1	15	10	½
L-0	1¼	1	30	18	¾
V-2	1½	1¼	50	15	¾
V-2	1½	1¼	50	25	1½
V-2	1½	1¼	50	35	2
L-1	2	1½	75	15	¾
L-1	2	1½	75	25	1
L-1	2	1½	75	33	1½
L-1	2	1½	100	15	1
L-1	2	1½	100	25	2
L-1	2	1½	100	30	2
V-1	2	1½	100	55	5
L-2	2½	2	125	38	3
V-3	2	1½	125	50	5
L-2	2½	2	125	28	3
L-2	2½	2	125	15	1½
V-4	2½	2	150	85	10
L-3	3	2½	150	78	7½
L-3	3	2½	150	50	5
L-2	2½	2	150	25	3
V-5	3	2½	200	98	15
L-3	3	2½	200	75	10
L-3	3	2½	200	50	7.5
L-3	3	2½	200	25	5
L-4	4	3	300	85	15
L-4	4	3	300	50	7.5
L-4	4	3	300	25	5

Unit No. and type	Suc., in.	Dis., in.	Rating at 1440 r p m Capacity, g p.m.	Head, ft.	Horsepower req'd
V-1	1¼	1	30	10	½
L-0	1¼	1	20	10	½
L-0	1¼	1	10	15	½
L-1	2	1½	50	25	1
L-1	2	1½	75	22	1
L-1	2	1½	50	10	¾
L-2	2½	2	100	25	2
L-2	2½	2	100	15	1½
L-2	2½	2	125	23	2
L-3	3	2½	150	52	5
L-3	3	2½	150	25	3
L-3	3	2½	175	50	5
L-3	3	2½	175	25	3
L-4	4	3	200	60	7½
L-4	4	3	200	25	3
L-4	4	3	200	40	5
L-4	4	3	300	50	7½
L-4	4	3	300	25	5
L-4	4	3	300	15	3

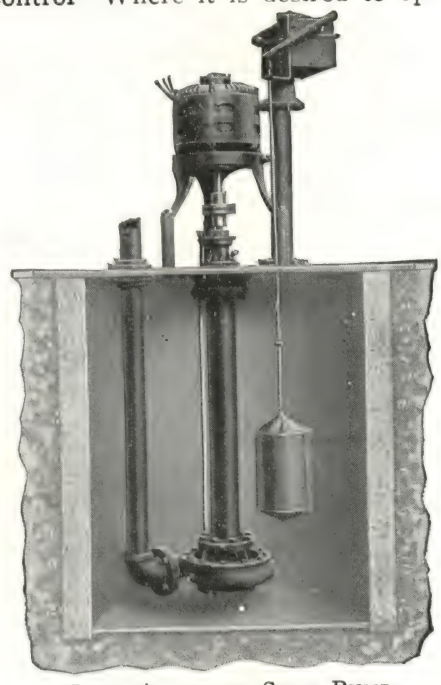
Information furnished on any units not listed. Other units up to 1,200 g. p. m. Units complete include proper pump motor, automatic controlling device, sump pit cover, manhole and plate for support of pump and motor.

We are prepared to furnish sump plates for any standard sumps, or special sizes.

Sizes up to 1200 g. p. m. capacity can be supplied. All pumps are supplied on a sump plate large enough to support the pump and motor. Auxiliary plates are provided when necessary or specified. Therefore in sending specifications, be sure to give all dimensions of the sump and the electric power characteristics.

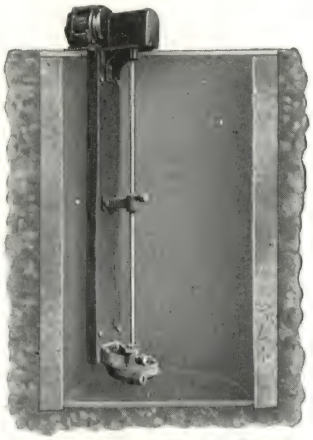
Complete sump pump bulletin sent upon request.

Automatic Control—Where it is desired to operate the Taber sump pump automatically, we furnish them fully equipped with a float, float switch and self starter. C-H float switches and starters are used and these are suitably mounted to make the pump a complete, self-contained unit. The type of control depends upon power characteristics, so do not fail to furnish this information.



TABER AUTOMATIC SUMP PUMP

Double Units—These units can also be supplied with two pumps on one sump plate where the service warrants having a reserve or alternate pump.



TABER LIGHT DUTY SUMP PUMP

Taber Light Duty Sump Pump

This pump is intended for light duty at a low cost. It is for sump depths not exceeding 4 ft. This is satisfactory for intermittent service where the slight buzz or noise of the gears is not objectionable. Can also be furnished for automatic starting and stopping.

LIGHT DUTY SUMP PUMPS
HEAD, HORSEPOWER AND CAPACITY

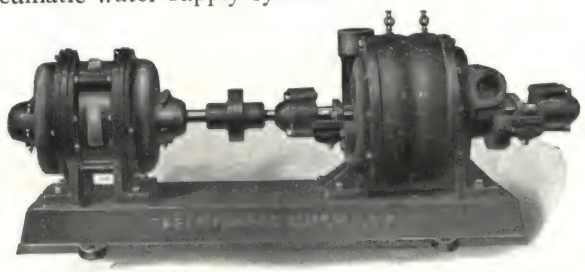
Unit No. and type	Suc., in.	Dis., in.	Rating at 1720 r.p.m. Capacity, g.p.m.	Head, ft.	Horsepower req'd
L-0	1¼	1	15	21	½
L-0	1¼	1	30	15	½
L-0	1¼	1	15	10	½
L-1	2	1½	50	36	1
L-1	2	1½	75	33	1½
L-1	2	1½	50	15	¾
L-1	2	1½	75	15	1

Unit No. and type	Suc., in.	Dis., in.	Rating at 1440 r.p.m. Capacity, g.p.m.	Head, ft.	Horsepower req'd
L-0	1¼	1	15	15	½
L-0	1¼	1	30	8	½
V-1	1¼	1	25	12	½
L-1	2	1½	50	26	1
L-1	2	1½	75	22	1
L-1	2	1½	50	15	¾
L-1	2	1½	75	15	1

Continued on next page

Taber Centrifugal Booster Pumps

The Taber multistage booster or house pump affords the best method of boosting the low pressure from the city water mains so as to have sufficient pressure to utilize on the upper floors. This pump can be used either in connection with an open tank or with a pneumatic water supply system.



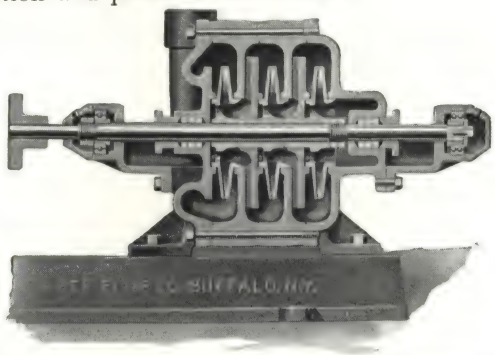
TABER CENTRIFUGAL BOOSTER PUMP

Number of stages	Over-all length, in. Pump No.		Width of base, in. Pump No.		Length of base, in. Pump No.	
	1	2	1	2	1	2
2	41 ½	58 ¼	17 ¼	24	47	56
3	44	61 ½	17 ¼	24	47	56
4	46 ½	64 ¾	17 ¼	24	47	56
5	49	68	17 ¼	24	47	56

Construction—The Taber pump is designed and built with one objective, namely, to make it the best. The ball bearings with which this pump is equipped are completely enclosed and packed in grease. As they are located outside of the pump proper, it is impossible to contaminate the water with lubricant.

Taber pumps can be furnished in units of from 2 to 5 stages and in capacities ranging from 30 to 150 gallons per minute against heads of 150 to 200 ft.

Pumps can be supplied with various forms of starting and stopping devices, depending upon conditions of installation and power characteristics.



SECTIONAL VIEW OF TABER CENTRIFUGAL BOOSTER PUMP

Specifications

House Pump—Furnish and install as described in plans (1) or (2) Taber centrifugal house or booster pump, having a capacity of ..... g.p.m. when operating against a head of ..... ft., with a city pressure to the inlet of the pump of ..... lbs. per sq. in. (If the city pressure varies over a wide range, give maximum and minimum.) The pump is to be fitted with enclosed type bronze impellers, thoroughly balanced and brought to a smooth finish over all to reduce the skin friction to a minimum. The pump to be mounted upon a heavy cast iron base plate.

Motor—The pump is to be connected through the medium of a flexible coupling to a ..... h.p.—(give current characteristics), current, electric motor operating at a speed of 1750 r.p.m. (1450 r.p.m. for 25 cycle current.)

Automatic Control—Install in connection with pump a float switch with the necessary accessories and an automatic starter. Or:

Automatic Control—One pressure gauge type regulator in connection with suitable self starter.

Note: For some small powered motors, it is entirely satisfactory to use only the float type switch or pressure gauge type regulator and throw the motor in across the lines.

TABLE, TABER BOOSTER PUMP RATINGS AT 1750 R.P.M.

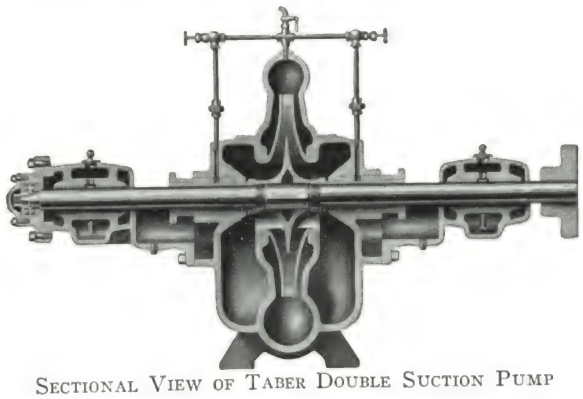
Capacity, in gallons per minute.			Total Head in Ft. 60	70	80	90	100	125	150	175
30		No. of stages..	2	2	2	3	3	4	4	5
		Horse power..	2	2	2	3	3	5	5	5
40		No. of stages..	2	2	2	3	3	4	4	5
		Horse power..	2	2	3	3	3	5	5	5
50		No. of stages..	2	2	3	3	3	4	4	5
		Horse power..	3	3	3	3	3	3	5	5
60		No. of stages..	2	2	3	3	3	4	5	5
		Horse power..	3	3	3	3	5	5	5	7 ½
70		No. of stages..	2	3	3	3	4	5	5	.....
		Horse power..	3	5	5	5	5	5	7 ½	.....
80		No. of stages..	3	3	3	4	4	5	5	.....
		Horse power..	5	5	5	5	5	7 ½	7 ½	.....
90		No. of stages..	3	3	4	4	5	5	.....	.....
		Horse power..	5	5	5	5	5	7 ½	.....	.....

TABLE, TABER BOOSTER PUMP RATINGS AT 1450 R.P.M.

Capacity, in gallons per minute.			Total Head in Feet 60	70	80	90	100	125
30		No. of stages.....	3	3	3	4	4	5
		Horse power.....	2	2	2	2	3	3
40		No. of stages.....	3	3	4	4	4	5
		Horse power.....	2	2	3	3	3	3
50		No. of stages.....	3	3	4	4	5	.....
		Horse power.....	2	2	3	3	3	.....
60		No. of stages.....	3	4	4	4	5	.....
		Horse power.....	2	3	3	3	5	.....
70		No. of stages.....	4	4	4	5	5	.....
		Horse power.....	3	3	3	5	5	.....
80		No. of stages.....	5	5	5	.....	.....	.....
		Horse power.....	5	5	5	.....	.....	.....

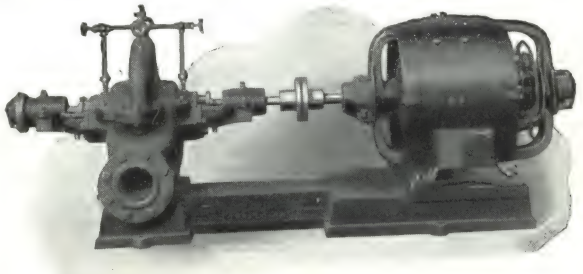
Taber Double Suction Centrifugal Pump

Taber double suction centrifugal pumps, type SV, are made to the same high standard as are all the Taber products and is for use in all places where a high grade centrifugal pump is required.



SECTIONAL VIEW OF TABER DOUBLE SUCTION PUMP

Type SV pumps are made up in single-stage units only but with capacities ranging up to 1200 gals. per minute and can be furnished for either belt or motor drive. When furnished for motor drive, connection to motor is made through a flexible coupling.



TABER TYPE SV CENTRIFUGAL PUMP

YEOMANS BROTHERS COMPANY

Sewage Ejectors and Pumping Machinery

1419 Dayton Street

CHICAGO, ILL.

REPRESENTATIVES

ATLANTA, GA., Burford, Hall & Smith, Third National Bank Building
BALTIMORE, MD., Morton McI. Dukehart & Co., McComas and Race Streets
BIRMINGHAM, ALA., E. N. Cunningham, Brown-Marx Building
BOSTON, MASS., Power Equipment Co., 131 State Street
BUENOS AIRES, ARGENTINA, Buxton, Guilayn & Co.
BUTTE, MONT., C. H. Cobb, Daly Bank Building
CHARLOTTE, N. C., J. R. Purser, Commercial Bank Building
CINCINNATI, OHIO, O. J. Allonier, Provident Bank Building
CLEVELAND, OHIO, Cleveland Pump & Supply Co., Kirby Building
DALLAS, TEX., John H. Van Zandt, Southwestern Life Insurance Building
DAVENPORT, IOWA, D. C. Murphy, Security Building
DAYTON, OHIO, Chas. M. Kelso Co., Reibold Building
DENVER, COLO., J. J. Daly, 230 15th Street
DETROIT, MICH., Power Plant Supply Co., Penobscot Building
EL PASO, TEX., Geo. W. Herlin, 202 Mills Building
HONOLULU, T. H., Honolulu Iron Works
INDIANAPOLIS, IND., Weinshank & Fenstermaker, Hume-Mansur Building
KANSAS CITY, MO., McCulley-Widener & Wright, 303 East 10th Street
LITTLE ROCK, ARK., P. E. Fallon, Gazette Building
LOS ANGELES, CAL., F. C. Millard Co., Marsh-Strong Building
MILWAUKEE, WIS., Chas. W. Miller, 209 Grand Avenue
MINNEAPOLIS, MINN., Healy-Ruff Co., Plymouth Building
MONTREAL, TORONTO, WINNIPEG, CANADA, Darling Bros., Ltd.
NEW ORLEANS, LA., H. J. Powers, Canal Bank Building
NEW YORK, N. Y., E. A. Julie, 51 East 42d Street
OMAHA, NEBR., McCulley-Widener & Wright, 1820 St. Marys Avenue
PHILADELPHIA, PA., Chas. C. Enderle, Commercial Trust Building
PITTSBURGH, PA., Carl D. Bushnell, 206 Wood Street
PORTLAND, ORE., Gordon & Finkbeiner, 224 Pine Street
ROCHESTER, N. Y., J. F. Brightman, Mercantile Building
SALT LAKE CITY, UTAH, Hawley-Richardson-Williams Co., Dooly Building
ST. LOUIS, MO., J. T. McAnulty, Syndicate Trust Building
SAN FRANCISCO, CAL., California Hydraulic Engineering & Supply Co., 70 Fremont Street
UTICA, N. Y., Chas. M. Kelso Co., City National Bank Building
VANCOUVER, B. C., Jno. W. Thompson Co., Ltd., 510 Hastings St. W.

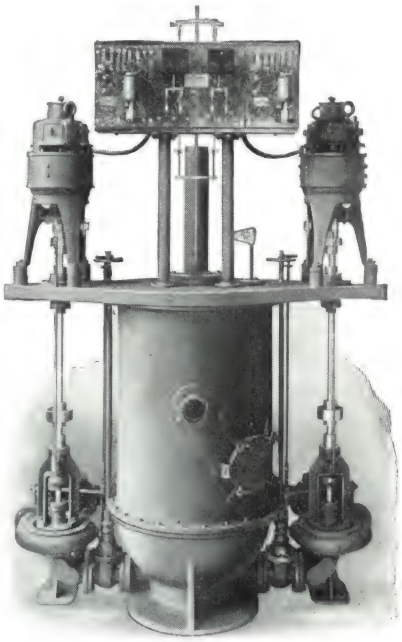
Products

Yeomans Form "A" Duplex Centrifugal Electric Sewage Ejectors; Shone Pneumatic Sewage Ejectors; Yeomans Single and Duplex Electric Bilge or Sump Pumps; Yeomans House Pumps; Yeomans Condensation Return Pumps.

Also manufacturers of pumping machinery for all purposes.

Yeomans Form "A" Sewage Ejector

A duplex equipment consisting of two special vertical centrifugal pumps operating in dry pit, connected to cast iron sewage receiver and driven by direct connected vertical motors mounted on receiver cover, equipped with automatic controllers, high-water alarm, pit-drainage connections, cast iron bar screen of large area, gate and flush back check valves. Pumps arranged so that top plate can be raised without disturbing shafting, bearings or impellers. No accumulation of solids in receiver; minimum space requirements; high efficiency; noiseless; sanitary and reliable.



Form "A" Duplex Ejector

FORM "A" DUPLEX SEWAGE EJECTORS

No.	3	4	5	6
Capacity each unit.....g p. m.	100–125	150–200	250–350	400–500
Pit diameter.....ft.	8	8	8	10
Depth of pit below inlet.....ft.	4	4	4	5

Shone Pneumatic Sewage Ejector

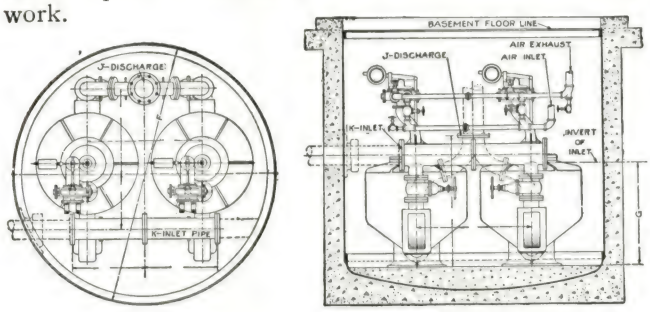
The Shone ejector has been in successful service in all parts of the world for over 35 years. First installation in this country in 1888 is still in service. At the World's Fair in Chicago in 1893, 52 Shone ejectors handled all sewage.

Unequaled for substantial design, durability, economy and reliability in operation. No screens required; bottom discharge and no accumulation of solids; special non-clogging check valves; no airtight floats; bronze, pressure operated, quick-acting piston type automatic air valves. Furnished with either motor or steam driven

250-Gallon Shone Duplex Ejector

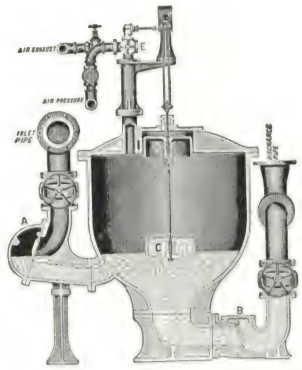
Continued on next page

air compressors. Compressors can be located at any desired distance from ejectors. Ejectors can be operated from air supply maintained for general purposes in industrial plants. Especially recommended for municipal work.

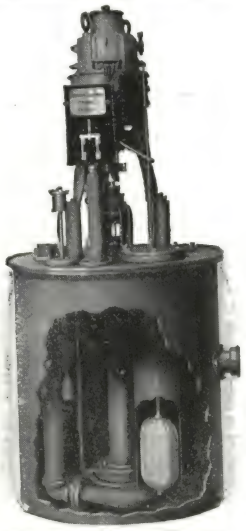


DIMENSION DIAGRAM OF SHONE DUPLEX EJECTOR

G. p. m. each unit	G ft. in.	Single Ejectors			Duplex Ejectors	
		F, ft.	J, in.	K, in.	F, ft.	J and K, in
50	3– 1	6	4	6	8	6
100	3– 7	7	5	6	9	8
150	4– 5	7	5	6	9	8
200	5–10	8	6	8	11	8
250	6– 5	8	6	8	11	8
300	7– 0	8	6	8	11	8
400	7– 3	13	12	12	14	12
500	8– 0	13	12	12	14	12
600	8– 9	13	12	12	14	12
750	8– 0	14	14	14	16	14
1000	9– 0	14	16	16	16	16



SHONE EJECTOR, SECTIONAL VIEW



GRADE 1 BILGE PUMP

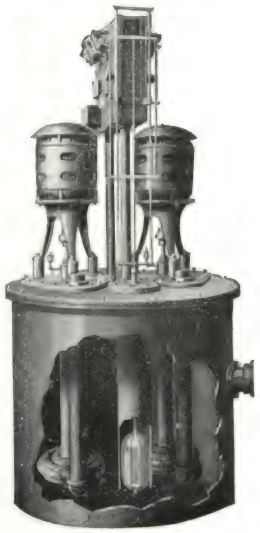
Yeomans Bilge Pumps

Single Electric—Automatic, self-contained, heavily constructed slow speed machines, with submerged centrifugal pumps, vertical direct connected motors and automatic controllers for handling waste water and sewage.

Built in two grades; Grade 1, pumps operating at slow speeds and equipped with high-water alarm, pipe casing for float, force feed lubricated bearings, etc. Grade 2, moderate speed.

SINGLE ELECTRIC BILGE PUMPS

No.	Capacity, g. p. m.	Basin diam., in.
½	15– 25	24
1	35– 50	36
2	50– 75	36
3	100–125	36
4	150–200	36
5	250–350	48
6	400–500	48



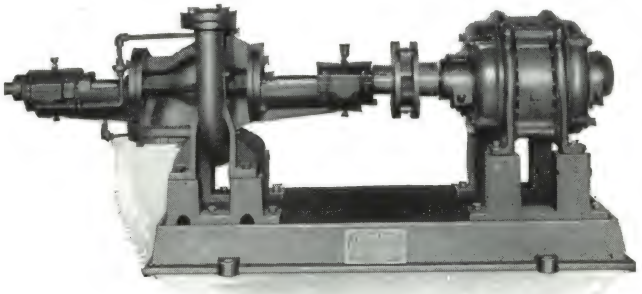
YEOMANS DUPLEX ELECTRIC BILGE PUMP

Duplex Electric Bilge Pumps or Submerged Sewage Ejectors—Construction similar to single bilge pumps; units arranged so that one can be removed without disturbing the other. Capacities per unit same as single bilge pumps.

Basin diameters: Nos. 1 and 2, 36 in.; No. 3, 48 in.; Nos. 4 and 5, 60 in.

Yeomans Centrifugal House Pumps

Most improved type, single and multistage, high efficiency, quiet running pumps with ring oiled, water cooled external shaft bearings, perfectly balanced rotors, flexible couplings. Special attention given to noiseless pumps for first-class apartment buildings, residences and hotels. Complete automatic equipments furnished for either roof tank or compression tank service, any capacity.



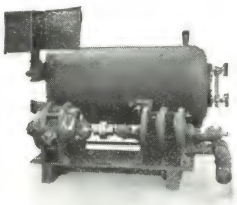
YEOMANS SINGLE STAGE CENTRIFUGAL HOUSE PUMP

Yeomans Condensation Return Pumps

High grade equipments consisting of cast iron receiver with water glass, direct connected centrifugal pump and motor, all on one base, enclosed quick break butt contact automatic switch, seamless copper float and protective devices.

Type "H" Pumps—For returns above basement floor level.

Type "V" Pumps—For returns close to or below basement floor.



CONDENSATION RETURN PUMP
Special Type "H" high pressure unit with multistage pump

TYPES "H" AND "V" CONDENSATION RETURN PUMPS

No.	Capacity, g. p. m.	Maximum direct radiation, sq. ft.
1	5	1,000
2	10	3,000
3	15	6,000
4	20	10,000
5	30	15,000
6	60	30,000

TYPE "V," CONDENSATION RETURN PUMP

References

Yeomans pumps and Shone ejectors have been in service in important city buildings, industrial plants and municipalities for many years. Installations can be referred to in all parts of the world.

ATEN SEWAGE DISPOSAL CO.

TELEPHONE CONNECTION

286 Fifth Avenue
NEW YORK, N. Y.

Products and Services

ATEN SANITARY SYSTEM of SEWAGE DISPOSAL.

ENGINEERS for SEWAGE DISPOSAL.

TRADE-MARK

Aten Service

The ATEN SEWAGE DISPOSAL CO. designs and furnishes sewage disposal systems for large and small country houses, clubs, hotels, factories or institutions not connected with city sewers. We usually install the systems, but if desired complete installation instructions will be sent to permit of installation by a local contractor.

Upon receipt of the necessary information, at no cost to the inquirer, we gladly specify the correct type of system and furnish an estimate of the cost of the complete installation.

Guarantee

When installed by us or in conformity with our directions, we guarantee the successful operation of our systems to dispose of the domestic sewage from the buildings served without offensive odors, back flows or other nuisance.

Aten Sewage Disposal Systems

The systems consist essentially of a septic tank and filtration fields or leaching chambers. A siphon tank, siphon, special fittings and special tile are features promoting automatic and efficient operation.

Septic Tank—Consists of an airtight, reinforced concrete tank which receives the sewage. Bacterial action liquifies the solids in the sewage and it then flows to the filtration fields or leaching chambers from where it is absorbed by the soil. No chemicals are used.

Filtration Field—Consists of at least two sets of tile lines laid so as to properly distribute the sewage and gases to the soil. A diverting gate permits one set of tile lines to "rest" while the other is in operation. Tile are specially designed to allow air to reach sewage and to permit uniform seepage of sewage to soil.

Leaching Chambers—Used where land is not available for tile fields. Two or more are used for each septic tank so that one chamber may "rest" while the other is in operation. Constructed of stone or brick.

Type A System—Consists of a septic tank, siphon chamber and tile fields. Used wherever practicable. Siphon chamber automatically provides a periodical flow of sewage to tile fields.

Type B System—Specially suited for places having very flat grades, Includes septic tank and tile fields, but no siphon chamber.

Type C System—Consists of a septic tank and two or more leaching chambers. Used where land is not available for Type A or B Systems, or where subsoil is particularly suitable.

References

Below are listed a few installations with the name of the architect:

Thos. Hastings, Old Westbury, L. I., Carrere & Hastings
Miss E. W. Smith, Amawalk, N. Y., Dana & Gibson
W. H. Hiller, Carbondale, Pa., L. C. Holden
F. G. Peabody, Loudenville, N. Y., C. C. Grant
Robert Cluett, Rye, N. Y., H. B. Upjohn
Engineers Club, Roslyn, N. Y., H. Craig Severance
Oceonside High School, Oceonside, L. I., Tooker & Marsh
Milton L'Eluse, Huntington, L. I., N. Y., John Gurd
Piping Rock Club, Locust Valley, L. I., N. Y., Guy Lowell
Wm. Church Osborn, Garrison, N. Y., Pleasant Pennington
Department of Parks, New York, N. Y., Ford, Butler & Oliver
Huntington Hospital, Huntington, L. I., N. Y., A. B. Sammis
Floral Park School, Floral Park, L. I., N. Y., Edw. Hahn
Blind Brook Club, Port Chester, N. Y., Frank A. Moore
Nelson Doubleday, Oyster Bay, L. I., N. Y., H. T. Lindeberg
G. T. Dearborn, Rye, N. Y., Hinchman & Pilat
Wm. Lyall, Passaic, N. J., Harvey Lyall
Darragh Park, Roslyn, N. Y., Peabody, Wilson & Brown

ENGLAND

C. S. Somerville, Banker, Flemwell

JAPAN

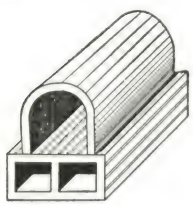
S. Saito Shazo, Official Government Contractor, Osaki Station, Tokyo

JAVA

M. Van Geisen, Merchant, Soerbaya

CANADA

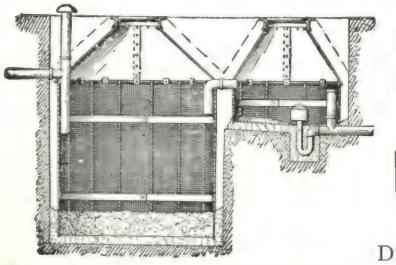
D. H. A. Fraser, Lumber Merchant, Ottawa



DISPOSAL TILE

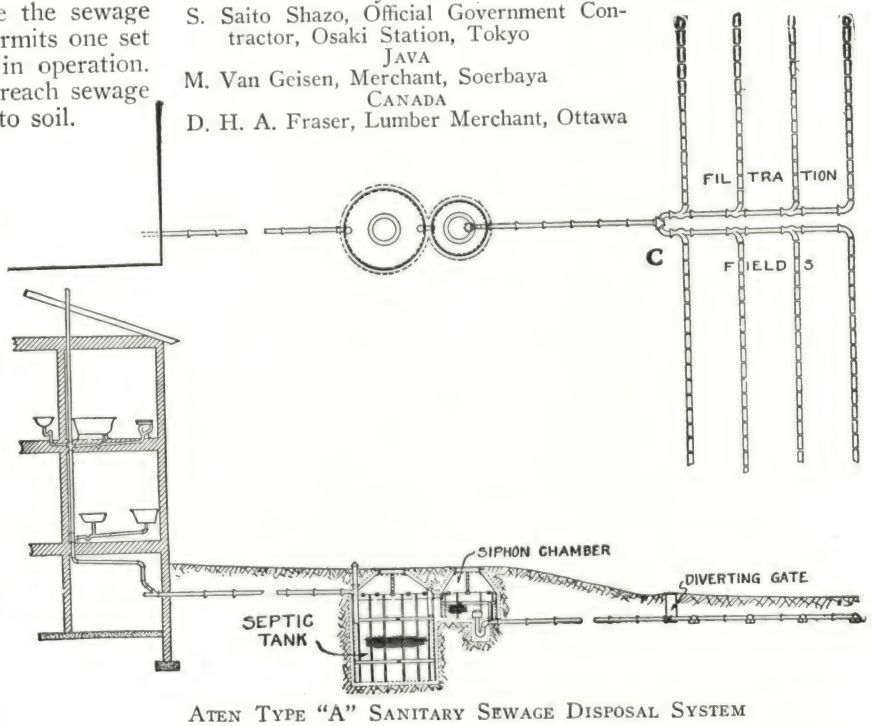
Y-BRANCH TILE

AUTOMATIC SEWAGE SIPHON



SECTIONAL VIEW OF SEPTIC TANK AND SIPHON CHAMBER

DIVERTING GATE CHAMBER



ATEN TYPE "A" SANITARY SEWAGE DISPOSAL SYSTEM

THE NEW YORK SEWAGE DISPOSAL CO.

Experts in Sanitary Engineering
5621 Grand Central Terminal
NEW YORK, N. Y.

Products and Services

Experts in the DESIGN and CONSTRUCTION of SEWAGE DISPOSAL SYSTEMS.

Also Water Supply Plants and other kindred suburban work.

The engineering staff is made up of graduates of the best technical schools who are trained by years of experience in sanitary and mechanical engineering in the fullest meaning of the terms. They will investigate and report on Sewerage, Drainage, Water Supply, Pumps, Swimming Pools and kindred subjects.

They are also prepared to furnish reports on Chemical and Bacterial Condition of Water, and to conduct Gauging Tests, Surveys and Location of Plants.

Experience

Twenty years' active work in design and construction. *More than 1000 plants* in all parts of the country and under the most widely divergent conditions have been built. Plans and work (approved by state, county and city health officers and engineers) have given such great satisfaction that frequent commissions for additional work are received from satisfied clients.

The scope of the work of this company extends from the smallest plant for a dwelling to the large municipal installations. Their experience in hospital work and golf clubs is unusually extensive.

Description of Residential and Institutional Sewage Disposal Plants

Special interest is given to the fact that this company has been the originator and developer of an automatic siphon which works properly; a diverting gate that does not rust or jam, and a type of sewage irrigation tile designed, after years of careful investigation, that accomplishes the best results.

Sewer—Vitrified or iron pipe; standard engineering specifications.

Settling Tank—A tight masonry structure provided with special inlet and outlet devices, baffle and weir walls and other arrangements, so that sewage will be received and held a proper length of time to permit the maximum degree of liquefaction—ripe for oxidation.

The particular design which may be selected depends upon the nature and volume of sewage to be treated.

Siphon Chamber—A tight masonry structure built in connection with settling tank. Receives liquid overflow and by means of an automatic siphon, *designed for the purpose,* discharges this effluent at periods. The function of the siphon chamber is to produce periodic discharges in order to fill uniformly the tile disposal field beyond, at the same time permitting a period of rest, during which the oxidation of the effluent will progress at a maximum rate.

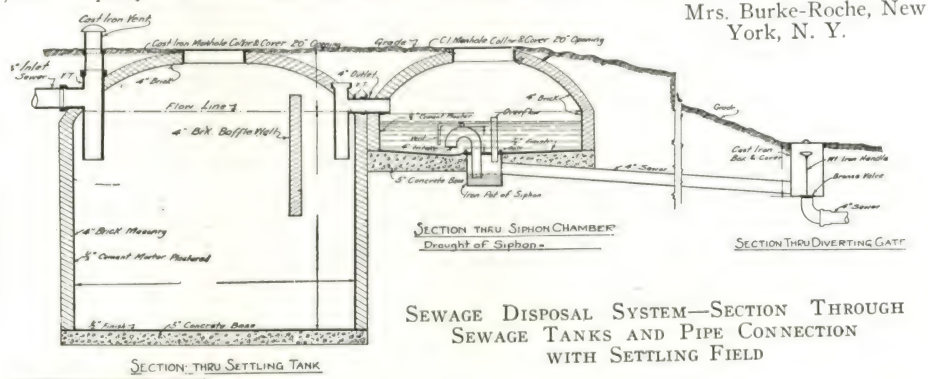
Tile Disposal Field—Made up of two or three divisions, or fields, of *special sewage irrigating tiles,* laid in a series of nearly parallel trenches following the contours. The type and quantity of absorption tiles used in disposal fields are determined by a study of the ground, and amount and nature of sewage to be treated.

Special Diverting Gate—Provided so that siphon discharge may be deflected into either of the fields. Merely turning a valve in this gate chamber once a week will accomplish this result and will permit a period of rest and recovery for the field last in use, while the next field is active.

Special Terra Cotta Fitting—Designed to set along the distribution lines so that the sewage will flow evenly and uniformly throughout each line of tile.

A Few of Our Noted Clients and Their Architects

Marshall Field, Lloyd Neck, N. Y., John Russell Pope, New York, N. Y.
Bryan L. Kennelly, Purchase, N. Y., Herbert Lucas, New York, N. Y.
J. Watson Webb, Westbury, N. Y., Peabody, Wilson & Brown, New York, N. Y.
W. Redmond Cross, Morristown, N. J., Cross & Cross, New York, N. Y.
Mrs. Edwin B. Holden, South Salem, N. Y., Arthur C. Holden, New York, N. Y.
Whitelaw Reid Estate, Purchase, N. Y., McKim, Mead & White, New York, N. Y.
H. H. Rogers, Southampton, N. Y., Walker & Gillette, New York, N. Y.
F. C. B. Page, Oyster Bay, N. Y., Little & Browne, Boston, Mass.
R. B. Ward, New Rochelle, N. Y., Chas. B. Keen, Philadelphia, Pa.
H. H. Houston, Chester, Pa., Savery & Scheetz, Philadelphia, Pa.
Dr. Cary Langhorne, Delaplane, Va., N. C. Wyeth, Washington, D. C.
W. C. Sproul, Chester, Pa., Price & McLanahan, Philadelphia, Pa.
Edw. S. Harkness, Haverford, Conn.
Harvey S. Ladew, Glen Head, N. Y., James O'Connor, New York, N. Y.
A. B. Schults, Hewlett, N. Y., R. B. Barnes, New York, N. Y.
J. C. Milholland, Woodmere, N. Y., W. H. Beers, New York, N. Y.
Geo. W. Elkins, Elkins Park, Pa., H. Trumbauer, Philadelphia, Pa.
Robert Goelet, Goshen, N. Y., Carrére & Hastings, New York, N. Y.
Col. John Magee, Mt. Kisco, N. Y., Warren & Wetmore, New York, N. Y.
Mrs. Burke-Roche, New Hamburg, N. Y., H. O. Chapman, New York, N. Y.
Children's Vacation Home (Reed Farm), Nyack, N. Y., Jas. Gamble Rogers, New York, N. Y.
Rockefeller Institute for Medical Research, Princeton, N. J., Coolidge & Shattuck, Boston, Mass.
Metropolitan Sanatorium, Mt. McGregor, N. Y., D. Everett Waid, New York, N. Y.
Mt. St. Joseph's School for Boys, Chestnut Hill, Pa., Paul Monaghan, Philadelphia, Pa.
Nurses Home, Heywood Memorial Hospital, Gardner, Mass., Stevens & Lee, Boston, Mass.



SEWAGE DISPOSAL SYSTEM—SECTION THROUGH SEWAGE TANKS AND PIPE CONNECTION WITH SETTLING FIELD

UNITED CEMENT PRODUCTS CO.

Sanitary Sewage Disposal Without Sewers

18 East Vermont Street
INDIANAPOLIS, IND.

Product

"Perfection" Septic Tank (Patented).

Adaptability

To be used in connection with inside closet, bathroom and kitchen sink, where there is no sewer connection, for *residences, schools, churches, factories, etc.*

Description

The "Perfection" septic tank reduces house sewage to water by the process of bacteria, which enter the tank with the sewage and, being increased by millions, literally devour and digest all contents, including tissue paper.

This tank is made of re-enforced cement concrete in sections for convenience in handling. These sections are cemented together in the ground forming a receptacle that is air- and water-tight.

The walls are 2 in. thick all around and every section is re-enforced with steel.

The residence size, which has 3 compartments is large enough for 8 people. This size is known as the unit and larger sizes are multiples of this unit. To preserve the life and activity of the bacteria, the excavation for this tank should be deep enough to maintain a temperature of not less than 50 degrees in the coldest weather. This should be approximately 5 ft. deep.

General Specifications

Construction—Reinforced cement concrete. Made with grooves, easily fitted. Shipped in sections (crated). Weight, 2,800 lbs., single unit. Each additional unit 2,600 lbs.

Size of Single Unit Tank (Up to 8 People)—7 ft. 4 in long, 32 in. wide, and 27 in. deep, inside. Walls, 2 in. thick. Size of elbows, 4 in. Elbows and farm tile necessary are not furnished as part of the standard equipment.

These tanks are furnished in any size to meet any requirement—2, 3, 4 and 5-unit systems and larger—length and capacities are multiples of the specifications of a single unit tank.

For factories a single unit (tank) as above is rated of sufficient capacity to accommodate 20 persons.

For schools and public buildings a single unit (tank) is rated of sufficient capacity to accommodate 20 pupils.

In special instances, if you will refer same to us, our engineers will be pleased to furnish blue prints and other information desired.

Guarantee

Where the directions for installing tanks are followed (which are simple and easy) the Company guarantees that contents of the tank will be reduced to water, which may be emptied anywhere without offense to sight or smell and that the tank will not require cleaning out.

Quick Shipments

Manufactured and shipped from 37 factories from Maine to California. Low freight rate.

There is a factory near you.

References

Thoroughly proved through years of use.

Nearly 10,000 "Perfection" tanks are now in use, some of them for 11 years, without any attention.

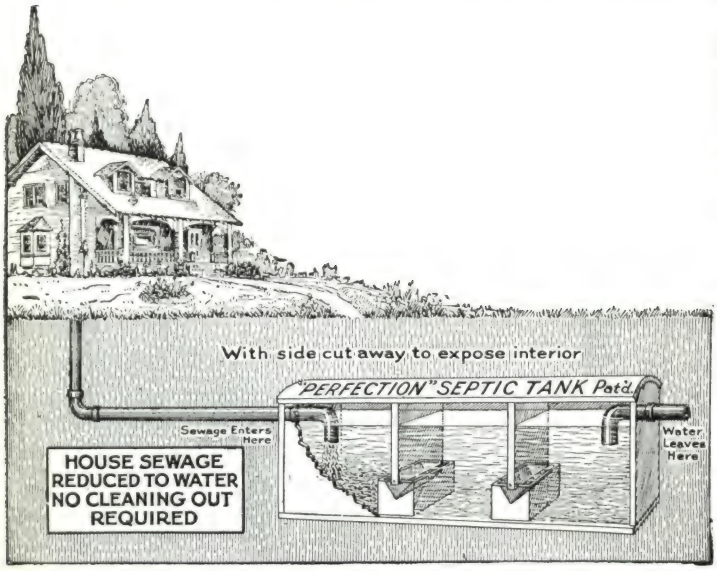
Prices, estimates and blue prints furnished on application.

Installation Data

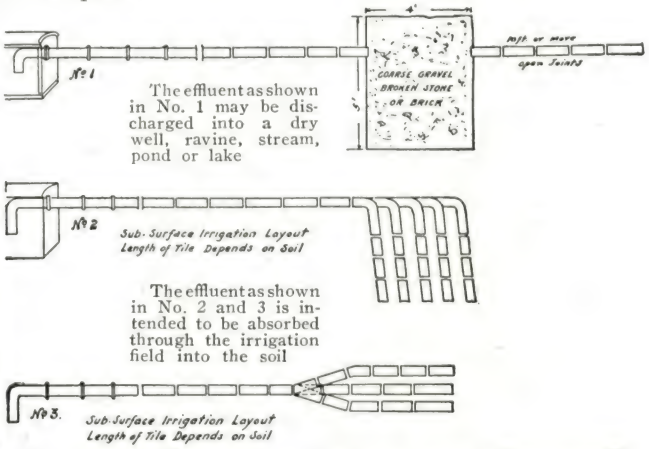
The installation of a septic tank is not complete unless the effluent from the same is taken care of—*This is of vital importance.* Full directions for installing and using this tank go with every shipment.

The drainage tile should be laid approximately 1 ft. below the surface of the ground. The joints should be left ¼ in. apart and blinded with burlap or broken tile.

The amount of tile laid should be based on 20 to 50 ft. per person tributary to the tank, according to the character of the soil. The parallel tile should be laid 15 ft. apart.



The "Perfection" Septic Tank Installed



Layouts for Disposal of Effluent from "Perfection" Septic Tanks

KAUSTINE COMPANY, INC.

Sanitation Engineers and Manufacturers of Sewage Disposal Equipment

BUFFALO, N. Y.

SALES OFFICES

NEW YORK, N. Y. CHICAGO, ILL. BOSTON, MASS. PHILADELPHIA, PA. PITTSBURGH, PA. ALTOONA, PA.
TRENTON, N. J. WASHINGTON, D. C. MEMPHIS, TENN. PORTLAND, ORE. HUNTINGTON, W. VA.
TORONTO, ONT., CANADA HAWTHORNE, MELBOURNE, AUSTRALIA

Products

SEPTIC TANKS.
SEWAGE DISPOSAL SYSTEMS.
CHEMICAL (Waterless) TOILETS.
Also Water Supply Systems, Room Heaters, Storage Tanks.

Scope of Use

For use in villages, schools, factories, homes, camps, mines, mills, clubs, hotels, etc.

Kaustine System Chemical Toilets

Kaustine System (Standard) chemical toilet is a self-contained sewage disposal plant and high class indoor toilet combined. The sewage drops directly into a tank containing a solution of Kaustine chemical. The result is complete liquefaction and sterilization.

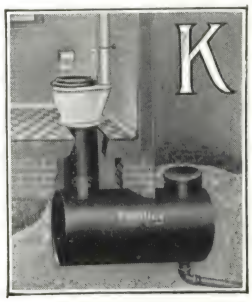
The downdraft aeration of the bowl and the correct ventilation insure a more odorless toilet than is provided for by the most modern water flushed fixtures.

The capacity of the tank is great enough to make emptying necessary only twice a year. Tank contents may be pumped out and used for fertilizer, or may be drained through tile to an inexpensive leaching pool.

Multiple Installation—This is suited for schools, factories, etc. The tanks are up to 750 gals. capacity and accommodate up to 6 bowls. Batteries of two or more multiple systems are used where more than 6 bowls are required.

The seats are installed in the same way as water closets. They require, however, proper ventilating facilities and location for tank, which must be directly under the closet bowl.

Special drawings and full specifications gladly furnished without obligation.



SINGLE INSTALLATION KAUSTINE SYSTEM TOILET

Kaustine
TRADE-MARK

Enameled Iron Kaustine Septic Tanks

The Kaustine septic tank is a standardized unit, designed on principles advocated and approved by sanitation and health authorities. It is made of No. 14 gage American ingot iron, "Armco" brand, with electrically welded seams. The special iron used, together with the coating, both inside and out, of Hermastic enamel, gives positive protection against corrosive influences.

Kaustine septic tanks are manufactured in standard sizes from 140 to 10,000 gals. Full details as to sizes, capacity, fluid depth, etc., will be supplied on request, without obligation.

Kaustine septic tanks are delivered ready to install and use; all uncertainties or installation problems are eliminated. They are durable, unbreakable, and backed by a binding guarantee.

KAUSTINE SEPTIC TANK OF 10,000-GAL. CAPACITY READY TO BE PLACED IN GROUND AND CONNECTIONS MADE WITH ABSORPTION BED

Kaustine septic tanks are made in all sizes to meet the requirements of every home, school, factory or village

Kaustine Septic Tank, Siphon Type

Sanitation engineers agree that in extremely cold climates, or in places where there is less than average sunshine, preventing ready drying of the absorption bed, the siphon septic tank is preferable.

The sludge compartment remains undisturbed, making septic action constant. The heat generated by bacterial action, together with the siphonic discharge of effluent, tends to prevent freezing.

SIPHON TYPE, KAUSTINE SEPTIC TANK

Engineering Service

A Department of competent sanitary engineers is maintained to solve your peculiar problems. Service free. No job too large—none too small. Write for information.

AMERICAN ARMCO INGOT IRON
Resists Rust
"ARMCO"
TRADE-MARK

ESTABLISHED 1864

A. M. BYERS COMPANY

Genuine Wrought Iron Pipe, Couplings and Nipples

PITTSBURGH, PA.

Products

GENUINE WROUGHT IRON PIPE.

Also manufacturers of Couplings and Nipples, Tubing, Casing, Line Pipe, Drill and Drive Pipe.

Guarantee

The International Society for Testing Materials, in 1912, suggested the following definition of wrought iron:

Wrought Iron—Malleable iron which is *aggregated from pasty particles without subsequent fusion*, and contains so little carbon that it does not harden usefully when cooled rapidly.

Remarks—Commercial wrought iron, though essentially made direct from the ore, is usually made from cast iron by such removal of its carbon and silicon as to convert it into pasty particles, and by squeezing these together in a bath of cinder or slag into a coherent mass, which *retains permanently an important quantity of that slag.*

The most important features of this definition, with its appended "Remarks," have been italicized in the above. The Byers guarantee quoted below, under which their pipe is sold, is an amplification of this definition, embodying additional provisions to safeguard against material not in keeping with the highest recognized quality of wrought iron. These additional provisions are italicized in the following:

"All Byers pipe is guaranteed to be produced from genuine wrought iron, aggregated from *a solidifying mass* of pasty particles of *highly refined metal* with which, *without subsequent fusion*, are incorporated a *minutely and uniformly distributed quantity of silicate slag.*"

There is guaranteed by the above, a product which conforms to certain chemical and physical characteristics. The base metal must be refined to the requisite degree of purity as indicated by the final amount of contained ingredients; and it must have incorporated in a proper manner the desired proportion of slag of the quality essential for the production of good wrought iron. Finally, the process must be such as to *preclude the possibility of segregation of impurities, common to steel making.*

Properties of Byers Pipe

Resistance to Vibration—By exaggerating differences, wrought iron pipe may be likened to a wire rope and steel to a stick of granite. The fibrous structure makes wrought iron extremely resistant to the constant vibration and shocks to which it is subjected in all large buildings, power plants, on railroad cars, etc.

Resistance to Shocks and Expansion—On account of its tough, fibrous structure, Byers pipe is able to withstand the severe shocks to which pipe in industrial service is continually subjected, such as water-hammer, etc. In addition, its low expansion coefficient of expansion enables it to stand the sudden changes in temperature incident to such service with a minimum strain at the joints, thus reducing the possibility of pulling away at the threads, a very common occurrence when cheaper pipe is used.

Cutting and Threading—The softness of the metal, its high purity and freedom from hard spots, make Byers pipe not only easy to cut and thread, but insure clean, sharp threads and save materials, time and tools. Owing to the perfect threads obtained, the joints are strong and permanently tight. These advantages mean a low fabricating and installation cost and are often sufficiently important to offset the higher initial cost of the pipe itself.

Resistance to Corrosion—Probably no other single quality of Byers pipe has contributed so greatly to its reputation as its large factor of immunity from corrosion, so characteristic of old-fashioned genuine wrought iron. The president of the Western Union Telegraph Co. a few years ago stated in a report to the United States Department of Agriculture: "Bessemer or open hearth steel wire will rust or deteriorate much more rapidly than iron wire, in all probability three times as rapidly."

Extended service records on Byers pipe lead to a similar conclusion; its useful life varying from two to ten times greater than that of cheaper pipe. Lists of specific cases will be sent on request.

Galvanized and Coated Pipe—Wrought iron has a rough surface to which protective coatings adhere very firmly. Byers pipe is furnished galvanized by the hot metal process, only the highest grade prime western spelter being used and a coating applied which is about 40% heavier than that of the best steel pipe. See Byers specifications following.

How to Specify Pipe

Steel pipe is known in the trade as "wrought pipe." This term has confused dealers and contractors to such an extent that many of them make no distinction between wrought iron pipe and wrought pipe, insisting on their right to furnish steel pipe on specifications calling for "wrought iron" pipe. To avoid such substitution, engineers and purchasers should specify

(1) *Genuine* Wrought Iron Pipe, or
(2) *Byers Pipe* (or approved equal).

The word Byers rolled into the pipe you use, is the surest guarantee of it being made of genuine wrought iron of highest quality.

Literature

Bulletin No. 26A—"What is Wrought Iron?"

Bulletin No. 30—"An Investigation of the Corrosion of Iron, Steel and Brass Pipe in Hot and Cold Water Supply Service."

Bulletin No. 32—"Investigations of the Relative Corrosion of W. I., Steel and C. I. Pipe in House Drainage Service."

Bulletin No. 34—"The Corrosion of Piping in Refrigeration Service."

Bulletin No. 38—"The Installation Cost of Pipe." (Itemized Cost of Pipe Systems of every variety.)

These and other bulletins will be sent free on request.

READING IRON COMPANY

Manufacturers of Genuine Wrought Iron Pipe

READING, PA.

BOSTON, MASS.
NEW YORK, N. Y.
PHILADELPHIA, PA.
BALTIMORE, MD.
PITTSBURGH, PA.
CHICAGO, ILL.
LOS ANGELES, CAL.
CINCINNATI, OHIO
FORT WORTH, TEX.

Products

READING GUARANTEED GENUINE WROUGHT IRON PIPE.

Also manufacturers of Reading Charcoal Iron Boiler Tubes, Reading Cut Nails.

The Company

READING IRON COMPANY, established 1848, is the world's *oldest* and *largest* producer of genuine wrought iron pipe, manufacturing 552 different sizes and kinds of tubular products, ranging from 1/8 to 20 in. in diameter, suitable for every industrial piping requirement.

Guarantee

This company guarantees that all READING wrought iron pipe is made strictly from puddled pig iron without the use of any scrap and that each individual length has passed the required testing and is full weight.

Specification

Ordinary steel pipe is sold under the name "wrought pipe," and a widely-followed trade custom reserves the right to install this less enduring material even where "wrought iron pipe" is specified. These misleading customs have given rise to use of the term *"genuine* wrought iron pipe" to denote the more enduring pipe made from puddled pig iron. The most positive protection, however, where pipe of long life is demanded is a specification of the manufacturer's name. READING IRON COMPANY therefore urges the adoption of the following model specification where pipe of long life and ultimate economy is desired.

All black and galvanized pipe and nipples shall be READING *or equally approved genuine wrought iron standard full weight pipe, made entirely from puddled pig iron, without the admixture of any scrap except crop ends from the pipe itself.*

All sizes of pipe should have the manufacturer's name rolled in the metal in raised or depressed letters one or more times on every full length, and certificate as to quality and weight shall be delivered to the architect by the contractor.

Reading Wrought Iron and Steel Compared

The radical difference between READING genuine wrought iron and steel is due entirely to the totally dissimilar methods of production. Wrought iron is refined only in the puddle furnace; steel, as used for welded pipe, is produced either by the Bessemer or open-hearth processes. To the metallurgist, this difference is apparent in comparing the relative structures of the metals; to the architect it is most clearly demonstrated in the ability of genuine wrought iron to give satisfactory service for two to three times the average life of steel pipe under identical conditions of service. These and other differences which greatly affect the relative service rendered are briefly outlined below.

Structural Differences—During the puddling process, wrought iron receives as an inseparable component, a basic silicate of protoxide of iron. This content, known as slag or cinder, thinly coats each grain of iron, and during the subsequent rolling and re-rolling is elongated into minute threads or filaments (Fig. 1). These filaments divide the grains of ferrite (pure iron)

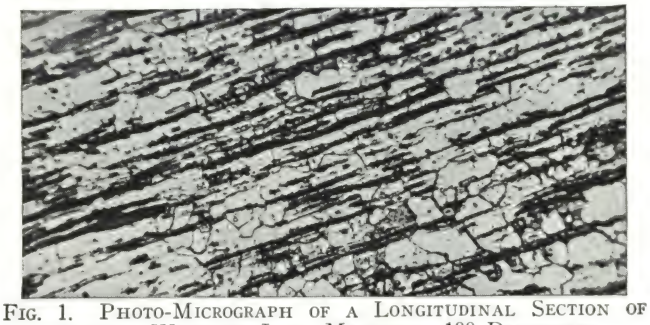


FIG. 1. PHOTO-MICROGRAPH OF A LONGITUDINAL SECTION OF READING WROUGHT IRON, MAGNIFIED 100 DIAMETERS
Black streaks indicate the fibers of corrosion-resisting siliceous slag

into clusters, thus giving to genuine wrought iron its characteristic fibrous structure (Fig. 2). The siliceous slag, being incorrodible as glass and thoroughly distributed throughout the metal, protects each grain of iron from the attacks of corrosion. It is this inherent protection that in a large measure explains the unusually long life of READING genuine wrought iron pipe.

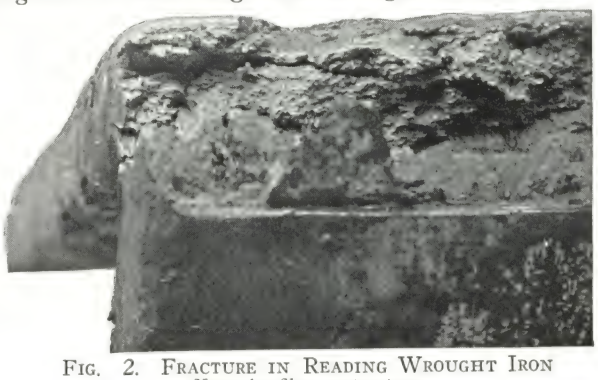


FIG. 2. FRACTURE IN READING WROUGHT IRON
Note the fibrous structure

In the Bessemer or open hearth processes, the formation of a siliceous slag is impossible. Steel, therefore, is totally lacking in this protection, and consists of a solid, crystalline mass of grains of ferrite (carbonless iron), and pearlite (iron containing carbon), which offers to the progress of corrosion a direct path through the metal from surface to surface (Fig. 3). It is largely due to this structural difference that an installation of READING wrought iron pipe will render satisfactory service through a period that would destroy two if not three successive steel pipe installations.

Welds—Wrought iron gives stronger welds; its slag content is a natural flux. In the commercial welding of steel an artificial flux such as borax is used. This is impracticable, however, in the manufacture of steel pipe, thus producing a bond far less dependable than the firm, even weld of READING wrought iron pipe.

Continued on next page

FIG. 3. PHOTO-MICROGRAPH OF A LONGITUDINAL STEEL SECTION (100 DIAMETERS) SHOWING LOW CARBON STRUCTURE AND TOTAL ABSENCE OF PROTECTING SLAG
Dark spots indicate high-carbon areas

Segregation in Steel—Wrought iron is continually agitated during the puddling process and when thoroughly refined is taken from the furnace in the form of white-hot, semiplastic balls. Steel, on the other hand, is tapped in a liquid condition from the converter or furnace and poured into huge ingot moulds, where it is allowed to cool undisturbed. During this solidification, impurities segregate toward the slow-cooling center of the ingot, thus producing an irregularity in composition which is largely responsible for the known irregularity of steel pipe in service.

Threading—Wrought iron cuts and threads easily and cleanly. Because of its uniform, fibrous structure, special dies are not required, nor do standard dies gouge or burr the threads.

Resistance to Fatigue—Wrought iron resists continued strains, both torsional and vibratory. Its fibrous structure is not subject to crystallization.

Four Easy Tests to Distinguish Genuine Wrought Iron Pipe

File Test—File a bright, smooth surface about 2 in. square on the piece of pipe to be inspected. If the bright surface shows fine hair lines running parallel to length of pipe it is wrought iron, for these hair lines are fibers of the siliceous slag. If, on the other hand, the surface does not show these lines the material is steel.

Threading Test—Examine cuttings while the pipe is being threaded. If they are in long coils, the pipe is steel; if they are broken into short chips, the pipe is wrought iron.

Galvanizing Test—Hammer a piece of galvanized pipe repeatedly. If, as it flattens out, the galvanizing flakes off freely, the pipe is steel. If, on the other hand, the galvanizing adheres firmly to the pipe, it is wrought iron.

Roll Mark Test—Every length of READING wrought iron pipe has the word "READING" rolled in the iron, except redrawn pipe, which has the letters depressed. The name "READING" insures genuine wrought iron pipe, with its life two to three times that of steel pipe.

Corrosive Effect of Cold Water

In cold water service, the corrosive effect depends largely upon the composition of the water, especially in regard to the salts and oxygen in solution. These components, however, do not readily attack the pipe at ordinary water temperatures unless they occur in excessive amount. Where an analysis of the water, therefore, shows a relatively small percentage of free oxygen and impurities, little corrosive effect may be expected in cold water lines.

Corrosive Effect of Hot Water

Experiments of Heyn and Bauer in 1910 indicate that corrosion of metal by hot water increases with the temperature, reaching its maximum at about 140° Fahr. where the effect is about four times greater than at normal temperature. At about 140° Fahr. the corrosion decreases with increase of temperature; above 176° Fahr. the falling off is rapid and the corrosion should be very slight at the boiling point (212° Fahr.), because of the expulsion of oxygen from the water.

Corrosive Effect of Condensed Water

Solubility of oxygen in water increases with its purity. In condensing, the large contact area of the water particles also facilitates the absorption of oxygen. When, as is usually the case, this water, saturated with oxygen, is of high temperature, corrosion may be even more rapid than that obtaining in hot water supply pipes.

Corrosive Effect of Steam

Corrosion may be attributed to the effect of the moisture or water of condensation. In steam heating systems as well as in the usual power lines, especially in those operated intermittently, the water of condensation will stand in horizontal and slightly inclined lines in small cavities and depressions in the pipe itself, particularly at the joints, and cause severe local rusting, often in the form of pitting.

In the case of genuine wrought iron pipe the tendency to pit is very much reduced, owing to the protection afforded by the slag fibers.

Relative Cost of Pipe

As in other products of the same class, the cost of pipe should be based upon cost per year of service. A total wrought iron pipe installation will cost approximately 6% more than a total installation of steel pipe, yet replacement costs on steel pipe, which must be expected within 5 to 10 years, can always be figured at 20% to 30% more than the original saving effected by using steel pipe. It is, therefore, apparent that the additional cost of wrought iron, with its period of usefulness double that of steel, is a decided economy in the long run.

Specifications of Reading Genuine Wrought Iron Standard Welded Pipe

The following specification embodies READING mill practice which insures READING Standard.

Material—Lapweld and buttweld pipe are to be made of guaranteed quality genuine wrought iron made from No. 1 gray forge pig iron by the process of puddling, and no scrap or cuttings except crop ends from the sheet or crop ends of the pipe itself shall be used in the manufacture. The use of steel scrap will not be permitted to enter into any part of the process of manufacture of the iron.

Process of Manufacture—All pipe must be made either by the lapweld or buttweld process. Sizes 1½ in. and smaller, standard and special sizes, are buttweld. All 2 in. and larger standard and special sizes, are made lapweld. 1¼ and 1½ in. are made lapweld when specified. All in accordance with the best methods and practice.

Surface Inspection—All pipe must be reasonably straight and free from blisters, cracks, or other injurious defects. Liquor marks incidental to manufacture of the pipe will not be considered as surface defects. The pipe shall not vary more than 1% either way from being perfectly round or true to size, outside diameter, except

Continued on next page

on the small sizes where a variation of $\frac{1}{64}$ in. will be accepted. The pipe must not vary more than 2½% below or 5% above standard weight.

Threading and Reaming—All pipe must have a good Briggs' standard thread which will make a tight joint when tested by hydrostatic pressure at mill (see tests). The thread must not vary more than one and one-half turns either way when tested with a Pratt & Whitney standard gauge.

Internal Pressure Test—The following hydrostatic test pressures must be applied to the respective sizes of standard buttweld and lapweld pipe as indicated in table following:

Nominal Size	Method of Manufacture	Test Pressure, lbs.
⅛ to 1½ in., inclusive	Buttweld	750
1½ to 8 in.	Lapweld	1000
9 to 10 in.	Lapweld	900
11 to 12 in.	Lapweld	800
13 and 14 in.	Lapweld	700
15 in. outside diameter	Lapweld	600
17, 18, and 20 in. outside diameter	Lapweld	550

All specials, or weights, other than standards, to be tested specially.

Testing of Materials—The iron from which the pipe is made must show the following physical properties:

Tensile strength ..... 45,000 to 55,000 lbs.
Elastic limit ..... 25,000 to 35,000 lbs.
Elongation, 8 in. ..... 12% to 25%
Reduction of area ..... 17% to 25%

Couplings—The material is to be made from No. 1 gray forge pig iron by the process of puddling, and no scrap or cuttings, except crop ends from the sheet or crop ends from the pipe itself, shall be used in the manufacture. The material must be sound and free from injurious defects for standard pipe couplings. Threads must be clean cut, tapped straight through, and of such pitch diameter as will make tight joint; the ends must be countersunk. Couplings for oil country goods must be made from double refined wrought iron. All standard pipe couplings larger than 4 in., and all oil country couplings must be full taper-tapped on each end, faced and recessed.

Thread Protection—Full length tapped rings or split couplings must be provided as thread protectors on all sizes 4 in. in diameter or larger. Protectors must be provided for small sizes when specifically called for on order. On all oil country goods the threads must be protected with heavy rings or split couplings.

All tests shall be made at the mill.

READING STANDARD GENUINE WROUGHT IRON PIPE
BLACK AND GALVANIZED

	Size, in.	List price per ft.	Diameters, in. External	Diameters, in. Internal	Thickness, in.	Weight per ft., lbs. Plain ends	Weight per ft., lbs. Thds. and couplings	Thds. per in.	Lgth. of thread, in.	Taper per foot, in.	Hydrostatic test, lbs.
Buttweld	⅛	$0.05½	.405	.266	.070	.244	.245	27	½	¾	750
	¼	.06	.540	.360	.090	.424	.425	18	½	¾	750
	⅜	.06	.675	.489	.093	.567	.568	18	⅝	¾	750
	½	.08½	.840	.617	.111	.850	.852	14	⅝	¾	750
	¾	.11½	1.050	.819	.115	1.130	1.134	14	¾	¾	750
	1	.17	1.315	1.043	.136	1.678	1.684	11½	1	¾	750
	1¼	.23	1.660	1.374	.143	2.272	2.281	11½	1	¾	750
	1½	.27½	1.900	1.604	.148	2.717	2.731	11½	1	¾	750
Lapweld	1½	.27½	1.900	1.604	.148	2.717	2.731	11½	1	¾	1000
	2	.37	2.375	2.060	.158	3.652	3.678	11½	1	¾	1000
	2½	.58½	2.875	2.460	.208	5.793	5.819	8	1½	¾	1000
	3	.76½	3.500	3.059	.221	7.575	7.616	8	1⅝	¾	1000
	3½	.92	4.000	3.538	.231	9.109	9.202	8	1¾	¾	1000
	4	1.09	4.500	4.016	.242	10.790	10.889	8	1¾	¾	1000
	4½	1.27	5.000	4.496	.252	12.538	12.642	8	1¾	¾	1000
	5	1.48	5.563	5.036	.263	14.617	14.810	8	1¾	¾	1000
	6	1.92	6.625	6.053	.286	18.974	19.185	8	1¾	¾	1000
	7	2.38	7.625	7.010	.307	23.544	23.769	8	1¾	¾	1000
	8	2.50	8.625	8.059	.283	24.696	25.000	8	1¾	¾	800
	8	2.88	8.625	7.967	.329	28.554	28.809	8	1¾	¾	1000
	9	3.45	9.625	8.927	.349	33.907	34.188	8	2¼	¾	900
	10	3.20	10.750	10.181	.284	31.201	32.000	8	2¼	¾	600
	10	3.50	10.750	10.124	.313	34.240	35.000	8	2¼	¾	800
	10	4.12	10.750	10.005	.372	40.483	41.132	8	2¼	¾	900
	11	4.63	11.750	10.985	.382	45.557	46.247	8	2¼	¾	800
	12	4.50	12.750	12.077	.336	43.773	45.000	8	2½	¾	600
	12	5.07	12.750	11.985	.382	49.562	50.706	8	2½	¾	800
	13	5.60	14.000	13.250	.375	53.510	55.824	8	3	¾	700
	14	6.10	15.000	14.250	.375	57.437	60.375	8	3	¾	700
	15	6.50	16.000	15.250	.375	61.364	64.500	8	3	¾	600

Furnished with threads and couplings and in random lengths unless otherwise ordered.

All weights and dimensions are nominal.

Weight per foot of pipe with threads and couplings is based on a length of 20 ft., including the coupling, but shipping lengths of small sizes will usually average less than 20 ft.

Permissible variation in weight is 2½% below and 5% above weights given in tables.

All weights are figured on the basis of 1 cu. in. of wrought iron weighing .2778 lb.

All pipe threaded to Briggs' standard gauges as made by Pratt & Whitney Co., Hartford, Conn.

For cut lengths, an extra charge will be made above random lengths.

For pipe smoothed on the inside (known as plugged and reamed) an extra charge will be made above standard pipe.

For galvanized or coated pipe an extra charge will be made above black.

When ordering sizes 8 to 12 in., please state weight of pipe wanted.

Facsimile of Reading Pipe

Guarantee

This company guarantees that all Reading wrought iron pipe is made strictly from puddled pig iron without the admixture of any foreign scrap, and that each individual length has passed the required testing and is full weight with a variation of not more than 2½% below or 5% above card weight.

READING X STRONG AND XX STRONG GENUINE WROUGHT IRON PIPE

	Size, in.	List price per ft.	Diameters, in. External	Diameters, in. Internal	Thickness, in.	Weight, per ft., plain ends, lbs.	Hydrostatic test, lbs.
		Extra Strong, Black and Galvanized					
Buttweld	⅛	$0.12	.405	.210	.098	.314	750
	¼	.07½	.540	.295	.122	.535	750
	⅜	.07½	.675	.417	.129	.738	750
	½	.11	.840	.539	.151	1.087	750
	¾	.15	1.050	.735	.157	1.473	750
	1	.22	1.315	.949	.183	2.171	750
	1¼	.30	1.660	1.269	.195	2.996	1500
	1½	.36½	1.900	1.491	.204	3.631	1500
Lapweld	1½	.36½	1.900	1.491	.204	3.631	2500
	2	.50½	2.375	1.929	.223	5.022	2500
	2½	.77	2.875	2.311	.282	7.661	2000
	3	1.03	3.500	2.887	.306	10.252	2000
	3½	1.25	4.000	3.350	.325	12.505	2000
	4	1.50	4.500	3.811	.344	14.983	2000
	4½	1.80	5.000	4.275	.363	17.611	1800
	5	2.08	5.563	4.797	.383	20.778	1800
	6	2.86	6.625	5.743	.441	28.573	1800
	7	3.81	7.625	6.603	.511	38.048	1500
	8	4.34	8.625	7.604	.510	43.388	1500
	9	4.90	9.625	8.604	.510	48.728	1500
	10	5.48	10.750	9.729	.510	54.735	1200
	11	6.10	11.750	10.729	.510	60.075	1100
	12	6.55	12.750	11.729	.510	65.415	1100
		Double Extra Strong, Black and Galvanized					
Buttweld	½	.32	.840	.226	.307	1.714	750
	¾	.35	1.050	.413	.318	2.440	750
	1	.37	1.315	.576	.369	3.659	750
	1¼	.52½	1.660	.874	.393	5.214	2200
	1½	.65	1.900	1.078	.411	6.408	2200
Lapweld	2	.91	2.375	1.480	.447	9.029	3000
	2½	1.37	2.875	1.742	.567	13.695	3000
	3	1.86	3.500	2.270	.615	18.583	3000
	3½	2.30	4.000	2.697	.651	22.850	2500
	4	2.76	4.500	3.119	.690	27.541	2500
	4½	3.26	5.000	3.546	.727	32.530	2000
	5	3.86	5.563	4.028	.768	38.552	2000
	6	5.32	6.625	4.857	.884	53.160	2000
	7	6.35	7.625	5.835	.895	63.079	2000
	8	7.25	8.625	6.835	.895	72.424	2000

Extra strong and double extra strong pipe will be shipped in random lengths and with plain ends unless otherwise ordered.

All weights and dimensions are nominal.

Random lengths extra strong and double extra strong pipe are considered to be 12 to 20 ft.

If fitted with threads and couplings, an extra charge will be made above regular. When extra strong and double extra strong pipe is ordered with threads and couplings, regular line pipe couplings will be furnished, unless otherwise specified.

For cut lengths, an extra charge will be made above random lengths.

For galvanized or tar coated pipe, an extra charge will be made above black.

All double extra strong pipe made from a solid sheet—not telescoped.

THE DURIRON COMPANY, INC.

Manufacturers of Acidproof Drain Pipe and Fittings

DAYTON, OHIO

SALES OFFICES

NEW YORK, N. Y. CHICAGO, ILL. SALT LAKE CITY, UTAH CLEVELAND, OHIO SAN FRANCISCO, CAL. ATLANTA, GA. MONTREAL, QUE. DENVER, COLO.

Products

ACIDPROOF DRAIN PIPE and FITTINGS (all standard and extra heavy).

Also "Josam-Duriron" Floor Drains; Acidproof Traps; Acidproof Laboratory Equipment and Chemical Plant Apparatus, including Sinks, Troughs for chemistry tables, Sink Connections, Dilution Basins, Exhaust Fans, Pumps, Valves, Cocks, Tanks, Tank Outlets and Kettles.

Duriron Engineering Service

Wide experience in connection with all conditions obtaining for the handling of acids and acid wastes, and knowledge of the varied building codes throughout the country, permits us to offer, without obligating the architect, service covering any information desired. Duriron is installed the same as cast iron soil pipe, so that no special instruction to the plumbing contractor is necessary.

Literature

Our bulletin, "Acidproof Drain Pipe and Sanitary Fittings," (size 8x10½ in.) contains complete information and will be found valuable to the specification writer. It is prepared for convenient filing and will be furnished on request.

Duriron

Duriron is an extremely hard, close grained cast metal alloy that is entirely resistant to the action of all corrosives used commercially. It has a tensile strength of 10,000 to 12,000 lbs. per sq. in.

Despite the similarity of names, Duriron should not be confused with iron. In analysis it differs more from iron than bronze does from brass.

Duriron serves a wide field for apparatus handling corrosives, but its chief value to the architect is in drain pipe where acids are carried or where acid wastes must be reckoned with, or where absolute permanence is essential.

Duriron Drain Pipe

Duriron is the one perfect material for drain lines. An installation is permanent regardless of conditions. Other materials produced to meet acid conditions are limited in service—Duriron withstands all corrosives and meets all the demands of drain line operation.

Duriron is much stronger than other acid resisting pipe. Being a solid cast metal (not coated, lined or treated) it is equally resistant inside, outside and all through its structure, and thus has no vulnerable surface to be affected by stoppage or overflow. Duriron pipe joints, properly calked, will not loosen under ordinary building vibration or settling. Its hardness also renders it perfectly resistant to the scouring action of solids carried in waste solutions.

Although Duriron will take paint readily, such protection is not needed. Having no asphaltum coatings there is never any danger of discoloration through walls when lines are concealed.

Where Duriron Pipe Is Used

Duriron drain lines are now considered essential in structures of the following types:

Chemical laboratories (high school, college and industrial); hospitals; newspaper plants; photo-engraving, electrotyping and electroplating plants; industrial buildings (acid wastes, pickling, etc.); battery and charging stations; public comfort stations; memorial structures; markets; hotels; lines through cinder or slag concrete; and for industrial conditions too numerous to catalogue here.

Typical Specifications for Duriron Drain Lines

(1) Pipe—All pipe and fittings carrying acid waste from ..... to ..... shall be of Duriron as manufactured by THE DURIRON COMPANY, INC., Dayton, Ohio, of the sizes shown on drawings ..... (See note "A" below).

(2) All such pipe and fittings shall be of bell and spigot type, extra heavy weight and dimensions, and shall fulfill the requirements of the city plumbing code of the City of..... Each piece shall bear the name "Duriron" cast thereon.

(3) Joints—All joints in lines carrying acid wastes shall be made by ramming tightly in bottom of bell one ring of asbestos wick packing, upon which shall be poured sufficient molten lead to fill the bell completely, the lead being properly calked in the manner usual with cast iron soil pipe. In lines handling non-acid wastes, hemp or oakum may be substituted for the asbestos wick.

(4) Cleanouts—Suitable cleanout plugs shall be provided as shown on drawings.

(5) Alignment—All pipe lines shall be correctly aligned before joints are made. Proper supports shall be provided; at least one support to each length of pipe in horizontal lines, one at each bend, and supports at intervals no greater than 10 ft. in vertical lines.

(6) Expansion Joints—If lines are to handle wastes of high temperature, expansion joints shall be provided as shown on drawings.

(7) Floor Drains—Floor drains in ..... shall be of Duriron as specified above. (See note "B" below).

(8) Vents—Vent lines carrying acid fumes shall be of Duriron as specified for pipe above. (When fumes are not severe, cast iron vent lines may be used).

(9) Sinks—All sinks in ..... shall be of Duriron of the sizes and shapes as shown on detail drawings. Each sink shall bear the name "Duriron" cast thereon. (See note "C" below).

(10) Sink Connections—All connections from sinks to waste lines, including traps, shall be Duriron as specified for pipe above.

(11) Exhaust Fans—All exhaust fans for exhausting acid fumes from hoods, together with all suction and discharge pipes connected therewith, shall be of Duriron. Such fans shall be of the type, size and capacity as shown on drawings.

Note "A": If it is desired to specify an alternate material, the words "or equal" may be inserted.

Note "B": "Josam-Duriron" drains are best for this purpose. They are of the double drainage type, which prevents any seepage around the drain.

Note "C": If Alberene or other stone or stoneware sinks are desired, the sink outlets should be of Duriron, of suitable type to conform to the design of the sinks as shown on drawings.

Continued on next page

Comparative Physical Tests on Drain Pipe

Some years ago, the Building Code of the City of New York permitted only lead and vitrified tile pipe to be used for acid drains. Duriron was called to the attention of the building departments of the five Boroughs and, as provided by the general code for the addition of other permissible material, comparative physical and chemical tests were conducted by the Testing Laboratories of Columbia University. Their findings were such that Duriron was at once added as a permissible material by all Boroughs of the city. The chemical tests showed Duriron far superior. A condensed summary of the physical tests is shown below.

COMPARATIVE PHYSICAL PROPERTIES DURIRON, LEAD AND VITRIFIED TILE PIPE

Compiled from Tests made by Testing Laboratories of Columbia University

	Vitrified Pipe	Lead Pipe	Duriron Pipe
Average ultimate crushing load, lbs. per ft	1556	1492	13490
Average transverse ultimate load, lbs., center load, span 21 in	1813	400	11250
Modulus of rupture, computed from crushing load, lbs. per sq. in	1644	*	17200

*Impossible to compute for a plastic material such as lead.

Corrosive Tests on Duriron

The United States Bureau of Standards in 1919 made exhaustive tests (120 days duration) on Duriron, with all corrosives in general commercial use. From their findings, "Depth of corrosion, inches per year," as shown in the table below, has been worked out.

Solution	Concentration, by weight	Depth of corrosion, inches per year
Sulphuric acid	95% H_2SO_4	.0000206*
Sulphuric acid	10% H_2SO_4	.0000685
Nitric acid	70% HNO_3	.0000188
Acetic acid	99% CH_3COOH	.0000188
Phosphoric acid	87% H_3PO_4	.0000188
Ferric chloride	48% Fe_2Cl_6	.0000395

*At this rate Duriron pipe would be eaten through in 12,000 years.

Duriron Design

All Duriron sanitary fittings have been designed by one of the foremost sanitary engineers of this country and comply with the most rigid codes. The line is complete, only the commoner fittings being shown in accompanying drawing.

Depth of water seal on all traps is 2½ in. Traps furnished with or without vents and cleanouts as required. All pipe and fittings have the word "Duriron" cast thereon. Pipe and fittings over 6 in. in diameter are cast special.

DIMENSIONS (IN INCHES) OF DURIRON PIPE

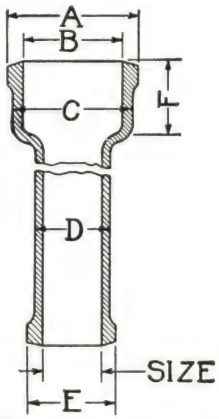
Size	1½	2	3	4	6
A	3 13/16	4 5/16	5 5/16	6 5/16	8 5/16
B	2 13/16	3 5/16	4 5/16	5 5/16	7 5/16
C	3 7/16	3 15/16	4 15/16	5 15/16	7 15/16
D	2 1/8	2 5/8	3 5/8	4 5/8	6 5/8
E	2 3/8	2 7/8	3 7/8	4 7/8	6 7/8
F	2 1/4	2 3/8	2 5/8	2 7/8	2 7/8

STANDARD BELL (HUB) AND SPIGOT PIPE

Size.....in.	1½	2	3	4	6
Length of joint.....ft.	3	4	5	5	5
Av. wt., per joint..lbs.	19	30	53	71	136

STANDARD DOUBLE HUB PIPE

Size.....in.	1½	2	3	4	6
Length of joint.....ft.	3	4	4	5	5
Av. wt. per joint...lbs.	20	34	55	81	147



DIMENSION DIAGRAM OF DURIRON PIPE

Installations

Lists of hundreds of users in all parts of the country are available for those interested in seeing actual installations and learning at first hand of the unquestioned superiority of Duriron for acid lines.

Copies of specifications written by prominent architects from coast to coast are available to those interested, as well as letters from owners in all classes of service requiring acid drains.

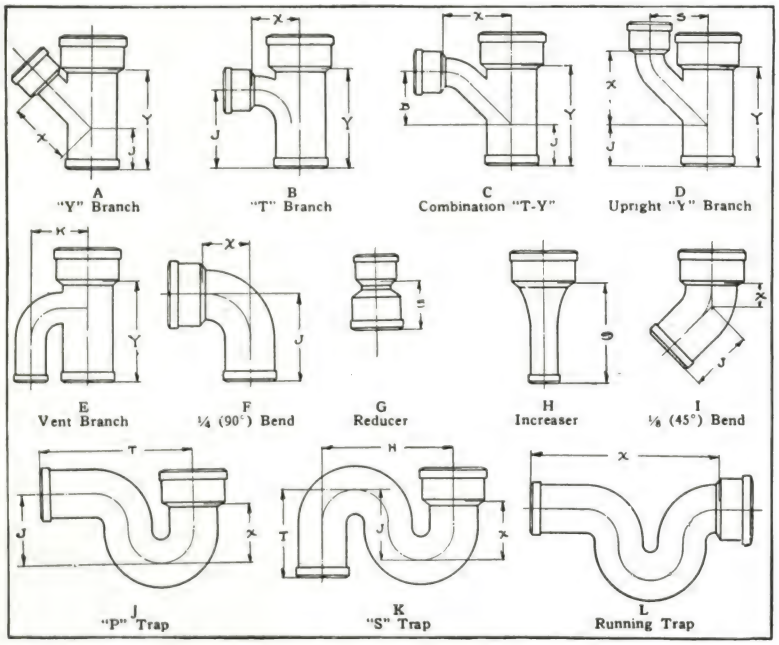
Write for Duriron ash tray or drainage fitting to show clients or for tests.

Duriron Drain Lines in Service

Sometimes the skeptical ask how we *know* that Duriron lines will last permanently. While it is true that they have been produced but a few years, yet there are instances that prove our claim.

The McGraw-Hill building in New York City installed a Duriron line from their engraving department in 1916, where nitric acid and ferric chloride are constantly wasted together with other corrosives. Recently they opened up this line and examined it carefully, and according to their statement, the pipe was exactly the same as when put in. They add that in the years this acid handling line has been in service, they have not had the slightest trouble.

We have many other testimonials equally convincing. Duriron solves what was long a problem in plumbing specifications.



DURIRON BELL AND SPIGOT FITTINGS

All dimensions in inches

Size	"Y" Branch A			"T" Branch B			"T-Y" Combinat'n C				Upright "Y" Branch, D				Vent Branch, E		¼ Bend F		⅛ Bend I		"P" Trap J			"S" Trap K				Running Trap, L
	J	X	Y	J	X	Y	B	J	X	Y	J	S	X	Y	K	Y	J	X	J	X	J	T	X	H	J	T	X	X
1½	4 3/8	3 3/4	8 1/8	6 3/4	3 1/4	8 3/8	3	4 3/8	4 5/8	8 1/8	4 3/8	4	5 5/8	8 1/8	4	8 3/8	6 3/4	3 1/4	5 1/8	1 5/8	4	10 1/4	2 3/8	7	4	6 3/4	2 3/8	12 1/8
2	4 3/4	4 1/4	9	7	3 1/2	9	3 1/2	4 3/4	5 1/4	9	4 3/4	4 1/2	6 1/4	9	4 1/2	9	7	3 1/2	5 1/4	1 3/4	4 1/2	11	3	8	4 1/2	7	3	13 1/2
3	5	5 1/2	10 1/2	7 1/2	4	10	4 9/16	5	6 1/2	10 1/2	5	5 1/2	7 7/16	10 1/2	5 1/2	10	7 1/2	4	5 7/16	1 15/16	5 1/2	12 1/2	4 1/4	10	5 1/2	7 1/2	4 1/4	15 1/2
4	5 1/4	6 3/4	12	8	4 1/2	11	5 9/16	5 1/4	7 3/4	12	5 1/4	6 1/2	8 11/16	12	6 1/2	11	8	4 1/2	5 11/16	2 3/16	6 1/2	14	5 1/2	12	6 1/2	8	5 1/2	17 1/2
6	5 3/4	9 1/4	15	9	5 1/2	13	7 11/16	5 3/4	10 1/4	15	5 3/4	8 1/2	11 1/16	15	8 1/2	13	9	5 1/2	6 1/16	2 9/16	8 1/2	17	8 1/2	16	8 1/2	9	8 1/2	21 1/2

NATIONAL TUBE COMPANY

GENERAL SALES OFFICES

Frick Building

PITTSBURGH, PA.

DISTRICT SALES OFFICES

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BOSTON	DENVER	NEW ORLEANS	PHILADELPHIA	SALT LAKE CITY	ST. PAUL

PACIFIC COAST REPRESENTATIVES: U. S. STEEL PRODUCTS CO., SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE
EXPORT REPRESENTATIVES: U. S. STEEL PRODUCTS CO., NEW YORK

Products

STANDARD, EXTRA STRONG and DOUBLE EXTRA STRONG WROUGHT PIPE, either BLACK or GALVANIZED, or with special coatings, for Water, Steam, Gas, Air, Drainage, Sprinkler, Refrigeration and Hydraulic Installations; Conductor, Signal, Railing, Fence and Ladder Pipe; Pneumatic Conveying and Speaking Tubes.

Also, Tubular Steel Poles for street lighting, electric transmission and traction purposes; Tubular Steel Flagpoles; Tubular Steel Masts, Booms and Kingposts for construction, engineering and marine purposes; Lap-welded and Seamless Steel (hot-rolled and cold-drawn) Boiler Tubes for stationary, locomotive and marine boilers.

"SHELBY" Seamless Steel Tubing, sizes from ¼ in. to 20 in., and wall-thicknesses from No. 20-gage to 1½ in.; (hot-rolled, hot-drawn and cold-drawn) for a variety of architectural, mechanical and structural uses. Made in square, hexagonal, oval, D-shape and other special shapes in addition to round, and in different anneals and special steels for various purposes; "SHELBY" Seamless Steel Cylinders for containing liquefied and non-liquefied gases, compressed air, fluids, etc.

Scale Free Pipe

"NATIONAL" butt-weld pipe (sizes ½-in. to 3-in.) is made by a welding-scale removing process which leaves the surfaces clean and smooth. This process consists of subjecting the pipe, while still hot, to the action of a series of rolls, which so work the pipe that the scale is cracked loose and falls from the pipe walls. The smooth surfaces furnish an ideal base for galvanizing and other coatings; reduce friction losses; increase the working capacity; and minimize any tendency to corrosion due to external surface influences. This product is known as "NATIONAL" WELDING-SCALE FREE Pipe.

The welding-scale free process is an exclusive feature developed by NATIONAL TUBE COMPANY and is applied only to "NATIONAL" pipe.

Spellerizing (Mechanical Roll-knobbling)

"NATIONAL" pipe, sizes 4 in. and under, is Spellerized (mechanically roll-knobbled) to reduce any tendency to corrosion. The process of Spellerizing consists of subjecting the heated bloom to the action of rolls having regularly shaped projections on their working surfaces, then to the action of smooth faced rolls, and repeating the operation whereby the surface of the metal is worked so as to produce a uniformly dense texture which reduces any acceleration of corrosion due to internal differences in the metal.

As this process is controlled exclusively by NATIONAL TUBE COMPANY, only "NATIONAL" pipe is Spellerized.

Threading Qualities

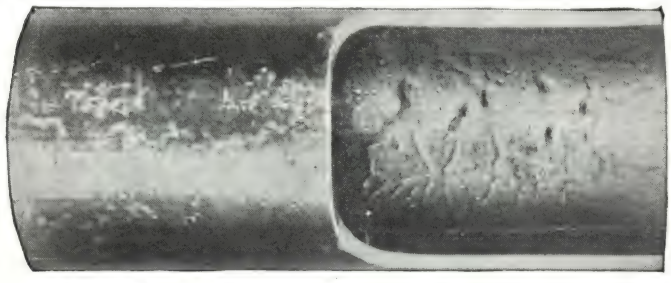
The clean-cut, strong threads which are obtained on "NATIONAL" pipe are due to the uniformity of the mild steel used, absence of laminations caused by slag streaks, blisters, pockets, etc., and lack of cinder or other foreign matter. "NATIONAL" pipe steel, being homogeneous, cuts clean and maintains its characteristic strength in the lightest part of the smallest thread.

Uniformity of "National" Pipe

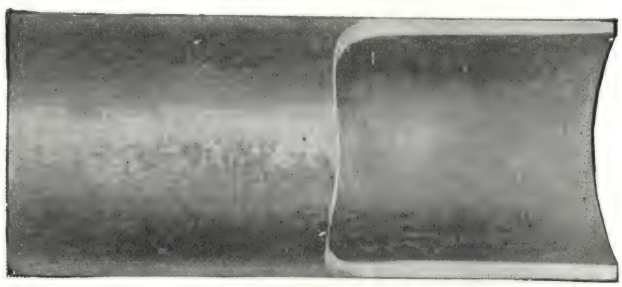
"NATIONAL" pipe is uniform because it is made from ore to finished pipe in NATIONAL TUBE COMPANY'S mills; in large unit quantities by modern machinery and under the direction of metallurgical and mechanical experts. Uniformity is reflected in those desirable physical properties which make "NATIONAL" pipe suitable for bending into coils and for those other services in which tubular material is subjected to severe manipulation.

Identification

To readily identify "NATIONAL" material, and as protection to manufacturer and consumer alike, the practice of NATIONAL TUBE COMPANY is to roll in raised letters of good size on each few feet of every length of welded pipe the name "NATIONAL" (except on the smaller butt-weld sizes on which this is not mechanically feasible; on these smaller butt-weld sizes the name "NATIONAL" appears on the metal tag attached to each bundle of pipe). When writing specifications or ordering tubular goods, always specify "NATIONAL" pipe, and identify as indicated.

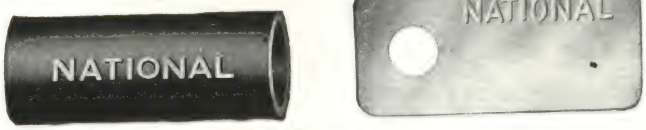


ORDINARY BLACK BUTT-WELD PIPE
Showing characteristic coating of welding-scale



"NATIONAL" WELDING-SCALE FREE PIPE
Showing clean, smooth surfaces of this modern product

Continued on next page



IDENTIFICATION MARKS

Architects who desire detailed information about "NATIONAL" pipe will find it in "NATIONAL" Bulletin No. 25—"'NATIONAL' Pipe in Large Buildings."

Specifications for "National" Standard Welded Pipe

(1) Material—Welded pipe is to be made of uniformly good quality soft weldable steel rolled from solid ingots. Sufficient crop shall be cut from the ends to insure sound material, and the steel shall be given the most approved treatment in heating and rolling.

(2) Process of Manufacture—All pipe shall be made either by the lap- or the butt-weld process as specified on order according to the best methods and practice.

(3) Surface Inspection—The pipe must be reasonably straight and free from blisters, cracks or other injurious defects.

Liquor marks incidental to the manufacture of lap-welded pipe will not be considered as surface defects.

The pipe shall not vary more than 1% either way from being perfectly round or true to the standard outside diameter, except on the small sizes where a variation of $\frac{1}{64}$ in. will be accepted. The pipe must not vary more than 5% either way from standard weight.

(4) Threading and Reaming—Where required, the pipe must have a good Briggs standard thread, which will make a tight joint when tested by hydraulic pressure at the mill (paragraph 5). The thread must not vary more than one and one-half turns either way when tested with a Pratt & Whitney Briggs standard gauge. All burrs at ends are to be removed.

(5) Internal Pressure Test—The following test pressures will be applied to the respective sizes of standard Butt- and Lap-weld pipe as indicated in table:

Nominal Size	Method of Manufacture	Test Pressure
⅛ in. to 2 in. (inclusive)	Butt-weld	700 lbs.
2½ and 3 in.	Butt-weld	800 lbs.
Up to 8 in.	Lap-weld	1000 lbs.
9 and 10 in.	Lap-weld	900 lbs.
11 and 12 in.	Lap-weld	800 lbs.
14 and 15 in. O. D.	Lap-weld	700 lbs.
16 in. O. D.	Lap-weld	600 lbs.

Note: On 8-, 10- and 12-in. sizes which have more than one weight as standard, the hydraulic test pressure for the heaviest weight is shown.

(6) Testing of Material—The steel from which the pipe is made must show the following physical properties:

Tensile strength, lbs. ..... Over 50,000
Yield point, lbs. per sq. in. ..... Over 30,000
Elongation in 8 in., per cent 20

A test piece cut lengthwise from the pipe and filed smooth on the edges should bend through 180° with an inner diameter at bend equal to the thickness of material, without fracture.

(7) Couplings—The material to be sound and free from injurious defects. Threads must be clean cut, tapped straight through and of such pitch diameter as will make a tight joint. The ends must be countersunk.

(8) Thread Protection—Solid tapped rings or split couplings will be provided as thread protectors on all sizes 4-in. diameter and larger. Protection will be provided for smaller sizes when specifically called for on order.

(9) All tests shall be made at mill.

Some Prominent Buildings in Which "National" Pipe Is Installed

Equitable Building, New York, N. Y.
Continental & Commercial Nat'l Bank Building, Chicago, Ill.
John Wanamaker Building, Philadelphia, Pa.
Union Arcade Building, Pittsburgh, Pa.
Michigan Central Railway Station, Detroit, Mich.
St. Francis Hotel, San Francisco, Cal.
Traymore Hotel, Atlantic City, N. J.
Railway Exchange Building, St. Louis, Mo.

Weights, Dimensions, and Threads per Inch

"NATIONAL" PIPE
FULL STANDARD WEIGHT—BLACK AND GALVANIZED
All weights and dimensions are nominal

Size	Diameters		Thickness	Weight per foot		Threads per inch
	External	Internal		Plain ends	Threads and couplings	
⅛	.405	.269	.068	.244	.245	27
¼	.540	.364	.088	.424	.425	18
⅜	.675	.493	.091	.567	.568	18
½	.840	.622	.109	.850	.852	14
¾	1.050	.824	.113	1.130	1.134	14
1	1.315	1.049	.133	1.678	1.684	11½
1¼	1.660	1.380	.140	2.272	2.281	11½
1½	1.900	1.610	.145	2.717	2.731	11½
2	2.375	2.067	.154	3.652	3.678	11½
2½	2.875	2.469	.203	5.793	5.819	8
3	3.500	3.068	.216	7.575	7.616	8
3½	4.000	3.548	.226	9.109	9.202	8
4	4.500	4.026	.237	10.790	10.889	8
4½	5.000	4.506	.247	12.538	12.642	8
5	5.563	5.047	.258	14.617	14.810	8
6	6.625	6.065	.280	18.974	19.185	8
7	7.625	7.023	.301	23.544	23.769	8
8	8.625	8.071	.277	24.696	25.000	8
8	8.625	7.981	.322	28.554	28.809	8
9	9.625	8.941	.342	33.907	34.188	8
10	10.750	10.192	.279	31.201	32.000	8
10	10.750	10.136	.307	34.240	35.000	8
10	10.750	10.020	.365	40.483	41.132	8
11	11.750	11.000	.375	45.557	46.247	8
12	12.750	12.090	.330	43.773	45.000	8
12	12.750	12.000	.375	49.562	50.706	8
14 O. D.	14.000	13.250	.375	54.568	55.824	8
15 O. D.	15.000	14.250	.375	58.573	60.375	8
16 O. D.	16.000	15.250	.375	62.579	64.500	8

The permissible variation in weight is 5% above and 5% below.
Furnished with threads and coupings and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.

"NATIONAL" EXTRA STRONG PIPE
BLACK AND GALVANIZED
All weights and dimensions are nominal

Size	Diameters		Thickness	Weight per foot, plain ends
	External	Internal		
⅛	.405	.215	.095	.314
¼	.540	.302	.119	.535
⅜	.675	.423	.126	.738
½	.840	.546	.147	1.087
¾	1.050	.742	.154	1.473
1	1.315	.957	.179	2.171
1¼	1.660	1.278	.191	2.996
1½	1.900	1.500	.200	3.631
2	2.375	1.939	.218	5.022
2½	2.875	2.323	.276	7.661
3	3.500	2.900	.300	10.252
3½	4.000	3.364	.318	12.505
4	4.500	3.826	.337	14.983
4½	5.000	4.290	.355	17.611
5	5.563	4.813	.375	20.778
6	6.625	5.761	.432	28.573
7	7.625	6.625	.500	38.048
8	8.625	7.625	.500	43.388
9	9.625	8.625	.500	48.728
10	10.750	9.750	.500	54.735
11	11.750	10.750	.500	60.075
12	12.750	11.750	.500	65.415

The permissible variation in weight is 5% above and 5% below.
Furnished with plain ends and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.

"NATIONAL" DOUBLE EXTRA STRONG PIPE
BLACK AND GALVANIZED
All weights and dimensions are nominal

Size	Diameters		Thickness	Weight per foot, plain ends
	External	Internal		
½	.840	.252	.294	1.714
¾	1.050	.434	.308	2.440
1	1.315	.599	.358	3.659
1¼	1.660	.896	.382	5.214
1½	1.900	1.100	.400	6.408
2	2.375	1.503	.436	9.029
2½	2.875	1.771	.552	13.695
3	3.500	2.300	.600	18.583
3½	4.000	2.728	.636	22.850
4	4.500	3.152	.674	27.541
4½	5.000	3.580	.710	32.530
5	5.563	4.063	.750	38.552
6	6.625	4.897	.864	53.160
7	7.625	5.875	.875	63.079
8	8.625	6.875	.875	72.424

The permissible variation in weight is 10% above and 10% below.
Furnished with plain ends and in random lengths, unless otherwise ordered.
All weights given in pounds. All dimensions given in inches.

THE YOUNGSTOWN SHEET & TUBE COMPANY

GENERAL OFFICES AND WORKS
YOUNGSTOWN, OHIO

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BOSTON, MASS., 120 Franklin Street

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Products

"YOUNGSTOWN" PIPE.
"YOUNGSTOWN COPPEROID" STEEL SHEETS.
"BUCKEYE" ELECTRICAL CONDUIT.
"REALFLEX" STEEL ARMORED FLEXIBLE CABLE.

The "Youngstown" Plant

This company operates one of the most modern and extensive steel plants in the world, mining its own ores and coal, producing its own coke, and controlling every step in the many processes necessary to manufacture a large number of products, among which those listed above are of especial interest to architects.

"Youngstown" Pipe

This company operates eleven tube mills, with a yearly capacity of 650,000 tons of pipe, including all standard sizes and weights, as well as many different kinds of pipe for special purposes. Attention is called particularly to the uniform quality of "Youngstown" pipe for plumbing and heating installations.

"Youngstown" steel pipe is welded from steel made for this particular purpose in our own mills, every operation being conducted with extreme care and with the most modern facilities. It is fitted with couplings made in our own shops from genuine double-refined hand-puddled iron, which we also produce. In durability and accuracy of threading it has no superior.

For the convenience of architects, specifications and other essential data concerning "Youngstown" steel and iron pipe are appended.

"YOUNGSTOWN" STEEL PIPE

"YOUNGSTOWN" STEEL AND "YOUNGSTOWN" STAR BRAND IRON PIPE
All Weights and Dimensions Are Nominal

Size, in.	List price per foot	Diameters, in. External	Diameters, in. Internal	Thickness, in.	Weight per foot, lbs. Plain ends	Weight per foot, lbs. Threads and couplings	Threads per in.
FULL STANDARD WEIGHT—BLACK AND GALVANIZED*							
⅛	$ .05½	.405	.269	.068	.244	.245	27
¼	.06	.540	.364	.088	.424	.425	18
⅜	.06	.675	.493	.091	.567	.568	18
½	.08½	.840	.622	.109	.850	.852	14
¾	.11½	1.050	.824	.113	1.130	1.134	14
1	.17	1.315	1.049	.133	1.678	1.684	11½
1¼	.23	1.660	1.380	.140	2.272	2.281	11½
1½	.27½	1.900	1.610	.145	2.717	2.731	11½
2	.37	2.375	2.067	.154	3.652	3.678	11½
2½	.58½	2.875	2.469	.203	5.793	5.819	8
3	.76½	3.500	3.068	.216	7.575	7.616	8
3½	.92	4.000	3.548	.226	9.109	9.202	8
4	1.09	4.500	4.026	.237	10.790	10.889	8
4½	1.27	5.000	4.506	.247	12.538	12.642	8
5	1.48	5.563	5.047	.258	14.617	14.810	8
6	1.92	6.625	6.065	.280	18.974	19.185	8
7	2.38	7.625	7.023	.301	23.544	23.769	8
8	2.50	8.625	8.071	.277	24.696	25.000	8
8	2.88	8.625	7.981	.322	28.554	28.809	8
9	3.45	9.625	8.941	.342	33.907	34.188	8
10	3.20	10.750	10.192	.279	31.201	32.000	8
10	3.50	10.750	10.136	.307	34.240	35.000	8
10	4.12	10.750	10.020	.365	40.483	41.132	8
12	4.50	12.750	12.090	.330	43.773	45.000	8
12	5.07	12.750	12.000	.375	49.562	50.706	8
13	5.60	14.000	13.250	.375	54.568	55.824	8
14	6.10	15.000	14.250	.375	58.573	60.375	8
15	6.50	16.000	15.250	.375	62.579	64.500	8

Size, in.	List price per foot	Diameters, in. External	Diameters, in. Internal	Thickness, in.	Weight per foot, lbs., plain ends
EXTRA STRONG PIPE—BLACK AND GALVANIZED*†					
⅛	$ .12	.405	.215	.095	.314
¼	.07½	.540	.302	.119	.535
⅜	.07½	.675	.423	.126	.738
½	.11	.840	.546	.147	1.087
¾	.15	1.050	.742	.154	1.473
1	.22	1.315	.957	.179	2.171
1¼	.30	1.660	1.278	.191	2.996
1½	.36½	1.900	1.500	.200	3.631
2	.50½	2.375	1.939	.218	5.022
2½	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3½	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
4½	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
9	4.90	9.625	8.625	.500	48.728
10	5.48	10.750	9.750	.500	54.735
11	6.10	11.750	10.750	.500	60.075
12	6.55	12.750	11.750	.500	65.415
DOUBLE EXTRA STRONG PIPE—BLACK AND GALVANIZED§†					
½	$ .32	.840	.252	.294	1.714
¾	.35	1.050	.434	.308	2.440
1	.37	1.315	.599	.358	3.659
1¼	.52½	1.660	.896	.382	5.214
1½	.65	1.900	1.100	.400	6.408
2	.91	2.375	1.503	.436	9.029
2½	1.37	2.875	1.771	.552	13.695
3	1.86	3.500	2.300	.600	18.583
3½	2.30	4.000	2.728	.636	22.850
4	2.76	4.500	3.152	.674	27.541
4½	3.26	5.000	3.580	.710	32.530
5	3.86	5.563	4.063	.750	38.552
6	5.32	6.625	4.897	.864	53.160
7	6.35	7.625	5.875	.875	63.079
8	7.25	8.625	6.875	.875	72.424

Furnished with threads and couplings and in random lengths unless otherwise ordered.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

For cut lengths, an extra charge will be made above random lengths. For galvanized or coated, an extra charge will be made above black. *The permissible variation in weight is 5% above and 5% below. §The permissible variation in weight is 10% above or 10% below. †Furnished with plain ends and in random lengths, unless otherwise ordered. Random length of Extra Strong and Double Extra Strong pipe is considered to be 12 to 22 ft.; we to have the privilege, however, of supplying not exceeding 5% of the total order in lengths of from 6 to 12 ft. For pipe fitted with threads and couplings, an extra charge will be made above plain ends.

Continued on next page

Specifications for "Youngstown" Steel Pipe

For the convenience of architects and engineers the following specifications for steel pipe are submitted:

Material—All "Youngstown" steel pipe shall be made of soft weldable steel of uniformly good quality. This steel to be particularly adaptable to the requirements for wrought pipe, and sufficient crop shall be cut from the top of each ingot to secure solid metal in the skelp.

Properties—The steel from which the pipe is made shall have approximately the following physical properties:
Tensile strength, not less than 50,000 lbs.
Elastic limit, not less than one-half tensile.
Elongation in 8 in., not less than 20%.
Reduction in area, not less than 50%.

Test Specimens—Test specimens for determining physical properties shall be cut from skelp or finished pipe.

Crushing Test—When required, cross sections cut from any pipe shall stand crushing down until the inside walls are three times the thickness of the wall from each other without showing cracks on the outside of the bend; except that, in the case of butt-welded pipe, any fracture at the weld must give evidence of having been firmly welded.

Bend Test—When required, a test specimen cut lengthwise from skelp or finished pipe and filed smooth on the edges shall bend through an angle of 180°, with an inner diameter equal to the thickness of the material, without fracture.

Hydrostatic Test—All sizes shall be tested at mill to an internal pressure, as shown in the following table:
⅛ to 2 in., butt-weld, 700 lbs.
2½ and 3 in., butt-weld, 800 lbs.
Up to 8 in., lap-weld, 1000 lbs.
9 and 10 in., lap-weld, 900 lbs.
11 and 12 in., lap-weld, 800 lbs.

On the 8-in., 10-in. and 12-in. sizes, which have more than one weight as standard, we have shown the test pressure for the heaviest weight.

Lengths—Unless otherwise specified, standard pipe will be furnished in random lengths with threads and couplings; extra strong pipe will be furnished plain ends.

Threading—Pipe and couplings shall be threaded and tapped according to Briggs' standard. Threads must be a good commercial thread and must not leak under the specified pressure (paragraph 5). The thread must not vary more than one and one-half turns, either way, when tested with a Pratt & Whitney Briggs' standard gauge. All burrs at the ends shall be removed.

Couplings—Chamfered or slightly beveled couplings will be furnished on all steam pipe, and shall be of soft puddled iron, thoroughly welded and free from all blisters, pits or other defects that would break the continuity of the thread.

Tolerance—The pipe shall not vary more than 1% either way from being perfectly round and true to the standard outside diameter, except on smaller sizes, where a variation of $\frac{1}{64}$ in. will be acceptable, and shall not vary more than 5% either way from weight as listed.

Tests—All tests shall be made at the mill.

"Youngstown Copperoid" Steel Sheets

In "Youngstown Copperoid" steel a material has been developed which resists corrosion under exposure to the atmosphere in such a surprising degree that it should receive special attention from all architects preparing specifications for steel roofing, siding, cornice work, steel window frames, sash, metal lath, and all other work in which metal sheets are used.

Exhaustive tests conducted by The American Society for Testing Materials have demonstrated the rust resisting qualities of "Copperoid" steel to be far superior to those of ordinary steel, so-called "pure irons," made in open hearth furnaces, or, in fact, any other metal at approximately equal cost.

Full information on this subject can be had on application or by reference to the reports of this test as published by the Society.

Identification

"Youngstown" steel pipe and "Youngstown" steel sheets are plainly marked. In pipe, the name is rolled in the steel. On sheets, it is stenciled in the usual manner.

"Buckeye" Conduit

"Buckeye" electrical conduit is the most widely used material of this kind made in this country. It is made of mild steel "Youngstown" pipe, carefully and thoroughly enameled or electro-galvanized. It is regularly tested and inspected by The Underwriters' Laboratories, Inc., and is used extensively on government work. "Buckeye" conduit is a product of uniform excellence entitling it to the approval of the most careful architect.

"Buckeye" Conduit

"Realflex" Armored Cable

This material is now among the smallest and lightest, as well as the strongest and most flexible of all flexible steel armored electrical conductors. It has recently been greatly improved by reducing its diameter and weight. "Realflex" is armored with hot-galvanized steel wire, and gives about the same protection as rigid steel conduit. Its remarkable flexibility, great strength and permanently handsome appearance suggest its use especially for exposed wiring and for rewiring old buildings, since it is inconspicuous when exposed and may be fished with the greatest ease through walls, fitting closely around sharp corners and in standard connections. For wiring in which rigid steel conduit can not be economically used, the logical substitute is "Realflex."

"Realflex" Armored Cable

Sizes and Weights

All of these products are regularly manufactured in standard sizes and weights, but they can be furnished to meet special requirements within reasonable limits. All of them can be obtained from leading jobbers and dealers in all parts of the United States, as well as in most foreign countries.

Additional Information Supplied on Request

This company is always glad to furnish detailed information concerning any of its products and to render any assistance possible to architects who communicate with it direct or with any of its sales offices as listed on the preceding page.

THE AMERICAN BRASS COMPANY

Manufacturers of Brass, Copper, Admiralty and Benedict Nickel Pipe

GENERAL OFFICES

WATERBURY, CONN.

MILLS AND FACTORIES

ANSONIA, CONN. WATERBURY, CONN. BUFFALO, N. Y. KENOSHA, WIS. TORRINGTON, CONN.

OFFICES AND AGENCIES

NEW YORK, N. Y., 25 Broadway
BOSTON, MASS., 201 Devonshire Street
PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., 1128 Widener Building
PITTSBURGH, PA., 904 Union Bank Building
CHICAGO, ILL., 29 East Madison Street
CLEVELAND, OHIO, 1118 Citizens Building
CINCINNATI, OHIO, 1026 Union Central Building
DETROIT, MICH., 3-132 General Motors Building
ST. LOUIS, MO., Security Building
SAN FRANCISCO, CAL., 351 California Street

Products

ANACONDA PIPE for Water Service made of BRASS, COPPER, ADMIRALTY and BENEDICT NICKEL ALLOYS.

For Anaconda Extruded Architectural Brass and Bronze Mouldings, Angles, Tees, etc., see pages 584-586.

ANACONDA
from mine to consumer
TRADE-MARK

Manufacturing Experience

From more than a century of experience THE AMERICAN BRASS COMPANY has acquired a knowledge of improved methods and a technical skill in manufacturing which enables it to control the quality of its pipe products at every stage of production, thereby assuring maximum results which can be obtained under various conditions of use. Anaconda pipe is not new, but a standard product of one of the oldest and most practiced manufacturers of brass in America.

Anaconda Brass Pipe

Brass pipe bearing the Anaconda trade-mark will not rust, clog or leak, and is guaranteed not to split. On account of its resistance to corrosion it rarely, if ever, needs replacing and is the ideal material for plumbing public buildings and dwellings. It is especially indispensable for concealed piping and exposed hot water systems.

Anaconda brass pipe is semi-annealed, hard enough to stand threading, but soft enough to remove the strains in the metal which cause splitting and season-cracking. Its corrosion resistance is manifest in the free flow of clear water, elimination of leaks and upkeep savings.

Why Anaconda Brass Pipe Is Semi-annealed—The accompanying microphotographs reveal the considerations which caused THE AMERICAN BRASS COMPANY to semi-anneal Anaconda Brass Pipe.

Anaconda brass pipe is semi-annealed to avoid, on the one hand, the tendency to split encountered in hard brass and on the other hand the physical weakness of soft annealed brass.

How Anaconda Brass Pipe Is Tested—Every length of Anaconda brass pipe is subjected to an internal hydraulic pressure of 1,000 lbs. per sq. in. before it leaves the mill and is manufactured to satisfactorily withstand the following tests:

(1) The end of each test pipe shall stand being flattened by hammering until the sides are brought parallel, with a curve on the inside at the ends not greater in diameter than twice the thickness of the metal in the pipe, without showing cracks and flaws.

(2) Each test pipe shall have a piece 3 in. long cut from it, which piece, when split, shall stand opening out flat without showing cracks or flaws.

(3) Each test pipe shall stand threading in a satisfactory manner with the thread of the required size.

These and other tests, more far-reaching than those of actual service are employed to make certain that the pipe meets Anaconda standards: Analytical tests to check the alloy; tensile strength tests to test the physical structure; special tests to safeguard the user against failure by splitting.

How to Identify Anaconda Brass Pipe—Look for the Anaconda trade-mark. It is stamped in every length of brass pipe made by THE AMERICAN BRASS COMPANY. The impression is permanent and can not be removed without destroying the metal.

Guarantee—Anaconda brass pipe is guaranteed not to split.

FIG. 1

FIG. 1. SEMI-ANNEALED BRASS PIPE
Note the great number of fine grains indicating absence of internal strains.

FIG. 2

FIG. 2. SOFT ANNEALED BRASS PIPE
Grains rounded and large. Metal too soft to stand threading or structural tension

FIG. 3

FIG. 3. HARD BRASS PIPE
Grains elongated showing slip bands—indication of hardness and internal strains.

Continued on next page

SCHEDULES OF STANDARD SIZES (I. P. S.) ANACONDA SEAMLESS BRASS AND COPPER PIPE

REGULAR					EXTRA HEAVY				
Standard size, in.	Diam., in.		Lbs. per ft.		Standard size, in.	Diam., in.		Lbs. per ft.	
	Outside	Inside	Brass	Copper		Outside	Inside	Brass	Copper
1/8	.405	.281	.246	.259	1/8	.405	.205	.353	.371
1/4	.540	.375	.437	.459	1/4	.540	.294	.593	.624
3/8	.675	.494	.612	.644	3/8	.675	.421	.805	.847
1/2	.840	.625	.911	.958	1/2	.840	.542	1.191	1.253
3/4	1.050	.822	1.235	1.298	3/4	1.050	.736	1.622	1.706
1	1.315	1.062	1.740	1.929	1	1.315	.951	2.380	2.509
1 1/4	1.660	1.368	2.557	2.689	1 1/4	1.660	1.272	3.291	3.460
1 1/2	1.900	1.600	3.037	3.193	1 1/2	1.900	1.494	3.986	4.191
2	2.375	2.062	4.017	4.224	2	2.375	1.933	5.508	5.791
2 1/2	2.875	2.500	5.830	6.130	2 1/2	2.875	2.315	8.407	8.939
3	3.500	3.062	8.314	8.741	3	3.500	2.892	11.24	11.82
3 1/2	4.000	3.500	10.85	11.41	3 1/2	4.000	3.358	13.66	14.37
4	4.500	4.000	12.29	12.93	4	4.500	3.818	16.41	17.25
4 1/2	5.000	4.500	13.74	14.44	4 1/2	5.000	4.250	20.07	21.10
5	5.563	5.062	15.40	16.19	5	5.563	4.813	22.51	23.67
6	6.625	6.125	18.44	19.39	6	6.625	5.750	31.32	32.93
7	7.625	7.062	23.92	25.15	7	7.625	6.625	41.22	43.34
8	8.625	8.000	30.05	31.60	8	8.625	7.625	47.00	49.42
9	9.625	8.937	36.94	38.84					
10	10.750	10.019	43.91	46.17					

Anaconda Admiralty Pipe for Salt Water

The severest conditions that brass pipe for water service must meet are those which are to be found at seaside resorts. Hot and cold salt water are supplied to the bathrooms and pools of the large hotels in Atlantic City and in other resorts along the seacoast. Salt water is highly corrosive; hence its action must be resisted by pipe of a special composition.

Long experience has proved that pipe made of what is known the world over as Admiralty Mixture should always be specified for salt water conductors. Wherever ordinary brass piping has been replaced with Admiralty Pipe made by THE AMERICAN BRASS COMPANY and this pipe has been installed with correctly made fittings, no further difficulties have been experienced. To satisfactorily meet the rigorous requirements of seaside resorts it is not only necessary that the pipe should be of the correct composition, but manufactured and treated by the correct processes. THE AMERICAN BRASS COMPANY uses the utmost care in producing Anaconda Admiralty Pipe which is finished and annealed by special processes guaranteed to prevent "season-cracking" a phenomenon which must be guarded against in all forms of pipe made from non-ferrous wrought metals.

Benedict Nickel

Benedict Nickel is a white metal which compares favorably with sterling silver in appearance and permanency of color. It is highly non-corrosive, and being of the same composition throughout can be kept bright with occasional cleaning no matter how much it is worn. Benedict Nickel is manufactured in the form of sheets, rods, wire, seamless tubes, angles, channels and architectural mouldings, and is especially suitable for exposed metal parts subject to wear. It is used in residences, office buildings, hospitals and hotels for exposed plumbing, for piping fixtures, ornamental work, railings, grilles, hardware, flashings, drainboards, pantry sinks, kick plates, etc. It is also used for covering soda fountains, bars and for restaurant fixtures.

It is superior to all other metals for such uses because it combines elegance, durability, non-corrosiveness and sanitation. When the luster and finish of a once nicely appointed nickel-plated job is worn off the brassy spots look unsightly but where Benedict Nickel is used its distinctive white color is as permanent and lasting as the metal itself. While the cost is slightly more than that of nickel-plated brass goods, it is much more economical because it is stronger and more durable than brass and never has to be re-plated.

Installations of Benedict Nickel — Benedict Nickel is now specified by leading architects and has been installed in the following prominent buildings:

General Hospital, Cincinnati, Ohio
The Copley-Plaza Hotel, Boston, Mass.
Bankers Trust Company Building, New York, N. Y.
Continental and Commercial Bank Building, Chicago, Ill.
Municipal Building, New York, N. Y.
Guaranty Trust Company, New York, N. Y.
McCormick Building Annex, Chicago, Ill.
Albany High School, Albany, N. Y.
H. W. Johns-Manville Building, New York, N. Y.
Northwestern Mutual Life Building, Milwaukee, Wis.
The State and Quincy Building, Chicago, Ill.
Woodmen of the World Building, Omaha, Nebr.
Stockyards Inn, Chicago, Ill.
New York Association for the Blind Building, New York, N. Y.
American Exchange National Bank Building, New York, N. Y.
White Sulphur Springs Bathhouse, White Sulphur Springs, W. Va.
The Elizabeth High School Building, Elizabeth, N. J.
Kesner Building, Chicago, Ill.
Narnheisel Building, Chicago, Ill.
Child's Restaurants
Prudential Life Insurance Building, Newark, N. J.
Franklin Life Insurance Company Building, Springfield, Ill.
Equitable Life Assurance Society Building, New York, N. Y.

Deliveries

Anaconda pipe is made in four mills of THE AMERICAN BRASS COMPANY, located at Waterbury, Conn., Torrington, Conn., Buffalo, N. Y., and Kenosha, Wis. The advantageous location of these plants, and stocks carried by jobbers, make possible quick deliveries to all parts of the country at small transportation cost.

ESTABLISHED 1851

AMERICAN TUBE WORKS

Seamless Drawn Brass and Copper Pipe

10 Oliver Street
BOSTON, MASS.
BRANCH OFFICES
NEW YORK, N. Y. CHICAGO, ILL. PHILADELPHIA, PA.

Products

SEAMLESS DRAWN BRASS and COPPER PIPE.

Original American Manufacturers of Seamless Drawn Brass and Copper Pipe

For 50 years every length of our brass and copper pipe, iron pipe sizes, has been stamped "A. T. W.·Boston" on each end, has borne our green trade-mark as shown below and has been absolutely guaranteed.

TRADE-MARK

Superiority of "A. T. W. Boston" Pipe

The illustrations below are photographs of brass pipe exhibited at the Sanitary and Efficiency Show held at Pittsburgh, Pa., during the recent 38th annual convention of the National Association of Master Plumbers. They are given simply to show that seamless drawn pipes made by the exclusive process of the AMERICAN TUBE WORKS (at left of illustration) will stand, before bursting, a pressure which expands the pipe greatly beyond its original diameter—a pressure exceeding by many times any pressure not due to accident or to any extremely severe test. They also show that some seamless drawn brass pipes (at right of illustration and not made by the American Tube Works process) do not expand and burst, but simply give away by splitting.

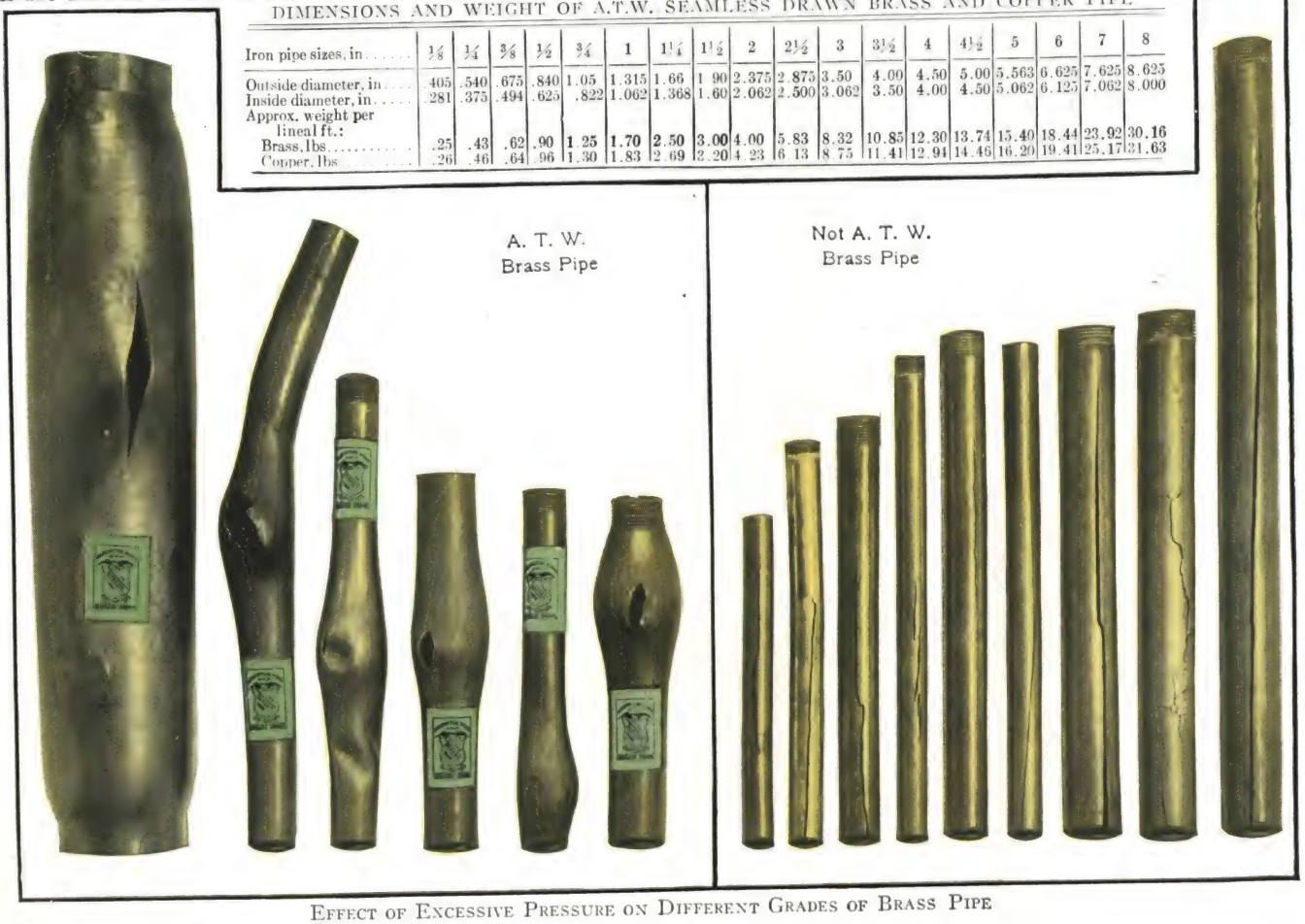
All brass pipe is far superior to iron and steel in non-corrosive quality, but some brass pipe is more reliable than others and more durable under pressure.

"A. T. W. Boston" pipe is tested to 1000 lbs. pressure before leaving the mill. It is positively guaranteed not to split. When specifying this pipe, please call for "American Tube Works Brass Pipe." We shall be pleased to furnish upon application a complete set of our architects' samples of seamless brass pipe, standard iron pipe sizes with weight per foot stamped on each piece, and threaded with standard thread.

EVERY LENGTH OF OUR BRASS PIPE, IRON PIPE SIZES, IS STAMPED "A.T.W. BOSTON" ON EACH END AND BEARS OUR TRADE-MARK

DIMENSIONS AND WEIGHT OF A.T.W. SEAMLESS DRAWN BRASS AND COPPER PIPE

Iron pipe sizes, in	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Outside diameter, in	.405	.540	.675	.840	1.05	1.315	1.66	1.90	2.375	2.875	3.50	4.00	4.50	5.00	5.563	6.625	7.625	8.625
Inside diameter, in	.281	.375	.494	.625	.822	1.062	1.368	1.60	2.062	2.500	3.062	3.50	4.00	4.50	5.062	6.125	7.062	8.000
Approx. weight per lineal ft.:																		
Brass, lbs	.25	.43	.62	.90	1.25	1.70	2.50	3.00	4.00	5.83	8.32	10.85	12.30	13.74	15.40	18.44	23.92	30.16
Copper, lbs	.26	.46	.64	.96	1.30	1.83	2.69	3.20	4.23	6.13	8.75	11.41	12.94	14.46	16.20	19.41	25.17	31.63



EFFECT OF EXCESSIVE PRESSURE ON DIFFERENT GRADES OF BRASS PIPE

BRASS PIPE

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER AND BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Range Boilers	1538
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

The Trend of Modern Plumbing Practices

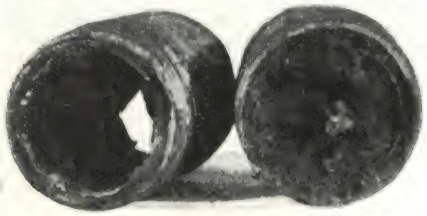
Plumbing has long since ceased to be "just a trade." It is today on a high plane of efficiency, and higher standards are constantly being set by those in the forefront of the industry.

In a recent discussion of plumbing and the relative merits of iron, steel and brass pipe, a prominent sanitary engineer said:

> ". . . This leads us now into a consideration of brass and copper piping. It is taking another step forward in modern plumbing. We stepped from lead to iron. Now we step from iron to brass and copper. That is the trend of the best modern practice in domestic sanitary engineering circles.
>
> "Plumbing Contractors, as a rule, are in favor of brass pipe because it seldom 'comes back on them.' Once a brass pipe job is installed, it is finished forever, as far as the pipe is concerned.
>
> "Given good semi-annealed brass pipe and good fittings made by reliable concerns, and good mechanics to fit them up—we obtain an everlasting job, even under the most adverse conditions."

The whole trend of modern plumbing is toward permanence. Yet, it is a curious fact that the least expensive part of the plumbing installation has been the last to feel the influence of this movement. Pipes and fittings, while only about 10% of the total plumbing cost, absolutely control the useful life of the whole installation. If pipes of quick-rusting metal are used, they become sources of constant trouble and expense.

IRON PIPE FITTING AFTER THREE YEARS' SERVICE, PENN-HARRIS HOTEL, HARRISBURG



TWO PIECES OF CORRODED IRON PIPE TAKEN FROM WATERBURY CITY HALL

Continued on next page

Brass Pipe Insures Permanence

The ideal plumbing installation is all *brass*. Even cold water lines, unless of *brass,* will eventually corrode, clog and leak, causing annoyance and expense, especially where lines are hidden and walls and floors have to be ripped out to make the necessary repairs and replacements.

For unusual cold water conditions such as the conducting of salt water, very hard water which deposits a slime content on iron and steel, and for soil pipes that are laid in ground that is acid or in salt marsh, brass should be specified. These conditions indicate brass of special mixtures and it is wisdom in such cases to communicate with the COPPER AND BRASS RESEARCH ASSOCIATION. Under no circumstances should unmarked, unbranded brass pipe be installed.

Brass Pipe for All Hot Water Lines

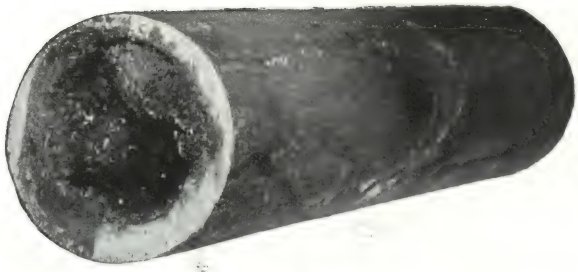
Only brass plumbing pipe can successfully withstand the intensified corrosive action of hot water.

Rust, the most destructive agent with which man must contend, is the combined action of oxygen and water. All water holds oxygen in suspension, and when water is heated the oxygen is liberated at a lively rate and settles on the inside walls of the conducting pipe in minute bubbles that immediately begin their destructive action, clog the pipes, discolor the water and cause leaks. The only certain means of resisting this destructive force is brass pipe and pipe fittings.

The Specifications of Good Brass Pipe

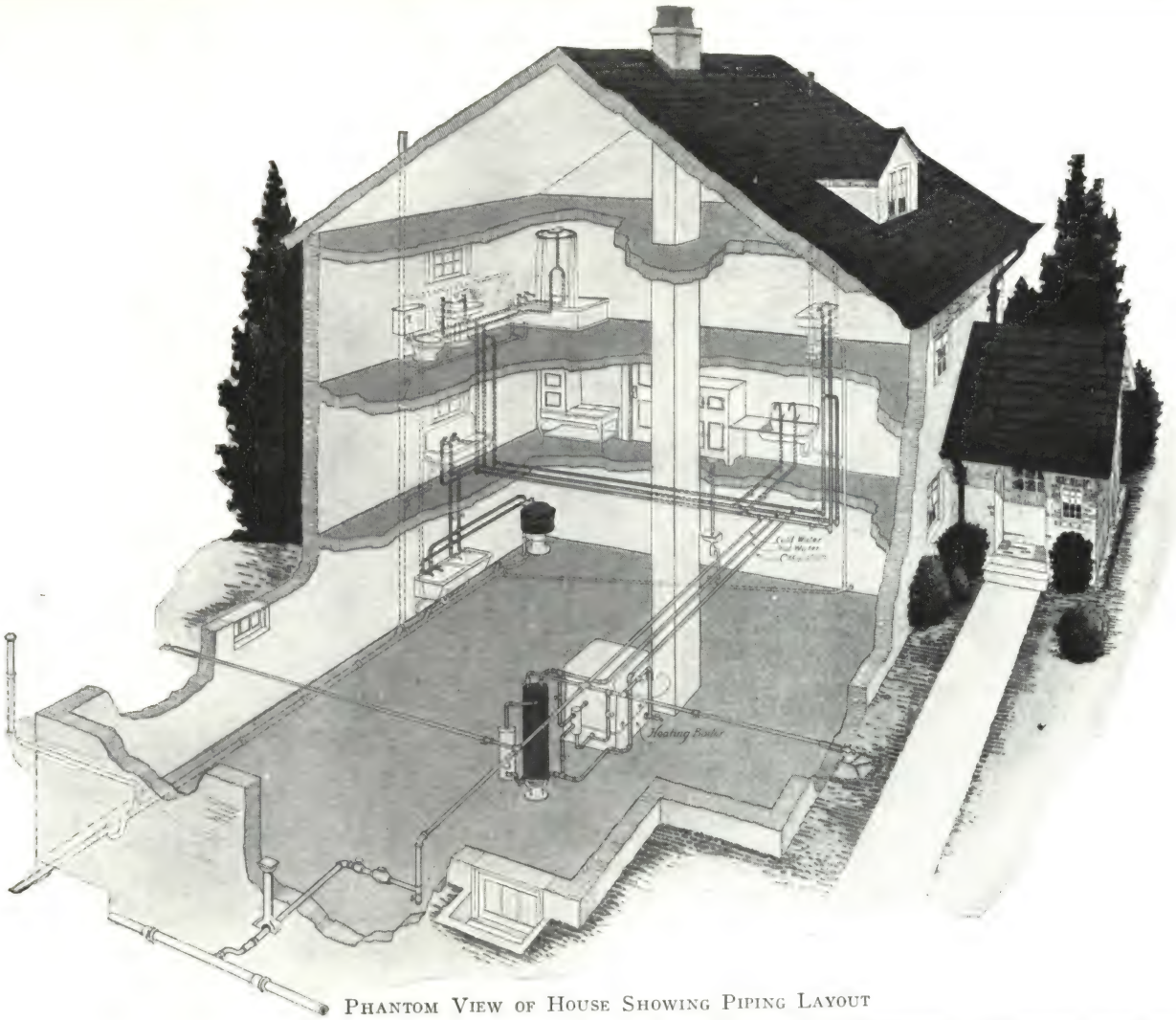
Reliable manufacturers mix, draw, anneal and test their product to conform to the rigid specifications of the U. S. Navy Department. These specifications assure brass pipe that will not season-crack, that has a close, homogeneous texture, and has ductility, malleability and corrosion resistance to a high degree. Uniform wall thickness and the strength to resist hydraulic pressures up to 1000 pounds to the square inch is further guarantee of brass pipe that is failure-proof.

PIECE OF BRASS PIPE FROM THE CONTINENTAL INSURANCE COMPANY'S BUILDING, NEW YORK, N. Y., WHICH HAS NOT HAD A SINGLE REPAIR IN 29 YEARS



CORRODED IRON PIPE FROM PENNSYLVANIA'S CAPITOL, HARRISBURG. COMPLETELY CLOSED WITH RUST

Continued on next page



PHANTOM VIEW OF HOUSE SHOWING PIPING LAYOUT

STANDARD BRASS AND COPPER PIPE SIZES (I. P. S.)
Made to correspond with Standard Pipe Fittings (I. P. S.)

Same as Standard (I. P. S.), in.	Approximate weight, lbs. per lin. ft.		Approx. outside diameter, frac. in.	Exact outside diameter, dec. in.	Exact inside diameter, dec. in.
	Brass	Copper			
1/8	.25	.26	3/8	.405	.281
1/4	.43	.45	9/16	.540	.375
3/8	.62	.65	11/16	.675	.494
1/2	.90	.95	13/16	.840	.625
3/4	1.25	1.31	1 1/16	1.050	.822
1	1.70	1.79	1 5/16	1.315	1.062
1 1/4	2.50	2.63	1 5/8	1.660	1.368
1 1/2	3.00	3.15	1 7/8	1.900	1.600
2	4.00	4.20	2 3/8	2.375	2.062
2 1/2	5.75	6.04	2 7/8	2.875	2.500
3	8.30	8.72	3 1/2	3.500	3.062
3 1/2	10.90	11.45	4	4.000	3.500
4	12.70	13.34	4 1/2	4.500	4.000
4 1/2	13.90	14.60	5	5.000	4.500
5	15.75	16.54	5 9/16	5.563	5.062
6	18.30	19.22	6 5/8	6.625	6.125
7	25.30	26.57	7 5/8	7.625	7.062

WATER DRAWN AT FIXTURES IN VARIOUS BUILDINGS*
(Estimated)

Fixtures	Rate
Bath	10 gal. per min.
Lavatory	5 " " "
Tank closets	5 " " "
Valve closets	30 " " "
Shower	5 " " "
Sink	10 " " "
Laundry tub	10 " " "
Garden hose	10 " " "

Rule: To find volume of water required per minute take quantities from this table and divide by 4 for Residences, Apartments, Schools, Office Buildings.

For Clubs and Hotels divide by 3.

For Gymnasiums, Hospitals, Y. M. C. A's., and Public Comfort Stations divide by 2.

For Public Baths, Laundries, Factories allow full amount.

SIZES OF WATER SUPPLY BRANCHES TO FIXTURES

Fixtures	Pressures		
	High, in.	Medium, in.	Low, in.
Baths	1/2	3/4	1
Lavatories	3/8	1/2	1/2
Tank closets	3/8	1/2	1/2
Valve closets	3/4	1	1 1/4
Pantry sinks	3/8	1/2	1/2
Kitchen sinks	1/2	3/4	3/4
Slop sinks	1/2	3/4	3/4
Showers	3/8	1/2	3/4
Urinals	1/2	3/4	3/4
Fountains	3/8	3/8	1/2

CAPACITIES OF WATER PIPING IN BUILDINGS

Main pressure less back pressure, lbs.	Length, 100 ft. Computed delivery, U. S. gallons per minute								
	1/2-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.	2 1/2-in.	3-in.	4-in.
17	3.2	9.1	18.7	33.5	51.6	105.8	200 0	290.0	589.0
30	5.0	13.8	28.3	52.0	78.0	159.7	308.0	436.0	885.0
40	5.8	15.9	32.7	60.0	90.0	184.4	350.0	504.0	1023.0
50	6.5	17.5	36.6	70.0	100.7	206.2	390.0	564.0	1143.0
60	7.0	19.5	40.0	76.0	110.3	225.9	430.0	617.0	1252.0
75	7.5	21.8	44.8	85.0	123.4	252.6	480.0	690.0	1400.0
100	9.0	25.2	51.7	99.0	142.4	291.6	558.0	797.0	1617.0

CHASE METAL WORKS

(DIVISION OF CHASE COMPANIES, INC.)

WATERBURY, CONN.

BRANCH OFFICES

NEW YORK BOSTON ROCHESTER PITTSBURGH PHILADELPHIA CHICAGO

CHASE COMPANIES OF CALIFORNIA, INC.
SAN FRANCISCO AND LOS ANGELES, CAL.

THE OHIO CHASE COMPANY.
CLEVELAND, OHIO

Products

SEAMLESS BRASS PIPE.

Also Brass, Bronze, Copper and Nickel Silver in the form of Sheets, Rods, Tubes and Wire.

Trade CHASE Mark

Brass Pipe for Permanence

Architects, recognizing that ultimate economy in the use of brass pipe has been convincingly proved, are specifying it instead of iron or steel pipe.

Iron or steel pipe corrodes and leaks after comparatively short service and requires repairs and replacement. It also becomes clogged by internal deposits, reducing the flow of water to almost a trickle.

Chase seamless brass pipe—the pipe everlasting—is proof against corrosion and clogging, and is widely known for its permanently dependable service.

By specifying Chase seamless brass pipe, corrosion, leaks and clogging are eliminated.

The handsome rich appearance of Chase seamless brass pipe also commends its use in this age of elegance in plumbing.

Brass Pipe for Economy

Anticipated economy in the use of iron pipe seldom materializes. Iron pipe rapidly disintegrates due to corrosion, and will either leak or burst, causing heavy damage to building and furnishings, necessitating costly repairs, the opening of walls and ripping up of floors and pavements to reach concealed work.

Through the use of Chase seamless brass pipe, all the cost of corrosion, all the expense of tearing out corroded pipe and the damage caused by leaks, are avoided.

Chase Quality

The fabrication of brass pipe is an art which requires maximum of care and experience.

The CHASE METAL WORKS has been engaged in producing high quality brass products for many years and Chase quality is favorably known and recommended by architects, engineers, contractors and others. By specifying Chase quality, the architect provides permanence.

Chase seamless brass pipe is made from good metals, correct in alloy, properly annealed and tempered and manufactured by the most improved methods to amply meet the conditions of plumbing service. Its high standard of excellence is maintained by frequent and exacting tests and inspections by expert metallurgists.

All Chase seamless brass pipe is guaranteed against splitting. It is uniform in diameter and thickness throughout; inside and outside surfaces are free from cracks or defects. Furnished either plain, tinned or nickel-plated, in plumbers' and iron pipe sizes listed below:

IRON PIPE SIZES CHASE SEAMLESS BRASS PIPE

Iron pipe, size, in.	Outside diameter, in.	Inside diameter, in.	Weight per lin. ft., lbs.	Iron pipe, size, in.	Outside diameter in.	Inside diameter, in.	Weight per lin. ft., lbs.
⅛	.405	.281	.246	3	3.500	3.062	8.314
¼	.540	.375	.437	3½	4.000	3.500	10.85
⅜	.675	.494	.612	4	4.500	4.000	12.29
½	.840	.625	.911	4½	5.000	4.500	13.74
¾	1.050	.822	1.235	5	5.563	5.062	15.40
1	1.315	1.062	1.740	6	6.625	6.125	18.44
1¼	1.660	1.368	2.557	7	7.625	7.062	23.92
1½	1.900	1.600	3.037	8	8.625	8.000	30.05
2	2.375	2.062	4.017	9	9.625	8.937	36.94
2½	2.875	2.500	5.830	10	10.750	10.019	43.91

PLANT OF THE CHASE METAL WORKS

U. T. HUNGERFORD BRASS & COPPER CO.

Hungerford Building, Lafayette, White and Franklin Streets

NEW YORK, N. Y.

BRANCH OFFICES AND WAREHOUSES

BOSTON, MASS., Franklin and Broad Streets
PHILADELPHIA, PA., 510 Arch Street
BALTIMORE, MD., Lombard and South Streets
SAN FRANCISCO, CAL., 438 Market Street

Products

"U. T. H. Star Brand" Semi-annealed Brass Pipe and Fittings.

For Copper Roofing Materials, see pages 954-955.

TRADE-MARK

Why "U. T. H. Star Brand" Semi-annealed Seamless Brass Pipe?

Seamless brass pipe is recognized as being superior to all other kinds of pipe for hot and cold water supply lines because of its non-corrodibility, permanence and rich appearance.

Endurance and permanency in brass pipe, however, is assured only if it is manufactured according to right principles.

"U. T. H. Star Brand" Semi-annealed Seamless Brass Pipe is made of the very best grades of copper and zinc. Every stage in its manufacture is scientifically controlled by analysis and inspection. As a final test, before it is shipped from the mill, each length is subjected to an internal hydraulic pressure of 1000 lbs. per sq. in.

Practically the one and only defect that develops in seamless brass pipe is what is technically known as "season cracking;" the pipe splits or tears longitudinally, sometimes immediately, but more often not until some little time after its initial installation. This manifestly is a condition to guard against.

Season cracking is primarily due to internal strains which are "set up" in the metal during the tube drawing process and not subsequently relieved by the proper degree of *annealing* or heat treating.

Annealing is only a relative term, and simply because tube or pipe can be said to have been "annealed" does not necessarily mean that the exact point of anneal has been reached to eliminate internal strains or on the other hand that too much anneal has not been obtained. If carried to extremes the annealing process will render brass pipe too soft for good threading and increases liability of damage through denting or bending out of shape with even the ordinary handling necessary to its installation.

It is evident therefore that pipe which is just sufficiently annealed to relieve all internal strains in the metal and yet not too soft for working requirements will have greatest endurance and lasting qualities.

"U .T. H. Star Brand" *Semi-annealed* Brass Pipe is manufactured according to mixing, drawing and heat treating formulas developed as a result of more than fifty years of successful manufacturing experience and is unconditionally offered by us as being superior to any brass pipe on the market.

When you specify "U. T. T. Star Brand" Semi-annealed Brass Pipe you have the assurance of knowing that a reputable, thoroughly experienced manufacturer stands ready to support the specification with every reasonable form of a guarantee.

Do not specify just "Brass Pipe"—specify and insist on having "U. T. H. Star Brand" Semi-annealed Brass Pipe. Our initials and brand mark are die stamped in every length for your guidance and protection.

Pipe Finish, Sizes and Delivery

"U. T. H. Star Brand" Semi-annealed Brass Pipe is carried in our warehouse stocks available for immediate shipment, plain, nickel-plated or tinned, in all standard iron pipe sizes, 12-ft. lengths, as noted in accompanying table.

Pipe Fittings

Obviously the proper installation of brass pipe can only be effected with fittings of a quality equaling that of the pipe. It is therefore essential that "Star Brand" Brass Pipe Fittings be used exclusively with "U. T. H. Star Brand" Semi-annealed Brass Pipe.

Trade-mark That Appears on Every Length of Genuine Hungerford Star Brand Seamless Brass Pipe

SIZES AND WEIGHTS OF HUNGERFORD STAR BRAND SEAMLESS BRASS PIPE

Iron pipe size, in.	Inside diameter, in.	Outside diameter, in.	Approx. weight per ft., lbs.
⅛	.281	.405	.2461
¼	.375	.540	.4368
⅜	.494	.675	.6122
½	.840	.625	.9114
¾	.822	1.05	1.235
1	1.062	1.315	1.740
1¼	1.368	1.66	2.558
1½	1.600	1.90	3.038
2	2.062	2.375	4.018
2½	2.500	2.875	5.832
3	3.062	3.500	8.316
3½	3.500	4.000	10.85
4	4.000	4.500	12.30
4½	4.500	5.000	13.74
5	5.062	5.563	15.40
6	6.125	6.625	18.45

How to Specify Brass Pipe

(1) All hot and cold water piping throughout the building shall be "U.T.H. Star Brand" Semiannealed, Seamless Brass Pipe and Pipe Fittings of sizes hereinafter specified.

(2) *Note*: State here the various sizes of brass pipe to be used as given in accompanying table, also whether pipe is to be plain, nickel-plated or tinned.

(3) All brass pipe shall be tested under a hydrostatic internal pressure of 1000 lbs. per sq. in.

(4) All exposed brass pipe to be supported where required, with cast brass (rough or finished) supports.

ROME BRASS & COPPER CO.

Manufacturer of Seamless Brass Pipe and Brass, Copper and Bronze

ROME, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 115-19 N. Market Street

SAN FRANCISCO, CAL., Wells-Fargo Building

NEW YORK, N. Y., Woolworth Building

Products

SEAMLESS BRASS PIPE.

Also Brass, Copper and Bronze Sheets; Rolls; Rods; Anodes; Tubes, brazed and seamless; Strips; Extruded Shapes; Angles and Channels; Tapered Tubes and Hose Pipes; Door Rail; Commutator Bars and Segments; Electrical Copper Bar; Rivets and Burs.

ROME Quality BRASS & COPPER

TRADE-MARK

Brass Pipe Is a Necessity—Not a Luxury

A plumbing job must be permanent. Down behind the walls, under the floors, embedded in the concrete, invincible enemies of any iron pipe are at work eating, picking and disintegrating—working destruction, not only on tangible things, but the reputation of the architect.

Iron pipe of every kind *will* rust, will corrode and clog—resulting in water-soaked walls, torn out installations, ruined furnishing and equipment—*EXPENSE*.

Rome quality brass pipe can not rust, corrode or clog. Nature provided perfect metals for this purpose, and their use means enduring satisfaction to the owner and credit to the architect.

Rome Quality Seamless Brass Pipe

Over half a century of manufacturing experience is behind this pipe. Modern methods have not only been adopted, but been developed, to the manufacture of a product capable not only of performing its service, but of the greater responsibility of upholding a highly prized and enviable reputation of quality. Latent defects are sought out by the chemists and metallurgists, and each tube, as a final proof of its worth, must withstand a bursting test of 1,000 lbs. per sq. in. hydrostatic.

Specify Rome quality, and you can not go wrong.

How to Specify Rome Quality Brass Pipe

Brass Pipe—(Paragraph 1 should be inserted when brass pipe is to be used for hot and cold water supply lines only. Where any plumbing pipes are to be run through cinder concrete use paragraph 2).

(1) All hot and cold water supply lines, together with all fittings and branch supply lines therefrom to plumbing fixtures, shall be seamless drawn brass pipe of sizes, gauges and weights hereinafter specified, as manufactured by the ROME BRASS & COPPER CO., Rome, N. Y.

(2) All supply, waste and vent pipes running through cinder concrete (here state where such cinder concrete is located) shall be seamless drawn brass pipe as specified above, for hot and cold water supply lines, for such lengths as run through the cinder concrete.

(3) All brass pipe shall be tested under a hydrostatic internal pressure of 1000 lbs. per sq. in.

(4) (State here the various sizes, gauges and weights of brass pipe to be used, as given in table on this page.)

DIMENSIONS AND WEIGHTS OF ROME QUALITY SEAMLESS BRASS PIPE

*Iron Pipe Sizes					*Extra Heavy Iron Pipe Sizes				Plumbers' Sizes			
Iron pipe size, in.	Amer. or B. & S. gauge	Outside diameter, in.	Inside diameter, in.	Approx. weight per ft., lbs.	Extra heavy iron pipe size, in.	Outside diameter, in.	Inside diameter, in.	Approx. weight per ft., lbs.	Plumbers' size, in.	Outside diameter, in.	Inside diameter, in.	Approx. weight per ft., lbs.
1/8	14	.405	.281	.25								
1/4	11	.540	.375	.43	1/8	.405	.205	.370	5/8	.654	.521	.46
3/8	11	.675	.494	.62	1/4	.540	.294	.625	3/4	.768	.631	.56
1/2	9½	.840	.625	.90	3/8	.675	.421	.830	7/8	.875	.728	.67
3/4	9	1.05	.822	1.25	1/2	.840	.542	1.200				
1	7½	1.315	1.062	1.70	3/4	1.050	.736	1.660	1	1.000	.836	.88
1¼	7	1.660	1.368	2.50					1¼	1.245	1.060	1.27
1½	7	1.900	1.600	3.00	1	1.315	.951	2.360	1½	1.508	1.311	1.55
2	6½	2.375	2.062	4.00	1¼	1.660	1.272	3.300	1¾	1.756	1.564	1.82
2½	4	2.875	2.500	5.75	1½	1.900	1.494	4.250				
3	7/16 in.	3.500	3.062	8.30					2	2.007	1.815	2.10
3½	15/64 in.	4.000	3.500	10.90	2	2.375	1.933	5.460				
4	1/4 in.	4.500	4.000	12.70	2½	2.875	2.315	8.300				
4½	1/4 in.	5.000	4.500	13.90								
5	17/64 in.	5.563	5.062	15.75	3	3.50	2.892	11.200				
6	1/4 in.	6.625	6.125	18.31	3½	4.00	3.358	13.700				
7	19/16 in.	7.625	7.062	26.28	4	4.50	3.818	16.500				
8	21/64 in.	8.626	7.982	29.88								

Rome quality seamless brass pipe is kept in stock in 12-ft. lengths. Special lengths to order. Furnished plain, tinned or nickel plated.

*Corresponds to outside measurements of iron pipe and made to fit iron fittings.

ARTESIAN WELL AND SUPPLY CO.

NEW YORK OFFICE
50 Church Street
Telephone, Cortlandt 4345

PROVIDENCE, R. I.
TELEPHONE, EAST PROVIDENCE 198

BOSTON OFFICE
170 Summer Street
Telephone, Main 1255

Products and Services

ARTESIAN WELL DRILLING and INSTALLATION OF WATER WORKS; TEST BORINGS for Foundations; PROSPECTING for Minerals; DRIVING PIPE or DRILLING HOLES for Elevator Shafts.

Facilities and Territory

The men engaged in these drilling and boring operations and installations of water works, etc., are thoroughly experienced in the work, practical and competent. The equipment in these lines is complete, to meet all conditions and requirements; especially for drilling wells in rock, and for drilling or washing in pipe through clay and sand to beds of water bearing gravel. Wells will be dug any depth to 5000 ft.

The territory of the operations of this company includes New England, the Middle Atlantic and Southern States and Cuba.

Artesian Wells

The earth being a natural filter, artesian water is usually of splendid quality. It is a constant, unfailing supply.

A deep well will meet all requirements, for water drawn from the never failing water strata, and where the surface water is properly cased off, is free from impurities and at the most healthful temperature (40° to 60° Fahr.) for drinking purposes. It has been filtered and purified and made ready for man's use by Nature's best process.

The ARTESIAN WELL AND SUPPLY CO. has, during many years, drilled and driven artesian wells as a source of water supply for cities, towns, manufacturing plants of all kinds, such as tanneries, bleacheries, knitting mills, fabric mills, rubber plants, paper plants; for hotels, hospitals, sanatoriums and other public institutions; for country and suburban residences; for breweries, food packing plants and chemical works; also, for supplying water generally for domestic use, for spraying and sprinkling, for greenhouses and for fire protection.

Estimates and Further Information

Estimates for all kinds of artesian well operations will be furnished. Write for further information, general prices, etc. Any desired assistance will be given by correspondence or a personal visit.

Partial List of References

INDUSTRIAL PLANTS

B. D. Rising Paper Co., Housatonic, Mass.
Crompton & Knowles Loom Works, Providence, R. I.
Brown & Sharpe Mfg. Co., Providence, R. I.
Merchants Cold Storage & Warehouse Co., Providence, R. I.
Nicholson File Co., Providence, R. I.
United States Rubber Co., Providence, R. I.
Providence Gas Co., Providence, R. I.
Providence Ice Co., Providence, R. I.
Standard Oil Co. of New York, East Providence, R. I.
Gulf Refining Co., East Providence, R. I.
American Optical Co., Southbridge, Mass.
Cliquot Club Ginger Ale Co., Millis, Mass.
Lowney Chocolate Co., Mansfield, Mass.
L. S. Starrett Co., Athol, Mass.
Cluett-Peabody Co., Troy, N. Y.
Fisk Rubber Co., Chicopee Falls, Mass.
New Departure Mfg. Co., Bristol, Conn.
New Haven Clock Co., New Haven, Conn.
Underwood Typewriter Co., Hartford, Conn.
American Woolen Co., Moosup, Conn.
Sheffield Farms Co., Inc., various locations
Columbia Chemical Co., Barberton, Ohio
Pittsburgh Plate Glass Co., Barberton, Ohio
Paterson Parchment Paper Co., Passaic, N. J.
Smith Paper Co., Lee, Mass.

RESIDENCES

Alfred G. Vanderbilt, Newport, R. I.
Rupert Hughes, Bedford Hills, N. Y.
Blanche Bates, Ossining, N. Y.
J. Stuart Blackton, Oyster Bay, L. I.
William du Pont, Orange, Va.
Howard C. Brokaw, Nanuet, N. Y.
C. D. Huyler, Greenwich, Conn.
Otto H. Kahn, Woodbury, L. I., N. Y.
Arthur Curtis James, Newport, R. I.
Marshall Field, 3rd, Lloyds Neck, L. I., N. Y.

SCHOOLS AND COLLEGES

Harvard Medical School, Brookline, Mass.
New Hampshire College, Durham, N. H.
Connecticut Agricultural College, Storrs, Conn.
School, District No. 12, Syosset, L. I., N. Y.

HOSPITALS

Foxborough State Hospital, Foxborough, Mass.
Monson State Hospital, Palmer, Mass.
Norwich State Hospital for Insane, Norwich, Conn.
Ottilie Orphan Asylum, Jamaica, N. Y.
State Colony for Insane, Gardner, Mass.
Worcester Hospital for Insane, Worcester, Mass.
Bristol County Tuberculosis Hospital, Attleboro, Mass.

Y. M. C. A. BUILDINGS

Brooklyn, N. Y.
New Britain, Conn.
Newport, R. I.
Providence, R. I.

RAILROADS

Boston & Maine R. R. Co., various places
Maine Central R. R. Co., Brunswick, Me.
New York, New Haven & Hartford R. R. Co., Providence, R. I.

UNITED STATES GOVERNMENT

Newport Naval Hospital, Newport, R. I.
Coast Defense of Narragansett Bay, Sachuest Point, R. I.
Coast Defense of Narragansett Bay, Fort Kearney, R. I.
Coast Defense of Narragansett Bay, Saunderstown, R. I.
Coastal Air Station, Montauk, L. I., N. Y.
Camp Mills, Garden City, L. I., N. Y.
Camp Upton, Yaphank, L. I., N. Y.
Fort Adams, Newport, R. I.
Fort Ethan Allen, Burlington, Vt.
Fort McKinley, Fort McKinley, Me.
Fort Terry, New London, Conn.
Navy Yard, Portsmouth, N. H.

TOWN AND CITY SUPPLIES

Adams, Mass.
Barberton, Ohio
Bloomingdale, N. Y.
Cuyahoga Falls, Ohio
Darien, Ga.
Dover, N. H.
Eastman, Ga.
Essex Junction, Vt.
Fernandina, Fla.
Great Barrington, Mass.
Hudson Falls, N. Y.
Jamestown, N. Y.
Newburyport, Mass.
Orange, Va.
Reading, Mass.
Warrenton, Va.

CUBA

Hormiguero Central Corp., Hormiguero, Cuba
Soledad Sugar Co., Cienfuegos, Cuba

THE DAYTON PUMP & MANUFACTURING CO.

DAYTON, OHIO

Products

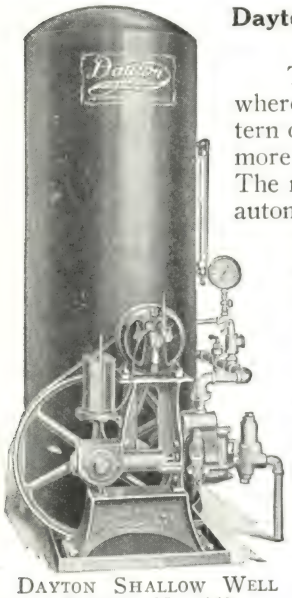
WATER SUPPLY SYSTEMS.
SHALLOW and DEEP WELL PUMPS.
For Gasoline Pumps and Storage Systems, see page 2029.

TRADE-MARK

Dayton Shallow Well Water Supply Systems

These systems are suitable where low water level in well, cistern or other source of supply is not more than 22 ft. below the pump. The motor driven systems are fully automatic, quiet in operation, absolutely reliable and require no attention except an occasional oiling. Shipped complete, ready to install.

Our pumping units listed in table below will be furnished independent of the tank where pressure tanks have already been installed or for pumping into elevated open tanks. Sketches and recommendations submitted to architects, without obligation, upon receipt of necessary data.



DAYTON SHALLOW WELL SYSTEM No. 140

DAYTON MOTOR DRIVEN SHALLOW WELL SYSTEMS

System No.	Pump capacity, g. p. h.	Tank capacity, gals.	Dimensions, in. Hgt.	Wdt.	Dpt.	Suction, in.	Discharge in.	Motor h. p.	Approx. shipping weights, lbs.
*No. 110 SERIES—"UNISYSTEM" Maximum suction, 22 ft. Maximum pressure, 40 lbs. Delivery head, 105 ft.									
1	100	30	32	22	28	¾	½	1/8	185
2	240	40	40	30	29	¾	½	1/6	275
§No. 140 SERIES Maximum suction lift, 22 ft. Maximum pressure, 45 lbs. Delivery head, 105 ft.									
140A	160	42	48	25	29	¾	½	1/8	230
141	160	52	48	27	31	¾	½	1/8	260
142	160	80	63	29	31	¾	½	1/8	290
143	160	120	63	33	36	¾	½	1/8	360
144	160	220	75	39	42	¾	½	1/8	500
†No. 240 SERIES Maximum suction lift, 22 ft. Maximum pressure, 50 lbs. Delivery head, 110 ft.									
240A	210	42	48	30	29	¾	½	1/6	245
241	210	52	52	30	34	¾	½	1/6	290
242	210	80	63	30	36	¾	½	1/6	330
243	210	120	63	31	40	¾	½	1/6	400
244	210	220	75	34	46	¾	½	1/6	540
††No. 380 SERIES Maximum suction lift, 22 ft. Maximum pressure, 50 lbs. (¼ h.p. motor) and 75 lbs. (½ h.p. motor). Delivery head, 110 ft. (¼ h.p. motor) and 170 ft. (½ h.p. motor)									
380A	350	42	48	30	40	1	¾	1/4	325
381	350	80	63	30	42	1	¾	or	420
382	350	120	63	30	46	1	¾	1/2	500
383	350	220	75	34	52	1	¾	....	750
384	350	315	75	40	58	1	¾	....	1000

*Suitable for supplying water to bathroom, laundry, kitchen and other inside fixtures of small residence, summer cottage, etc. Shipped completely assembled.

§Suitable for supplying water to bathroom, laundry, kitchen and other inside fixtures and when furnished with 120- or 220-gal. tanks, will also supply water for intermittent sprinkling.

†This system is an intermediate size, for use where the requirements are slightly in excess of No. 140 series, but not sufficiently large to justify the installation of a 380 series system.

††Suitable for supplying water for all general purposes, including sprinkling lawn and garden, watering stock, etc.

General Note: The above systems consist of: Double acting brass fitted pump, automatic air intake valve for pressure tank service; repulsion-induction type electric motor for 110 or 220 volts alternating current (single phase, 60 cycles) or 32, 110 or 220 volts direct current; automatic electric pressure switch (omitted if hand control is desired); tank; water and pressure gauges; pressure relief valve; safety valve; automatic belt tightening idler; endless leather belt; suction strainer; union connections for suction and discharge; piping as illustrated: oil can and wrench.

Suction Pumps

The two sizes of suction pumps listed below are suitable for general water supply for all purposes, including sprinkling, washing automobiles, etc. These sizes are intended for use in the larger type of homes, centralized schools, industrial plants, and for country estates where several bathrooms, greenhouses, etc., are to be supplied. They will draw water from any source of supply where the lowest level is not more than 22 ft. below the pump. They may be installed with open gravity tanks or pressure tanks. The latter are to be preferred as giving most satisfactory service.

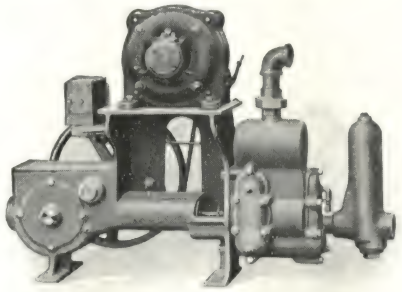


Fig. No. 600
SUCTION PUMP

DAYTON SUCTION PUMPS

Trade No.	Pumping capacity, g. p. h.	Motor, h. p.	Max. pressure, lbs.	Size pump pulley, in.	Suction, in.	Discharge, in.	Approx. shipping wt., lbs.
601	600	½	40	13⅝x2¼	1¼	1¼	350
602	600	1	90	13⅝x2¼	1½	1¼	390
720	720	1	75	13⅝x2¼	1½	1¼	390
721	720	1½	90	13⅝x2¼	1½	1¼	425
901	900	1	50	13⅝x2¼	1½	1¼	390
902	900	1½	90	13⅝x2¼	1½	1¼	425

Gasoline Engine Drive—Where desired or where electricity is not available, we furnish Nos. 720 and 900 pumps belted to 1½-h.p. and 2½-h.p. Hercules gasoline engine. Pump and engine mounted on channel iron base. If engine is not desired, pump only can be furnished.

Tanks for Series 720 and 900—The following sizes of tanks are most suitable for pumps of these series. Water and pressure gauges are included as standard equipment.

TANKS FOR SERIES NOS. 720 and 900

Trade No.	Capacity of tank, gals.	Size of tank, ft.	Shipping weight of tank, lbs.
†x-3	220	30 x 6	575
*x-4	295	30 x 8	725
†x-5	315	36 x 6	735
*x-6	525	36 x 10	1050
*x-7	720	42 x 10	1650
*x-8	940	48 x 10	1900
*x-9	1500	48 x 16	2800
*x-10	1880	48 x 20	3400

(†)—Vertical Tank. (*)—Horizontal Tank.
The 6-ft. tank can be furnished horizontal when so ordered.

Dayton Deep Well Water Supply Systems

These systems are suitable where water level is greater than 22 ft. below the pump.

Made in capacities from 124 to 2000 gals. per hour. Furnished for (1) with electric motor and silent chain drive, (2) with direct gear drive to electric motor, (3) belt drive from any power.

Continued on next page

Pumping units furnished with or without pressure tank. Gasoline engine furnished instead of motor when desired.

The motor driven systems are fully automatic.

Pumping units equipped with Hyatt roller bearings; all parts easily accessible.

Positive in operation and absolutely reliable.

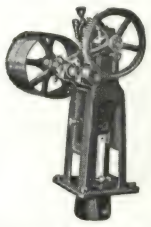
Selection of a Proper Unit—All deep well pumping units must be placed directly over well operating a submerged working cylinder suspended by drop pipe and sucker rod. The pumping capacity of a deep well pumping unit depends upon the length of the stroke of the power head and the diameter of the cylinder used. The size of the cylinder is governed by the total lift in feet against which the machine must operate and the inside diameter of well which it must enter. Total lift in feet means the vertical distance from the low water level in well to the highest point to which the water must be elevated. When water is pumped into a pneumatic tank under pressure, add 2-ft. lift for each pound pressure to be carried in tank.

Before selecting deep well equipment, it is therefore necessary to have the following information:

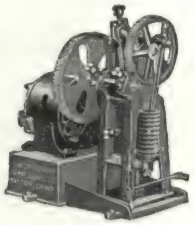
(1) Inside diameter of well.
(2) Total depth of well.
(3) Normal depth of water.
(4) How far water level lowers when being pumped.
(5) Approximate flow of well in gallons per minute.
(6) Highest point to which water must be raised above pump.

With this information, the pumping unit of suitable size can be selected by referring to capacity tables, taking into consideration the number of fixtures to be supplied and the average daily consumption necessary to give satisfactory service.

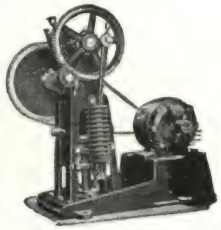
The pumping units and complete systems shown on this page are suitable for supplying residences, suburban estates, schoolhouses, country clubs, office buildings and hotels. Our Sales and Engineering Departments will cheerfully assist in planning installation, selecting proper equipment and overcoming any difficulties that may arise.



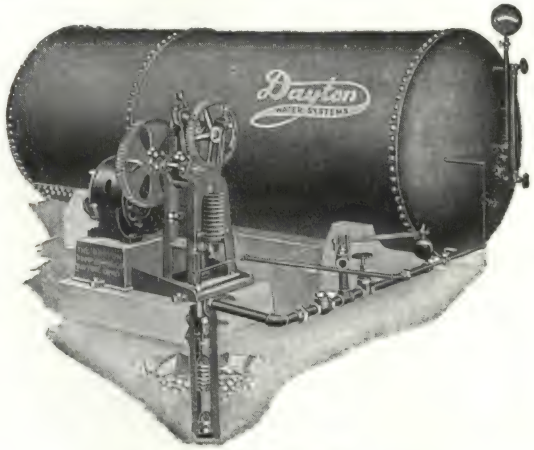
TYPE A DRIVE, POWER HEAD ALONE, FOR LONG BELT DRIVE



TYPE C DRIVE, MOTOR DIRECT GEARED



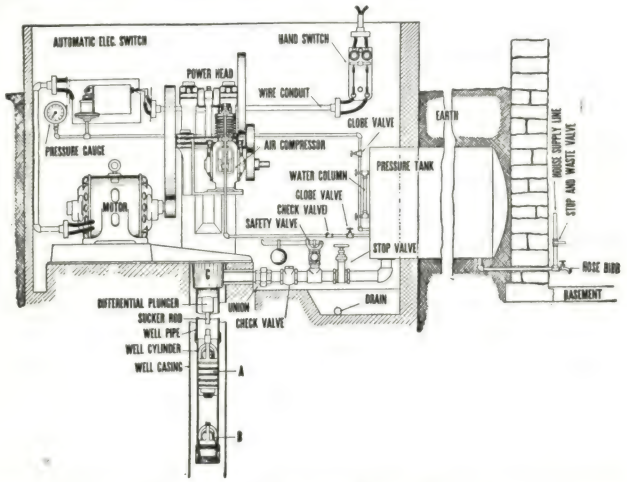
TYPE D DRIVE, SILENT CHAIN DRIVE



NO. 60 SYSTEM

Type D drive, 6-in. stroke deep well pump pumping into pneumatic pressure tank

No. 60 Series—Complete system consists of 6-in. stroke deep well pumping unit with air pump attached; electric motor; all brass well cylinder; any size pneumatic pressure tank listed below; combined air chamber and check valve; gate valve; safety valve; check and stop valve for air pump line; automatic electric pressure switch; pipe fittings necessary to assemble valves in their proper order in discharge line at pump (piping from these valves to tank not furnished); drop pipe and sucker rod (when desired).



SETTING PLAN SHOWING A COMPLETE DEEP WELL INSTALLATION IN A PIT AT TOP OF WELL

Pneumatic tank is buried in ground with one end extending into pit. Location of tank is optional. Deep well pumps must be installed directly over well and, if not installed in a pit as shown, a small pump house should be provided

DEEP WELL SYSTEMS

Type of model	Smallest size of well for capacity given, in.	Capacity, g. p. h.	Depth to water, ft.	Motor h. p.	Tank capacity	Catalogue reference
Junior	2	124	125	¼	Any	For detailed capacity table see Page 1 Bulletin 103
Junior	2	168	75	¼	Any	
Junior	3½	193	60	¼	Any	
Junior	2½	212	35	¼	Any	
6″ Stroke	2	137	175	½	Any	For detailed capacity table see page 4 Bulletin 103
6″ Stroke	2	187	125	½	Any	
6″ Stroke	3½	215	100	½	Any	
6″ Stroke	2½	245	75	½	Any	
6″ Stroke	4	309	50	½	Any	
6″ Stroke	3	382	30	½	Any	
8″ Stroke	3¼	250	300	2	Any	
8″ Stroke	2½	326	175	2	Any	
8″ Stroke	2¾	422	225	2	Any	
8″ Stroke	3¼	616	140	2	Any	
8″ Stroke	3½	734	110	2	Any	
8″ Stroke	3¾	866	90	2	Any	
8″ Stroke	4¼	1147	50	2	Any	
8″ Stroke	6	1473	30	2	Any	For detailed capacity table See Page 3 Bulletin 104
12″ Stroke	3¼	337	500	3	Any	
12″ Stroke	4	557	325	3	Any	
12″ Stroke	4½	832	220	3	Any	
12″ Stroke	5	1163	150	3	Any	
12″ Stroke	5⅝	1548	80	3	Any	
12″ Stroke	6	1988	40	3	Any	
12″ Stroke	4½	832	300	5	Any	
12″ Stroke	5	1163	225	5	Any	
12″ Stroke	5⅝	1548	130	5	Any	
12″ Stroke	6	1988	100	5	Any	
12″ Stroke	6¼	2485	60	5	Any	

TANKS FOR DEEP WELL PUMPS

Trade No.	Capacity of tank, gals.	Size of tank, in. ft.	Shipping weight of tank, lbs.
†x–3	220	36 x 6	575
*x–4	295	30 x 8	725
†x–5	315	36 x 6	735
*x–6	525	36 x 10	1050
*x–7	720	42 x 10	1650
*x–8	940	48 x 10	1900
*x–9	1500	48 x 16	2800
*x–10	1880	48 x 20	3400

(†)—Vertical Tank. (*)—Horizontal Tank.
The 6-ft. tank can be furnished horizontal when so ordered.

THE DURO PUMP & MANUFACTURING CO.

Manufacturers of Pumps and Residence Water Systems

DAYTON, OHIO

BRANCH OFFICES, DISTRIBUTORS AND SALESMEN IN ALL PRINCIPAL CITIES

(Write us for name and address of nearest representative)

Products

"DURO" PUMPS and RESIDENCE WATER SYSTEMS for supplying running water under pressure for city, suburban and farm homes, schools, churches, institutions, etc.; ELECTRIC MOTORS, GASOLINE ENGINES, and TANKS.

GUARANTEED DURO MADE BY THE DURO PUMP AND MANUFACTURING CO. DAYTON OHIO.

TRADE-MARK

Two Types of Pumps

Deep well and shallow well or suction pumps. Power for operating can be electric current, gasoline engine or belt power.

How to Select the Right Size and Type of Water System

For city, suburban and farm homes, schools, churches, institutions, large estates, etc. The source of water supply may be either a shallow or deep well, spring, stream or lake, which will require either a shallow or deep well pump.

Therefore, the proper application of a residence water system is very important, both from a standpoint of successful operation and ample water service. See table below and compare with description of each outfit.

HOW TO SELECT THE RIGHT PUMPING SYSTEM*

Style No.	Cap. of pump, gals. per hr.	Number of rooms in house	Number of Fixtures System Will Supply							
			Tub bath	Shower bath	Lavatory	Laundry	Kitchen	Barn	Sprinkling	Garage
ELECTRIC CISTERN SYSTEM										
1901 and 2000	120	5 or 6	1	..	1	1	1	..	..	..
ELECTRIC SHALLOW WELL										
180	180	6 or 8	2	1	1	1	1	..	..	..
300	360	8 or 10	3	1	1	2	1	1	1	1
100	600 to 1500	10 or 15	3	2	2	2	1	1	2	1
ENGINE DRIVEN										
2300	360	8 or 10	3	1	1	2	1	1	1	1

Deep well pumps are made in capacities from 125 to 1143 gals. per hour.

*Conditions alter cases and these figures are approximate and act as a guide in selecting a water system.

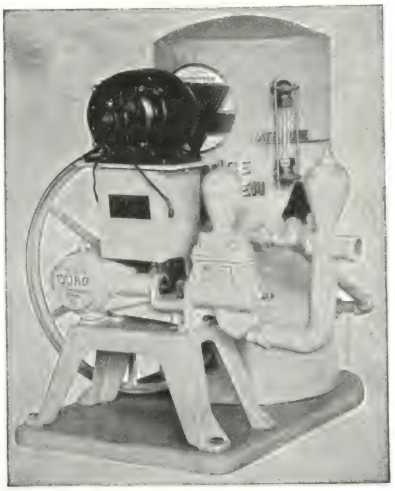
Nine "Duro" pumps and water systems are illustrated herewith, adapted to certain conditions and requirements. Any one of these outfits will supply running water under a good, dependable pressure when and where needed at the turn of a faucet.

"Duro" residence water systems can be operated either by electric motor or gasoline engine. The electric systems are automatic in starting and stopping. The engine driven systems can only be made automatic in stopping.

The equivalent of city water service is made possible for city, suburban and farm homes by "Duro" residence water systems. They bring those conveniences and pleasures of a sanitary bathroom to the home which heretofore has been unable to have running water under pressure. Besides, they furnish running water in liberal quantities for the kitchen, laundry, and for sprinkling, watering stock, etc.

"Duro" Shallow Well Pumps and Water Systems—Electric and Engine Driven

Unit System No. 180—Capacity, 180 gals. per hour. For the water requirements of average home—bathroom, kitchen and laundry, and water in limited quantities for sprinkling purposes.



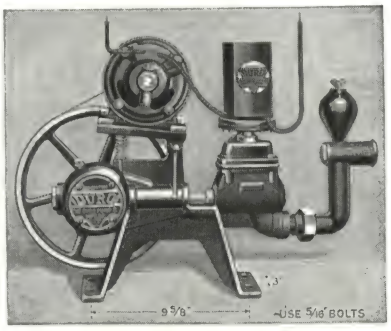
STYLE NO. 180 SYSTEM

Suction pump type. Tanks of 12 gals. capacity. Source of water supply: shallow well, spring, lake or stream.

Electric motor driven; automatic operation, starts and stops itself.

Also two other sizes of Unit systems.

Cistern Pump No. 1901—Capacity, 120 gals. per hour. For the soft water requirements of the average home with one or two bathrooms with tub baths and the usual other fixtures in the kitchen and laundry.



STYLE NO. 1901 SYSTEM

Suction pump type. Source of water supply: cistern.

Complete System Known as Style 2000—Used with 42- or 80-gal. black or galvanized tanks.

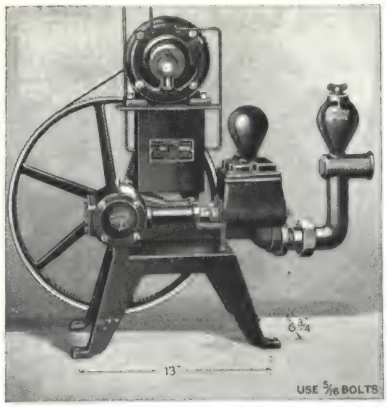
Style 300 System—Capacity, 360 gals. per hour.

For the water requirements of the suburban or farm home, watering stock, sprinkling, etc. The ideal water system for the farm. Suction pump type. Tanks of 42 to 525 gals. Source of water supply: shallow well, spring, lake or stream.

Electric motor driven; automatic operation, starts and stops itself.

STYLE NO. 300 SYSTEM

Continued on next page



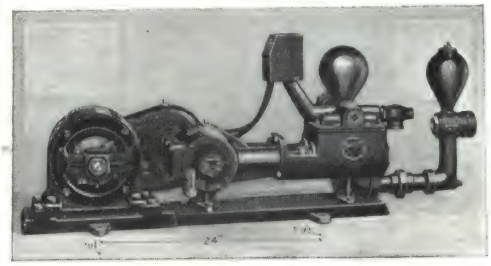
STYLE No. 104 SYSTEM

No. 104 Electric Duplex Suction Pump—Capacity, 360 gals. per hour.

Used with tanks ranging in capacity from 42 to 525 gals. It is the same pump used with the Style 300 System and recommended for same requirements.

Style 100 Electric Duplex Suction Pumps — Capacities, 600, 900, 1200 and 1500 gals. per hour for the water requirements of the city, suburban, and farm homes, large estates, institutions, schools, factories, etc., furnishing liberal quantities of water for all purposes.

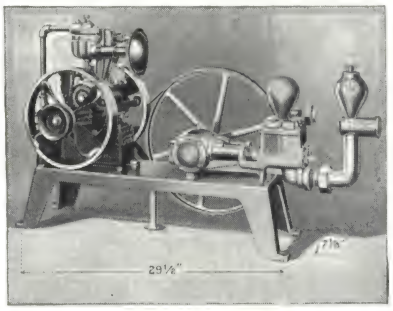
A good and dependable water service.



STYLE No. 100 SYSTEM

Complete System Known as Style 500—Furnished with tanks ranging in capacities from 120 to 525 gals. and larger.

Style 2300 Engine Driven Suction Pump—Capacity, 360 gals. per hour. For the water requirements of average homes in suburban and farm districts where electric current is not available. Equipped with a Duro ½ h.p., 4-cycle air cooled engine, automatic in stopping only.



STYLE No. 2300 SYSTEM

System Known as Style 2400—Furnishing in capacities from 42 to 525

53HM-S			1000			
53HM-U						
53HM-V						
54HM-R			365		4 o...	
54HM-S			630		4½ or larger	
54HM-T			1000	2	5 or larger	1...
54HM-U			1500		6 or larger	11...
54HM-V			1880			
54HM-R	926	27	630		4 or larger	7...
54HM-S			1000	3	4½ or larger	10...
54HM-T			1500		5 or larger	1776
54HM-U			1880		6 or larger	1375
54HM-V			2260			

Note: Systems built for belt or gasoline engine power; s...

...ter Supply
...n

...eep Well

...e average ...ates, insti-tutions, schools, factories, etc., furnishing the equivalent of city water service.

Made in 46 sizes ranging in capacities from 125 to 1143 gals. per hour at depths from 22 to 500 ft. Electrically operated, chain driven, automatic in starting and stopping.

Styles 1000 and 3100 Complete Electric Deep Well Water Systems—Using deep well pumps Nos. 900 and 3000 above and recommended for the same requirements.

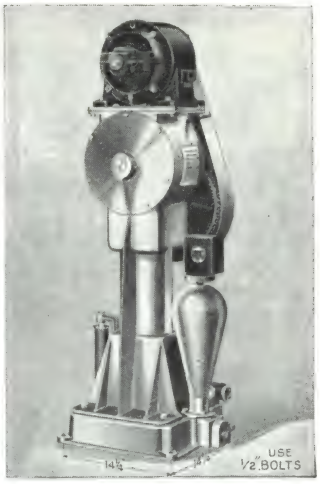
Furnished with tanks ranging in capacities from 42 to 525 gals. and larger.

46 sizes to select from, ranging in pump capacities from 125 to 1143 gals. per hour at depths of 22 to 500 ft. Pumps electrically operated, chain driven and automatic in operation.

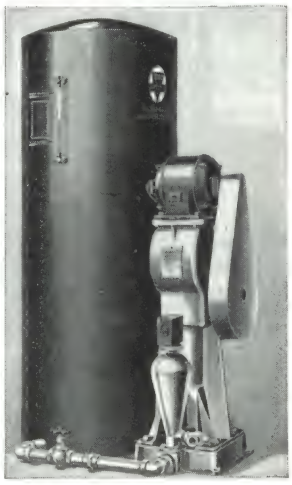
Style 900-E Engine Driven Deep Well Pump—For the water requirements of the average suburban or farm homes without electric current.

Capacities, 125, 130 and 225 gals. per hour; depth of wells 22 to 125 ft. Equipped with a Duro ½ h.p. 4-cycle air cooled engine, chain driven, automatic in stopping only.

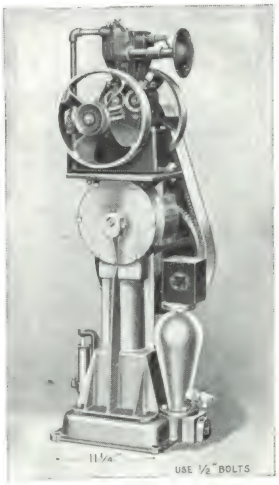
Complete System Known as Style 1000-E—Furnished with tanks from 42 to 525 gals. capacities.



STYLE No. 900 SYSTEM



STYLE No. 1000 SYSTEM



STYLE No. 900-E SYSTEM

General

Operating pressures, 25 to 40 lbs.

Operating cost, 8c to 15c per 1000 gals.

"Duro" Repulsion-Induction Motors

High starting torque. Manufactured especially for "Duro" pumps. Will not stall, no matter what pressure is put on pulley with 1¼-in. belt. Overcome low voltage condition so often encountered.

Information

General catalogue and name of nearest distributor sent on request.

FORT WAYNE ENGINEERING & MANUFACTURING CO.

Manufacturers of Private Water Supply Systems
FORT WAYNE, IND.

Products

PAUL WATER SYSTEMS.

Classification of Systems

(A) Shallow well pump systems for pumping from shallow wells, cisterns, springs, lakes or streams where water stands at all times not more than 25 ft. below pump.

(B) Deep well pump systems for pumping from deep cased wells, 2-in. diameter or larger, where water stands from 25 to 300 ft. below pump.

Installation

Paul systems, as listed, are standard stock systems. They are furnished complete with pressure controllers for automatic operation and electric motors for either central station or farm light power. Standard pipe to connect the system to the source of water supply and to the service fixtures is not included and is found in every merchant's stock. The systems are simple, easily installed, require very little attention and operate on an average power cost of 10 cents per 1000 gals. of water pumped under normal conditions.

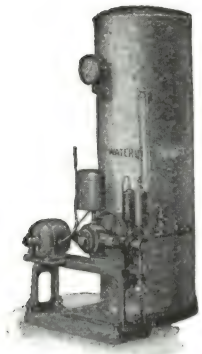


FIG. NOS. 901, 918, 932

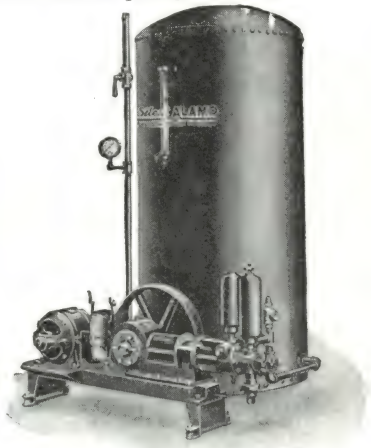


FIG. NO. 956

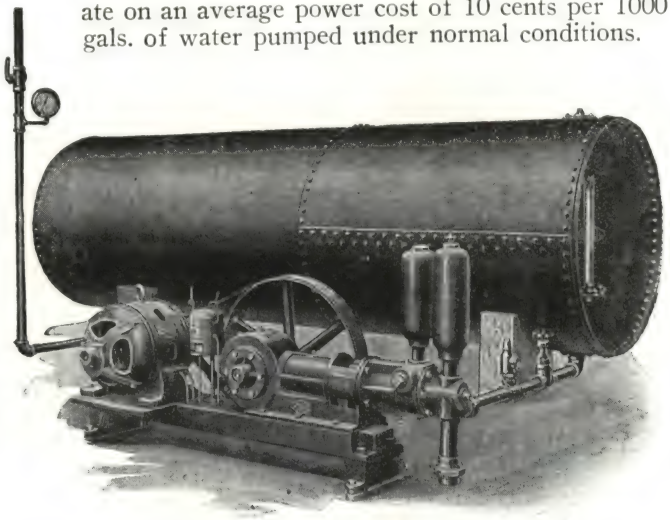


FIG. NO. 865

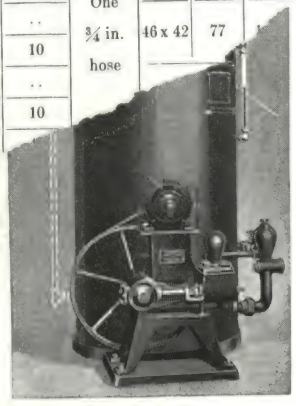
SHALLOW WELL PUMPING SYSTEMS

CLASSIFICATION A—PAUL SYSTEMS FOR DOMESTIC USE PUMPING FROM SHALLOW WELLS, CISTERNS, LAKES OR SPRINGS

SPECIFICATIONS OF WATER SYSTEMS						PROJECT ONE AND TWO										DIMENSIONS		
From general catalogue number 5010						Project One — Soft water from cisterns for city and village residences, country and farm homes, apartments, hotels, etc.					Project Two — Hard water from shallow wells, lakes, springs or streams for village residences, country and farm homes, schools, factories, hotels, etc.							
Catalog number	Figure number	Page number	Pump capacity, gals. per hour	Tank contents gals.	Motor h.p.	Number of rooms in building	Number of people accommodated	Plumbing fixtures: Bath	Plumbing fixtures: Showers	Plumbing fixtures: Kitchen and laundry	Number of rooms in building	Number of people accommodated	Plumbing fixtures: Bath	Plumbing fixtures: Kitchen and laundry	Live stock: Number of horses or cattle	Live stock: Number of hogs or sheep	Grounds: Lawn or garden	Floor space, in.	Height in.	Shipping weight lbs.
97O-A	901	9	100	42	⅛	6	6	1	..	1	6	3	1	1	6	10	Limited	27 x 28	54	220
												5			3	5				
95O-A	918	11	180	52	1/6	8	8	1	..	1	8	3	1	1	15	20	One ½ in. hose	26 x 32	54	340
												8				1				
95O-B	932	11	180	100		8	8	2	One small	1	8	4	2	1	12	25		26 x 37	65	400
												8			6	10				
82GM-P	956	15	360	140	½	10 or more	15	2	2	1	10	5	2	1	20	60	One ¾ in. hose	46 x 43	77	830
												12			10	20				
82GM-S	956	15		315			20	3		1		18	3	1	..	..		46 x 42	77	
												6			40	10				
82GM-U	865	15		630			25	4	3	1	Large country home and stock farm	20	3	1	..	..				
												6			60	10				
83GM-O	865	17	720	315	1	Apartment hotel, club, or any other building where people live and work	30	6	4	One or more		15	3	1	20					
												5			40					
83GM-R				630			40	8	5			25								
												8								
83GM-S				1000			50	10	8		Factory, school, club, hotel or any other building where people live and work	75								
												100								
83GM-T				1500			60	12	10			150								
												200								
84GM-O	865	17	1440	630	2		80	16	14											
84GM-P				1000			100	20	16											
84GM-R				1500			120	24	20											
84GM-S				2260			150	30	24											

Note: Systems built for belt or gasoline engine power; specification on application.

...ump type. Tanks ...25 gals. Source ... supply: shallow ...g, lake or stream. ...tric motor driven; ...ic operation, starts ...ps itself. ...e ideal ...m for the farm.



STYLE NO. 300 SYSTEM

Continued on next page

Special Systems

Special systems will be furnished with made-to-order pressure tanks and with pumps for belt or gasoline engine power to meet any requirement. Specifications on application.

Sample Specification

(A) Shallow Well Systems—This contractor shall furnish and install one (1) complete Paul Water System, catalogue No. 970-A illustrated by Fig. 901 and listed on page 9 of the Fort Wayne Engineering & Manufacturing Co.'s general Catalogue No. 5010.

(B) Deep Well Systems—This contractor shall furnish and install one (1) complete Paul Water System catalogue No. 50-HMR illustrated by Fig 912 and listed on page 23 of the Fort Wayne Engineering & Manufacturing Co.'s general catalogue No. 5010.

The architect will note that with deep well pumps it is necessary to include in the specification the inside diameter of the well; the pumping capacity per hour and the depth to water as found in columns 6, 7 and 8 of specification table. With any system the kind of power current available should be included.

Co-operative Service

The engineering department of this company will gladly furnish detailed specification of any system listed. When in doubt write fully concerning the source of water supply, power available, also number and kind of fixtures and outlets to be supplied with water.

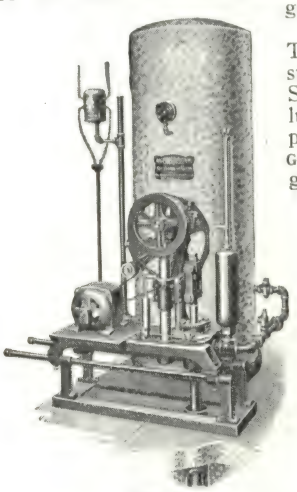


Fig. 912

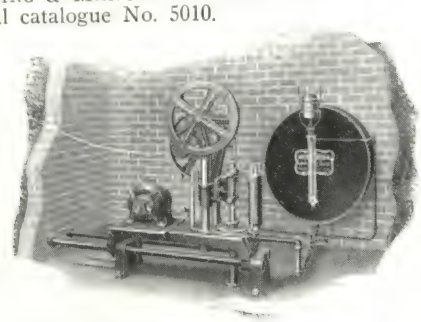


Fig. 942

Deep Well Pumping Systems

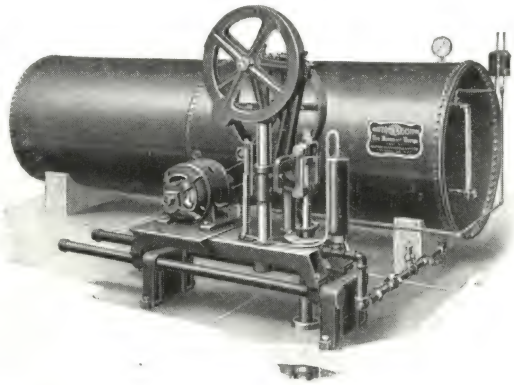


Fig. 926

CLASSIFICATION B—PAUL SYSTEMS FOR DOMESTIC USE, PUMPING FROM DEEP WELLS

Specifications of Water Systems								Project							Dimensions		
From general catalogue number 5010			Tank contents gals.	Motor h p.	Size in in. of well casing required for capacities listed	Maximum duty of pumps		Hard water from deep wells for city and village residences, farms and country homes, factories, schools, hotels, etc.									
Catalogue number	Figure number	Page number				Capacity, gals. per hour	Depth to water, ft.	Number of rooms in building	Number of people accommodated	Plumbing fixtures: Baths	Plumbing fixtures: Kitchen and laundry	Live stock: Number of horses or cattle	Live stock: Number of hogs or sheep	Grounds: Lawn and garden	Floor space, in.	Height, in.	Shipping weight, lbs.
50HM-R	912	23	52	½	2 or larger	150	100	6	5	1	1	Small	number	One ½ in hose	30 x 30	52	600
50HM-J			120					7	4	2	1	8	20		30 x 40	77	625
50HM-K			220		2½ or larger	200	60		6								
50HM-L	942	23	315		3 or larger	250	40	8	5	Two or more	1	15	20		38 x 45	77	825
50HM-P			630		4 or larger	250	50		8								
50HM-Q			1000					9	6		1	12	40		42 x 45	77	1000
									8			6	20				
51HM-R			140	¾	2 or larger	165	150	12	6		1	20	30		Dimensions on application		1500
51HM-S			220		2½ or larger	275	80		12			4	10				
51HM-T			315		3 or larger	410	50	Hotel or club	40		1						2300
51HM-U	926	25	630					6	4	2	1	12	30	Two ½ in or one ¾ in. hose	30 x 40	77	890
53HM-R			220	1	3 or larger	365	100		6								
53HM-S			315		3½ or larger	448	70	8	5	3	1	18	30		38 x 45	77	1050
53HM-U			630		4 or larger	543	70		8			6	10				
53HM-V			1000					10	6	Three or more	1	20	40		42 x 45	77	1175
54HM-R			365	2	4 or larger	615	210		8								
54HM-S			630		4½ or larger	865	140	Hotel or club	50		1						1620
54HM-T			1000		5 or larger	1310	50	6	5		1	14	50	Two ¾ in. hose	Dimensions on application		1050
54HM-U			1500		6 or larger	1150	90		8								
54HM-V			1880					8	6		1	3	10				1200
54HM-R	926	27	630	3	4 or larger	740	300		8			20	50				
54HM-S			1000		4½ or larger	1035	210	12	6		1	6	40		With these systems the tanks may be buried in the ground thereby saving floor space		1700
54HM-T			1500		5 or larger	1770	70		15			50	30				
54HM-U			1880		6 or larger	1375	50	School or factory	75		1	10	50				2450
54HM-V			2260														
									8	Three or more	1	50	100	Three ¾ in. hose			1700
								Large country homes, stock farms, factories, hotels, schools, clubs, etc.	15			100	40				2100
									150	Drinking fountains, sanitary fixtures. Kitchen and laundry fixtures		Our engineering department should be consulted if water will be consumed for manufacturing purposes					2900
									200								3600
									250								5000
									150						Write for special print		2200
									200								3000
									250								3700
									300								5100
									350								5800

Note: Systems built for belt or gasoline engine power; specification on application.

KEWANEE PRIVATE UTILITIES COMPANY

Manufacturers of Water Supply, Sewage Disposal and Electric Lighting Systems

MAIN OFFICE AND FACTORY

KEWANEE, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street

CHICAGO, ILL., 1213 Marquette Building

DISTRICT REPRESENTATIVES

MINNEAPOLIS, MINN., Earll W. Norton, 649 Plymouth Building
KANSAS CITY, MO., J. T. Thurman, 311 Mutual Building
PORTLAND, ORE., M. D. Spencer, 40 First Street
SAN FRANCISCO, CAL., Simonds Machinery Co., 117-20 New Montgomery Street
SALT LAKE CITY, UTAH, Hawley-Richardson-Williams Co., 611 Dooly Building
DENVER, COLO., M. J. O'Fallon Supply Co., 1621-39 Fifteenth Street
SEATTLE, WASH., Walworth Mfg. Co.
LITTLE ROCK, ARK., Moody, Knight & Lewis, A. O. U. W. Building
TAMPA, FLA., Cameron & Barkley
ST. LOUIS, MO., H. J. Wobus, 1006 Fullerton Building
INDIANAPOLIS, IND., Jackson Supply Co., 333 W. Ohio Street
DETROIT, MICH., G. A. O'Keefe, 331 E. Fort Street
CLEVELAND, OHIO, H. L. Foote, 1900 Euclid Avenue
PITTSBURGH, PA., C. D. Bushnell, 206 Wood Street
PHILADELPHIA, PA., J. F. Alexander, 928 Presser Building
PROVIDENCE, R. I., Walter H. Jackson Company, 510 Industrial Trust Building
WINSTON-SALEM, N. C., J. F. Kerner
JACKSONVILLE, FLA., E. W. Bentley, 214 Duval Building
OMAHA, NEBR., Omaha Sanitary Supply Co., 15th and Jackson Streets

Products and Services

Kewanee Systems, which include:

Water Supply Systems, Complete Pumping Units, and Pneumatic Tanks.

Sewage Disposal Systems.

Also Electric Lighting Systems, with or without Storage Battery.

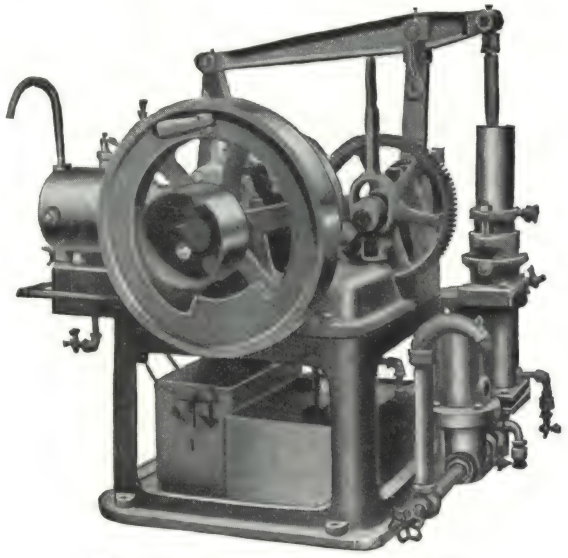
TRADE-MARK

A competent Engineering Department will cooperate with architects in planning and selecting apparatus for each particular requirement, and layouts will be made and submitted free of charge.

Water Supply Systems

Furnished in capacities to take care of smallest requirements, up to largest country homes and estates. Also especially designed for isolated institutions, country clubs, etc.

Furnished for shallow or deep well, for motor, gasoline engine, or belt drive from other power.

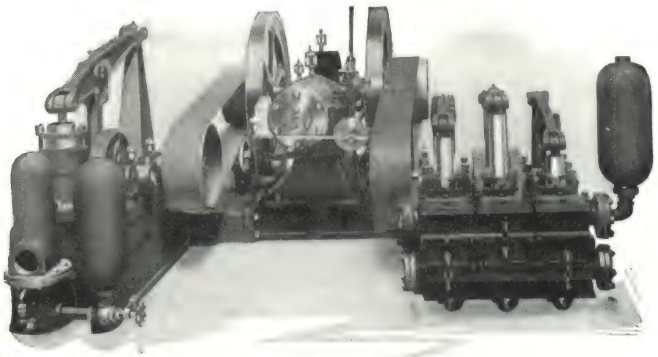


No. 19. Kewanee Pumping Unit

Power, gasoline engine, 1 h. p. Capacity, 156 or 315 gals. per hour. Maximum depth to water, 150 ft.

No. 74. Kewanee Pumping Unit, Deep Well Type

Power, electric motor, 2 to 10 h. p. Capacity, 594 to 3420 gals. per hour. Maximum depth to water, 300 ft.



Kewanee Long Stroke Triplex Suction Pump and Differential Plunger Deep Well Working Head, Driven By Kewanee Gasoline Engine

Each machine mounted on a rigid cast iron subbase, all bolted together. No lining up, no special foundations or fastening down

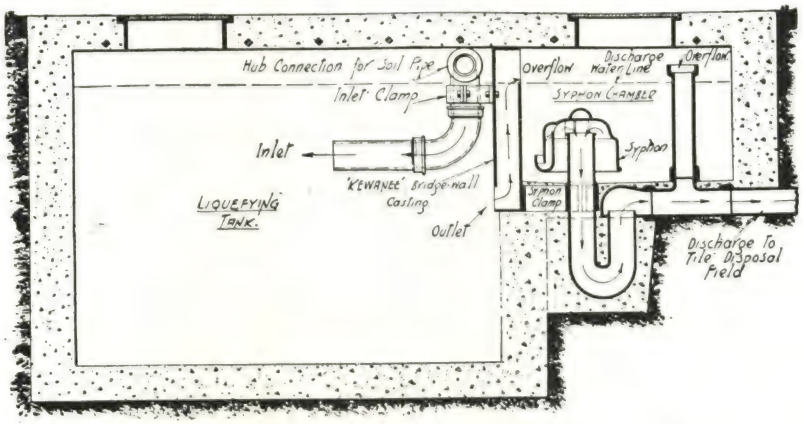
Continued on next page

Kewanee Bacterial System of Sewage Disposal

The Kewanee bacterial system of sewage disposal represents a scientific and highly approved simplification of the sewage problem for residences and other buildings not served by public sewers. It accomplishes its results bacteriologically, and without the use of any chemicals. It converts the sewage into liquid and distributes it, over a disposal field, as pure, clean, inorganic matter, harmless to life or vegetation.

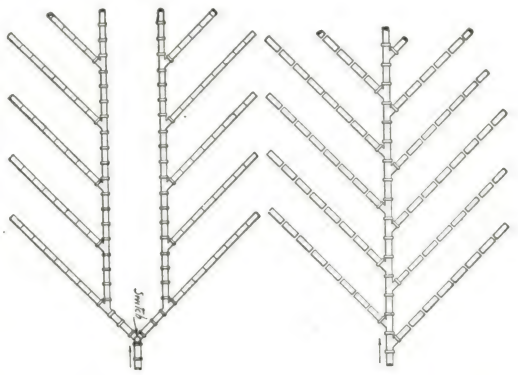
This system is recommended for installations having capacity requirements of not over 100 persons. For these capacities, it is entirely automatic in operation, and requires no attention whatsoever.

Information Required when Ordering—(1) Number and kind of buildings; of plumbing fixtures. (2) Number of people using fixtures. Fixtures in basement. (3) Depth of basement floor below ground level. (4) Fall of ground in yard. (5) Is brook, ditch, or drain tile available for purified water? (6) City or private water supply. If private, give description of plant and well. (7) Kind and depth of surface soil; of subsoil. (8) Make rough sketch of buildings and grounds, giving distances. (9) Show direction and amount of fall of ground from buildings. Show location of well. (10) Show preferred location of liquefying tank and tile disposal field.



VERTICAL SECTION SHOWING CONSTRUCTION OF SEWAGE TANK

Tank of concrete and carefully proportioned according to capacity requirements. A simple casting carries inlet, outlet and vent openings, bridge wall and baffle plate between the two chambers, and fixes position of siphon. Entrance to outlet is vertical, and does not collect solid matter. Automatic siphon discharges periodically into the disposal field



Double Tile for Large Systems or Heavy Soil

Single Tile for Small Systems and Light Soil

DISPOSAL FIELDS

Distributing lines of 4-in. land tile laid in long or short runs, straight or curved, with ¼-in. spaces between the 1-ft. lengths of tile

The system is unaffected by changes in temperature, and is vented through the soil pipe, all odors and gases being discharged through the soil pipe stack above the roof.

A few Kewanee operating specialties and installation instructions, together with necessary construction materials purchasable locally, make it possible for any mechanic properly to install this system.

Bacterial Principle Involved—The principle involved in a bacterial sewage disposal plant is very simple.

Certain bacteria, called anaerobes because they thrive only when kept in the dark and out of contact with the air, have the power to reduce vegetable and animal solids to liquids and gases. Certain other bacteria, called aerobes because they thrive only when kept in contact with the air, have the power to purify this liquid product produced by the anaerobes, by oxydizing it and reducing it to pure water and harmless gases.

The bacteria necessary for this work exist everywhere, and all that is necessary to do in the development of a sewage system is to provide the best conditions for them to live and multiply in, subjecting the sewage, in turn, to each of the two kinds of bacteria.

Brief Description—The Kewanee system consists, primarily, of a septic tank, or anaerobian breeding plant, into which the sewage is first passed and in which it is liquefied, and of a subsurface disposal field through which the liquefied sewage is passed for exposure to air and aerobes, and consequent conversion into clean inorganic gases and pure water.

Fittings Supplied—Kewanee bridge wall casting, inlet clamps, siphon and all necessary bolts; also two manhole rings and covers, when specified.

Summary

The KEWANEE PRIVATE UTILITIES COMPANY provides high grade equipment and dependable service for the average man in the out-of-the-way place. The equipments go together without mistake, start without coaxing, run without skilled attention, wear the longest time possible, and can be repaired by the unskilled man without shop tools or conveniences.

Bulletins on Private Utilities

A Complete Handbook of Information on Private Utilities for Country Homes is contained in our set of bulletins which total almost 200 pages with only the necessary information and details. The complete set of bulletins, in neatly bound form, or any separate bulletins, will be sent to any architect on request.

The complete list of bulletins, with the subjects covered, follows:

Bulletin "A"—General Description of all Plants.
Bulletin "E"—Kewanee Standard Service Pumping Machinery with capacities from 100 to 1000 gals. per hour.
Bulletin "F"—Kewanee Long Stroke Triplex Pumps with capacities from 1500 to 10,000 gals. per hour, and working pressures from 75 lbs. to 200 lbs.
Bulletin "G"—Kewanee Deep Well Working Heads. Capacity from 600 to 7500 gals. per hour. Maximum depth to water 300 ft.
Bulletin "H"—Kewanee Sewage Disposal System, explaining septic tank action and showing method of construction.
Bulletin "L"—Kewanee Isolated Service Storage Battery Electric Plants.

Specifications

A special bulletin, called "Specifications," has been prepared for the architect. It covers detailed drawings of all Kewanee equipment.

MILWAUKEE AIR POWER PUMP CO.

Private Water Supply System

886 Third Street
MILWAUKEE, WIS.

Product

MILWAUKEE AIR POWER WATER SYSTEM for country homes, schools, clubs, institutions, farms and other places where city water systems do not reach; also for private wells and cisterns in the city.

Milwaukee Air Power Water System

The two types of water supply systems most generally used are: the non-storage system that brings water through pipes from well or spring direct to the faucet; and the storage system, which pumps water into a tank where it is stored.

The Milwaukee air power water system is a "direct from the well," non-storage system, and supplies water that is absolutely fresh. It consists of five principal parts as follows: engine or motor, pump, air storage tank, air pressure valve, air compressor. Pump is placed in water in well, rain water or fresh water cistern, spring, or intake well which draws its water from a lake or running stream.

Power Equipment—Consists of engine or motor, air compressor and air tank, and may be located in any existing building or in small shed erected especially for it. The average power equipment occupies about 4x14-ft. floor space, and is 5 ft. high.

Flexibility of System—Power equipment does not have to be at well, but located anywhere, thus utilizing engine to operate other machinery such as electric generators, feed grinders, washing machines and cream separators, charging storage batteries, inflating tires. A dozen or more pumps may be operated by one power equipment of size giving sufficient air capacity.

Hot and Cold, Hard and Soft Water—One power equipment and two pumps with piping will give hard and soft, hot and cold water, any place desired.

Advantages of Non-storage Systems

Water always fresh, right from well or spring — cool in summer, and in winter of the same temperature as that in well or spring.

With tanks of equal size, it delivers about five times as much water as a storage system; for a given quantity of water, requires a much smaller tank.

Air tank placed anywhere; air does not freeze. Power equipment may be placed where engine or motor may be used for other work. One or a dozen springs, wells or cisterns may be pumped with one tank and one power equipment. Always plenty of air to operate pump. Water for fire protection is at *high* pressure.

WATER DELIVERED "DIRECT FROM THE WELL"

Pump is submerged in the source of supply and delivery is made to *all points*, regardless of distance

Motor Installation

Where current is available, a motor installation is always recommended, as it can be made automatic in its operation.

Engine Installation

Small oil or gasoline engines operate most of the Milwaukee installations. A 2½ h. p. engine supplies ample air for two No. 5 pumps. This is the outfit generally installed. By using air tank of sufficient capacity to pump one day's supply of water, the engine need be run only a short time each day. A larger air tank makes pumping necessary only two or three times a week. Air may be taken from tank to soft water cistern, spring, lake or river, where one or more pumps may be installed. Other pumps may be added at any time after original installation.

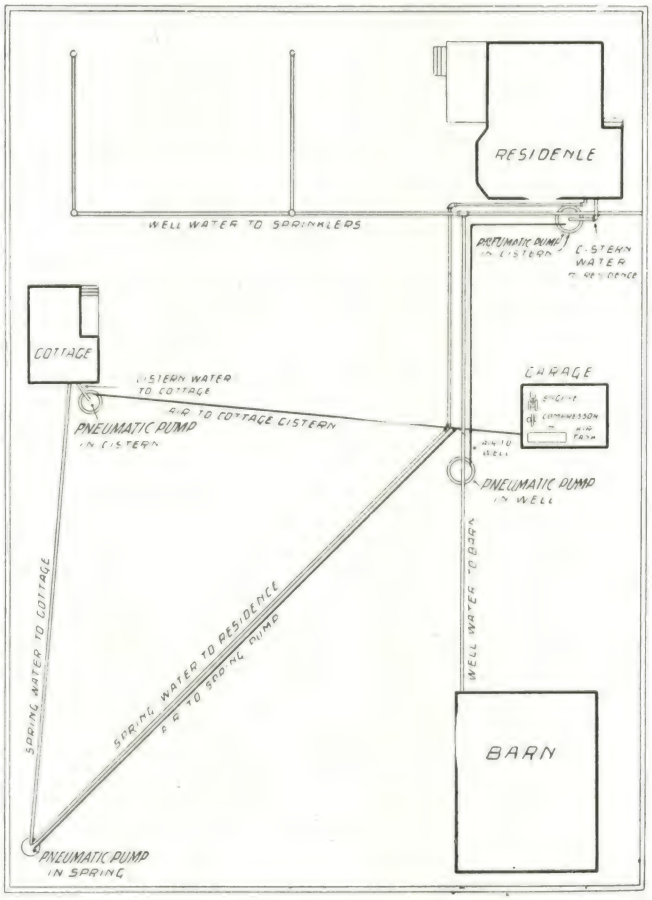


DIAGRAM SHOWING INSTALLATION OF MILWAUKEE AIR POWER WATER SYSTEM

Pumping equipment installed in existing buildings at any convenient point. In this case it is a garage. Pump is placed in well or cistern. 4 pumps used in this installation, 1 each for 2 cisterns, 1 in spring and 1 in well. The air lines are carried underground to each of 4 pumps. Thus there are 2 systems of pipes, 1 for air and 1 for water.

Spring, well or cistern water can be supplied to any building or point by merely adding necessary piping

Continued on next page

Important Feature

A storage water system generally can be changed into a Milwaukee air power "direct from the well" water system at comparatively small cost, as the water storage tank may be used for an air reservoir.

Milwaukee Double Cylinder Pumps

No. 4 "B"—For 4-in. or larger inside diameter wells. Delivering capacity, 700 gals. per hour (4 to 6 ft. of water required.)

No. 5 "B"—For 5-in. or larger inside diameter wells. Delivering capacity, 900 to 1000 gals. per hour (4 to 6 ft. of water required).

No. 6 "B"—For 6 in or larger inside diameter wells. Delivering capacity, 1200 to 1300 gals. per hour (4 to 6 ft. of water required).

12 "B"—Double cylinder shallow water pump. For 15-in. or larger inside diameter wells. Delivering capacity, 1200 to 1500 gals. per hour (1 to 3 ft. of water required).

Shallow Water Double Cylinder 12-B Pump

Description—The Nos. 4, 5 and 6 double cylinder drilled well pumps are built entirely of brass and bronze, and all working parts of the 12 "B" shallow water pump are brass and bronze. This point should be given special consideration for the reason that brass and bronze working parts will last longer in water than any other material from which pumps are built.

For the reason that the air exhaust valve seats independent of the air inlet valve, no fine adjustments are necessary. The operation of these pumps is governed entirely by two floats, so that no motive power, spring action, pistons or latches are required. There being no frictional parts, they will handle more sand, lime, iron and other solid matter than any pneumatic pump ever built.

For simplicity in construction, accessibility, delivering capacity, economy of operation and durability, these pumps have no equal.

These pumps are all double cylinder so that no expansion chamber is needed to maintain a steady flow of water at the faucets.

It will be noted that there is a pump for almost every condition and requirement; Nos. 4, 5 and 6 for drilled wells and 12 "B" for cisterns, shallow wells, springs, lakes and streams.

From the fact that the pump in the well is the most important part of a water system, we are sure that you will buy only the best, and from a manufacturer who has had years of experience in building pneumatic pumps.

4-B, 5-B, 6-B Drilled Well Pumps

Fire Protection

A Milwaukee air power system is specially adapted for fire use, and supplies an unbroken stream of water of steady volume and even pressure. Normal pressure of 5 to 10 lbs. can be increased almost instantly by simply turning a valve to give a pressure of from 50 to 100 lbs., sufficient to throw a stream to any point on the gables or roof of the ordinary house or barn. This is accomplished by use of the Milwaukee pressure regulator, an exclusive feature and one which may be worth in five minutes five times the cost of the entire plant.

Air Pressure Regulator

Cost of Milwaukee Water System

Cost of any individual installation and full particulars will be given on receipt of necessary data as indicated on information blank, copy of which follows. Estimate will be furnished either directly by the company or by dealer.

Dealers who install this system are widely distributed over the United States; and where no such dealer is located, a competent plumber or steamfitter does the work.

Information Required to Make Specifications

(1) Give depth of well.
(2) Give depth to the water from top of well.
(3) Give diameter of well at smallest place in inches.
(4) Give amount of water required each 24 hours.
(5) How many, and what, plumbing fixtures in house, barn and on lawn to be provided with water?
(6) What power do you have?
(7) If electric motor or gasoline engine, give horsepower.
(8) Do you want to draw or raise water from both rain water cistern and well?
(9) How high do you want to deliver water from mouth of well?
(10) Make rough diagram showing points to which you wish to deliver water from well, giving distance in feet.
(11) Will you want pressure enough for sprinkling purposes?
(12) If you have no power at present, or are in need of a new power, what do you prefer—electric motor or gasoline engine?
(13) If electric motor, state voltage and whether direct or alternating current; and if alternating current, whether 1-, 2- or 3-phase. Also give number of cycles.
(14) State whether or not current is continuous. If interrupted any time during 24 hours, give hours when there is no current.
(15) Do you need power for any purpose other than supplying water?
(16) Do you separate cream every day?
(17) Give distance of well to location of motive power.

References

Up to date 20,000 installations have been made in all parts of the country. List will be furnished on application.

THE MONARCH ENGINEERING CO.

Water Systems for Homes and Farms

DAYTON, OHIO

Products

MONARCH DOUBLE ACTING SHALLOW WELL PUMP; MONARCH WALL UNIT; MONARCH SHALLOW WELL SYSTEM; MONARCH DEEP WELL PUMP; MONARCH DEEP WELL HEAD.

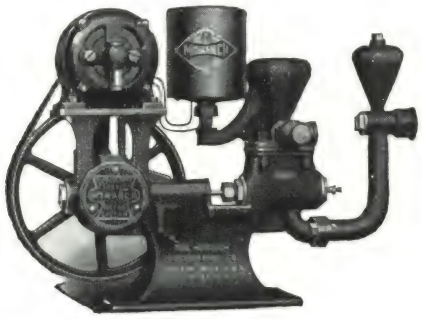
TRADE-MARK

Monarch Double Acting Shallow Well Pump

This is the basis of all Monarch shallow well systems.

Built in three sizes with pumping capacities of 120, 200 and 400 gals. per hour. Equipped with repulsion-induction motor without extra charge, two-pole automatic control switch, piston rod sleeve guard, improved valve seats, doubly packed stuffing box, safety relief valve, adjustable crank shaft bearings, cup leather expanders, and many other features.

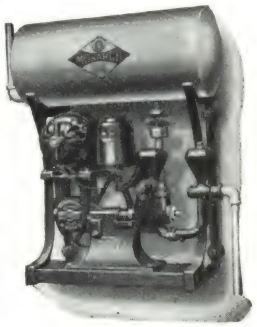
All Monarch pumps may be equipped for gasoline engine drive where electricity is not available.



MONARCH SHALLOW WELL PUMP

Monarch Wall Unit

This is a complete water supply system for direct service from cistern or shallow well. Designed to meet the demand for a compact, efficient and low priced outfit for domestic service where the storage capacity of water is of minor importance. Comes completely assembled with 10x22-in. galvanized tank mounted on bracket above the pump ready to connect to suction and discharge pipes and electric service wires.



MONARCH WALL UNIT

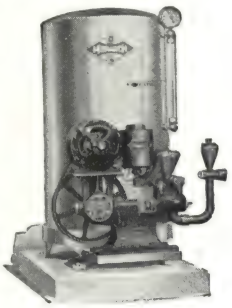
Three sizes, 120, 200 and 400 gals. per hour pumping capacity. These systems are particularly adaptable to homes where cellar space is limited as they can be mounted on the wall, occupying a space only 24 in. wide, 31 in. high and 13 in. deep. Or they can be placed on the basement floor. They will furnish an ample supply of hot or cold water for bathroom, kitchen and laundry under 20 to 40 lbs. pressure.

The source of the water may be cistern, well, lake or spring, just so the vertical distance from water level to pump does not exceed 22 ft.

Monarch Shallow Well Systems

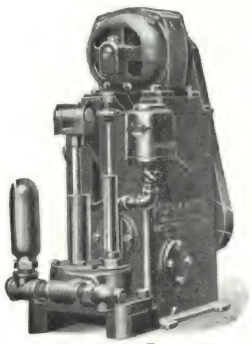
These are also made in three sizes, using identically the same pump as the wall unit, but they are furnished with large upright tanks, black or galvanized iron, with a substantial and pleasing base for tank and pump. This is a satisfactory and practical outfit for the average family where the depth to water does not exceed 22 ft. They are entirely automatic, self-oiling and noiseless.

Tank capacities 35, 70, 120, 220 and 315 gals.



MONARCH SHALLOW WELL SYSTEM

Monarch No. 600 Deep Well Pump



No. 600 SYSTEM

This is a light duty deep well pump designed particularly for ordinary farm use. It is unique in its construction with many desirable features. It is only 8 in. wide, 18 in. long and 25 in. high, with pumping capacities of 120 to 250 gals. per hour from well 22 to 150 ft. deep.

Monarch No. 700 Deep Well Head

This is in a class by itself when water is to be drawn from a depth of 22 to 650 ft. It is entirely enclosed; safe, silent, automatic in operation, self-lubricating, and designed to give a lifetime of service. It is by far the finest deep well pump on the market today.

It is built in various sizes with pumping capacities ranging from 120 to 1032 gals. per hour.

It is the ideal pump for country clubs, rural schools, suburban estates, farms; in fact, any place where high efficiency, durability and unfailing service are of first importance.

MONARCH DEEP WELL HEAD

Catalogues

We issue catalogues completely descriptive of all Monarch pumps and systems. We are glad to co-operate with architects and to supply them with complete informative data regarding the proper system to use under their particular conditions. Correspondence is invited.

THE F. E. MYERS & BRO. COMPANY

Manufacturers of Pumps

ASHLAND, OHIO

Products

SHALLOW WELL POWER PUMPS.
DEEP WELL POWER WORKING HEADS.
LIFT and FORCE PUMPS.

For Door Hangers and Store Ladders, see pages 1248-1251; for Hay Tools, see page 1339.

TRADE-MARK

Myers Self-oiling Shallow Well Power Pumps for Wells 22 Ft. or Less

These pumps are of the horizontal double acting self-oiling type, suitable for lifting water from wells, cisterns, etc., 22 ft. or less in depth and forcing it to an elevation. Also suitable for general service, such as pumping hot or cold water, oil, gasoline and similar liquids. They are also excellent boiler feed or booster pumps.

Their construction is exceedingly simple. They can be easily installed, economically operated by any power and can be depended upon for uniform, long time service.

Built in a large number of styles and sizes, with capacities ranging from 500 to 9000 gals. per hour.

They are equipped with a positive self-oiling system and all working parts are enclosed. They have extra large valves, liberal direct waterways and other features which permit operation against heavy pressure or at high speed, securing large volume and high efficiency.

All sizes equipped with air valve for pneumatic water systems, if desired.

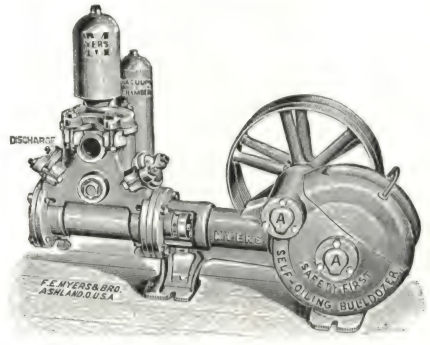


Fig. 1866. Myers Self-oiling Bulldozer Power Pump. For service against 100 lbs. pressure or 230-ft. elevation

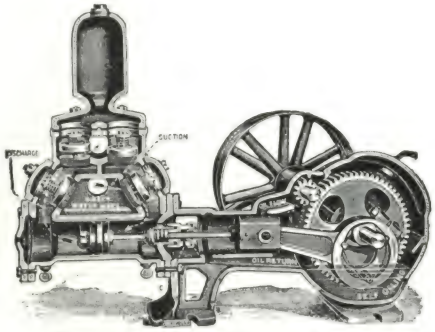


Fig. 1819. Section Through Myers Self-oiling Bulldozer Power Pump

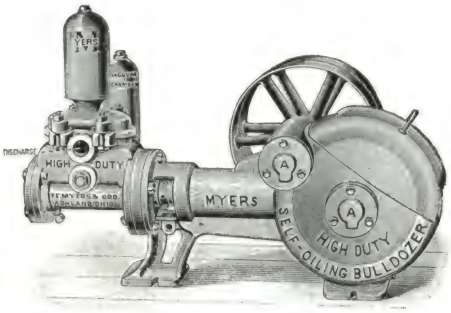


Fig. 1929. Myers High Pressure Self-oiling Bulldozer Power Pump. For service against 250 lbs. pressure or 580-ft. elevation

SPECIFICATIONS MYERS SELF-OILING BULLDOZER POWER PUMPS

FIG. 1866—100 LBS. PRESSURE

Pump No.	Diam. and stroke, in.	Maximum r. p. m.	Maximum gal. per hour	Pulleys, in.	Suction and discharge, in.	Lift, ft.	Maximum pressure, lbs.	Floor space, in.
			FOR ENGINE DRIVE					
				T. & L.				
612	2½ x 3	70	500	12 x 2	1¼	22	100	15 x 31
613	3 x 4	70	1000	14 x 2½	1½	22	100	18 x 38
614	4 x 5	65	2000	16 x 4	2	22	100	24 x 46
615	5 x 5	60	3000	16 x 4	2½	22	100	24 x 48
616	6 x 6	52	4500	24 x 4	3	22	100	27 x 56
618	8 x 8	45	9000	30 x 6	4	22	100	46 x 75
			HAND POWER					
610	2½ x 3	70	500	12 x 2	1¼	22	100	15 x 33
			FOR MOTOR DRIVE					
				Tight				
612M	2½ x 3	70	500	15 x 2½	1¼	22	100	15 x 31
613M	3 x 4	70	1000	20 x 3	1½	22	100	18 x 38
614M	4 x 5	65	2000	24 x 4	2	22	100	20 x 46
615M	5 x 5	60	3000	24 x 4	2½	22	100	20 x 48
616M	6 x 6	52	4500	30 x 4	3	22	100	23 x 56
618M	8 x 8	45	9000	42 x 6	4	22	100	40 x 75
			HAND AND POWER					
610M	7½ x 3	70	500	15 x 2½	1¼	22	100	15 x 33

FIG. 1929—250 LBS. PRESSURE

			FOR ENGINE DRIVE					
				T. & L.				
632	2¼ x 4	65	500	14 x 2½	1¼	22	250	18 x 35
633	3 x 5	60	1100	16 x 4	1½	22	250	24 x 44
634	4 x 6	50	1900	24 x 4	2	22	250	27 x 52
635	5 x 8	45	3600	30 x 6	2½	22	250	46 x 75
			FOR MOTOR DRIVE					
				Tight				
632M	2¼ x 4	65	500	20 x 3	1¼	22	250	18 x 35
633M	3 x 5	60	1100	24 x 4	1½	22	250	20 x 44
634M	4 x 6	50	1900	30 x 4	2	22	250	23 x 52
635M	5 x 8	45	3600	42 x 6	2½	22	250	40 x 75

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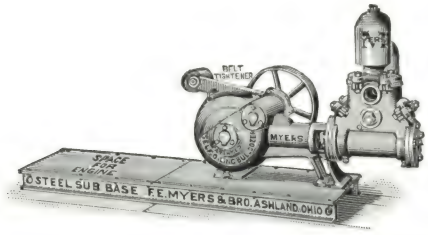


FIG. 2015. MYERS SELF-OILING BULLDOZER POWER PUMP MOUNTED ON STEEL SUBBASE

Equipped with belt tightener; has free space at one end for either motor or engine. Also furnished with a sprocket wheel for all steel chain drive same as Fig. 2010. Subbases, 15x50, 18x64 and 20x76 in.

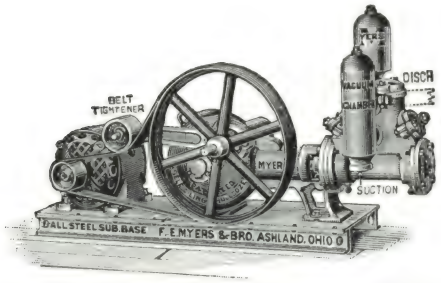


FIG. 2014. MYERS SELF-OILING BULLDOZER POWER PUMP MOTOR DRIVEN

Mounted on all-steel subbase

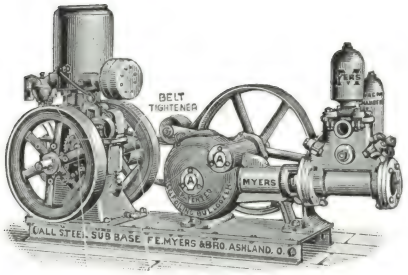


FIG. 2010. MYERS SELF-OILING ENGINE DRIVEN BULLDOZER POWER PUMP

For belt or chain drive. Mounted on all-steel subbase. Furnished with or without 3-h.p. Novo gasoline engine

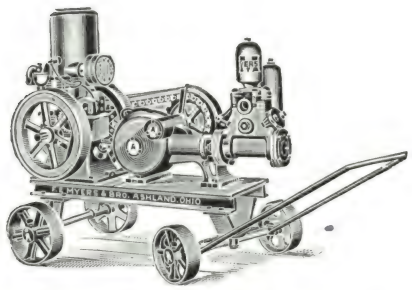


FIG. 2016. MYERS PORTABLE SELF-OILING BULLDOZER POWER PUMP FOR CONTRACTORS

Chain drive for either motor or gasoline engine. Mounted on steel subbase and tracks with or without 3-h.p. Novo gasoline engine. Belt and motor not furnished

Myers Self-oiling Deep Well Power Working Heads for Motor or Engine Drive

For lifting water from wells of greater depth than 22 ft. and delivering it to ground level or forcing it into elevated tanks or reservoirs.

Designed for safe continuous operation, long life, economical operation and minimum attention.

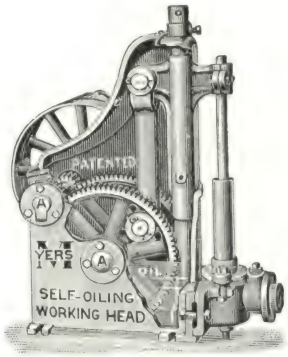


FIG. 1997 SECTIONAL VIEW SELF-OILING WORKING HEAD

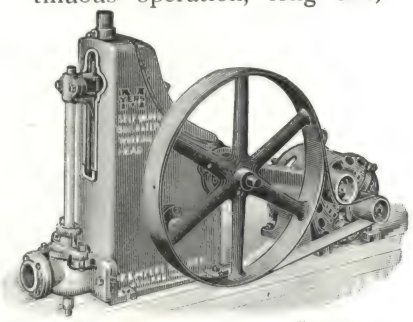


FIG. 2007. WORKING PARTS SELF-OILING WORKING HEAD

Made in sizes 6, 9, 12 and 18 in. stroke. Working heads do not include pumping cylinders.

All moving parts are enclosed. Gears machine cut. Back geared 7 to 1. Positive self-oiling system.

Regularly fitted with tight and loose pulleys for engine drive; single pulley and belt tightener for motor drive. Anti-freezing set length furnished when desired. Air chambers are extra.

Myers All-brass and Brass Lined Working Barrels

With brass ball valves, spool or poppet valves.

Designed for use with power pumps and working heads for pumping water from deep wells.

No. 1402. BRASS LINED BARREL

No. 1404. ALL-BRASS BARREL

Made in different styles and in all standard sizes, meeting depth, capacity and operation requirements.

MYERS SELF-OILING WORKING HEADS FOR DEEP WELLS

Pump No.	Length stroke, in.	Max. speed up strokes, min.	Diam. cyl., in.	Drop pipe, in.	Min. diam. well, in.	Disch. pipe tap, in.	Rod coup., in.	Total vert. head, ft.	G.p.m.	40 lbs. tank pres., h. p.	Total head open tank, ft.
650-650A	6	48	1 13/16	2	3	1¼	½ x ⅜	150	2½	½	242
650AM											
651-651A	6	48	2¼	2½	3½	1¼	½ x ⅜	75	4½	½	167
651AM											
655AM	6	48	3	1¼	3½	1¼	½ x ⅜	50	6½	¾	142
							Rod			50 lbs.	
658-658A	9	40	1 13/16	2	3	2	⅝ x ½	200	3½	1	315
	9	35	1 13/16	2	3	2	⅝ x ½	300	3	1	415
	9	30	1 13/16	2	3	2	⅝ x ½	500	2½	1½	615
658AM	9	40	2¼	2½	3½	2	⅝ x ½	200	5½	1½	315
	9	35	2¼	2½	3½	2	⅝ x ½	300	4½	1½	415
	9	30	2¼	2½	3½	2	⅝ x ½	400	4	2	515
659-659A	9	40	2¾	3	4	2	⅝ x ½	100	7½	1½	215
	9	35	2¾	3	4	2	⅝ x ½	200	7	2	315
	9	30	2¾	3	4	2	⅝ x ½	300	6	2	415
659AM	9	40	3½	1½	4	2	⅝ x ½	100	12	2½	215
	9	35	3½	1½	4	2	⅝ x ½	150	10	2½	265
	9	30	3½	1½	4	2	⅝ x ½	200	8½	2½	315
660-660A	12	35	2¼	2½	3½	3	⅞	300	6	2	415
	12	30	2¼	2½	3½	3	⅞	400	5½	2½	515
	12	25	2¼	2½	3½	3	⅞	600	4½	2½	715
660AM	12	35	2¾	3	4	3	⅞	200	10	2½	315
	12	30	2¾	3	4	3	⅞	300	8½	3	415
	12	25	2¾	3	4	3	⅞	400	7	3	515
661-661A	12	35	3¼	3½	5	3	⅞	100	13½	2½	215
	12	30	3¼	3½	5	3	⅞	200	11	3	315
	12	25	3¼	3½	5	3	⅞	300	10	3½	415
661AM	12	35	3¾	4	6	3	⅞	100	18	3	215
	12	30	3¾	4	6	3	⅞	150	15½	3–3½	265
	12	25	3¾	4	6	3	⅞	200	13	3–3½	315

Continued on next page

Myers Electric Driven Pneumatic and Open Tank Water Supply Systems

Myers self-oiling double acting electric house pumps are designed for pumping water from shallow wells, cisterns, springs, lakes or other sources not more than 22 ft. in depth and forcing it into pneumatic tanks or into open gravity tanks. Operate on any electric light or power current.

An automatic pressure controller is furnished with pneumatic tank outfits by which the tank pressure is automatically controlled; air chambers eliminate water hammer; relief valve protects pump and motor from excessive pressure; power end has long self-oiling, easily renewable bearings.

Simple power transmission; few working parts fully enclosed; runs in oil; water end has liberal and direct waterways; large valves. These features result in high efficiency, long life and large pumping capacity at low current cost.

Easily installed, quiet in operation, safe, dependable and require little or no attention.

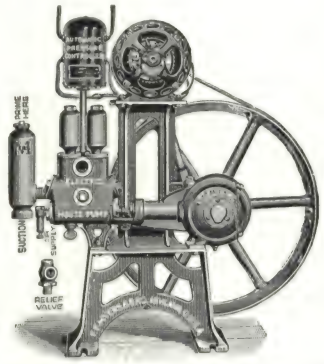


FIG. 1822. MYERS ELECTRIC SELF-OILING HOUSE PUMP

Capacity, 180 gals. per hour. Suction and discharge, ¾ in. Width, 12 in.; length, 27 in.; height, 29 in. Brass lined cylinder, 1¼ in. diameter. Stroke, 2 in.

No. 600A pump for pressure tank system consists of pump with vacuum chamber, relief valve, air valve, pressure controller, endless belt, belt tightener and ⅓ h.p. 110-volt 60-cycle single phase A.C. Century motor or 110-volt or 32-volt D. C. Robbins & Myers motor.

No. 605 pump for open tank system is same as above but without air valve and pressure controller.

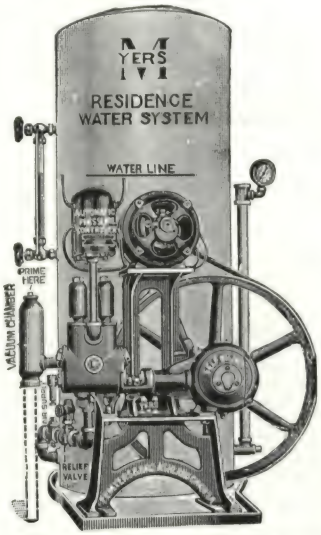


FIG. 1823. MYERS ELECTRIC DRIVEN PNEUMATIC WATER SUPPLY OUTFIT

Capacity, 180 gals. per hour. Suction and discharge, ¾ in. Overall dimensions, 27 in. x 29 in. Height, 51 in.

No. 600AT outfit consists of Myers electric house pump with vacuum chamber, relief valve, air valve, pressure controller, endless belt, belt tightener, ⅓ h.p. 110-volt 60-cycle single phase A.C. Century motor or 110-volt or 32-volt D.C. Robbins & Myers motor, 40-gal. galvanized iron tank, base, water gauge, pressure gauge and connecting fittings.

Myers "Direct from Well" Water Supply System

The Myers direct water system will supply an abundance of fresh water direct from the well. No storage tank is used. The opening of a faucet after discharging 1 gal. of water immediately starts the pump and delivers fresh water to all parts of the building. Current is consumed only when water is drawn. The ordinary leakage of a defective faucet will not start the pump, as there is a gallon of water in reserve to take care of any minor defects in the plumbing.

Shallow Well Direct Water Supply Outfit—Fig. 1980 direct water system is suitable for shallow wells not more than 22 ft. in depth. It will furnish 450 gals. of water per hour and has sufficient capacity to supply water for lawn sprinkling. The unit is complete—it is only necessary to connect the discharge to the house line.

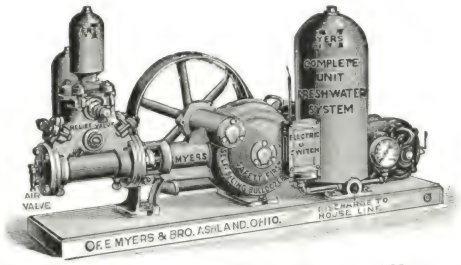


FIG. 1980. MYERS SHALLOW WELL DIRECT WATER SUPPLY OUTFIT

Capacity, 450 gals. per hour. Width, 16 in.; length, 48 in.; height, 25 in. Suction tapped 1¼ in.

No. 622AM outfit consists of Myers No. 612AM self-oiling Bulldozer 2½x3-in. power pump, wood base, ½ h.p. 110-220-volt 60-cycle single phase A.C. or D.C. motor or 32-volt D.C. motor, belt, belt tightener, pressure gauge, electric switch and air chamber for discharge.

Deep Well Direct Water Supply Outfit—Fig. 1998 direct water supply system is suitable for deep well service where depth is greater than 22 ft. Operates in same manner as Fig. 1980 outfit except that it is fitted with a Myers deep well self-oiling power working head. Will furnish 350 gals. of water per hour with 2½-in. cylinder and 450 gals. per hour with 3-in. cylinder, and has sufficient capacity to supply water for lawn sprinkling at 30 lbs. pressure.

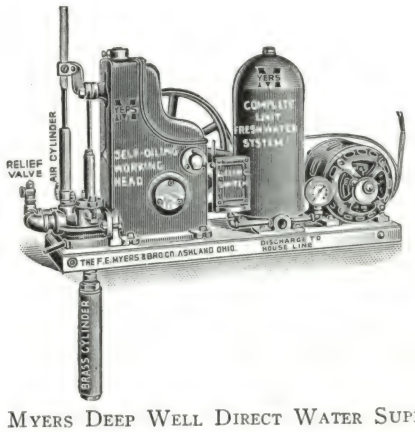


FIG. 1998. MYERS DEEP WELL DIRECT WATER SUPPLY OUTFIT

Width, 16 in.; length, 46 in.; height, 24 in. Suction tapped 2½ in. and bushed to 1¼ in.

No. 655AM outfit consists of Myers self-oiling power working head, ½ h.p., 110-220-volt, 60-cycle, single phase A.C. or D.C. motor or 32-volt D.C. motor, belt, belt tightener, pressure gauge, electric switch, air chamber and wood base.

No. 656AM outfit is same as above with anti-freezing set length.

Note: ½ h.p. motor will operate 2½-in. cylinder in 100-ft. well against 30 lbs. tank pressure or a 3-in. cylinder in 50-ft. well against 30 lbs. tank pressure.

Brass body cylinders, 2½x14 in. or 3x14 in., two leather plungers furnished extra.

THE VAILE-KIMES CO.

Manufacturers of Pumps and Residence Water Systems

DAYTON, OHIO

Products

"V&K" Water Supply Systems.

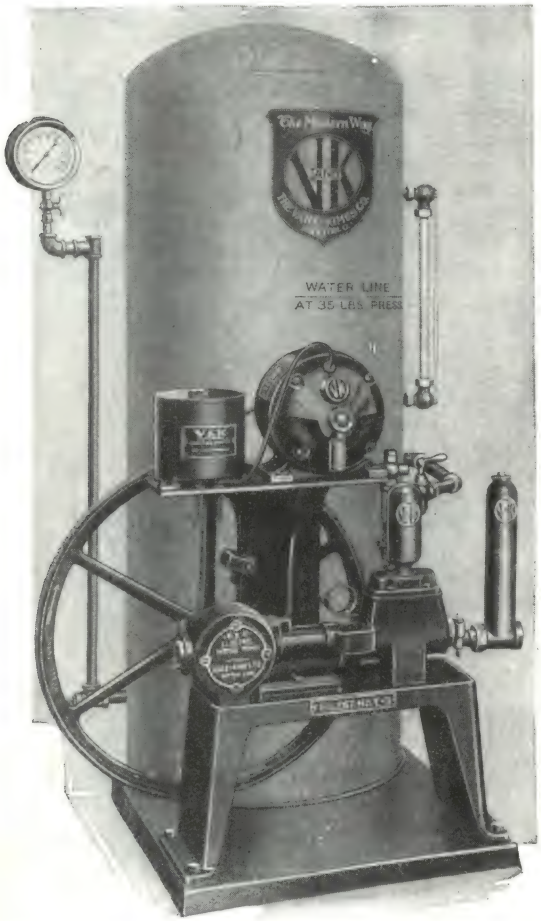
Where Used

"V&K" water supply systems are built for every domestic requirement. They are built to supply running water under pressure for city, suburban and farm homes. For schools, churches and institutions.

In many communities, well or city water is too hard to form good lather and rain water is used as a substitute for washing and bathing purposes. In such places, cisterns are used and "V&K" pumping systems are used to supply rain water under pressure.

"V&K" Pumping Systems

"V&K" pumping systems are noiseless and economical in operation. They are entirely automatic, that is, they are self-starting, self-stopping, self-lubricating and self-priming. The "V&K" Company is the oldest and largest exclusive manufacturer of water supply systems in the country.



Style 267. Complete Shallow Well System
Pump and tank on cast iron base. Pressure, 35 to 50 lbs. Suction lift, 22 ft.

Selection of a Pumping System

If electricity is available, select an electric driven pumping system. If electricity is not available, select a gasoline engine driven pumping system.

If the vertical distance between the level of the water in the well and the pump is likely to be more than 22 ft., select a deep well pumping system, Style "G" or "H," illustrated herein. Style "H" is recommended where the capacity of the tank is 525 gals. or more. For all other purposes, select a shallow well pumping system, such as Style "267" or Style "C," illustrated herein.

Proper Capacity of Pumping Systems

The following tables may serve as a guide in the selection of a pumping system:

RESIDENCE PUMPING SYSTEMS (CITY OR SUBURBAN)*

Number of bathrooms	Number of persons in family	Proper capacity of pump, gals. per hour	Proper capacity of tank, gals.	Symbol of "V&K" system to meet requirements
1	4	210	120	F-6-Y Style 267
2	8	210	220	F-8-Y Style 267
3	12	360	220	G-8-Y Style 267

HOTELS, APARTMENTS OR PUBLIC BUILDINGS*

Number of bathrooms	Number of occupants	Proper capacity of pump, gals. per hour	Proper capacity of tank, gals.	Symbol of "V&K" system to meet requirements
6	30	360	220	G-10 Style 267
10	50	360	525	190-D Style "C"
15	75	720	720	273-B Style "C"
.....	100	720	1000	273-C Style "C"

SCHOOLS

Well	No. of Pupils	Proper capacity of pump, gals. per hour	Proper capacity of tank, gals.	Symbol of Our System
Shallow	100	720	1500	273-D Style "C"
Deep	100	775	1500	Style "H"

RAIN WATER PUMPING SYSTEMS

Number of bath-rooms	Number of shower baths	Occupants in building	Proper capacity of pump, gals. per hour	Proper capacity of tank, gals.	Symbol of "V&K" system to meet requirements
1	.....	2	120	42	E-2-Y Style 267
1	.....	5	180	53	E-3-Y Style 267
1	1	2	210	80	F-4-Y Style 267
1	1	5	210	120	F-6-Y Style 267
2	.....	7	210	80	F-4-Y Style 267
2	.....	12	210	120	F-6-Y Style 267
2	1	7	210	220	F-8-Y Style 267
2	2	12	360	220	G-8 Style 267
4	4	15	360	315	G-10 Style 267

COUNTRY HOMES*

Head of stock	Proper capacity of pump, gals. per hour	Proper capacity of tank, gals.	Symbol of "V&K" system
5	210	120	F- 6 Style 267
15	210	220	F- 8 Style 267
35	360	220	G- 8 Style 267
50	360	315	G-10 Style 267
75	360	525	190-D Style C
200	720	1500	273-D Style C

*The above tables are all for shallow well pumping systems.

Full information regarding capacities and sizes of deep well pumping systems and engine driven pumps will be given on application.

Continued on next page

Architects' Specifications Covering Electric Water Supply Systems—(Shallow Well)

General—The pumping system shall be "V & K" as manufactured by The Vaile-Kimes Co., Dayton, Ohio, or equal, and shall consist essentially of a motor driven, reciprocating pump, automatic switch and tank, all of which shall be mounted on one base.

The pumping system shall be automatic in operation, self-oiling, self-priming and self-lubricating.

Capacity—The pump shall have a capacity of .... gals. per hour. The tank shall be .... in. in diameter and .... in. high.

Type of Pump—The pump shall be of the reciprocating, double acting type.

Speed of Pump—The pump shall operate at not over 150 r.p.m. and not less than 115 r.p.m.

Pump Valves—The valves shall be of non-blooming rubber and so situated that they will rise vertically upward and will be easily accessible by removing the discharge chamber.

Priming Tubes—In order to prevent the pump from becoming airbound, it shall be provided with vertical priming tubes in the discharge plate, so designed that dirt or rust can not collect in them.

Oiling System—The oiling system shall be such that it will require practically no attention on the part of the owner. It shall be such that it will insure a proper supply of oil to all parts that require it, at all times. It shall be so designed that the oil will be automatically carried to the points where it is needed rather than splashed. It shall be such that oil can not leak out on the floor or belt.

Oil Protection—The oil reservoir shall be so designed that any water that might collect on the piston rod will not be carried into it, thus eliminating the necessity of separating the oil from the water, after the water has worked its way into the oil chamber.

Piston Rod—The piston rod shall be of bronze and shall be free from sleeves of any character.

Idler—The idler shall be so designed that it will maintain a tight belt at all times and also cause the belt to be in contact with at least 50% of the motor pulley.

Tank—The tank shall be galvanized inside and outside and shall be provided with all the necessary openings, with gauge glass, gauge glass fittings and pressure gauge. The tank shall have a coat of aluminum bronze over the outside.

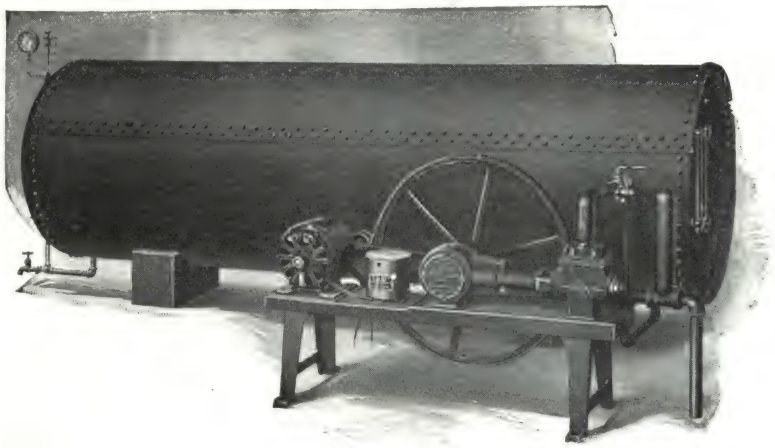
Pressure Switch—The switch shall be positive in its action and it is to be free from toggle joints or vibrating contracts.

Relief Valve—The pumping system shall be equipped with a relief valve guaranteed not to leak and so designed that it will open should the pressure in the tank reach 70 lbs. per sq. in.

Motor—The motor shall be a Westinghouse Clutch Type or equal. It shall be of such capacity that it will bring the pump up to full speed in three seconds, with the terminal voltage 20% below the rated voltage of the motor against a pressure of 50 lbs. per sq. in.

Drive—The pump shall be driven by a belt and shall be free from gears of any character.

Workmanship and Guarantee—The workmanship shall be first class in every respect. Should any part or parts prove defective within one year, from date of installation, the manufacturer shall replace the said part or parts, without charge to the purchaser.



Style "C" Shallow Well Pumping System

Specification Blanks

Complete sample specifications covering deep well or gas engine driven pumps, will be sent on application.

A Brief Specification Form

Furnish and install the "V & K" water supply system No..... (or equal) as manufactured by The Vaile-Kimes Co., Dayton, Ohio.

Bulletin

For full information regarding the proper size of pump, see Bulletin 713.

Style "H" Deep Well Pumping System

Style "G" Deep Well Pumping System

AMERICAN STEAM PUMP COMPANY

BATTLE CREEK, MICH.

NEW YORK OFFICE, 17 Battery Place — CHICAGO OFFICE, 1220 Monadnock Block

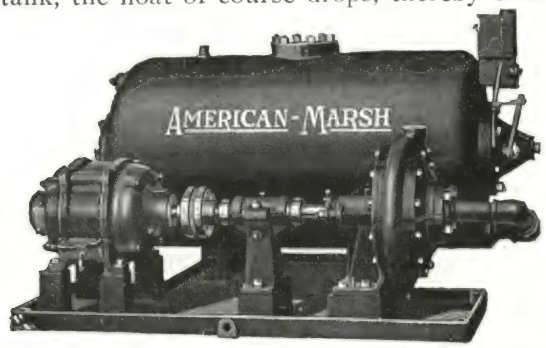
Products

AMERICAN-MARSH VACUUM PUMPS; AMERICAN-MARSH CONDENSATION PUMPS; AMERICAN-MARSH BOILER FEED PUMPS; AMERICAN-MARSH CENTRIFUGAL PUMPS.

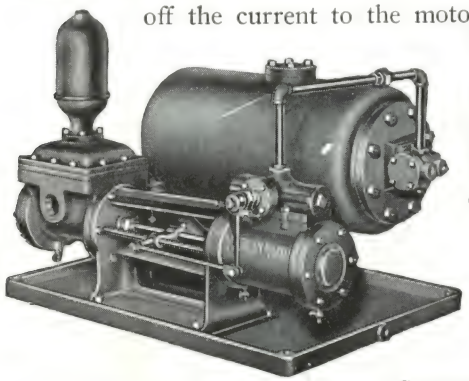
Also manufacturers of Compound Pumps, Elevator Pumps, Belt or Steam Driven Air Compressors; Automatic Boiler Feed Pumps and Receivers, Hydraulic Pressure Pumps, Tank Pumps, Magma Pumps, Oil Pumps, Brine Pumps, Sinking Pumps, Jet Condensers, Bilge Pumps, Power Pumps, Spray Pumps; Marsh Deep Well Engines.

American-Marsh Condensation Pumps

Where, on account of low steam pressure, it is not practical to operate a steam pump, the motor driven centrifugal pump and receiver may be used to advantage. With this device, the water of condensation flows by gravity into the receiver tank. As it accumulates, a copper ball float raises the control apparatus which closes the circuit and automatically starts the motor. When the water is pumped out of the tank, the float of course drops, thereby shutting off the current to the motor and stopping the pump.



AMERICAN-MARSH MOTOR DRIVEN CONDENSATION PUMP



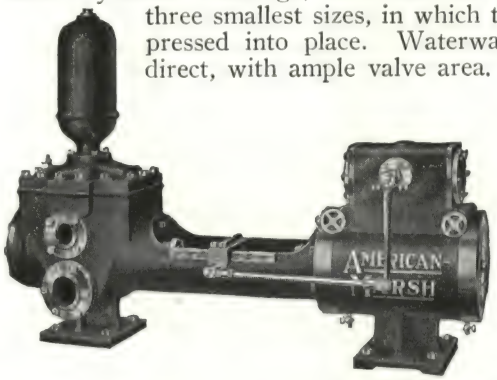
Pump and tank mounted on heavy cast iron drip pan. Tank is made of close grained cast iron firmly mounted on cast iron legs. Pump and motor connected by flexible coupling. Bearing is babbitted and equipped with thrust collar.

AMERICAN-MARSH STEAM DRIVEN CONDENSATION PUMP

Size of pump	Radiation surface, sq. ft.	G.p.m.	Max. delivery pressure lbs.	Max. delivery pressure ft.	Speed Min.	Speed Max.	Motor h. p.
¾ AMR	2000 to 3500	10	8	18	1400	2330	½
¾ BMR	5000 to 7000	10	10	23	1600	2500	½
1 AMR	7000 to 12000	25	5	11.5	1200	1800	¾
1 AMR	7000 to 12000	25	10	23	1600	2500	¾
1 BMR	7000 to 12000	25	15	35	1450	2350	1
1 BMR	7000 to 12000	25	20	46	1660	2650	1½
1½ AMR	12000 to 30000	60	5	11.5	840	1400	1
1½ AMR	12000 to 30000	60	10	23	1200	2000	1½
1½ AMR	12000 to 30000	60	15	35	1450	2320	1½
1½ AMR	12000 to 30000	60	20	46	1660	2650	2
1½ BMR	25000 to 50000	70	25	58	1270	1905	3
1½ BMR	25000 to 50000	70	30	70	1360	2040	5
1½ BMR	25000 to 50000	70	35	81	1450	2175	5

American-Marsh Boiler Feed Pump

Heavily constructed and bronze fitted; equipped with solid bronze piston rods, bronze valve seats, bolts and springs and heavy cast bronze removable water cylinder bushings, with the exception of the three smallest sizes, in which the bushing is pressed into place. Waterways large and direct, with ample valve area.

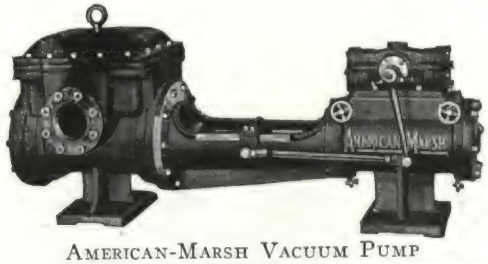


AMERICAN-MARSH BOILER FEED PUMP

Cylinder, in. Steam	Cylinder, in. Water	Stroke, in.	Pipe, in. Steam	Pipe, in. Exhaust	Pipe, in. Suction	Pipe, in. Delivery	Capacity, gals. per stroke	Boiler h. p. pump will feed at moderate speed	Floor space, in.
2½	1⅜	2	¼	⅜	¾	½	.013	20	7x14
3	1¾	2½	⅜	½	1	¾	.026	35	8x17
4	2⅜	3	⅜	¾	1¼	¾	.058	60	10x21
4	2½	6	⅜	¾	2	1¼	.128	100	11x39
5	3	6	½	¾	2	1¼	.184	150	11x39
5½	3½	6	¾	1	2	1½	.250	200	13x42
6	3⅝	8	¾	1	2½	2	.360	250	14x45
6	4	8	¾	1	2½	2	.435	300	14x45
7	4	8	1	1¼	2½	2	.435	350	14x45
7	4½	10	1	1¼	3½	2½	.688	400	17x62
7½	4½	10	1	1¼	3½	2½	.688	450	17x62
8	5	10	1	1½	3½	2½	.850	500	17x62
8	5	12	1	1½	4	3	1.02	600	17x65
10	6	12	1¼	1½	4	3	1.469	1000	19x68
12	7¼	12	1½	2	5	4	2.144	1500	19x68
12	8	12	1½	2	5	4	2.611	1650	19x68
14	8½	12	2	2½	6	5	2.948	2000	22x75

American-Marsh Vacuum Pumps

Designed for use on vacuum heating systems. Bronze removable water cylinder bushings, bronze piston rods, bronze valve seats, bolts and springs.



AMERICAN-MARSH VACUUM PUMP

Size of pumps for steam pressure over 50 lbs.	Radiation handled at moderate speed, sq. ft.	Size of pumps for steam pressure over 50 lbs.	Radiation handled at moderate speed, sq. ft.
4 x3 x 6	1200	5x 7¼x10	12000
4 x3⅝x 6	1800	6x 8 x12	18000
4 x4 x 6	2200	8x10 x12	30000
4 x4½x 6	2750	8x12 x12	40000
4 x5 x 6	3400	10x14 x12	54000
4 x5 x 8	4500	10x14 x16	57000
4½x6 x 8	7000	10x14 x20	70000
5 x6 x10	8000	12x16 x20	87000
5 x6½x10	9000		

ECONOMY PUMPING MACHINERY CO.

TELEPHONE
MONROE 5941

122-124 North Curtis Street
CHICAGO, ILL.

Products

PUMPS and RECEIVERS; SEWAGE and BILGE PUMPS; SEWAGE EJECTORS; VACUUM and BOILER FEED PUMPS; CENTRIFUGAL PUMPS.

Automatic Condensation Pump and Receiver

Built specially to handle hot water. Direct connected by flexible coupling to motor. Automatic control consists of a float switch enclosed in steel cabinet, and where necessary self-starters are also included. Control is actuated by extra heavy seamless copper float in receiver; it stops motor when water has been discharged into boiler.

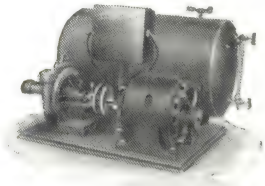


FIG. 2176

DATA, FIG. 2176

Unit No.	Cap. sq. ft. rad.	Boiler press., lbs.	H.p.
6	2000	10	¼
6½	3500	10	⅓
7	5000	10	½
7½	7500	10	¾
8	10000	15	1
8½	15000	15	1½
9	25000	15	2
9½	35000	15	3
10	50000	15	5

Automatic Underground Pump and Receiver

Designed for use where radiation is placed on basement floor or where returns from heating apparatus are located below floor. Receiver, which is made of cast iron (or steel where preferred), can be placed below floor level at depth desired to clear returns, and motor is located above floor free from dirt or dampness, which usually causes trouble when using a horizontal outfit placed in pit in order to have receiver low enough to receive condensation.

FIG. 2175

DATA, FIG. 2175

Unit No.	Cap., sq. ft. rad.	Boiler press., lbs.	Motor, h.p.	Diam., in.	Depth, in.
9	2000	8	¼	20	30
12	3500	10	⅓	24	30
15	5000	10	½	24	36
17	7500	15	¾	30	36
20	10000	15	1	30	36
21	15000	15	1½	36	36
23	25000	15	2	36	42

Economy Automatic Centrifugal Vacuum and Boiler Feed Pumps

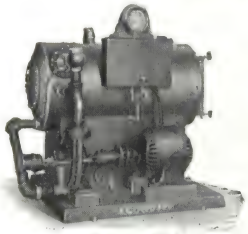


FIG. 2234

DATA, FIG. 2234

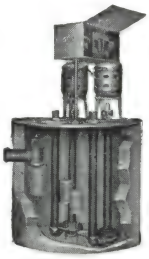
Unit No.	Cap., sq. ft., rad.	Motor, h.p.	Cu. ft. air min.	Size boiler feed, in.	Size return inlet, in.
C. V. 1	2500	½	1¾	¾	1½
C. V. 2	5000	¾	4	1	2
C. V. 3	8000	1	6	1	2½
C. V. 4	15000	1½	10	1¼	3
C. V. 5	20000	2	15	1¼	3
C. V. 6	27500	3	19	1½	3½
C. V. 7	40000	5	24	1½	4
C. V. 8	65000	7½	40	2	5

Economy Automatic Sewage and Bilge Pumps

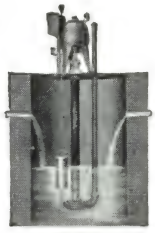
These bilge and sewage pumps are built for all classes of low level pumping, for draining cellars, wheel pits, cesspools, catchbasins, sewage sumps, etc. They are thoroughly machined and fitted with special self-lubricating bearings where pump dips into fluid, in addition to the oil or grease regularly provided. Of sturdy construction and thoroughly dependable.

Type B, duplex; type C, single pump. Speed up to 95 g.p.m., 1750 r.p.m.; units above 100 g.p.m., 900 to 1200 r.p.m.

In ordering always specify dimensions of basin.



TYPE B



TYPE C

CAPACITIES, SPEEDS AND POWER BILGE PUMPS AND SEWAGE EJECTORS

Hd. ft.	Capacity g. p. m.	7–12	15–25	35–40	40–50	60–75		85–100		
10	Size, in.	¾	1	1½ L.S.	1½ L.S.	2 L.S.	2 L.S.	2½ L.S.	2½ S.	2½ S.
	Speed, r.p.m.	1750	1750	1750	1750	1750	1150	1750	1150	850
	H. P.	1/6	1/4	½	¾	1	¾	1½	1½	1
15	Size, in.	1	1¼	1½ L.S.	1½ S.	2 L.S.	2 S.	2½ L.S.	2½ S.	2½ H.S.
	Speed, r.p.m.	1750	1750	1750	1750	1750	1150	1750	1150	850
	H. P.	1/4	1/3	½	¾	1	1	1½	1½	1½
20	Size, in.	1	1¼	1½ S.	1½ S.	2 L.S.	2 S.	2½ S.	2½ S.	2½ H.S.
	Speed, r.p.m.	1750	1750	1750	1750	1750	1150	1750	1150	850
	H. P.	1/3	1/2	¾	1	1½	1½	2	1½	1½
30	Size, in.	1	1¼	1½ S.	1½ S.	2 L.S.	2 S.	2½ S.	2½ H.S.	2½ HHS
	Speed, r.p.m.	1750	1750	1750	1750	1750	1150	1750	1150	850
	H. P.	1/2	3/4	1	1½	1½	2	3	2	2
40	Size, in.	1	1¼	1½ S.	1½ S.	2 L.S.	2 S.	2½ H.S.	2½ H.S.	2½ HHS
	Speed, r.p.m.	1750	1750	1750	1750	1750	1150	1750	1150	850
	H. P.	3/4	1	1½	1½	2	3	3	3	3

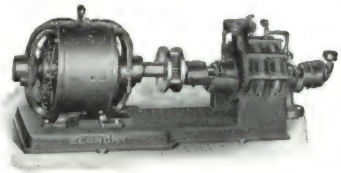
Head, ft.	Capacity, g. p. m.	115–125			150–175			200–250		
10	Size, in.	3 S.	3 S.	3 S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.
	Speed, r.p.m.	1750	1150	850	1750	1150	850	1750	1150	850
	H. P.	2	1½	1	2	1½	1½	2	2	2
15	Size, in.	3 S.	3 S.	3 S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.
	Speed, r.p.m.	1750	1150	850	1750	1150	850	1750	1150	850
	H. P.	2	1½	1½	2	1½	2	3	3	2
20	Size, in.	3 S.	3 S.	3 S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S.	4 L.S
	Speed, r.p.m.	1750	1150	850	1750	1150	850	1750	1150	850
	H. P.	3	2	2	3	2	3	3	3	3
30	Size, in.	3 S.	3 S.	3 H.S.	4 L.S.	4 L.S.	4 S.	4 L.S.	4 L.S.	4S.
	Speed, r.p.m.	1750	1150	850	1750	1150	850	1750	1150	850
	H. P.	3	2	3	3	3	3	5	5	5
40	Size, in.	3 S.	3 H.S.	3 H.S.	4 L.S.	4 S.	4 S.	4 L.S.	4 S.	4 S.
	Speed, r.p.m.	1750	1150	850	1750	1150	850	1750	1150	850
	H. P.	3	3	3	5	3	3	5	5	5

Head capacities of ejectors of capacities to 3000 gals. per minute shown in catalogue. Units smaller than 2 in. will not handle sewage.

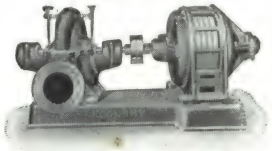
House Water-Supply and Circulating Pumps

Economy centrifugal pumps are made in a large variety of designs and sizes. They are widely used for house water supply, sprinkler filling, brine circulating, air washer, swimming pool duty, etc. For water supply of office and hotel buildings up to 250 ft. in height, single stage double suction horizontal split case pumps are recommended. For higher heads multistage pumps are used. A complete head capacity table will be furnished on request.

SINGLE SUCTION CENTRIFUGAL PUMP



MULTISTAGE CENTRIFUGAL PUMP



SINGLESTAGE DOUBLE SUCTION CENTRIFUGAL PUMP

ESTABLISHED 1880

THE DEMING COMPANY

Hand and Power Pumps; Complete Water Systems

SALEM, OHIO

GENERAL AGENCIES FOR DEMING POWER PUMPS

BALTIMORE, Standard Supply Corporation
BOSTON, Chas. J. Jager Co., 13-15 Custom House Street
BUFFALO, Root, Neal & Co., 178-180 Main Street
CHARLESTON, W. VA., Charleston Electrical Supply Co.
CHARLOTTE, The Deming Co., Realty Building
CHICAGO, Henion & Hubbell
COLUMBUS, Scioto Valley Supply Co.
DENVER, Hendrie & Bolthoff Mfg. & Supply Co.
DETROIT, Kerr Machinery Corporation, Kerr Building
EL PASO, Krakauer, Zork Co.
INDIANAPOLIS, Crane Co.
KANSAS CITY, English Tool & Supply Co.
LOS ANGELES, R. W. Sparling
LOUISVILLE, Laib Co.
MIAMI, Miami Supply Co., 253 W. Flagler Street
MUSKOGEE, Atlas Supply Co.
NEW ORLEANS, Engineering Sales Co.
NEW YORK, N. Y., Ralph B. Carter Co., 152 Chambers Street
PHILADELPHIA, W. P. Dallett Co., 922-924 Sansom Street
PITTSBURGH, Harris Pump & Supply Co.
PORTLAND, Crane Co.
RICHMOND, Sydnor Pump & Well Co.
SACRAMENTO, Crane Co.
SALT LAKE CITY, Salt Lake Hardware Co.
SAN FRANCISCO, Crane Co.
TOLEDO, National Supply Co.
CANADA: MONTREAL, TORONTO, WINNIPEG, Darling Bros., Ltd.

Products

Pumping Machinery, for operation by any power, including Single and Double Acting Triplex Pumps for various services, Deep Well Power Working Heads, Artesian Well Cylinders.

Deming Hydro-pneumatic Systems, operated by Hand or Windmill, Gasoline Engine, or Electric Motor.

Also manufacturers of Rotary and Centrifugal Pumps, Hydraulic Rams, Spray Pumps and Accessories.

Information Required for Estimate Basis

To determine size and capacity of pump or water system required, the following information should be furnished:

(1) The source of water supply. If a deep drilled well, give diameter and depth; also distance from surface of ground to water level maintained under continuous pumping.

(2) The approximate number of people using the water, or the amount in gallons used per day.

(3) The vertical distance from the pump (or pressure, if hydro-pneumatic system) to the highest point of plumbing fixtures.

(4) The number and kind of water fixtures in the house, and the number of garden and barn fixtures, such as hydrants; and if there is live stock to water, the number of head.

(5) Method of pumping; whether by hand, windmill, electric motor or gasoline engine.

If electricity is used, give voltage and state whether alternating or direct current. If alternating, give phase and cycles.

Co-operative Engineering Service

Architects and engineers are invited to refer their pumping and water system problems to the Deming engineering department.

On receipt of layout of conditions and statement of requirements, an estimate for the pumping equipment will be submitted.

Blue prints and photographs showing typical installations will be sent on request.

Catalogues and Bulletins

No. 26, Complete General Catalogue of 256 pages. Individual bulletins descriptive of Deming triplex power pumps, deep well working heads, etc. Catalogue of Spray Pumps and Accessories. Hydro-pneumatic Water Supply System Catalogue.

Deming "Atlas" Double Acting Pump, Fig. 691

For wells 25 ft. deep or less.

The "Atlas" is made in three sizes, with capacities of 600, 1200 and 2400 gals. per hour and is especially designed for use in connection with hydro-pneumatic

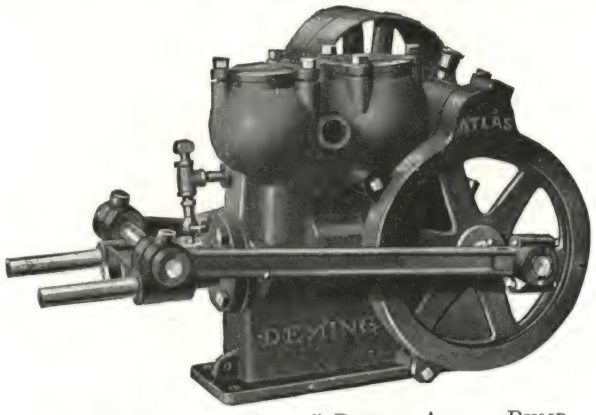


Fig. 691. Deming "Atlas" Double Acting Pump
With tight and loose pulleys and air charging device

water systems, but may also be used for open tank supply or other service where the pressure will not exceed 75 lbs. Will lift water a vertical suction distance of 25 ft. and force it a vertical distance of 150 ft.

May be operated by gasoline engine or electric motor. The smallest size (2¼x5) will be fitted with hand attachment when specified.

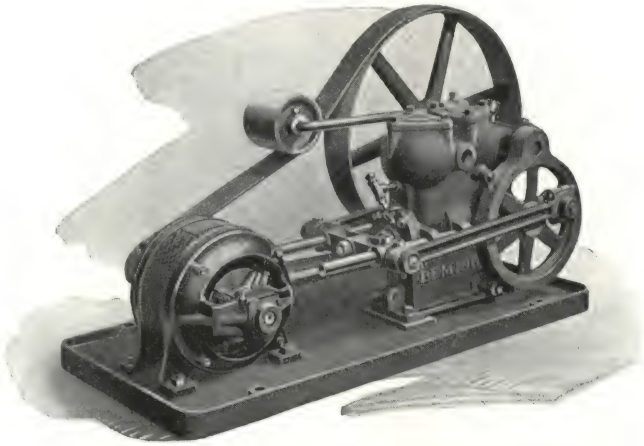


Fig. 691. With Type "C" Drive and Motor

Continued on next page

Suction and Discharge Valves are Quickly Accessible—Each of the two valve chambers contains one set of discharge and suction valves. By removing three cap screws from each of the valve chamber covers, the valves may be reached. These openings are large enough to admit inserting the hand for withdrawal of one set of discharge valves.

A set of suction valves is located directly under the discharge valves in each chamber. The suction valves may be withdrawn through the same opening as the discharge valves.

Other Points of Advantage—*Cylinder* is brass lined.

Bearings are babbitted, insuring long life and minimum friction.

Gears are fully enclosed by a cast iron gear guard.

Cylinder and *valve decks* are cast in one piece. They can not pull apart.

Crank end of connecting rod has adjustable boxes, which permits taking up all wear.

Valves are metal, faced with rubber and have *brass valve seats.*

Oil pockets and grease cups insure thorough lubrication.

Provision for Air Supply—Size 2¼x5 is regularly equipped with an air charging device consisting of small check valve and air cock for supplying air to pneumatic tank for hydro-pneumatic service.

Types of Drive—Furnished when desired with subbase for motor or engine, to permit driving by belt or direct connection. See illustration below and on preceding page.

Catalogue "Deming Water Supply Systems" shows Fig. 691 in connection with hydro-pneumatic steel tanks.

SIZES, CAPACITIES, ETC., FIG. 691

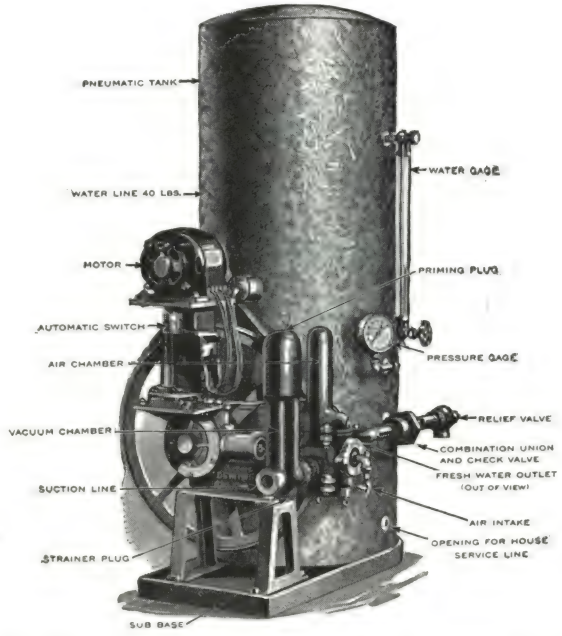
Cylinder		Capacity		Maximum working pressure, lbs.	Diam. pipes, in.		Tight and loose pulleys, in.
Diam., in.	Stroke, in.	Revs. per min.	Gals. per min. at maximum speed		Suction	Discharge	
2¼	5	60	9.6	75	1¼	1	8x2½
3	6	55	19.2	75	1½	1¼	14x3
4	8	50	42.5	75	2	1½	16x4

FIG. 691 WITH TYPE "B" DRIVE AND ELECTRIC MOTOR

Deming "Marvel" House Pumping Outfits

For wells 25 ft. deep or less.

For supplying the requirements of the bathroom, laundry and kitchen, in farm and suburban homes, summer cottages and other places where a moderate quantity of water is required. Operated by electric motor or gasoline engine.



No. 2085. "MARVEL" ELECTRIC HOUSE PUMPING OUTFIT
Two sizes: 180 and 360 gals. per hour

Every electric driven "Marvel" outfit is regularly equipped with a fresh water outlet (no extra charge) which supplies fresh water for drinking purposes, *direct from the well.*

The electric system is entirely automatic. The electric driven "Marvel" No. 2085 is self-starting; self-stopping; self-priming; self-oiling; entirely automatic.

No. 2085 is especially adapted for use with private lighting plants. This company should, however, be advised concerning the characteristics of the current.

No. 2086 gasoline engine outfit has automatic stop. When electric current is not available the "Marvel" can be furnished with ½ h. p. reliable gasoline engine, started by foot pressure—no hand cranking. A circuit breaker is provided which throws out the battery switch when the desired pressure is obtained and stops the engine.

Complete details of the "Marvel" systems will be found in Catalogue "Deming Water Supply Systems."

A full set of instructions for installing and operating is furnished with every outfit.

SIZES, CAPACITIES, ETC., SYSTEM NO. 2085

No.	Capacity of pump per hour, gals.	Diam. pipes, in.		Capacity of galv. tank, gals.	Maximum working pressure, lbs.	Over-all dimensions, in.			Shipping weight of outfit, lbs.
		Suction	Discharge			Height	Length	Width	
1	180	1	½	53	50	53	27	31	340
2	360	1¼	¾	120	50	65	30	39	500

When desired, System No. 2085, No. 1, will be furnished with 120-gal. galvanized iron tank at extra cost.

Continued on next page

Deming Geared Deep Well Power Working Head, Fig. 66

For wells 75 ft. deep or less.

This head is adapted especially for suburban homes and other places requiring a moderate water supply. All parts are readily accessible.

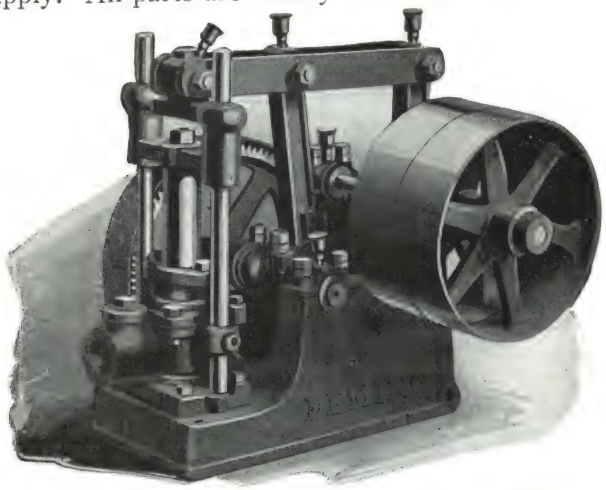


FIG. 66. DEMING DEEP WELL POWER WORKING HEAD
With tight and loose pulleys and air compressor

The sucker rod and cylinder valves can be withdrawn without disturbing any pipe connections.

The standard head includes cut gearing, tight and loose pulleys and oil cups. For hydro-pneumatic service an air compressor will be supplied at extra cost.

When desired, an extended walking beam and counterweight for equalizing the plunger load will be furnished at extra cost.

Our Fig. 311 or 324 cylinders are recommended for use with this head.

Type "B" drive consists of a cast iron bed plate, on which working head and electric motor are mounted with motor direct connected by gearing.

Type "CS" drive consists of a cast iron shelf hinged to the back of working head frame, the motor being mounted on the shelf and bolted to the working head. Quieter in operation than the Type "B" drive.

In the opposite column this head is shown in connection with a complete hydro-pneumatic water supply system.

SIZES, CAPACITIES, ETC., FIG. 66

Stroke in.	Maximum diam. of pipes, in.		Gear ratio	Tight and loose pulleys, in.	Maximum height, in.	Weight with tight and loose pulleys, lbs.	Weight with Type "B" or Type "C" drive, lbs.
	Suction	Discharge					
6	3	1½	6 to 1	12 x 3	25	215	315

Diam. cylinder, in.	Capacity			†Maximum lift, ft.
	Gals. per rev. of crank shaft	Usual revs. per min.	Gals. per min.	
1¾	.063	40	2.52	375
2¼	.103	40	4.12	225
2¾	.154	40	6.16	140
3¼	.215	40	8.60	100

†Refers to vertical distance from surface of water to point of delivery or equivalent pressure.

Motors for Deep Well Working Heads

While deep well working heads operating single acting or double acting cylinders will develop a mechanical efficiency of from 60% to 75%, it is necessary, because of the widely fluctuating loads, that motors capable of delivering not less than three times the required theoretical horsepower be furnished.

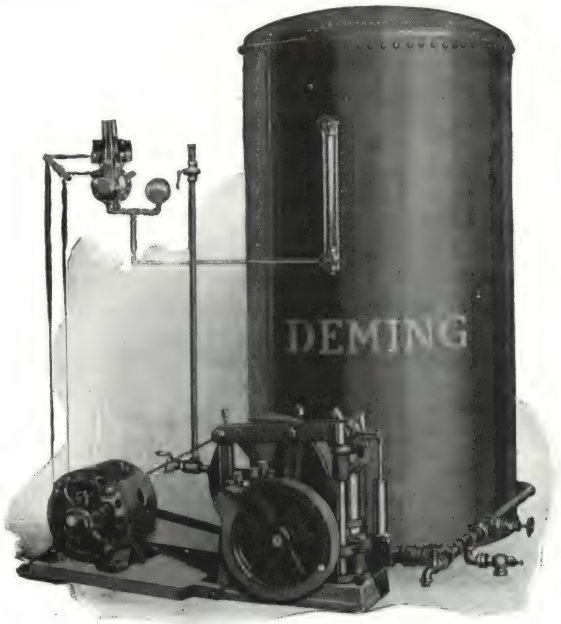
To determine the theoretical horsepower, multiply the number of gallons required per minute by the total number of feet vertical head and divide by 4000. This result multiplied by three will give the minimum size motor necessary.

Motors for operating two or three cylinder pumps for deep open wells should be large enough to deliver twice the theoretical horsepower required.

Deming Deep Well Water System No. 2016

With electric motor and Fig. 66 power working head. For wells 75 ft. deep or less.

The working head in this system is our Fig. 66 described in the preceding column. Installed in a



DEMING DEEP WELL WATER SYSTEM NO. 2016

75-ft. well, System No. 2016 will deliver about 250 gals. per hour against 60-lb. tank pressure.

Since conditions affecting deep well installations may vary greatly, different sizes of cylinder and motor are often required. It is, therefore, advisable to send us complete details before specifying a deep well outfit. However, for many installations, No. 2016 will be satisfactory without alteration in equipment specified below.

Equipment Specifications of System No. 2016—

36 in. x 6 ft. vertical tank.
Fig. 66 deep well power working head with air compressor and "CS" drive.
1½ h.p. A.C. single phase, 60-cycle, 110 to 220-volt electric motor.
Fig. 1508 automatic pressure regulator.
Fig. 311 2¼x10-in. special brass cylinder.
Fig. 1995 ¾-in. relief valve.
Fig. 904 1-in. check valve.
Fig. 900 1-in. globe valve.
Fig. 917 ½-in. hose bibbs (2).
Fig. 913 ¾-in. stop and waste cock.
Glass water gauge.

SIZES, CAPACITIES, ETC., NO. 2016

Working head, in.		Cylinder, in.		Gals. per min. at 40 revs.	Capacity of 36"x6' tank, gals.	Weight complete outfit, lbs.
Stroke	Suction fitted for pipe	Discharge fitted for pipe	Diam. and length			
6	2½	1	2¼ x 10	4.12	315	1300

Handhole in tank, furnished at extra cost.

Continued on next page

Deming Deep Well Working Head, Fig. 62

For wells 300 ft. deep or less.

Adapted especially for supplying water from deep wells for private estates, manufacturing plants, farms, etc.

FIG. 62. WORKING HEAD
With Fig. 63 air pumping attachment and tight and loose pulleys for belt drive

No. 324
BRASS ARTESIAN WELL CYLINDER

By disconnecting the differential plunger from the crosshead, and the walking beam from the connecting rod, and removing the stuffing box cap, the plunger can be readily withdrawn without disturbing the pipe connections.

Specifications—*Main Base*—Of cast iron, carries crank and pinion shaft bearings, which are lined with best babbitt metal. *Gearing*—Machine cut, main gear bolted to a flange integral with crank shaft. *Crosshead*—Babbitt lined, guide rods of polished steel.

Each pump has a differential plunger which discharges part of the water on the down stroke, equalizing load and giving a more uniform flow of water. *Stuffing Box*—Easy of access for repacking, gland being of the bolted type. *Air Chamber*—Furnished at extra price.

Types of drive showing Fig. 62 direct connected to electric motor, gas engine, etc., may be seen in separate bulletin No. 320.

Deming Triplex Power Pump, Fig. 50

For use in office buildings, hotels, hospitals, theaters, country clubs, factories, municipalities, etc., where the vertical suction distance is not more than 25 ft.

FIG. 50. DEMING TRIPLEX PLUNGER PUMP
Size 5½x8 in. with Type "C" drive

Specifications—*Frame*—Of large sizes, made in one casting, with guides and crank shaft bearings lined with antifriction metal. In sizes 4x4 and smaller, frame and cylinder cast in one piece. *Gearing*—Machine cut, double in sizes 9x10 and larger. *Pinion Shaft*—Of steel, running in antifriction metal bolted to main housing. *Connecting Rods*—In sizes 4x6 and larger, have bronze boxes with wedge and screw adjustments at crosshead end and marine type babbitted boxes at crank end. Smaller sizes have bronze bushings at crosshead ends. *Crossheads*—Run in bored guides. Sizes 4x6 and larger have bronze adjustable shoes. *Plungers*—Of best cast iron, finished true and smooth; packing of ample depth. *Cylinders and Base*—In one casting in sizes 10x10 and smaller. In larger sizes, cylinders are separate castings. *Valve Chambers*—In sizes 3½x4 and larger, separate castings bolted to cylinders.

Valves—Of large area and readily accessible; for cold water, are rubber disks, protected on top from cylindrically wound springs by brass plates; for hot water, either special hard composition or bronze valves. *Valve Seats*—Bronze, of grid type, screwed into decks. Iron seats and valves furnished, if required. *Grease Cups*—With all pumps. Gear ratios 5 to 1.

Pumps furnished with bronze plungers, and varying otherwise from standard construction, at extra price.

For other Deming triplex pumps with various types of drives, see bulletin No. 300.

SIZES, CAPACITIES, ETC., FIG. 62

Stroke, in.	Maximum diam. pipes, in.		Gear ratio	Tight and loose pulleys, in.	Maximum height, in.
	Suction	Discharge			
8, 9 and 10	4½	2½	6 to 1	16 x 3	40½
12, 14 and 16	6	3	7 to 1	20 x 5	51
20, 22 and 24	8	4	6⅔ to 1	28 x 6	73

CAPACITIES, FIG. 62, WHEN OPERATING CYLINDER FIG. 324

Diam. and stroke of cylinder, in.	Gals. per rev. of crank shaft	Maximum rev. per min.	Gals. per min.	†Maximum depth of well, ft.
2¾ x 10	.257	40	10.2	300
2¾ x 16	.411	35	14.3	300
2¾ x 24	.617	28	17.2	350
3¾ x 10	.478	40	19.1	175
3¾ x 16	.765	35	26.7	175
3¾ x 24	1.147	28	32.1	190
4¼ x 10	.614	40	24.5	130
4¾ x 16	1.227	35	42.9	100
4¾ x 24	1.841	28	51.5	120
5¾ x 16	1.798	35	62.9	70
5¾ x 24	2.696	28	75.4	80
6¾ x 24	3.716	28	104.0	60
7¾ x 24	4.900	28	137.2	45

†Refers to vertical distance from lowest surface of water in well to highest point of delivery.

SIZES, CAPACITIES, ETC., FIG. 50

Plungers, in.		Capacity		Maximum working pressure, lbs.	Diam. pipes, in.		*Tight and loose pulleys, in.
Diam.	Stroke	Usual revs. per min.	Gals. per min.		Suction	Discharge	
2	2	70	5.67	150	1½	1	8 x 2
2½	2	70	8.89	150	1½	1	10 x 2
2½	3	60	11.4	150	2	1½	12 x 3
3	3	60	16.2	150	2	1½	14 x 3
3½	3	60	22.	150	2	1½	16 x 3
3½	4	60	30.	150	2½	2	16 x 4
4	4	60	39.	150	2½	2	18 x 4
4	6	60	59.	160	2½	2	20 x 5
4½	6	60	74.	150	3	2½	20 x 5
5	6	60	91.	150	3	2½	24 x 5
5½	8	60	147.	150	4	3	28 x 6
6	8	55	161.	140	4	3	30 x 6
7	8	55	220.	150	5	4	30 x 8
8	8	55	287.	150	5	4	36 x 8
8½	8	55	324.	140	6	5	36 x 8
9	10	50	413.	160	8	6	42 x 10
10	10	45	459.	150	8	6	42 x 12
11	12	42	622.	160	10	8	48 x 14
12	12	42	740.	150	10	8	48 x 16
12	14	40	820.	150	12	10	48 x 18
13	14	40	964.	140	12	10	48 x 20

*Note—Sizes 9x10 and larger regularly furnished with tight pulley only.

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Products

HAND and POWER PUMPS for every service: Single and Double Acting Triplex Power Pumps; Cistern and Well, Lift and Force Pumps; House Force Pumps; Single Stage and Multistage Centrifugal Pumps; Deep Well Power Working Heads and Cylinders; Vacuum Pumps; Air Compressors; Sump Pumps.

AUTOWATER SYSTEMS.

Also manufacturers of Hydraulic Rams; Pump Jacks; Double Acting Piston Pumps, hand and power; Rotary Pumps; Deep Well Triplex Pumps; Diaphragm Pumps; Hydraulic Pressure Pumps.

TRADE-MARK

Specification Goulds Standard Triplex Power Pump

The following is the specification for Gould's standard triplex power pump, small and moderate capacity type, Fig. 1696, 1¼x2 in. to 8x10 in., capacity 2 to 350 gals. per minute:

Frame—Close grained iron, cast in one piece with crosshead guides and cylinders, forming exceptionally rigid construction and accurate alignment of all working parts.

Crank Shaft—High carbon open hearth steel, accurately machined to gage.

Bearings—Crank shaft and pinion shaft bearings are of babbitt metal.

Gearing—Gear and pinion charcoal iron, machine cut from the solid. A guard covers the pinion and adjacent teeth of the gear. Gear ratio 5 to 1.

Crossheads—Sizes 4x6 in. and larger, fitted with adjustable shoes, which run in bored guides. Sizes 3½x4 in. and smaller, the crossheads are cylindrical in form, and run in bored guides.

Connecting Rods—Sizes 4x6 in. and larger, strap head and wedge adjustment with bronze boxes at crank end and bronze bushings at crosshead end. Sizes 3½x4 in. and smaller have adjustable boxes babbitted at crank end, and bronze bushings at crosshead end.

Cylinders—Close grained iron cast in one piece with standards.

Plungers—Sizes 2½x4 in. and larger are fitted with hard cast iron plungers. Sizes 2x3 in. and smaller have bronze plungers accurately machined and ground true and smooth.

Glands—Sizes 2½x4 in. and larger have iron glands. Sizes 2x3 in. and smaller have bronze glands.

Base and Valve Boxes—Charcoal iron in one casting, of liberal proportions, affording large valve area.

Valves — 3x4 in. and smaller bronze valves. 3½x4 in. and larger—for cold water—rubber disks on bronze grid seats, cylindrically wound springs. For hot water the grid seat valve with special disk is recommended.

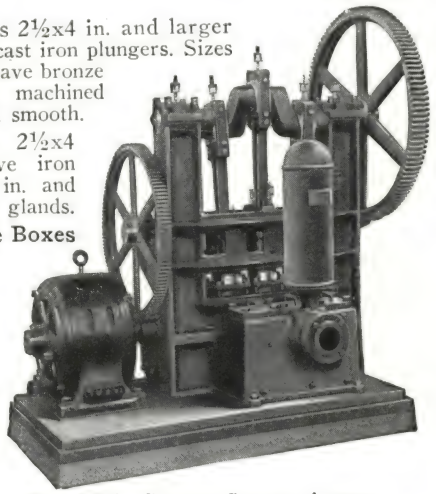

FIG. 1696. GOULDS SINGLE ACTING TRIPLEX PUMP
With gear connected motor. For heads up to 350 ft., and capacities up to 350 gals. per minute
Bulletin No. 101

Air Chamber—Supplied with pump. Vacuum chamber to order.

Special Construction—Phosphor bronze plungers, lined cylinders and glands, rawhide pinions, etc., to order.

Autowater System

Automatic, compact, pump and electric motor, pressure tank and automatic regulator—is a complete system designed by Goulds engineers to furnish fresh water for all purposes where not more than 180 gals. an hour are required, and where the lowest level of water supply is not more than 20 ft. below the base of the pump.

How It Works—At the turn of a faucet, water is forced through the pipes by air pressure in the pressure tank. As the water level falls in the tank, the pressure of the air above is reduced. When reduced to a certain point, the pressure regulator automatically starts the motor. The pump then re-fills the tank to its normal level.

Why It Is Reliable—The heart of the Autowater system is its unfailing Goulds noiseless pump.

Unlike the usual piston type pump, its parts are easily accessible for re-packing in the remote event of leakage. The oiling is automatic. There are no gears to wear and cause noise.

The ¼ h.p. electric motor is selected for the particular requirements of the Autowater system. It is available in the standard voltages for direct and alternating currents, and in the 32-volt, direct current type for use with farm-lighting generator sets.

GOULDS AUTOWATER SYSTEM
Capacity 180 gals. per hour for pressures of 43 lbs. or elevations of 100 ft.

The automatic pressure regulator, designed for the Autowater system, affords perfect control of the motor. Its positive action can be observed at any time by reading the pressure gage.

The airtight, galvanized steel pressure tank has a capacity of 30 gals.—large enough to hold a generous supply, yet not so large that the water remains in it long enough to become stale.

Cold Drinking Water—A direct-from-well attachment will be supplied for a small additional cost. It provides cold drinking water pumped direct from the well.

Catalogues, Dimension Sheets and Prices

Complete specifications on all types and capacities of Goulds power pumps are given in a set of bulletins. A bound set of these bulletins, including a special bul-

Continued on next page

letin containing all the handy data and tables needed in making pumping calculations, will be furnished to architects on request. A set of dimension sheets on all standard sizes will also be provided if desired. Blue prints and data on special types and sizes will be furnished by the engineering department on request.

FIG. 1531. "PYRAMID" PUMP WITH GEAR CONNECTED MOTOR
For 75 lbs. working pressure or 175 ft. elevation. Capacities ranging from 360 to 6840 gals. per hour
Bulletin No. 100

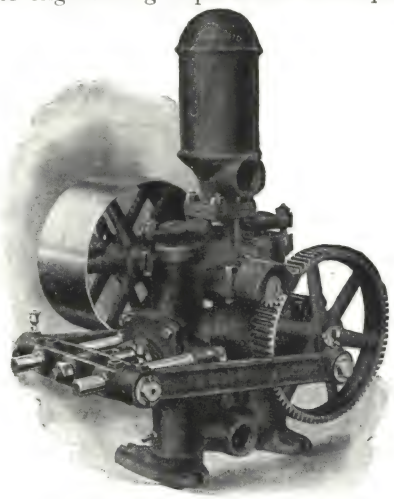

FIG. 1678. "PYRAMID" PUMP
For 87 lbs. working pressure or 200 ft. elevation. Capacities ranging from 300 to 6000 gals. per hour
Bulletin No. 100

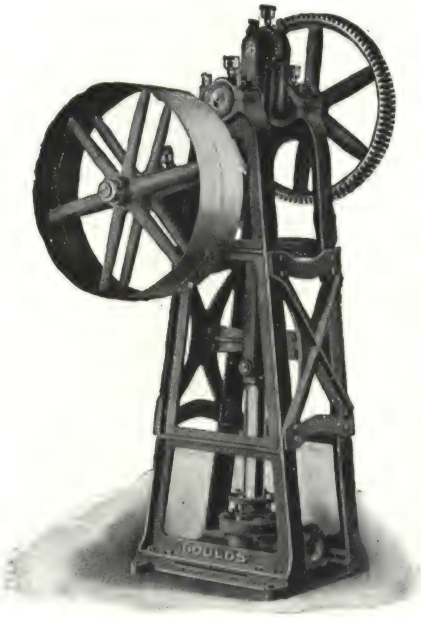

FIG. 1030. GOULDS POWER WORKING HEAD
For operating cylinders in deep wells
Bulletin No. 108

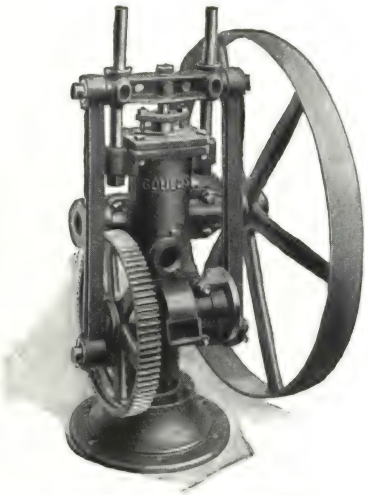

FIG. 1697. GOULDS DEEP WELL HEAD
Capacity 150 to 500 gals. per hour depending on well conditions. Lift and force 50 to 150 ft.

FIG. 3013. GOULDS CENTRIFUGAL SUMP PUMP, NO. 1½
Direct connected to a 3 h.p. 220-volt direct current motor
Bulletin No. 111

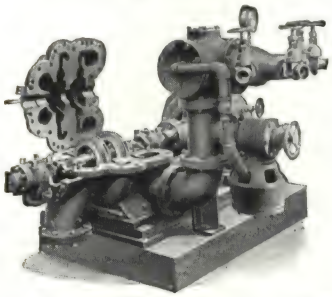

FIG. 3014. GOULDS TWO-STAGE AND THREE-STAGE CENTRIFUGAL FIRE PUMP
Open view
Bulletin No. 118

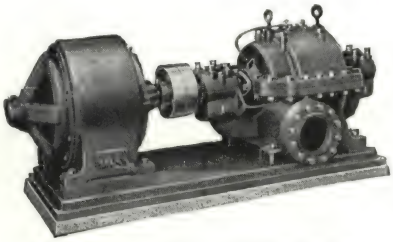

FIG. 3300. GOULDS MULTISTAGE CENTRIFUGAL PUMP
For heads up to 580 ft., and capacities up to 1500 gals. per minute
Bulletin No. 120

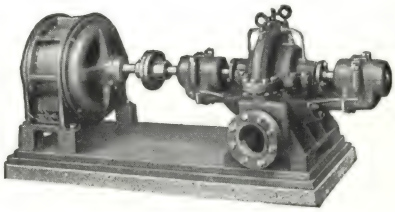

FIG. 3030. GOULDS SINGLE-STAGE DOUBLE SUCTION CENTRIFUGAL PUMP
Direct connected to electric motor. For heads up to 150 ft., and capacities up to 8000 gals. per minute
Bulletin No. 110

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Products

PUMPS: Boiler Feed, Dredge, Automatic Electric Bilge, Centrifugal, Underwriters', House or Tank, Acid Resistant, Contractors'.

SEWAGE EJECTORS; PUMPING SETS (Stationary, Steam, Gasoline or Motor Driven; Portable Gasoline Driven); ELECTRIC CELLAR DRAINERS; WATER SUPPLY SYSTEMS; STEAM ENGINES.

Dredge Pumps

Built for hardest service in handling sand and gravel, mine tailings, paper stock, industrial and chemical plant sludges, etc.

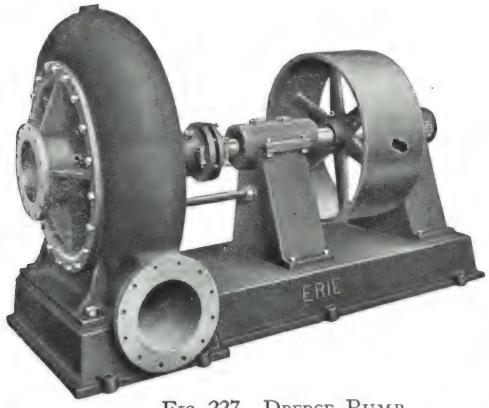

FIG. 227. DREDGE PUMP

Sewage Ejectors

Made in both single (Fig. 293) and duplex types.

FIG. 293. SEWAGE EJECTOR

Automatic Electric Bilge Pumps

Made in both single and duplex types with open or enclosed type impellers. Ball thrust bearings, one-piece cast iron support pipes and oil flooded steady bearings insure freedom from bearing troubles.

Pumping Sets

Stationary, Steam (Turbine or Engine) Gasoline or Motor Driven—Made in single stage, double suction, horizontally split shell construction (Fig. 257), for total pumping heads up to 200 ft.

Made in multistage horizontally split shell type (Fig. 235), for pressures up to 400 lbs. per sq. in.

Portable, Gasoline Driven—Constructed for direct connection to four-cycle gasoline engines, the entire unit mounted on all-steel truck for emergency pumping by municipalities, public utilities, contractors, etc. Our sand-gravel dredging pumps are also mounted in similar manner for road building purposes.

Centrifugal Pumps

Constructed in single stage, double suction, horizontally split shell type for total heads up to 200 ft. (Fig. 257). For greater pressures, see Fig. 235. Split renewable bearing shells; bronze shaft sleeves, dustproof, leakproof bearings; renewable wearing rings; bronze impellers hydraulically and mechanically balanced. Impeller design prevents overload of driving motor under reduced head.

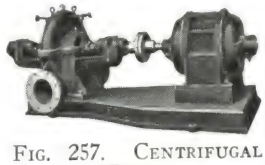

FIG. 257. CENTRIFUGAL PUMP

Boiler Feed Pumps

Made only in the centrifugal horizontally split shell type, 2 to 6 stages. (Fig. 235).

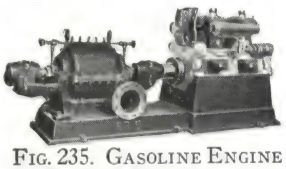

FIG. 235. GASOLINE ENGINE DRIVEN MULTISTAGE PUMP

Fire Protection or Underwriters' Pumps

Made in strict compliance with underwriters' specifications. Furnished without fittings (Fig. 235), or with complete underwriters' fittings.

House or Tank Pumps

Constructed in single suction, single stage type, either open or enclosed type impeller (Fig. 268) for low pressures. For higher pressures, furnished in multistage type (Fig. 235).

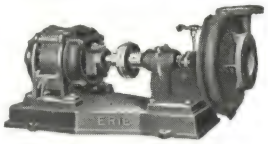

FIG. 268. HOUSE OR TANK PUMP

Acid Resistant Pumps

Horizontal and vertical types having all parts in contact with liquid, made from acid resisting alloys. Special designs for coal mine and chemical plant service.

Contractors' Pumps

Fig. 239 shows steam engine driven Class "L" centrifugal pump especially suited for draining excavations, cofferdams, etc.

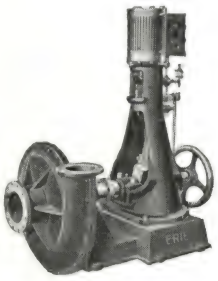

FIG. 239. CONTRACTORS' PUMP

Electric Cellar Drainers

Furnished in vertical type with capacities from 5 to 100 gals. per minute, adapted for direct connection to either vertical or horizontal motors. Smallest size will discharge up to 20-ft. lift, using ¼-h.p. motor.

Water Supply Systems

Centrifugal types only for installations with water not more than 20 ft. below ground level. Hydropneumatic, storage tank or direct pumping outfits for electric motor gasoline engine drive.

Steam Engines

Vertical A-frame throttling type only up to 12x12 size (Fig. 239). Heavy construction especially suited for dredging and construction work.

THE NASH ENGINEERING COMPANY

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SAN FRANCISCO, CAL., Sharon Building
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JENNINGS HYTOR VACUUM PUMPS for Air Line and Return Line Heating Systems; JENNINGS HYTOR CONDENSATION PUMPS and RECEIVERS.

Also Centrifugal Sump Pumps and Air Compressors.

"HYTOR"

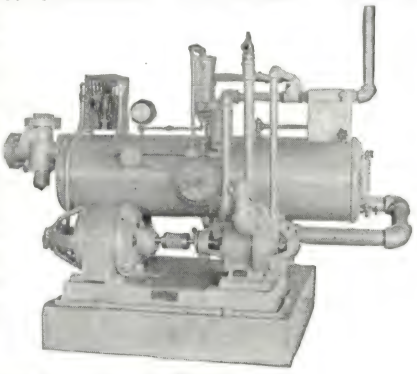
TRADE-MARK

Vaccum Pumps for Return Line Heating Systems

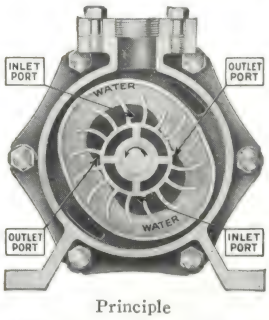
Remove air and water from vacuum heating systems and automatically return water to boiler or hot well. Pump consists of two independent units—a Hytor turbine air pump and a Jennings centrifugal water pump—combined in one casing. Air and water are pumped separately, saving in horsepower over 50% and cost of current is reduced proportionately.

Their compact design permits them to be installed in one-third the space necessary for other apparatus. All interior parts are bronze. Moving parts revolve without contact and are supported on annular ball bearings mounted outside of casing. Jennings pumps assure quiet, reliable operation without annoyance or shutdowns and minimum expense for repairs.

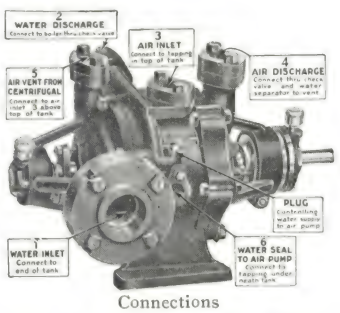
Furnished direct connected to standard electric motors or for belt drive, also with steam turbine drive designed to operate at a normal steam pressure of 75 lbs. back pressure, but this can be varied. Turbine units designed to discharge condensate against boiler pressure not exceeding 20 lbs.



Complete for Automatic Control



Principle



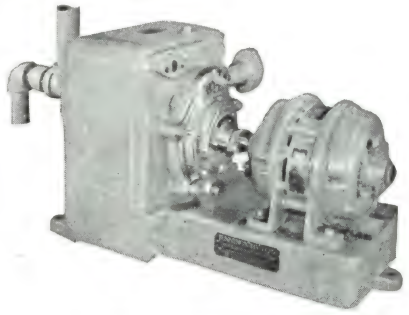
Connections

JENNINGS HYTOR RETURN LINE VACUUM HEATING PUMP

Size M Jennings Return Line Vacuum Heating Pump

This new addition to our well known line has ample capacity for 5,000 sq. ft. of equivalent direct radiation. Because of simplified design, in connection with quantity production, this unit is being sold at a price never before possible in a pump of this capacity. Equipped with solid bronze air rotor, rotor housing, water inpeller and shaft. Only necessary to make three connections: (1) Return main; (2) water discharge; (3) air discharge.

Air capacity, 3 cu. ft. per min., measured at 10-in. mercury vacuum. Pump at same time handles 6 gals. water per min. from vacuum of 10-in. mercury against 10 lbs. gauge pressure at pump. Under these conditions pump requires ¾ h. p. motor.



NEW SIZE M JENNINGS RETURN LINE VACUUM HEATING PUMP

STANDARD SIZES AND CAPACITIES, JENNINGS HYTOR VACUUM PUMPS

Size	Sq. ft. direct equivalent radiation surface	Air capacity, cu. ft. per min.	Water capacity, g.p.m. 10 lbs. pres. 180° F.	Actual h. p.	R.p.m.	H. p. of motor
M	5,000	3	8	.6	1700	¾
A	8,000	6	11	.9	1800	1
B	16,000	11	22	1.4	1800	1½
C	26,000	19	35	2.0	1800	2
D	40,000	25	60	2.8	1200	3
E	65,000	42	90	3.9	1200	5
F	100,000	75	140	9.	1200	10
G	150,000	90	200	10.	900	10
H	250,000	180	400	19.	720	20

Condensation Pumps and Receivers

Outfit consists of an efficient centrifugal pump and a receiving tank. Automatically return condensation water from return line heating systems direct to boiler. Interior of pump is of bronze. Equipped with high grade annular ball bearings. Operated by rugged open bucket float control. Standard sizes up to 65,000 sq. ft.

Bulletins

No. 15, Jennings Hytor Return Line Vacuum Heating Pumps, Electric Driven
No. 16, Jennings Hytor Air Line Heating Pumps
No. 10, Nash Hytor Compressors
No. 11, Nash Hytor Vacuum Pumps
No. 17, Jennings Hytor Condensation Pumps
No. 18, Jennings Hytor Return Line Vacuum Heating Pumps, Steam Turbine Driven
No. 19, Jennings Sump Pumps
No. 25, Size M Jennings Return Line Vacuum Heating Pumps

W. E. CALDWELL CO.

INCORPORATED

Manufacturers of Tanks and Tank Towers

2290 Brook Street

LOUISVILLE, KY.

Products

WOOD, STEEL and GALVANIZED TANKS, any shape or size, for any purpose; TUBULAR, ANGLE or CHANNEL COLUMN STEEL and WOOD TOWERS.

Also manufacturers of Railroad Tank Fixtures; Tank Agitators; Friction Clutches and Pulleys; Gearing and General Power Transmission Machinery.

Cypress Tanks

This company specializes in cypress, as it is the best wood for tanks for most purposes. It has great durability with minimum shrinking and swelling, and gives no taste or coloring.

For some acids, yellow pine is recommended. Poplar, white pine, cedar and fir are also used.

Made round, elliptical and rectangular.

THE TANK WITH A REPUTATION
Caldwell
TANKS AND TOWERS
TRADE-MARK

CYPRESS TANK

Specifications—Lumber to be thoroughly dry, without loose or unsound knots, splits, shakes, pecks, wormholes or other defects: all heart on inside; sound sap on outside, and then not to exceed one-half of the thickness of stave.

Thickness—2 in. for 10,000 gals. or less; 2½ in. up to 20,000 gals.; 3 in. for larger sizes. Finished thicknesses to be ¼ in. less than above.

Standard Inside Diameters of Round Tank—Every 6 in. from 3 to 9 ft.; every foot to 16 ft.; and every 2 ft. above 16 ft.

Standard Inside Depths of Round Tanks—1 ft. 5 in.; 2 ft.; 2 ft. 5 in.; 3 ft.; 3 ft. 5 in.; 4 ft.; 4 ft. 5 in.; 5 ft.; 5 ft. 5 in.; 6 ft.; 6 ft. 5 in.; 7 ft. 5 in.; 9 ft. 5 in.; 11 ft. 5 in.; 13 ft. 5 in.; 15 ft. 4 in.; 17 ft. 4 in.; 19 ft. 4 in.; 21 ft. 4 in.; and 23 ft. 4 in.

Finish—Staves to be dressed both sides with edges machine jointed to proper bevel. Bottom to be dressed on top side only with edges machine jointed and square and well doweled.

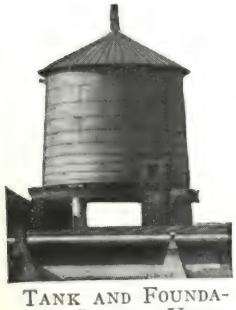
Hoops—Round hoops to be of wrought iron (not steel) with malleable iron draw lugs; sizes and spacing to give a factor of safety of 4 to 1 or greater if required.

We also manufacture rectangular tanks of all dimensions and capacities.

Our Research Department will be glad to go into any special problem with you.

Tank Covers—Standard wood covers are supported by trusses and rafters and covered with 1-in. sheating and ruberoid roofing.

Flat wood covers are also furnished for frost protection when specified.



TANK AND FOUNDATION, COLONIAL HOTEL, YORK, PA.

Tank Foundations

Realizing to what an extent the success of the tank depends on its foundation, we have made a careful study of tank foundations and have developed a series of standard designs which are not only of the proper strength but also use the minimum of material.

Steel Tanks

Caldwell steel tanks, in the larger sizes, are being more and more extensively used and the hemispherical bottom tank is as inexpensive in first cost as the wooden tank. Thin galvanized tanks are recommended only in the smaller sizes and for intermittent or temporary use. Heavy steel tanks can be furnished in any size or shape.

Specifications—Standard diameters and depths are in even feet while thicknesses are ⅛ in. for 10 ft. and less; $\frac{3}{16}$ up to 16 ft.; ¼ in. up to 24 ft.; and $\frac{5}{16}$ in. above 24 ft.

Steel tanks can be furnished set up, in the smaller sizes; or knocked down, in the larger sizes, punched, fitted and bent to shape, with the necessary rivets.

Tank Towers

Standard steel towers are of the following types: tubular column and angle column for flat bottom wood and steel tanks; latticed channel column for wood and hemispherical bottom steel tanks.

Standard Heights—*Tubular*—Every 12 ft. from 15 ft. to 100 ft.

Angle—Every 10 ft. from 12 ft. up.

Latticed—Every 5 ft. from 20 ft. up.

Erected anywhere.

150,000-GAL. TANK
205-FT. TOWER
STUDEBAKER BROS. MFG. CO., SOUTH BEND, IND.

DIMENSIONS AND CAPACITIES OF STANDARD TOWER TANKS

Class towers	Capacity, gals.	Standard wood tanks: Diameter ft.	in.	Depth ft.	in.	Standard steel or galvanized tanks: Diameter ft.	in.	Depth ft.	in.
O tubuler	1,000	6	6	4	5	6	0	5	0
or CC angle	1,500	6	6	6	5	6	6	6	6
A tubular	2,800	8	0	7	5				
or FF angle	3,000	8	0	8	5	8	0	8	0
B tubular	5,000	10	0	9	5				
or HH angle	6,000	10	0	11	5	10	0	10	0
C tubular	10,000	12	6	11	5	12	0	12	0
or JJ angle	12,000	12	6	13	5				
D tubular	15,000	14	0	13	5	14	0	14	0
or KK angle or LD latticed	17,000	14	0	15	5				
E tubular	20,000	16	0	13	5	16	0	14	0
or LL angle or LE latticed	22,000	16	0	15	5				
ES tubular or LES latticed	25,000	16	0	17	4	16	0	18	0
F tubular	30,000	18	0	15	4	18	0	16	0
or LF latticed	33,000	18	0	17	4				
FS tubular or LFS latticed	35,000	18	0	19	4	18	0	20	0
G tubular	36,000	19	6	17	4				
or LG latticed	40,000	19	6	19	4	20	0	18	0
LH latticed	50,000	22	0	17	4	22	0	18	0
	55,000	22	0	19	4	22	0	20	0

Hemispherical bottom steel tanks and towers are regularly made in capacities from 10,000 gals. up. Any of the above towers can be made to suit special conditions.

CHICAGO BRIDGE & IRON WORKS

ESTABLISHED BY HORACE E. HORTON IN 1865

Designers, Manufacturers and Constructors of Horton Steel Tanks and Steel Plate Construction

OFFICES

CHICAGO, ILL., 2022 Transportation Building
NEW YORK, N. Y., 3135 Hudson Terminal Building
DALLAS, TEX., 1623 Pretorian Building
ATLANTA, GA., 1011 Forsyth Building
SAN FRANCISCO, CAL., 1074 Rialto Building
SEATTLE, WASH., L. C. Smith Building
JACKSONVILLE, FLA., 1349 Bisbee Building
BRIDGEBURG, ONT., CAN., 161 Janet Street
MONTREAL, QUE., CAN., 1024 Bank of Toronto Building

EASTERN PLANT: GREENVILLE, PA. CENTRAL PLANT: CHICAGO, ILL.
CANADIAN PLANT: BRIDGEBURG, ONTARIO, HORTON STEEL WORKS, LTD.

Products

HORTON STEEL TANKS: Elevated Water Tanks for Sprinkler, Mill, Private Estate, Golf Club and Municipal Service.

Also HORTON STEEL PLATE CONSTRUCTION, including every type of steel structure built principally of steel plate, and Tanks for All Purposes, including:

Oil and Gasoline Storage Tanks
Sprinkler Tanks
Cylindrical Tanks
Railroad Water Tanks
Coal Bins and Bunkers
Steel Stacks
Riveted Steel Pipe
Standpipes

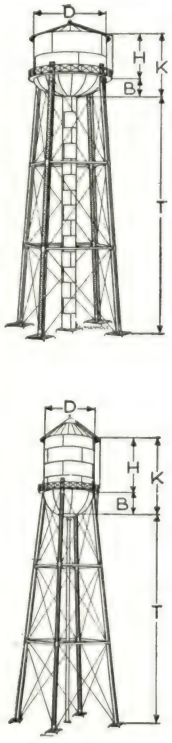
DATA, ELLIPTICAL AND HEMISPHERICAL BOTTOM TANKS

Capacity, gals.	Elliptical bottom			Hemispherical bottom		
	D	H	K	D	H	K
15,000	15′ 0″	9′ 0″	12′ 9″	12′ 0″	14′ 0″	18′ 6″
20,000	16′ 0″	11′ 0″	15′ 0″	12′ 9″	17′ 3″	22 1″
25,000	17′ 6″	11′ 0″	15′ 4″	14′ 1″	17′ 3″	22′ 9″
30,000	18′ 6″	12′ 0″	16′ 7″	15′ 3″	17′ 3″	23′ 4″
35,000	19′ 0″	13′ 4″	18′ 1″	16′ 4″	17′ 3″	23′ 11″
40,000	20′ 0″	13′ 9″	18′ 9″	17′ 4″	17′ 3″	24′ 5″
50,000	22′ 0″	14′ 0″	19′ 6″	19′ 0″	17′ 6″	25′ 6″
60,000	24′ 0″	14′ 0″	20′ 0″	19′ 0″	22′ 3″	30′ 3″
70,000	25′ 0″	15′ 0″	21′ 3″	21′ 0″	20′ 3″	29′ 3″
75,000	26′ 0″	15′ 0″	21′ 6″	22′ 0″	19′ 4″	28′ 10″
80,000	26′ 0″	16′ 0″	22′ 6″	22′ 0″	21′ 1″	30′ 7″
100,000	28′ 8″	16′ 0″	23′ 2″	22′ 0″	28′ 0″	37′ 6″
125,000	28′ 8″	21′ 2″	28′ 4″	24′ 0″	29′ 0″	39′ 6″
150,000	34′ 0″	16′ 6″	25′ 0″	26′ 0″	29′ 3″	40′ 9″
200,000	38′ 0″	17′ 6″	27′ 0″	28′ 0″	34′ 6″	47′ 0″
250,000	40′ 0″	20′ 0″	30′ 0″	30′ 0″	37′ 2″	50′ 8″
300,000	41′ 0″	23′ 9″	34′ 0″	32′ 0″	40′ 0″	54′ 6″
400,000	47′ 0″	23′ 2″	34′ 11″	35′ 0″	44′ 0″	60′ 0″
500,000	51′ 0″	24′ 3″	37′ 0″	38′ 0″	46′ 6″	64′ 0″
750,000	54′ 0″	32′ 0″	50′ 0″			
1,000,000	60′ 0″	34′ 0″	54′ 0″			

Depth of bottom $B=\frac{D}{4}$ $B=\frac{D}{2}$

Square of base .71D+.118(T+B) .71D+.162(T+B)

Note: If the weight of tank and contents including wind load is desired for estimating foundations, increase weight of water by 25% to include weight of metal and wind. This is for values of T *only* up to 30 ft. and is *approximate.*



D = Diameter of tank
H = Height of tank shell
B = Depth of bottom
K = Depth of tank capacity
T = Height to bottom of tank capacity

Information Required for Quotations

(1) Capacity of tank; (2) Height of bottom of tank capacity above top of foundations; (3) If sprinkler tank, state whether stock company or mutual; (4) Which, if any, of the following accessories manufacturer is to furnish: riser pipe, frost casing, overflow, indicator, pressure gage, tank heater, heater house, foot elbow, gate valve, float valve. None of these accessories is included in quotations except when so expressly stated.

Plans, specifications and quotations furnished without obligating you.

HORTON STANDARD STORAGE TANKS FOR VARIOUS LIQUIDS

Capacity, gal.	Diam.	Height	Capacity, gals.	Diam.	Hgt.
35,000	18′9″	17′6″	175,000	32′3″	29′0½″
40,000	20′0″	17′6″	200,000	34′6″	29′0½″
45,000	21′3″	17′6″	225,000	36′6″	29′0½″
50,000	22′4″	17′6″	250,000	38′6″	29′0½″
60,000	21′3″	23′3″	300,000	42′0″	29′0¾″
70,000	23′0″	23′3″	400,000	49′0″	29′0¾″
75,000	23′9″	23′3″	500,000	54′3″	29′0¾″
80,000	24′6″	23′3″	600,000	60′0″	29′0¾″
90,000	26′0″	23′3″	750,000	66′3″	29′0¾″
100,000	27′4″	23′3″	1,000,000	77′0″	29′1″
125,000	27′4″	29′0½″	1,500,000	94′0″	29′1″
150,000	30′0″	29′0½″	2,000,000	108′4″	29′1″

HORTON STANDARD OIL STORAGE TANKS

Capacity, bbl.	Diam.	Height	Capacity, bbls.	Diam.	Hgt.
2,500	27′9″	23′3½″	31,200	87′8″	29′0¾″
3,000	30′6″	23′3½″	35,000	93′7″	29′0¾″
4,000	31′6″	29′0½″	37,500	96′6″	29′0¾″
5,000	35′1½″	29′0½″	40,000	99′5½″	29′1″
7,500	43′0″	29′0½″	45,000	105′3½″	29′1″
10,000	49′8″	29′0½″	50,000	111′1¾″	29′1″
12,500	55′9″	29′0¾″	55,000	117′0″	29′1″
15,000	61′0″	29′0¾″	66,000	117′1″	34′10″
20,000	70′2″	29′0¾″	77,000	117′2″	40′7″
25,000	78′9″	29′0¾″	80,000	117′2″	41′10″

Barrels contain 42 gals. each.

HORTON CYLINDRICAL OIL TANKS

Capacity, gal.	Diam.	Length	Capacity, gal.	Diam.	Length
1,000	3′ 10″	11′ 9″	7,500	7′ 6″	23′ 3″
1,500	4′ 8″	11′ 9″	8,000	7′ 0″	29′ 0″
2,000	5′ 5″	11′ 9″	8,000	7′ 8″	23′ 3″
2,500	5′ 0″	17′ 6″	10,000	7′ 8″	29′ 0″
3,000	5′ 5″	17′ 6″	10,000	8′ 7″	23′ 3″
3,700	6′ 0″	17′ 6″	12,000	8′ 7″	29′ 0″
4,000	6′ 3″	17′ 6″	15,000	8′ 7″	34′ 9″
5,000	7′ 0″	17′ 6″	15,000	10′ 6″	23′ 3″
6,000	7′ 8″	17′ 6″	20,000	10′ 0″	34′ 9″
			25,000	10′ 6″	34′ 9″

Specify size and location of openings and whether to be used in horizontal or vertical position.

HORTON STORAGE TANK

TANK FOR PROCTER & GAMBLE, HAMILTON, ONT. Capacities, 50,000 and 100,000 gal. Heights, 100 and 50 ft. to bottom

STEEL STACK UNITED VERDE COPPER CO., JEROME, ARIZ. Diameter, 31 ft.; height, 400 ft.

STANDARD SPECIFICATIONS, PRESSURE WATER FILTERS

ASSOCIATED MANUFACTURERS OF WATER PURIFYING EQUIPMENT

AMERICAN WATER SOFTENER CO., Philadelphia, Pa.
ELECTRIC WATER STERILIZER & OZONE CO., Scottdale, Pa.
GRAVER CORPORATION, East Chicago, Ind.
H. S. B. W.-COCHRANE CORPORATION, Philadelphia, Pa.
HUNGERFORD & TERRY, INC., Philadelphia, Pa.
HYGEIA FILTER CO., Detroit, Mich.
INTERNATIONAL FILTER CO., Chicago, Ill.
LOOMIS-MANNING FILTER DISTRIBUTING CO., Philadelphia, Pa.
NEW YORK CONTINENTAL-JEWELL FILTRATION CO., Nutley, N. J.
NORWOOD ENGINEERING CO., Florence, Mass.
THE PERMUTIT COMPANY, New York, N. Y.
THE REFINITE COMPANY, Omaha, Nebr.
REISERT AUTOMATIC WATER PURIFYING CO., New York, N. Y.
ROBERTS FILTER MFG. CO., Darby, Pa.
THE R. U. V. COMPANY, INC., New York, N. Y.
WM. B. SCAIFE & SONS CO., Oakmont, Pa.
WALLACE & TIERNAN CO., INC., Newark, N. J.
WAYNE TANK & PUMP CO., Fort Wayne, Ind.

Products

WATER PURIFYING EQUIPMENT.

Standard Specification for Pressure Water Filters Adopted by Associated Manufacturers of Water Purifying Equipment

This page is published for the information of those desiring to purchase pressure filters, and that they may have the benefit of the best advice on this equipment.

The data has been compiled by a committee of experts appointed by the Association who after two years of investigation and consultation with various manufacturers submitted a report, which, after full discussion and consideration, was officially adopted by the Association as embodying the best practice for rates and features of construction for pressure filters, and which as an accepted standard of requirements, would enable purchasers to compare bids on a fair basis of merit. These requirements do not in any manner interfere with individual design and may be complied with by any present manufacturer without change in pattern or design.

Rates of Filtration—Rates of filtration are based upon the "Report of Committee on Recommended Standardization of Filters" of the American Society of Mechanical Engineers, presented at the annual meeting of the A.S.M.E. December, 1916. This report fixes the rate of filtration for potable water as follows:

"Whenever the water is to be used for domestic purposes or to secure full bacterial purification, the capacity shall be based on a rate of filtration not to exceed 2 gals. per minute per square foot of filtering area and a coagulant must be used."

A full report of the committee is contained in Transactions of A.S.M.E. for 1917, pages 425-432.

Rates of filtration for various uses should conform to the following schedule:

2 gals. per sq. ft. per minute for all supplies used for drinking, or for the preparation of food products.

2 to 4 gals. per sq. ft. per minute when filtering a treated municipal supply of approved bacterial purity.

2 to 4 gals. per sq. ft. per minute for swimming pools, and for all industrial uses.

2 to 5 gals. per sq. ft. per minute as conditions may warrant for double filtration, using sand followed by charcoal where reduction of color, odor, taste or certain forms of iron is desired. This method of filtration not to be applied for bacterial purification.

CAPACITIES OF FILTERS FOR RATES OF 2, 3 AND 4 GALS. PER SQ. FT. PER MINUTE

Diam., ft. in.	Lgth., ft.	Area, sq. ft.	Capacities in gals. per min.			Pipe connections, in.		Min. wash water at 12 gals. per sq. ft. per min., gal.
			2 gals. per sq. ft.	3 gals. per sq. ft.	4 gals. per sq. ft.	Inlet outlet filter wash	Waste to sewer	
VERTICAL FILTERS								
1—0	.....	0.785	1.57	2.35	3.14	¾	1	9.42
1—2	.....	1.06	2.12	3.18	4.24	1	1¼	12.72
1—4	.....	1.39	2.78	4.17	5.56	1	1¼	16.68
1—8	.....	2.18	4.36	6.54	8.72	1¼	1½	26.16
2—0	.....	3.14	6.28	9.42	12.5	1½	2	37
2—6	.....	4.90	9.8	14.7	19.6	1½	2	60
3—0	.....	7.06	14.1	21.1	28.2	2	2½	84
3—6	.....	9.62	19.2	28.8	38.5	2	2½	115
4—0	.....	12.56	25.1	37.6	50.2	2½	3	150
4—6	.....	15.90	31.8	47.7	63.6	2½	3	190
5—0	.....	19.63	39.2	58.8	78.5	3	4	235
6—0	.....	28.27	56.5	84.8	113.1	4	5	339
7—0	.....	38.48	76.9	115.4	153.9	4	5	460
8—0	.....	50.27	100.5	150.8	201.1	5	6	600
HORIZONTAL FILTERS								
8—0	10	68.5	137	205.5	274.0	6	8	822
8—0	12	83.4	166.8	250.2	333.6	6	8	1000
8—0	14	98.2	196.4	294.6	392.8	6	8	1178
8—0	16	113.1	226.2	339.3	452.4	8	10	1357
8—0	20	142.7	285.4	428.1	570.8	8	10	1712
8—0	25	179.8	359.6	539.4	719.2	8	10	2157

Length is over-all length of filter, and area of bed is calculated for surface of bed 18 in. above center of shell.
Area of segments of the 2 dished heads=9.2 sq. ft.
Area per lineal foot of bed in the cylinder=7.42 sq. ft.
Example: 8x16-ft. filter—Area in heads=9.2 sq. ft.
Area in cylinder, 14x7.42=103.9 sq. ft.
Total effective area =113.1 sq. ft.

CONSTRUCTION OF VERTICAL STEEL PRESSURE FILTERS

Diameter, in.	Working pressure: 65 lbs. per sq. in.			100 lbs. per sq. in.			125 lbs. per sq. in.		
	Shell		Head	Shell		Head	Shell		Head
	Min. joint eff., per cent	Thickness, in.	Thickness, in.	Min. joint eff., per cent	Thickness, in.	Thickness, in.	Min. joint eff., per cent	Thickness, in.	Thickness, in.
24	50	3/16	1/4	50	3/16	1/4	50	1/4	5/16
30	50	3/16	1/4	57	1/4	5/16	50	5/16	5/16
36	50	3/16	1/4	57	1/4	5/16	70	1/4	3/8
42	57	1/4	5/16	70	1/4	3/8	70	5/16	7/16
48	57	1/4	5/16	70	1/4	3/8	70	5/16	7/16
54	57	1/4	5/16	70	5/16	7/16	70	3/8	1/2
60	57	1/4	3/8	70	5/16	7/16	67	7/16	1/2
72	57	1/4	3/8	69	3/8	1/2	66	1/2	9/16
84	70	5/16	7/16	66	1/2	9/16	66	9/16	11/16
96	69	3/8	7/16	68	1/2	5/8	68	5/8	3/4

Standard manholes 11x15 in. or 10x16 in.
Tensile strength of steel plate 55,000 to 65,000 lbs. per sq. in.
Heads dished to radius of diameter of tank.
Hydrostatic test 50% in excess of working pressure.

CONSTRUCTION OF CAST IRON PRESSURE FILTERS

Diameter, in.	Working pressure: 65 lbs. per sq. in.		100 lbs. per sq. in.	
	Shell thickness, in.	Head and flange thickness, in.	Shell thickness, in.	Head and flange thickness, in.
12	5/8	7/8	5/8	7/8
14	5/8	7/8	11/16	15/16
16	5/8	7/8	11/16	15/16
20	11/16	15/16	3/4	1
24	11/16	15/16	13/16	1 1/16
30	3/4	1	7/8	1 1/8
36	13/16	1 1/16	15/16	1 3/16
42	13/16	1 1/16	1	1 1/4
48	7/8	1 1/8	1 1/16	1 5/16

Filters to be gray iron castings having a tensile strength of approximately 20,000 lbs. per sq. in.
Hydrostatic test 50% in excess of working pressure to be applied.
Heads dished to radius equal to diameter of shell may be modified with rib reinforcement to same thickness as shell.
Variations of 1/8 in. in these thicknesses of shells and heads and flanges to be permissible.

Reprints of this page may be obtained from any of the associate companies

GRAVER CORPORATION

Water Softener and Purifying Equipment; Steel Tanks and General Steel Plate Construction

GENERAL OFFICES AND PLANT
EAST CHICAGO, IND.
CHICAGO, ILL., 1412 Steger Building
SPECIAL BRANCHES—TANK AND STEEL PLATE WORK
TULSA, OKLA., 203 Haver Building
FORT WORTH, TEX., 209 West First Street

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CHARLOTTE, N. C.

Products

WATER FILTERS: Horizontal and Vertical Pressure or Gravity Types for domestic and industrial purposes; REFILTERING or RECIRCULATING SYSTEM of EQUIPMENT for swimming pools; WATER SOFTENERS for steam boiler plants, ice plants, laundries, textile mills, etc., including the Hot Process, Cold Continuous Process Type "K" Softener, Intermittent and Zeolite Softeners.

STEEL TANKS: Riveted or Welded Construction; Horizontal and Vertical Types for storage of all liquids; Elevated Water Storage Tanks.

STEEL PLATE CONSTRUCTION: Standpipes, flues, shapes, penstocks, refinery equipment and general steel plate work.

Water Filters

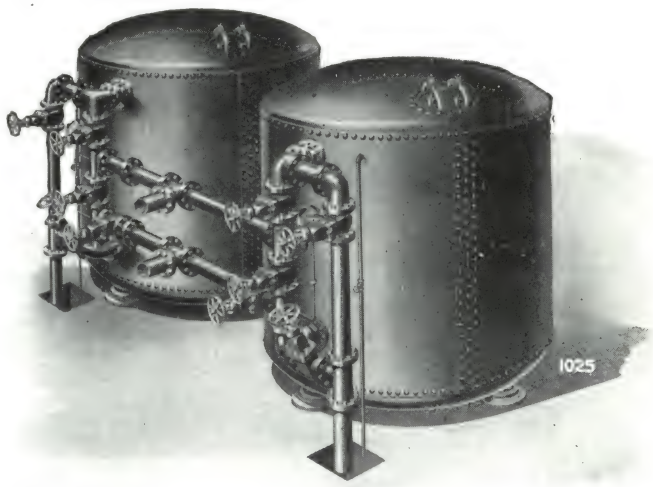
Graver water filters are built in three types, vertical or horizontal pressure and open top gravity.

The open top gravity filters are furnished in either wood or steel shell. In other details they are similar to pressure filters.

The filters are made in the sizes shown in table. The household sizes are of cast iron, or steel and cast-iron construction. The shell of the large units is of high-grade mild plate steel, well fabricated, caulked and riveted.

Each filter is equipped with 5 main control gate valves seating tightly and arranged for ease of operation. Filters greater than 5 ft. in diameter are equipped with flange fittings and valves. All piping and tanks are painted with 2 coats of non-corrosive paint. A manhole gives access to the interior and automatic air relief or pipe, vent and test cock for sampling are also provided. Filter medium consists of crushed silica quartz of sharp grains. Graver automatic coagulant feed tank and sight-wash glass furnished where specified.

Batteries of 2 or more filters are frequently used where continuous service is desired and where the quantity of water to properly backwash a single unit of equal capacity is not available. When double units are required, proposal should include necessary inter-connecting piping to permit operation of one or more filters.



GRAVER VERTICAL FILTER, DOUBLE UNIT

RECOMMENDED PRESSURE FILTER STANDARDS AS ADOPTED AND MANUFACTURED BY GRAVER CORPORATION

VERTICAL PRESSURE FILTERS

Inside diameter, in.	Effective area, sq. ft.	Capacity, single unit, based on the rates per sq. ft. per min. shown: 2 gal.	3 gal.	4 gal.	Pipe connections, in.: Inlet, outlet	Waste	Thickness, in.: 65 lb. per sq. in. working pressure: Shell	Head	100 lb. per sq. in. working pressure: Shell	Head	Graver code No.	
12	0.785	1.57	2.35	3.04	¾	1	5/8	7/8	5/8	7/8	D12	Cast Iron
16	1.39	2.78	4.17	5.56	1	1¼	11/16	15/16	11/16	15/16	D16	Cast Iron
20	2.18	4.36	6.54	8.72	1¼	1½	¾	1	¾	1	D20	Cast Iron
24	3.14	6.28	9.42	12.5	1½	2	3/16	¼	¼	¼	V2	Steel
30	4.90	9.8	14.7	19.6	1½	2	¼	¼	¼	5/16	V2½	Steel
36	7.06	14.1	21.1	28.2	2	2½	¼	¼	¼	5/16	V3	Steel
42	9.62	19.2	28.8	38.5	2	2½	¼	5/16	¼	3/8	V3½	Steel
48	12.56	25.1	37.6	50.2	2½	3	5/32	5/16	9/32	7/16	V4	Steel
60	19.63	39.2	58.8	78.5	3	4	¼	3/8	11/32	7/16	V5	Steel
72	28.27	56.5	84.8	113.1	4	5	5/16	3/8	7/16	½	V6	Steel
84	38.48	76.9	115.4	153.9	4	5	11/32	7/16	½	9/16	V7	Steel
96	50.27	100.5	150.8	201.1	5	6	13/32	7/16	17/32	5/8	V8	Steel

HORIZONTAL PRESSURE FILTERS

Inside diameter, ft.—in.	Length over dished heads, ft.—in.	Effective area, sq. ft.	Capacity, single unit based on the rates per sq. ft. per min. shown: 2 gal.	3 gal.	4 gal.	Pipe connections, in.: Inlet, outlet	Waste	Thickness, in.: 65 lb. per sq. in. working pressure: Shell	Head	100 lb. per sq. in. working pressure: Shell	Head	Graver code No.
8—0	10—0	68.5	137.0	205.5	274.0	6	8	13/32	7/16	17/32	5/8	H10
8—0	12—0	83.4	166.8	250.2	333.6	6	8	13/32	7/16	17/32	5/8	H12
8—0	14—0	98.2	196.4	294.6	392.8	6	8	13/32	7/16	17/32	5/8	H14
8—0	16—0	113.1	226.2	339.3	452.4	8	10	13/32	7/16	17/32	5/8	H16
8—0	20—0	142.7	285.4	428.1	570.8	8	10	13/32	7/16	17/32	5/8	H20
8—0	25—0	179.8	359.6	539.4	719.2	8	10	13/32	7/16	17/32	5/8	H25

Remarks: Standard manholes, 10x16 in.; tensile strength of steel plate, 55,000 to 65,000 lbs. per sq. in.; tensile strength of cast iron, 20,000 lbs. per sq. in.; heads dished to radius of diameter of tank; hydrostatic test 50 per cent in excess of working pressure; factor of safety, 5. (See data given by Associated Manufacturers of Water Purifying Equipment, page 1490 of SWEET'S ARCHITECTURAL CATALOGUE.)

Continued on next page

Rates of Filtration—Rates for various uses should conform to the following schedule:

2 gals. per sq. ft. per minute for all supplies used for drinking, or for the preparation of food products.

2 to 4 gals. per sq. ft. per minute when filtering a treated municipal supply of approved bacterial purity.

2 to 4 gals. per sq. ft. per minute for swimming pools and for all industrial uses.

The rates of filtration are based upon the "Report of Committee on Recommended Standardization of Filters" of the American Society of Mechanical Engineers presented at the annual meeting of A. S. M. E., December, 1916. The report fixes the rate of filtration for potable water as follows:

Whenever the water is to be used for domestic purposes or to secure full bacterial purification, the capacity shall be based upon a rate of filtration not to exceed 2 gals. per minute per sq. ft. of filtering area and a coagulant must be used.

For Complete Details—Vertical pressure Filters, write for Bulletin 502; Horizontal Pressure Filters, write for Bulletin 501; Recirculating System for Swimming Pools, Bulletin 500.

Some Users of Graver Filters—

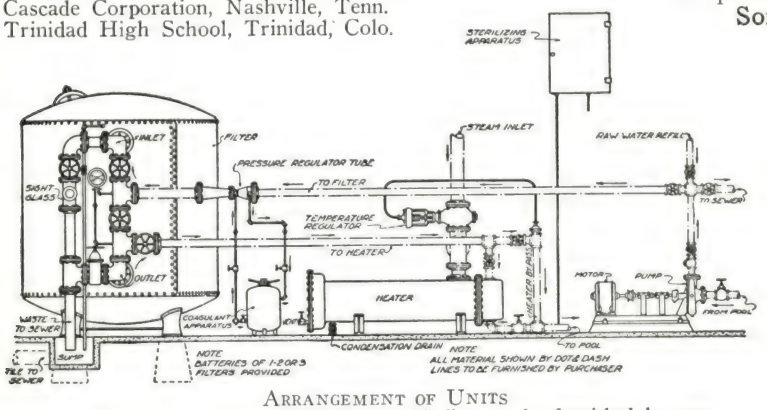
Morgan & Hamilton Co., Nashville, Tenn.
Yazoo & Mississippi R. R.
Peech Sons & Phillips Co., Camden, N. J.
Fleischman Yeast Co., Peekskill, N. Y.
Equity Co-operative Co., Haggard, N. D.

Graver Refiltering or Recirculating System for Swimming Pools

This system comprises filter, coagulant device, sterilizing apparatus, pump and also heater if required. The water is recirculated, filtered and disinfected, giving a complete change of pool contents daily. A complete cycle of recirculation is accomplished in not over 10 hrs. Bulletin 500 describes the system with drawings and details. Filter specifications shown on preceding page.

Some Users of Graver System for Swimming Pools—

Y. M. C. A, Zanesville, Ohio
Tri-State Fair Grounds, Memphis, Tenn.
Cascade Corporation, Nashville, Tenn.
Trinidad High School, Trinidad, Colo.



ARRANGEMENT OF UNITS

Connection shown in "dot and dash" lines to be furnished by customer unless otherwise provided.

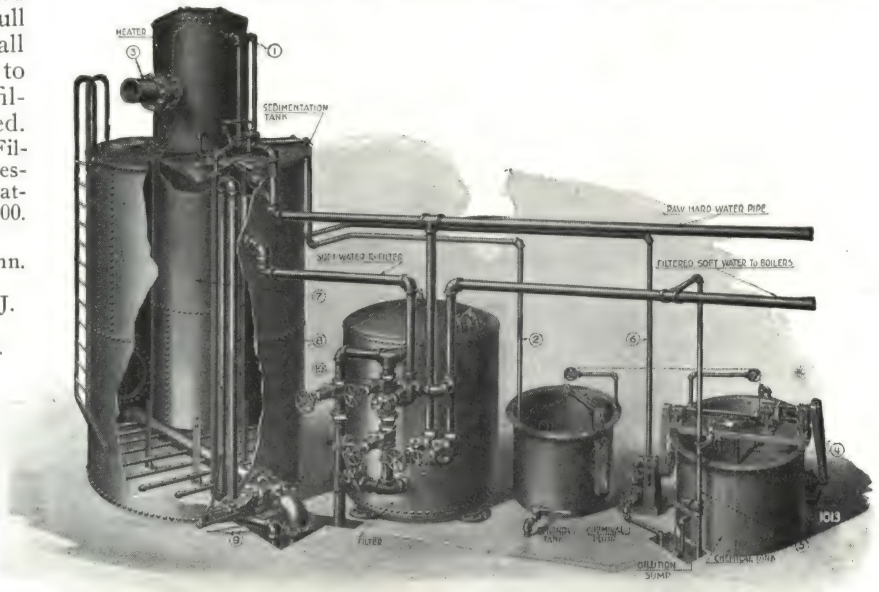
Graver Hot Process Water Softener

This softener provides softened, purified, hot water for boiler-feed purposes. It is adaptable to steam boiler plants from 200 b.h.p. and up. The treated water is delivered to boilers, guaranteed to contain not over 2½ grs. per U. S. gal. of hardening ingredients, within 5° Fahr. of temperature of incoming exhaust steam used to heat water; it will be clear and free of suspended matter visible to eye, and will contain no scale-forming matter. The Graver hot process softener is a certain means of effecting economies in fuel, labor and maintenance charges.

Bulletin 504 describes the equipment.

Some Graver Hot Process Softener Installations—

Wisconsin Steel Co., Chicago, Ill.
Sinclair Refining Co. (4 installations. Latest at Coffeyville, Kan.)
Illinois Steel Co., Chicago, Ill.
Wisconsin Light & Traction Co., Appleton, Wis.
Forked Leaf White Oak Lumber Co., West Eminence, Mo.



GRAVER HOT PROCESS WATER SOFTENER

Graver Intermittent Softener

This softener is designed for use where treatment and special local conditions make it desirable. Two tanks are provided in this system, treatment of water being carried on in one while softened water is being withdrawn from the other. Either wood or steel tanks can be provided. Filter is part of equipment.

Some Intermittent Softener Installations—

American Sheet and Tin Plate Co., Sabraton, W. Va.
Reid, Murdock Co., Princeton, Ind.
Garrett Pure Ice Co., Garrett, Ind.

Graver Cold Process Water Softener, Type "K"

The widest use of this method is made in raw water ice-plants and railroads. The apparatus comprises steel settling tank, control and chemical mixing tanks and Graver filter. The success depends in ability to feed minute uniform quantities of chemical to a changeable and complex raw water. They are extremely simple, both in construction and operation, yet they give most accurate results. Standardized units are manufactured for ice plants.

Bulletin 507—Cold Process Softener for Industrial Use.

Bulletin 508—Cold Process Softener for Raw Water Ice Plants.

Bulletin 506—Cold Process Softener for Railroads.

Continued on next page

Some Cold Process Softener Installations—

Chicago Artificial Ice Co., Chicago, Ill.
Lincoln Ice Co., Chicago, Ill.
Kansas City Ice & C. S. Co., Kansas City (S. Scott Joy, Chicago, Architect)
Hy Henke Ice & Cold Storage Co., Houston, Tex.
Western Union Telegraph Co., Brisbane, Ill.
Union Pacific Railroad, Omaha, Nebr.

GRAVER TYPE "KM" WATER SOFTENER
Capacity and Dimensions

Capacity gals., per hour	Dimensions of settling tank				Over-all height		Diam of filter, in.	Inlet piping in.	Sludge pipe, in.	Approximate shipping weight, lbs.		Approximate operating weight, lbs.		Size of ice plant tons daily
	Steel		Wood											
	Diam. ft. in.	Height ft. in.	Diam. ft. in	Height ft. in	Steel ft. in.	Wood ft. in.				Steel	Wood	Steel	Wood	
250	5-5	6-11¾	6-0	8-0	11-6	12-6	24	1½	2½	3275	2950	10500	10640	12-18
500	5-5	12-9½	8-0	8-0	17-3½	12-6	24	1½	2½	4870	4250	20000	24650	18-35
750	8-0	10-9¾	8-0	10-0	15-3¾	14-6	30	1½	3	6090	4520	37000	30720	35-50
1000	10-6	13-5⅜	8-0	14-0	17-11⅜	18-6	36	1½	3	8920	7250	47000	54250	50-70
1500	10-6	11-11¼	10-6	14-0	16-5¼	18-6	42	2	4	10380	8500	70500	62000	70-105
2000	10-6	14-9¼	10-0	18-0	19-3¼	22-6	48	2	4	12990	12670	87500	87470	105-140
2500	10-6	17-9¼	12-0	16-0	22-3¼	20-6	60	2½	4	16830	16150	104500	97500	140-175
3000	10-6	20-7¼	12-0	18-0	25-1¼	22-6	60	2½	4	18770	17050	137200	126150	175-215

Note: Steel settling tanks fabricated in shop, tested and shipped whole. Wood settling tanks shipped knocked down. Filter included on each softener.
All softeners can be furnished as ground operated at slight additional cost.
Overall height on ground-operated softeners 4 ft. 6 in. less than given above.
Without charge we will make an analysis of the water you use and furnish data and recommendations for equipping your plant with a Graver softener.

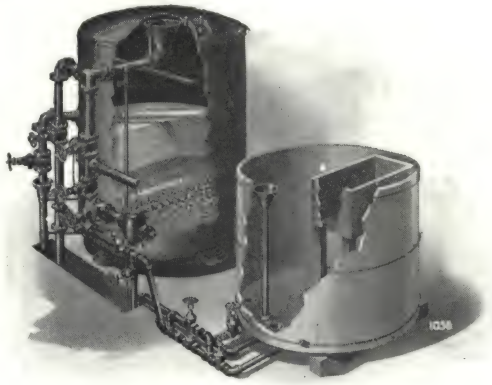
Graver Zeolite Water Softener

These softeners are made in sizes suitable for domestic use, textile mills, laundries, hotels, hospitals, schools and all other installations requiring a water of zero hardness by soap solution test. The Graver softening material, used in these machines is a synthetic zeolite with very rapid regenerative qualities. It permits of extreme ranges in rate of flow during operation. It is placed in a steel shell similar to filter. Softening is carried on up to the limit of hours for which the machine is rated. The softener is then backwashed and regenerated with salt solution. Sizes 12 to 120 in. diameter. In writing, give quantity, hardness and period of use of water.

Bulletin 509 —Zeolite Softeners for Industrials.
Bulletin 509x—Zeolite Softeners for Domestic Use.

Some Zeolite Water Softener Installations—

White Cloud Laundry, Cincinnati, Ohio
McAlester State Penitentiary, McAlester, Okla.
Best Laundry Co., Chicago, Ill.
Walnut Hills Laundry, Cincinnati, Ohio
Western Felt Co., Chicago, Ill.



ZEOLITE WATER SOFTENER

Graver Standard Steel Storage Tanks

These tanks are ideal for the storage of gasoline, oils and all liquids, with capacities ranging from 550 gals. to 24,600 gals. For public and private garages, and filling stations, the sizes shown below cover practically all requirements. Underwriters Label furnished when specified.

Field Erected Tanks

Graver field storage tanks are built in standardized sizes to give a range of capacity, without special construction from 560 to 80,000 bbls. Also furnished in special construction.

VERTICAL RIVETED TANKS

Cap., gal.	Size	Ship. wt.	Code No.
7000	10′6″ x 10′9¾″	4600	69
8100	10′6″ x 12′6¾″	5100	71
10000	10′6″ x 15′6¾″	5900	83
11300	10′6″ x 17′6¾″	6400	84
11854	10′6″ x 18′3¾″	6600	85
12300	10′6″ x 19′0¾″	6800	104
13100	10′6″ x 20′3¾″	7200	86
14200	10′6″ x 22′0¾″	7600	87
15000	10′6″ x 23′3¾″	8000	88
16000	10′6″ x 24′9¾″	8400	89
16800	10′6″ x 26′0¾″	8800	105
18100	10′6″ x 28′0¾″	9600	90
19300	10′6″ x 29′9¾″	9700	106
20200	10′6″ x 31′3¾″	10400	91

$\frac{3}{16}$″ Metal throughout. Fitted with 1-16″ Manhead bolted or screwed cover and 3-2″ flanges or equivalent for pipe connections. These tanks furnished ¼″-1-Piece bottom, at slight additional cost.

HORIZONTAL RIVETED TANKS

Capacity, gallons	Size, diam. length	Ship. wt., $\frac{3}{16}$ in.	Code No., $\frac{3}{16}$-in.	Ship wt., ¼-in.	Code No., ¼-in.
4075	8′ x 10′11″	3800	7	4500	8
5050	8′ x 13′ 6″	4400	9	5400	10
6075	8′ x 16′ 3″	5000	11	6200	12
7050	8′ x 18′10″	5700	13	7000	14
8075	8′ x 21′ 7″	6200	15	7700	16
9050	8′ x 24′ 2″	6800	17	8500	18
10075	8′ x 26′11″	7300	19	9200	20
11050	8′ x 29′ 6″	7900	21	10000	22
12075	8′ x 32′ 3″	8500	23	10800	24
13050	8′ x 34′10″	9100	25	11500	26
14075	8′ x 37′ 7″	9700	27	12300	28
15050	8′ x 40′ 2″	10400	29	13300	30
16075	8′ x 42′11″	10900	31	13900	32
7700	10′6″ x 11′11″	5800	38	6900	39
11500	10′6″ x 17′ 9″	7400	40	9000	41
15200	10′6″ x 23′ 7″	9100	42	11300	43
19000	10′6″ x 29′ 5″	10800	44	13500	45
22800	10′6″ x 35′ 3″	12500	48	15500	49
24600	10′6″ x 38′ 1″	13400	80	16900	81

One-piece Flat Heads, 12 lbs. (about $\frac{5}{16}$″); Shell ¼″ or $\frac{3}{16}$″. Fitted with one 16″ manhead with bolted or screw cover and three two inch flanges or equivalent for pipe connections.

WELDED HORIZONTAL TANKS

Cap., gal.	Size	Ship. wt.	Code No.
550	4′ x 6′	800	46
1000	5′5″ x 6′	1200	47
1500	5′5″ x 9′	1600	76
2000	5′5″ x 12′	2100	77
2500	5′5″ x 15′	2600	78
3000	5′5″ x 18′	3000	79

$\frac{3}{16}$″ Metal throughout. Fitted with 1-3½″, 1-2″ and 1-1″ flange or equivalent for pipe connection. 16″ Manhead furnished extra when desired.

Elevated Tanks for Sprinkler Systems, etc.

Steel tanks, for placing on roofs or complete on steel structure.

Steel Plate Construction

Our engineering and shop facilities are fully adequate for the production of standpipes, flues, shapes, and other plate work.

THE FILTRINE MANUFACTURING COMPANY

Manufacturers of Filters and Water Coolers

51-53 Lexington Avenue

BROOKLYN, N. Y.

Products

FILTERS for drinking water, syrups, vegetable oils, extracts, preserving brine, etc., capacities 1 to 300 gals. per minute.

WATER COOLERS and FILTERS, combined; SANITARY DRINKING FOUNTAINS.

Filtrine

Filtrine is the filtering material used in all "K-System" filters. This fabric contains the essential qualities of a filtering material, as specified by recognized standard authorities, here and abroad, viz: all filtering devices must be constructed so as to allow frequent renewal of filtering bed. Why? Because no medium can retain its purifying power indefinitely. The oftener it is changed, the more effective the filter. Filtrine retains all suspended matter, rendering the water clean and pure, without the use of coagulent. To clean the filter take out the dirty "spent" sheet and replace with new. Upkeep cost is very low.

KNEUPER'S TRADE K MARK SYSTEM Filters and Filtrine

TRADE-MARK

GUIDE FOR THE SELECTION OF "K-SYSTEM" PRODUCTS

Service	†Style No. 1 Filter (Fig. 1)	Style A Filter (Fig. 2)	Style B Filter (Fig. 3)	Wall Filter-cooler (Fig. 5)	Gooseneck Filter (Fig. 4)	Wall bubbler (Fig. 6)	Filter-cooler (Fig. 7)	Bubbler Filter-cooler (Fig. 8)
Apartment houses	*		*		*		*	
Clubs	*	*	*			*	*	*
Department stores		*	*			*	*	*
General circulating drinking water systems	*	*	*					
Hotels	*	*	*			*		
Offices	*			*		*	*	*
Office buildings			*					
Residences (large)	*	*	*		*			
Residences (small)	*	*			*			
Restaurants	*	*	*			*	*	
Swimming pools			*					
Theaters	*	*	*		*	*		

*Denotes style suitable for services listed.
†K-System Filters built for 65 lbs. working pressure, tested to 100 lbs. All capacities based on 30 lbs.

"K-System" Style No. 1 Filter

A combination filter and faucet, suitable for installation on sinks in the same manner as an ordinary faucet. Does not take up basin space.

To maintain filter at its highest point of efficiency, it is simply necessary to unscrew the ball top, remove the polluted Filtrine sheet and replace it with a new one. This task is accomplished in a minute and the filter then operates as when new.

Supplies both filtered and unfiltered water.

Made of nickelplated brass.

Suitable for residences, hotels, theaters, restaurants, clubs, offices and general circulating drinking water systems.

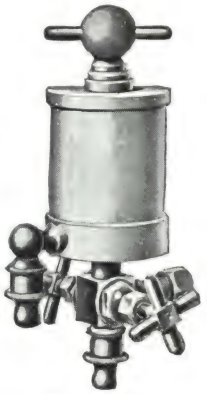


FIG. 1. "K-SYSTEM" NO. 1 FILTER

Capacity, 1 to 2 gals. per min. Body, 5x6 in. Inlet and waste, ⅜ in. Weight, 6 lbs.

"K-System" Style "A" Filter

Suitable for general circulating drinking water systems in residences, hotels, theaters, apartment houses, department stores, restaurants, clubs.

It is installed at any point in the water service line (not over a sink). Simple, light in weight and compact. Made of nickelplated brass.

For greater capacities, this filter can be installed in batteries of two or more units.

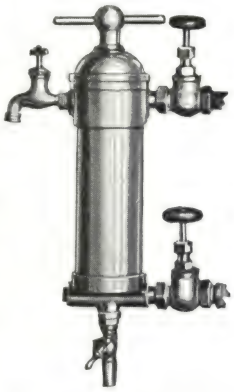


FIG. 2. "K-SYSTEM" STYLE "A" FILTER

Capacity, 4 to 6 gals. per min. Body, 5x14 in. Inlet and waste, ¾ in. Weight, 20 lbs.

"K-System" Style "B" Filter

Suitable for general circulating drinking water systems in hotels, theaters, restaurants, apartment houses, department stores, and for filtering water for swimming pools, ice plants, factory and industrial use.

Installed at any point in the water service line.

Made of galvanized iron. Can be installed in batteries of two or more units with capacities up to 300 gals. per minute.

FIG. 3. "K-SYSTEM" STYLE "B" FILTER

Capacity, 15 to 20 gals. per min. Body, 8x20 in. Inlet and waste, 1½ in. Weight, 85 lbs.

"K-System" Gooseneck Filter-faucet

A combination filter and faucet suitable for installation in sinks. Does not take up basin space.

Water can be drawn from either side of faucet. Supplies both filtered and unfiltered water.

Made of nickelplated brass.

Suitable for residences, hotels, theaters and apartment houses.

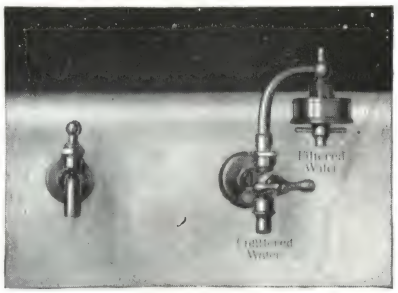


FIG. 4. GOOSENECK FILTER-FAUCET

Inlet threaded for ½-in. pipe

Continued on next page

"K-System" Wall Bubbler

"K-System" wall bubbler takes the place of elaborate circulating drinking water system. Cooling box and filter located in one room, sanitary drinking fountain brought out in main room. Original expense and upkeep are moderate.

Steel cooling box of white enamel, dimensions according to available space; tinned copper lining, cork insulation; block tin cooling coil, in conjunction with cooling cell.

Style No. 1 filter, Fig. 1.

Sanitary drinking fountain furnished to suit client.

Designed for stores, banks, restaurants, theaters, offices, etc.

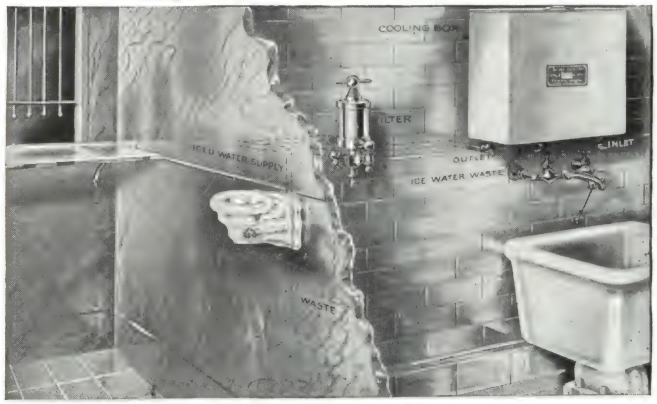


FIG. 5. TYPICAL "K-SYSTEM" WALL BUBBLER INSTALLATION
Note the absence of the unsightly, unsanitary and space wasting bottle cooler

FIG. 6. "K-SYSTEM" WALL TYPE FILTER-COOLER
Height, 18 in.; width, 20 in.; depth, 7 in. Holds 33 lbs. of ice (cracked). Inlet, ⅜ in.; waste, ½ in. Weight, 50 lbs.

"K-System" Wall Type Filter-cooler

Hung over a lavatory, this filter-cooler saves valuable space.

It is connected to the building water supply and wastes either direct from pipes in wall or from underside of lavatory.

Made of white enameled non-corrosive metal. Special finishes if desired.

Especially suitable for offices.

"K-System" Filter-coolers

The most sanitary and efficient water coolers made, displacing the unsightly, unsanitary and expensive bottle water cooler.

"K-System" filter-coolers provide under pressure, an unlimited supply of fresh, cold, filtered water, purified as it is drawn. They will not run dry and the water they deliver can not be contaminated by either air, dirt or ice.

The inexpensive filtrine disc is changed in 30 seconds—the operation is as simple as winding a watch.

"K-System" filter-coolers are connected to the building water supply and waste pipes, thus a constant delivery of pure, cold drinking water is obtained from an unlimited source. Both inlet and waste openings are located in the bottom of the tub and connections may be made in any manner desired. Classified in the plumbers' code the same as wash basins or refrigerators in so far as piping connections are concerned. Supply and waste connections not furnished by us.

The water from the building supply enters directly into a high pressure cooling cell located in the base of the ice reservoir. Ice does not come in contact with the drinking water. The cold water passes through our patented filter-faucet and is purified the instant it is delivered.

By simply lifting the removable porcelain tray the interior is readily accessible for ice filling and for cleaning. Ice reservoir is made of steel, well insulated with cork, and will not sweat.

Finished in white enamel, mahogany or oak.

Fitted with self-closing faucet and water pressure regulator.

FIG. 7. FILTER-COOLER
Over-all height, 4 ft. 10 in.; leg spread, 18 in. Weight, 60 lbs.

FIG. 8. BUBBLER FILTER-COOLER
Over-all height, 4 ft. 9 in.; leg spread, 18 in. Weight, 65 lbs.

"K-SYSTEM" FILTER-COOLERS
Inlet, ⅜ in.; waste, ½ in. Hold 23 lbs. of cracked ice. Waste water pail furnished when required

"K-System" Bubbler Filter-coolers—Our filter-coolers can be furnished with our vertical flow sanitary bubblers as shown in Fig. 8. If desired, a filter-faucet can be furnished in addition to the bubbler, affording an ideal *combination* for both sanitary drinking fountain use and for filling glasses.

Partial List of "K-System" Users

BANKS—Irving National Bank, Mechanics & Metals National Bank, Pacific Bank and branches, Guaranty Trust Co., New York, N. Y.

STORES—Oppenheim, Collins & Co., Brooklyn, N. Y.; L. Bamberger & Co., Newark, N. J.; Charles Broadway Rouss, Butler Bros., New York, N. Y.

GROCERS—Atlantic & Pacific Tea Co., Jersey City, N. J.; Austin, Nichols & Co., Brooklyn, N. Y.; Francis H. Leggett & Co., R. C. Williams & Co., New York, N. Y.

BOTTLERS—LaManna, Azema & Farnan, Alart & McGuire, Brooklyn, N. Y.; Peter Breidt Co., Elizabeth, N. J.; Kalak Water Co., New York, N. Y.

MOTION PICTURES—Nicholas Kessel Laboratory and Selznick Pictures, Fort Lee, N. J.; Goldwyn Pictures, Culver City, Cal.; Famous Players, New York, N. Y.

INSURANCE COMPANIES—Mutual Benefit Life Insurance Co., Newark, N. J.; Metropolitan Life Insurance Co., New York, N. Y.; Travelers Insurance Co., Hartford, Conn.

STEAMSHIPS—Clyde-Mallory Line, Munson Line, United Fruit Co., U. S. Mail Steamship Co., United States Lines, New York, N. Y.

LITHOGRAPHERS—American Lithographic Co., Stockinger Photo Engraving Co., Powers Colortype Co., Walker Engraving Co., New York, N. Y.

MISCELLANEOUS—Hotel St. Regis, Hotel Breslin, Whyte's Restaurant, National Cloak & Suit Co., Underwood Typewriter Co., New York Telephone Co., Linde Air Products Co., Texas Co. and Cunard Steamship Co. Building, New York, N. Y; Silsbee's Restaurant, Brooklyn, N. Y.

ESTABLISHED 1880

LOOMIS-MANNING FILTER DISTRIBUTING CO.

1431 South 37th Street
PHILADELPHIA, PA.

CABLE ADDRESS
"LOMISMAN," W. T. U. Code

BRANCH OFFICES
NEW YORK, N. Y., 10 East 43rd Street
BOSTON, MASS., 53 State Street
BALTIMORE, MD., 420 Law Building

Products

WATER FILTERS, and FILTRATION SYSTEMS, Patented, for the cleansing and purification of water supplies for all purposes. Water freshly filtered and made bright, clean, free from all suspended matters; free from odor, taste or iron stains; and safe for drinking, domestic and manufacturing purposes.

Also Filter Parts, Crushed Quarried Quartz, specially prepared Bonechar, Alum.

TRADE-MARK

Design of Loomis-Manning Filter

In accomplishing results of the great refinement mentioned above, a filter extracts and collects large quantities of foreign matter from the water. It is obviously necessary that these accumulations must be gotten rid of at regular intervals if a filter is to do good work *continuously*.

Thus the most important feature of the filter—and this can not be emphasized too strongly—is the cleansing of the filter bed. It bears the same relation to a filter that a mainspring does to a watch.

The cleansing of a Loomis-Manning filter is brought about by moving the operating lever over a plainly marked dial. The resulting action is shown by the cuts below illustrating our glass working model in actual operation.

This is the only filter which shows behind glass how it works so that any one can recognize its thoroughness.

OPERATION DURING WASHING PROCESS

The reverse current of water through the filter pushes the filter bed through the Loomis Cutting Plate which breaks up the mat of impurities and prevents the filtering material from gathering into lumps or masses. Every grain of the filtering material is separated and scoured while the bed vigorously agitates in a space twice as great as it occupies when in the filtering position.

The filter is also unique because the bed rests on a screen system extending over the *full area* of the filter chamber, allowing the free passage of water but retaining the fine, uniform filtering material. No heavy, stagnant gravel is used. Filtration is uniform throughout the entire bed. A perforated diaphragm at the top (Loomis Confining Plate) prevents the filtering material from washing out of filter, and also prevents entrance of large particles when filtering.

Operation of Loomis-Manning Filter

Simpleness of operation is an important factor in obtaining good results. The Manning Single Controlling Valve reduces the care of the filter to moving one lever. All mistakes are avoided.

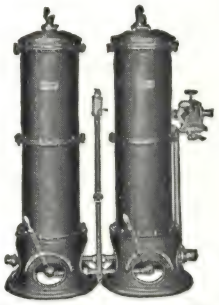
The lever moves over a plainly marked dial to four stations: (1) "Filtering," water being filtered and passing to supply of house or building; (2) "Washing," water reversed through filter, cleansing filter bed and discharged to waste; (3) "Filtering to Waste," water being filtered and discharged to waste (this position used after washing before turning filter into regular service); (4) "By-pass," water passing through filter valve without being filtered, an emergency station.

Construction of Loomis-Manning Filter

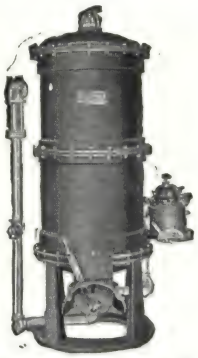
The whole makeup of the filter is most substantial and durable as shown by this "specification cut":

LOOMIS-MANNING FILTER

Continued on next page



Double Cylinder Filter
Nos. 37, 47, 57



Single Cylinder Filter
Nos. 67 to 97

Double Cylinder Filter
Nos. 107, 112, 117

Double Cylinder Filter
Nos. 67, 77, 87, 97

Hot Water Filtration

To remove the dirt and discoloration often present in hot water we have devised a practical and well-tried special filter system. In the case of circulation systems there is no stoppage of the circulation. We fit them in with the existing hot water equipment and are always glad to submit data and plans to meet any situation.

Swimming Pool Filtration

The popularity of swimming pools has made it necessary to provide a means for economizing water and heat, and at the same time keep the pool in clean, sanitary condition. There are many phases to this subject, such as the arrangement of pipes, size of equipment, rate and frequency of circulation, sterilization, etc. The information we have is at your disposal. Plans and suggestions for the entire installation are gladly furnished.

Specifications for Loomis-Manning Filters

Suggested Specifications—Furnish and erect where shown on plans or where directed (*w*) No. (*x*) Style (*y*) Loomis-Manning filter (*s*) having a capacity of (*x*) to (*x*) gals. of bright, clear water a minute. Filter shall be constructed of cast iron (*z—porcelain lined.*)

Each filter cylinder shall be equipped with a solid bronze Manning Single Controlling Valve operated by a nickelplated lever moving over a marked indicating dial to stations, "Filtering," "Filtering to Waste," "Washing," "By-pass."

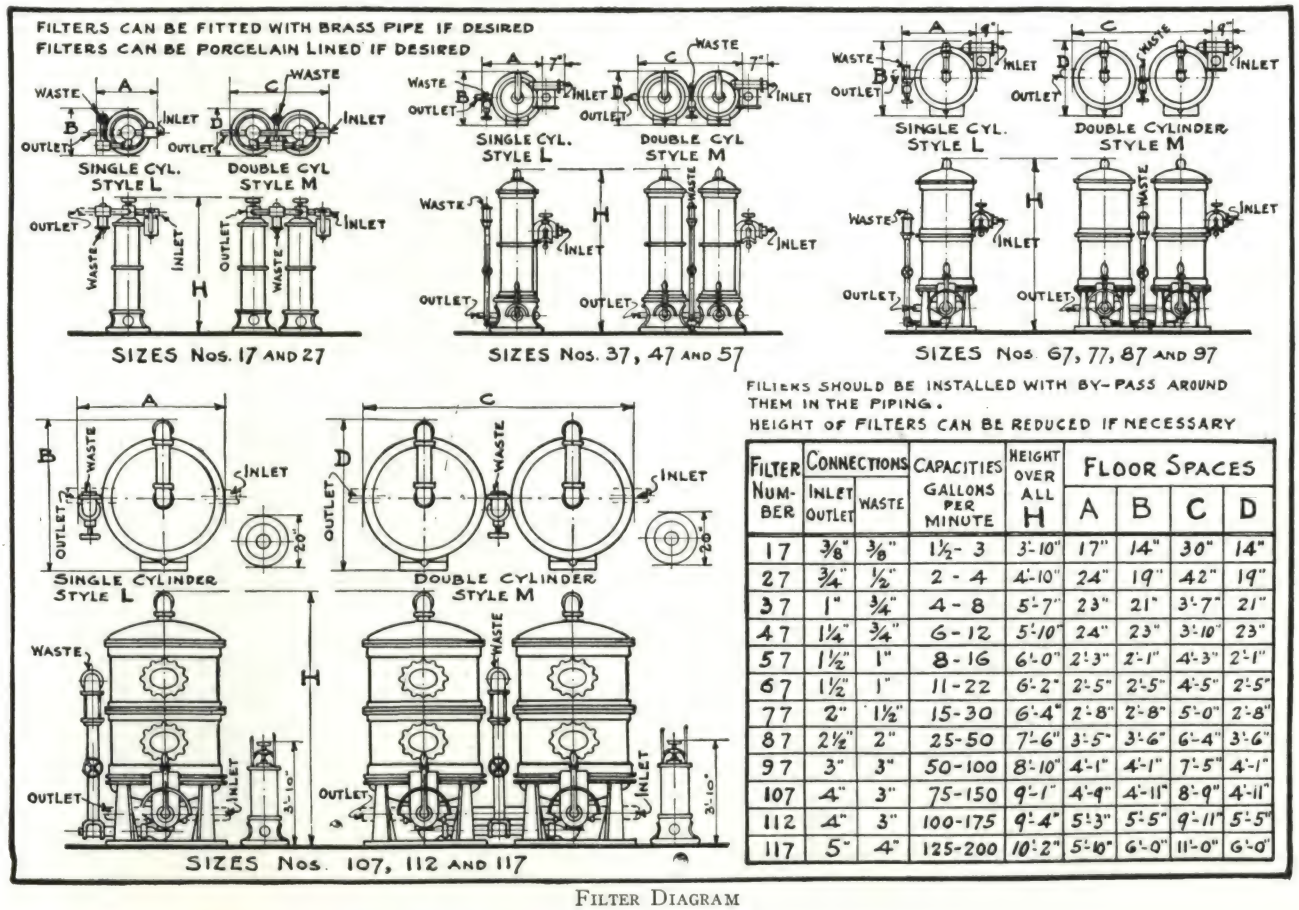
There shall be provided at bottom of filter cylinder a sand-tight system of screens; at top, Loomis Confining Plate; and just above filter bed, Loomis Cutting Plate—all of these shall extend over *full area* of cylinder and shall be such that it is mechanically impossible for filtering material to escape out of filter either when filtering or washing.

Filter(s) shall be charged with best materials for filtering water in question, but material must be of a uniform size without any gravel.

Filter(s) shall be fitted with galvanized wrought iron pipe and cast iron fittings (or brass if desired—*z*); with a sight glass on waste line; with coagulant feeding device if needed; with air and drain cocks; and with directions for operating.

Construction shall be guaranteed by the manufacturer for one year after filter is put into service.

"*w*"—Number of units.
"*x*"—Size (see table below).
"*y*"—Style L or M (see table below).
"*z*"—Porcelain lining and brass pipe are optional extra refinements.



Filter Number	Connections Inlet Outlet	Waste	Capacities Gallons per Minute	Height over all H	Floor Spaces A	B	C	D
17	3/8"	3/8"	1½- 3	3'-10"	17"	14"	30"	14"
27	3/4"	½"	2 - 4	4'-10"	24"	19"	42"	19"
37	1"	3/4"	4 - 8	5'-7"	23"	21"	3'-7"	21"
47	1¼"	3/4"	6 - 12	5'-10"	24"	23"	3'-10"	23"
57	1½"	1"	8 - 16	6'-0"	2'-3"	2'-1"	4'-3"	2'-1"
67	1½"	1"	11 - 22	6'-2"	2'-5"	2'-5"	4'-5"	2'-5"
77	2"	1½"	15-30	6'-4"	2'-8"	2'-8"	5'-0"	2'-8"
87	2½"	2"	25-50	7'-6"	3'-5"	3'-6"	6'-4"	3'-6"
97	3"	3"	50-100	8'-10"	4'-1"	4'-1"	7'-5"	4'-1"
107	4"	3"	75-150	9'-1"	4'-9"	4'-11"	8'-9"	4'-11"
112	4"	3"	100-175	9'-4"	5'-3"	5'-5"	9'-11"	5'-5"
117	5"	4"	125-200	10'-2"	5'-10"	6'-0"	11'-0"	6'-0"

Filter Diagram

ROBERTS FILTER MANUFACTURING CO.

MAIN OFFICE AND FACTORY

DARBY, PA.

NEW YORK OFFICE, 949 Broadway (Fuller Building)

KANSAS CITY OFFICE, 307 Mutual Building

Products

ROBERTS FILTERS, FILTRATION PLANTS and FILTER APPLIANCES for every water purification requirement.

Types and Uses

Pressure type and gravity type filters, with capacities from 1 gal. per hour to 1,000,000 gals. an hour and larger.

Filters for residences, apartment houses, hotels, institutions, hospitals, swimming pools, industrial drinking water systems, mills and factories, water works and municipalities.

See table below, classifying filters as to type of service.

CLASSIFICATION AS TO TYPE OF SERVICE

Type of Service	Roberts Germproof Stone Filters	Vertical Pressure Filters								Horizontal Pressure Filters	Wood Tank Gravity Filters	Rectangular Concrete Gravity Filters
		Style D	Style M	Style E	Style O	Style G	Style H	Style L				
Individual faucet use	x											
Residences (small and medium)		x	x	x								
Residences (large)				x	x							
Apartment houses				x	x	x						
Hotels and institutions				x	x	x	x	x				
Theaters		x	x	x	x	x						
Department stores				x	x	x		x				
Swimming pools (ordinary)				x	x	x	x					
Swimming pools (large)								x		x	x	x
Factory drinking water systems		x	x	x	x		x					
General industrial use				x	x		x	x		x		
Large industrial water supply									x	x	x	x
Town or city water works									x	x	x	x

Operation

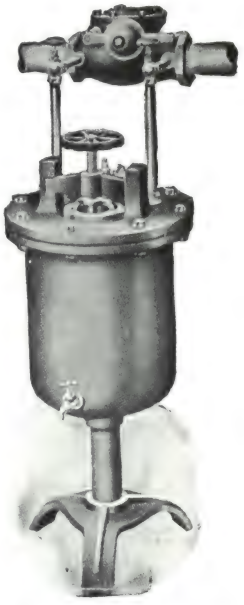
Water enters filter at top, passing downward through the filter bed, collects in strainer system at bottom and discharges through outlet.

Filter bed consists of specially graded pure silica sand, resting on graded silica gravel. In some cases quartz, marble, or refined bone charcoal are employed. Attached to inlet line of filter there may be (and usually is) employed a Roberts automatic coagulant feeder, which accurately feeds a slight quantity of alum into the raw water.

In all vertical pressure filters, except Styles "H" and "L," the entire operation is governed by the Roberts single control valve.

Cleaning of all Roberts filters is thoroughly and easily accomplished by a reverse flow of water, which lifts and "liquefies" the sand bed, scouring it on itself and flushing the removed matter to the sewer.

A sight glass on the waste line indicates when the washing is complete.



ROBERTS' AUTOMATIC COAGULATED FEEDER

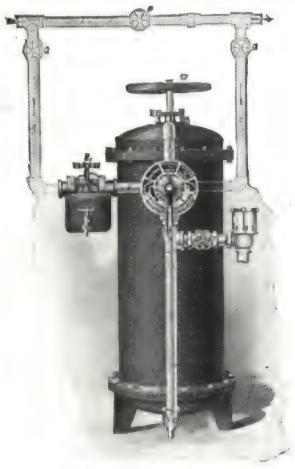
Roberts Style "D" Filter

The model household filter. Made in 12-in., 16-in. and 20-in. sizes. Cast iron construction. Equipped with coagulant feeder, single control valve, sight glass. Also has agitator, operated by hand wheel, which is used during washing to assist in breaking up the filter bed.

ROBERTS' SINGLE CONTROL VALVE

Roberts Style "M" Filter

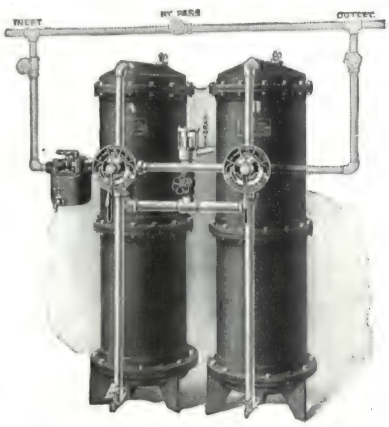
Widely used in residences of the better class. Consists of two cast iron filters, connected *in tandem* for double filtration. First cylinder charged with sand and ground marble; second cylinder with refined bone charcoal. First cylinder removes suspended matter; second cylinder reduces or removes odor, taste and color. Equipped with single control valves, sight glass and coagulant feeder. Made in 12-in., 16-in. and 20-in. sizes.



STYLE "D" FILTER

Roberts Style "E" Filter

Cast iron construction—in sections. Can readily be taken through small doorways. Equipped with coagulant feeder, single control valve and sight glass. Filling and inspection hole (4-in.) in top; larger sizes also have standard man-



STYLE "M" FILTER

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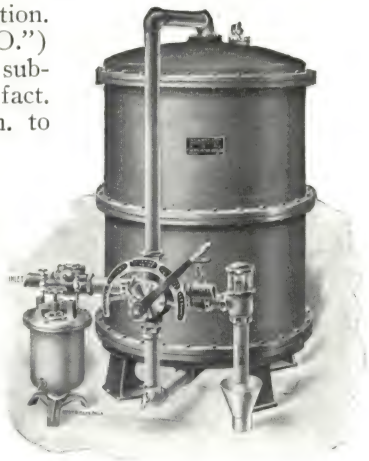
hole in each shell section. (See illustration Style "O.") Pleasing appearance; substantial in looks and in fact. Made in 9 sizes, 12 in. to 60 in.



STYLE "E" FILTER

Roberts Style "O" Filter

Consists of two Style "E" filters connected *in tandem* for double filtration. Principle similar to Style "M," but larger units. Two Style "G" or Style "H" units may also be connected up as a double filter. Specially adapted for waters containing dissolved color, taste and odor. Made in 6 sizes, 24 in. to 60 in.

STYLE "O" FILTER

Roberts Style "G" Filter

Steel construction; top head bumped convex, bottom head concave. Equipment and connections similar to Style "E." Handhole in top, manhole in shell. Made in 5 sizes, 30 in. to 60 in.

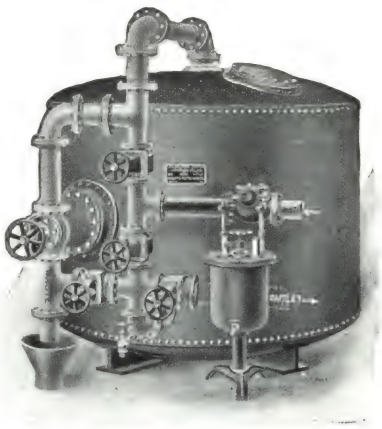
STYLE "G" FILTER

Roberts Style "H" Filter

Same as Style "G," except single control valve omitted. Operation controlled by 5 gate valves. Connections as illustrated on Style "L." Made in 5 sizes, 30 to 60 in.

Roberts Style "L" Filter

Steel construction; both heads bumped convex. Filtered water collector system consists of central manifold, laterals and strainers; all but the strainers to be embedded in concrete. Equipped with gate valve control, coagulant feeder and waste funnel. Manhole in top and shell. Made in 72-in., 78-in., 84-in. and 96-in. sizes.



STYLE "L" FILTER

Roberts Stone Filters

For individual faucet use. Capacities 1 gal. to 60 gals. per hour. Prices $3.25 to $48.00. Over 500,000 in use.

Catalogue on request.

Other Types

Horizontal pressure filters, wood tank gravity filters and rectangular concrete gravity filters for large installations. Full data on request.

VERTICAL PRESSURE FILTERS, DIMENSIONS AND CAPACITIES

Size (inside diam.) in.	Filtering area, sq. ft.	Capacity gals. per min.*				Height overall in.	Pipe connections in, †		Floor space, ft.
		Unit rate 2	Unit rate 3	Unit rate 4	Unit rate 5		Inlet and outlet	Waste to sewer	
12	.78	1.56	2.34	3.12	3.90	58	1	1¼	3 x2½
16	1.39	2.78	4.17	5.56	6.95	63	1	1¼	3 x3
20	2.19	4.38	6.57	8.76	10.95	64	1	1¼	3 x3
24	3.14	6.28	9.42	12.56	15.70	64	1¼	1½	3¼x3
30	4.91	9.82	14.73	19 64	24.55	74	1½	2	4½x3
36	7.07	14.14	21.21	28.28	35.35	76	2	2½	5 x3½
42	9.62	19.24	28.86	38.48	48.10	78	2	2½	6 x4
50	13.63	27.26	40.89	54.52	68.15	79	2½	3	6½x5
60	19.63	39.26	58.89	78.52	98.15	82	2½	3	7 x5½
72	28.27	56.54	84.81	113.10	141.40	94	3	4	8½x6½
78	33.17	66.34	99.51	132.70	165.90	96	3	4	9 x7
84	38.48	76.96	115.40	153.90	192.40	98	4	5	10 x7½
96	50.26	100.50	150.80	201 00	251.30	100	4	5	10½x8½

*See "Notes on Specifications."
†Special or oversize connections can be furnished.

Notes on Specifications

Specify filters by *inside diameter*. If diameter is not specified, the term "capacity" is meaningless unless accompanied by the following "at a unit rate of filtration not exceeding .. gals. per min. per sq. ft. of effective cross-sectional filter area." Example: A 42-in. (inside diameter) filter has an area of 9.62 sq. ft. (42-in. circle) and at a unit rate of 4 has a capacity of 38.48 gals. per min.; while at a unit rate of 3, capacity is 28.86 gals. per min.

The *unit* rate of filtration that may be safely employed in a given case is determined by two factors: (a) the character of the raw water, and (b) the quality of filtered water desired. When bacterial efficiency and complete clarification are desired, a 2-gal. unit rate is the maximum. For clarification of a turbid water use a 2-gal. unit rate; of a slightly turbid water, a 3-gal. unit rate; and of a good water (such as New York City) a 4- or 5-gal. unit rate. For recirculating *swimming pools* the standard unit rate is 3. *No unit rate in excess of 5 gals. should ever be employed.*

In filter practice, the accepted meaning of clarification is the removal of practically all suspended matter visible to the naked eye, rendering the water bright, clear and sparkling.

Capacity of a double filter (two cylinders *in tandem*) is that of a single filter of same diameter cylinder.

Always specify maximum pressure to which filters will be subjected in operation.

Roberts standard cast iron filters are built for a working pressure of 65 lbs. and tested to 100 lbs.; steel filters are for working pressure of 100 lbs. and tested to 150 lbs. Filters for higher pressures supplied, where required.

Catalogues, etc.

Catalogues and special bulletins on request.

THE NEW YORK CONTINENTAL JEWELL FILTRATION COMPANY

East Centre Street
NUTLEY, N. J.

BRANCH OFFICES

NEW YORK, N. Y., 45 East 17th Street — CHICAGO, ILL., 111 West Monroe Street — MONTREAL, CAN., New Birks Building

Member of Associated Manufacturers of Water Purifying Equipment

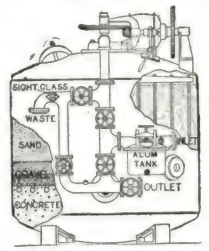
Products

WATER FILTERS, both Pressure and Gravity Types, for all purposes for which pure water is desired, including the "New York," "Continental," "Jewell," "Warren," "Hyatt," "Blessing," "American" and "National."

Principles of Filtration and Their Application

Pressure filters can be connected into any pressure line without double pumping equipment.

Unless there is a storage tank to contain filtered water and take care of peak loads, filter should be large enough to take care of the maximum consumption figured on a per minute basis, irrespective of the average or total use for any longer period. There is an additional advantage in a storage tank, in that filter may then be washed with filtered water. If there is no storage tank and conditions are such that filter can not be cut out of service for daily washing periods, filtration plant should consist of more than one unit, so that it may be cleaned without shutting off entire supply of filtered water. In order to suspend and disintegrate the bed and wash filter quickly and economically, water should be introduced into filter under pressure of about 15 lbs. Volume of water required per square foot of surface area of filter bed per minute, varies from 6 to 12 gals. per minute, according to construction of filter.



"JEWELL" VERTICAL PRESSURE FILTER

All sizes, 30" to 120" inc. Steel tank. Cast iron flanged piping. Alum tank. Sight glass. Revolving rakes for breaking up bed during washing process. For hand operation, motor or belt drive, as specified

"NEW YORK" HOUSE FILTER

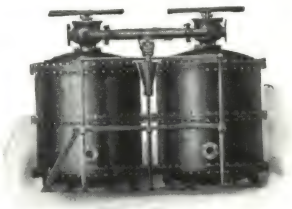
Sizes 12", 16", 20" and 24". Cast iron tank. Brass operating valve. Alum tank. Sight glass. Hand operated rake for breaking up bed during washing process

"CONTINENTAL" STEEL FILTER

All sizes, 30" to 96" inc. Steel tank. Five-way operating valve. Alum tank. Sight glass or funnel for waste discharge. Also made double (two tanks, double filtration, via sand and bone char). Can be equipped for "air wash."

IMPROVED "NEW YORK" SECTIONAL WASH VERTICAL PRESSURE FILTER

All sizes, 30" to 120" inc. See schedule. Steel tank. Cast iron flanged piping. Alum tank. Sight glass. Washed in sections. No rakes or air required



CAST IRON "CONTINENTAL" FILTER

Sizes, 14", 20", 24", 30", 36", 42", 48", 54", and 60". Cast iron tank. Five-way operating valve. With or without alum tank. Sight glass or funnel for waste discharge. "Single" filters for "single filtration." "Double" filters for "double filtration," via sand and bone char. Can be equipped for "air wash"

The chief difference in the several types and makes of pressure filters, aside from quality of materials and minor points of construction, is in the adjuncts to reversed flow of water for "washing" or cleaning filter.

Examples—A 48-in. filter, having an area of 12½ sq. ft. without sectional wash, air wash, revolving rakes, or other means of breaking up the bed of filtering material, would require 12 gals. per sq. ft. or 150 gals. per minute; same size filter, with a proper air wash or rakes, would require only 8 gals. per sq. ft. or 100 gals.; and with Hyatt sectional wash, same size filter could be washed with only 6 gals. per sq. ft. or 75 gals. per minute.

Construction

Our construction is in accordance with the standards of the Associated Manufacturers of Water Purifying Equipment as shown on page 1490.

Capacity

The capacity of a filter depends upon area of top surface of filter bed. All filters of the same area are of the same capacity. Capacity, as applied to a filter, means the rate at which filter will pass water of a certain character with a specified result.

CAPACITIES OF FILTERS AT VARIOUS RATES

Size of filter, inside diameter	Capacity, U. S. gals. per minute				Approximate floor space required	Approximate weight in operation, lbs.
	At 2 gals. per sq. ft. per minute. For 97% bacterial efficiency	At 3 gals. per sq. ft. per minute. For re-filtration, swimming pools, etc.	At 4 gals. per sq. ft. per minute. For clarification. 95% iron removal (See note below)	At 5 gals. per sq. ft. per minute. For removing suspended matter		
12"	1.57	2.35	3.14	3.92	1' 7" x 2' 9"	800
14"	2.12	3.18	4.24	5.30	1' 10" x 2' 11"	1,020
16"	2.78	4.17	5.56	6.95	1' 10" x 3' 0"	1,250
20"	4.36	6.54	8.72	10.90	2' 0" x 3' 3"	1,725
24"	6.28	9.42	12.56	15.70	2' 5" x 3' 8"	2,480
30"	9.80	14.70	19.60	24.50	3' 4" x 3' 9"	3,700
36"	14.12	21.18	28.24	35.30	3' 4" x 4' 3"	5,200
42"	19.24	28.86	38.48	48.10	3' 9" x 5' 0"	6,800
48"	25.12	37.68	50.24	62.80	4' 3" x 5' 8"	8,950
54"	31.80	47.70	63.60	79.50	4' 9" x 6' 2"	11,000
60"	39.26	58.89	78.52	98.15	5' 3" x 6' 8"	13,700
72"	56.54	84.81	113.08	141.35	6' 3" x 8' 0"	24,000
84"	76.96	115.44	153.92	192.40	7' 5" x 9' 2"	34,300
96"	100.54	150.81	201.08	251.35	8' 4" x 10' 2"	45,200

Note: For iron removal, if iron is in solution, provide preliminary aeration or specify "lime feeding device" or "Continental Double Cylinder Sand and Charcoal Filter." Note that a "double" filter consists of two tanks operated in tandem. Do not specify a "double" filter if two separate filters operated in parallel are desired. In specifying, always state maximum working pressure to which filter will be subjected. All standard filters up to and including 60-in. size carried in stock good for 100 lbs. working pressure; 60 in. and up also for 65 lbs. working pressure. Specify which is desired. Steel filters for higher pressures made to order. Specify filters by diameter, and not by capacity only.

Referring to the above table of capacities, it should be borne in mind that the more slowly water passes through a filter, the more thorough the filtration. Increasing the rate decreases the efficiency. When the raw water is not contaminated the minimum rate above stated may be exceeded with safety.

These statements as to capacity and rate of filtration are in accordance with the report of the Filter Standardization Committee of the American Society of Mechanical Engineers, December, 1916:

"The permissible rate of filtration in any instance depends upon the character of the water to be filtered and the purpose for which the water is used. * * *

"Whenever the water is to be used for domestic purposes or to secure full bacterial purification, the capacity shall be based upon a rate of filtration not to exceed 2 gals. per min. per sq. ft. of filtering area and a coagulant must be used."

THE PERMUTIT COMPANY

Water Rectification Apparatus of Every Description

440 Fourth Avenue

NEW YORK, N. Y.

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Products

"PERMUTIT" WATER SOFTENERS.
Also Filters for every purpose. Special Apparatus.

Soft Water for the Home

A Permutit water softener system will give your clients a bountiful supply of sparkling soft water from every faucet in the house, no matter how hard and unsatisfactory the available supply is.

Permutit is a granular material on the order of sand that possesses the property of abstracting all the hardness from any water that is passed through it. The water softener is a metal tank containing Permutit, which removes all hardness from the water as it passes through. For years Permutit systems have been utilized industrially in mills, hotels, laundries, hospitals and similar places to render water pure, soft and clean for various exacting purposes. Hundreds of Permutit water softeners are in daily use in private homes, where soft water is supplied for drinking, cooking, washing and all domestic purposes. It is vastly superior to rain water and free from the dangerous contaminations found in cisterns.

Size

A Permutit water softener is a metal shell or tank, containing Permutit material, that is connected into the house supply line. It is offered in two sizes and six styles, which give an unlimited range of capacities according to the hardness of the water and quantity to be softened. Largest size requires 3 ft. x 6 ft. 6 in. floor space and 6 ft. headroom. Smallest size, 2 ft. x 5 ft. 6 in. floor space and 6 ft. headroom. This includes necessary room for operation.

Regeneration

Permutit material is not consumed by the softening process, but is regenerated periodically and used for an indefinite length of time. When it has softened its designated quantity of water, common cooking salt is run through the Permutit bed. The salt restores the Permutit material to its original condition, and after draining off the surplus, it is in exactly the same condition it was at the beginning. The amount of attention required is but a few minutes a week, and any one can learn to turn the necessary valves correctly.

Capacity

Softeners are customarily designed with capacities to operate a week to ten days between regenerations. Meters are not included in standard equipment but are furnished on order, as most houses have meters. Where no meters are used, the time for regeneration is determined by a soap test that is simple and accurate.

The capacity required for a given house is determined from the number of people in the household, the number of servants and probable number of guests. This information together with an analysis of the water supply, which we make free of charge, is sufficient to make an estimate.

Location

Softeners may be located in the basement or any other convenient spot, and can be connected into the water supply line by any plumber. They are usually placed directly in the main feed line with a simple by-pass arrangement of valves.

Sewer Connection

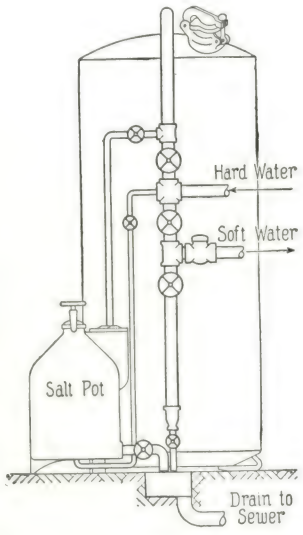
Sewer connection is customarily in the form of an open sump to avoid the backing up of sewer gases, but it is not necessarily confined to that form.

Pressure

Standard designs are constructed to operate under pressures up to 100 lbs. per sq. in. The normal pressure drop through the softener does not exceed 5 lbs.

Material and Workmanship

Softener shells are made of steel. All valves are of the Crane and Jenkins standard, and workmanship throughout is the highest quality. Our many refinements in design and construction make a Permutit softener a permanent and dependable fixture.



PERMUTIT WATER SOFTENER

Information Required for Estimates

To properly estimate the size, capacity and cost of a Permutit water softener for any household the following information is required:

(1) Number of people in house (including servants if any).
(2) Height of ceiling in basement or other location.
(3) Source of water supply, i. e., city, well, river, lake, etc.

If the water supply is that of any good sized city we have an analysis in our files, otherwise we need a half-gallon sample of water, forwarded preferably in glass. Earthenware may be used if clean.

WAYNE TANK & PUMP CO.

Manufacturers of Wayne Rapid-Rate Water Softening Systems

861 Canal Street
FORT WAYNE, IND.

An International Organization with Sales and Service Offices Everywhere

Products

WAYNE RAPID-RATE WATER SOFTENING SYSTEMS for Homes, Hospitals, Hotels, Laundries, Textile Mills, Power Houses and Institutions.

Also Measuring Pumps, Storage Tanks (from 20 to 20,000 gals.), Air Compressors, Oil Burning Systems, Furnaces and Forges, Oil Filtration Systems.

Wayne Water Softening System for the Home

This modern utility is built in 3 sizes for installation in private homes ranging from the small bungalow to the residence with several baths. Larger sizes are built when required. The Wayne system delivers soft water at the faucets under pressure direct from the mains.

Operation

The Wayne system operates on the filter principle. Containers are of riveted steel, built for 100 lbs. working pressure, thoroughly tested and fully guaranteed. The system is installed in the basement so that cold raw water direct from the mains passes through the system to the hot and cold water fixtures. No storage tanks are required. Separating all sill cocks, hydrants and water closets permits making the most economical installation, although separation of the toilets is not imperative.

Mineral

Wayne mineral is a durable base exchange silicate of almost instantaneous action for softening any hard water. The water is softened simply by contact as it passes through the mineral bed in the container. The calcium (lime) and magnesium (which cause water to be hard) are retained, thus producing a clear, soft, non-caustic water, fresh from the well or mains, suitable for drinking, cooking and other household uses.

Wayne System Regenerates in 15 to 20 Minutes

The water softening action continues until the system has reached its capacity. A reverse flow of water for 2 or 3 minutes then cleans the system after which the softening action is completely restored by placing a small amount of common salt in the system and flushing it through. The entire operation takes but 15 to 20 minutes. No salty taste remains in the soft water. The salt is not used to treat the water but simply to "condition" the mineral.

Selection of Size

We recommend installing a Wayne system of sufficient capacity to run one week on each regeneration. Thirty gallons per day per person is a fair estimate of the average consumption of soft water for all purposes (see capacity tables for the proper size).

It will be noted that the capacity of any size varies according to the hardness of the water to be softened. If full information as to water condition, hardness, etc., is not available, we will gladly send a shipping container for a sample of water and analyze it for you. This service is free and does not obligate you or your client in any way.

WAYNE WATER SOFTENING SYSTEMS

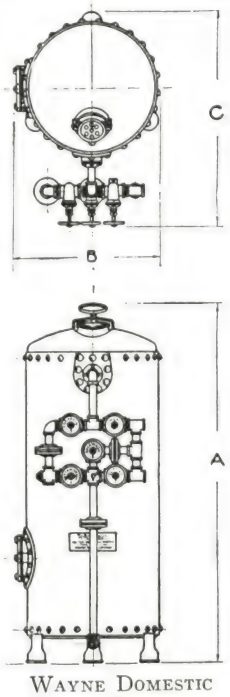
CAPACITIES

Size, in.	Gals. per* min.	Capacity, gallons per reconditioning					
		Hardness in grains per U. S. gal.					
		6	12	18	24	30	36
16	8½	1500	750	500	375	300	250
22	16	2900	1450	965	725	580	480
28	25	4750	2375	1580	1190	950	790

*Maximum service flow for water of hardness shown in above table

SIZES AND DIMENSIONS

Size, in.	Size of piping and valves, in.	Dimensions, in. (see diagram)			Approximate shipping weights, lbs.	
		A	B	C	Mineral and gravel	Softener and fittings
16	¾	60	19	27	450	355
22	1	62	25	33	800	475
28	1¼	65	31	40	1240	600



WAYNE DOMESTIC WATER SOFTENING SYSTEM

Installation

The Wayne water softening system should be placed in the basement where it will be convenient. Location near the water supply line will facilitate the installation work (making 3 connections—to the raw water inlet, the soft water outlet, and the drain). It is advisable to locate the system near an open floor drain, but if the basement floor is below the sewer line, the water may be expelled under pressure to an overhead drain. The drain and service lines should be the same size (see table) as the fittings on the softener, and as free from elbows or bends as possible.

Bulletins and Engineering Service

Bulletins and free engineering service giving information in greater detail covering any use of softened water will be supplied upon request. Ask for Bulletin No. 1600, which describes the Wayne water softening system for homes, or ask for special information for hotels, hospitals, power plants, textile mills or any other industrial installation.

THE BRYANT HEATER & MFG. COMPANY

Bryant Automatic Hot Water Storage Systems

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 103 Park Avenue
CINCINNATI, OHIO, 401 Mercantile Library Building
DENVER, COLO., 230 15th Street
CANTON, OHIO, 1607 Shorb Avenue N. W.
PITTSBURGH, PA., 1441 Potomac Avenue
CHICAGO, ILL., 15 East Van Buren Street
ST. LOUIS, MO., 1500 Central National Bank Building
COLUMBUS, OHIO, 600 Joyce Realty Building
TOLEDO, OHIO, 1503 Nicholas Building
PHILADELPHIA, PA., Bourse Building

FACTORY: 952 E. 72nd Street, CLEVELAND, OHIO

Product

BRYANT AUTOMATIC HOT WATER STORAGE SYSTEMS.

For Bryant Gas Boilers for Hot Water, Steam and Vapor Heating, and Low Pressure Steam for manufacturing purposes, see page 1668.

General Description

A rugged and highly efficient system, the main unit of which is the Bryant tubular gas boiler described on page 1668.

Suitable for: Office buildings, apartments, restaurants, hotels, hospitals, clubs, factories, public garages, bottling works, dairies, ice cream plants and large residences.

A large supply of hot water is maintained in the tank at all times; and by means of automatic devices, the amount of water heated is proportioned to the demands made upon this supply.

The system is amply powerful to meet large and sudden demands; reliable and free from operating troubles and so rugged and durable as to serve practically a lifetime.

Bryant boilers are built almost entirely of cast iron. This, together with liberal designing of all parts, insures uncommon durability, ruggedness and freedom from shutdowns.

Read description of Bryant boilers; then write for literature giving information in detail.

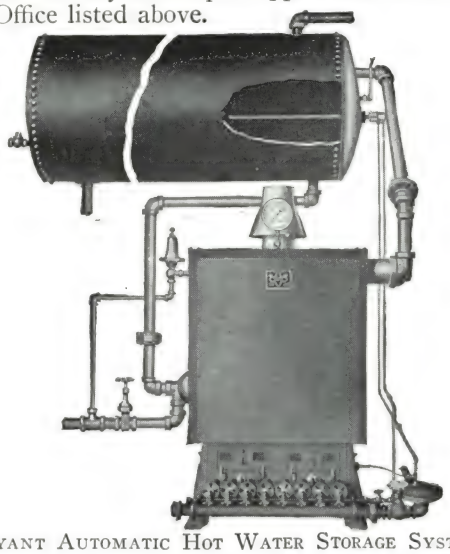
TUBULAR TRADE MARK

The Indirect Method—This method is recommended for heating "hard" water, a Bryant steam boiler being used to supply steam to a coil of pipes immersed in the water.

Bryant Service

Bryant representatives are ready to go anywhere, at any time, to furnish information.

Architects may obtain literature, technical data, or information of any kind upon application to the nearest Bryant Office listed above.



BRYANT AUTOMATIC HOT WATER STORAGE SYSTEM

CAPACITIES OF BRYANT HOT WATER STORAGE SYSTEMS

Boiler h. p.	Available B. t. u.	Boiler No. (Number of Sections, Series, Size Tapping)	Capacity, in gallons per hour raised							
			40°	60°	70°	80°	90°	100°	120°	140°
2.7	90,500	3—A—3	275	185	155	140	125	110	90	80
3.6	120,500	4—A—3	360	240	205	180	160	145	120	105
4.5	151,000	5—A—3	450	300	260	225	200	180	150	130
5.4	181,000	6—A—3	545	360	310	270	240	215	180	155
6.3	211,000	7—A—3	630	420	370	315	280	250	210	180
7.2	241,500	8—A—3	720	480	415	360	320	290	240	205
9	305,000	9—A—4	920	610	530	460	405	370	305	230
11	372,000	11—A—4	1120	735	645	560	495	450	370	280
13	439,000	13—A—4	1320	880	760	660	585	530	440	330
15	506,000	15—A—4	1520	1020	870	760	675	610	505	380
17	573,000	17—A—4	1720	1150	985	860	765	690	575	430
19	640,000	19—A—4	1920	1280	1100	960	850	770	640	480
21	707,000	21—A—4	2120	1410	1210	1060	940	850	705	530
23	774,000	23—A—4	2320	1540	1330	1160	1030	930	775	580
25	840,000	25—A—4	2520	1680	1440	1260	1120	1010	840	630
27	908,000	27—A—4	2720	1820	1560	1360	1210	1090	910	680
29	975,000	29—A—4	2920	1950	1670	1460	1300	1170	975	730
31	1,041,000	31—A—4	3130	2080	1780	1565	1390	1250	1040	780
33	1,109,000	33—A—4	3330	2220	1900	1665	1480	1330	1110	830
35	1,176,000	35—A—4	3530	2350	2010	1765	1570	1410	1175	880
37	1,242,000	37—A—4	3730	2480	2130	1865	1650	1490	1240	930
39	1,310,000	39—A—4	3930	2620	2240	1965	1740	1570	1310	980
41	1,377,000	41—A—4	4130	2750	2360	2065	1830	1650	1375	1030

AMERICAN HEATER CORPORATION

Manufacturers of Automatic Gas Fired Heaters

EXECUTIVE OFFICE AND PLANT
Sixth and Carr Streets
ST. LOUIS, MO.

Represented in all cities throughout the United States by the Principal Jobbers of Plumbing Supplies

Products

AMERICAN AUTOMATIC INSTANTANEOUS HEATERS.
AMERICAN AUTOMATIC STORAGE HEATERS.
AMERICAN COMBINATION HEATERS.

American Automatic Instantaneous Heater

The design of the American heater incorporates cardinal features that make it the most powerfully efficient and economical heater ever devised. These features are patent to the "American" alone. They include a combustion chamber which not only shields the burners and the pilot light from condensation, but through their unique location are constantly kept cool and can not become overheated. The primary and secondary air is so regulated that complete combustion is effected, resulting in the greatest heat obtainable from the gas. This heat is conserved by means of a scientifically wound coil so graduated that the spaces between the outer winds are wider apart than those of the inner, which causes the heat to be diverted from the center to the outer layers of coil where the greatest heating area obtains.

The upper portion of the coil is kept constantly cool by the incoming water so that as the heat rises it is gradually taken up and absorbed until by the time it reaches the flue it has been reduced to a negligible temperature. In short, the American heaters render the highest efficiency that it is possible to obtain from fuel gas.

While admittedly the most efficient heater on the market in point of heat conservation, it moreover, by its protective features, is the most durable and economical of heaters, as its vital parts are protected against the corrosive features of condensation so prevalent in a highly efficient water heater.

The automatic mechanism exercises full control over both the flow and the temperature of the water and is so graduated as to take care of fluctuations in the hot water temperature to as low as 4° Fahr.

The workmanship and the finish of all parts, inclusive of the jacket, will stand the most rigid scrutiny. Every part is strictly interchangeable and all pipe work and fittings are of standard iron pipe size, Briggs standard thread, so that repairs can be made in the majority of cases by a plumber, without recourse to the manufacturer.

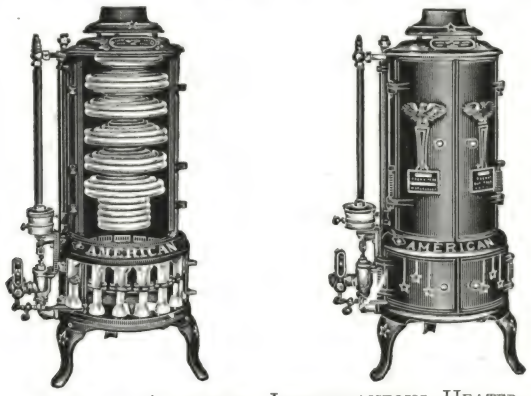
American Beauty Heater

The American Beauty heater is designed to fill a long felt want; an instantaneous automatic heater, beautiful enough to be placed either in a kitchen or bathroom.

The working parts have all the well-known and exclusive features contained in the regular American line. The heater has full length cast iron fire liners with a 1-in. dead air space between the liners and the heater jacket. The jacket is finished in white porcelain, with trimmings of an exquisite pearl gray blue. It is the most handsome and efficient heater ever designed.

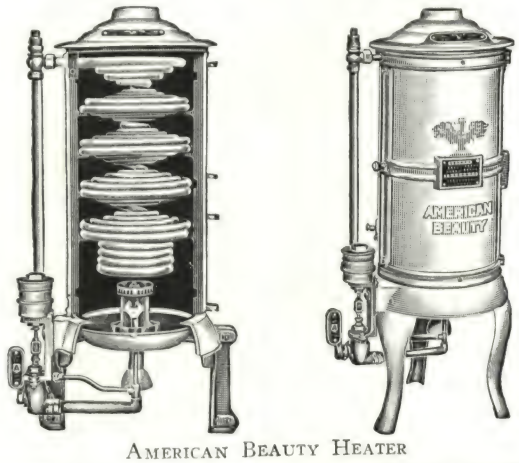
The operation is entirely automatic, the opening of a faucet causing the heater to light, and the closing of a faucet causing the gas to close off. It is not thermostatic, but is equipped with a regulating device to prevent the water from overheating beyond a given point.

It has but one burner, which is located in the center of the heater, protected by a deflecting plate located immediately above it, which deflects the water of condensation into the evaporating pan without contacting with the burner or gas supply. It is adapted for either natural or artificial gas and either legs or brackets.



AMERICAN AUTOMATIC INSTANTANEOUS HEATER

Size No.	Gals. per minute	Water connection, in.	Diameter at base, in.	Gas inlet, in.	Height, in.	Shipping weight, lbs.
2½	2½	½	16	¾	47	210
3	3	½	18	1	49	300
4	4	½	20	1	48	350
6	6	¾	28	1¼	54	510
8	8	1	28	1½	58	620



AMERICAN BEAUTY HEATER

Size No.	Gals. per minute	Diameter at base, in.	Height, in.	Shipping weight, lb.
A. B.	2½	17	43	175

Continued on next page

American Automatic Storage Heater

The heater coils used in this heater are of cast iron, presenting a maximum heating surface with ample water space to prevent liming and consequent choking. Ready access is provided so that the interior may be thoroughly cleaned out should residue accumulate.

These coils are cast in separate units and bolted together through the center by means of two steel stud bolts, the joints being machine faced and provided with a special heatproof gasket so that they can be readily taken apart should the necessity arise.

Between each coil unit is placed a circular baffle plate having a triangular shaped baffle which diverts the heat completely around the heating surface of the coils, providing a heat influence and consequent efficiency higher than that obtaining in any other design of storage heater.

Heater with Jacket and Baffles Removed

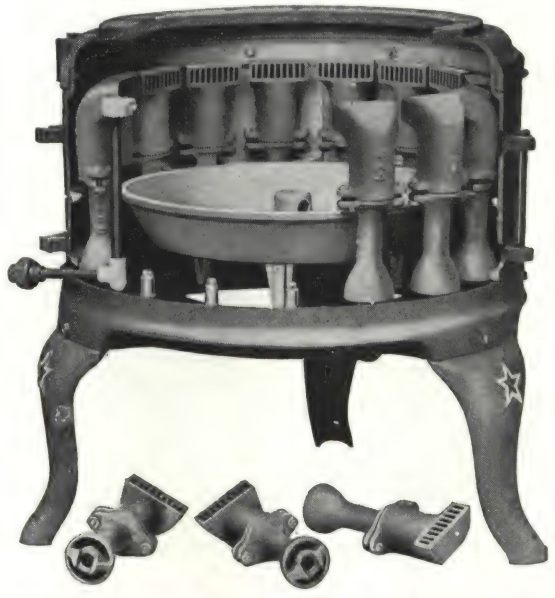
Storage Heater Complete with Insulated Jacket

AMERICAN AUTOMATIC STORAGE HEATER

Size No.	Gals. per hour	Diam. at base	Height, in.	Shipping weight, lbs.	List price
100	125	15	50	400	$175.00
200	250	19	55	630	225.00

No. 100 Heater with 100- or 150-gal. boiler.

Suitable for residences having 3 to 5 bathrooms, bedroom lavatories, kitchen and pantry sinks and laundry tubs.



DETAIL OF COMBUSTION CHAMBER USED IN AMERICAN HEATERS

No. 200 Heater with 200- or 250-gal. boiler.

Suitable for residences having 5 to 8 bathrooms, kitchen sink, mechanical laundry, or apartment buildings with 6 to 12 apartments of 5 to 3 rooms each.

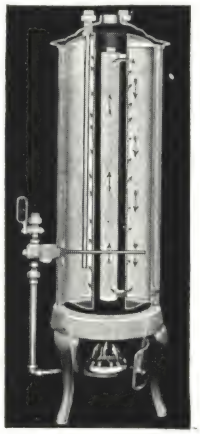
"American Daisy" Combination Heater

This type of heater is a composite of a storage tank with an internal heating element. It is designed to operate where local conditions would not be favorable to an instantaneous heater, such as low water pressure, inadequate gas volume, and waters containing lime. alkali or other deleterious elements in solution.

It has full thermostatic control, an unequalled efficiency, and combines the advantages of an instantaneous with a storage system. The structure comprises a galvanized heavy steel tank, through the center of which is carried a flue containing an additional heating element parallel with the flue. Both heating elements are readily accessible for the removal of any residue that may accumulate. An adequate supply of water is always in reserve for immediate use. The tank is insulated with asbestos air cell packing, covered with a steel jacket, and highly finished in baked white enamel with gold relief.

The burner used takes its air by vacuum induction after the gas leaves the nozzle orifices. It is proof against back firing and consequent carbonization. The same care is exercised in its finish as that of the "American Beauty" and it is equally handsome in appearance.

It is especially adapted for bungalows, small homes and flats. Its low price makes it extremely popular with people of moderate means.



Sectional View

Exterior View

"AMERICAN DAISY" COMBINATION HEATER

Size No.	Dimensions over all, in.	Cold water supply, in.	Hot water outlet, in.	Gas supply, in.	Gals. capacity per hr.	Net storage hot water instantly available, gals.	Deg. raised Fahr.
18	16x42	¾	¾	½	55	11¼	60
24	16x54	¾	¾	½	60	16½	60
32	16x66	¾	¾	½	65	22	60
42	18x66	¾	¾	¾	65	30	60
52	20x66	¾	¾	¾	75	40	60

Model Specifications

Install where indicated on plans ——, No. ——, American Automatic Water Heater, Type ——.

Connect gas and water lines and flue pipe in accordance with printed directions provided by the AMERICAN HEATER CORPORATION, using no less diameter pipe than specified by them Connect to separate flue, if available.

BASTIAN-MORLEY CO.

Manufacturers of Storage Gas Water Heaters

LA PORTE, IND.

SALES OFFICES WITH OPERATING DISPLAYS IN ALL PRINCIPAL CITIES

CANADIAN OFFICE: BASTIAN-MORLEY, LTD., TORONTO, ONT.

Products

AUTOMATIC and NON-AUTOMATIC STORAGE GAS WATER HEATERS.

TRADE-MARK

Specification Manual

Before preparing specifications for residential work, refer to your B-M specification manual or write for complete information.

Royal Automatic Storage Gas Water Heater

The Royal automatic is a storage water heater which maintains a constant supply of fresh, steaming hot water at minimum cost for gas because it heats water scientifically. Its operation is entirely automatic and it is built to give real satisfactory and enduring service.

The Royal has no coils nor gas wasting pilot light; it is limeproof, silent, odorless and safe.

Heating Element—The B-M patented spreader (Fig. 1) is the modern miracle of water heater design and is an exclusive feature of our heaters. It supplants the old-fashioned, troublesome coil or disc.

This ingenious device is placed directly above the main burner and thus receives the full force of heat from the hottest part of the fire. It brings the water, a little at a time, in direct impingement with this intense heat, thus the water boils violently and this agitation induces a constant thermo-syphon circulation that extends through the entire tank, preventing lime and sediment formations.

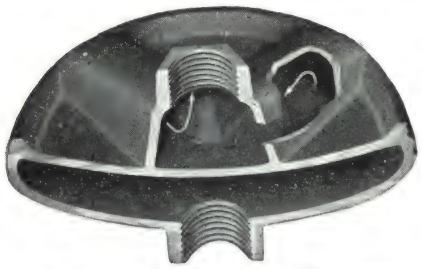


FIG. 1. B-M PATENTED SPREADER

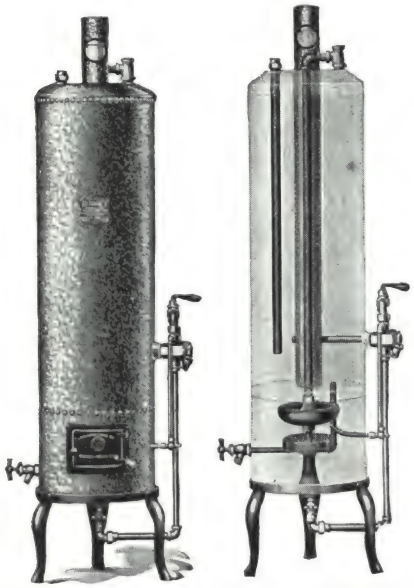


FIG. 2. NO. 32 ROYAL AUTOMATIC STORAGE GAS WATER HEATER

Thermo-valve—The supply of gas to the main burner is automatically controlled by the B-M thermo-valve (Fig. 3.) This automatic control eliminates the annoyance of lighting and extinguishing the gas by hand. The mechanism is absolutely reliable, very simple in construction and operation, and may be adjusted to maintain any desired temperature in the tank from 80° up to 200°.

Boiler Shell—Includes both storage tank and heating chamber. Made of extra heavy galvanized sheet steel. All circulating pipes are heavily galvanized. Boiler is both riveted and welded and tested to 150 lbs. working pressure.

Size Nos. 18 to 42 rest on substantial 10-in. 3-leg bases. Legs are of heavy cast iron fitted to cast flanged ring. Sizes 52 to 120 rest on ring stands with triangular legs (Fig. 5).

Finished in black japan. Smaller sizes may be installed on wall bracket (Fig. 4), if desired.

Heating chamber entirely enclosed by heat retaining drip pan which eliminates cold air drafts from below and takes care of any possible condensation.

Burner—The Royal burner is made in 3 parts of cast iron. A heavy gauze partitioning the distributing chamber prevents popping or flashing back into the mixture and insures an even flame over the entire burner plate. Burner fitted with standard mixer, assuring correct proportion of gas and air, and with a special gas cock so designed as to give a high nozzle velocity on low gas pressure.

Insulation—The Royal may be insulated either with plaster or patent jacket, if desired. The Royal thermos jacket saves 50% of the heat otherwise lost by radiation. Applicable to either Royal or Marvel heaters. Made of heavy felt, asbestos lined. Easily and quickly applied. No tools or paste required, being laced on. May be bronzed or painted. Furnished in all sizes.

Draft Regulator—Insures perfect ventilation, yet prevents heat loss. Also prevents down drafts, rendering complete immunity from burner troubles arising from this cause.

How the Royal Automatic Operates—It is only necessary to light the auxiliary burner, open gas cock to main burner and heater is in full operation. Being under automatic control, it requires absolutely no further attention.

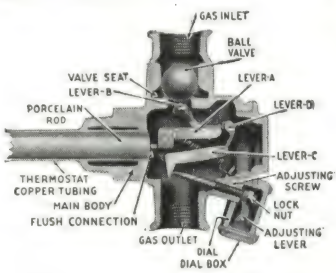


FIG. 3. ROYAL THERMO VALVE

FIG. 4. NO. 18 ROYAL BUNGALOW AUTOMATIC STORAGE GAS WATER HEATER

Bracket throws tank 6 in. from wall

Continued on next page

The main burner will continue to operate until all the water in the tank is heated to the thermostatically set temperature (130° adjustable). When this temperature is reached, the thermo valve shuts off the gas supply to main burner. The auxiliary burner, however, continues to cast its powerful little flame directly against the water spreader and this tiny jet (a trifle larger than the blaze of a match) maintains the tank temperature indefinitely.

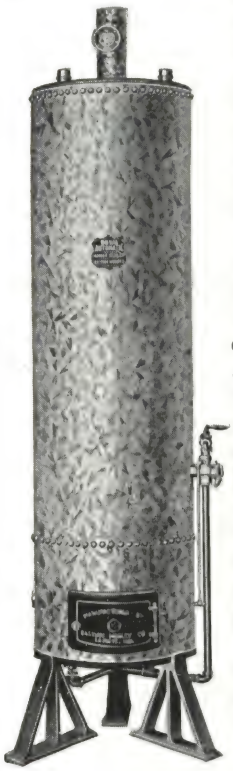


FIG. 5. MULTIPLE BURNER ROYAL AUTOMATIC STORAGE GAS WATER HEATER

Small quantities of hot water may be drawn without bringing the main burner into operation. When larger quantities are drawn, with a consequent reduction in temperature at the bottom of the tank, the thermo-valve again operates, this time with a reverse action which opens the supply of gas to the main burner. The auxiliary burner now serves as a pilot light and the main burner continues silently to cast its intense heat against the water spreader until the entire tank temperature is regained.

Thus there is had a continuous supply of hot water, instantly available at any hot water faucet. It rushes forth at full pressure when a faucet is opened.

Maximum Heat Obtained from Gas—Both main and auxiliary burners are designed and adjusted to produce the hottest of green-blue flames and to handle either natural or artificial gas with equal efficiency.

Installation—The Royal takes standard cold water and gas connections. Vent connection furnished. Venting all heaters is recommended. Side spud is provided in tank for connection to furnace coils.

Royal Bungalow Heaters—Made in two sizes, Nos. 18 and 24 (see table). Similar to the larger sizes of the Royal automatic except that capacities are smaller. May be installed on base or wall bracket (Fig. 4).

Royal Multiple Burner Heaters—Made in sizes 52 to 120 inclusive (see table). Similar to the other sizes of Royal automatics except equipped with 2 burners and rest on ring stands with triangular legs.

ROYAL AUTOMATIC STORAGE GAS WATER HEATERS
SIZES AND DIMENSIONS

Size, heater No.	Dimensions of heater above legs in.	Cold water outlet, in.	Hot water outlet, in.	Gas connection, in.	Height of connections from floor, in.			Head room required including vent connection, in.	Flue dimensions, in.	Sq. in. furnace coil required	Approximate weight, lbs.
					Cold water	Hot water	Gas				
18	12 x 36	¾	¾	¾	49½	51	31½	60	3	....	135
24	12 x 48	¾	¾	¾	51½	63	31½	72	3	....	152
32	14 x 48	¾	¾	¾	61½	63	31½	72	3	75	175
42	16 x 48	¾	¾	¾	61½	63	31½	72	3	90	205
52	16 x 60	¾	¾	¾	70½	73	33½	84	4	120	246
66	18 x 60	¾	¾	¾	70½	73	33½	84	4	150	305
82	20 x 60	¾	¾	¾	70½	73	33½	84	4	190	333
120	24 x 60	¾	¾	¾	70½	73	33½	84	4	275	404

Sizes—No one heater or type of heater will meet all requirements. Each proposition has its peculiarities which should be taken into consideration when choosing the size and style of Royal automatic to install. Our engineering department will co-operate with architects and engineers in arriving at a practical conclusion as to the best installation for the best results.

ROYAL AUTOMATIC STORAGE GAS WATER HEATERS
CAPACITIES

Size, heater No.	No of burners	Approximate gas consumption per hour, cu. ft.		Storage capacity, ready for instant delivery, gals.	24-hour capacity, gals.	Degrees rise per gallon per ft. of gas fired
		Main burner	Auxiliary burner			
18	1	60	3	12	1440	53
24	1	60	3	17	1440	53
32	1	60	3	23	1440	53
42	1	60	3	31	1440	53
52	2	120	3	41	2880	53
66	2	120	3	52	2880	53
82	2	120	3	65	2880	53
120	2	120	3	93	2880	53

GUARANTEE
We guarantee to recover 80% of the total net heating value of gas fired.
EXAMPLE
550 B.t.u.'s=net heating value per cu. ft. gas.
80% of 550=440 B.t.u.'s or heat recovered.
Therefore:
440 B.t.u.'s ÷ 8.3 Lbs. (Weight of 1 gal. of water) equals 53° rise in temperature per cu. ft. of gas fired.
Therefore, if water enters the heater from the mains at a temperature of 60° each cu. ft. of gas will raise 1 gal. of water 53° or to 113° Fahr.

Nos. 18 and 24—Suitable for 1 bath in bungalows or small apartments.
No. 32—Low type for residences with 1 bathroom and corresponding fixtures in kitchen and laundry or for other places having similar requirements. Can be installed in low basement or where perpendicular space is limited.
No. 42—Low type for 2 baths, shower and corresponding kitchen and laundry fixtures.
No. 45—Same as No. 42 but equipped with 2 burners for installation where double quick recovery is desired.
No. 52—For residences where 2 or 3 baths and showers, also for boarding houses, factories, etc.
No. 66—For residences with 3 baths and showers, also for gymnasiums, factories, etc.
No. 82—For residences with 4 baths and showers, also for small apartments, houses, hotels, clubs, etc.
No. 120—For apartment houses, hotels, factories, restaurants, office buildings, etc. Full city pressure back of all hot water faucets.

Marvel Non-Automatic Storage Gas Water Heater

Similar to the Royal in all respects but is without the automatic feature.

When hot water is wanted, burner is lighted by hand and in a remarkably short time the entire capacity of the tank is hot. The burner may then be turned low or out, as desired.

More efficient than the old side-arm combination as it is built all in one piece and holds every wave of rising heat, recovering a much greater percentage of the heat units.

Shell made of extra heavy galvanized iron, electric welded. Furnished with heat retaining pan stand.

Particularly suitable for bathroom and kitchen installation where space is limited, or for factory, office or garage where hot water is required at varying intervals.

FIG. 6. MARVEL STORAGE GAS WATER HEATER

MARVEL NON-AUTOMATIC STORAGE GAS WATER HEATERS

Heater No.....	18	24	30	32	40	42	52	66
Shell, in.....	12 x 36	12 x 48	12 x 60	14 x 48	14 x 60	16 x 48	16 x 60	18 x 60

No. 18 is suitable for beauty parlors and other places requiring a moderate supply of hot water.
Nos. 24 and 30 are suitable for residences with one bath, 2 or 3 lavatories and kitchen sink.
No. 40 is suitable for 2 baths, 3 or 4 lavatories, kitchen sink and laundry tray.
Nos. 32 and 42 are suitable for low basements or other places where perpendicular space is limited.
Nos. 52 and 66 (2 burners each) are suitable for large residences with many baths, also for boarding houses, small gymnasiums, factories, etc.

ECONOMY HEATER COMPANY

Manufacturers of Combination Boilers and Gas Water Heaters

108 South La Salle Street
CHICAGO, ILL.

TELEPHONE
FRANKLIN 4668

Products

"ECONOMY" COMBINATION BOILERS and GAS WATER HEATERS, in automatic and regular types; "CELEBRATED PEERLESS" KITCHEN BOILERS, Gas Heating.

"Economy Automatic" Combination Boiler and Gas Water Heater

Description—The "Economy Automatic" meets a building construction need ably and thoroughly in a manner which nothing else on the market can equal. It is a complete piece of hot water service equipment in itself, working independently and furnishing instant and continuous hot water for the residence or apartment building at a very modest fuel cost. It uses gas for fuel and requires no attention by owner, landlord or tenant.

It keeps an ample storage of hot water constantly ready for use; and with return piping of hot water, this means that the hot water is always at the faucet when wanted and the supply always abundant.

It renders true, instantaneous hot water service every hour of the day and night, 365 days in the year—no bother, no worry, no dirt, no danger of any kind, and all with a plain piece of equipment which is not expensive in first cost; no mechanism to get out of order and under ordinary conditions good for 10 to 15 years of service.

The "Economy Automatic" requires no special gas piping for its supply—the regular ⅜-in and ½-in. house supply serves it fully.

In addition to its serviceability as a distinctly separate piece of equipment working independently as outlined, it is in every respect a practical boiler for hot water storage to be served by the regular heating plant.

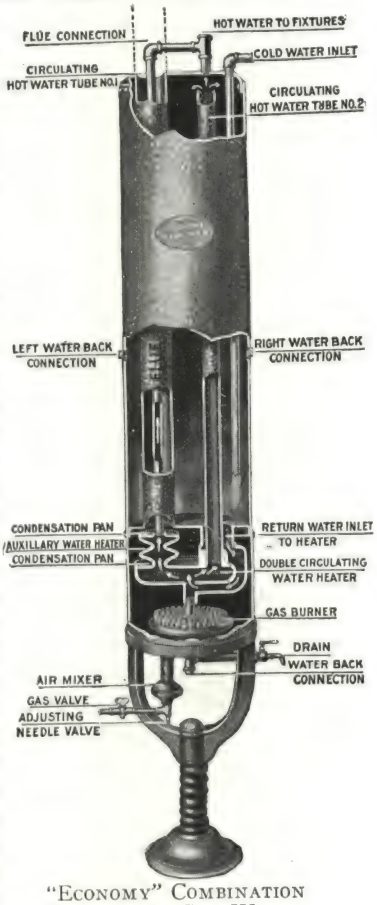
"ECONOMY AUTOMATIC" COMBINATION BOILER AND GAS WATER HEATER
Showing thermo-valve control

It can be connected with the water coil in the furnace, and thus during the months when the house heating system is operating it becomes the plain boiler and need not be operated with its own interior gas heating equipment except at such times as the furnace fire is kept low and hotter water is desired than that which the heating plant is making.

Advantages—The "Economy Automatic" combination boiler and gas water heater recommends itself to the architect and the professional builder because it solves many of their problems, and once specified and installed completely provides for all the hot water needs in the home and apartment building.

Where a plain boiler is specified, then something in addition is required. Perhaps it will be a coal stove side heater or a gas side heater. In the case of the coal stove side heater it is quite certain that sooner or later something instead of it will be wanted.

Owners do not want to be their own janitors for a coal stove in the basement merely to get hot water, nor can they afford to pay for janitor service just to have the hot water needs looked after during the many months of the year when the house heating plant is shut down. As a result they turn to gas to do away with the work and dirt and annoyance of the coal heater. If they then install a gas side heater to furnish the hot water for the boiler it has no control and needs personal and careful attention. In addition, no auxiliary gas side heater, even of the most expensive type, can make the hot water as economically as the "Economy" boiler makes it. But if, in the first place, the "Economy Automatic" boiler is installed, every need is met. The burner is lighted, the boiler is soon filled with hot water of the temperature desired, and the positive thermostatic control valve operates to turn the flame down to a point which keeps the water in the boiler constantly at the predetermined desired temperature. The expense is not more than would be the cost of coal for a side heating stove and much less than would be the cost for gas consumed by a gas side heater, and no one needs to go near the equipment from month's end to month's end. The owner of the two-flat or three-story apartment building who lives in one of the apartments and undertakes to furnish hot water for the tenants will, with the "Economy Automatic" boiler installed, have all the hot water needs looked after completely by the boiler itself. This relieves him of all care in the matter, and at a monthly cost less than would be sustained by any other method of providing the hot water, and with



"ECONOMY" COMBINATION BOILER AND GAS WATER HEATER
Showing interior patented construction

Continued on next page

a certainty of freedom from complaint which could not be accomplished in any other way or with any other equipment.

The "Economy Automatic" combination boiler and gas water heater is manufactured under patent No. 1,035,636 and is not competed with by anything else on the market. The ordinary type of center flue combination boilers made automatic by the use of a thermostat are entirely different from the "Economy Automatic" in their operation—more expensive in their fuel cost, and do not accomplish the results of our piece of equipment.

Also bear in mind that the "Economy Automatic" combination boiler and gas water heater is not one of the so-called "instantaneous water heaters," the machines which heat water instantly by throwing on a tremendous volume of gas to do it and which are open to serious objections in respect to danger, to complicated mechanism, to expensive piping for gas supply, to heavy operation expense and to unnecessarily large first cost. They are subject as well to the very practical objection that while they may heat water instantly, they can not possibly deliver hot water at the faucet instantly, and also that they can not serve as the boiler for storage of hot water when the house heating plant is able to make it.

The "Economy Automatic" combination boiler and gas water heater is open to no criticism. First cost is reasonable; cost of operation is very modest; its service is universal. It renders true instantaneous hot water service on the storage principle and only by the storage principle can complete and perfect hot water service be had. In specifying, it is well to be sure that the size boiler selected is large enough. Do not make the mistake of putting in a number 52 or 66 where a number 82 or 100 should go. Greatest economy is achieved with ample reserve storage. It is always better to have oversize than a boiler too small.

"Economy Regular" Combination Boiler and Gas Water Heater

The "Economy Regular" combination boiler and gas water heater is identical in construction and material with the "Economy Automatic" in the respective sizes, but it is not provided with the thermostatic control valve, nor is it tapped with the opening for the valve.

The combination gas heating boiler has become so well known and its advantages so fully recognized, that no argument for its use need be presented here. However, some parts of the United States are far behind others in the adoption of this type of boiler. As a general statement we would say that in a majority of cases it would be better to install "Economy Regular" combination boilers and gas water heaters than to install plain boilers. The combination boiler does everything that the plain boiler does, and in addition it is capable of independently providing hot water through its own gas heating equipment. Usually a plain boiler is supplemented by a gas or coal side heater later on, and the result is that more expense is thereby incurred and less efficiency secured than where the "Economy" combination boiler is installed in the first place.

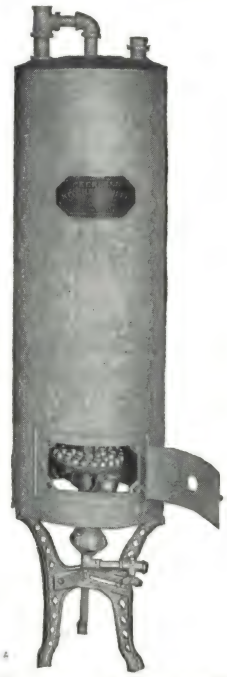
"ECONOMY" COMBINATION BOILERS AND GAS WATER HEATERS

No.	Actual capacity, gals.	Size		Shipping weight, lbs.	Prices	
		Height, ft.	Diam., in.		Automatic with thermo-valve control	Non-automatic "Regular" type without thermo-valve control
18	13	3	12	115	$ 46.00	$23.00
24	17	4	12	135	47.00	23.50
30	21	5	12	155	48.00	24.00
32	23	4	14	165	51.00	.....
40	30	5	14	175	54.50	32.50
42	32	4	16	180	57.00	.....
52	40	5	16	195	67.20	52.80
66	51	5	18	235	81.60	67.20
82	64	5	20	255	96.00	76.80
100	78	5	22	300	117.60	98.40
120	94	5	24	365	129.60	108.00

Stands Extra. Above prices are f.o.b. Chicago and include contracting plumbing cost; these prices are taken from Clow Bulletin.

"Celebrated Peerless" Kitchen Boiler

The logic of the combined gas heater and boiler is so strong that as soon as the first "Celebrated Peerless" kitchen boiler was placed on the market the trade felt its influence. This was many years ago, and now we can point to many spots in this country, and in fact to entire sections of the country where the gas heating combination boiler so dominates the field that the copper coil gas side heater scarcely has any sale whatever. It is right that this should be so. The combination gas heating boiler has so much greater efficiency in operation and so much longer life in service than the side heater connected with a range boiler that, once introduced, the combination gas heating boiler is bound to win the popular demand.



"Celebrated Peerless" Kitchen Boiler

It is much more economical on gas—it is neat in appearance—requires less floor space—is more easily installed—and on every point of comparison it wins out. Builders and owners would do well to see that "Celebrated Peerless" boilers are specified for them instead of plain range boilers. With a plain range boiler installed a deficiency exists. That deficiency is the need of getting hot water from the boiler with gas as the fuel. To meet this need side gas heaters are then connected to the boiler. The result is an inefficient outfit, but one which will after a manner serve. Better do it right in the first place and put in "Celebrated Peerless" kitchen boilers. They can be installed in the basement, to be connected by coil with the heating plant, and thus during the winter months will serve as the plain range boiler serves—then during the open season they can be operated by gas on their own interior built-in gas heating equipment; or they can be installed in the kitchen or the bathroom.

"CELEBRATED PEERLESS" KITCHEN BOILERS

No.	Actual capacity, gals.	Diameter, in.	Height, ft.	Shipping weight, lbs.	Price
18	13	12	3	105	$ 21.25
24	17	12	4	125	22.00
30	22	12	5	140	22.50
40	30	14	5	160	29.00
52	40	16	5	190	52.80
66	51	18	5	227	67.20
82	64	20	5	240	76.80
100	78	22	5	290	98.40
120	94	24	5	355	108.00

Stands not furnished. Use any type of range boiler stand.
Above prices are f.o.b. Chicago and include contracting plumbing cost; these prices are taken from Clow Bulletin.

EVERHOT HEATER COMPANY

Manufacturers of Gas Fired, Automatic Water Heaters

FACTORY AND GENERAL OFFICES

DETROIT, MICH.

DISTRIBUTORS IN ALL LARGE CITIES

Product

EverHot Gas Fired, Automatic Storage Water Heaters.

Types

EverHot Junior—Heating capacity, 50 to 75 gals. per hour; storage capacity, 20 gals. Built for the average home, i. e. the home with a single bath room, laundry and kitchen.

No. 32—Heating capacity, 100 to 150 gals. per hour; storage capacity, 32 gals. Meets the requirements of the finest homes, of restaurants, garages, small apartments, etc.

An EverHot Junior Supplies the Hot Water in This Eight-room House

Advantages of the EverHot

Service—Immediate hot water service is rendered because the water in storage is *always* hot. Having no water valve, the EverHot delivers hot water at the same pressure as cold, insuring a full stream to every faucet at once.

Interior Construction of the EverHot

Operating Cost—Due to the effective manner in which every particle of the heat generated is used, the cost of operating the EverHot is considerably less than any other heater.

This is the only heater on which a tiny pilot light keeps a tank full of water hot.

Maintenance Cost—No copper coils—no complicated parts. Condensation and precipitation of lime are practically eliminated, insuring long life to the heating element. Repairs and maintenance on the EverHot are practically unknown.

Price—The low price brings automatic hot water service within the reach of every family.

Construction

Boiler—The heating element is the sturdy boiler in which the water is stored. It is built of heavy, copper bearing steel, thoroughly galvanized, making it practically rustproof. Boilers are riveted and welded and tested at 200 lbs. pressure per sq. in.

Burner—The combustion chamber is directly beneath the boiler. The burner is a specially designed, semi-bunsen type. It is non-carbonizing.

Only a limited amount of primary air is admitted through the bunsen tubes, allowing an unlimited turn down without possibility of back fire. The tubes are placed in pairs which incline towards each other, thus causing the jets of each pair to impinge. A minus pressure is created at the point of impingement which induces the necessary amount of secondary air for perfect combustion.

Flues—This heater has a revertible flue construction similar to that used on the finest type steam boilers.

Completely surrounding the boiler, but separated from it by a series of spacers, is a cylinder of terne plate. The space between this cylinder and the boiler forms the inner leg of the flues.

The flue chamber is at the top. The gases pass through it into the outer leg or downward flue which is at the back of the heater, between the inner and outer shells.

The flue connection is taken off midway between the flue chamber and the combustion chamber. The stack is connected through an open end "T," so an excessive draft will not draw the hot gases through the heater too rapidly, while a back draft will not interfere with combustion.

Insulation—The entire heater is thoroughly insulated with rock wool which is packed between the inner and outer shells. This material is blown from natural rock. In addition to being one of the best insulators, it has a high refractory value.

Thermostat—The operation of the heater is controlled by a thermo valve. This is a simple, graduated type of thermostat with a copper tube as the expansion member and a carbon rod as the fixed member. It may be set to keep the water at any desired temperature.

Operation of the EverHot

When first lighted, the burner operates at full capacity until the water in storage is heated. As the temperature of the water nears the set temperature, the thermostat gradually closes off the gas until only the pilot is burning.

When a hot faucet is opened, hot water flows immediately. The cold water, entering the boiler, causes the thermo valve to open, admitting gas to the

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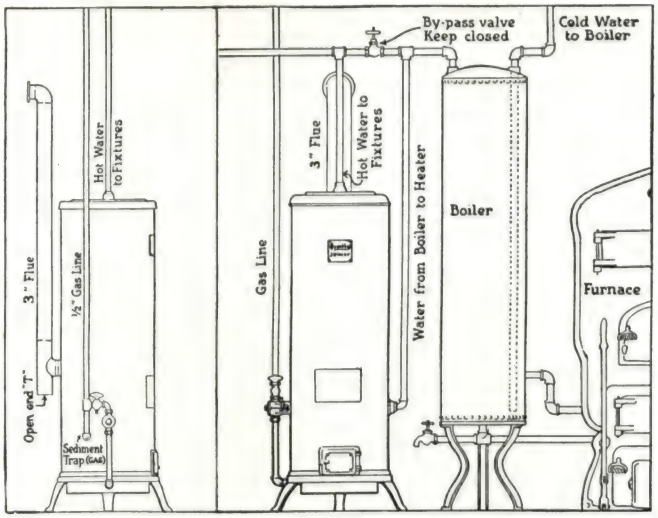


Direct System Reheating System

METHODS OF CONNECTING EVERHOT HEATERS

burner. The pilot flares up into full flame which burns until the water is heated.

The entire surface of the boiler is the heating area. It is from two to four times as large as that of any other heater, burner capacity considered. The narrow flue way gives the gases a "scrubbing" action which insures all the heat being used.

The EverHot has a very high thermal efficiency. This is due to its large heating area, its long "up and down" heat travel and the thorough insulation.

Temperature Maintained by the Pilot—When the heater is not in operation, the flue way is filled with hot gases which cannot escape because of the revertible flue construction.

The tiny pilot light generates sufficient heat to keep these gases and the water in storage hot.

One of the greatest wastes that automatic heaters are subject to results from heating water that later cools and must be reheated. With the EverHot no water is heated that is not used, no water ever cools and no gas is wasted.

Elimination of Condensation—Condensation occurs when warm gases come in contact with a cold surface. Condensation is a dilute acid which rapidly destroys any metal with which it comes in contact. As the surface of the EverHot boiler never becomes cold, condensation occurs only in a slight degree after the heater is first started.

Capacity of EverHot Heaters

No. 32 stores 32 gals. of hot water. It heats 100 gals. of water an hour, raising the temperature 60° on 100 cu. ft. of 600 B. t. u. gas. It is capable of carrying a 50% overload. This is ample capacity for large homes, restaurants, small apartments, stores, etc.

The EverHot Junior stores 20 gals. of hot water. It heats 50 gals. an hour, raising the temperature 60° on 50 cu. ft. of 600 B. t. u. gas. It also has a 50% overload capacity. The EverHot Junior is designed for homes with a single bath, laundry and kitchen. It is not recommended for use with a shower and should never be installed in houses with 2 or more baths.

Guarantee

EverHot Heaters are guaranteed to be free from defects in workmanship and materials for 1 year.

They are guaranteed to raise 1 gal. of water 60° Fahr., on 1 cu. ft. of 600 B. t. u. gas.

The pilot light is guaranteed to maintain the temperature of the water in storage at 70° above room temperature while burning not over 1½ cu. ft. of 600 B. t. u. gas per hour on No. 32, and not over 1¼ cu. ft. on the EverHot Junior.

Installation

Installation of EverHot Heaters is easy and can be handled by any competent plumber. They may be connected either direct or reheating. When a circulating system is installed, water lines should be insulated, also long runs on direct systems. Furnace coils should never be connected direct to the heater.

The EverHot will operate on artificial, natural or gasoline gas.

HEATER CAPACITY, DIMENSIONS AND INFORMATION FOR INSTALLATION

EverHot model	Price	Storage, gals.	Rated heating capacity 60° raise, gals. per hour, (Overload 50%)	Rated gas consumption, cu., ft. per hour	Dimensions, in.				Water connections, in.	Gas connections, in.	Size of gas meter	Size of flue pipe, in.
					Width	Front to back	Height	Diameter of cylinder				
Junior	$99	20	50	50	21	22	56	16	¾	½	5 light	3
No. 32	160	32	100	100	26	24	66	19½	1	¾	10 light	4

FOUR HOMES FACING THE DETROIT RIVER, EACH WITH AN EVERHOT HEATER

THE HOFFMAN HEATER COMPANY

Gas Water Heaters

1305 Oberlin Avenue
LORAIN, OHIO

Products

INSTANTANEOUS AUTOMATIC GAS WATER HEATERS; AUTOMATIC STORAGE WATER HEATERS; AUTOMATIC STORAGE SYSTEMS.

Also manufacturers of Tank Water Heaters.

TRADE-MARK

Instantaneous Automatic Water Heaters

Hoffman heaters are designed to develop the greatest efficiency possible consistent with economy in operation. With the patented burner and thermostatic valve, they are foolproof, efficient and superior heaters.

The casings or jackets are of cast iron properly insulated. All jackets are equipped with doors to give ready access to the interior.

The coils are of the highest grade No. 18 gage seamless drawn copper tubing and are wound in a manner to produce the greatest efficiency. The lower sections, which lie in the fire zone, are detachable and removable.

Hoffman Improved Burner—The burners with the cylindrical gauze are a step far in advance of the old style burner with its horizontal gauze or any deviation therefrom made by placing the gauze perpendicularly or at any angle.

The new improved Hoffman burner is fundamentally different—its special features are protected by letters patent, which are the sole property of THE HOFFMAN HEATER COMPANY. The gas is introduced through a minute hole in the nipple and rushes to the top of the burner, carrying with it an increased volume of air, which it siphons through the openings that surround the nipple at the bottom of the burner.

This air and gas strike against the solid iron at the top of the burner, from which they rebound and are thoroughly mixed, taking the natural rotary motion of gas and escaping through the cylindrical gauze to the tip of the burner, where ignition takes place.

The top of burner is so constructed as to throw the flame in two directions, and protected in such a manner that being extinguished from drip caused by condensation is impossible.

Thermostat Valve—The thermostatic mechanism has 50% less working parts than any other automatic heater in use. There is no other valve so positive in its working action and so simple in its construction.

It acts on the water valve instead of on the gas valve. In operating, it reverses action of the water valve by opening a port. This throws the water pressure on the opposite side of the plunger, driving it back to place and releasing the pressure from the gas valve, which is forced shut by this reversed action of the water valve.

Styles—*No. 45 Non-thermostatic Type*—For small home, bungalow or cottage. Capacity 2½ gals. per minute. Furnished with or without wall brackets.

No. 2½D—Suitable for cottages, bungalows or small apartments with kitchen and bath. Furnished with or without wall brackets, and can be installed either in kitchen or basement.

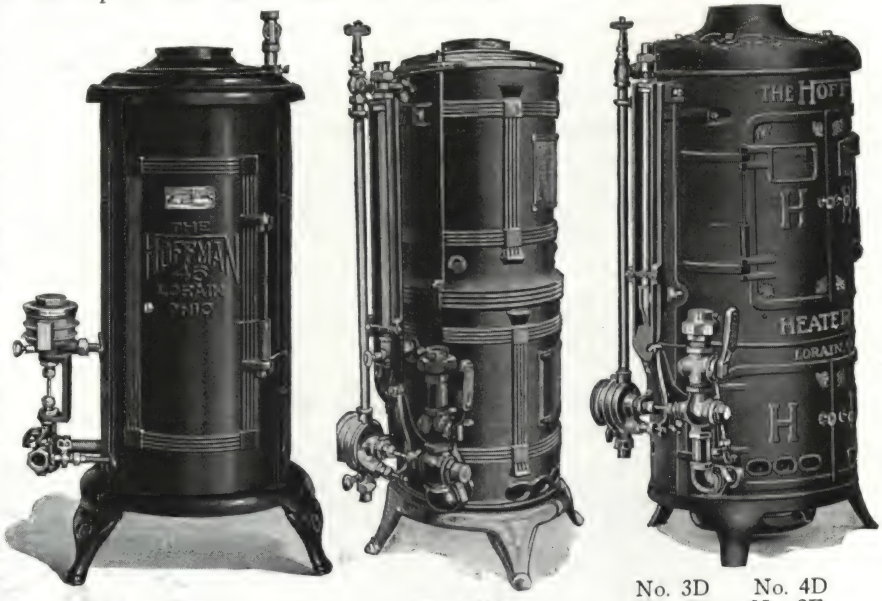
No. 3D—A heater for the small residence usually having kitchen, bath and small laundry.

No. 4D—This is the heater generally used in the average residence with usual equipment of hot water conveniences for kitchen, bathroom and laundry and extra lavatory.

No. 6F—Generally used in large residences where there are a number of bathrooms; small hotels, business blocks, public places, etc., for limited service.

No. 8F—This size is suitable for large dwellings having three or more bathrooms, butler's pantry, hall or bedroom lavatories. It is also well adapted for small hotels, restaurants, small apartment houses, etc.

Specifications—One No. .. Hoffman Automatic Gas Water Heater in the basement as nearly under the kitchen as possible, exact location shown in blue print. Supply heater with water from cold water lines, or by-pass from supply tank. Connect hot water outlet to hot water service lines, at a point as close to kitchen as possible. Connect heater vent to flue in basement with .. size galvanized flue pipe. Place .. size vertical check valve in hot water outlet pipe as near heater as possible. Supply vertical air chamber at cold water inlet of 1¼-in. pipe, 20 in. long, with cap soldered in place. Gas supply should be made of .. diameter, black or galvanized pipe.



No. 45 No. 2½D No. 3D No. 4D No. 6F No. 8F

HOFFMAN INSTANTANEOUS AUTOMATIC WATER HEATERS

No.	Capacity, gals. per min.	Diameter, in.	Height, in.	Gas supply from meter to heater, in.	Flue connection, in.	Shipping weight, lbs.
45	2½	19	34	¾	4	...
2½-D	2½	13	39	1	5	200
3 -D	3	15	41	1	6	250
4 -D	4	17	45	1¼	6	350
6 -F	6	19	49	1½	7	500
8 -F	8	25	55	1½	7	540

Continued on next page

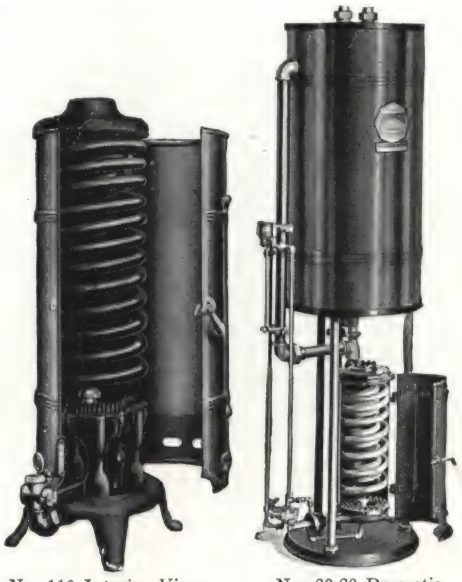
Automatic Storage Water Heaters

Hoffman No. 110 Heater—These heaters are built for service; first class workmanship and high grade material enter into every part of their construction.

Simple, compact and efficient. Guaranteed absolutely to furnish not less than 100 gals. of hot water per hour on the basis of 70° rise in temperature.

Coils, burners and shell have been designed to form a heater that delivers the maximum number of heat units from the gas to the water.

Complete System—This system consists of a Hoffman No. 110 heater, 80 to 150 gals. capacity, 85% magnesia tank covering, tank supports, boiler thermometer, and a Hoffman thermostatic gas valve for controlling gas supply and maintaining uniform water temperature.



No. 110 Interior View — No. 20-20 Domestic Storage System

AUTOMATIC STORAGE WATER HEATERS

Adaptability of No. 110—For use in small hotels, business blocks, public places, etc., for limited service, also small apartment houses and restaurants.

No. 20-20 Domestic Storage System—Designed to meet the needs of the small home owner, and particularly adapted to use in cottages or bungalows, where the demands for hot water service are moderate.

It is admirably suited to operate where gas or water pressures are low or uneven. Can be installed in connection with gravity supply system or isolated pumping systems.

Thermostatically controlled by the Hoffman new principle thermostat, assuring the user of a maximum supply of hot water to the full capacity of the tank at all times. Quickly and as easily installed as the standard range boiler.

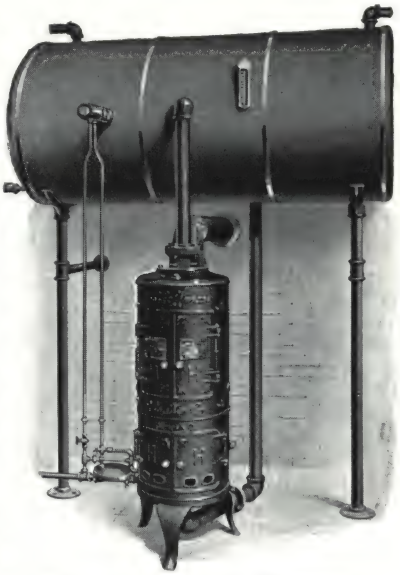
HOFFMAN AUTOMATIC NO. 110 STORAGE HEATER

Capacity	100 gals. per hour
Diameter	9½ in.
Height	35 in.
Shipping weight	100 lbs.

HOFFMAN 20-20 DOMESTIC STORAGE SYSTEMS

Gas supply from meter	½ in.
Water connection	¾ in.
Height crated	68 in.
Length of coil	18 ft. 6 in.
Diameter crated	20 in.
Weight	200 lbs.

Multicoil Storage System—This system is the modern and up-to-date method of supplying an ever-ready and unlimited supply of hot water for large buildings such as apartment houses, office buildings, hotels, restaurants, hospitals, schools, etc., or wherever a large quantity of hot water at a uniform temperature may be required. The system is entirely automatic, the gas supply being controlled by a thermostat in the tank.



VIEW OF COMPLETE MULTICOIL SYSTEM

These systems are furnished complete with the exception of the circulator pipes between the heater and the tank.

COILS, MANIFOLDS AND BY-PASS ASSEMBLED

The Hoffman sectional multicoil construction consists of 10 separate sections of copper coil which are connected independent of each other, with unions, to brass manifolds at top and bottom.

Any coil can be removed for cleaning or replacing without interfering with the use of the heater, except while connections are being broken.

Manifolds and all coil connections are contained in the heater shell. This is distinctly a Hoffman feature and adds to the effectiveness of nearly 20 ft. of coil beyond the actual rating of the heater. Only the highest grades of material are used throughout.

MULTICOIL STORAGE SYSTEMS

Capacity, gals.		A in.	B in.	C in.	D in.	F in.	G in.	H in.	K in.	Circulator, in.	Gas supply, in.	Hot water inlet, in.	Cold water inlet, in.
Heat.	Tank												
200	150	24	72	50	12	44	6	18	15	2	1	1¼	1¼
200	200	24	96	50	12	44	6	18	15	2	1	1½	1½
200	250	30	84	50	15	44	6	18	15	2	1	1½	1½
200	300	30	96	50	15	44	6	18	15	2	1	1½	1½
300	250	30	84	53	15	47	7	21	18	2	1¼	1½	1½
300	300	30	96	53	15	47	7	21	18	2	1¼	2	2
300	375	30	120	53	15	47	7	21	18	2	1¼	2	2
300	425	36	96	59	18	47	7	21	18	2	1¼	2	2
500	425	36	96	61	18	55	8	23	20	2½	1½	2	2
500	500	42	84	67	21	55	8	23	20	2½	1½	2	2
500	720	42	120	67	21	55	8	23	20	2½	1½	2	2
500	860	42	144	67	21	55	8	23	20	2½	1½	2	2

NOTE—Over-all dimensions include 2-in. asbestos boiler covering.

Specifications—One .. gallon (black iron, galvanized iron, or copper) tank as supplied by THE HOFFMAN HEATER COMPANY to be supported in a horizontal position, on proper tank supports and connected to one No. .. Hoffman Multicoil heater with proper circulation and gas connections in exact accordance with the printed direction, running .. inch gas line from meter to heater with .. inch gas cock in same.

A .. inch flue pipe to be run from heater to chimney having good draft.

Boiler to be covered with 2-in. wall, 85% magnesia insulation, canvased, and to be equipped with Hoffman Thermostatic Gas Valve.

HUMPHREY COMPANY

DIV. RUUD MFG. CO.

Manufacturers of Gas Water Heaters

KALAMAZOO, MICH.

Products

HUMPHREY GAS WATER HEATERS: Type A Automatic Water Heaters; Cottage Automatic Water Heaters; Nos. 20 and 30 Automatic Water Heaters; Multicoil Automatic Storage Systems; Junior Automatic Storage Systems; Copper Coil Tank Water Heaters; Instantaneous Bath Water Heaters; Shower Bath Water Heaters.

Humphrey Type A Automatic Gas Water Heater

This type of heater is designed to automatically supply hot water at any predetermined temperature. Water is heated in a series of copper coils enclosed in a double cast iron casing. Heat is generated by Bunsen burners at the bottom of the heater.

Operation—Positively automatic. Simply turning on a faucet starts water flowing through heater and turns on gas which is ignited by a pilot light; hot water is delivered at faucet instantly. Turning off faucet shuts off gas. Requires minimum water pressure of 20 lbs. at highest faucet. Temperature of water is regulated by a thermo valve or "secondary" control.

Special Features—*Primary Control*—An automatic water and gas valve for controlling gas supply. Consists of a double ended piston, one end of which is operated by pressure of incoming water and the other end of which operates the gas valve. When any faucet of system is opened the resulting pressure on water end of piston opens gas valve at gas end of piston. Gas flows to burners where it is ignited by pilot light. Closing faucet automatically closes gas valve. An adjustable by-pass is provided for preventing overheating of water.

Secondary Control—Consists of a thermo valve for automatically controlling temperature of water. When water reaches temperature for which this valve is set, the gas supply is regulated by a second gas valve. Saves gas, prevents overheating, insures utmost safety.

Bunsen Burners—Specially built to give 100% heat from gas burned. Are very simple and can be readily cleaned.

Patented "Flash" Pilot Light—For lighting burners. Ordinarily burns a very small amount of gas. Gives a 2-in. flash at turn of faucet. When faucet is turned off, pilot light again becomes a tiny spark. Can not blow out. Adjustable.

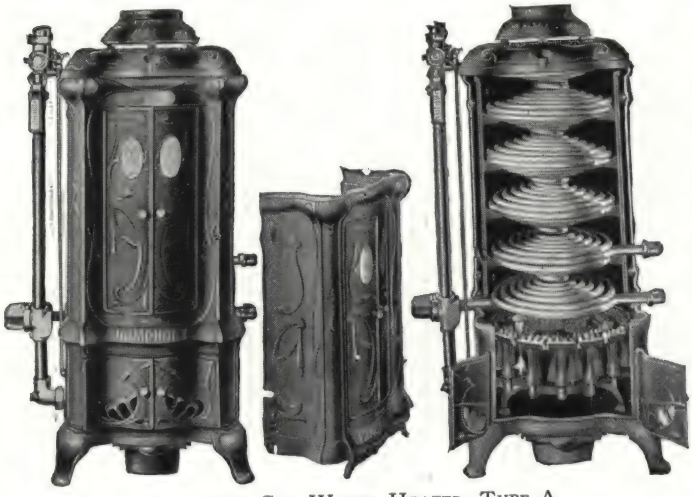
Copper Coils—Accurately machine wound from seamless copper tubing, tested to 600 lbs. per sq. in. Lower section is made heavier, and is easily removable for cleaning or replacement.

Methods of Installation—*Direct System*—Heater is direct connected to cold water main and delivers hot water to hot water piping system.

Re-heating System—Heater draws water from tank and delivers hot water to hot water piping system. Water in tank is usually warmer than water in main, due to standing in heater room. This saves gas. Tank may be connected to furnace by a heating coil. When furnace is in use, less gas is required to heat water to proper point, due to regulation of gas supply by thermo valve or secondary control.

This system is recommended wherever possible.

Uses—This type of heater is especially suitable for use in systems where an abundant supply of hot water is required and where the demand is fairly uniform.



AUTOMATIC GAS WATER HEATER, TYPE A

SIZES, DIMENSIONS AND CAPACITIES

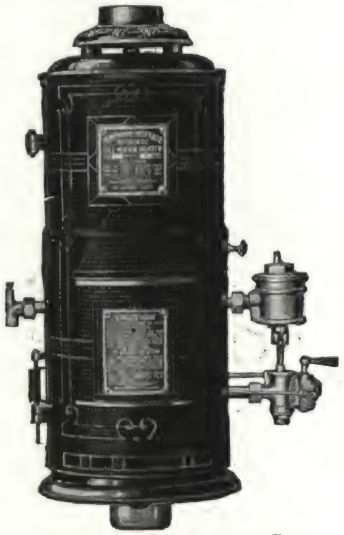
Heater No.	Height, in.	Diam. shell only, in.	Diam. shell including valve, in.	Diam. copper coils, in.	Length copper coils, ft.	Size flue pipe, in.	Number burners	Gas supply from meter, in.	Size gas meter, lights	Gas consumed per min. cu. ft.	Heats per min. 63° raise, gals.	Supply home with not more than	Net weight, lbs.	Approx. shipping weight, lbs.
2A	39	13	20	⅝	60	4	9	¾	10	2½	2½	2 faucets	139	175
3A	44	16	25½	¾	74	5	12	1	20	3	3	3 faucets	220	295
4A	47	20	28½	¾	100	6	16	1	30	4	4	8 faucets	266	350
6A	52	22	32	⅞	124	6½	24	1½	45	6	6	14 faucets	394	490
8A	59	25	35½	⅞	156	8	32	2	60	8	8	22 faucets	452	580

Humphrey Cottage Automatic Gas Water Heater

This type is similar in construction to the Type A heater but is smaller in capacity. Designed for cottages, bungalows, small homes, doctors' and dentists' offices, soda fountains, apartment houses where one heater is provided for each apartment, etc.

Made in two sizes having capacities of 2 and 2½ gals. per minute. The 2-gal. size is made with either a cast iron casing (No. 50) or an aluminum casing (No. 55). The 2½-gal. size is made with an aluminum casing only (No. 60).

The aluminum heater is preferable where light weight and fine appearance are essential.



COTTAGE AUTOMATIC GAS WATER HEATER

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No. 30 Automatic Water Heater

Humphrey Nos. 20 and 30 Automatic Gas Water Heaters

Identical with Type A heater in design and operation, except for the thermo valve or secondary control.

Where the demands for hot water are comparatively light this type is recommended because of its lower first cost and efficient, inexpensive service.

No. 20 has a capacity of 2 gals. per minute, and No. 30, 3 gals. per minute.

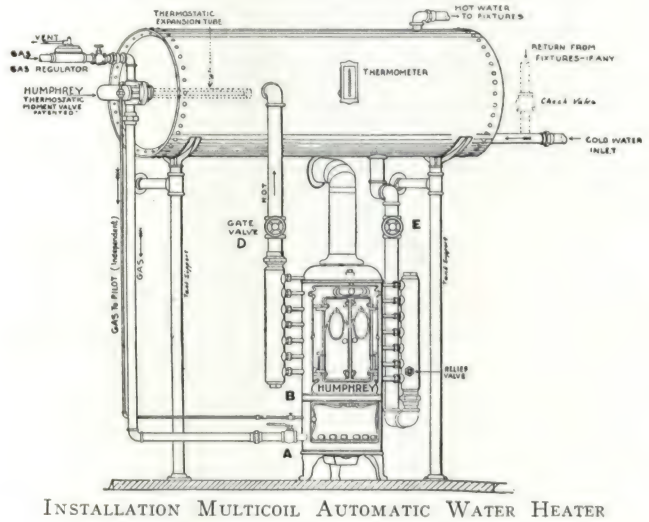
Humphrey Multicoil Automatic Storage System

Specially designed to meet heavy duty, short time, and severe hot water demands such as occur in apartment houses, hospitals, schools, bathhouses, gymnasiums, large residences, etc., Consists of an automatic gas water heater and an insulated storage tank of sufficient capacity to meet the maximum demand. The heater is built on the same principle as the Type A heater but has more and heavier copper coils, and is equipped with a patented thermostatic moment valve.

HUMPHREY NOS. 20 AND 30 AUTOMATIC GAS WATER HEATERS

Heater No.	Height, in.	Diam. shell only, in.	Diam. shell incl. valve, in.	Diam. copper coil, in.	Length copper coil, ft.	Size flue pipe, in.	Number burners	Gas supply from meter, in.	Size gas meter, lights	Gas consumed per min., cu. ft.	Heats per min. 63° raise, gals.	Supply home with not more than	Net weight, lbs.	Approx. shipping weight, lbs.
20	38½	13	19	⅝	60	4	9	¾	10	2	2	2 faucets	138	168
30	41½	16	23½	¾	63	5	12	1	20	3	3	3 faucets	167	205

By means of this valve the water in the storage tank is kept at a predetermined temperature. Whenever the temperature of the water drops 20° the gas is turned on and burned until the water reaches the temperature at which the valve is set. The valve then shuts off the gas.



Installation Multicoil Automatic Water Heater

GALLONS PER HOUR, DELIVERED BY MULTICOIL STORAGE HEATER

Size of heater	Temperature raise										
	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°
No. 2C	126	105	90	78.8	70	63	57.2	52.5	48.4	45	42
No. 3C	252	210	180	157.5	140	126	114.5	105	97	90	84
No. 4C	378	315	270	236	210	189	172	158	145	135	126
No. 8C	630	525	450	394	350	315	287	262	242	225	210

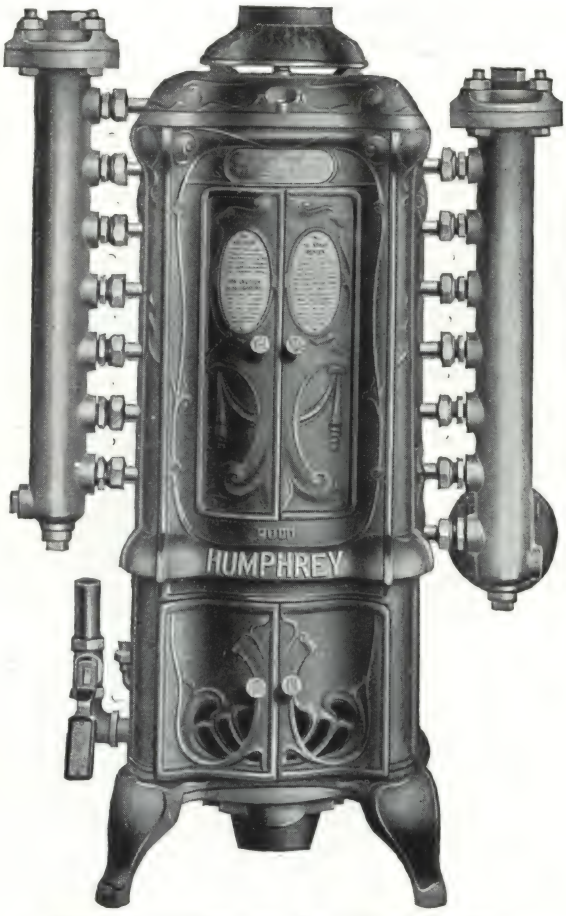
MULTICOIL AUTOMATIC STORAGE SYSTEMS

Heater No.	Height, in.	Diam., in.	Circulators betw. boiler and heater, in.	Size gas supply pipe, in.	Size gas meter, lights	Size flue pipe, in.	Size cold water inlet, in.	Use with tanks, gals.	Capacity per hour, gals.
2C	39	13	1½	¾	10	4	1	80 to 150	100
3C	44	16	2	1	20	5	1	100 to 300	200
4C	47	20	2	1	30	6	1¼	200 to 365	300
8C	59	25	2½	2	60	8	2	425 to 800	500

SIZES OF MULTICOIL SYSTEMS AND THEIR APPLICATIONS TO VARIOUS CONDITIONS

Size heater	Capacity of tank, gals.	Applications
2-C	80, 100 or 150	Residences with two or three baths, one shower bath, kitchen, pantry and laundry. Flat buildings with three to six apartments of 4 to 6 rooms each.
3-C	100,150,200 250 or 300	Residences with three to six baths, one or two showers, kitchen, pantry, laundry, etc. Flat buildings with 6 to 12 apartments, averaging 5 or 6 rooms, kitchen and bath in each. Small hotels with 3 to 5 baths, not more than 10 bedroom lavatories, kitchen, laundry, etc.
4-C	200, 250, 300 or 365	Residences having 8 to 15 baths, several showers, bedroom lavatories, kitchen, butler's pantry, laundry, etc. Flat buildings having 10 to 18 apartments, averaging 7 rooms and bath. Hotels having 4 to 10 baths, not over 50 bedroom lavatories, kitchen, large laundry, etc. Small gymnasiums, having not more than 10 to 15 hot water outlets and membership of not more than 200.
8-C	425, 500, 600, 700 or 800	Large hotels, large hospitals, office buildings, bath houses, large gymnasiums and other places requiring immense quantities of hot water.

For multicoil storage systems it is well to submit all data and information to the Humphrey Company for all calculation as to size of heater, storage tank, etc., proper to use.



Multicoil Automatic Gas Water Heater

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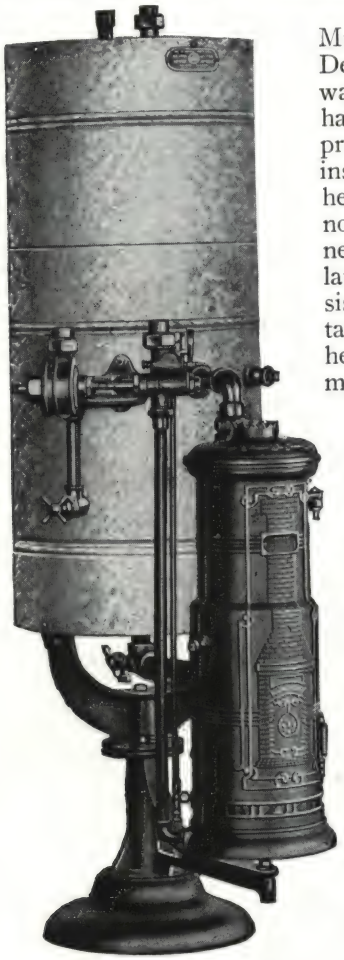
Humphrey Junior Automatic Storage System



Junior Storage System

Similar in design to the Multicoil system but smaller. Designed to meet the hot water requirements of places having such gas and water pressure conditions that an instantaneous automatic heater of sufficient size can not be used and where the needs do not require the larger Multicoil system. Consists of an insulated storage tank, removable copper coil heater, and a patented timing moment valve heat control.

The burning of the gas is timed economically to the need by the timing moment valve. When the water in the tank reaches the set temperature the gas is automatically shut off, and is not turned on again until a hot water faucet is opened and only when the temperature of the water has dropped 20° below the set temperature. This valve prevents waste of gas during such times as the heater is not in use, such as overnight or during absence of family for day or week-end. Systems can also be furnished without timing moment valve. Valve requires a minimum water pressure of 15 lbs.

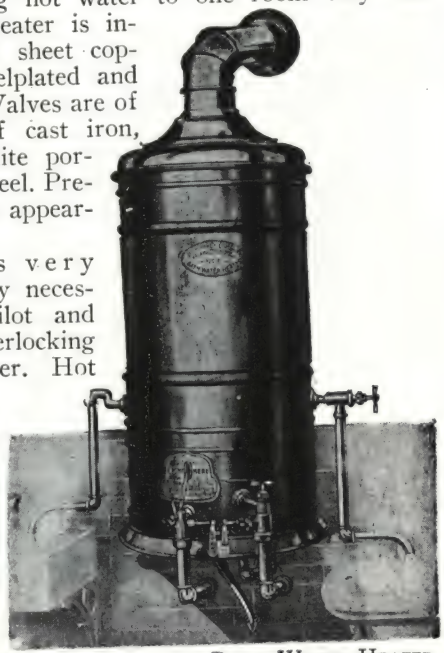
Made in 3 sizes: No. 24 with 24-gal. storage tank, No. 40 with 40-gal. tank, and No. 66 with 66-gal. tank.

Humphrey Instantaneous Bath Water Heater

For supplying hot water to one room only—the room in which heater is installed. Built of sheet copper, heavily nickelplated and highly polished. Valves are of brass, burners of cast iron, and shelf of white porcelain enameled steel. Presents a very fine appearance.

Operation is very simple. It is only necessary to light pilot and turn on the interlocking gas and water lever. Hot water then flows instantly. Turning off interlocking lever shuts off gas and water simultaneously.

Made with capacities of 2½ and 3 gals. per minute.



Instantaneous Bath Water Heater

Humphrey Copper Coil Tank Water Heater

Designed for use in connection with a hot water tank. Consists of a copper coil enclosed in a steel or cast iron casing. Heat is supplied by a Bunsen burner which must be lit when heater is to be used.

Made in three types:

No. 5-R — With blue enameled, pressed steel casing and patented, heat resisting, moistureproof lining. Has sensitive copper coil, doubly wound, heated by two-piece spout flame burner. Suitable for tanks of from 30 to 40 gals. capacity.

No. 5-I—Similar to No. 5-R, except that casing is of cast iron, without lining, finished in black enamel, and heat is supplied by a one-piece burner.

No. 35—Similar to 5-R, but larger, and with a semi-wall insulating lining. Copper coil is 35 ft. long. For tanks with 60 to 80 gals. capacity.

5-R Tank Water Heater

Humphrey Shower Bath Water Heater

For supplying fresh hot water for shower or tub bath. Water can be diverted from lower outlet to overhead shower and vice versa by means of a two-way cock. Operates simply by lighting pilot and turning on interlocking gas and water valve. Gas may be shut off for taking a cold shower, but water can not be shut off without shutting off gas.

Made of brass and copper, nickel-plated and highly polished. Very handsome, durable and economical.

Shower Bath Water Heater

THE OHIO HEATER COMPANY

Manufacturers of Tank Water Heaters

222 North Fourth Street

COLUMBUS, OHIO

Products

GAS FIRED NON-AUTOMATIC AND AUTOMATIC TANK WATER HEATERS.

Facts Regarding Our Tank Water Heaters

Ohio and Rolf tank water heaters combine all the best features of hot water heaters and represent the most dependable and economical gas fired heaters on the market. They are suitable for attachment to any type of tank or range boiler for rapidly and economically heating water by circulation. Lighted and extinguished by hand and are built to meet the most exacting requirements. All valves are equipped with two orifice plugs so that any heater can be used for natural or manufactured gas. Our heaters are adjustable to any gas pressure.

Guaranteed to be mechanically perfect and to render satisfactory service.

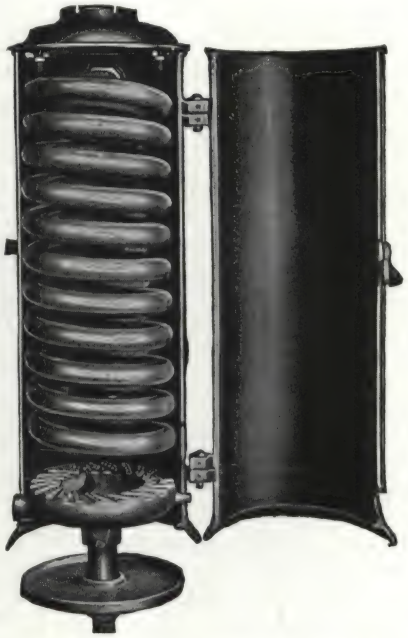
Ohio Double Copper Coil Tank Water Heater

The double coil heater is a very efficient type of tank heater and can be used in either natural or manufactured gas territories. However, the double coil heater is the only heater recommended for manufactured gas.

Made with double coils of ¾-in. seamless No. 20 gauge high grade copper, with heavy red brass fittings. Coils are tested to 250 lbs. water pressure.

Jacket is of cast iron and fits snugly around coils, forcing flames and gases directly through the coils. Burner is powerful and of the whirling type, with side or bottom connections. Drip cup is of new and improved design and hangs from burner.

Finished in gray indestructible porcelain enamel or in black japan.



OHIO DOUBLE COPPER COIL TANK WATER HEATER

OHIO DOUBLE COPPER COIL TANK WATER HEATERS

Heater No.	Diameter of shell, in.	Height, in.	Tank capacity, gals.	Net weight, lbs.
20	7	17½	30–40	25
25	7	21½	30–60	31
30	7	21½	30–80	33

Rolf Single Copper Coil Tank Water Heater

Made with single coils of ¾-in. seamless No. 20 gauge copper, with heavy red brass fittings. Coils are tested to 250 lbs. water pressure. Jacket is of sheet iron, asbestos lined. Burner, base and mixer are in one piece. Finished in black japan.

No. 1 single copper coil heater is recommended for natural gas territories only.

ROLF SINGLE COPPER COIL TANK WATER HEATERS

Heater No.	Diameter of shell, in.	Height, in.	Tank apacity, gals.	Net weight, lbs.
1	8	16½	30	15
1½	8	18½	30	17
2	8	21	40	19

ROLF SINGLE COPPER COIL TANK WATER HEATER

Rolf Cast Iron Coil Tank Water Heater

Made with cast iron coils as illustrated. These coils constitute a series of staggered tapering disks cast in one piece, so that ample fire space is provided at lower end. The waterway inside the coils is large (1¾ in. in diameter), smooth and free from pockets, specially adapted for hard water.

Coils are tested to 100 lbs. water pressure.

Jacket is of sheet iron, asbestos lined. Coil is readily accessible for cleaning.

The large heating surface and freedom from deposits and clogging insure maximum results.

Finished in black japan or blue porcelain enamel.

Automatic Storage Systems

Ohio heaters when installed with a thermostat operate automatically and make a very satisfactory installation. Use ⅜-in. gas supply thermostat with one heater, ½-in. gas supply with two or more heaters. In large houses having 2 or 3 baths, 3 or 4 No. 30 Ohio heaters attached to a 120-gal. range boiler and equipped with ½-in. thermostat and relief valve on the hot water line should be used.

ROLF CAST IRON COIL

ROLF CAST IRON COIL TANK WATER HEATER

ROLF CAST IRON COIL TANK WATER HEATERS

Heater No.	Diameter of shell, in.	Height, in.	Tank capacity, gals.	Net weight, lbs.
8 and 9	7	22	30	23
10 and 12	7	26	30–40	30
14 and 16	7	30	30–80	35

THE KOMPAK COMPANY

Manufacturers of Automatic Gas Water Heaters

NEW BRUNSWICK, N. J.

Product

KOMPAK AUTOMATIC WATER HEATERS for use with Manufactured Gas, Natural Gas, or Gasoline Gas, for furnishing hot water in homes, apartments, cafes, restaurants, etc.

If Pilot Goes Out — KOMPAK — All Gas Shuts Off

TRADE-MARK REG. IN U. S. PAT. OFF.

Easy to Install

Owing to the small gas consumption only a ½-in. gas supply is required. Heater can be connected to original gas meter. A separate or larger meter is not required. Flue connection, 3 in.

Experience and Service

Kompak gas water heaters have 20 years of experience back of them.

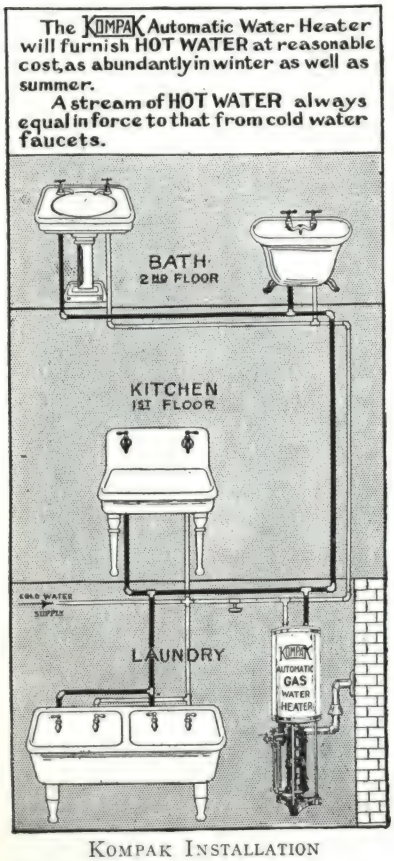
Hot water can be drawn as fast as the cold water flows. No reduction in water pressure. Full faucet flow on all floors, winter and summer.

Kompak Automatic Gas Water Heaters

No. 20 Kompak is built for homes with laundry, kitchen, bath, or shower. No. 32 Kompak is built in homes with laundry, kitchen, and 2 to 3 baths, or showers. Kompak gas water heaters are also made in eight larger styles and sizes for large residences, hotels, big restaurants, buildings, etc. Information cheerfully furnished.

Economy

The "storage" system is the most economical method of supplying automatic hot water. Kompak special features assure reasonable gas bills at all times.



KOMPAK INSTALLATION

Safety

Should the pilot light become extinguished all the gas to the heater is automatically shut off. This is an exclusive Kompak patented feature.

Copper Tank

Copper tanks are used. A copper tank will last forever and assures pure, clear, hot water. Galvanized iron tanks will be furnished if desired.

Condensation

Kompak coils are always free from condensation. Dry coils and clean burners promote long life and freedom from repairs.

Burner

The burner is easy to adjust as there is only one air mixer and it is located outside the heater. There are four burner tops each having its separate gauze which absolutely prevents back flashing. The burner can be disassembled and cleaned without use of tools.

Circulating

Kompak water heaters circulate water perfectly, supplying hot water the instant faucets are opened. Circulating systems, however, involve added expense for gas and should be installed only where the owner is willing to pay for this added convenience.

Reheating

Kompak water heaters can be connected with water back in coal range or furnace. Where a range boiler is already connected with water back, the hot water from range boiler is connected to inlet of the Kompak and from the Kompak to house pipes. When water in range boiler is hot no gas is used.

References

Kompak heaters are retailed through gas companies. Traveling factory representatives make periodic calls to all parts of the country; their service is free. Large users of Kompak heaters are:

Consolidated Gas Co. of New York

Public Service Gas Co. of New Jersey

Detroit City Gas Co.

Boston Consolidated Gas Co. and nearly 300 other companies throughout United States and Canada.

KOMPAK AUTOMATIC WATER HEATER

Continued on next page

Model Specification

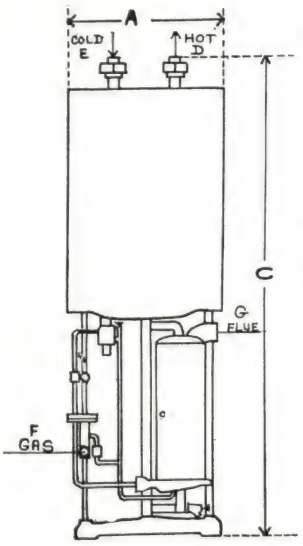
Furnish and install complete where shown on plans one No. .... Kompak Automatic Storage Gas Water Heater manufactured by THE KOMPAK COMPANY, New Brunswick, N. J.

Location—Place heater with shortest possible hot water runs to fixtures, particularly to the kitchen, at the same time making the flue connection as short as possible.

Hot and Cold Water Connections—Connection to heater to be same size as house piping. Place valve in cold water line at heater.

Gas Connection—Use ½-in. black pipe. If more than 20 ft., use ¾-in. pipe. Place union between gas cock and heater.

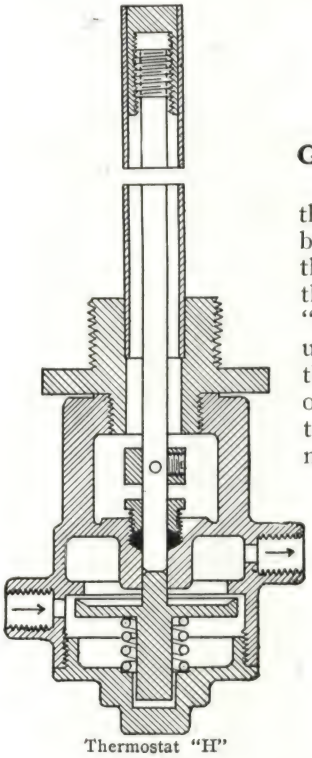
Flue Connection—Use 3-in. galvanized pipe. Insert draft hood, which is supplied with heater, in a vertical position. Flue should be free from down draft.



HEATER DIAGRAM

DIMENSIONS OF KOMPAK HEATERS

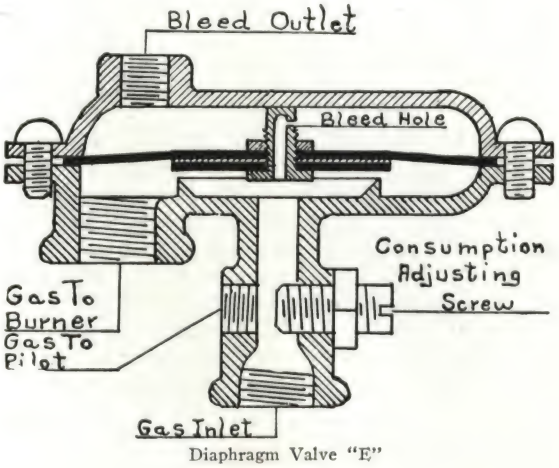
	No. 20 Kompak	No. 32 Kompak
A Diameter, in.....	17½	20
C Height, in.....	66	78
D Hot water, in....	¾	¾
E Cold water, in...	¾	¾
F Gas, in.....	½	½
G Flue, in.....	3	3
Tank capacity, gal..	20	32
Crated weight, lbs..	225	325



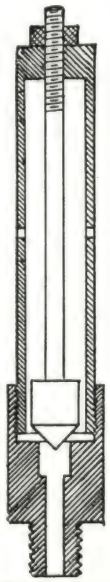
Thermostat "H"

Gas Can't Escape If Pilot Goes Out

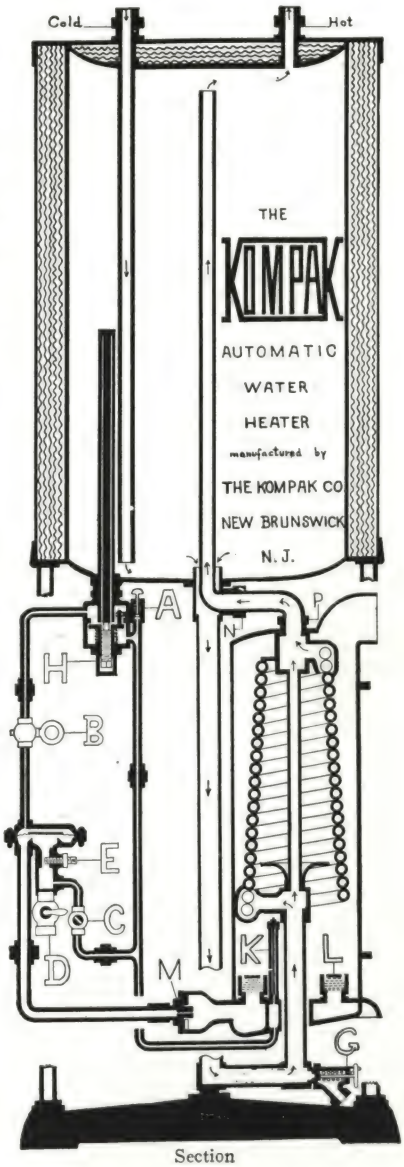
How It Works—Gas enters at "D," raises the diaphragm off the seat and passes to the main burners "L." A tiny amount of gas passes first through the bleed hole in diaphragm "E" and then through thermostat "H" into the thermostatic pilot "K." If the pilot goes out, it closes the pilot valve upon cooling. The bleed gas can no longer escape through the pilot and builds up a gas pressure on top of the diaphragm "E," thus causing the diaphragm to drop to the valve seat and shut off the gas to the main burners.



Diaphragm Valve "E"



Thermostatic Pilot "K"



Section

DETAILS OF KOMPAK AUTOMATIC WATER HEATERS

PITTSBURG WATER HEATER COMPANY

Patentees and Manufacturers of Gas Fired, Copper Coil Water Heaters

PITTSBURGH, PA.

SALES OFFICES, DISPLAY ROOMS AND SERVICE STATIONS

BALTIMORE, MD., Howard and Mulberry Streets
BOSTON, MASS., 78 Broad Street
BROOKLYN, N. Y., 212 Livingston Street
BUFFALO, N. Y., 86 West Huron Street
CHICAGO, ILL., 319 North Michigan Boulevard
CINCINNATI, OHIO, 622 Main Street
CLEVELAND, OHIO, 2008 East 46th Street
COLUMBUS, OHIO, 346 North High Street
DALLAS, TEX., 1601 Commerce Street
DAYTON, OHIO, 15 North Jefferson Street
DENVER, COLO., 217 Fifteenth Street
DETROIT, MICH., 148 Bagley Avenue
HOUSTON, TEX., 611 San Jacinto Street
INDIANAPOLIS, IND., 45 South Pennsylvania Street
KANSAS CITY, MO., 507 East 15th Street
LOS ANGELES, CAL., 131 East Sixth Street
LOUISVILLE, KY., 518½ South Second Street
MILWAUKEE, WIS., 731 Grand Avenue
NEW ORLEANS, LA., 924 Common Street
NEWARK, N. J., 15 West Park Street
OAKLAND, CAL., 309 Thirteenth Street
PASADENA, CAL., 47 South Raymond Street
PHILADELPHIA, PA., 1111 Arch Street
PITTSBURGH, PA., 110 Jenkins Arcade
PORTLAND, ORE., 188 Fourth Street
ST. LOUIS, MO., 1007 Locust Street
ST. PAUL, MINN., 6th and Cedar Streets
SAN ANTONIO, TEX., 208 Avenue C
SAN DIEGO, CAL., 758 Front Street
SAN FRANCISCO, CAL., 478 Sutter Street
SEATTLE, WASH., 590 First Avenue South
WASHINGTON, D. C., 1305 G Street, Northwest
TORONTO, CANADA,

Products

"PITTSBURG" AUTOMATIC GAS WATER HEATERS; "LION" TANK WATER HEATERS; "PITTSBURG" MULTICOIL AUTOMATIC STORAGE SYSTEMS.

The "Pittsburg" line includes water heaters suitable for every purpose, and of sufficient capacities to meet every requirement. There are 18 sizes, with capacities ranging from 2 gals. a minute to 5000 gals. an hour.

Selection of Type and Size of Heater

Correct specification of type and size of heater can be made only by careful analysis of the hot water requirements of the particular situation.

The choice between an automatic heater (direct flow type) and an automatic storage system is simple—the conditions for one are the reverse of the other.

CONDITIONS WHICH DETERMINE THE TYPE OF HEATER

Direct Flow Automatic Heater	*Storage Heater*
(1) Good water pressure	(1) Low water pressure
(2) Ample gas flow	(2) Fluctuating or low gas supply
(3) Unvarying hot water demand	(3) Heavy or fluctuating hot water demand
(4) Short runs to fixtures and standard size of piping	(4) Long run to fixtures and large pipes
(5) Chimney having good draft	

Under the above conditions specifying the proper type of water heater is comparatively easy.

Selection of Size of Automatic Heater

Every "Pittsburg" water heater has a standard rate of capacity, rated in gallons of water per minute (see table No. 1). To determine the proper size heater, it is necessary to know the number of hot water faucets to be supplied at one time; also their flow in gallons per minute (see table below).

FLOW OF ORDINARY PLUMBING FIXTURES, GALLONS PER MINUTE

Fixture	Fair flow	Good flow	Excellent flow
Kitchen sink bibbs	2	4	6
High gooseneck bibbs	2	2	3
Pantry sink, large bibbs	4	6	8
Laundry tray bibbs	4	6	8
Slop sink bibbs	3	4	6
Lavatory basin bibbs	2	3	4
Bathtub bibbs	3	4	6
Shower baths:			
5-in. heads	2	3	4
6½-in. rain heads	2	3	5
8-in. rain heads	4	6	8
8-in. tabular heads	6	8	10
Needle baths	20	30	40

Compiled from tests on 30 lbs. water pressure, and intended merely as a guide.

"Fair flow" is minimum from which good service could be expected.

"Excellent flow" is maximum to be obtained without splashing and noise.

"Good flow" is a stream which combines satisfaction and economy in most cases.

When the number of gallons per minute and the temperature rise are known, the proper size heater may be determined by the following calculations:

Multiply the temperature rise wanted by the number of gallons per minute to be supplied; divide this product by 63 (for manufactured gas), or by 80 (for natural gas). Quotient obtained is size of heater required.

Example—Given the following conditions: faucet temperature desired, 130°; average temperature of incoming water, 50°; 4 gals. per minute to be supplied. Temperature rise is then 80°, and the solution is:

$$80 \times 4 \div \begin{Bmatrix} 63 \text{ for manufactured gas} \\ 80 \text{ for natural gas} \end{Bmatrix} = \begin{Bmatrix} \text{size of "Pittsburg"} \\ \text{heater to be supplied} \end{Bmatrix}$$

If the result obtained is not the exact capacity of a heater, select heater rated next larger than this figure. For a result of 5.3, select a No. 6 "Pittsburg," the capacity of which is 6 gals. per minute.

Selection of Sizes, Automatic Storage Combination and Multicoil Storage Systems

To correctly specify the proper size storage system for any particular requirement involves considerable estimation. The basic principles are the same as for an automatic water heater except that the capacity of the heater is figured in gallons per hour instead of in gallons per minute. The number of times the fixtures are to be used per hour also enters into the problem.

Determine the number of fixtures to be supplied, and the flow in gallons per minute at each; estimate the number of times each fixture will be used during the hour of greatest demand; also estimate the average number of minutes the fixtures will be used each time. Multiply these four factors together and the result will be the hourly demand, to meet which the system must be selected.

Example—Peak hour demand has been found to be 600 gals. A 500-500 "Pittsburg" multicoil system will be ample to supply the requirements. This system comprises a No. 500 "Pittsburg" multicoil storage heater and a 500-gal. tank. This system would have 500 gals. of hot water stored ready for use; the heater would add 500 gals. more during the second hour, the temperature raised 63°.

Methods of Installation

Direct—The water is instantly heated in the

Continued on next page

TABLE No. 1. SIZES, CAPACITIES AND DATA, "PITTSBURG" AND "BUNGALOW" AUTOMATIC WATER HEATERS

Size	*Price Eastern	*Price Western	Avg. capacity, gals. per min.	Size of water connection, cold inlet, hot outlet, in.	Gas supply, direct line from meter, in.	Min. size of meter, lights	Size of flue connections, in.	Height, in. Leg base equipment	Height, in. Wall bracket equipment	Diam. of heater incl. mechanism, in.
† 2	$100.00	$105.00	2	½	¾	10	5	50⅝	32⅝	21
†50	115.00	120.00	2½	¾	¾	20	5	47⅞	35⅞	21
55	130.00	135.00	2½	¾	¾	20	5	47⅞	35⅞	24
†60	160.00	165.00	3	¾	1	30	5	49½	Not manufactured	23
65	180.00	190.00	3	¾	1	30	5	49½		26
4	225.00	240.00	4	¾	1¼	45	6	47		25
6	290.00	310.00	6	¾	1¼	60	7	52		26
8	385.00	410.00	8	¾	1½	80	8	58		30

*Western is from eastern boundary of Montana, Wyoming, Colorado and New Mexico.

†Sizes Nos. 2, 50 and 60 are pressure valve type non-thermostatic. All other "Pittsburg" heaters are thermostatically controlled.

coils when the hot water faucet is opened. A few moments elapse before the hot water reaches the faucet.

Circulating—By this installation, the water is kept hot at any or all faucets and provides a service slightly more prompt than the direct system. Blue print on request.

Supplementary—This the "re-heating" method of installing automatic heaters. The "Pittsburg" is set up in connection with the house heating furnace coils and storage tank. It intercepts the water as it flows from the tank to the fixtures, and if the hot water in the tank is up to the desired temperature, it passes through the copper coils in heater and over the thermostat or temperature regulator without turning on the gas in heater. If temperature of water from tank drops, the heater is called into action and continuous hot water is provided at an even temperature.

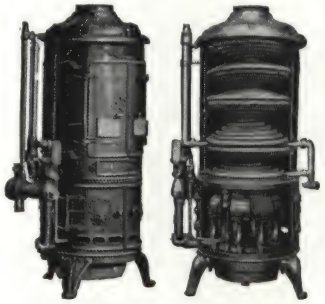
TABLE No. 2. SIZES, CAPACITIES AND DATA, PITTSBURG AUTOMATIC STORAGE SYSTEMS

System and heating capacity, gals. per hour.	†Price Eastern	†Price Western	Capacity of tanks, gals.	Dimension of iron tanks, black—galv.	Size of circulating pipes, in.	Size of hot supply to house—also cold inlet—in.	Heating surface of heater, sq. in.	Size, moment valve and gas supply, in.
"Lion" storage one unit	* $140.00	* $145.00	20	2′6″ x 14″	¾	¾	576	*
30	175.00	185.00	30	2′6″ x 18″	¾	¾	576	
30-40 system	* 200.00	* 215.00	40	3′7″ x 17½″	1	¾	677	¾
50-66 system	* 300.00	* 315.00	66	4′5″ x 20″	1¼	1	855	¾
100	215.00	240.00	80	5′ x 20″	1½	1	1500	¾
100			100	5′ x 22″	1½	1¼	1500	¾
100	Heater	only	150	6′4″ x 24″	1½	1¼	1500	¾
200	260.00	285.00	100	5′ x 22″	2	1¼	2450	1
200			150	6′4″ x 24″	2	1¼	2450	1
200	Heater		200	8′6″ x 24″	2	1½	2450	1
200	only		250	7′ x 30″	2	1½	2450	1
200			300	8′ x 30″	2	2	2450	1
300	315.00	350 00	200	8′6″ x 24″	2½	1½	3500	1½
300			250	7′ x 30″	2½	1½	3500	1½
300	Heater		300	8′ x 30″	2½	2	3500	1½
300	only		365	10′ x 30″	2½	2	3500	1½
500	525.00	570.00	425	8′ x 36″	3½	2½	5100	2
500			500	9′6″ x 36″	3½	2½	5100	2
500	Heater		600	8′6″ x 42″	3½	2½	5100	2
500	only		700	10′ x 42″	3½	2½	5100	2
500			800	8′6″ x 48″	3½	2½	5100	2
500			1000	11′2″ x 48″	3½	2½	5100	2

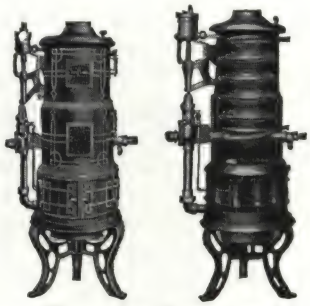
†Western is from eastern border of Montana, Wyoming, Colorado and New Mexico.

*Price includes complete system. Other prices, heaters only.

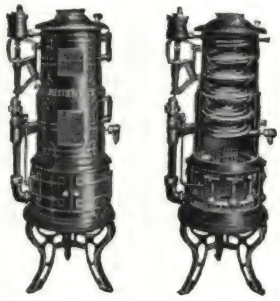
All tanks should be provided with handholes for cleaning, and large sizes with manholes. Tanks of 200-gal. capacity and larger are furnished with extra tappings for connecting additional heaters. Dimensions, capacities and weights of tanks not guaranteed. Specify dimensions if exact size is important. Brown Bros. copper tanks can be furnished up to 300-gal. capacity.



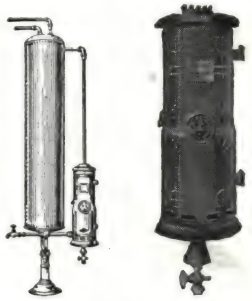
"Pittsburg"
Capacities, 4, 6, and 8 gals. per min.



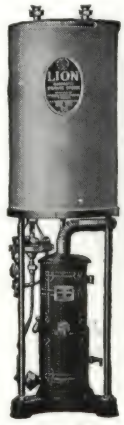
"Pittsburg-Bungalow"
Capacities, 2½ and 3 gals. per min.



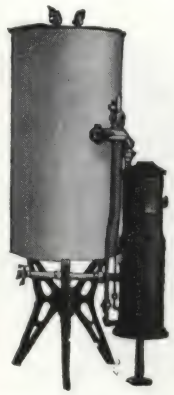
"Bungalow" (Pressure Valve)
Capacities, 2½ and 3 gals. per min. 2-gal. heater not shown



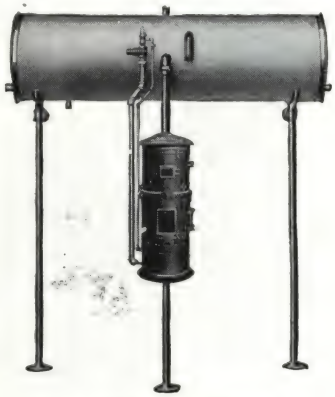
"Lion" Tank Heater
Three sizes. Single, double and triple coil



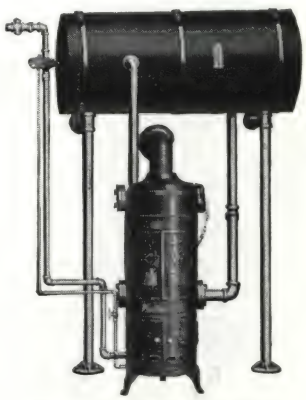
"Lion" Storage System
Capacity insulated tank, 20 and 30 gals.



"Pittsburg" Storage System No. 30
Capacity of insulated tank, 40 gals.



"Pittsburg" Storage System No. 50
Capacity of insulated tank, 66 gals.



"Pittsburg" Multicoil Storage System
Four sizes—see table No. 2

RUUD MANUFACTURING COMPANY

Manufacturers of Gas Fired Water Heaters

GENERAL OFFICES

PITTSBURGH, PA.

FACTORIES

PITTSBURGH, PA. TORONTO, CAN.

BRANCH OFFICES

BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
COLUMBUS, OHIO
DALLAS, TEX.
DAYTON, OHIO
DETROIT, MICH.
DULUTH, MINN.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.
OKLAHOMA CITY, OKLA.
PHILADELPHIA, PA.
PORTLAND, ORE.
ROCHESTER, N. Y.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SYRACUSE, N. Y.
TOLEDO, OHIO
TORONTO, CAN.
WASHINGTON, D. C.

Products

RUUD STANDARD INSTANTANEOUS AUTOMATIC WATER HEATER.

RUUD COTTAGE AUTOMATIC WATER HEATERS (Cast Iron and Aluminum Types).

RUUD AUTOMATIC REHEATING SYSTEMS.

RUUD AUTOMATIC MULTICOIL STORAGE WATER HEATER SYSTEMS.

RUUD SMALL AUTOMATIC STORAGE WATER HEATER SYSTEMS (Nos. 30, 40 and 50).

RUUD TANK or BOILER WATER HEATERS (Non-automatic).

Ruud Instantaneous Automatic Water Heaters

Types—Ruud instantaneous automatic water heaters are made in two types, the Standard and the Cottage.

Ruud Standard Instantaneous Automatic Water Heaters—This type is the standard by which all water heater values are measured. It is the most efficient and economical. It combines instantaneous service with an inexhaustible supply of hot water.

Ruud Automatic Cottage Water Heater—Embodies the same general principle of construction and operates in the same manner as Ruud standard instantaneous automatic water heater of larger size. Equally efficient and economical. Designed especially for places and purposes where only a small amount of hot water is wanted per minute, and generally but one fixture to be supplied.

Ruud Automatic Aluminum Cottage Water Heater—Because of its beauty of design, lightness of weight and elegance of finish, this heater is adapted for installations in bathrooms and kitchens. Has a polished aluminum shell and nickelplated mechanism, presents a very pleasing appearance, harmonizes with high class fixtures wherever installed, and, being unusually light, readily connects to wall or other places without troublesome fitting. Operation is the same as the Ruud cottage water heater.

Construction—Consists of cast iron shell, (except the aluminum cottage heater) enclosing burners, heating surfaces (copper coil) and thermostat. Automatic mechanism (comprising gas and water valves) is outside of shell.

Operation—Opening any hot water faucet unbalances water pressures in water valve, causing plunger to move and open gas valves. Gas passes at once to a second gas valve, which is controlled by thermostat internally located in heat zone of heater. If this valve is open, gas goes to burners, where it ignites from a pilot flame. Pilot burner (fed by a separate line) is not affected by operation of automatic mechanism. Water is then heated as it flows through coil. Should water become too hot, gas is shut off by thermostat, until temperature of water has fallen somewhat. Gas would then relight,

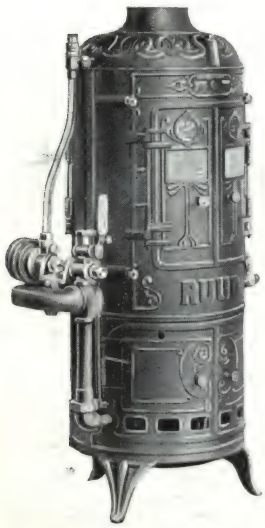


FIG. 1. RUUD STANDARD INSTANTANEOUS AUTOMATIC WATER HEATER

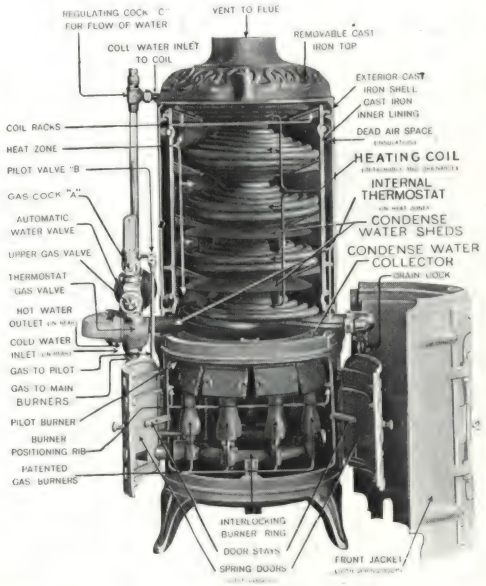


FIG 2. ANALYTICAL VIEW OF RUUD STANDARD WATER HEATER

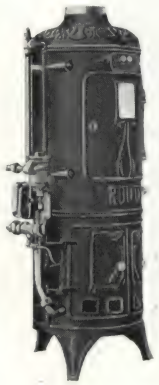


FIG. 3. RUUD AUTOMATIC COTTAGE WATER HEATER
Nos. 85 and 95

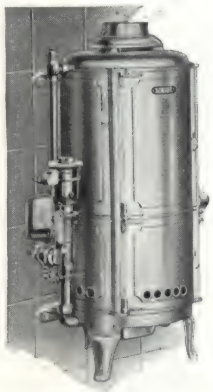


FIG. 4. RUUD ALUMINUM COTTAGE WATER HEATER
May be installed on floor or wall brackets

Continued on next page

providing hot water faucet is still open. Closing of hot water faucet restores balance of water pressure in water valve, which immediately shuts off gas in main burners. This operation is repeated whenever a hot water faucet is opened. Except for small pilot flame, heater burns gas only when hot water is being drawn. Temperature of hot water is controlled by thermostat in heater, which is adjusted at factory at 140° Fahr.

Stones or other foreign substances in the inlet water, which keep the water valve open, will not affect the operation of the heater, for the separate thermostatic valve will shut off the flow of gas when the water reaches the predetermined temperature. This is known as double fuel control and is an exclusive Ruud feature.

Installation—Designed to operate with artificial, natural or gasoline gas. Simple to install, involving no special fittings or devices. Delivered ready to attach to water and gas lines. All heaters should be connected to a flue having a good draft. An independent flue is desirable but not essential. Always set heater nearest point where hot water is used most frequently, giving flue line first consideration. The standard instantaneous type is not adapted for use on return circulation systems of plumbing. Hot water will be delivered more quickly if larger sizes of pipe are avoided. Keep hot water piping as small as possible, in no case exceeding one size larger than heater outlet. The runs to various faucets should be as direct as possible. A Ruud can be installed by any competent plumber, and in any place having suitable gas supply (artificial, natural or gasoline gas) and where at least 5 lbs. of water pressure is available at highest fixture.

Cost of Operation—1⅓ cu. ft. of gas will heat 1 gal. of water. With artificial gas measuring 525 B.t.u. (heat units) at $1.00 per 1000 cu. ft. the Ruud furnishes 10 gals. of hot water for 1⅓¢, an ordinary hot bath for 2⅔¢. Cost per month ranges from $2.50 in summer to $3.50 in winter, including pilot light. Natural gas has more heat units and costs less, so that the foregoing figures will be considerable lower where it is used. Under the Ruud reheating system, operating cost is even less than above estimate.

Sizes, etc.—Size of heater should be based upon class of building, average number of occupants, number of hot water faucets and kind of fixtures supplied. Gas and water pressure conditions invariably govern type of heater best adapted. (See tables Nos. 1, 2, 3, and 4.)

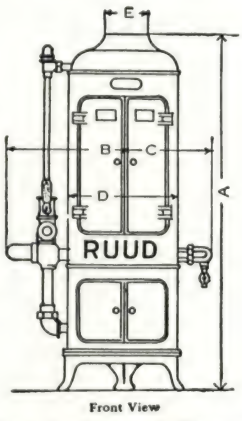


FIG. 5. DIAGRAM SHOWING DIMENSIONS OF STANDARD AND COTTAGE HEATERS

Model Specifications, Ruud Instantaneous Automatic Heaters (Standard and Cottage Heater Types).

Install where indicated on plans .... No. .... Rudd Instantaneous automatic water heater (or cottage heater). Take cold water connection off main at convenient point, run to heater using full size pipe indicated in directions. Connect hot water from heater to hot lines, using pipe not smaller than size indicated in directions. Connect gas line to heater, run line direct from meter to heater, not smaller than indicated in directions. Install Ruud draft hood in vertical position. Connect vent from heater to independent chimney, if available, of size not smaller than indicated in directions published by RUUD MANUFACTURING COMPANY, Pittsburgh, Pa.

TABLE NO. 2. SIZES OF HEATERS—THEIR APPLICATION TO RESIDENCES

Size heater	Gals. per min.	Residences having
No. 3	3	1 bathroom and kitchen sink, small family
No. 4	4	1 family bathroom, servants' bathroom, kitchen and laundry
No. 6	6	2 family bathrooms, servants' bathroom, kitchen, pantry, laundry and 1 or 2 lavatories
No. 8	8	3 or 4 family bathrooms, servants' bathroom, kitchen, pantry, laundry and lavatories

NOTE—The table "Sizes of Heaters" should be used only in conjunction with the table of "Capacities of Heaters." Table No. 3.

Cottage heaters, Nos. 85, 95, 60 and 70 are adapted for places and purposes where only a small amount of hot water is wanted per minute and where 1 fixture is to be supplied.

TABLE NO. 3. CAPACITIES OF HEATERS, IN GALLONS PER MINUTE

Delivered by Ruud Instantaneous Automatic Water Heaters and Ruud Instantaneous Automatic Cottage Water Heaters

Size heater	Temperature raise 50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°
COTTAGE INSTANTANEOUS WATER HEATERS											
No. 85	2.52	2.10	1.80	1.58	1.40	1.26	1.15	1.05	.....	.....	.....
No. 95	3.15	2.62	2.25	1.97	1.75	1.58	1.43	1.31	.....	.....	.....
No. 60	2.28	1.87	1.60	1.40	1.24	1.12	1.03	.93	.....	.....	.....
No. 70	3.15	2.62	2.25	1.97	1.75	1.58	1.43	1.31	.....	.....	.....
STANDARD INSTANTANEOUS WATER HEATERS											
No. 3	3.78	3.15	2.70	2.36	2.10	1.89	1.72	1.58	1.45	1.35	1.26
No. 4	5.05	4.20	3.60	3.15	2.80	2.52	2.29	2.10	1.94	1.80	1.68
No. 6	7.58	6.30	5.40	4.73	4.20	3.87	3.52	3.23	2.98	2.76	2.58
No. 8	10.10	8.40	7.20	6.30	5.60	5.04	4.59	4.20	3.88	3.60	3.36

TABLE NO. 4. FLOW IN GALLONS PER MINUTE DELIVERED BY ORDINARY PLUMBING FIXTURES

Fixture	Fair flow	Good flow	Excellent flow
Kitchen sink bibbs	2	4	6
Pantry sink—high gooseneck bibbs	2	2	3
Pantry sink—large plain bibbs	4	6	8
Laundry tray bibbs	4	6	8
Slop sink bibbs	3	4	6
Lavatory basin bibbs	2	3	4
Bathtub bibbs	3	4	6
Shampoo spray	½	1	2
Shower baths:			
5 -in. rain heads	2	3	4
6½-in. rain heads	2	3	5
8 -in. rain heads	4	6	8
8 -in. tubular heads	6	8	10
Needle baths	20	30	40
Manicure tables	1	1½	2

Compiled from tests on 30 lbs. water pressure, and intended merely as a guide.

"Fair Flow" is minimum from which good service could be expected.

"Excellent Flow" is maximum to be obtained without splashing and noise.

"Good Flow" is a stream which combines satisfaction and economy in most cases.

TABLE NO. 1. GENERAL TABLE, RUUD STANDARD INSTANTANEOUS AUTOMATIC AND COTTAGE WATER HEATERS

(Thermal Valve or Type F Model—Natural or Artificial Gas)

Size number	Cap. per min., gals.	Heater dimensions, in. A	B	C	D	E	Average temp. rise, deg.	Size water inlet, in.	Size water outlet, in.	Min. water pressure, lbs.	Size gas meter	Gas consumed per min., cu. ft. Art.	Nat.	Size gas line, in.	Size flue conn., in.	Net weight, lbs.	Prices on application Eastern district	Rocky Mt. district
COTTAGE WATER HEATERS																		
85	2	38½	12	9	12½	4	63	½	½	20	10-L	2	1	¾	4	175	.....	.....
95	2½	41¾	12½	9⅜	13⅛	5	63	½	½	20	10-L	3	1¾	¾	5	210	.....	.....
60	1½	30¾	12	9	11¾	4	63	½	½	20	10-L	2	1	¾	4	60	.....	.....
70	2½	33	12	9	12⅛	4	63	½	½	20	10-L	3	1¾	¾	4	70	.....	.....
STANDARD INSTANTANEOUS WATER HEATERS																		
3	3	45½	14¾	11	14½	6	63	½	½	25	30-L	4	2	1	6	270	.....	.....
4	4	47¼	15⅞	12	16⅜	6	63	½	½	25	45-L	5	3	1¼	6	330	.....	.....
6	6	55½	17¼	13⅜	19	7	63	¾	¾	25	60-L	7½	4	1½	7	475	.....	.....
8	8	58½	18⅜	14	21¼	8	63	¾	1	25	80-L	10	6	2	8	575	.....	.....

NOTE—Sizes Nos. 4, 6 and 8 heaters are also built for operating where water pressure is less than 25 lbs. at highest faucet. For these conditions, specify "Low Pressure" heaters.

Continued on next page

Automatic Re-heating System

Thermostatic regulation of Ruud heaters enables them to work in conjunction with a boiler, the water in which has been heated by some other source of heat. This is known as the automatic re-heating system.

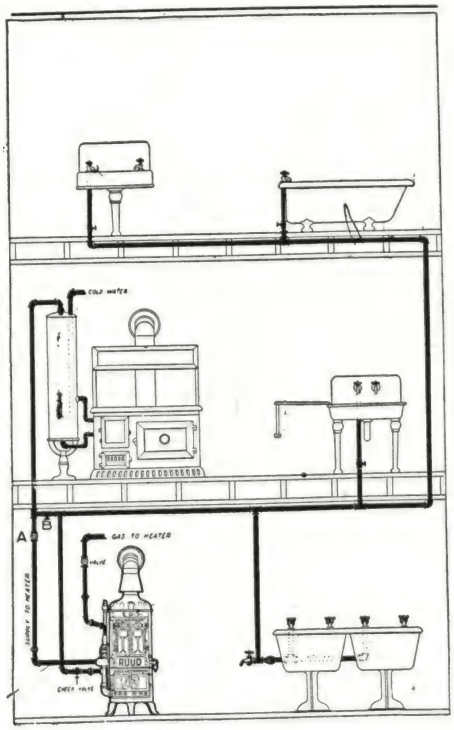


FIG. 6. THE RUUD INSTALLED ON RE-HEATING SYSTEM IN CONNECTION WITH RANGE BOILER

By this system all water from tanks passes through heater on way to fixtures. If water is sufficiently hot, no gas is burned in heater. Supply of water to heater is taken from outlet of boiler instead of from cold water main. In this manner, heater intercepts water, raising it to the desired temperature, using only enough gas to guarantee the predetermined temperature. Whole operation is automatic and made possible by the Ruud internal thermostat. It is a very desirable installation from viewpoint of economy of operation.

Other Forms of Installation—Aside from common forms of installation which are treated separately, all Ruud automatic systems are adopted for use in connection with water supply from gravity tank located in attic, with water supplied from range boiler, with furnace coil placed in house heating plant and with gas supplied from gasoline gas generator.

Ruud Automatic Multicoil Storage System

Designed to supply demand for hot water in large quantities and to fulfill severe requirements frequently met in apartment houses, large residences, small hotels, hospitals, and in general, any institution or building where need for hot water and the conditions surrounding installation are more than ordinarily exacting.

Operation—System is entirely automatic, operating without any attention. Principle of operation is the maintenance in a storage tank of sufficient hot water at a predetermined temperature to supply anticipated demand. Size number of heater denotes number of gallons per hour heater will raise 63° Fahr. Storage systems take but little account of water pressure. Flue connections are of utmost importance.

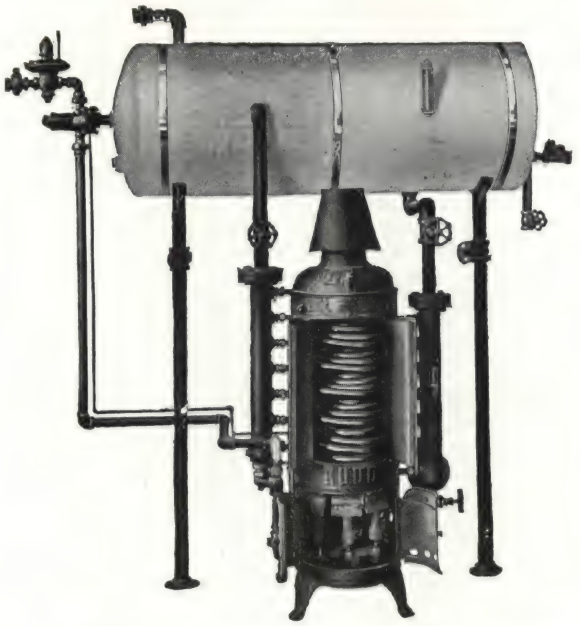


FIG. 7. RUUD MULTICOIL STORAGE SYSTEM (AUTOMATIC)

TABLE NO 5. GENERAL TABLE RUUD MULTICOIL STORAGE HEATERS

Size	Height of heater, in.	Width of heater, in.	Per hour capacity, gals.	Aver. tem. rise, deg.	Size manifold connection, in.	Size gas line, in	Size flue connections, in.	Moment valve required, in.	Gas consumed per hr., cu. ft.		Size gas meter	Weight net (lbs.)
									Art.	Nat.		
100	45	27	100	63	1½	¾	4	¾	142	80	20	233
200	49⅞	29½	200	63	2	1	6	1	280	150	30	333
300	53⅜	32	300	63	2	1	6	1	375	225	45	410
500	64⅛	38½	500	63	2½	1½	8	1½	650	375	80	683

NOTE—Tanks furnished with multicoil storage systems are equipped when so ordered with galvanized iron or copper steam heating coils and handholes or manholes. No manholes can be supplied on copper tanks.

Prices on application.

TABLE NO. 6. GALLONS PER HOUR DELIVERED BY MULTICOIL STORAGE HEATER

Size heater	Temperature raise						
	50°	60°	70°	80°	90°	100°	110°
No. 100	126	105	90	78.8	70	63	57.2
No. 200	252	210	180	157.5	140	126	114.5
No. 300	378	315	270	236	210	189	172
No. 500	630	525	450	394	350	315	287

TABLE NO. 7. SIZES OF SYSTEMS AND THEIR APPLICATION TO VARIOUS CONDITIONS

Size heater	Capacity of tank, gals.	Requirements
100	100 or 150	Residences having 3 to 5 bathrooms, bedroom lavatories, large kitchen sink, pantry sink and laundry. Apartment buildings with 6 apartments of 4 or 5 rooms each.
200	150, 200 or 250	Residences having 5 to 8 bathrooms, large kitchen sink, dishwashing machine, large laundry. Apartment buildings having 6 to 12 apartments of 5 or 6 rooms each.
300	250, 300 or 365	Residences having 7 to 10 bathrooms, large kitchen sink, dishwashing machine, large laundry. Apartment buildings having 10 to 18 apartments of 5 or 6 rooms each.
500	425, 500 or 600	Apartment buildings having 20 to 30 apartments of 5, 6 or 7 rooms each. Very large homes. 40- to 60-room hotels

After starting system, heater will operate continuously until tank is filled with hot water up to a temperature at which thermostat is adjusted—usually 140° Fahr., after which burners will light up intermittently or as often as is necessary to keep water in boiler at this temperature. The famous Ruud thermostatic moment valve is the controlling mechanism for artificial gas installation. Ruud graduating thermostat is supplied where natural gas is used. Ruud multicoil systems are

Continued on next page

universally adapted for return circulation systems of plumbing.

Model Specifications—A .... gal. (black iron, galvanized iron, or copper) tank, as supplied by RUUD MANUFACTURING COMPANY, to be supported in horizontal position on Ruud tank supports, and fitted in automatic connection with .... No. .... Ruud multicoil storage heater[s], using .... in. brass pipe as circulators between heater and boiler, with .... gate valves and elbows; system to be fitted in exact accordance with RUUD MANUFACTURING COMPANY'S printed directions, running direct .... in. gas line direct from meter to heater, with .... in. gas cock in same. A .... in. independent flue pipe to be run from heater to chimney having good draft, inserting draft hood in vent line in a vertical position. Cover tank with a 2-in. wall of 85% Ruud magnesia insulation, canvassed.

Ruud Automatic Storage Systems, Nos. 30, 40 and 50 for Home, Industrial and Commercial Use

Operate upon identically the same principle as Ruud multicoil storage system. Maintain automatically a tank of hot water at desired degree of temperature for any demand. All Ruud small storage systems are supplied with Ruud thermostatic moment valves. Tanks are made of copper-brazed steel or copper, completely surrounded with an insulation held in place by an outer jacket of heavy galvanized iron.

Specially adapted for low water pressure conditions and where private water works operate. Freedom from limitations imposed by water pressure and gas supply conditions renders system almost universally adaptable. Can be installed in connection with direct supply and return circulation systems. Recommended for work where gasoline gas will be used for fuel to operate heater. Built as units, complete, ready to set up.

FIG. 8. RUUD SMALL STORAGE SYSTEM No. 30

TABLE NO. 8. RUUD STORAGE SYSTEMS NOS. 30, 40 and 50

No. of system	Capacity of tank, gals.	Size of circulators, in.	Cold water inlet, in.	Hot water outlet, in.	Gas supply, in.	Size flue, in.	Size meter	Weight crated, lbs.
30	20	1	¾	¾	¾	3	10 light	370
40	40	1	¾	¾	¾	4	10 light	430
50	66	1¼	1	1	¾	4	10 light	695

TABLE NO. 9. SIZE OF HEATERS—THEIR APPLICATION TO RESIDENCES

Size heater	Capacity of tank, gals.	For residences having
30	20	1 or 2 bathrooms, laundry and kitchen sink. For small family.
40	40	1 or 2 private bathrooms, 1 servants' bathroom, laundry and kitchen sink.
50	66	3 or 4 bathrooms, 1 or 2 bedroom lavatories, laundry and kitchen sink.

Model Specifications—Install where indicated on plans, ... No. .... Ruud automatic storage system. Take cold water connections off main at convenient point, run to boiler, using full size pipe, as indicated in directions. Connect hot water from boiler to hot lines, using pipe not smaller than indicated in directions. Connect gas line, not smaller than size indicated in directions, to inlet opening on moment valve. Install Ruud draft hood in vertical position. Connect vent from heater to chimney, of size not smaller than indicated in directions, as furnished by RUUD MANUFACTURING COMPANY, Pittsburgh, Pa.

Ruud Tank or Boiler Heaters

The difference between these heaters and automatic heaters is only in absence of automatic features. Ruud patented construction lessens cost of installation and maintenance. Coil arrangement is that of multicoil development. Quality of workmanship and material is same as employed in construction of Ruud automatic heaters. Tubing used in coils is, like tubing in automatic heaters, tested to 1000 lbs. per sq. in. before being coiled, and after assembly to 300 lbs. per sq. in. Made in 2 sizes.

FIG. 9. RUUD TANK HEATER No. 25
Black japan model

FIG. 10. RUUD TANK HEATER No. 25
Gray porcelain enamel model

FIG. 11. RUUD TANK HEATER No. 35
Black japan model

TABLE NO. 10. DIMENSIONS, WEIGHTS, ETC., TANK WATER HEATERS

Size of heater	For size tank, gals.	Diameter of coil, in.	Height, in.	Diam. in.	Net weight, lbs.	Weight crated, lbs.
No. 25 Black Japan Finish...	30–40	¾	22⅞	7	35	45
No. 25 Gray Porcelain Finish.....	30–40	¾	22⅞	7	38	47
No. 35.....	40–60	¾–⅞	25⅞	9⅝	71	95

NOTE—The No. 35 is equipped with Triple Coil.

Industrial Installations

Since Ruud water heaters were first manufactured, hundreds of uses have been found for the various heaters quite apart from the original purpose of domestic use or furnishing hot water for toilet or kitchen purposes. Wherever hot water is needed the Ruud of some type or size can supply it. Many other uses have been found for the heater besides furnishing hot water. It is impossible to enumerate these uses, but information pertaining to various industrial installations will be furnished on request.

Guarantee

This company guarantees all heaters delivered in perfect mechanical condition, and free from any defects in material or workmanship, for a period of 1 year from date of installation. With artificial gas testing 525 B.t.u. (heat units), the Ruud instantaneous automatic water heater will not require more than 1⅓ cu. ft. of gas to each gallon of water raised 63° Fahr. in temperature; with natural gas, not more than ¾ cu. ft. of gas to each gallon of water raised 63° Fahr. in temperature. With adequate gas and water supplies, a Ruud storage system (of proper size) will supply hot water in large quantities at any desired temperature, winter or summer, with a very reasonable consumption of gas.

Co-operation

This company maintains district offices in every large center together with a large number of traveling representatives. Their service is available at any time.

THE SANDS MFG. CO.

Manufacturers of Water Heaters

5401-5407 Sweeney Avenue
CLEVELAND, OHIO

Products

INSTANTANEOUS AUTOMATIC GAS WATER HEATERS; COPPER COIL TANK HEATERS.

Also Automatic Storage Systems; Iron Coil and Sectional Tank Heaters.

TRADE-MARK

Instantaneous Automatic Gas Water Heaters

Sands heaters are designed to meet the requirements of the most exacting purchasers. Efficiency and durability are paramount. Patented burner. A simple, effective thermostatic control valve. The jackets are of cast iron with inner liners. All heaters are equipped with cast iron doors which give ready access to the interior of heater. The coils are of the highest grade lake copper seamless tube—wound and placed in the jacket in a manner to produce the greatest efficiency.

All in all, the burners are the most important part of an automatic heater. Our burner is the acme of possibility in design and, without question, the nearest perfect gas-burning device ever invented. Fully protected by letters patent.

Thermostatic Valve Control—The thermostatic control is a simple and properly designed mechanism made entirely of the finest valve bronze, perfectly machined. Non-sticking packed water plunger. This mechanism is covered by our unqualified guarantee and indorsement. It is the zenith of possibility in simplicity.

Styles of Instantaneous Heaters—*No. 2NT*—Suitable for small barber shops, soda fountains having one or two hot water outlets, and small cottages located in southern climates. Furnished with either legs or wall brackets.

No. 3NT—Suitable for cottages, bungalows or small apartments with kitchen and bath. Furnished with or without wall brackets. Can be located either in kitchen or in basement.

No. 4NT—A heater for small residences with kitchen, bath and laundry.

No. 5NT—This is the heater generally used for the average residence.

Note: No. 2NT, 3NT, 4NT and 5NT are non-thermostatic heaters. When a thermostatic heater is required, specify 3T, 4T or 5T. Thermostatic heaters are not made in size No. 2.

SANDS INSTANTANEOUS AUTOMATIC WATER HEATERS

No.	Cap., g. p. m.	Diam., in.	Height, in.	Gas supply from meter to heater, in.	Water conn., in.	Flue conn., in.	Shipping weight, lbs.
2NT	2	11	32	¾	½	4	134
3NT	3	13	39	1	½	5	218
4NT	4	14	43	1	½	6	280
5NT	5	17	45	1	½	6	333
3T	3	13	39	1	½	5	228
4T	4	14	43	1	½	6	290
5T	5	17	45	1	½	6	344

Specifications—Always specify whether heater is to be used on artificial or natural gas. The number of the heater designates the capacity in gallons per minute.

One No..... Sands Automatic Gas Water Heater in the basement as nearly under the kitchen as possible, exact location shown in blue print. Supply heater with water from cold water lines or by-pass from supply tank. Connect hot water outlet to ho. water service lines at a point as close to kitchen as possible. Connect heater vent to flue in basement with ..... size galvanized flue pipe. Place ..... size check valve (vertical) in hot water outlet pipe as near heater as possible. Supply vertical air chamber at cold water inlet of 1¼-in. pipe 20 in. long with cap soldered in place. Gas supply to be of ..... size black iron pipe.

Style 3T Style 4T
SANDS INSTANTANEOUS THERMOSTATIC WATER HEATER

Style 26
SANDS DOUBLE COPPER COIL WATER HEATER

Double Copper Coil Water Heaters

The most efficient tank heaters manufactured. Capacity, 30- to 40-gal tank.

Guarantee

We guarantee all heaters against defective workmanship and material for one year. Capacity guaranteed where gas pressures are 3 in. or more and each cubic foot of gas contains 550 B. t. u. or more.

THERMAL APPLIANCE COMPANY, INC.

Manufacturers of Water Heaters

342 Madison Avenue

NEW YORK, N. Y.

Products

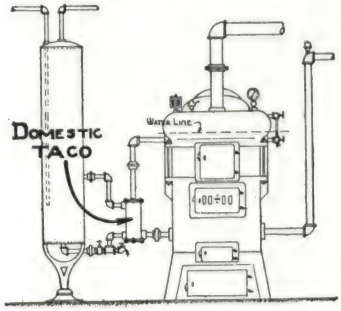
TACO WATER HEATERS.

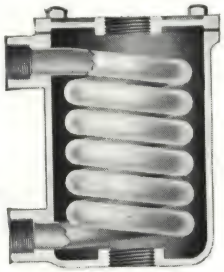
TACO Trade Mark Reg. U.S. Pat. Off.

Taco Water Heaters

Taco heaters are attached to steam, vapor or hot water heating boilers, for furnishing a dependable supply of hot water during the winter months. While the house heating boiler is warming the home, it is false economy to use still another fire for heating water. Use of Taco heater during the winter saves enough money to pay the fuel cost of gas heater, or coal heater during the summer.

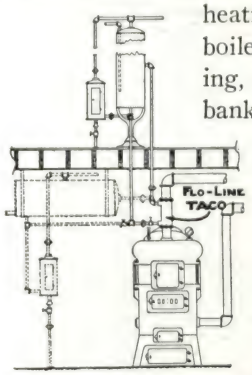
Domestic Taco Water Heater—This is connected below the water line of steam or vapor heating boiler. *No water is drawn out of boiler.* The boiler water circulates over the outside of copper coil, and gives up its heat to the domestic water circulating through the coil.





INSTALLATION DOMESTIC TACO COIL

Flo-Line Taco Water Heater—This is installed at boiler outlet, in main of steam, vapor or hot water heating boiler and connected to range boiler, suspended from basement ceiling, or on floor above. Even with a banked fire in mild weather, or at night, a tank full of hot water will be maintained, for at the outlet of heating boiler when Taco is installed, there is always sufficient vapor to properly heat the domestic water, irrespective of whether or not any steam is carried in the radiators.

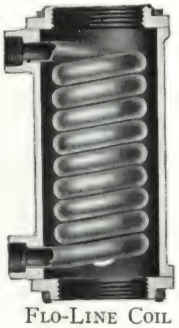


FLO-LINE INSTALLATION

DOMESTIC AND FLO-LINE TACO WATER HEATERS

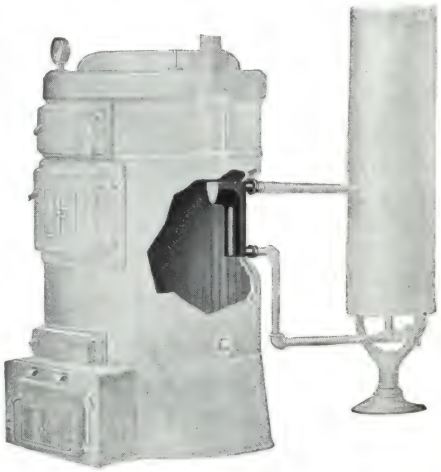
No.	Capacity gals.	Tank connections in.	Boiler connections in.	Height over all in.	List price	Shipping, wgt. lbs.
30 Domestic	30	¾	1	8	$15.00	12
1 Domestic	40	¾	1	9⅜	20.00	25
2 Domestic	80	1	1	13⅞	30.00	45
3 Domestic	120	1¼	1¼	19⅝	50.00	70
01 Flo-Line	*60	¾	3	9⅜	25.00	25
02 Flo-Line	*120	1	4	13⅞	35.00	45
03 Flo-Line	*240	1¼	5	19⅝	55.00	75

*Capacity rating for steam.
For capacity with hot water heating boiler, divide by 2.



FLO-LINE COIL

Universal Taco Water Heater—Universal Taco takes the place of objectionable pipe coil in the boiler fire pot. Fits snugly against the boiler wall. No space for ashes or coal to collect, or air to leak through fire bed and so cause fire to burn out. So shaped as to give hot water in mild weather. Made in one piece; no joint to leak. Recommended by leading boiler manufacturers throughout the country.



UNIVERSAL INSTALLATION

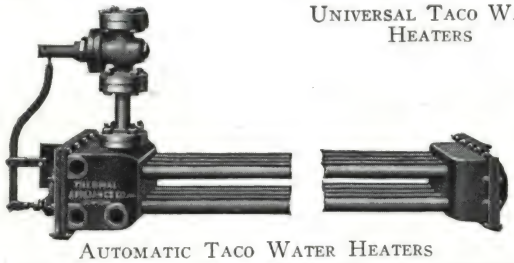
UNIVERSAL WATER HEATERS

No.	Capacity, gals.	For boiler with coil openings, c. to c. in.	Tank connections in.	List price	Shipping wt., lbs.
9–30	30	9	1	$ 8.00	10
9–60	60	9	1	14.00	17
†6–9–30	30	*6–9	1	8.00	10
†6–9–60	60	*6–9	1	14.00	17
3–30	30	*3–5	1	8.00	10
3–60	60	*3–5	1	14.00	17

†Made in brass: 30 gal., list price, $20.00; 60 gal., list price, $35.00.
*Or more.

No. 9-30 No. 6-9-30

UNIVERSAL TACO WATER HEATERS



AUTOMATIC TACO WATER HEATERS

No.	Capacity in Gallons Per Hour, Pounds Steam								Shipping weight, lbs.
	Low Pressure Type				High Pressure Type				
	1	5	10	15	20	40	60	75	
T- 1	120	240	360	430	540	840	1080	1260	190
T- 2	240	480	720	960	1080	1680	2060	2520	300
T- 3	360	720	1080	1440	1620	2520	3140	3780	425
T- 4	480	960	1440	1920	2160	3360	4220	5040	550
T- 5	600	1200	1800	2400	2700	4200	5300	6300	675
T- 6	720	1440	2160	2880	3240	5040	6380	7560	800
T- 7	840	1680	2520	3360	3780	5880	7460	8820	925
T- 8	960	1920	2880	3840	4320	6720	8540	10080	1050
T- 9	1080	2160	3240	4320	4860	7560	9620	11340	1175
T-10	1200	2400	3600	4800	5400	8400	10700	12600	1300
T-11	1320	2640	3960	5280	5940	9240	11780	13860	1425
T-12	1440	2880	4320	5760	6480	10080	12860	15120	1700

Specification

Furnish and install one No. (mention size and type) Taco water heater and make all necessary connections as shown in catalogue of THERMAL APPLIANCE COMPANY, INC., New York, N. Y.

ESTABLISHED 1894 INCORPORATED 1912

STACK HEATER COMPANY

Manufacturers and Designers of Water Heaters and Allied Specialties

33 Sudbury Street
BOSTON, MASS.

Products

STACK GAS WATER HEATERS.
STACK INDIRECT WATER HEATERS.
STACK INSTANTANEOUS STEAM WATER HEATERS.
STACK AUTOMATIC STORAGE SYSTEMS.
STACK NON-BY-PASS TEES and SAFETY RELIEF VALVES.

Stack Water Heater Construction

All Stack water heaters have seamless drawn copper tubes. Ratio of heating surface to volume of water is 3 times that of any other heater. All waterways are of copper, brass or bronze. No expansion joints. Each tube can expand and contract without stress or strain.

All coils are tested to 600 lbs. water pressure before assembling.

Advantages of Stack Water Heaters

Speed in heating water.
Free circulation.
Highly efficient and economical.
Safe; no Stack system has ever exploded.
Manufactured since 1894.

Actual service tests made at International Exposition showed that Stack heaters have the greatest speed and efficiency in each test.

Stack Gas Water Heater

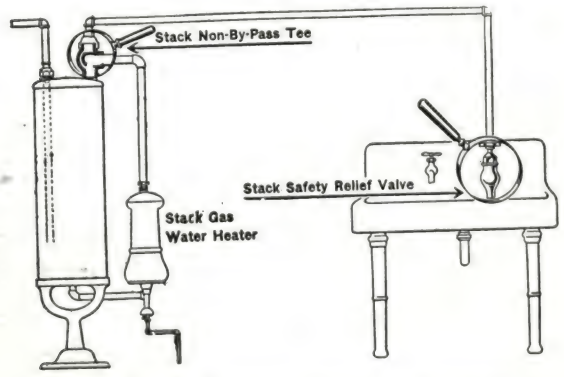
In this heater, the small columns of water in the almost vertical copper tubes are heated very rapidly, the proportion of heating surface to volume of water being 20 to 1. Its rapid circulation results in economy and absence of sediment.

Can be used in combination with the Stack indirect water heater.

STACK GAS WATER HEATER

No.	Boiler capacity, gals.	Cu. ft. gas per hour	Length, in.	Diam., in.	Weight, lbs.
1	30	40–50	20	7½	20
2	40	50–60	20	9½	25
3	100	70–80	20	9½	42

STACK GAS WATER HEATER



STACK GAS WATER HEATER CONNECTED TO RANGE BOILER

Stack Indirect Water Heater

Utilizes the heat in the water of any steam or hot water heating plant for heating water for domestic use. The two waters do not mix.

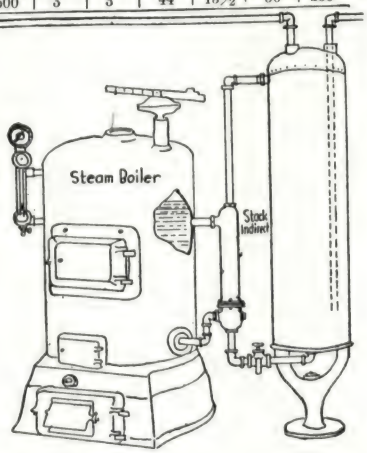
Can also be installed in connection with hot air heating plants and with cast iron water jacketed coal burning heaters, relieving them of excessive pressure.

The combination of Stack gas water heater for summer use and Stack indirect water heater for winter use is ideal.

STACK INDIRECT WATER HEATER

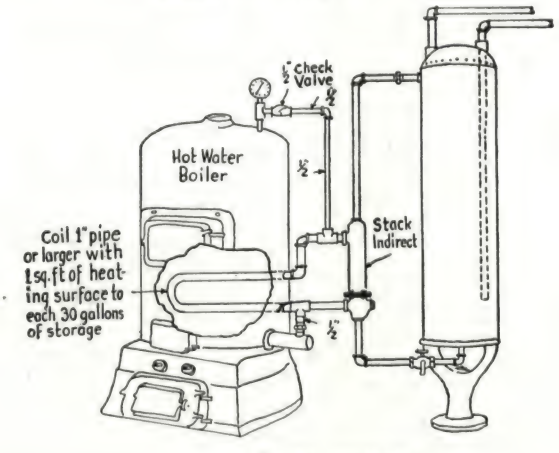
Size	Tank capacity rated on 3 hrs.	Tank capacity rated on 1 hr.	Shell opening, in.	Hot water conn., in.	L'gth., in.	Diam., in.	Shell openings on centers, in.	Wt., lbs.
D-6-13	40	15	1	¾	18	4	13	18
D-12-13	60	24	1	¾	18	6	13	24
D-24-15	100	40	1¼	1	24	6	15	32
D-37-15	200	80	1½	1¼	24	8	15	50
D-50-15	300	120	2	1½	24	10	15	60
D-50-24	400	150	2	1½	36	10	24	70
D-100-24	600	250	2½	2	36	13½	24	120
D-100-36	750	300	2½	2	44	13½	36	160
D-120-24	1000	400	3	3	36	13½	24	200
D-120-36	1200	500	3	3	44	13½	36	250

STACK INDIRECT WATER HEATER



STACK SYSTEM.

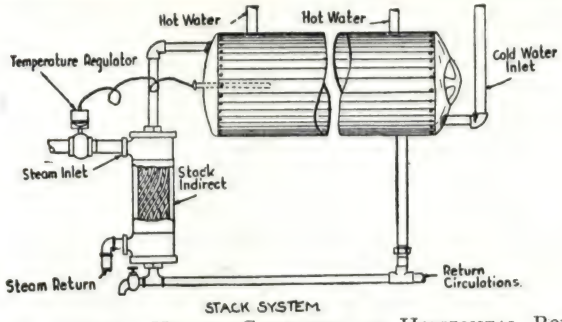
STACK INDIRECT WATER HEATER CONNECTED TO HEATING BOILER AND STORAGE TANK



STACK SYSTEM

STACK INDIRECT WATER HEATER CONNECTED TO HOT WATER BOILER AND STORAGE TANK

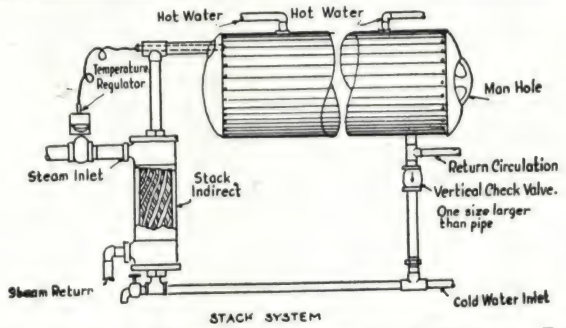
Continued on next page



STACK INDIRECT HEATER CONNECTED TO HORIZONTAL BOILER FOR USE WITH THERMOSTATIC CONTROL ON STEAM SUPPLY

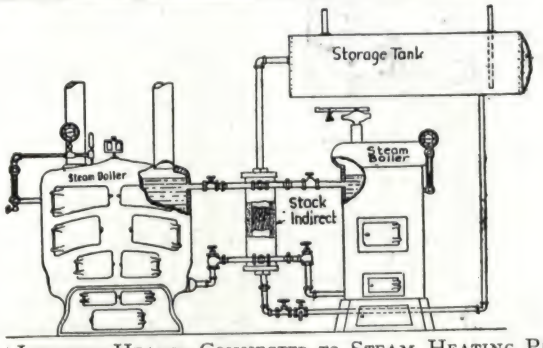
For use when exhaust or low pressure steam is used. Steam inlet and return should be same size as tappings of indirect heater

Size heater....	D-12-13	D-24-15	D-37-15	D-50-15	D-50-24	D-100-24	D-120-24
Tank capacity gals.) 100° rise in 1 hour with 5 lbs. steam.	60	120	250	350	500	750	1000

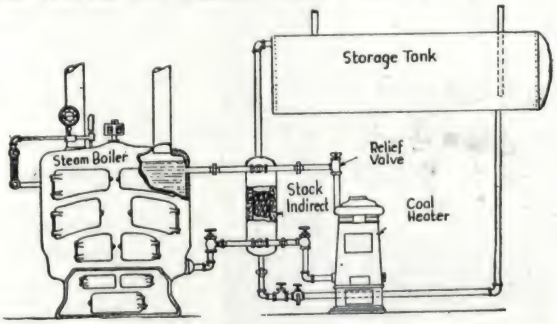


STACK INDIRECT HEATER CONNECTED TO HORIZONTAL BOILER WHERE THERE IS A CONSTANTLY LARGE SUPPLY OF STEAM AT 25 LBS. OR MORE PRESSURE

Size	Water connections, in.	Steam connections, in.	Tank capacity, gal.	Gals. per hr. 100° rise	Length, ft.	Diam., in.	Weight, lbs.
D-12-36	¾	1	150	400	5	4	50
D-24-36	1	1¼	300	750	5	5	60
D-37-36	1¼	1½	500	1000	5	6	75
D-50-36	1½	2	1000	2500	6	7	95
D-100-36	2	2½	2000	5000	6	12	160
D-120-36	3	3	3500	7000	6	12	210

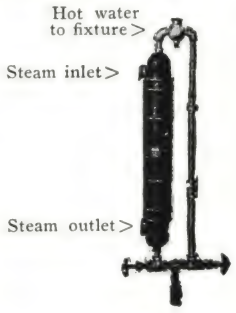


STACK INDIRECT HEATER CONNECTED TO STEAM HEATING PLANT FOR WINTER AND SMALL STEAM BOILER FOR SUMMER



STACK INDIRECT HEATER CONNECTED TO STEAM HEATER FOR WINTER SERVICE AND TO AUXILIARY COAL HEATER FOR SUMMER SERVICE

Stack Instantaneous Steam Water Heater



STACK WATER HEATER

Vertical Type—Suitable for moderate hot water demands in factories, office buildings, institutions, hotels, restaurants, clubs, laundries, etc. Utilize the heat from either exhaust or high pressure steam. Steam and heated water do not mix. Steam is used only when water is being drawn. Temperature of water delivered is governed by the temperator at top of heater—scalding is thus prevented.

Horizontal Type—Suitable for heavy demands. Capacities are based on actual service tests which we guarantee, provided steam and water pressures are maintained in the heater. Flow from heater is based on 30 lbs. water pressure. Steam thermostatic control can be used for any combination of steam and water pressures, or mixing valve control can be used when water pressure exceeds steam pressure.

STACK INSTANTANEOUS STEAM WATER HEATERS

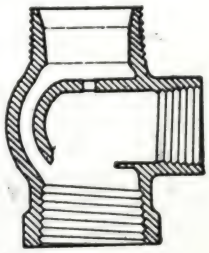
For water pressures up to 250 lbs. and steam pressures up to 100 lbs. Water pressure must exceed steam pressure

No.	Water inlet and outlet, in.	Steam connection, in.	Gallons per min. 5-10 lbs. steam	Gallons per min. 30 lbs. steam	Length, ft.	Diam., in.	Weight, lbs.
VERTICAL TYPE							
IS-12-48	½	1¼	6	8	6	4	60
IS-37-36	¾	1½	12	16	5	5	100
IS-50-36	¾	2	15	20	5	7	120
HORIZONTAL TYPE							
IS-100-36	1	2½	30	45	5	12	200
IS-100-48	1	2½	40	60	6	12	240
IS-100-72	1½	2½	60	90	8	12	320
IS-150-72	2	2½	100	150	8	16	550
IS-150-144	2	2½	150	225	10	16	700
IS-200-144	3	4	225	500	10	24	1000

IS-100 and IS-150 furnished with larger steam connection when required.

Larger sizes on application.

Stack Non-by-pass Tee



STACK NON-BY-PASS TEE

Prevents mixing of hot water in range boiler with cold water from heater while water is being drawn, and prevents condensation in heater. Installed as shown on preceeding page. Adds 15% to 20% to the efficiency of any heater. Made in 26 styles.

Stack Safety Relief Valve

STACK SAFETY RELIEF VALVE

A combination faucet and relief valve (made of best steam metal). Constant use insures that the seats are free. Flow of water through the valve proves that pressure has access to the valve. Does not waterhammer. Is foolproof. Relieves into sink, saving separate drain. Order valves set 25 lbs. higher than normal water pressure at outlet.

EXCELSO SPECIALTY WORKS

TELEPHONE:
MURRAY HILL 7162

Manufacturers of Water Heaters

137 East 43rd Street
NEW YORK, N. Y.

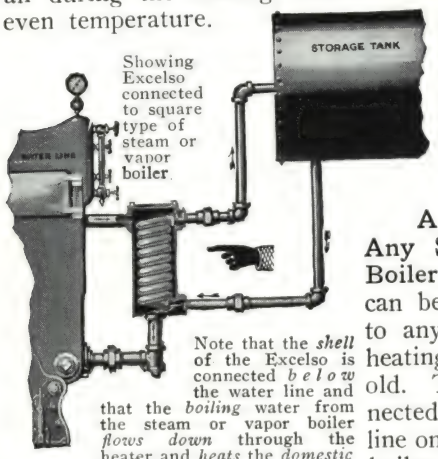
119 Clinton Street
BUFFALO, N. Y.

EXCELSO
TRADE-MARK

Excelso Water Heater

The Excelso consists of a heavy copper coil heating element fitted in a cast iron shell by means of patented ground joint connections. All parts are interchangeable and easily accessible.

Operation—When connected on the outside of steam or vapor boilers, the Excelso eliminates the necessity of a fire pot coil and insures an absolutely constant supply of domestic hot water all during the heating season at an even temperature.



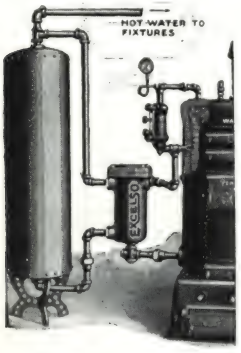
Showing Excelso connected to square type of steam or vapor boiler

Note that the *shell* of the Excelso is connected *below* the water line and that the *boiling* water from the steam or vapor boiler *flows down* through the heater and *heats* the *domestic water* which *circulates* up through the *copper coil*

INTERIOR OF EXCELSO HEATER

Application to Any Steam or Vapor Boiler — The Excelso can be easily connected to any steam or vapor heating boiler new or old. The heater is connected below the water line on the outside of the boiler; the water from the heating boiler flowing through the cast iron shell at boiling temperature heats the domestic water circulating through the copper coil to just the right temperature for domestic purposes.

Note: Many of the leading boiler manufacturers stock the Excelso and provide tappings. Where such tappings are not provided they can be easily and quickly made by means of a rotary hack saw tool, sold by us to the plumbing and heating trade.



INSTALLATION OF EXCELSO HEATER

DIMENSIONS

Size of heater	11	12	13	14	15
Length, in.	10½	14	11½	15	19½
Diam., in.	5	5	6½	6½	6½
Shell openings, in.	1	1	1¼	1½	1½
Coil openings, in.	¾	¾	1	1	1
Wgt. crated, lbs.	17	23	31	39	46
List price	$ 30	$ 40	$ 50	$ 60	$ 70

Capacity heating water below water line of steam or vapor boilers:

Size	11	12	13	14	15
Tank cap'ty, gals.	30	45	60	90	120

Temperature rise 100° in 3 hours.

Heating Domestic Water With Live Steam—The Excelso is extensively used to heat water by means of live steam or vapor. Its large heating surface makes it efficient and its cost is less than installing a coil and manhole in a storage tank. Can be connected to storage tanks in many different ways and used with or without thermostatic control. Capacities as follows:

Size of heater	11	12	13	14	15
Tank capacity, gals.	50	75	100	150	200

Temperature rise 100° in 3 hours at 5 lbs.

Note: Many tanks are installed too small so heaters should correspond with work required and not size of tank. Also make liberal allowance if circulating system is used.

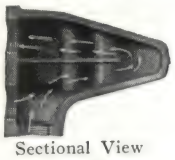
Excelso Fire Pot Generator

Heating domestic water in connection with hot water boilers and hot air furnaces requires the use of a fire pot generator because boiling water is not available.

The Excelso fire pot generator is so designed as to insure maximum heating surface, and, being entirely above the fire, does not interfere with the combustion of the fuel or the firing of the boiler. This feature is important as many of the troubles of the ordinary type of fire pot generator are due to its being located in the fuel bed and seriously interfering with the fire.

Top View

Side View

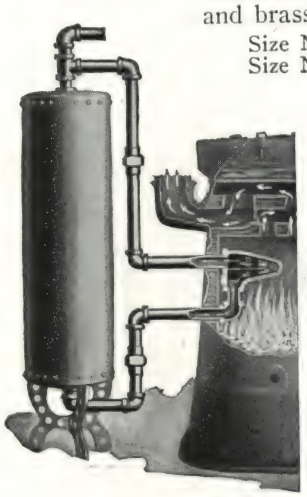


Sectional View

FIRE POT GENERATOR

Made in two sizes and in both cast iron and brass.

Size No. 1. Up to 40 gal. capacity.
Size No. 2. Over 40 gal. capacity.



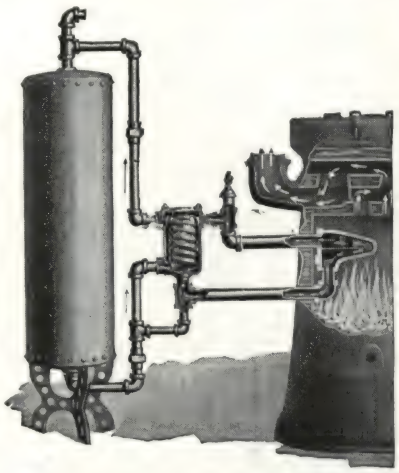
INSTALLATION OF FIRE POT GENERATOR

Overcoming Lime Deposits in Fire Pot Coils

The combination of an Excelso generator in the fire pot and an Excelso water heater on the outside is a very simple and entirely practical method for reducing lime deposits.

The principle of two bodies of water—one heating the other—is employed. A small connection is made between the two bodies to supply and keep filled the fire pot side and allow for expansion and contraction of the water. The air is relieved through the petcock.

The water circulating through the fire pot generator and shell of the indirect heater always stays the same—becomes neutral chemically. The domestic water circulating through the copper coil of the Excelso heater seldom gets above 160°, hence lime deposits are reduced to a minimum, as lime deposits do not form to any extent until water is heated above 160°.



COMBINATION OF EXCELSO GENERATOR AND WATER HEATER

Co-operation of Our Engineering Department

This company will gladly advise regarding special problems, furnish literature and render other services on request.

WHITE MANUFACTURING COMPANY

Manufacturers of Burt Tubular Water Heaters

NEWARK, N. J.

Product

BURT WATER HEATER.

Slogan

"The Burt of a Nation."

Burt Water Heater

The Burt hot water heater eliminates the use of the old-fashioned fire pot coil by placing the heater on the outside of the boiler (see piping diagrams). No part goes into the fire box. Water cannot be overheated or underheated, provided the fire is maintained. It is the *hot water* from the boiler and not steam (in the case of a steam heating plant) that is the heating agent.

Construction—The construction of the Burt heater is very simple. It consists of a heavy cast iron shell with either 2 loose heads or 2 screw heads (see illustrations). Either one of these heads can be quickly removed, even after installation, by simply removing the bolts. The copper tubes, in which the water is heated, are expanded into the iron, and are of the best quality of extra heavy copper.

Heating Principle—The tubular principle of heating, which is approved by the highest authorities and used most extensively wherever real service is required, is the basic feature of the Burt water heater and is truly dependable.

Cleaning Feature—The Burt can be easily and thoroughly cleaned, offering insurance against replacements.

Advantages of the Burt Heater

The installation of a Burt heater automatically does away with the possibility of over-heated, scalding water, resulting in nerve racking banging in the boiler and piping, so common with pot coil heating. An independent working unit, the Burt heater requires absolutely no attention after being installed—a life long service at a small initial and final cost.

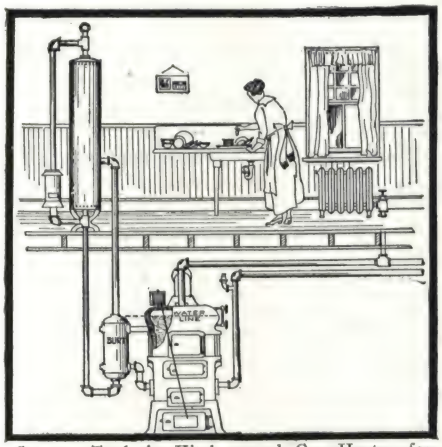
The plates below illustrate a variety of installations for the Burt water heater.

Any plumber can make the necessary connections at a minimum of time and cost. The Burt water heater will forever solve your hot water problems.

The Burt water heater is simple and substantially constructed. It requires no attention after installation. There is nothing to wear out or to look after. It will give a life-time service at a very small initial expense (the final cost).

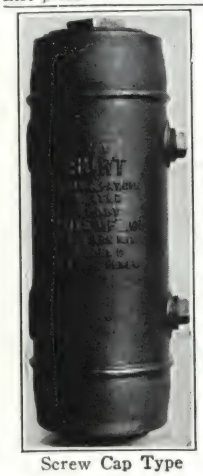
SCHEDULE OF BURT HEATERS

Model	C	D	E	H
Shell openings, in.	1	1¼	1½	2
Hot water openings, in.	¾	1	1	1¼
Inside diameter, in.	4	6	6	8
Length, in.	15	15	18	18
Gallons heated per hour	26	45	75	110
Tank capacity, gals.	30–40	50–60	80–100	120–160
List price	$30.00	$40.00	$60.00	$90.00

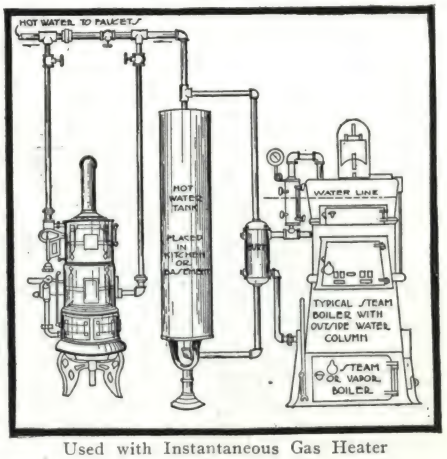


Storage Tank in Kitchen and Gas Heater for Summer

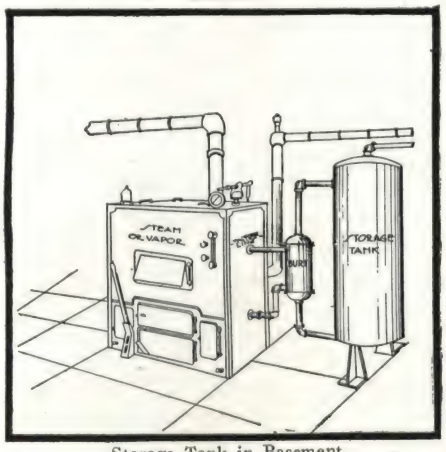
Gasket Type



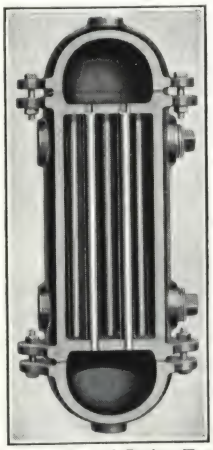
Screw Cap Type



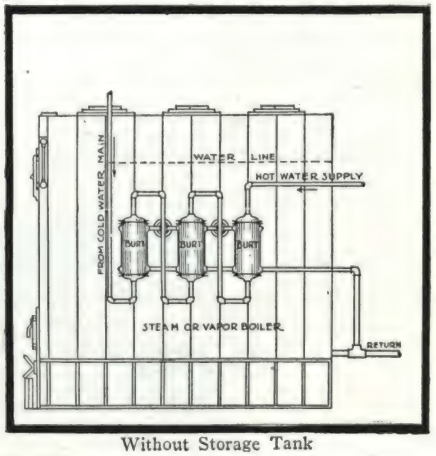
Used with Instantaneous Gas Heater



Storage Tank in Basement



Inside View of Gasket Type



Without Storage Tank

TYPES OF BURT WATER HEATERS AND PIPING DIAGRAMS

THE NATIONAL PIPE BENDING CO.

Manufacturers of Steam Actuated Water Heaters

156 River Street
NEW HAVEN, CONN.

OFFICES IN THE FOLLOWING CITIES

NEW YORK, N. Y. BOSTON, MASS. PHILADELPHIA, PA. WASHINGTON, D. C. PITTSBURGH, PA.
BUFFALO, N. Y. CHARLOTTE, N. C. CLEVELAND, OHIO DULUTH, MINN. SALT LAKE CITY, UTAH
CHICAGO, ILL. ST. LOUIS, MO. JACKSONVILLE, FLA.

Products

HOT WATER STORAGE HEATERS.

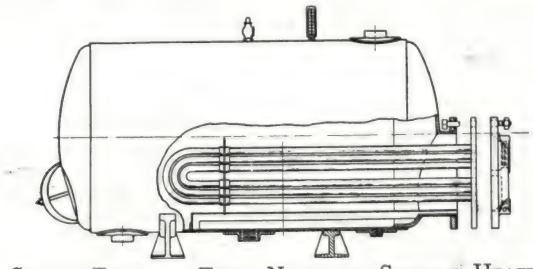
Also manufacturers of Instantaneous Hot Water Generators, Forced or Gravity Hot Water Heating System Converters, Heaters for swimming pool installations, showers, etc.

Dominant Features of the National Storage Heater

This heater is an apparatus for heating water either continuously or intermittently by live or exhaust steam and storing it for either constant or occasional use.

It consists of a shell or tank containing a heating element, made up of coiled or bent pipe or tubing. Water from any source enters the bottom of the shell, is heated by steam in the heating element, and leaves at the top in quantities and at intervals to meet the varied requirements.

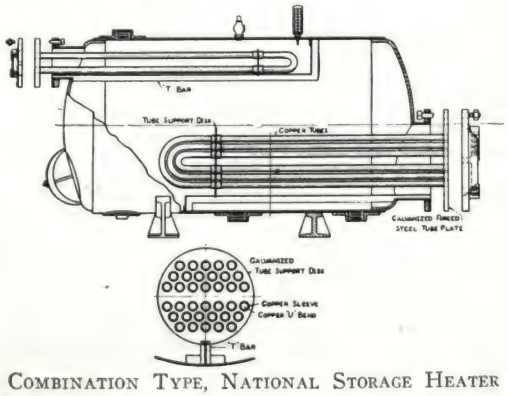
The illustration shows the U-bend type with steel shell, and heating element of bent copper tubes, with ends expanded into a steel tube-plate bolted on the outside of the head and provided with a cast iron cover with



SINGLE ELEMENT TYPE, NATIONAL STORAGE HEATER

suitable openings for the admission of steam and the removal of condensation.

This heating element is removable for inspection repairs or substitution of a larger or smaller element when desired. It is placed in the lower part of the shell, where the entering water will come in contact with it, resulting in maximum efficiency in the transfer of heat. The area through the tubes is sufficient for unrestricted flow of steam and condensation.



COMBINATION TYPE, NATIONAL STORAGE HEATER

Bracing

All heating elements 66 in. and longer require supports in the shell, not only to relieve strains but to facilitate removal. The National form of support (patent applied for) consists of a galvanized disk into which are expanded copper sleeves of proper internal diameter to make a snug fit on the tube of the U-bends.

Properly placed and secured immediately under the heating element is located a T-bar. The supporting disk is slotted to fit the T-bar and slides freely on it. This combination—a distinctive feature in the National heater—is keenly appreciated by those who have had experience in removing long and heavy heating elements.

Storage Capacities

The following table gives the usual standard diameters and storage capacity in gallons per foot of length:

Shell diameter, in.	24	30	36	42	48	54	60	72
Gals. per ft. length	23½	36½	52½	72	95	131	142	215

Hourly Heating Capacities

Size of heating element is dependent on pressure of steam furnished the heater and the range of water temperature required. Can be furnished to meet any requirement. Bulletin No. 54 gives heating capacity of standard elements with atmospheric steam pressure.

Relative Heating Values

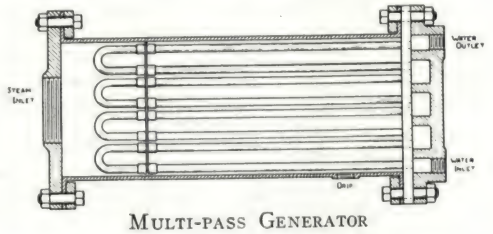
These factors under different pressures are given in the table below:

Steam pressure	0	2	5	10	20	30	50	75	100
Ratio	1	1.09	1.22	1.39	1.67	1.87	2.18	2.47	2.70

(Water temperature range, 50° Fahr. to 180° Fahr.)

Instantaneous Heaters

Built in all capacities for varied uses where a continuous supply of heated water is required as—forced circulation hot water heating systems, swimming pools, process service, air washers, etc.



MULTI-PASS GENERATOR

Distinctive Features of the National

Small size compared with heating capacity, high heating efficiency, proper tube supporting features and design of absorbing element (heating surface). The absorbing element consists of several "U" bends all alike and arranged in one or more groups to suit requirements. Each tube may be removed independently and with greater facility than a straight tube.

THE WHITLOCK COIL PIPE COMPANY

Feed Water and Hot Water Service Heaters

HARTFORD, CONN.

BRANCH OFFICES

NEW YORK, 149 Broadway
BOSTON, 50 Congress Street
PHILADELPHIA, Commercial Trust Building
CHARLOTTE, N. C.
ALSO OTHER PRINCIPAL CITIES
BUFFALO, White Building
CHICAGO, 343 S. Dearborn Street

Products

Engineers, and manufacturers of CLOSED FEED WATER HEATERS; HOT WATER SERVICE HEATERS, DOMESTIC WATER HEATERS.

Also manufacturers of Oil Heaters and Coolers, Heat Exchangers for heating and cooling liquids, vapors and gases; Coils and Bends made from Iron, Steel, Copper and Brass Pipe and Tubing, etc.

Type "A" Feed Water Heaters

For over 30 years the Whitlock Type "A" feed water heater has been the accepted *standard* by which all others have been judged. Heating surface consists of everlasting coils of seamless copper tubing (Fig. 50).

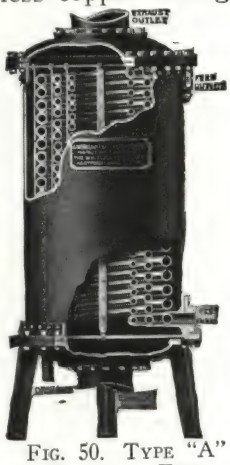


FIG. 50. TYPE "A" STANDARD FEED WATER HEATER
Sizes and capacities shown in Bulletin 13

Hot Water Service Heaters

Steam-actuated service heaters may be divided into two classes: Instantaneous and storage. Several types are offered in each class adapted to different requirements.

Instantaneous Heaters — The Whitlock instantaneous heater is similar in construction to Type "A" feed water heaters. The water comes into contact only with copper or bronze eliminating the possibility of corrosion, making this heater especially suited for heating any liquid which would corrode iron or steel. See table below for dimensions of standard sizes.

The Type "R" instantaneous heater is of the Berryman or "U-bend" pattern. The heating surface consists of a number of "U-bends" of seamless copper tubing mounted in parallel (the ends of the bends being expanded into a heavy tube sheet), and communicating with a cast iron head containing the inlet and outlet water connections (Fig. 151).

The Type "S" instantaneous heaters are of the straight tube floating head pattern (Fig. 152).

They are used wherever the water contains such quantities of mud or scale-forming materials as to necessitate the occasional cleaning of the tubes. Cleaning may be easily accomplished in this type of heater, by removing the front and rear heads and running a tube cleaner or brush through the tubes. This can be done without breaking any pipe connections.

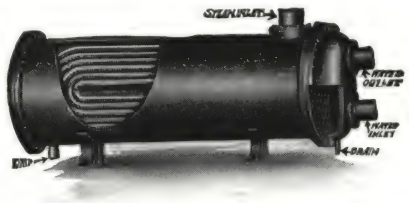


FIG. 151. WHITLOCK-AMERICAN TYPE "R" BERRYMAN PATTERN INSTANTANEOUS HEATER
Sizes and capacities shown in Bulletin 25

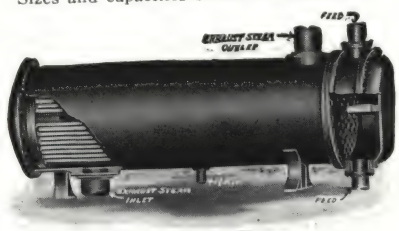


FIG. 152. WHITLOCK-AMERICAN TYPE "S" STRAIGHT TUBE FLOATING HEAD PATTERN INSTANTANEOUS HEATER
Sizes and capacities shown in Bulletin 26

Storage Heaters—Type "J" storage heater is of the Berryman or "U-bend" construction, having a large cross section area through tubes. Especially suitable for use with exhaust or low pressure steam.

Type "K" storage heater is similar in construction, but has a greater range of storage capacity, and is especially suited to violently fluctuating service with heavy peak loads; particularly where steam supply is limited (Figs. 14 and 131).

Where supply of exhaust or low pressure steam is not sufficient to heat required amount of water, a combination heater, provided with an auxiliary high pressure heating section, is furnished. Fig. 131 shows the Combination Type "K" heater.

All Whitlock storage heaters are built with heating surface of seamless copper tubing—a better

Continued on next page

TYPE A-C COPPER COIL INSTANTANEOUS HEATERS

	Material shell	No. of heater	Gals. per hr. from 40° to 180° with steam at atm.	Weight, lbs.	Length over all, in. A	Length of shell, in. B	Diam. of flange, in. C	Diam. of body, in. D	C. to c. of feeds, in. E	Length of legs, in. F	Steam inlet, in. G	Water connection, in. H	Drip for condensation, in. I
TYPE A	CI	0	50	41	13	11	9	7	8	..	1½	½	½
	CI	1	100	50	17	15	9	7	12	..	2	½	½
	CI	2	150	85	18	15	12	9½	11	..	2½	¾	½
	CI	3	200	94	21	18	12	9½	14	..	2½	¾	½
	CI	4	250	234	25	21	18	15	16	12	3	1	¾
	CI	5	300	270	29	25	18	15	20	12	3½	1	¾
	CI	6	400	390	34	30	18	15	25	12	3½	1	¾
	CI	7	500	450	37	32	20	17	26	12	4	1¼	1
	CI	8	600	500	40	35	20	17	29	12	4	1¼	1
	CI	9	800	540	45	40	20	17	34	12	5	1¼	1
	CI	10	1000	630	50	45	20	17	39	12	5	1¼	1
	CI	11	1250	810	45	40	24	20	33	12	6	1½	1¼
	CI	12	1500	890	50	45	24	20	38	12	6	1½	1¼
	CI	13	2000	1250	51	45	27	24	37½	15	8	2	1¼
	CI	14	2500	1450	56	50	27	24	42½	15	8	2	1¼
	CI	15	3000	1600	69	63	27	24	55½	15	8	2	1¼
	S	16	4000	1750	66	58	34	28	50	15	10	2½	1½
	S	17	5000	1900	71	63	34	28	55	15	10	2½	1½
	S	18	6000	2400	81	73	38	32	63	15	12	3	2
	S	18½	7000	2700	92	84	38	32	74	15	12	3	2
	S	19	8000	3000	102	94	38	32	84	15	14	3	2
	S	19½	9000	3400	112	104	38	32	94	15	14	3	2

Heaters shipped for vertical use unless otherwise specified.
For additional details see Bulletin 111.

FIG. 14. TYPE "K" STORAGE HEATER

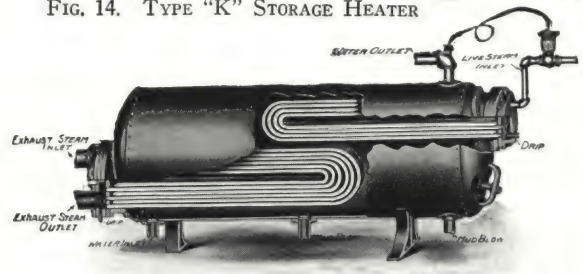


FIG. 131. TYPE "K" STORAGE HEATER
Combination live and exhaust steam pattern

conductor of heat than brass, and more reliable mechanically, not being subject to "season cracks" sometimes developing in brass tubing.

Shells ordinarily made extra heavy and of the best grade of boiler steel. Shells of cast iron, or shells coated inside with rustproof white enamel furnished when ordered. All castings are extra heavy and of the best grade of gray iron.

All Whitlock heaters are tested under hydrostatic pressure before leaving the shop and made absolutely tight.

Installation Diagrams and Layouts

This company has developed a number of installation diagrams for piping layouts showing some of the more important types of installations in which Whitlock heaters are used. The one on this page is a typical example.

A complete set will be sent to architects or consulting engineers on request.

WHITLOCK AMERICAN TYPE K STORAGE HEATERS
Horizontal

Shells — To be used with Type K Heating Section. Shell prices include cradle. Manhole 11 x 15 in.							Heating Sections — Capacity based on heating from 40° to 180° with steam at 0 lbs. pressure.				
Number	Gals. one filling	Diam., in.	Length, in.	Thickness, in.	Thickness of head, in.	Weight, lbs.	Number	Gals. per hour	Maximum size steam pipe, in.	Smallest shell into which section will fit, in.	Weight of entire heating section, lbs.
1	65	18	60	1/4	3/8	400	H 0	100	2	18x48	85
2	80	18	72	1/4	3/8	450	H 1	150	2	18x60	93
3	118	24	60	1/4	3/8	600	H 2	200	2½	18x48	130
4	141	24	72	1/4	3/8	700	H 3	250	2½	24x60	138
5	164	24	84	1/4	3/8	800	H 4	300	2½	24x72	145
6	185	30	60	1/4	3/8	750	H 5	350	2½	24x72	153
7	220	30	72	1/4	3/8	850	H 6	400	3	24x48	252
8	255	30	84	1/4	3/8	950	H 7	500	3	24x60	275
9	290	30	96	1/4	3/8	1050	H 8	550	3	24x72	283
10	365	36	84	5/16	1/2	1300	H 9	600	3	24x72	290
11	420	36	96	5/16	1/2	1450	H10	750	3	24x84	313
12	475	36	108	5/16	1/2	1600	H11	800	4	30x72	410
13	525	36	120	5/16	1/2	1800	H12	900	4	30x72	425
14	575	42	96	5/16	1/2	1850	H13	1000	4	30x84	440
15	720	42	120	5/16	1/2	2150	H14	1250	5	36x72	588
16	860	42	144	5/16	1/2	2500	H15	1500	5	36x72	625
17	1000	42	168	5/16	1/2	2900	H16	1750	5	36x84	663
18	950	48	120	3/8	1/2	2850	H17	2000	6	36x72	900
19	1140	48	144	3/8	1/2	3250	H18				
20	1310	48	168	3/8	1/2	3700	H19	2400	6	36x96	960
21	1480	48	192	3/8	1/2	4100	H20	2800	8	42x60	1420
22	1190	54	120	3/8	1/2	3250	H21				
23	1430	54	144	3/8	1/2	3700	H22	3200	8	42x72	1480
24	1670	54	168	3/8	1/2	4200	H23	3600	8	42x84	1540
25	1900	54	192	3/8	1/2	4700	H24	4000	8	42x84	1600
26	1420	60	120	7/16	9/16	4300	H25	4400	8	42x96	1660
27	1710	60	144	7/16	9/16	4900	H26				
28	2000	60	168	7/16	9/16	5600	H27				
29	2300	60	192	7/16	9/16	6200	H28	4800	8	42x108	1790
30	2460	72	144	7/16	9/16	5700	H29				
31	2880	72	168	7/16	9/16	6400	H30				
32	3310	72	192	7/16	9/16	7300	H31	5600	8	42x120	1920
33	3730	72	216	7/16	9/16	8000	H32	6000	10	42x132	1920
34	3900	84	168	1/2	5/8	8700	H33	7000	10	42x144	2100
35	4480	84	192	1/2	5/8	9650	H34	8000	10	48x84	2440
36	5060	84	216	1/2	5/8	10800	H35	9000	10	48x96	2570
37	5640	84	240	1/2	5/8	11800	H36	10000	12	48x108	2700
38	5820	96	192	1/2	5/8	11100	H37	11000	12	48x120	2830
39	6570	96	216	1/2	5/8	12500	H38	12000	12	48x120	2950
40	7320	96	240	1/2	5/8	13500	H39	13000	12	48x132	3080
41	8070	96	264	1/2	5/8	14500	H40	15000	14	48x148	3340
42	7350	108	192	9/16	5/8	13100	H41	16000	14	48x156	3470
43	8300	108	216	9/16	5/8	14700	H42				
44	9250	108	240	9/16	5/8	15900	H43	17000	14	54x132	4110
45	10200	108	264	9/16	5/8	17200	H44	18000	14	54x132	4230
							H45	20000	14	54x144	4490

Directions for use—Select the size storage you require and combine its designating number with the number which designates the desired hourly output. Assuming a required storage of 1000 gals. (No. 17 shell 42x168) and a required hourly output of 1750 gals. (No. H16 Heating unit) you would specify a Whitlock Type K, No. 17H16. For additional details, see Bulletin 40.

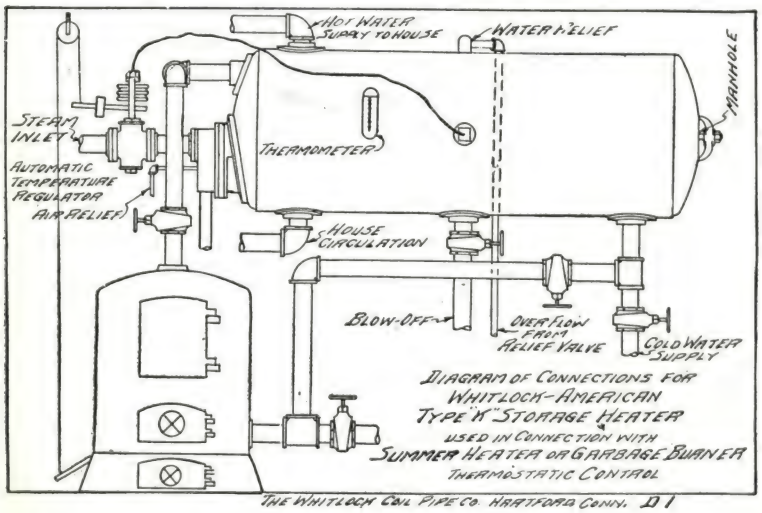


FIG. 160-A. WHITLOCK-AMERICAN TYPE "K" STORAGE HEATER WORKING IN CONNECTION WITH A COAL BURNING AUXILIARY HEATER

In this type of installation steam is supplied to the Type "K" heater from the main heating boilers during the heating season; and at times when no steam is carried on the main heating boilers, the auxiliary coal burning heater is fired.

This plan is also used in conjunction with a garbage burner.

The table opposite will be found very useful for figuring hot water fixture capacities.

HOT WATER FIXTURE CAPACITIES FOR VARIOUS TYPES OF BUILDINGS
Figured at a Final Temp. of 150° Fahr.

Type of Fixture	Gals. of Water per Hour per Fixture											
	Apart. House	Club	Gym.	Hospital	Hotel	Indust. Plant	Laundry	Office Building	Public Bath	Private Residence	School	Y. M. C. A. Buildings
Basins—Private Lavatory	3	3	3	3	3	3	3	3	3	3	3	3
Basins—Public Lavatory	5	8	10	8	10	15	10	8	15	....	18	10
Bath Tubs	15	15	30	15	15	30	....	....	45	15	....	30
Dish Washers	15	30	....	30	30	30	....	....	....	15	15	30
Foot Basins	3	3	12	3	3	12	....	....	....	3	3	12
Kitchen Sink	10	20	....	20	20	20	....	....	....	10	10	20
Laundry Stationary Tubs	25	35	....	35	35	....	42	....	....	25	....	35
Laundry Revolving Tubs	75	75	....	100	150	....	75 to 100	....	100	75	....	100
Pantry Sink	10	20	....	20	20	....	....	....	....	10	20	20
Showers	100	200	300	100	100	300	....	....	300	100	300	300
Slop Sink	20	20	....	20	30	20	10	15	15	15	20	20
Dish Washers	180	Note.—At 180° capacity, 500 people per hour.										
Per cent of Total Water for all Fixtures likely to be drawn at once	35	60	80	45	75	90	100	20	100	50	25	75

Apartments	One Kitchen and One Bath				
Number of Families	Up to 25	25–50	50–75	75–100	Over 100
Gals. per Hour per Family	35	30	25	20	15
Swimming pools	Usually figure to fill pool in 24 hours. Also figure on refiltering all water in pool every 24 hours. 50,000 gal. pool O. K. for 100 persons.				

Continued on next page

Steam and Water Velocities

In laying out a hot water supply or indirect hot water heating system, the calculation of the proper sizes of piping (both water and steam), to give the results required, is an important item and one that often consumes a considerable amount of time. In order to reduce the time required by these calculations and arrive at accurate results we have compiled the following tables.

WATER VELOCITIES
Velocities in feet per second

Rate of flow, gals. per hr.	Size Pipe, In.									
	1	1¼	1½	2	2½	3	3½	4	5	6
50	19	11								
100	37	22	16							
150	56	33	24	14						
200	74	43	32	19	14					
250	93	54	40	24	17					
300	111	65	47	29	20	13				
400	148	86	63	39	27	18				
500	185	108	79	48	34	22	16			
600	222	129	95	58	41	26	19			
700	259	151	111	67	48	31	22			
800	296	172	126	77	54	35	26			
900	333	194	142	86	61	39	29			
1000	370	215	158	96	68	44	32	23	16	
1200	444	258	190	115	82	53	38	28	19	
1400	518	301	221	134	95	62	45	32	22	
1600	590	344	253	153	108	70	51	37	25	
1800		387	284	172	122	79	58	41	28	
2000		430	316	192	136	88	64	46	32	
2500		538	395	240	170	110	80	57	40	28
3000		645	474	288	204	132	96	69	48	33
3500			553	336	238	154	112	80	56	39
4000			632	384	272	176	128	92	64	44
5000				480	340	220	160	115	80	55
7500				720	510	330	240	172	120	83
10000					680	440	320	230	160	110

RECOMMENDED SHELL THICKNESSES FOR STEEL SHELL STORAGE HEATERS
55,000 lbs. per sq. in. tensile strength—Factor of safety, 5

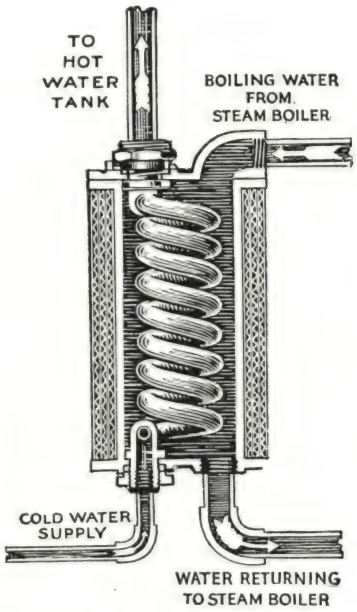
Diam. of shell, in.	Thickness of Shell, In.					
	3/16	¼	5/16	⅜	7/16	½
18	170	230	280	340	400	450
24	130	170	210	250	300	340
30	100	140	170	200	240	270
36	85	110	140	170	200	230
42	70	100	120	150	170	190
48	60	80	110	130	150	170
54	55	75	95	110	130	150
60	50	70	85	100	120	140
72	40	55	70	85	100	110
84	35	50	60	75	85	95
96	30	40	55	65	75	85

"Sure Hot" Domestic Water Heater

The Whitlock "Sure Hot" represents a new principle in heating domestic water. It operates without cost for either fuel or maintenance.

The "Sure Hot" attaches to the outside of a steam boiler. Boiling water from the boiler circulates through the shell of the "Sure Hot" heating the copper coil through which water circulates to the hot water tank (see diagram).

This method is by far the most economical and dependable way of supplying continuous domestic hot water at any hour of the day or night.



SECTION OF WHITLOCK "SURE HOT" DOMESTIC WATER HEATER

The shell of the "Sure Hot" is made of heavy cast iron covered with asbestos insulation. The coil is seamless copper tubing tested tight at 200 lbs. pressure. Nothing to adjust or get out of order. Made in five sizes from 30- to 120-gal. tank capacities, and larger as required.

The initial cost of the "Sure Hot" is extremely low compared with the service it renders. It eliminates gas bills for heating water during the winter months.

Catalogues and Bulletins

Descriptive bulletins are issued giving complete data with regard to the types of heaters mentioned, including tables of dimensions, diagrams of typical installations, price lists, etc. A set of these bulletins will be mailed to any architect or engineer on request.

Another series of bulletins giving tables and engineering data pertaining to hot water problems is issued and will be sent on request.

STEAM VELOCITIES

Gauge Pressure of Steam	Steam Pipe Sizes, In.															
	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10
0	35	57	98	134	225	315	490	650	810	1060	1300	1900	2500	3300	4100	5100
1	37	60	104	142	238	335	520	690	890	1120	1400	2000	2600	3500	4300	5400
2	39	64	111	153	250	355	550	730	950	1200	1500	2100	2800	3700	4600	5700
3	42	68	117	160	268	375	580	770	1000	1250	1550	2250	3000	3900	4900	6100
4	44	71	123	167	281	390	610	810	1050	1300	1600	2350	3100	4100	5100	6400
5	46	75	130	176	294	415	690	850	1100	1400	1700	2500	3300	4300	5400	6700
10	58	94	160	220	370	520	800	1070	1400	1700	2150	3100	4100	5400	6700	8400
15	67	108	190	250	430	600	930	1240	1600	2000	2500	3600	4700	6300	7800	9700
25	88	144	246	340	560	800	1240	1600	2100	2700	3300	4800	6300	8300	10200	12800
40	120	190	330	450	760	1080	1660	2200	2800	3800	4400	6400	8500	11200	14000	17000
50	140	230	390	530	890	1250	1950	2600	3300	4200	5100	7500	10000	13000	16000	20000
60	160	260	450	630	1020	1430	2200	2950	3800	4800	5900	8600	11500	15000	18600	23000
75	190	310	530	720	1200	1700	2650	3500	4500	5700	7000	10200	13500	17600	22000	27000
100	240	390	660	910	1500	2100	3300	4400	5700	7200	8800	12800	17000	22000	28000	35000
125	285	460	800	1100	1800	2600	4000	5300	6800	8600	10600	15500	20000	27000	33000	41000
150	330	540	930	1280	2150	3000	4600	6200	8000	10000	12400	18000	24000	31000	39000	48000
175	380	620	1080	1500	2500	3500	5400	7100	9200	11600	14000	21000	27000	36000	45000	56000

E. W. SEDGWICK, PRESIDENT

H. M. SEDGWICK, SECRETARY-TREASURER

S. WILKS MFG. CO.

ESTABLISHED 1857

Water Heaters, Steel Tanks and Garbage Burners

TELEPHONE
YARDS 0866

3517-3539 Shields Avenue

CHICAGO, ILL.

Products

WILKS WATER HEATERS; COMBINATION WATER HEATER and GARBAGE BURNER; WILKS HOT WATER BOILERS; STORAGE WATER HEATERS; STEEL STORAGE TANKS for all purposes.

Also manufacturers of Pneumatic Pressure Tanks, Steam Generators, Vertical and Horizontal Air Receivers, Steel Gravel Basins and Blow-off Receivers.

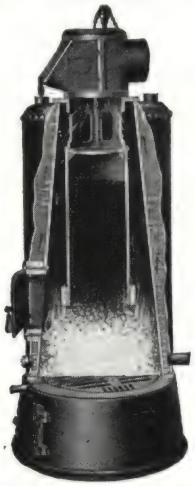
WILKS TRADE-MARK

Wilks Water Heaters

The Wilks water heaters have been in constant use for over fifty years and at the present time are more universally used than any other water heater on the market. They provide a safe and economical means for securing hot water in any quantity, whether for the small residence or for the largest apartment house or hotel.

Construction—Wilks heaters are built of the best quality steel, strongly riveted and calked, and have no cast iron sections to crack, no bolts or packing to keep tight and no coils to clog or leak.

Surface Burner



Self-feeder with Coal Magazine

WILKS WATER HEATER

SIZES, CAPACITIES AND PRICES, WATER HEATERS

Size of boiler, in. Diam., Hgt.,	Capacity, gals., per hour	List price Without fire door	List price With fire door		Size of openings, in.	Total height, in.	Size of smoke pipe, in.	Approximate weight, lbs.
10x18	40	$52.00	.....		1	32	4	100
12x24	65	64.00	$80.00		1	43	5	160
12x30	80	66.00	82.00		1	49	5	170
14x30	100	76.00	94.00		1¼	49	5	200
14x36	120	80.00	98.00		1¼	55	5	235
			Magazine feed	Surface burner				
16x30	130	.....	$130.00	$125.00	1½	52	5	400
16x36	150	.....	135.00	130.00	1½	58	5	420
20x30	200	.....	160.00	150.00	2	54	7	520
20x36	250	.....	165.00	155.00	2	60	7	550
20x42	275	.....	170.00	160.00	2	66	7	580
24x36	300	.....	195.00	185.00	2	60	8	780
24x42	350	.....	200.00	190.00	2	66	8	810
24x48	400	.....	205.00	195.00	2	72	8	840
30x42	500	.....	250.00	235.00	3	67	8	1100
30x48	600	.....	260.00	245.00	3	73	8	1150
30x54	700	.....	270.00	255.00	3	79	8	1240
36x42	900	.....	370.00	355.00	3	68	9	1900
36x48	1000	.....	390.00	375.00	3	74	9	2000
42x42	1200	.....	430.00	412.00	3	69	9	2400
42x48	1400	.....	450.00	432.00	3	75	9	2500

Small sizes are not self-feeders, but are furnished with shaking and dumping grates, and can be used with either hard or soft coal.

These heaters being made of steel are stronger than cast iron heaters and being lighter there is not the thickness of metal to heat through, giving a greater heating capacity and a lower fuel consumption. The fire being entirely surrounded by water these heaters have the greatest possible heating surface which is so arranged as to convey the maximum amount of heat from the fire to the water. The conical shape of the inner sheet is such that the circulation of the water is vertical and consequently unrestricted.

Heaters are made either with or without front fire doors. Sizes 14x36 and smaller will be furnished without fire door unless otherwise specified.

Coal Magazine—The Wilks water heater may be had with a coal magazine which makes it self-feeding so that an even and continuous fire may be kept for a period of from ten to twelve hours or even longer without the slightest attention.

Fuel—Wilks heaters burn either hard or soft coal.

Wilks Hot Water Boilers

The Wilks hot water boilers are of the self-feeding type and are very extensively used for heating residences, greenhouses, garages and other small buildings. They are as easily managed as an ordinary stove, are very economical and require but very little attention.

The construction of the hot water boiler is practically the same as the Wilks water heater and is of the same general appearance.

CAPACITY OF WILKS HOT WATER BOILERS

Size boiler, in.	Capacity Cu. ft. of space	Capacity Sq. ft. of radiation	Size boiler, in.	Capacity Cu. ft. of space	Capacity Sq. ft. of radiation
16x30	5,000	200	30x42	16,000	600
16x36	6,000	250	30x48	17,000	650
20x30	8,000	300	30x54	18,000	700
20x36	9,000	350	36x42	20,000	800
20x42	10,000	400	36x48	22,000	900
24x36	12,000	450	42x42	26,000	1000
24x42	13,000	500	42x48	28,000	1200
24x48	14,000	550			

Wilks Combination Water Heater and Garbage Burner

The Wilks combination water heater and garbage burner provides an excellent method of heating water and disposal of garbage without using duplicate apparatus.

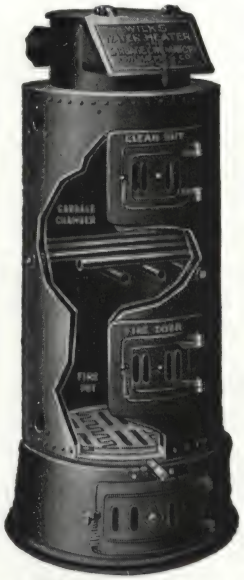
Construction—The combination heater and garbage burner is very similar in construction to the Wilks water heater but has the addition of a garbage grate placed a short distance from the fire. This garbage grate is constructed of the very best boiler tubing, which is expanded into the inner shell of the water jacket. By making water tubes of the garbage grate, the danger of

Continued on next page

burning out this upper grate is eliminated and water heating surface is substantially increased.

The garbage being thrown into the upper chamber and with the coal fire below, it requires but a short time to drive off all moisture from the garbage. As soon as the garbage is free from moisture it is a combustible material and effects a considerable saving by producing heat. The cost of otherwise disposing of the garbage is also saved.

This combination Heater and Burner should be placed as near as possible to the chimney flue and should have a smoke pipe at least as large as specified in the table. Whenever possible a separate chimney flue should be provided.



WILKS COMBINATION WATER HEATER AND GARBAGE BURNER

SIZES, CAPACITIES AND PRICES, COMBINATION WATER HEATER AND GARBAGE BURNER

No.	Size of boiler, in. Diam.	Size of boiler, in. Hgt.	Heating capacity, gals. per hour	Total height, in.	Diam. of grates, in.	Size of opening, in.	Size of smoke pipe, in.	Weight, lbs.	List price
1	16	36	200	56	12	1½	7	550	$190.00
2	20	42	300	64	15	2	8	825	230.00
3	24	42	400	66	19	2	8	950	260.00
4	30	48	500	72	24	3	8	1,300	385.00

Note: The heating capacity as given above is based on raising the temperature of the water in the storage tank 50° Fahr. in 1 hour.

Wilks Storage Water Heaters

Where steam is available an excellent and efficient method of securing hot water is by use of a storage tank in which are steam coils. These are made from standard tanks as illustrated by the addition of standard coils. Coils of brass or copper can be supplied as well as coils containing larger and more pipes. For vertical tanks we recommend a spiral steam coil so as to get proper circulation of steam and provide for return of condensation.

We recommend that tanks containing coils be made with a manhole.

Standard Steel Storage Tanks

These are made for ordinary water storage purposes and for working pressures not exceeding 65 lbs. per sq. in. All tanks supplied by us are tested to 100 lbs. hydrostatic pressure. Tanks are tapped as shown in illustration so that they may be used in either the horizontal or vertical position.

We will be pleased to quote prices on special tanks upon receiving complete information and specifications.

STANDARD STORAGE TANK

LIST PRICE OF STANDARD BLACK STORAGE TANKS
With and Without Coils

Capacity, gals.	Size Diam., in.	Size Length ft.	Approx. shipping weight, lbs.	Regular openings, in.	List price, black	List price of coils built in tanks: Size coil Number pipes	Size coil Size of coil, in.	Plain coil	Galvanized coil
66	20	4	270	1½	$ 94.00	4	1	$29.00	$35.00
85	20	5	310	1½	104.00	4	1	30.50	38.50
100	24	4	330	1½	109.00	4	1¼	35.50	42.00
120	24	5	380	1½	123.00	4	1¼	37.00	45.00
140	24	6	440	1½	134.00	4	1¼	38.50	48.00
150	30	4	430	2	143.00	4	1¼	35.50	42.00
180	30	5	500	2	158.00	4	1¼	37.00	45.00
220	30	6	560	2	173.00	4	1¼	38.50	48.00
250	30	7	630	2	196.00	4	1¼	40.00	51.00
295	30	8	700	2	211.00	4	1¼	41.50	54.00
315	36	6	700	2	206.00	4	1½	51.00	62.00
365	36	7	780	2	241.00	4	1½	54.00	66.00
420	36	8	870	2	256.00	4	1½	57.50	70.00
525	36	10	1030	2	293.00	4	1½	64.00	78.00
430	42	6	890	2	276.00	4	1½	51.00	62.00
500	42	7	980	2	310.00	4	1½	54.50	66.00
575	42	8	1070	2	333.00	4	1½	57.50	70.00
720	42	10	1250	2	375.00	4	1½	64.00	78.00
865	42	12	1430	2	415.00	4	1½	70.50	85.00
1000	42	14	1620	2	468.00	4	1½	77.00	93.00

Manhole in head	$30.00
Manhole in shell	45.00
Handhole in head	8.00
Handhole in shell	8.00

Flanged Openings Extra

Size, in.	List	Size, in.	List
2	$8.00	4	$10.00
2½	8.00	5	15.00
3	9.00	6	18.00
3½	9.00		

Extra Heavy Storage Tanks—These are built for water storage purpose where the working pressure does not exceed 125 lbs. per sq. in. All tanks are tested to 150 lbs. hydrostatic pressure.

LIST PRICE OF EXTRA HEAVY BLACK STORAGE TANKS

Capacity gals.	Size Diam., in.	Size Length, ft.	Thickness of material, in. Shell	Convex head	Concave head	Weight, lbs.	Regular openings, in.	List price, black
120	24	5	3/16	1/4	5/16	390	1½	$137.00
140	24	6	3/16	1/4	5/16	440	1½	155.00
180	30	5	3/16	1/4	5/16	520	2	182.00
220	30	6	3/16	1/4	5/16	590	2	198.00
250	30	7	3/16	1/4	5/16	660	2	224.00
295	30	8	3/16	1/4	5/16	720	2	242.00
315	36	6	1/4	5/16	3/8	920	2	264.00
365	36	7	1/4	5/16	3/8	1030	2	300.00
420	36	8	1/4	5/16	3/8	1160	2	328.00
525	36	10	1/4	5/16	3/8	1380	2	385.00
430	42	6	1/4	5/16	3/8	1140	2	345.00
500	42	7	1/4	5/16	3/8	1260	2	390.00
575	42	8	1/4	5/16	3/8	1400	2	420.00
720	42	10	1/4	5/16	3/8	1660	2	480.00
865	42	12	1/4	5/16	3/8	1910	2	540.00
1000	42	14	1/4	5/16	3/8	2180	2	614.00
750	48	8	1/4	5/16	3/8	1690	3	510.00
940	48	10	1/4	5/16	3/8	1960	3	580.00
1130	48	12	1/4	5/16	3/8	2250	3	650.00
1300	48	14	1/4	5/16	3/8	2570	3	715.00
1500	48	16	1/4	5/16	3/8	2860	3	800.00
1700	48	18	1/4	5/16	3/8	3150	3	870.00

Coils, manholes, handholes and flanges furnished at same price as in standard tanks.

Further Information

Any communication regarding further information on any of the Wilks products will receive our prompt and careful attention.

References

Extensive lists of satisfied users of Wilks water heaters, hot water boilers, and garbage burners, during many years, will, on request of architects, contractors or owners, be forwarded without delay.

COPPER RANGE BOILERS AND STORAGE WATER HEATERS

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway

NEW YORK, N. Y.

Information Concerning Copper, Brass, and Copper Products

The COPPER AND BRASS RESEARCH ASSOCIATION publishes in this volume other information on copper, brass, and copper products, as follows:

SECTION	PAGE
List of Members	601
Hardware	1276–1277
Pipe	1455–1457
Roofing and Flashing	928– 935
Sash Chain	1187
Screen Cloth	1171
Shingles	924
Skylights	964
Store Fronts	1010
Ventilators	990

Copper for Range Boilers and Storage Water Heaters

Range boilers and storage water heaters should be permanent and not subject to frequent renewals.

Nearly all range boiler and storage water heater troubles are directly traceable to the use of quick-rusting metal in their manufacture. Iron rusts, causing structural weakness, finally resulting in leaks or bursting.

Copper boilers and heaters are non-corrosive and will outlast the building. There are copper boilers in active use today after fifty-five years of service. On account of their non-corrosive qualities, long life, attractive appearance and high salvage value, their superiority is generally recognized.

A Copper Range Boiler Eliminates the Rusty Water Nuisance

Iron range boilers and storage water heaters quickly corrode and the rust discolors the water frequently.

The corrosive action often forms nodules of rust in various parts of the boiler or heater, besides unevenly coating it with a scale of rust which retards the circulation of the water.

Various attempts have been made to overcome the rusting action in iron range boilers and storage water heaters, but there is no practicable method known for applying a rust-preventive coating to the interior of range boilers or storage water heaters.

Copper boilers and heaters do not corrode, and can be depended upon to deliver water free from rust.

The first cost of copper is the last cost—nothing need ever be spent for painting, repairs or renewals.

Superior Appearance of Copper Range Boilers

Copper boilers are an attractive addition to any well kept kitchen. They never need painting to preserve their pleasing appearance. They look well permanently.

The Importance of Specifying Solid Copper

Range boilers and storage water heaters made of corrodible metals, coated so as to represent copper, or of corrosive metals containing a small amount of copper, are not proof against corrosion. To be certain of enduring service, specify solid copper.

General Notes

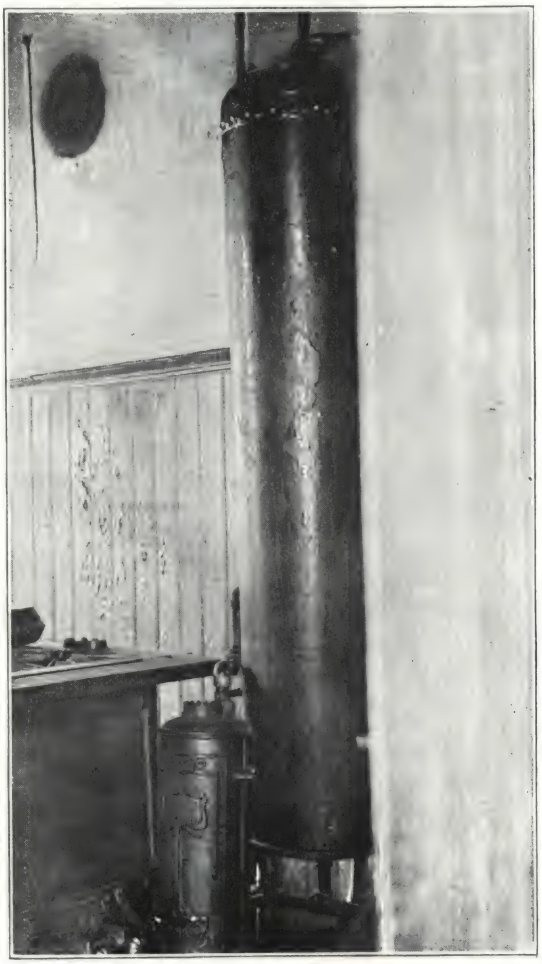
All range boilers and storage water heaters are sold by the manufacturers under guaranteed test and working pressures.

Copper boilers and heaters are made for both vertical and horizontal setting, in a wide range of sizes and capacities.

Where the water is to be heated with steam a brass or copper coil is placed inside the boiler.

Specifications of copper range boilers and storage water heaters should include the thickness of shells, heads and bottoms for various water pressures. The hydrostatic test pressure and working pressure should also be specified. Specifying without this data has in the past led to substitution of inferior products.

Information in this connection will be found in manufacturers' catalogues, or may be obtained from the COPPER AND BRASS RESEARCH ASSOCIATION.



COPPER RANGE BOILER INSTALLED IN 1857

This boiler has been in continuous use for 55 years and is still giving perfect satisfaction

ESTABLISHED 1841

E. B. BADGER & SONS CO.

Manufacturers of Hot Water Boilers and Pantry Sinks

75 Pitts Street
BOSTON, MASS.

NEW YORK OFFICE, 101 Park Avenue

CHICAGO OFFICE, 8 South Dearborn Street

Products

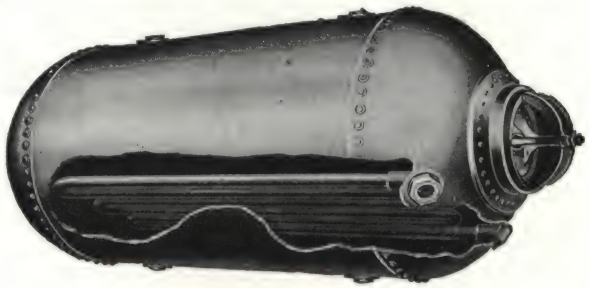
BADGER COPPER HOT WATER BOILERS.

Also manufacturers of Copper and White Metal Pantry Sinks.

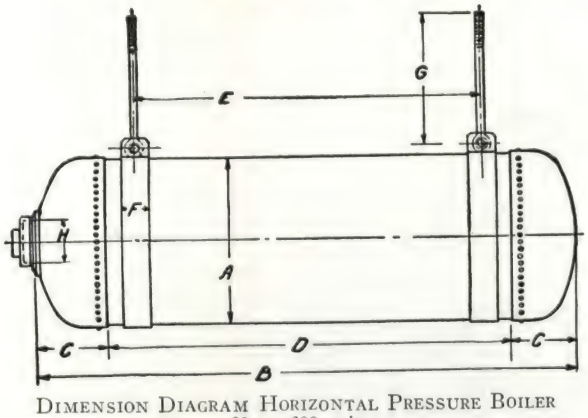
Copper Boilers

Badger copper boilers have always been made from the very best materials by the most expert workmen. A real quality product, they are built for permanency.

Boiler interiors are thoroughly tinned to insure clean water, while the shell has one longitudinal seam brazed and hard hammered; the heads are of the half-round type, riveted to shell, and thoroughly sweat on the inside with solder. Furnished in sizes from 30 to 1500 gals., inclusive, with special size connections, manholes, and steam coils, if specified.



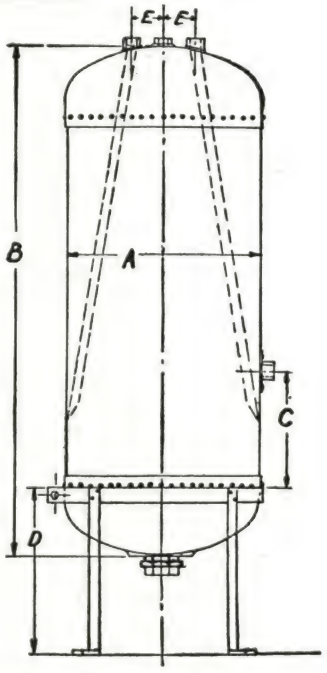
COPPER HOT WATER BOILER



DIMENSION DIAGRAM HORIZONTAL PRESSURE BOILER
30 to 300 gals.
Wall brackets may be used instead of hangers

Size, gals.	A	B	C	D	E	F	G	H
30	12	62	5	52	47	3	15	3
40	14	61¾	6	49¾	45	3	15	3
50	16	60½	6½	47½	42	4	15	3
60	17	65	7	51	45	4	15	3
70	18	66½	7	52½	47	4	15	3
80	20	62	8¼	45½	40	4	16½	3
90	20	70	8¼	53½	48	4	16½	3
100	20	78	8¼	61½	56	4	16½	3
125	22	81	9¼	60½	55	4	18½	4½
150	24	80	10	60	54	4	18½	4½
175	28	72	11	50	44	4	18½	6
200	30	72	12	48	42	4	18½	6
225	30	80	12	56	50	4	18½	6
250	30	90	12	66	60	4	18½	6
275	30	97½	12	73½	68	4	18½	6
300	30	106½	12	82½	77	4	18½	6

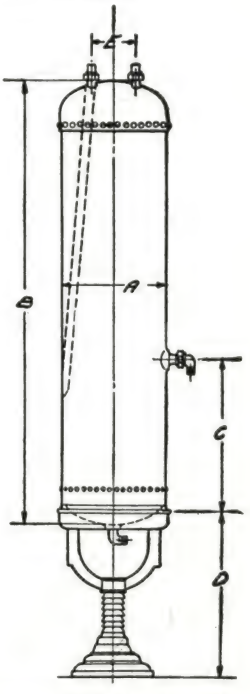
All dimensions are in inches.



DIMENSION DIAGRAM VERTICAL PRESSURE BOILER
125 to 300 gals.

Size, gals.	A	B	C	D	E
125	22	81	24	20	4
150	24	80	24	20	4½
175	28	72	24	20	4½
200	30	72	24	20	5
225	30	80	24	20	5
250	30	90	24	20	5
275	30	97½	24	20	5
300	30	106½	24	20	5

All dimensions are in inches.
The 125-gal. size has bent side and bottom connections.
The 150-gal. size has bent side connection. All others as shown.



DIMENSION DIAGRAM VERTICAL PRESSURE BOILER
30 to 100 gals.

Size, gals.	A	B	C	D	E
30	12	62	20½	21⅞	6
40	14	61¾	20½	21⅞	6
50	16	60½	25	21⅞	7
60	17	65	25	21⅞	7
70	18	66½	25	21⅞	7½
80	20	62	25	21⅞	7½
90	20	70	25	21⅞	7½
100	20	78	25	21⅞	7½

All dimensions are in inches.
Sizes 70- to 100-gal. inclusive, have a third connection in center of top.

Boiler Specification—The following is frequently used by architects and found to be very satisfactory:

Furnish ... gal. Badger Copper Boiler to be ... diameter x ... long; shell to be made of sheet copper weighing ... lbs. per sq. ft.; to have one longitudinal seam, said seam to be brazed and hard hammered; heads to be made of copper weighing ... lbs. per sq. ft.; said heads to be half-round type, riveted to the shell and thoroughly sweat on the inside with solder; one head to be fitted with ... x ... composition manhole and cover; all connections in head to be standard type, brazed to copper. All connections on shell to be standard flanged type riveted on outside.

Material in boiler to be tinned on the inside with block tin, and all seams and connections to be heavily backed with solder.

Boiler to be tested to ... lbs. hydrostatic pressure.

Note: This company will supply dimensions and weights for this specification to any architect who will furnish information regarding volume of hot water required and the water pressure.

VERTICAL BOILER

DAHLQUIST MFG. COMPANY

Coppersmiths and Metal Workers

TELEPHONE
SOUTH BOSTON 2160

30-40 West Third Street
SOUTH BOSTON, MASS.

FACTORY, 11-19 Bolton Street

Products

All kinds of COPPER BOILERS, including HEAVY PRESSURE BOILERS, DIRECT OR STREET PRESSURE BOILERS, TANK PRESSURE BOILERS, and WASH BOILERS.

Also, Decorative Copper Work from architects' drawings.

Satisfaction Assured

In durability, neat appearance and cleanliness, copper is beyond comparison. It resists rust and corrosion as no other tank metal can.

Heavy Pressure Boilers

For private residences, apartment houses, office buildings, hospitals, etc., requiring a constant supply of hot water, heavy pressure boilers are made in varying capacities, from 100 to 3000 gals.; the latter frequently requiring a working pressure of 200 lbs., with or without coils, can be supplied. In ordering, state whether coil is needed or not.

Material and workmanship in heavy pressure boilers are thoroughly inspected and tested, and best possible results guaranteed.

References—Listed below are some of the large boilers recently furnished by us:

Two 800-gal. boilers for the John Hancock Mutual Life Insurance Building, installed by W. G. Cornell Company.

One 750-gal. boiler for St. Mary's Hospital, Waterbury, Conn., installed by M. J. Daly & Co.

One 350-gal. boiler for the Lowell High School, installed by J. J. Hurley.

One 350-gal. boiler for new high school at Manchester, N. H., installed by John H. Stevens.

Four 250-gal. boilers all of which were installed by W. G. Cornell Company, of New York City, as follows:

One 250-gal. boiler for 14 East Eighty-ninth Street.

One 250-gal. boiler for 15 East Eighty-eighth Street.

Two 250-gal. boilers for 12-16 East Eighty-ninth Street.

One 500-gal. boiler for Greenwood Memorial Building at Gardner, Mass., installed by Royal Steam Heating Company.

One 500-gal. boiler for Women's Educational and Industrial Building, installed by D. J. Farrell, Boston, Mass.

The Dahlquist copper hot water boilers have established a splendid reputation for themselves and are generally specified by the country's leading architects for large apartment houses, hotels, hospitals, restaurants and public institutions.

Direct or Street Pressure Boilers

Heavily reinforced with brass rings, the tops are riveted, and on the 250- and 300-lb. pressure boilers, both ends are riveted. In all direct pressure boilers of above 80 gals. capacity, a handhole is placed in the bottom.

Made in varying capacities from 5 to 500 gals., and in 3 pressures tested respectively to 200, 250 and 300 lbs. Stock range boilers are made in various pressures up to 250 lbs., and to order up to 300 lbs. Working pressure in all cases complies with the Massachusetts Plumbing Regulations.

SIZES OF RANGE BOILERS

Capacity, gals.	Dimensions		Capacity, gals.	Dimensions	
	Diam., in.	Length, ft.		Diam., in.	Length, ft.
30	12	5	125	22	6
40	14	5	150	25	6
50	16	5	200	30	6
60	17	5	250	32	6
70	18	5	300	35	6
80	20	5	350	35	7
90	20	5½	400	35	8
100	20	6			

DIRECT OR STREET PRESSURE BOILER

Tank Pressure Boilers

Tank pressure boilers are made of best quailty lake copper, in varying capacities from 25 to 300 gals., and will stand a pressure of about 25 lbs.

Stock sizes run up to 100 gals. capacity.

When ordering, state clearly what couplings are required.

Extra charge for large connections.

Coils

Coils may be had, if desired, with all boilers.

Wash Boilers

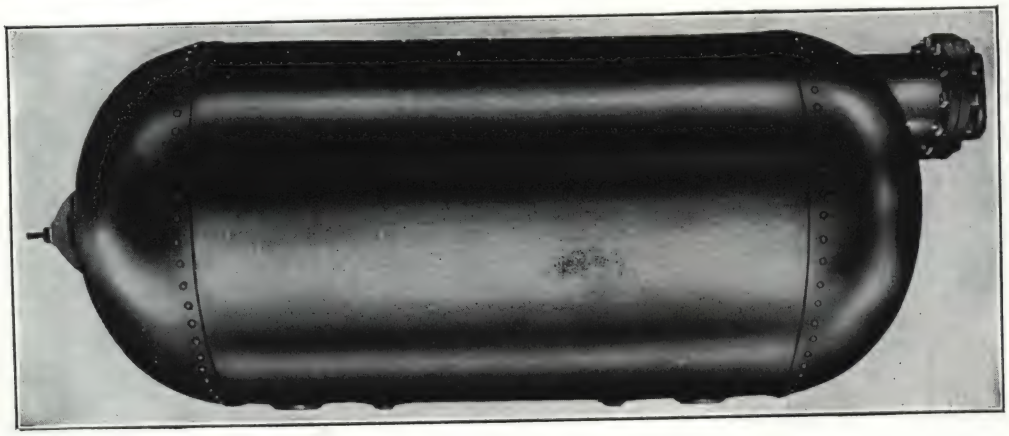
Copper wash boilers are generally used in connection with wash trays, and are set in brickwork. Bottom is double seamed and soldered; the interior is tinned.

How to Specify

"Hot water boiler shall be a 'Dahlquist' copper boiler of —— capacity, —— type, and guaranteed for a working pressure of —— lbs."

Prices

Prices supplied on request.



800-GALLON DAHLQUIST BOILER

Two boilers of this type were installed by the W. G. Cornell Company in the new John Hancock Mutual Life Insurance Building in Boston. Size of boilers, 9 ft. 6 in. long and 4 ft. in diameter

ESTABLISHED 1830

THE RANDOLPH-CLOWES COMPANY

FORMERLY BROWN AND BROTHERS

Manufacturers of Copper Range Boilers

WATERBURY, CONN.

BRANCH OFFICE: 253 Broadway, NEW YORK, N. Y.

Products

"Brown and Brothers" Cold Drawn Seamless Copper Range Boilers; Brass and Tubing.

Also manufacturers of Brass and Bronze Sheets and Rods.

"Brown and Brothers" Cold Drawn Seamless Copper Range Boilers

Parts—The parts consist of two cold drawn seamless copper shells, each forming one-half of the boiler proper; a corrugated spiral interior rib (see sectional cut); a heavy seamless copper exterior reinforcing band (at center); a seamless copper band at the bottom to support the boiler on its stand; the necessary connections or couplings.

Construction—The two cold drawn seamless copper shells are made from flat rolled discs of copper worked into the desired shape and size by a series of drawing operations which gradually elongate and reduce the thickness of sides from ⅛ or ¼ in. down to about $\frac{1}{16}$ in., the final thickness of sides depending on size of boiler and pressure under which it will be used. These drawing operations do not reduce thickness of ends, or the head and bottom of boiler.

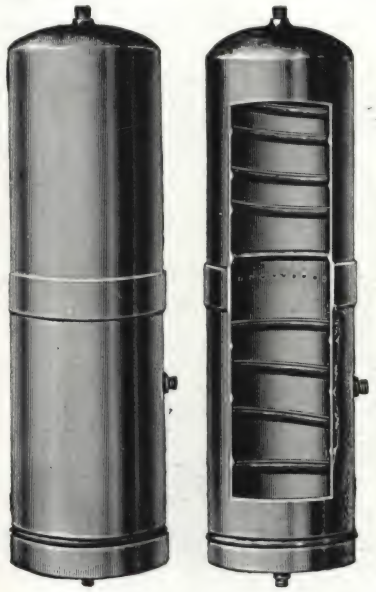
After these shells are completed and the corrugated spiral interior rib put in place, they are thoroughly tinned inside and connections bolted and soldered in.

The shells are then telescoped together by heavy hydraulic pressure. Overlapping parts (which overlap about 4 in.) are riveted together, the exterior reinforcing band shrunk on over telescope joint and rivet heads, and the whole sweated together with solder.

Points of Superiority—The cold drawing process used in forming the shells very materially increases the tensile strength of the copper.

The boiler is without a longitudinal seam, thus eliminating one element of the risk of leakage. The sides and ends are in one piece, whereas in other boilers the heads have to be jointed to the side.

The greater thickness of metal in ends, or head and bottom of boiler, the double thickness of metal in the middle due to telescoping one shell into the other and the further reinforcing at this point by heavy copper band, provide a maximum of strength at points where greatest pressure is exerted when boiler is in service. Ribs inside the boiler absolutely guard against collapse.



Exterior Sectional

"Brown and Brothers" Copper Boiler, Showing Spiral Ribs

The riveting of the two shells together (see sectional cut), insures against their pulling apart.

Every "Brown and Brothers" boiler is subjected to a rigid inspection and water pressure test, the regular pressure boiler being tested to 200 lbs. and the extra heavy to 300 lbs. to the sq. in.

Can be furnished for either vertical or horizontal setting; with steam coil of either brass or copper pipe; and with brass screw cap handhole.

Where over 85 lbs. working pressure exists, the extra heavy boiler should be used.

The "Brown and Brothers" seamless drawn copper range boiler has been on the market since 1876, and never has the method of construction, or the material used, been the cause of any trouble or complaint.

Sizes—The "Brown and Brothers" boilers are made in the following capacities and sizes:

Capacity, gal.	30	35	40	45	50	60	80	60	80
Diameter, in.	12	14	14	14	16	16	16	20	20
Height, in.	60	53	60	68	60	70	96	44	59

Capacity, gal.	100	100	120	125	150	180	200	250	300
Diameter, in.	20	24	24	24	24	24	24	24	24
Height, in.	76	60	65½	69	78½	92½	103	129	155

How to Specify—Provide and install where shown a 200-lb. test (or 300-lb. test) "Brown and Brothers" cold drawn seamless copper range boiler .... in. in diameter, and .... in. high.

Seamless Drawn Brass Pipe

We manufacture seamless drawn brass pipe in all sizes from ⅛-in. to 12-in. iron pipe size, inclusive. This is particularly suited to high grade plumbing work, as it does not rust or corrode, and can not clog.

Once installed, repair bills are eliminated, as seamless drawn brass pipe is practically everlasting. Thus, in the long run, it is more economical than iron.

We also make seamless drawn brass and copper tubing in sizes from $\frac{3}{16}$-in. to 32-in. diameter.

WEIGHT PER LINEAL FOOT, SEAMLESS BRASS AND COPPER TUBING, IRON PIPE SIZES

Iron pipe size, in.	Outside diameter, in.	Regular			Extra Heavy		
		Inside diam., in.	Weight, lbs.		Inside diam., in.	Weight, lbs.	
			Brass	Copper		Brass	Copper
⅛	.405	.281	.246	.259	.205	.353	.371
¼	.540	.375	.437	.459	.294	.593	.624
⅜	.675	.494	.612	.644	.421	.805	.847
½	.840	.625	.911	.958	.542	1.191	1.253
¾	1.050	.822	1.235	1.298	.736	1.622	1.706
1	1.315	1.062	1.740	1.829	.951	2.386	2.509
1¼	1.660	1.368	2.557	2.689	1.272	3.291	3.460
1½	1.900	1.600	3.037	3.193	1.494	3.986	4.191
2	2.375	2.062	4.017	4.224	1.933	5.508	5.791
2½	2.875	2.500	5.830	6.130	2.315	8.407	8.839
3	3.500	3.062	8.314	8.741	2.892	11.24	11.82
3½	4.000	3.500	10.85	11.41	3.358	13.66	14.37
4	4.500	4.000	12.29	12.93	3.818	16.41	17.25
4½	5.000	4.500	13.74	14.44	4.250	20.07	21.10
5	5.563	5.062	15.40	16.19	4.813	22.51	23.67
6	6.625	6.125	18.44	19.39	5.750	31.32	32.93
7	7.625	7.062	23.92	25.15	6.625	41.22	43.34
8	8.625	8.000	30.05	31.60	7.625	47.00	49.42
9	9.625	8.937	36.94	38.84	.....	.....	.....
10	10.750	10.019	43.91	46.17	.....	.....	.....

Variations from these weights must be expected in practice

"AUTOMATIC" SPRINKLER COMPANY OF AMERICA

Contractors for Fire Prevention

123 William Street
NEW YORK, N. Y.

PLANT
YOUNGSTOWN, OHIO

DEPARTMENT OFFICES

AKRON, OHIO, 232 Central Savings & Trust Building
ATLANTA, GA., 702-3-4 Candler Building
BALTIMORE, MD., 907 Calvert Building
BOSTON, MASS., 141 Milk Street
BUFFALO, N. Y., 822 Prudential Building
CHARLOTTE, N. C., 326 South Tryon Street
CHICAGO, ILL., 209 South La Salle Street
CINCINNATI, OHIO, 1817-18 First National Bank Building
DALLAS, TEX., 1608 Main Street
DETROIT, MICH., 1416 David Whitney Building
KANSAS CITY., MO., 112 West 9th Street
KNOXVILLE, TENN., 826 Holston National Bank Building
LOS ANGELES, CAL., 610 South Broadway
MINNEAPOLIS, MINN., 550-52 McKnight Building
NEW ORLEANS, LA., 525 Whitney Central Building
NEW YORK, N. Y., 123-33 William Street
PHILADELPHIA, PA., 328 Chestnut Street
PORTLAND, ORE., 628-29 Railway Exchange Building
ROCHESTER, N. Y., 130 Main Street, East
SAN FRANCISCO, CAL., 519 California Street
SEATTLE, WASH, 1906 Third Avenue
ST. LOUIS, MO., 1114 International Life Building
SYRACUSE, N. Y., 441 South Salina Street
YOUNGSTOWN, OHIO, Brittain Street

"AUTOMATIC" SPRINKLER CO. OF CANADA, LTD.

MONTREAL, QUE., 24 Victoria Square

TORONTO, ONT., 70 Lombard Street

Products

"Automatic" Fire Extinguishing Equipments, including Standard Sprinkler Apparatus, Wet and Dry Pipe; also Protection against Special Hazards, such as powder manufacturing, pyroxyline products, varnish dip tanks, oil and grease fires: Automatic Draft Stops; Automatic Water Curtains; Automatic Drainage of Hazardous Liquids; Automatic Fuel Oil Stops; Automatic Chemical Equipments for Supplying Automatic Sprinklers and Hose Standpipes Independent of Water Supplies; Sprinkler Heads, Dry Valves; Alarms, water and electric; Automatic Fire Door Releases; Deluge Valves; Sprinkler Systems, and all auxiliaries to complete systems of protection on ordinary and unusual fire hazards.

"Automatic" Service

This company is the largest organization specializing in fire protection. Its large volume of business and efficient organization make for economy on any individual installation, yet first cost is not lowered at the expense of the service expected or of the protection acquired.

The actual basis on which fire protection can be acquired must necessarily vary according to the conditions bearing upon each case. Without expense or obligation on your part, this company will make a survey of the situation and report explicitly.

We maintain a complete inspection service in many locations with competent repair men available at any time, skilled inspectors and technical advisers.

Official Approval

"Automatic" sprinkler apparatus has been tested and approved by the Underwriters' Laboratories, Inc., and accepted by the National Board of Fire Underwriters and every insurance association and company in the United States and Canada, with consequent reduction of insurance.

The Most Efficient Fire Fighters Known

"Automatic" sprinkler systems embody the scientific supply and distribution of water immediately and automatically a fire occurs. They make the spreading of fire impossible—they do not prevent fires, but extinguish them with minimum loss.

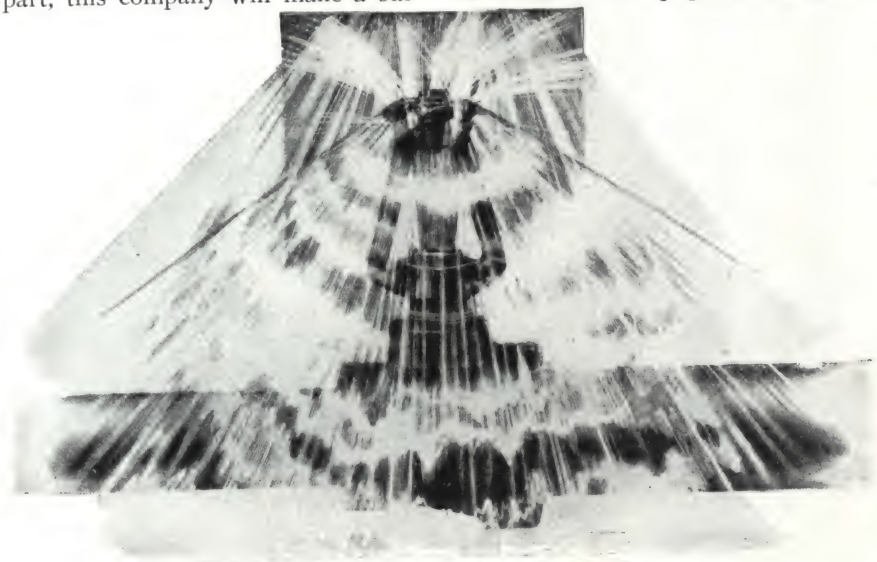
Besides reducing fire losses, they considerably reduce the cost of insurance and the risk of delay and loss of business resulting from fire.

Sprinkler Heads

Sprinkler heads are considered to be the most thorough fire fighting device. A fire seldom opens more than a few—85% of all fires in sprinklered buildings have been controlled by 5 heads or less. We have installed the largest equipments in the country, one plant alone requiring 120,000 sprinkler heads.

We Do Nothing But Specialize in Fire Protection

Our sole aim is to afford customers the highest possible character of equipment designed to automatically and positively control fire. It is an utter impossibility to eradicate the occurrence of fire, but the little fire can be kept little—automatically, positively. We do nothing but specialize in fire protection—create, manufacture and install equipments which assure the automatic control of fire under whatever conditions that may exist.



"Automatic" Sprinkler Head in Operation

GLOBE AUTOMATIC SPRINKLER CO.

Engineers and Contractors for Fire Protection Systems; Heating, Power and Process Piping Equipments; Manufacturers of Fire Extinguishing Devices

2019-2035 Washington Avenue
PHILADELPHIA, PA.

FACTORIES: PHILADELPHIA, PA., WHEELING, W. VA.

SALES AND ENGINEERING OFFICES

ATLANTA, GA., 812 Forsyth Building
BALTIMORE, MD., Baker Building, Pleasant Street and St. Paul Place
BOSTON, MASS., 429 Board of Trade Building
CHARLOTTE, N. C., 106 Kinney Building
CHICAGO, ILL., 1126 Association Building
CINCINNATI, OHIO, 420 First National Bank Building
CLEVELAND, OHIO, 619 National Building, 1404 East Ninth Street
DALLAS, TEX., 601 Dallas County State Bank Building
GRAND RAPIDS, MICH., 312 Powers Building
MEMPHIS, TENN., 1016 Union & Planters Building
NEW YORK, N. Y., 152 West 42nd Street
OMAHA, NEBR., 728 World-Herald Building
PHILADELPHIA, PA., 2035 Washington Avenue
ST. LOUIS, MO., 1025 Pierce Building
SYRACUSE, N. Y., 602 Cahill Building

Products

Manufacturers of DEVICES for AUTOMATIC SPRINKLER SYSTEMS.

Engineers and Contractors for Automatic Sprinkler Equipments; Cornice, Roof and Window Sprinkler Systems; Standpipe and Hydrant Systems; Complete Fire Protection Equipments, including Chemical Extinguishers, Fire Doors, Hose and other Fire Protection Accessories.

Also, Engineers and Contractors for Heating, Power Piping, Process Piping and Complete Industrial Piping Equipments.

TRADE-MARK
Reg. U. S. Patent Off.

Information and Approval

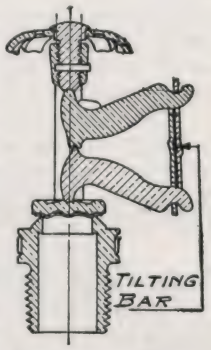
The National Fire Protection Association in 1903 adopted resolutions providing that automatic sprinklers should only be installed by recognized automatic sprinkler companies and should not be sold for erection to those not experienced in this class of work, unless such installations be guaranteed by the manufacturers to comply with the rules of the National Board of Fire Underwriters.

The GLOBE AUTOMATIC SPRINKLER Co. guarantees its own installations. All devices installed are fully approved by the Underwriters' Laboratories, Inc., and all insurance bureaus in the United States and Canada.

Globe Automatic Sprinklers

Sprinklers are simple automatic valves consisting of a bronze frame, bronze upper and lower levers, a bronze die stamped fusible link, a bronze die stamped fixed water distributor, a bronze die stamped valve and a die stamped copper gasket.

Special Features, Model C—(1) Perfected tilting bar construction, insuring a perfect mechanical carrying of load and removing all strains from fusible metal. (2) High factor of safety due to tilting bar construction. (3) Positive and uniform fusing due to resolder, enabling it to function freely and instantly. (4) Dependability of operation assured through positive and instant separation of link plates, caused by tilting bar. (5) Use of die stamped parts wherever possible, insuring uniformity of manufacture, extreme and uniform strength, and maximum resistance to corrosion.



SECTION OF MODEL C SPRINKLER HEAD
Made in 4 fusing temperatures, 165°, 212°, 280°, 360°

Globe Model B, Semimechanical Dry Pipe Valve

The Model "B" dry pipe valve stands for the most advanced practice in automatic sprinkler protection; combining, as it does, the features of the differential and mechanical types of dry valves found most desirable.

The description, "semimechanical," applied to it is quite apt and covers its characteristics—a combination of mechanical leverages with differential areas exposed to the water and air respectively.

Globe Dry Pipe Valve Accelerator

The Globe accelerator is a highly perfected automatic device designed to facilitate quick operation of a dry pipe sprinkler system when installed as an auxiliary attachment to a dry pipe valve. It will insure the same efficiency as a wet system, and effect important economies both in the cost of construction and in the insurance rate penalty where it is now being exacted against the dry systems.

The device is exceedingly simple in operation, rugged and compact in construction and is adaptable to all types of dry pipe valves.

Globe Alarm Check Valves, Model E

Used in connection with wet pipe sprinkler systems in buildings of every character for giving an immediate alarm upon opening of a Globe sprinkler. It is simple, reliable and positive in action; all parts readily accessible.

Complete equipment consists of an alarm check valve, a retarding or variable pressure chamber, water motor for mechanical alarm, and a circuit closer for electrical alarm.

Inspection and Maintenance Service

Originated by the Globe Company, conducted by trained men who have become experts by years of field experience. This service has proved to be of real value to owners of Globe equipments, assisting in maintaining their sprinkler equipments at the same high standard of efficiency as when installed.

Co-operative Service

Architects, engineers and contractors are invited and urged to avail themselves of the facilities that the GLOBE AUTOMATIC SPRINKLER Co. extends through its numerous offices to consult with its engineers, from the inception of plans to the consummation of building, that good and economical engineering may distinguish the completed structure. Literature on request.

GRINNELL COMPANY, INC.

Manufacturers of Fire Protection Systems

EXECUTIVE OFFICES

PROVIDENCE, R. I.

NEW YORK, N. Y.
PROVIDENCE, R. I. (Plant)
BUFFALO, N. Y.
MINNEAPOLIS, MINN.
COLUMBUS, OHIO
BOSTON, MASS.
HARTFORD, CONN.
ALBANY, N. Y.
DALLAS, TEX.

ST. PAUL, MINN.
ATLANTA, GA. (Plant)
PHILADELPHIA, PA. (Plant)
CINCINNATI, OHIO
CLEVELAND, OHIO
NORTH CHARLOTTE, N. C. (Plant)
AUBURN, R. I. (Plant)
BALTIMORE, MD.

CHICAGO, ILL. (Plant)
ST. LOUIS, MO.
DETROIT, MICH.
NEW ORLEANS, LA.
ROCHESTER, N. Y.
MILWAUKEE, WIS.
KANSAS CITY, MO.
WARREN, OHIO (Plant)
GREENVILLE, S. C.

GRINNELL COMPANY OF THE PACIFIC

LOS ANGELES, CAL. SAN FRANCISCO, CAL. SEATTLE, WASH.

GRINNELL COMPANY OF CANADA, LTD.

MONTREAL, QUE. (Plant) TORONTO, ONT. (Plant) VANCOUVER, B. C. WINNIPEG, MAN.

Products

GRINNELL SYSTEMS of AUTOMATIC FIRE PROTECTION and AUTOMATIC FIRE ALARM.

For Power Piping, Heating and Industrial Piping Equipments, see pages 1739-1741.

Grinnell Automatic Sprinkler System

This system has been in successful operation for more than 40 years.

Today over 20,000,000 Grinnell sprinkler heads are safeguarding business property valued at approximately three billion dollars. The average loss per fire in Grinnell protected buildings in over 22,000 recorded fires is less than $300.00 —a reduction of over 96% on the lowest average fire loss previous to the invention of this system.

SPRINKLER HEAD

Operation

When fire breaks out, temperature at the ceiling rapidly increases and causes the fusible strut of the sprinkler head to melt. Thereupon, the glass valve, found only in the Grinnell head, is instantly thrown from its seat on the unique flexible diaphragm. This allows the water to rush out and strike the deflector, which breaks it into a heavy spray. One sprinkler head effectively drenches an area of 80 to 100 sq. ft.

The operation of the sprinkler head immediately and automatically gives the fire alarm, a water motor alarm being usually installed on the outside of the building.

Connections and Piping

An ample supply of water is furnished, either from tanks, a fire pump or a connection with city water, or a combination of two or more of these units. Often city water alone is sufficient.

From this abundant source of water a large riser or supply pipe extends from the top to the bottom of the building to be protected. Connected with this large pipe are branch lines of smaller pipe. These run near the ceiling to all parts of the building. They are carefully graded in size in order that the water everywhere throughout the building may be under good pressure and ample in volume. At stated intervals along these branch lines (usually 8 to 10 ft.) are placed Grinnell automatic sprinkler heads.

Grinnell Dry Pipe System

To obviate freezing in the sprinkler piping in buildings which are unheated, GRINNELL COMPANY, INC., installs a dry pipe system. In this system the water is held back of any point where it might freeze by the Grinnell dry pipe valve. The pipes in this system are filled with air under moderate pressure, but when a sprinkler head opens, the air escapes and the dry valve operates, admitting water to the system.

The system is further improved by the Grinnell Dry Valve Accelerator, an important invention which makes dry pipe systems practically as quick in operation as wet ones.

Installation

Grinnell Automatic Sprinkler Systems are factory-assembled to blue prints, fittings being made-on as far as possible by machinery. The result is that the equipment comes to the job ready for quick and botherless installation by our highly trained erecting crews. This reduces interference with usual plant operation to a minimum.

Inspection and Service

This company has instituted a new department whose sole duty it is to inspect Grinnell sprinkler equipments and render full reports to the owners on such inspections with practical suggestions for needed changes. A corps of expert sprinkler engineers is engaged in this work and the success with which it has already been attended is ample evidence of the necessity of this independent inspection service.

The sole aim of this inspection work is to maintain Grinnell equipments in the same first class operative condition that they were in when originally installed. For that reason this service is rendered on a low yearly fee basis which is practically cost.

Designs and Estimates

Inquiries addressed to the head office of GRINNELL COMPANY, INC., or to any of the branches will immediately receive the attention of the engineering staff, who will promptly furnish expert advice with designs or estimates as required.

ROCKWOOD SPRINKLER CO. OF MASSACHUSETTS

38 Harlow Street
WORCESTER, MASS.

SALES OFFICES

NEW YORK, N. Y., 25 West 43rd Street
BOSTON, MASS., 141 Milk Street
BUFFALO, N. Y., 444 Prudential Building
CHICAGO, ILL., 134 South LaSalle Street
SEATTLE, WASH., 208 Columbia Street
ALBANY, N. Y., 445 Broadway
SOLE AGENT FOR CANADA: Worcester Fire Extinguisher Co., Ltd., 137 McGill Street, MONTREAL, CAN.

Products

Complete Automatic Sprinkler Equipments, using either Wet-pipe or Dry-pipe Systems; Rockwood Automatic Sprinkler Heads; Rockwood Dry-pipe Valves; Rockwood Pressed Steel Unions.

Also Rockwood Wet-pipe Alarm Valves; Rockwood Water Motors, Rockwood Electric Alarms, Rockwood Pressed Metal Products.

Description of Rockwood Sprinkler System

The Rockwood automatic sprinkler and fire alarm system consists of a series of automatic sprinkler heads attached to a piping system leading from a straightway dry-pipe valve or wet-pipe alarm valve. These valves are located in the main water supply pipe line. The type of system, supplies, etc., are all determined by the underwriters having jurisdiction.

Sprinkler Head

The Rockwood sprinkler is unique in that the two parts of the soldered link are held together, not merely by a sweated soldered joint, but by covering the end of the lever with a small piece of solder, which is mechanically bound to the strut by a loop of wire riveted through one part of the link.

The Rockwood sprinkler is the only approved head that is incapable of opening by the breaking of the soldered joint, which must absolutely melt to open. It is thus in a class by itself, superior to all others.

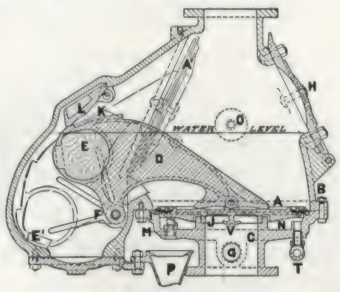
Head Before Melting of Soldered Strut — Head Opening After Melting of Soldered Strut

Rockwood Automatic Sprinkler Head

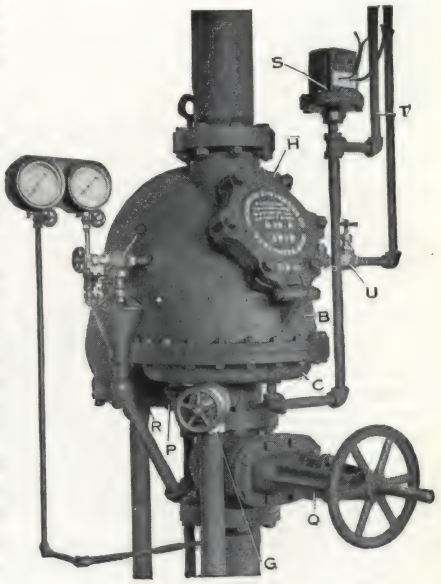
Dry-pipe Valve

Dry-pipe systems are used where there is a possibility that sprinkler piping filled with water would freeze. The Rockwood dry-pipe valve is simply a differential check valve, so designed that a low air pressure will hold back three times greater water pressure. Where there is a danger of the priming water in the dry valve freezing, valves must be enclosed in a specially constructed valve house, according to the underwriter's specifications.

Air pressure in valve, acting on surface of priming water, is relieved or lessened automatically *by the opening of a sprinkler* through melting of soldered strut, causing pressure of water underneath valve plate "A" to automatically lift it. By this action, the intermediate chamber "N" fills instantly, with the result that the entire force of the water, exerted over full area of the valve plate, pushes it over to the wide open position at "A," thus leaving a straight, unobstructed passage for water through the valve and piping to the sprinklers above.



Sectional View, Rockwood 6-in. Dry-pipe Valve



Rockwood 6-in. Dry-pipe Valve

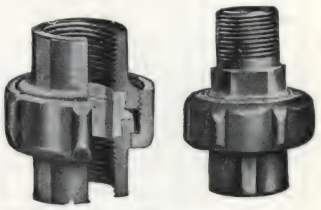
Pressed Steel Unions

Rockwood unions are sherardized, with ground bronze seats for steam, water, air, gas or oil lines. They contain the following combined features found only in these unions:

(1) Pressed steel—having no seams, sandholes or blowholes.

(2) Strength—stronger than any cast union.

(3) Sherardized—absolutely protected from rust.



Rockwood Pressed Steel Unions

(4) Two bronze seats—both ground to a ball joint.

(5) Expansion and contraction equal—no leaks at the thread.

(6) Unique nut—can be loosened or tightened in places too small to use a wrench.

(7) Tested—Every Rockwood union is tested and guaranteed to hold tight.

Made in sizes from ¼ in. to 3 in. inclusive.

References

Over 5,000,000 Rockwood sprinkler heads, 6,000 Rockwood dry-pipe valves, and 5,000 Rockwood alarm valves are installed and in service today without a single failure.

Sprinkler heads and dry-pipe valves are approved by both the Underwriters' Laboratories, Inc., Chicago, and the Associated Factory Mutual Fire Insurance Companies, Boston.

Complete sprinkler systems installed subject to approval of the underwriters having jurisdiction.

W. D. ALLEN MANUFACTURING CO.

Fire Protection Equipment

566-570 West Lake Street
CHICAGO, ILL.

FACTORY
5630-5658 Roosevelt Road
CHICAGO, ILL.

BRANCH OFFICES
NEW YORK, N. Y., 69 Warren Street
SALT LAKE CITY, UTAH, Scott Building
DENVER, COLO., Colorado National Bank Building
NEW ORLEANS, LA., Godchaux Building

Products

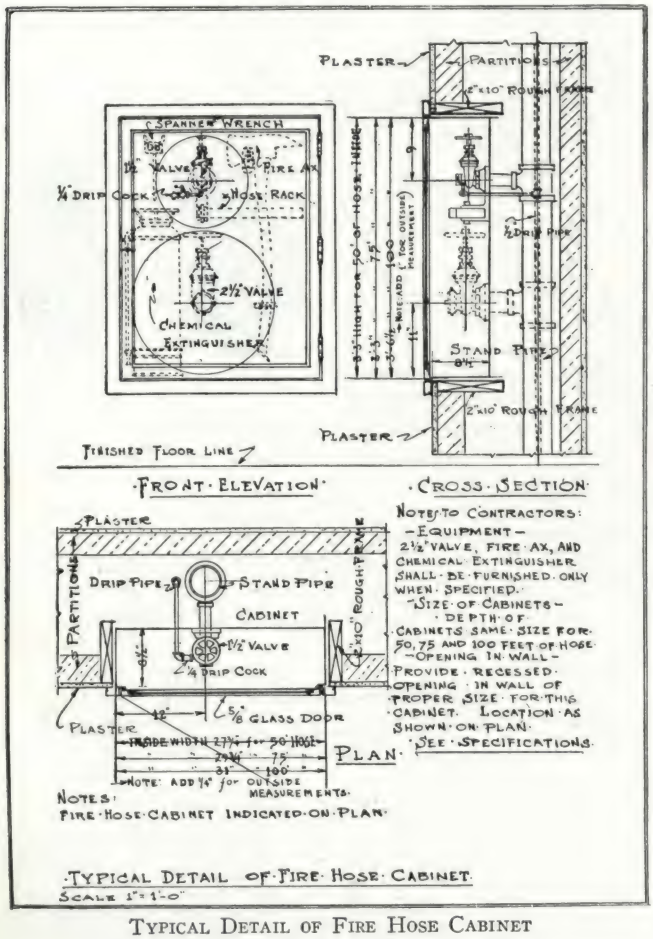
Complete FIRE EXTINGUISHING APPARATUS.

Facilities

Allen products include the most modern fire fighting appliances on the market. Twenty-five years' experience, close co-operation with insurance companies and underwriters, coupled with a close study of their requirements, have enabled this company to satisfy the most exacting specifications.

Installation of Fire Extinguishing Apparatus

Specifications for Interior Standpipe—Furnish, set up and run from sidewalk to roof, riser pipe not less than 4-in. diameter, complete with valves as specified hereinafter; all to be securely fastened to beams and walls; standpipe to be carried up as shown in diagram. Run main 4-in. pipe line from standpipe to street at front wall as directed, attach a Fig. .... W. D. ALLEN MANUFACTURING CO.'s double clapper Siamese with *sensible caps.* On inside of main wall, located where frost can not affect it, not less than 10 ft. from wall, place 4-in. check valve, to check against hose tank or pump pressure, with ½-in. ball drip valve, placed at lowest point between check valve and Siamese connection. All fittings to be of long sweep pattern.



TYPICAL DETAIL OF FIRE HOSE CABINET

Pipe Line to House Tank—Connect 4-in. pipe line from standpipe to house tank at roof with 4-in. underwriters' pattern indicator gate valve and 4-in. underwriters' pattern check valve placed in a horizontal position to check against steamer pressure.

Pipe Line to Fire Pump—(If a fire pump is specified.) Connect standpipe to fire pump in basement, properly valved and checked against steamer pressure.

Hose and Hose Equipment—*Dimension Suggestion*—Size of valves and hose depends largely on local conditions. Insurance and municipal authorities having jurisdiction should be consulted. In the absence of specific requirements, it is recommended that on all buildings, 1½-in. valves and hose be installed. On buildings over 5 stories in height, an additional 2½-in. valve should be provided for use of the fire department.

Specifications—Install a 2½-in. valve and cap with a 1½-in. valve for the hose line, or a 2½-in. valve with an auxiliary reducer for the 1½-in. hose.

Support on a combination escutcheon and wall bracket a labeled underwriters' semiautomatic Bowes hose rack with .... ft. of 1½-in. Nella underwriters' linen hose sufficient to reach any portion of the floor served by this standpipe. Hose to be coupled in lengths not longer than 50 ft., and equipped with one ½-in. discharge nozzle (1½x12 in. long) with lugs. Provide an approved 2½-gal. labeled extinguisher and fire axe.

Specifications for Steel Hose Cabinets—Furnish and install Alenco steel fire hose cabinets where shown on plans. Body of cabinets to be made of No. 22 gauge steel. The hollow steel frame forming the door to be made of No. 18 gauge steel and to have a plate glass panel door with bullet catch and pull handle. Finish to be 4 coats of hard baked filler enamel and varnish. Finishes: white enamel; grained to match trim.

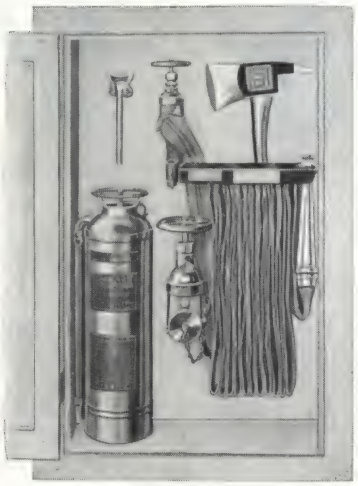


FIG. 190. CABINET

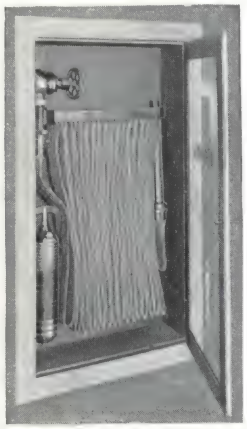


FIG. 185. CABINET

Bowes Rack: Outside Dimensions

50 ft.—29 x19x7½ in.
75 ft.—34½x22x7½ in.
100 ft.—36 x24x7½ in.

In addition to the typical cabinet installations shown above—cabinets can be supplied with any of the equipment shown on the following pages.

Complete specifications and detail drawings gladly sent on request.

Bowes Type of Hose Rack for Linen Hose Only

The selection of the proper hose rack should be determined by the care and protection it gives the

Continued on next page

hose, the ease and simplicity of operation with or without water pressure, the time consumed in placing the hose on the rack and the appearance.

The Bowes idea, embodied in our several types of racks, consists of two parallel tubular arms on which are slidably mounted double rings or pins, which support the folded hose. This gives a positive support: the pressure is equal on both arms, prevents pinching of the hose, and absolutely holds it in place until the hose is withdrawn at the open end, the pins remaining on the extension arm, as shown.

The cover and sides are formed from one piece of heavy sheet steel, which, firmly joined to the malleable iron back, gives a rigid sturdy rack designed for heavy service.

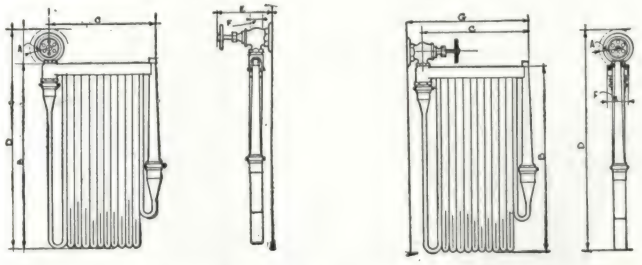
The regular finish on the Bowes rack, Styles E, F, G, is red enamel. Furnished with aluminum bronze, gold bronze or dead black without extra charge. Also furnished nickelplated on iron, polished brass, and polished brass nickelplated as listed.

Bowes Storage Rack

For 2-in. and 2½-in. underwriters' unlined linen hose only. Labeled to underwriters' specifications, but is without the semiautomatic feature.

Bowes Hose Rack, Regular Type

This rack, as shown in cabinet Fig. 185, is recommended where the semiautomatic features of the underwriters' racks are not desired. Made in the same manner, of the same material, but without the semiautomatic feature.



DIMENSION DIAGRAMS, BOWES HOSE RACKS

Capacity Ft. / Hose, in.	50 / 1½	50 / 2	50 / 2½	75 / 1½	75 / 2	75 / 2½	100 / 1½	100 / 2	100 / 2½
Dimension A, in.	2½	3¼	3¾	2½	3¼	3¾	2½	3¼	3¾
Dimension B, in.	21	21½	22	25½	26	26½	28	28½	29
Dimension C, in.	15	15½	16	18	18½	19	20	20½	21
Dimension D, in.	26½	27	27½	31	31½	32	33½	34	34½
Dimension E, in.	7⅛	9	10¼	7⅛	9	10¼	7⅛	9	10¼
Dimension F, in.	5⅞	6¾	7⅜	5⅞	6¾	7⅜	5⅞	6¾	7⅜
Dimension G, in.	17	17½	18	20	20½	21	22	22½	23

Bowes Underwriters' Labeled Semiautomatic Rack

The Bowes idea of the positive supports and extension arm has been incorporated into our semiautomatic underwriters' labeled rack. In case of fire the valve is opened, and a simple arrangement automatically holds the water at the first fold of hose, as shown, until a slight tug at the nozzle end releases it. This rack is labeled and approved by the Underwriters' Laboratories, Inc.

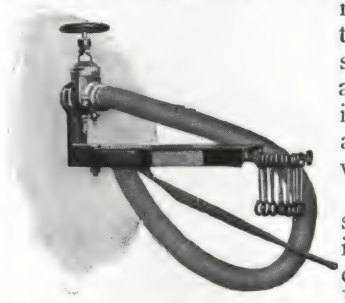


FIG. 2115. BOWES UNDERWRITERS' LABELED SEMIAUTOMATIC HOSE RACK

Architects wishing to secure the lowest possible insurance rates for their clients should specify the Bowes labeled rack.

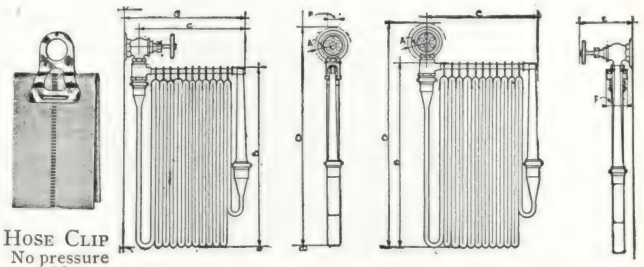
Made for 1¼-in. and 1½-in. unlined hose only.

Yale Swinging Hose Rack

For linen hose only. Hose supported by a series of brass clips, slidably and permanently mounted on an extension arm. Pressure of clips is sufficient to support weight of hose, but not great enough to interfere with its easy withdrawal. It will be seen from the accompanying illustration of the clip that the pressure is applied at the center of the hose only and not on the edge or fold. Pressure so applied can not possibly injure linen hose.

All racks can be supported from the wall, from the standpipe, or from the valve by means of an intermediate nipple or as shown in Fig. 2115.

YALE RACK



HOSE CLIP
No pressure on folds or edges of hose

YALE SWINGING HOSE RACK

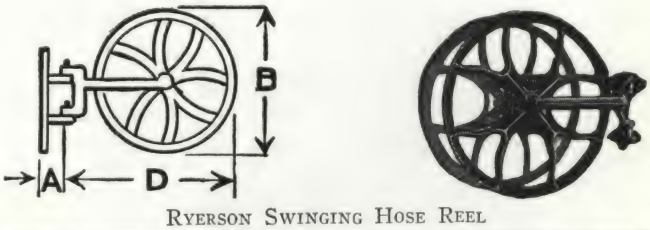
Capacity Ft. / Hose, in.	50 / 1½	50 / 2	50 / 2½	75 / 1½	75 / 2	75 / 2½	100 / 1½	100 / 2	100 / 2½
Dimension A, in.	2½	3¼	3¾	2½	3¼	3¾	2½	3¼	3¾
Dimension B, in.	27	27½	28	30½	31	31½	35½	36	36½
Dimension C, in.	14½	15	15½	17½	18	18½	19½	20	20½
Dimension D, in.	32½	33	33½	36	36½	37	41	41½	42
Dimension E, in.	7⅛	9	10¼	7⅛	9	10¼	7⅛	9	10¼
Dimension F, in.	2¾	3½	4¼	2¾	3½	4¼	2¾	3½	4¼
Dimension G, in.	17	17½	18	20	20½	21	22	22½	23

Cabinet dimension can be drawn from table as allowance has been made for swing of rack. If dimension of rack with wall brackets or pipe clamps is wanted, add 3 in. to dimension C.

Ryerson Swinging Hose Reel (Style A)

For either unlined linen or cotton rubber lined hose. Side castings finished in solid black, side braces in red. A brass wire clip engaging in side arm prevents weight of nozzle from unreeling the hose. Well balanced and operates easily.

Ryerson reels are approved and listed by the Associated Factory Mutuals Companies. These reels can be supported either from the wall or standpipe.



RYERSON SWINGING HOSE REEL

No.	1	2	3	4	5	6
Capacity Linen, ft.	175	150	150	250	250	275
Capacity C. R. L., ft.	50	50	50	100	100	100
Capacity Hose, in.	1¼–1½	2	2½	1¼–1½	2	2½
Dimension A, in.	3½	3½	3½	6⅝	6⅝	6⅝
Dimension B, in.	24	24	24	27	27	27
Dimension D, in.	28	28	28	28	28	28
Width of reel, in.	7	7¾	9¾	9¾	11	13¾

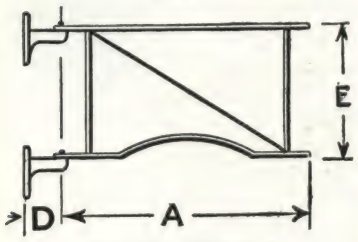
Continued on next page

Hartford Swinging Hose Racks

Rack

For linen and rubber lined cotton hose. Especially recommended for use in warehouses and manufacturing plants. Hose is folded flat, and as the rack is usually suspended about 6 ft. from the floor, the hose is protected from damage, yet is instantly available in case of emergency.

Hartford rack is listed and approved by the Associated Factory Mutual Insurance Companies for use in buildings under their jurisdiction. All racks can be supported from the wall or from the standpipe.



Dimension Diagram

HARTFORD SWINGING HOSE RACK

DIMENSIONS, HARTFORD SWINGING HOSE RACKS

Capacity Ft.	50	50	50	75	75	75	100	100	150	150
Capacity Hose, in.	1¼–1½	2	2½	1¼–1½	2	2½	1½–2	2½	1¼–1½	2–2½
Dimension A, in.	20	20	20	20	20	20	26½	26½	26½	26½
Dimension D, in.	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½
Dimension E, in.	11½	11½	11½	13½	13½	13½	13½	13½	19½	19½
Width of rack, in.	4½	6	6½	4½	6	6½	5¾	6¾	5¾	6¾

New York Pattern Hose Valves

Heavy and well finished. Have rubber discs which can be renewed as occasion requires. Intended for use on systems where there is a continuous pressure on the standpipe.

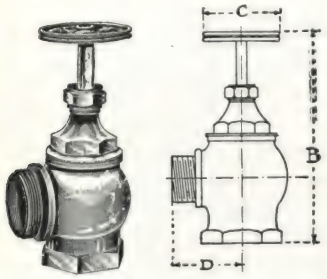


FIG. 170. Valve with Male Hose Connection and Dimension Diagram

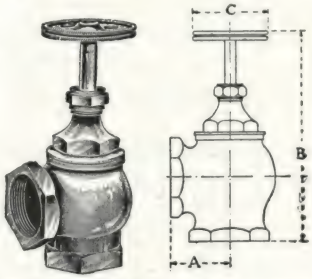


FIG. 171. Valve with Female Hose Connection and Dimension Diagram

NEW YORK PATTERN HOSE VALVES

Fig. 170 used where rack is attached to wall or standpipe; Fig. 171 used when rack is supported by special nipple

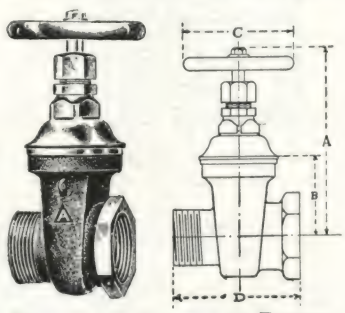
Fig. 171 made with iron pipe thread at both ends

Size, in	1¼	1½	2	2½	Size, in	1¼	1½	2	2½
Dimension A, in.	1¾	2	2⅜	3	Dimension C, in.	3¼	3¼	4	4¾
Dimension B, in.	7⅛	7⅛	9	10¼	Dimension D, in	2⅛	2½	2¾	3¼

Hose Gate Valves

These valves are made extra heavy and designed for use with inside standpipe. They have an adjustable double disc and stationary stem.

Each valve is tested before leaving the shop and warranted absolutely tight on delivery.



HOSE GATE VALVE AND DIMENSION DIAGRAM

DIMENSIONS, HOSE GATE VALVES

Size, in	1½	2	2½	Size, in	1½	2	2½
Dimension A, in.	6½	7¾	11	Dimension C, in.	4	4½	6
Dimension B, in.	2½	3¼	4	Dimension D, in.	3½	3¾	4¼

Siamese Connections

A Siamese connection can be made an ornament to any building.

Figs. 232 and 231 are made of bronze, well proportioned, highly polished; and are distinctively handsome.

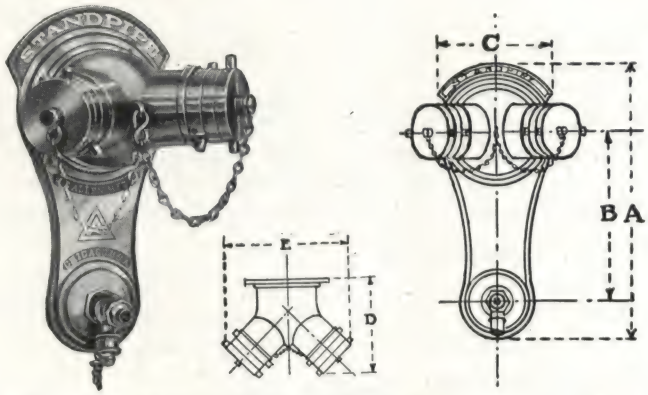


FIG. 232. COMBINATION SIAMESE CONNECTION AND SILL COCK, AND DIMENSION DIAGRAMS

For use where inlet pipe is run through side of building. Furnished with double clapper closing valve.

Size, in	4x2½x2½	6x2½x2½	6x3x3
Dimension A, in.	19	21¾	21¾
Dimension B, in.	10	12¼	12¼
Dimension C, in.	10	11½	11½
Dimension D, in.	9	11½	11½
Dimension E, in.	11½	12¾	12¾

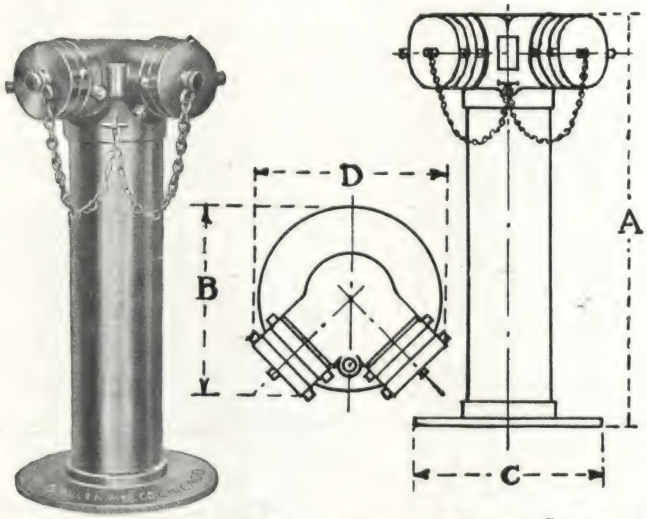


FIG. 231. COMBINATION SIAMESE CONNECTION AND STANDPIPE, AND DIMENSION DIAGRAMS

For use where inlet pipe comes through pavement. Consists of heavy brass escutcheon to protect and cover opening in sidewalk, a polished brass sleeve to cover iron pipe and a double clapper, polished brass Siamese connection. Made for either a 4- or 6-in. standpipe and with either 2½- or 3-in. inlets

Size, in	4x2½x2½	4x3x3	6x2½x2½	6x3x3
Dimension A, in.	24	24	24	24
Dimension B, in.	11	14½	13½	14½
Dimension C, in.	10¼	10¼	12	12
Dimension D, in.	11½	13½	12	13½

Further Information

Space forbids listing all the possible combinations but the details and illustrations will permit the architect to specify the unit best suited to his conditions.

CHAS. NUHRING & BRO.

Manufacturers and Patentees of Fire Apparatus

1212 Walnut Street

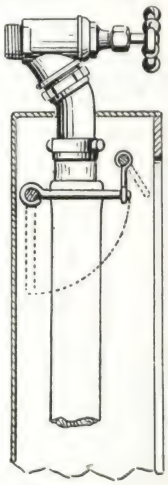
CINCINNATI, OHIO

Products

NUHRING PATENTED COMBINED FIRE HOSE CABINET and RACK; SWINGING HOSE RACKS for 1½-, 2- or 2½-in. unlined hose.

"Rapid" Combined Fire Hose Cabinet and Rack

Thirty years of experience in making fire hose racks and reels are back of the "Rapid" combined cabinet and rack. Its novelty, beauty, qualities of cleanliness, durability and quick action commend it to architects, builders and owners alike.



SECTIONAL SIDE VIEW OF HOSE RACK

The Rack—The sectional side view shows how the hose is supported on pins, the dotted lines show movement of pins as hose is withdrawn. The pins supporting the hose swing down as the hose, in unracking, trips the double eyed pin off the hose supporting pin. The small pin swings outward.

The "Rapid" does not swing, but allows hose to be run out in any direction at any angle.

The Cabinet—Made of steel in two styles: for recessed and exposed wall positions. The equipment is stationary, does not swing and allows the hose to run off at any angle and in any direction; more so than in any swinging reel or rack. In specifying, give the side valve is to be placed (right or left facing cabinet) and state size of valve.

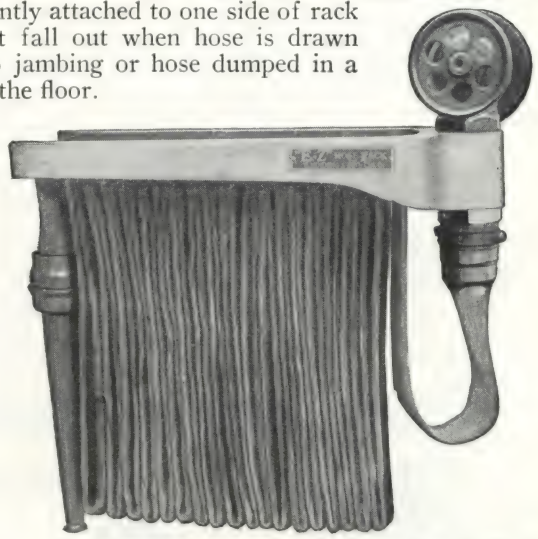
RECESSED HOSE CABINET

EXPOSED HOSE CABINET

Hose length, ft.	Inside dimensions of cabinets, in.						
	Recessed type			Exposed type			
	Height	Width	Depth	Height	Width	depth for diam., hose	
50	30	15	7	29	14	4½	1½
57	30	22	7	29	20	5	2
100	36	24	7	29	24	6	2½

"E-Z" Swinging Fire Hose Rack

Strong and ornamental; renders efficient service under all conditions. *Rustproof* hose supporting pins, permanently attached to one side of rack —do not fall out when hose is drawn off. No jambing or hose dumped in a heap on the floor.

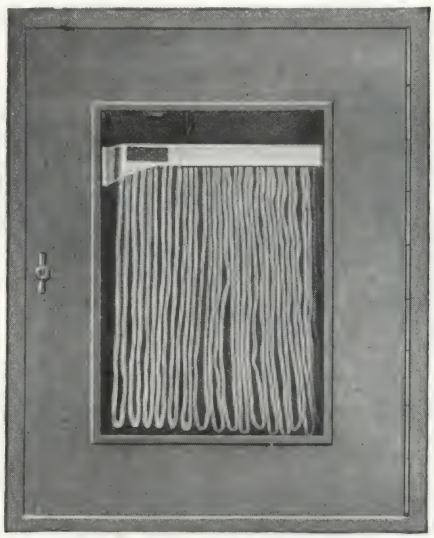


Swivels on Nipple from Valve
Center of valve to end, 17½ in.

Swings on Wall Plate showing pins attached on rod—Hose off

Outside width, in.	Hose, in.
1½	4½
2	5⅜
2¼	6⅛

"E-Z" SWINGING FIRE HOSE RACKS



STEEL CABINET WITH "E-Z" RACK

Length, hose, ft.	Height, in.	Width, in.	Depth, in.
50	23	22	7
75	28	22	7
100	36	22	7

Specify side valve is to be placed and valve size

THE JIFFY FIRE HOSE RACK CO.

Manufacturers of Complete Interior Fire Extinguishing Equipment

133 West 52nd Street

NEW YORK, N. Y.

Products

Hose Racks, Hose Cabinets, Siamese Connections, Fire Hose Valves, Chemical Fire Extinguishers.

Also Nozzles, Underwriters' Unlined Linen Hose, Couplings, Axes, Pails and Accessories.

Materials

"Jiffy" appliances are made in malleable iron (bronzed) or of brass, and in any style finish as required.

Hose Racks

Principle of Operation—The comb of the "Jiffy" fire hose rack holds the hose in position ready at all times for instant release. A pull upon the nozzle releases the arm holding the comb, letting the hose fall to the floor.

"Jiffy" Fire Hose Rack for Unlined Linen Hose, with Hose in Position On Rack Ready to Be Released By a Pull Upon the Nozzle

Hose Lying On the Floor Exactly As It Fell When Released By a Pull On the Nozzle

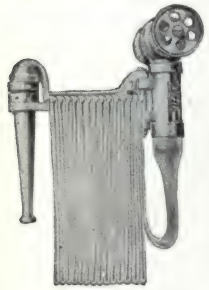


Illustration "C." "Jiffy" Fire Hose Rack Hinged to Lugs Cast On Extension Piece Attached to Valve

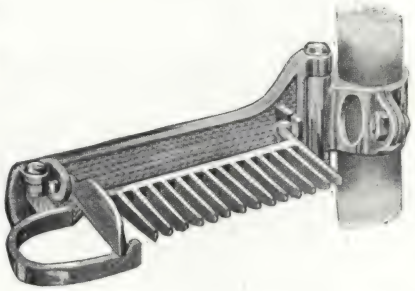


Fig. 1. "Jiffy" Fire Hose Rack Hinged to Standpipe By Means of Pipe Clamp
Comb up ready for use

DIMENSIONS OF "JIFFY" FIRE HOSE RACKS

Measurements from center of pipe to end of nozzle holder

25- or 50-ft. rack for ¾-, 1-, 1½-, 2- and 2½-in. hose.....18 in. long
75-ft. rack for ¾-, 1-, 1½,- 2- and 2½-in. hose.....21 in. long
100-ft. rack for ¾-, 1-, 1½-, 2- and 2½-in. hose.....26 in. long

Measurements allow hose to hang down 26 in. If limited for wall space, a 50-ft. rack can be used for 75 or 100 ft. of hose by hanging hose on racks in longer loops.

Advantages of "Jiffy" Fire Hose Racks—Always ready for immediate use. Automatic in operation; pull the nozzle and turn on the water.

No loose parts to become lost or broken. No metal rings or links to be dragged over furniture or caught on trim.

So constructed as to permit a free circulation of air around the hose, keeping it dry and in reliable condition.

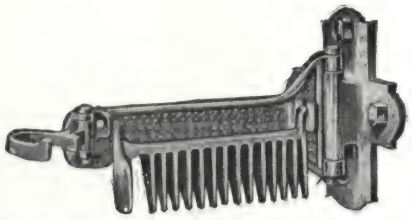


Fig. 2. "Jiffy" Fire Hose Rack Hinged to the Wall Plate
Comb down as it would appear after delivering hose

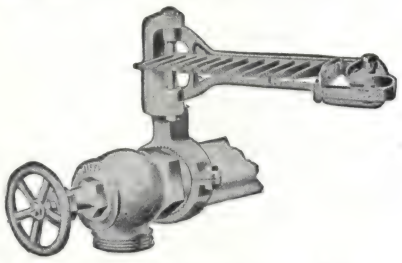


Fig. J. "Jiffy" Space Saver Rack Clamp Holder

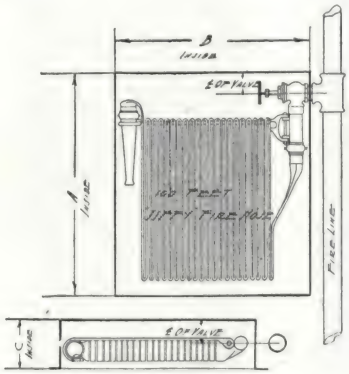
"Jiffy" fire hose racks are neat and attractive in appearance and can be had in small compact sizes for country residences and private homes.

They are so simple in operation that a maid or child can handle them. Non-corrosive, will not rust.

Hose Cabinets

The "Jiffy" hose cabinet is the latest addition to the ever increasing "Jiffy" line of specialties in fire equipment.

Architects who specify "Jiffy" racks frequently inquire for a cabinet to accommodate the rack and equipment.



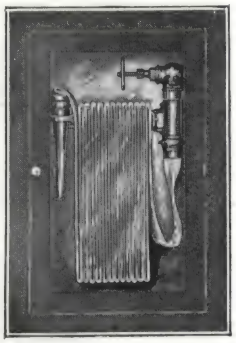
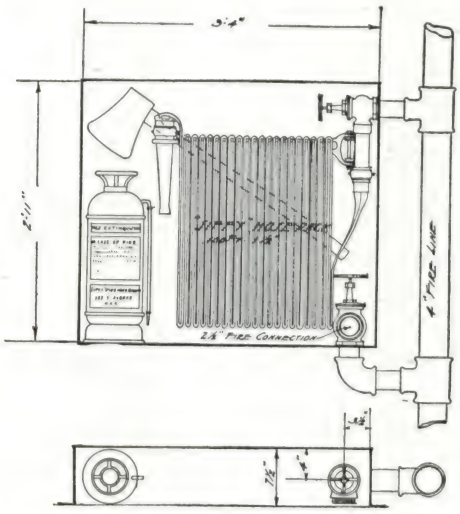


Plate 600. "Jiffy" Hose Cabinet

Length of hose, ft.	Size, in.	"A," in.	"B," in.	"C," in.	Center of valve from back, in.	Center of valve from top, in.
25	1½ or 2	22	20½	7½	For 1½—3¼	3¼
50	1½ or 2	35	20½	7½	For 2 —3½	3½
75	1½ or 2	35	26	7½	For 2½—4¼	4¼
100	1½ or 2	35	31	7½	.....	.....
25	2½	35½	20½	9	.....	.....
50	2½	35½	20½	9	.....	.....
75	2½	35½	26	9	.....	.....
100	2½	35½	31	9	.....	.....

Continued on next page

The "Jiffy" hose cabinets are made in iron or in other metal, either painted, enameled or plated as desired.



Dimension Diagram of "Jiffy" Hose Cabinet with Extinguisher and Ax

Siamese Connections

As Siamese connections are placed on the exterior of buildings, they should be ornamental and attractive. We offer our Figs. 610 and 615 for your consideration.

Fig. 610. With Tubing and Flange. Space for Inscription

Fig. 615. With Combination Wall Flange and Sill Cock

"Jiffy" Brass Siamese Connections

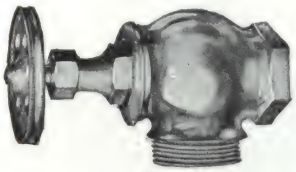


Fig. 701
"Jiffy" Fire Hose Valve

Fire Hose Valve

These valves are made in six sizes, ¾, 1, 1¼, 1½, 2 and 2½ in.

They are made in two styles, angle or straight; they are also made male or female.

Made rough body with iron wheel; rough body, painted or bronzed in any color, with iron or brass wheel, rough or polished, nickelplated all over. When ordering, state finish desired.

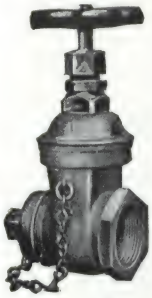


Fig. 700.
"Jiffy" Hose Gate Valve

Hose Gate Valve

Made in six sizes, ¾, 1, 1¼, 1½, 2 and 2½ in.

Finished rough body, iron wheel; polished or nickelplated brass with polished or nickelplated brass wheel. When ordering, state finish.

Chemical Fire Extinguisher

The "Jiffy" extinguisher is constructed of extra heavy cold rolled copper of a special temper, thoroughly coated on the inside with a lead lining to prevent corrosion, and practically acidproof. The seam is double-lock jointed and reinforced on the inside by a patented bronze stay, all thoroughly sweated together and soldered, making a strong, smooth joint. Each extinguisher is tested to a cold water pressure of 350 lbs. to the sq. in., making it absolutely safe to handle, as the pressure generated when in use does not exceed 90 to 100 lbs.

Fig. 710.
"Jiffy"
Chemical
Fire Extinguisher

Other "Jiffy" Specialtes

Fire extinguishers, fire axes, fire hooks, fire pails, bucket tanks, spanner wrenches, play pipes, (nozzles), etc., always carried in stock.

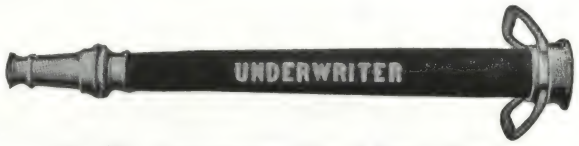


Fig. 599. Underwriters' Play Pipe (Nozzle)

2½ by 30 in. long. Made in strict accordance with specifications of Associated Factory Mutuals

Fire Line Specifications

Standpipe—Where shown on plans, furnish and erect standpipe with necessary check valves, shut-off valves and Siamese connections, properly connected to meet requirements of Fire Prevention Bureau and governing departments.

Hose Equipment—Where shown on plans, furnish and install "Jiffy" nickelplated brass angle hose valve, nickelplated milled wheel, "Jiffy" Illustration "C" improved hose rack with .... ft. (1½-, 2-, 2½-in.) St. Regis brand underwriters' labeled linen hose, nickelplated brass couplings and nozzles.

Note: Racks furnished in aluminum bronzed malleable iron, painted, nickelplated on iron, or brass polished or nickelplated.

Siamese Connections—*Fig. 615*—Where shown on plans, attach Fig. 615 "Jiffy" polished brass Siamese connection with combination sill cock and flange, securely fastened.

Fig. 610—Where shown on plans, attach Fig. 610 "Jiffy" polished brass Siamese connection with 24-in. polished brass tubing and polished brass flange.

Cabinet—Where shown on plans, furnish and install Fig. 600 "Jiffy" No. 16 gage steel fire hose cabinet, No. 12 gage frame and door with plate glass panel, concealed brass hinges, concealed catch and pull handle, finished in factory white prime paint.

References

A few of the many installations of "Jiffy" fire hose rack equipments throughout the country:

Hospitals

Marcy State Hospital, Marcy, N. Y.
Holtsville Tuberculosis Sanatorium, Holtsville, L. I., N. Y.
Cambria Steel Hospital, Johnstown, Pa.

Public and Office Buildings

Bell Block, Manchester, N. H.
Westminster College, New Castle, Pa.
Washington State Capitol, Tacoma, Wash.
High School, Pensacola, Fla.

Residences

H. H. Ziegler Residence, New York, N. Y.
Kinnicut Residence, Far Hills, N. J.
John D. Rockefeller, Jr., Residence, New York, N. Y.
Lydia Thorne Residence, Oyster Bay, L. I., N. Y.
Admiral Rixey Residence, Washington, D. C.

Hotels

Ambassador Hotel, New York, N. Y.
Lincoln Hotel, Lincoln, N. H.

JOHN A. BROOKS

Lawn Sprinkling and Subirrigation Systems

10226 Woodward Avenue

DETROIT, MICH.

Products

BROOKS UNDERGROUND (Automatic or Hand Control Valve) SPRINKLING SYSTEMS for Sprinkling Lawns, Flowers, Shrubs and Gardens, also for Tree-root Subirrigation. All features of these Systems are patented.

BROOKS AUTOMATIC FROSTPROOF FIRE APPARATUS.

The Brooks Sprinkling System

The Brooks sprinkling system is a complete, frostproof, lawn and garden watering and subirrigating system. It consists of an underground water supply piping system, sprayers suitably located, automatic or hand control valve and patented drainage valves.

The pipes are laid 6 in. underground at gravity pitch, insuring, with the drainage valves, complete drainage after every operation of the system. This protects pipes from frost. Drainage valves can also be located so that roots of trees and shrubs can be supplied with water.

The automatic control valve controls the time and duration of the sprinkling periods, or hand valves may be used.

The sprayers are of such types and so located as to spray a uniform quantity of water over all parts of the lawn or garden. The lawn sprayers, when not in use, are flush with the ground, permitting lawn mowers and rollers to pass over them without damage.

This system does in 10 minutes what it formerly took men hours to do. Saves time, water and hose.

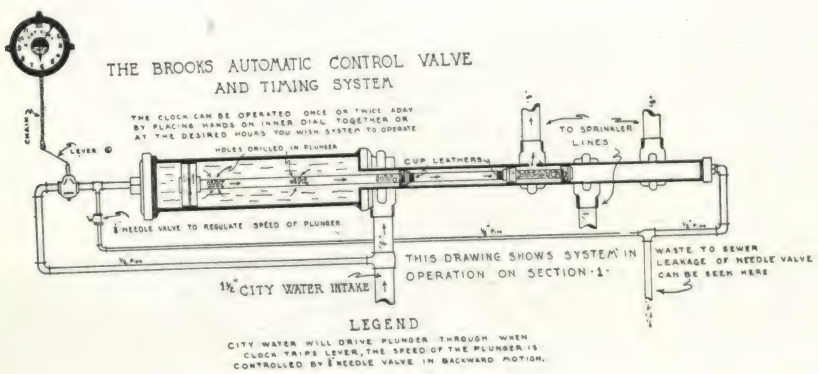
Uses of the Brooks Sprinkling Systems

Brooks underground sprinkling systems are particularly suited for watering lawns, gardens, parks and boulevards, and for subirrigating roots of trees and shrubs.

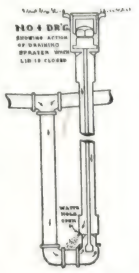
We can cover estates or grounds of any magnitude. No installations are too large nor any too small for our careful attention to every detail.

Special Features of the Brooks System

Automatic Control Valve—Operates the complete sprinkler system at any predetermined time of day or night. Valve is controlled by a 14-day clock which can be set for sprinkling once or twice a day. Valve may be adjusted for any desired duration of sprinkling period.

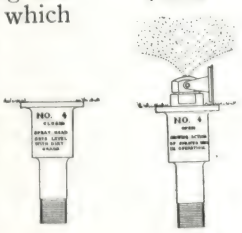


Drainage Valve—Located at bottom of "drainage" sprayer. Automatically and completely drains system after each operation, thus making the system absolutely frostproof. Valves can be so arranged as to convey the back water (or any desired quantity of water) to the roots of trees and shrubs.



DRAINAGE VALVE

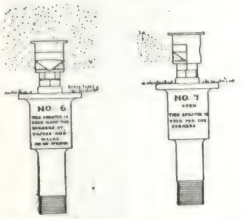
Sprayers—The No. 4 sprayer is ordinarily used on lawns, except at walks, driveways and narrow spaces. It throws a "square" spray, uniformly covering 400 sq. ft., and is provided with a cover which is flush with the ground when the sprayer is not in operation. When water is turned on, the cover is lifted and the sprayer raised above the grass around it, so that the water may spray unhindered. After sprinkling, the sprayer drops back, pulling the cover after it; this prevents meddling with sprayer heads, making them foolproof.



Closed Open
No. 4 SPRAYER

The No. 6 sprayer is a "one-way" sprayer for use along walks and driveways. Waters grass and shrubbery but keeps walks dry.

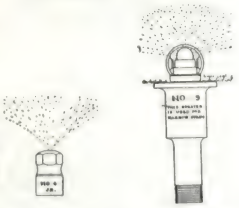
The No. 7 sprayer ("corner" sprayer) is designed for use at intersections of walks and driveways.



"ONE-WAY" SPRAYER "CORNER" SPRAYER

The No. 9 sprayer is designed for use on narrow strips of grass, such as those between driveways or between walks and driveways.

The No. 4 Junior sprayer is used for sprinkling gardens and shrubs and is raised above the tops of plants.



No. 4 JUNIOR SPRAYER No. 9 SPRAYER

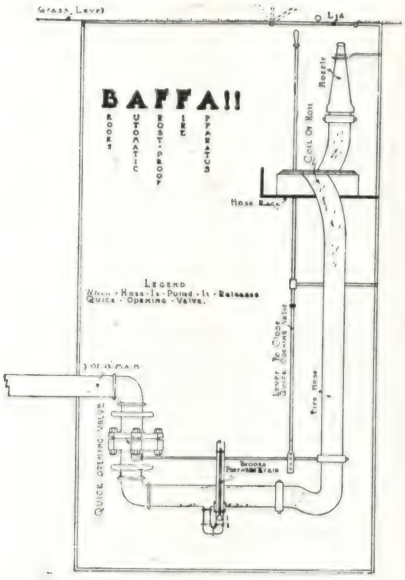
Estimates on Sprinkling Systems

Upon receipt of lot plans or dimensions we will, without obligation, promptly submit estimates. When blue prints or outlines are furnished, we will submit drawings with estimates. All inquiries are given prompt and careful consideration.

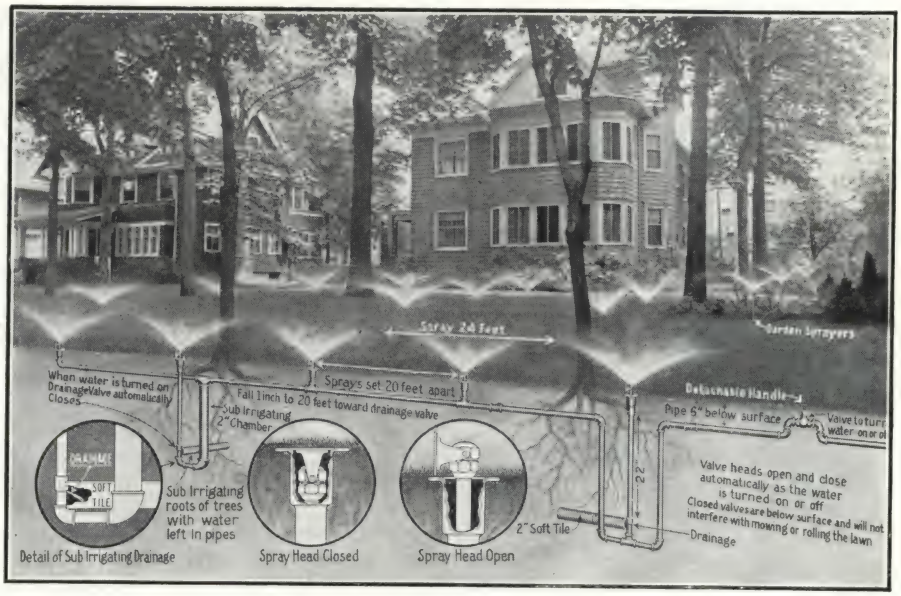
Brooks Automatic Frostproof Fire Apparatus

This apparatus is furnished with a hose rack and quick-opening valve. Hose is coiled on rack and is so arranged that when it is pulled off rack, the valve is automatically opened. Provided with a valve for draining back water after hose has been used.

Continued on next page



BROOKS AUTOMATIC FROST-PROOF FIRE APPARATUS
For homes isolated like the one below



BROOKS LAWN SPRINKLING SYSTEM
Showing arrangement of pipe line, sprayers and drainage valves

BROOKS SPRINKLING SYSTEM INSTALLED ON LAWN
Keeps lawn and shrubbery green and beautiful through the longest summer drought

BROOKS LAWN SPRINKLING SYSTEM IN OPERATION IN A SECTION OF ROOSEVELT PARK, DETROIT, MICH.
12 acres of park grounds being watered in 30 min.—time and hose saved

A BROOKS GARDEN SPRAYING SYSTEM IN OPERATION

THE D. A. EBINGER SANITARY MFG. CO.

Manufacturers of "Ebco" Steel Toilet and Shower Enclosures

COLUMBUS, OHIO

BRANCH OFFICES AND AGENCIES

NEW YORK, N. Y., W. W. Frothingham, 101 Park Avenue
MINNEAPOLIS, MINN., R. H. Evans, Hampshire Arms
CHARLESTON, S. C., E. G. Haymaker, 258 Congress Street
INDIANAPOLIS, IND., E. B. Leppert, Hume-Mansur Building
DETROIT, MICH., Jas. M. Watt, 3942 Commonwealth Avenue
OMAHA, NEBR., Omaha Sanitary Supply Co.
GOLDSBORO, N. C., Noland Co., Inc.
WINSTON-SALEM, N. C., Noland Co., Inc.
PITTSBURGH, PA., T. F. Scanlon, 1405 East Street
KANSAS CITY, MO., Jno. H. Kitchen & Co.
CLEVELAND, OHIO, American Sanitary Co.
LOS ANGELES, CAL., Leslie C. Brintnall, Bryson Block
ROCHESTER, N. Y., Swalbach Building Supply Co.
ROANOKE, VA., Noland Co., Inc.
NEWPORT NEWS, VA., Noland Co., Inc.
MILWAUKEE, WIS., J. A. Hanson, 248 Brisbane Avenue

Products

Steel Toilet and Shower Enclosures.

For Toilet Fixtures, see pages 1592-1593.

TRADE-MARK

Advantages of "Ebco" Steel Toilet and Shower Enclosures

The advantages in the use of steel toilet enclosures are evident, when considering permanent, sanitary and economical results in building construction.

"Ebco" enameled steel toilet partitions and enclosures solve the problem of securing an efficient, durable and attractive toilet room at a minimum cost and a maximum of safety, both as to sanitation and fireproof qualities.

This material cannot be defaced by cutting or writing upon, as chalk or pencil marks are easily wiped off the enamel. It is non-absorbent. The first cost is considerably less than other materials for it will not break, bend, bulge or corrode. It is attractive; and is germproof, dustproof and verminproof, adding the final touch to a sanitary toilet room.

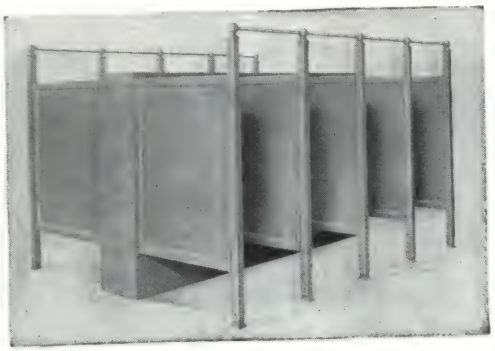
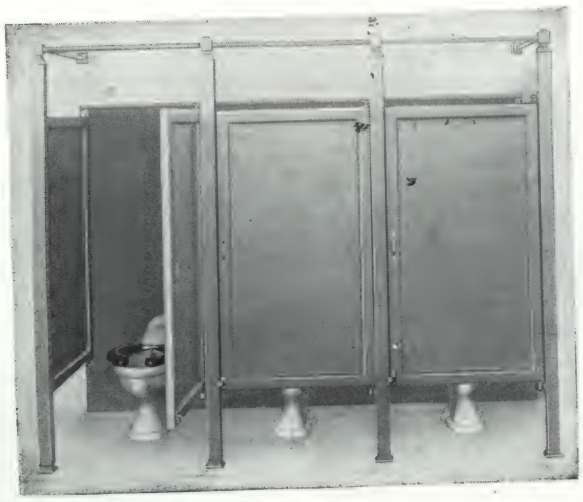


Plate E-556

"Ebco" Steel Toilet Enclosures



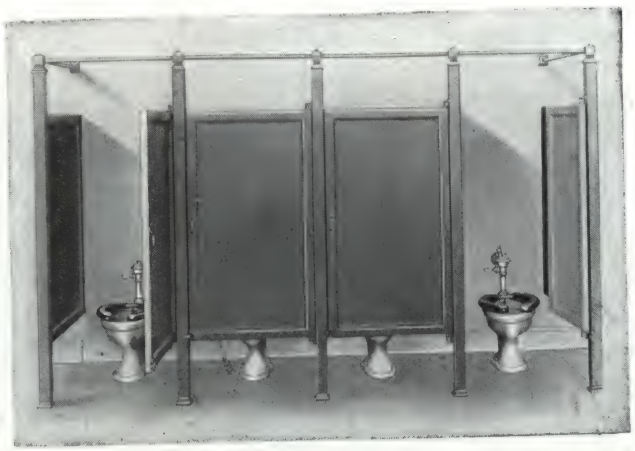


Plate E-552

Plate E-557

"Ebco" Sanitary Steel Enclosures for Toilets and Showers

Continued on next page

Specifications for "Ebco" Steel Toilet and Shower Compartments

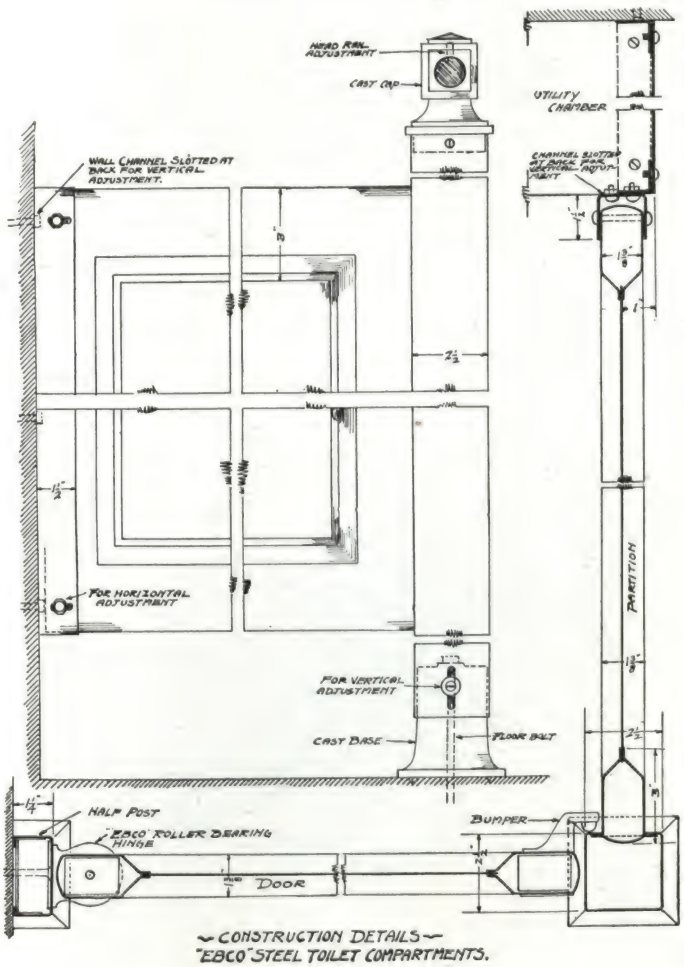
Panel sheets, stiles, etc., are constructed of best quality furniture stock, full cold rolled annealed and patent levelled heavy sheet steel containing the proper percentage of copper to make it rust resisting.

Constructed of a heavy panel sheet completely surrounded with a formed rounded top rail or stile. This continuous stile is welded at the intersections and electrically spot welded to the panel sheet.

Post shall be 2½x2½ inches square in cross section with rounded corners.

Partitions are secured with concealed fasteners at front edge where joined to post and at back they are secured with a wall channel slotted at back and sides to permit of both vertical and horizontal adjustment.

Doors shall be hung on (may swing in or out or may be double acting) aluminum bronze incased roller bearing gravity hinges. The top and bottom hinges are properly aligned by the hinge rod which is continuous through the door stile insuring at all times a free and perfect operating door.



CONSTRUCTION DETAILS "EBCO" STEEL TOILET COMPARTMENTS.

Bumpers, pulls and latch bolts shall be of nickel-plated brass.

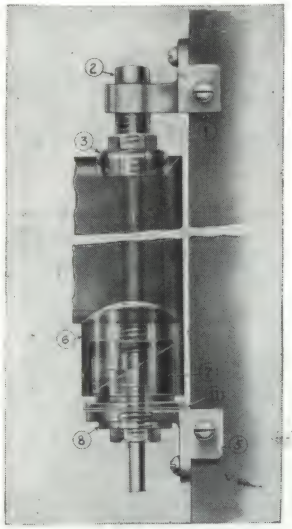
The utility chamber or vent space shall be constructed of reinforced sheets, with top having formed edges. The reinforcing frame to be of angle iron properly shaped and reinforced to insure proper spacing and aligning of backs. End sheets of chamber shall be held with machine screws to permit access to chamber.

Castings are provided at the top and bottom of post and at wall to receive head rail. Caps and wall plates shall have concealed clamp with bolts to secure the rails and permit of adjustment. Bases shall be secured to the floor with concealed bolt and shall have vertical adjustment to compensate for unevenness in floor.

Standard finish of all steel parts consists of a metal filler and prime coat only or a hard baked on finish or high grade enamel. The baked on enamel finish is preferable as it has a much more durable surface than a finish as usually applied after erection. Standard colors, olive green and battleship grey.

The "Ebco" Gravity Hinge

This efficient gravity hinge is roller bearing and incased in aluminum bronze. It is a long wearing positive acting hinge. The swing of the door can be set to remain at rest in either an open or shut position by loosening the lock washer (No. 8) and turning part (No. 7) to the desired position. It is double acting, swinging either in or out or both according to the way the bumper (No. 12) is placed.



"Ebco" Gravity Hinge

FIAT METAL MANUFACTURING CO.

Plymetl and Steel Toilet Partitions

MAIN OFFICE AND FACTORY
1207-1209 Roscoe Street
CHICAGO, ILL.

TELEPHONE
LAKEVIEW 3104, 3147

REPRESENTATIVES IN PRINCIPAL CITIES

Products

FIAT NOISEPROOF and SANITARY PARTITIONS for enclosing Toilets, Showers, Bath Rooms and Dressing Rooms.

Fiat
TRADE-MARK
Registered

Fiat Partitions

Designed and constructed to meet a distinct demand formulated by eminent architects and engineers throughout the United States, and are recommended for use in schools, factories, hotels, beauty and dental parlors, hospitals and all public buildings and institutions where a perfectly sanitary, durable, practical and economical partition is imperative.

Particular attention is directed to our Type "A" construction "Wide Stile" Plymetl partitions which are simply and sensibly built along scientific lines. They provide improved construction of rich appearance at less than one-half the cost of marble.

Specifications and Description of Fiat Partitions

Type "A" (Wide Stile Partitions)—*Panels*—Consist of 2 Plymetl panels, each having plywood core and 2 galvanized steel faces, cemented and hydraulically pressed together, with a perpendicular joint between the panels. These Plymetl panels to be framed in at top, bottom and back with 1¾ in. outside dimension No. 16 gauge Keystone copper-bearing steel tubing and so constructed that the 2 edges of the tubing will be butted close together so when the Plymetl panels are inserted they will be firmly held in place due to the spring or tension of the steel tubing, making a perfectly tight fit. All joints are securely welded, finished smooth and polished. Each front, "Wide Stile" is 6 in. wide and 1¾ in. thick, constructed of Plymetl, provided with a "T" slot for the insertion of the partition panel. These front wide stiles are set plumb into a cast floor base; top of each stile is squared off for mounting the overhead rail and is securely fastened together by concealed bolts.

Overhead Rail and Floor Fittings—Top overhead rail extends across entire battery of stalls and is fabricated of the same material as that of the front wide stile. Floor flanges are of malleable cast iron and have screw or bolt holes for anchorage into the floor and front wide stile.

Doors—Constructed with 1⅛ in. thick by 3½ in. wide wood core and metal faced stiles and fitted to $\frac{3}{16}$-in. thick Plymetl panel.

Hardware—All hardware is of standard equipment; nickel-plated brass Universal pivot spring hinge with box clamp, nickel-plated brass door pull, nickel-plated brass bolt and strike with rubber bumper.

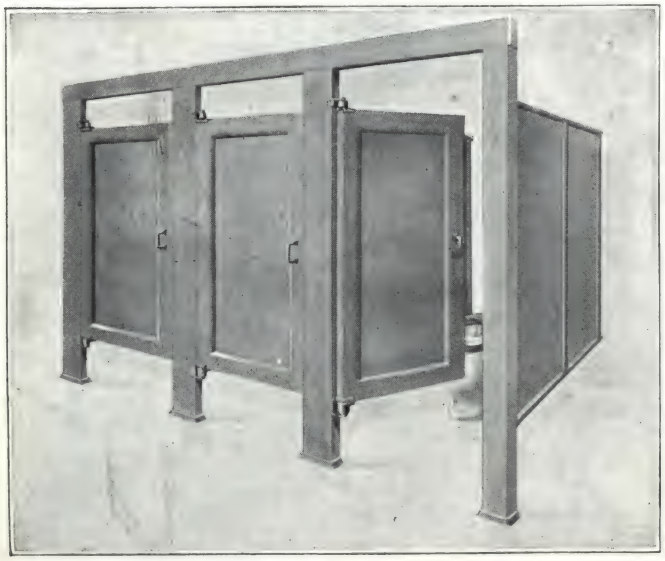
Type "B" (Plymetl Panels and Steel Tubular Front Posts) and Type "C" (All-steel Panels and Steel Tubular Front Posts)—Panels of partitions and doors are framed in with 1¾-in. outside dimension steel tubing. This frame is so constructed as to insure a perfectly tight fit and a sanitary seam all around. A cross section of this detail is shown in Fig. 2. Tube frame and panel are welded together so as to make the partitions noiseproof. All corners are smooth and polished.

Front Tube Posts—Outside dimension, 1¾ in. Extend 1 ft. above and 1 ft. below partition. Posts are snugly fitted into malleable cast floor flanges, provided with adjustment for uneven floors, set screws for holding posts firmly in place, and likewise holes for bolts to securely fasten to floor. Nesessary provisions are made for securely fastening partitions to wall or backs, as well as adjustment for uneven walls. For construction of partitions with backs, which allows the battery to set against a wall or away from the wall making a pipe or working space behind the backs of the toilet stalls and the wall itself, see Fig. 3.

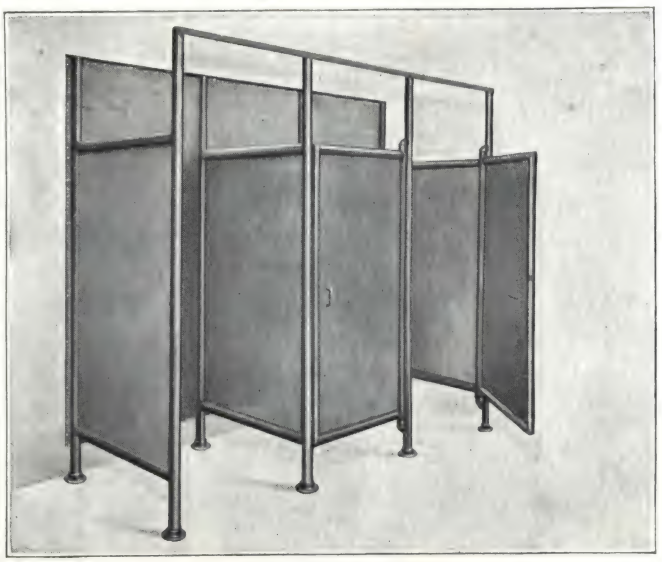
Doors—Fiat Plymetl or steel doors are hung on pivot spring hinges of our own special design, being built into the door itself as an integral part of it and held securely in place on the post by a ⅜-in. machine bolt.

Hardware—The lock is a strong mortise bolt firmly fixed in the door and operated by turning a knob on the inside of the door. The door stop is of neat design and oxy-acetylene welded to stile. Solid brass door pull.

Overhead Railing—Outside dimension, 1¼ in. welded steel tubing running through ball pattern castings which are tightly fitted to top of each post and held firmly in place by means of concealed set screws.



TYPE "A" FIAT PARTITION



TYPES "B" AND "C" FIAT PARTITIONS

Continued on next page

Exclusive Sanitary Features

The sanitary features of all flat partitions are immediately evident. The round tubular frame and plain smooth surface of panels offers no place for filth or vermin to lodge. The absolute tightness of all seams, due to the spring tension in tubular frame, gives no opportunity for moisture to permeate inside of tubing or for vermin to enter. The space between partition and wall at the back, on partitions that are not furnished with either Plymetl or steel backs, is a decided feature, allows for cleaning and redecorating and a complete circulation of air throughout the entire stall.

Vibrationless and Noiseproof

A very important and exclusive feature of Fiat partitions and doors is that they are practically vibrationless and noiseproof due to their scientific and substantial construction, an imperative quality for toilet partitions in schools and public institutions.

Finish

All parts are finished in prime coat of grey rust resisting paint.

Erection

All parts (except floor and wall bolts) are completely assembled and fitted at the factory before shipping so that erection is made at a minimum cost. Erection made in accordance with shop drawings and instructions, which are supplied.

Many Sizes and Types

Fiat toilet partitions and doors are made to fit the requirements of any toilet room layout in a wide variety of sizes and types, viz.: plain straight partitions, partitions with extension fronts (with and without doors), partitions with Plymetl or steel backs and pipe space, or batteries back to back, partitions with or without pipe space or vent. See table of stock sizes. Special sizes made to order.

Service to Architects

The services of our engineering department are at the disposal of the architect pertaining to all details of complicated layouts.

Standard layouts and specification sheets furnished immediately upon request.

SIZES OF STOCK FIAT PARTITIONS AND DOORS

Partitions				Doors	
Depth, ft. in.	Height, ft. in.	Depth, ft. in.	Height, ft. in.	Width, ft. in.	Height, ft. in.
3 6	5 6	3 6	6 0	2 4	4 6
4 0	from top of	4 0	from top of	2 6	
4 6	partition to	4 6	partition to	2 10	5 0
5 0	floor.	5 0	floor.	3 0	

Standard sizes other than those mentioned can be furnished. Special sizes to suit requirements or conditions

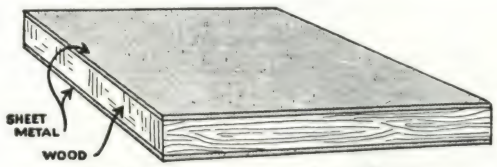


Fig. 1. Construction of Plymetl Panel

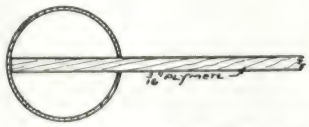


Fig. 2. Showing Method of Insertion of Plymetl, and Steel Panel into the Steel Tubing

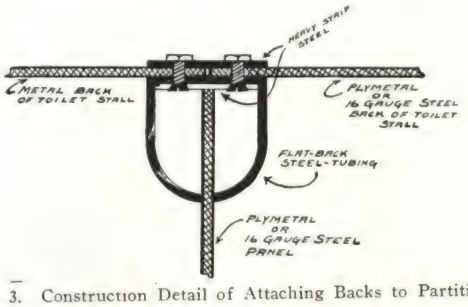


Fig. 3. Construction Detail of Attaching Backs to Partitions

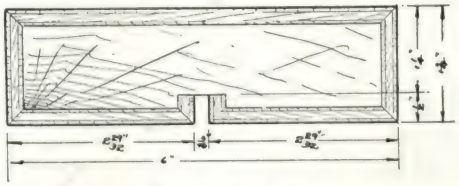


Fig. 4. Cross-Section of Fiat Wide Stile

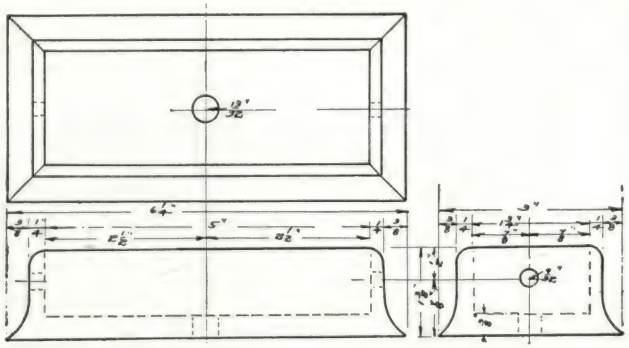


Fig. 5. End Stile Base Casting

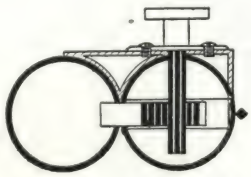


Fig. 6. Lock and Door Stop

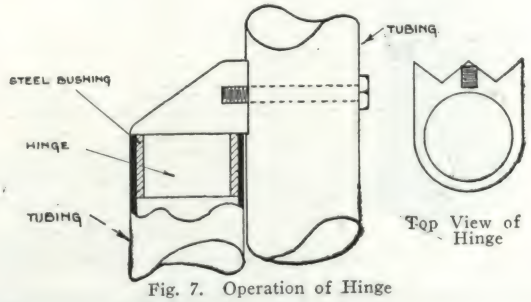


Fig. 7. Operation of Hinge

DETAILS OF FIAT PARTITIONS AND DOORS

THE E. F. HAUSERMAN COMPANY

Hauserman-System Steel Toilet and Shower Partitions

1729 East 22nd Street
CLEVELAND, OHIO

BRANCH OFFICES
NEW YORK, N. Y., 41 East 42nd Street
DETROIT, MICH.,
PITTSBURGH, PA., Oliver Building

Products

HAUSERMAN-SYSTEM TOILET and SHOWER PARTITIONS (Unitbilt Steel Construction).

For Hauserman-System Skylights, see pages 968-969; for Hauserman-System Industrial Partitions, see pages 1104-1105; for Hauserman-System Shelving, see pages 2046-2047.

Service

The Hauserman-System extends from a thorough study of requirements to the final installation of the job.

Hauserman-System Toilet Partitions

Made in two types, finished in olive green baked-on enamel, combining rigidity and strength with the utmost sanitary utility.

Type A—Where no doors are required or a full width door is used between compartments. See standard sizes below.

Type B—Where the door swing is limited, a standard 26-in. door being used with variable panels.

Installation

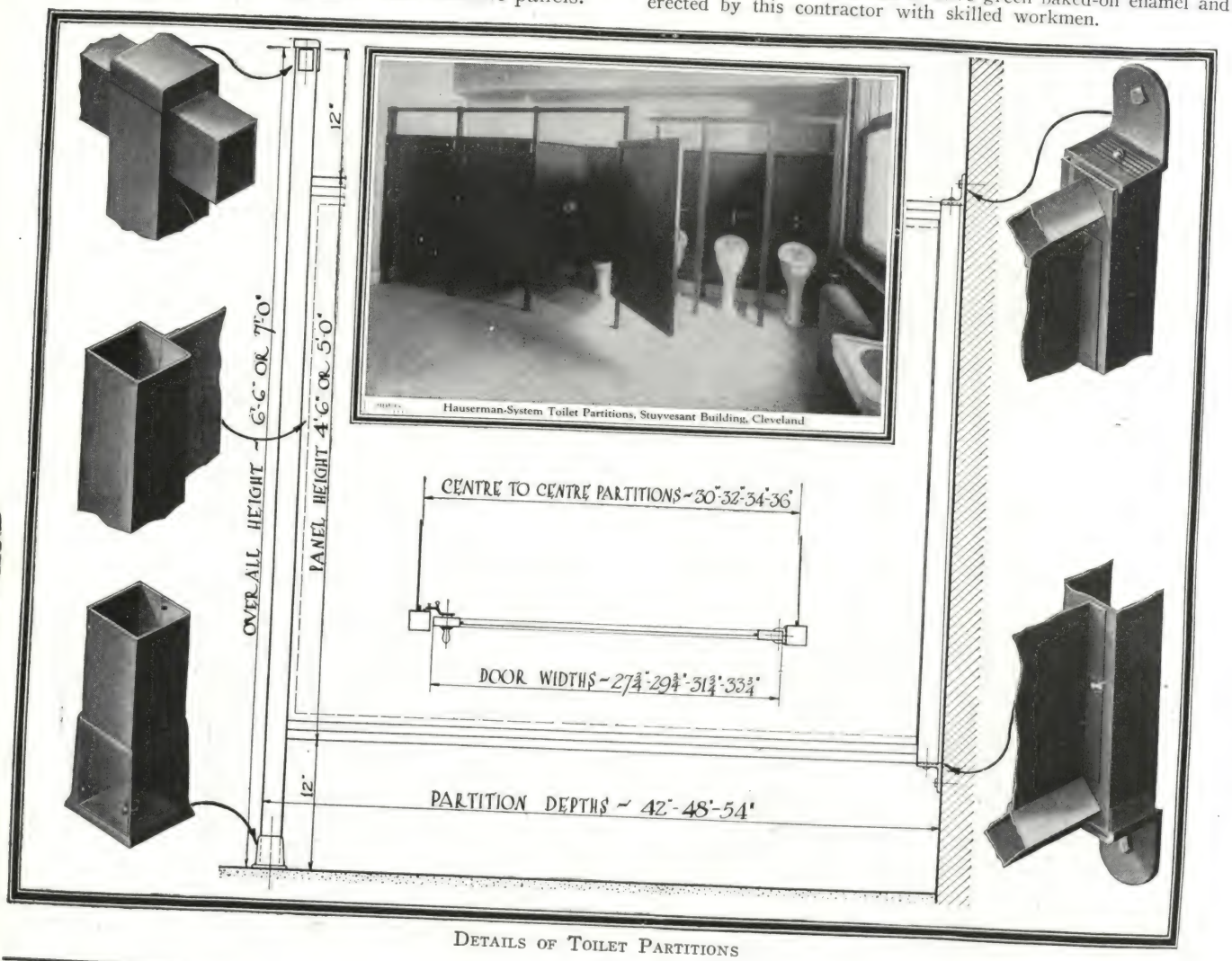
Hauserman-System toilet and shower partitions are sold preferably on the basis of a complete installation by us. In this way the user is assured of good workmanship and savings in erection costs.

Specifications

All toilet and shower partitions to be Hauserman-System Steel Partitions as manufactured by the E. F. HAUSERMAN COMPANY, Cleveland, Ohio.

Partitions are to be built with diamond shaped sanitary top and bottom rails with No. 16 gauge panel of rust resisting steel. Head rail to be rectangular rail to match balance of work and to be securely fastened to post by cap with bolts in rear. Floor connections to be sanitary castings having adjustments for post from rear. Doors to be 1⅛ in. thick with hollow stiles and rails and equipped with gravity hinges. All joints to be electrically welded, no angle iron, box stiffeners or other crude methods of construction to be used. There are to be no projecting bolts or screw heads. All hardware to be of polished cast aluminum or cast brass nickel plated.

All work to be finished in olive green baked-on enamel and erected by this contractor with skilled workmen.



DETAILS OF TOILET PARTITIONS

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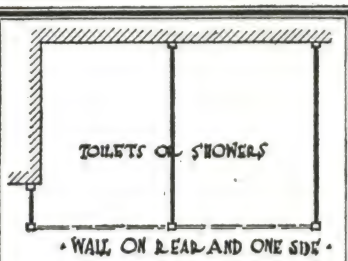


• WALL ON REAR AND ONE SIDE •

• WALL ON REAR ONLY

••• STANDARD DIMENSIONS •••

FOR DESCRIPTION SEE GENERAL SHEET

TYPE 'A' TOILET PARTITIONS COME IN 42"-48"-54" DEPTH AND 78" AND 84" IN HEIGHT AND ARE SPACED ON 30"-32"-34" AND 36" ON CENTRES

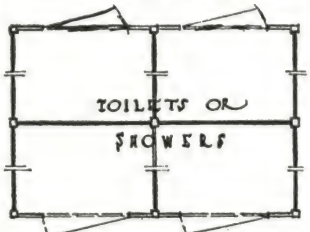
TYPE 'B' TOILET PARTITIONS COME IN THE SAME DEPTH AND HEIGHT BUT HAVE A STANDARD 26" DOOR

VARIATIONS OF CENTRES ARE MADE BY THE USE OF VARIABLE FRONT PANELS

UNITBILT SHOWER PARTITIONS ARE SIMILAR IN DESIGN TO TOILET PARTITIONS WITH THE EXCEPTION THAT PARTITION IS CARRIED TO FLOOR AND BACKS ARE FURNISHED WITH EACH COMPARTMENT

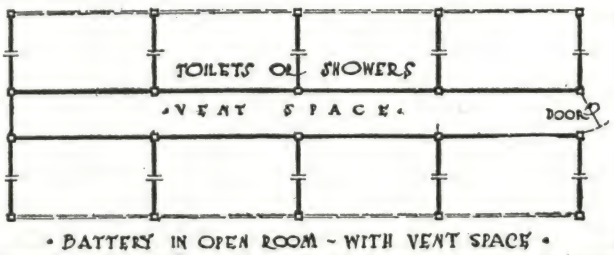
UNITBILT URINAL STALLS ARE SIMILAR IN DESIGN AND HAVE EQUAL HEIGHTS AS TOILET PARTITIONS THEY ARE SPACED 24" ON CENTRE AND ARE 18" IN DEPTH

• WALLS REAR & SIDES •

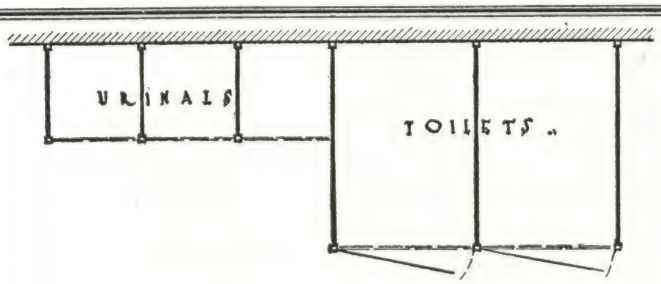


• BATTERY • IN OPEN ROOM •

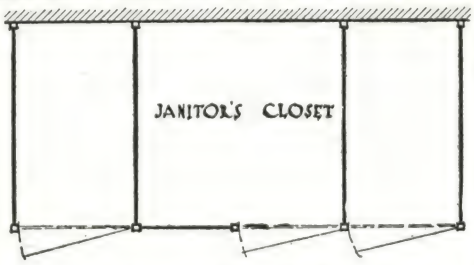
• BATTERY - WITH VENT SPACE AT REAR •



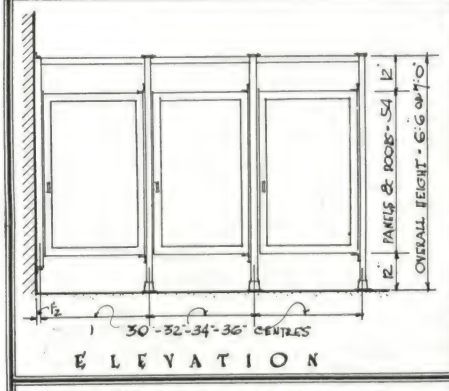
• BATTERY IN OPEN ROOM - WITH VENT SPACE •



COMBINATION LAYOUT URINALS & TOILETS

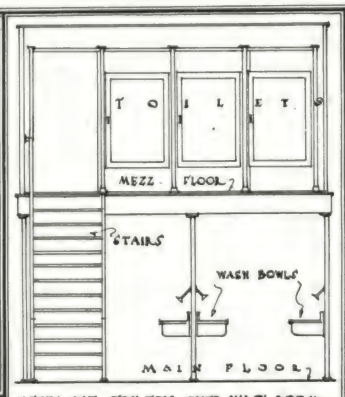


LAYOUT SHOWING JANITOR'S CLOSET

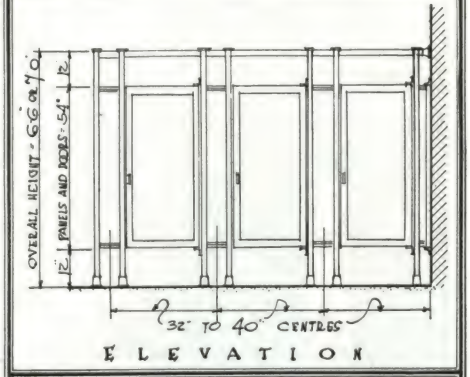


ELEVATION

TYPE 'A' TOILET PARTITIONS



MEZZANINE TOILETS OVER WASH ROOM - CONSERVES SPACE WHERE HEIGHT IS AVAILABLE



ELEVATION

TYPE 'B' TOILET PARTITIONS

THE E. F. HAUSERMAN CO.
CLEVELAND OHIO

"STANDARD SIZES & SUGGESTED ARRANGEMENTS"
UNITBILT TOILET PARTITIONS

SHEET SCALE: NO SCALE 2

"ORGANIZED FOR SERVICE"

THE HUGHES-KEENAN CO.

Manufacturers of Steel Toilet and Shower Partitions

MANSFIELD, OHIO

AGENCIES IN THE PRINCIPAL CITIES

Products

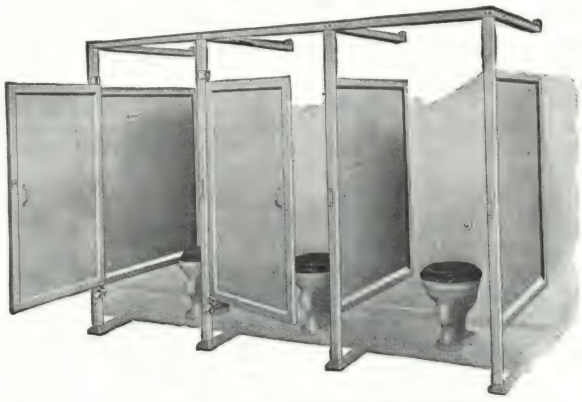
HYGEA STEEL PARTITIONS and DOORS for Toilet Rooms, Dressing Rooms, Shower Baths, Urinals, etc.; ADJUSTABLE SELF-CLOSING GRAVITY HINGES for Toilet Doors.

For "S & L" Steel Stairs, see pages 538-539.

TRADE-MARK

Hygea Steel Partitions and Doors

THE HUGHES-KEENAN Co.'s patented Hygea toilet partition is a pleasing result of much experimenting and investigation, the object of which was to apply steel (the logical, sanitary material for toilet partitions) in a way to meet the demand. The Hygea design presents to the public a neat, sanitary, pleasing and substantial toilet partition, which is easy to erect; it has patented features, which make it distinctive, and can be finished to conform to any requirements.



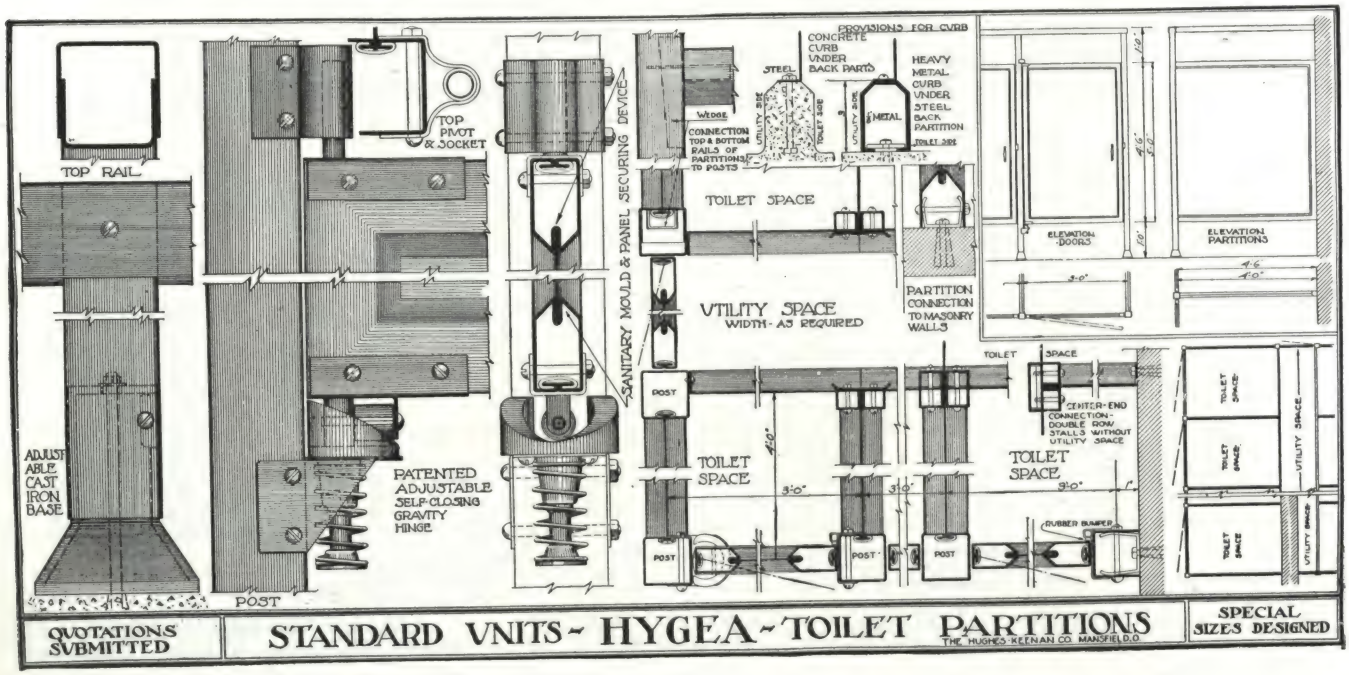
HYGEA STEEL TOILET PARTITION

Construction—The Hygea construction consists of formed steel tubular posts or supporting members, extending from the floor level to a height of 6 ft. 6 in. (on standard partition—see details). The backs of the posts are arranged to connect to the steel panel and form a mould or stile for that portion of the panel connecting to it. The panel is made with an upper and lower mould and a special channel and stile at the building wall, which in itself is a feature, making a joint between wall and panel that is secure and also neat, adjustable and practical.

Single Post Construction—The single post construction between doors is very desirable, as it eliminates obstructions to mopping. This design is best for maintaining a condition of cleanliness.

Wall Connection — See detail of this connection. A channel shaped member is provided with two flanges, slightly curved inward at the ends. These flanges stand at an angle slightly more than 90° to the web, which is bolted to the wall. These flanges are separated to a width that is slightly more than the inside of the stile or wall moulding of the panel.

In connecting these members, it is necessary only to press the wall stile over this channel shaped wall connection, which fits very snugly to the inside of the stile and practically holds the partition in place. How-



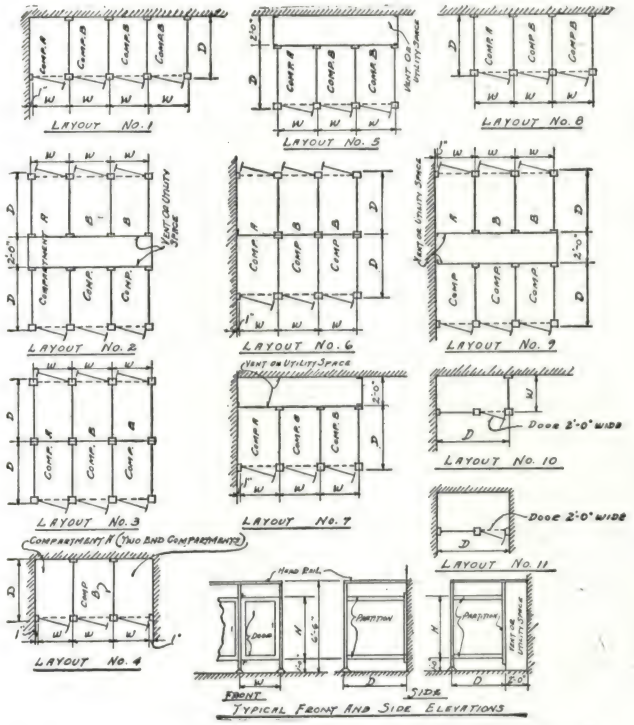
Continued on next page

ever, to avoid any possibility of shifting, through bolts are also inserted into the stile and wall channel, which tighten it and allow for any variation in the alignment of the wall.

Standard Sizes and Finish of Toilet Partitions

4 ft. 0 in. wide, 4 ft. 6 in. deep, inside.
4 ft. 6 in. wide, 4 ft. 6 in. deep, inside.
4 ft. 6 in. wide, 5 ft. 0 in. deep, inside.

Special sizes designed, with or without utility spaces. Panels and posts No. 14 gauge metal. Stiles, rails, etc., No. 16 gauge.



STANDARD LAYOUTS OF HYGEA STEEL COMPARTMENTS

Double batteries have dividing partitions between rows from floor or curb to top rail 6 ft. 6 in. high.

Finish is gray, olive green, or white baked enamel.

Hygea Toilet Doors

These doors are made from the best material, formed with a single panel having same patented top and bottom rails and side stiles as partition panels (see details).

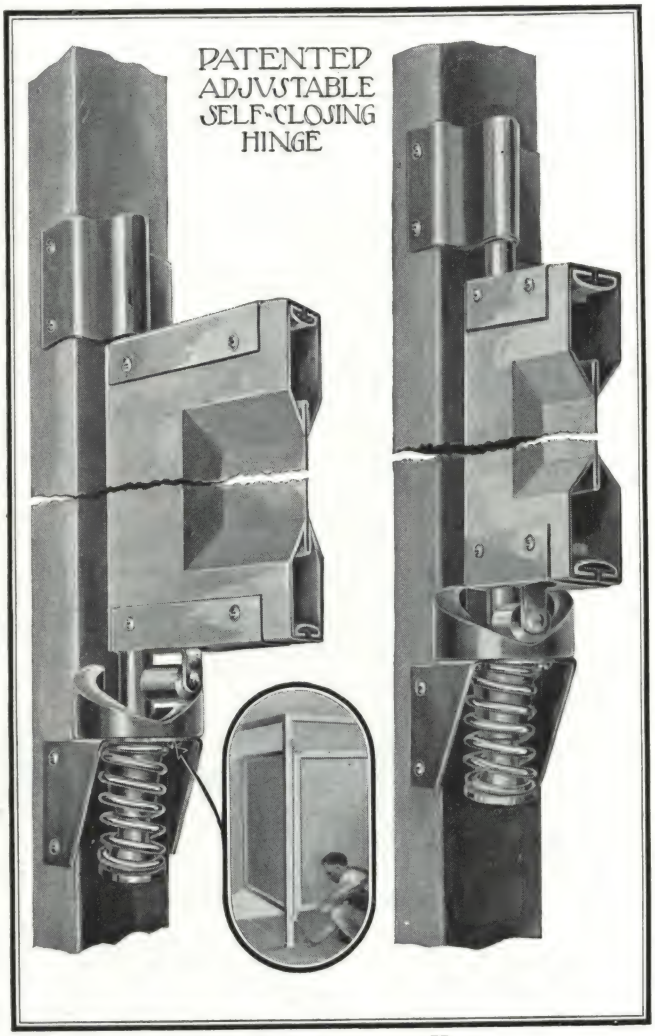
Hygea doors with all hardware desired, arranged for use with wood, slate or marble partitions.

Patented Mould and Panel Securing Device

Another feature of the Hygea partition is THE HUGHES-KEENAN Co.'s combination mould and panel securing device. The object of this connection, which is shown on the drawing on preceding page, is to eliminate any rivets, screws or objectionable edges of metal on the exposed surfaces of the panels. It also insures a panel free from waves or buckles due to riveting and other methods of securing.

Patented Self-closing Hinge

The patented self-closing hinge is built for hard service, designed to swing door either in or out, and make it stand slightly ajar when toilet is not occupied.



ADJUSTABLE SELF-CLOSING HINGE
Swings in or out; also holds the door slightly ajar when not engaged

Shower Bath and Urinal Partitions

Made of special lead coated steel enameled same as toilet partitions and having bottom mould lead-sealed. Patented mould and panel securing device eliminates exposed shearing edges—where rusting starts. All ends of sheets are turned in and lead-sealed.

Special provisions for concrete curb for either toilet or shower partitions; also a heavy metal curb furnished for either, where desired.

Finish—Standard finish for all Hygea partitions is green or gray. Other finishes may be substituted.

Prices

The prices for Hygea toilet partitions vary, according to sizes, details and location of the installation.

Although a standard size of partition is made, as shown on drawings, the prices are governed by the job and the combinations of stalls.

LITTERER BROS. MFG. CO.

Toilet Partitions

MAIN OFFICE AND FACTORY

730-740 North Franklin Street

CHICAGO, ILL.

Products

FERROMETAL UNIT PARTITIONS and DOORS for toilets, showers and dressing rooms.

For Nickel, Silver and Copper Pantry Sinks and Drainboards, Scullery Sinks, see pages 1608-1611.

Construction

Ferrometal standard unit partitions and doors are the result of many years' experience in the manufacture of sheet metal products.

Sanitation, durable construction, and practical utility necessary to meet all conditions, have been incorporated in the design of Ferrometal products.

Solid panel construction of No. 16 gauge cold rolled stretcher leveled pickled material, with No. 16 gauge 1⅞x1¼ in. rectangular hollow metal front and rear posts, sanitary top and bottom hollow metal panel rails 2⅛x1¼ in. All rails cold rolled pickled material drawn to shape. Partition sheet inserted full depth into the four panel rails and securely welded, making homogeneous joints throughout.

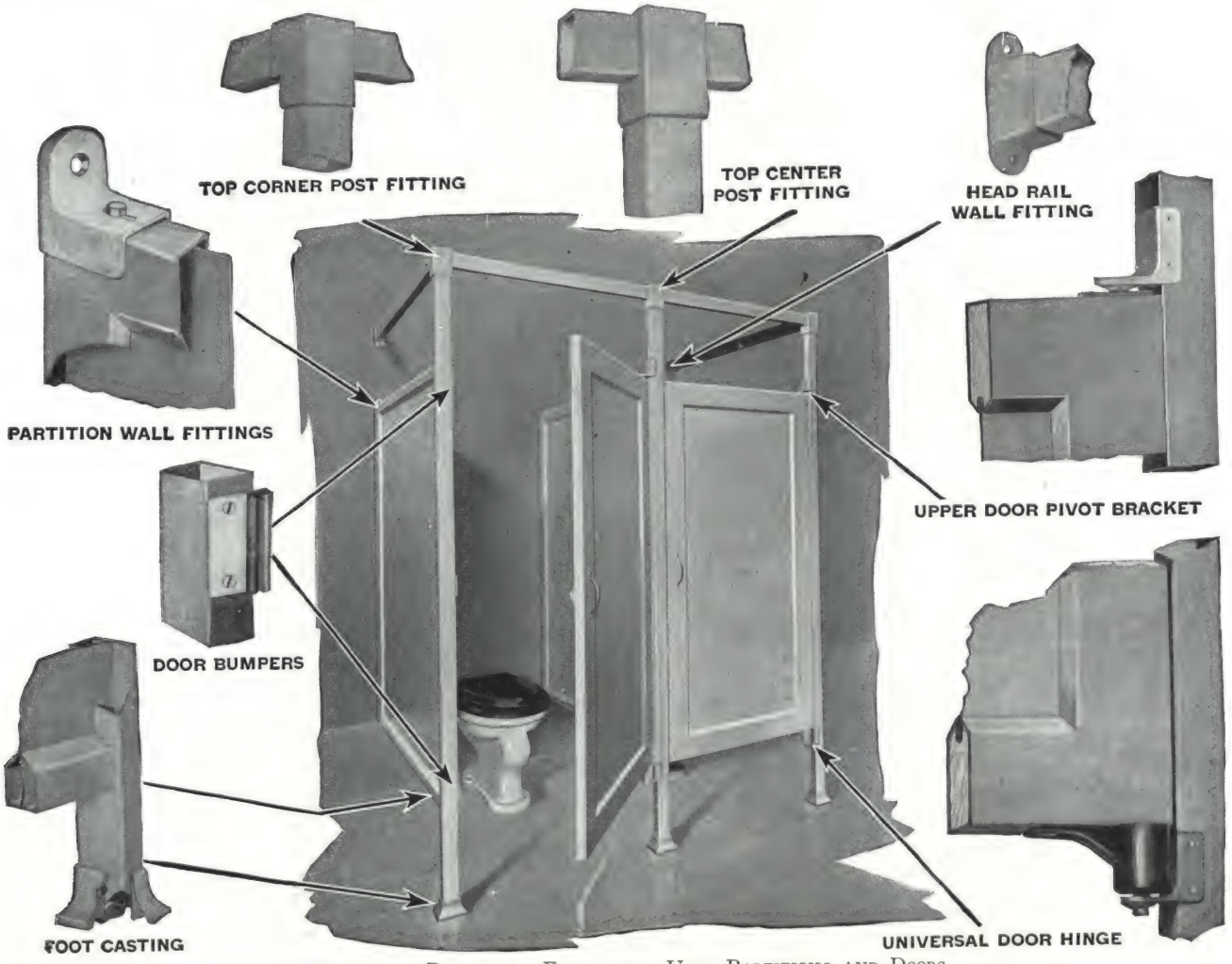
Hollow metal rectangular head rails 1⅞x1¼ in. above partitions and doors.

Doors

Door stiles with sanitary shaped lips of No. 24 gauge material, with double thickness overlapping mitered corners, 1¼ in. thick kiln dried wood core with two ½x6-in. hardwood dowel pins at each corner, securely hot glued.

No. 16 gauge steel panel interlocked into door stiles giving utmost rigidity.

The general construction of Ferrometal doors, while designed to insure strength and durability, make a very pleasing and finished appearance. They are also practically noiseless.



CONSTRUCTION DETAILS OF FERROMETAL UNIT PARTITIONS AND DOORS

Continued on next page

Wood Doors

Hardwood oak paneled door 1 in. thick, using our standard hardware, can be furnished.

Hardware

Each door provided with a Lawson Universal hinge allowing door to swing in or out and can be adjusted to remain at any desired position, top and bottom steel bumpers with rubber fillers, 5 in. nickelplated door pulls, nickelplated brass latch and heavy steel keeper.

Fittings

Malleable iron castings furnished throughout as illustrated, all setscrews for adjustment are flush.

Finish

Standard finish in prime coat of gray metal filler, or a baked-on enamel of olive green or gray. Other colors furnished if desired.

Backs and Service Panels

Backs are simple to remove without mutilating partitions, removable panels or doors furnished to allow access to utility spaces.

Shower Partitions

These partitions are constructed with our standard sanitary top and bottom rails to deflect water and can be furnished with standard backs and in special sizes.

Erection

Erection is very simple, only 3 bolts necessary for each partition, with no drilling, cutting or fitting of material. Adjustable wall and foot fittings take care of any variations.

Complete instructions and drawings furnished with each installation.

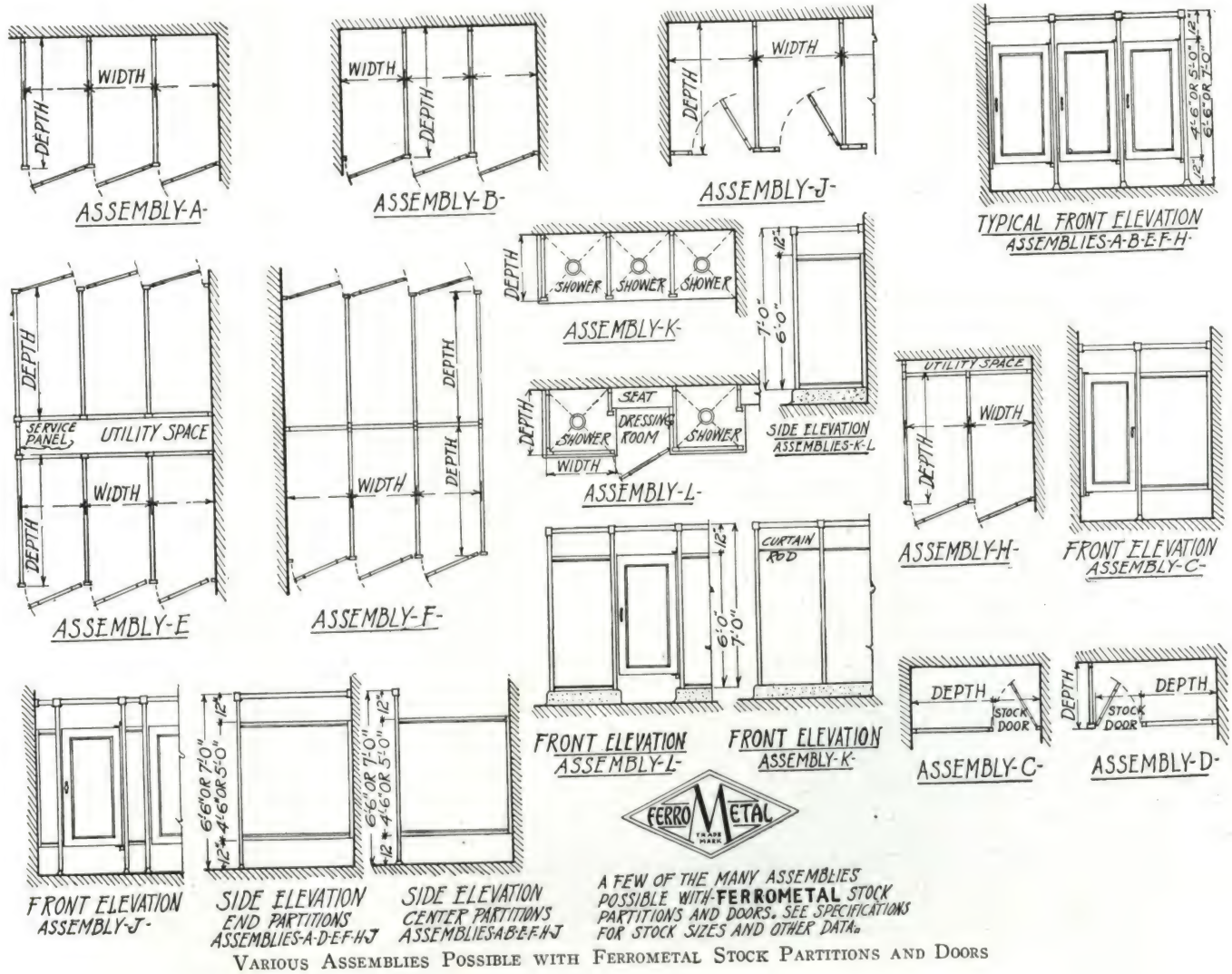
Service

We furnish estimates on equipment installed complete when desired.

STANDARD SIZES, FERROMETAL UNIT PARTITIONS AND DOORS

Width, ft.	Width, in.	Depth, ft.	Depth, in.	Partition height, ft.	Partition height, in.	Over-all height, ft.	Over-all height, in.	Door height, ft.	Door height, in.	Net door width
2	6*	3	0**	4	6*	6	6*	4	6*	27¾*
2	8	3	6							29¾
2	10	4	0*	5	0	7	0	5	0	31¾
3	0	4	6*	6	0**					33¾
		5	0*							

*Stock sizes. **Standard stock size for showers.
Net door widths 2¼ in. less than standard widths.
Net door opening 1⅞ in. less.
Special sizes and assemblies can be furnished to meet all conditions.
For total over-all width of assemblies with wall on one side as in "A," add 1 in.; assembly "C" standard partition depth plus 1⅞ in., adding net width of door used; assembly "D" standard partition depth plus 2¼ in., adding net width of door.
Other assemblies with walls on both ends, total of listed widths equal over-all dimensions.



VARIOUS ASSEMBLIES POSSIBLE WITH FERROMETAL STOCK PARTITIONS AND DOORS

THE MILLS COMPANY

Manufacturers of Steel Partitions and Equipment

MAIN OFFICE AND WORKS

5322 St. Clair Avenue

CLEVELAND, OHIO

Products

"Mills Metal" Steel Toilet Partitions; Toilet Doors; Shower Stalls.

Steel Office and Factory Partitions.

Steel Shelving.

Also manufacturers of Hollow Metal Doors and Trim, Steel Tables, Steel Boxes and Bins, and Miscellaneous Steel Equipment.

MILLS METAL
TRADE-MARK

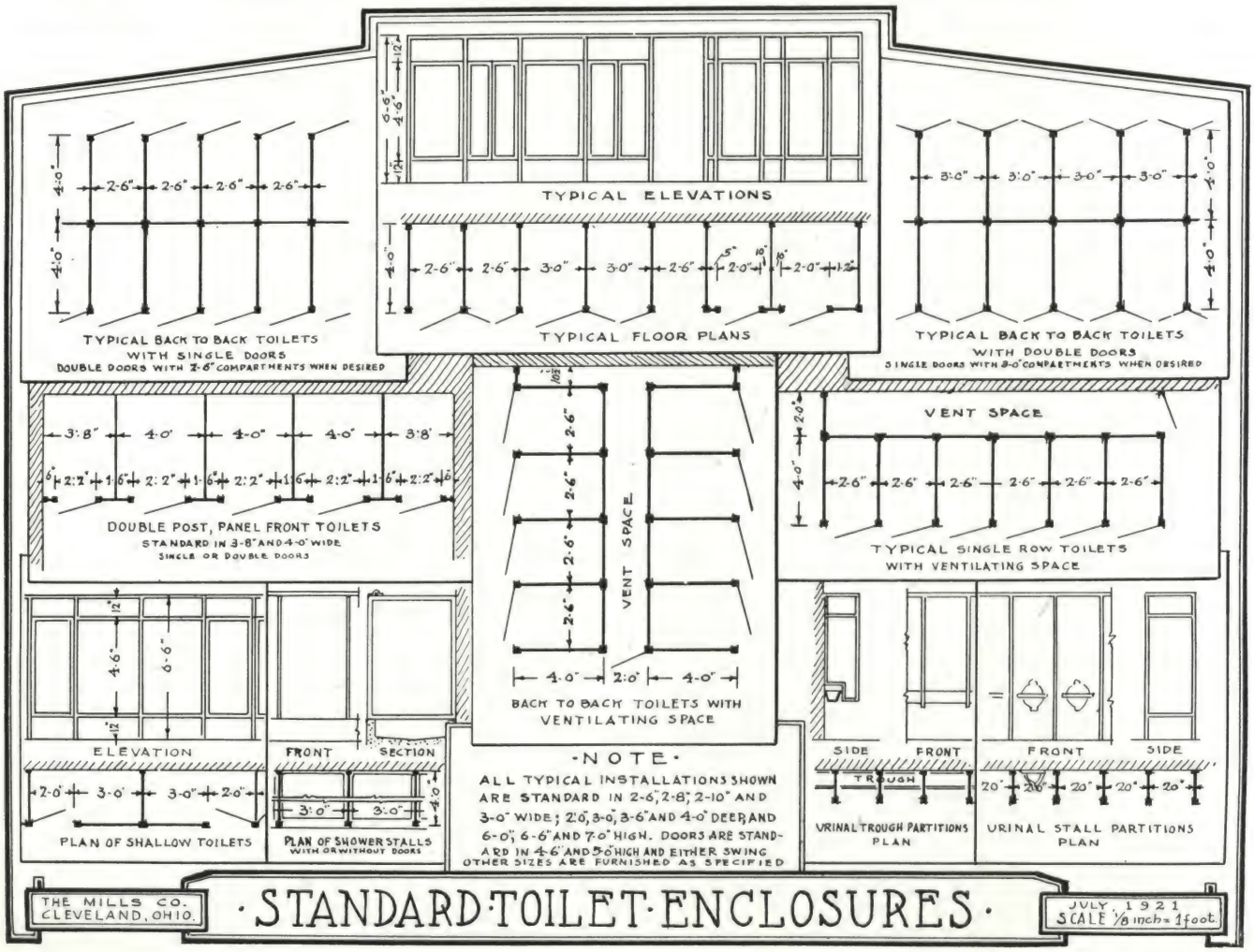
"Mills Metal" Partitions

"Mills Metal" standard steel partitions include a variety of units to meet any of the ordinary requirements of good practice in design and arrangement and, where special conditions demand, these standard units are readjusted to meet the requirements. Designers, however, are urged to arrange for the use of standard units wherever possible in the interests of economy, prompt service, the best results in mechanical accuracy and the highest ideals in sanitary requirements.

Toilet Partitions

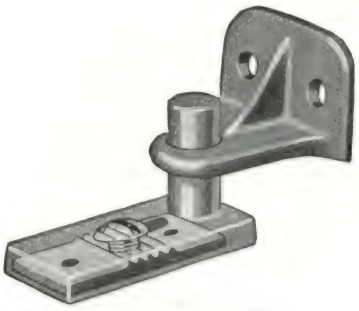
Typical standard toilet enclosures are shown herewith for the practical use of the designers. Any desired arrangement or spacing of partitions may be produced, however, to meet requirements.

Standard width water closet enclosures are generally found acceptable, but in cases where space economy is imperative, widths of 2 ft., 2 ft. 2 in., and 2 ft. 4 in. are sometimes resorted to, although widths less than 2 ft. 6 in. are not recommended. Batteries of enclosures in double rows (back to back) are economical where ventilating spaces between them are not essential, and

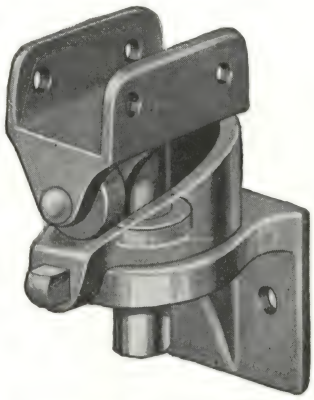


Continued on next page

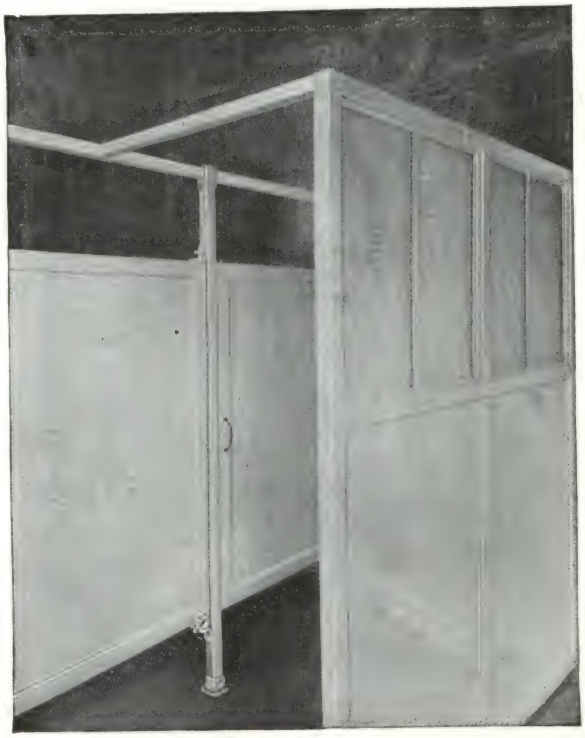
of course enclosures without doors cost considerably less. Standard conditions, however, provide for enclosures in single rows (with or without ventilating space), double rows (with or without ventilating space) with or without panel fronts and with or without doors. Doors may be single or double and made to swing either in or out, or right hand or left hand as desired.



Upper Hinge for Toilet Partition Door



Adjustable, Gravity Roller Bearing Hinge for Toilet Partition Door



"Mills Metal" Toilet Partitions

Standard sizes are listed on the drawings published herewith and other sizes are furnished as specified.

Partitions are finished in standard olive green or gray, baked-on enamel in a dull gloss.

Hardware—*"Mills Metal"* toilet partitions are equipped with our adjustable, gravity roller bearing hinges, made standard in aluminum alloy or nickelplated brass. This hinge is easily adjusted to hold door in any desired position; it is neat and compact in appearance, and will not rust or tarnish. The adjustment will not slip due to the fact that the weight of the door tends to hold it in place.

Office and Factory Partitions

Any desired grouping or arrangement can be secured with *"Mills Metal"* standard units which are produced in sections with solid panels, glazed panels and wire mesh panels as desired; the sections are made either in full height from floor to ceiling, in standard partition height or in railing height and are provided with doors swinging either right or left hand as specified. Glazed sections have ventilators when desired.

The posts and frames are accurate, square and true for easy assembling and erection. The parts are well proportioned, strong, serviceable and satisfactory. Glass can be made in large or small lights.

All standard partitions are finished in olive green baked-on enamel with a dull gloss. Special finishes may be had upon specification.

Standard Steel Shelving

A standard unit type of open or closed shelving that is rigid, rugged, easily erected or taken down and rearranged or moved, and that includes standard uprights, ends, partitions, backs, shelves, dividers, bin fronts, boxes, label and card holders, ledge shelves and doors when required.

Great care is taken in the manufacture to produce the best in mechanical values in combination with great strength and rigidity, simplicity in erection and economies in combination with practical values.

Units may be easily added or deducted from the stacks. Uprights are punched on 3-in. centers for the vertical adjustment of shelves and shelves are punched for the horizontal adjustment of dividers as specified.

Ledge shelves are furnished when desired and are of the same construction as the full height units and attached to them on the face.

All shelving units are finished in standard olive green baked-on enamel with a dull gloss. Special finishes are furnished as specified.

Service

The Mills Company will contract for the furnishing and erecting of its products when desired or it will ship the materials, knocked down and accompanied by erection instructions when that is preferred.

This company has had a long experience with the many requirements of users of steel partitions and miscellaneous steel equipment and its services are available to designers and others interested and applying for advice or other preliminary information on this subject. Comprehensive layouts will be made and preliminary or definite estimates furnished on request.

THE HART & HUTCHINSON COMPANY

Steel Toilet, Dressing Room and Shower Partitions

NEW BRITAIN, CONN.

BRANCH OFFICES

BOSTON, MASS., 654 Oliver Building
CHICAGO, ILL., 73 East Lake Street
NEW YORK, N. Y., 9 East 40th Street
PHILADELPHIA, PA., Real Estate Trust Building

Product

STEEL PARTITIONS for toilets, dressing rooms and showers.

For Steel Lockers and Shelving, see page 2045.

Use

"H & H" steel partitions have demonstrated their thorough usefulness and practicability. They are backed by fifteen years' experience in this field and can be specified with the full confidence that they will completely meet the service demanded.

Construction

Door and partition panels of No. 16 gauge three-pass cold rolled stretcher-leveled steel, framed and welded to channels and special shapes to guarantee full rigidity, and in pattern to insure proper sanitation, appearance and finish.

Equipment

Hinges are Lawson Universal pivot hinges, attached and held by malleable iron castings. Foot casting, also of malleable iron with 1-in. floor adjustment and of pattern without openings or pockets to collect water or dirt. Rubber bumpers at top and bottom of door. Attachments for fastening to wall of heavy gauge pressed steel with adjustment to take up slight surface inequalities. Substantial handles of generous size, securely attached and finished in dull black. Throw bolt on inside of door of extra heavy type. One rust-proofed two-prong hook supplied with each partition.

Finish

Priming coat of mineral filler baked at 250° Fahr. for three hours; finish coats of olive green or gray, baked on and applied before shipping; or, if shipped with priming coat only, the light color of this primer lends itself to lighter finishes to match the finish of adjoining walls or room.

Locks

Whenever desired, pin-tumbler locks with 2 keys can be supplied.

Shipment

Shipped knocked down and crated with full instructions for erecting by ordinary mechanics. We, however, maintain an efficient corps of erectors for those who perfer us to handle the complete installation.

Service

The advantages of "H & H" steel partitions are obvious: they eliminate breakage in shipping and, being much lighter in weight, save on freight. Made entirely of metal, they will not absorb odors, and after an extended use can be made as good as new with a coat of paint. Using only a minimum of screws for attaching to walls, the cost of installing is very low. Built on the unit principle, they can be moved to another location and re-erected, or can be salvaged for other work.

With Doors

Open Type

"H & H" STEEL TOILET PARTITIONS

MANUFACTURING EQUIPMENT & ENGINEERING CO.

Steel Toilet Enclosures

HOME OFFICE AND SHOWROOMS

BOSTON, MASS.

NEW YORK OFFICE, Grand Central Terminal

FACTORY AND MAIL ADDRESS: FRAMINGHAM, MASS.

Products

STEEL TOILET ENCLOSURES.

For Sanitary Washbowls, see page 1628; for Sanitary Drinking Fountains, see page 1621; for Metal Lockers, Shelving, etc., see page 2051.

METAL MEECO PRODUCTS

TRADE-MARK

Toilet Enclosures

General—Meeco toilet enclosures are built for service without sacrificing their pleasing design and neat appearance. They are in great demand for factories, schoolhouses, office buildings, and all places where sanitary, permanent enclosures are needed for toilets, showers, or other purposes.

Material—All parts are made of high grade material, thoroughly finished in baked on japan, to suit requirements.

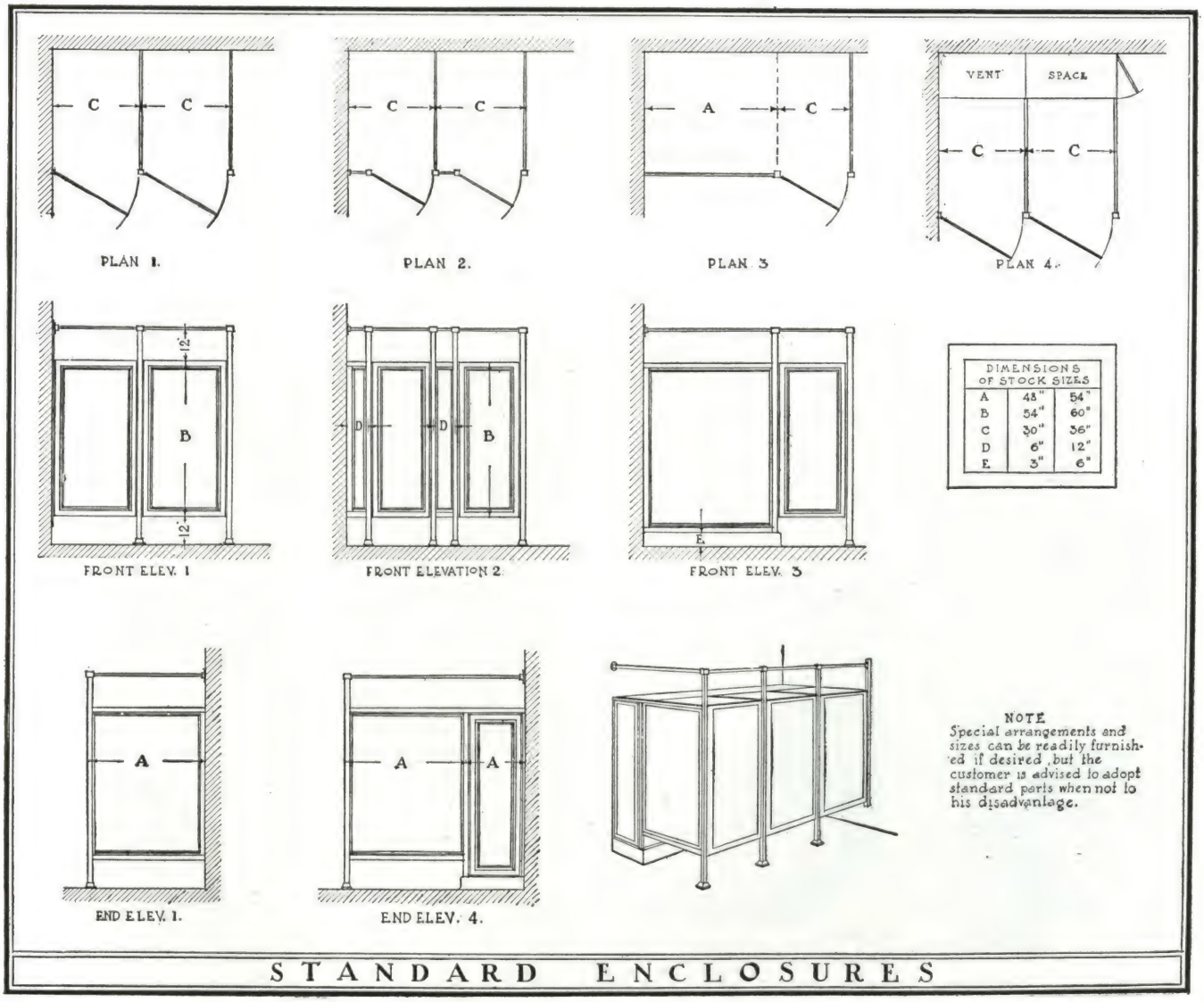
Construction—Partitions are made with hollow posts and stiles, and doors with hollow stiles and rails securely and neatly welded to the panels. The partition feet and wall brackets are so made as to give necessary adjustment for uneven floors and walls. Hinges are of heavy gravity or spring type, especially adapted for this class of work.

Standard parts are all made on the unit principle, and can easily be relocated or rearranged if desired, without depreciation.

Arrangement—Standard parts allow for either single or double row enclosures with or without the vent space, doors or backs.

Erection

The enclosures are very easy to erect and where necessary a simple diagram is furnished to assist the erector. Prices are generally quoted, knocked down, crated.



STANDARD ENCLOSURES

HENRY WEIS MANUFACTURING COMPANY

Toilet Compartments

FACTORY AND GENERAL SALES OFFICE
ATCHISON, KANS.

CHICAGO, ILL., 455 Peoples Gas Building
BOSTON, MASS., 24 Milk Street
NEW YORK, N. Y., 110 West 34th Street
CLEVELAND, OHIO, 1836 Euclid Avenue
SALES REPRESENTATIVES IN PRINCIPAL CITIES

Product

"Weisteel" Compartments for enclosing Toilets, Showers and Dressing Rooms.

WEISTEEL
TRADE MARK REGISTERED

Weisteel Compartments

"Weisteel" compartments have stood up under every condition in bank, office, public and semi-public buildings, steel mills, industrial plants, packing plants, railway buildings, comfort stations, school houses, clubs, religious community centers, theaters, hospitals, etc.

The simplicity and refinement of the sturdy design, coupled with excellent finish, make "Weisteel" compartments preferable for the finest buildings. On account of their economy and endurance they are specified where moderate cost and hard service conditions are the prime factors.

Design

Every sanitary requirement has been fully taken care of. All unnecessary joints have been eliminated. All parts are so shaped that water will not stand on them, and there are no projecting screws or boltheads to catch dirt or on clothing.

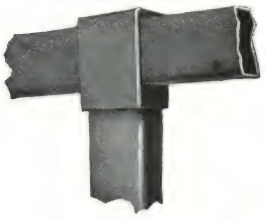
Being constructed of steel they will not absorb moisture nor can they be easily defaced.

Erection

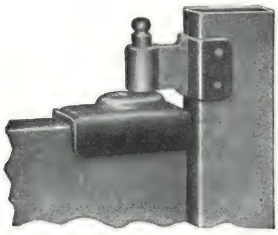
The erection of these compartments is so simple that any handy man with ordinary tools can do the work quickly. Only three bolts are required to erect the ordinary toilet compartment, and there is no drilling or fitting to do in connection with the material. Wall connections allow for variation in walls and permit setting the partitions out 1 in. from the wall, where desired. Foot casting allows for adjustable height of front post to care for any variation in floor and is fastened to the floor by concealed screw in the casting.

Units

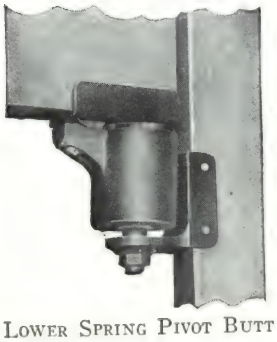
"Weisteel" compartments are built in standard units for toilets, showers and dressing rooms, to suit almost every condition and can be shipped from stock. Compartments are also built to suit all special conditions. For toilets requiring utility or working space at the rear, space is enclosed completely with steel backs, ends and tops.



Top Front Post



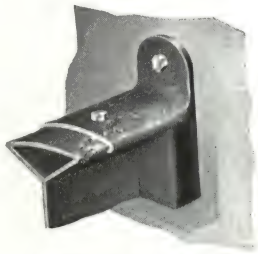
Upper Pivot Butt



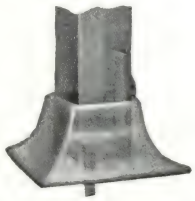
Lower Spring Pivot Butt

"Weisteel" Compartments As Installed in Toilets, Showers or Dressing Rooms

Bumper



Wall Fastening



Phantom View of Foot Casting

Continued on next page

Specifications

Partitions—Partitions, including front and rear posts, are built in one unit, of No. 16-gauge full pickled, copper-bearing steel sheets, top and bottom rail of partition being formed from the partition sheet, which is interlocked into hollow metal posts and securely welded into place. Partitions can be set any distance up from floor, or on floor, if desired.

Doors—Door stiles and rails are formed of 22-gauge full pickled, copper bearing steel; panels of No. 16-gauge full pickled, copper-bearing steel. Miters of stiles and rails are interlocked, countersunk, finished flush and reinforced in corners with heavy steel reinforcing plates.

Backs and Utility Plates—All backs, utility end plates and cover plates are made of No. 16-gauge full pickled, copper-bearing steel sheets, and so formed that there will be no projecting bolts or screw heads.

Headrail—Rectangular drawn tubing of No. 16-gauge full pickled stock, 1¼x1⅞ in.

Castings—All foot castings made of brass and allow for an adjustment of 1 in. to take care of any unevenness in floor. Each casting fastened to floor with a screw concealed within casting. Malleable castings furnished at top of front post to receive headrail, and at top and bottom of rear posts for fastening to wall. Castings fastening partitions to wall at top and bottom of rear posts of partitions, and also at top and bottom of rear posts, are adjustable to allow for variations in walls, and to allow partitions to be set out from the wall a distance of 1 in. where desired.

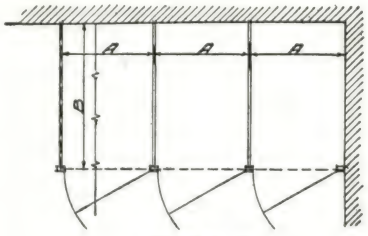
Hardware—Where doors are used, each compartment is provided with a 3½-in. 2-prong coat and hat hook, 4-in. cast bar pull, heavy slide bolt latch, steel bumper stop with rubber filler at top and bottom of door, and "Weisteel" specially designed Lawson Universal hinge. The same hinge is used for doors that swing in or out of compartment, or for double acting doors, and can be adjusted so that door will stay set in any desired position when not in use.

Special "Weisteel" patented, roller-bearing, brass nickel-plated shower curtain hangers to accommodate regular rectangular headrail are furnished when desired.

Wood Doors—We can furnish our regular or brass nickelplated hardware equipment for use with 1¼-in. wood doors, furnished by others, when desired.

Shower Curtains—Curtains, complete with fittings, for shower compartments, made from any suitable material, can be furnished as desired.

Finish—All parts, with the exception of coat hook, pull and latch, can be furnished with prime coat special grey metal filler, prime coat of red lead and oil, or enamel finish, either olive green or light grey. Finish sprayed on under 40-lb. pressure, and the enamel finishes baked at a high temperature. Coat hooks, pulls and latches are standard dead black finish, or can be furnished with nickelplated finish. Complete hardware of brass, heavily nickelplated, furnished when desired.



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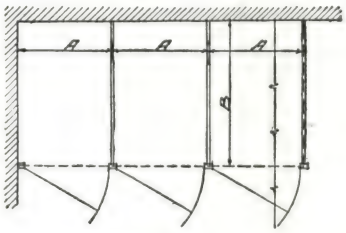

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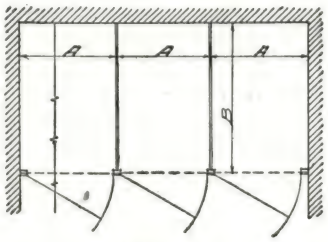

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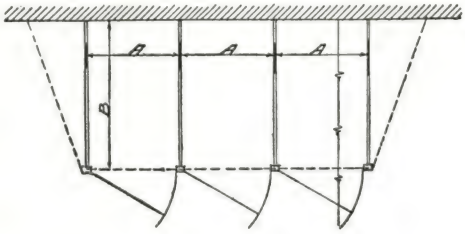

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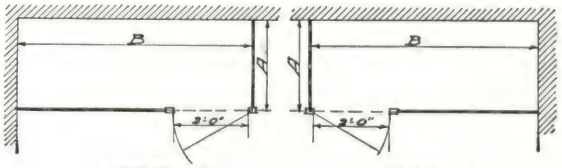
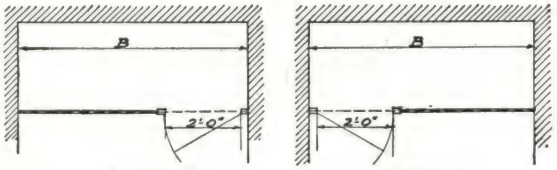
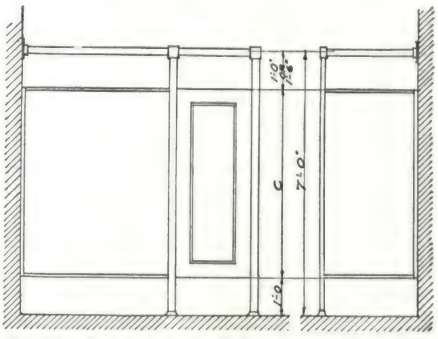


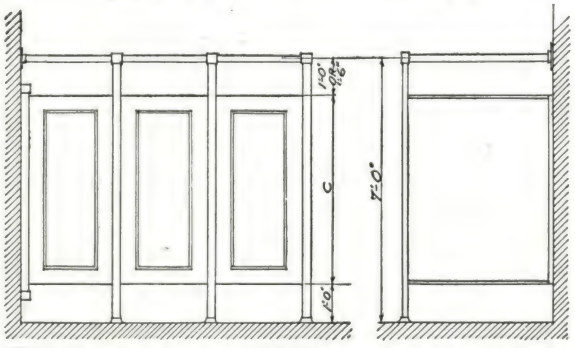
SERIES 5. SERIES 6



SERIES 7 SERIES 8



TYPICAL FRONT ELEVATION SERIES 5-6-7-8. SIDE SERIES 5-6.



TYPICAL FRONT ELEVATIONS SERIES 1-2-3-4. SIDE ELEVATION SERIES 1-2-4.

Stock Units of "Weisteel" Compartments

Note—Series 1 and 2 are batteries of compartments where wall forms the end at right or left. Series 3 is a battery of compartments entirely between walls and where both ends are formed by walls. Series 4 is a battery of compartments having no walls at ends. In series 1, 2, 3 and 4 any number of compartments can be had in one battery. Series 5, 6, 7 and 8 are made in single compartments as shown.

Doors—Width of doors in series 5, 6, 7 and 8 are 2 ft. 0 in. in all cases as shown. Width of all other doors in every case 2 in. less than dimension "A"; except in series 1, 2 and 3, where doors in end stalls at wall ends are 3 in. less than dimension "A."

Swing of doors may be reversed where desired. Any of the above stock units can be had without doors where desired.

DIMENSIONS OF STOCK UNITS

Series Nos. 1, 2, 3, 4, 5 and 6			Series Nos. 7 and 8	
Dimension "A"	Dimension "B"	Dimension "C"	Dimension "B"	Dimension "C"
2'– 6"	4'–0"	4'–6"	4'–0"	4'–6"
2'– 8"	4'–6"	5'–0"	4'–6"	5'–0"
2'–10"	5'–0"		5'–0"	
3'– 0"				

Units without doors in Series 1, 2, 3 and 4 are also made in the following sizes for dimension "B": 2'–6", 3'–0" and 3'–6".

Any stock unit can be made in special units with provision for utility or working spaces.

Urinal partitions, also shower and dressing compartments, with or without doors, can be furnished in special units of any desired size.

THE SANYMETAL PRODUCTS COMPANY

FORMERLY THE R. F. CARPENTER MFG. CO.

Metal Partitions for Toilets and Offices

980 East Sixty-fourth Street

CLEVELAND, OHIO

NEW YORK OFFICE, 1170 Broadway

BOSTON OFFICE, 73 Tremont Street

AGENCIES

ALBANY, N. Y., Harvey B. Kimmey, 496 Broadway
ATLANTA, GA., Strafford R. Hewitt, 200 National City Building
BILLINGS, MONT., Frank W. Richardson, Electric Building
BIRMINGHAM, ALA., J. G. Riley, 746 Brown-Marx Building
BUFFALO, N. Y., W. C. McQueeny, 69 Victoria Avenue
BUTTE, MONT., Frank W. Richardson, 214 Metals Bank Building
CHARLOTTE, N. C., Walter L. Hoover, 21 Winifred Place
CHATTANOOGA, TENN., Campbell Supply Co., 823 Chestnut Street
CHICAGO, ILL., Hugh J. Baker & Co., Monadnock Building
CINCINNATI, OHIO, Durbrow & Otte, 206 W. Court Street
DAYTON, OHIO, John G. Pool, Schwind Building
DECATUR, ILL., Hugh J. Baker Co., 327 Citizens Bank Building
DENVER, COLO., McElhinney Tile & Marble Co., 427 17th Street
DES MOINES, IOWA, C. P. Massard, 266 Arts Building, 1024 Grand Avenue
DETROIT, MICH., Wm. Seifert, 1535 Spruce Street
DULUTH, MINN., Henry P. Hasemeyer, 311 Torrey Building
EL PASO, TEX., Sheehan-North Co.
FORT WAYNE, IND., Hugh J. Baker Co., Schoaff Building
FORT WORTH, TEX., Collingsville Mfg. Co., 1009-15 Front Street
GRAND RAPIDS, MICH., Charles Vanderveldе, 757 Hawthorne Street
HOUSTON, TEX., Vandaveer, Browne & Stoy
INDIANAPOLIS, IND., Hugh J. Baker Co., 602 W. McCarty Street, P. O. Box 892
LOS ANGELES, CAL., Waterhouse-Wilcox Pacific Co., 331 E. Fourth Street
MEMPHIS, TENN., Klyce Building Co., 540 Goodwin Building
MILWAUKEE, WIS., R. B. Petley Co., 1010 Majestic Building
MINNEAPOLIS, MINN., H. S. Nesbitt Co., Builders Exchange
OKLAHOMA CITY, OKLA., Bissell Builders Supply Co., 717 Colcord Building
OMAHA, NEBR., Earl S. Lewis & Co., 602 Paxton Building
PHILADELPHIA, PA., James A. Clancy, Harrison Building
PITTSBURGH, PA., E. H. Dermitt, 336 Fourth Street
PORTLAND, ORE., J. McCracken Co., 45 Fourth Street
SALT LAKE CITY, UTAH, S. A. Roberts & Co., 212 Dooly Building
SAN FRANCISCO, CAL., Waterhouse-Wilcox Co., 523 Market Street
SCRANTON, PA., LeBar, Parsons & Pierce, 526 Scranton Life Building
SEATTLE, WASH., S. W. R. Dally, 332 Pioneer Building
SIOUX CITY, IOWA, Haakinson Beatty Co., First and Nebraska Streets
SPOKANE, WASH., R. H. Hoskins, 510 Hyde Building
SYRACUSE, N. Y., Francis Metal Door & Window Co., 423½ S. Salina Street
TOLEDO, OHIO, S. L. Everitt, 615 Ohio Building
WASHINGTON, D. C., H. Schnabel, 4316 15th Street N. W.

Products

Sanymetal

TRADE MARK U. S. REG.

Sanymetal Partitions, Doors, and Screens, for toilet rooms, dressing rooms, shower baths and urinals.

Sanymetal Partitions for offices, factories, hospitals, churches, schools, hotels, etc.

Sanymetal Gravity Roller Hinges for all toilet and part-length swinging doors.

Also Sanymetal Toilet Room Hardware.

Toilet Partitions

Sanymetal toilet partitions are made of heavy gauge Armco ingot iron, stretcher leveled, electrically welded to an integral hollow metal vertical post, and fitted top, bottom and rear with rigid metal mouldings, all electrically welded into one complete whole.

The door, of similar construction, is fitted with our gravity roller bearing hinge, rubber bumper, and pull. These two units, with the special sanitary base casting for securing post of partition to floor, caps and pipe rail bracing, constitute Sanymetal toilet sections. Stock fronts and doors are adaptable to compartments of any width desired.

Finish—Partitions and doors are finished with one priming coat of mineral oxide and two coats of olive green or gray enamel, each coat baked on at a high temperature. Base castings, all hinge parts and other door hardware, and all bolts, screws and nuts are electro zinc-plated, which plating process stands government tests against rust.

Erection—The erection of Sanymetal toilet partitions is a simple matter. After base casting is fastened to floor by a concealed screw in the casting, a U-channel (adjustable to any unevenness) is fastened to the walls. Partitions are then securely fastened to the U-channel; caps are inserted in tops of posts; and the head rail brace is installed and fastened to walls. Doors are then hung on partition posts.

Quotations will be given on Sanymetal erected or f.o.b. the factory.

Gravity Roller Hinges

For double or single acting doors of wood or steel, made to fit Sanymetal, slate, marble or wood partitions. Hinge has five parts only. Upper hinge is a heavy stamping with pivot carried in socket; lower hinge is similar, the weight of the door being carried by a wheel roller on a double inclined cam. Hinge can be used for either right- or left-hand door, and for any thickness of material. In steel or brass, zinc or nickel finish.

Shower and Urinal Partitions

For shower and urinal partitions Armco iron alloy (lead coated) is used, finished like the toilet partitions with baked enamel. Construction is the same as in toilet partitions. Partitions can be furnished to fit special container or cement curb.

Partitions for Offices, Factories, Hospitals, Schools, etc.

Type "A" units, for offices exclusively, consist of a heavy gauge, single sheet, bottom panel (double insulated if specified), drawn steel channel uprights, and generous hollow base and top rail, all electrically welded into one complete whole. A neat drawn moulding, held in place without screws, surrounds the panel on inside and outside. No bolts or screws show at any joint—all are covered with trim held by a concealed locking device. Standard unit widths are from 3 to 4½ ft. Glass, divided as desired by muntins, is stopped in, without bolts or putty, by a continuous drawn moulding, same as that around panels. Sanymetal doors are well proportioned and substantially built, and equipped with high grade hardware. Standard baked enamel hand rubbed finish can be applied at the factory or enameling can be done after erection. Partitions can be furnished grained.

Type "B" partitions, for plant offices and ordinary shop purposes, are similar in design and construction to Type "A," at a somewhat lower cost. They can be glazed like Type "A" or fitted with standard steel sash and glazed. Wire mesh or steel may be substituted for glass in any panels. Type "B" partitions installed and glazed cost little more than the equivalent installation of wood, and have the advantages of being interchangeable, durable, sanitary, and *fireproof*.

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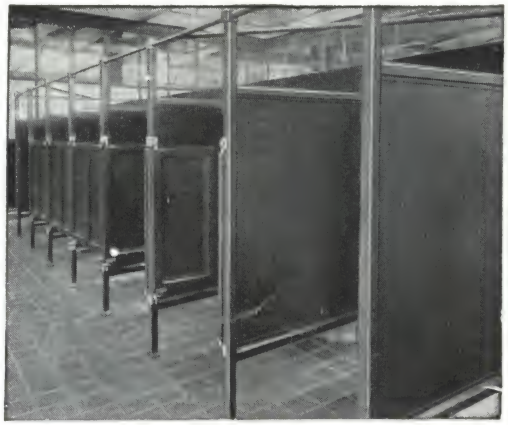
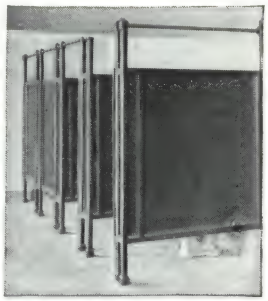
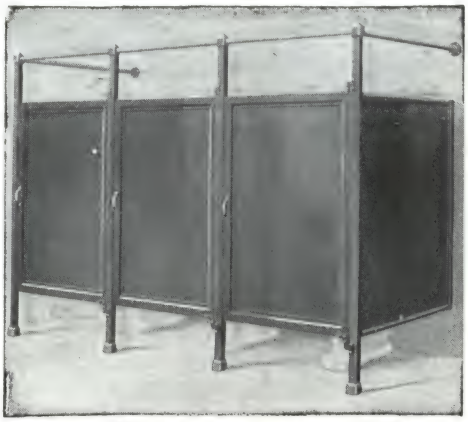


TOILET PARTITIONS—THE NATIONAL TUBE CO.
LORAIN, OHIO

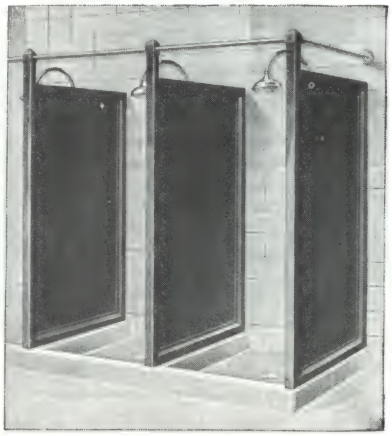


FIVE-FOOT DEEP PARTITIONS WITH WIDE FRONTS

TOILET PARTITIONS—A. C. SMITH CORP.
MILWAUKEE, WIS.

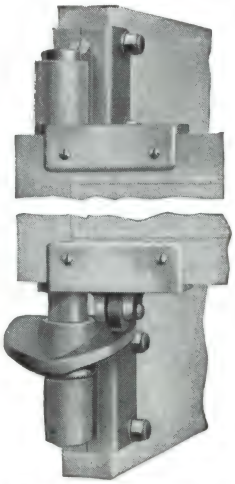


TYPICAL INSTALLATION OF SINGLE-DOORED TOILETS

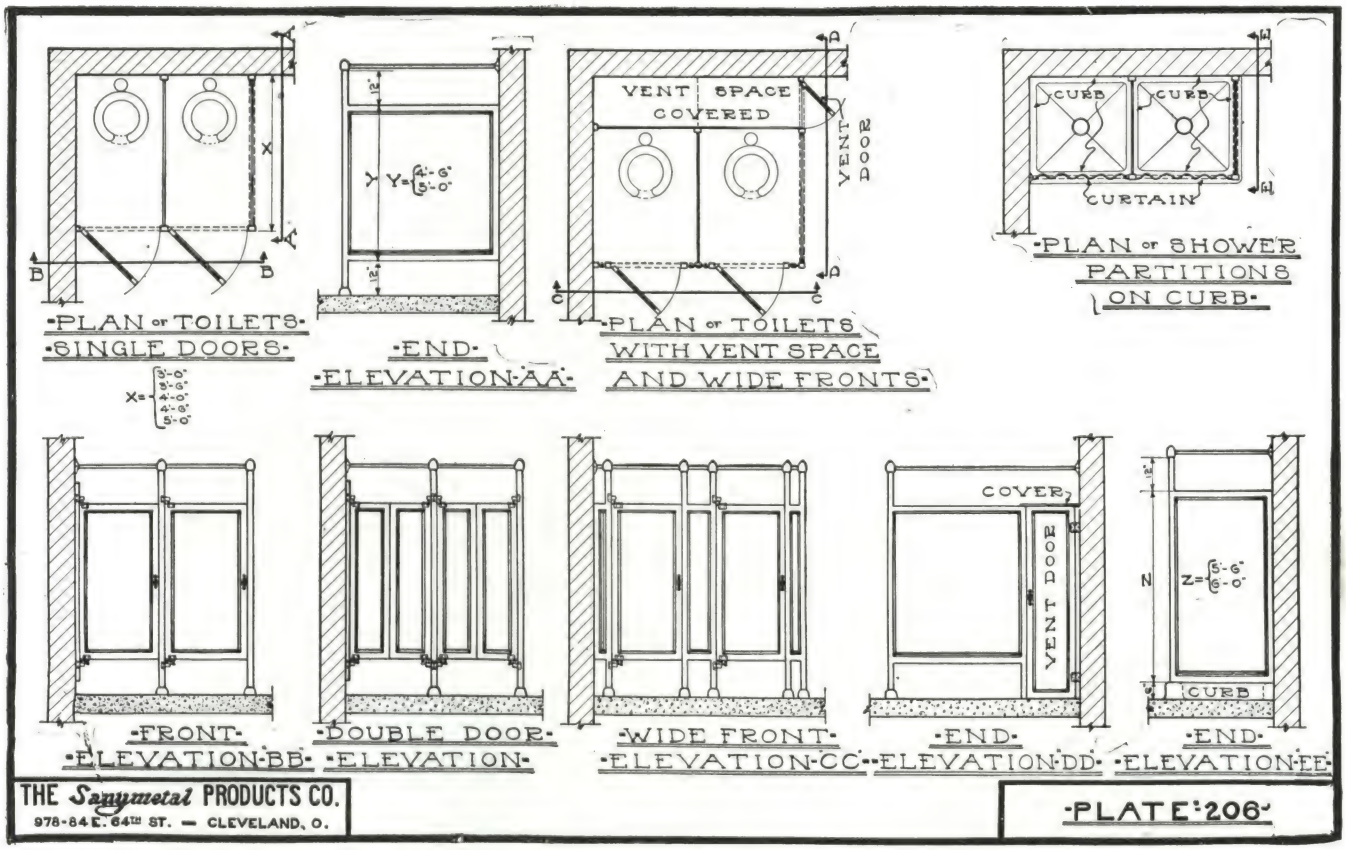


SHOWER PARTITIONS WITH CURB

SPECIAL WATER-SHEDDING BASE SHOE



SANYMETAL GRAVITY ROLLER HINGE



INSTALLATION DETAILS—SANYMETAL TOILET PARTITIONS

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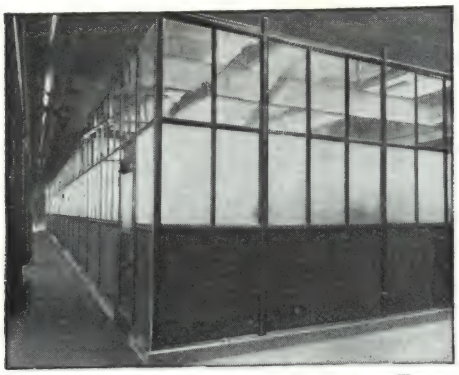
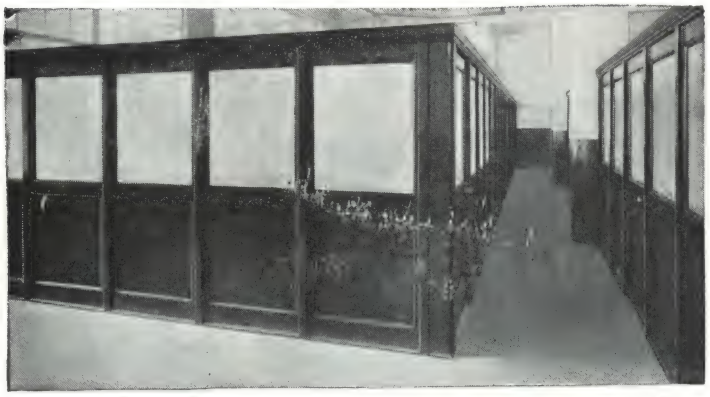


Lavatory Building of the National Tube Co., Lorain, Ohio—110x32 Ft. Built of Type "B" Sanymetal

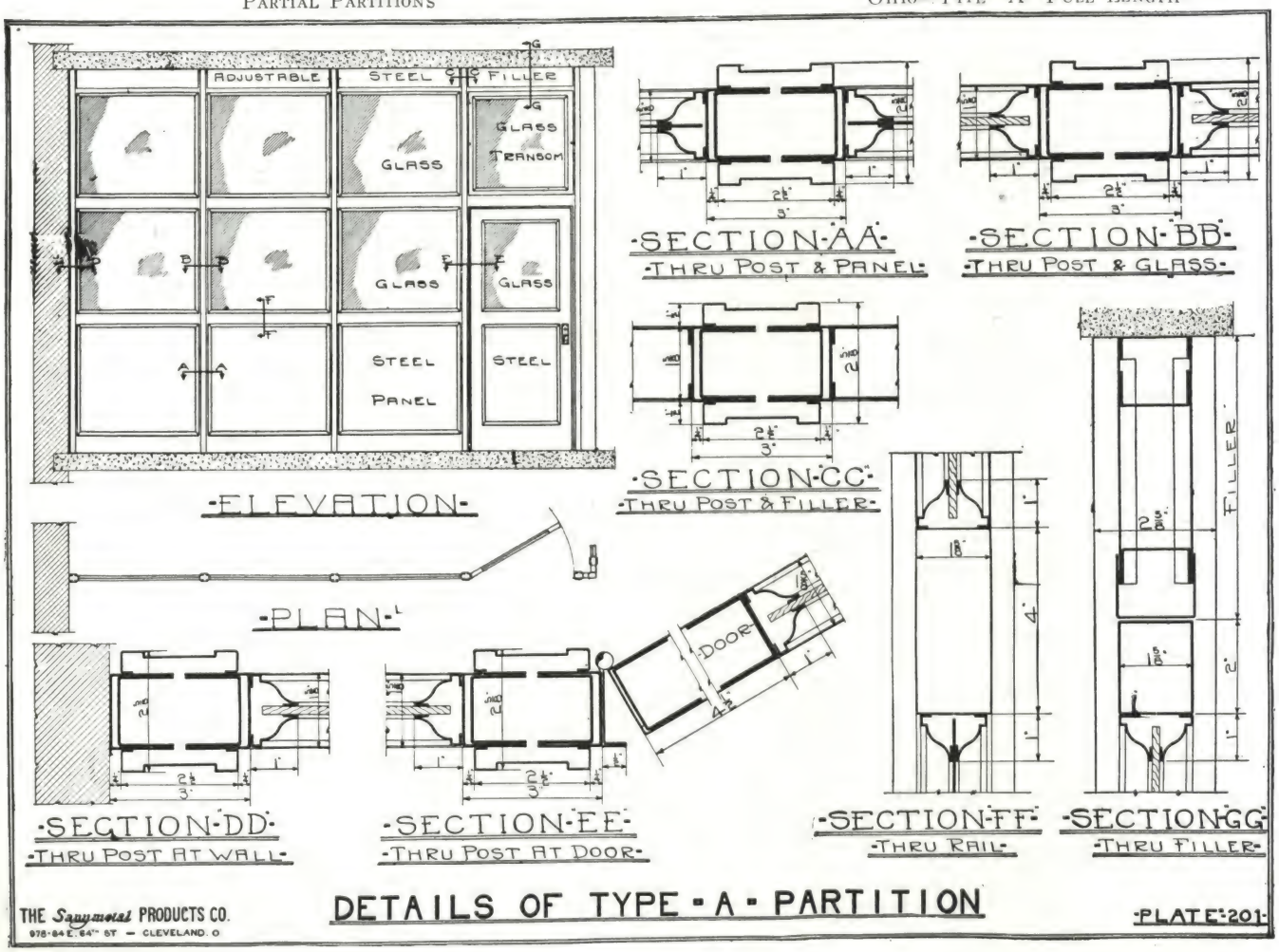
Smoke Screen in the School of the Immaculate Conception, Bellevue, Ohio

Type "A" Unit Section



Liggett & Meyers Tobacco Co., Richmond, Va.—Type "A" Partial Partitions

Plain-Dealer Publishing Co., Cleveland, Ohio—Type "A" Full Length



SANI PRODUCTS CO.

Sani-Onyx Wainscoting, Paneling, Ceilings, Partitions

Sani Building
NORTH CHICAGO, ILL.

FACTORIES: NORTH CHICAGO, ILL., INDIANAPOLIS, IND., TORONTO, CAN.

BRANCH OFFICES

ATLANTA, GA.
DALLAS, TEX.
KANSAS CITY, MO.
NEW YORK, N. Y.
BOSTON, MASS.
DENVER, COLO.
LOS ANGELES, CAL.
PHILADELPHIA, PA.
CHICAGO, ILL.
SAN FRANCISCO, CAL.
DETROIT, MICH.
MEMPHIS, TENN.
ST. LOUIS, MO.
HOUSTON, TEX.
CLEVELAND, OHIO
INDIANAPOLIS, IND.
MINNEAPOLIS, MINN.
SALT LAKE CITY, UTAH

FOREIGN BRANCHES

MONTREAL, CAN. TORONTO, CAN. WINNIPEG, CAN.

Product

SANI-ONYX for Wainscoting, Paneling, Ceilings, Partitions, Counter and Table Tops, Bulkheads, Shower Baths, Shelving, Basing and Capping.

Description

Sani-Onyx is a snow white composition of flint-like hardness that gives indefinite service without wear or deterioration.

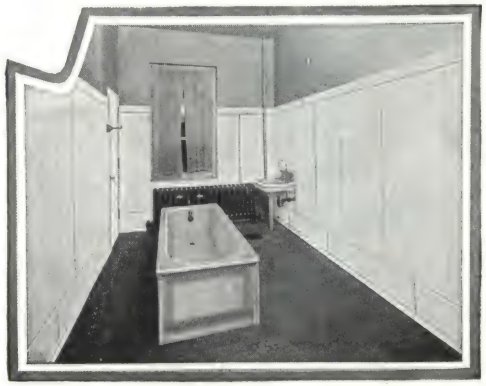
Sani-Onyx in its finished form is as smooth as polished glass, strictly non-absorbent and can be cleaned by simply rubbing with a damp cloth. The tensile strength of Sani-Onyx is 1550 lbs. per sq. in., which is about 45% stronger than any similar material on the market today. Made of rock ingredients, and fused at 2600° Fahr., it is 40% harder than marble and impermeable to absorption of foreign matter.

Manufactured into slabs of any length up to 10 ft. and in most any thickness not exceeding 1 in., except on special order.

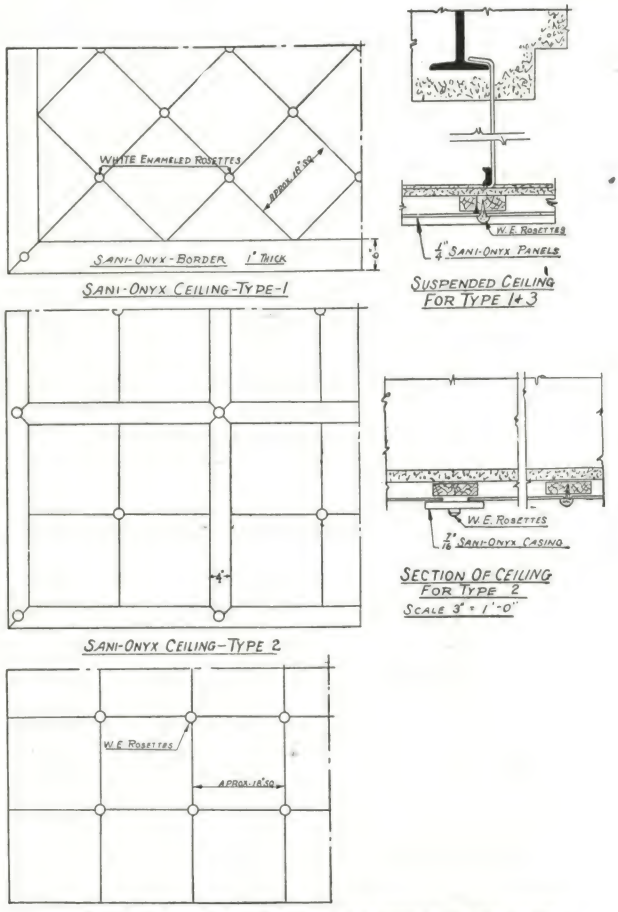
Ceilings

Sani-Onyx ceilings can be installed in a number of various designs and the cost of same is so low that it is the most economical material that can possibly be used for this class of work.

TYPICAL CEILING INSTALLATION OF WHITE SANI-ONYX



TYPICAL WHITE SANI-ONYX INSTALLATION IN MODERN HOSPITAL BATHROOM



DETAILS OF SANI-ONYX CEILING CONSTRUCTION

Continued on next page

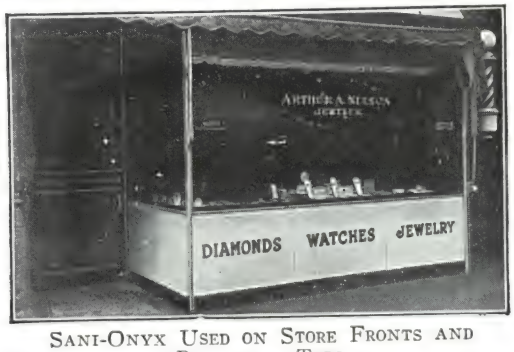
Store Fronts

Sani-Onyx can be used on store fronts of any description and on bulkheads of same.

It becomes a decidedly effective trade builder and makes the most attractive fronts that can possibly be obtained.

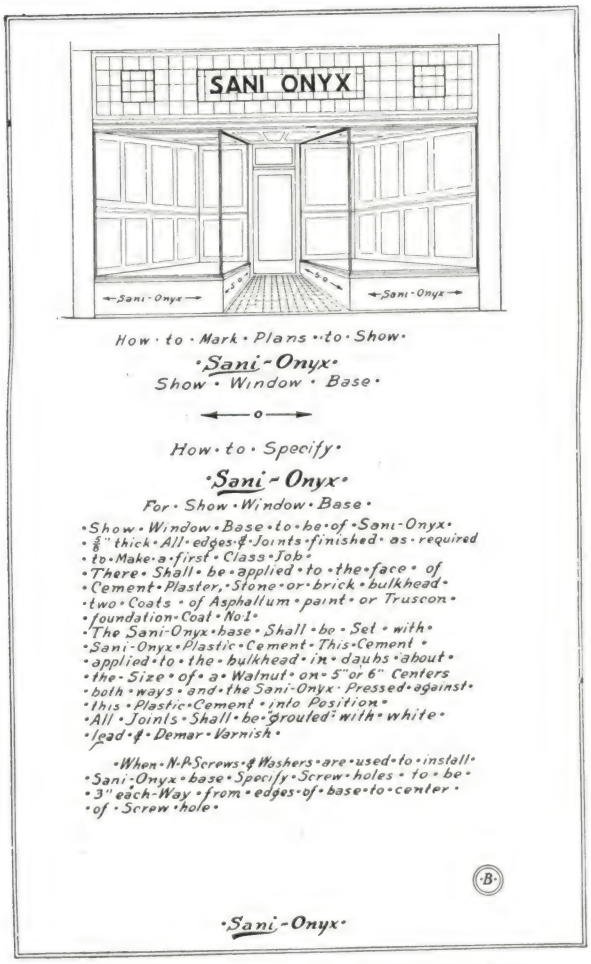
Wainscoting, Partitions

Sani-Onyx used as wainscoting for the walls of bathrooms and toilet partitions is the most attractive and most sanitary material that can possibly be used for this class of work.

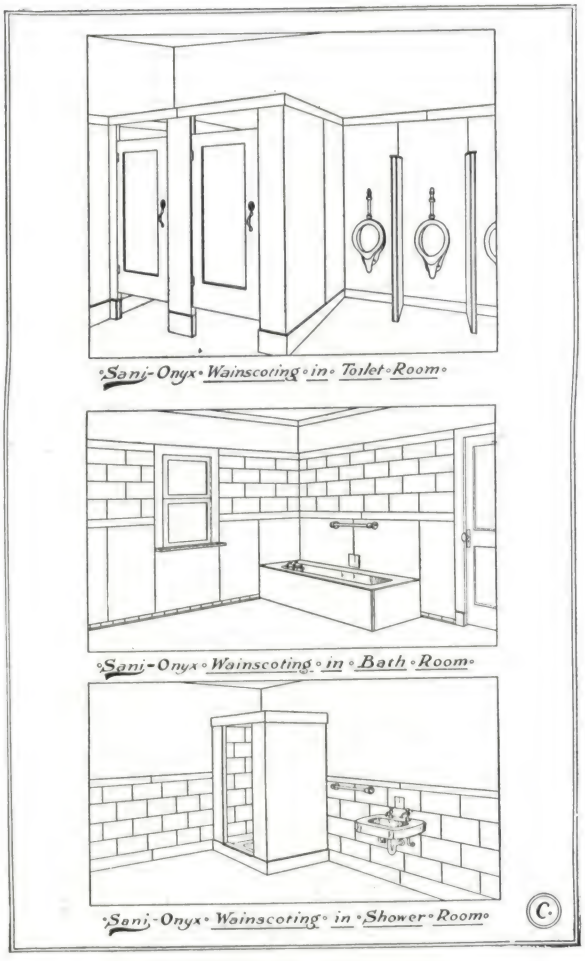


SANI-ONYX USED ON STORE FRONTS AND BULKHEAD TOPS

SANI-ONYX USED IN TOILETS



HOW TO MARK PLANS AND SPECIFICATION DATA



WAINSCOTINGS IN VARIOUS DESIGNS

Continued on next page

Finishing of Edges

The sketches below show a few of the various ways of finishing the edges of Sani-Onyx.

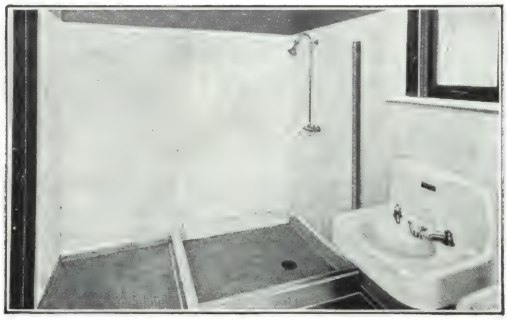
Edges can be finished in any way that may be required on the various kinds of construction.

Wainscoting, Walls and Ceilings

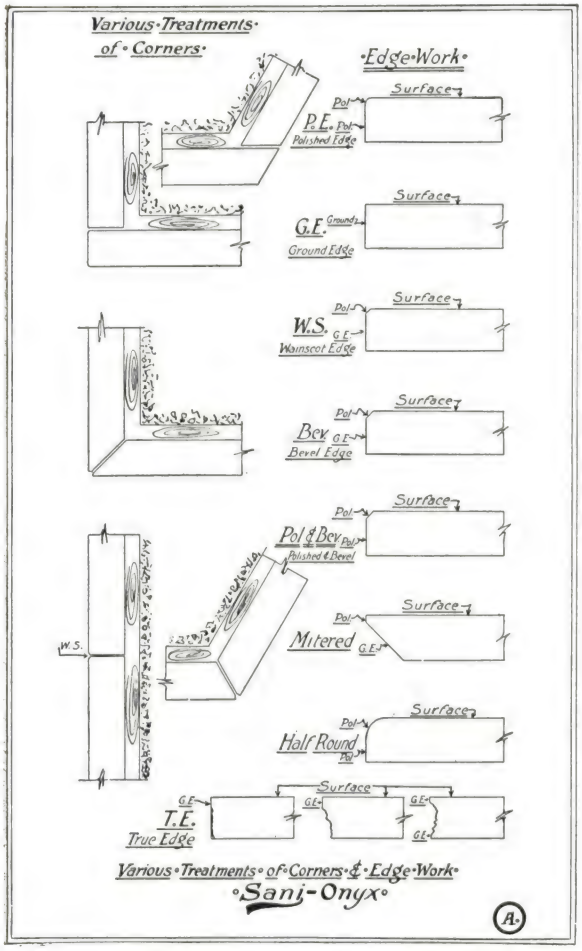
Sani-Onyx wainscoting can be installed in any style desired.

It is the most practical material on the market today for the covering of walls and ceilings.

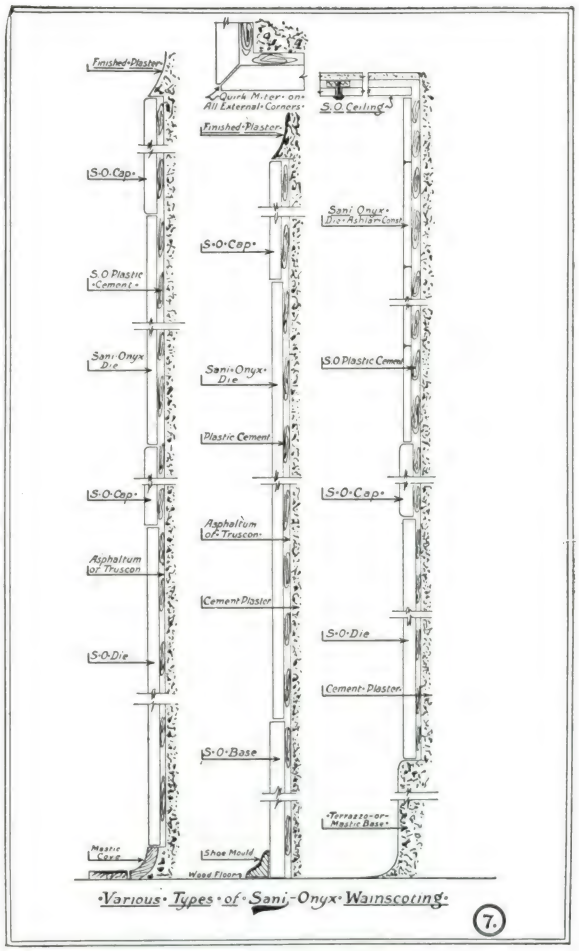
FINISHING OF EDGEWORK IN SANI-ONYX



SANI-ONYX WAINSCOTING



DETAILS OF VARIOUS TREATMENTS OF CORNERS AND EDGE WORK



DETAILS OF VARIOUS TYPES OF WAINSCOTING

THE VITROLITE COMPANY

Sanitary Structural Slabs

TELEPHONE
FRANKLIN 3511

Chamber of Commerce Building
CHICAGO, ILL.

FACTORY, PARKERSBURG, W. VA.

Product

VITROLITE, a White Impervious Structural Material made in Slabs.

VITROLITE
"Better than Marble"
TRADE-MARK

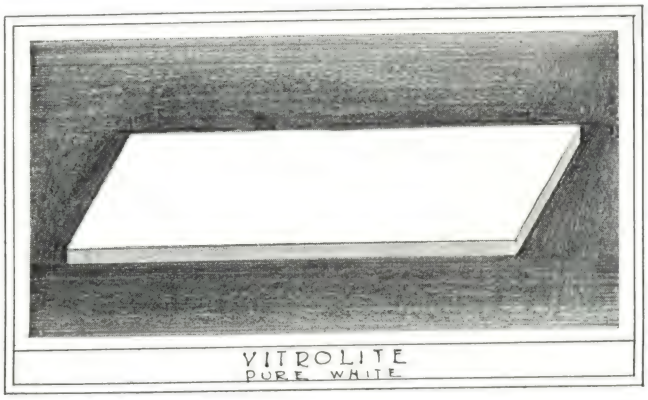
Description

Vitrolite is homogeneous and opaque, and fused at a temperature of about 3000° Fahr. The molten mass is rolled into slab form, thoroughly annealed and toughened.

Surface—Vitrolite is milk white. The exposed surface is fire polished and the reverse side corrugated.

Uses—Vitrolite is unexcelled for toilet and shower partitions and toilet room wainscoting in clubs, office and public buildings and hospitals. Adapted for wainscoting in the halls and corridors of the class of buildings mentioned, also for apartment building entrances.

In residences, Vitrolite is used for the bathroom, kitchen and pantry walls, table and cabinet tops.



VITROLITE
PURE WHITE

For light shafts, Vitrolite claims consideration on the basis of its high light reflecting factor and the possibility of easily removing the ordinary stains of such places. The same can be said of elevator shafts.

In the industrial field, Vitrolite is used for laboratory walls and ceilings; brine freezing rooms in ice cream factories; walls and ceilings in bakeries; walls in electric power stations; cooling rooms and refrigerators in breweries; walls in creameries and dairies. Also for table tops and counters in industrial lunchrooms.

Vitrolite for the interior of markets, bakeries, restaurants and lunchrooms is decidedly satisfactory for surfacing walls, ceilings, counters, bulkheads and basing.

In barber shops Vitrolite is used for mirror frames and wainscoting because it is sanitary and easy to keep spotlessly clean.

Vitrolite is widely used in hospitals where the demand for asepticism in everything that enters into the construction and equipment of an operating, diet or utility room is insistent.

Vitrolite is aseptic and can be installed in large slabs so that seams and joints are reduced to a minimum. No chemicals can stain or react with it, it does not craze and can be sterilized without injury.

Permanence is an important feature of Vitrolite walls and ceilings; they last a lifetime, look clean and sanitary and eliminate redecorating expense.

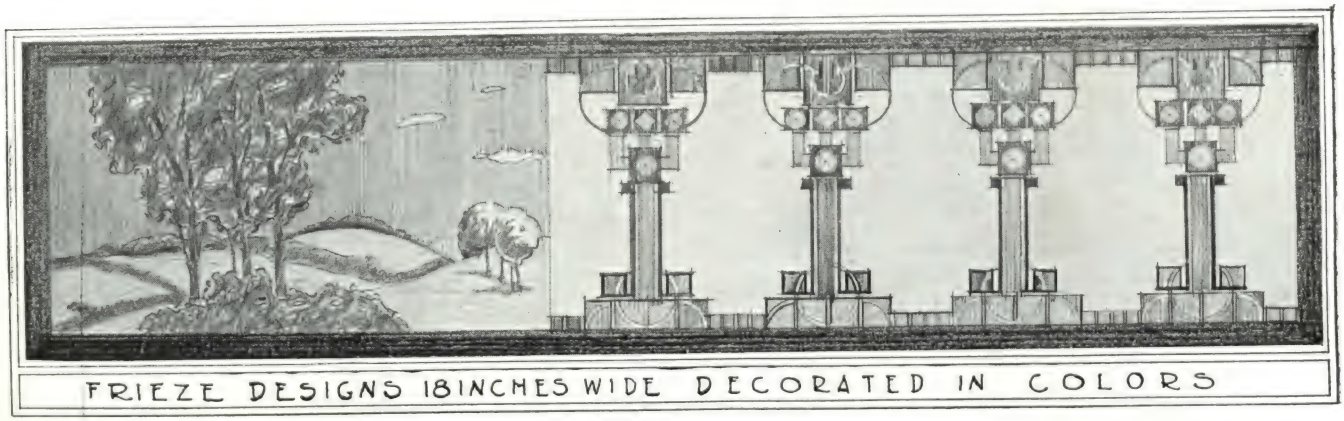
Sizes

Vitrolite is manufactured in thicknesses from $\frac{3}{16}$ to 1 in., inclusive; and slabs up to 48 in. wide, from 100 to 120 in. long. These are extreme. We advocate for structural work panels about 30 in. in width.

Decorated

Vitrolite can be most beautifully decorated in almost any design that might be desired and in richness of color that can not be surpassed by the decorations on the finest china.

For restaurants, lunchrooms, barber shops, theater entrances, bathrooms, confectionery stores and other places of this character, decorated Vitrolite lends itself to new and artistic treatment of the highest order.



FRIEZE DESIGNS 18 INCHES WIDE DECORATED IN COLORS

Continued on next page

Vitrolite Gravity Toilet Partitions

The Vitrolite gravity toilet partition is recommended by the company, but the fact is recognized that other types of Vitrolite partitions have found favor with certain architects, and therefore they will be built whenever specified.

The gravity partitions are constructed in units, standardized throughout, and are factory assembled and fitted. All parts interchangeable, giving the greatest degree of flexibility and permitting quick installations. Constructed in conformance with the principle of gravity settlement, partition is held rigidly in slotted stiles, but without strain or stress at any point.

The entire absence of bolts, screws or nuts in the construction (not a single hole drilled in the Vitrolite) is a new and highly desirable feature.

Vitrolite partition is ¾ in. thick, double faced, and contains within itself a shock absorbing cushion, which absolutely protects it against the most severe shocks.

Standard—Vitreous china standard when set in tile or terrazza floor forms a sanitary cove at floor.

Guarantee—Any partition which it can be proved has been damaged due to its own faulty construction will be replaced, because the construction is based on the right principle and will meet all conditions in actual service.

Specifications for Toilet Partitions

All water closet partitions and backs shall be of Vitrolite constructed in the following manner, in accordance with shop drawings submitted by the contractor doing this work and subject to the approval of the architect.

Provide a vitreous china standard 12 in. high with sanitary cove at base, and top recessed to receive 2-in. square section metal stile hereinafter described.

All stiles to be of sheet metal 2 in. square in section with spring lipped channel extending throughout its length. The lower end to telescope into the vitreous china standard 1¼ in., the upper end finishing with a cast metal tee connection 6 ft. and 4 in. above the finished floor.

The head rail shall be secured in a workmanlike manner to the tee castings at the top of each stile. The hardware, such as spring butts, strikes, etc., shall be thoroughly secured to the metal stiles.

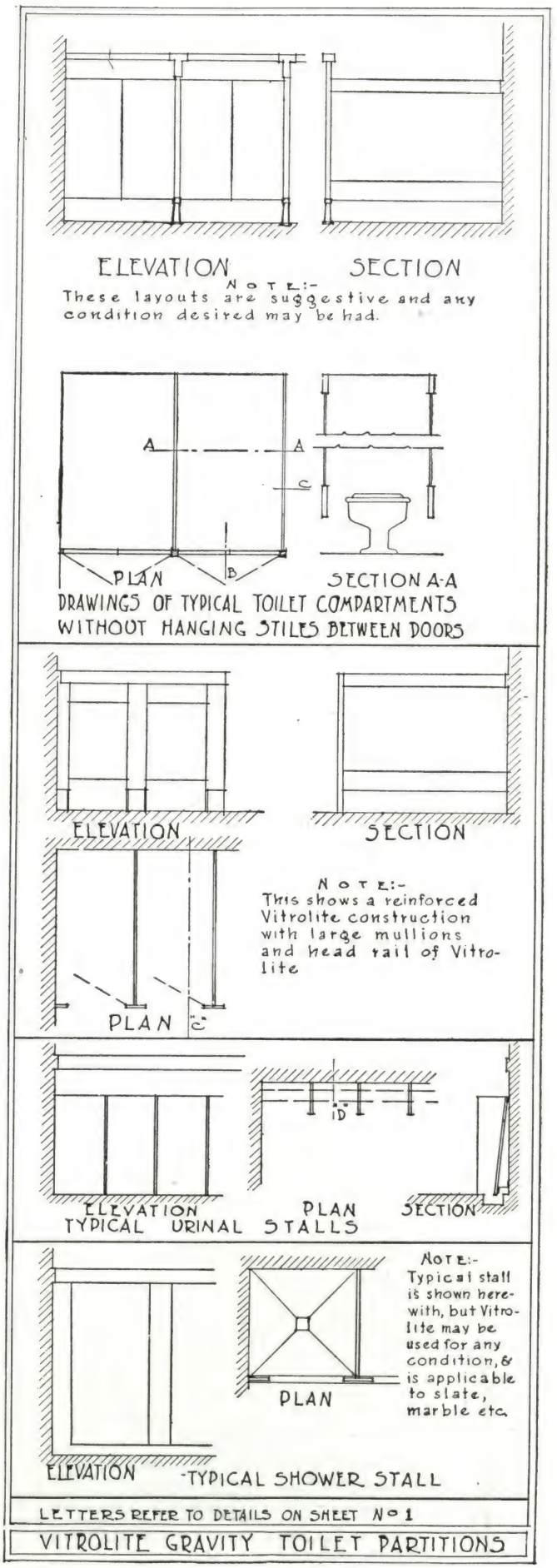
All structural metal work is to be rustproofed and to receive four coats of celluloid enamel.

Each partition to consist of base 10 in. high, panel 44 in. high and cap 6 in. high; the base to be supported at the front by a vitreous china standard and at the wall to rest upon a Vitrolite base 12 in. high, which shall have been previously set along the wall. The various members of this partition shall be constructed as follows:

Base and cap shall be made up of two pieces of Vitrolite $\frac{7}{16}$ in. thick, mounted back to back with plastic cement on a felt core. The vertical faces of the Vitrolite shall be grooved to a depth of ⅛ in. along the short ends. These grooves to engage the spring lipped channel of the stile at the front and to receive rustproofed sheet metal strips at the end engaging the wall. The panels or die shall be made up of two $\frac{5}{16}$-in. pieces of Vitrolite mounted in a similar manner. In assembling this partition, sheet metal dowels shall be inserted into the top edge of the base embedded in the plastic cement between the Vitrolite and the felt and shall extend into the plastic cement core of the die. In a similar manner the top edge of the die and bottom edge of the cap shall be doweled together, thus insuring the alignment of all members.

The partition shall be erected as above described, and the use of bolts and angles or the drilling of holes will not be permitted.

Unless otherwise specified all hardware shall be furnished by others as well as toilet doors. However, this contractor to drill necessary holes for hardware as per templet furnished. In public work where statutes prohibit the specifications of a single product, the words "or other similar fire finished products" may be inserted. All necessary holes for plumbing, etc., must be drilled by Vitrolite men.



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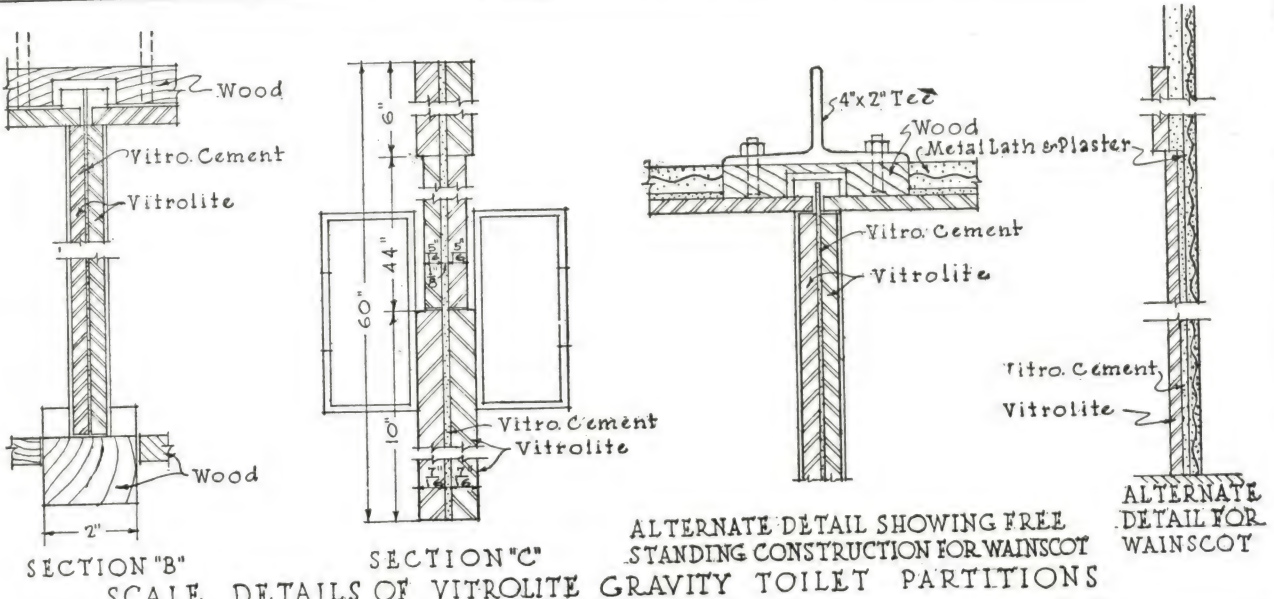
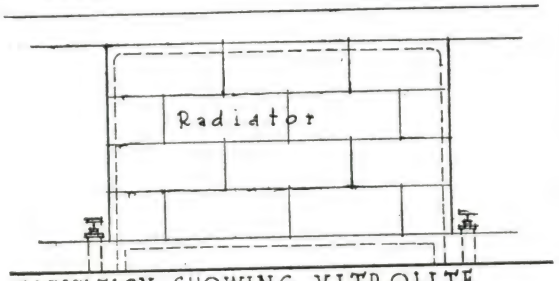
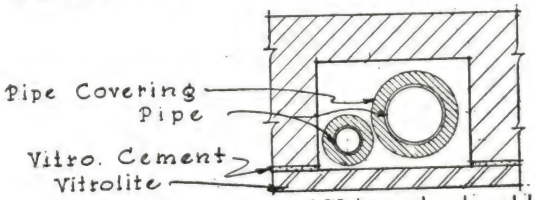


SCALE DETAILS OF VITROLITE GRAVITY TOILET PARTITIONS



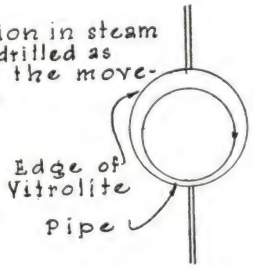
ELEVATION SHOWING VITROLITE BACK OF RADIATORS LAID UP IN SMALLER UNITS PROVIDING ADDITIONAL JOINTS TO ALLOW FOR THE EXPANSION AND CONTRACTION DUE TO HEAT FROM RADIATORS



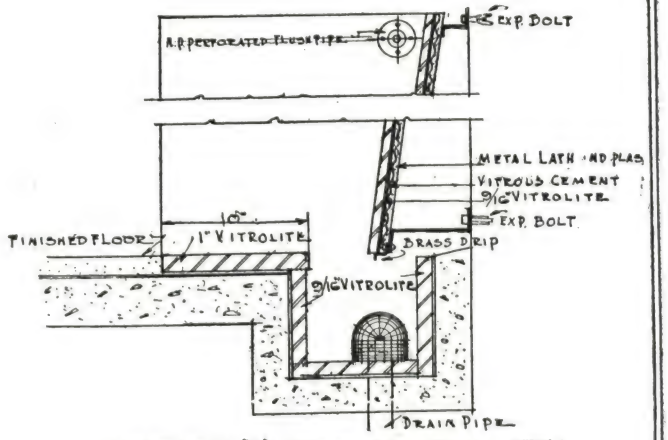
Note:- All pipes back of Wainscots should be covered.

PLUMBING OR HEATING PIPES IN WALL CHASE

Note:- Due to expansion in steam pipes all holes to be drilled as per detail to permit the movement of such pipes. Expansion and contraction cannot be prevented therefore provision must be made as suggested in detail.

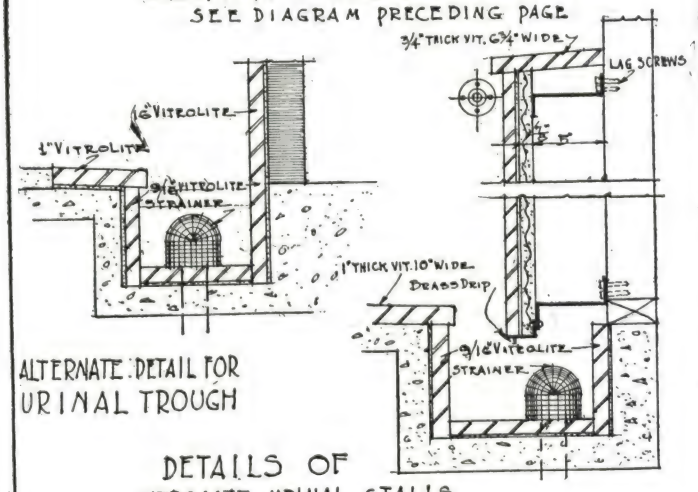


PLUMBING OR HEATING PIPE PASSING THRU' VITROLITE



SECTION "D" THROUGH URINAL STALL

SEE DIAGRAM PRECEDING PAGE



ALTERNATE DETAIL FOR URINAL TROUGH

DETAILS OF VITROLITE URINAL STALLS

THE VITROLITE COMPANY	USE OF VITROLITE FOR TOILET PARTITIONS, URINAL STALLS, RADIATOR RECESSES AND PIPE ENCLOSURES.	AUG. '21. DRAW'G No 1

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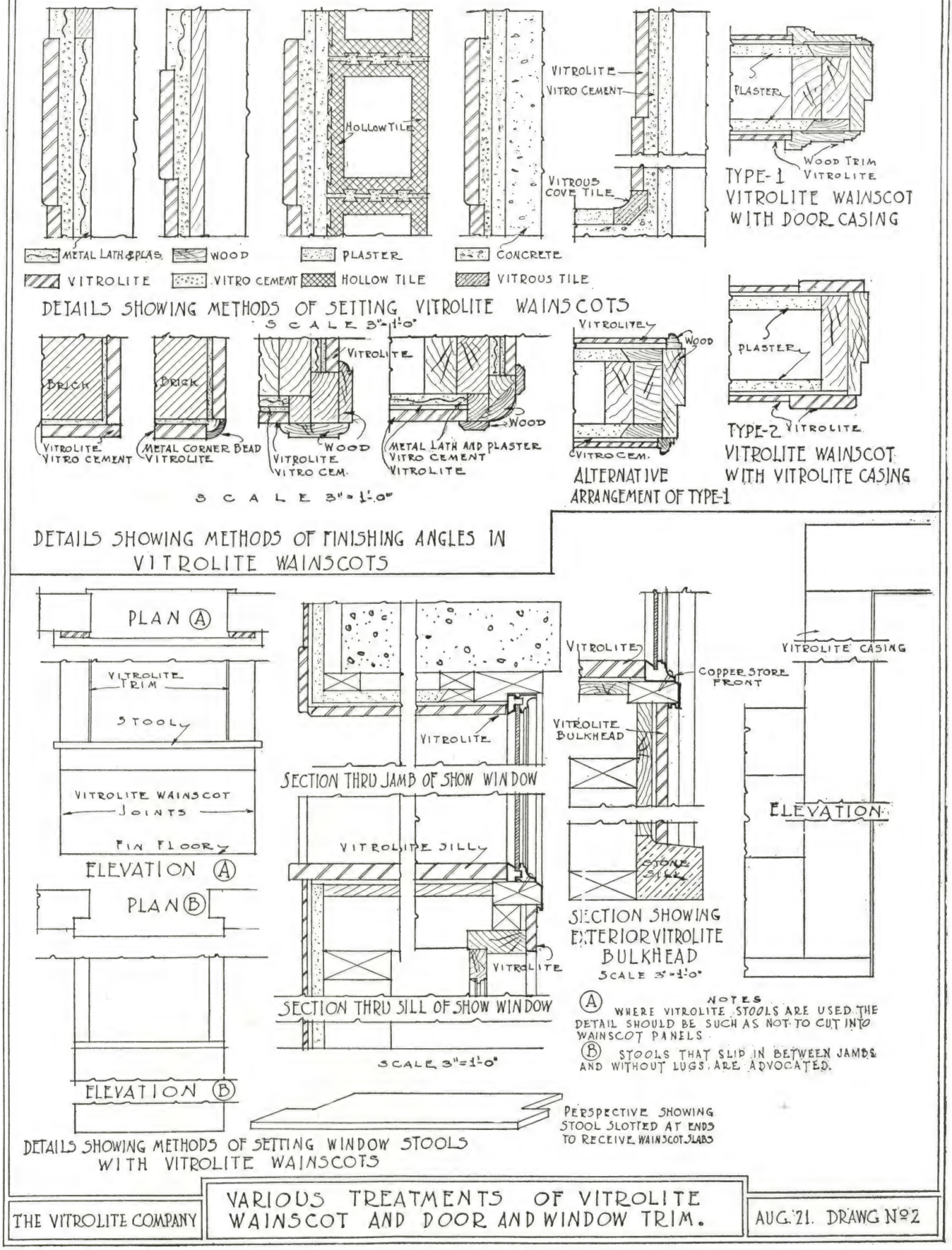
METAL LATH & PLAS.
WOOD
PLASTER
CONCRETE
VITROLITE
VITRO CEMENT
HOLLOW TILE
VITROUS TILE
DETAILS SHOWING METHODS OF SETTING VITROLITE WAINSCOTS
SCALE 3"-1'-0"
BRICK
VITROLITE
VITRO CEMENT
METAL CORNER BEAD
VITROLITE
WOOD
METAL LATH AND PLASTER
VITRO CEMENT
VITROLITE
SCALE 3"-1'-0"
VITROCEM.
ALTERNATIVE ARRANGEMENT OF TYPE-1
PLASTER
WOOD TRIM
VITROLITE
TYPE-1 VITROLITE WAINSCOT WITH DOOR CASING
TYPE-2 VITROLITE WAINSCOT WITH VITROLITE CASING
DETAILS SHOWING METHODS OF FINISHING ANGLES IN VITROLITE WAINSCOTS
PLAN (A)
VITROLITE TRIM
STOOL
VITROLITE WAINSCOT JOINTS
FIN FLOOR
ELEVATION (A)
PLAN (B)
ELEVATION (B)
SECTION THRU JAMB OF SHOW WINDOW
VITROLITE SILL
SECTION THRU SILL OF SHOW WINDOW
SCALE 3"=1'-0"
VITROLITE
COPPER STORE FRONT
VITROLITE BULKHEAD
STONE SILL
SECTION SHOWING EXTERIOR VITROLITE BULKHEAD
SCALE 3"-1'-0"
VITROLITE CASING
ELEVATION
NOTES
(A) WHERE VITROLITE STOOLS ARE USED THE DETAIL SHOULD BE SUCH AS NOT TO CUT INTO WAINSCOT PANELS
(B) STOOLS THAT SLIP IN BETWEEN JAMBS AND WITHOUT LUGS ARE ADVOCATED.
PERSPECTIVE SHOWING STOOL SLOTTED AT ENDS TO RECEIVE WAINSCOT SLABS
DETAILS SHOWING METHODS OF SETTING WINDOW STOOLS WITH VITROLITE WAINSCOTS
THE VITROLITE COMPANY
VARIOUS TREATMENTS OF VITROLITE WAINSCOT AND DOOR AND WINDOW TRIM.
AUG. '21. DRAWG Nº2

BRAYMAN WATER-TIGHT DRAIN CO.

133 West 52nd Street
NEW YORK, N. Y.

Products

BRAYMAN WATERTIGHT DRAIN BOXES.

Brayman Watertight Drain Boxes

Made for every purpose and suitable for every condition where drainage is required, especially for concrete construction. Different types for stables, garages, manure pits, ice plants, storage buildings, railroad yards, areas, courts, roofs, hospitals, powerhouses, mausoleums, roadways, bridges, showers, toilets, swimming pools, schools, cow barns, etc.

Where special drain boxes for particular purposes are required, castings will be made to suit drawings submitted. Brayman drains are made in plain iron, galvanized iron, polished brass or white metal. Covers are of cast iron, malleable, steel, galvanized, polished brass or white metal. Unless otherwise specified, 4-lb. sheet lead flashings are furnished.

Advantages of Brayman Watertight Drains

Brayman watertight drains may be set at the time the contractor lays the floor, thereby avoiding the possibility of improper levels, or any incorrect pitch to the drain. The flashing, when worked in with the waterproof section, becomes a part of it. The plumbing connections may be made at any time thereafter, as the joint is made *inside* the drain from the top. Lead flashings may be made any dimension specified by the architect. There are no leaks or discolored ceilings where Brayman watertight drains are used. Guaranteed absolutely non-freezing when used in exterior parts of buildings.

Floor sweepings, or other solid matter, are prevented from passing through the drain boxes and clogging the pipes, being *retained* by means of *sieves* and *dams* which are readily accessible for the purpose of cleaning out accumulated sediment.

Furnished with either *side* or *bottom* connections, making Brayman watertight drains practical in all locations.

FIG. O. SHALLOW FLOOR OR STALL DRAIN

How to specify: (1) Furnish and install in....., as shown on plans, Fig. O Brayman watertight drain 8½x8½x7½ in. deep, with 12x12 in. 4-lb. sheet lead flashing 2¼ in. below top. Bottom connection (3 or 4) in.

(2) Furnish and install in....., as shown on plans, Fig. O Brayman watertight drain 10x10x7½ in. deep, with 18x18-in. 4-lb. sheet lead flashing 3½ in. below top. Bottom connection (2, 3 or 4) in.

(3) Furnish and install in....., as shown on plans, Fig. O Brayman watertight drain 12x12x7 in. deep, with 18x18-in. 4-lb. sheet lead flashing 2½ in. below top. Bottom connection (2, 3 or 4) in.

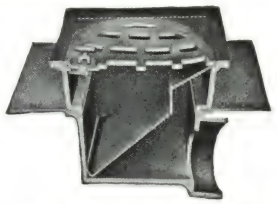

FIG. B. BUILDING DEPARTMENT FLOOR OR VAULT DRAIN

How to specify: Furnish and instal in....., as shown on plans, Fig. B Brayman watertight drain 8½x8½x9¼ in. deep, with interior removable strainer dam and brass locking device and 12x12-in. 4-lb. sheet lead flashing 2½ in. below top. Side (or bottom) connection (2, 3 or 4) in.

(2) Furnish and install in..... as shown on plans, Fig. B Brayman watertight drain 10x10x9½ in. deep, with interior removable strainer dam and brass locking device, with 18x18-in. 4-lb. sheet lead flashing 3½ in. below top. Side (or bottom) connection (2, 3 or 4) in.

(3) Furnish and install in....., as shown on plans, Fig. B Brayman watertight drain 12x12x9½ in. deep, with interior removable strainer dam and brass locking device, with 18x18-in. 4-lb. sheet lead flashing 2½ in. below top. Side (or bottom) connection (2, 3 or 4) in.

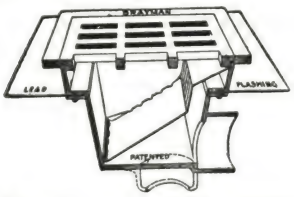

FIG. H, I, J. WATERTIGHT DRAINS FOR ABATTOIRS, CREAMERIES, ETC.

How to specify: (1) Furnish and install in....., as shown on plans, Fig. H Brayman watertight drain 12x12x9½ in. deep, with removable dirt arrester and 18x18-in. 4-lb. sheet lead flashing (2¼ or 7½) in. below top. Side (or bottom) connection, (3 or 4) in.

(2) Furnish and install in....., as shown on plans, Fig. I Brayman watertight drain 15½x15½x11½ in. deep, with removable dirt arrester and 24x24-in. sheet lead flashing 3½ in. below top. Side (or bottom) connection, (3, 4 or 5) in.

(3) Furnish and install in....., as shown on plans, Fig. J Brayman watertight drain 18½x18½x16 in. deep, with removable dirt arrester and 30x30-in. 4-lb. sheet lead flashing 5 in. below top. Side (or bottom) connection (3, 4 or 5) in.

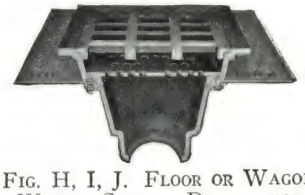

FIG. H, I, J. FLOOR OR WAGON WASH STAND DRAIN FOR WATERTIGHTNESS, MADE WITH INSIDE REMOVABLE STRAINER

FIG. M. SHALLOW ROOF AND FLOOR DRAIN PERFORATED OR BARRED

How to specify: (1) Furnish and install in....., as shown on plans, Fig. M Brayman watertight drain 8½x8½x4 in. deep, with 12x12-in. 4-lb. sheet lead flashing 1½ in. below top. Bottom connection, (2, 3 or 4) in.

(2) Furnish and install in....., as shown on plans, Fig. M Brayman watertight drain 10x10x4 in. deep, with 18x18-in. 4-lb. sheet lead flashing 1¼ in. below top. Bottom connection, (3 or 4) in.

(3) Furnish and install in....., as shown on plans, Fig. M Brayman watertight drain 12x12x4 in. deep, with 18x18-in. 4-lb. sheet lead flashing 1½ in. below top. Bottom connection, (3 or 4) in.

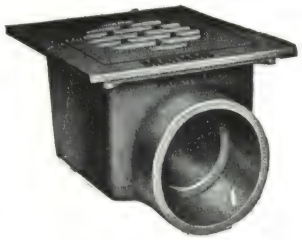

FIG. L. SHALLOW FLOOR DRAIN

How to specify: Furnish and install in....., as shown on plans, Fig. L Brayman watertight drain with side outlet 8½x8½x6½ in. deep (or bottom outlet 8½x8½x7¼ in. deep) for (2, 3 or 4) in. pipe, with inside removable dam

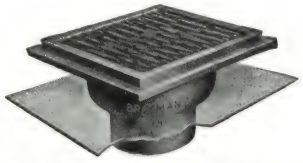

FIG. K. DRAIN FOR SHALLOW DEPTH CONCRETE FLOORS

How to specify: Furnish and install in....., as shown on plans, Fig. K Brayman watertight drain 10½x10½x5½ in. deep, with perforated diamond steel tops and 18x18-in. 4-lb. sheet lead flashing 3 in. below top. Bottom connection, (3 or 4) in.

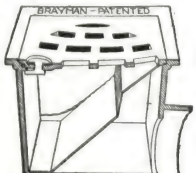

FIG. A. YARD AND AREA DRAIN, REMOVABLE STRAINER DAM

How to specify: Furnish and install in....., as shown on plans, Fig. A Brayman watertight drain 10x10x9½ in. deep, with interior removable strainer dam and brass locking device. Side (or bottom) connection (3 or 4) in.

FIG. C. GARAGE OR STABLE WASHING FLOOR DRAIN

13½x13½x7¾ in. deep; flashings, 18x18 in., 5 in. below top; 3 or 4-in. bottom connection. Special device for locking ring and cover to drain

FIG. E. AUTOMOBILE, CARRIAGE OR WAGON WASH FLOOR DRAIN

12¾x12¾x7½ in. deep; flashings, 18x18 in., 5 in. below top; 3 or 4-in. bottom connection

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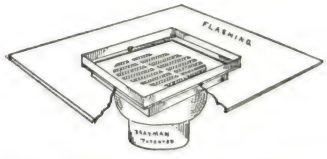


FIG. O-65. TILE AND GRAVEL ROOF DRAIN

How to specify: Furnish and install in....., as shown on plans, Fig. 0-65 Brayman watertight drain 10¾x10¾x7 in. deep with an abutment for gravel, with 24x24 in. 4-lb. sheet lead flashing 1½ in. below roof level

Note: Made in cast iron, galvanized or all brass and for 3, 4, 5 or 6-in. bottom connection for internal calking. No expansion joints required

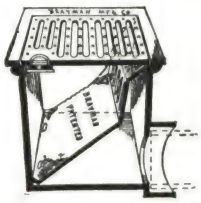


FIG. 90. NON-SLIP TOP DRAIN. BOARD OF EDUCATION PATTERN

How to specify: Furnish and install in....., as shown on plans, Fig. 90 Brayman non-slip top drain with inside dirt arrester and locking device, 12x12x10 in. deep. Side connection (3, 4 or 5) in.

Note: Made in galvanized iron with covers of galvanized malleable iron and inside galvanized malleable iron dirt arrester (or cast brass)

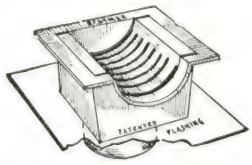


FIG. Q-1. GUTTER DRAIN FOR CONCRETE OR WOODEN FLOORS

One or both ends open

8½ in. long, 9¾ in. wide, 7½ in. deep; gutter, 5⅜x2½ in. deep; flashings, 18x18 in., 5¼ in. below top; 3 or 4-in. bottom connection

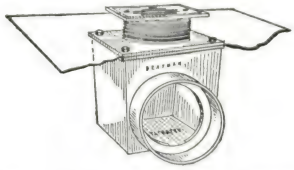


FIG. Y-10. SHOWER DRAIN, WITH ADJUSTABLE TOP FOR FLOOR LEVELS

How to specify: Furnish and install in....., as shown on plans, Fig. Y-10 Brayman watertight drain 3½x3½x6 in. deep; flashing 12x12 in.; with adjustable top for floor level, in (plain iron, galvanized iron or all brass) with tops of polished brass. Side connection (2 or 3) in.

FIG. Y-11. SWIMMING POOL FLAT TOP SCUM-GUTTER DRAIN

FIG. Y-12. SWIMMING POOL CURVED SCUM-GUTTER DRAIN

How to specify: Furnish and install in..... as shown on plans, (Fig. Y-11 flat, Fig. Y-12 curved or Fig. Y-13 slightly depressed) Brayman scum gutter drain 5½x3½x3½ in. deep, in all brass with polished brass top, with 2-in. screw pipe connection

FIG. O-66. DRAIN FOR CONCRETE ROOFS WITH BEEHIVE

10¾x10¾ in.; depth over all from top of beehive, 9¾ in.; flashings 24x24 in., 1¼ in. below roof level; 3, 4, 5 or 6-in. bottom connection

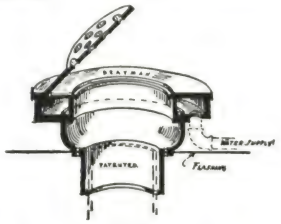


FIG. Y-1. SANITARY FLUSHING DRAIN FOR HOSPITAL, SUBWAY, RAILWAY STATION AND PUBLIC BUILDINGS

How to specify: Furnish and install in....., as shown on plans, Fig. Y-1 Brayman watertight drain with non-rustable flush, 11 in. diameter, 6½ in. deep with ¾-in. water supply, in (all brass or white metal), with 24x24-in. 4-lb. sheet lead flashing 4 in. below top, having (2, 2½ or 3) in. calk (or screw) connection

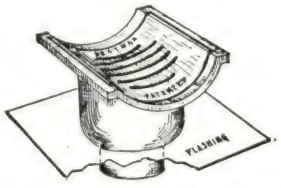


FIG. P-1. GUTTER DRAIN FOR CONTINUOUS CONCRETE GUTTERS

One or both ends open. Absolutely watertight

10x10x9¼ in. deep; width of gutter, 7¾ in., 2¼ in. deep; flashings, 18x18 in., 7 in. below top; 3-in. bell if desired

FIG. Y-5. SWIMMING POOL DRAIN OUTLET

How to specify: Furnish and install in....., as shown on plans, Fig. Y-5 Brayman swimming pool drain 13½x13½x9½ in. deep, having 6-in. side connection in galvanized iron (or solid brass) with covers of galvanized iron (or polished brass)

FIG. O-67. DRAIN FOR TILE OR GRAVEL ROOF

10¾x10¾ in.; depth over all from top of beehive, 9¾ in.; flashings, 1½ in. below top of roof; 3, 4, 5 or 6-in. bottom connection.

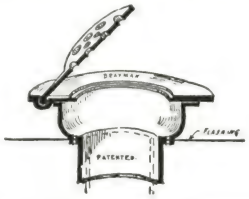


FIG. Y-2. DRAIN WITHOUT FLUSHING RIM

How to specify: Furnish and install in....., as shown on plans, Fig. Y-2 white metal Brayman watertight drain 9½ in. diameter, 4½ in. deep, without flushing rim, with 30x30 in. 4-lb. sheet lead flashing 2⅛ in. below top and with (2, 2½ or 3) in. calk (or screw) connection

FIG. G. MANURE PIT DRAIN

How to specify: Furnish and install in....., as shown on plans, Fig. G Brayman watertight drain 14x14x12 in. deep, with all parts removable for cleaning; lower side of connection 5 in. from inside of bottom. Side outlet, (3, 4 or 5) in.

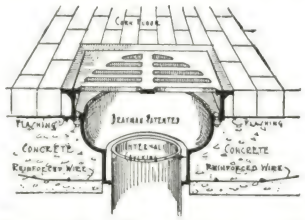


FIG. O-29. CORK, TILE OR CEMENT FLOOR DRAIN

10x10x5¼ in. deep; flashings, 18x18 in., 1¼ in. below top; 3 or 4-in. bottom connection

FIG. 46. BRIDGE ROADWAY DRAINS (PATENTED)

12 in. diam., 11 in. deep; flange, 2½ in. below top; 3 or 4-in. screw pipe

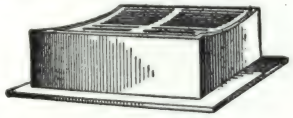


FIG. 86. CURVED ROADWAY BOX DRAIN

Over bottom flange, 2 ft. 3¼ in. x1 ft. 5½ in.; top, 1 ft. 9¼ in.x 11½ in. deep; gratings, 1 ft. 7¾ in. x9⅞ in.; depth, 8 in.

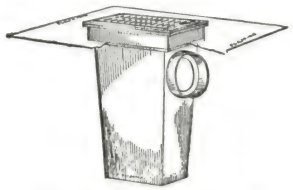


FIG. 45. POWERHOUSE DRAIN

How to specify: Furnish and install in....., as shown on plans, Fig. 45 Brayman watertight drain 18x24x30 in. deep, with 36x36-in. 4-lb. sheet lead flashing 4 in. below top. Side connection, 6 in.

Note: Made to take 2, 3 or 4-in. outlets

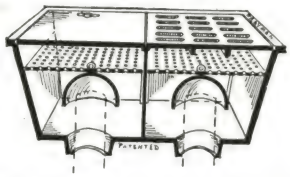


FIG. G-400. LIQUID MANURE SAVER DRAIN FOR COW BARNS AND STABLES

How to specify: Furnish and install in..... as shown on plans Fig. G-400 Brayman watertight drain 27½x14½x12 in. deep, with special partition for retention of liquids and with bells and inside strainers. Bottom connection, (3 or 4) in. Water seal, 1½ in.

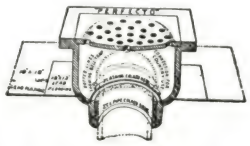


FIG. N. COW BARN OR STABLE FLOOR DRAIN PERFORATED OR BARRED, SHOWING INSTALLATION OF BELL TRAP

How to specify: Furnish and install in....., as shown on plans, Fig. N Brayman watertight drain 10x10x7 in. deep, with 18x18-in. 4-lb. sheet lead flashing 4½ in. below top. Bottom connection, (3 or 4) in.

FIG. Y-28. REFRIGERATOR DRIP RECEPTOR MADE WITH REMOVABLE CLEANER

How to specify: Furnish and install in....., as shown on plans, Fig. Y-28 Brayman refrigerator drain 7 in. diameter, 4 in. deep, in all brass, polished inside, with ½-in. water supply and 1¼-in. waste.

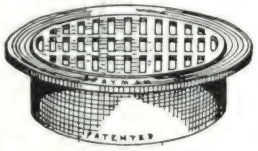


FIG. 88. CIRCULAR ROADWAY BOX DRAIN

15 in. diam., 6 in. deep

ESTABLISHED 1897

COMPOUND INJECTOR & SPECIALTY CO.

Manufacturers of Floor Drains and Grease Traps

LONG DISTANCE TELEPHONE
AUSTIN 1861, 1862

419-421 North Laramie Avenue
CHICAGO, ILL.

CABLE ADDRESS
"COMPOUND"

Products

GARAGE, LAUNDRY, STABLE, RESIDENCE and PUBLIC BUILDING FLOOR DRAINS; HYGIENIC and "ACME" GREASE TRAPS, with and without Water Coolers.

"ACME" FLOOR DRAINS

Also manufacturers of "AcmE" Adjustable Floor Drains, with and without Automatic Backwater Valves; "PeerlesS" Garage Drains and "PeerlesS" Floor Drains, with and without Automatic Backwater Valves; Dehn's Automatic Water Softening and Scale Removing Devices, "PeerlesS" Water Softener, "KomposT" Bricks, "AcmE" Iron Closed-end Adjustable Closet Bends and Extensions; Iron Drum Traps, Clean-out Tees, End Ferrules, Refrigerator Drains; Blow-off Catch and Gravel Basins; and other accessories to make a complete, perfectly sanitary plumbing drainage system.

"KOMPOST" BRICKS

All our TRADE-MARKS are Registered U. S. Patent Office

Sanitary Safeguards

Architects, sanitary engineers and contractors will safeguard the health and property of their clients by specifying this company's sanitary devices. As the trade-names "AcmE" and "PeerlesS" imply, they are unexcelled in design and operation. They are durable in make and in *every way reliable;* no other devices on the market may be substituted without *risk* for the "Dehn" Line as being "equally as good." The essential parts of these devices are patented.

DEHNSANIGARD THE QUALITY GOODS
TRADE-MARK

This company manufactures the largest and most complete line of sanitary plumbing drainage specialties in the United States.

Garage Floor Drains

The following regulations governing drainage from garages and other establishments, where gasoline, oils or other inflammable materials are used or stored, have been adopted by a great many cities throughout the United States:

Garage floor drains (cast iron) shall be installed to avoid explosions, choked sewers, prevent accidents from formation of gases, and other complaints and nuisances common in automobile garages and other establishments.

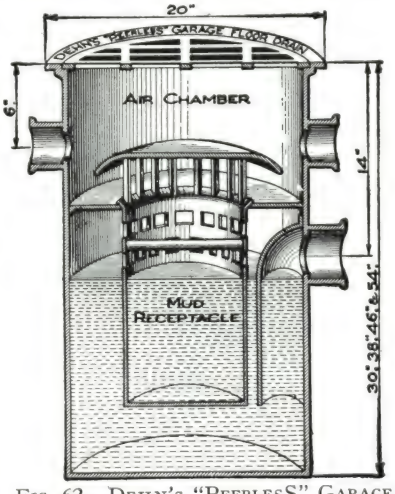


FIG. 62. DEHN'S "PEERLESS" GARAGE FLOOR DRAIN (Patented)

Section 1: It shall be unlawful to use or attach any garage, dye, cleaning or other establishment with the public sewers where gasoline, oils or other inflammable materials are used or stored, unless a system of mud, gas and oil basin (cast iron) is installed. Garages shall be classified according to their construction and capacity of automobiles to be housed as follows: Class "A," Class "B," Class "C," Class "D," and Class "E."

"DEEP SEAL" FLOOR DRAINS

"PEERLESS" WATER SOFTENER

Other establishments shall be classified according to the construction, size of the building, and number of persons employed on the premises.

Schedule of Capacity—The following schedule of capacities of "PeerlesS" Garage Floor Drains must be according to the following specifications here described and referred to as authority:

Every garage housing automobiles, hereafter constructed in the city of ————, shall instal a system of drainage basin (cast iron) to be provided with a removable receptacle (cast iron) inside of the basin to receive the mud and other material washed into the basin. The basin must be provided with an air chamber in the receiver, with a separate compartment constructed in such a manner that the direct discharge of water and other material can not come in direct contact with the fluid in the basin. The inlet of the receptacle in the basin must be provided with a guard (cast iron), having a solid top of sufficient size to entirely conceal the opening of the receptacle when discharging water or other material into the basin. The air chamber compartment must be provided with at least two 2-in. vent hub connections. Top of basin to be provided with bar grate (cast iron). Two 2-in. vent stacks must be connected with the air chamber, and must be extended outside of the building or through the roof. One vent pipe should be several feet higher than the other in order to establish a continuous circulation.

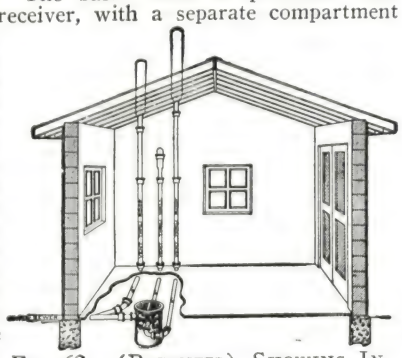


FIG. 62. (PATENTED) SHOWING INSTALLATION OF DEHN'S "PEERLESS" GARAGE DRAINAGE SYSTEM

Class "A"—Where from 1 to 50 automobiles are housed, two Fig. 62 "PeerlesS" Garage Floor Drains, 20 in. diameter at top and 38 in. deep, shall be installed.

Class "B"—Where from 1 to 25 automobiles are housed, one Fig. 62 "PeerlesS" Garage Floor Drain, 20 in. diameter at top and 38 in. deep, shall be installed.

Class "C"—Where from 1 to 10 automobiles are housed, one Fig. 62 "PeerlesS" Garage Floor Drain, 20 in. diameter at top and 30 in. deep, shall be installed.

Class "D"—Where from 1 to 5 automobiles are housed, one Fig. 61 "PeerlesS" Garage Floor Drain, 15 in. diameter at top and 24 in. deep, shall be installed.

FIG. 62. DIMENSIONS AND PRICES, GARAGE FLOOR DRAINS

Diameter of top, in.	20	20	20	20
Waste outlet, in.	4	4	4	4
Depth over all, in.	30	38	46	54
Vent hub connections, in.	2	2	2	2
Approximate weight, lbs.	400	500	600	700
Price, iron top and strainer, each	$75.00	95.00	110.00	125.00

Continued on next page

Dehn's "AcmE" Grease Traps

Designed to keep the water in the basin at a low temperature. By connecting the cold water supply pipe leading to the kitchen sink, range boiler and other fixtures with the water jacket in the basin, the water in the basin will be continually chilled to a very low temperature.

As soon as the greasy water enters the basin, the grease congeals and floats to the top of the water. This grease can be very easily removed by any one. The handhole is provided with a malleable iron saddle and heavy thumbscrew.

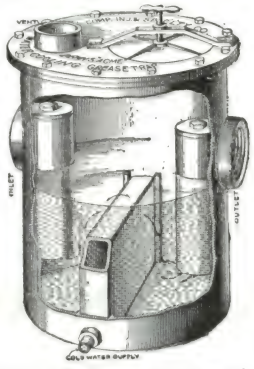
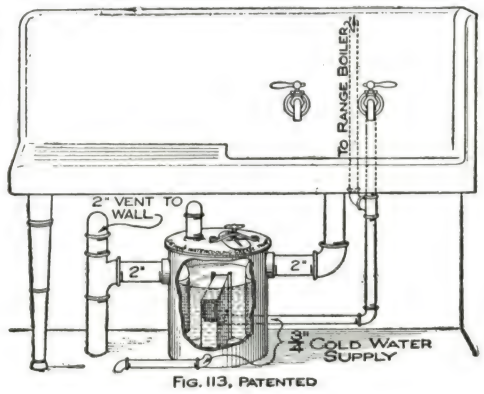


FIG. 113. DEHN'S "ACME" DOUBLE TRAPPED WATER COOLING GREASE TRAP
(Patented)



SHOWING DERN'S "ACME" GREASE TRAP PROPERLY INSTALLED IN KITCHEN

Schedule of Capacity—The following schedule of capacity applies to Dehn's "AcmE" Grease Traps when installed in residences, restaurants, hotels, boarding houses, large and public institutions.

No. 15-1—12 in. diameter of top, 15 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 25 people with 3 meals each day.

No. 18-1—12 in. diameter of top, 18 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 35 people with 3 meals each day.

No. 24-1—20 in. diameter of top, 24 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 150 people with 3 meals each day.

No. 30-1—20 in. diameter of top, 30 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 100 people with 3 meals each day.

No. 36-1—20 in. diameter of top, 36 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 150 people with 3 meals each day.

No. 24-2—24 in. diameter of top, 24 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 100 people with 3 meals each day.

No. 30-2—24 in. diameter of top, 30 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 150 people with 3 meals each day.

No. 36-2—24 in. diameter at top, 36 in. deep, double trapped water cooling grease trap will fill the requirements when supplying from 1 to 200 people with 3 meals each day.

Suggestion for Grease Trap Installation—For large institutions, it is suggested that a grease trap be installed for each individual sink, dishwasher, etc. For such installations, the minimum capacity of grease trap should be installed.

FIG. 113. DIMENSIONS AND PRICES, GREASE TRAPS

No.	15–1	18–1	24–1	30–1	36–1	24–2	30–2	36–2
Diameter of top, in.	12	12	20	20	20	24	24	24
Depth over all, in.	15	18	24	30	38	24	30	38
Waste inlet connection, in.	2	2	4	4	4	4	4	4
Waste outlet connection, in.	2	2	4	4	4	4	4	4
Vent hub connection, in.	1½	1½	2	2	2	4	4	4
Water supply connection, in.	3–4	3–4	1	1	1	1	1	1
Price, painted	$35.00	40.00	65.00	75.00	90.00	80.00	95.00	110.00

These grease traps can be furnished enameled inside, if desired. Prices quoted on application.

When Dehn's "AcmE" Double Trapped Water Cooling Grease Traps are installed and properly connected—i. e., the main cold water supply pipe connected with the inlet of the water cooler in the grease trap and the outlet of the water cooler with the cold water supply to range boiler or storage tank, and also with all the cold water faucets on the premises, including the cold water supply pipes to the closet tanks—the installation will permit the continuous circulation of cold water through the water cooler in the grease trap; hence, the grease accumulating in the grease trap will be congealed where it can easily be removed by any one.

Not a particle of grease can find its way out of the basin through the outlet into the sewer when Dehn's "AcmE" Double Trapped Water Cooling Grease Traps are installed and connected according to these directions. (See illustration.)

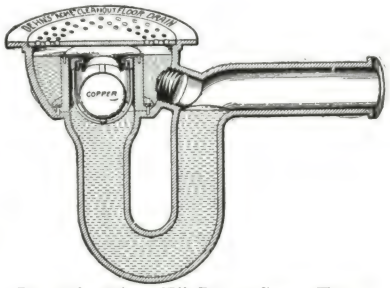
When the grease traps are installed in restaurants, hotels, large and public institutions, the grease should be removed from the grease trap at least 3 times each week.

From this it will be readily understood that the results to be obtained from the grease traps depend largely upon the plumbing contractor who has the supervision of the installation of the grease traps, and the owner whose duty it is to appoint or elect some one to give the grease traps the required attention.

Dehn's "AcmE" Deep Seal Floor Drains

These drains, with continuous pipe traps and automatic backwater valves, are also provided with large brass taper-threaded clean-out plugs and seamless metal ball floats.

These floats prevent flooding of cellars; can not get down into trap outlets and become air-bound, and can be easily removed with cage by unscrewing the four brass screws.



DEHN'S "ACME" DEEP SEAL FLOOR DRAIN
Fig. 9 Patented

DIMENSIONS AND PRICES, DEEP SEAL FLOOR DRAINS

No.	Fig. 9		
Outlet, in.	2	3	4
Water seal, in.	4	4	4
Diameter of top, in.	9	10	12
Depth over all, in.	11	13	16
Length over all, in.	18	20	24
Receiver above outlet, in.	2	2	2
Approximate weight, lbs.	30	40	65
Price, with iron top and strainer	$7.50	10.00	14.00
Price, with finished brass top and strainer	$13.50	17.00	22.00
Price, with nickelplated brass top and strainer	$15.50	19.00	25.00

CRAMPTON-FARLEY BRASS CO.

Manufacturers of Plumbers' Specialties

KANSAS CITY, MO.

Products

FLOOR DRAINS: the SIGNET and SAN-SEAL-O.

Also, Noxall and K. C. Area-Way Floor Drains; Star Hopper Valves; Needle Valves for Oil Burners.

Signet Drains

The Signet floor drains are made in one casting of heavy cast iron, with clean-out opening affording easy access to valve and sewer. All parts of the backwater trap are made of cast brass.

SIGNET FLOOR DRAIN (Patented)

San-Seal-O Drains

The San-Seal-O backwater trap drains are made of heavy cast iron, except the backwater trap parts, which are made of cast brass. The body of drain is made in one piece with flange on inside to support the J-shaped inner, which is held in place by four brass screws. A rubber cord gasket forms the joint.

Access to valve and sewer is obtained by removing the J-shaped inner.

No.	Approx. weight, lbs.	Diam. of top, in.	Diam. iron top strainer, in.	Size and style of outlet	Size and style of back inlet	Depth in clear, in.	Depth over outlet, in.	List Price	
								Iron top	Polished brass top
2	20	8	6¾	2-in. soil pipe		7¾	1⅛	$ 6.00	$ 8.50
3	50	13	11⅜	3-in. soil pipe		12	2	13.00	19.00
4	65	14¾	13	4-in. soil pipe		14	1⅞	18.00	28.00
D-2	19	8	6¾	2-in. iron pipe		7¾	1	6.50	9.00
2-R	22	8	6¾	2-in. soil pipe	1¼-in. iron pipe	7¾	1⅛	7.00	9.50
3-H	55	13	11⅜	3-in. soil pipe	2 -in. soil pipe	12	2	14.00	20.00
4-H	70	14¾	13	4-in. soil pipe	2 -in. soil pipe	14	1⅞	19.00	29.00

For extra heavy iron strainers add to list as follows. 2-in., $1.00; 3-in., $2.00; 4-in., $2.50
For nickel plating brass tops add to list as follows. . 2-in., .50; 3-in., .70; 4-in., .80

Construction and Operation

Both the Signet and San-Seal-O drains have submerged backwater trap.

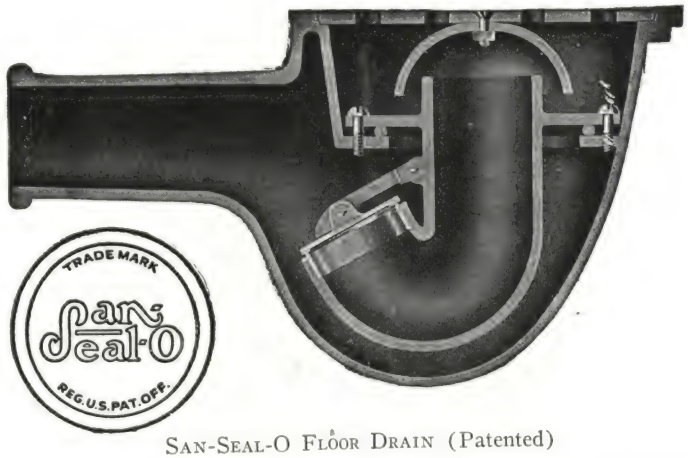
They work by gravity and, being submerged, work easily.

The grease, lint, etc., come to the surface, insuring a clean seat and a positive seal.

The water seal is large, and the openings full size with no obstruction to prevent the free outflow of water.

They are a positive insurance against backwater or sewer gas, wet or dry.

The quality of material, the superiority of design, the absolute safety and reliability of operation recommend the Signet and San-Seal-O drains for all high class work where permanent satisfaction is sought.



SAN-SEAL-O FLOOR DRAIN (Patented)

No.	Approximate weight, lbs.	Size and style of outlet, tapped for	Diameter of top, in.	Depth, in.	Distance from top center to outlet, in.	Price list with backwater trap	
						Iron top	Polished brass top
0	22	1½-in. iron pipe	8	8½	8	$ 6.25	$ 8.75
00	24	2 -in. iron pipe	8	8½	8	6.50	9.00
1	24	2 -in. soil pipe	8	8½	9½	6.00	8.50
2	35	2 -in. soil pipe	11	9	13	8.00	13.00
3	60	3 -in. soil pipe	13	12	13½	13.00	19.00
4	85	4 -in. soil pipe	15	14½	16½	18.00	28.00

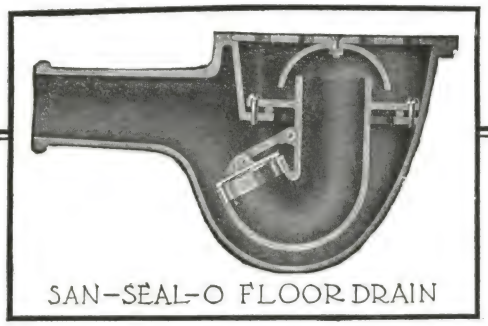
Discount

Discount will be given on application.

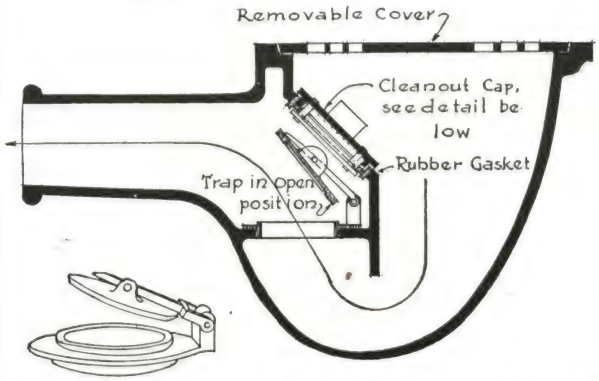
Write for descriptive circular.

Continued on next page

SIGNET FLOOR DRAIN

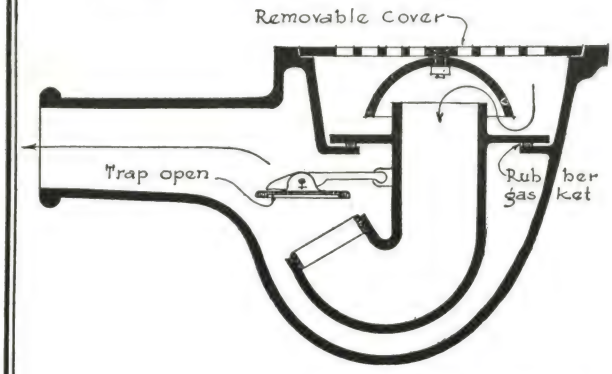


SAN-SEAL-O FLOOR DRAIN

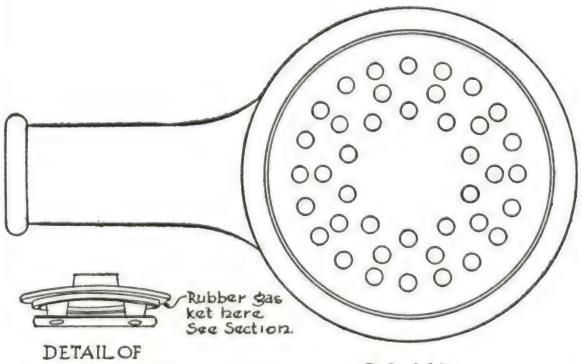


ETAIL OF TRAP

SECTION SHOWING TRAP OPEN WITH FLOW OF WATER TO OUTLET

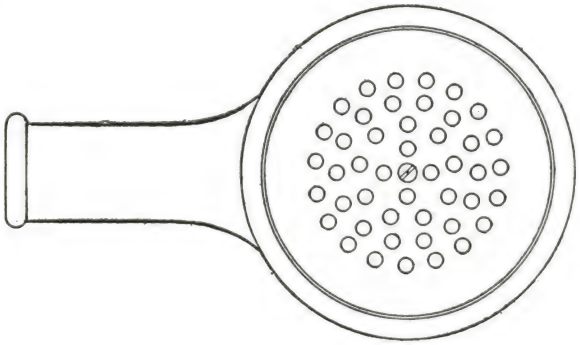


SECTION SHOWING TRAP OPEN, WITH FLOW OF WATER TO OUTLET

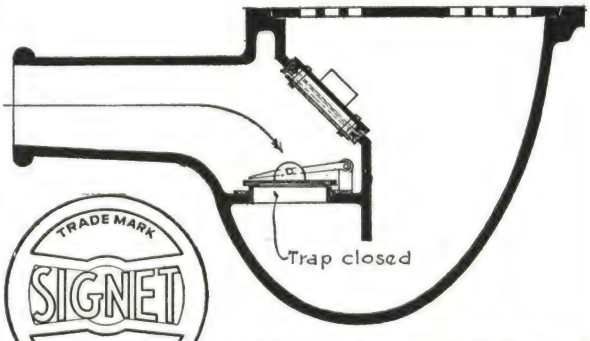


DETAIL OF CLEAN-OUT CAP

PLAN



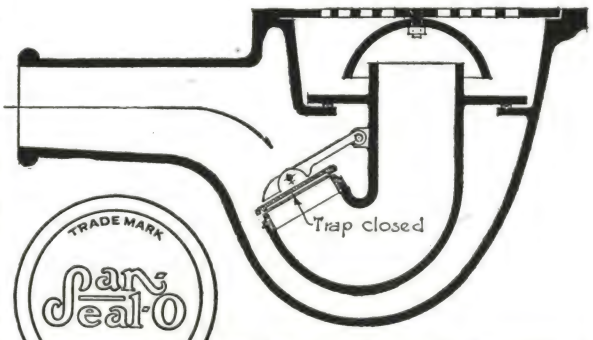
PLAN



TRADE MARK

SECTION SHOWING THE TRAP CLOSED · PROTECTS AGAINST FOUL AIR AND SEWAGE

SIGNET FLOOR DRAIN



TRADE MARK

SECTION SHOWING THE TRAP CLOSED · PROTECTS AGAINST FOUL AIR AND SEWAGE

SAN-SEAL-O B.W.T FLOOR DRAIN

JOSAM MANUFACTURING CO.

Floor and Roof Drains

MICHIGAN CITY, IND.

BRANCH OFFICES

NEW YORK, N. Y., 207 East 43rd Street
ST. LOUIS, MO., 317 De Baliviere Avenue
BOSTON, MASS., 10 High Street
ALBANY, N. Y., 496 Broadway
BUFFALO, N. Y., 69 Victoria Street
TORONTO, ONT., 81 Victoria Street
CLEVELAND, OHIO, 1104 Prospect Avenue
CHICAGO, ILL., 6167 Leiter Building
WASHINGTON, D. C., 4316 15th Street, N. W.
SAN FRANCISCO, CAL., Merchants National Bank Building
LOS ANGELES, CAL., 600 Metropolitan Building
MONTREAL, QUE., New Birk Building

Products

JOSAM DOUBLE DRAINAGE DRAINS for Shower Stalls, Floor, Roof, Garage, Hospitals, Swimming Pools, Gutters and Roadway.

Description of Josam Double Drainage Drains

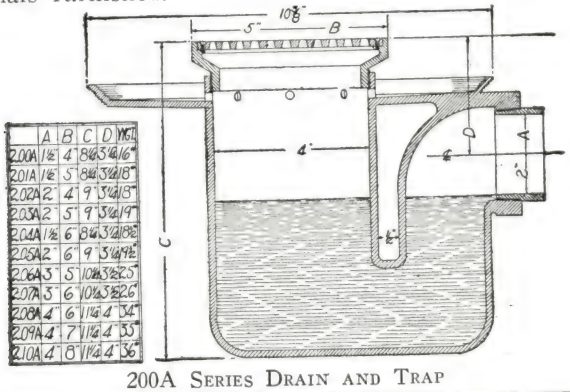
Double drainage drains prevent leakages to ceiling below at points of contact between the metal and floor or roof. Economy in installation. Absolutely trouble-proof. Once installed no further attention is necessary.

All numbers made in cast iron, black or galvanized finish, and in all-brass, plain or nickelplate finish.

Josam Double Drainage Drain and Trap Combination

200A Series—Heavy cast iron body with adjustable brass strainer to suit floor thickness variations. Regular finish is black japan. Galvanized, extra. Also furnished in all-brass.

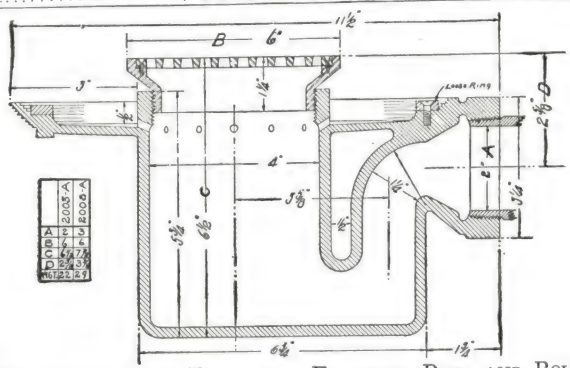
Strainers for porcelain shower receptors and urinals furnished.



200A SERIES DRAIN AND TRAP

No.	200A	201A	202A	203A	204A	205A
Strainer, in.	4	5	4	5	6	6
Outlet, in.	1½	1½	2	2	1½	2
Price	$10.50	12.00	12.00	12.00	12.50	13.00

No.	206A	207A	208A	209A	210A
Strainer, in.	5	6	5	6	7
Outlet, in.	3	3	4	4	4
Price	$15.00	16.00	19.00	21.00	23.00



2003A DRAIN AND TRAP WITH FLASHING RING AND BOLTS

No.	2003A	2008A
Strainer, in.	6	6
Outlet, in.	2	3
Price	$15.00	18.00

Made with hub or screw outlet. Galvanized additional.

2003A Special Shallow Type—Same construction as 200A, but designed for shallow installation.

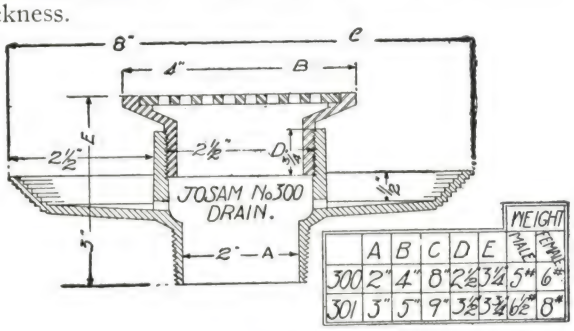
This number comes fitted with flashing ring and bolts to clamp and hold flashing permanently. Also nickelplated brass strainer and adjustable collar.

Josam Double Drainage Drain for Shower and Urinals

300 Series—Without trap, for shower stalls. Body is of cast iron and strainer nickelplated brass.

Can be installed in connection with independent trap to suit construction.

Can furnish either flat, convex or concave nickelplated strainers. Adjustable to variations in floor thickness.



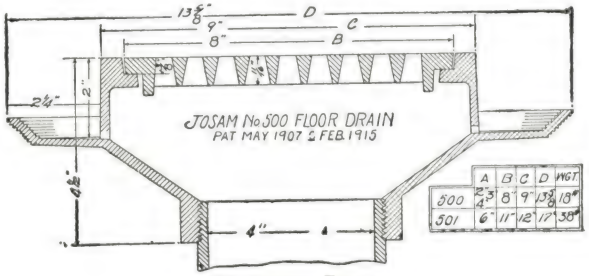
300 SERIES DRAIN

No.	300	301	302
Strainer, in.	4	5	6
Outlet, in.	2	3	4
Price	$6.00	8.00	9.50

Josam Double Drainage Drains or Cesspools

500 Series—For dairy, laundry, warehouse or factory floors.

Made of cast iron with antitilting cast iron grate, or brass grate furnished if desired.



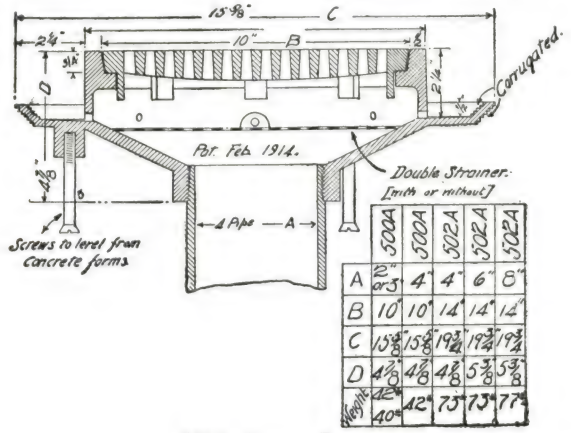
500 SERIES DRAIN

No.	500	500	500	501	501
Strainer, in.	8	8	8	11	11
Outlet, in.	2	3	4	6	6
Price	$6.00	6.00	6.00	8.50	9.00

500A Series—Extra heavy type made of cast iron and especially adapted for packing house, dairy, laundry or cold storage buildings where heavy trucking is necessary, also suitable as garage drains. The supplementary grate is of utmost importance in preventing sewer stoppage.

Continued on next page

This series comes equipped with leveling screws for adjustment to suit floor variations. Also has an extra heavy cast iron non-tilting grate 1 in. thick.

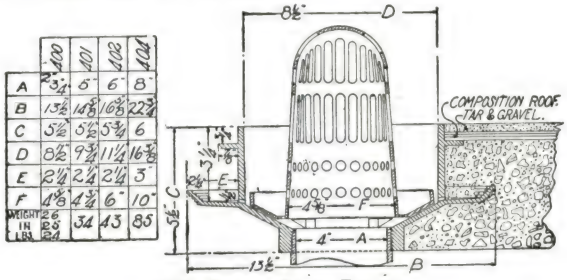


500A Series Drain

No.	500A	500A	502A	502A	502A	502A
Strainer, in.	10	10	14	14	14	14
Outlet, in.	3	4	4	5	6	8
Price	$10.00	10.50	12.00	13.00	14.00	16.00

Josam Double Drainage Drains for Roofs

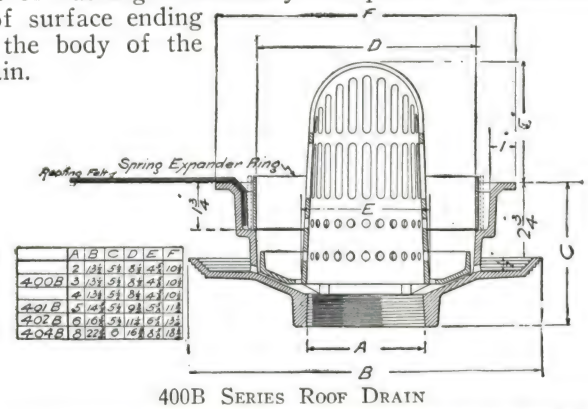
400 Series for Concrete Roof—All roof drains have removable strainer and sediment cup cast integral, to catch gravel, etc., making it easy to remove and clean out. Tapped for standard iron pipe thread. All cast iron. Soil pipe connectors for all sizes and all series of roof drains can be furnished.



400 Series Roof Drain

No.	400	400	400	401	402	404
Outlet, in.	2	3	4	5	6	8
Price	$12.00	12.00	12.00	14.00	16.00	20.00

Improved 400B Series Josam Roof Drain for Concrete Roofs—Construction same as in 400 series with the addition of positive means whereby roofing felts are joined to drain by an expander ring which permanently holds the felts tightly against the inside of a recess formed for that purpose. This renders the use of flashing unnecessary and permits a continuous roof surface ending in the body of the drain.

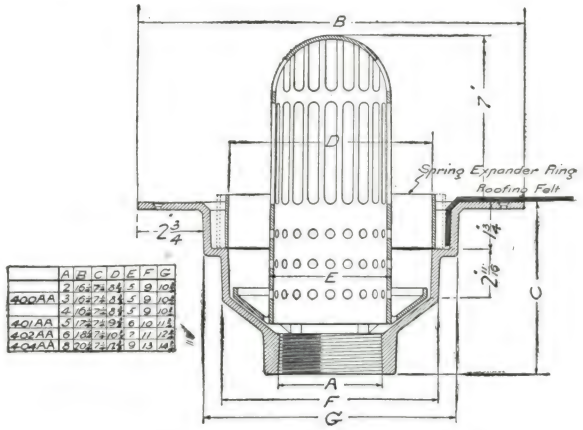


400B Series Roof Drain

No.	400B	400B	401B	402B	404B
Outlet, in.	2	3	5	6	8
Price	$13.00	13.00	15.00	17.00	24.00

Improved Josam Roof Drain with Removable Sediment Cup for Wood or Tile Roof

This series has an easily removable combined sediment cup and dome strainer 2 in. greater in diameter than drain outlet, an expander ring as used in 400B and is made with 3-in. cast iron ledge or flange to carry roof composition. In this series the double drainage cupped flange with weep holes is omitted.



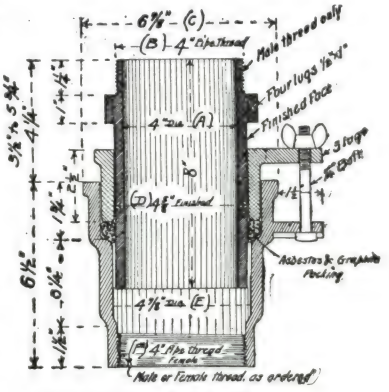
Improved 400AA Series Roof Drain

No.	400AA	401AA	402AA	404AA
Outlet, in.	2, 3 or 4	5	6	8
Price	$14.00	16.00	18.00	26.00

Josam Expansion Joint Connection

PRICE LIST

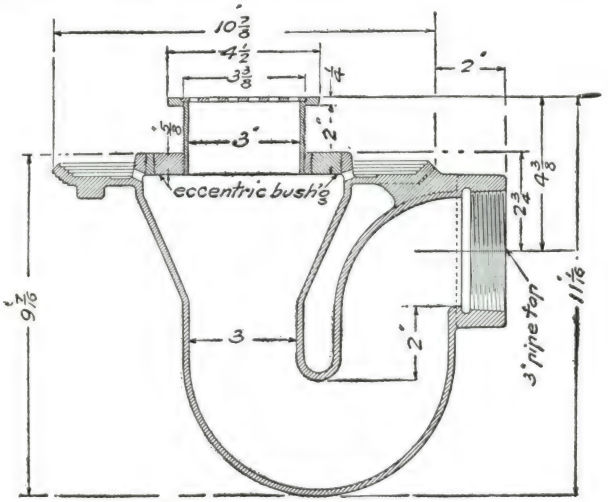
Size of pipe, in.	Price
3	$ 4.50
4	5.00
5	6.00
6	7.00
8	10.00



Expansion Joint Connection

Josam Double Drainage Combined Trap and Drain

2006A—Equipped with adjustable double eccentric bushings for porcelain, enameled iron, slate or marble urinal and shower receptors. (Patented May 1907 and May 1919.)



Double Drainage Combined Trap and Drain
Can be furnished without trap

2006A—2 in. outlet.....$14.00
2006A—3 in. outlet..... 16.00

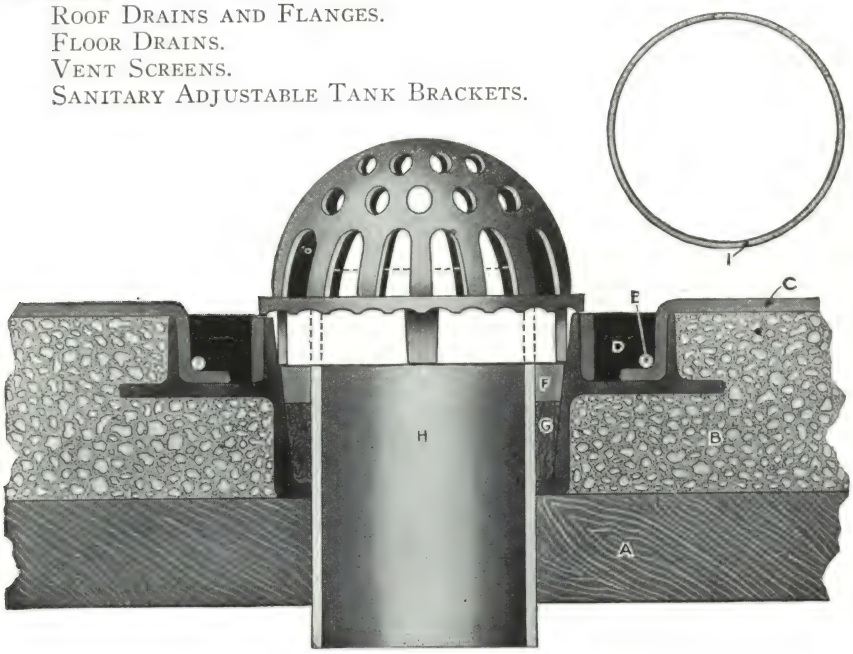
MECHANICVILLE SPECIALTY SUPPLY MFG. CO.

Manufacturers of Plumbing Specialties

MECHANICVILLE, N. Y.

Products

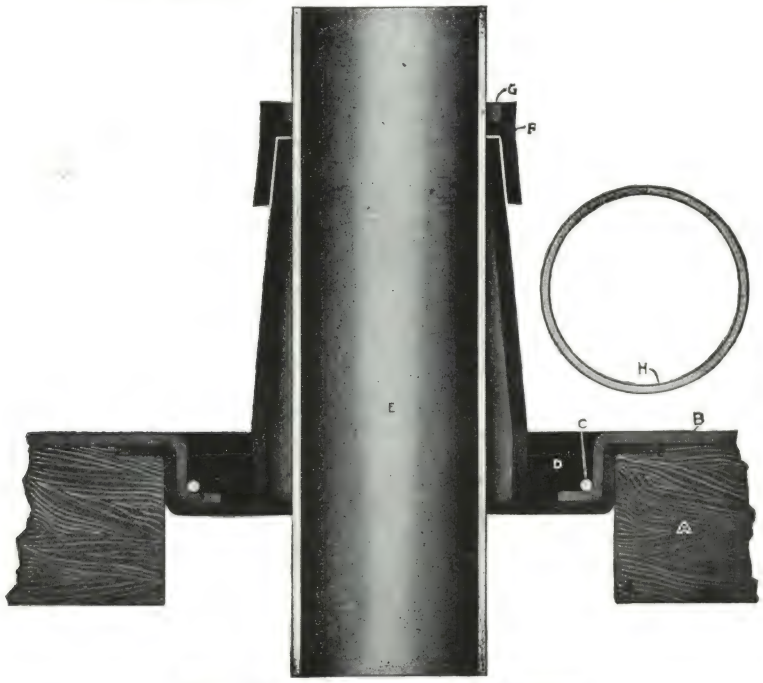
ROOF DRAINS AND FLANGES.
FLOOR DRAINS.
VENT SCREENS.
SANITARY ADJUSTABLE TANK BRACKETS.



ROOF DRAIN FOR CONCRETE CONSTRUCTION

A—Concrete form
B—Concrete roof
C—Roofing materials
D—Tar pit bonding felts to flange
E and I—Spring ring
F—Calking lead
G—Jute part of joint
H—Conductor of vent pipe

Suitable for all downspout connections, for both concrete and wood deck construction. Made in brass, cast iron or galvanized cast iron in sizes of 2, 3, 4, 5, 6, 7, 8, and 10 in.



ROOF FLANGE FOR WOOD CONSTRUCTION

A—Wood roof
B—Roofing materials
C and H—Spring ring locking material to tar pit
D—Tar pit
E—Vent pipe
F—Expansion joint sleeve
G—Wool lead joint furnished with flange

Suitable for all kinds of pipes passing through roofs, for both concrete and wood deck construction. Made in brass, cast iron or galvanized cast iron in sizes of 2, 3, 4, 5, 6, 7, 8, and 10 in.

DEEP SEAL BELL TRAP FLOOR DRAIN

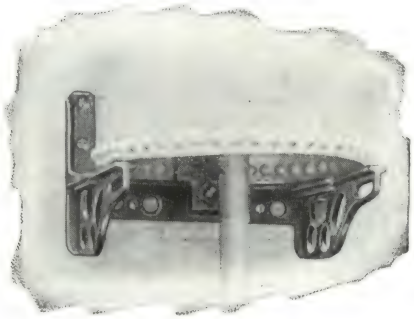
With hub connection and lead calking joint suitable for draining all floors, swimming pools, etc.

Made in galvanized cast iron or brass, in sizes of 2, 3 and 4 in.

VENT SCREEN

For covering foot vents. Simple to attach or remove and eliminates the necessity of clamping to stone or brick.

Made in brass or galvanized cast iron in sizes of 4, 5, 6, 7, 8, and 10 in.



SANITARY ADJUSTABLE TANK BRACKET

Has adjustable wings to fit tanks 10 to 16 in. in diameter

WADE IRON SANITARY MANUFACTURING CO.

Manufacturers of Sanitary Drainage Specialties

551-553 West Fulton Street
CHICAGO, ILL.

Products

CAST IRON PUMP BASINS, CAST IRON CATCHBASINS, GREASE BASINS, STEAM BASINS, FLOOR DRAIN BASINS and FITTINGS, FLOOR DRAINS with BACKWATER GATE VALVES and FITTINGS, SEWER LOCKOUT and BACKWATER VALVES, GARAGE BASINS, IRON CATCHBASIN COVERS, DOWN-SPOUT HEADS.

Also Electric Bilge Pumps.

Co-operative Service

The experts of this company will gladly assist in drawing up plans for sanitary sewage systems that may be under contemplation.

Catalogues

Catalogues giving sizes and further details furnished on request.

FIG. 36

FIG. 38

Clean-out Sectional Basins
Each section easily added and made to reach any depth

FIG. 31. Extra Heavy Catch basin and Gravel Basin

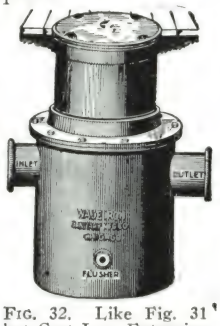


FIG. 32. Like Fig. 31 but Cast Iron Extension to Floor Level

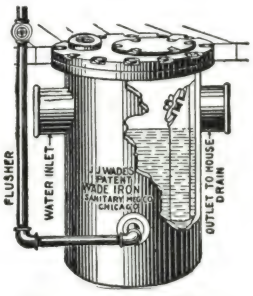


FIG. 33. Steam Water Cooling and Condensing Catchbasin

WADE ACCESSIBLE FLUSHING CLEAN-OUT EXTRA HEAVY CAST IRON BASINS

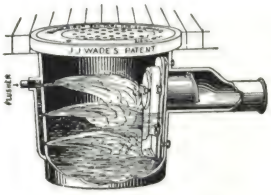


FIG. 126. Floor Wash and Gate Valve Combination

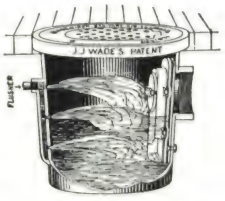


FIG. 130. Floor Wash and Water Seal Trap Combination

FIG. 62. For Concrete Floors

FIG. 52. Extra Heavy Basin

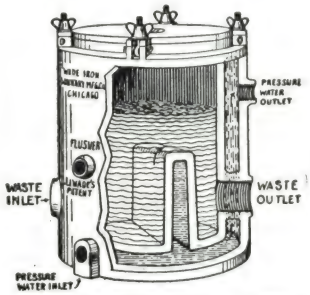


FIG. 27. Water Jacket Grease Catchbasin

WADE ACCESSIBLE FLUSHING CLEAN-OUT CAST IRON FLOOR DRAIN BASINS

FIG. 237
DOWN-SPOUT HEAD

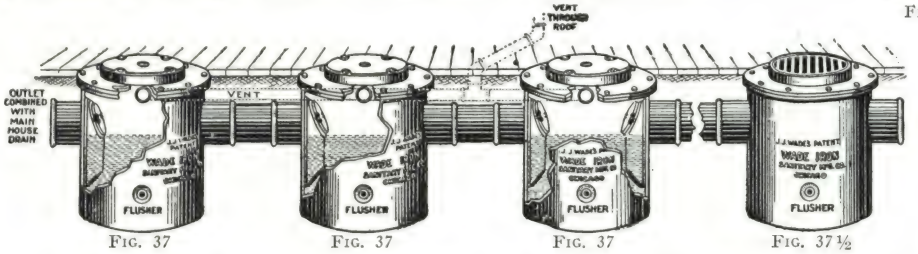


FIG. 37 FIG. 37 FIG. 37 FIG. 37½

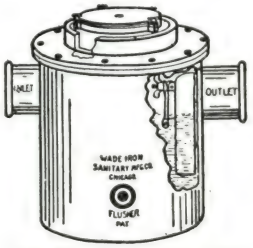


FIG. 29. Grease Intercepting Catchbasin

WADE ACCESIBLE FLUSHING CLEAN-OUT GREASE BASINS

WADE ACCESSIBLE FLUSHING CLEAN-OUT, EXTRA HEAVY CAST IRON, TRIPLE GARAGE GASOLINE AND OIL SEPARATING CATCHBASINS AND ACCESSORIES

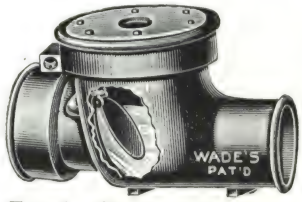


FIG. 1. BACKWATER GATE VALVE

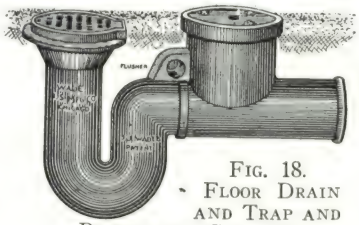


FIG. 18. FLOOR DRAIN AND TRAP AND BACKWATER GATE VALVE

FIG. 20. BACKWATER GATE AREA DRAIN

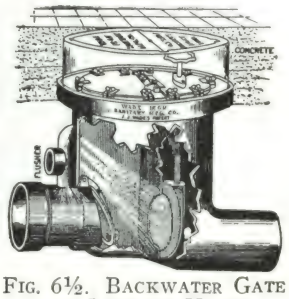


FIG. 6½. BACKWATER GATE AND LOCKOUT VALVE

FIG. 93. LOOSE CENTER CATCHBASIN IRON COVER

FIG. 44. BOLTED IRON CATCHBASIN COVER

FIG. 224. GRATED CENTER FLOOR DRAIN COVER

THE EAGLE-PICHER LEAD COMPANY

Manufacturers of Plumbers' Lead Goods

CINCINNATI, OHIO

Products

EAGLE ANTI-SIPHON TRAPS; EAGLE ALL-LEAD ROOF FLANGE.

Also the following, all of high grade: Lead Pipe, Plumbers' Standard Lead Goods, etc.

Slogan

"A Lead Product for every Lead Purpose."

Eagle Anti-siphon Traps

Eagle anti-siphon traps—body, inlet and outlet—are made entirely of lead. Their joints are *lead burned*, so that every trap is practically *one* piece, strong and durable; no solder is used. The clean-out caps are brass.

The fact that these traps are made entirely of lead should convince architects and builders of their value. Lead traps and pipes that are installed properly are worth all that they cost, and in the end will prove more economical than those of any other metal. Metallic lead is immune from oxidation and rust in ordinary temperatures. These traps are drawn under a hydraulic pressure of 2400 lbs. per cu. in., increasing their length of service far beyond the ordinary trap.

Eagle "P" Bath Trap No. 1-A—This trap is especially adapted to *hidden work*. It has no clean-out.

PRICES

Standard weight, each, $1.50 Extra heavy, each, $1.70

Eagle Running Bath Trap No. 2-B—Is the same as No. 1-A, except that it has an inlet of running shape instead of P-shape. Like that trap, it is adapted to *hidden work*.

No. 2-B can be furnished with inlet or outlet of any style or any size. PRICES

Standard weight, each, $1.50 Extra heavy, each, $1.70

Eagle Drum Bath Trap No. 4-D—The special feature of this trap is that, even if the cover is removed, no gas can escape into the apartment. It is less expensive to use No. 4-D trap than it is to buy a drum trap of another make, and then wipe the connections. It also insures a neater installation.

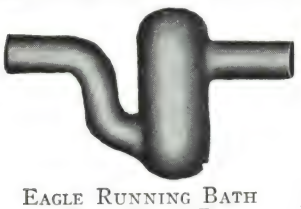
Two types of caps: style "A" cap is flush with the sides of the trap; style "E" cap has 5/8-in. flange extension over side of trap.

Style	PRICES Standard weight	Extra heavy weight
"A," brass cap	$1.90	$2.10
"A," nickelplated cap	1.95	2.15
"E," brass cap	1.95	2.15
"E," nickelplated cap	2.00	2.20

Eagle Clean-sweep Trap No. 6-F—Is very desirable because of its strength and durability. It has a clean-out at the bottom.

Size over all	PRICES Standard weight	Extra heavy weight
15 in.	$1.40	$1.65
24 in.	1.75	2.00
28 in.	2.00	2.25

Eagle Deep Seal Trap No. 7-G—Like No. 6-F, this trap has a clean-out at the bottom. It is designed to meet the same requirements as No. 6-F; but as it is less bulky than that trap, and contains less lead and brass, it is more desirable for some classes of work.



EAGLE RUNNING BATH TRAP NO. 2-B
Depth 7½ in.; seal 5¼ in.

EAGLE DRUM BATH TRAP NO. 4-D
Any depth 8 in. up; seal 5¼ in.

EAGLE "P" BATH TRAP NO. 1-A
Depth 7½ in.; seal 5¼ in.

EAGLE DEEP SEAL BATH TRAP NO. 7-G

EAGLE CLEAN-SWEEP BATH TRAP NO. 6-F
Depth 7½ in.; seal 5¼ in.

The Eagle All-lead Roof Flange

This is the only flange that is made entirely of lead. It has *lead burned joints*. No solder whatever is used in its construction.

The flange plate is made for a slope of 45° or 22½°, or for a level surface; but can easily be adjusted to any irregular angle, because it is made of pure lead of the finest quality.

The Eagle all-lead flange seals the opening in the roof so effectually that no calking is necessary. It can be installed before the roofing is put on. The plumber who uses it saves time, labor and money.

THE EAGLE ALL-LEAD ROOF FLANGE

Weight of sheet lead in roof flanges is 3 lbs. per sq. ft. Lead pipe used in boot is made of drawn lead and weighs 6 lbs. per lin. ft. Flanges are made with boots 2½, 3½ and 4½ in. inside diameter for standard cast iron soil pipe; 4¾ and 6 in. for extra heavy 4-in. and 5-in. cast iron soil pipe. Sheet lead apron measures 15x15 in. on all sizes, except the 6-in., which measures 18x18 in. Length of lead boot, 6 in. on the short side

Other Products

This company also manufactures a standard line of metallic products for the plumber's use, such as traps, bends, drum traps, combination lead and iron ferrules, combination lead and iron bends and ferrules, combination lead and brass solder nipples, lead pipe and wiping solder.

Virgin metals only are used in the manufacture of these products thereby insuring the best possible results.

THE GROENIGER MANUFACTURING CO.

Closet Bowl Connections and Sanitary Specialties

8 East Chestnut Street
COLUMBUS, OHIO

Products

Manufacturers of "TESTITE" CLOSET CONNECTIONS and "TESTITE" SANITARY SPECIALTIES.

TESTITE
TRADE-MARK

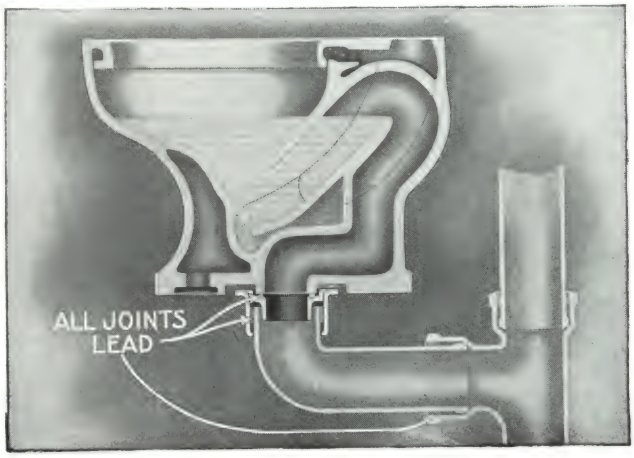
"Testite" Closet Connections

All agree that the "Testite" closet connection makes an ideal job of a neglected spot and that they are the standard of the country. Many architects specify them without adding the ordinary phrase "or equal" because there is no equal.

No special bowl is required. We furnish all types *for both long and short horn.*

Some of the architects and plumbers do not know that with our variety of "Testite" designs, we are able to solve the connection problem between the closet bowl and stack cheaper than can be done in any of the old, imperfect ways. We can save considerable material that is now wasted, and in some cases, about 2 hours of plumber's time. These 2 hours of the plumber's time cost equivalent to 4 hours of plumber's wages if proper value is given to the overhead cost of running the business.

Let us show you the best type to use upon your job. We make six types in both 3- and 4-in. sizes, and show 5 of them below, numbered 1 to 5, inclusive.



INSTALLATION OF "TESTITE" CONNECTION

"Testite" Sanitary Specialties

We show below four of the most used types of "Testite" sanitary specialties, numbered 6 to 9, inclusive.

If you do not find here what you are looking for to help solve your special problem, write us and we will make it for you.

We will make any special fitting desired promptly and at a reasonable cost.

Type A. For use with cast iron pipe; 3-in., $4.75; 4-in., $5.00

Type B. For use with lead pipe; 3-in., $3.50; 4-in., $3.50

Type C. For use with screwed w. i. pipe. Iron: 3-in., $4.50; 4-in. $5.00. Brass: 3-in., $6.50; 4-in., $7.00

Type D. For use with lead pipe; 3-in., $5.75; 4-in., $6.00

Type F. Cast with bend; 3 in., 15 in. long, $5.00; 4-in., 15 in. long, $6.50

VARIOUS TYPES OF "TESTITE" CLOSET CONNECTIONS

Roof Connection

Does not have to be adjusted when dropped over vent pipe. Fits any roof. Made in pressed lead, copper and cast iron

Urinal Trap

Adjustable every way. Vertical. Reaches any point within 1½-in. circle. Ball joint and will swivel; 2-in., $12.00; 3-in., $15.00

O. S. Distributing Fittings

Save elbows and nipples and equalize distribution of heat on different floors

Drainage Fittings, Type A

Made in two other types, besides short sweep bends, cut in hubs, etc. Save right and left threads or long screws

"TESTITE" SANITARY SPECIALTIES

THE D. A. EBINGER SANITARY MFG. CO.

Specialists and Manufacturers of "Ebco" Ventilated Toilet Fixtures

COLUMBUS, OHIO

BRANCH OFFICES AND AGENCIES

NEW YORK, N. Y., W. W. Frothingham, 101 Park Avenue
MINNEAPOLIS, MINN., R. H. Evans, Hampshire Arms
CHARLESTON, S. C., E. G. Haymaker, 258 Congress Street
INDIANAPOLIS, IND., E. B. Leppert, Hume-Mansur Building
DETROIT, MICH., Jas. M. Watt, 3942 Commonwealth Avenue
OMAHA, NEBR., Omaha Sanitary Supply Co.
GOLDSBORO, N. C., Noland Co., Inc.
WINSTON-SALEM, N. C., Noland Co., Inc.
PITTSBURGH, PA., T. F. Scanlon, 1405 East Street
KANSAS CITY, MO., Jno. H. Kitchen & Co.
CLEVELAND, OHIO, American Sanitary Co.
LOS ANGELES, CAL., Leslie C. Brintnall, Bryson Block
ROCHESTER, N. Y., Swalbach Bldg. Products Co.
ROANOKE, VA., Noland Co., Inc.
NEWPORT NEWS, VA., Noland Co., Inc.
MILWAUKEE, WIS., J. A. Hanson, 248 Brisbane Avenue

Products

Ventilated Individual and Range Closets.
Ventilated Octagon and Wall Urinals.
Ventilated Vitro Porcelain Urinals.
Drinking Fountains.
Lavatories.
Wash Sinks and Showers.

TRADE-MARK

For Steel Toilet and Shower Enclosures, see pages 1554-1555.

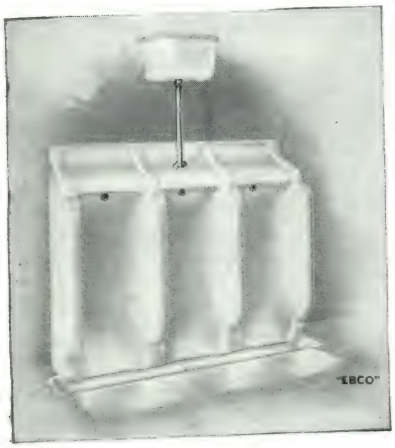
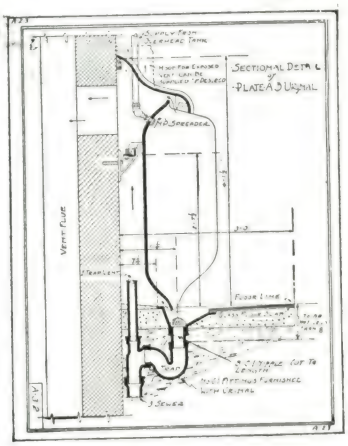


Plate A-3
"Ebco" Vented Wall Urinal



Sectional Detail of A-3 Urinal

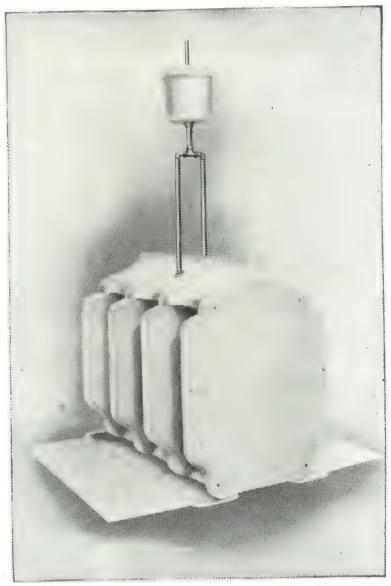


Plate A-3-D
Same as A-3 But Stalls Are Placed Back to Back

"Ebco" Vitreous Enameled Ventilated Urinals

Specifications—"Ebco" vitreous enameled ventilated urinals. Concave back and partitions made in one piece. Each urinal back flushed periodically from automatic flush tank, white glass floor slabs (if desired) drain into receptor.
Each stall shall have two points of ventilation, top and bottom, with capacity of 25 sq. in. per section

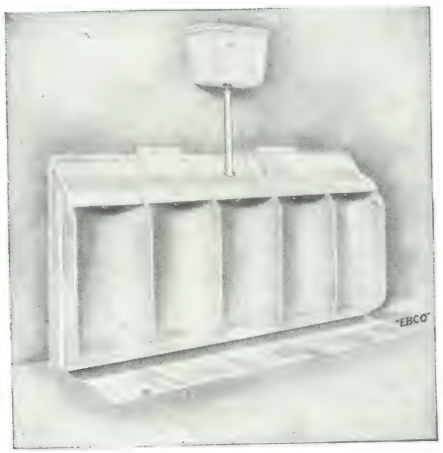


Plate A-4

"Ebco" Vitreous Enameled Ventilated Urinal

Specifications—"Ebco" vitreous enameled ventilated urinals. Each urinal back flushed periodically from automatic flush tank. White glass floor slabs (if desired) drain into receptor. Each stall to have two points of ventilation, top and bottom, with capacity of 25 sq. in. per section. May consist of any number of stalls

Plate A-7

"Ebco" Porcelain Ventilated Urinal

Specifications—"Ebco" ventilated porcelain urinals. Partitions and back made in one piece. Each urinal back to be flushed periodically from automatic flush tank. Each stall to have two points of ventilation, top and bottom, with capacity of 30 sq. in. per section. May consist of any number of stalls

Continued on next page

Plate B-61
"Ebco" Special Ventilated Automatic Closet
Specifications—"Ebco" Special ventilated automatic closet, heavy vitreous china bowl, extended front and rear, with large raised rear vent, automatic seat-operated concealed flush valve, heavily reinforced seat, open front and rear

Plate B-85
"Ebco" Flush Valve Closet with China Oscillating Handle
Specifications—"Ebco" closet combination. Vitreous china syphonic action bowl, positive flush valve with china oscillating handle and oak seat

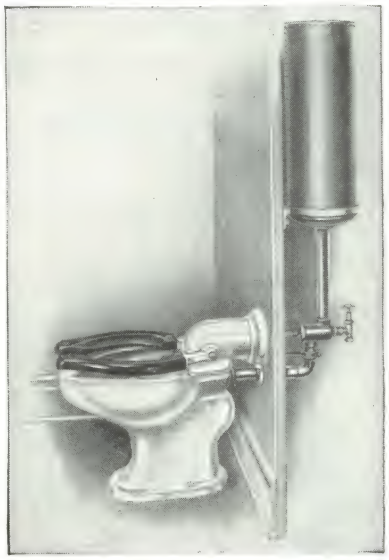


Plate B-65
"Ebco" Special Vented Automatic Compression Tank Closet
Specifications—"Ebco" Special ventilated Automatic closet, heavy vitreous china bowl extended front and rear with large raised rear vent, galvanized compression tank and seat operated valve. Open front and rear seat

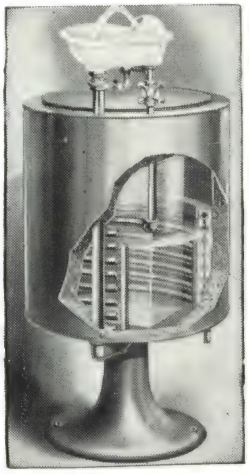


Plate C-271
"Ebco" Cooler Fountain
Specifications—"Ebco" combination water cooler and fountain; tinned brass coils; vitreous enameled receptor; ice capacity 75 lbs. in one piece. Other type bubblers may be used if desired

Plate C-202
"Ebco" Vitreous Enameled Pedestal Fountain
Specifications—"Ebco" pedestal fountain with nickelplated anti-squirt bubbler and self-closing and stop valve. Heights, 30 in., 36 in. and 42 in.

Plate C-243
"Ebco" Vitreous Enameled Wall Fountain
Specifications—"Ebco" wall fountain with angle jet bubbler and self-closing and stop valve

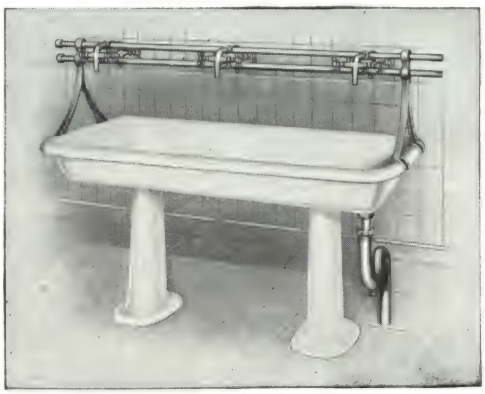


Plate D-310
"Ebco" Porcelain Enameled Wash Sink
Specifications—"Ebco" porcelain enameled roll rim double wash sink on floor pedestals and with combination mixing faucets. Sizes: widths, 27 and 30 in.; lengths, 4, 5 or 6 ft.; one-piece sinks and up to 20 ft. long in sectional sink

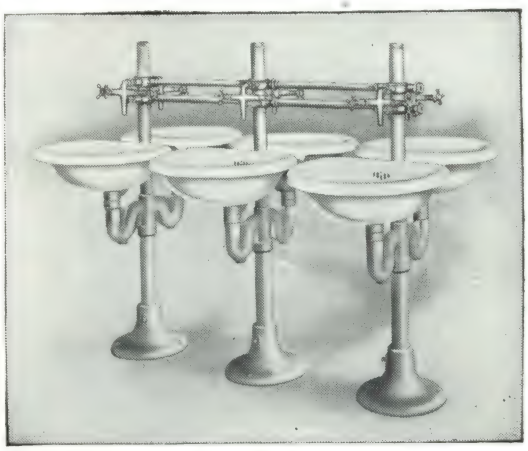


Plate D-309
"Ebco" Individual Factory Lavatory
Specifications—"Ebco" factory lavatory; vitreous enameled bowls; combination trap standard; "Ebco" combination faucets; any number of bowls may be used

THE IMPERIAL BRASS MFG. CO.

Manufacturers of Plumbing Specialties

1222 West Harrison Street

CHICAGO, ILL.

Products

WATROUS DUOJET WATER CLOSETS; WATROUS WALTANK CLOSET COMBINATION; WATROUS GRAVITY LIQUID SOAP SYSTEM; WATROUS INDIVIDUAL SOAP CONTAINER; WATROUS SELF-CLOSING FAUCETS; WATROUS LAVATORY WASTE; WATROUS OSILOMETER, PEDOMETER and PUSHOMETER FLUSHING VALVES.

WATROUS PATENT PLUMBING FIXTURES AND DUOJET WATER CLOSETS

TRADE-MARK

Watrous Duojet Water Closets

The principle of action is a new and important development in the flushing of water closets. The action is derived from two powerful converging jets of water coming together at the entrance of the trap, forming a spray which completely fills it and produces a strong instantaneous action, using less water than any other type of closet; dispensing with the siphonic feature, thus eliminating the down leg as an operative element of the closet.

Advantages—The objection to a closet having a zigzag down leg (notably siphon closets), that necessitates taking up the bowl if it should become clogged, has been entirely removed.

The Watrous Duojet has a full 3-in. unobstructed opening throughout, and, as the smallest part is at the mouth of the trap, it will be seen that no obstruction can lodge beyond the reach of the hand. A deep refill is obtained at all times, as the gradual receding of the converging jets, due to the gradual stopping of the flushing supply, causes the action to cease and produces a perfect and most natural refill.

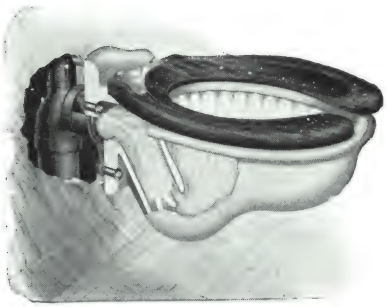
This is in direct contrast to the siphon closets, where the siphonic process often continues until after the water supply has been completely shut off, making necessary the addition of refill chambers and other devices to insure the proper, though still uncertain water seal in the bowl.

Flushing Valve—Watrous Duojet closets are furnished with either the Watrous Osilometer, Pedometer or Pushometer flushing valve with side or bottom inlets as required.

Various Types—Watrous Duojet combinations are made in various forms, both floor and wall closets, for all service conditions and requirements, including a complete line for prisons.

C-110 OSILOMETER FLUSHING VALVE

C-190 SECTIONAL VIEW WATROUS PATENT DUOJET FLOOR CLOSET



C-194 SECTIONAL VIEW SHOWING METHOD OF SUPPORT OF WATROUS DUOJET WALL CLOSET

C-300 WATROUS DUOJET FLOOR CLOSET

Watrous Duojet Floor Closet and nickelplated Watrous Osilometer Flushing Valve combination. One of many floor closet types

C-200L WATROUS DUOJET WALL CLOSET

Watrous Duojet Wall Closet and nickelplated Watrous Osilometer Flushing Valve combination. One of many wall closet types

Watrous Waltank Closet Combination

For the first time a wall closet can be used successfully with a "low down" tank. This long wished for result is made possible by the new Watrous Patent Low Waltank and Watrous Siphon Duojet Wall Closet.

Continued on next page

It is accessible—can be disconnected and removed in 1½ minutes—fits easily in any regular partition, connecting with lead, cast iron soil or threaded wrought iron pipe.

Economizes Water—A 3-gal. low tank thoroughly, quickly and quietly scores the bowl and provides an ample refill and water seal.

Saves Space—The space saved in the bathroom is important. From 8 to 11 in. are saved where the wall closet is used, and 6 or 8 in. in the case of floor closets.

Flushes Quietly — Being concealed in the wall, all noise due to flushing and refilling is muffled and hushed.

Attractive Appearance — Made of vitreous, smooth white china, the Waltank blends ideally with any form of decorated wall. There is no exposed metal to corrode or necessitate cleaning.

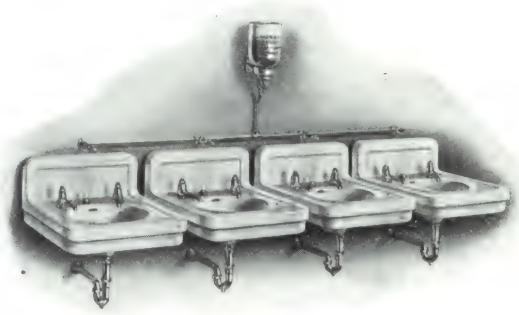
C-266 Showing Waltank Open

C-366 Showing Waltank Closed

C-266 Showing Waltank Removed

Watrous Gravity Liquid Soap System

Operates wholly by the time-proved gravity principle. No moving parts to get out of order. A simple valve delivers a pre-determined supply of soap without drip or waste. The large soap container is simply placed on its receptacle as shown in the illustration and replaced by a full one in a moment's time.



Watrous Gravity Liquid Soap System
As applied to series of lavatories (patented)

One sanitary glass container serves any number of washstands, thus eliminating the tedious filling of individual fixtures formerly used.

Watrous Style "M" Individual Soap Container

The illustration shows but one of many types of our individual containers.

Strongly attached to the wall waste; clog-proof and very durable. Full details on request.

Style "M" Individual Soap Container

Watrous Self-closing Faucets

No. 7—This is the only push button, self-closing faucet, closing against pressure. It is easily operated, no packing, no leakage, no corrosion of working parts. Time and trouble saving.

No. 7 Faucet

No. 8 Faucet

No. 8—The simplest self-closing faucet made. Has only 2 working parts—a spring and a valve stem. Easily operated accessible parts, well designed.

Watrous Lavatory Waste

Watrous Lavatory Waste

The most simple, easily adjusted waste yet developed. Has only one-third as many parts as any other. Fits any type of enameled iron, porcelain or vitreous lavatory. The operating rod has a universal ball joint which allows for distance variations between the two lavatory openings, and a series of holes in the shank of the stopper plug takes care of varying thicknesses of lavatory openings. Open or closed, the action is always positive. The drain area empties 3 times as fast as the ordinary waste, saving time. The conical expansion spring minimizes friction and adjustments.

Catalogue

The complete line of Watrous water closet combinations, flushing valves, urinals, drinking fountains, self-closing and compression faucets, lavatory combinations and liquid soap fixtures, is fully illustrated and described in our new plumbing catalogue.

Copy will be mailed to all architects on request.

PHILIP HAAS COMPANY

Manufacturers of Flush Valves and Water Closets

MAIN OFFICE AND FACTORY

DAYTON, OHIO

Products

"HAAS" FLUSH VALVES; "HAAS" SEAT ACTION and MANUAL CLOSET COMBINATIONS; "HAAS" VENTILATING CLOSETS; "HAAS" FROSTPROOF CLOSETS.

HAAS FLUSH VALVES

TRADE-MARK

"Haas" Improved "Universal" Flush Valve

Architects are specifying this Improved Flush Valve for many well established reasons. Below are given a few important advantages:

(1) Five years' service guarantee.
(2) Simplicity and sturdiness.
(3) Low initial cost and water economy.
(4) No metal-to-metal parts to wear loose and rattle.
(5) Internally self-cleansing in any water.
(6) No small ports or needle point adjustments.
(7) Independent compression control and shut-off valve.
(8) Compact, pleasing appearance.
(9) Easily cleaned and polished.
(10) Top cap nut locks entire assembly.

Haas valves can be supplied separately for staple bowls or in complete combinations.

Below is given a quick reference table to determine size of piping for proper water supply to Flush Valves.

SIZE OF PIPING FOR FLUSH VALVES

Minimum pressure at flush valve, lbs.	Total feet of supply pipe from flush valve to street main or storage tank									
	5	10	20	30	40	60	80	100	150	200
	Size of pipe for one water closet									
5	1¼	1½	1½	1½	2	2	2	2½	2½	3
10	1	1¼	1½	1½	1½	1½	2	2	2½	2½
20	1	1	1¼	1¼	1¼	1½	1½	1½	2	2
30	1	1	1	1¼	1¼	1¼	1½	1½	1½	1½
40	1	1	1	1	1¼	1¼	1¼	1½	1½	1½
60	¾	1	1	1	1	1¼	1¼	1¼	1½	1½
80	¾	¾	1	1	1	1	1¼	1¼	1¼	1½

Add 10 ft. for each 90° fitting.

A Service to Architects

"Ready-Made Specifications" have been prepared on practically every type of standard water closet combination required. They can be copied right into the building specifications without change or alternation. There is one for each "Haas" closet combination shown on the following pages as well as many others shown in the "Haas" Catalogue.

These "Ready-Made Specifications" will be supplied willingly and without charge to any architect. Style and type of combination or "Haas" plate number should be mentioned in the request.

This insures a good leakproof, error-tight specification with years of experience behind it, at no expense and minimum trouble.

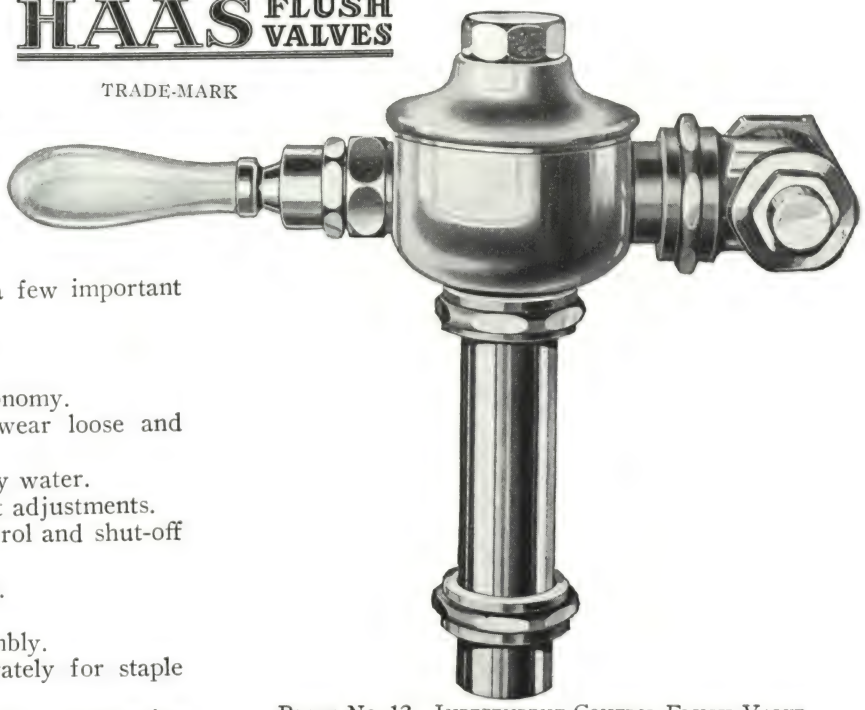


PLATE NO. 12. INDEPENDENT CONTROL FLUSH VALVE

Haas "Utility" Flush Valves (two types)

This valve operates on the never failing principle of equalization of pressure and can be installed on either direct or tank supply. It is fully guaranteed to give maximum service and satisfaction with minimum attention when under proper working conditions. The action is positive, the flush powerful and cleansing.

Liberal piping is required in accordance with the table given above.

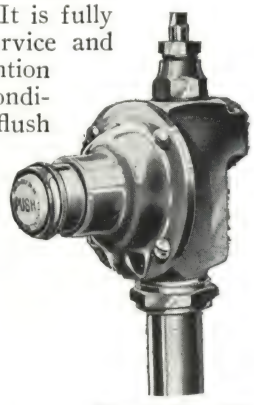


PLATE NO. 3B. INTEGRAL CONTROL FLUSH VALVE WITH PUSH BUTTON

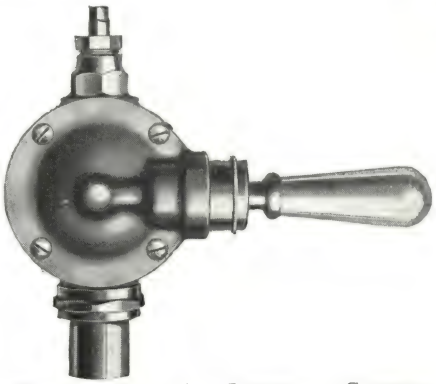


PLATE NO. 3A. INTEGRAL CONTROL FLUSH VALVE WITH OSCILLATING HANDLE

Continued on next page

"Haas" Water Closet Combinations

Complete information on any of the following combinations on request. Send for catalogue. *Ask for "Ready-Made Specifications" giving plate number.*

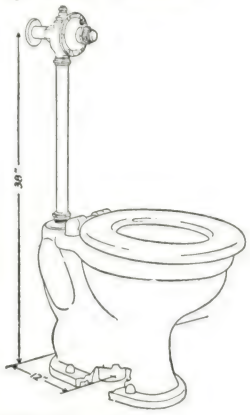


PLATE 101. SIPHON JET COMBINATION

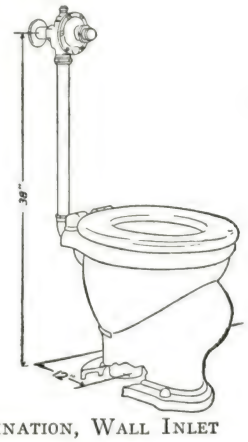


PLATE 103. WASHDOWN COMBINATION, WALL INLET

PLATE 104. WASHDOWN COMBINATION, FLOOR INLET

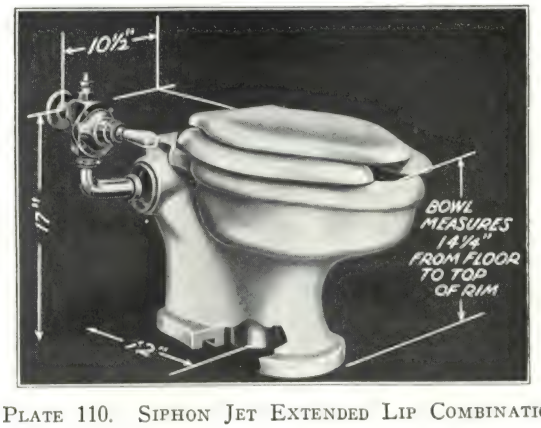


PLATE 110. SIPHON JET EXTENDED LIP COMBINATION

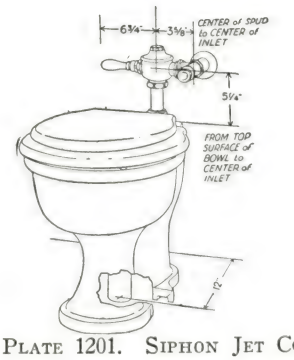


PLATE 1201. SIPHON JET COMBINATION "UNIVERSAL" VALVE

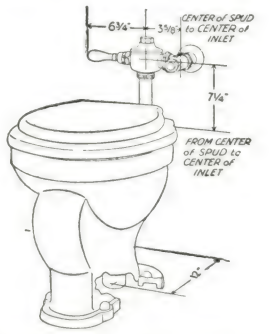


PLATE 1202. WASHDOWN COMBINATION "UNIVERSAL" VALVE

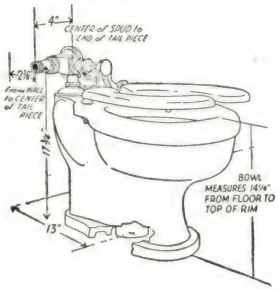


PLATE 205. SIPHON JET SEAT ACTION COMBINATION

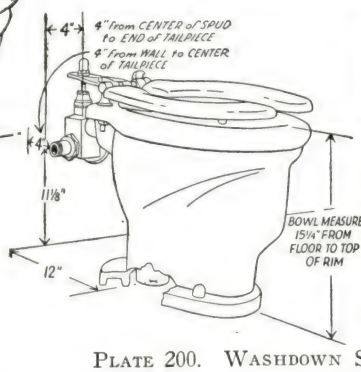


PLATE 200. WASHDOWN SEAT ACTION COMBINATION

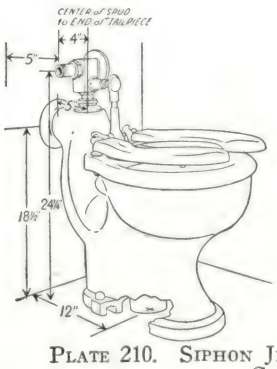


PLATE 210. SIPHON JET SEAT ACTION RAISED VENT COMBINATION

Continued on next page

"Haas" Seat Action Pressure Tank Closets

The following "Haas" seat action pressure tank closets will operate with ½- to ¾-in. supply piping at a minimum pressure of 35 lbs. *Ask for "Ready-made Specifications," giving plate number.*

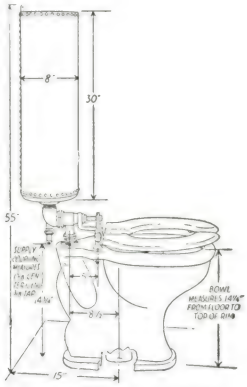


PLATE 702. SIPHON JET PRESSURE TANK SEAT ACTION COMBINATION

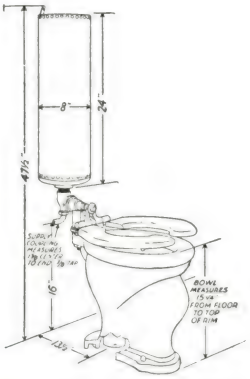


PLATE 700. WASHDOWN PRESSURE TANK SEAT ACTION COMBINATION

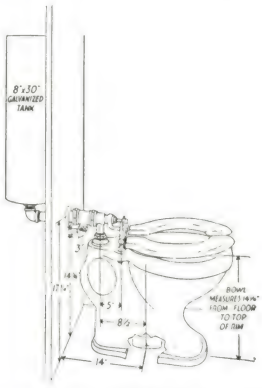


PLATE 707. SIPHON JET CONCEALED TANK SEAT ACTION COMBINATION

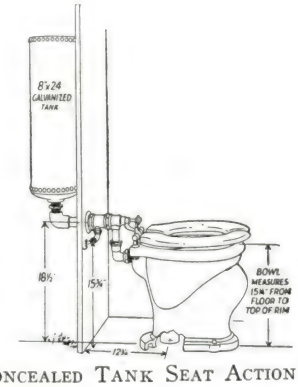


PLATE 706. WASHDOWN CONCEALED TANK SEAT ACTION COMBINATION

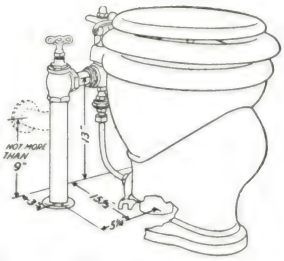


PLATE 505. SELF-VENTILATING SEAT ACTION COMBINATION

Plate 600

Plate 655

PRISON COMBINATIONS—INTEGRAL SEAT, CONCEALED VALVE, WALL AND FLOOR OUTLETS

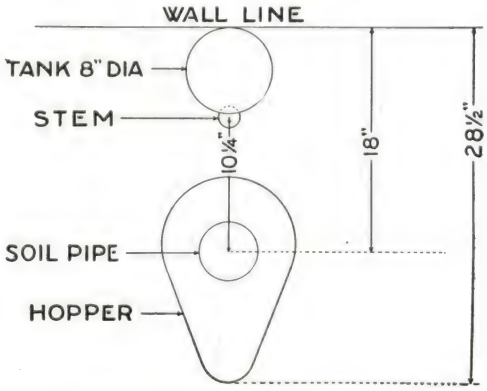
"Haas" Frostproof Closets

"Haas" frostproof closets in 2 models: H-1 flushes after seat is released, H-2 flushes while seat is depressed. No stuffing box or packing to freeze or get hard. Unobstructed drain. Proof against sewage backing up in water supply.

Plate H-2

Plate H-1

"HAAS" FROSTPROOF CLOSETS



FROSTPROOF ROUGHING CHART

THOMAS MADDOCK'S SONS CO.

Manufacturers of Vitreous China Sanitary Plumbing Fixtures

TRENTON, N. J.

Products

Manufacturers of VITREOUS CHINA PLUMBING FIXTURES.

Thomas Maddock Plumbing Fixtures

This company manufactures a complete line of improved vitreous china sanitary plumbing fixtures. "Maddock's" vitreous china sanitary ware is a solid white china product, non-absorbent throughout and covered with an absolutely impervious transparent glaze, which is applied to the vitreous chinaware and subjected in our kilns to so intense a heat as to chemically amalgamate all substances used, thereby assuring the most sanitary product of the greatest consistency and durability.

Vitreous china plumbing fixtures can not become discolored through usage, and are kept clean with but ordinary attention, the glaze permanently maintaining its lustrous gloss.

In construction they meet the requirements of all plumbing codes and also conform in design to architectural ideas as to style and adaptability.

TRADE-MARK

This company manufactures but one grade of goods. The "Anchor" trade-mark is stamped under the glaze on all fixtures. A guarantee of quality that we have lived up to for more than sixty years.

Illustrations

The illustrations on this and the next two pages show a part of the extensive line of Thomas Maddock Plumbing Fixtures. A complete catalogue will gladly be furnished on request.

MADBURY H-2000

SPECIFICATION—White Vitreous China Straight Front Lavatory; size (see below), with integral supply nozzle, cleansing overflow feature, square bowl, hooded overflow, antisplash rim, plain square pedestal and nickelplated brass wall brackets.

Fitted with compression supply valves with china cross arm handles and escutcheons and pop-up waste with china knob and escutcheon, with 1¼-in. or 1½-in. nickelplated brass trap to wall and ⅜-in. nickelplated brass supply pipes to wall with china handle stop valves and china wall

DIMENSIONS

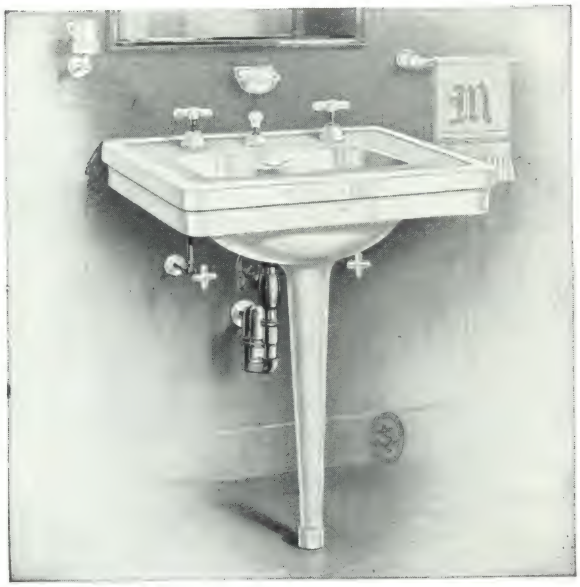
Lavatory, in.	20x24	22x27	24x30
Bowl, in.	16x12x6	18x13x6	18x13x6

MADERA SILENT H-3002

SPECIFICATION—White Vitreous China Silent Action Siphon Jet Closet with extended top inlet, floor outlet and 2-in. brass spud. Water surface in bowl to be not less than 13x10 in. Thin sanitary rim, flushed all the way around.

Fitted with white celluloid covered seat and cover with white finish concealed post hinge; white vitreous china one-piece flush pipe cover and white vitreous china bolt caps; Madora H-3111 White Vitreous China Low Down Tank and Cover, capacity 7½ gals. Fitted with Maddock double acting guaranteed fittings.

Continued on next page



MADBURY H-2201

SPECIFICATION—White Vitreous China Straight Front Lavatory, size (see below), with integral supply nozzle, cleansing overflow feature, square bowl, hooded overflow, antisplash rim, vitreous china leg and rod with nickelplated brass wall brackets.

Fitted with compression supply valves with china cross arm handles and escutcheons and pop-up waste with china knob and escutcheon with 1¼-in. nickelplated. Brass trap to wall and ⅜-in. nickelplated brass supply pipes to wall with china handle stop valve and china wall escutcheons.

DIMENSIONS

Lavatory, in.	18x20	20x24
Bowl, in.	14x10x6	16x12x6

MADBURY H-2204

SPECIFICATION—White Vitreous China Straight Front Lavatory with 6-in. integral back and concealed hanger; size (see below), with integral supply nozzle, cleansing overflow feature, square bowl, hooded overflow, antisplash rim and vitreous china leg and rod.

Fitted with compression supply valves with china cross arm handles and escutcheons and pop-up waste with china knob and escutcheon with 1¼-in. nickelplated brass trap to wall, and ⅜-in. nickelplated brass supply pipes to wall with china handle stop valve and china wall escutcheons.

DIMENSIONS

Lavatory, in.	18x20	20x24
Bowl, in.	14¾x10½x6	16x12x6

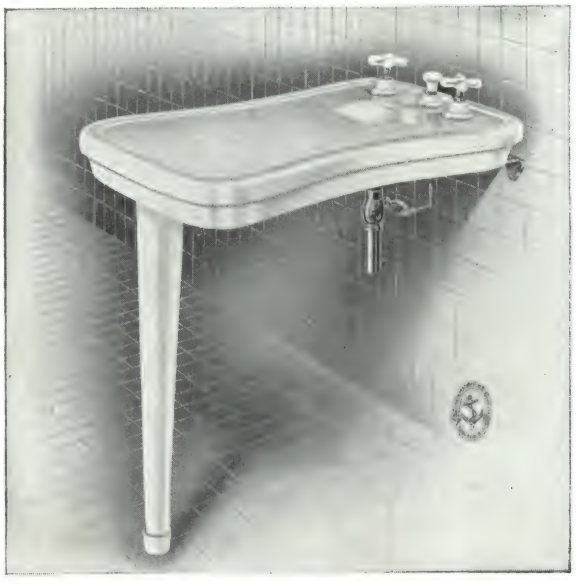
MADBURY H-2403

SPECIFICATION—White Vitreous China Straight Front Lavatory, with 6-in. integral back and concealed hanger; size (see below), with integral supply nozzle, cleansing overflow feature, square bowl, hooded overflow and antisplash rim.

Fitted with compression supply valves with china cross arm handles and escutcheons and pop-up waste and china knob and escutcheon.

DIMENSIONS

Lavatory, in.	18x20	20x24
Bowl, in.	14x10x6	16x12x6



MADADORE H-2303

SPECIFICATIONS—White Vitreous China Manicuring Table, size 18x32 in., diameter of bowl 6 in., with integral supply nozzle, hooded overflow, vitreous china leg and rod and nickelplated brass wall brackets.

Fitted with compression supply valves with china cross arm handles and escutcheons and pop-up waste with china knob and escutcheon. All operating parts on top of slab.

Continued on next page

MADVAL H-2831

SPECIFICATION—White Vitreous China Flushing Rim Pedestal Bidet Pan, height, 15 in., with douche and fixture shelf.

Fitted with nickelplated brass 1¼-in. pop-up waste fixture with china knob, 1¼-in. outside diameter tail piece; "hot" and "cold" compression supply valves with china cross arm handles and escutcheons, permitting either "hot" and "cold" supply to flushing rim or center douche, with supply pipes to floor.

DIMENSIONS

Length over all, in.	25¾
Width, in.	15
Opening of bowl, in.	15½

ARISTON H-2900

SPECIFICATION—White Vitreous China Silent Action Siphon Jet Closet with extended top inlet and floor outlet, 2-in. brass spud, extended front lip and cut back rim, flushed all the way around; height, 14½ in., opening of bowl 16 in., water surface 14x10 in. and sanitary rim. Water seal 3 in.; white celluloid covered saddle seat, no cover, open front and back with heavy nickelplated brass bar hinge. One-piece white vitreous china flush pipe cover and white vitreous china bolt caps.

To be flushed with H-3112 Madora White Vitreous China Low Down Tank and Cover, capacity 7½ gals., fitted with underpull operating lever with china handle.

MADERA H-3000

SPECIFICATION—White Vitreous China Siphon Jet Closet with extended top inlet, floor outlet and 1½-in. brass spud; height, 15 in.; opening of bowl 12 in.; water surface 10x12 in. and 3-in. water seal.

Imitation mahogany saddle seat and cover, with heavy nickelplated brass bar hinge, white vitreous china bolt caps and nickelplated brass flushing valve.

MADSTONE H-3210

SPECIFICATION—White Vitreous China Siphon Jet Pedestal Urinal with back inlet, floor outlet and 1½-in. brass spud; high back, extended front lip and flushing rim; water surface to be not less than 6x6 in. and 2-in. trap opening.

To be flushed with White Vitreous China High-up Tank with pull fittings and china handle.

SLOAN VALVE COMPANY

Manufacturers of Flush Valves for Water Closets, Urinals and Slop Sinks

Lake Street and Kildare Avenue
CHICAGO, ILL.

Product

ROYAL FLUSH VALVES. (Awarded Gold Medal, San Francisco, 1915.)

Advantages

Royal Flush Valves can not be held open to waste water; require no regulating for any variation in water pressure between 5 and 100 lbs.; deliver a uniform flush regardless of how operated.

Adaptability

Royal Flush Valves can be used on old or new plumbing fixtures of any manufacture.

Catalogue

Complete catalogue, containing detailed illustrations and descriptions, furnished on request.

Styles

The Royal Flush Valves, shown on these pages, are those most frequently used. However, they can also be equipped in the manner indicated by any of the following styles or combinations thereof. When any of these styles are wanted, specify number of Valve, followed by letters designating style desired.

Inlets—

Style A—With inlet on right-hand side of flush valve. No extra.

Style B—With inlet on back of flush valve. No extra.

Style C—With inlet on left-hand side of flush valve. No extra.

Stops—

Style D—With ground joint union angle stop. No extra.

Style E—With ground joint union straight stop. No extra.

Handles—

Style G—With handle on left-hand side of flush valve. No extra.

Style H—With handle on front of flush valve. No extra.

Style I—With handle on right-hand side of flush valve. No extra.

Style J—With metal handle. No extra.

Buttons—

Style K—With china push button. No extra.

Style L—With metal push button. No extra.

Outlets—

Style P—With elbow flush connection for back spud closet. Extra $1.50.

Style R—With 1¼-in. female iron pipe union outlet. No extra.

Style S—With 2x1½-in. spud reducer. Extra $1.00.

Style T—With 1½-in. outside diameter flush connection. No extra.

Style U—With 1¼-in. outside diameter flush connection. No extra.

Style V—With 1-in. outside diameter flush connection. No extra.

Style W—With ¾-in. outside diameter flush connection. No extra.

Bumpers—

Style YG—With bumper on valve for seat with cover. No extra.

Style YH—With wall bumper for closed-front seat without cover. No extra.

Style YI—With wall bumper for open-front seat without cover. Extra $0.50.

Miscellaneous—

Style X—For pressures from 5 to 12 lbs. No extra.

Style BEHP—Can be applied to F-54 only. With inlet on back of flush valve, 1-in. straight stop, handle on front of valve and elbow flush connection for side spud wall hung bowl. Extra $1.50. (*Note:* Orders must state distance from wall to center of side spud.)

Style YA—Can be applied to F-54 only. Includes concealed rough brass Royal Flush Valve with left-hand inlet, 1-in. straight stop, 1½-in. outside diameter elbow flush connection, spud coupling, nickelplated wall flange, wall bumper for closed front seat and china handle suitable for wall 0 to 1 in. thick. Extra $3.00.

Style YB—Can be applied to F-54 only. Includes concealed Royal Flush Valve same as Style YA, except with push button on center line of fixture 22½ in. above center of spud. Extra $2.00.

Style O—Can be applied to F-56 only. With brass slip joint flush connection complete to fixture spud. Extra $4.00.

Style YF—Can be applied to F-57 only. Includes concealed rough brass Royal Flush Valve with left-hand inlet, ¾-in. straight stop, ¾-in. outside diameter elbow flush connection, spud coupling, nickelplated wall flange and china handle suitable for wall 0 to 1 in. thick. No extra.

Style YD—Can be applied to F-58 only. Includes concealed Royal Flush Valve same as Style YF. No extra.

Style YE—Can be applied to F-59 only. Includes concealed Royal Flush Valve same as Style YF and YD, except with 1-in. straight stop, 1½-in. outside diameter elbow flush connection and nickelplated spud coupling, wall and spud flanges. Extra $1.50.

Style YC—Can be applied to F-60 only. Includes concealed Royal Flush Valve same as Style YE. Extra $1.50.

Style YK—Can be applied to F-61 only. With seat for extended lip closet. Extra $1.00.

Style YL—Can be applied to F-61 only. With hinge suitable for raised rear vent closet. Extra $1.00. (*Note:* Order must be accompanied by full sized side elevation of closet, specifying distance face of spud is elevated above rim of bowl and distance from center of spud to center of seat post holes.)

Style YM—Can be applied to F-61 only. Includes concealed rough brass Royal Flush Valve, seat operated with left-hand inlet, 1-in. straight stop; 1½-in. outside diameter elbow flush connection, spud coupling, nickelplated cast bronze adjustable bar hinge, polished golden oak open-front and back seat, nickelplated flange and wall extension suitable for wall 0 to 1 in. thick. Extra $2.50. (*Note:* Order must specify distance from face of finished wall to center of seat post holes.)

Thickness of Wall

Orders for concealed Royal Flush Valves must state if thickness of wall exceeds 1 in. An additional charge is made when wall is more than 1 in. thick. Prices sent on application.

F-50

Includes nickelplated Royal Flush Valve with back inlet, 1-in. ground joint union straight stop, china oscillating handle, 1½-in. o.d. flush connection, spud coupling, wall and spud flanges and wall bumper for closed-front seat. Price $23.00

F-51

Includes nickelplated Royal Flush Valve with back inlet, 1-in. ground joint union straight stop, china oscillating handle, 1½-in. o.d. flush connection, spud coupling, wall and spud flanges, and bumper on valve for closed-front seat. Price $24.00

Continued on next page

F-52

Includes nickelplated Royal Flush Valve with back inlet, 1-in. ground joint union straight stop, china push button, 1½-in. outside diameter flush connection, spud coupling, wall and spud flanges and bumper for closed-front seat. Price $24.50

F-53

Includes nickelplated Royal Flush Valve with back inlet, 1-in. ground joint union straight stop, china oscillating handle, 1½-in. outside diameter elbow flush connection, spud coupling, wall and spud flanges and wall bumper for closed-front seat. Price $24.50

F-54

Includes nickelplated Royal Flush Valve with side inlet, 1-in. ground joint union angle stop, china oscillating handle, 1½-in. outside diameter flush connection, spud coupling, wall and spud flanges, and wall bumper for closed-front seat. Price $23.00.

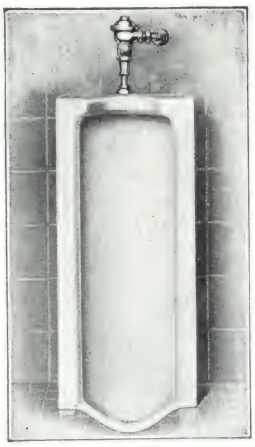
Note: Wall hung closets require a pressure maintained at the valve of not less than 15 lbs. for blow-out type or 10 lbs. for syphon jet type

F-55

Includes concealed rough brass Royal Flush Valve with inlet on left-hand side, 1-in. ground joint union straight stop, 1½-in. outside diameter elbow flush connection, nickelplated spud coupling, wall and spud flanges. wall bumper for closed-front seat and china oscillating handle suitable for wall 0 to 1 in. thick. Price $26.00

F-56

Includes concealed rough brass Royal Flush Valve with inlet on left-hand side, 1-in. ground joint union straight stop, 1-in. female iron pipe union outlet (no flush connection), china push button suitable for wall 0 to 1 in. thick. Price $21.00.



F-57

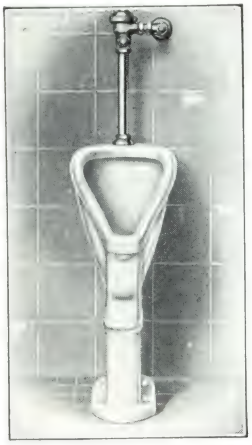
Includes nickelplated Royal Flush Valve with right-hand inlet, ¾-in. ground joint union angle stop, china push button, ¾-in. outside diameter flush connection, spud coupling, wall and spud flanges. Price $22.00.

Note: State distance from wall to center of spud

F-58

Includes nickelplated Royal Flush Valve with right-hand inlet, ¾-in. ground joint union angle stop, china push button, ¾-in. outside diameter flush connection, spud coupling, wall and spud flanges. Price $22.00.

Note: State distance from wall to center of spud and whether urinal is syphon jet or wash-out

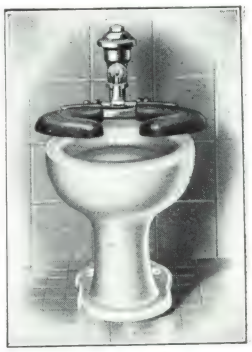


F-59

Includes nickelplated Royal Flush Valve with right-hand inlet, 1-in. ground joint union angle stop, china push button, 1½-in. outside diameter flush connection, spud coupling, wall and spud flanges. Price $23.00

F-60

Includes nickelplated Royal Flush Valve with right-hand inlet, 1-in. ground joint union angle stop, china push button, 1½-in. outside diameter flush connection, spud coupling, wall and spud flanges. Price $24.00



F-61

Includes nickelplated Royal Flush Valve, seat-operated with back inlet, 1-in. ground joint union straight stop, 1½ in. outside diameter flush connection for top spud bowl, spud coupling, wall and spud flanges, nickelplated cast bronze adjustable bar hinge and polished golden oak, open-front and back seat. Price $44.00.

Note: Order must specify distance from center of spud to center of seat post holes for top spud bowl or distance from face of snud to center of seat post holes for back spud bowl

Installation

The water supply to a Royal Flush Valve must have a rate of flow sufficient to properly flush the fixture. The pressure should never be less than 5 lbs. at the flush valve. The pressure at the flush valve and the length of the supply line determine the size of pipe required. The sizes indicated in the table are suitable for one closet or three urinals. The size of pipe required to supply any installation of Royal Flush Valves will be furnished on receipt of the building plans or a sketch giving name and location of job; number and location of flush valves; minimum pressure at each valve; length of supply pipe from each flush valve to the street main or storage tank.

ROYAL FLUSH VALVES

Table No. 4		*Total Feet of Supply Pipe from the Flush Valve to the Street Main or Storage Tank									
		5	10	20	30	40	60	80	100	150	200
		Size of Pipe for One Water Closet									
Minimum pressure at the flush valve in lbs.	5	1¼	1½	1½	1½	2	2	2	2½	2½	3
	10	1	1¼	1½	1½	1½	1½	2	2	2½	2½
	20	1	1	1¼	1¼	1¼	1½	1½	1½	2	2
	30	1	1	1	1¼	1¼	1¼	1½	1½	1½	1½
	40	1	1	1	1	1¼	1¼	1¼	1½	1½	1½
	60	¾	1	1	1	1	1¼	1¼	1¼	1½	1½
	80	¾	¾	1	1	1	1	1¼	1¼	1¼	1½

*Add 10 ft. for each 90° fitting.

STANDARD METALS MANUFACTURING CO.

Manufacturers of Flush Valves for Toilets and Urinals

1300-1302 North Main Street
LOS ANGELES, CAL.

SAN FRANCISCO OFFICE
16 Steuart Street

SALES REPRESENTATIVES

NEW YORK, N. Y. PORTLAND, ORE. DENVER, COLO. SALT LAKE CITY, UTAH. PHOENIX, ARIZ. SAN DIEGO, CAL.

Products
Schroeder Direct-flush Valves.

Slogan
"The Schroeder's Correct—Its Flush is Direct."

TRADE-MARK

Schroeder Direct-flush Valve

The only all-brass (nickelplated) flush valve on the market, having ground valve seat and opened and closed by water pressure. It can be used in connection with plumbing fixtures of any make or type (reverse trap bowls are not recommended for use with flush valves).

The Schroeder valve has been giving satisfactory service for the past seven years, saving time, money and annoyance wherever it has been installed.

It has no by-passes, springs, weights, leather valve seats nor rubber diaphragm, consequently it is not subject to electrolytic action or corrosion.

Durable in construction, simple in operation, and economical in its consumption of water. Adjustable to suit any water pressure.

The Schroeder valve closes *with* (not against) the water pressure, insuring positive closing and precluding any possibility of waterhammer or noise.

Each valve is furnished complete with necessary fittings, including straight or angle control stops, flush ell and nickelplated tubing and wall flange and 1¼- or 1½-in. slip nut.

Sizes

Schroeder direct-flush valves are furnished in two sizes; ¾ in. for urinals and 1 in. for toilets.

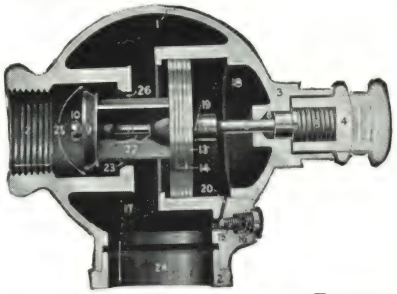
SCHEDULE FOR METER SERVICE and WATER SUPPLY

Number of 1-in. valves	Size meter required, in.	Size of supply pipe from meter with 1-in. leaders, in.	Minimum pressure, lbs.
1	1	1	15
2– 3	1	1	30
4	1	1	60
5– 6	1¼	1¼	45
7– 9	1¼	1¼	60
5– 9	1½	1½	30
10–12	1½	1½	45
13–16	2	2	30
17–24	2	2	45
25 or more	2	2	60
25 or more	3	3	30

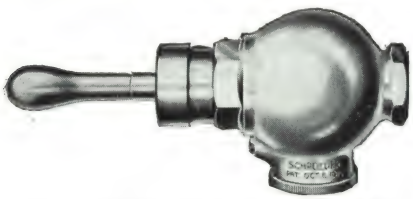
We do not accept responsibility for unsatisfactory service if this schedule is not adhered to. Recommendations under special conditions differing from the above will be gladly furnished on request.

Guarantee

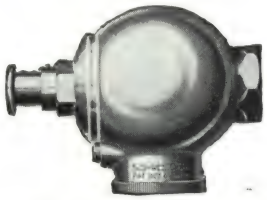
We guarantee the Schroeder valve will withstand the effects of corrosion and ordinary wear and tear for a period of five years, and we agree to furnish and supply on demand any part or parts which either wear out or corrode within said period.



Interior View of Schroeder Direct-flush Valve When Open



Valve With Oscillating Handle



Valve With Push Button

Type "K"

1-in. valve with oscillating handle and angle control stop. Can be used on any make of siphon jet bowl

Type "A"

1-in. push button valve with straight control stop. Can be used on any make of wash down bowl

1-in. push button valve in horizontal position connected to side inlet bowl

Type "F"

ALBERENE STONE COMPANY

QUARRIERS AND MANUFACTURERS

Laundry Fixtures, Sanitary and Laboratory Equipment

TELEPHONE
GRAMERCY 5431

223 East Twenty-third Street
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, 216 No. Clinton Street—Telephone, Main 3526
NEWARK, 43 Halsey Street—Telephone, Market 6316
BOSTON, 51 Bristol Street—Telephone, Beach 5253
PHILADELPHIA, 1511 Walnut Street

Products

ALBERENE STONE (Natural Quarried Soapstone); LAUNDRY TUBS and KITCHEN SINKS; SANITARY URINALS; TOILET and SHOWER PARTITIONS; STAIR TREADS; LABORATORY TABLES, HOODS and SINKS.

Also manufacturers of Photographic and Acid Tanks, Hearth Linings, Switchboards and Barriers, and other Electrical and Power Station Equipment, Flooring, Linings for Smelting Furnaces.

Services

The engineering and draughting departments of the ALBERENE STONE COMPANY are equipped to prepare specifications, plans and details for laboratory and sanitary work. Inquiries at any of its offices will receive prompt attention. Contracts for the erection of ALBERENE STONE and for furnishing complete laboratory equipment will be assumed by this company. Many satisfied users of ALBERENE STONE bear testimony to the capacity of the company for doing the whole job.

Description

ALBERENE STONE is the name applied solely to the output of the extensive quarries of this company, and serves both to identify and to guarantee its products.

ALBERENE STONE has been recognized for more than 35 years as a most satisfactory material for laundry and kitchen fixtures and for sanitary purposes.

ALBERENE STONE is a natural, quarried stone, gray in color, close grained, of uniform density and hardness, and non-absorbent. It can, therefore, be kept clean with ordinary care. Stains do not penetrate beneath the surface and are readily removed by the use of soap and water. ALBERENE STONE is not affected by extreme heat or cold. In the manufacture of ALBERENE STONE laundry tubs and kitchen sinks, interlocking tongued and grooved joints are employed, as illustrated. The density and close grain of ALBERENE STONE, together with the freedom from stratification, make possible the finest milling and joints without spawls or shaling. The durability, reasonable cost, and satisfactory service of ALBERENE STONE render it a most desirable material for sanitary work and fixtures.

Laundry Tubs, Kitchen Sinks and Combinations

ALBERENE STONE laundry tubs are manufactured in 1, 2 and 3 compartments, with or without high backs. The 2- and 3-part fixtures in separate sections and combinations of 1 or 2 tubs with sink can be furnished. Caps and return ends may be provided and other modifications added to meet special requirements.

TONGUED AND GROOVED JOINT

ALBERENE STONE kitchen sinks are particularly desirable on account of the high back and drainboard, which are integral parts of the fixture, thus eliminating loose or open joints in which dirt or vermin might collect.

PLATE H-101
One-compartment Laundry Tub
Lengths, 24, 30 and 36 in.; width, 24 in.; depth, 16 in.
PLATE H-102—Same sizes with 12- and 16-in. high back

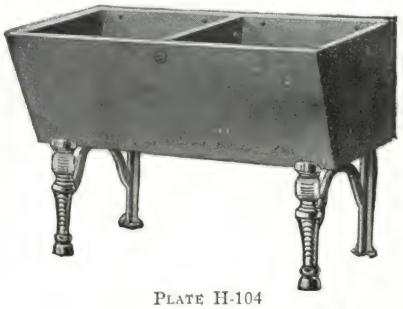


PLATE H-104
Two-compartment Laundry Tub
Lengths, 42, 44, 46, 48, 54 and 60 in.; width, 24 in.; depth, 16 in.
Standard fixture, 48x24x16 in.
PLATE H-105—Same sizes with high back.
PLATE H-106—Same sizes with high back, cap and return ends

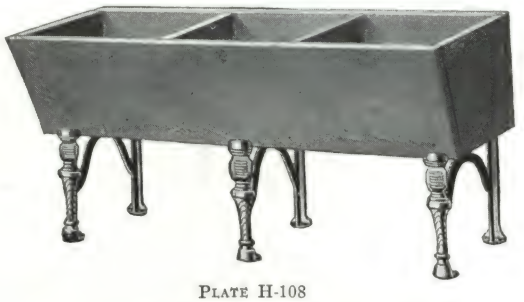


PLATE H-108
Three-compartment Laundry Tub
Lengths, 72, 78, 84 and 90 in.; width, 24 in.; depth, 16 in.

ALBERENE STONE LAUNDRY TUBS

All measurements are outside. All tubs are drilled for faucet holes, unless otherwise ordered.
Location of wastes: 1-part, center at back; 2-part, twin waste with collar for connection to lead pipe, or right or left waste; 3-part, right or left waste.
Brass rim and brass wringer guard may be furnished if desired.

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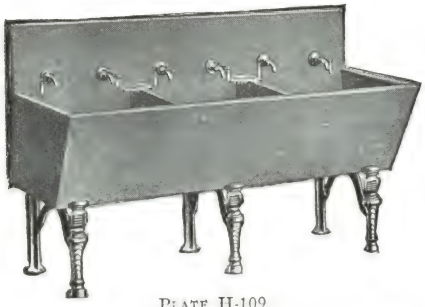


PLATE H-109
Three-compartment Laundry Tub with Integral High Back
Lengths, 72, 78, 84 and 90 in.; width, 24 in.; depth, 16 in.

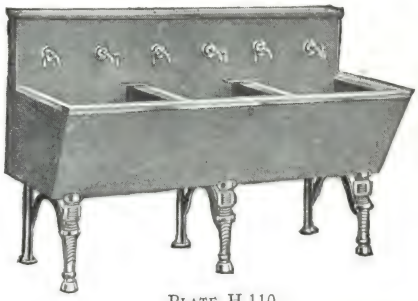


PLATE H-110
Three compartment Laundry Tub with Integral High Back, Cap and Return Ends
Brass rim may be furnished, if desired. Lengths, 72, 78, 84 and 90 in.; width, 24 in.; depth, 16 in.

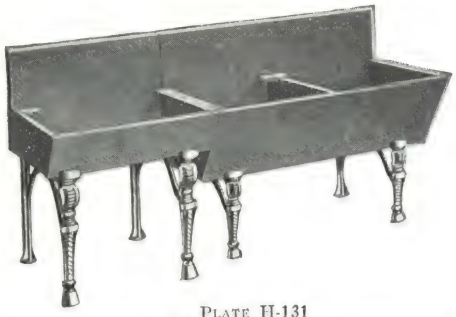


PLATE H-131
Combination Kitchen Sink and Laundry Tubs with Integral High Back
Sink may be furnished at right or left. Lengths, 72, 78, 84 and 90 in.; width, 24 in.; depth of tub, 16 in.; depth of sink, 8 in. Tub lengths, 48 and 54 in.; sink lengths, 24, 30 and 36 in.; standard high back, 12 in. Other heights furnished on specification

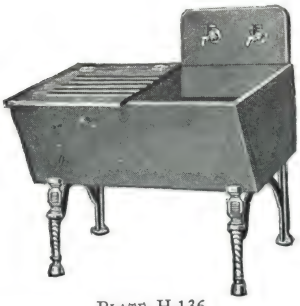


PLATE H-136
Combination Laundry Tub and Kitchen Sink
Sink may be furnished at right or left. 12-in. high back provided for sink, and wood cover for tub, serving as a drainboard, may be furnished. Lengths, 48, 54 and 60 in.; width, 24 in.; depth, 16 in.
This fixture may be provided with 12-in. integral high back over tub and sink, if desired

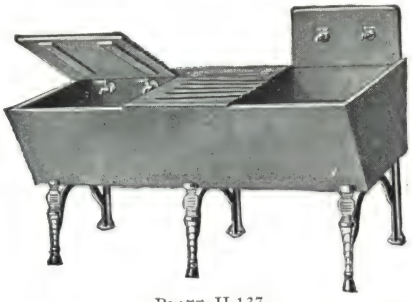


PLATE H-137
Combination Kitchen Sink and Laundry Tubs
Sink may be furnished at right or left, or in the center. 12-in. high back provided for sink, and wood cover for tubs, serving as a drainboard, may be furnished. Lengths, 60, 66 and 72 in.; width, 24 in.; depth, 16 in.

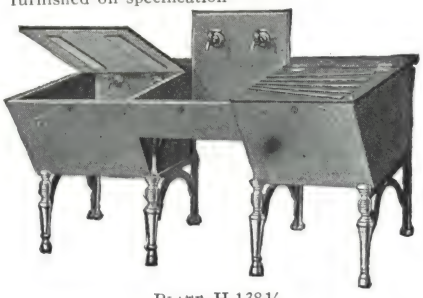


PLATE H-138½
Combination Laundry Tubs and Kitchen Sink
Sink may be furnished at right, left or center. 12-in. integral high back provided for sink. Wood drainboard covers for tubs may be furnished. Lengths, 72, 78, 84 and 90 in.; width, 24 in.; depth of sink, 8 in.; depth of tub, 16 in.

PLATE H-147
Kitchen Sink with Integral High Back
Back, 12 in. Sizes, 18x24, 20x30, 20x36, 22x30, 22x36, 22x42, 24x30, 24x36, and 24x48 in.; depth, 8 in.

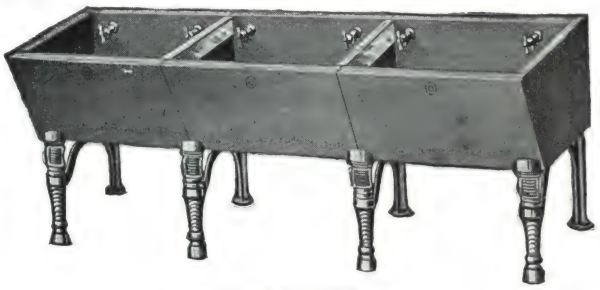


PLATE H-115BB
Single Combination Setting
Combination composed of single tubs bound together at abutting ends by heavy brass clamps. Batteries of any number or length may be furnished. High back may be added, if desired. Lengths of sections, 24, 30 and 36 in.; width, 24 in.; depth, 16 in.

PLATE H-150
Kitchen Sink with Integral High Back and Shelf
Sink provided with drainboard, shelf and return ends. The latter furnish space behind sink for plumbing connections. Sink may be furnished at right or left. Length of sink, 24, 30, 36, 42 and 48 in.; width, 18, 20, 22 and 24 in.; drainboard, 24 in.
Total length of fixture, 48 to 72 in.

PLATE H-150Q
Kitchen Sink with Integral 16-in. High Back and Drainboard
Fixture should be set flush with wall; supply pipes depressed in the wall behind the back. Sink may be furnished at right or left. Length of sink, 24, 30, 36, 42 and 48 in.; width, 18, 20, 22 and 24 in.; drainboard, 24 in. Total length of fixture, 48 to 72 in.

PLATE H-154
Kitchen Sink with Integral High Back and End
Sink may be furnished with high end at right or left. Length of sink, 24, 30, 36, 42 and 48 in.; width, 18, 20, 22 and 24 in.; drainboard, 24 in. Total length of fixture, 48, 54, 60, 66 and 72 in.

PLATE H-160
Kitchen Sink with Integral High Back and Double Drainboard
Sink furnished with 12-in. high back, cap and return ends. Brass rim furnished if desired. Length of sink, 24, 30, 36, 42 and 48 in.; width, 18, 20, 22 and 24 in.; drainboards, 18 in. each. Total length of fixture, 60, 66, 72, 78 and 84 in.

ALBERENE STONE LAUNDRY TUBS AND SINKS

All measurements are outside. All tubs are drilled for faucet holes, unless otherwise ordered.

Faucets are not furnished with laundry tubs or sinks. Faucet holes for sinks will be drilled 8 in. apart from center to center and 14 in. from the inside of the bottom of the sink to the center of the holes, unless otherwise specified.

Brass rim and brass wringer guard may be furnished if desired.

Location of wastes: laundry tubs, right or left; combination laundry tubs and sink, for the sink center at back, for the tub right or left hand adjoining the sink; sink wastes, center at back.

Continued on next page

Urinal and Toilet Work

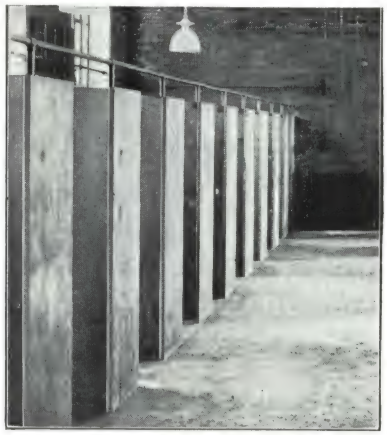
ALBERENE STONE provides a sanitary material, reasonable in cost, for urinals and water closet compartments. For backs, partitions and floor slabs, ALBERENE STONE insures cleanliness and freedom from odors on account of its non-absorbent quality. The use of our slip tongue construction makes possible flush, watertight joints.

TYPICAL TOILET ROOM, BALTIMORE, MD.

Water closet compartments and urinals, partitions, backs and jambs—all of ALBERENE STONE.

Toilet Partitions

ALBERENE STONE toilet partitions or jambs are bedded in the floor and firmly secured to the backs by means of concealed bolts, which render unnecessary the use of exposed angles or top rail.



MUNICIPAL BATHHOUSE, CHICAGO, ILL.

All toilet, shower and dressing room partitions of ALBERENE STONE.

Shower Stalls

ALBERENE STONE has been extensively used for shower compartments in public baths and other institutions. Watertight construction is secured by the use of tongued and grooved and slip tongue joints. Floor slabs are countersunk to drain.

Heights, 6 and 7 ft.; other dimensions as desired.

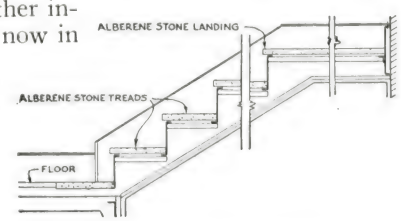
SHOWER STALL, ESSEX COUNTY HOSPITAL

Back, ends and floor slab of ALBERENE STONE.

Stair Treads

The color, durability, and non-slipping quality of ALBERENE STONE account for the superiority of this material for stair treads and platforms in the many hospitals, schools, and other institutions where it is now in use.

The weight of ALBERENE STONE makes possible the setting of treads and platforms without bolts or dowels.



TYPICAL STAIR DETAILS

Laboratory Equipment

The non-absorbent quality of ALBERENE STONE renders it acid and alkali resistant. For many years it has been recognized as the standard material for table tops, shelving, sinks and fume hoods in laboratories of every description.

STAIR TREADS, LINCOLN SCHOOL OF TEACHERS' COLLEGE, NEW YORK, N. Y.

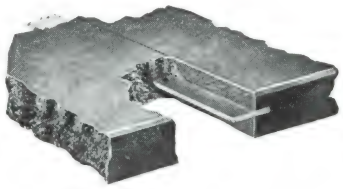
TYPICAL LABORATORY EQUIPMENT

Equipment consists of ALBERENE STONE table tops, shelving, sinks, drainboards, peg boards and hood.

Equipment can be furnished according to the varying needs of the chemist for whom installation is made.

Samples

Sample slip tongue joints, stair treads, or stone for testing purposes, as well as references and estimates, will be furnished to those contemplating the use of ALBERENE STONE.



SLIP TONGUE JOINT

Typical Installations

Note below the prominent architects and engineers who use ALBERENE STONE:

SANITARY EQUIPMENT AND STAIR TREADS

Baltimore Comfort Station, Baltimore, Md.
High School, Bridgeport, Conn., James Gamble Rogers, Architect
Public Schools, Chicago, Ill.
High School, Kearney, N. J., Guilbert and Betelle
High School, Montclair, N. J., Starrett and Van Vleck
Public Schools, New York, N. Y.
Schenley High School, Pittsburgh, Pa., Edward Stotz
Teachers' College, Columbia University, Parish and Schroeder
United States Appraisers' Stores, Boston, Mass., Supervising Architect, United States Treasury Department
West Side Bath, Newark, N. J.

LABORATORY EQUIPMENT

Aluminum Co. of America
Barrett Co.
Bethlehem Steel Corp.
Catholic University of America
Columbia and Cornell Universities
E. I. du Pont de Nemours & Co.
General Chemical Co.
Massachusetts Institute of Technology
New Jersey Zinc Co.
Pennsylvania R. R. Co.
Rockefeller Institute
Standard Oil Co.
University of Chicago
University of Minnesota
U. S. Bureau of Chemistry, Standards and Mines
U. S. Steel Corp.
Sterling Laboratory, Yale University

LITTERER BROS. MFG. CO.

Pantry and Scullery Sinks

730-740 North Franklin Street

CHICAGO, ILL.

Products

NICKEL SILVER and COPPER PANTRY SINKS; NICKEL SILVER and COPPER DRAINBOARDS; SCULLERY SINKS.

For Ferrometal Toilet Partitions and Doors, see pages 1562-1563.

Trade-mark

The accompanying figure is the trade-mark which is used on all Litterer sink products.

Pantry Sinks

LITTERER BROS. MFG. CO. are specialists in the manufacture of pantry sinks, for many years having devoted their time exclusively to the one line of manufacture. Pantry sinks are made in 8 standard units, which may be fitted to any style of fixtures.

Special styles and sizes are also made.

Prices and Estimates—Prices on any style furnished on request. Also estimates on any special equipment required will be quoted on receipt of complete specifications.

Illustrations—The 8 units and several styles of fixtures are illustrated, but any combination of the units shown can be supplied.

Specifications

A-400 Nickel Silver or Copper Pantry Sink with Recess—Recess on end, fitted with nickelplated standing overflow and waste with coupling and tail piece. Measurements are inside but do not include recess. Silverplated waste when specified.

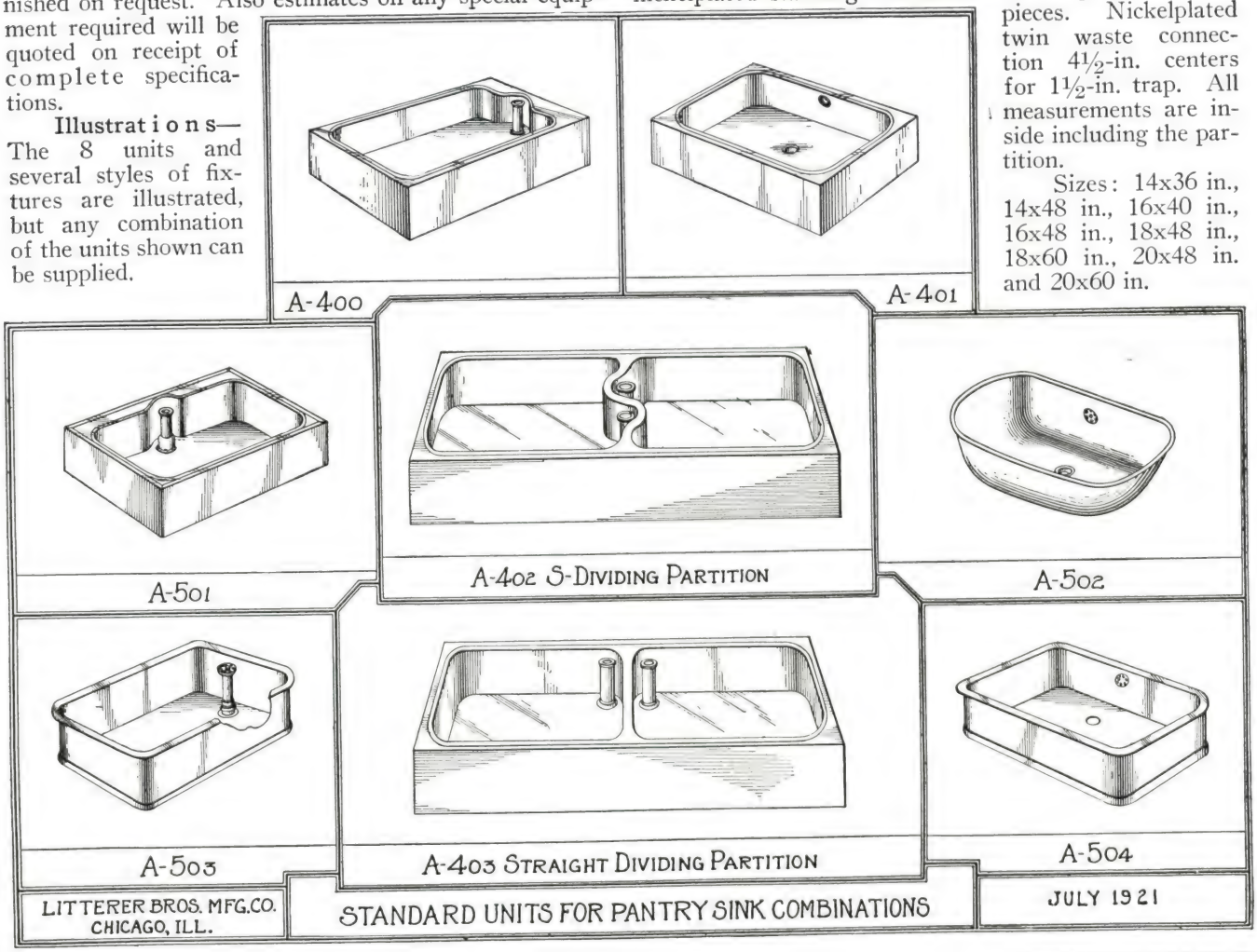
Sizes: 14x20 in., 14x24 in., 16x24 in., 16x30 in. and 18x30 in.

A-401 Nickel Silver or Copper Square Pantry Sink Set in Plain Wood Box—Round corners. Fitted with connected side overflow, waste plug, coupling and tail piece. Can be furnished in planished or tinned copper.

Sizes: 12x18 in., 12x20 in., 14x16 in., 14x20 in., 14x24 in., 16x24 in., 16x30 in. and 18x30 in.

A-402 Nickel Silver or Copper Pantry Sink with "S" Dividing Partition—Plain wood box. Two nickelplated standing overflows with couplings and tail pieces. Nickelplated twin waste connection 4½-in. centers for 1½-in. trap. All measurements are inside including the partition.

Sizes: 14x36 in., 14x48 in., 16x40 in., 16x48 in., 18x48 in., 18x60 in., 20x48 in. and 20x60 in.



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A-403 Nickel Silver or Copper Straight Dividing Partition Pantry Sink—Same as A-402 except with straight partition instead of "S" dividing partition. Can be furnished in either planished or tinned copper.

Sizes: 14x36 in., 14x48 in., 16x40 in., 16x48 in., 18x48 in., 18x60 in., 20x48 in., and 20x60 in.

A-501 Nickel Silver or Copper Pantry Sink with Recess—Fitted with nickelplated standing overflow and waste with coupling and tail piece. Measurements are inside, but do not include the recess. Made with silverplated waste when specified.

Sizes: 14x20 in., 14x24 in., 16x24 in., 16x30 in., and 18x30 in.

A-502 Nickel Silver or Copper Pantry Sink—The bottom is so shaped that dishes can not accumulate in center of sink and obstruct the waste outlet. Also furnished with connected side overflow, waste plug, coupling and tail piece.

Sizes: 12x18 in., 12x20 in., 14x16 in., 14x20 in., 14x24 in., 16x24 in., 16x30 in., and 18x30 in.

A-503 Nickel Silver or Copper Square Pantry Sink—Round corners. Fitted with nickelplated standing overflow and waste, with coupling and tail piece. Can be furnished in planished or tinned copper.

Sizes: 12x18 in., 12x20 in., 14x16 in., 14x20 in., 14x24 in., 16x24 in., 16x30 in. and 18x30 in.

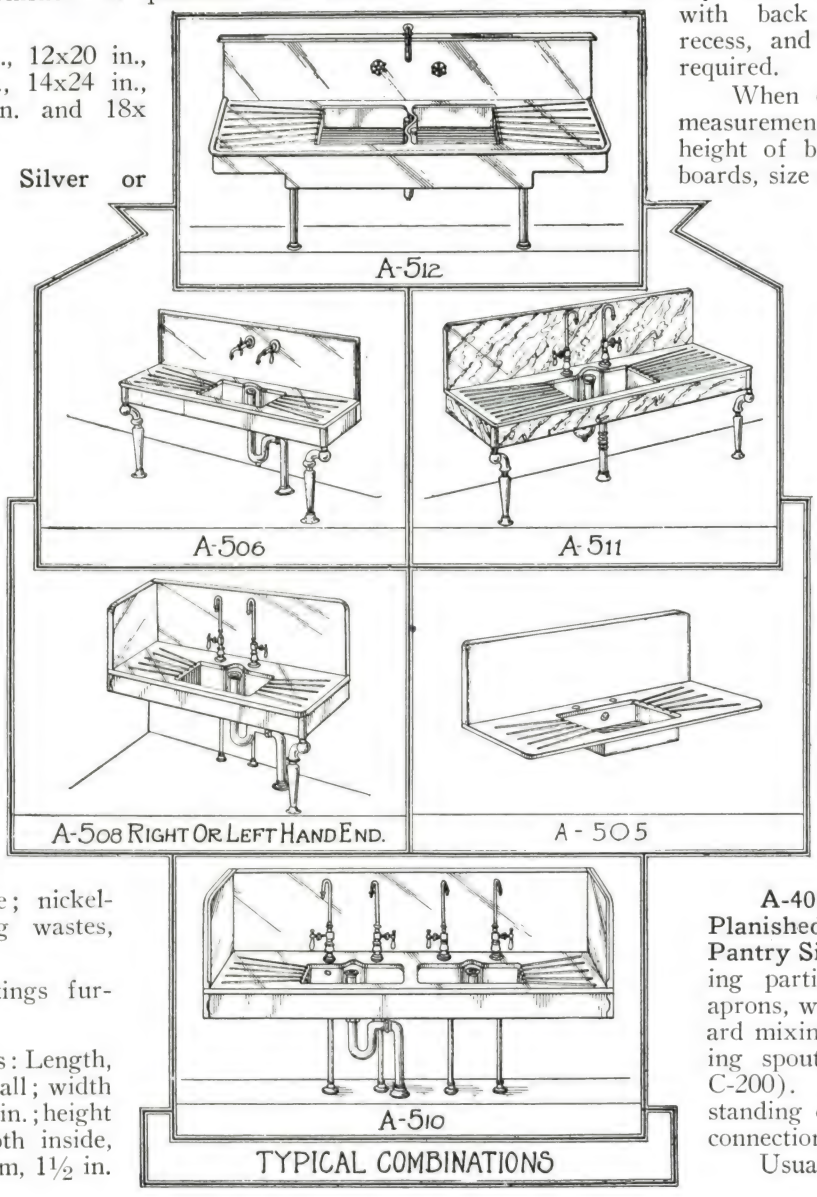
A-504 Nickel Silver or Copper Square Pantry Sink—Round corners. Connected side overflow, waste plug coupling and tail piece. Can be furnished in planished or tinned copper.

Sizes: 12x18 in., 12x20 in., 14x16 in., 14x20 in., 14x24 in., 16x24 in., 16x30 in. and 18x30 in.

A-512 Nickel Silver or Planished Copper Double Pantry Sink—With "S" dividing partition and right- and left-hand drainboard with back and apron; nickelplated combination supply fixture with swinging nozzle; nickelplated legs, standing wastes, etc.

White metal fittings furnished if specified.

Usual Dimensions: Length, about 6 ft. 6 in. over all; width from front to back, 27 in.; height of back, 12 in.; depth inside, 6 in.; width of roll rim, 1½ in.



TYPICAL COMBINATIONS

Also furnished with right-hand or left-hand end or both, where sink goes in a recess.

A-506 Nickel Silver or Planished Copper Pantry Sink—With recess sink (A-501) with standing nickelplated overflow. Arrangement changed to suit requirements. Can be furnished in either planished or tinned copper or nickel silver. Double or single drainboards or with one end or two ends if wanted for a recess.

Specify correct outside length and width, height of back and length of drainboard and size and style of sink, and whether it is to be nickel silver or copper.

A-511 Nickel Silver or Copper Recessed Pantry Sink and Standing Overflow—Countersunk marble top with drainboards in one piece; marble back and 7-in. aprons on front and ends. Can furnish this outfit complete as shown. Full specifications and prices on application.

A-508 Nickel Silver or Copper Recess Pantry Sink and Standing Overflow—With nickel silver or copper lined top and grooved drainboard; Italian marble, nickel silver or copper back and left-hand end; apron on front and right-hand end.

A-505 Nickel Silver or Copper Pantry Sink—Can be furnished in combination with A-502, A-503 or A-504.

Can be made any size, with one drainboard, with back and end, or for recess, and any height of back required.

When ordering give outside measurements, length and width, height of back, length of drainboards, size and style of sink.

A-510 Nickel Silver or Copper Recessed Pantry Sinks—Standing overflows. Italian marble, nickel silver or copper top, back, ends and apron.

A-507 Nickel Silver or Planished Copper Pantry Sink and Top—With marble back and end, marble apron on front and right-hand end; oval sink, fitted with connected side overflow, waste plug, coupling and tail piece.

Can also be furnished with silver or copper back, end and apron. For sizes of oval sink, see A-502.

A-406 Nickel Silver or Planished Copper Double Pantry Sink—With "S" dividing partition with back and aprons, with nickelplated standard mixing faucet, with swinging spout (Accessories Plate, C-200). Nickelplated legs, standing overflows, twin waste connection and "P" trap to wall.

Usual Dimensions: Length,

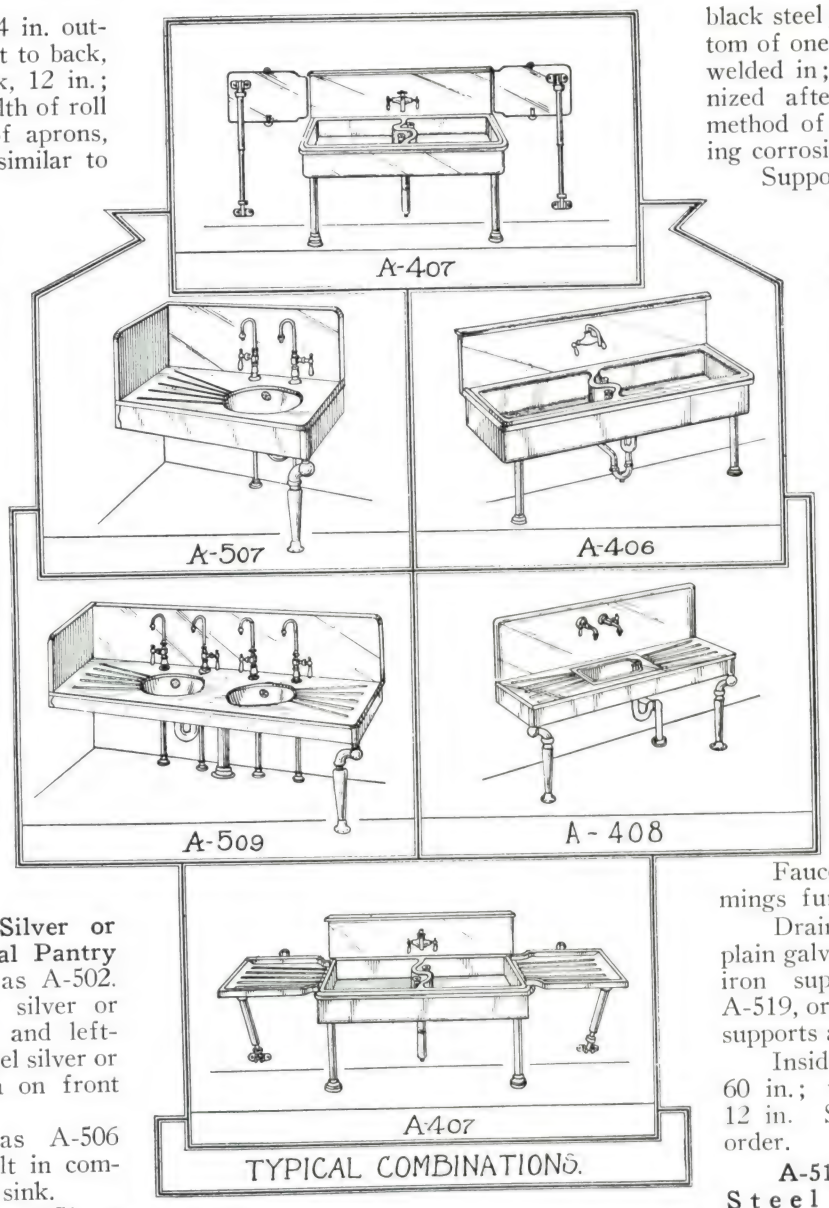
Continued on next page

about 48 in. inside, 54 in. outside; width from front to back, 25 in.; height of back, 12 in.; depth inside, 6 in.; width of roll rim, 1½ in.; width of aprons, 7 in. This outfit is similar to Plate A-512 except it does not show the drainboards built in, and shows the swinging faucet coming through the back instead of the top. If adjustable drainboards are required refer to those shown in Plate A-404 and A-405. This fixture can also be furnished with straight dividing partition as shown in Plate A-403.

A-407 — Same style of sink as A-406 showing adjustable drainboards with telescopic legs, etc. Drainboards can be furnished covered with nickel silver or copper and also in plain hardwood.

A-509 Nickel Silver or Copper Double Oval Pantry Sinks—Same style as A-502. With either nickel silver or Italian marble back and left-hand end or with nickel silver or Italian marble apron on front and right-hand end.

A-408—Same as A-506 except that it is built in combination with A-400 sink.



TYPICAL COMBINATIONS.

A-514 Galvanized Sheet Steel Scullery Sink with Partition and 15 in. High Back—Standard sinks are made of No. 12 gauge black steel; front, back and bottom of one-piece materials, ends welded in; all parts hot galvanized after fabrication. This method of galvanizing preventing corrosion.

Support: Reinforced galvanized steel frame.

Faucets: Fittings and trimmings furnished if so desired.

Inside Dimensions: Length, 60 in.; width, 24 in.; depth, 12 in. Special sinks made to order.

A-515 Galvanized Sheet Steel Scullery Sink with 15 in. High Back— Standard sinks are made of No. 12 gauge black steel; front, back, and bottom of one-piece material, ends welded in; all parts hot galvanized after fabrication.

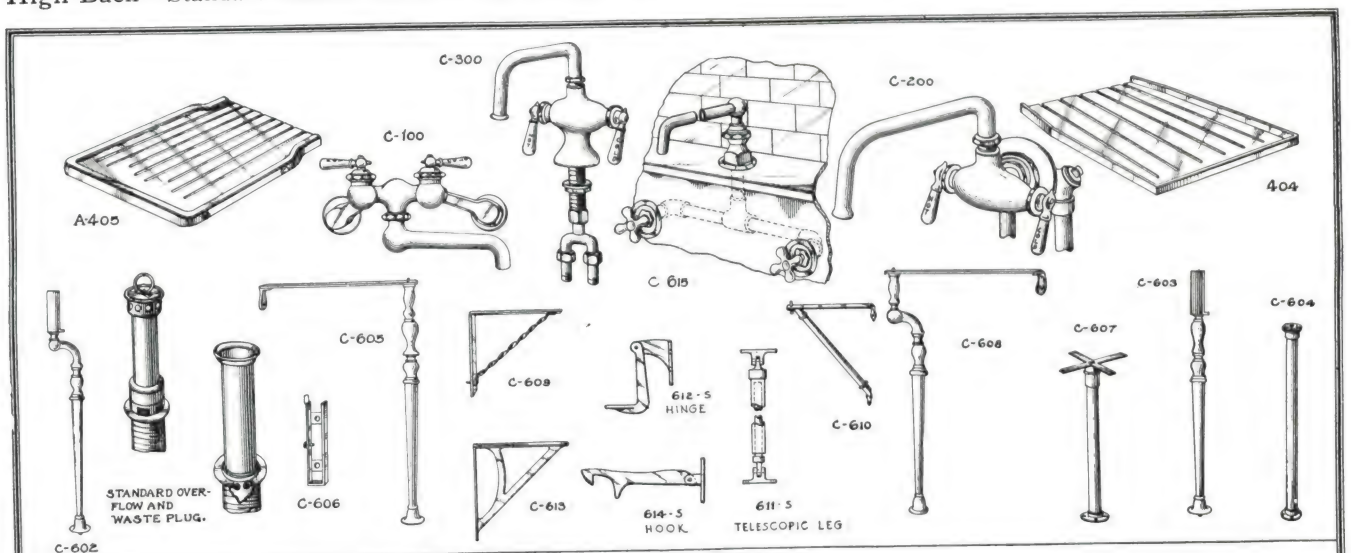
Support: Reinforced galvanized steel frame.

Faucets: Fittings and trimmings furnished if desired.

Drainboards: Can furnish plain galvanized steel with angle iron supports as shown in A-519, or wood with hinges and supports as shown.

Inside Dimensions: Length, 60 in.; width, 24 in.; depth, 12 in. Special sinks made to order.

A-516 Galvanized Sheet Steel Scullery Sink with 15 in. High Back; and Corner Strainer—Standard sinks are made of No. 12 gauge black steel;



ACCESSORIES

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front, back and bottom of one-piece material, ends welded in; all parts hot galvanized after fabrication.

Support: Reinforced galvanized steel angle frame and legs.

Faucets: Fittings and trimmings furnished if desired. Above sink in accordance with U. S. Government specifications, 1916—plate No. 37, sink 60-B, page 110, "Plumbing Fixtures for Treasury, War and Navy Departments."

Inside Dimensions: Length, 60 in.; width, 24 in.; depth, 12 in. Special sinks made to order.

A-517 Galvanized Sheet Steel Scullery Sink—With copper covered wood back and drainboards.

Support: Reinforced galvanized steel frame.

Faucets: Fittings and trimmings furnished if desired.

Approximate Measurements: Wall to front, 30 in.; length of drains, 24 in.; height of back, 15 in.; depth inside, 12 in. Sinks of special sizes with back and drains of wood (not covered), slate or marble, made to order.

A-518 Galvanized Sheet Steel Double Scullery Sink—Twin sinks; rolled edge; dividing partition in one sink; front, back and bottom of one-piece material, ends welded in; all parts hot galvanized after fabrication.

Support: Reinforced galvanized steel double frame.

Faucets: Fittings and trimmings furnished if desired.

Approximate Measurements: Length over rim, 62½ in.; width over all, 55½ in.; depth inside, 12 in.

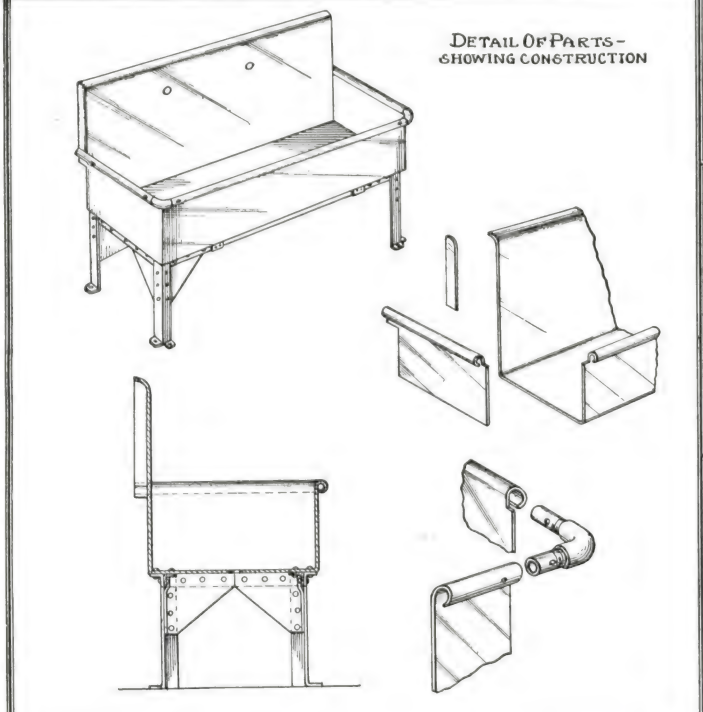
Sinks of special sizes and with any number of dividing partitions can be made to order.

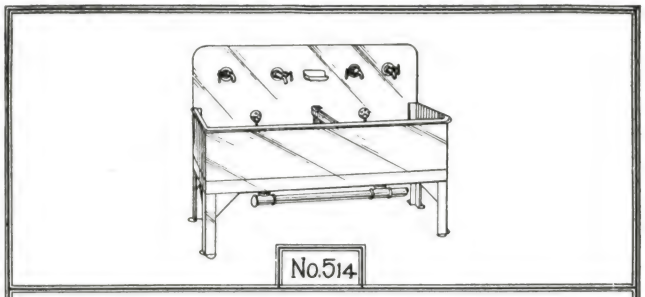
A-519 Galvanized Sheet Steel Scullery Sink with Galvanized Sheet Steel Drainboards—With partition and 15-in. high back. Standard sinks are made of No. 12 gage black steel; front, back and bottom of one-piece material, ends welded in; all parts hot galvanized after fabrication. Can be furnished with either right- or left-hand drainboards, or both, as shown.

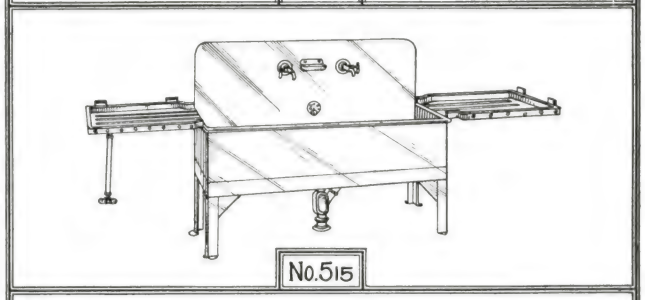
Supports: Reinforced galvanized steel frame.

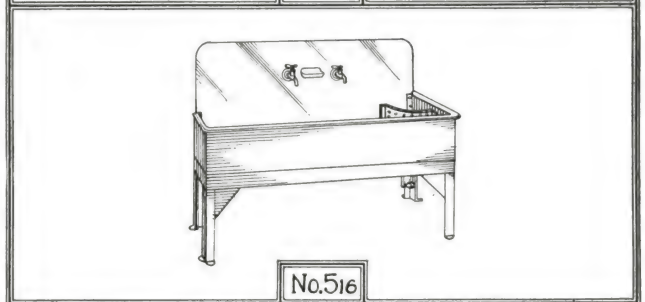
Faucets: Fittings and trimmings furnished if desired.

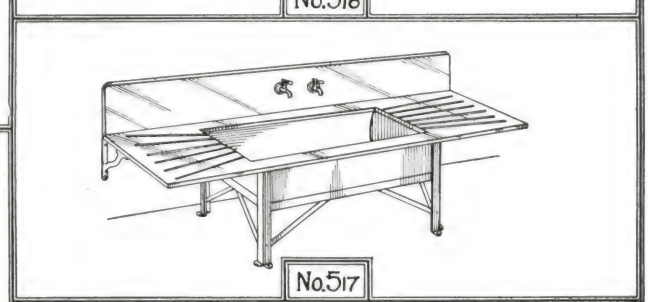
Drainboards: Usual sizes are 24 in. wide; 24, 30 and 36 in. long. Inside Dimensions: Length of sink, 60 in.; width, 24 in.; depth, 12 in.

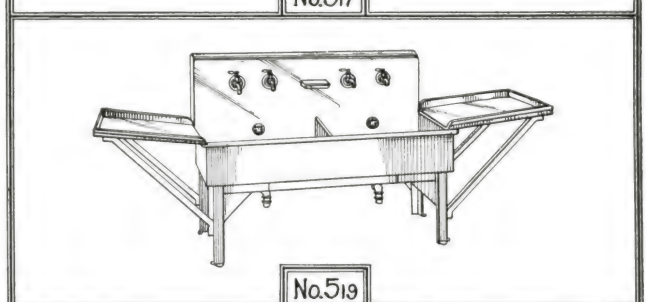


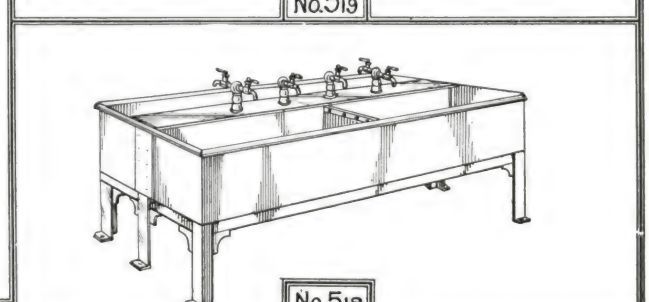












STANDARD GALVANIZED SHEET STEEL SCULLERY SINKS.

LITTERER BROS. MFG. CO. CHICAGO, ILL.

JOHN TRAGESER STEAM COPPER WORKS

Manufacturers of Range Boilers, White Metal Pantry Sinks and Drainboards

447-459 West 26th Street
NEW YORK, N. Y.

TELEPHONE
CHELSEA 6100

Products

"GRAVES" RANGE BOILERS; WHITE METAL PANTRY SINKS and DRAINBOARDS.

"Graves" Range Boiler

The "Graves" Range Boiler is hand made of heavy copper bearing steel, galvanized by the hot dip process inside and outside. Enamel painted on the outside.

The "Graves" Range Boiler is packed and boxed for shipping. It will stand 300 lbs. pressure, and is warranted for 6 years' service. Every boiler bears a brass plate with this guarantee.

CAPACITIES, DIMENSIONS AND PRICES

Capacity, gals.	Height, in.	Diameter, in.	Price
30	60	12	$29.00
40	60	14	34.00
52	60	16	41.00
66	60	18	48.00
82	60	20	55.50
100	60	22	73.50

FIG. 1. "GRAVES" RANGE BOILER

Material Used in Trageser Sinks

The composition of white metal and of German silver are, respectively, as follows:

WHITE METAL		GERMAN SILVER	
Copper	60%	Copper	68%
Zinc	22%	Zinc	22%
Nickel	18%	Nickel	10%
	100%		100%

The higher percentage of nickel in the composition of white metal lessens the tendency to become discolored and brassy in appearance.

Copper alone is undesirable for drainboards, both from a standpoint of sanitation and also that of appearance.

"Fulton" Double Pantry Sink and Drainboard

The "Fulton" Double Pantry Sink and Drainboard is made of white metal or German silver.

It may be furnished in types A, B, C or D (see the drawing on the following page).

If so specified this company will furnish the fittings; namely, swing nozzle cocks with China index handles, standing waste, twin waste connection, 1½-in. outside diameter for trap. White metal or nickelplated brass legs. Special fittings furnished when desired.

Any fixtures may be used, as the sink may be made to fit conditions.

There are no stock sizes. The details shown on the following page are standard and the sinks can be furnished to any dimensions.

Prices on application.

Butler's Double Pantry Sink

The Butler's Double Pantry Sink is made in the various sizes listed below.

The prices include nickel-plated standing waste and overflow.

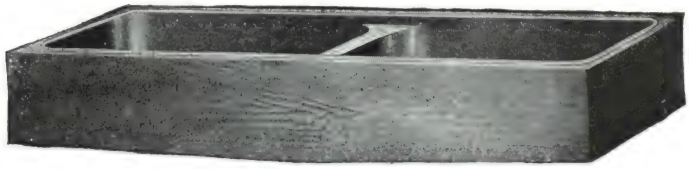


FIG. 3. BUTLER'S DOUBLE PANTRY SINK

Size, inside, in.	40x18	44x22	48x16	48x24
Tinned and planished copper	$46.00	$48.00	$48.00	$50.00
German silver	60.00	65.00	70.00	75.00
White metal	70.00	75.00	80.00	85.00

Special Sinks and Drainboards

Sinks and drainboards are made to special details when desired, but attention is called to the fact that the Standard details of the "Fulton" may be used, and adapted to fit the existing conditions in most cases.

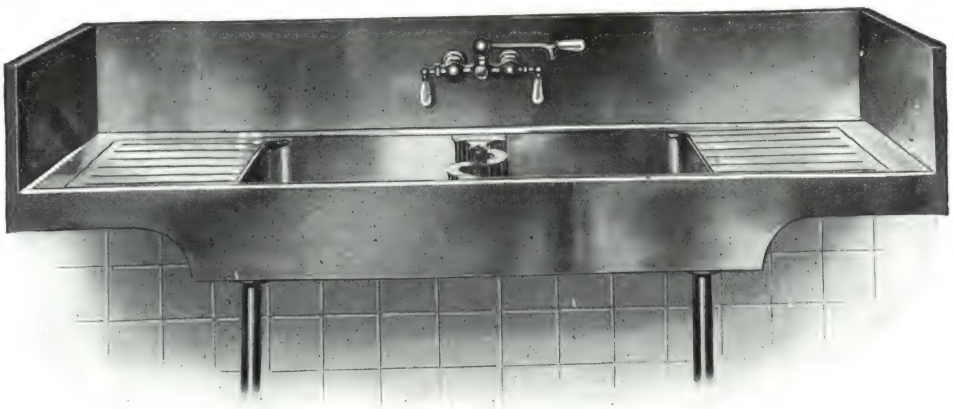


FIG. 2. "FULTON" DOUBLE SINK AND DRAINBOARD

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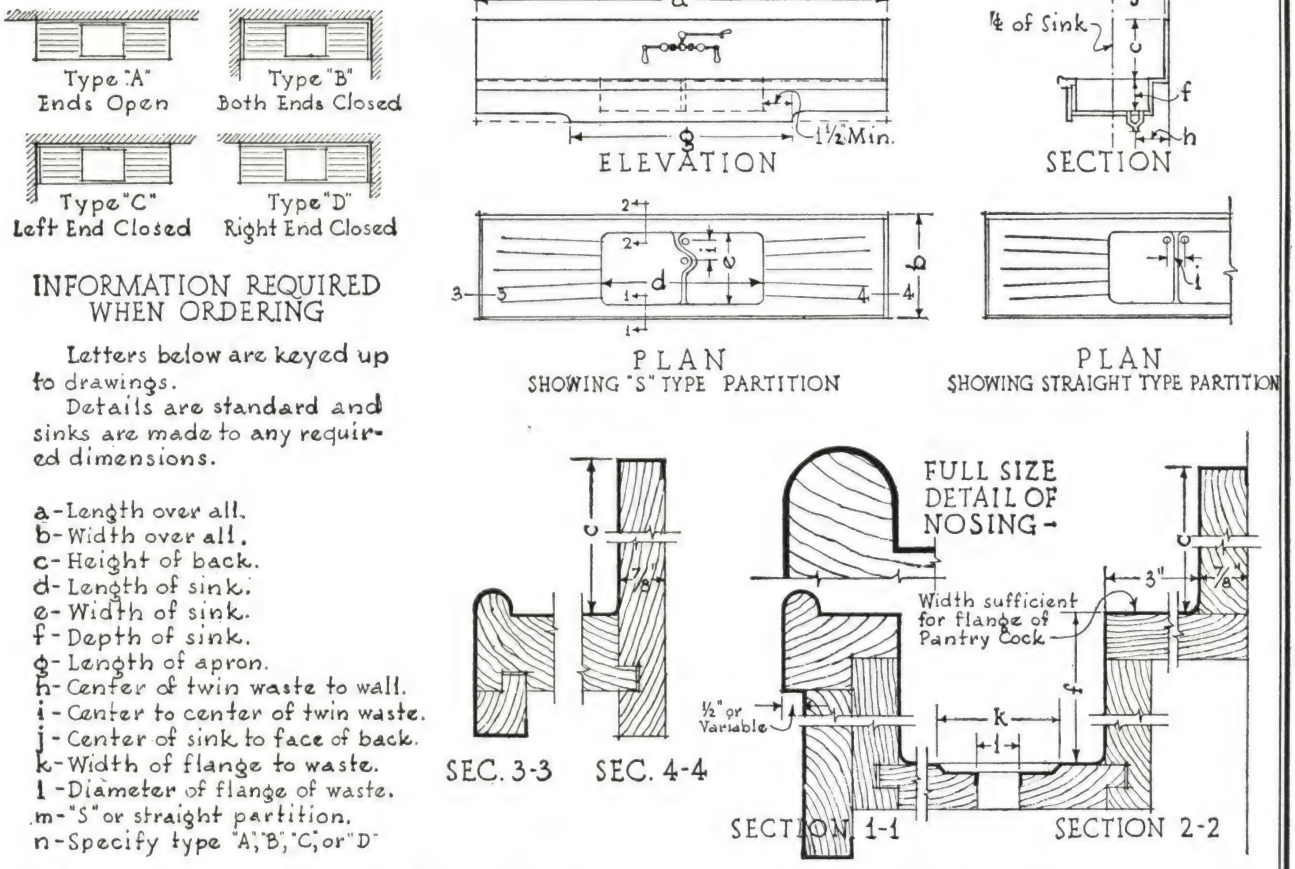


	DETAILS OF STANDARD AND SPECIAL TRAGESER SINKS AND DRAINBOARDS	SCALE: F.S., ¼", 3" EQUALS 1'-0" DATE-JULY 21	DRWG 1

HOFFMANN & BILLINGS MFG. CO.

ESTABLISHED 1855

Manufacturers of Plumbing Fixtures

MILWAUKEE, WIS.

Products

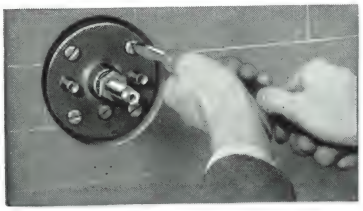
NIEDECKEN MIXER SUPPLY CONTROLS: Shower Baths, Bathtub Supply Fixtures, Hospital Fixtures, etc., with Niedecken Mixer Supply Controls.

Also high grade Plumbers' Brass Goods.

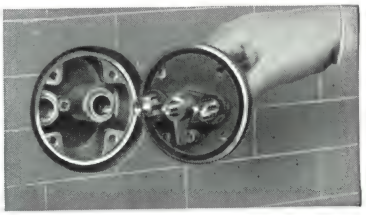
Niedecken Mixer Controls

The illustrations below show the types of mixers; simplicity of construction and ease of repair. The principle is compression work, eliminating springs and cams. A temperature regulating stop is provided which, when properly adjusted, prevents discharges of scalding water. The small number of working parts reduces wear to a minimum. All parts can be readily replaced even after years of use.

Write for catalogue S.S. 220-N.



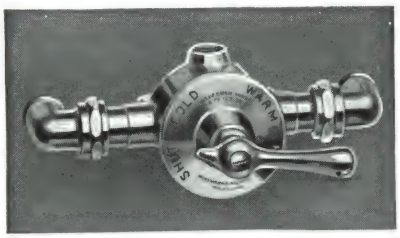
China handle and dial removed.
The only tool required to take the mixer apart is a screwdriver



NIEDECKEN MIXER CONTROLS

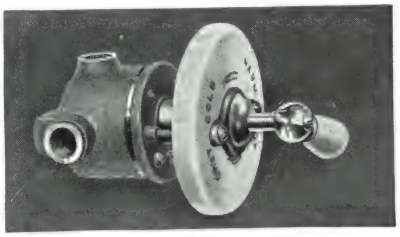
Cover removed, giving access to valves and seats.
Also shows temperature regulating stop

Valve seats are renewable and easily replaced



Exposed type—polished and nickelplated

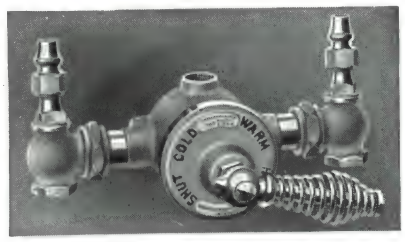
N. F. 1—	½	in. $29.00
N. F. 2—	¾	in. 38.00
N. F. 3—	1	in. 65.00



NIEDECKEN MIXER CONTROLS

Concealed type—with china handle and dial

N. C. 1—	½	in. $28.00
N. C. 2—	¾	in. 37.00
N. C. 3—	1	in. 65.00



Exposed type for steam—rough, nickelplated

N. R. S. 1—	½	in. $32.00
N. R. S. 2—	¾	in. 40.00
N. R. S. 3—	1	in. 70.00

N. C. 1570

Bath supply and waste with concealed type Niedecken mixer having china dial and concealed bath waste with china dial operating device.

For built-in enameled iron or light weight porcelain bathtubs

N. C. 1580

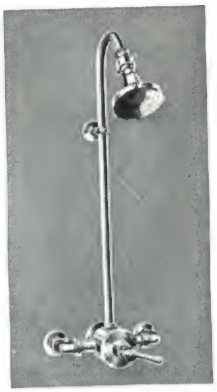
Residence and apartment type combination shower, bath supply and waste fixture with concealed type Niedecken mixer having china dial, china trimmed shower bath controls and concealed bath waste with china operating device

N. C. 1900

NIEDECKEN BATHTUB AND SHOWER FIXTURES

Hotel type combination shower, bath supply and waste fixture with independent concealed type Niedecken mixer controls for shower and tub.

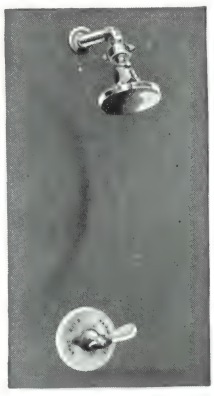
Mixers are marked "Shower" and "Tub" to avoid confusion



N. F. 1050

½-in. polished and nickelplated shower with exposed type Niedecken mixer

Price.....$38.00



N. C. 1100

NIEDECKEN SHOWERS

½-in. shower with concealed type Niedecken mixer having china handle and dial

Price.....$32.00

Niedecken showers are made for all requirements and conditions

THE KENNEY-CUTTING PRODUCTS CORPORATION

507 Fifth Avenue

NEW YORK, N. Y.

Product

KENNEY SHOWERS, Stationary and Portable Models.

Description of Kenney Showers Nickelplated

Permanent and portable all-brass nickelplated shower fixtures which eliminate the need of the unsanitary and unsightly curtains. For use with bath tubs or shower stall. The Kenney shower principle of converging streams strikes body from shoulders down and affords a delightful and time-saving way to bathe which is enjoyed by women and children as well as men.

The diagram (Fig. 5) visualizes the simplicity and practicability of the Kenney shower patent—converging streams which prevent splashing. Illustrations show several models of the Kenney showers ready for use.

Congress Exposed Model (Fig. 3)—Exposed heavily nickeled brass frame, 2½-in. removable-face heads, hot and cold compression stops, water pressure governor and tail pieces and escutcheons forming connection with supply pipes, furnished complete.

DeLuxe Models—Two types. Tub type (Fig. 4) for permanent installation with roll rim tubs, combining shower, tub supply and shampoo all in one fixture.

Also made in wall type for concealed supplies; used over end of built-in tubs.

Specifications—Detailed drawings, specifications and complete catalogue will be sent promptly on request. See Kenney showers on display at plumbing contractors or supply houses.

FIG. 1. Congress Concealed Model

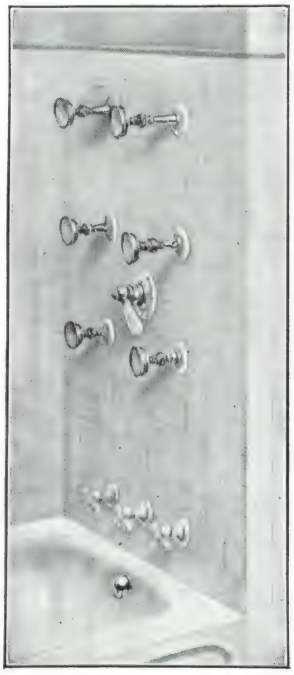


FIG. 2. Congress Concealed Model with Mixing Valve

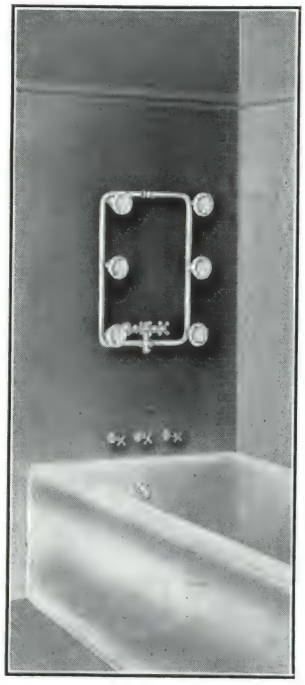


FIG. 3. Congress Exposed Model

FIG. 4. De Luxe Model

KENNEY SHOWERS (STATIONARY MODELS)

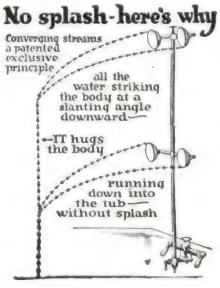


FIG. 5. SPLASHLESS FEATURE OF KENNEY SHOWERS

Installed Models

Congress Concealed Model (Fig. 1)—All concealed parts are of heavy brass pipe and castings complete. Six 2½ in. removable-face nickelplated shower heads on ball joints. Outlets trimmed with white bone china escutcheons. Hot and cold compression valves, with 4-arm china handles, indexed. Equipped with water pressure regulator.

Congress Concealed Model with Mixing Valve (Fig. 2)—Same as Fig. 1 except has mixing valve with china indexed escutcheon.

Portable Models

All metal fixtures; no rubber hose. Any one can quickly and easily attach a portable model to any style bath tub faucet. Does not interfere with use of tub.

Niagara Model (Fig. 6)—½-in. nickelplated brass tubing and four 2½-in. adjustable heads.

Palm Beach Model—Heavier and massive in appearance; ⅝-in. nickelplated brass tubing and four 3-in. adjustable heads.

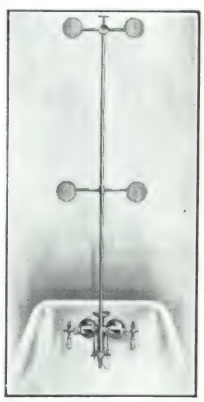


FIG. 6. NIAGARA MODEL, PORTABLE SHOWER

SPEAKMAN COMPANY

INCORPORATED 1889

Showers and Plumbing Fixtures

WILMINGTON, DEL.

Products

SPEAKMAN SHOWERS; INDUSTRIAL WASH-UP FIXTURES; BATH and LAVATORY FIXTURES; BRASS PLUMBING MATERIAL.

TRADE-MARK

Facilities

The SPEAKMAN COMPANY'S factory is modernly equipped, including engineering department. It has ample capacity to handle large orders.

Prices

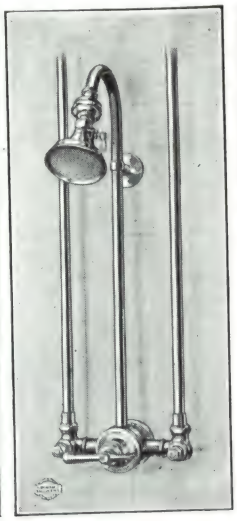
Plumbing supply houses and plumbing contractors throughout the United States can immediately furnish estimates and quote prices on Speakman products.

Complete Catalogue

Catalogue H should be referred to for additional types. This catalogue will be sent on request.

H-952½. SPEAKMAN BUILT-IN "MIXOMETER" SHOWER

½-in. size, with No. 15 "Mixometer" having china wall plate, 4-in. Anyforce Kas-Bras head with ball joint, bent arm and cast brass wall flange. Exposed metal parts n.p. finish

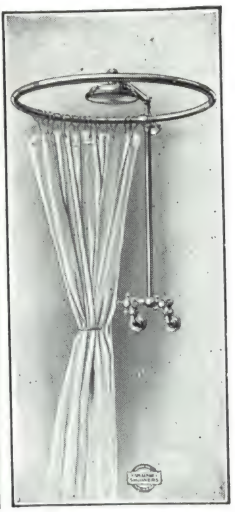


H-895. SPEAKMAN INSTITUTION "MIXOMETER" SHOWER

½-in. size, with lock-shield controlling valves on supplies to overhead, gooseneck discharge pipe with cast brass supporting strap, ball joint and 4-in. Anyforce Kas-Bras head—n.p. finish

H-1402. SPEAKMAN BUILT-IN COMPRESSION SHOWER

½-in. size, with Hi-Seat valves having china escutcheons and china cross arm handles, 4-in. Kas-Bras head with ball joint, bent arm and cast brass wall flange. Exposed metal parts n.p. finish



H-1512. SPEAKMAN COLUMBIA SHOWER

½-in. size, with elbow couplings to wall, china index metal handles, straight arm, 6½-in. needle head, 24-in. curtain ring, white duck curtain with hanger hooks and hold-back hook

H-965. SPEAKMAN BUILT-IN "MIXOMETER" SHOWER AND NEEDLE BATH

¾-in. size, with No. 15 "Mixometer" having china wall plate, six 3-in. Kas-Bras sprays. 5-in. Kas-Bras head with ball joint and bent arm, one Hi-Seat valve with china escutcheon and handle to control sprays and one to control head. Top sprays with ball joint. Concealed piping galvanized iron. Exposed metal parts n.p. finish.

H-2370. SPEAKMAN DESHLER BATH FIXTURE AND "MIXOMETER" SHOWER

½-in. size, with Hi-Seat by-pass valves on bath fixture having china escutcheons and handles, 2-in. standing waste, No. 15 "Mixometer" having china wall plate, 4-in. Kas-Bras head with ball joint and bent arm. The "Mixometer" to be connected to bath fixture valves by galvanized iron pipe and tested at factory. Exposed metal parts n.p. finish

H-2460. SPEAKMAN DESHLER BUILT-IN BATH FIXTURE

½-in. size, with Hi-Seat by-pass pattern valves having solid china cross arm handles and china escutcheons, top nozzle supply and 2-in. standing waste.

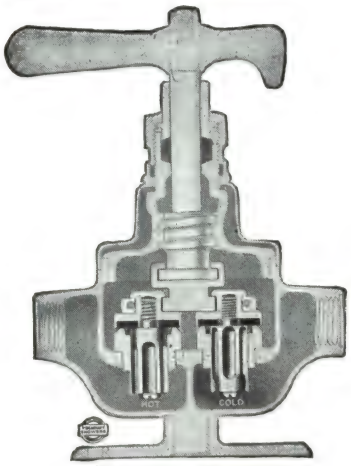
Also made with ¾-in. valves and 2¼-in. waste.

By-pass valves are for convenience in connecting a shower over the bath fixture. See the application of this feature in H-2370.

This fixture and all other Speakman built-in compression fixtures and showers are furnished with the patented Speakman Renewable Hi-Seat valve

Continued on next page

Speakman "Mixometer"

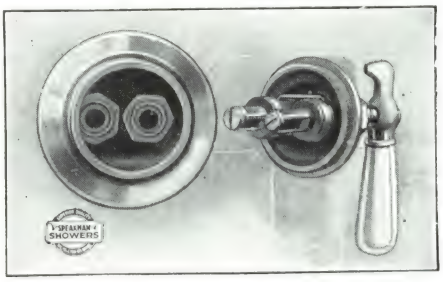


Working Parts of "Mixometer"

By a process of development and improvement gained by 25 years' experience in the manufacture of mixing valves, and 50 years' experience in different branches of the plumbing business, this company has perfected the Speakman "Mixometer" for automatically mixing hot and cold water for showers and other plumbing fixtures.

The object to be gained by the "Mixometer" is the saving of water, saving of time, and convenience of operation, all of which is possible because of the positive control of the mixing of the water.

The "Mixometer" is made in both exposed and built-in types; also in ½-in. and ¾-in. sizes. The H-952½ shower shown on preceding page is the most popular type for installation over a built-in tub in such buildings as homes, hotels, clubs, etc., also, the small amount of exposed metal greatly reduces the labor of cleaning.

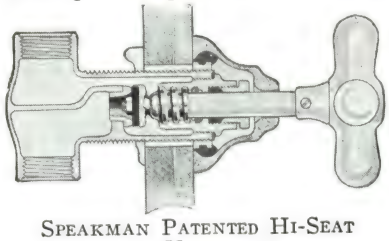


Working Parts of Built-in "Mixometer"

The "Mixometer" has three chambers—one for hot, one for cold and one for "mixed" water. Graduation of temperature of water in the "mixed" chamber is obtained by operating plungers which control flow of hot and cold water. Plungers are provided with grooves, each of a different length, and are attached to a yoke which is raised or lowered by a threaded spindle operated by lever handle. In opening valve, cold water is admitted first. Turning handle gradually increases the hot and lessens the cold water admitted into the "mixed" chamber

Speakman Patented High-Seat Valve (Renewable)

Wall construction is more or less standardized, and when plumbing fixtures are built in the wall, it has been established that the most practical length valve for general use is 3 in. from center of inlet of valve to face of wall. If valve is constructed in the usual way, with seat in line with inlet and outlet; i.e., 3 in. from face of wall, seat is so deep in the valve that it is difficult to examine or to re-grind.



Speakman Patented Hi-Seat Valve

Seat is 1⅜ in. from face of wall. In convenient view and easily accessible. Shank of valve extends beyond face of wall. All working parts are removable.

Thread which engages spindle is in bonnet and not in body of valve. These parts also are all renewable.

Disk is swivel; washer is incased and held on by a nut—not a setscrew

H-1704 Kas-Bras Head with Concealed Regulator

H-1704. Kas-Bras Head with Concealed Regulator

Often, as a matter of water economy, it is desirable to limit the volume of water—to 6 gals. per minute, for instance—two minutes, 12 gals., are enough for a shower. The regulator in this head is concealed. It is set with a screwdriver after the face has been removed.

H-1705 Speakman Anyforce Kas-Bras Head

The latest shower improvement—the Speakman Anyforce Head (patented). The shower's force is under the instant control of the bather by means of that china lever handle on the side. With the Anyforce Head and "Mixometer," it is possible to have instantly any shower force at any temperature.

H-1705. Speakman Anyforce Kas-Bras Head

H-2276 Speakman Unit-Acto Lavatory Fixture

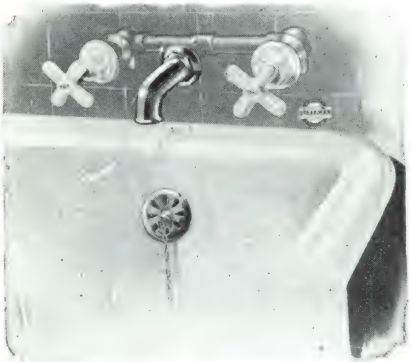
This is a simplified combination fixture which will fit a stock lavatory with overflow drilled for 2 cocks and chain-stay through slab back of the overflow. Supply to nozzle and pop-up waste pass through the chain-stay hole. This fixture permits washing in running water, which is the only sanitary way.

H-2276. Speakman Unit-Acto Lavatory Fixture

Compression valves having solid china cross arm handles, china escutcheons, incased washers and ¼-in. threaded tails. Valves can be easily rewashered from top of lavatory. Waste is the Speakman Acto Pop-up with china knob and 1¼-in. tail

H-2476 Speakman Dupont Built-in Tub Filler

To go with this fixture the Speakman Company manufactures a heavy connected waste and overflow, plate number H-2480, with cast overflow grate, solid link chain, heavy rubber stopper with ring post securely anchored in it. No slip joints back of the wall. Connections are either screwed or soldered.



H-2476. Speakman Dupont Built-in Tub Filler

½-in. size, with Hi-Seat valves, 8 in. c. to c. having solid china cross arm handles and china escutcheons and cast brass nozzle with adjustable screwed flange above rim of tub

STURGIS COMPANY

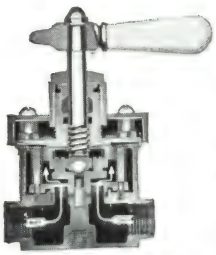
Mixing Valves and Shower Accessories

STURGIS, MICH.

Products

M-VB Temporator Mixing Valve; Shower Accessories.

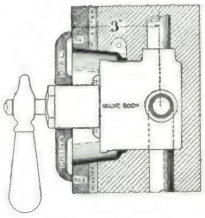
The M-VB Temporator



Sectional View of M-VB Temporator

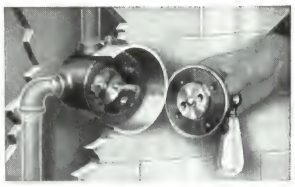
The Temporator's radically different design and construction makes it suitable for use under the most adverse conditions. The sectional view shows the centralized construction with the pressure being exerted through the bronze ball and pressing the mixing spool down on the seating disc. In this manner a perfect frictionless seat is obtained. The Temporator reduces slippage, which runs as high as 18% of the total volume in ordinary showers to less than ¾ of 1%. All Temporators are furnished with a volume valve for adjusting quantities and pressures of water delivered.

An Exclusive Feature—This consists of an adjustable roughing-in and waterproofing flange, which, when moved backward or forward, compensates for variations in tile and plaster. This prevents any water following the inside of the partition and ruining the finish in the adjoining room, should a leak occur in the stuffing box or bonnet.



Adjustable Flange

Principle of Operation—The mixing chamber contains two cold and two hot water inlets. As handle is turned, the port uncovers first one and then the second cold water inlet. At this point 99% cold water is delivered. Continued operation of the handle closes one cold and opens one hot water inlet. Moving it still further closes the second cold and opens the second hot water inlet, giving all hot water. Clearances of less than one-thousandth part of an inch make absolute control of the water possible.



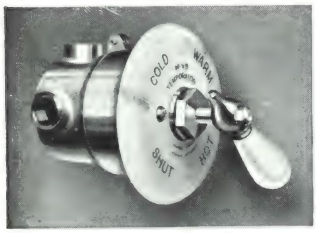
Showing Accessibility of M-VB Temporator

A screwdriver is the only tool necessary to replace the one wearing part, the seating disc

None of the working parts of the Temporator are exposed to sediment or corrosion when valve is closed; the seating disc over which the mixing stool revolves, is cleaned at every operation.

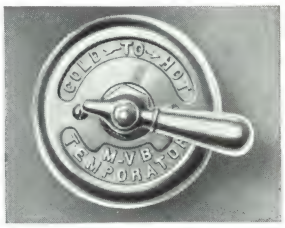
A Five-year Guarantee

We guarantee every M-VB Temporator to render satisfactory service when properly installed and used for the purposes intended and will furnish without question, new parts as an even exchange for any that prove defective within *five years* from the date of installation.



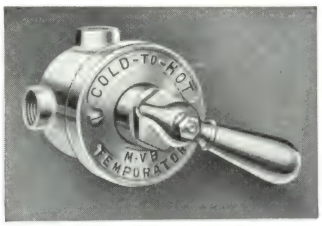
No. 1. Concealed Type

China handle and dial or all metal handle. Dial of bone china, marking under glaze, guaranteed not to discolor or craze. Inlets and outlets, ½ in.



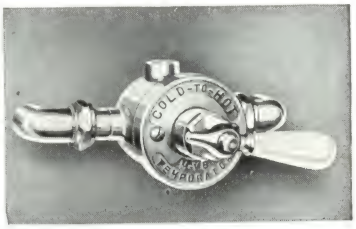
No. 1M. Concealed Type

Dial and handle of polished and nickeled brass for use in institutions, factories and public buildings. Inlets and outlets, ½ in.



No. 3. Exposed Type

Same valve structure as concealed type. All metal handle; to connect directly to nickeled piping without use of unions. Inlets and outlets, ½ in.



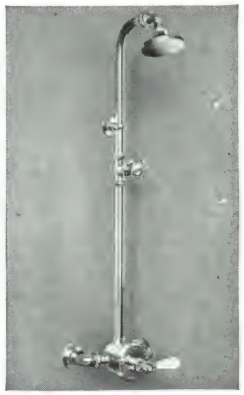
No. 3U. Exposed Type

Packing nut may be tightened without the removal of any parts. Furnished with china handle. Inlets and outlets, ½ in.

M-VB Temporator Mixing Valves

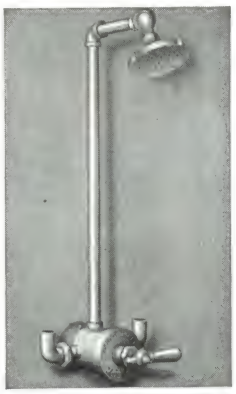
A225. Adjusto Type

Union elbows, wall flanges, upper and lower packed ball joints, volume valve, discharge pipe and 4-in. cast brass shower head



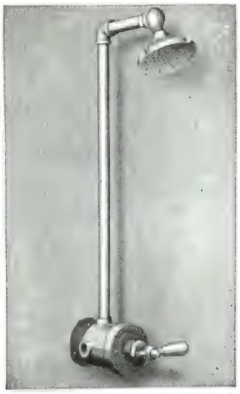
A-300. Exposed Type

Brass dial china handle, union elbows and wall flanges, volume valve, discharge pipes, pipe support, ball joint and 4-in. cast brass head



A-370. Industrial Type

Union elbows, all rough white plated, metal handle, valve supporting flange, galvanized iron discharge pipe, 30° elbow and 4-in. cast brass head

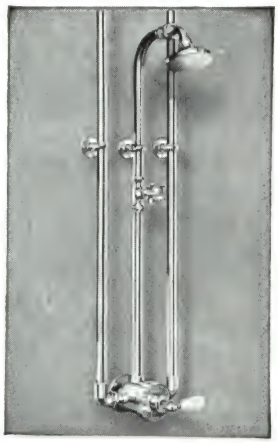


A-380. Industrial Type

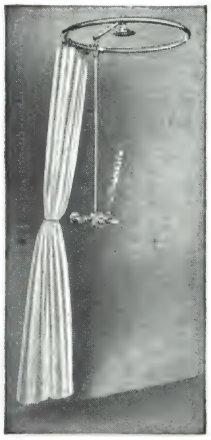
Rough white plated, all metal handle, valve supporting flange, 30° bright plated elbow and 4-in. cast brass head. No discharge pipe furnished

Shower Fixtures

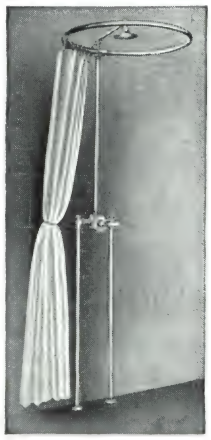
Continued on next page



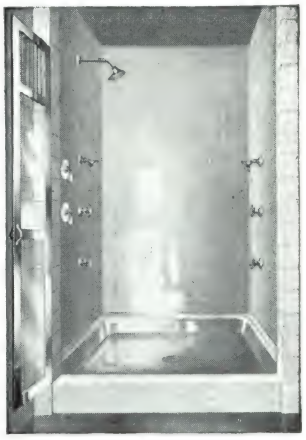
A-325. Exposed Type
Brass dial, china handle, union elbows, valve supporting flange, discharge pipes, pipe supports, ball joints, 4-in. cast brass head and ½-in. supplies to ceiling



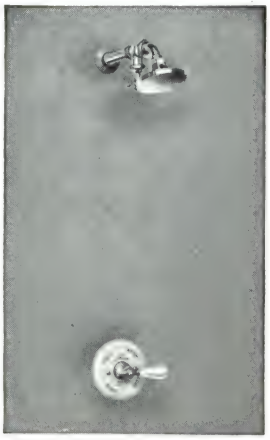
A-350. Exposed Type
Metal dial and china handle, discharge pipe, 24-in. curtain ring, duck curtain, 4-in. cast brass head and elbow, screw driver slotted stops



A-355. Exposed Type
Metal dial and china handle, discharge pipe, 24-in. curtain ring, duck curtain, 4-in. cast brass head, valve supporting flange, ½-in. supply pipes to floor with elbow, screw driver slotted stops

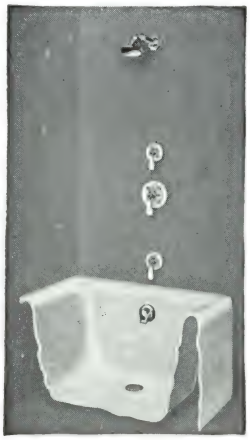


A-135. Concealed Type Shower and Needle Bath
Separate valves controlling shower head and side sprays. Discharge pipe, ball joints, 4-in. cast brass head, 2 sprays with ball joints and wall flanges and 4 sprays with wall flanges



A-100. Concealed Type
China dial and handle discharge pipe, volume valve, adjustable ball joint and 4-in. cast brass shower head

A-125. Concealed Type
Polished and plated brass dial and handle, discharge pipe, 30° elbow and 4-in. cast brass shower head

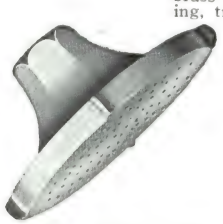


A-65. Concealed Type Tub and Shower Fixture
½-in. size with concealed mixing and transfer valve, china dial and handles, 2-in. standing waste, direct action lever with china dial and handle, nickelplated nozzle and outlet strainer, discharge pipe with ball joint and 4-in. cast brass head, piping between mixing, transfer valve and nozzle

A50. Concealed Type Tub Fixture
½-in. size with concealed mixing valve, china dial and handle, 2-in. standing waste, direct action lever with china dial and handle, nickelplated nozzle and outlet strainer

A-525. Ball Joint
Nickelplated brass, straight type, ½-in. male and female.

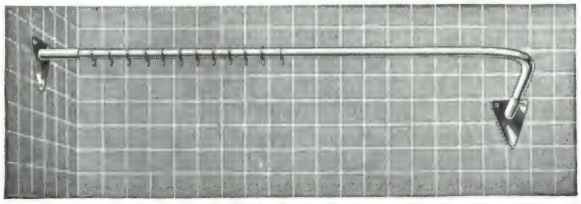
A-540. Ball Joint
Nickelplated brass, bent type, ½-in. male and female



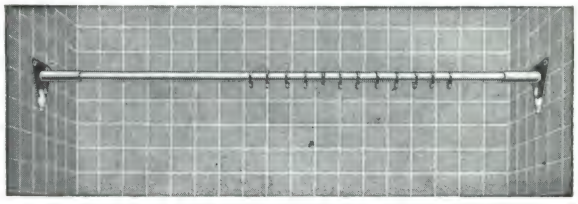
A-550. Shower Head
Polished nickelplated cast brass, ½-in. female inlet; furnished for 25 to 40 lbs., 45 lbs. and less than 25 lbs. pressures

A-650. White Duck Curtains
Thoroughly shrunk duck with nickelplated brass grommets. Made in all sizes to fit corner or recess tubs and stalls

A-660. Curtain Snap
Nickelplated brass, to fit 1-in. o. d. rods



A-605. Corner Curtain Rod
1-in. o. d. heavy tube, well finished and nickeled with cast brass supporting flanges. Made in lengths of 4 ft. 6 in., 5 ft., 5 ft. 6 in. and 6 ft. Hooks not included



A-610. Recess Curtain Rod
1-in. o. d. heavy tube, well finished and nickeled with heavy cast brass supporting flanges. Made in lengths of 4 ft. 6 in., 5 ft., 5 ft. 6 in. and 6 ft. Hooks not included

HAWS SANITARY DRINKING FAUCET CO.

INCORPORATED
1808 Harmon Street
BERKELEY, CAL.

AGENCIES IN ALL PLUMBING JOBBERS IN THE FOLLOWING CITIES

SAN FRANCISCO, CAL. OAKLAND, CAL. LOS ANGELES, CAL. SAN DIEGO, CAL. DENVER, COLO. PORTLAND, ORE. RENO, NEV. FRESNO, CAL. SACRAMENTO, CAL. PUEBLO, COLO. SAN JOSE, CAL. STOCKTON, CAL. BOISE, IDAHO PHOENIX, ARIZ. HONOLULU, H. I. WALLA WALLA, WASH. TACOMA, WASH. SEATTLE, WASH. SPOKANE, WASH. EL PASO, TEX. OMAHA, NEB. SALT LAKE CITY, UTAH OGDEN, UTAH VICTORIA, B. C.

Products

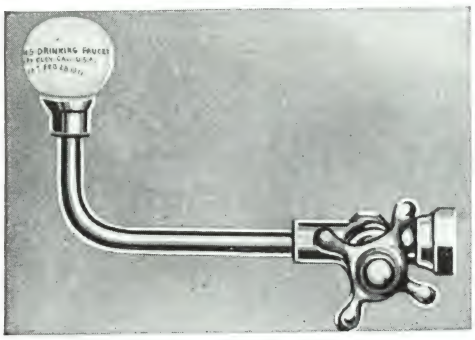
HAWS SANITARY DRINKING FAUCETS and FOUNTAINS.

Distinctive Features

The HAWS SANITARY DRINKING FOUNTAIN CO. confines its efforts exclusively to the production of a sanitary drinking fountain that, in every respect, comes up to the highest standards.

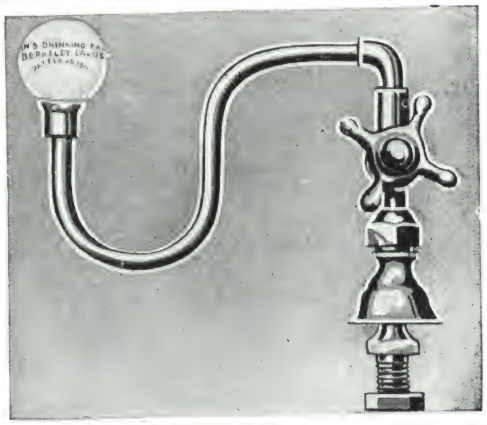
Saving in first cost and maintenance, together with durability, attractive design and sanitation are conspicuous in Haws fountains.

All of the various Haws models, including those illustrated below, have the Haws vitreous china drinking head and the special 4-arm Mueller self-closing valve with concealed regulating screw, which permits the height of the water to be varied, as desired.



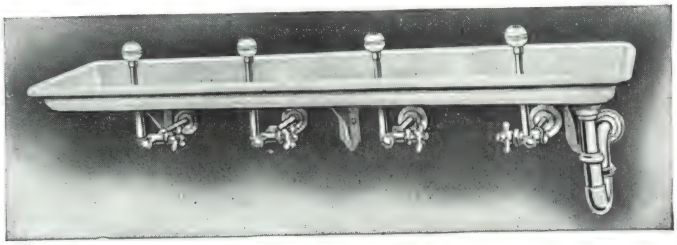
MODEL NO. 1
Complete as shown. Dimensions—Length, 8 in.; inlet, ½-in. iron pipe size; drinking head, 1¾ in.; shipping weight, 1½ lbs. Can be furnished in any size from 4 to 8 in.

MODEL NO. 12. NORDICA
Complete as shown. Dimensions—Height, 36, 30, in.; width, 14 in.; depth of bowl, 4½ in.; shipping weight crated, 36-in., 110 lbs.; 30-in. 100 lbs.



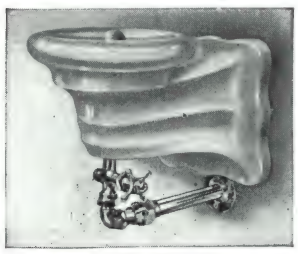
MODEL NO. 2
Generally used in lavatories. Complete as shown. Dimensions—Length, 7 in.; ½-in. iron pipe size; drinking head, 1¾ in.; shipping weight, 2½ lbs.

MODEL NO. 6-A. DORIS
Complete as shown. 1¾-in. head; 1½ in. g. i. waste pipe; bowl, 8½ in. diameter, 6 in. deep; wall to c. bowl, 7 in.; shipping weight, 35 lbs.

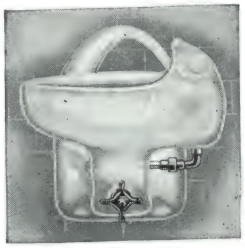


MODEL NO. 10. REX
For school yards and basements. Complete as shown. Dimensions—1½-in. brass trap with 1¾-in. heads; width of receptor, 12 in.; depth, 2½ in.; length, 2 heads—30 in., 3—42 in., 4—54 in.; shipping weight, 36 in.—60 lbs., 42 in.—80 lbs., 54 in.—100 lbs.

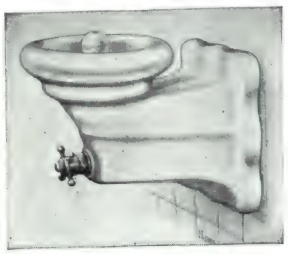
MODEL NO. 3
Complete as shown, 1¾-in. head; height, 5 in.; inlet, ½-in. iron pipe size; shipping weight, 1½ lbs.



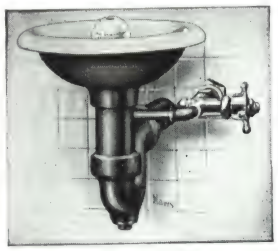
MODEL NO. 7. IDEAL
Vit. china receptor and 1¾-in. drinking head, cast concealed brass trap, Mueller valve, n. p. brass union and concealed iron wall hanger. Dimensions—Bowl, 10 in. diameter, 3 in. deep; receptor, 9¼ in. square; 9¼ in. wall to center of bowl; shipping weight, 38 lbs.



MODEL NO. 7-A. JUNE
Vit. china receptor with anti-splash rim and 1¾-in. head at 73° angle; concealed iron wall hanger, Mueller valve. Dimensions—Bowl, 8x13 in. across top, 4 in. deep; 1 in. anti-splash rim; receptor, 9¼x10¼ in.; 9 in. wall to c. and 13 in. wall to outside bowl; shipping weight, 35 lbs.



MODEL NO. 7-B. IDEAL
Vit. china receptor and 1¾ in. drinking head, cast concealed brass trap, concealed cast iron wall hanger, Mueller valve. Dimensions—Bowl, 10 in. diameter, 3 in. deep; receptor, 9¼x10¼ in.; 9¼ in. wall to c. of bowl; shipping weight, 36 lbs.



MODEL NO. 9. DURABLE
Suitable for factory installation c. i. bowl enameled inside, c. i. bronzed trap to wall. Mueller valve and 1¾ in. vit. china drinking head. Dimensions—Bowl, 9 in. across top; 2½ in. deep; shipping weight, 15 lbs.

MANUFACTURING EQUIPMENT & ENGINEERING CO.

Sanitary Drinking Fountains

HOME OFFICE AND SHOWROOMS

BOSTON, MASS.

NEW YORK OFFICE, Grand Central Terminal

FACTORY AND MAIL ADDRESS: FRAMINGHAM, MASS.

Products

SANITARY DRINKING FOUNTAINS.

For Metal Toilet Enclosures, see page 1567; for Sanitary Washbowls, see page 1628; for Metal Lockers, Shelving, etc, see page 2051.

METAL MEECO PRODUCTS

TRADE-MARK

Combined Sanitary Drinking Fountains and Ice Tanks

Designed for connection to municipal water supply or gravity tank and to furnish water sufficiently ice-cooled to supply a continuous procession of persons such as is customary under practical conditions. Their wide adoption attests their popularity.

Furnished with any kind of bubbler, or without bubblers. Our standard bubblers have an oblique or vertical stream so as to meet various Board of Health regulations, and can be regulated to suit any water pressure, so that height of stream will always be constant, regardless of variance of pressure. Bubbler bowls are cast iron, heavily vitrified porcelain enameled on inside.

FIG. 613
This improved type saves space. Specifications same as Fig. 604

FIG. 604
Regular ice capacity, 75 lbs.; special capacity, 150 lbs. Supply capacity, 125 to 150 persons. Has 15½ coils of ½-in. brass tubing. Heights, 36 and 42 in.

FIG. 606
Same as Fig. 604 except has double capacity, being furnished with either 2 bubblers, 2 goosenecks, or 1 bubbler and a gooseneck for filling glasses, etc.

COMBINED SANITARY DRINKING FOUNTAIN AND ICE TANKS

Ice tank is cork insulated; watertight parts are galvanized after fabrication. Finished with 2 coats of dark olive brown baked enamel. Small fittings nickelplated. Supply connections, ¼ in.; waste connections, 2 in. Standard fountains waste through base, but can be furnished to waste through elbow above floor. Operated by self-closing stops.

Economizer Fountains and Ice Tanks—

Represent the closest approximation to the ideal sanitary drinking fountain that has been attained and have many practical advantages that will appeal to the user.

They are ice-cooled, having 2 tanks and 2 coils. Incoming water first passes through a coil within a tank of ice-cooled waste water, where it is cooled considerably. It then passes through a second coil which is within the ice tank and becomes ice cold. Then the water passes through the bubbler and down to the waste water tank where it helps cool incoming water. Overflow pipe in waste water tank carries off excess water.

In this way, full use is made of the cooling effect of the ice with a great resultant reduction in the amount of ice consumed.

FIG. 627. ECONOMIZER FOUNTAIN AND ICE TANK
Patent applied for
Contains 105 ft. of ½-in. copper coil. Height, 43 in.

Sanitary Drinking Fountains

We illustrate a few of our fountains for use with concealed ice tanks or for direct connection to municipal water supply. Any kind of bubbler furnished.

FIG. 611. WALL TYPE SANITARY DRINKING FOUNTAIN

FIG. 609. WALL TYPE SANITARY DRINKING FOUNTAIN
Furnished with bubbler, and with or without spout or bibb

FIG. 602. PEDESTAL DRINKING FOUNTAIN
Standard heights, 36 and 42 in.; special heights if desired

THE MURDOCK MFG. & SUPPLY CO.

Drinking Fountains and Hydrants

426-430 Plum Street
CINCINNATI, OHIO

Products

Manufacturers of SANITARY DRINKING FOUNTAINS, including Original Murdock Outdoor Bubble-Font, Lily White Bubble-Font and "Sandow" Pedestal Fountains; HYDRANTS and RAILWAY WATER SERVICE BOXES.

Also dealers in General Water, Gas and Steam Supplies and Tools.

Murdock Outdoor Sanitary Drinking Fountains

Murdock sanitary drinking fountains, described below are made in three general types, namely

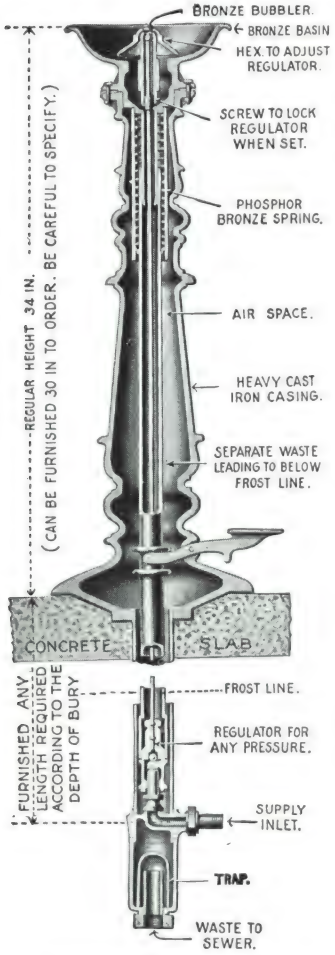
(1) Original Murdock Antifreezing Bubble-Font for outdoor use.

(2) The Lily White Bubble-Font for outdoor or indoor use.

(3) "Sandow" Pedestal Fountains for indoor use only.

Original Murdock Antifreezing Bubble-Font

The severe weather and changing conditions incident to open air installations require special construction in outdoor fountains. Porcelain, enamel and china chip easily or air-crack in time and become most unsanitary. Outdoor fountains must, in addition, be built to withstand the abuse of the irresponsible public as well as of the elements.



CONSTRUCTION OF MURDOCK OUTDOOR DRINKING FOUNTAIN (ANTIFREEZING)

The Murdock patent antifreezing Bubble-Font, the product of the Murdock long experience in making open air antifreezing devices, is a thoroughly practical outdoor fountain which fulfils all of these necessary conditions.

Construction and Operation—Attention is called to the following distinctive features. The solid working valve and the supply regulator are located in the ground *below frost line*. A foot treadle opens the valve and permits water to rise to the bubbler. A separate waste pipe conducts overflow from the basin back to a point below frost line. Releasing foot treadle causes water to drain from supply pipe into sewer. This automatic drainage prevents water standing in fixture to become warm and stagnant in summer or to freeze and burst it in winter.

Every piece is made substantially heavy and all inner parts are brass. There is no flimsy self-closing cock to get out of order. The only wear is where the leather washer of a well-made valve rides the bronze stem, and this will last as long as a pump plunger. The integral trap prevents sewer gases from rising to the bubbler.

By removing treadle bolt and two top bolts, treadle and inner working parts may be lifted out. Thus valve can be repacked or any part replaced without digging up fixture. This advantage should appeal to all.

ORIGINAL MURDOCK OUTDOOR BUBBLE-FONT (ANTIFREEZING)

Uses—Ideal for public streets, parks, playgrounds, schoolyards, railroad yards, cemeteries, and other outdoor installations. Strong and practical for shelter houses, comfort stations and all semiexposed places.

Outer shell cast iron, simply ornamented and painted green. Other colors to order.

Furnished for interior installation by reducing the shank below pedestal to 6 in., omitting trap at the base and placing outlet opposite or at an angle to the inlet. Ideal for shop and factory use where strong pedestals that will withstand rough use are desired. Indoor fountains can be drained into open receptors.

Furnished for any depth of bury desired; anything shorter than 2 ft. takes 2-ft. list. Regularly made 34 in. above ground, but can be made 30 in. if desired.

Lily White Bubble-Font

A pure white, painted, cast iron shell fountain free of all ornamentation, made for outdoor or indoor use with same interior mechanism as the Original Murdock. Finished in pure white vitrolite which can be renewed as often as desired or necessary. The bubbler and the basin are made of solid bronze, nickelplated. This all-metal feature makes them practically everlasting.

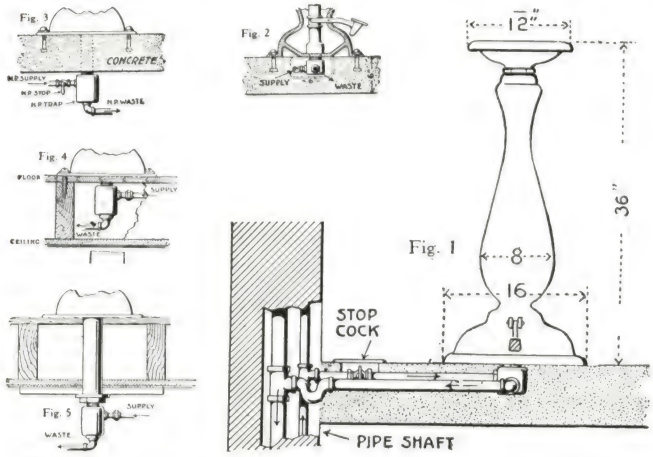
Ideal for installation in hospitals and medical institutions, churches, public buildings, comfort stations, industrial plants, etc.

Installation—The Murdock Lily White Bubble-Font may be installed in several ways. It is particularly adapted for concrete construction; both supply and waste may be placed just below surface in a space of less than 2½ in. in depth. Fountain may be connected to circulating ice water systems or to separate iced coils in boxes. Construction of fountain permits installing trap in space between floor and ceiling or beneath ceiling of story below in old buildings having wood floors.

For installation see five methods on next page.

LILY WHITE BUBBLE-FONT

Continued on next page



FIVE DETAILS OF INSTALLATION OF MURDOCK LILY WHITE BUBBLE-FONT

(1) Concrete floor. Working parts accessible without disturbing fixture.

(2) Concrete floor. 2½ in. from floor line to bottom of 1-in. waste pipe. 3 in. from floor line to extreme lower end.

(3) Concrete floor. Method of installation with trap exposed on ceiling of story below. Trap regularly furnished rough brass, but may be polished and nickelplated to order.

(4) Wood floor. Trap between floor and ceiling.

(5) Wood floor. Trap between ceiling of story below as in detail 3.

Note:—Inlets and outlets can be placed at any angle facing pedal, if so specified when ordering. Bottom fittings without traps, shown in 1 and 2, having a measurement of 3 in. over all, may also be used as shown in 3, 4 and 5, when trap is otherwise placed. Bottom fittings with trap measure 8 in. over all. This does not include ells nor nipples.

Can also be furnished with antifreezing parts for outdoor use.

Information for Ordering and Prices

When Ordering Outdoor Fountains—Be careful to specify depth of bury, or length required below the surface of ground, sufficient to have valve and all working parts below a possible freezing point.

When Ordering Indoor Fountains—Specify kind and thickness of flooring and whether the supply and drain is to be concealed or exposed.

OUTDOOR FOUNTAIN LIST PRICES

Depth of bury, ft.	Original Murdock	Murdock Lily White
2	$70.00	$ 97.00
3	73.50	100.50
4	77.00	104.00
5	80.50	107.50
6	84.00	111.00

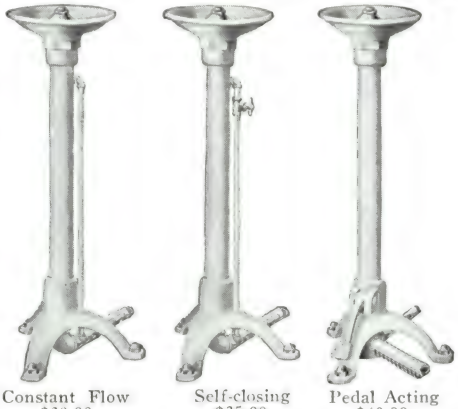
Half-foot lengths between the above will be furnished at price of next longest length; i. e., a 2½-ft. length takes same price as of 3-ft. length.

INDOOR FOUNTAIN LIST PRICES

Description and Construction	Original Murdock	Murdock Lily White
With short connections for concealed piping	$70.00	$97.00
With long connections for exposed piping	73.00	100.00

"Sandow" Pedestal Fountains

Strong, durable, heavy cast and wrought iron standards finished pure white. Equipped with special "Murdock" bubblers. Regular 36 in. Can be built 30 or 24 in. to order. Supplies and wastes furnished to floor unless otherwise specified. No water control furnished with Constant Flow. Self-closing stop-cock furnished with Self-closing. Murdock pedal valve built into Pedal Acting. A good heavy duty variety for use in factories, mills, shops or other places where higher priced fountains may not be desired.



Constant Flow $30.00 — Self-closing $35.00 — Pedal Acting $40.00

"SANDOW" PEDESTAL FOUNTAINS

Murdock Hydrants and Hose Boxes

Thoroughly tested and guaranteed to give entire satisfaction under any regular working pressure.

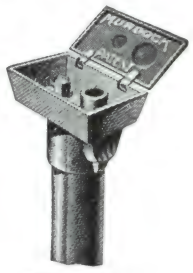
NOTE—This is the way the genuine Murdock compression hydrant is marked

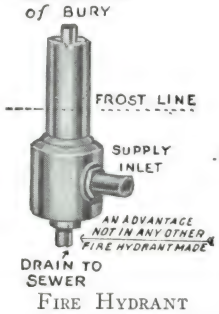
NOTE—This is the way the genuine Murdock self-closing hydrant is marked

COMPRESSION HYDRANT — SELF-CLOSING HYDRANT

HYDRANT LIST PRICES

To bury ft.	Compression ¾-in.	Compression 1-in.	Self-closing ¾-in.	Self-closing 1-in.
2	$ 9.00	$11.50	$11.00	$19.00
3	10.00	12.50	12.00	20.00
4	11.00	13.50	13.00	21.00
5	12.00	14.50	14.00	22.00
6	13.00	15.50	15.00	23.00

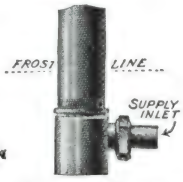




FIRE HYDRANT

Can not fail to operate as it will not freeze. Has full 2 in. waterway throughout

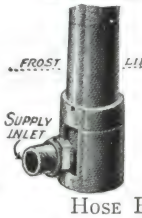
Fitted also, on order, with 1½-in. or 2½-in. hose and bottom pipe connections



GROUND DRAINED HYDRANT

For tanneries, stock yards, mills, factories, etc. Gives large supply

Fitted also, on order, with 1¼-, 1½- or 2-in. iron pipe and hose connections



HOSE BOX

Sets flush with paving. Ideal for garage or stable floor flushing

¾- and 1-in. Fitted also, on order, with 1¼-, 1½- or 2-in. hose and bottom connections

HYDRANTS AND HOSE BOX PRICES

To bury ft.	Fire hydrant drained to sewer	Ground drained hydrant	Ground drained hose boxes ¾-in.	1-in.	Extra Large
2	$45.00	$30.00	$ 7.50	$ 9.00	$27.00
3	48.00	32.00	8.50	10.00	29.00
4	51.00	34.00	9.50	11.00	31.00
5	54.00	36.00	10.50	12.00	33.00
6	57.00	38.00	11.50	13.00	35.00

Note:—In ordering be careful to give length (or depth of bury) and whether wanted for lead or iron pipe connections. Specify *"Genuine Murdock"* as made by THE MURDOCK MFG. & SUPPLY CO., Cincinnati, Ohio, and avoid substitutions.

THE HALSEY W. TAYLOR CO.

Manufacturers of Drinking Fountains and Water Coolers

WARREN, OHIO

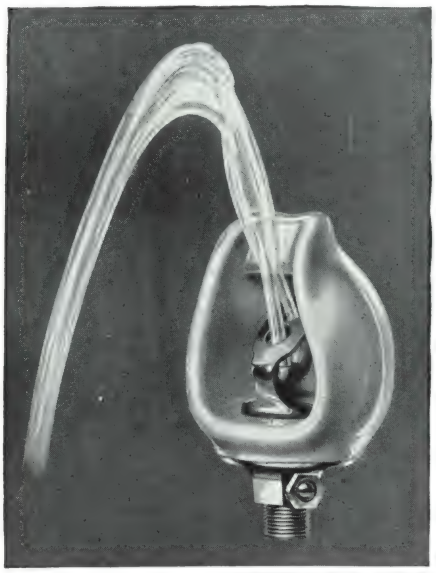
Products

PURITAN SANITARY DRINKING FOUNTAINS and WATER COOLERS (Patented).

Puritan CANTONMENT DRINKING FOUNTAINS
TRADE-MARK

Puritan Sanitary Drinking Fountains and Coolers

Puritan cantonment drinking fountains were designed to meet the demand of the government for better drinking equipment for use in cantonments, naval training stations, etc. They are approved and adopted by all departments of the army and navy.



PURITAN 562 FOUNTAIN HEAD

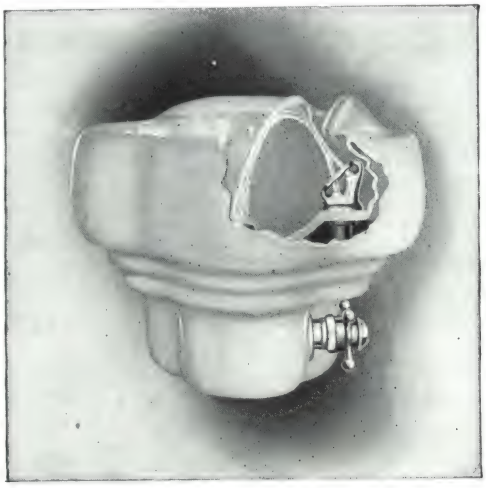
Puritan 2-stream side jet projectors are recognized by leading architects, schools and industries as the very highest development in drinking fountains; embodying the automatic stream control (stream never too high, never too low); perfect sanitary drinking mound; non-squirting projector; and simple foolproof design.

In Halsey Taylor fountains two streams of water are projected from the side of the fountain. As these streams rise at an angle they converge, setting up a mechanical interference that retards the movement of the water at the apex of the arc, thus forming a convenient drinking mound (see illustration above).

Halsey Taylor Automatic Stream Control—This device is a late development and can be furnished with all Halsey Taylor side stream fountains. No wasting of water. Delivers a constant, even stream at high or low pressure.

Puritan 605 Wall Fountain

Heavy vitreous china wall drinking fountain with integral trap housing; with or without stream protecting guard; "cantonment 2-stream mound-building projector"; nickel plated brass strainer and self-closing stop with either lever or cross handle; supply with volume regulator, and rough brass trap concealed; furnished with Taylor automatic stream control in waste which keeps drinking stream at constant height.



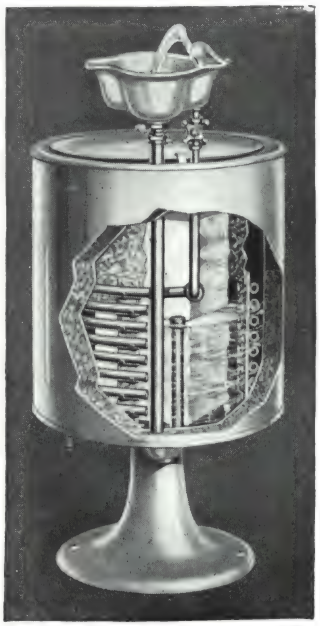
PURITAN 605 WALL FOUNTAIN

Puritan 570 "Cantonment" Cooler Fountain

Designed to attach to city pressure lines. Made from heavy cast iron and galvanized sheet steel. Insulated with granulated cork and corkboard throughout; cooling coil; ½-in. outside diameter No. 20 gauge seamless brass tubing, tinned both inside and outside; locking device on cover.

Fountain head; cast iron vitreous enameled with stream protecting guard; furnished with "Cantonment 2-stream mound-building projector" and nickel plated cross handle self-closing stop.

No. 570-A cooler fountain has 7½x10-in. vitreous china bowl and automatic stream control.



PURITAN 570 "CANTONMENT" COOLER FOUNTAIN

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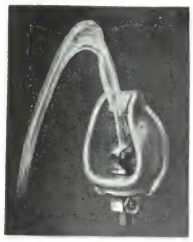
Puritan 562 Fountain Head



PURITAN 562 FOUNTAIN HEAD

Made from vitreous china with nickel plated brass base and projector. The projector used is the famous "2-stream converging mound-building side stream projector" which produces a practical drinking mound at the highest point of projection.

This fixture is designed to replace present unsanitary bubblers on drinking fountains already installed.

Puritan 575 Fountain Head

Same as 570 fountain bowl; furnished with self-closing valve and regulator. Used to replace present unsanitary heads on coolers and pedestal fountains.

PURITAN 575 FOUNTAIN HEAD

Puritan 566 "Cantonment" Wall Type Drinking Fountain

Made of cast iron, vitreous enameled all over; with "2-stream converging mound-building side stream projector." Nickel plated self-closing valve with volume regulator in valve; and nickel plated brass strainer.

PURITAN 566 "CANTONMENT" WALL TYPE DRINKING FOUNTAIN

Puritan 520-68 Pedestal Fountain

Fountain receptor made from cast iron, vitreous enameled; equipped with "2-stream converging side jet projector," and furnished with cross handle self-closing valve and loose key regulator, which is concealed by slip base.

Puritan 568 Pedestal Fountain

Cast iron open base; 2½-in. outside diameter tubing; "2-stream projector" and self-closing valve with volume regulator.

568 520-68

PURITAN PEDESTAL FOUNTAINS

Puritan 578 Cooler Fountain

Construction same as No. 570 cooler. With 15½-in. combination cast iron cover and catch basin, with perforated nickel plated brass drain plate. Catch basin is removed to replenish ice in cooler. Shown with 562 fountain head with lever handle self-closing valve. Also one self-opening, self-closing glass filler.

Finished in white enamel.

578—Complete as shown.

579—Cooler with 1 fountain head only.

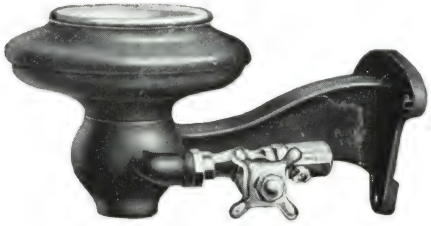
576—Cooler with 1 glass filler only.

577—Cooler with 2 glass fillers.

PURITAN 578 COOLER FOUNTAIN (Patented)

Puritan 540 Wall Type Drinking Fountain

For mills, factories, schools, railroad depots, etc. Heavy 6-in. vitreous china bowl, mounted in cast iron bracket and bowl support; "4-stream angle jet projector;" self-closing valve with volume regulator in valve. Finished in battleship gray.



PURITAN 540 WALL TYPE DRINKING FOUNTAIN

PURITAN 4. STREAM ANGLE JET PROJECTOR (Patented)
Used on fountains 501 to 549 inclusive

Puritan 571 Plain Cooler

This plain cooler tank can be used in connection with fountains already installed or where it is desired to conceal cooler.

Puritan 573 Cooler Fountain

Constructed same as 570 cooler but is furnished with 9½-in. vitreous china bowl and "4-stream angle jet projector."

PURITAN 573 COOLER FOUNTAIN

PURITAN 571 PLAIN COOLER

BRADLEY WASHFOUNTAIN CO.

Manufacturers of Lavatory Fixtures

MILWAUKEE, WIS.

SALES OFFICES

MILWAUKEE, WIS., 413-419 Third Street

CHICAGO, ILL., 1180 Old Colony Building

Products

WASHFOUNTAINS.
Also Ornamental Fountains.

Uses

Bradley Washfountains are used in factories, mills, foundries, shops, schools, hotels, railroad and comfort stations, public buildings and public lavatories for men and women.

Description

Bradley Washfountains are made in two types, "Marmorite" and "Granito."

"Marmorite" is a combination of colored marble and cement, ground and polished so as to approximate a highly finished marble.

("Marmorite" can be furnished in "white" at extra cost.)

"Granito" is a composition of a high grade cement without the addition of marble.

Both types are otherwise alike. Both have smooth, impervious surfaces, are densified, hardened and waterproofed by special processes. They are suitably reinforced, are of great durability and virtually indestructible. They are equipped for cake soap trays or glass containers for liquid soap, as desired.

The fixtures are made in two parts, the bowl and the pedestal, and are easily assembled.

Operation

The valve above the soap fixture regulates the flow, and the height of the spray is controlled by an adjusting screw just under fountain head. As fast as the water is used, it drains off the smooth surface of the bowl, carrying with it all dirt and soap suds, thus eliminating unsanitary conditions and saving much time in keeping fixtures clean. When not used, water is shut off as on other fixtures.

Owing to the method of washing, there is no splashing and no water is spilled on floor or walls.

The illustration showing mechanical details on opposite page indicates how supply and drain connections are made and how the fixture is set and assembled.

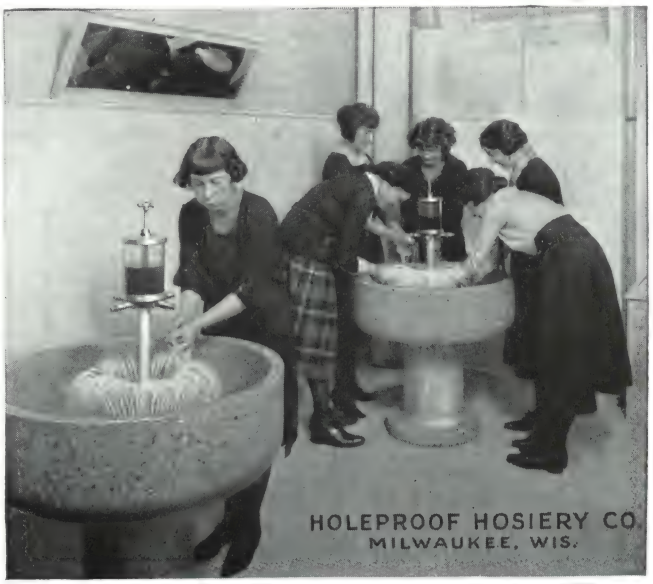
Advantages

By providing running showers of water they make washing delightful. The washfountains are very economical in water consumption. A large, constantly open drain assures perfect sanitation. In eliminating the large number of traps, faucets, bowls, stoppers, piping, etc., the Washfountains effect economies in upkeep, repair expense and in installation costs. The circular shape of the fixture makes access easier and allows more elbow room, which saves time in washing. Bradley Washfountains are very attractive and vastly improve the appearance of lavatory rooms. All traps, pipes, etc., are concealed but are easily accessible.

Floor Space—The average saving in floor space over individual wash bowels is approximately one-third. The larger the installation, the greater the proportionate saving.

The 32-in. Washfountain occupies but 5.5 sq. ft., accommodating 6 persons, and the 54-in. Washfountain but 5.9 sq. ft. for 10.

BRADLEY WASHFOUNTAINS INSTALLED IN ONE OF THREE SIMILAR WASHROOMS AT THE NEWPORT COMPANY PLANTS



INSTALLATION OF BRADLEY WASHFOUNTAINS FOR GIRLS' USE AT HOLEPROOF HOSIERY CO., MILWAUKEE, WIS.

Continued on next page

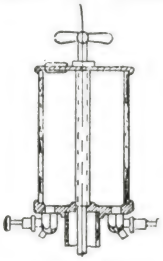
Soap Fixtures

Soap Tray—Circular metal tray for holding cake soap.

Liquid Soap Container—Made of special nickel metal with glass cylinder and 4 soap valves.

Combination liquid soap container and cake soap tray may also be specified if desired.

Only those fittings shown in full lines on illustration of mechanical details are furnished by us.

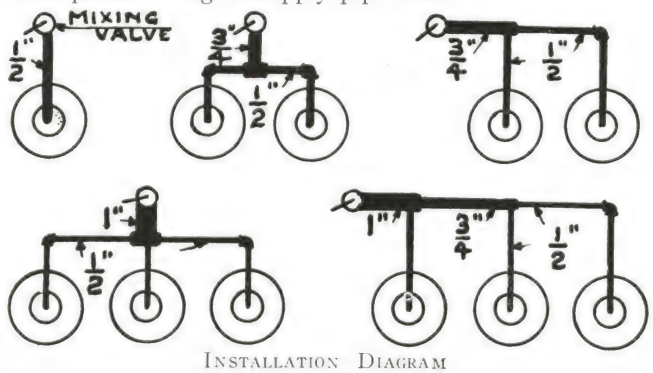


Liquid Soap Container

Soap Tray

Installation Directions and Diagram

The accompanying diagram gives size of pipe and shows how Bradley Washfountains may be connected. Never connect more than three Washfountains to one hot water mixing device. When two or three Washfountains are connected to one hot water mixer, connect them to give each fixture an even supply of water. If runs of pipe exceed 15 ft. use pipes one size larger than shown in diagram to allow for friction. Size of hot water mixer or combination must correspond to largest supply pipe used.



Installation Diagram

Specification Particulars

Sizes—54 in. diameter for 10 persons; 32-in. diam. for 6 persons.

Types—"Marmorite" and "Granito."

Supply—½-in. pipe at fixture connections. Hot water mixing valve or hot and cold water combination optional as shown, to be located on adjacent column or at other convenient positions on walls near fixture. Not furnished by us.

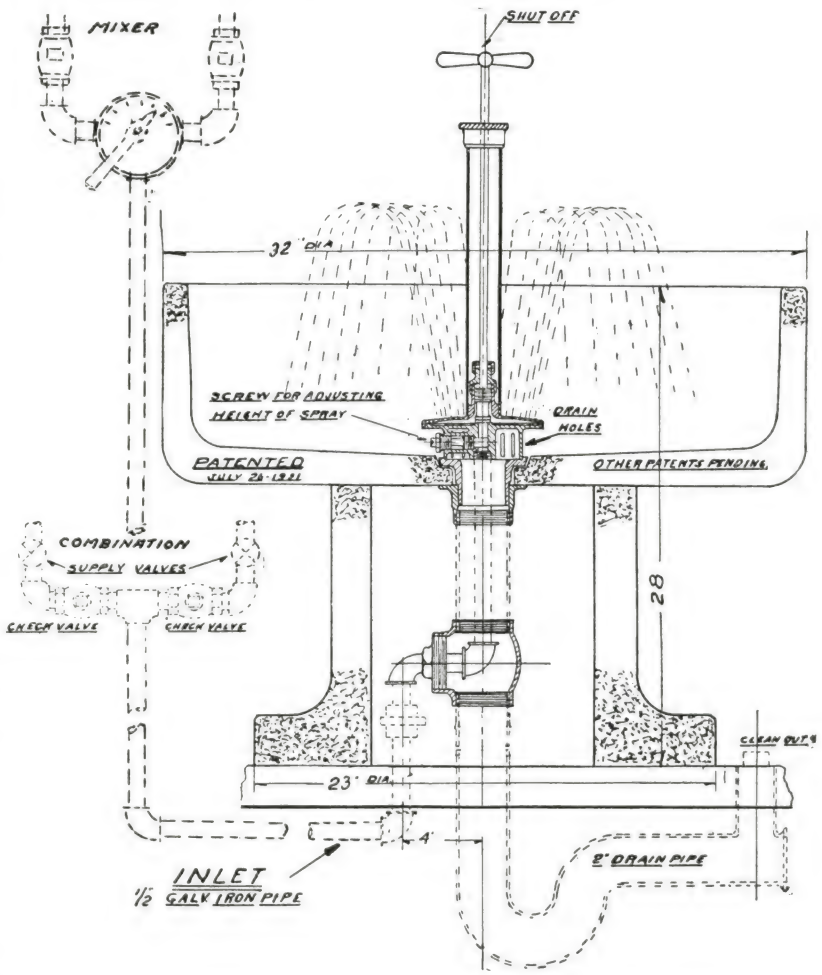
Waste—2 in. Trap, 2 in., type optional.

Vent—As local conditions require. Complete drawings and instructions for installing fixture furnished on request.

Special soap fixtures as above if wanted.

Catalogues

Catalogues fully describing the Bradley Washfountains and also Ornamental Fountains will be sent on request.



Mechanical Details of Bradley Washfountain

A Few Representative Installations

Eline's Incorporated, Milwaukee, Wis.
Allen Bradley Co., Milwaukee, Wis.
Case & Martin Co., Chicago, Ill.
Central Continuation School, Milwaukee, Wis.
Corn Exchange National Bank, Chicago, Ill.
Harrisburg Colliery Co., Harrisburg, Ill.
Lutheran Home for Feeble Minded, Watertown, Wis.
Martin Hotel, Milwaukee, Wis.
Holeproof Hosiery Co., Milwaukee, Wis.
Marquette University, Milwaukee, Wis.
Milwaukee Coke & Gas Co., Milwaukee, Wis.
Milwaukee Rolling Mill Co., Milwaukee, Wis.
A. O. Smith Co., Milwaukee, Wis.
Newport Co., Carrollville, Wis.
Northwestern Malleable Iron Co., Milwaukee, Wis.
Republic Carbon Co., Niagara Falls, N. Y.
Seaman Body Corp., Milwaukee, Wis.
U. S. Aluminum Co., New Kensington, Pa.
U. S. Glue Co., Carollville, Wis.
University of Pennsylvania, Philadelphia, Pa.
Worthington Pump & Machinery Co., Cudahy, Wis.
International Nickel Co., Huntington, W. Va.
Muirdale Sanitorium, Wauwatosa, Wis.

Bradley Washfountains are being installed among others in the following plants and buildings:

American Car & Foundry Co., Madison, Ill.
American Thermos Bottle Co., Huntington, W. Va.
Crane Technical High School, Chicago, Ill.
Illinois Merchants Bank Bldg., Chicago, Ill.
Janesville High School, Janesville, Wis.
Illinois Masonic Orphans' Home, La Grange, Ill.
U. S. Railway Mail Terminal, Chicago, Ill.
Real Silk Hosiery Co., Indianapolis, Ind.
Shorewood Grade School, Shorewood, Wis.
Claybourn Process Corp'n., Milwaukee, Wis.
Lamson & Sessions Co., Cleveland, Ohio

MANUFACTURING EQUIPMENT & ENGINEERING CO.

Sanitary Washbowls

HOME OFFICE AND SHOWROOMS
BOSTON, MASS.
NEW YORK OFFICE, Grand Central Terminal
FACTORY AND MAIL ADDRESS: FRAMINGHAM, MASS.

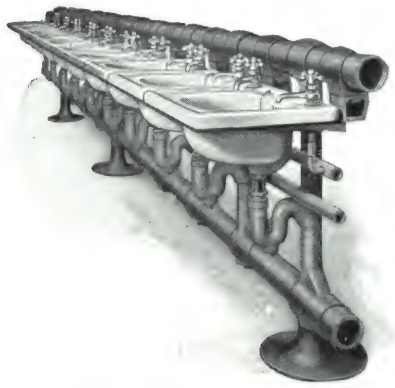
Products

SANITARY WASHBOWLS.

For Metal Toilet Enclosures, see page 1567; for Sanitary Drinking Fountains and Water Coolers, see page 1621; for Metal Lockers, Shelving, etc., see page 2051.

METAL MEECO PRODUCTS

TRADE-MARK



SINGLE BATTERY OF VICTORY WASHBOWLS

DOUBLE BATTERY OF VICTORY WASHBOWLS

Victory Washbowls (Patented)

Have common water supply, common waste and common vent. Every bowl trapped and vented. Meet most technical Board of Health regulations.

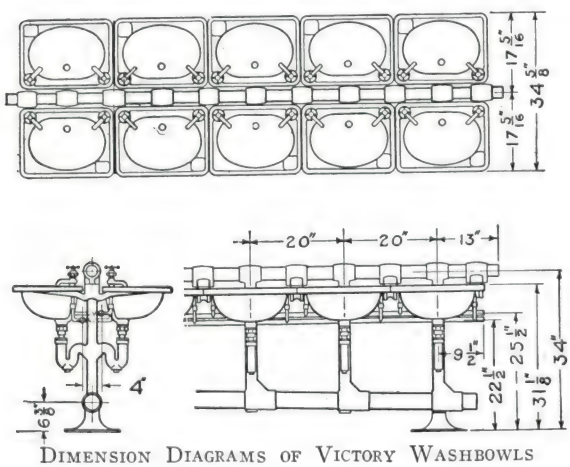
Shipped largely erected, greatly reducing cost of installation. All that is necessary is to connect water supply, vent and waste. Bowl holds 2 gals. of water. Extremely simple in construction and staunchly built for long service.

Economy Washbowls (Patented)

Have common water supply and common waste. Differ from Victory washbowls in that they lack a common vent. Only one trap per battery is necessary even when as many as 20 bowls are used in each battery.

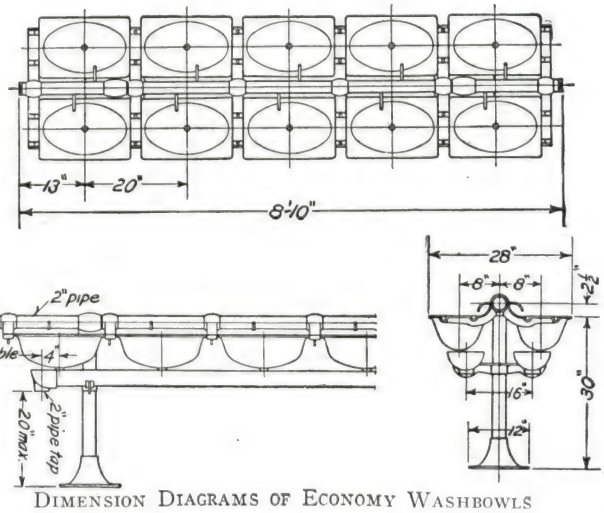
A 1-gal. bowl is usually furnished, but a 2½-gal. bowl can be provided.

Shipped knocked down, crated.



DIMENSION DIAGRAMS OF VICTORY WASHBOWLS

SINGLE BATTERY OF ECONOMY WASHBOWLS



DIMENSION DIAGRAMS OF ECONOMY WASHBOWLS

DOUBLE BATTERY OF ECONOMY WASHBOWLS

How Our Washbowls Are Furnished

(1) In single or double batteries.

(2) For hot and cold or one temperature of water.

(3) With vitrified porcelain enameled, plain iron or galvanized iron bowls.

(4) With compression or self-closing bibbs, Economy bowls being also furnished with plain nozzle.

All piping for Victory bowls galvanized unless otherwise specified.

All piping for Economy bowls black iron unless otherwise specified.

BRE MANUFACTURING CO.

Closet Seats, Tanks and Bathroom Accessories

Hyde Park District
BOSTON, MASS.

Products

"BRE HYGIENIC" and BRE RING TYPE CLOSET SEATS.

Also manufacturers of Wooden Closet Tanks, Brass Fittings and Hinges.

"Bre Hygienic" Closet Seats

Construction—"BRE Hygienic" seats are made from two solid pieces of wood. 1½-in. kiln dried stock. They have no glue joints. The two seat halves are held rigidly together by means of a steel screw dowel and locked in back by the patented BRE hinge. Heavy white porcelain spreaders keep the seat halves apart.

Finishes—Four finishes, light or dark polished oak, imitation mahogany and Breloid, a sheet covered celluloid finish which will not chip nor crack nor turn yellow. Easily cleaned with soap and water, impervious to moisture.

Advantages—That "BRE Hygienic" seats are constructed on correct principles of hygiene and durability is well shown by the following facts:

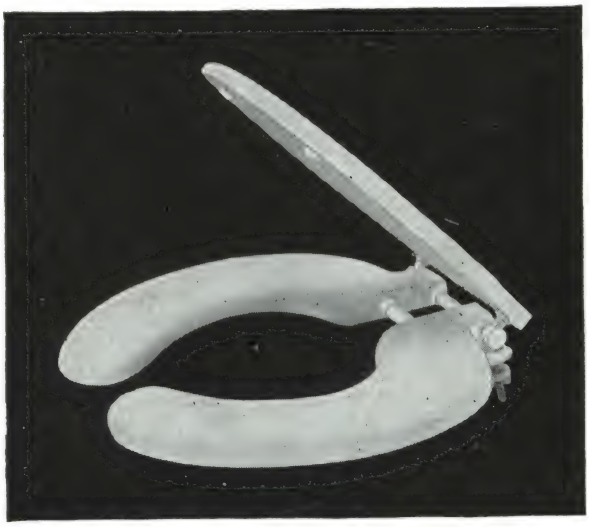
(1) They are open front and back.

(2) No metal parts on the bottom of seat to corrode or collect germs.

(3) No glue joints to split apart.

(4) Made of two solid pieces of wood, steel reinforced.

(5) Patented BRE hinge gives strength with very little exposed metal.



No. 212 "BRE HYGIENIC" SEAT AND COVER

Open front and back; BRE patented hinge; no exposed metal. Fits all standard bowls. No. 312 same as above but has extended lip

No. 213 "BRE HYGIENIC" SEAT ONLY

No exposed metal. Fits all standard bowls. No. 313 same as above but has extended lip

"Bre" Ring Type Closet Seats

Made from 1½-in. kiln dried stock, doweled front and back. Heavy brass hinges covered with a washable celluloid finish. No exposed metal to corrode.

Guarantee

Every seat is guaranteed to be the best of material and workmanship. Replacement will be made of any goods not satisfactory in every respect.

No. 250 "BRE HYGIENIC" SPRING SEAT

Adjustable spring tension; concealed spring; spring shock absorber and stop. Fits all standard bowls

No. 20 BRE RING SEAT AND COVER

Heavy brass hinges; no exposed metal. Fits all standard bowls

C. F. CHURCH MANUFACTURING CO.

Closet Seat Specialists

HOLYOKE, MASS.

BRANCHES

NEW YORK, N. Y.
BOSTON, MASS.
STAMFORD, CONN.
BAYONNE, N. J.
BALTIMORE, MD.
CHICAGO, ILL.
DETROIT, MICH.
ST. LOUIS, MO.
MINNEAPOLIS, MINN.
SAN FRANCISCO, CAL.

Product

GENUINE CHURCH WHITE PYRALIN CLOSET SEATS.

TRADE-MARK

Description

Church White Pyralin closet seats are made of selected hardwood (all from full 1½-in. stock) and covered with non-porous *sheet* pyralin. Each seat is guaranteed not to turn yellow, crack, warp, nor chip and to be impervious to atmospheric conditions. The metal trimmings or hinges are cast from pure ingot brass, heavily nickelplated, and guaranteed against breakage.

These seats meet every requirement for homes, hotels, schools, hospitals and public buildings where a purely sanitary condition must be preserved.

Catalogue

Complete catalogue illustrating seats for every need, including line drawings of every necessary dimension, prices, etc., will be furnished on request.

Some of the Many Buildings Equipped Throughout with Church White Pyralin Closet Seats

Hotel Commodore, New York, N. Y.
Hotel Biltmore, New York, N. Y.
Hotel Ambassador, New York, N. Y.
Ambassador Annex, Atlantic City, N. J.
Hotel Highland, Springfield, Mass.
Hotel Nonotuck, Holyoke, Mass.
Hotel Francis Marion, Charleston, S. C.
Citizens Hotel, Charlotte, N. C.
San Juan Hotel, Orlando, Fla.
Winfield Building, New York, N. Y.
Mission Inn, Riverside, Cal.
Hann Apartments, Baltimore, Md.
Avery Hotel, Boston, Mass.
Magnolia Petroleum Building, Houston, Tex.
Berman Apartments, Detroit, Mich.
Standard Oil Co., El Segundo, Cal.
Cockerell Apartments, Houston, Tex.
Baltimore Co. Fire Engine Houses, Baltimore, Md.
Scott Apartments, Baltimore, Md.
Texas Creamery Building, Houston, Tex.
Boyland Hotel, Santa Barbara, Cal.
Gressitt Cottages, Baltimore, Md.
Garden Apartments, Forest Hills, L. I., N. Y.
St. Francis Hospital, San Francisco, Cal.
Hotel Weldon, Greenfield, Mass.
Mansion House, Greenfield, Mass.
Martin Hotel, Milwaukee, Wis.
Broad Street Hospital, New York, N. Y.
Lutheran Hospital, New York, N. Y.
Algert Court Apartments, Brownville, N. Y.
Colonial Apartments, Brooklyn, N. Y.
Rheinlander Apartments, New York, N. Y.
Hotel Beaconsfield, Boston, Mass.
Boston College, Boston, Mass.
Harvard College Dormitories, Cambridge, Mass.
Hotel Ansonia, New York, N. Y.
Newark Athletic Club, Newark, N. J.
Fifth Avenue Hospital, New York, N. Y.
Ten Eyck Hotel, Albany, N. Y.
Proctors Theater, Yonkers, N. Y.
City of New York Comfort Station, Williamsburgh Bridge, New York, N. Y.
Palatine Hotel, Newburgh, N. Y.
Sherman Square Hotel, New York, N. Y.
Jackson Heights Apartments, (Elmhurst) New York, N. Y.
Metropolitan Theater, Mt. Vernon, N. Y.
Admiral Hotel, Chicago, Ill.
Mount Royal Hotel, Montreal, Can.
Chateau Frontenac, Quebec, Can.
St. Joseph Hospital, St. Paul, Minn.
Lycoming Hotel, Williamsport, Pa.
Onondaga Hotel, Syracuse, N. Y.
Hotel Kimball, Springfield, Mass.

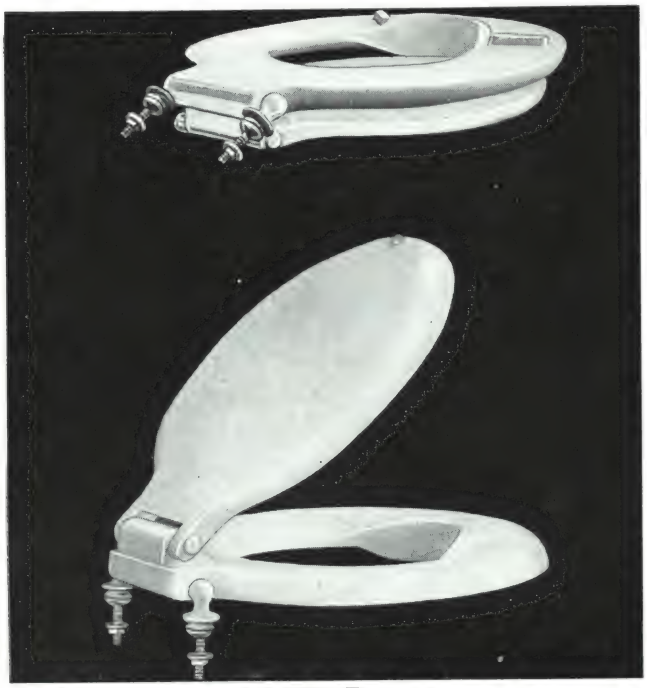


PLATE 100, EXCELLO

All white saddle, seat and cover with sanitary lip and white cushion bar bumpers. Has no exposed metal. No waste can pass the sanitary lip

PLATE 231

Plain pattern seat with heavy nickelplated, cast brass check hinge and white cushion bar bumpers. Check hinge designed to allow seat to stand in vertical position, when raised, without striking against wall, tank or flush valve

Continued on next page

PLATE 140, EXCELLO

All white seat and cover, entirely covered with sheet pyralin, including hinges. No exposed metal. Patented April 30, 1918

PLATE 520, EXTENDED LIP OPEN FRONT AND BACK

Made to fit extended lip bowl. Equipped with white rubber cushion bumpers and extra heavy nickelplated brass hinges. Also made to fit regular bowl

PLATE 251

Open front seat only. Has automatic check when seat is raised to prevent striking against tank. Especially suitable for hotels, office buildings and public toilets

PLATE 360, EXTENDED LIP OPEN FRONT

Made to fit all standard extended lip bowls. Equipped with extra heavy nickelplated brass hinges and white rubber cushion bumpers

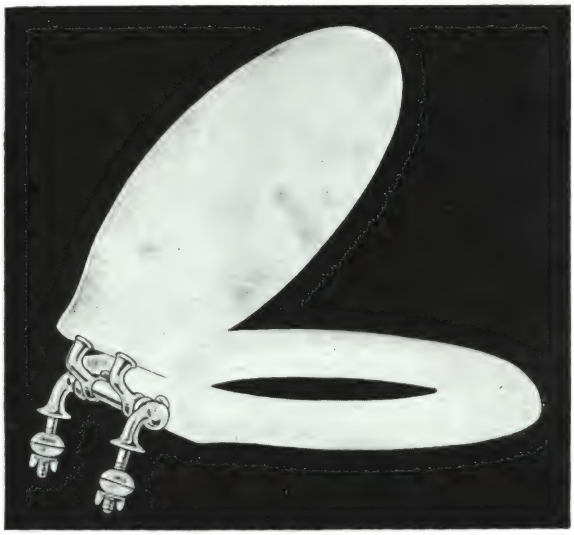


PLATE 220, NON-SOIL

No metal on underside of seat. Has screw-in hinge made of heavy nickelplated brass. Equipped with patent white rubber cushion bumpers

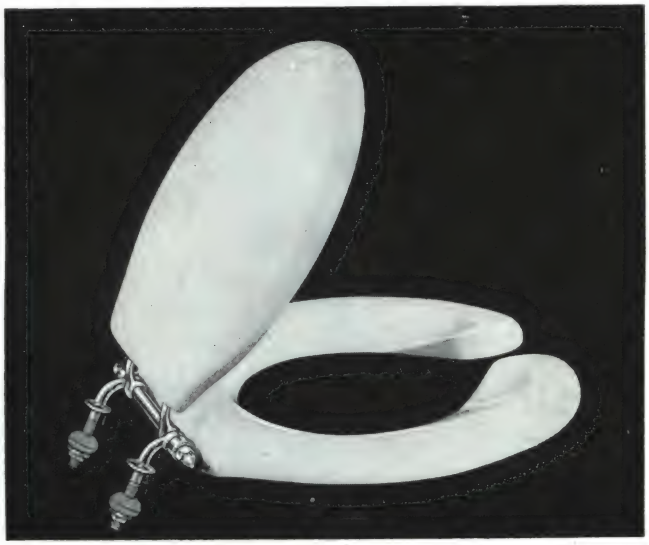


PLATE 340, CRESCENT

Open front seat and cover. Made to fit all standard bowls. White rubber cushion bumpers and heavy nickelplated brass bar hinge

HAYES PRODUCTS COMPANY

Water Closet Seats

GRAND RAPIDS, MICH.

Products

HAYES "NO-JOINT" WATER CLOSET SEAT.
For Water Closet Tanks, see page 1633.

Hayes "No-joint" Water Closet Seat

Construction—The material of which the Hayes No-joint seat is made is a combination of cork with a powerful mineral cement. The seats are moulded in dies in which are mounted cold rolled band steel reinforcing rings and headless hinge bolts. This method of construction results in a jointless one-piece, steel-trussed, water closet seat that never swells, warps, splits, rots, nor comes apart. The rim is of semisaddle design with hinge bolts embedded in seat and cover.

NO-JOINT SEAT
TRADE-MARK

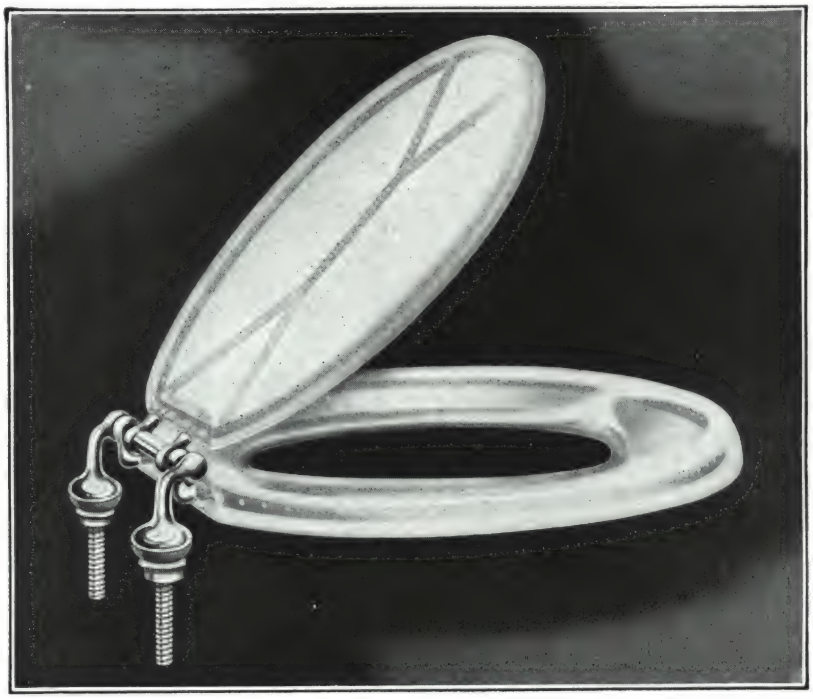
The X-ray view of the Hayes No-joint seat, shown below, clearly illustrates the trussed steel construction of both the seat and cover. Concentric rings of cold drawn band steel girders encircle both inside and outside of seat. Stress and strain on cover are cantilevered over entire structure. Note the headless bolt anchorage.

Finishes—Hayes No-joint seats are made in three finishes, namely: Mahogany, Ebony, Enamel and veneered sheet Pyralin White.

Advantages—The material of which the seat is made is a powerful germicide. Disease germs entering the Hayes "No-joint" seat are soon destroyed. Hence this seat is sanitary to the last degree; it can not become foul like wood.

An unvarnished piece of a Hayes "No-joint" seat can be cooked in boiling water for an hour and dried without injury to structure or surface. In other words moisture, which is the destroyer of wood seats, has absolutely no effect on the Hayes "No-joint" seat.

Finally, the Hayes "No-joint" seat is extremely handsome in appearance with its "stream line" semisaddle rim design and crowned cover top with unbroken surface.



X-RAY VIEW OF THE HAYES "NO-JOINT" CLOSET SEAT, SHOWING THE TRUSSED STEEL CONSTRUCTION OF BOTH SEAT AND COVER

HAYES-RUPPEL MANUFACTURING CO.

Water Closet Tanks

GRAND RAPIDS, MICH.

Products

HAYES WATER CLOSET TANK.

For Water Closet Seats, see page 1632.

THE HAYES TANK

TRADE-MARK

Hayes Water Closet Tank

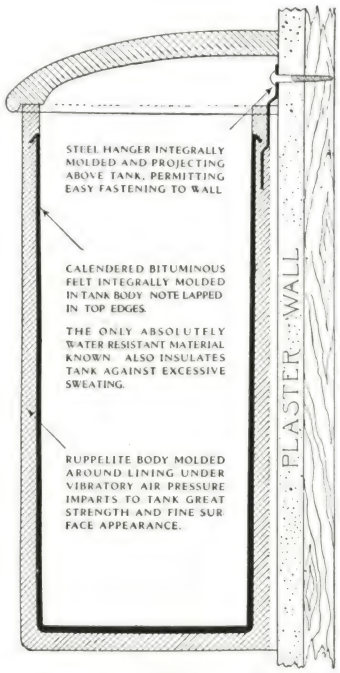
The Hayes tank is an ornament to the most luxurious bathroom. It is of the "stream line" type and has the beauty that always accompanies perfect proportion and plain outline. There are no warps or dents—every tank is as true as a die.

Construction—The Hayes tank is made of "Ruppelite," an inorganic or mineral compound resembling marble or unglazed vitreous material, but having an elastic strength far greater than either of these. It does not contain rosin, paper stock, asbestos, etc.

To prevent any possibility of water absorption, there is moulded into and forming an integral part of the tank a lining of calendered bituminous felt, averaging ⅛ in. in thickness. Reference to the sectional view will make this construction clear. The felt lining is folded over and keyed into the "Ruppelite" all around its upper edge obviating any possibility of its working loose.

The steel wall hangers, which are firmly embedded in the "Ruppelite," are placed above the top line of the tank, thus allowing ready accessibility in screwing same to the wall.

The cover is of crowned shape, without rear flange. This allows the outside air to circulate freely over the water in the tank and eliminates excessive condensation on underside of lid, eliminating the nuisance of the same flowing down the face of the tank.



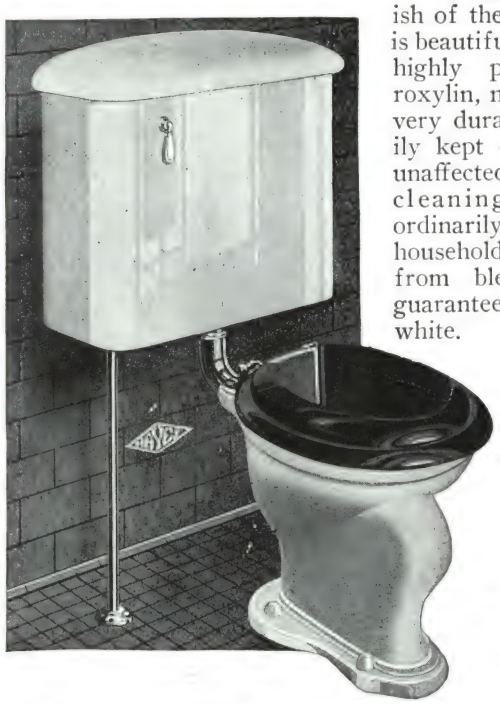
SECTION OF HAYES CLOSET TANK

Advantages—Due to the nature of "Ruppelite" and its peculiar and original construction, the Hayes tank is not affected by even boiling water. The "Ruppelite" body itself is unaffected by any temperature below 700° Fahr. Therefore, this tank can not swell, bulge or become distorted by warm or boiling water.

The felt lining, being a non-conductor of heat, functions to prevent thermal changes passing through the body of the tank, chilling the surface and causing excessive condensation of atmospheric moisture or "sweating." Hayes tanks have never been known to drip moisture, even in the hottest and most humid weather.

Pure bituminous felt is the only substance known which remains absolutely unaltered by long continued immersion in water, excelling even glass in this respect. For this reason it is employed on the most difficult foundation waterproofing jobs on all large buildings, tunnels, etc., throughout the world. The method of construction employed only in the Hayes tank is exactly similar to that employed by engineers in protecting millions of dollars' worth of property from damage by water. This method has stood the test for over fifty years under far more difficult conditions than the Hayes tank is ever called upon to meet. In brief, the Hayes tank is designed and built by a method that has stood the test of time and is in thorough accord with modern chemical and engineering practice.

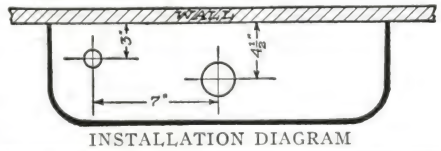
Finish—The finish of the Hayes tank is beautiful, rich white, highly polished pyroxylin, not a varnish, very durable and easily kept clean. It is unaffected by any cleaning compound ordinarily used in the household. It is free from blemishes and guaranteed to remain white.



HAYES TANK WITH WASHDOWN BOWL

Equally well suited for use with reversed trap and siphon jet bowl

Capacity—The Hayes tank is a large size tank (over 7 gals.) having ample capacity to flush either reversed trap or siphon jet bowls.



INSTALLATION DIAGRAM

Guarantee—This company fully guarantees the Hayes tank in every respect against any defect in workmanship or material.

Tank punchings, in.....	Center flush to wall, 4½ Center supply to wall, 3 Center to center, 7
Inside dimensions, in....	19½ x 6 x 15 deep.
Outside dimensions, in..	22 x 7½ x 18½ deep.

THE BRUNSWICK-BALKE-COLLENDER CO.

Manufacturers of Quality Closet Seats

623-633 Wabash Avenue
CHICAGO, ILL.

TELEPHONE
WABASH 7060

SOLD BY ALL LEADING PLUMBERS AND PLUMBING JOBBERS

Product

WHALE-BONE-ITE TOILET SEATS.

For Billiard Tables and Bowling Alleys, see page 2156.

Whale-Bone-Ite Toilet Seat

For hotels, hospitals, schools, industrial buildings, etc.

Made of a compact core, covered with a sealed composition of Whale-Bone-Ite. Whale-Bone-Ite is put on in its softened state under heavy hydraulic pressure, thus anchoring the covering, as it were, to the core, making one solid, concrete piece. It is then vulcanized, which produces the hard surface capable of taking a high grade lasting polish. The Whale-Bone-Ite is "the quality seat."

These seats are *absolutely sanitary*. Whale-Bone-Ite is conceded by the medical fraternity to be positively germproof. When cleaned with diluted alcohol, it is made absolutely aseptic. No deodorizing is necessary.

Whale-Bone-Ite is impervious to moisture and is not affected by action of uric acid—in fact is acidproof.

"This seat is unqualifiedly guaranteed not to split, crack or craze." There are no joints to open. The seat is light in weight, indestructible, of lifelong durability.

The Whale-Bone-Ite seat is comfortable and of pleasing appearance. Colors are ebony and mahogany which readily show all dust, dirt, etc. The seats will not discolor, they improve from use and eliminate all maintenance costs.

The patented, concealed hinges are most rigid and reduce corrosion to a minimum having the least possible exposed metal. They are made from cast brass, nickelplated, bronze or red metal. Non-corrosive white metal furnished when desired.

No. 16–91. SADDLE SEAT AND COVER

Concealed hinge. Hinge posts to front of seat, 17¾ in. 15⅝ in. wide. Hole, 10½x8 in.

No. 16-9. SEAT WITHOUT COVER

No. 24–91. SEAT AND COVER

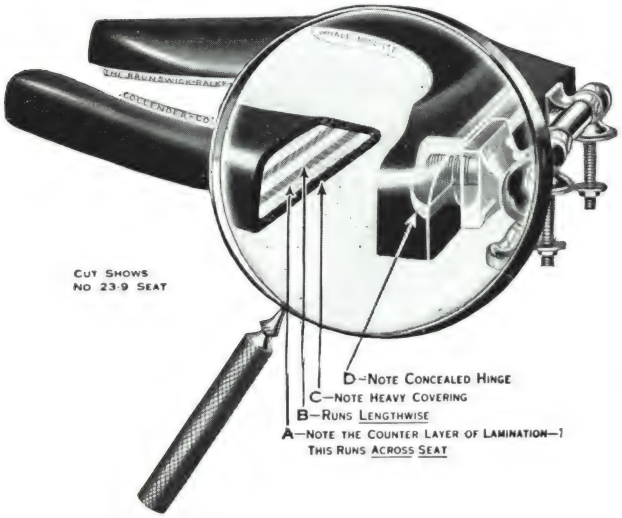
No. 24–9. SEAT

Hinge post center to front edge seat, 17¾ in. 14½ in. wide. Hole, 9¾x8 in.

No. 18–59. SEAT

Heavy nickelplated concealed hinges, for bowls with extended lips. Posts to front of seat, 18¾ in. 15 in. wide. Front and back openings, 3¼ in. wide

No. 18½-59—Same as 18-59, but for regular bowls. 17¾ in. long.



CONSTRUCTION OF WHALE-BONE-ITE SEATS

No. 18–55. SEAT

Hinge, with 2 nickelplated, cast brass, lead filled ball weights

No. 21–9. SEAT

Fits all standard extended lip bowls. Center hinge posts to front, 19 in. 15½ in. wide. Hole, 8 in. wide.

No. 23–9. SEAT

For regular bowls with No. 9 concealed hinge. Center hinge posts to front, 16½ in. 15½ in. wide. Front opening 4 in.

THE BENNETT MFG. CO.

Manufacturers of Enameled Steel Medicine Cabinets

ALDEN, N. Y.

Product

ENAMELED STEEL MEDICINE CABINETS.

"Steel Maid" Medicine Cabinets

"Steel Maid" medicine cabinets are constructed of full finished furniture steel of proper gauge to produce cabinets of rigid strength. Standard finish of cabinets is high grade baked white enamel, producing a finished article that can be washed and retain its fine appearance, matching the best interior white finish.

All cabinets fitted with glass or brass nickelplated knob, friction catch and brass nickelplated hinges.

The regular depth of recess and wall type "Steel Maid" cabinets is 5 in., with return of 5/8 in., allowing cabinet to recess into the wall 4 3/8 in.

No. 410 Recess Type

Special Sizes

Cabinets can be made to conform to specifications of architects or to meet special conditions.

Catalogue

Write for free booklet descriptive of our entire line.

No. 208 Recess Type

No. 610 Recess Type

No. 311 Wall Type

"STEEL MAID" MEDICINE CABINETS

DIMENSIONS OF "STEEL MAID" MEDICINE CABINETS

Plate No.	Interior, in.	Exterior, in.	Wall opening, in.	Bevel mirror, in.	Number adjustable glass shelves	Plate No.	Interior, in.	Exterior, in.	Wall opening, in.	Bevel mirror, in.	Number adjustable glass shelves
				RECESSED TYPE							
410	16 x 22 x 4½	18½ x 24½	16½ x 22½	14 x 20	2	610	16 x 22 x 4½	18½ x 24½	16½ x 22½	10 x 16	2
412	18 x 24 x 4½	20½ x 26½	18½ x 24½	16 x 22	3	612	18 x 24 x 4½	20½ x 26½	18½ x 24½	12 x 18	3
414	20 x 26 x 4½	22½ x 28½	20½ x 26½	18 x 24	3	614	20 x 26 x 4½	22½ x 28½	20½ x 26½	14 x 20	3
416	22 x 28 x 4½	24½ x 30½	22½ x 28½	20 x 26	3	616	22 x 28 x 4½	24½ x 30½	22½ x 28½	16 x 22	3
418	24 x 30 x 4½	26½ x 32½	24½ x 30½	22 x 28	3	618	24 x 20 x 4½	26½ x 32½	24½ x 30½	18 x 24	3
208	14 x 20 x 4½	16½ x 22½	14½ x 20½	8 x 14*	2	311	16 x 22 x 5	16½ x 22½	.....	12 x 18	2
210	16 x 22 x 4½	18½ x 24½	16½ x 22½	10 x 16	2	313	18 x 24 x 5	18½ x 24½	.....	14 x 20	3
212	18 x 24 x 4½	20½ x 26½	18½ x 24½	12 x 18	3	315	20 x 26 x 5	20½ x 26½	.....	16 x 22	3
214	20 x 26 x 4½	22½ x 28½	20½ x 26½	14 x 20	3	317	22 x 28 x 5	22½ x 28½	.....	18 x 24	3
216	22 x 28 x 4½	24½ x 30½	22½ x 28½	16 x 22	3	319	24 x 30 x 5	24½ x 30½	.....	20 x 26	3
218	24 x 30 x 4½	26½ x 32½	24½ x 30½	18 x 24	3						
				WALL TYPE							
511	14 x 20 x 5	14½ x 20½	.....	8 x 14	2	519	22 x 28 x 5	22½ x 28½	.....	16 x 22	3
513	16 x 22 x 5	16½ x 22½	.....	10 x 16	2	521	24 x 30 x 5	24½ x 30½	.....	18 x 24	3
515	18 x 24 x 5	18½ x 24½	.....	12 x 18	3	111	18 x 21 x 5	.....	.....	10 x 14*	2†
517	20 x 26 x 5	20½ x 26½	.....	14 x 20	3	117	18 x 21 x 5	.....	.....	10 x 14*	2

*Plain plate glass mirror, also plain plate glass shelves No. 111.

†Two stationary steel shelves and steel poison locker.

FRANK S. BETZ CO.

Manufacturers of Medicine Cabinets

HAMMOND, IND.

CONTRACT DEPARTMENT AND SALES ROOMS: CHICAGO, ILL., 30 East Randolph Street—Telephone, Central 6040
NEW YORK OFFICE: 6-8 West 48th Street—Telephone, Bryant 6142

Products

BETZCO ENAMELED STEEL MEDICINE CABINETS.

For Steel De Luxe Radiator Cover, see page 1731; for All-steel Standard "Kitchunits," see pages 2110-2111.

Betzco Steel Medicine Cabinets

The Betzco steel medicine cabinets are made in both built-in and exposed types. The use of steel in the construction of bathroom or medicine cabinets offers many advantages which are obvious to the architect and builder. Not only is greater strength and rigidity secured, but the cabinets are more easily installed, and are not subject to the shrinkage generally found in wood cabinets. The clean, washable white enamel, in which the cabinets are finished, and the welded joints without opening, crack or crevice, give a sanitary quality which is appreciated by tenant and owner alike.

Betzco cabinets are offered in two standard styles, either of which can be supplied as built-in units when desired. The cabinets are made of heavy furniture steel, specially rolled to insure even surface and with every joint stoutly welded. The regular finish is oven baked white enamel, applied under pressure, but standard wood finishes can be furnished when specified at extra cost.

Heavy plate mirrors are regularly supplied, and are mounted in a special metal frame, screwed to the door and removable, permitting the ready replacement of broken mirrors. This is a feature not usually found in moderate priced cabinets of this type.

No. 6-SW-1523 BUILT-IN WALL CABINET

Height 25½ in., width 19⅝ in., depth 4¼ in. Mirror 14x20 in. Requires wall opening 23 in. high, 17 in. wide, 4½ in. deep. Countersunk hole in each corner of frame for fastening to wall. Can be supplied without countersunk hole

No. 6-SW-1521 HANGING WALL CABINET WITH OPENING BELOW

Height 30 in., width 19 in., depth 4 in., recess 4 in. Bottom opening 4 in. high, 4½ in. deep, full width of cabinet. Has two special clips at top for hanging

No. 6-SW-1522 BUILT-IN WALL CABINET WITH OPEN SPACE BELOW

Height 30½ in., width 19⅝ in., depth 4½ in. Requires wall opening 28 in. high, 17 in. wide, 4½ in. deep. Mirror 14x20 in. Has countersunk holes for fastening; also furnished without holes. Bottom opening 4 in. high, 4½ in. deep and full width of cabinet.

No. 6-SW-1520 HANGING MEDICINE CABINET

Height 25 in., width 19 in., depth 4 in. Mirror 14x20 in. Has two special clips at top for hanging

J. P. EUSTIS MFG. CO.

Manufacturers of Bathroom Accessories

12-16 Ames Street

CAMBRIDGE "A" (BOSTON), MASS.

Products

RECESS TOILET PAPER HOLDERS.

ONE-PIECE STEEL MEDICINE CABINETS.

Also manufacturers of a full line of Bathroom and Lavatory Accessories.

TRADE MARK
The Brasscrafters
WHITE
SYMBOL OF GUARANTEED WHITE FINISH TRADE-MARK

The "Brasscrafters White" Toilet Paper Holders

These recess pattern toilet paper holders are made of cold rolled steel, guaranteed against corrosion.

The guaranteed finish is the "Brasscrafters White."

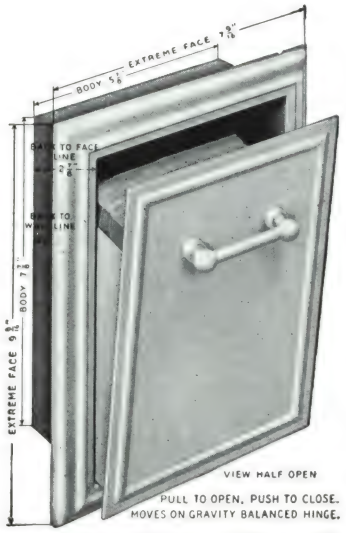
These holders are adapted for standard size paper and can be installed without cutting standard size tile (see dimensions in illustration).

Steel hinge-leaves (4 in. wide) on the inside carry and balance the box. No outside hinge joints or springs are used.

Finished inside and outside, ready to be anchored in the wall by simply setting two 7/8 in. No. 7 wood screws in the vertical sides.

It is a beautiful, rugged and everlasting fixture.

Opening required for installation, 6x8x2⅜ in.



THE "BRASSCRAFTERS WHITE" RECESS TOILET PAPER HOLDER

The "Brasscrafters White" Sanitary Steel Medicine Cabinets

The following are some reasons why "Brasscrafters White" cabinets are a success:—

The cabinets are made entirely of steel secured from corrosion by application of a process approved by the U. S. Government.

The durable finish is the "Brasscrafters White."

The shelf rests are securely fixed, but instantly adjustable. The two shelves are pure white Vitrolite glass, impervious to acids and chemicals.

The mirror door is plain French plate glass in seamless metal frame, with moisture pad, flush fitting metal back, china knob in combination with spring catch, concealed hinge flanges, and loose pin for convenience in detaching the door.

The body and moulding are integral, or are made so by oxy-acetylene welding, thus securing a cabinet without joint, seams or cracks.

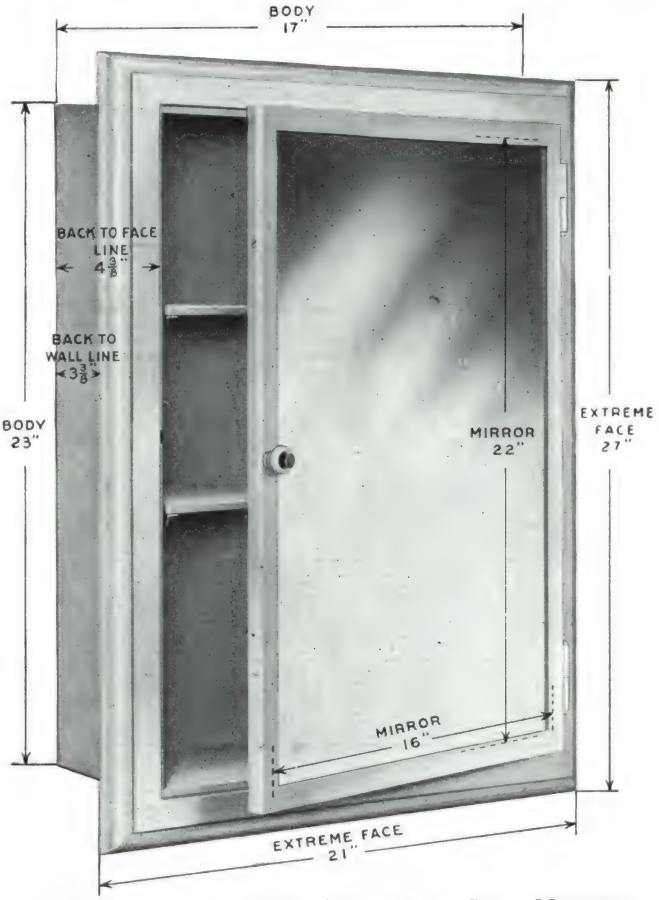
The cabinets require no finishing, either inside or outside, at the building. They are delivered ready for immediate installation, which is completed by using two wood screws in holes provided in the middle of the vertical sides.

Guaranteed satisfaction.

The makers of these cabinets are the makers of the well-known line of "Brasscrafters White" bathroom and lavatory accessories, with concha-head screws (Pat. Aug. 9, 1921), and guaranteed finish. Send for a sample of screw.

Handbook showing complete line sent on request.

Dealers know our fixtures and will supply them by your directions.



THE "BRASSCRAFTERS WHITE" ONE-PIECE STEEL MEDICINE CABINET

DIMENSIONS AND ROUGHING-IN MEASUREMENTS

Extreme of moulded edges	21 x 27 in.
Body	17 x 23 in.
Mirror, without bevel	16 x 22 in.
Wall line to face	1 in.
Wall line to back	3⅜ in.
Opening required for installation	17¼ x 23¼ x 3⅜ in.

HESS WARMING & VENTILATING CO.

Snow White Steel Medicine Cabinets and Lavatory Mirrors

1206-B Tacoma Building

CHICAGO, ILL.

Products

ENAMELED STEEL MEDICINE CABINETS.
ENAMELED STEEL FRAME LAVATORY MIRRORS.
PIPE SHAFT ACCESS DOORS.
WELDED STEEL HOT AIR FURNACES.
Also manufacturers of Grain Dryers, Steel Register Faces.

Hess White Steel Medicine Cabinet

Made of smooth, soft steel, enameled inside and out with best white varnish enamel baked in ovens.

The mirror is of best American plate glass, beveled or plain. The door closes flush with the front in a rabbeted opening. Furnished with brass nickel plated hinges and turn catch.

Shelves adjustable, of white enameled steel or clear, polished plate glass.

The recessed cabinet (styles E and F) recesses 4¼ in. back of finished face of plaster and projects 1¼ in. Special grounds and methods of attaching are described in free booklet.

Another style, H, similar to F, does not recess, but attaches to face of wall.

Lavatory Mirrors

Similar in construction to mirror doors of the cabinets. Made with or without shelves and towel bars. Five sizes.

Pipe Shaft Mirror Doors

Similar in appearance to the cabinets, and give

STYLE E TO RECESS

STYLE F TO RECESS

STYLE A

STYLE B

HESS STEEL MEDICINE CABINETS

Number	Extreme outside dimensions, in.	Inside dimensions, in.	Wall opening required, 4¼ in. deep	Size of mirror, in.	Shipping weight lbs.
STYLE E: TO RECESS, WITH POCKET SHELF BELOW					
19	16 x 27½	13½ x 16	13¾ x 24¼	10 x 14	52
20	21½ x 33½	18½ x 21	18¾ x 29¾	14 x 18	68
21	23½ x 35½	20½ x 23	20¾ x 31¾	16 x 20	77
22	25½ x 37½	22½ x 25	22¾ x 33¾	18 x 22	85
23	27½ x 39½	24½ x 27	24¾ x 35¾	20 x 24	100
STYLE F: TO RECESS					
29	16 x 20	13½ x 16	13¾ x 16¼	10 x 14	48
30	21½ x 25½	18½ x 21	18¾ x 21¼	14 x 18	59
31	23½ x 27½	20½ x 23	20¾ x 23¼	16 x 20	68
32	25½ x 29½	22½ x 25	22¾ x 25¼	18 x 22	75
33	27½ x 31½	24½ x 27	24¾ x 27¼	20 x 24	90
STYLE G: TO HANG ON WALL DISCONTINUED					
STYLE H: TO HANG ON WALL					
49	16¾ x 20	15⅜ x 18	.....	10 x 14	51
50	21¾ x 24¾	20½ x 22¾	.....	14 x 18	62
51	23¾ x 26¾	22½ x 24¾	.....	16 x 20	71

HESS STEEL LAVATORY MIRRORS

Style B is also an Access Door

Number	Outside dimensions (shelf and bar not included), in.	Wall opening, in.	Size of mirror, in.	Shipping weight lbs.
STYLE A—MIRROR ONLY, WITH GLASS SHELF AND TOWEL BAR				
6	12⅜ x 16⅜	No opening required	10 x 14	30
60	17⅜ x 21⅜		14 x 18	35
61	19⅜ x 23⅜		16 x 20	38
62	21⅜ x 25⅜		18 x 22	40
63	23⅜ x 27⅜		20 x 24	43
STYLE B—MIRROR, DOOR AND FRAME WITH GLASS SHELF AND TOWEL BAR				
7	16 x 25½	12¾ x 16¾	10 x 14	34
70	21½ x 31½	17¾ x 21¾	14 x 18	40
71	23½ x 33½	19¾ x 23¾	16 x 20	44
72	25½ x 35½	21¾ x 25¾	18 x 22	47
73	27½ x 37½	23¾ x 27¾	20 x 24	54
STYLE C—MIRROR, DOOR AND FRAME WITH POCKET SHELF BELOW				
8	16 x 27½	12¾ x 24¾	10 x 14	38
80	21½ x 33½	17¾ x 29¾	14 x 18	44
81	23½ x 35½	19¾ x 31¾	16 x 20	48
82	25½ x 37½	21¾ x 33¾	18 x 22	52
83	27½ x 39½	23¾ x 35¾	20 x 24	60

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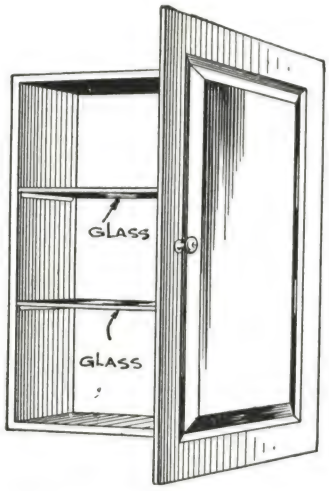
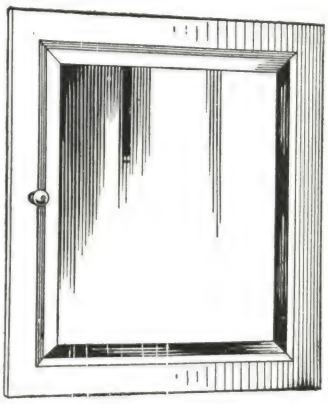
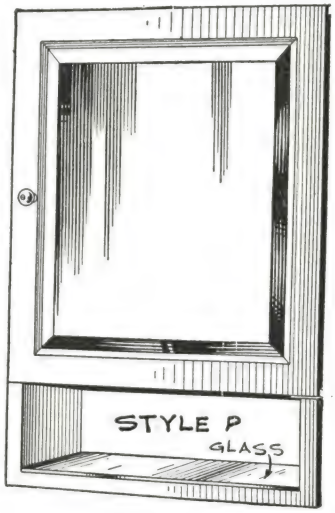


Style O Open



Style O Closed



Style P

"Special" Recessed Cabinets

	STYLE O			STYLE P		
	No. 230	No. 231	No. 232	No. 220	No. 221	No. 222
Outside dimensions, in.	17⅜ x 21⅜	19⅜ x 23⅜	21⅜ x 25⅜	17⅜ x 27⅜	19⅜ x 29⅜	21⅜ x 31⅜
Inside dimensions, in.	15¼ x 19¼	17¼ x 21¼	19¼ x 23¼	15¼ x 25¼	17¼ x 27¼	19¼ x 29¼
Size of mirrors, in.	14 x 18	16 x 20	18 x 22	14 x 18	16 x 20	18 x 22
Wall opening required, in.	15½ x 19½	17½ x 21½	19½ x 23½	15½ x 25½	17½ x 27½	19½ x 29½
Shipping weight, lbs.	35	41	48	39	46	54

access to pipes and valves back of them. For hotels, apartments, etc.

Provided with locks and keys if desired. Three styles: plain door and frame; with shelf and drawer; with pocket shelf below.

Five sizes in each style.

Illustrated booklet and price list on request.

"Special" Recessed Cabinets

The shelves and box of this cabinet are entirely concealed by the door. The cabinet is 4½ in. deep, projecting ½ in. from the face of the plaster and requires a recess 4¼ in. deep. Porcelain knob, spring catch. Polished plate glass shelves and not adjustable. The pocket shelf below in style P is also fitted with a plate glass shelf.

Our "Special" cabinets are priced to compete successfully with wooden cabinets and with the cheaper lines of steel, yet they are of the best quality, in material, workmanship and finish.

Our Guarantee

Specify all cabinets to be made by Hess Warming & Ventilating Co., and to bear the trade-mark HESS. The enamel on such goods is guaranteed not to crack, flake nor blister (external violence excepted). Our trade-mark is a promise to restore any enamel showing such defect or to replace with a new cabinet, without expense to the purchaser.

Hess Welded Steel Furnaces

Fully described in a 48-page illustrated handbook on heating. It is instructive and useful—no matter what furnace you use, and is sent free on request.

Hess furnaces never leak. They burn any fuel; deliver all the heat.

The difference between Hess furnaces and ordinary furnaces is radical.

It will pay to get full information.

The Ordinary Furnace

Rough castings; piled up with cracks filled with cement or sand. Limited heating surface; wasteful of fuel, leaky and dirty

The Hess Welded Steel Furnace

A solid steel box; every seam closed by welding and riveting. Firebox and grates inside. Immense radiating surface, evenly heated; never overheated. Seams guaranteed never to leak as long as the furnace stands

JAMESTOWN NOVELTY MANUFACTURING CORPORATION

Manufacturers of "Sanisteel" Closet Seats and Medicine Cabinets

Chandler and River Streets

JAMESTOWN, N. Y.

Products

"SANISTEEL" CELLULOID CLOSET SEATS; "SANI-STEEL" MEDICINE CABINETS.

Also manufacturers of Bathroom Mirrors and Sheet Metal Specialities.

"Sanisteel" Celluloid Closet Seat

Constructed with a metal base of heavy gage, the seat will resist many times the weight that use will impose on it. The joints are invisible and so constructed that the seat is practically a one-piece device. Moisture will not open the joints and they are unbreakable. Hinges are of brass, nickelplated of the "bar" design.

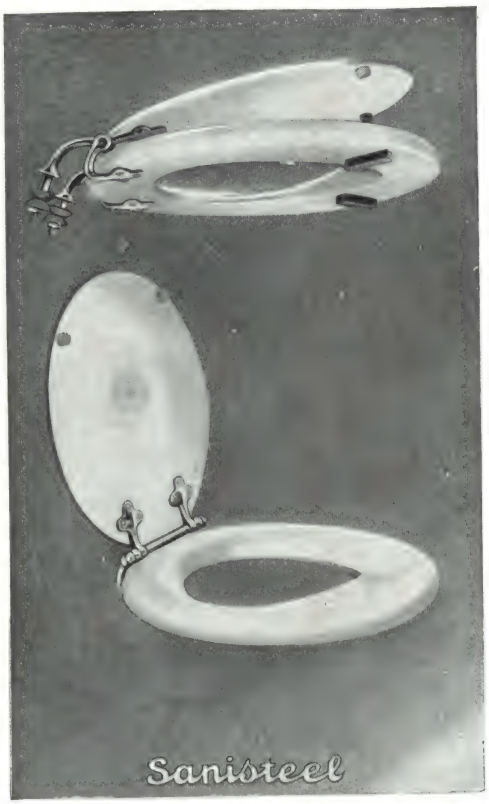
Water and other liquids which come in contact with the "Sanisteel" seat will do it no harm. Its pure snowy whiteness, which will never turn yellow, lends to it an attractiveness positively unequalled.

The design of the seat is that of a full saddle with arch or rounded turtle back. Good taste awards this the crown of best designs.

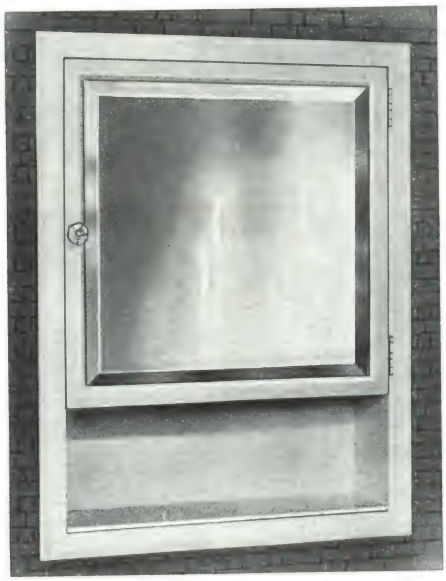
"Sanisteel" Medicine Cabinet

Made of the finest grade of sheet steel with electrically welded corners and joints, insuring strength and rigidity. Absolutely sanitary and most durable. The finish is a beautiful white enamel, smooth as ivory, which will not crack nor peel. The moisture of a bathroom cannot open the joints as in the case with a wooden cabinet and fire cannot originate in these cabinets.

Stock or special cabinets (wall or recess) to meet all requirements.



"SANISTEEL" CELLULOID CLOSET SEAT



NOS. 20½-21½-22½ RECESS CABINET

Plate No.	Extreme outside, in.	Interior depth, in.	Return flange, depth, in.	Mirror, in.	Wall opening required, in.
20½	20x26	4⅞	¾ or 1¼	16x16	18x24
21½	22x28	4⅞	¾ or 1¼	18x18	20x26
22½	24x30	4⅞	¾ or 1¼	20x20	22x28

Fitted with 3 plate glass shelves and 1 opal shelf on bottom, adjustable aluminum shelf supports, glass knob and friction catch. All screws and hinges nickelplated brass. Finished in four coats of white enamel baked on and rubbed to an ivory smoothness.

NOS. 20-21-22 RECESS CABINET

Plate No.	Extreme Outside, in.	Interior depth, in.	Return flange, depth, in.	Mirror, in.	Wall opening, required, in
20	20x26	4⅞	¾ or 1¼	16x22	17½x23½
21	22x28	4⅞	¾ or 1¼	18x24	19½x25½
22	24x30	4⅞	¾ or 1¼	20x26	21½x27½

Fitted with 3 plate glass shelves, adjustable aluminum shelf supports, glass knob and friction catch, all screws and hinges nickelplated brass. Can be used as right- or left-hand cabinet. Finished in four coats of white enamel baked on and rubbed to an ivory smoothness.

S. D. BAKER MANUFACTURING CO.

"Samsonchina" Bathroom Accessories

234 West 14th Street
NEW YORK, N. Y.

AGENCIES

LOS ANGELES, CAL., Wm. E. Graham, care of A. E. Tandy Co., Kerckhoff Building
SAN FRANCISCO, CAL., California Pottery Co., Mills Building
CHICAGO, ILL., Greenville Jeffery, 675 North Michigan Avenue
WASHINGTON, D. C., The Fairfacts Co., Inc., 47 Century Building

Product

"Samsonchina" Bathroom Accessories (Patents applied for).

Material

This is an all-china line of accessories meeting every demand of the modern bathroom.

Application

They are screwed to walls in the usual manner and the screws then concealed by china buttons or caps that are cemented over them.

These fixtures take the place of metal fixtures, either nickelplated or white coated.

Design

The numerous pieces have been made with careful regard to their various uses, and are sanitary, easily cleaned and strong.

There is harmony of design not usually found.

Size

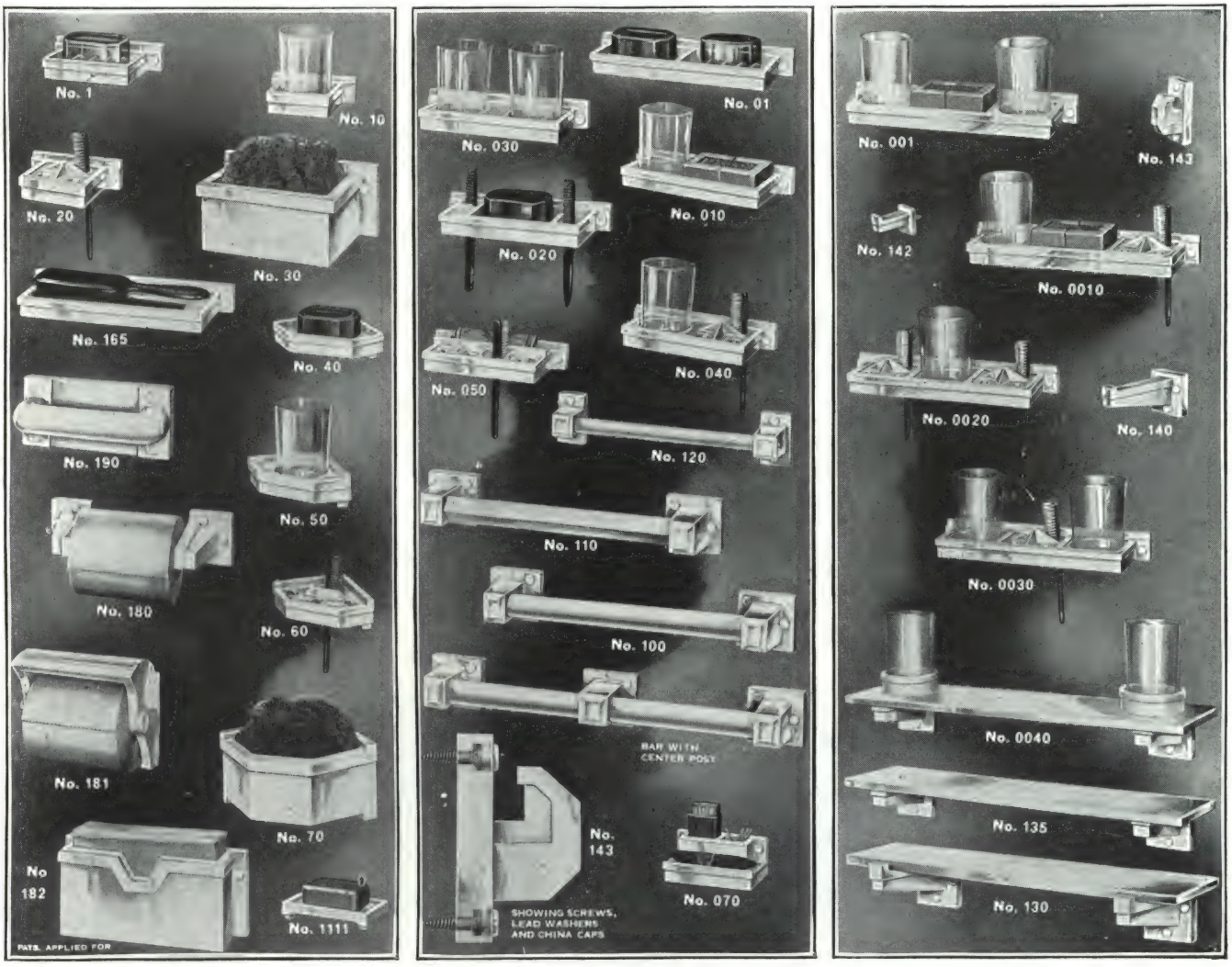
The toilet articles shown with these fixtures enable one to determine approximate sizes.

Distribution

They are for sale by wholesale houses in the building trades throughout the United States, and specifications need only to mention "Samsonchina," the plate number, and the quantity desired.

Catalogue

Catalogues have been published for the use of architects and their clients, and will be mailed on request.



"Samsonchina" Bathroom Accessories

GOLCO SANITARY SYSTEM, INC.

618-620 Cherry Street
PHILADELPHIA, PA.

Products

Golco Toilet Paper Holder.

Also manufacturers of Golco Bathroom Accessories.

Golco Toilet Paper Holder

The Golco toilet paper holder is a sanitary and beautiful fixture that is an ornament to the modern bathroom. It is made in either tile or china and thus remains clean without care and neither rusts nor tarnishes. Instead, the glistening white fixture, unobtrusive and refined, harmonizes perfectly with the tile wall. It replaces the unsightly roll and, since it has neither doors nor locks, there is nothing mechanical to get out of order. In fact, the Golco fills in every detail the desire for a toilet paper holder that is both pleasing to the eye and sanitary in use.

Golco toilet paper holders may be used in tile or Keene's cement wainscoting.

The Golco toilet paper holder is easily and quickly filled by inserting the package of paper into the opening. The unique feature of single, interlocked sheets, dispensing only one at a time, makes it economical as well as sanitary.

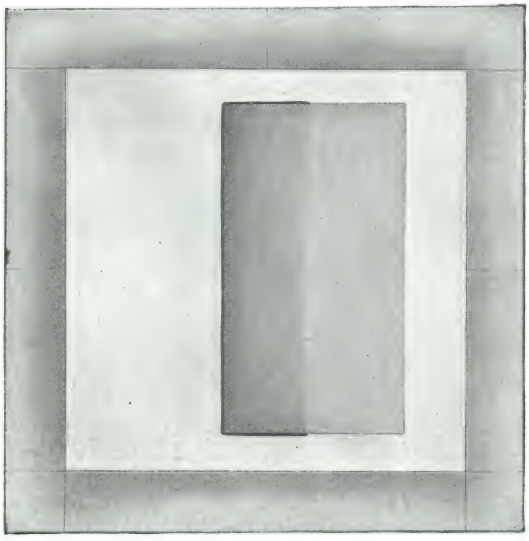
Recessed Model

The Golco toilet paper holder, recessed model, is built in flush with the wall, taking the space of standard size tile. A model is also furnished for 4½ tile.

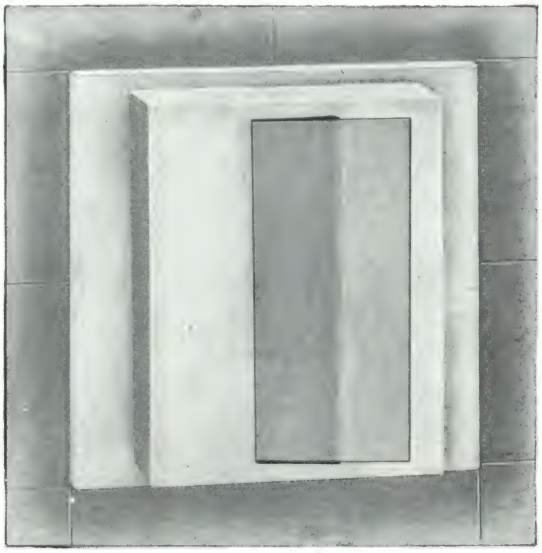
Projecting Model

The projecting model is used on wall surfaces and partitions. It is easily attached to the wall with two ordinary screws inserted through the slots in the back of the holder, which are concealed in use. This type is used to advantage in remodeling work.

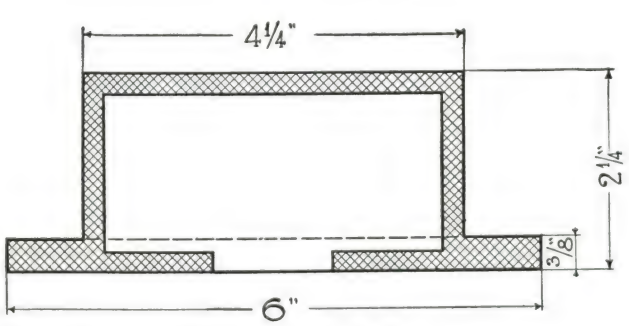
The flange covers any holes exposed by the removal of other holders. It is the thickness of a tile and may be recessed to that depth.



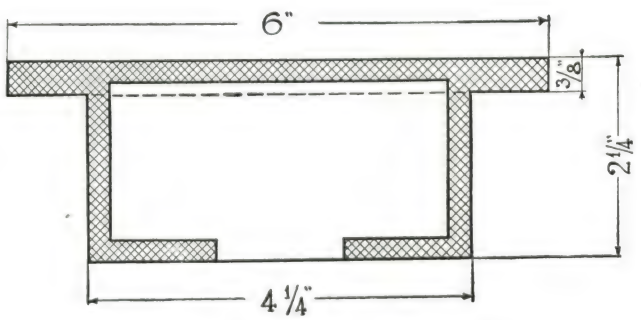
Recessed Model
6x6 in. Depth, 2¼ in



Projecting Model
6x6 in.



Installation Detail of Recessed Model



Installation Detail of Projecting Model

THE FAIRFACTS CO., INC.

Manufacturers of Bathroom Accessories

NEW YORK, N. Y.

AGENCIES

SAN FRANCISCO, CAL., California Pottery Co., Mills Building
CHICAGO, ILL., Grenville Jeffrey, 675 North Michigan Avenue
LOS ANGELES, CAL., Wm. E. Graham, care of A. E. Tandy Co., Kerchoff Building
WASHINGTON, D. C., The Fairfacts Co., Inc., 47 Century Building

Products

Bathroom Accessories, of China: Recessed and Projecting Types cemented, not screwed, to walls.

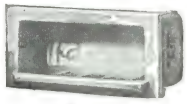
Recessed Type includes Holders for Soap, Tumblers, Sponges, Toilet Paper, China Bathroom Radiators; Safety Wall Grips; Combined Safety Wall Grip Soap Holders, etc.

Projecting Type includes Holders for Soap, Tumblers, Sponges, Tooth Brushes and Toilet Paper; Towel Bars; Glass Shelves; China Hooks, Non-slip Towel Bars with China Posts, etc.

Fairfacts Biltin Accessories

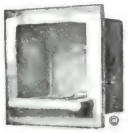
Fairfacts Biltin accessories (the recessed type) only are shown on this page. They are laid up with the tile and should be included in the tile contract (see specifications at foot of second page following). Can also be satisfactorily used in Keene's cement wainscots.

Soap holders with fluted base are for use in shower compartments, or over bathtubs where showers are used. Safety wall grips prevent accidents and aid in getting in and out of bathtubs. Safety wall grips and soap holders combined are used largely in hotels and apartments.



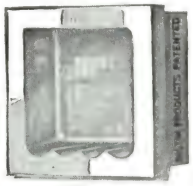
F 100
Soap Holder
6x3x3 in.

F 110
Soap Holder
6x4¼x2½ in.



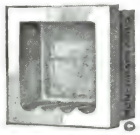
F 105
Soap Holder
4¼x4¼x3 in.

F 115
Soap Holder
6x6x3 in.



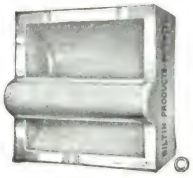
F 125
Soap Holder
6x6x3 in.

F 122
Soap Holder
6x4¼x3 in.



F 121
Soap Holder
4¼x4¼x3 in.

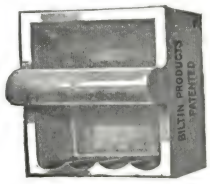
F 120
Soap Holder
6x3x3 in.



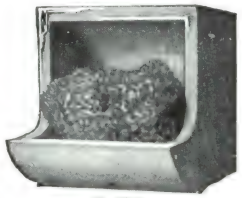
F 140
Safety Wall Grip
6x6x2¾ in.

F 180
Electric Bathroom Radiator
15x15x5 in.
Equipment is complete with 3 heat units each of 100-112 volts, 250 watts. No wire or switch included. Usual precautions regarding wiring and fire should be observed

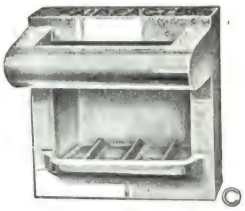
F 160
Tumbler Holder
6x6x3 in.



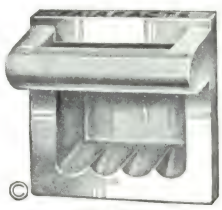
F 150
Safety Wall Grip
and Soap Holder
6x6x2¾ in.



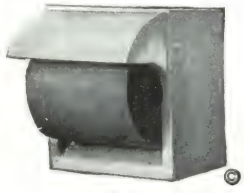
F 170
Sponge Holder
6x6x3¼ in.



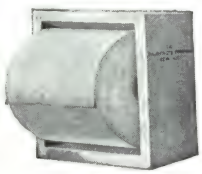
F 151
Safety Wall Grip and
Soap Holder
6x6x2¾ in.



F 152
Safety Wall Grip and
Soap Holder
6x6x3 in.



F 1
Roll Paper Holder
6x6x3¼ in.
Rewind roller keeps paper rolled up



F 2
Roll Paper Holder
6x6x3¼ in.

F 60
Sheet Paper Holder
Outside, 10½x7⅞ in.; aperature required, 9¾x7⅛x3 in. deep
Heavy cast metal, white finish; will hold very large sheet paper

Fairfacts Biltin China Bathroom Accessories—Recessed Type

Continued on next page

Fairfacts Projecting Type Accessories

Fairfacts bathroom accessories, projecting type, are shown on this page. The shank, shown below, which is on the back of all Fairfacts projecting accessories, is cemented to the wall after the tile is laid, making a substantial and permanent support.

Projecting type accessories should be included in the tile contract, and can be set while the tile is being laid, or after it is laid. They can also be used satisfactorily in Keene's cement wainscots, if heavy wood bucks are set back of the finished wall and cut out to receive the shanks and the necessary cement.

Advantages of Fairfacts Bathroom Accessories

Both types of Fairfacts bathroom accessories have the qualities that you like: strength, durability, cleanliness, attractiveness.

Strength—They are strongly made of heavy china and cemented securely into place.

Durability—Fairfacts accessories will not crack or craze. Since they are installed without screws, there is nothing about them to work loose. They are part of the wall and will last as long as the wall.

Cleanliness—China is the most sanitary of materials. By its use the necessity for metal polishing is done away with; Fairfacts accessories can be wiped clean with a damp cloth.

Attractiveness—Fairfacts accessories are part of the tile wall; they replace the ugly and conspicuous fixtures in use before their invention. Their handsome appearance is appreciated by occupants of buildings everywhere; they add renting value and selling value to any building in which they are installed.

Because of the friendly interest of numerous architects who have been quick to realize these advantages, Fairfacts accessories are now installed in thousands of fine bathrooms.

Patents

Fairfacts bathroom accessories are patented and bear the following dates: Feb. 13, Aug. 21, Aug. 28, Sept. 4, Sept. 11 and Oct. 23, 1917; Feb. 12, May 28 and July 16, 1918; and April 15 and July 29, 1919.

Adaptability of Fairfacts Bathroom Accessories

Both types of accessories are used in residences, hotels, apartment buildings and hospitals especially, and in all kinds and types of buildings where good equipment is desired.

Service

Literature and roughing measures furnished on request. If building operation is to be low in cost, write us for special economical selection.

Important Notice

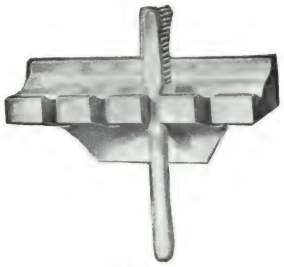
Fairfacts accessories are made of china, because it does not craze and because it is much stronger and more durable than tile. Tile is a very porous and fragile clay product, quite similar to a clay pipe, but having an extremely thin glazed surface. Expansion and contraction breaks the glazed surface into numerous cracks, called crazes, exposing the soft clay beneath, which quickly absorbs dirty water, soap, greases, etc., when made into bathroom accessories. An unsightly as well as unsanitary condition results. China is as hard as flint all the way through, and does not craze. When made into Fairfacts accessories of heavy and substantial design, it is a material that is ideal for the purpose.

Catalogue

Write for late catalogues having additional fixtures.

China Hooks
F 340—4½ in. long
F 341—3½ in. long
(for towels or robes)
F 342—2 in. long
(for strop or douche)

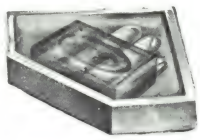
Detail of Shank
On the back of all articles shown on this page
Cemented in the wall after tile is laid, it makes a substantial and permanent support



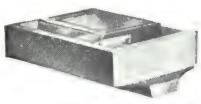
F 330
Tooth Brush Holder
6x2¼x1⅝ in.

F 300
Non-slip Towel Bars with China Posts
Bar is ⅞ in. square
Center to center of posts:
F 300—18 in. F 302—30 in. F 304—42 in.
F 301—24 in. F 303—36 in. F 305—48 in.

F 145
Grab Rail with China Posts
Bar is 1⅛ in. square
Center to center of posts:
F 145—12 in. F 146—18 in.
Also used for long towel bars

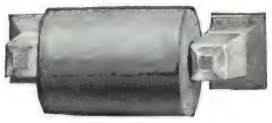


F 135
Soap, Sponge or Brush Holder
5¾x5¾ in.
Corner pattern. For bathtub, shower or lavatory



F 130
Soap Holder
4¾x3¼ in.

F 320
White Glass Shelves with China Brackets
F 320—20x5x$\frac{7}{16}$ in. thick
F 321—24x5x$\frac{7}{16}$ in. thick
F 322—30x5x$\frac{7}{16}$ in. thick

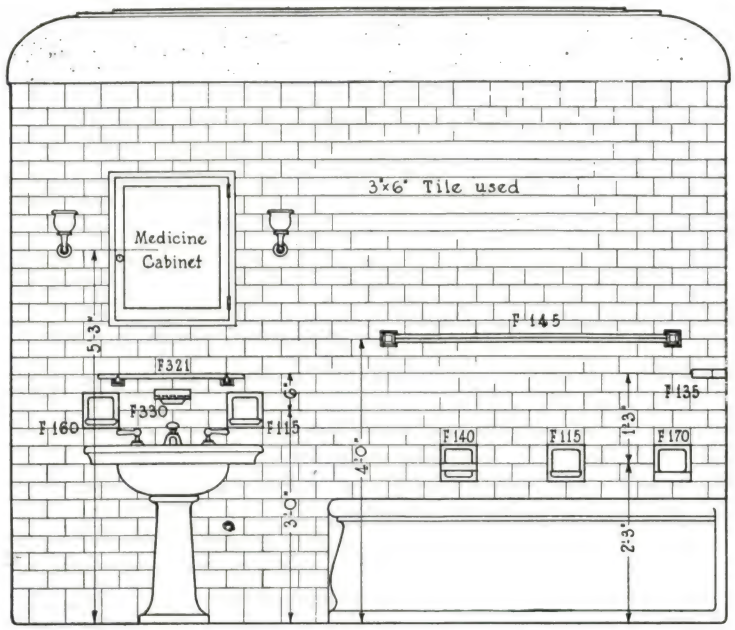


F 30
Roll Paper Holder
6⅛ in. center to center of posts
With plain roller

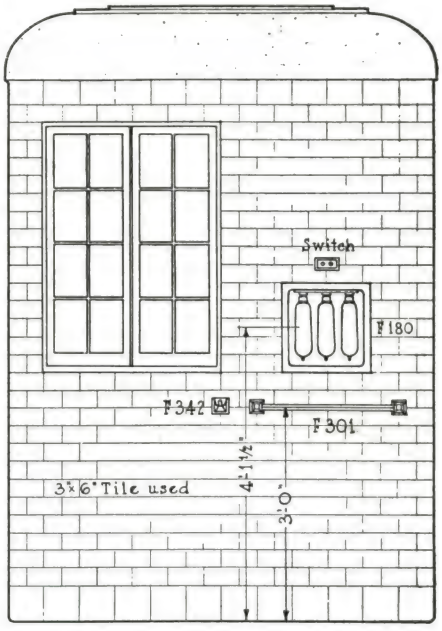
F 165
Tumbler Holder
3¼x3¼ in.

Fairfacts Bathroom Accessories—Projecting Type

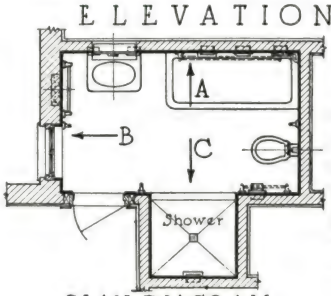
Continued on next page



ELEVATION "A"

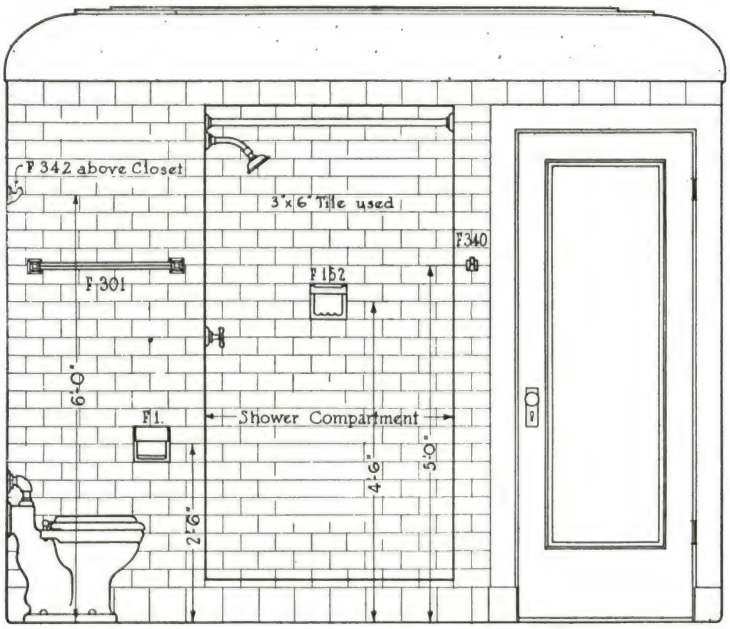


ELEVATION "B"



PLAN-DIAGRAM

NOTE: For dimensions of all Accessories shown here see illustrations on the preceding pages.



ELEVATION "C"

KEY TABLE TO ACCESSORIES	
NUMBER	ARTICLE
F 1	Biltin China Roll Paper Holder
F 115	Biltin China Soap Holder
F 135	China Soap, Sponge or Brush Holder
F 140	Biltin China Safety Wall Grip
F 145	Nonslip Towel Bar with China Posts (48" long)
F 152	Biltin China Combination Soap Holder & Wall Grip
F 160	Biltin China Tumbler Holder
F 170	Biltin China Sponge Holder
F 180	Biltin China Electric Bathroom Radiator
F 301	Nonslip Towel Bar with China Posts (24" long)
F 321	White Glass Shelf with China Brackets (24" long)
F 330	China Tooth Brush Holder
F 340	China Hook for Robes etc. (4½" long)
F 342	China Hook for Strop, Douche etc. (2" long)

Scale of Elevations— 3/8"=1'-0".

TYPICAL BATHROOM SHOWING FAIRFACTS ACCESSORIES

Specifications

Bathroom Accessories—(1) The tile contractor shall furnish and set China Bathroom Accessories as manufactured by The Fairfacts Co., Inc., New York, N. Y., in accordance with the subjoined specification and schedule of accessories.

(2) *Setting Biltin (Recessed Type)*—(a) In stud and metal lath partitions, cut the metal lath across the top of the opening and down the two sides; bend the flap back to form a shelf and fill the space around the opening with excelsior bound together with plaster of paris to form a pocket; then set the piece in rich cement in the same manner that tile is set.

(b) In masonry partitions, cut pockets and fill up any openings to prevent the escape of cement when setting.

(3) *Setting Projecting Types*—Projecting types to be set while laying the tile or after it is laid. Cut hole of sufficient size to receive the shank and set in rich cement mortar.

(4) *Location*—Accessories shall be set as shown on drawings or as will be directed by the architect. Care shall be taken to locate tile joints in such manner that accessories will center over fixtures without the necessity of cutting any tile.

Note: In setting electric radiators, all wiring and switch to be furnished and set by electrical contractor (see electrical wiring specifications).

Schedule of Bathroom Accessories (A Typical List)—(5) For each lavatory: F 115 Soap Holder; F 160 Tumbler Holder; F 330 Tooth Brush Holder; F 321 Glass Shelf; F 301 Towel Bar.

(6) For each bathtub: F 115 Soap Holder; F 140 Wall Grip; F 170 Sponge Holder; F 135 Brush Holder; F 303 Towel Bar.

(7) For each water closet: F 1 Paper Holder.

(8) For each shower compartment: F 152 Safety Wall Grip and Soap Holder; F 340 Towel Hook.

(9) For each bathroom: F 180 Electric Bathroom Radiator; F 340 Towel Hook; F 342 Strop or Douche Hook.

(10) For each kitchen sink, pantry sink, vegetable sink, slop sink and wash tray: F 115 Soap Holder.

THE W. R. HUGHES CO., INC.

Manufacturers of China Bathroom Accessories

507-509 West 35th Street
NEW YORK, N. Y.

Products

"Tile-in" China Bathroom Accessories.

"Tile-in" Accessories

"Tile-in" china bathroom accessories are made for every requirement of the bathroom, lavatory and kitchen and for use with every standard size tile.

Material—"Tile-in" bathroom accessories are made of the best grade of vitreous china, covered with a glaze which is guaranteed against crazing. This vitreous china is a very hard, non-porous body and is far superior to the comparatively soft body as used in tile or porcelain.

Design—"Tile-in" accessories are simple in design and easy to clean. The fine grade of china used in their manufacture, together with their beautiful, plain design, makes them harmonize with the best modern, sanitary plumbing fixtures.

Strength—These accessories successfully withstand the abuse, wear and tear which bathroom accessories generally receive. They are made of materials similar to those used for the best grades of lavatories, closet bowls and tanks, which are subject to more abuse than accessories.

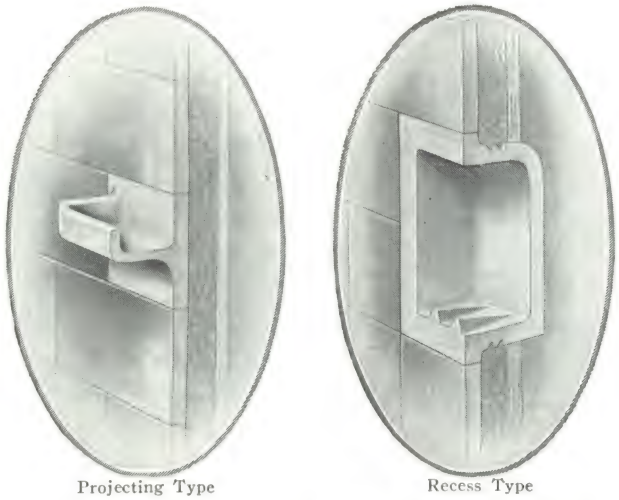
Grab rails and combination soap holders and grab rails are usually subject to more strain than any other accessories. Of the many thousands of these particular "Tile-in" pieces which have been installed, not a single piece has been known to break or come loose.

Sizes—"Tile-in" accessories are made to be used in connection with 6x6-, 6x3- or 4¼x4¼-in. tile. When used with other sizes of tile it may be necessary to cut the tile.

Types of "Tile-in" Accessories

Projecting—Used only in walls with tile wainscoting. The back of each accessory takes the place of one or more tile, and has three vertical undercut grooves. Cement is buttered to the back of the piece which is then set in the wall. When the cement sets hard the accessory is part of the wall and can not become loose.

Recess—May be used in any kind of wall, regardless of the kind of wainscoting. The flange at the face of the accessory takes the place of one or more tile and is set flush. Two rows of grooves are provided around all four sides of each piece. Cement is buttered around the sides back of the flange, and the accessory is then placed in a recess provided in the wall. When the cement sets hard the accessory becomes a permanent part of the wall.



Projecting Type — Recess Type

Sectional Views Showing Methods of Installing "Tile-in" Accessories

Specifications

"Tile-in" china bathroom accessories are installed by the tile contractor, and specifications for their installation should appear in the tile specification.

Bathroom Accessories—The tile contractor shall furnish and install China Bathroom Accessories as manufactured by The W. R. Hughes Co., Inc., New York., N. Y., in accordance with the following specification and subjoined schedule of accessories.

Accessories to be set while laying the tile or afterward.

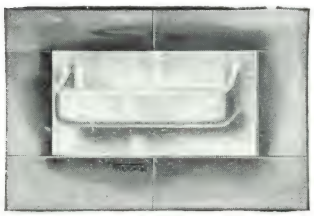
Setting Projecting Type—Butter back of accessory with rich cement mortar and set in same manner as tile are laid.

Setting Recess Type—Cut recess in wall of proper size for accessory to be installed. Butter outside walls of accessory back of flange with rich cement mortar and set in recess with face of flange flush with wall. Flange to be set in same manner as tile are laid.

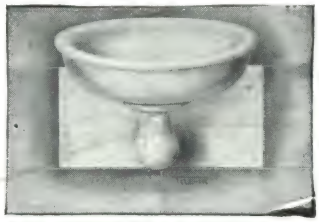
Location—Accessories shall be set as shown on drawings or as directed by architect. Care shall be taken to locate tile joints so that accessories can be set without the necessity of cutting any tile.

Note: In setting electric heaters, all wiring and switch to be furnished and set by electrical contractor (see electrical wiring specifications).

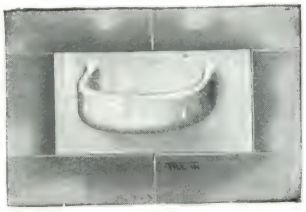
Schedule of Bathroom Accessories—(Here list all accessories to be provided with each fixture, giving number, name, size, type of lip if any, etc.)



B-50 "Tile-in" China Soap Holder, 6x3-in. Back
Also made with 4¼x4¼-in. back



B-51 "Tile-in" China Soap Holder, With Loose Dish, 6x3-in. Back
Also made with 4¼x4¼-in. back



B-52 "Tile-in" China Tumbler Holder, 6x3-in. Back
Also made with 4¼x4¼-in. back

B-53 "Tile-in" China Tooth Brush Holder, 6x3-in. Back
Also made with 4¼x4¼-in. back

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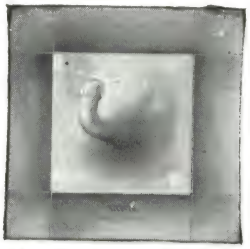
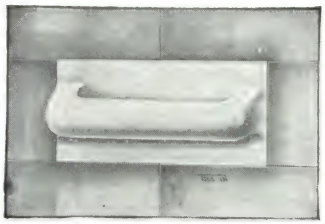
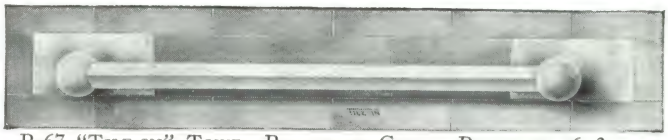


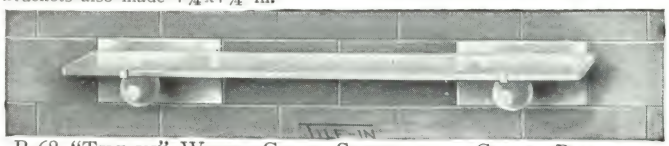
B-108 "Tile-in" China Robe Hook, 4¼x4¼-in. Back
Also made with 6x3-in. back



B-61 "Tile-in" China Grab Rail with 6x3-in. Back
Also made with 12x3-in. back



B-67 "Tile-in" Towel Bar with China Brackets, 6x3-in. Backs
Towel bar furnished square or round, 18, 24, 30 or 36 in. long. Brackets also made 4¼x4¼ in.

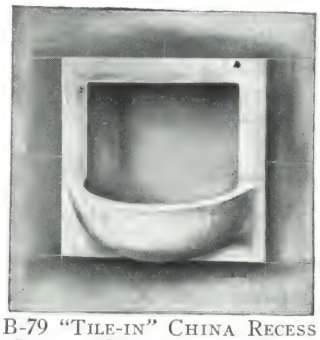


B-68 "Tile-in" White Glass Shelf with China Brackets, 6x3-in. Backs
Shelf 5 in. wide, ⅜ in. thick, furnished 18, 24, 30 or 36 in. long. Brackets also made 4¼x4¼ in.

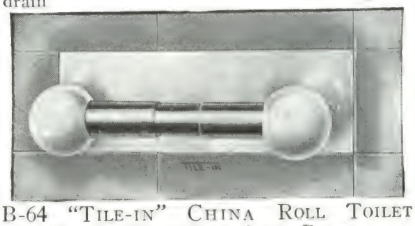
B-78 "Tile-in" China Recess Combination Soap Holder and Grab Rail, Lip Drain, 6x6-in. Flange
Also made with full lip or flush drain

B-54 "Tile-in" China Tumbler Holder, with China Tumbler, 6x3-in. Back
Also made with 4¼x4¼-in. back. Also furnished with china mug

B-75 "Tile-in" China Recess Tumbler Holder
6x6-in. flange

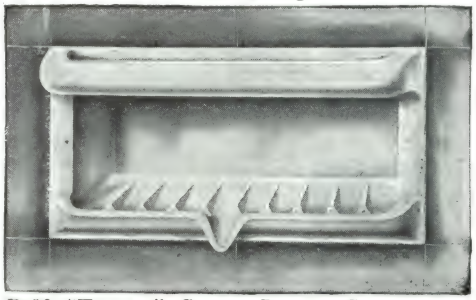


B-79 "Tile-in" China Recess Sponge Holder, Drain Hole
6x6-in. flange



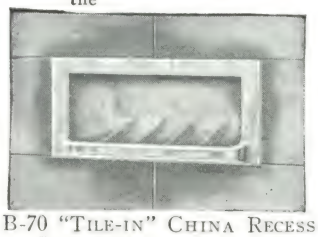
B-64 "Tile-in" China Roll Toilet Paper Holder, 9x3-in. Back

B-83 "Tile-in" China Recess Soap Holder, Flush Drain
9x6-in. flange. Also made with full lip or lip drain. Also made with 12x6-in. flange with flush drain, full lip or lip drain. Also made with 8½x4¼-in. flange with flush drain, full lip or lip drain for 4¼x4¼-in. tile

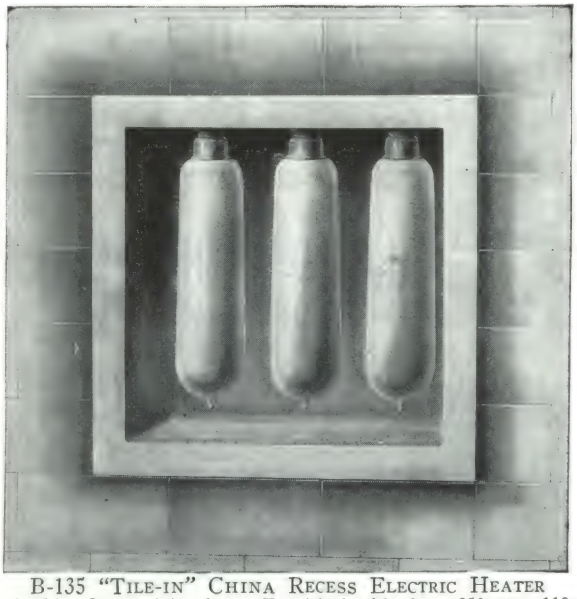


B-93 "Tile-in" China Recess Combination Soap Holder and Grab Rail, Lip Drain
12x6-in. flange. Also made with flush drain or full lip. Also made with 9x6-in. flange with flush drain, full lip or lip drain. Also made with 8½x4¼-in. flange with flush drain, full lip or lip drain for 4¼x4¼-in. tile

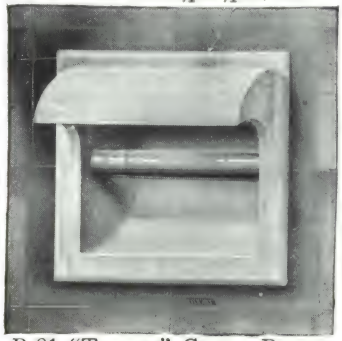
B-72 "Tile-in" China Recess Soap Holder, Full Lip
6x6-in. flange. Also made with flush drain or lip drain. Also made with 4¼x4¼-in. flange with full lip or flush drain for 4¼x4¼-in. tile



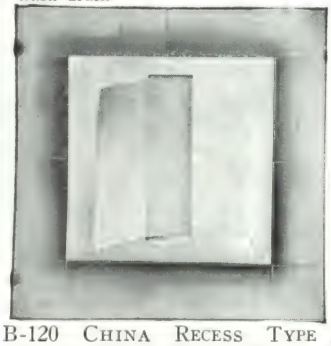
B-70 "Tile-in" China Recess Soap Holder, Full Lip
6x3-in. flange. Also made with flush drain



B-135 "Tile-in" China Recess Electric Heater
15x15-in. flange, 5 in. deep. Furnished with three 250-watt, 110-volt lamps. Lamps of higher wattage or voltage if desired. Switch and wiring not included. Can be used for heating bathroom or for drying towels when placed under towel rack



B-81 "Tile-in" China Recess Roll Toilet Paper Holder
6x6-in. flange. Also made with 7x7-in. flange for 4¼x4¼-in. tile



B-120 China Recess Type Single Sheet Toilet Paper Holder

A. P. W. PAPER COMPANY

Manufacturers of Onliwon Toilet Paper, Paper Towels and Automatic Cabinets

ALBANY, N. Y.

BRANCH OFFICES

ATLANTA, GA., 121 South Forsyth Street
BOSTON, MASS., 79 Milk Street
BUFFALO, N. Y., Ellicott Square
CHICAGO, ILL., Caxton Building, 508 South Dearborn Street
CINCINNATI, OHIO, Box 731
CLEVELAND, OHIO, 1012 National City Building
DALLAS, TEX., 406-408 South Lamar Street
DENVER, COLO., Box 1903
DES MOINES, IOWA, 409 Youngerman Building
DETROIT, MICH., Box 23, Western Market Station
HARTFORD, CONN., 9 Lenox Street
INDIANAPOLIS, IND., 616 Terminal Building
LOS ANGELES, CAL., 322-324 East Third Street
LOUISVILLE, KY., Suite 1018 Francis Building
MILWAUKEE, WIS., 404 Iron Block
MINNEAPOLIS, MINN., 2871 Irving Avenue, South
NEW YORK, N. Y., 200 Fifth Avenue
PHILADELPHIA, PA., 1001 Chestnut Street
PITTSBURGH, PA., 1536 Oliver Building
ST. LOUIS, MO., Ninth and Oliver Streets
SAN FRANCISCO, CAL., 228-230 Balboa Building
SYRACUSE, N. Y., 505 Gurney Building
TOLEDO, OHIO, 317 Twelfth Street
WORCESTER, MASS., 12 Federal Street

Products

ONLIWON TOILET PAPER, TOWELS and AUTOMATIC CABINETS.

Onliwon Hygiene Toilet Paper and Cabinets

The cabinet toilet paper service that saves money, safeguards health and improves appearance of lavatory.

PACKAGE OF 1000 SHEETS ONLIWON TOILET PAPER

ONLIWON HYGIENE

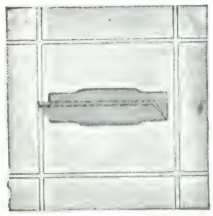
Onliwon Toilet Paper—Made in a clean modern factory with every precaution to insure sterility. The compact 1000-sheet package is easily slipped into the protecting cabinet.

No. 8 ONLIWON TOILET PAPER CABINET

No. 8 Onliwon Surface Type Toilet Paper Cabinet—Nickel or gunmetal. Adapted especially to schools, factories, office buildings, hospitals, or servants' quarters. Dustproof, self-feeding. Keeps paper under lock and key. Serves two sheets at a time. Indicator on the front shows when to renew paper.

No. 9 ONLIWON TOILET PAPER CABINET

No. 9 Onliwon Surface Type Porcelain Toilet Paper Cabinet—Adapted to all-white lavatories of hotels, apartment houses, department stores or guests' baths. Obtainable with or without lock and key. Opening right or left side as preferred.



No. 14 ONLIWON TOILET PAPER CABINET

No. 11 or 14 Onliwon Recess Type Porcelain Toilet Paper Cabinet—For fine residences, hotels and apartment houses. Sets right into the wall, the face of cabinet being flush with surface of wall. No. 11 is 5¾ in. wide, 2⅝ in. high, 3⅜ in. deep and takes the place of a standard 3x6-in. wall tile. No. 14 takes the place of a 6x6-in. wall tile.

Onliwon Paper Towels and Cabinets

The automatic towel service that protects the individual, prevents waste, and graces the building.

THE Onliwon Paper Towels
SERVED DOUBLED GIVE DOUBLE SERVICE

PACKAGE OF 100 ONLIWON PAPER TOWELS

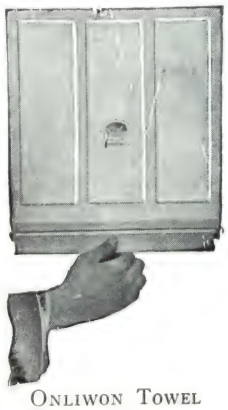
Onliwon Paper Towels—Made from the finest grade new pine wood pulp, cut and folded by machinery in a model factory under the most sanitary conditions. They come in packages of 100 with simple directions on wrapper.

SINGLE TOWEL

The Automatic Onliwon Paper Towel Service—Provides an individual towel. No knobs or levers to handle. Just pull the projecting end and towel comes away, automatically bringing next towel into position. Simple, economical, hygienic. *One towel dries the hands.*

The Onliwon Towel Service Cabinet—Is dustproof. It is furnished with lock and key and has glass inspection aperture on the front which shows when to refill. There is no mechanism to get out of order. Permanent, substantial, sanitary. Finished in white enamel. Can be washed without injury to contents.

The Onliwon Towel Cabinet is very compact and takes but little space. It measures only 12 in. high by 12 in. wide, and extends only 3 in. from the wall.



ONLIWON TOWEL SERVICE CABINET

NATIONAL PAPER PRODUCTS CO.

Manufacturers of Paper Towels, Toilet Paper and Cabinets

MILLS AND SALES OFFICE
CARTHAGE, N. Y.

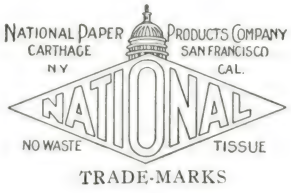
NEW YORK OFFICE: 160 Fifth Avenue, NEW YORK, N. Y. WESTERN OFFICE: SAN FRANCISCO, CAL.

Products

Manufacturers of "Public Service" Towels and Cabinets; "No-Waste" Toilet Tissue and Cabinets.

The Company and Its Products

The National Paper Products Co. were the first makers of paper towels and are now the largest producers. "Public Service" towels and "No-Waste" toilet tissue are sold by paper jobbers throughout the United States.



TRADE-MARKS

The Perfect Paper Towel and Its Economy

"Public Service" towels answer all the requirements of the perfect towel in that they are sanitary, strong, absorbent and economical.

The Paper—Made of a clean spruce wood especially treated so that the towels do not leave bits of paper on the face and hands.

Strength—They are made so strong, that instead of being used as blotters, as many paper towels are used, the hands can be dried by rubbing as with cloth towels.

Economy—Only one towel is withdrawn from the cabinet at a time and economy is forced on the user. A double folded hem where the wet hand grasps towel to pull it from the cabinet prevents tearing and waste. The cabinet stops pilfering.

Sizes of Towels—Regular: 13½x11 in.; Junior (for schools) 11½x11 in. They come packed in fiber cartons containing 25 packages of 150 towels each (3750 towels per carton). Average shipping weight, 54 lbs. for the Regular; 45 lbs. for the Junior.

"Public Service" Towel Cabinets

Made especially for use with "Public Service" towels. No mechanical features and nothing to get out of order. Secured to the wall by means of four screws on the inside. Can not be removed as it is under lock and key. Made of sheet steel and finished in baked-on enamel in white and olive green.

"No-Waste" Toilet Tissue

Made from clean, fresh spruce wood only. No old paper refuse. Special process of manufacture gives it a soft, velvety texture combined with strength, not found in ordinary grades of toilet paper. Sheets are 4½x5 in. Come packed 800 sheets in a package, 125 packages (100,000 sheets) in a fiber case. Average shipping weight of case, 70 lbs.

"No-Waste" Toilet Tissue Cabinet

Made especially for the "No-Waste" toilet tissue, of steel finished in heavy nickelplate or baked-on olive green enamel. It is secured to the wall or partition by means of two screws on the inside and can not be removed as it is under lock and key. Delivers but two sheets at a time, which enforces economy. Stops all pilfering. These fixtures are loaned *free,* for use with "No-Waste" Toilet Tissue.

Note the Folded Reinforced Edge of the Paper is Exclusive with "Public Service" Towels

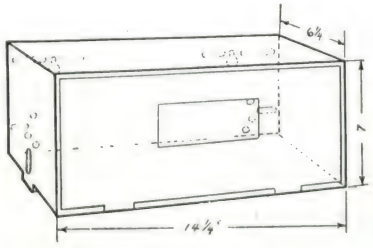


Diagram showing Dimensions of Cabinet and Fastenings

"Public Service" Towel Cabinet

"No-Waste" Toilet Tissue Cabinet

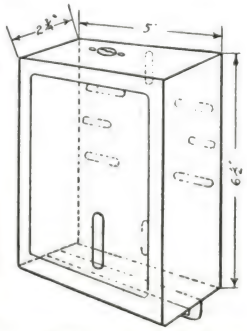


Diagram showing Dimensions of Cabinet and Location of Bolts

"No-Waste" Toilet Tissue Cabinet

WEST DISINFECTING COMPANY

Soaparatus Liquid Soap Dispensing System

411 Fifth Ave.
NEW YORK, N. Y.

BRANCHES AND OFFICES

ALBANY
BALTIMORE
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CLEVELAND
DENVER
DETROIT
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LOUISVILLE
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MONTREAL
OMAHA
PHILADELPHIA
PITTSBURGH
PORTLAND
RICHMOND
ROCHESTER
ST. LOUIS
ST. PAUL
SAN FRANCISCO
SEATTLE
SYRACUSE
TOLEDO
TORONTO
VANCOUVER
WASHINGTON
WINNIPEG

Product

SOAPARATUS LIQUID SOAP DISPENSING SYSTEM.

Soaparatus System

This is the ultimate development in liquid soap dispensing systems for heavy service demands, where a large number of people must be supplied without interruption.

Pure, cocoanut oil liquid soap conveyed by gravity from a supply tank mounted on the wall, through a feed pipe extending the entire length of the row of washstands, to taps equipped with Soaparatus valves, centered over each basin.

That the Soaparatus assumes a place of deservedly high rank as an important modernizing factor in the up-to-date washroom, is evidenced by the rapidity with which it has been adopted by most of the leading hotels, clubs, theaters, banks, office buildings, and factories.

The Soaparatus keeps pace with the latest developments in plumbing appliances and washroom appointments. Where absolutely sanitary conditions are required with a desire to create an atmosphere of tone the Soaparatus becomes an essential feature, worthy of the high consideration it deserves.

Soaparatus Valve—Of unusually sturdy construction, built to withstand constant service and to meet the most severe conditions that could be imposed upon a device of this character, the Soaparatus valve is one of the outstanding features of the system.

The casing is composed entirely of brass castings, heavily nickelplated, assembled in such manner as to render the valve practically foolproof, leaving no vulnerable points open to the attack of those with tampering proclivities.

All inside parts are made of non-corrosive white metal, insuring a supply of absolutely pure soap. The joints are equipped with washers, thus eliminating the possibility of leakage.

Action—One push of the plunger releases the soap contained in the reservoir chamber located in the dome of the valve, delivering into the hand sufficient soap for a satisfactory wash. The reservoir is automatically refilled by the action of the plunger in resuming position. The amount of soap ejected each time is controlled by the dome, an exclusive feature found only in the Soaparatus valve.

Soaparatus Tank—The supply tank is constructed of white enameled sheet steel and is furnished in 2-, 3-, and 5-gal. capacities. An indicator is provided, affording a means of easily ascertaining at all times the level of the soap in the tank. The tank is mounted on the wall, at any convenient point, high enough to provide sufficient gravity flow and accessible for filling. A cut-off valve is located on the feed pipe directly under the tank by which the flow of soap is controlled.

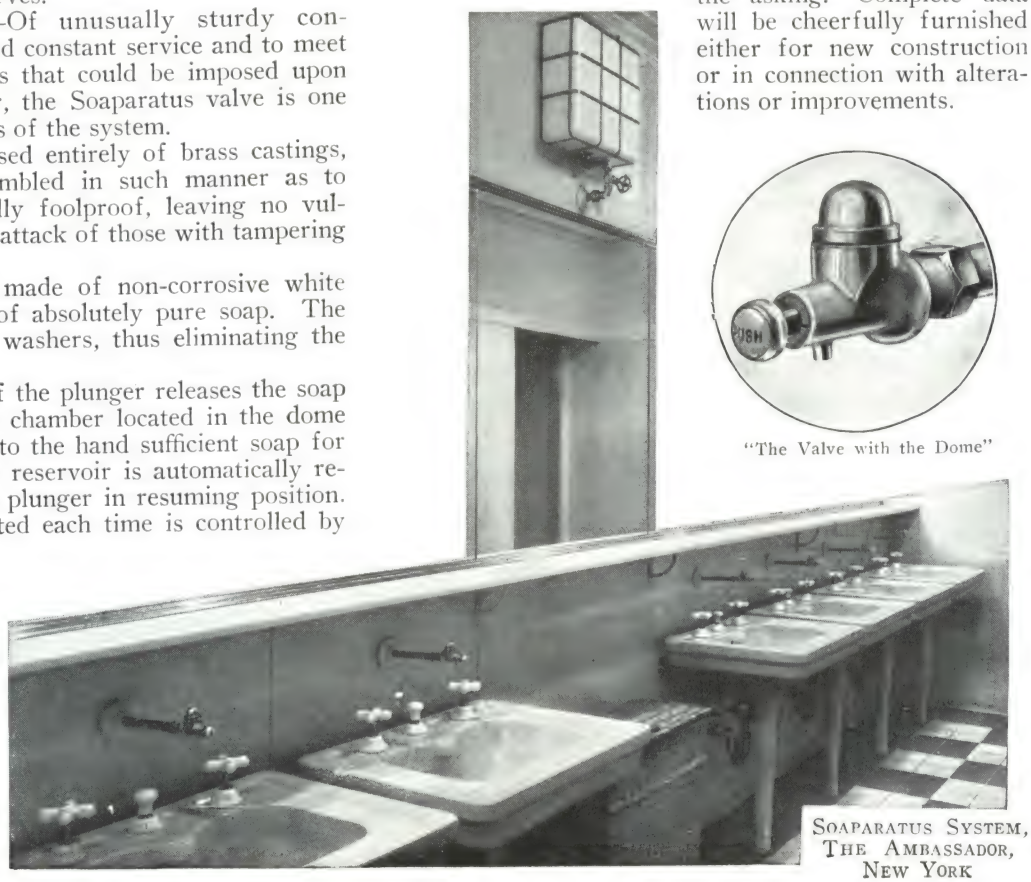
Installation

The Soaparatus system, due to its flexibility, is admirably adapted to varying conditions of installation. One tank may be used to supply any number of valves and extensions may be made as required, provided they are at a level at least a foot lower than the location of the supply tank in order to provide proper gravity flow. When installed in connection with new construction, where provision has been made in the plans or where existing conditions will permit, the piping from the tank to taps may be concealed, creating an exceptionally neat appearance. In cases where it is impossible to conceal the piping a thoroughly attractive installation is provided by the use of nickelplated piping throughout.

Service

The co-operation of our nearest branch is yours for the asking. Complete data will be cheerfully furnished either for new construction or in connection with alterations or improvements.

"The Valve with the Dome"



SOAPARATUS SYSTEM, THE AMBASSADOR, NEW YORK

ADAMS BROS. MANUFACTURING CO.

Manufacturers of Gas Heating Appliances

Fayette and Chateau Streets

PITTSBURGH, PA.

Products

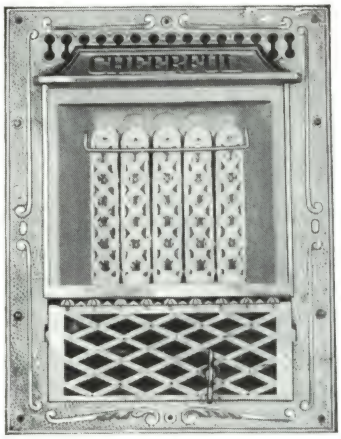
CHEERFUL RADIANT BATHROOM HEATERS, RADIANT GRATE FIREPLACES and a general line of radiant heaters, using natural or artificial gas as fuel.

Cheerful Radiant Bathroom Heaters

General Advantages—This company has manufactured gas heating appliances for 25 years. It claims a radiant heater that is odorless, noiseless, dirtproof, sanitary and safe.

Installed in the walls of bathrooms generally and in other rooms where, when installed as directed, it eliminates the danger of heaters placed on floors and serves as an auxiliary to the regular heating system. In many localities bathrooms are heated entirely by this type of heater.

Description—Consists of a sheet iron box, lined inside and outside with heavy asbestos board, enclosing a fire clay chamber, 2 in. thick throughout. The radiants (fire clay tubes) are placed inside of the fire clay chamber and are therefore surrounded at the top, bottom and sides by a thick fire clay wall. Outside frame is of cast iron, finished in heavy nickel plate or pure white enamel, as desired.



CHEERFUL RADIANT BATHROOM HEATER

Height, 19 in.; width, 14 in.; depth, 4 in.; weight, 35 lbs.; number of radiants, 5

A powerful burner, operating on the central draft principle, mixes a maximum amount of air with the gas. Burns about 1/5 the gas of open flame burners. Flue connection is not required.

Testing Service for Architects—Upon request, a Cheerful Radiant bathroom heater will be sent direct to architects for testing, or if preferred, to gas companies' testing laboratories, tests to be conducted in presence of architect's representatives or notification given architect of result.

Suggested Specifications—*For Brick Wall*—The brick contractor will leave opening in wall for the proper installation of an Adams Cheerful Radiant heater when performing his work. This recess to be formed by the omission of the inner course of brick where marked on the plans, spanning with header course as shown by detail drawing. Plaster the back of the opening as designated.

For Frame Wall—The carpenter will trim the opening in wall, 4 in. deep, for the locating of an Adams Cheerful Radiant heater in the walls of the bathroom where indicated on the drawings. Dimensions to be neat in every case.

Plumbing—The contractor will furnish and install where shown on the drawings, one Adams Cheerful Radiant heater, making all connections to the same, testing in the presence of the owner and leaving ready to light. The finish to be either white porcelain enamel or heavy nickelplate, at the option of the owner.

ADAMS RADIANT GRATE FIREPLACE

No.	Net wt., lbs.	Height, in.	Width, in.	Depth, in.	Number of radiants
6	67	30⅛	24½	4½	10
7	85	30¼	30½	4½	14

Adams Radiant Grate Fireplaces (Using Natural or Artificial Gas)

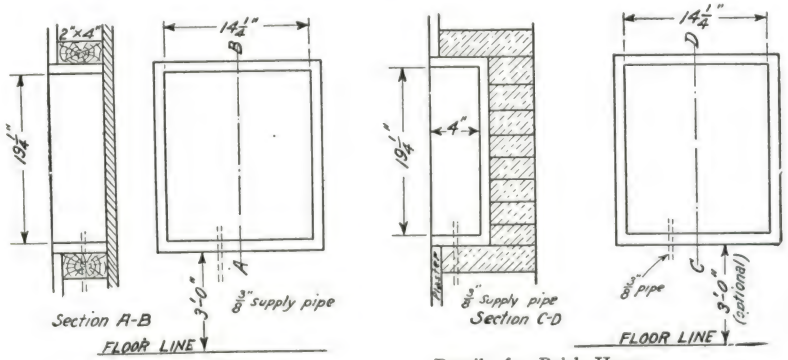
Advantages—Radiant principle replaces asbestos fronts, open flame burners, gas logs and similar methods. Gives far greater heating efficiency with considerably less gas. More sanitary and safe. Odorless, noiseless, dirtproof and dustproof.

Design and Finish—Conventional design shown, finished standard in light brass, antique brass and statuary bronze.

Special Note: Architects are privileged to specify special finishes to match interiors of homes.

Construction — Cast iron frames, weight and dimensions given above.

Powerful gas burner operating on central draft principle, mixing maximum amount of air with gas. Burns about 1/5 the gas of open flame burners.



Details for Frame House — Details for Brick House

OPENINGS REQUIRED IN BATHROOM WALL FOR INSTALLATION OF ADAMS BATHROOM RADIANT HEATER

NEW METHOD STOVE COMPANY

Manufacturers of Gas Ranges and Radiant Heaters

MANSFIELD, OHIO

Products

GAS RADIANT HEATERS: Wall and Mantel; GAS RANGES.

Also Special Ovens and Hot Plates for domestic science schools.

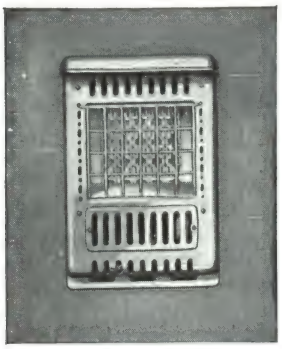
TRADE-MARK

Radiant Heaters

Five patented improvements. Twenty-six different styles and sizes. Made in statuary bronze or antique brass finish.

Wall Heater

Construction—Can be connected to vent pipe if so desired by cutting out asbestos over hole in steel in top. Has dust hood that collects the dust from the hot



WALL HEATER

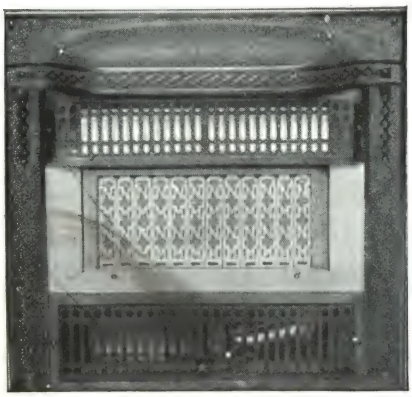
SECTION

circulated air, preventing discoloration of walls and curtains, so it is suitable to install bathrooms and also in small living rooms. The burner is odorless and will not pop back. With a 3-in. gas pressure it consumes only 8 cu. ft. per hour.

Dimensions—Width of front 13¼ in.; height of front 19½ in. Size of opening in wall 12½x18¾ in.

Mantel Heater

Construction—This is such that all the heat possible is obtained from the amount of gas consumed, by drawing the cold air from the floor and passing it over the back of the very hot clay back; then, through a series of tubes surrounded by the heat from the top of radiants; then, rapidly discharge through the front causing uniform heat in room. Can be installed in wall built on 4-in. studding with mantel and false breast at a comparatively small expense.



MANTEL HEATER

SECTION

DIMENSIONS

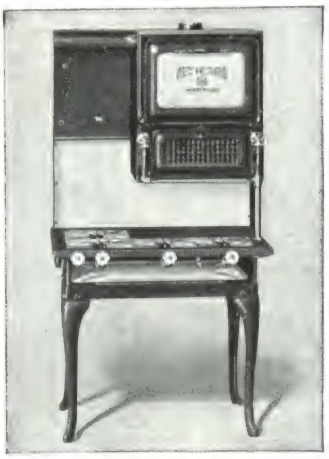
	No. 16	No. 17	No. 16E	No. 17E
Width, in.	24½	30½	26½	32½
Height, in.	30¼	30¼	31¼	31¼
Depth, in.	7	7	5	5

New Method Ranges

Ranges have eight patented improvements. Thirty different styles and sizes.

Apartment Range

Construction—Cooking top 50% larger than any other type of four-burner gas range. No dark corners. Three burners in row at front. Swinging simmering burner will light one burner from the other. Oven



APARTMENT RANGE

liners at each side under flame plates will not choke or warp. Even broiling or toasting. Lights direct. Flame always in sight. No explosion possible. Canopy connected to flue. Vent opening in back under overhanging oven into flue.

DIMENSIONS

No.	Baking oven, in.	Broiling oven, in.	Cooking top, in.	Height to pipe collar, in.	Depth of range, in.
370	16x18x12	14x18x6½	32x24½	60½	29

White Enamel—No. 370—Broiler pans and oven door panel vitreous enamel oven liners.

No. 370S—Same as No. 370 and with waste pan, lower splasher and wheels.

No. 370SE—Same as No. 370S and with upper splasher. Broiler door and front feet. Vitreous enamel top. Burners and oven liners.

REZNOR MANUFACTURING CO.

Bathroom Gas Heaters

MERCER, PA.

Product

REZNOR BATHROOM GAS HEATER.

Reznor Bathroom Heater

The Reznor Bathroom Heater is a permanent installation for auxiliary heating. It is easily installed in any standard stud partition. Occupies no floor space. Burns either natural or artificial gas. Has no mixer; can not light back. Perfect combustion yellow flame burner, gives 100% efficient, odorless heat as soon as lighted. Copper reflector directs heat to floor first, and heats entire room evenly. Will operate on pressure as low as ½-oz. Heating capacity, 700 to 1000 cu. ft. Average consumption, 3 to 5 ft. per hour.

Used as an Auxiliary Heater

Used as an auxiliary heater, it replaces the portable gas heater found in practically every bathroom. While the Reznor Bathroom Heater has been designed primarily to solve the problems of bathroom heating, it offers the most practical solution of many other difficulties in auxiliary heating.

In the office or den, the child's room, the sewing room, breakfast room, sleeping porch or sun parlor, Reznor Bathroom Heaters offer just the help needed in the chilly mornings and evenings of fall and spring, before and after the furnace season, and in the mornings through the winter before the furnace is well started. Some owners of fine homes have installed them in every room in the house as auxiliary heaters.

REZNOR BATHROOM HEATER
Over-all dimensions, 16¾ in. wide by 18¾ in. high

Underwriters' Approval

On the accepted list of the Underwriters' Laboratories, Inc., established and maintained by the National Board of Fire Underwriters.

How the Heater Is Furnished

The Reznor Bathroom Heater is shipped complete, ready for installation. Directions for plumber's use are included with every heater.

Finish

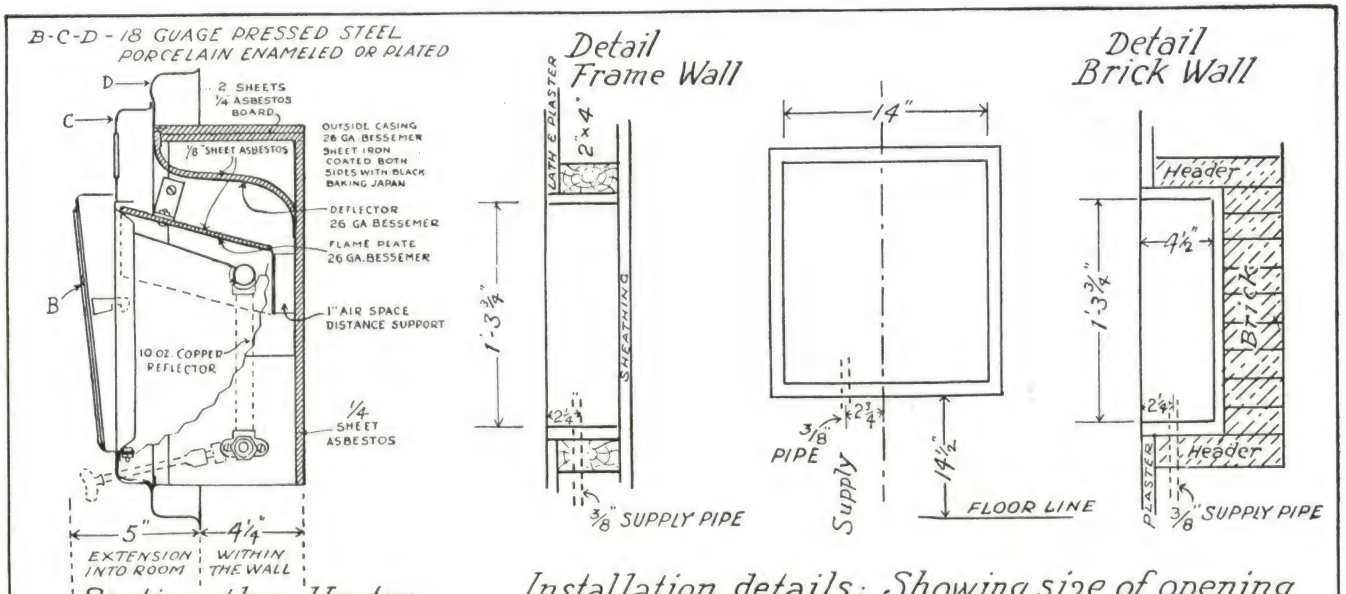
The Standard finish of the Reznor Bathroom Heater is white porcelain enamel. Special finishes to order.

Sample Specifications

For Brick Wall—Contractor will leave opening in wall for proper installation of a Reznor Bathroom Heater when performing his work. Recess to be formed by omission of the inner course of brick where marked on the plans.

For Frame Wall—Carpenter will provide an opening in wall 13½x15¾x4¾ in. deep, for the locating of a Reznor Bathroom Heater in the walls of the bathroom where indicated on the drawings.

Plumbing—Contractor will furnish and install where shown on the drawings, a Reznor Bathroom Heater, making all connections to the same, testing in the presence of the owner and leaving ready to light. The finish to be as indicated in general specifications.



DETAILS of REZNOR BATHROOM HEATER

SUPERIOR MANUFACTURING COMPANY

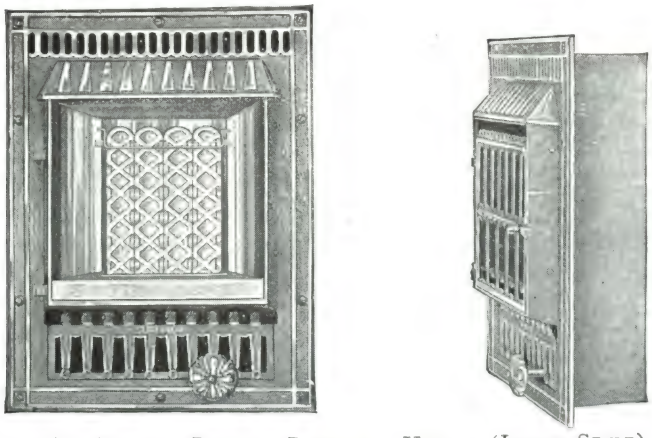
Manufacturers of Gas Heating Appliances
PITTSBURGH, PA.

Products (Patents Applied For)

BATHROOM HEATERS; FIREPLACE GRATE and LOG with Superior Radiant Type Burner for natural gas.

SUPERIOR and COSY SAFE GARAGE HEATERS with Regular Type Burner for natural or artificial gas.

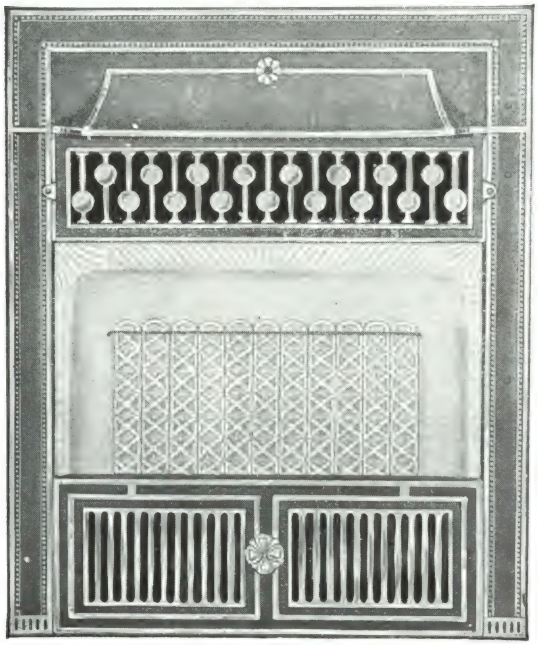
Also manufacturers of Fireplace Fixtures; Logs; Stoves; Combination Coal and Gas Grate; Andirons, etc.



No. 51. SUPERIOR RADIANT BATHROOM HEATER (INSERT STYLE) WITH DRESS GUARD

Odorless and flueless. Frame, 14x18 in.; body, 13x17 in.; depth, 4 in.; pipe connection, ¼ in. Cast frame highly nickeled or other plate finishes. Coppered reflector and back. Burner will not carbonize or corrode. Body lined with heavy asbestos. Construction insures safety for use in frame dwellings. Consumes 4½ cu. ft. gas per hour. State whether for concealed or exposed connections.

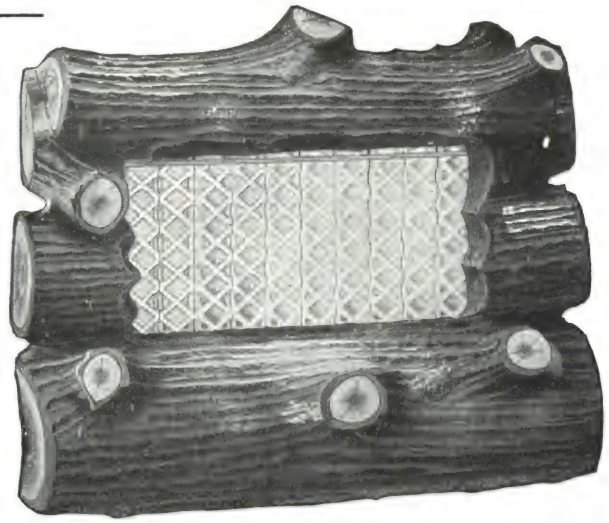
No. 50 for Heater of Reflector Style, no stilts, same frame as above



No. 412. SUPERIOR RADIANT GRATE

Artistic, efficient fireplace heater with cast front finished in jap copper, antique copper, brush brass and polished brass. Tile back wall, special burner and adjustment spud. Consumes 14 cu. ft. gas per hour. Frame, 24½x30¼ in.; body, 21x24⅞ in.; depth, 5 in. Will cover standard size opening 24x30 in. Pipe connections, ½ in.

No. 410 for Grate of Reflector Style, no stilts or tile back wall, same frame as above



No. 13. 3-STICK SUPERIOR RADIANT GAS LOG

Greatest length, in.	Height includes rest, in.	Depth, in.	Number stilts	Cu. ft. gas per hour
14	18	10	4	4½
16	18	10½	6	7
18	21	10½	8	9½
20	21½	11	8	9½
22	21½	11	10	12
24	21½	11	10	12
26	22	11½	11	14
28	22	11½	12	15
30	22	12	14	18

SUPERIOR SAFE GARAGE HEATER

Type	Height, in.	Width, in.	Length in.	Intake pipe, in.	Outlet pipe, in.	Cu. ft. gas per hour	Pipe connection, in.	Max. space will heat cu. ft.
Superior	37	13	41	3	4	16	½	6000
Cosy	37	13	27	3	3	11	½	3000

Complete as shown with 2 elbows, 2 lengths pipe, cast iron damper, fresh air cap and outlet cap.

Catalogue

Complete catalogue with full descriptive matter sent on request.

FULLER & WARREN COMPANY

Manufacturers of Warm Air Furnaces

TROY, N. Y.

Products

STEWART WARM AIR FURNACES.

For Stewart Ranges, see page 2096.

Stewart Warm Air Furnaces

Stewart furnaces are built to give service and satisfaction. Ninety years of successful furnace and stove making experience is incorporated in their design and construction. They are made by master craftsmen, and only the best of materials are used.

The Stewart line comprises styles and sizes to meet every need and requirement. Special attention has been paid to furnaces for heating schools and other heavy duty service.

Stewart "A" Series Furnace

Designed for extra hard service. Particularly suitable for schools, churches, public buildings and residences. No expense has been spared to make this heater the equal of any on the market.

Furnace Proper—All cast iron, very heavy and durable, and will stand great abuse.

Fire Pot—Extra heavy, with perpendicular sides which increase draft, prevent accumulation of ashes, and give large grate area.

Grate Bars—Composed of four heavy bars operated in pairs. Bars are triangular in shape and easily removed.

Top Pipe and Dome—Each cast in one piece. Have unusually long fire travel, providing a large area of effective heating surface.

Joints—Gas and dustproof, as all are horizontal and cup shape.

Fuel—Burns hard or soft coal, coke or wood.

STEWART SERIES "A" FURNACE

No.	Diam. of fire pot, in.	Diam. of casing, in.	Height of castings, in.	Diam. of smoke pipe, in.	Heat pipe *cap., sq. in.
A 22-42	22	42	54¼	7	485.
A 24-48	24	48	56¾	8	573
A 26-53	26	53	58¼	9	677
A 28-58	28	58	59½	10	786
300	30	65	65½	10	1003
350	35	65	65½	10	1200

*If only one heat pipe is used, add 20% to capacity.

Stewart "B," "C" and "O" Series Furnaces

These furnaces are designed for less severe service than the "A" Series, and while somewhat cheaper, are very durable. They may be fitted with a gas ring for burning gas. "B" Series has steel radiator. "C" Series has cast iron radiator made in one jointless piece. "O" Series is made especially low for use where headroom is restricted.

Stewart "One-pipe" Furnace

The Stewart "One pipe" is a very practical heater, easily installed, and easy to operate. Made with one large pipe and one large two part register. Is very economical in the use of fuel, since *no heat is wasted*. All the heat is forced up into the house, while cold air from the rooms is drawn down into the outer or cold air section of the furnace. No heat escapes to the basement.

Furnished with steel or one-piece cast iron radiator, and for burning coal, wood or natural gas. Equipped with heavy triangular grate bars.

Where wood is to be used for fuel, a flat wood plate can be furnished. This gives great satisfaction.

When natural gas is to be burned, a gas ring is fitted. With this attachment the furnace will burn either coal or gas, or both. Especially desirable where natural gas is plentiful.

STEWART "ONE-PIPE" FURNACE

No.	M 18-42 P 18-42	M 20-45 P 20-45	M 22-48 P 22-48	M 24-53 P 24-53	M 26-58 P 26-58
Diam. firepot, in.	18	20	22	24	26
Diam. grate, in.	16	18	20	22	24
Diam. inside casing, in.	32	36	38	42	49
Diam. outside casing, in.	42	45	48	53	58
Diam. smoke pipe, in.	7	7	7	8	8
Feed door opening, in.	9x12	12x12	13x12	13x12	11x15
Size of register, in.	29x29	30x30	30x36	36x36	40x40
Diam warm air pipe, in	20	22	24	28	30
Capacity. No. of rooms	4 to 6	6 to 8	8 to 10	10 to 12	12 to 14
Capacity, cu ft.	3 to 8 M	8 to 13 M	13 to 18 M	18 to 25 M	25 to 35 M

Prefix M designates steel radiator; P, cast iron radiator.

Note: Every "Stewart" one-pipe furnace is shipped with casing and pipe measuring 8 ft. high and can be cut down for lower basements. Made to order for heights over 8 ft.

HOLLAND FURNACE COMPANY

HOLLAND, MICH.

Products

FURNACES: Holland and Ottawa All-cast.
Also The Holland Window Chute.

Holland Furnaces

Advantages—The Holland furnace will burn any and all grades of fuel—hard coal, soft coal, lignite or wood—without waste of gases, without internal explosions and without opening of joints.

It gives the maximum heat for the fuel consumed, because it has the air-admitting fire pot, the one-piece radiator and the most perfect and natural way of burning the fuel.

Description—The special patented features are necessary common sense improvements. The castings are heavy and well made, and the fittings are the best that can be provided.

Grate and Ash Pit—The Holland grate, as illustrated herewith, is slightly cone shaped, which breaks up all clinkers and makes the fuel roll towards the wall of the fire pot, where air is mixed with the gas. This generates a much greater degree of heat than it is possible to obtain with the old duplex and flat grates, and clinkers that would form and be wasted in other furnaces are thereby consumed.

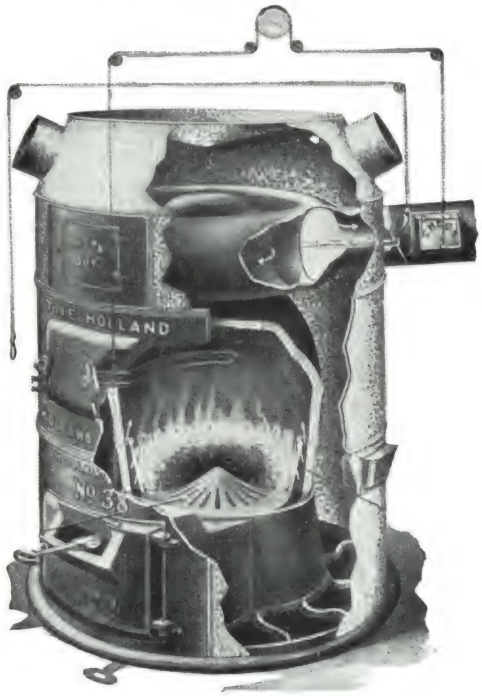
Resting on a pivot, it is easily operated, and for convenience and simplicity it has no equal. Either the solid or open construction is furnished; both have the pivot center, and either can be removed through door of ash pit.

By lifting grate slightly and moving sidewise, the grate can be lowered, giving an opening of 7 in., and the holding bar locks back in position by simply raising grate with shaker or lifter.

The ash pit is large and roomy on the inside, and is provided with a very large door, which makes it convenient for the removal of ashes.

HOLLAND GRATE, ASH PIT AND PATENTED FIRE POT

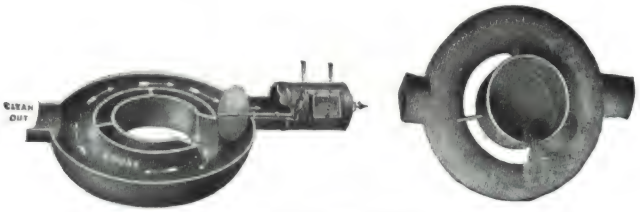
Patented Fire Pot—The Holland air-admitting fire pot insures fuel economy, durability and cleanliness. Made in two heavy corrugated sections, with lower part provided with a large number of funnel shaped slots, it supplies the fuel with superheated air from all sides. This burns the fuel from the sides and over the top. The gases and soot are consumed, which means fuel saving in place of trouble and dirt.



SECTIONAL VIEW OF HOLLAND FURNACE

Patented Radiator—The Holland radiator is cast in one piece, with no joints to be cemented or bolted together. It has three heating surfaces, and longest possible smoke travel, so produces the greatest amount of radiation, all heat being utilized.

The damper, operated from the outside of casing, makes all smoke travel the full circuit, when closed; or allows a direct draft, when open. It opens and closes by lifting and lowering the weight hanging in front of furnace. With this damper arrangement the smoke has to travel twice as far in the "Holland" as it does in other furnaces similarly constructed, and the heat is equal for all warm air pipes taken off.



PATENTED RADIATOR OF THE HOLLAND FURNACE

Continued on next page

Combination Heating—For combination heating, cast iron water rings can be supplied to go between fire pot and feed section. Through recess in feed section water coil can be placed for combination heating purposes, by using a radiator or two, or the coil can be used for heating bath and kitchen water.

HOLLAND FURNACES AND CASINGS

No.	Fire pot diam., in.	Casing diam., in.	Casting height, in.	Residence capacity, cu. ft.	One-room capacity, cu. ft.	Weight, lbs.	Prices and plans on application
37	19	37	49	8,000	12,000	925	
40	22	40	50	10,000	16,000	1,080	
45	25	45	52	14,000	21,000	1,240	
50	28	50	54	18,000	28,000	1,540	
60	32	60	55	25,000	40,000	1,930	

No. 40 Pipeless and No. 3-40 Pipeless, with special casing and register—prices and plans on application.

All-cast Ottawa Furnace

The demand by real estate dealers and builders, who build houses to sell, has made such a strong call for an ordinary all-cast furnace which can be sold at a price consideration, that the All-cast Ottawa has been added to the line.

This furnace is heavy and well made; and while the radiator is cast in two pieces and bolted together, and the smoke travels only half as far as in the Holland, it is fully as good as other furnaces of similar construction that have not the patented "direct-indirect" damper feature of the Holland. The fire pot is in two plain sections, with outside surfaces corrugated. The furnace is also provided with the cone grate.

The All-cast Ottawa is an ideal heating plant for those who want an ordinary all-cast furnace, to gain a saving in first cost.

A recess is provided in the feed section for the admittance of a water coil.

ALL-CAST OTTAWA FURNACE

ALL-CAST OTTAWA FURNACES AND CASINGS

No.	Fire pot diam., in.	Casing diam., in.	Casting height, in.	Residence capacity, cu. ft.	One-room capacity, cu. ft.	Weight, lbs.	Prices and plans on application
19	19	37	48	7,500	11,000	825	
22	22	40	49	9,000	15,000	965	
25	25	45	50	12,500	20,000	1,045	

No. 22-40 Pipeless and No. 25-40 Pipeless, with special casing and register—prices and plans on application.

Holland Service

Customers do not merely buy a furnace—a heating plant. They buy experience, the ripeness of years of dealing with heating problems and difficulties. To be sure, the HOLLAND FURNACE COMPANY sells the best furnace that it can manufacture, but the service does not end there. A special feature is made of knowing positively that every furnace installed by this company will give satisfaction.

Write to the service department about heating problems.

Holland Transferable Guarantee Bond

There are several reasons why real estate dealers feature the Holland furnace in the advertisements of their houses, but no reason carries more weight than the transferability of the Holland Guarantee.

No matter who moves into a Holland-heated home, there is only one place to put responsibility with respect to the heating system. The Holland furnace is manufactured, sold and completely installed by the HOLLAND FURNACE COMPANY. That is why the Holland Bond can and does mean undivided responsibility. And that is why the bond can be transferred from one buyer of a house to another.

Architects, contractors and real estate men are more and more realizing the demand on the part of their clients for the transferable heating guarantee. And they appreciate the value of a guarantee which is the direct pledge of the greatest organization of heating experts in the world.

Every Holland Branch is a permanent, local institution. It is permanent because it is an important part of a national institution. It is local because every Holland man is primarily interested in things local. Holland Branch managers are allowed to remain where they have been established residents whenever that is possible. When they are sent away from home they are put to stay. The Holland man is selected and trained to give high grade heating service, he does a good business, and is respected in his community.

The Holland man is trained particularly to have Holland work done in harmony with other building equipment work, and to hold courtesy, promptness and thoroughness, foremost. Architects who are friends of the Holland are strong friends.

KELSEY HEATING COMPANY

Manufacturers of Warm Air Heating Systems

SYRACUSE, N. Y.

CABLE ADDRESS
"KELSEYCO"

BRANCH OFFICES

NEW YORK, N. Y., 565 Fifth Avenue
Telephone, Murray Hill, 6591, 6592

BOSTON, MASS., 405 P. O. Square Building

DETROIT, MICH., Builders' Exchange

BROCKVILLE, CAN., CANADA FOUNDRIES AND FORGINGS, LTD.

DEALERS IN ALL PRINCIPAL CITIES

Products

KELSEY FRESH AIR HEATING and VENTILATING SYSTEMS.

KELSEY WARM AIR GENERATORS.

KELSEY MECHANICAL SYSTEM.

KELSEY HEALTH HEAT

TRADE-MARK

Kelsey Service

The KELSEY HEATING COMPANY are designers of fresh air heating and ventilating systems, as well as being manufacturers of the apparatus and appliances.

An Engineering Service Department is maintained to properly design heating and ventilating systems, and its technical knowledge and experience are available to architects and owners. Each proposed installation is carefully analyzed, and individual recommendations are made as to the best methods of meeting the requirements of the architect or owner of the building to be served.

This department does not operate on the prejudiced plan of "free service." A fair charge is made for service rendered.

General information concerning Kelsey systems will be furnished upon receipt of inquiry.

Record

More than 70,000 Kelsey installations have been made in residences and in most cases the systems have been adopted after a careful investigation.

More than 3000 have been placed in churches, schools and public buildings and their practicability and efficiency is vouched for by the steadily increasing sales for this class of work.

A list indicating the character of buildings in various parts of the country, where Kelsey systems are in successful operation, will be furnished on request.

Fresh Air Heating and Ventilating Systems

Each of the Kelsey systems is designed to fulfil the requirements of the particular installation it is to serve. Each has peculiar advantages that especially fit it to given conditions, and each is a complete and satisfactory unit for the purpose for which it is designed and recommended.

Kelsey fresh air heating and ventilating systems are adaptable to any type or size of residential work and are particularly efficient in the heating and ventilating of the larger residences, churches and schoolhouses.

Kelsey systems not only heat but ventilate at the same time. They have not only established a record for being the most efficient, economical, easily managed and regulated, but they differ from other systems in that they will deliver the correct volume of properly warmed and automatically humidified clean, fresh air accurately and scientifically mixed, and will maintain the proper amount and proportion of heat and humidity throughout the entire building.

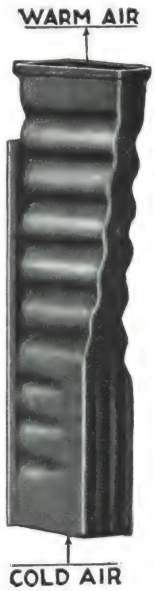
Operation and fuel consumption are decidedly economical where Kelsey systems are employed.

Distant and exposed rooms can be positively and accurately served with the same satisfactory volume and quality of heat and ventilation as are the ones that are of lesser dimensions and closer proximity.

Kelsey Warm Air Generator

The Kelsey generator receives, warms, humidifies and delivers fresh air by a distinct and improved method peculiar to itself. Great volumes of air are warmed by being brought into contact with very extensive and properly heated surfaces, which is accomplished by sending the air in separate channels through the battery of cast iron zigzag heat tubes which surrounds the fire. By dividing the air into currents and passing it through heating tubes, it is more thoroughly and evenly heated than by simply passing a body of air over or next to a hot surface.

Zigzag Heat Tubes—These tubes, through which most of the air passes in being heated, have corrugations on the inside as well as the outside. These corrugations cause the air in passing through to deflect from a straight course and to become more thoroughly mixed, thereby bringing more of the air particles into contact with the heated surfaces than would be possible with any other construction.



KELSEY ZIGZAG HEAT TUBE

The backs of the tubes overlap each other up to within 6 in. of the top, confining the fire within. At the top between the tubes, 6 in. of space is left open, through which the products of combustion pass to the draft chamber and thence down the backs of the tubes to the indirect draft opening.

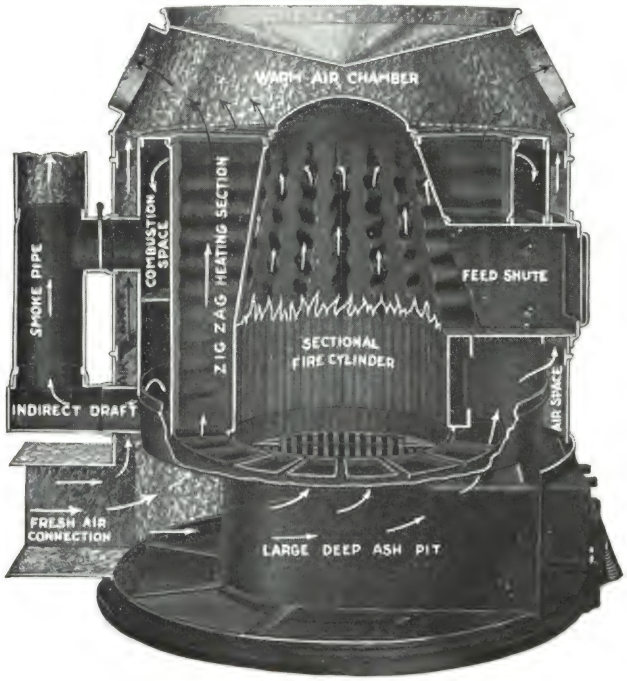
Ash Pit—Fitted to base with cup joint. Absolutely no escape of dust. Sides are straight.

Grates—Are of the Smyth pattern, having 4 revolving bars, triangular in shape. At each one-third revolution they present a new surface to the fire. Grate bars are independent and are easily removed and replaced.

Fire Pot Ring and Lower Deck—A cast iron "ring section" 3¼ in. wide is fitted in a cup joint to ash pit. On this ring rests the lower deck, the latter supporting the heating tubes or sections above, which fit into it with deep cup joints.

Continued on next page

This ring section may also be fitted for burning natural gas. Lower deck extends beyond line of the back of the heat tubes 4 in. and then upwards 7 in., forming a flange upon which rests the inside casing and in it are cast the indirect smoke pipe collar and the side clean-out openings.



KELSEY WARM AIR GENERATOR
Showing zigzag heat tube construction

Upper Deck—Heat tubes or sections are held in position at the top by an upper deck ring which is fitted to each section with a deep cup joint. The upper and lower decks, with heat tubes between, are securely fastened together by heavy iron rods or bolts. These pass through the air chamber of the heat tubes.

Inside Casing—Extends from lower deck to upper deck and confines products of combustion. Between the backs of the heat tubes and inside casing there is a space of 4 in., which forms the draft chamber. Made of heavy refined sheet iron or of cast iron plates.

Outside Casing—Made of galvanized metal; upper half lined with asbestos sheathing and this in turn with tin. Between inside and outside casing there is a space of 3 in. through which the air passes and is heated by being brought into contact with the inner casing, thus giving additional heating surface.

Baffle Plate—The direct draft provides for passage of smoke and gases directly from combustion chamber to chimney. This direct draft is only opened when a new fire is built or when fire is low. With the direct draft closed, all products of combustion must pass down around the end of the baffle plate which fills the space between the backs of the heat tubes and inner casing and extends to within 14 in. of the feed door section. Products of combustion are brought into contact with the backs of the heat tubes and inner casing before making their escape. Practically all heat generated is thus utilized.

Automatic Humidifier—Supplies sufficient moisture to protect the furnishings of the finest home and to give the air the humidity needed for health and comfort.

Fuel—The Kelsey generator uses anthracite coal, a good grade of bituminous coal, natural gas and wood.

Battery System for Large Buildings—Large buildings can be very efficiently heated and ventilated by two or more Kelsey generators placed under one dome in battery form. The required quantity of warm air is supplied as needed, there is no waste of fuel, and operating and maintenance expenses are reduced to a minimum. In moderate weather all rooms connected with the battery may be heated by one generator.

By installing 2 smaller generators instead of one large one, it is possible to increase the number of heat conducting pipes and to maintain a more uniform circulation of warm air in all the rooms of the building.

Kelsey Mechanical Heating System

By this system, a fan or blower forces fresh air under and through one or more Kelsey generators and through the heat pipes extending to all parts of the building. Generators may be used singly or in batteries of two or more.

This system is particularly suitable for heating and ventilating large residences, schools, churches and public buildings where frequent changes of air are required. Air can be completely changed every 15 minutes without increasing the cost for fuel over that for an ordinary direct steam or gravity warm air system.

Kelsey mechanical systems are extensively used in schools, where they successfully meet all requirements in supplying 30 cu. ft. of properly warmed fresh air per minute for each occupant.

One No. 30 Kelsey generator has by actual test heated 4500 cu. ft. of air per minute through 130° temperature with fan pressure. The heat efficiency shown by this test was 85.7%.

SIZES, WEIGHTS AND CAPACITIES, KELSEY WARM AIR GENERATORS

No. of generator	Diameter of grate and fire cylinder, in.	Grate area, sq. in.	Sq. ft. of heating surfaces	Sq. ft. of heating surfaces per sq. ft. of grate surface	Weight of generators complete, lbs.	Height generator, cased complete, in.	Diameter of base, in.	House heating capacities: Number of average sized pipes or rooms	House heating capacities: Total area heating pipes supplied by each generator, sq. in.	Church heating capacities: Estimated capacity in cu. ft. using 1 to 4 pipes
16	16	201	114	82	1168	63	42	4 to 6	350 to 420	10,000 to 14,000
18	18	254	135	78	1635	68	46	6 to 8	450 to 500	16,000 to 20,000
21	21	346	146	61	2033	69	53	9 to 11	575 to 625	25,000 to 35,000
24	24	452	161	51	2300	69	56	10 to 13	675 to 750	35,000 to 45,000
27	27	572½	176	44	2600	72	60	12 to 15	850 to 925	50,000 to 60,000
30	30	707	211	43	3124	76	64	14 to 19	975 to 1,100	70,000 to 90,000

Capacities given are estimated averages under varying conditions, and are based on heating to 70° Fahr., with temperature outside at zero. All weights include refined sheet iron inside casings. With cast inside casings add about 300 lbs. for each heater.

PHILLIPS & CLARK STOVE CO.

Manufacturers of Warm Air Furnaces

GENEVA, N. Y.

Product

ANDES WARM AIR FURNACES, Pipe and Pipeless.

For Andes Ranges see page 2097.

ANDES SYSTEM FURNACES
TRADE-MARK

Type "BRN" Warm Air Furnaces

This furnace is designed for use in connection with pipes which carry the warm air to the different rooms. Made in sizes for heating houses containing up to 160,000 cu. ft.

Casing—Andes Type "BRN" furnaces are made with double casings designed to prevent loss of heat by radiation in the basement or cellar. The casings may be raised to inspect, clean or repair castings without dismantling the hot air pipes.

Fire Pot—Made in two pieces, allowing free expansion and contraction. The fire pot is rectangular in shape with rounded corners and perpendicular sides. The sides overhang the ash pit section, making it impossible for dead ashes to accumulate. The shape of the fire pot makes it particularly suitable for burning sticks of wood in the spring or fall when only a small amount of heat is required.

Grates—Bars are of triangular section, easily removed and very heavy in construction. Each bar is a shaker bar and can be operated independently. This permits of more frequent cleaning around the sides, where ashes usually accumulate.

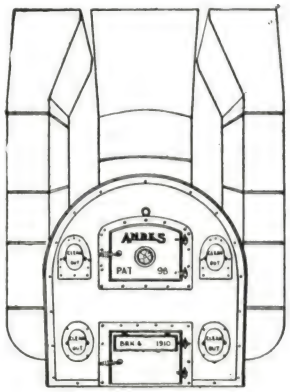
Radiator or Flues—Made of one-piece cast iron. There are four large horizontal flues and two vertical flues connecting them, the insides of all of which are visible when cleaning. Four clean out doors are provided at the front of the furnace for cleaning flues.

Radiating Surface—The combined radiating surface of flues, fire pot and combustion dome is exceptionally large in proportion to the grate surface.

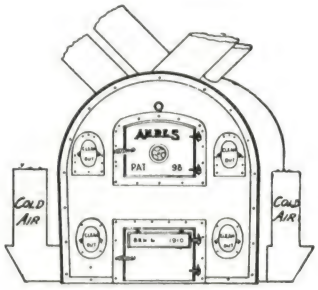
Circulation—Air enters at the bottom of the furnace, passes over the flues and around the combustion top and is drawn off at the top of the casing. Incoming air strikes the coolest part of the castings first and passes over the hottest parts last. This arrangement together with the large radiating surface gives maximum conduction and operating efficiency.

Joints—All joints are fitted with sheet asbestos gaskets, bolted between ground iron flanges, thereby forming absolutely gastight and dusttight joints. This is a very important consideration from the standpoint of health and cleanliness.

Humidity—Automatic humidifier is furnished with sufficient capacity to provide the proper humidity for the home. The proper amount of moisture in the air is not



Three Pipe Installation



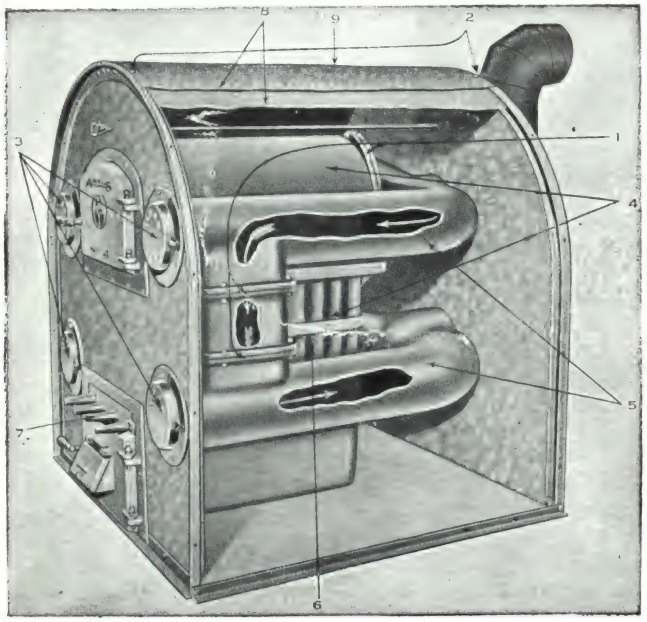
Two Air Returns
Pipes to Individual Rooms

INSTALLATION METHODS—"BRN" FURNACES

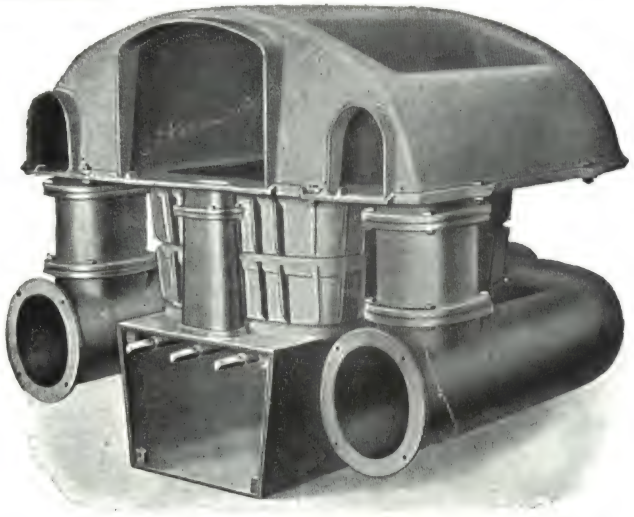
ANDES TYPE "BRN" WARM AIR FURNACES

No.	Height of castings, in.	Height of casing, in.	Length over all, in.	Width over all, in.	Grate area, sq. in.	Necessary cross section area, sq. in.		Smoke pipe diam., in.	Net heating capacity, cu. ft.
						Total warm air pipes	Cold air intake pipe		
BRN-3	35	40	41	42	287	390	390	7	10,000 to 16,000
BRN-4	37½	44	41	44	341	485	485	8	14,000 to 25,000
BRN-6	40	50	48	54	522	825	825	9	22,000 to 40,000

Net heating capacity is estimated for heating house to 70° Fahr. in zero weather.



Sectional View



Castings—Assembled View

TYPE "BRN" WARM AIR FURNACES

Continued on next page

only essential for health but it aids in keeping furniture and woodwork free from cracks and deterioration.

Low Height—The comparatively low height of the "BRN" type furnace makes it possible to give a sharper rise to the hot air pipes. This increases the speed of the air through the pipes with resultant reduction in radiation.

Fuel—These furnaces burn hard or soft coal, coke, or wood, with equal efficiency.

Type "MDN" "Pipeless" Warm Air Furnace

With this type of furnace the warm air is carried to the first floor of the house by one large pipe from the top of the furnace, instead of being carried to the different rooms by individual pipes. Warm air rises to the top of the rooms and cold air drops to the bottom from where it is drawn into the furnace to be reheated. This circulation is very rapid when all parts of the house are cold, and is slow when the house becomes comfortably warm. This furnace heats the house very rapidly and thoroughly.

Can be furnished with one register serving for both warm air outlet and cold air intake (one-pipe), or with one warm air outlet register and two cold air intake registers (three-pipe). The three-pipe is an adaptation of the one pipe or "pipeless" furnace and is designed for use where the one-pipe furnace can not be used advantageously.

This type of furnace has a low first cost and is very economical.

Fire Pot—The fire pot is round and made in two sections, permitting free expansion and contraction.

Grates—Bars are very heavy and are cut deep to allow ample circulation of air for combustion. Bars are easily removed without use of any tools.

Radiator—Made of cast iron and is very durable.

Radiating Surfaces—The combustion dome and radiator are designed to give large radiating surface, permitting the air to absorb a maximum amount of heat.

Casings—The casings consist of a double inner casing and a single outer casing made of best quality heavy galvanized iron (see illustration). The inner casing terminates in a large pipe at the register in the floor directly above the furnace, and conducts the warm air to the house.

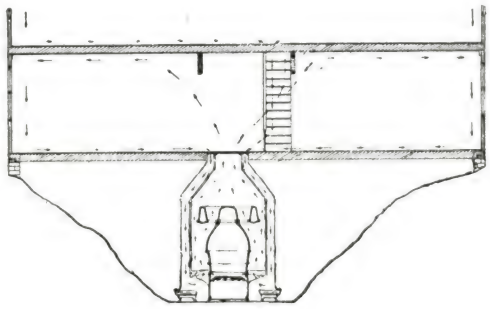
In the single register type, the outer casing extends to the register and forms a passage for the downcoming cold air.

In the three-register type the outer casing is joined to the inner casing just below the warm air register. The two cold air registers are connected by pipes to the upper part of the outer casing.

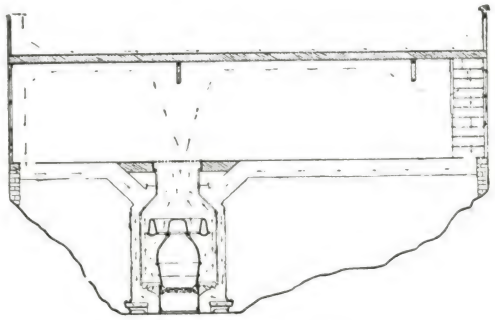
Circulation—Warm air rises in the inner casing and circulates through the house. Cold air comes down, either through the single register or through the two pipes from the separate cold air registers, around the *outside* of the warm air casing. The cold air completely encloses the warm air and thereby prevents radiation of heat to the basement.

Humidity—Water pans of 7½ gals. capacity are provided at the bottom of the furnace for supplying the proper amount of moisture to the air.

Fuel—This furnace burns hard or soft coal, coke or wood, and can be fitted with a gas ring for burning gas.



Single Register Type



Three Register Type

"MDN" Single Register "Pipeless" Warm Air Furnace—Sectional View

Installation of Type "MDN" "Pipeless" Warm Air Furnaces

ANDES TYPE "MDN" "PIPELESS" WARM AIR FURNACES

No.	Height casing, in.	Diam. outer casing in.	Grate area, sq. in.	Register sizes, in.				Smoke pipe diam., in.	Net heating capacity, cu. ft.
				Single register		Three registers			
				Size	Round opening, diam.	Hot air (1)	Cold air (2)		
MDN-180	90	40	209	25x25	20	22x22	12x15	7	6000 to 10000
MDN-210	90	44	281	30x30	22	24x24	14x18	7	10000 to 14000
MDN-240	90	48	380	20x36	24	27x27	16x18	8	14000 to 18000
MDN-260	90	52	450	36x36	28	30x30	16x20	8	17000 to 22000
MDN-290	90	59	546	40x40	30	33x33	18x24	8	21000 to 27000

Net heating capacity is estimated for heating house to 70° Fahr. in zero weather.

RICHARDSON & BOYNTON CO.

SINCE 1837

Manufacturers of Warm Air Furnaces

260 Fifth Avenue

NEW YORK, N. Y.

FACTORY
DOVER, N. J.

BOSTON, MASS., 60 High Street
PHILADELPHIA, PA., 1332 Arch Street
CHICAGO, ILL., 171-173 West Lake Street
PROVIDENCE, R. I., 429 Industrial Trust Building
ROCHESTER, N. Y., Rockwood Street

Products

RICHARDSON "PERFECT" WARM AIR FURNACES; RICHARDSON "PERFECT" PIPELESS WARM AIR FURNACES.

For Low Pressure Boilers for Steam, Vapor and Hot Water, Domestic Hot Water Supply, Tank and Laundry Heaters, see pages 1675-1679; for Richardson Vapor-Vacuum-Pressure System of Heating, and Automatic Heating System for garages, see pages 1708-1711; for Coal and Gas Cooking Ranges, see pages 2098-2103.

Advantages of Heating With Warm Air Furnaces

For houses of moderate size (up to 1500 sq. ft. ground area) there is no method of heating by which *both* the required amount of ventilation and heat can be obtained so economically as by the warm air system.

The initial expense of installing a warm air heating system is less than for any other type. The consumption of coal is less; the cost of repairs over an extended period of years is less, and in all other respects it is a most economical system to maintain and operate.

Rating Richardson "Perfect" Warm Air Furnaces

Richardson furnaces are rated according to the average area of warm air piping in square inches that can be supplied by the furnace, based on temperature of 140° and a velocity of 240 ft. per minute at the first floor register, maintaining a rate of combustion of 6 lbs. of coal per square foot of grate per hour, outside temperature being zero. Of course the normal consumption of coal for an average winter, with only occasional zero weather, would be at a much lower rate of combustion.

Types of Richardson Warm Air Furnaces

Richardson warm air furnaces are made in two general types. First, the multipipe furnaces in two grades, Richardson "Perfect" warm air furnaces and Richardson "Perfect" positive air circulating furnaces; second, the Richardson "Perfect" pipeless furnaces.

"Perfect" Grates

"Perfect" revolving triangular ventilated grates with cutting edges are perfect in operation, durable, and completely clear the fire from ashes and clinkers with very little effort. Each edge of the triangle is cast solid so that whichever flat side is uppermost, there is a solid backbone running the entire length of each grate bar. This backbone is braced by webs running to each solid edge. They have proper amount air space for the complete combustion of fuel, and on account of the solid bottom which carries the weight, they will not warp. All Richardson furnaces are fitted with these grates.

"PERFECT" REVOLVING CLINKER CUTTING GRATE BAR

RICHARDSON AUTOMATIC HUMIDIFIER

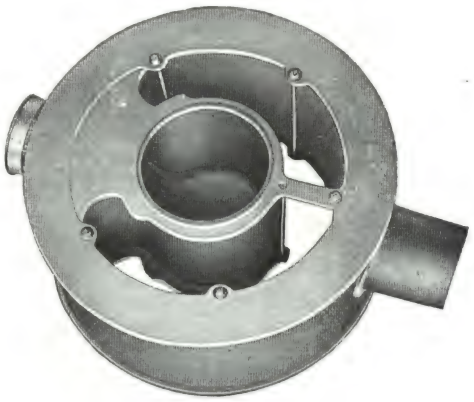
Richardson Automatic Humidifier

The Richardson automatic humidifier is for use in connection with all of RICHARDSON & BOYNTON CO.'s furnaces. It satisfies the demand for a mechanical means of moistening the air, is absolutely automatic in action and requires no attention.

Richardson "Perfect" Warm Air Furnaces

These furnaces are built on approved lines and carefully

RICHARDSON "PERFECT" FURNACE



STEEL RADIATOR

RICHARDSON "PERFECT" WARM AIR FURNACES
With steel or cast iron radiator

No.	Fire pot diameter, in.	Case diameter, in.	Height of castings, in.	Smoke collar diameter, in.		Heat pipe capacity, sq. in.
				Steel radiator	Cast iron radiator	
217	17	32	48	6	.....	210
219	19	36	50	7	8	265
222	22	40	52	7	8	310
224	24	44	53	7	8	450
226	26	50	54	7	8	575

Continued on next page

constructed with the idea of insuring maximum efficiency with a moderate fuel supply.

The general construction of this furnace is superior to anything this company has offered heretofore for this type of furnace.

This furnace can be furnished to burn soft or hard coal, wood, gas, or coke as ordered.

A one-piece cast iron radiator may be furnished instead of the steel radiator with which the furnace is usually constructed if desired.

Richardson "Perfect" Low Construction Furnaces

Richardson "Perfect" Low Construction Furnaces

This is a new and an improved furnace, low in height, with large heating surfaces and great efficiency.

It may be installed in low cellars and yet allow sufficient elevation for the heat pipes to insure easy flow of warm air to the various rooms.

The wide spaces between the combustion chamber and the radiator insure free circulation, and the proper heating of the air through these passages.

It has large feed doors, 15x14 in. Made only in steel radiators.

No.	Firepot diameter, in.	Case diameter, in.	Height of castings in.	Smoke collar diameter, in.	Heat pipe capacity, sq. in.
41	19	41	48	7	315
46	22	46	49	8	378
51	24	51	49	8	504
56	26	56	50	7x10 oval	620

Richardson "Perfect" Positive Air Circulating Furnaces

These are the highest grade warm air furnaces made by this company. They are constructed on modern lines, the result of the most exhaustive technical and practical tests.

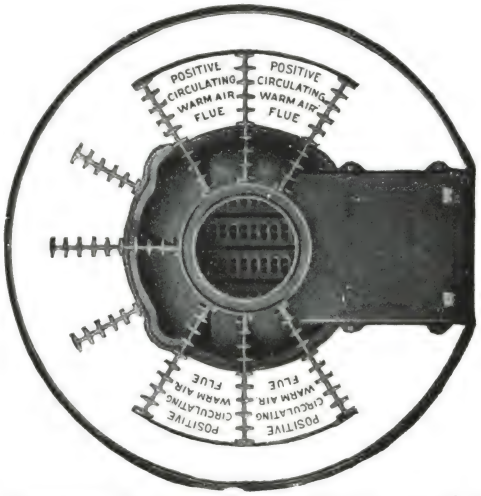
In the Richardson "Perfect" positive air circulating furnace the fire pot and combustion chambers are surrounded by extended heating surfaces (see illustration) which are *positive*. They pull away the heat from the fire pot, body, and radiator, bringing the heat out where the incoming air comes in direct contact with it, and the air is well heated at the commencement of its upward course.

Large Radiating Surface—Experience extending over many years shows that the heating power or capacity as well as the efficiency of any warm air furnace is determined by the ratio of the heating surface to the grate area. The "Perfect" positive furnaces have 42 to 53 sq. ft. of heating surface to each square foot of grate. Old style heaters have only 15 to 23 sq. ft. of heating surface to each square foot of grate. The result is that "Perfect" positive furnaces, having practically double the amount of radiating surface contained in old style heaters with the same size fire

Richardson "Perfect" Positive Air Circulating Furnaces
With steel or cast iron radiator

Radiation Diagram
Showing effect of extended heating surfaces

Positive Circulating Warm Air Tube



Section Through Radiator, Richardson "Perfect" Positive Air Circulating Furnace

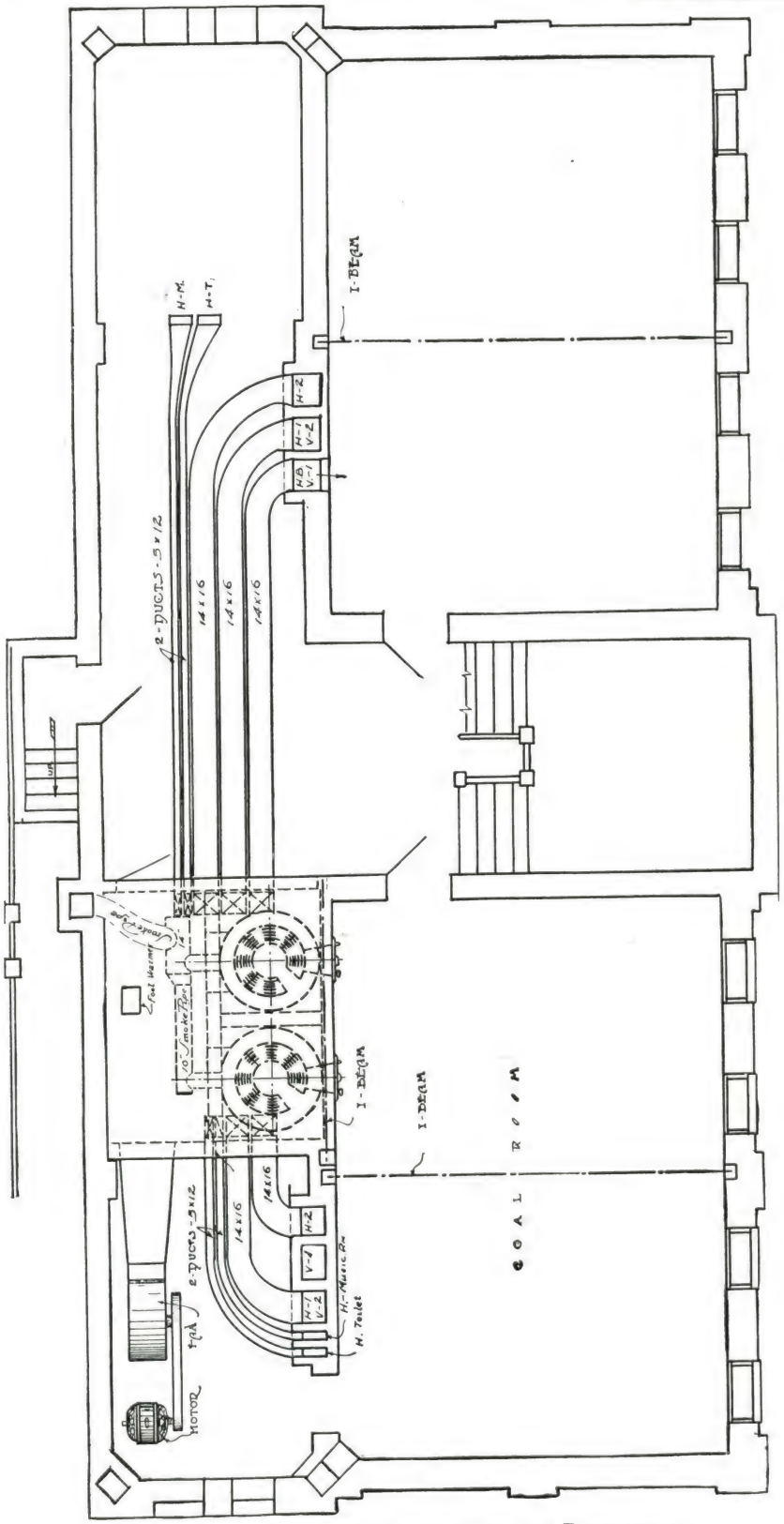
Continued on next page

pot, will heat from 25% to 33% more air than any other furnace ever produced.

Few Joints—The "Perfect" positive furnaces have only three joints—pot, body and radiator—making the heater practically dustproof. The construction is rugged, consisting of deep cast iron ash pit, heavy corrugated fire pot with straight sides, heavy steel or one-piece cast iron radiator (see illustration). The steel radiator is slightly cheaper and is more generally used. It heats quicker and is as durable as cast iron.

"PERFECT" POSITIVE AIR CIRCULATING FURNACES

No.	Fire pot diameter, in.	Case diameter, in.	Height of castings, in.	Smoke collar diameter, in.		Heat pipe capacity, sq. in.	
				Steel radiator	Cast iron radiator	Steel radiator	Cast iron radiator
901	21	40	55½	7	8	418	375
902	24	47	56¼	8	9	560	507
904	26	53	57½	8	9	665	644
906	29	58	59¾	9	10	835	814
908	33	64	61½	10	10	1150	1088



FLOOR PLAN OF AN ACTUAL INSTALLATION OF RICHARDSON MECHANICAL SYSTEM OF WARM AIR HEATING

The 1900 Series "Perfect" Positive Air Circulating Furnace for Soft Coal

The construction of this series is identical with the 900 Series "Perfect" positive air circulating and in addition is equipped with air ejectors in the fire pot and combustion chamber, which make it possible to use the cheapest forms of bituminous coal. It is supplied only with cast iron radiator, as steel radiators are not practical where soft coal is used.

Richardson Mechanical System of Warm Air Heating

An ideal method for heating and ventilating schools, churches and large residences.

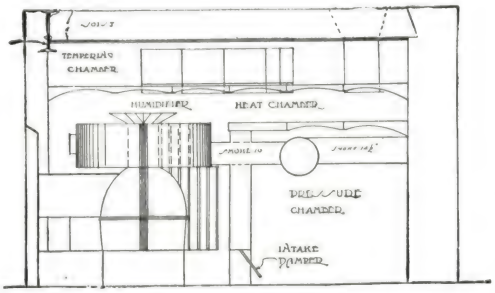
With this system pure warmed air can be delivered wherever wanted and the vitiated air exhausted into vent stacks through grilles at the floor line.

Some of Its Many Advantages—Original installation and operating costs always show a comfortable saving over indirect steam or other methods.

It complies with every state law on ventilation in every building.

Sufficient fresh air is at all times delivered to each room to permit of from 3 to 7 changes per hour, according to requirements.

The discharge of the warmed air into the various rooms at 8 ft. above the floor line is reduced to a velocity that eliminates drafts.



SIDE VIEW OF INSTALLATION, SHOWING TEMPERING, HEAT AND PRESSURE CHAMBERS, INTAKE DAMPER AND AUTOMATIC HUMIDIFIER

Continued on next page

Richardson "Perfect" Pipeless Furnace With Extra Size Air Chamber

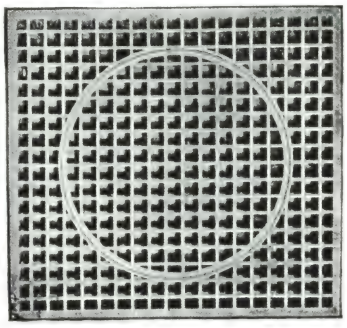
The ideal pipeless furnace is one in which *all* of the cold air in the house passes freely and naturally through the furnace *without stopping,* and becomes quickly warmed and passes back up through the house as warm air.

In the Richardson "Perfect" pipeless furnace, there is a big, ample chamber in which the cold air can come *down,* and another big, ample chamber in which the warm air can go *up*.

The cold air comes down through the big outside chamber, and the warm air goes up through the big inner chamber. It does not halt for an instant. It is not *burned* and made unhealthy for human breathing as in many pipeless furnaces.

The pipeless furnace is the lowest priced heating system that can be purchased, and the Richardson is the most economically operated of them all. It *warms more air and burns less coal,* chiefly because of its over-size air chambers. It burns hard coal, soft coal, wood, or any other fuel. Be sure your pipeless furnace is a Richardson "Perfect."

Duplex Grating—This duplex grating is built both to take down the cool air and to send up the warm air. It is a two-purpose duplex grating. The cooler air descends down the outer section of the duplex grating, and the warm air ascends through the cylindrical center. This one duplex grating performs this double function efficiently for an entire house or other building.



Duplex Grating

It is strong and attractive in appearance. It bespeaks the simplicity of the Richardson pipeless heating system.

Special Vapor Pan—A healthful moisture is introduced into the warmth of the Richardson pipeless furnace by the use of this special vapor pan, an integral part of the furnace.

Special Vapor Pan

Simply fill it with water now and then. It is so placed that it can be easily filled or cleaned without opening any doors. Its position does not interfere with the passage of air around the fire pot.

Richardson "Perfect" Pipeless Furnace

Size	117	119	122	124	126
Fire pot diam., in.	17	19	22	24	26
Feed door, in.	12½ x 13	12 x 14	12 x 14	12 x 14	12 x 14
Smoke pipe diam., in.	7	7	7	7	7
Inner casing diam., in.	32	36	40	44	50
Outer casing diam., in.	43	47	53	58	63
Register, in.	22 x 24	24 x 27	30 x 30	30 x 36	36 x 36
Warm air pipe, in.	16	18	22	24	28
Shipping weight, lbs.	913	1043	1249	1376	1590
Capacities, cu. ft.	7,000	10,000	16,000	25,000	40,000
Height from floor to top of bonnet, in	66	68	70	71	72
To top of pipe, in.	90	90	90	90	90

Recommendations as to Use and Installation of Richardson "Perfect" Pipeless Furnaces

Popular opinion has agreed upon the bungalow and two-story type houses as being best adapted for the pipeless furnace.

Houses of open reception hall type, rooms on both sides of hall, and with open stairway to the second floor prove most ideal for perfect circulation.

In locating the register care must be taken to insure an equal distribution as well as catching the return air before it has a chance to travel any distance over the floor to the register.

The ordinary 2 ft. 8-in. x 6 ft. 8-in. door and 9-ft. ceilings have been found to be most satisfactory. With ceilings lower than 7 ft. on the first floor, the use of the circulating system is not recommended. A drop of more than 24 in. over the standard size door usually requires the use of a transom or wood grille. If there are drops in ceiling levels and floor levels from the main part of the house attention must be given to these rooms.

Occasionally it has been found advisable to use a positive pipe to heat an isolated room, and in practice this has proved very satisfactory. Practical operation has shown that it is impossible to heat two rooms through one standard door. If a cased opening or arch is available it is possible to heat two rooms away from the register.

The location of the register itself should be left to an expert who is familiar with the distribution and circulation of warm air through the principle of convection.

BURNHAM BOILER CORPORATION

Manufacturers of Steam and Hot Water Boilers

IRVINGTON-ON-HUDSON, N. Y.

BRANCHES

BOSTON, MASS., 80 Boylston Street
CHICAGO, ILL., 15 East Van Buren Street
PHILADELPHIA, PA., 1716 Sansom Street
BALTIMORE, MD., 15 East Fayette Street

Products

SECTIONAL STEAM and HOT WATER BOILERS.
HOT WATER TANK HEATERS.

Burnham Square Sectional Boilers

Burnham square sectional boilers are based on the principle that a long fire travel (correctly proportioned) reduces fuel bills. The hot gases go back and forth the length of the boiler, *on each side of the boiler,* before they are led to the smoke box opening. Because of the individual side flue openings, each section absorbs an equal amount of heat.

Burnham steam boilers have such a low water line that they can be used in shallow cellars. They are so constructed that the size of the steam dome is not sacrificed.

Every operating part is handy in front of the boiler. Every flue has a separate clean-out door.

BURNHAM SQUARE TWIN SECTION BOILER
Just the thing for low pressure, heavy duty jobs
Has 50-in. grate

RATINGS—BURNHAM SQUARE SECTIONAL BOILERS

Series	No.	List price	Direct radiation, sq. ft.	Number of sections	Average dimensions of fire pot, in.	Grate area, sq. ft.	Dimensions of grate, in.	Supply tappings, in.	Return tappings, in.	Total length, in.
HOT WATER BOILERS										
18-in.	W-18-4	$ 233	1,250	4	24x24	$3.00	18x24	2–3½	2–3½	41
	W-18-5	283	1,575	5	24x31½	3.94	18x31½	2–3½	2–3½	48½
	W-18-6	324	1,900	6	24x39	4.88	18x39	2–3½	2–3½	56
	W-18-7	374	2,225	7	24x46½	5.81	18x46½	3–3½	3–3½	63½
24-in.	W-24-5	374	2,225	5	30x31	5.17	24x31	2–4	2–4	49½
	W-24-6	449	2,800	6	30x38½	6.42	24x38½	2–4	2–4	57
	W-24-7	524	3,375	7	30x46	7.67	24x46	2–4	2–4	64½
	W-24-8	599	3,950	8	30x53½	8.92	24x53½	3–4	3–4	72
30-in.	W-30-5	465	2,900	5	36x31	6.46	30x31	2–4	2–4	52½
	W-30-6	555	3,715	6	36x38½	8.02	30x38½	2–4	2–4	60
	W-30-7	645	4,530	7	36x46	9.58	30x46	3–4	3–4	67½
	W-30-8	735	5,345	8	36x53½	11.15	30x53½	3–4	3–4	75
	W-30-9	825	6,160	9	36x61	12.71	30x61	4–4	4–4	82½
36-in.	W-36-6	655	4,700	6	41x39½	9.88	36x39½	3–4	3–4	63
	W-36-7	775	5,775	7	41x47	11.75	36x47	3–4	3–4	70½
	W-36-8	895	6,850	8	41x54½	13.63	36x54½	4–4	4–4	78
	W-36-9	1,015	7,925	9	41x62	15.50	36x62	4–4	4–4	85½
	W-36-10	1,135	9,000	10	41x69½	17.38	36x69½	5–4	5–4	93
	W-36-11	1,255	10,075	11	41x77	19.25	36x77	5–4	5–4	100½
50-in. twin section	W-50-6	1,400	10,300	6	55x55½	19.27	50x55½	4–5	4–5	91
	W-50-7	1,635	12,250	7	55x66	22.92	50x66	4–5	4–5	101½
	W-50-8	1,870	14,200	8	55x76½	26.56	50x76½	5–5	5–5	112
	W-50-9	2,105	16,150	9	55x87	30.20	50x87	5–5	5–5	122½
	W-50-10	2,340	18,100	10	55x97½	33.85	50x97½	5–5	5–5	133
STEAM BOILERS										
18-in.	S-18-4	260	750	4	24x24	3.00	18x24	1–3½	1–3½	41
	S-18-5	310	950	5	24x31½	3.94	18x31½	2–3½	2–3½	48½
	S-18-6	360	1,150	6	24x39	4.88	18x39	2–3½	2–3½	56
	S-18-7	410	1,350	7	24x46½	5.81	18x46½	2–3½	2–3½	63½
24-in.	S-24-5	405	1,350	5	30x31	5.17	24x31	2–4	2–4	49½
	S-24-6	480	1,700	6	30x38½	6.42	24x38½	2–4	2–4	57
	S-24-7	555	2,050	7	30x46	7.67	24x46	2–4	2–4	64½
	S-24-8	630	2,400	8	30x53½	8.92	24x53½	2–4	2–4	72
30-in.	S-30-5	505	1,750	5	36x31	6.46	30x31	2–4	2–4	52½
	S-30-6	595	2,250	6	36x38½	8.02	30x38½	2–4	2–4	60
	S-30-7	685	2,750	7	36x46	9.58	30x46	2–4	2–4	67½
	S-30-8	775	3,250	8	36x53½	11.15	30x53½	3–4	2–4	75
	S-30-9	865	3,750	9	36x61	12.71	30x61	3–4	2–4	82½
36-in.	S-36-6	700	2,850	6	41x39½	9.88	36x39½	2–4	2–4	63
	S-36-7	827	3,500	7	41x47	11.75	36x47	3–4	2–4	70½
	S-36-8	954	4,150	8	41x54½	13.63	36x54½	3–4	2–4	78
	S-36-9	1,081	4,700	9	41x62	15.50	36x62	3–4	2–4	85½
	S-36-10	1,208	5,350	10	41x69½	17.38	36x69½	4–4	2–4	93
	S-36-11	1,335	6,000	11	41x77	19.25	36x77	4–4	2–4	100½
50-in. twin section	S-50-6	1,425	6,250	6	55x55½	19.27	50x55½	3–5	3–5	91
	S-50-7	1,660	7,425	7	55x66	22.92	50x66	3–5	3–5	101½
	S-50-8	1,885	8,600	8	55x76½	26.56	50x76½	4–5	4–5	112
	S-50-9	2,130	9,775	9	55x87	30.20	50x87	4–5	4–5	122½
	S-50-10	2,355	10,950	10	55x97½	33.85	50x97½	4–5	4–5	133

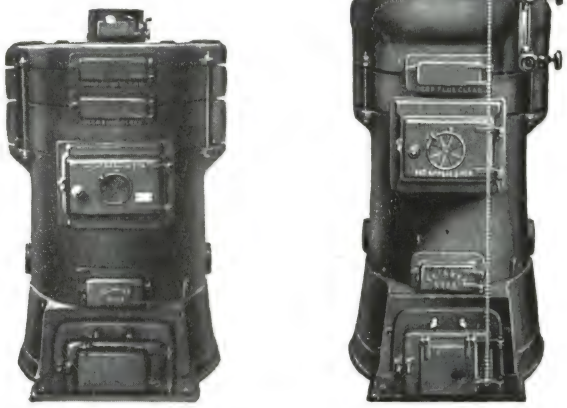
All boilers (except S-18-4 and W-18-4) have double shaker bar, operating grate in two sections.

Continued on next page

Burnham Round Sectional Boilers

The crown sheet is *corrugated,* more than doubling the surface directly over the fire. The nipple openings are beyond the sides of the boiler where they do not take up fire-surface room. The intermediate sections have flue clean-out openings at both front and rear, so that no matter how many sections are added, the back and front fire travel will be maintained, and the outlet in the dome section will always come to the rear. The fire pot and crown sheet are in separate sections, making it easier to handle. In case of breakage, only the part broken need be repaired.

On steam boilers, the top or dome section is half again as large as on the water boiler, and considerably longer than on any other round boiler made. There is plenty of room for rapid, frictionless expansion.



Water Steam

BURNHAM ROUND SECTIONAL BOILERS

Round Junior Hot Water Tank Boilers

As gas ranges are now almost universally used, it is often a good plan to have a round furnace boiler installed and connected to the hot water tank. Insures a plentiful supply of hot water at minimum cost.

Also adapted to the heating of small garages, chicken and brooder houses.

The Junior boiler is built along the same sturdy lines as the larger Burnham boilers.

ROUND JUNIOR BOILER

With side broken through to give glimpse of interior construction

RATINGS—ROUND JUNIOR BOILERS

No.	110	112	114	116	181
Diameter grate, in.	10	12	14	16	18
Direct radiation, sq. ft.	125	200	300	450	550
Tank capacity, gals.	175	275	375	550	700
Total diameter, in.	16	18	20	26	27
Total height, in.	32¾	36⅝	39	40¼	41¼
Size, supply, in.	2	2	2½	3	3
Size, return, in.	2	2	2½	3	3
Diameter smoke pipe, in.	5	6	7	7	7
List price	$48.00	$66.00	$85.00	$114.00	$132.00

Cast iron bases with legs, suitable for setting boiler on wood floor, can be furnished with Nos. 110, 112 and 114 boilers at special prices.

Brass water sections can be furnished in Nos. 110 and 112 sizes only. Special prices on application.

RATINGS—BURNHAM IMPROVED ROUND SECTIONAL BOILERS

No.	List price	Direct radiation, sq. ft.	Diameter of grate, in.	Grate area, sq. ft.	Supply tappings, in.	Return tappings, in.	Diameter of smoke box, in.
HOT WATER BOILERS							
W-17-4	$ 87.00	550	17	1.58	2-2	2-2	7
W-17-5	102.00	600	17	1.58	2-2	2-2	7
W-17-6	117.00	650	17	1.58	2-2	2-2	7
W-19-4	120.00	725	19	1.97	2-2½	2-2½	7
W-19-5	137.00	810	19	1.97	2-2½	2-2½	7
W-19-6	154.00	875	19	1.97	2-2½	2-2½	7
W-22-4	150.00	990	22	2.64	2-2½	2-2½	8
W-22-5	170.00	1115	22	2.64	2-2½	2-2½	8
W-22-6	190.00	1200	22	2.64	2-2½	2-2½	8
W-25-4	185.00	1280	25	3.41	2-3	2-3	9
W-25-5	210.00	1445	25	3.41	2-3	2-3	9
W-25-6	235.00	1570	25	3.41	2-3	2-3	9
W-28-4	255.00	1860	28	4.28	2-3½	2-3½	10
W-28-5	285.00	2075	28	4.28	2-3½	2-3½	10
W-28-6	315.00	2230	28	4.28	2-3½	2-3½	10
W-31-4	315.00	2230	31	5.25	2-4	2-4	11
W-31-5	350.00	2450	31	5.25	2-4	2-4	11
W-31-6	385.00	2560	31	5.25	2-4	2-4	11
STEAM BOILERS							
S-17-4	$116.00	330	17	1.58	2-2	2-2	7
S-17-5	131.00	360	17	1.58	2-2	2-2	7
S-17-6	146.00	390	17	1.58	2-2	2-2	7
S-19-4	150.00	440	19	1.97	2-2½	2-2½	7
S-19-5	167.00	490	19	1.97	2-2½	2-2½	7
S-19-6	184.00	530	19	1.97	2-2½	2-2½	7
S-22-4	185.00	600	22	2.64	2-2½	2-2½	8
S-22-5	205.00	675	22	2.64	2-2½	2-2½	8
S-22-6	225.00	725	22	2.64	2-2½	2-2½	8
S-25-4	220.00	775	25	3.41	2-3	2-3	9
S-25-5	245.00	875	25	3.41	2-3	2-3	9
S-25-6	270.00	950	25	3.41	2-3	2-3	9
S-28-4	285.00	1125	28	4.28	2-3½	2-3½	10
S-28-5	325.00	1250	28	4.28	2-3½	2-3½	10
S-28-6	370.00	1350	28	4.28	2-3½	2-3½	10
S-31-4	340.00	1350	31	5.25	2-4	2-4	11
S-31-5	385.00	1475	31	5.25	2-4	2-4	11
S-31-6	430.00	1550	31	5.25	2-4	2-4	11

THE BRYANT HEATER & MFG. COMPANY

Bryant Tubular Gas Boilers

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 103 Park Avenue
CINCINNATI, OHIO, 401 Mercantile Library Building
DENVER, COLO., 230 15th Street
CANTON, OHIO, 1607 Shorb Avenue, N. W.
PITTSBURGH, PA., 1441 Potomac Avenue
CHICAGO, ILL., 15 East Van Buren Street
ST. LOUIS, MO., 1500 Central National Bank Building
COLUMBUS, OHIO, 600 Joyce Realty Building
TOLEDO, OHIO, 1503 Nicholas Building
PHILADELPHIA, PA., Bourse Building

FACTORY: 952 E. 72nd Street, CLEVELAND, OHIO

Product

BRYANT GAS BOILERS for Hot Water, Steam and Vapor Heating, and for Low Pressure Steam for manufacturing purposes.

For Bryant Automatic Hot Water Storage Systems, see page 1503.

Description

A patented boiler of tubular construction, with a successful record of 15 years. Operates with natural or manufactured gas. Embodies thermostatic control and automatic regulating devices, giving excellent results under all gas conditions. Of sectional construction with an individual burner for each section. Substantially constructed of cast iron, having a heavy base which serves as a foundation.

Noteworthy Features

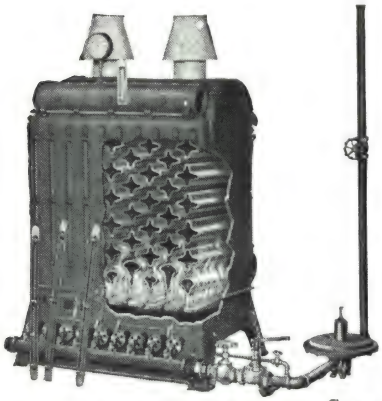
Heat is quickly transmitted through thin walls of liberally proportioned tubes; *staggard tubes* give a 4-ft. heat travel; *baffle plates* on end castings confine flames against tubes; *lower tubes* especially shaped to prevent reflection of heat and promote rapid travel of hot gases; *enlarged top* of section facilitates circulation and provides ample steam space when used as a steam boiler; *scientifically proportioned burners* afford perfect combustion; *draft hood* prevents down-draft; *tubes* easily accessible for cleaning, if desired.

Bryant Service

Bryant representatives are ready to go anywhere, at any time, to furnish information.

Architects may obtain literature, technical data or information of any kind upon application to the nearest Bryant Office listed above.

BOILER ENCASED WITH REMOVABLE ASBESTOS INSULATION



BROKEN AWAY VIEW SHOWING STAGGARD TUBES OF LARGE AREA; ALSO LONG FIRE TRAVEL

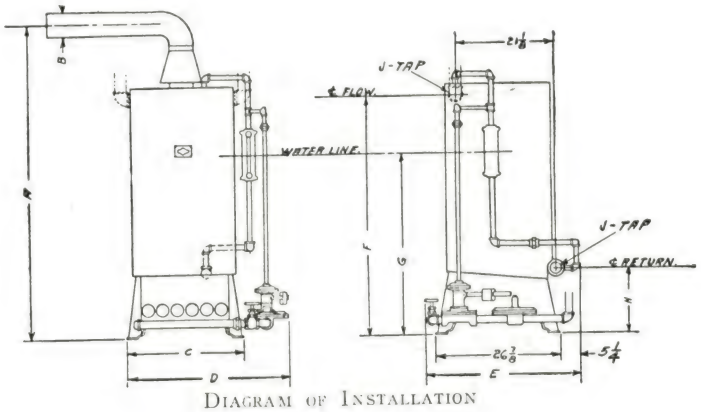


DIAGRAM OF INSTALLATION

CAPACITIES BRYANT GAS BOILERS

Steam Boiler No.		Water Boiler No.		Dimensions, inches								
Sections Series Tap'gs	Rating	Sections Series Tap'gs	Rating	A	B	C	D	E	F	G	H	J
3-S-3	400	3-C-3	640	65	5	17 1/16	30 1/2	37	46	36	15 1/16	3
4-S-3	560	4-C-3	895	66	6	20 1/4	33 3/4	37	46	36	15 1/16	3
5-S-3	720	5-C-3	1,150	66	6	23 7/16	37 7/8	37	46	36	15 1/16	3
6-S-3	880	6-C-3	1,410	66	6	26 5/8	41 1/16	37	46	36	15 1/16	3
7-S-3	1,040	7-C-3	1,665	67	7	29 13/16	44 1/4	37	46	36	15 1/16	3
8-S-3	1,200	8-C-3	1,920	67	7	33	47 7/16	37	46	36	15 1/16	3
9-S-4	1,500	9-C-4	2,400	66 1/2	8	40 1/4	54 9/16	37	47 3/4	37	15 3/4	4
11-S-4	1,880	11-C-4	3,010	67	8	47 3/8	63 3/8	37 1/4	47 3/4	37	15 3/4	4
13-S-4	2,260	13-C-4	3,620	67	8	54 5/8	70 5/8	37 1/4	47 3/4	37	15 3/4	4
15-S-4	2,640	15-C-4	4,220	67 1/2	9	61 7/8	77 7/8	37 1/4	47 3/4	37	15 3/4	4
17-S-4	3,020	17-C-4	4,830	67 1/2	9	69 1/8	86	37 3/8	47 3/4	37	15 3/4	4
19-S-4	3,400	19-C-4	5,440	67 1/2	9	76 3/8	93 1/4	37 3/8	47 3/4	37	15 3/4	4
21-S-4	3,780	21-C-4	6,050	67 1/2	9	83 5/8	100 1/2	37 3/8	47 3/4	37	15 3/4	4
23-S-4	4,160	23-C-4	6,660	68	10	90 7/8	107 3/4	37 3/8	47 3/4	37	15 3/4	4
25-S-4	4,540	25-C-4	7,260	68	10	98 1/8	115	37 3/8	47 3/4	37	15 3/4	4
27-S-4	4,920	27-C-4	7,870	68 1/2	11	105 3/8	122 1/4	37 3/8	47 3/4	37	15 3/4	4
29-S-4	5,300	29-C-4	8,480	68 1/2	11	112 5/8	129 1/2	37 3/8	47 3/4	37	15 3/4	4
31-S-4	5,680	31-C-4	9,090	68 1/2	11	119 7/8	136 3/4	37 3/8	47 3/4	37	15 3/4	4
33-S-4	6,060	33-C-4	9,700	68 1/2	11	127 1/8	144	37 3/8	47 3/4	37	15 3/4	4
35-S-4	6,440	35-C-4	10,300	68 1/2	11	134 3/8	151 1/4	37 3/8	47 3/4	37	15 3/4	4
37-S-4	6,820	37-C-4	10,910	69	12	141 5/8	158 1/2	37 3/8	47 3/4	37	15 3/4	4
39-S-4	7,200	39-C-4	11,520	69	12	148 7/8	165 3/4	37 3/8	47 3/4	37	15 3/4	4
41-S-4	7,580	41-C-4	12,330	69	12	156 1/8	173	37 3/8	47 3/4	37	15 3/4	4

ABRAM COX STOVE CO.

American and Dauphin Streets
PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y., 347 Fifth Avenue
BROOKLYN, N. Y., 32 Court Street
CHICAGO, ILL., 736-738 West Monroe Street
NEWARK, N. J., 46 New Street

Products

NOVELTY STEAM and WATER BOILERS.

NOVELTY WARM AIR FURNACES (Pipe and Pipeless).

Also, Novelty Coal Tank Heaters, Novelty Kitchener Coal Ranges, Novelty Fortune Combination Coal and Gas Ranges, Fortune Gas Ranges and Gas Water Heaters.

Seventy-five Years of Continuous Manufacture

This company has been manufacturing heating and cooking appliances under the trade-name of Novelty for the past 75 years.

Side Feed Boilers

Over 30 years ago the advantages of feeding a steam or water boiler from the side were recognized by this company. The boiler they brought out at that time remains unchanged in its fundamental principles. As a section is added, the grate surface, fire surface and flue surface is increased in equal proportion, giving every size from the smallest (made for homes) to the largest (made for schools, churches, apartments, office buildings and public buildings), a balance which is not possible with the end feed type.

The distance from fire door to back of fire pot is only 40 in. in the largest boiler. Low water line is only 51 in. in all sizes—saves excavating—*a valuable space saver.*

Novelty Carburetor (Side Feed) Sectional Boilers

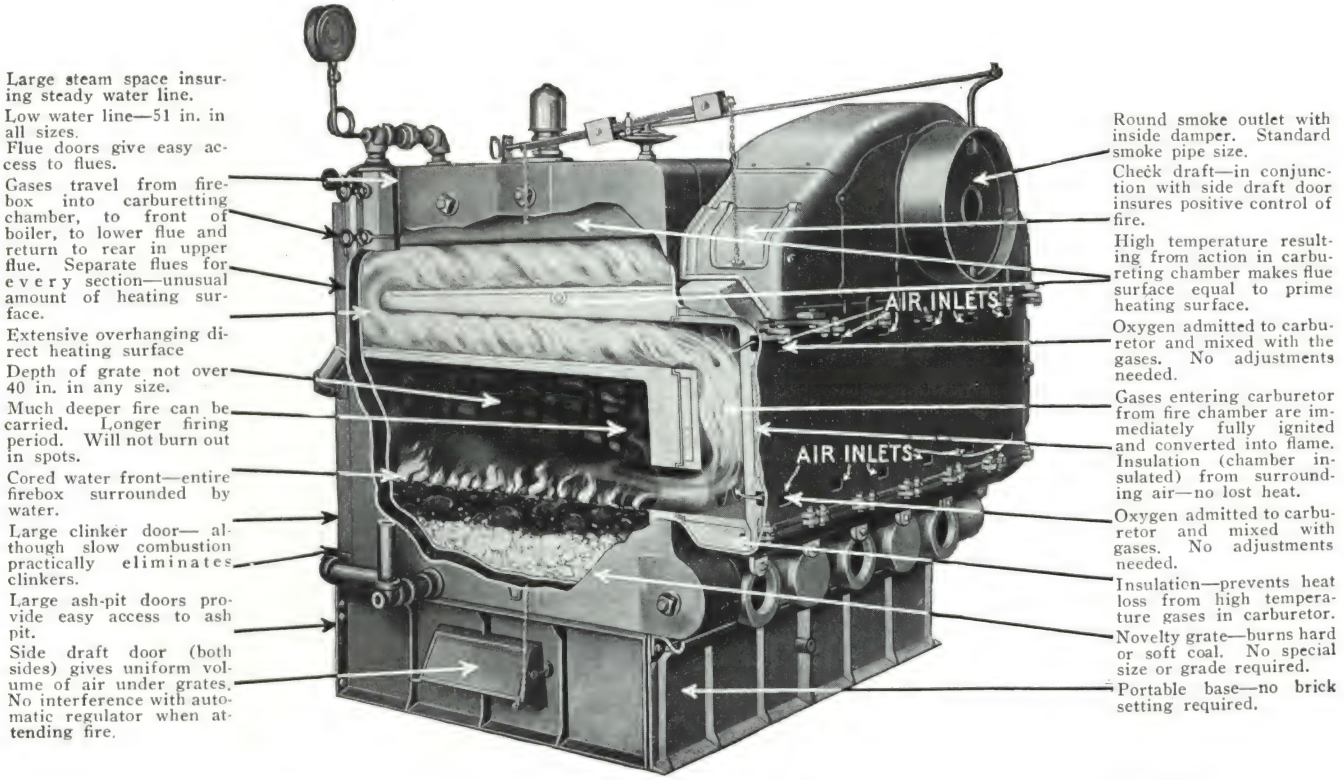
After the coal gases in the Novelty carburetor boiler have come in contact with the extensive overhanging direct heating surface in the firebox of the boiler, they are drawn outside of the firebox into the carburetting chambers located at the rear of the boiler. In these chambers all smoke, gases and carbon ordinarily wasted are mixed with oxygen from the air and ignited. This air is admitted through the inlets (see illustration below) in such a manner that CO_2 is formed.

These gases thus converted into flame pass into the lower flues at an unusually high temperature and return to the rear in the upper flues.

These flues are surrounded by water so that this part of the boiler, which is indirect heating surface in other boilers, becomes prime heating surface in the Novelty carburetor boiler.

Burns Hard or Soft Coal—Where hard coal is used, cheaper grades and sizes are made to yield as many heat units as a larger and more expensive size.

Where soft coal is used, about 80% of the volatile matter from non-coking or coking coal (which analysis shows to be very high in heat value) is thoroughly consumed.



END VIEW, SHOWING INTERNAL CONSTRUCTION AND ACTION OF FIRE IN THE NOVELTY CARBURETOR BOILER

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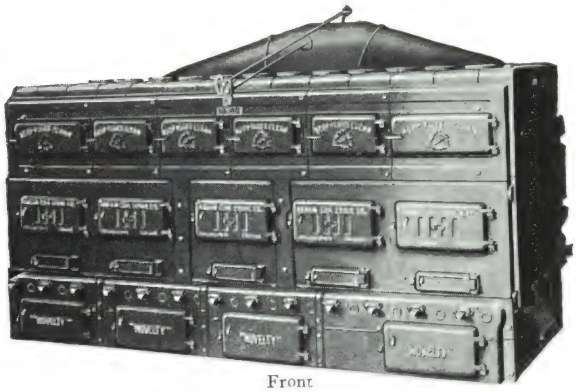
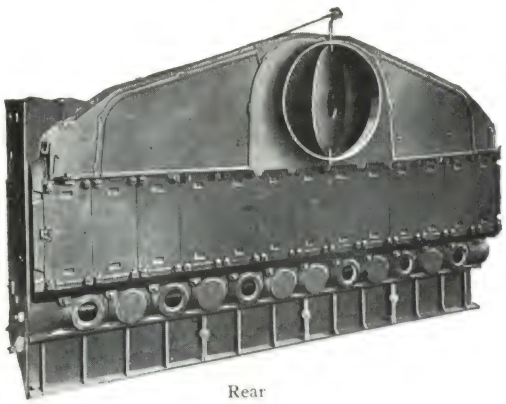


Front



Rear

FRONT AND REAR VIEWS OF NOVELTY CARBURETOR SIDE FEED SECTIONAL BOILER

NOVELTY CARBURETOR SIDE FEED BOILERS

Number	Size of grate, in.	Grate area, sq. ft.	Base dimensions, in. (outside)		Boiler dimensions, in. (outside) Including smoke box and trimmings		Number supply outlets and size, in.	Number return inlets and size, in.	Smoke outlet, in.	Rating, sq. ft.	
			Length	Width	Length	Width				Steam	Water
3–30	30 x 18½	3.85	39	24	66	36	1–3½	1–3½	8	1000	1625
4–30	30 x 27⅝	5.76	39	33	66	45	2–3½	2–3½	10	1500	2450
5–30	30 x 36¾	7.65	39	42	66	54	2–3½	2–3½	12	2000	3250
4–40	40 x 27⅝	7.68	49	33	64	45	2–4	2–4	12	2300	3750
5–40	40 x 36¾	10.21	49	42	69	54	2–4	2–4	14	3100	5100
6–40	40 x 45⅞	12.75	49	51	69	63	3–4	3–4	16	3900	6300
7–40	40 x 55	15.28	49	60	71	72	3–4	3–4	16	4700	7750
8–40	40 x 64⅛	17.81	49	69	71	81	4–4	4–4	18	5750	9450
9–40	40 x 73¼	20.35	49	78	72	90	4–4	4–4	20	6900	11350
10–40	40 x 82⅜	22.88	49	87	72	99	5–4	5–4	20	8050	13200
11–40	40 x 91½	25.42	49	96	75	108	5–4	5–4	22	9200	12150
12–40	40 x 100⅝	27.88	49	105	75	117	5–4	5–4	22	10350	17000
13–40	40 x 109¼	30.50	49	114	75	126	5–4	5–4	25	11500	18950
14–40	40 x 118⅛	33.04	49	123	75	135	6–4	6–4	25	12600	20700
15–40	40 x 127	35.58	49	132	75	144	6–4	6–4	25	13800	22900
16–40	40 x 136⅛	38.12	49	141	75	153	7–4	7–4	25	15000	25100

Height of water line—all sizes 51 in. Height from floor to outlets—all sizes 59 in. Height from floor to inlets—all sizes 16 in.

Novelty Side Feed Sectional Boiler (Without Carburetor)

This boiler has all the advantages of the side feed construction explained on preceding page. It is the same as the carburetor boiler except that it does not have the carburetting chamber.

The gases from the firebox travel upward at the rear of the firebox into the rear of the lower flues and thence to the front, passing into the upper flues and returning to the back of the boiler. This boiler burns any size or grade of coal, oil, gas, etc. Where soft coal is used, it does not meet the requirements of some city ordinances for the burning of smoke, as does the Novelty carburetor boiler.

NOVELTY SIDE FEED BOILERS (WITHOUT CARBURETOR)

Number	Size of grate, in.	Grate area, sq. ft.	Base dimensions, in. (outside)		Boiler dimensions, in. (outside)		Number supply outlets and size, in.	Number return inlet and size, in.	Smoke outlet, in.	Rating, sq. ft.	
			Length	Width	Length	Width				Steam	Water
16– 3	10 x 16	1.11	19½	13½	32	19½	1–2½	1–2½	7	375	625
16– 4	15 x 16	1.66	19½	18½	32	24½	2–2½	2–2½	7	475	800
16– 5	20 x 16	2.22	19½	23½	33	29½	2–2½	2–2½	8	600	1000
16– 6	25 x 16	2.77	19½	28½	33	34½	2–2½	2–2½	8	725	1200
25– 4	25 x 27⅝	4.80	39	32	52	36	2–3½	2–3½	10	1075	1775
25– 5	25 x 36¾	6.38	39	42	52	46	2–3½	2–3½	12	1450	2400
25– 6	25 x 45⅞	7.96	39	52	52	56	3–3½	3–3½	12	1850	3100
25– 7	25 x 55	9.55	39	62	52	66	3–3½	3–3½	14	2250	3800
30– 4	30 x 27⅝	5.76	44	32	57	36	2–3½	2–3½	10	1325	2200
30– 5	30 x 36¾	7.65	44	42	57	46	2–3½	2–3½	12	1775	3000
30– 6	30 x 45⅞	9.56	44	52	57	56	3–3½	3–3½	14	2250	3800
30– 7	30 x 55	11.45	44	62	57	66	3–3½	3–3½	14	2750	4600
30– 8	30 x 64⅛	13.36	44	72	57	76	4–3½	4–3½	16	3250	5400
40– 4	40 x 27⅝	7.68	49	32	62	36	2–4	2–4	12	2000	3300
40– 5	40 x 36¾	10.21	49	42	62	46	2–4	2–4	14	2700	4450
40– 6	40 x 45⅞	12.75	49	52	62	56	3–4	3–4	16	3400	5600
40– 7	40 x 55	15.28	49	52	62	66	3–4	3–4	16	4100	6750
40– 8	40 x 64⅛	17.81	49	72	62	76	4–4	4–4	18	5000	8200
40– 9	40 x 73¼	20.35	49	82	62	86	4–4	4–4	20	6000	9800
40–10	40 x 82⅜	22.88	49	92	62	96	5–4	5–4	20	7000	11400
40–11	40 x 91½	25.42	49	102	62	106	5–4	5–4	22	8000	13000
40–12	40 x 100⅝	27.88	49	112	62	116	5–4	5–4	22	9000	14600
40–13	40 x 109¼	30.50	49	122	62	126	5–4	5–4	25	10000	16200
40–14	40 x 118⅛	33.04	49	132	62	136	6–4	6–4	25	11000	17800
40–15	40 x 127¼	35.58	49	142	62	146	6–4	6–4	25	12000	19400
40–16	40 x 136⅜	38.12	49	152	62	156	6–4	6–4	25	13000	21000

No. 16 Series sizes: Height of water line, 38 in.; height from floor to outlets, 44¼ in.; height from floor to inlets, 15 in.
No. 25, 30 and 40 Series sizes: Height of water line, 51 in.; height from floor to outlet, 59 in.; height from floor to inlets, 16 in.

Continued on next page

Novelty Round Steam and Water Boilers

Novelty round boilers are complete in three parts—base, fire pot section and dome section. No intermediate sections are used since from the experience of 75 years of manufacturing for this company, they are convinced that every time the size of the boiler is increased, the grate surface, heating surface and flue surface should be increased.

The waterways are constructed on the outside of the fire pot instead of on the inside, which gives a full diameter of the fire pot and thus a larger coal carrying capacity. Outside waterways insure a steady water line in steam boilers. The crown sheet of Novelty round boilers has three water tubes directly over the fire instead of being flat like other makes. This feature increases the heating surface and thus saves fuel.

The Novelty is the only round boiler in which the gases, as they leave the fire pot and enter the flue, are carried first to the back of the boiler and then to the front through right- and left-hand flues, and then back through a larger center flue to the smoke outlet (note the white arrows in the illustration below.) Due to the extended baffle cast to the dome which intersects with the fire pot section and forms the flue, it will be readily seen that the Novelty boiler has an unusually long flue travel on each side of the dome and then back through the center.

This exclusive feature insures the extraction of the greatest number of heat units from the gases before they reach the smoke outlet.

Novelty Warm Air Furnaces

Novelty warm air furnaces are original in design. They are built with grate surface in exact proportion as in Novelty boilers. The fire pot is straight and corrugated. The straight pot not only gives more grate surface and larger coal carrying capacity, but it prevents the collection of ashes along the sides, which happens in furnaces with tapered pots. The collection of ashes on the sides deadens the fire at that point and prevents that fire surface from giving off heat. The corrugations in the pot furnish air space around the side for admitting the proper amount of air for good combustion.

The drum, that part of the furnace above the fire, is of the double horseshoe type and unusually deep, which furnishes 25% to 40% more heating surface than found in other makes.

The crab type of flue construction in the Novelty Modern is a self-cleaning feature found in no other furnace.

The Novelty warm air furnaces are made in 20 different sizes for pipe and pipeless installation.

Novelty Steam Boiler
Grate sizes, 17, 18, 20, 23, 26, 29 and 32 in.

Dome Section Raised Showing Definite Flue Travel, Nipple Connections and Outside Waterways

Novelty Cast Iron Push Nipple
Used with All Novelty Boilers

Main Section Tilted, Showing Extensive Direct Heating Surface and the Novelty Mesh Grate

NOVELTY ROUND STEAM AND WATER BOILERS

Number	Diameter of grate, in.	Grate area, sq. ft.	Number supply outlets and size, in.	Number return inlets and size, in.	Height (in.) from floor to		Height of water line, in.	Smoke outlet, in.	Ratings, sq. ft.	
					Inlet	Outlet			Steam	Water
*117	17	1.53	2–2½	2–2½	15¼	Water –46½ Steam –51	41½	7	375	625
1118	18	1.76	2–2	2–2	15	Water –47 Steam –51	45	7	400	650
1121	21	2.18	2–2½	2–2½	15	Water –47 Steam –51	45	8	525	875
1123	23	2.90	2–2½	2–2½	15	Water –47 Steam –52	45	8	650	1075
1126	26	3.70	2–3	2–3	16	Water –48 Steam –52	45	10	850	1400
1129	29	4.59	2–3½	2–3½	16	Water –48 Steam –52	45	10	1100	1825
1132	32	5.59	2–4	2–4	16	Water –48	45	10	1450	2400

*No. 117 is made with one large center nipple

ESTABLISHED 1857

L. J. MUELLER FURNACE CO.

Makers of Warm Air, Steam, Vapor and Hot Water Heating Systems

GENERAL OFFICES

246 Reed Street

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CHICAGO, ILL., 60 East Lake Street
ST. PAUL, MINN., 158 East Fifth Street
MINNEAPOLIS, MINN., 631 Third Avenue, S.
PORTLAND, ORE., 609 Panama Building

Products

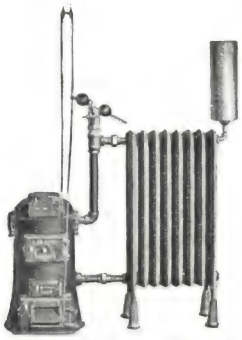
HOT WATER SUPPLY BOILERS.
COMBINATION HOT WATER SUPPLY BOILERS and GARBAGE BURNERS.
STEAM and HOT WATER BOILERS.
Also, Everything in the Heating Line.

Mueller Hot Water Supply Boilers

For homes, garages, factories, hotels, offices, barber shops, etc. Designed to supply an abundance of hot water quickly and economically. Simple in operation, have but few parts and are quickly and easily erected. The grate is of simple draw-center shaking and dumping type with ample air space, yet constructed so pea or slack coal can be used. Every boiler is erected at factory and carefully inspected before shipment. Cored castings are tested under 200 lbs. pressure. Especially adapted for garage heating (see illustration to the right of hot water supply boiler connected to radiator, for this purpose). Conservatively rated. Catalogue furnished on request.

HOT WATER SUPPLY BOILER

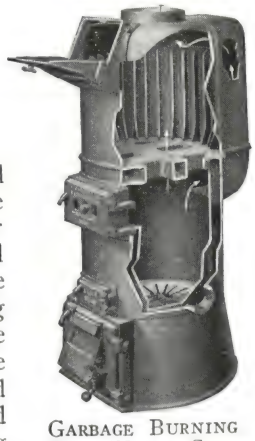
GARBAGE BURNER AND HOT WATER SUPPLY BOILER CONNECTED TO TANK



HOT WATER SUPPLY BOILER CONNECTED TO RADIATOR FOR GARAGE HEATING

Mueller Combination Hot Water Supply Boiler and Garbage Burner

Of the same construction as the Mueller Hot Water Supply Boilers with the addition of a heavy cast iron garbage chamber. A special flue construction carries smoke and gas to the rear and over top of garbage chamber until garbage is dried. The garbage is then burned by flame passing through the water filled garbage grate below and up through the garbage. Can also be connected with radiator, or radiator and tank, for heating and supplying hot water in garage.



GARBAGE BURNING HOT WATER SUPPLY BOILER

CAPACITIES OF PLAIN AND GARBAGE BURNING HOT WATER SUPPLY BOILERS

		Hours between firing	5	6	7	8	9	10	11
No. 10-T and No. 10-G		Hard coal per hr., lbs.	6.00	5.00	4.28	3.75	3.34	3.00	2.73
		Power per hr., B. t. u.	45000	37500	32100	28125	25050	22500	20475
		Radiation, sq. ft.	300	250	214	188	167	150	137
Capacity in gallons per hr.	Temperature rise, F. degrees per hour	20	270	225	192	168	150	135	128
		30	180	150	128	112	100	90	82
		40	135	112	96	84	75	67	64
		50	108	90	77	67	60	54	51
		60	90	75	64	56	50	45	43
		70	77	64	55	48	43	39	37
		80	68	56	48	42	38	33	32
		90	61	50	43	38	34	29	28
		100	55	45	39	34	30	26	25

		Hours between firing	5	6	7	8	9	10	11
No. 12-T and No. 12-G		Hard coal per hr., lbs.	8.50	7.08	6.08	5.32	4.72	4.25	3.86
		Power per hr., B. t. u.	63750	53100	45600	39900	35400	31900	28950
		Radiation, sq. ft.	425	354	304	266	236	213	193
Capacity in gallons per hr.	Temperature rise, F. degrees per hour	20	383	319	274	239	212	191	174
		30	255	212	183	160	142	128	116
		40	192	159	137	120	106	96	87
		50	153	128	110	96	85	77	70
		60	129	106	92	80	71	64	58
		70	109	91	79	69	61	55	50
		80	96	80	69	60	53	48	43
		90	85	71	61	53	47	43	39
		100	77	64	55	48	43	38	35

		Hours between firing	5	6	7	8	9	10	11
No. 14-T and No. 14-G		Hard coal per hr., lbs.	13.60	11.36	9.68	8.50	7.55	6.80	6.18
		Power per hr., B. t. u.	102000	85200	72600	63750	56625	51000	46350
		Radiation, sq. ft.	680	568	484	425	378	340	309
Capacity in gallons per hr.	Temperature rise, F. degrees per hour	20	612	511	435	383	339	306	279
		30	408	341	290	255	226	204	186
		40	306	256	217	191	170	153	139
		50	245	205	174	153	136	122	112
		60	204	171	145	126	113	102	93
		70	175	146	124	109	97	87	80
		80	141	128	109	96	85	77	70
		90	136	114	97	85	75	68	62
		100	123	102	87	77	68	61	56

		Hours between firing	5	6	7	8	9	10	11
No. 16-T and No. 16-G		Hard coal per hr., lbs.	19.80	16.60	14.20	12.40	11.00	9.90	9.00
		Power per hr., B. t. u.	158400	132800	113600	99200	88000	79200	72000
		Radiation, sq. ft.	1056	885	758	661	586	528	480
Capacity in gallons per hr.	Temperature rise, F. degrees per hour	20	960	803	685	600	534	480	441
		30	640	535	457	400	356	320	294
		40	480	400	343	300	267	240	220
		50	384	320	274	240	214	192	176
		60	320	266	228	200	178	160	147
		70	274	228	196	170	152	137	126
		80	240	200	172	150	134	120	110
		90	214	179	152	134	119	107	99
		100	192	160	137	120	106	96	88

Continued on next page

Steam Boiler

Sectional View

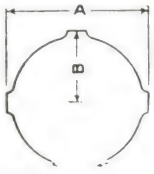
Hot Water Boiler

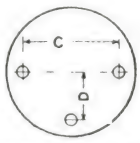
MUELLER ROUND BOILERS FOR STEAM AND HOT WATER

Mueller Round Boilers

For steam and hot water heating. Made entirely of cast iron and in sections easily assembled. The fire pot embodies those scientific features of construction that insure greatest heating efficiency and economical fuel consumption. It is deep, providing large coal carrying capacity and allowing for long periods between firing. The exceptionally large and effective heating surface, found in the rest of the boiler, the double dome section with water space in bottom and top with a fire and smoke space between, and the radial arms in the firepot bringing the water spaces in close contact with the fire, enable the user to obtain full heat returns from the fuel consumed. The radial arms extract the heat from the hottest part of the fire immediately, and utilize heat which would otherwise be lost. The double dome section insures fire travel across entire section, imparting heat to the water even at the outlet of the boiler.

All water passages are ample and provide for easy interior circulation. Large clean-out and ash pit doors. Easily operated rocking and dumping grate, having ample air space, and suitable for burning all kinds of fuel. Grate bars easily replaced. Furnished with or without hot water attachment.





DIMENSIONS AND CAPACITIES, MUELLER STEAM AND HOT WATER BOILERS

	STEAM									WATER									
No. of boiler	Nominal diameter of grate, in.	Size outlet, in.	Number and size inlets, in.	Size center column, in.	Distance center to center, in. A	Distance center to center, in. B	Diameter smoke pipe, in.	8-hr. rating direct radiation, square ft.	No. of boiler	Nominal diam. of grate, in.	No. and size outlets, in.	No. and size inlets, in.	Size center column, in.	Distance center to center, in. A	Distance center to center, in. B	Distance center to center, in. C	Distance center to center, in. D	Diameter smoke pipe, in.	8-hr. rating direct radiation, sq. ft.
1-16-S	16	2	3–2	5½	21	10⅝	7	300	1-16-W	16	3–2	3–2	5½	21	10⅝	16⅝	8¼	7	500
2-16-S	16	2	3–2	5½	21	10⅝	7	330	2-16-W	16	3–2	3–2	5½	21	10⅝	16⅝	8¼	7	550
1-19-S	19	2½	3–2½	5½	23½	11⁹⁄₁₆	8	420	1-19-W	19	3–2½	3–2½	5½	23½	11⁹⁄₁₆	18⅜	9⅛	8	700
2-19-S	19	2½	3–2½	5½	23½	11⁹⁄₁₆	8	460	2-19-W	19	3–2½	3–2½	5½	23½	11⁹⁄₁₆	18⅜	9⅛	8	765
3-19-S	19	2½	3–2½	5½	23½	11⁹⁄₁₆	8	480	3-19-W	19	3–2½	3–2½	5½	23½	11⁹⁄₁₆	18⅜	9⅛	8	800
1-22-S	22	3	3–3	7	26⁹⁄₁₆	13½	9	600	1-22-W	22	3–3	3–3	7	26⁹⁄₁₆	13½	20⅝	10⁷⁄₁₆	9	1,000
2-22-S	22	3	3–3	7	26⁹⁄₁₆	13½	9	690	2-22-W	22	3–3	3–3	7	26⁹⁄₁₆	13½	20⅝	10⁷⁄₁₆	9	1,150
3-22-S	22	3	3–3	7	26⁹⁄₁₆	13½	9	720	3-22-W	22	3–3	3–3	7	26⁹⁄₁₆	13½	20⅝	10⁷⁄₁₆	9	1,200
1-25-S	25	3	3–3	8	29¹¹⁄₁₆	14¾	10	780	1-25-W	25	3–3	3–3	8	29¹¹⁄₁₆	14¾	22¹³⁄₁₆	11⁵⁄₁₆	10	1,300
2-25-S	25	3	3–3	8	29¹¹⁄₁₆	14¾	10	870	2-25-W	25	3–3	3–3	8	29¹¹⁄₁₆	14¾	22¹³⁄₁₆	11⁵⁄₁₆	10	1,450
3-25-S	25	3	3–3	8	29¹¹⁄₁₆	14¾	10	900	3-25-W	25	3–3	3–3	8	29¹¹⁄₁₆	14¾	22¹³⁄₁₆	11⁵⁄₁₆	10	1,500
1-28-S	28	4	3–4	9	32⅝	16¼	11	1,020	1-28-W	28	3–4	3–4	9	32⅝	16¼	25¼	12½	11	1,700
2-28-S	28	4	3–4	9	32⅝	16¼	11	1,140	2-28-W	28	3–4	3–4	9	32⅝	16¼	25¼	12½	11	1,900
3-28-S	28	4	3–4	9	32⅝	16¼	11	1,170	3-28-W	28	3–4	3–4	9	32⅝	16¼	25¼	12½	11	1,950
1-31-S	31	4	3–4	9	35¾	18⅜	12	1,300	1-31-W	31	3–4	3–4	9	35¾	18⅜	28¼	14	12	2,165
2-31-S	31	4	3–4	9	35¾	18⅜	12	1,450	2-31-W	31	3–4	3–4	9	35¾	18⅜	28¼	14	12	2,415
3-31-S	31	4	3–4	9	35¾	18⅜	12	1,500	3-31-W	31	3–4	3–4	9	35¾	18⅜	28¼	14	12	2,500
1-34-S	34	5	3–5	10	40	20⅜	13	1,500	1-34-W	34	3–5	3–5	10	40	20⅜	31¼	15⅝	13	2,500
2-34-S	34	5	3–5	10	40	20⅜	13	1,700	2-34-W	34	3–5	3–5	10	40	20⅜	31¼	15⅝	13	2,835
3-34-S	34	5	3–5	10	40	20⅜	13	1,750	3-34-W	34	3–5	3–5	10	40	20⅜	31¼	15⅝	13	2,915

MONITOR BI-LOOP RADIATOR CO.

Boilers and Radiators

FACTORY

LANCASTER, PA.

SALES OFFICE: Finance Building, PHILADELPHIA, PA.

Products

Monitor U-Tube Steel Boilers; Monitor Bi-Loop Radiators.

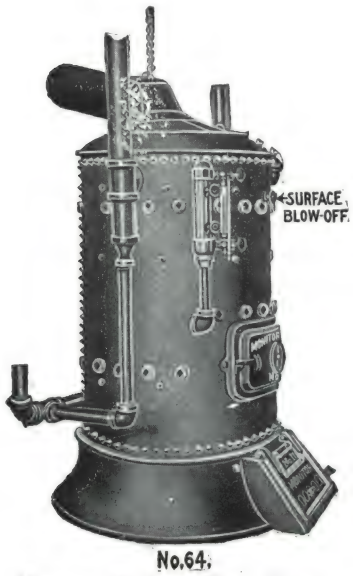
Also Monitor Steam Water Heaters.

Monitor U-Tube Steel Boilers

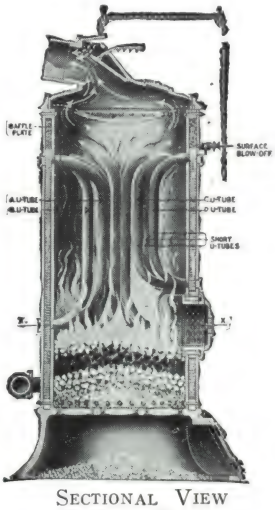
Monitor U-Tube boilers are constructed of steel and in accordance with code as recommended by the A. S. M. E. Boiler Code Committee.

Monitor U-Tube boilers have a high rate of efficiency due to the construction of the heating surface, which is nearly all direct, there being no place for soot or fine ash to accumulate and thus retard transmission of heat.

Monitor U-Tube boilers are constructed for any working pressure and are used for steam and hot water heating, domestic hot water and for producing steam for dairies, bakeries, candy factories, dyeing establishments, hotels and restaurant kitchens, etc.



Monitor U-Tube Steel Boiler



Sectional View U-Tube Boiler

MONITOR U-TUBE STEEL BOILERS

Boiler No.	Grate Area, sq. ft.	Steam Rating, sq. ft.	Water Rating, sq. it.
17	1.6	400	640
20–1	2.2	500	800
–2	2.2	600	960
23–1	2.9	700	1120
–2	2.9	800	1280
25–1	3.7	900	1440
–2	3.7	1000	1600
28–1	4.3	1150	1840
–2	4.3	1300	2080
31–1	5.3	1500	2400
–2	5.3	1800	2880
–3	5.3	2150	3440
35–1	6.7	2500	4000
–2	6.7	3000	4800
–3	6.7	3500	5600
40–1	8.8	4000	6400
–2	8.8	4750	7600
40–01	10.75	5600	8960
–02	13.44	7000	11200
48–01	16.32	8500	13600
–02	19.02	10000	16000

Monitor Bi-Loop Hot Water Radiators

This process of radiation is the result obtained by expert heating engineers, who for years have devoted time and energy to perfecting a system of radiation that is practical, and does not have the discomforts and annoyances of the average steam radiator which requires either pressure at the boiler or a mechanically induced vacuum upon the return air line to obtain even fairly good circulation results.

Circulation—Monitor Bi-Loop hot water radiators are partly filled with water which is heated by steam within the radiator, thereby eliminating the large volume of water to be circulated in the direct hot water system, and eliminating 95 per cent of the air that is found in a steam or vapor radiator.

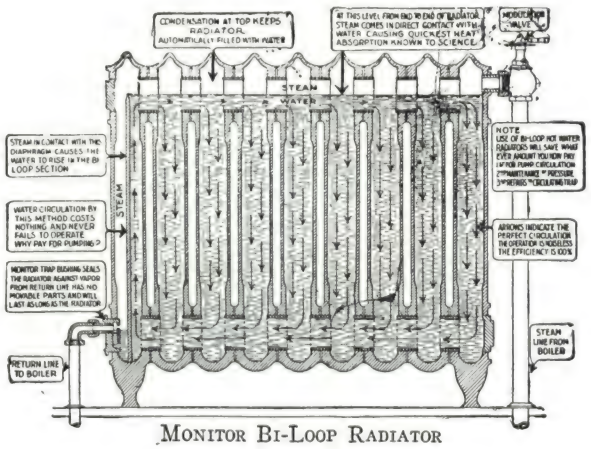
Monitor Bi-Loop radiators are constructed of cast iron having same heating surface as any standard make of radiator. The end section has a diaphragm which acts as a dividing line between the water and steam; it also acts as a transmitting medium to circulate the water in the radiator.

Automatic in Action—The Bi-Loop radiator after once being filled with water is automatically kept in this condition by the steam condensing at the top of radiator, and the steam coming in contact with diaphragm in Bi-Loop section produces positive circulation.

High Pressure Steam Unnecessary—A building of any height may be heated by hot water with pressure on any part of the system at less than 1 lb. The pressure is the same on the first floor as it is on the top floor.

Monitor Bi-Loop radiators are assembled in any standard units and will transmit approximately 200 B. t. u. per sq. ft. of surface.

Monitor Bi-Loop hot water radiators are made in the following sizes and heights: 2- and 3-column: 38, 32, 26, 22 and 18 in.; single column: 38 and 32 in.; distance, center to center of sections, 2⅝ in.



Monitor Bi-Loop Radiator

RICHARDSON & BOYNTON CO.

SINCE 1837

Manufacturers of Low Pressure Boilers and Hot Water Tank Heaters

260 Fifth Avenue
NEW YORK, N. Y.

FACTORY
DOVER, N. J.

BOSTON, MASS., 60 High Street
ROCHESTER, N. Y., Rockwood Street

PHILADELPHIA, PA., 1332 Arch Street

CHICAGO, ILL., 171-173 West Lake Street
PROVIDENCE, R. I., 429 Industrial Trust Building

Products

RICHARDSON LOW PRESSURE BOILERS for Steam, Vapor and Hot Water: DOMESTIC HOT WATER SUPPLY, TANK and LAUNDRY HEATERS.

For Warm Air Furnaces, see pages 1662-1665; for Richardson Vapor-Vacuum-Pressure System of Heating, and Automatic Heating System for garages, see pages 1708-1711; for Coal and Gas Cooking Ranges, see pages 2098-2103.

Richardson Low Pressure Boilers for Steam, Vapor and Hot Water

Richardson low pressure cast iron boilers are made in *three* distinct types and many sizes. The three types are:

(1) Smokeless square sectional boilers.
(2) Round sectional boilers.
(3) End feed square sectional boilers.

Ratings—Richardson boilers are rated according to accurate standards and on the assumption that sufficient radiation will be used, the piping system properly arranged and the boiler connected to a flue of ample capacity and good draft, with steam at 2 lbs. boiler pressure and with hot water at a temperature of 180° Fahr.

Richardson ratings provide that all piping (mains, risers and returns), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of boiler necessary. One size larger boiler for reserve power is best used.

For indirect radiation add 75% to surface for such radiation, and where pipe radiation surface is used, add 25% for same to equal the usual amount direct radiation.

When a pipe coil or cast iron section is placed in the firebox for heating water for domestic uses, additional capacity must be figured at the rate of 1½ sq. ft. of direct radiation for a steam boiler and 2½ sq. ft. of direct radiation for a hot water boiler, for each gallon of water to be heated per hour.

Richardson boilers are tapped for coils to be placed in the firebox for heating water.

Do not bush outlets on boilers; connect all of them full size to mains.

To secure best results boilers should be covered with asbestos cement.

Guarantee—Every Richardson boiler is sold under a guarantee as to its perfection in manufacture, and its ability to carry the rating shown in our printed matter.

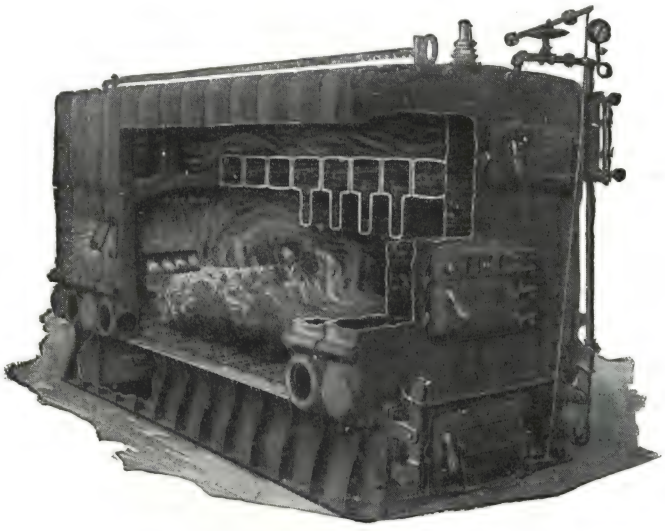
Coal—Richardson boilers can be furnished with grates to burn the small sizes of coal when so ordered.

When soft coal is used for fuel, increase boiler one size.

Boiler Trimmings—All Richardson steam boilers are equipped with all necessary trimmings consisting of automatic damper regulator, steam gauge, water column, with water gauge and gauge cocks, safety valve and fusible plug when called for.

Hot water boilers are furnished with firing tools only.

Firing Tools—All Richardson boilers are furnished with a complete set of firing tools consisting of flue brush, hoe and slice bar.



Side Sectional View

End Sectional View of Bridgewall Section

Front Sectional View of Bridgewall Section

Ribbed Grate Bar

RICHARDSON SMOKELESS BOILERS

Continued on next page

Richardson Smokeless Boilers

Richardson smokeless boilers, based on an entirely new principle, are designed to provide *perfect and complete* combustion of the cheaper grades of bituminous coal.

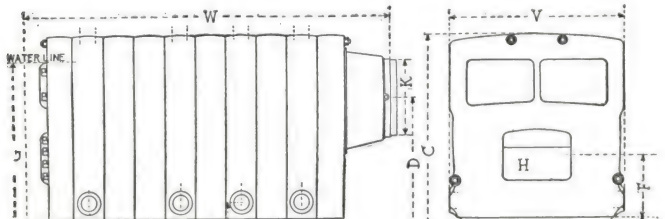
The result is the entire elimination of smoke (which the ordinary boiler pours out of the stack), and an enormous economy in fuel, since the volatile gases wasted in the ordinary system of combustion are converted into active heat units and used.

Principle of Operation—Perfect combustion of soft coals is accomplished by supplying the proper amount of oxygen at the right place and the right temperature.

In order to effect a complete chemical union the air supplying the oxygen must reach the fire *at a high temperature,* and this is accomplished through the special bridgewall section, through which the air is taken from outside the boiler for both sides—openings being provided with dampers for graduating the supply. The air is pulled in through a fire clay duct located in this bridgewall section (see illustration). The fire clay duct being located in this section near the rear of the firebox is heated to a high temperature and the air, in turn, is pre-heated and is pulled down by the vacuum created under the bridgewall section. The hot gases distilled from the coking coal in the front of the boiler meet the hot blast of air producing an intimate mixture of gases and oxygen with perfect chemical union and, therefore, intense combustion.

It is the principle of the Welsbach gaslight and the Bunsen burner applied to burning coal. Observing the action of this combination of gases and air it will be seen that a *bluish white flame* burns all the way along the side flues of the boiler and back through the center flue on its return to the smoke exit. This intensely hot flame travels with a perfect spiral motion, striking and imparting its heat to every square inch of heating surface through the entire length of the boiler.

Special Features—Sectional construction permits erection at any time. Can be put through any standard width of doors. Can be installed any time. Handling expense on job at a minimum.



DIMENSION DIAGRAMS RICHARDSON SMOKELESS BOILERS

DIMENSIONS IN INCHES, RICHARDSON SMOKELESS BOILERS

Boiler No.	A	B	C	D	E	F	G	H	J	K	L	V	W	Z
742	50	57	66	473/4	13	18	60	16x22	17	20	481/8	54	68	41
842	50	651/4	66	473/4	13	18	60	16x22	17	20	5671/16	54	761/4	41
942	50	733/4	66	473/4	13	18	60	16x22	17	20	643/4	54	843/4	41
1042	50	82	66	473/4	13	18	60	16x22	17	20	731/16	54	93	41
1142	50	901/4	66	473/4	13	18	60	16x22	17	20	813/8	54	1011/4	41
1242	50	981/2	66	473/4	13	18	60	16x22	17	20	8911/16	54	1091/2	41
1342	50	107	66	473/4	13	18	60	16x22	17	20	8911/16	54	118	41
1442	50	1151/4	66	473/4	13	18	60	16x22	17	20	98	54	1261/4	41
1542	50	1231/2	66	473/4	13	18	60	16x22	17	20	98	54	1341/2	41
1642	50	1313/4	66	473/4	13	18	60	16x22	17	20	98	54	1423/4	41
1742	50	1401/4	66	473/4	13	18	60	16x22	17	20	98	54	1511/4	41
1842	50	1481/2	66	473/4	13	18	60	16x22	17	20	98	54	1591/2	41
1942	50	1563/4	66	473/4	13	18	60	16x22	17	20	98	54	1673/4	41
2042	50	165	66	473/4	13	18	60	16x22	17	20	98	54	176	41

Natural Fire Travel and Draft—Eliminates excessive heights in chimneys.

Long Smoke Travel—No obstruction to flames, which aids combustion to perfection point and utilizes maximum heat from the fuel.

"Y" Flue Construction—Equalizes circulation, assures steady water line.

Overhanging Prime Heating Surface—At the maximum, assuring highest evaporative power.

Combustion Chamber—During process of coking gases are drawn back into a large chamber in front of bridgewall, which has two portholes at the top, making it impossible for gases to accumulate and explode.

Base—Is made in sections, permitting enlargement of boiler if ever necessary.

Fire Door—Carelessness or neglect in cleaning ash pit of ashes destroys grates. Replacing of grates through fire door (big enough for man to enter, 15x20 in.) means saving in time. The size of this door permits even distribution of fuel over fire.

Twin or Battery Jobs—Provide extra large range of capacities, economical in fuel consumption in mild weather, never necessitates absence of steam in case plant is shut down for repairs.

APPROXIMATE SIZE CHIMNEY FLUES—BOILERS OPERATED AT FULL RATED CAPACITY

Boiler No.	Number of boilers connected to one chimney											
	1		2		3		4		5		6	
	Size, in.	H't, ft.	Size, in.	H't, ft.	Size, in.	H't, ft.	Size, in.	H't, ft.	Size, in.	H't, ft.	Size, in.	H't, ft.
742	16x20	45	24x24	55	28x28	60	28x32	65	30x30	70	32x32	75
842	16x20	50	24x24	60	28x28	65	30x30	70	30x30	75	32x32	80
942	20x20	50	24x28	60	30x30	65	30x30	70	30x36	75	36x36	80
1042	20x20	55	24x28	65	30x30	70	30x36	75	30x36	80	36x36	85
1142	20x24	55	28x28	65	30x36	70	30x36	75	36x36	80	42x42	85
1242	20x24	60	24x28	70	30x36	80	30x36	90	36x36	100	42x42	100
1342	20x24	60	28x28	70	30x36	80	30x36	90	36x36	100	42x42	100
1442	24x24	65	30x30	75	30x36	85	36x36	100	36x42	100	42x42	110
1542	24x24	70	30x30	75	30x36	85	36x36	100	42x42	100	42x48	110
1642	28x28	70	30x36	80	36x36	90	42x42	100	42x48	110	48x48	120
1742	28x28	70	30x36	80	36x36	90	42x42	100	48x48	110	48x48	120
1842	30x30	70	36x36	80	42x42	90	48x48	100	48x48	110	54x54	120
1942	30x30	75	36x36	85	42x42	90	48x48	100	48x48	110	54x54	120
2042	30x30	75	36x36	85	42x42	90	48x48	100	48x48	110	54x54	120

RICHARDSON SMOKELESS BOILER RATINGS

Boiler No.	Rating, sq. ft.	Grate area, sq. ft.	Total length, in.	Water line, in.	Number outlets and size, in.	Number inlets and size, in.	Ash pit, inside, in.	Size chimney, in.	Height chimney, ft.	Smoke pipe, in.	List price
STEAM*											
742	4200	13.82	64	60	3–5	6–5	45x 50	16x20	45	20	$1370.00
842	4950	16.11	721/4	60	3–5	6–5	45x 581/4	16x20	50	20	1545.00
942	5700	18.40	801/2	60	3–5	6–5	45x 661/2	20x20	50	20	1720.00
1042	6450	20.69	883/4	60	4–5	8–5	45x 743/4	20x20	55	20	1895.00
1142	7200	22.98	97	60	4–5	8–5	45x 83	20x24	55	20	2068.00
1242	7950	25.27	1051/4	60	4–5	8–5	45x 911/4	20x24	60	20	2241.00
1342	8700	25.27	1131/2	60	4–5	8–5	45x 991/2	20x24	60	20	2414.00
1442	9450	27.56	1213/4	60	5–5	10–5	45x1073/4	24x24	65	20	2589.00
1542	10200	27.56	130	60	5–5	10–5	45x116	24x24	70	20	2762.00
1642	10950	27.56	1381/4	60	5–5	10–5	45x1241/4	28x28	70	20	2936.00
1742	11700	27.56	1461/2	60	5–5	10–5	45x1321/2	28x28	70	20	3110.00
1842	12450	27.56	1543/4	60	6–5	12–5	45x1403/4	30x30	70	20	3284.00
1942	13200	27.56	163	60	6–5	12–5	45x149	30x30	75	20	3458.00
2042	13950	27.56	1711/4	60	6–5	12–5	45x1571/4	30x30	75	20	3631.00
WATER											
742	7025	13.82	64	....	3–5	6–5	45x 50	16x20	45	20	$1350.00
842	8275	16.11	721/4	....	3–5	6–5	45x 581/4	16x20	50	20	1525.00
942	9525	18.40	801/2	....	3–5	6–5	45x 661/2	20x20	50	20	1700.00
1042	10775	20.69	883/4	....	4–5	8–5	45x 743/4	20x20	55	20	1875.00
1142	12025	22.98	97	....	4–5	8–5	45x 83	20x24	55	20	2048.00
1242	13275	25.27	1051/4	....	4–5	8–5	45x 911/4	20x24	60	20	2221.00
1342	14525	25.27	1131/2	....	4–5	8–5	45x 991/2	20x24	60	20	2394.00
1442	15775	27.56	1213/4	....	5–5	10–5	45x1073/4	24x24	65	20	2569.00
1542	17025	27.56	130	....	5–5	10–5	45x116	24x24	70	20	2742.00
1642	18275	27.56	1381/4	....	5–5	10–5	45x1241/4	28x28	70	20	2916.00
1742	19525	27.56	1461/2	....	5–5	10–5	45x1321/2	28x28	70	20	3090.00
1842	20775	27.56	1543/4	....	6–5	12–5	45x1403/4	30x30	70	20	3264.00
1942	22025	27.56	163	....	6–5	12–5	45x149	30x30	75	20	3438.00
2042	23275	27.56	1711/4	....	6–5	12–5	45x1571/4	30x30	75	20	3611.00

*Prices for steam boilers include safety valves.

Continued on next page

Richardson Round Sectional Boilers for Steam, Vapor and Water

Richardson round sectional boilers were designed to furnish a boiler adapted for small buildings and private residences, one that would be simple and easy to operate, powerful, yet economical. Their operation is most simple and requires no practical knowledge. They have large feed doors for supplying fuel to the fire, and ample clean-out and ash pit doors, and will carry sufficient fire all night to insure a warm house in early mornings. The water boilers have a special dome section for water heating and all the waterways throughout the boiler are small, producing a rapid circulation of water over the heating surfaces and absorbing the heat units as they are given off from the fire and heated gases. All the heating surfaces are within the boiler and surrounded by water passages.

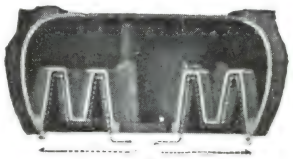
Construction — Richardson round boilers for steam and hot water are made up of several parts. The lower, or base section is fitted with "Perfect" revolving triangular grate bars, as shown, the most effective and durable, clinker-clearing grates possible to make. The ash pits are fitted with large doors for the easy removal of the ashes, and an air inlet butterfly draft door for supplying oxygen to the fuel, this draft door being operated from the automatic damper regulator of steam boilers and with a ratchet on water boilers.

Above the ash pit comes the fire pot section, heavily corrugated on the inside and with overhanging surfaces or arms over the fire. The fire pot is deep, so that the fire can be run at a low rate of combustion and require attention at long intervals. These sections are also fitted with two openings at the rear so water can be heated for domestic purposes from a coil in the fire box.

The flue openings in the intermediate sections are arranged so the fire travel is staggered, the opening in one section going below the heating surfaces in the section above; consequently, there is no waste heat, the products of combustion being constantly in contact with heating surfaces backed by water.

The connections between all sections in Richardson boilers are made with extra heavy machine cut tapered cast iron nipples fitted into tapered openings in the section, *making an iron to iron joint,* without the use of any lead or packing, and absolutely tight.

The top section of all is the dome. The illustration shows fully the large amount of heating surface contained in the Richardson boiler dome. *Heating surface* is *necessary* to *produce heat* with *economy* of fuel. Richardson boilers have the necessary surface to benefit by all the heat produced by the fuel.



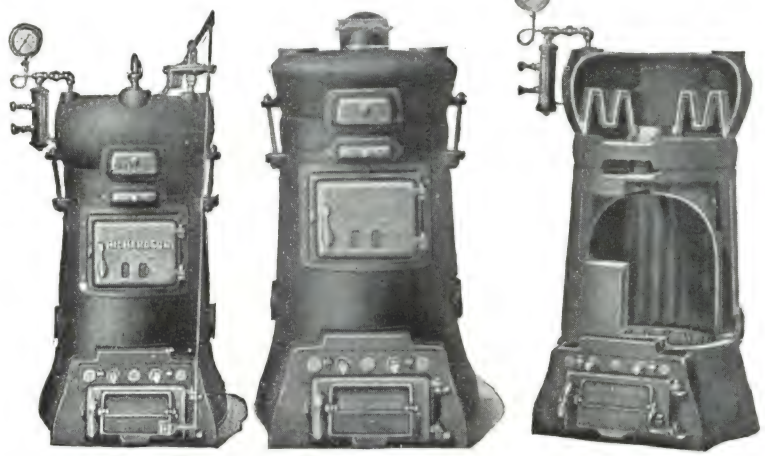
Dome Section

Fire Pot Section

Base and Grate Section

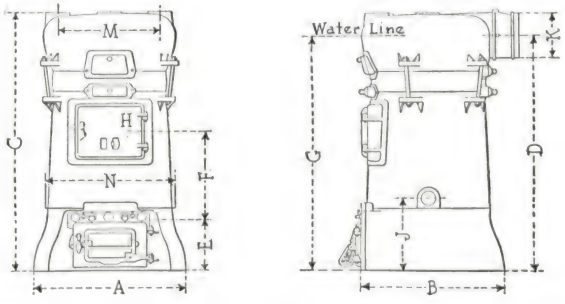
RICHARDSON ROUND SECTIONAL BOILERS

Boiler No.	8-hour rating, sq. ft.	Nom. diam. grate, in.	Grate area, sq. ft.	Number outlets and size, in.	Number inlets and size, in.	List price, complete
			Steam			
161	250	16	1.40	2–2	2–2	$118.00
162	275	16	1.40	2–2	2–2	135.00
190	300	19	1.97	2–2½	2–2½	142.00
191	350	19	1.97	2–2½	2–2½	158.00
192	375	19	1.97	2–2½	2–2½	175.00
221	450	22	2.64	2–2½	2–2½	194.00
222	500	22	2.64	2–2½	2–2½	207.00
223	550	22	2.64	2–2½	2–2½	220.00
251	625	25	3.41	2–3	2–3	242.00
252	675	25	3.41	2–3	2–3	258.00
253	725	25	3.41	2–3	2–3	283.00
281	875	28	4.28	2–3½	2–3½	295.00
282	950	28	4.28	2–3½	2–3½	322.00
283	1025	28	4.28	2–3½	2–3½	355.00
			Water			
161	400	16	1.40	2–2	2–2	103.00
162	425	16	1.40	2–2	2–2	113.00
190	500	19	1.97	2–2½	2–2½	116.00
191	575	19	1.97	2–2½	2–2½	133.00
192	625	19	1.97	2–2½	2–2½	146.00
221	750	22	2.64	2–2½	2–2½	160.00
222	825	22	2.64	2–2½	2–2½	177.00
223	900	22	2.64	2–2½	2–2½	192.00
251	1025	25	3.41	2–3½	2–3	202.00
252	1100	25	3.41	2–3	2–3	215.00
253	1200	25	3.41	2–3	2–3	242.00
281	1350	28	4.28	2–3½	2–3½	250.00
282	1550	28	4.28	2–3½	2–3½	273.00
283	1675	28	4.28	2–3½	2–3½	308.00



Steam—Front View Water—Front View Steam—Sectional View

Richardson Round Sectional Boilers



Dimension Diagrams, Richardson Round Sectional Boilers

DIMENSIONS IN INCHES, RICHARDSON ROUND SECTIONAL BOILERS—(See diagram at left)

Boiler No.	Steam and Water										Steam only		Water only
	A	B	D	E	F	H	J	K	M	N	C	G	C
161	26⅛	25¼	48⅜	9½	17	9½x11½	14¼	7	17	22	50	45⅜	47½
162	26½	25¼	52⅜	9½	17	9½x11½	14¼	7	17	22	54	49⅜	51½
190	30⅛	28¼	45⅜	10	17½	10 x12½	14⅜	8	20⅛	25½	47½	42½	45¼
191	30¼	28¼	49⅜	10	17½	10 x12½	14⅜	8	20⅛	25½	51½	46½	49¼
192	30¼	28¼	53⅜	10	17½	10 x12½	14⅜	8	20⅛	25½	55½	50½	53¼
221	33¼	32	50⅝	10½	18	10 x13⅜	15½	9	22	28	53	48¼	50½
222	33¼	32	55¼	10½	18	10 x13⅜	15½	9	22	28	57	52¼	54½
223	33¼	32	59¼	10½	18	10 x13⅜	15½	9	22	28	61	56¼	58½
251	36	34½	52¼	11¼	18	10 x15½	16¼	10	24⅞	31⅜	54¼	49½	52
252	36	34½	56¼	11¼	18	10 x15½	16¼	10	24⅞	31⅜	58¼	53½	56
253	36	34½	60⅜	11¼	18	10 x15½	16¼	10	24⅞	31⅜	62¼	57½	60
281	40	38¼	53¾	11¼	18	10½x16	16⅞	10	28	34¾	55¾	51	53¼
282	40	38¼	57¾	11¼	18	10½x16	16⅞	10	28	34¾	59¾	55	57¼
283	40	38¼	62	11¼	18	10½x16	16⅞	10	28	34¾	63¾	59	61¼

Continued on next page

Richardson End Feed Square Sectional Boilers for Steam, Vapor and Water

These boilers are made in sizes to meet practically any steam, hot water or vapor heating requirement for dwellings of moderate or large size, apartment house, office and commercial buildings, hospitals, schoolhouses, etc. The prime features are the ease with which they can be operated, their ability to carry their ratings for long periods, and an economical operating expense. This is accomplished by securing the proper proportion and arrangement of the heating surface to the grate area with large flues, admitting of a low rate of combustion.

Heating Surface—Richardson boilers are so constructed as to present to the fire a large amount of correctly proportioned direct heating surface. This surface being entirely backed by water in thin, shallow bodies causes rapid circulation and a quick absorption of the heat units given off by the fire. The flames pass three times the full length of the boiler and are constantly in contact with the water heating surfaces, thus securing an effective and positive transfer of heat from the products of combustion to all parts of the boiler.

Grates—The grate bars are extra heavy sectional shaking and dumping pattern, operated in sections from the front of the boiler and controlled by a lock plate permitting the bars to be shaken, dumped, or locked in position, as desired, and are made for burning a large or small size coal.

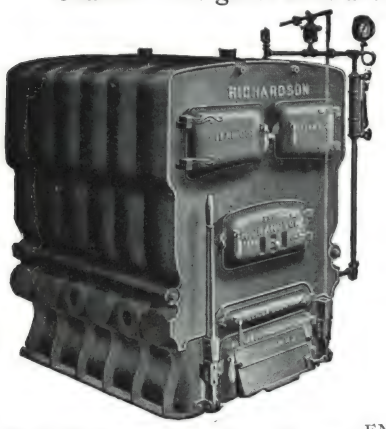
Ash Pit—The ash pit is high and wide and is fitted with a large door, making the removal of the ashes a simple operation. The ash pit door is provided with an air inlet, butterfly draft door for supplying oxygen to the fuel, this draft door being operated from the automatic damper regulator of steam boilers and with a ratchet on water boilers.

The slicer door in the ash pit front permits cleaning the grate of clinkers and ashes without disturbing the top of the fire.

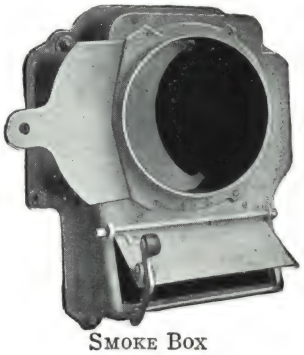
Firing and Clean-out Doors—Firing doors are large, permitting easy firing. Large double doors are provided for wood fuel. Two large clean-out doors furnish access to flue surfaces for cleaning.

Smoke Box—At the rear of boiler is the smoke box, fitted with sliding throttle damper for controlling draft, and an air inlet check draft door at bottom operated with a ratchet on the water boilers and with weighted lever handle connected by chain to the automatic damper regulator on steam boilers.

Connections—All connections between the sections are made with extra heavy cast iron machine cut tapered slip nipples, fitting into tapered openings in the section, and making up absolutely tight.

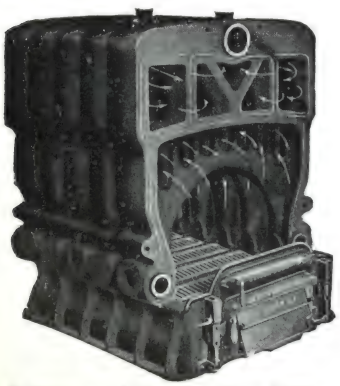


25-35-42 Series End Feed Steam and Hot Water Boiler



Smoke Box

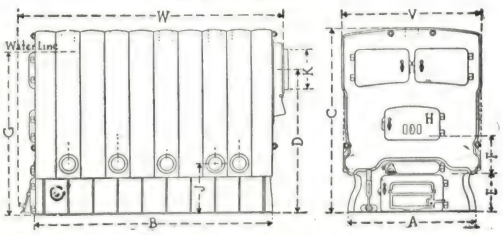
53 Series End Feed Steam and Hot Water Boilers



Sectional View of End Feed Steam and Hot Water Boilers

END FEED STEAM AND HOT WATER BOILERS

Boiler No.	8-hour rating, sq. ft.	Grate area, sq. ft.	Ash pit inside, in.	Number outlets and size, in.	List price, complete
Steam					
255	1000	4.57	27½x35½	2–3½	$ 361.00
256	1250	5.70	27½x42¾	2–3½	430.00
257	1500	6.83	27½x50	2–3½	490.00
258	1700	7.97	27½x57¼	2–3½	547.00
355	1950	7.85	39x33¼	2–4	590.00
356	2400	9.81	39x41½	2–4	700.00
357	2850	11.75	39x50	3–4	810.00
358	3300	13.70	39x58¼	3–4	900.00
359	3750	15.65	39x66½	3–4	990.00
427	3500	13.82	45x50	2–5	942.00
428	4050	16.11	45x58¼	2–5	1035.00
429	4600	18.40	45x66½	2–5	1150.00
4210	5150	20.69	45x74¾	3–5	1245.00
4211	5700	22.98	45x83	3–5	1345.00
536	6300	18.94	55x55	2–6	1553.00
537	7300	22.68	55x65¾	2–6	1748.00
538	8300	26.40	55x76½	3–6	1950.00
539	9300	30.12	55x87¼	3–6	2143.00
5310	10300	33.88	55x98	3–6	2354.00
Hot Water					
255	1600	4.57	27½x35½	2–3½	$ 328.00
256	2000	5.70	27½x42¾	3–3½	397.00
257	2400	6.83	27½x50	3–3½	457.00
258	2800	7.97	27½x57¼	3–3½	514.00
355	3125	7.85	39x33¼	3–4	548.00
356	3850	9.81	39x41½	3–4	658.00
357	4575	11.75	39x50	4–4	768.00
358	5300	13.70	39x58¼	4–4	850.00
359	6025	15.65	39x66½	5–4	940.00
427	5600	13.82	45x50	3–5	892.00
428	6500	16.11	45x58¼	3–5	985.00
429	7400	18.40	45x66½	3–5	1085.00
4210	8300	20.69	45x74¾	4–5	1180.00
4211	9200	22.98	45x83	4–5	1275.00
536	10000	18.94	55x55	2–6	1495.00
537	11600	22.68	55x65¾	2–6	1685.00
538	13200	26.40	55x76½	3–6	1870.00
539	14800	30.12	55x87¼	3–6	2060.00
5310	16400	33.88	55x98	3–6	2250.00



Dimension Diagram Richardson End Feed Sectional Boilers

DIMENSIONS IN INCHES, RICHARDSON END FEED SECTIONAL BOILERS

Boiler No.	Steam and Water A	B	C	D	E	F	H	J	K	V	W	St'm G
255	32¾	35¾	55	43	11½	14½	10¼x17¾	15½	9	39⅜	48¾	48¼
256	32¾	43	55	43	11½	14½	10¼x17¾	15½	10	39⅜	56	48¼
257	32¾	50¼	55	43	11½	14½	10¼x17¾	15½	11	39⅜	63¼	48¼
258	32¾	57½	55	43	11½	14½	10¼x17¾	15½	12	39⅜	70½	48¼
355	44	40½	63	49½	13	13	11x18	17	14	48	47¼	56
356	44	48¾	63	49½	13	13	11x18	17	14	48	55½	56
357	44	57	63	49½	13	13	11x18	17	14	48	64	56
358	44	65½	63	49½	13	13	11x18	17	14	48	72¾	56
359	44	73¾	63	49½	13	13	11x18	17	14	48	80½	56
427	50	57	66	50½	13	14	11x20	17	16	54	64	60
428	50	65½	66	50½	13	14	11x20	17	16	54	72¼	60
429	50	73¼	66	50½	13	14	11x20	17	16	54	80½	60
4210	50	82	66	50½	13	14	11x20	17	16	54	88¾	60
4211	50	90¼	66	50½	13	14	11x20	17	16	54	97	60
536	61¾	61¼	82	60⅞	14⅞	17	13x21	20⅝	17	60½	78¼	70½
537	61¾	72	82	60⅞	14⅞	17	13x21	20⅝	17	69½	89	70½
538	61¾	82¾	82	60⅞	14⅞	17	13x21	20⅝	19	69½	99¾	70½
539	61¾	93½	82	60⅞	14⅞	17	13x21	20⅝	21	69½	110½	70½
5310	61¾	104¼	82	60⅞	14⅞	17	13x21	20⅝	21	69½	121¼	70½

Continued on next page

Richardson Domestic Hot Water Supply and Tank Heaters

Furnish an abundant supply of hot water for residences, apartments, clubs, restaurants, hotels, laundries, garages, or wherever hot water is required. Made with three types of water section: cast iron; galvoxide; brass.

Richardson Galvoxide Process — In many sections the chemical composition of the water makes it impossible to obtain clean hot water free from rust or discoloration, except by using brass sections in the tank and laundry heaters. Six years ago the RICHARDSON & BOYNTON CO. perfected a new type of heater with a galvoxide water section so treated by a special process that it is not affected by the chemical properties in the water in any way whatsoever. The result is that clean hot water is available at all times.

Thousands of successful installations in the past six years have so established the Richardson galvoxide heater as a solution for the clean water problem that RICHARDSON & BOYNTON CO. now guarantee their galvoxide water heaters to keep water free from rust or discoloration. Architects and plumbers find the guaranteed galvoxide water section so satisfactory in all ways that they do not hesitate to recommend it without reservation to clients.

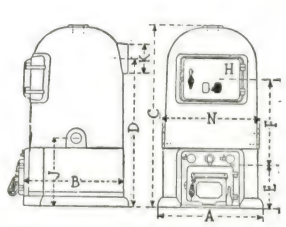
Nos. 110-112-114

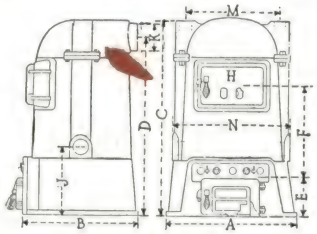
Nos. 170-200-230

RICHARDSON DOMESTIC HOT WATER SUPPLY AND TANK HEATERS FITTED WITH TRIANGULAR GRATES

No.	List price: All cast iron	List price: With galvoxide water section	Capacity gals. of water	Capacity sq. ft. of radiation	Height, in.	Diam. grates, in.	Tappings, flow and return, in	Smoke pipe, in.
110	$72.50	$90.50	150	115	34¼	10	1½	6
112	94.00	122.00	250	200	36½	12	2	6
114	110.00	138.00	350	280	38	14	2½	6

No.	List price, all cast iron	Capacity, gals. of water	Capacity, sq. ft. of radiation	Height, in.	Diam. grates, in.	Tappings, flow and return, in.	Smoke pipe, in.
170	$170.00	475	380	43¼	17	2-2½	7
200	220.00	600	480	43¼	20	2-3	8
230	260.00	800	600	48¾	23	2-3	9





DIMENSION DIAGRAMS RICHARDSON DOMESTIC HOT WATER SUPPLY AND TANK HEATERS

DIMENSIONS IN INCHES

No.	A	B	C	D	J	K		No.		B	C	D	J	K	M	N
110	17	16½	34¼	28	13¾	6	15½	170	24	25¼	43¼	38	14½	7	16	23½
112	20	19½	36½	30¼	15	6	17¾	200	27	28½	43¼	39¼	15½	8	18¾	26¾
114	22½	22	38	31¼	15½	6	20	230	30	31½	48¾	41¾	16½	9	21¾	29¾

Richardson Domestic Hot Water Supply and Laundry Heaters

No. 123 and No. 124 Laundry and Tank Heaters—

No. 123 23 in. high.
No. 124 26 in. high.
Top 24x16 in.
Grate 10½ in.
Smoke pipe 4½ in.
1-in. flow and return tapping.

Fitted with high ash pit and "Perfect" revolving grate bars.

LIST PRICES

All Cast Iron

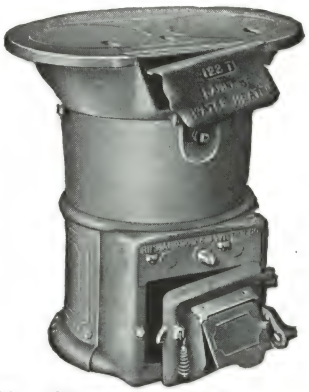
No. 123 for 80 gals...$52.00
No. 124 for 100 gals... 60.00

With Galvoxide Water Section

No. 123 for 80 gals...$66.00
No. 124 for 100 gals... 74.00

With Brass Water Section

No. 123 for 80 gals..$258.00
No. 124 for 100 gals.. 330.00



NO. 123 AND NO. 124 LAUNDRY AND TANK HEATER

No. 4 Union Laundry and Tank Heater—

Height 27½ in.
Top 21x16 in.
Grate 10 in.
Smoke pipe 6 in.
1-in. flow and return tapping.

Fitted with high ash pit and "Perfect" revolving grate bars.

LIST PRICES

All Cast Iron

No. 4 for 40 gals.....$44.00

With Galvoxide Water Section

No. 4 for 40 gals.....$56.00

NO. 4 UNION LAUNDRY AND TANK HEATER

No. 60 and 80 Richardson Domestic Hot Water Supply and Laundry and Tank Heaters—

No. 60, 32 in. high. No. 80, 35 in. high.
Top 24x15 in.
Grate 12 in.
Smoke pipe 5 in.
1-in. flow and return tapping.
Fitted with high ash pit and "Perfect" revolving grate bars.

LIST PRICES

All Cast Iron

No. 60 for 60 gals.....$44.00
No. 80 for 80 gals..... 60.00

With Galvoxide Water Section

No. 60 for 60 gals.....$56.00
No. 80 for 80 gals..... 74.00

With Brass Water Section

No. 60 for 60 gals.....$210.00
No. 80 for 80 gals..... 285.00

NO. 60 AND NO. 80 LAUNDRY AND TANK HEATER

No. 115 Richardson Domestic Hot Water Supply and Laundry Heater—

Capacity 115 gals.
Height 30⅞ in.
Grate 12 in.
Smoke pipe 6 in.
One size only.

A course of fire brick under water section prevents ashes and dead coal from coming in contact with heating surface, insuring maximum efficiency.

Fitted with high ash pit and "Perfect" revolving grate bars.

LIST PRICES

All cast iron.....$60.00
With galvoxide water section..... 74.00
With brass water section.....330.00

NO. 115 LAUNDRY HEATER

THE H. B. SMITH CO.

Manufacturers of Boilers and Radiators

WESTFIELD, MASS.

BRANCH OFFICES AND WAREHOUSES

BOSTON, 640 Main Street, Cambridge, MASS. NEW YORK, N. Y., 10 East 39th Street

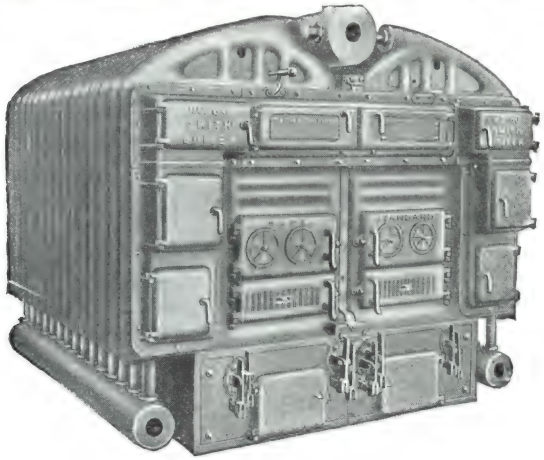
PHILADELPHIA, PA., 17th and Arch Streets

PACIFIC COAST REPRESENTATIVES: HOLBROOK, MERRILL & STETSON, SAN FRANCISCO AND LOS ANGELES, CAL.

Products

SMITH STEAM and WATER BOILERS with and without Smokeless Furnaces; MILLS WATER TUBE STEAM and WATER BOILERS; H-B STEAM and WATER BOILERS; MENLO HOT WATER SUPPLY BOILERS; PRINCESS DIRECT and WALL RADIATORS.

Also Princess Direct-Indirect and Indirect Radiators.



SMITH BOILER WITH SMOKELESS FURNACE

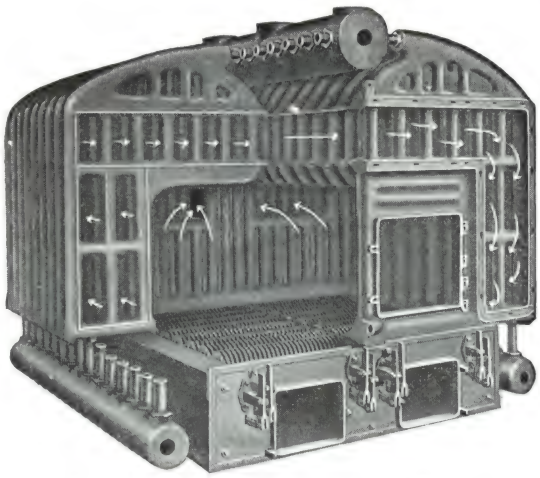
Number of sections in boiler	Nominal size of fire pot, in.		Total length of boiler, in.	Length at foundation, in.	Steam rating, ft.	Water rating, ft.
	Width	Length				
No. 27						
10	27	30	77	62	1500	2475
11	27	30	83	68	1650	2725
11	27	36	83	68	1800	2975
12	27	36	89	74	1950	3225
12	27	42	89	74	2100	3475
13	27	42	95	80	2250	3725
13	27	48	95	80	2400	3950
14	27	48	101	86	2550	4200
15	27	54	107	92	2725	4500
16	27	60	113	98	2900	4775
No. 36						
11	36	36	87	68	2750	4550
12	36	36	93	74	3000	4950
12	36	42	93	74	3250	5375
13	36	42	99	80	3500	5775
13	36	48	99	80	3750	6200
14	36	48	105	86	4000	6600
14	36	54	105	86	4250	7000
15	36	54	111	92	4500	7425
16	36	60	117	98	4800	7925
17	36	66	123	104	5100	8425
18	36	72	129	110	5400	8900
No. 60						
12	60	36	110	73	6600	10900
13	60	36	116	79	7200	11900
13	60	42	116	79	7800	12850
14	60	42	122	85	8400	13850
14	60	48	122	85	9000	14850
15	60	48	128	91	9600	15850
15	60	54	128	91	10200	16850
16	60	54	134	97	10800	17800
17	60	60	140	103	12000	19800
18	60	66	146	109	13200	21800
19	60	72	152	115	14400	23750
20	60	78	158	121	15600	25750

ADDITIONAL DATA APPLYING TO BOILERS BOTH WITH AND WITHOUT SMOKELESS FURNACE

Boiler No.	27	36	60
Width at foundation, in	35	48¼	72
Width of boiler, steam, in	56	72	98
Width of boiler, water, in	59	76	98
Height of boiler, in	80	83	87
Height of water line, in	57	59	66
Oval smoke pipe opening equivalent to	13¾ in. round	17 in. round	26 in. round

Smith Steam and Water Boilers

Smith steam and hot water boilers are of the cast iron sectional type for use in low pressure heating systems. They are made both with and without smokeless furnaces.



SMITH BOILER WITHOUT SMOKELESS FURNACE

Number of sections in boiler	Nominal size of fire, pot, in.		Total length of boiler, in.	Length at foundation, in.	Steam rating, ft.	Water rating, ft.
	Width	Length				
No. 27						
5	27	24	47	32	1200	1975
6	27	30	53	38	1500	2475
7	27	36	59	44	1800	2975
8	27	42	65	50	2100	3475
9	27	48	71	56	2400	3950
10	27	54	77	62	2700	4450
11	27	60	83	68	3000	4950
12	27	60	89	74	3300	5450
12	27	66	89	74	3300	5450
13	27	66	95	80	3600	5950
13	27	72	95	80	3600	5950
14	27	66	101	86	3900	6425
14	27	78	101	86	3900	6425
No. 36						
7	36	36	63	44	2300	3800
8	36	42	69	50	2800	4625
9	36	48	75	56	3300	5450
10	36	54	81	62	3800	6275
11	36	60	87	68	4300	7100
12	36	60	93	74	4800	7925
12	36	66	93	74	4800	7925
13	36	66	99	80	5300	8750
13	36	72	99	80	5300	8750
14	36	66	105	86	5800	9575
14	36	78	105	86	5800	9575
15	36	72	111	92	6300	10400
15	36	84	111	92	6300	10400
16	36	72	117	98	6800	11225
16	36	90	117	98	6800	11225
No. 60						
8	60	36	86	49	6000	9900
9	60	42	92	55	7200	11900
10	60	48	98	61	8400	13850
11	60	54	104	67	9600	15850
12	60	60	110	73	10800	17800
13	60	66	116	79	12000	19800
14	60	72	122	85	13200	21800
15	60	78	128	91	14400	23750
16	60	84	134	97	15600	25750
17	60	78	140	103	16800	27700
17	60	90	140	103	16800	27700
18	60	84	146	109	18000	29700
18	60	96	146	109	18000	29700

Note: For additional data pertaining to these boilers, see table at bottom of opposite column.

Continued on next page

Mills Water Tube Steam and Water Boilers

Sectional cast iron boilers which are moderate in first cost, low maintenance and extremely economical in fuel. Sectional view shows large combustion chamber and vertical waterways of small area. The latter absorb heat quickly, circulate water rapidly and make dry steam. Fired with anthracite coal, wood, coke or fuel gas.

MILLS WATER TUBE STEAM AND WATER BOILERS

Number of sections	Nominal size of fire pot, in.		Total length of boiler, in.	Length at foundation, in.	Smoke pipe opening equals, in. round	Fire (heating) surface, sq. ft.	Steam rating, ft.	Water rating, ft.
	Width	Length						
				No. 24				
5	24	24	48	32	9	75.5	900	1500
6	24	30	54	38	9	91.0	1125	1875
7	24	36	60	44	10	106.5	1350	2250
8	24	42	66	50	10	122.0	1575	2600
9	24	48	72	56	12	137.5	1800	2975
10	24	54	78	62	12	153.0	2025	3350
Total height, 66 in. Total widths—steam, 45 in.; water, 48 in. Height of water line, 47 in.								
				No. 34				
6	34	30	60	37	12	165.0	2000	3300
7	34	36	66	43	12	192.5	2400	3950
8	34	42	72	49	12	220.0	2800	4625
9	34	48	78	55	14	247.5	3200	5275
10	34	54	84	61	14	275.0	3600	5950
11	34	60	90	67	14	302.5	4000	6600
12	34	66	96	73	16	330.0	4400	7250
13	34	72	102	79	16	357.5	4800	7925
14	34	78	108	85	16	385.0	5200	8575
Total height, 78 in. Total width, 51 in. Height of water line, 54 in.								
				No. 44				
7	44	36	72	43	15	287	3600	5950
8	44	42	78	49	15	328	4200	6925
9	44	48	84	55	15	369	4800	7925
10	44	54	90	61	18	410	5400	8900
11	44	60	96	67	18	451	6000	9900
12	44	66	102	73	18	492	6600	10900
13	44	72	108	79	20	533	7200	11875
14	44	78	114	85	20	574	7800	12875
15	44	84	120	91	20	615	8400	13850
16	44	90	126	97	20	656	9000	14850
Total height, 75 in. Total width, 64 in. Height of water line, 58 in.								
				No. 48				
7	48	30	74	43	16	360	4800	7925
8	48	36	80	49	16	420	5600	9250
9	48	42	86	55	16	480	6400	10550
10	48	48	92	61	16	540	7200	11875
11	48	54	98	67	20	500	8000	13200
12	48	60	104	73	20	660	8800	14625
13	48	66	110	79	20	720	9600	15850
14	48	72	116	85	20	780	10400	17150
15	48	78	122	91	20	840	11200	18475
16	48	84	128	97	24	900	12000	19800
17	48	72	134	103	24	960	12800	21125
17	48	*90	134	103	24	960	12800	21125
18	48	78	140	109	24	1020	13600	22450
18	48	*96	140	109	24	1020	13600	22450
Total height, 103 in. Total width, 84 in. Height of water line, 84 in. *Maximum size of fire pot, not shipped as regular.								

H-B Steam and Water Boilers

H-B boilers have three waterways between sections. They are the only boilers in which ascending and descending currents of water are circulated through separate connections, giving a steady water line and rapid circulation without back pressure.

Outside connections assist in the ease of erection, remove joints from intense heat and are accessible, allowing full diameter of fire box.

No. 224 H-B Steam Boiler

H-B STEAM AND WATER BOILERS

No. of boiler	Nominal diam. fire pot, in.	Total height boiler, in.	Height of dome, in.	Height of water line, in.	Diam. smoke pipe opening, in.	Outside diam. fire pot, in.	Steam rating, ft.	Water rating, ft.
115	15	46	34	39½	6	19	250	425
217	17	55¼	20¾	49¾	7	20½	325	550
317	17	62¼	20¾	56¾	7	20½	375	625
219	19	55¼	20¾	49¾	7	22⅝	425	700
319	19	62¼	20¾	56¾	7	22⅝	475	775
221	21	56½	22	49¾	8	24⅝	500	825
321	21	63½	22	56¾	8	24⅝	550	900
223	23	56½	22	49¾	8	26⅝	600	1000
323*	23	63½	22	56¾	8	26⅝	700	1150
224	24	58	22	51	8	28¼	650	1075
324	24	65½	22	58½	8	28¼	800	1325
227	27	58	22	51	8	31¼	900	1500
327	27	65½	22	58½	8	31¼	1000	1650

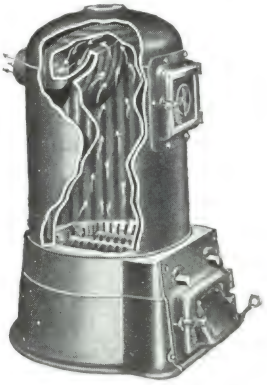
*Note that No. 323 is larger than No. 224.

Fire tools furnished: poker and flue brush with handle.

Trimmings furnished with steam boilers: steam gage with cock; water column complete; two ⅝-in. gage cocks; one pair water gage cocks with glass; damper regulator complete with chain; pipe and fittings for connecting steam trimmings.

Menlo Hot Water Supply Boilers

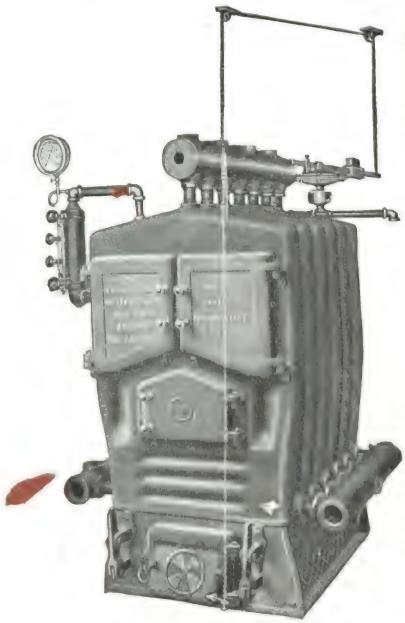
The sizes listed below will be found extremely economical for domestic hot water supply.



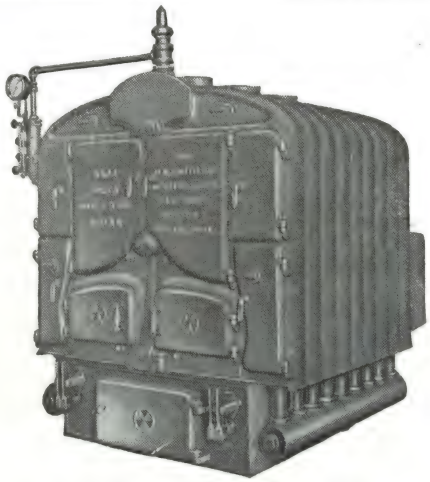
Interior of Menlo Boiler Showing Fire Travel

MENLO HOT WATER SUPPLY BOILERS

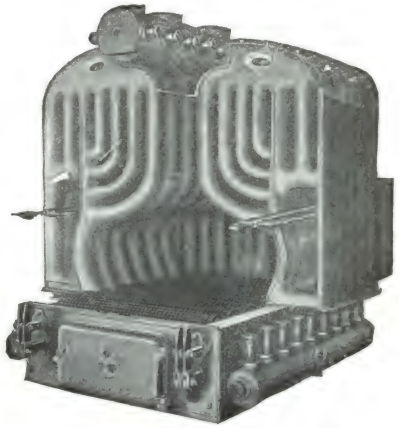
No. of boiler	10	12	14	214	16	18	20
Diam. fire pot, in.	10	12	14	14	16	18	20
Water rating, ft	200	300	400	500	500	600	800
Hot water supply rating, gals	225	350	500	750	.....	.....	.....
Total height of boiler, in	36	37½	39	45½	50	50	51
Outside diam. dome, in	15	17½	20	20	22	24	26
Diam. smoke pipe opening, in.	5	5	6	6	7	7	8



No. 24 Mills Water Tube Steam Boiler



No. 44 Mills Water Tube Water Boiler



Interior of No. 44 Mills Water Tube Boiler

Continued on next page

Princess Direct Radiators

For sanitary reasons, radiators with wide spacing should be demanded.

If ordinary radiators are not sanitary enough for hospitals, they are not sanitary for the home. To meet hospital specifications, some manufacturers make special radiators with wide spacing and charge an increased price.

Princess radiators are the standard radiators of THE H. B. SMITH CO. and are sold at regular list prices.

Single Column Two-column Three-column Five-column

PRINCESS DIRECT RADIATORS

Princess Direct Radiator Tappings

Radiators will be tapped for two-pipe work unless otherwise specified.

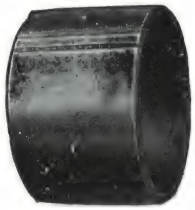
STEAM, ONE-PIPE WORK	Inches
Radiators of 30 ft. and smaller	1
Radiators larger than 30 ft. and smaller than 60 ft.	1¼
Radiators of 60 ft. and larger and smaller than 120 ft.	1½
Radiators of 120 ft. and larger	2
Air valve	⅛

STEAM, TWO-PIPE WORK	
Radiators of 50 ft. and smaller	1 x ¾
Radiators larger than 50 ft. and smaller than 120 ft.	1¼ x 1
Radiators of 120 ft. and larger	1½ x 1¼
Air valve	⅛

WATER	
Radiators of 50 ft. and smaller	1 x 1
Radiators larger than 50 ft. and smaller than 120 ft.	1¼ x 1¼
Radiators of 120 ft. and larger	1½ x 1½
Air valve	⅛ at top

SPECIAL NOTICE—If radiators are required tapped top and bottom same end, or top and bottom opposite ends, so specify on order. All tappings will be made right-hand unless otherwise specified.

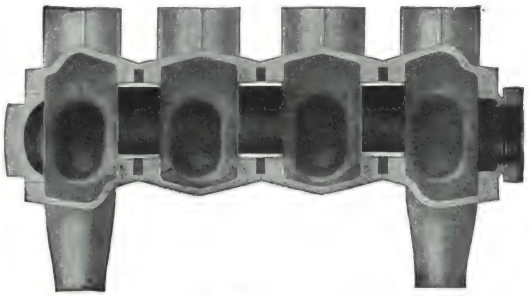
Tappings other than regular can be made special to order.



PUSH NIPPLE

PRINCESS TWO-COLUMN STEAM RADIATOR

PRINCESS TWO-COLUMN WATER RADIATOR



SECTION THROUGH RADIATOR SHOWING PUSH NIPPLE CONSTRUCTION FOR DIRECT RADIATORS

LIST OF SIZES SHOWING RADIATING SURFACE IN SQUARE FEET OF PRINCESS DIRECT RADIATORS

No. of sections	TWO-COLUMN: Length per section, 3 in. total, ft.	in.	Height, in. 45	37	31	25	22	19 — Radiation in sq. ft. per section 5	4	3½	3	2⅝	2¼	THREE-COLUMN: Length per section, 3¼ in. total, ft.	in.	Height, in. 45	37	31	25	22	19 — Radiation in sq. ft. per section 8	6½	5½	4½	4	3½	FIVE-COLUMN: Length per section, 3¼ in. total, ft.	in.	Height, in. 37	25	16	14	12 — Radiation in sq. ft. per section 10	7	4⅔	4	3⅓
3	0	10	15	12	10½	9	7⅞	6¾	0	10¾	24	19½	16½	13½	12	10½	0	10¾	30	21	14	12	10
4	1	1	20	16	14	12	10½	9	1	2	32	26	22	18	16	14	1	2	40	28	18⅔	16	13⅓
5	1	4	25	20	17½	15	13⅛	11¼	1	5¼	40	32½	27½	22½	20	17½	1	5¼	50	35	23⅓	20	16⅔
6	1	7	30	24	21	18	15¾	13½	1	8½	48	39	33	27	24	21	1	8½	60	42	28	24	20
7	1	10	35	28	24½	21	18⅜	15¾	1	11¾	56	45½	38½	31½	28	24½	1	11¾	70	49	32⅔	28	23⅓
8	2	1	40	32	28	24	21	18	2	3	64	52	44	36	32	28	2	3	80	56	37⅓	32	26⅔
9	2	4	45	36	31½	27	23⅝	20¼	2	6¼	72	58½	49½	40½	36	31½	2	6¼	90	63	42	36	30
10	2	7	50	40	35	30	26¼	22½	2	9½	80	65	55	45	40	35	2	9½	100	70	46⅔	40	33⅓
11	2	10	55	44	38½	33	28⅞	24¾	3	¾	88	71½	60½	49½	44	38½	3	¾	110	77	51⅓	44	36⅔
12	3	1	60	48	42	36	31½	27	3	4	96	78	66	54	48	42	3	4	120	84	56	48	40
13	3	4	65	52	45½	39	34⅛	29¼	3	7¼	104	84½	71½	58½	52	45½	3	7¼	130	91	60⅔	52	43⅓
14	3	7	70	56	49	42	36¾	31½	3	10½	112	91	77	63	56	49	3	10½	140	98	65⅓	56	46⅔
15	3	10	75	60	52½	45	39⅜	33¾	4	1¾	120	97½	82½	67½	60	52½	4	1¾	150	105	70	60	50
16	4	1	80	64	56	48	42	36	4	5	128	104	88	72	64	56	4	5	160	112	74⅔	64	53⅓
17	4	4	85	68	59½	51	44⅝	38¼	4	8¼	136	110½	93½	76½	68	59½	4	8¼	170	119	79⅓	68	56⅔
18	4	7	90	72	63	54	47¼	40½	4	11½	144	117	99	81	72	63	4	11½	180	126	84	72	60
19	4	10	95	76	66½	57	49⅞	42¾	5	2¾	152	123½	104½	85½	76	66½	5	2¾	190	133	88⅔	76	63⅓
20	5	1	100	80	70	60	52½	45	5	6	160	130	110	90	80	70	5	6	200	140	93⅓	80	66⅔
21	5	4	105	84	73½	63	55⅛	47¼	5	9¼	168	136½	115½	94½	84	73½	5	9¼	210	147	98	84	70
22	5	7	110	88	77	66	57¾	49½	6	½	176	143	121	99	88	77	6	½	220	154	102⅔	88	73⅓
23	5	10	115	92	80½	69	60⅜	51¾	6	3¾	184	149½	126½	103½	92	80½	6	3¾	230	161	107⅓	92	76⅔
24	6	1	120	96	84	72	63	54	6	7	192	156	132	108	96	84	6	7	240	168	112	96	80
25	6	4	125	100	87½	75	65⅝	56¼	6	10¼	200	162½	137½	112½	100	87½	6	10¼	250	175	116⅔	100	83⅓
26	6	7	130	104	91	78	68¼	58½	7	1½	208	169	143	117	104	91	7	1½	260	182	121⅓	104	86⅔
27	6	10	135	108	94½	81	70⅞	60¾	7	4¾	216	175½	148½	121½	108	94½	7	4¾	270	189	126	108	90
28	7	1	140	112	98	84	73½	63	7	8	224	182	154	126	112	98	7	8	280	196	130⅔	112	93⅓
29	7	4	145	116	101½	87	76⅛	65¼	7	11¼	232	188½	159½	130½	116	101½	7	11¼	290	203	135⅓	116	96⅔
30	7	7	150	120	105	90	78¾	67½	8	2½	240	195	165	135	120	105	8	2½	300	210	140	120	100

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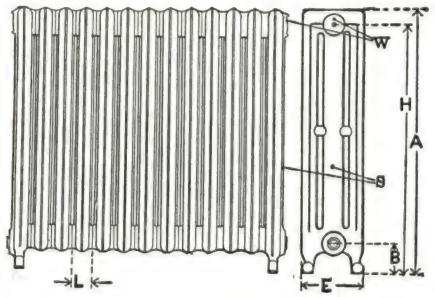


DIMENSIONS OF PRINCESS DIRECT RADIATORS IN INCHES

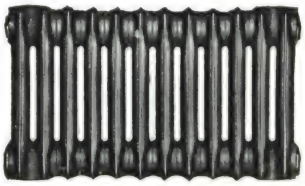
	Single-column	2-column	3-column	5-column Heights: 37 and 25	5-column Heights: 16, 14 and 12
E—Width of section	5¼	7	9	12	12
L—Length of section	3	3	3¼	3¼	3¼
B—Hgt. to center on regular tapping	4⅝	4⅝	4⅝	4⅝	3
Single-, 2- and 3-column					
A—Total height	45	37	31	25	22	19
H—Height of top tapping:						
Single-column	43⅛	34 9/16	28 15/16	23	20	17
2-column	43	35	29	23	20	17
3-column	43	35	29 1/16	23 3/16	20	17 3/16
5-column						
A—Total height	37	25	*16	*14	*12
H—Height of top tapping	35	23	14	12	10

S Location of air vent tapping (steam) *Window heights.
W Location of air vent tapping (water)

Princess Wall Radiators

Suited for all places where direct radiators or pipe coils can not be used. Especially desirable in locations where floor space is valuable and where wall, column or ceiling space is more available. They possess extreme flexibility of size and arrangement. Made in two heights: 15 and 22 in. Can be furnished with heating surfaces from 5 sq. ft. up, in multiples of 2½ sq. ft. Corresponding lengths in 22-in. radiator are from 9 in. up, in multiples of 4 in. (1 in. allowed in over-all length for plugs and bushings). In the 15-in. radiator, corresponding lengths are from 13 in. up in multiples of 6 in. By combinations of the two heights, these radiators can be arranged in tiers, either for horizontal runs or for column work. Hung horizontally, they make excellent ceiling radiators.

For water, Princess wall radiators have nipple connections between groups. For steam, the top connection at intervals is a plug instead of a nipple. Steam radiators can not be used for water; water radiators can (but should not) be used for steam.



15-IN. PRINCESS RADIATOR
10 sq. ft. of radiation

22-IN. PRINCESS RADIATOR
10 sq. ft. of radiation

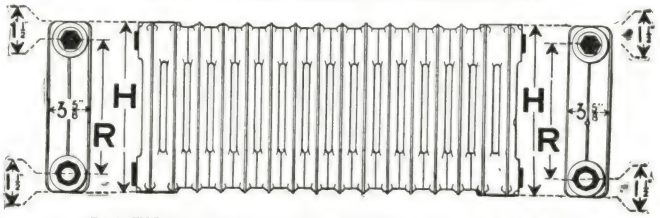
END VIEW

RADIATING SURFACE

15-in. radiator Length ft. in.	15-in. radiator Sq. ft. of surface	22-in. radiator Length ft. in.	22-in. radiator Sq. ft. of surface
1—1	5	0—9	5
1—7	7½	1—1	7½
2—1	10	1—5	10
2—7	12½	1—9	12½
3—1	15	2—1	15
3—7	17½	2—5	17½
4—1	20	2—9	20
4—7	22½	3—1	22½
5—1	25	3—5	25
5—7	27½	3—9	27½
6—1	30	4—1	30
6—7	32½	4—5	32½
7—1	35	4—9	35
7—7	37½	5—1	37½
8—1	40	5—5	40
8—7	42½	5—9	42½
9—1	45	6—1	45
9—7	47½	6—5	47½
10—1	50	6—9	50
10—7	52½	7—1	52½
11—1	55	7—5	55
11—7	57½	7—9	57½
12—1	60	8—1	60
12—7	62½	8—5	62½
13—1	65	8—9	65
13—7	67½	9—1	67½
14—1	70, 72½	9—5	70
14—7	72½	9—9	72½
15—1	75	10—1	75

20-ft. Radiator 2 Tiers High
25-ft. Radiator 2 Tiers High
30-ft. Radiator 2 Tiers High

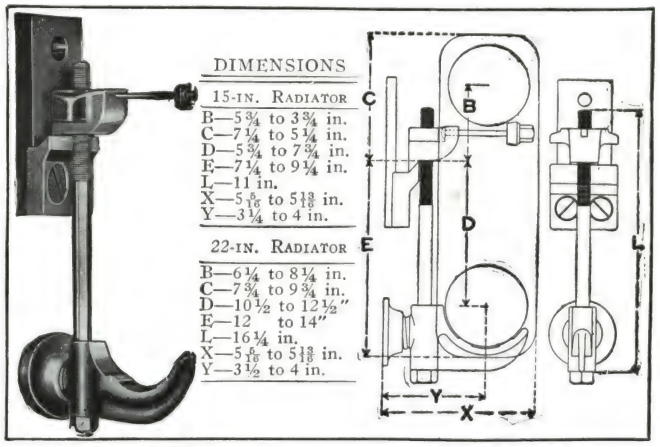
PRINCESS WALL RADIATOR COMBINATIONS



DIMENSIONS OF PRINCESS WALL RADIATORS

	15-in. radiator	22-in. radiator
H—Total height	14 9/16 in.	21 11/16 in.
R—Center to center of tapping	11 9/16 in.	18 11/16 in.

Width of radiator 3⅝ in.
Radiator 15 in. high—6 in. in length = 2½ ft. surface.
Radiator 22 in. high—4 in. in length = 2½ ft. surface.
Plugs and bushings (1 in.) included in total length of radiator.



NO. 10 PRINCESS ADJUSTABLE WALL BRACKET

Princess Wall Radiator Tappings

Radiators will be tapped for two-pipe work unless otherwise specified.

	Inches
STEAM, TWO-PIPE WORK	
Radiators of 50 ft. and smaller	1 x ¾
Radiators larger than 50 ft. and smaller than 120 ft.	1¼ x 1
Radiators of 120 ft. and larger	1½ x 1¼
Air valves	⅛
Radiators 2, 4, or 6 units high—tapped top and bottom same end	
Radiators 3, 5, or 7 units high—tapped top and bottom opposite ends	
STEAM, ONE-PIPE WORK	
Radiators of 30 ft. and smaller	1
Radiators larger than 30 ft. and smaller than 60 ft.	1¼
Radiators of 60 ft. and larger	1½
Air valve	⅛
WATER	
Radiators of 50 ft. and smaller	1 x 1
Radiators larger than 50 ft. and smaller than 120 ft.	1¼ x 1¼
Radiators of 120 ft. and larger	1½ x 1½
Air valve	⅛ in. top plug
Radiators 2, 4, or 6 units high—tapped top and bottom same end	
Radiators 3, 5, or 7 units high—tapped top and bottom opposite ends	

UTICA HEATER COMPANY

UTICA, N. Y.

NEW YORK OFFICE, 5620 Grand Central Terminal CHICAGO OFFICE, 218-220 W. Kinzie Street CLEVELAND OFFICE, 30 Euclid Arcade

REPRESENTATIVES IN THE JOBBING CENTERS

Product

The UTICA-IMPERIAL SUPER-SMOKELESS BOILER, a single grate boiler burning any grade of soft coal, hard coal, oil or gas without smoke. Patented June 10, 1922.

Introduction

Rigid smoke ordinances in many cities necessitate the use of smokeless boilers in large buildings such as schools, churches, hotels, apartments, theaters, public buildings and large residences. Increasing cost of fuel and recurring periods of coal scarcity suggest the selection of heating equipment that can be successfully operated with practically any fuel available.

The Utica-Imperial Super-smokeless Boiler meets these several requirements and, unlike many types of boilers, it operates smokelessly and economically with ordinary care and comparatively little attention. Even with inferior grades of bituminous coal, it maintains high efficiency.

Construction

The Utica-Imperial Super-smokeless Boiler is an up-draft single grate type of boiler. The rear of the firebox is formed by a hollow baffle or water curtain section, surfaced with special high test fire brick, with a fusing point far above any possible temperature within the boiler. The smoke and flames rise in the firebox, heating the overhanging fire surface; travel toward the rear and strike the superheated face of the baffle wall, breaking up the soot particles preliminary to more perfect combustion.

Smoke and soot consist largely of carbon, which is completely consumed when mixed with the correct proportion of oxygen. The higher the temperature of this carbon and oxygen at the moment of union, the more nearly perfect is the resulting combustion. The hot blast chamber of the Super-smokeless Boiler accomplishes this most successfully. Cold air entering at both sides through adjustable inlets is intensely heated and then discharged below the water curtain, combining readily with smoke and soot just as they leave the baffle wall in their broken-up condition.

Practically perfect combustion is attained. An intensely hot clean flame results (similar to a Bunsen burner flame) which swirls spirally through the flues, consuming all the combustible gases and soot and superheating the flue surfaces. The carbon is consumed and utilized for heating instead of being released in the form of smoke.

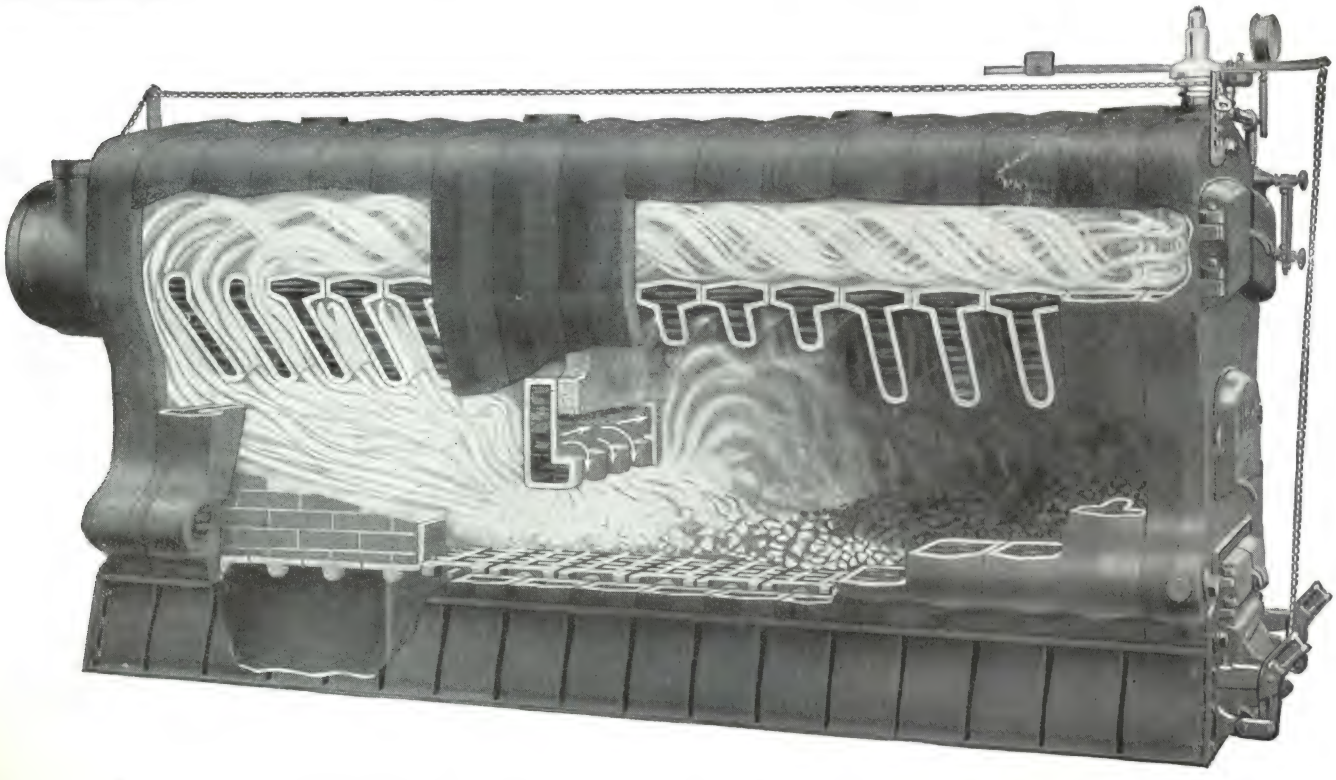
Operation

Utica-Imperial Super-smokeless Boilers require far less attention than the ordinary soft coal boiler. An unskilled janitor can run the heater successfully and its firing periods are less frequent than in other types of boilers.

Installation

Thousands of Super-smokeless Boilers are installed in every type of large building throughout the United States and are giving thoroughly reliable and economical service.

Complete catalogue upon application.



CROSS-SECTIONAL VIEW OF THE UTICA-IMPERIAL SUPER-SMOKELESS BOILER

Continued on next page

RATINGS AND DIMENSIONS OF UTICA-IMPERIAL SUPER-SMOKELESS BOILERS

No. steam boiler	Ratings (sq. ft.)	Water boiler number	Ratings (sq. ft.)	Grate area (sq. ft.)	Measurement of pit under ash pit, in.	Foundation measurements, in.	Minimum chimney flue sizes, in.*		
							Square	Round	Height
S-245	1200	W-245	1975	4.88	36 x 24	40 x 29½	12 x 12	12	40
S-246	1500	W-246	2475	6.10	44¼ x 24	48¼ x 29½	12 x 12	12	40
S-247	1800	W-247	2975	6.10	44¼ x 24	56¾ x 29½	14 x 14	14	45
S-248	2100	W-248	3475	7.32	52¾ x 24	64¾ x 29½	14 x 14	14	50
S-249	2400	W-249	3975	7.32	52¾ x 24	72½ x 29½	14 x 14	14	55
S-335	2000	W-335	3325	6.95	36 x 33½	40 x 39	16 x 16	15	40
S-336	2500	W-336	4175	8.68	44¼ x 33½	48¼ x 39	16 x 16	15	40
S-337	3000	W-337	5000	10.42	52¾ x 33½	56¾ x 39	16 x 16	15	40
S-338	3500	W-338	5825	12.15	60¾ x 33½	64¾ x 39	18 x 18	16	50
S-339	4000	W-339	6675	13.89	68½ x 33½	72½ x 39	18 x 18	16	50
S-3310	4700	W-3310	7850	15.63	77¼ x 33½	81¼ x 39	20 x 20	20	55
S-405	2750	W-405	4575	9.25	34½ x 44½	39½ x 52	18 x 18	18	50
S-406	3500	W-406	5825	11.57	43 x 44½	48 x 52	18 x 18	18	50
S-407	4250	W-407	7075	13.88	51 x 44½	56 x 52	18 x 18	18	50
S-408	5000	W-408	8325	16.19	60 x 44½	65 x 52	20 x 20	20	55
S-409	5750	W-409	9575	18.51	68 x 44½	73 x 52	20 x 20	20	55
S-4010	6500	W-4010	10825	20.82	76 x 44½	81 x 52	20 x 20	20	60
S-4011	7250	W-4011	12075	23.13	84½ x 44½	89½ x 52	22 x 22	22	60
S-4012	8000	W-4012	13325	23.13	89 x 44½	97½ x 52	22 x 22	22	65
S-4013	8750	W-4013	14575	23.13	89 x 44½	106½ x 52	22 x 22	22	70
S-4014	9500	W-4014	15825	23.13	89 x 44½	115 x 52	22 x 22	22	75
S-4015	10250	W-4015	17075	23.13	89 x 44½	123½ x 52	22 x 22	22	75
S-4016	11000	W-4016	18325	23.13	89 x 44½	132 x 52	22 x 22	22	80
S-4017	11750	W-4017	19575	23.13	89 x 44½	141 x 52	24 x 24	24	80
S-4018	12500	W-4018	20825	23.13	89 x 44½	149½ x 52	24 x 24	24	80
S-4019	13250	W-4019	22075	23.13	89 x 44½	158 x 52	24 x 24	24	85
S-4020	14000	W-4020	23325	23.13	89 x 44½	166½ x 52	24 x 24	24	90
S-4021	14750	W-4021	24575	23.13	89 x 44½	175 x 52	24 x 24	24	100
S-4022	15500	W-4022	25825	23.13	89 x 44½	183½ x 52	26 x 26	26	100
S-4023	16250	W-4023	27075	23.13	89 x 44½	192 x 52	26 x 26	26	100
S-4024	17000	W-4024	28325	23.13	89 x 44½	200½ x 52	26 x 26	26	100

	24 Series	33 Series	40 Series		24 Series	33 Series	40 Series
Height to top of steam trimmings, in.	66	72¼	77½	Height of ash pit, in.	10	10	11
Height to top of outlets, in.	54	64½	69	Length of smoke box, in.	20	21½	28
Height of water line, in.	45½	53	57	Height to center of smoke collar, in.	40	47	51
Width including trimmings, in.	46	53	66	Height to bottom of smoke box, in.	33½	39½	41
Width excluding trimmings, in.	34¾	48	58	Height to top of smoke box, in.	46½	54½	61
Width of ash pit, in.	29½	39	52	Size of feed door, in.	9¼ x 15	10x18	12½ x 24

*These sizes apply only to single boilers. If a battery of two or more boilers is to be used, send for complete schedule of chimney sizes.

A Typical Installation of Utica-Imperial Super-smokeless Boilers

CONTINENTAL OIL BURNER CORPORATION

Manufacturers of Oil Burning Heaters

430 Rush Street
CHICAGO, ILL.

Product

CONTINENTAL FUEL OIL BURNER.

CONTINENTAL Fuel Oil Burner

TRADE-MARK

Description

A fuel oil burner that can be installed in any new or old furnace, steam heating plant or hot water plant, converting same into an oil burning system. It is usually installed with complete automatic thermostatic control so it will operate with little or no attention. It can also be controlled by steam pressure or be controlled by hand, thus reducing the cost of equipment.

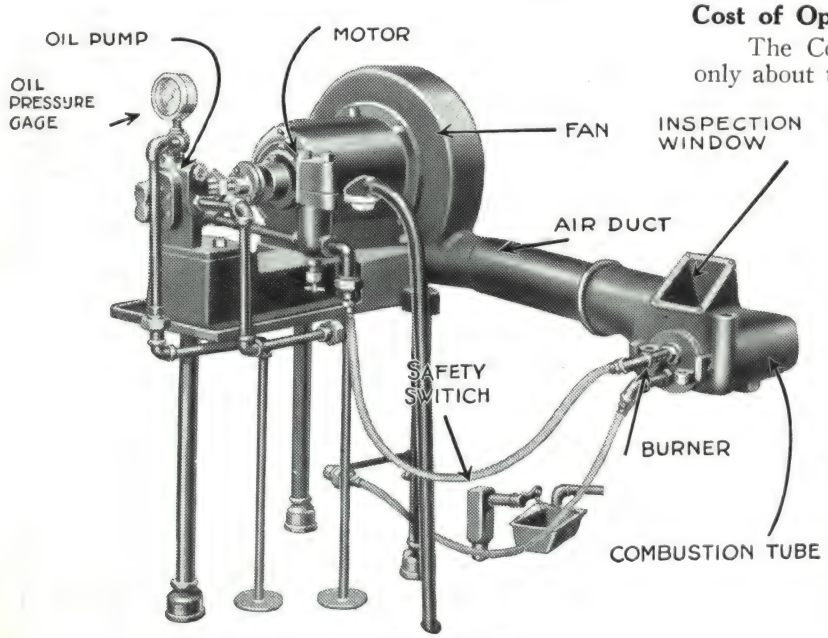
It burns domestic fuel oil of 30°-36° gravity, which is safer to handle and store than kerosene and is not subject to as many city or underwriters' restrictions. Large storage tanks can usually be placed in the basement if desired. It will also burn kerosene or distillate satisfactorily.

Mechanism

The Continental fuel oil burner consists of a small pump and low pressure centrifugal fan directly connected to a slow speed motor. The fuel is sprayed by pump pressure through a nozzle without any moving parts.

The motor is high grade and made especially for the purpose. It is provided with extra large oil chambers to give continuous service for long periods without attention if the oiling should be neglected.

The pump is very carefully made of high grade materials, having been designed especially for this purpose. The wearing parts are made of case hardened steel so as to insure consistent results and long life.



CONTINENTAL FUEL OIL BURNER
Showing various parts of mechanism

The air and fuel vapor are intimately mixed and highly heated and ignited by a small pilot immediately before they are injected into the combustion chamber, thus assisting in the production of an efficient and intense fire.

The amount of fuel and air are independent of the flue draft at all times so it is not necessary to readjust when the weather changes.

Equipment

The Continental fuel oil burner includes everything necessary to convert a coal heater into an efficient and safe oil heater. The burner is often inserted through the clinker door and it is very seldom necessary to interfere with operation of either firebox or ashpit doors.

The equipment includes firebrick lining and firebrick arch so as to secure the same efficient combustion realized in large industrial plants, locomotives and steam boats.

All parts of the Continental fuel oil burner are well made of suitable materials intended to give a long and satisfactory life. There are no flimsy parts to quickly fail and there are no inaccessible delicate parts inside the furnace.

Quiet Operation

The Continental fuel oil burner operates without the objectionable noise often produced by equipments of this character.

Cost of Operation

The Continental fuel oil burner uses fuel costing only about two-thirds the cost of kerosene and the fuel cost will never be greater than hard coal, and in many localities much less.

The Continental fuel oil burner is being made to *heat water automatically* at about one-fifth the cost of city gas.

Capacity

One small unit of the Continental fuel oil burner is sufficient to heat 1500 sq. ft. of steam radiation. The units can be grouped or larger units used to handle larger installations as desired.

Dependability

This system embodies only oil burning methods which have been used for years by large installations and have been adopted by the United States Navy.

This equipment, while employing well-known principles, is especially designed and adapted for automatic domestic heating.

COMMONWEALTH BRASS CORPORATION

Radiator Valves

5781-5835 Commonwealth Avenue

DETROIT, MICH.

Products

Manufacturers of a line of PACKLESS STEAM RADIATOR VALVES in many styles, including Round Wheel Handle, Graduated Dial with Lever Handle, Plain Lever Handle and Extension Handle or Lock Shield, either plain or graduated.

Also manufacturers of Standard Type Steam Radiator Valves, Quick Opening Hot Water Radiator Valves and Union Elbows.

Scope of Use, Lavigne Packless Steam Valves

Can be used on vapor or vacuum installations, and to advantage on any low pressure steam heating systems, because the packless arrangement prevents leakage due to use of ordinary valves. The easy regulation renders them *economical* for use on central station steam plants.

Extension handle packless steam radiator valves are operated behind wood or rattan grilles, and an overhead device permits operation of valves by means of a chain pull when radiators are placed beyond easy access.

The "Packless" Feature

The Lavigne construction dispenses with the ordinary method of packing around stem, and substitutes therefor a permanent packing arrangement which illustrates the push and pull principle and *absolutely prevents leakage of steam, air or water.* Valve has double washers of non-deteriorating composition; is independent of metal joints, and always stays tight.

Lavigne Graduated Packless Valve

By reason of such construction, this valve opens quickly and closes quickly, a seven-eighths turn of the handle completely opening or closing it, and locking it closed—whether handle be graduated, wood wheel, lever or extension.

Extra large handle remains cool, prevents hand from coming in contact with heated metal parts, and is fastened with one accessible screw to cast lugs (part of valve itself). Valve not injured by standing on handle, by side thrusts, etc., and is of normal dimensions and neat appearance.

Installation—Each valve can be accurately adjusted by any steamfitter to a wide range of sizes of radiators, thus enabling jobbers and heating contractors to carry these valves in stock. Any one of 4 shells (furnished with valves), with appropriate number of upright slots, may be attached to disk holder below disk. Shell with 1 slot is used with valve when connected to a small radiator; and shells with 2, 3 or 4 slots are, respectively, employed on medium or large size radiators; radiator being heated entirely, three-fourths, one-half or one-fourth, etc., as desired.

Advantages of Packless Valves—(1) A non-leaking, permanent tight joint. (2) A quick opening and closing feature—by a seven-eighths turn; also permitting valve to remain partly open at any desired position. (3) Valve is foolproof, all working parts being protected by valve bonnet from outside kicks, etc. (4) Comfort and economy of heat regulation are obtained.

Specifications, Lavigne Packless Valves

All radiators shall be equipped with Lavigne packless steam radiator valves, as manufactured by the COMMONWEALTH BRASS CORPORATION, Detroit, Mich.

Radiator valves shall be (angle, corner or globe) type equipped with (wood wheel, graduated with lever handle, or furnished with lock shield). Special mention should be made when extension handle or overhead device is required. Also specify whether corner valves should be right or left hand.

WOOD WHEEL PACKLESS ANGLE VALVE

SECTIONAL VIEW, GRADUATED PACKLESS VALVE

GRADUATED PACKLESS VALVE

WOOD WHEEL PACKLESS GLOBE VALVE

WOOD WHEEL PACKLESS CORNER VALVE

AMERICAN DISTRICT STEAM COMPANY

Manufacturers of Steam Heating Specialties

NORTH TONAWANDA, N. Y.

BRANCH OFFICES

NEW YORK, N. Y. ST. PAUL, MINN. SEATTLE, WASH. CHICAGO, ILL.

SALES AGENCIES IN PRINCIPAL CITIES

Products

SPECIALTIES used in the ADSCO SYSTEM of ATMOSPHERIC STEAM HEATING.

Also manufacturers of all material used in connection with the distribution and measurement of steam: Pipe Fittings for underground steam mains, including Anchorage Collars, Pipe Anchors, Pipe Guides, Angle Fittings, Companion Flanges, Slotted Angle Flanges and Adjustable Annular Wedges; Underground Steam Pipe Casing; Expansion Joints; Expansion Variators; Manhole Curbs; Gate Valves; Steam Traps; Pressure Regulators; Service Water Heaters; Meters for Steam or Liquids.

Adsco System of Atmospheric Steam Heating

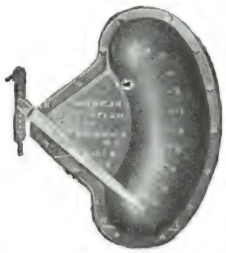
Adsco heating constitutes an economical method of distributing steam heat throughout a building, either from a central station or by an individual boiler on the premises. In either case, the principle of operation remains the same and is applicable to all classes of buildings.

Adsco heating belongs to the classification commonly known as vapor systems and it has been conclusively proved that this type of heating system is by far the most satisfactory of any yet developed.

Where Adsco systems are installed, fuel savings range from 20% to 30%.

ADSCO GRADUATED RADIATOR VALVE

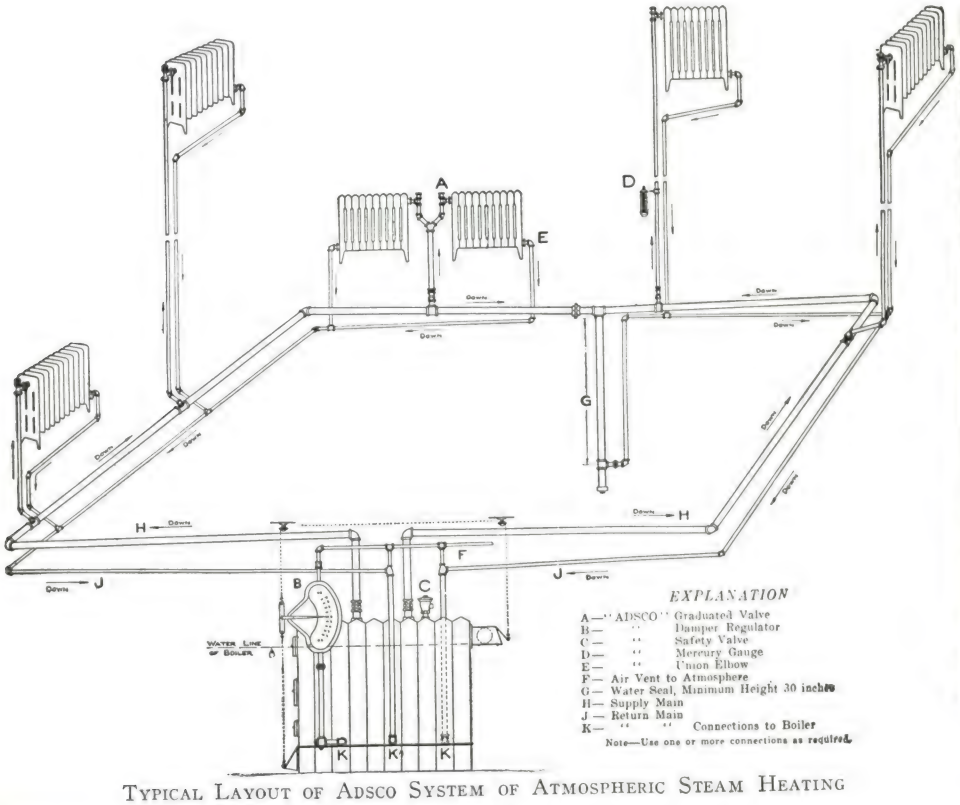
ADSCO UNION ELBOW



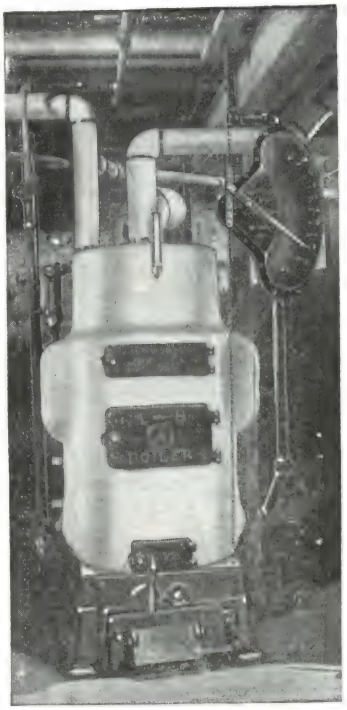
ADSCO DAMPER REGULATOR

ADSCO SAFETY VALVE

ADSCO MERCURY GAUGE



TYPICAL LAYOUT OF ADSCO SYSTEM OF ATMOSPHERIC STEAM HEATING



INDIVIDUAL STEAM BOILER SUPPLY

Note Adsco damper regulator, mercury gauge and safety valve

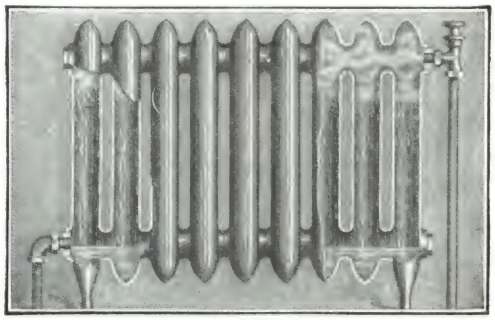
Continued on next page

Principle of the Adsco Heating System

The principle of operation is that under the pressure (in ounces) at which the system is to operate, a fully opened Adsco radiator valve will fill not more than 80% of the radiator with steam under average conditions. The remaining 20% of the radiator (the lower 20%) is filled with air and is in direct communication with the atmosphere by means of the return piping which is thoroughly vented. Thus the full capacity of the radiator acts as heating surface.

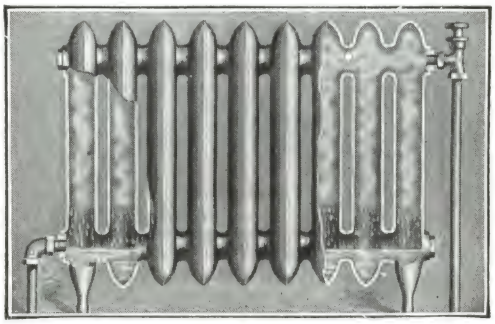
All heat units in the steam are transmitted to the radiator and into the room. Even the condensation, as it flows over the lower inside surface of the radiator, gives up its heat to the room, leaving the radiator at a temperature so low that there is no need to insulate the return pipes.

The Adsco system is *noiseless*.



Sectional View of Radiator Showing Action of Adsco Heating

Upper portion of radiator filled with steam, remainder used as heat economizing surface



A Colder Day, Steam "Full On"

Adsco graduated radiator valve allows enough steam to enter to fill but 80% of radiator, the rest is heat economizing surface

Radiators Used in the Adsco System

Any make of standard hot water radiators can be used. They should be large enough to give ample heating effect under the coldest and most unfavorable weather conditions.

Adsco Graduated Radiator Valve

A specially constructed radiator valve for use with the Adsco system. It has a plainly graduated collar and a pointer on the stem which indicates the position of the valve opening. The valve opens full with a three-quarter turn.

Although only made in ¾-in. size, it can be regulated to fit any size standard radiator up to 200 sq. ft. of radiation. This is accomplished by means of a removable disk inside the valve which is calibrated at the factory for each radiator. Each disk is plainly marked for the size radiator for which it has been set. It will therefore allow only 80% of the radiator to become filled with steam.

Adsco Union Elbow

Used for discharge connection on all radiators, no valves or return traps of any kind being required on the return connection.

Size, ¾ in. for all radiators.

Adsco Damper Regulator

For individual boiler supply.

Provides sensitive pressure regulation by controlling the position of draft and check damper.

Cast iron shell is tapped at the bottom for 1¼-in. pipe connection to the water space of the boiler; the top is provided with ¾-in. connection to the air vent of the system.

Adsco Safety Valve

For individual boiler supply.

Provides quick relief for excess boiler pressure resulting from leaving ash pit door open or from other accidental causes. The valve is set at the factory to blow off at 18-oz. pressure and is then sealed.

Easily adjusted for lower pressures of 15 and 13 oz. Boiler connection is 1¼ in.

Adsco Mercury Gauge

Specially designed for indicating pressures on the Adsco system and should be connected to the main steam supply pipe or, if desired, may be installed in a convenient location on any supply riser.

Pressure range, 3 lbs. Furnished with special gauge cock and mercury.

Pipe connection is ¼ in.

Type and Size of Boiler

If individual boiler supply is to be used, the boiler selected should have a water line as low as is consistent with proper design.

Rated capacity of the boiler should be from 60% to 80% greater than the surface of radiators installed.

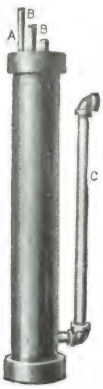
Where Central Station Service Is Used

If steam supply is from central station carrying steam pressures from 1 to 15 lbs., the Perfection pressure reducing valve and the Adsco pipe receiver is required in place of the damper regulator and safety valve.

Adsco Pressure Reducing Valve—Installed on the service pipe where it enters the building.

Adsco Pipe Receiver—For collection of return condensation. Connection "A" is for vent line to atmosphere; connections "B" are for main return lines; connection "C" is for discharge of condensation to meter.

Adsco Perfection Pressure Reducing Valve



Adsco Pipe Receiver

THE BISHOP & BABCOCK COMPANY

Vapor and Vacuum Heating Specialties, Temperature Control Systems, and High Pressure Steam Specialties

GENERAL OFFICES AND FACTORY

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y. ATLANTA, GA. CHICAGO, ILL. PITTSBURGH, PA. ST. LOUIS, MO. DETROIT, MICH. KANSAS CITY, MO. DENVER, COLO. DALLAS, TEX. CINCINNATI, OHIO ST. PAUL, MINN.

AGENTS

BOSTON, MASS., W. D. Cashin & Co.
PHILADELPHIA, PA., Alexander & McDevitt
CHARLOTTE, N. C., I. Hardeman
DETROIT, MICH., T. R. Woolley
CHICAGO, ILL., E. Vernon Hill Co.
MINNEAPOLIS, MINN., W. P. Nevins Co.
KANSAS CITY, MO., Engineering Sales Co.
OKLAHOMA CITY, OKLA., Federal Steam Specialties Co.
BUFFALO, N. Y., Myron C. Beman
CINCINNATI, OHIO, C. R. Lingo Engineering Sales Co.
AMSTERDAM, N. Y., F. E. Dwyer
BIRMINGHAM, ALA., R. L. Hicks
NASHVILLE, TENN., Ryan Sales Co.

Products

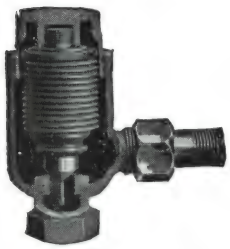
Manufacturers of Heating Specialties for Vapor and Vacuum Heating Systems; Temperature Control Systems; and High Pressure Steam Specialties.

THE B&B LINE
TRADE-MARK

B & B Multiflex Radiator Trap

At the return end of each unit of radiation, drip points, hot water generator and hot blast heaters, there should be installed a Bishop & Babcock water and air relief trap, which is designed to freely permit the water of condensation and air accumulated in the radiation to enter the return line but to always prevent the passage of steam, thereby maintaining the radiation at an efficiency of 100%.

These traps are factory adjusted and require no adjustments on the installation, have no gaskets and are of heavy bronze construction. They have large openings and are capable of passing large quantities of condensation, have large lifts, removable seat and valve, are entirely automatic in operation and absolutely noiseless, being so constructed that dirt or foreign matter will in no way interfere with their successful operation.



B & B Multiflex Trap

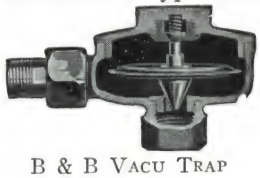
SCHEDULE OF B & B MULTIFLEX TRAPS

Size	Capacities vacu vapor, sq. ft.	Capacities return line, sq. ft.	Net weight, lbs.
½" angle	200	250	2½
¾" angle	500	600	3
1" angle	1000	1100	3½

Multiflex traps are made angle, right hand, left hand and straightway.

B & B Vacu Radiator Trap

This trap is practically identical in operation to the Multiflex trap, both being of the thermostatic type: the Vacu having a single diaphragm and the Multiflex having a diaphragm of numerous corrugations. Both are all-metal in construction and the life of each is considerably greater than similar devices.



B & B Vacu Trap

SCHEDULE OF B & B VACU TRAPS

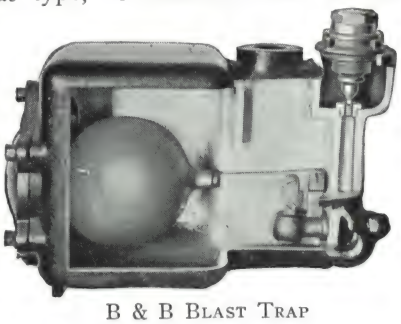
Size	Capacities vacu vapor, sq. ft.	Capacities return line, sq. ft.	Net weight, lbs.
½" No. 0 angle	100	125	1½
¾" No. 0 angle	150	200	2¼
½" No. 1 angle	150	200	2
¾" No. 1 angle	400	500	3½
1" No. 1 angle	800	1000	4

The Vacu traps are made in angle, right hand, left hand and straightway patterns.

B & B Blast Traps

Where very large quantities of condensation, such as blast heaters, indirect radiators, very large pipe coils or drip points and large hot water generators are to be drained, we recommend the float type of trap. These, of course, must be specially constructed to operate under vacuum conditions.

The Bishop & Babcock blast trap is a combination thermostatic and float type, so balanced that it will operate under varying degrees of vacuum on the return line and varying pressures on the supply line. It handles large volumes of condensation and air quickly and effectively, positively and efficiently; the float chamber of the trap handling the condensation through a perfectly balanced valve, while the thermostatic chamber of the trap handles the air and prevents the passage of the steam, never allowing the trap to become air-bound.



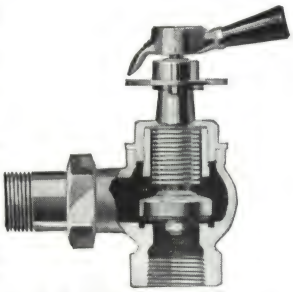
B & B Blast Trap

SCHEDULE OF B & B BLAST TRAPS

Trap No.	Capacity, sq. ft. of radiation	Inlet, in.		Outlet, in.	Net weight, lbs.
		Regular	Special		
1	3000	1	1¼	¾	60
2	6000	1¼	1½	1	60
3	9000	1½	2	1¼	65
4	12000	1½	2	1½	105
5	15000	2	2½	1½	105

B & B Multiflex Modulation Valve

It requires only one turn to close this valve from wide open. It is fitted with a graduated dial, while the handle is provided with a pointer so that the valve can be set to admit only a sufficient amount of steam to the radiator so that modulation of temperature can be secured.



B & B Multiflex Modulation Valve

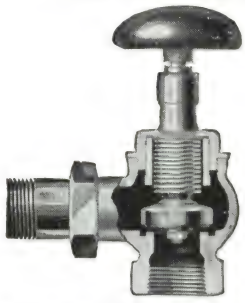
SCHEDULE OF B & B MULTIFLEX MODULATION VALVE

Size	Vacu vapor system sq. ft.	Return line system, sq. ft.	Net weight, lbs.
½" angle	0 to 20	0 to 25	2
¾" angle	21 to 60	26 to 75	2½
1" angle	61 to 120	76 to 150	3
1¼" angle	121 to 200	151 to 300	6

Continued on next page

B & B Multiflex Packless Valve

This valve is absolutely tight against steam, air and water, containing no stuffing boxes with packing or no springs to wear out. The stem is surrounded by a brass multiflex bellows which expands and contracts as the stem is screwed up or down. The bellows is of one piece of unbroken metal and has no joints which can wear. The valve has a special composition disc which is easily removable for repairs. The handle is made of wood.



B & B Multiflex Full Open Valve

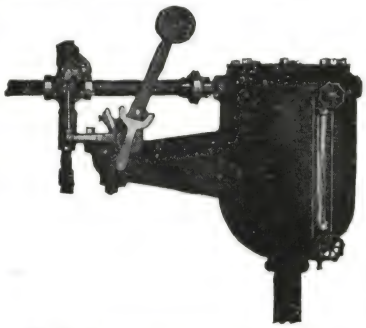
SCHEDULE OF B & B MULTIFLEX FULL OPEN VALVE

Size	Vacu vapor system, sq. ft.	Return line system, sq. ft.	One-pipe system, sq. ft.	Net weight, lbs.
½″ angle	0 to 20	0 to 25		2
¾″ angle	21 to 60	26 to 75		2½
1″ angle	61 to 120	76 to 150	0 to 30	3
1¼″ angle	121 to 200	151 to 300	31 to 60	6
1½″ angle	201 to 350	301 to 500	61 to 80	7
2″ angle	351 to 450	501 to 650	81 to 130	10

The B & B Multiflex valves are made in all patterns.

B & B Alternating Receiver

The Bishop & Babcock alternating receiver is an automatic device for returning water to the boiler. It is connected to the return main. Should the boiler pressure increase, the water of condensation rises in the receiver, while at the same time the float rising, raises the weighted lever till same drops by gravity to open the steam valve, allowing the steam to pass into the receiver; the pressure in the boiler and the receiver are equalized and the water of condensation flows back to the boiler by gravity without collecting in the return mains or risers whether the boiler pressure be 2 or 10 lbs.



B & B Alternating Receiver

SCHEDULE OF B & B ALTERNATING RECEIVER

Size	Dimensions, in.	Size of steam connection, in.	Capacity radiation, sq. ft.	Net weight, lbs.
No. 1		1	4000	180
No. 2	20 x 24	1	10000	270
No. 3	24 x 30	1	15000	290
No. 4	24 x 36	1½	18000	325
No. 5	30 x 36	1½	25000	350

B & B Oil and Steam Separator

A high pressure steam connection is taken from the high pressure steam header properly valved, run to and connected with the steam inlet on the engine. Previous to this connection to the engine there should be installed a Bishop & Babcock steam separator, the purpose of which is to eliminate the entrained moisture from the live steam before it enters the steam cylinder on the engine, thereby increasing the efficiency of same.

Where exhaust steam is used for heating purposes, there should be connected in the exhaust line a B & B Separator, the function of which is to remove the oil from the exhaust steam so that the condensation may be safely used for boiler feed purposes. It prevents the accumulation of oil within the radiating surfaces which invariably reduces the efficiency, also prevents the clogging of valves and piping.

B & B Oil and Steam Separator

B & B Bucket Trap

It is designed for use on high and low pressure steam mains and apparatus of any kind to automatically permit the passage of air or water of condensation and to prevent the passage of steam. It will operate at pressures up to 170 lbs. per sq. in. The trap should be properly valved and by-passed.

It operates on the intermittent principle, in which the valve is either tightly closed or wide open. Wire drawing on the valve and seat is, therefore, eliminated, prolonging the life of the valve and reducing the danger of leakage through the valve to a minimum.

B & B Bucket Trap

It will not return water to the boiler, but it will discharge condensation to any height corresponding with the steam pressure, approximately 1 lb. of steam pressure being necessary for each 2 ft. of lift desired, plus a slight extra pressure to compensate for pipe friction, elbows, etc.

B & B Pressure Reducing Valve

This pressure reducing valve is designed for use where exhaust steam is used for heating and reduces the pressure from as high as 40 lbs. to atmospheric (or that required to supply the heating system with live steam) at such times as there is not a sufficient amount of exhaust steam available to fill the entire system, or when the power plant is not in operation.

B & B Reducing Valve

B & B Back Pressure Valve

Where exhaust steam is used for heating, an exhaust to atmosphere should be provided for those times when the heating system is not in use. In this line a back pressure valve should be installed.

This valve will open with a variation of only 2 oz. of pressure. The lever and links are so arranged that the valve is at all times steadied against the pulsations of the exhaust without the use of dashpots, and damage by pounding is thus prevented.

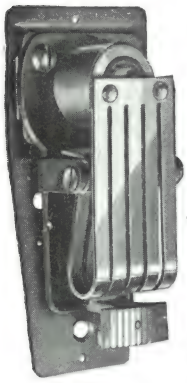
B & B Back Pressure Valve

Continued on next page

B & B All-metal Thermostat

The Bishop & Babcock all-metal thermostat is the last word in simplicity, its complete mechanism consisting of only one moving part, viz., a double seated air valve operated directly by the thermal member.

This air valve is a large port valve, the operating stem moving up and down through the port so that it can not clog with dust or other foreign matter, which might find its way through the air pipes. The moving stem makes it self-cleaning and in the eleven years that this valve has been in use on thermostatic control, we have yet to hear of a single instance where it has given trouble that requires special tools or highly skilled mechanics to adjust. This valve is the same as is used on the old style rubber expansion member thermostat and experience has amply proved it the superior of any type yet devised for thermostatic control.



B & B All-metal Thermostat

Thermal Member—The thermal member of the all-metal thermostat consists of a grid of thermosensitive metal .050 in. thick and 1¼ in. wide, slotted longitudinally to eliminate cross deflation and to give added radiation surface to the atmosphere so that there is a quick response to temperature change.

This grid is composed of a sheet of "Invar" or steel having practically no thermal expansion and a sheet of high expansion brass, which are welded together.

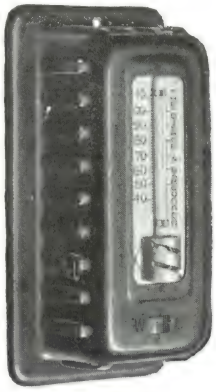
This forms a bi-metallic sheet which deflects from a straight line under changing temperatures. Its action is always constant, that is to say that for a given temperature change there will always occur the same amount of deflection.

The grid is so mounted on the frame that its operation is not affected by the expansion and contraction of the frame itself due to cold walls, as when the system has been shut down. Thus as soon as steam is raised and the air in the room reaches the required temperature, regulation begins at once without waiting for the walls to warm up.

Adjustment—Adjustment is by a screw operated by means of a convenient handle as in residence or hotel work, or by means of a key as in schoolhouse and certain kinds of factory control. An indicator plainly visible from the front shows how to make the adjustment.

Size—The size of this instrument is extremely small considering its efficiency and ruggedness, the cover or case being only 4½ in. long, 2¼ in. wide, and 1¾ in. high. No sacrifice of strength or sensitiveness has been made in order to reduce its size, but the small size is due entirely to the compact arrangement of its parts. Valve and thermal member are full size and weight, the thermal member being a little heavier than any other similar thermostat, while its sensitiveness has been maintained by the method of slotting the grid. (Patent applied for.)

Types of Thermostat—This thermostat is made in two types: Intermediate and positive actions. The intermediate action thermostat is best adapted to all classes of two-pipe heating systems, whether vapor, vacuum or straight return line gravity systems. When so applied its action is to automatically throttle the radiators, admitting just enough steam to maintain the desired room temperature.



Thermostat Cover

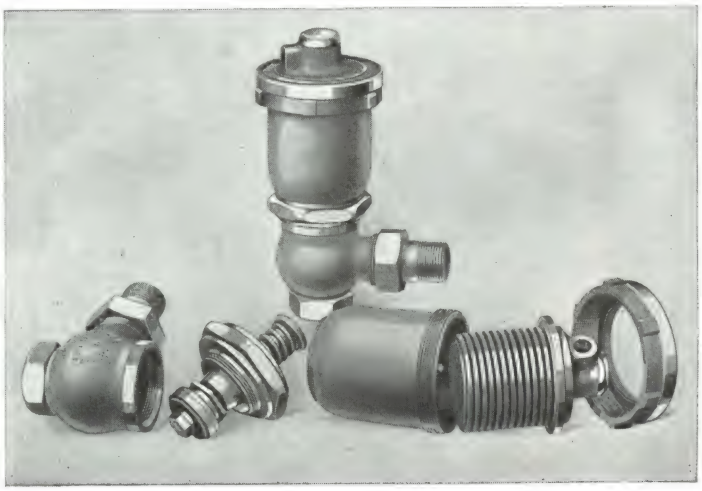
In a one-piece steam system or air line system, it is necessary that the radiator valve be fully open or tightly closed in order that when steam is admitted to the radiator, the water of condensation may pass back through the same valve.

If the valve is partially opened, steam will be admitted to the radiator while the condensate can not escape thus filling the radiator with water and causing that disagreeable hammering noise. On this class of heating work it is necessary to have a positive action thermostat, i. e., one which will close the valve entirely or leave it open wide. In the Bishop & Babcock thermostats of either the all-metal or the hard rubber expansion element type this is accomplished by the use of a specially designed air valve, no difference in the external appearance of the thermostat being apparent to the eye.

Covers—This thermostat is furnished with one standard design of cover with several features which are variable. Thermostats for residence work have a small pull-out lever projecting from the right-hand side which when pulled out closes off the steam for the night; and when pushed in the next morning automatically puts the temperature of the room under control of the thermostat, without disturbing the original adjustment.

Covers may be had for either key adjustment or for hand adjustment, as desired, and either with or without thermometers on the face of the cover.

Covers are furnished with a plated finish to match the hardware or furnishings of the building or room in which thermostat is installed, and for gymnasiums may be had with guard over thermometer for its protection.



B & B All-metal Pneumatic Valve

B & B Multiflex Pneumatic Valves

The B & B Multiflex pneumatic valves are made in sizes from ½ in. to 10 in., inclusive. All of the radiator valves (under 2 in.) contain union connections thus making these valves very easy to install. These valves require but a slight pressure of air, above the pressure of that of the steam, to operate. Coil valves and tank heater valves are made in sizes from 2 in. to 10 in. inclusive.

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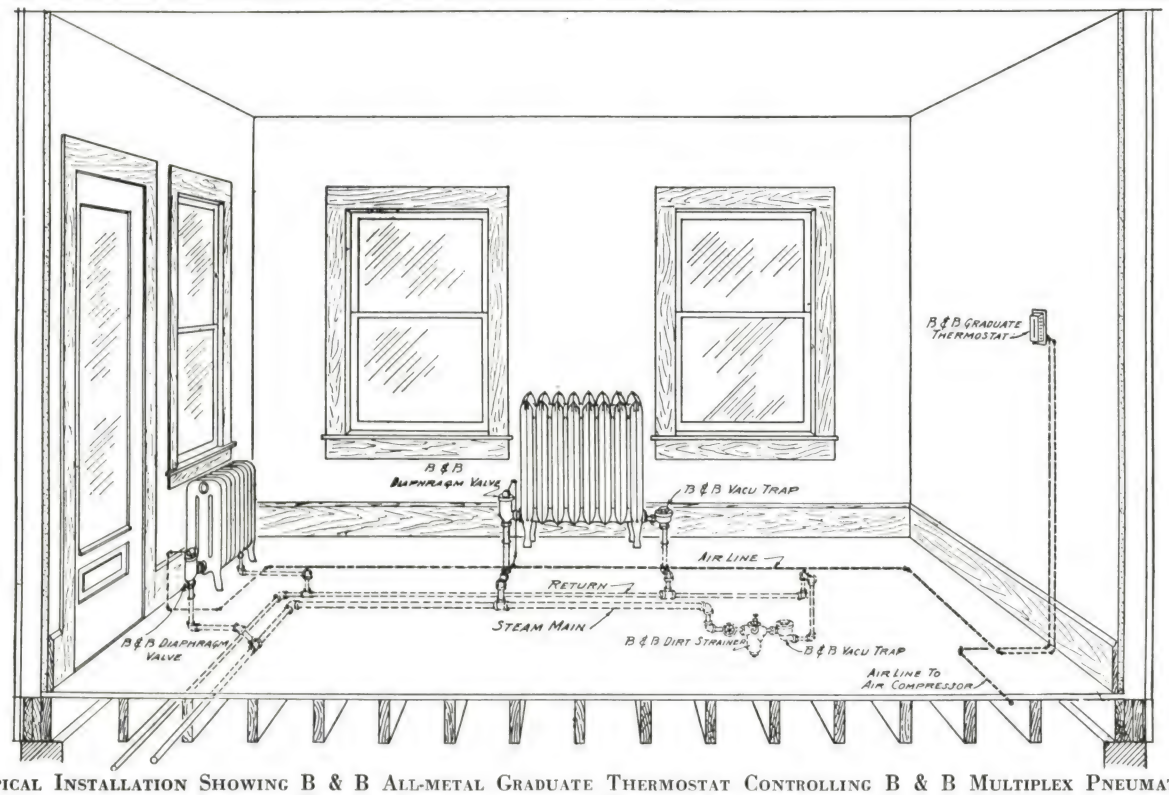
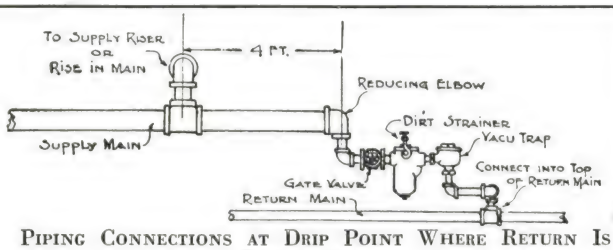
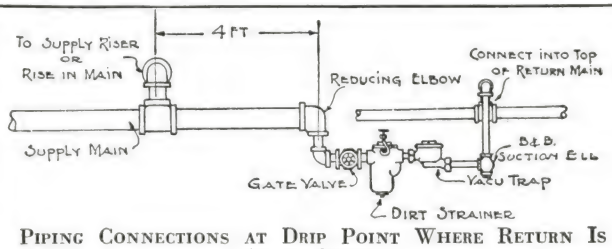


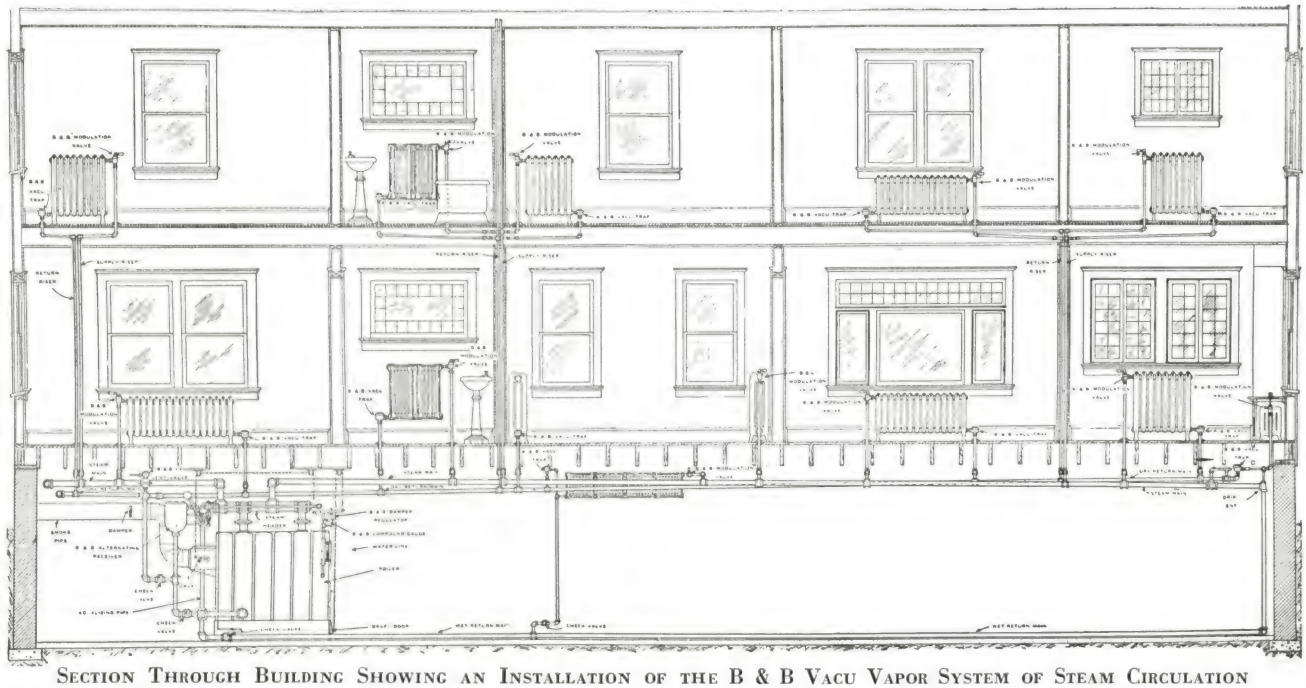
Typical Installation Showing B & B All-metal Graduate Thermostat Controlling B & B Multiplex Pneumatic Valve in Connection with a Two-pipe Vacuum System



Piping Connections at Drip Point Where Return Is Below Supply



Piping Connections at Drip Point Where Return Is Above Supply



Section Through Building Showing an Installation of the B & B Vacu Vapor System of Steam Circulation

C. A. DUNHAM COMPANY

Manufacturers of Specialties for the Dunham System of Heating

ADMINISTRATIVE AND GENERAL OFFICES

230 East Ohio Street

CHICAGO, ILL.

FACTORIES: MARSHALLTOWN, IOWA, AND TORONTO, ONT., CAN.

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Products

Specialties for use in connection with the DUNHAM SYSTEM OF HEATING, known according to its several adaptable forms as the Dunham Home Heating System, the Dunham Return System, and the Dunham Vacuum System—all two-pipe systems; and the Dunham Air Line System.

These specialties are: Dunham Radiator Traps, Dunham Blast Traps; Dunham Air Line Valve; Dunham Return Traps; Dunham "D" Style Medium Pressure Traps; Dunham Packless Radiator Valves; Dunham Reducing Pressure Valve; Dunham Vacuum Pump Governor; Dunham Air Eliminator; Dunham Oil Separator; Dunham Suction Strainer; Dunham Air Vent; Dunham Damper Control.

Dunham Heating Service

Dunham service is: first, advisory—when making contracts and soliciting business; second, supervisory—during construction period; third, adjustive—in the sense of rendering aid to the user.

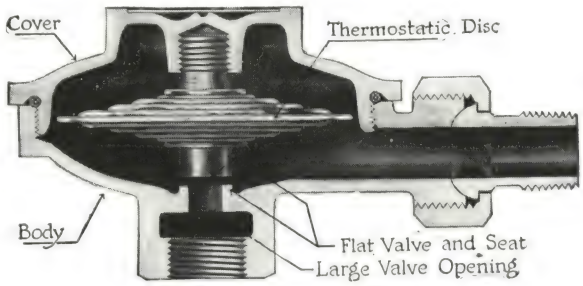
The DUNHAM HEATING SERVICE

This service is delivered through 52 branch and local sales offices throughout the United States and Canada, back of which organization are two modern and complete factories. Dunham heating service co-operates intimately with consulting engineers, architects and heating contractors.

Dunham Radiator Trap

The Dunham Radiator Trap is distinctive in the simplicity of its construction. It consists of two major parts, a body, and a cover. The operating member, the thermostatic disc, is securely placed in the cover. The trap has a large valve opening. There are no detached loose parts in the path of flow, no sliding contacts, nothing to gum up, and no guide or pin to obstruct the valve opening. The action of the disc is positive and the valve seats squarely. The body is standardized, also the cover and disc, giving the further advantage of interchangeable parts.

The working part of the trap, the thermostatic disc, is fully exposed to the actual conditions, within the radiator, and it therefore responds instantly to any change taking place therein, automatically releasing air and water of condensation and closing to prevent waste of unused steam.



DUNHAM RADIATOR TRAP

It is made in 5 sizes, and for steam pressures not to exceed 10 lbs. gage.

The No. 1 and No. 2 traps are for use principally on radiators; No. 3 for large radiators, for pipe coils, and dripping piping; No. 4 and No. 5 for large pipe coils, and dripping steam mains.

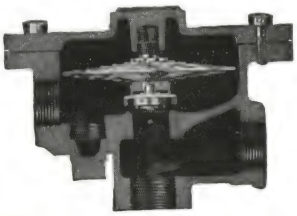
TABLE A—DUNHAM RADIATOR TRAPS

Size	Pipe connection	Capacity, direct radiation
No. 1	½ in.	100 sq. ft.
No. 2	½ in.	350 sq. ft.
No. 3	¾ in.	450 sq. ft.
No. 4	¾ in.	1500 sq. ft.
No. 5	1 in.	3000 sq. ft.

Nos. 1, 2, and 3 traps made in angle, straightway, right-hand, and left-hand patterns; Nos. 4 and 5 in angle and straightway patterns only.

Dunham Blast Trap

This trap is designed only for draining blast heating coils. In selecting capacities, be sure and reduce blast coil radiation to equivalent direct radiation by multiplying the actual surface of coil by a factor ranging from 6 to 10, depending upon temperature, velocity and volume of air blown over coils.



No. 6 AND No. 7 DUNHAM BLAST TRAP

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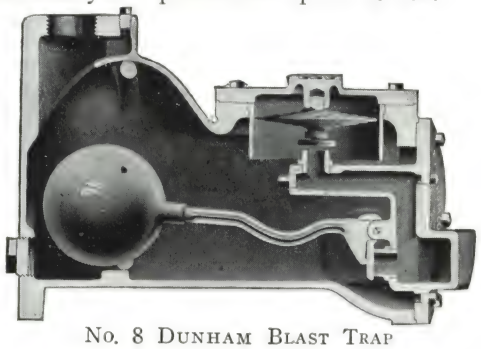
No. 8 Dunham trap combines the Dunham thermostatic principle with the float; it has a double valve and large connections.

Made only for pressures up to 10 lbs.



No. 8 Dunham Blast Trap

TABLE B—DUNHAM BLAST TRAPS

Size	Pipe connection	Capacity, direct radiation	Weight
*No. 6	¾ in.	1500 sq. ft.	9 lbs. net.
*No. 7	1 in.	3000 sq. ft.	16 lbs. net.
No. 8	2 in.	12000 sq. ft.	80 lbs. boxed.

*Made in angle and straightway patterns.

Dunham Return Trap

Used to separate the air and water discharged into the dry return piping by the Dunham Radiator Traps, to release the air, and to automatically return the water to the boiler without regard to the pressure carried in boiler or system. Not for use where steam pressures exceed 10 lbs. gauge.

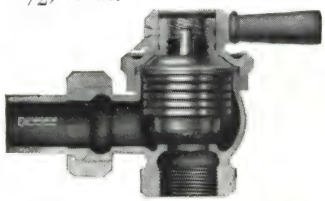
Dunham Packless Radiator Valve

This is a bona fide packless radiator valve and not dependent upon springs and packing rings. The Dunham "built up" bellows makes this possible. It has a low bonnet and stem and unusual lines, making it attractive in appearance. The valve can be opened or closed in seven-eighths of a turn.

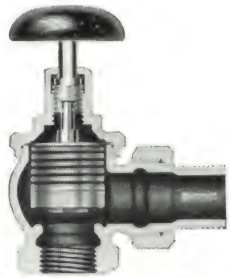
Made in lever handle and wheel handle models in following sizes:

Lever—½, ¾, 1, 1¼ in.

Wheel—½, ¾, 1, 1¼, 1½, 2 in.



Lever Handle Type No. 100



Wheel Handle, Angle Pattern, Type No. 140

Dunham Packless Radiator Valves

Lever handle model made only in angle pattern.

Wheel handle model made in angle, straightway and corner patterns.

Dunham Medium Pressure Trap, "D" Style

This embodies the principle so successfully used in the Dunham Radiator Trap, and is just as simple and satisfactory. It is used almost exclusively in hospitals and kitchens for dripping sterilizers and steam cooking apparatus, where steam is to be used at a pressure not less than 10 lbs. or more than 50 lbs. gauge.

Dunham "D" Style Medium Pressure Trap

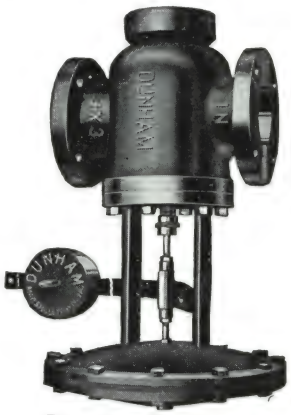
TABLE C—DUNHAM MEDIUM PRESSURE TRAPS, "D" STYLE

Size	Pipe connection	Capacity, water per hour	Net weight
No. 13	½ in.	100 lbs.	3½ lbs.
No. 14	¾ in.	200 lbs.	9½ lbs.
No. 15	1 in.	400 lbs.	17 lbs.

Always state operating pressure when ordering.

Dunham Reducing Pressure Valve

Made only in standard weight for a pressure range of 125 lbs. down on high side, to 10 lbs. and atmosphere on low side, in straight and expanded outlet patterns.



Dunham Reducing Pressure Valve

Dunham Vacuum Pump Governor

The function of this governor is to control the steam to a steam driven vacuum pump, to operate same so as to maintain a certain vacuum in the suction piping.

Made in all pipe sizes from ½-in. to 2-in. inclusive.

Dunham Damper Control

The Dunham Diaphragm Damper Regulator is made with a large diameter all-metal diaphragm sensitive for operation at very low pressures to regulate the steam pressure in ounces. It operates the check and draft dampers directly through a system of control chains.

Dunham Air Eliminator

This is used in connection with the Dunham Home Heating System for venting the air from the system.

Capacity for 2000 sq. ft. radiation.

Dunham Air Vent

This device is for the purpose of venting air from water that is under pressure. It is particularly adapted to heating work where the vacuum pump is discharging water of condensation directly back to the boiler.

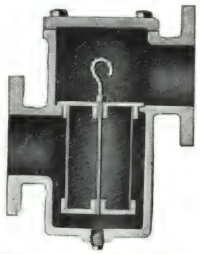
Capacity for 5000 sq. ft. of radiation.

Dunham Oil Separator

Made in all sizes from 1½ to 6 in., in horizontal pattern only, with flanged ends.

Dunham Strainer

Has a large brass screen basket for catching and holding the dirt; easily accessible for cleaning and at once commends itself for this purpose. Made in all sizes from 2½ to 6 in., with flanged ends only.



Dunham Strainer and Basket

Dunham Air Line Valve

The principle of operation is identical, and design similar, to the Dunham Radiator Trap. Its efficiency is high, and service in connection with air line systems invaluable. Can be furnished with either ⅛-in. or ¼-in. radiator connection. Air piping is required in connection with its use. It must not be subjected to steam pressures exceeding 10 lbs. gauge.

HOFFMAN SPECIALTY CO., INC.

Manufacturers of Venting Devices

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WATERBURY, CONN.

BRANCH OFFICES
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NEW YORK, N. Y., 512 Fifth Avenue
CHICAGO, ILL., 130 North Wells Street
LOS ANGELES, CAL., 405 South Hill Street
PHILADELPHIA, PA., 1711 Sansom Street

Products

AIR VENTING VALVES for every type of Steam Heating Systems; HOFFMAN "CONTROLLED HEAT" EQUIPMENT.

HOFFMAN VALVES
TRADE-MARK

Guarantee

The satisfactory performance of Hoffman valves is guaranteed in writing for five years from the date of installation. Many architects mention this guarantee in their specifications, for the protection afforded the architect, the heating contractor and the owner, stimulates confidence in the merit of Hoffman valves. Their performance in actual service furnishes further proof of this Company's desire to supply specialties of the highest grade.

In making such an unqualified guarantee utmost care must be exercised in manufacture—every individual valve tested before shipment, and such a factor of safety must be allowed for the manufacturer's protection that the user has every reason to expect the life of the valves will be greatly in excess of that covered by the guarantee.

Hoffman Venting Valves

In the Hoffman line of air vents there is a specially designed valve for every type of steam heating system.

The basic principle used in the design of all Hoffman venting valves is that of an all-metal thermostatic member having one or more flexible diaphragms and containing a volative or heat sensitive fluid which causes valve action upon slight temperature changes.

Hoffman valves have a wide pressure range in which they operate with the same degree of accuracy, due to the fact that the internal fluid pressure in the thermostatic member maintains a constant relationship with the external steam pressure throughout the whole range of pressure for which each valve is intended.

Hoffman valves are automatic, non-adjustable and are shipped ready for installation.

Reliability—The fact that over three million Hoffman valves are in service throughout the country all working under the five-year guarantee, is submitted as ample proof of their reliability.

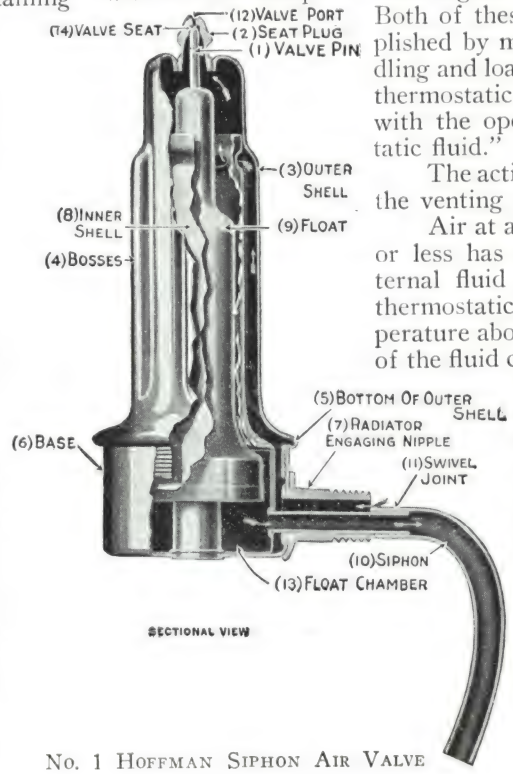
Material—Various alloys are used in making Hoffman valves, each composition being especially adapted for the particular requirements of the valve part. The valve pin and seat are of a special nickel-silver alloy; diaphragms of phosphor bronze or a special diaphragm alloy which has been developed in the Hoffman Laboratory; formed and drawn parts of a close grain composition that resists operating strains. Modulating and return line valve bodies are made of high grade steam metal.

All valves are heavily nickelplated presenting a neat, compact and serviceable appearance.

No. 1 Hoffman Siphon Air Valves

The No. 1 Hoffman siphon air valve is designed for use on radiators in systems of the one-pipe gravity type. Through its use all air is vented from the radiator without the loss of steam, maximum heating efficiency is assured and leakage from water-logged radiators prevented. After contact of water with the valve, the siphon drains all water from the valve and venting occurs without the slightest "spit" of water even if the radiator is under pressure. This is a distinctive Hoffman feature.

To obtain maximum efficiency from a radiator, it is necessary that all air be vented when pressure is being generated, and likewise the air which is released by condensation of the steam must be relieved from the radiator even though steam is present. The No. 1 Hoffman valve fulfills both of these conditions, for it maintains a wide open vent port until steam reaches the valve when an instant and positive closure takes place without steam loss. Furthermore, when the small quantity of air released by condensation (0.1 cu. in. per sq. ft. of radiation per hour) reaches the valve it is instantly relieved, thereby enabling the radiator to maintain full heating efficiency. It is interesting to observe a No. 1 valve in operation. From time to time the valve emits short "puffs" of air even though the radiator is steam hot from end to end. In releasing this small quantity of air it does so without the escape of the slightest particle of steam. Both of these actions are accomplished by means of careful handling and loading of the combined thermostatic member and float with the operating or "thermostatic fluid."



No. 1 HOFFMAN SIPHON AIR VALVE

The action of the fluid during the venting period is as follows:

Air at a temperature of 180° or less has no effect on the internal fluid pressure within the thermostatic member. At a temperature above 180°, vaporization of the fluid commences, but as the fluid has been sealed in the thermostatic member under a vacuum, no internal pressure will be generated that will effect diaphragm action until 195° is reached. At this point the fluid pressure begins to exceed the atmospheric pressure and at a temperature between 205° and 207°, the internal

Continued on next page

fluid pressure forces the diaphragm of the thermostatic member outwardly and instantly closes the vent port. It will be noted that the vent port is either wide open or shut tightly.

Premature closing with a resultant loss in heating efficiency is thus eliminated as well as the disagreeable hissing which occurs with a partly closed vent port. The Hoffman valve is noiseless in operation.

The radiator connection is ⅛-in. standard pipe thread.

No. 2 Hoffman Siphon Air Valve

The No. 2 Hoffman siphon air and vacuum valve is intended for use in systems of the one-pipe gravity vacuum type. It is similar in construction to the No. 1 valve but by the addition of a diaphragm in the base of the valve, the vent port is normally held closed and only opens when a pressure of 4 oz. is generated in the radiator when venting takes place. As soon as the pressure goes below 4 oz. the vent port is automatically closed, preventing the intake of air through the vent port and, in so doing, a vacuum is created in the radiator as steam condenses. With the formation of a vacuum, generation of steam will take place at temperatures below 212°. This means that more heat will be delivered by the radiators between firing periods than in systems where the air valves are of the open type; in other words the radiator temperature is more uniform. Systems equipped with the No. 2 valves show marked economies in coal consumption because the need for generating pressure to expel air from the radiators is only necessary when air leakage takes place through boiler trimmings and inlet valves on the radiators. With a reasonably tight system, the venting of air and the generating of a pressure is very infrequent.

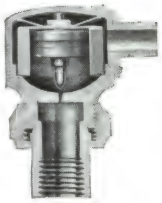
The No. 2 valve has ⅛-in. connection.

No. 2 Hoffman Siphon Air and Vacuum Valve

No. 3 Hoffman Air Line Valve

The No. 3 Hoffman air line valve is a compact, well constructed valve for air line, or as they are frequently termed "Paul Systems." It is sensitive in action and closes the instant steam fills the radiator. No adjustment is necessary either before or after installation.

The No. 3 valve has ⅛-in. radiator and ¼-in. air line connections.



No. 3 Hoffman Valve

No. 4 Hoffman Quick Vent Valve

The No. 4 Hoffman quick vent valve is used in venting risers or return mains where water will not come in contact with the valve. All air is freely vented through a ⅛-in. vent port without steam loss but the valve will not prevent the escape of water. Where water is a factor which must be considered in the design of a system, the No. 5 valve should always be specified.

For new systems, valve is usually specified with ¾-in. connections but where it is necessary to tap into fittings or pipe line, ¼-in. connections are furnished.

No. 4 Hoffman Valve

No. 5 Hoffman Quick Vent Float Air Valve

The No. 5 Hoffman quick vent float air valve is of the triple duty type intended for venting return mains, indirect stacks, or for use where water is present in the system and possibly may come in contact with the valve. All air is vented with little frictional resistance and immediately upon contact with steam or water the combined float and thermostat closes the vent port, preventing the escape of either. Installed on the end of return mains in one-pipe gravity systems, this valve causes steam to first flow to the end of the main then into the radiators at a uniform rate, so that radiators distant from the boiler will receive their supply of steam as quickly as those close to the boiler. The No. 5 valve has ⅜-in. pipe connection and is supplied with a $\frac{3}{16}$-in. port for pressures below 3 lbs., for pressures above 3 lbs. a $\frac{1}{16}$-in. port must be used.

No. 5 Hoffman Valve

No. 6 Hoffman Quick Vent Float Air and Vacuum Valve

The No. 6 Hoffman quick vent float air and vacuum valve is similar to the No. 5 valve with the addition of a diaphragm at the base of the valve which holds the vent port closed when venting ceases and prevents the intake of air through the port. The valve is used for venting the return mains of systems of the one-pipe gravity vacuum type where No. 2 valves are used on the radiators, or for any condition where return of air to the system after having once been vented is not desirable.

The standard pipe connection of the No. 6 valve is ⅜ in. and it is made with a $\frac{3}{16}$-in. vent port for pressures less than 3 lbs. and $\frac{1}{16}$-in. port for pressures over 3 lbs.

No. 6 Hoffman Valve

Hoffman "Controlled Heat" Specialties

Many attempts have been made to design inlet valves for radiators in vapor or vapor vacuum systems which would permit the amount of steam admitted to the radiator to be "modulated" or "controlled" so as to bring into service any desired portion of the radiator. The chief difficulty with valves of this type has seemed to be the inability of the heating contractor to "set" or adjust the valve with any degree of certainty for the particular requirements of each individual radiator.

With Hoffman "Controlled Heat" specialties it is possible to obtain the desired results and likewise show marked reduction in coal consumption.

Continued on next page

No. 7 Hoffman Adjustable Modulating Valve—The No. 7 Hoffman adjustable modulating valve is made in ¾-in. size only, having a visible range of adjustment which permits its use on direct radiators up to 200 sq. ft. of heating surface.

Usually radiators of the hot water type are used in vapor or vapor vacuum systems and the No. 7 valve is installed at the top of the radiator. It is supplied the heating contractor with the inlet port wide open and after the system has been operated for a reasonable time or until thoroughly cleaned, the contractor adjusts the valve port for the individual requirements of each radiator. This is done in a very simple and easy manner whether the system is in operation or cold. It is only necessary to loosen a lock nut on the bonnet of the valve, then turn a dial plate until a certain number of graduations are visible (one graduation being equivalent to 10 sq. ft. of heating surface). The lock nut is then tightened and the amount of steam admitted to the radiator can be controlled by the user through a secondary dial plate which has graduations indicating when the port opening is sufficient to maintain the radiator one-quarter, one-half, three-quarters, or entirely hot. With this value it is possible to control the temperature of each room to suit the desires of the occupant.

The stuffing box of the valve is of special construction having a metallic-fiber packing that will last indefinitely and require no attention. The valve action is so free that only the pressure of one finger is required to vary the amount of steam admitted to the radiator.

The No. 7 valve is regularly supplied with lever handle as illustrated, but it can likewise be furnished with wood wheel, lock shield, or closed top. For concealed radiators an extension stem and handle can be furnished.

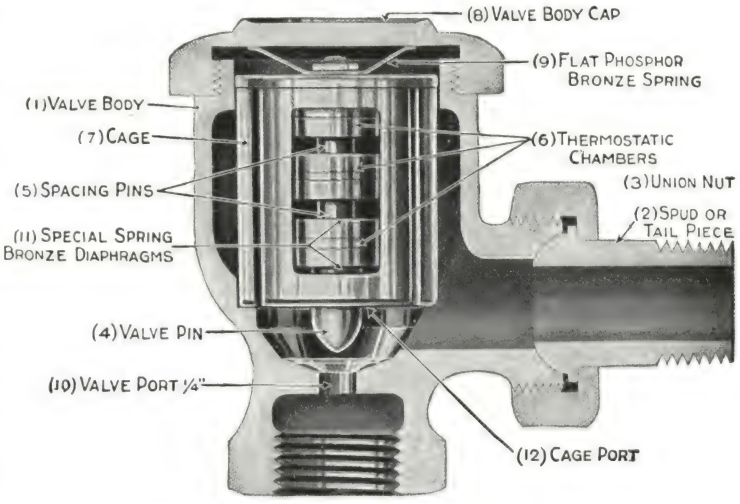
No. 7 Hoffman Modulating Valve

No. 8 and 9 Hoffman Return Line Valves—The companion to the No. 7 valve in Hoffman "Controlled Heat" is the No. 8 Hoffman return line valve which is installed on the discharge side of the radiator and permits air and condensation to discharge into the return lines without loss of steam. The valve is extremely sensitive in operation and positively distinguishes between steam, air and water, handling each in the proper manner.

The chief feature of this valve is its consistency of operation under varying pressures. Within a range of 18 in. of vacuum to 50 lbs. pressure the valve will operate with the same temperature drop without adjustment or change of any sort. This permits its use as a steam trap in industrial work and likewise in heating systems where steam is supplied through a pressure reducing valve. If at any time the reducing valve should fail to function properly, the No. 8 valve will operate in as satisfactory a manner whether the pressure were high or low.

The fact that the valve is adaptable for high or low pressure makes it possible for architects to standardize their specifications using the same style valves required for the heating system, in connection with laundry equipment, sterilizers, steam jacketed kettles, coffee urns, etc.

Hoffman return line valves are absolutely non-adjustable and thermostats can be changed from one body to the other without the necessity of "setting" or adjusting; likewise the valve may be used on either high or low pressures without changes of any sort.

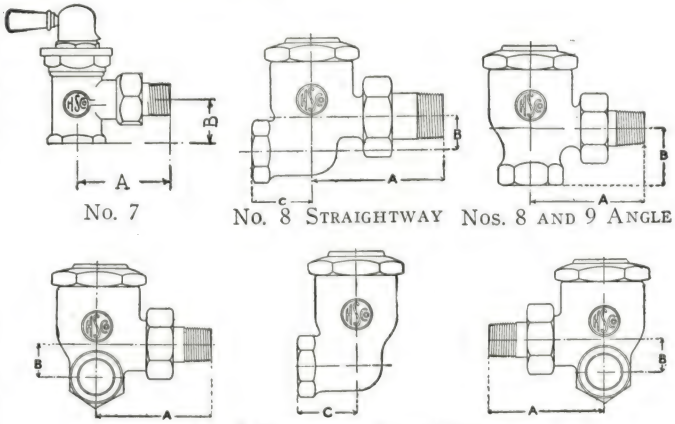


No. 8 Hoffman Return Line Valve

The No. 8 value has ½-in. pipe connection and is furnished in angle, straightway, right- and left-hand offset patterns. The normal capacity of the valve is 200 sq. ft. of direct radiation.

The No. 9 Hoffman return line valve is used for the same purpose as the No. 8 except that it has a capacity of from 200 to 600 sq. ft. of direct radiation. The valve is made in ¾-in. size and angle pattern only. It may be used for dripping risers or any other condition where a large capacity is required.

For pressures of 15 lbs. or less, the discharge port is ⅜ in. in diameter; for pressures above 15 lbs. $\frac{3}{16}$-in. port should be specified.



VALVE DATA

Style	Size, in.	Diameter, valve port, in.	Maximum capacity, ft.	Dimensions, in. A	B	C
No. 7 Angle	¾	.....	200	2 7/8	1 3/8	.....
No. 8 Angle	½	¼	200	2 23/32	1 9/32	.....
No. 8 Straightway	½	¼	200	2 23/32	25/32	1 13/32
No. 8 Offset	½	¼	200	2 23/32	25/32	1 10/32
No. 9 Angle	¾	⅜*	600	2 3/32	1 11/32	.....

*No. 9 valve furnished with $\frac{3}{16}$-in. port for pressures above 15 lbs.

Continued on next page

No. 10 Hoffman Vapor Valve

No. 10 Hoffman Vapor Valve

The No. 10 Hoffman vapor valve is intended for venting the return mains of vapor systems or for any service where large capacity is required, and steam, air or water must be properly handled.

The main or ¾-in. port controlled by the float has an auxiliary port of $\frac{3}{16}$ in. in diameter. The purpose of the double valve is to permit venting even though pressure is maintained after a surge of water receded from the valve. An air-way equivalent to a ¾-in. diameter valve port is maintained throughout the valve permitting venting with little resistance. Pipe connections of this valve are ¾ in.

No. 11 Hoffman Vapor Vacuum Valve

No. 11 Hoffman Vapor Vacuum Valve

The No. 11 Hoffman vapor vacuum valve is similar in appearance to the No. 10 valve but the check valve on the opposite side of the vent port prevents the return of air to the system. The valve is widely used for venting return mains of vapor vacuum systems or wherever return of air to the system when once vented is not permissible.

Hoffman Differential Loop

Many complicated ways have been tried to prevent water from leaving the boiler in vapor or vapor vacuum systems, but their chief drawbacks have been due to their complicated nature and their unreliability, for almost without exception, they contain moving parts which corrode or stick and when there is need for action the device fails to function.

Hoffman Differential Loop

The Hoffman differential loop is an extremely simple yet efficient device, which without moving parts, prevents water from backing up in the return main and at the same time maintains a constant differential pressure between the steam and return mains whenever the pressure exceeds a predetermined amount. In residential systems where the No. 1 loop is universally used, it is necessary to have a difference of 24 in. between the low point in the return main and the water line of the boiler. The No. 1 loop has what is termed a 10-oz. differential in that it permits the water to rise in the vertical part of the return to a height of 17½ in. (equivalent to 10 oz. boiler pressure). Whenever the boiler pressure exceeds 10 oz. further rise of water in the return main would take place were it not for the action of the loop, which, by means of a moving water column that varies with the pressure, permits a small quantity of steam to be "blown over" into the return main and close the port of the thermostatic venting valve, compressing the air which is "bottled up" in the return main until a pressure is generated which will always be 10 oz. less than the pressure in the boiler. By maintaining this differential pressure, further rise of water in the return main beyond the height of 17½ in. is prevented and there is also a differential pressure between the inlet and discharge sides of the radiators which causes circulation of steam through the radiators even though the vent valve on the return main is closed. For example, if through inattention or carelessness on the part of the attendant, the ash pit door is left open and the damper regulator put out of action thereby, with a boiler pressure of 5 lbs. there would be an air pressure in the return main of 4 lbs. 6 oz. Thus if a radiator which had been closed off were "turned on" it would heat as quickly as though the boiler pressure were 10 oz. and venting valve on the return were open to atmosphere.

Hoffman differential loops are made in four standard sizes; the largest having a capacity up to 10,000 sq. ft. of direct radiation. Larger sizes are made to order for any individual requirements of each system.

Specification Data for One-pipe Gravity Layouts

Air Valves—Heating contractor shall operate the system until thoroughly clean, with pet cocks or old automatic valves on the radiators. Prior to final test each radiator shall be equipped with one No. 1 Hoffman Siphon Air Valve.

Quick Vent Valves—Each dry return main having its low point at least 18 in. above the boiler water line shall be equipped with one No. 4 Hoffman Quick Vent Valve. Where return main is less than 18 in. above water line, No. 5 Hoffman Valves shall be used.

Guarantee—Heating contractor shall supply the owner with a manufacturer's guarantee covering the satisfactory performance of the venting valves for a period of five years from the date of installation.

Specification Data for Low Pressure One-pipe Combination Pressure and Vacuum Steam Layouts (Closed Systems)

Air and Vacuum Valves—Each radiator shall be equipped with a pet cock or old automatic valve which shall be used until the system is thoroughly cleaned and free from oil, grease, pipe chips, scale, etc., after which the contractor will install one No. 2 Hoffman Siphon Air and Vacuum Valve.

Quick Vent Air and Vacuum Valves—On each return main at the point where it drops to go below the water line of the boiler, contractor shall install a No. 6 Hoffman Float Air and Vacuum Valve to relieve the basement piping of air and insure a perfect and even distribution of vapor and steam throughout the entire system.

General Instructions—Contractor shall use every precaution to make up tightly all joints in the pipe lines and likewise make certain that there are no air leaks in the inlet valve stuffing boxes, boiler trimmings, etc.

Guarantee—Heating contractor shall supply the owner with a manufacturer's guarantee covering the satisfactory performance of the venting valves for a period of five years from the date of installation.

Specification Data for Hoffman "Controlled Heat"

Modulating Valves—Each radiator shall be equipped with a ¾-in. No. 7 Hoffman Adjustable Modulating Valve with wide open port as received from manufacturer. After system has been operated for a reasonably short time and thoroughly cleaned, the contractor shall adjust each valve for the particular radiator to which it is attached.

Return Line Valves—On the discharge side of each radiator furnish and connect one ½-in. No. 8 Hoffman Return Line Valve for radiators of 200 sq. ft. or less. Where pipe coils or radiation exceeds 200 sq. ft. the No. 9 valve shall be installed. Offset and Straightway Valves to be installed wherever specified by architect. Thermostatic members of all return line valves shall be removed after installation and when the system has been operated and thoroughly cleaned, they shall be reinserted in the valves.

Basement Specialties—Install where indicated on plans one set Class —— Basement Specialties comprising —— No. 8 Return Line Valves for venting steam mains, one No. —— Hoffman Differential Loop, —— No. (10 or 11) Hoffman Eliminator, one Damper Regulator and one Pressure Gauge.

Note for Architect: For Vapor Systems the No. 10 valve should be used. For Vapor Vacuum Systems the No. 11 valve is required.

Guarantee—Heating contractor shall supply the owner with a manufacturer's guarantee covering the satisfactory performance of the venting valves for a period of five years from the date of installation.

List of Hoffman Specialties Classified

For the convenience of the architect and heating contractor we have classified the necessary specialties for vapor or vapor vacuum systems as follows. This list of specialties comprises those necessary for practically all standard vapor or vapor vacuum installations.

Continued on next page

Radiator Specialties—One No. 7 Hoffman adjustable modulating valve (capacity up to 200 sq. ft. radiation); one No. 8 Hoffman return line valve (capacity up to 200 sq. ft. radiation).

Class A Basement Specialties—For installations up to 1500 sq. ft. direct radiation, consisting of: two No. 8 Hoffman return line valves for venting steam mains; one No. 1 Hoffman differential loop; one No. 11 Hoffman air eliminator; one damper regulator; one pressure gauge.

Class B Basement Specialties—For installations of 1501 to 3000 sq. ft. direct radiation, consisting of: three No. 8 Hoffman return line valves for venting steam mains; one No. 2 Hoffman differential loop; one No. 11 Hoffman air eliminator; one damper regulator; one pressure gauge.

Class C Basement Specialties—For installations of 3001 to 5000 sq. ft. direct radiation, consisting of: four No. 8 Hoffman return line valves for venting steam mains; one No. 3 Hoffman differential loop; two No. 11 Hoffman air eliminators; one damper regulator; one pressure gauge.

Class D Basement Specialties—For installations of 5001 to 10,000 sq. ft. direct radiation, consisting of: six No. 8 Hoffman return line valves for venting steam mains; one No. 4 Hoffman differential loop; two No. 11 Hoffman air eliminators; one damper regulator; one pressure gauge.

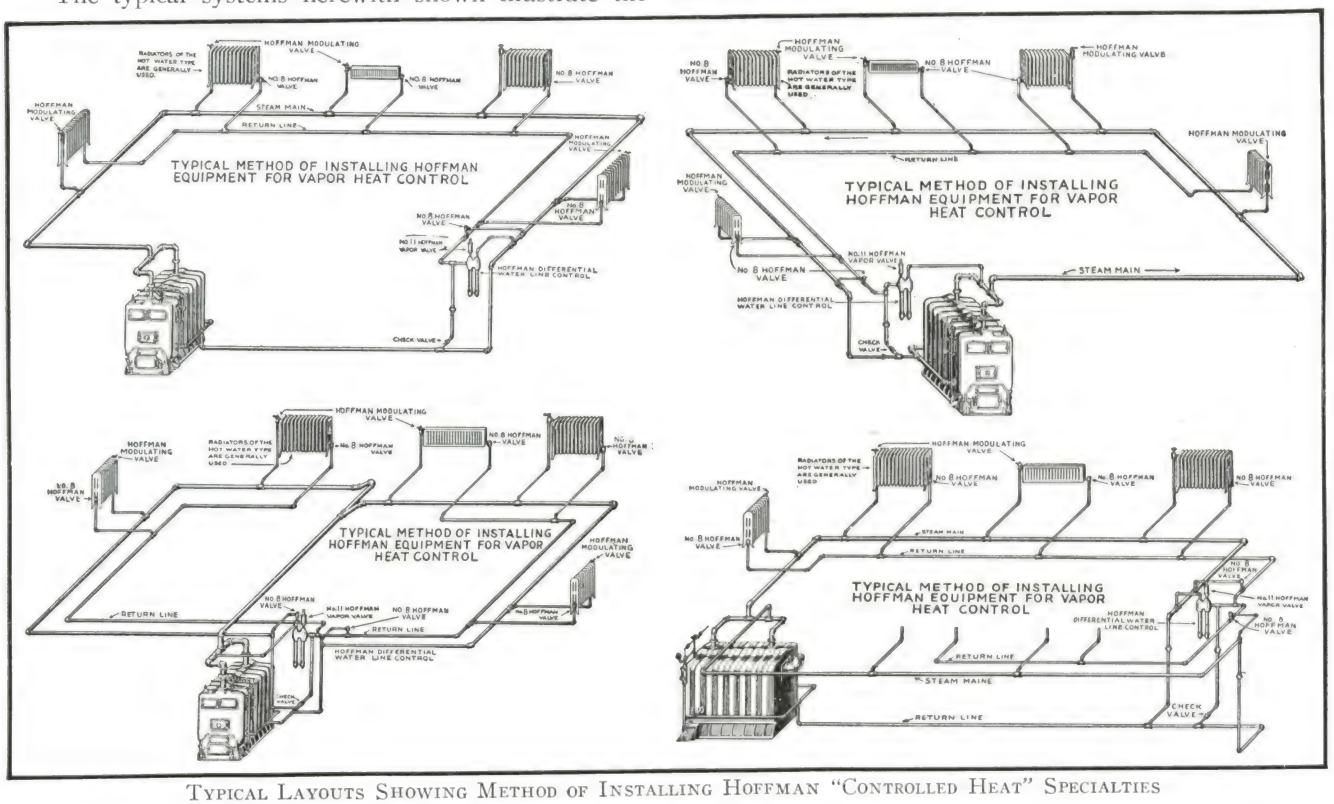
Typical Layouts Showing Method of Installing Hoffman "Controlled Heat" Specialties

The typical systems herewith shown illustrate the manner of installing Hoffman specialties in various types of vapor and vapor vacuum systems. The simplicity of the layouts is worthy of note; for, in systems where Hoffman valves are used, the arrangement of piping is not unlike that of the two-pipe gravity system with which all heating contractors are familiar. It is a policy of this Company to eliminate all of the "mystery" which has surrounded the so-called "special systems."

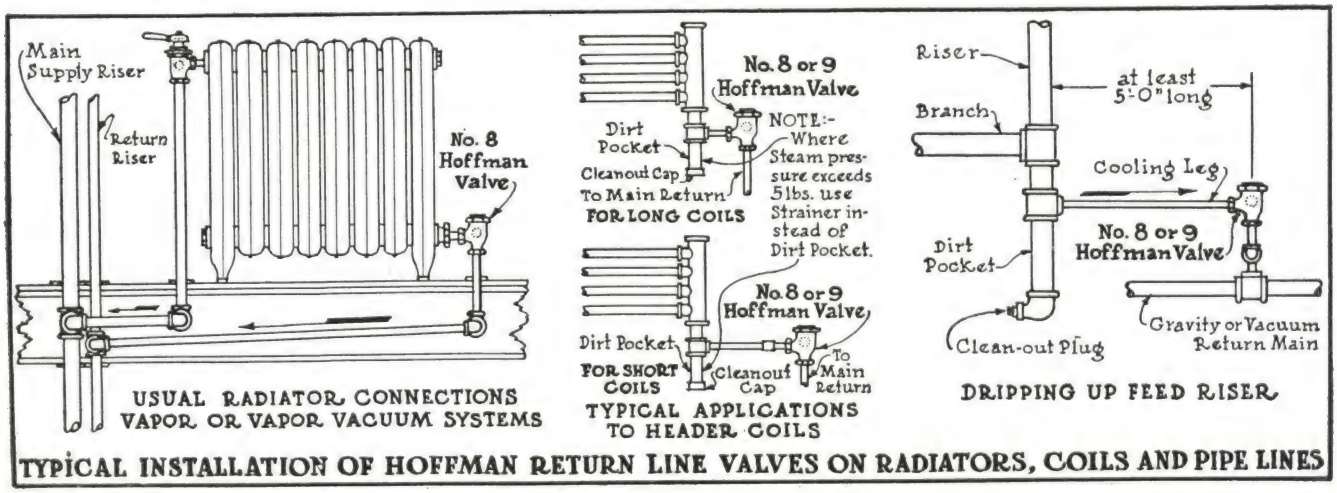
The general arrangement of valves and piping in vapor and vapor vacuum systems is similar; the only difference being in the type of return main vents.

No. 10 valves are used for venting return mains in vapor systems and No. 11 valves in vapor vacuum installations.

Differential Loop—Steam connection to loop may be carried direct from the boiler, header, or steam main. It should be uncovered and at least 4 ft. long, to supply the necessary amount of condensation to loop. The standard loop should not be used where distance between lowest point in the return main is less than 24 in. above the boiler water line.



Typical Layouts Showing Method of Installing Hoffman "Controlled Heat" Specialties



TYPICAL INSTALLATION OF HOFFMAN RETURN LINE VALVES ON RADIATORS, COILS AND PIPE LINES

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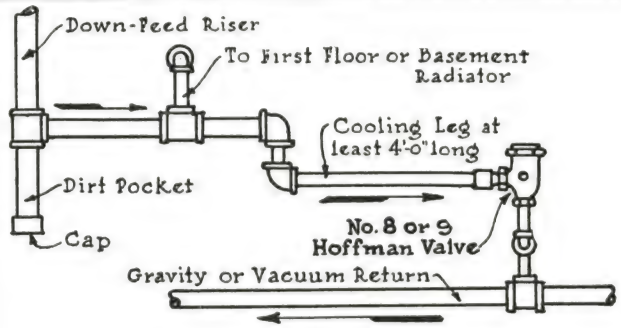
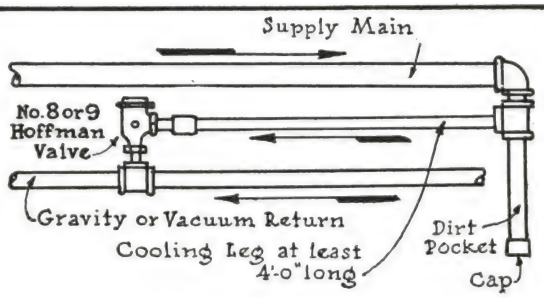
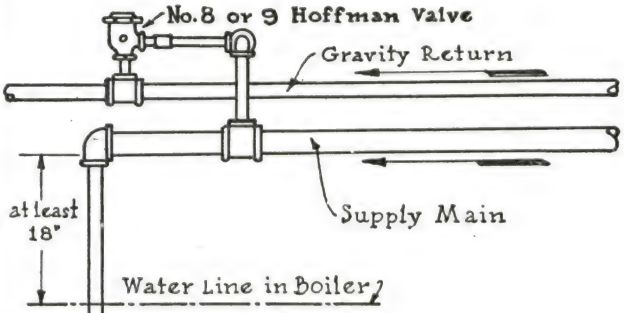


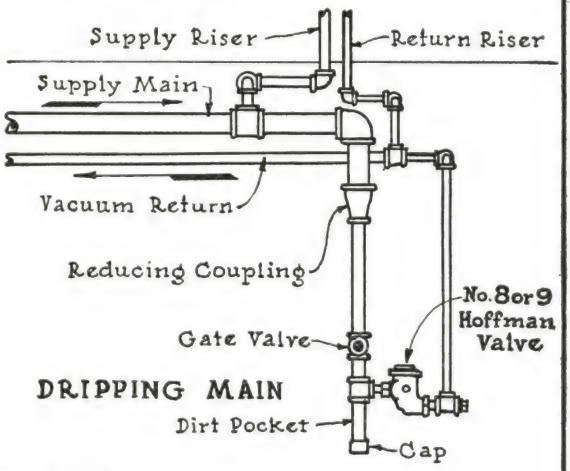
DRIPPING DOWN-FEED RISERS



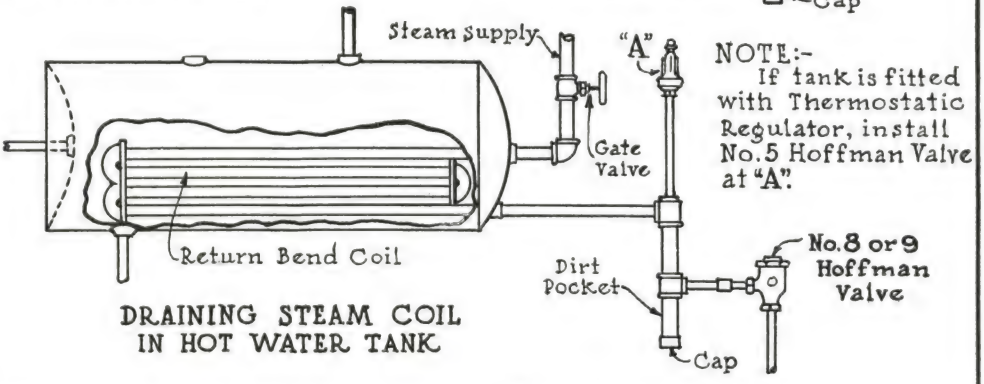
DRIPPING AND VENTING MAIN



DRIPPING AND VENTING MAIN

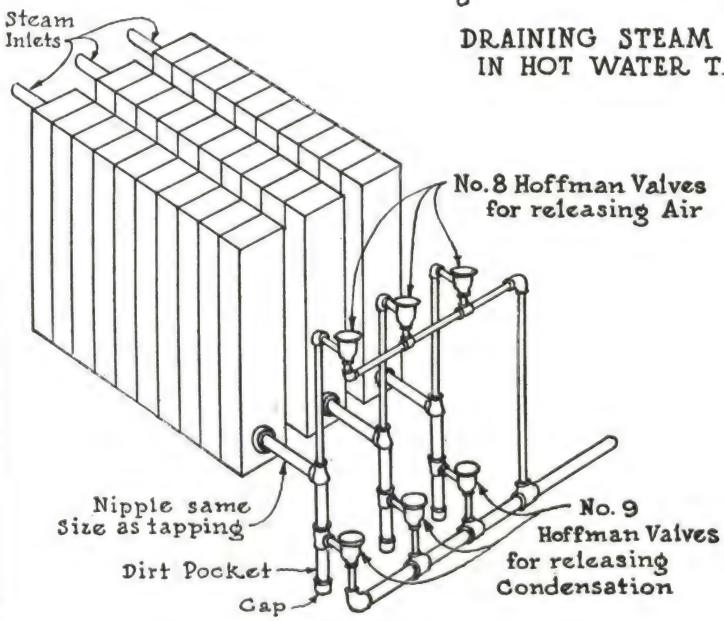


DRIPPING MAIN

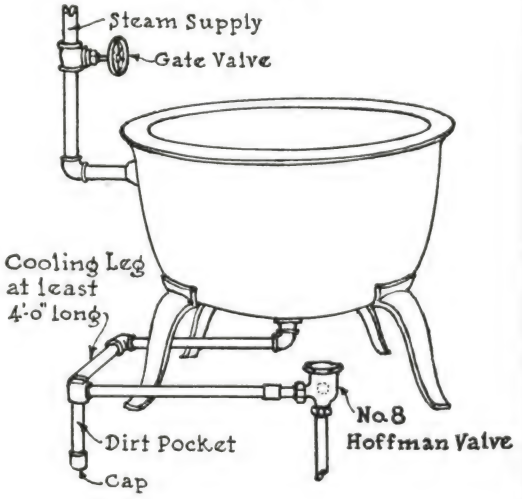


NOTE:- If tank is fitted with Thermostatic Regulator, install No. 5 Hoffman Valve at "A".

DRAINING STEAM COIL IN HOT WATER TANK



TYPICAL BLAST COIL OR VENTO INSTALLATION



DRAINING STEAM JACKETED KETTLE

TYPICAL INSTALLATION OF HOFFMAN RETURN LINE VALVES ON PIPE LINES, BLAST COILS, ETC.

WILLIAM S. HAINES & COMPANY

Manufacturers of Steam Heating Specialties

Twelfth and Buttonwood Streets

PHILADELPHIA, PA.

Products

HAINES VACUUM HEATING SYSTEMS and AUTOMATIC VAPOR SYSTEMS, consisting of Haines Automatic Valves and Traps, Automatic Air Traps, Graduated Supply Valves, Suction Strainers, Safety Valves, Vacuum Pump Governors, Damper Regulators, Low Pressure Gages, and all Specialties used in the systems.

Vacuum Systems of Steam Heating

This company believes that the architect and engineer are sufficiently familiar with the principle, operation and general piping arrangement of this system to make it unnecessary to detail them here.

It is generally conceded that the vacuum system of steam heating, properly installed and equipped, is the most efficient and economical heating system that can be used in connection with large buildings of any description.

Vacuum systems of heating, however, have not always proved successful, due not to any fault in the principle of the system, but almost entirely to poorly constructed automatic valves. In fact, the automatic valve is so important a feature that, regardless of all other perfections, any system of vacuum heating would be a failure without an equipment of positive and reliable automatic valves.

Haines Automatic Valves and Traps

This company is the sole manufacturer of the Haines automatic valves and traps (four illustrated herewith), in all of which the operating power consists of the Haines specially designed thermostatic tube. This member is not new or untried, as the company has been using it in connection with its automatic valves and traps for 25 years, and during this entire period the principle of the thermostatic tube has not been changed a particle.

Construction—The Haines automatic valves and traps are all constructed on one principle, with some slight difference in design to meet different conditions. In all cases the operating power consists of a specially designed Haines thermostatic tube mounted vertically on a horizontal valve motion.

The thermostatic tube has forked or bifurcated ends made to fit a groove in the valve head at one end and a groove in the guide stem at the opposite end. The guide stem is set permanent so that the movement or travel of the tube is confined to the opposite end in such a way as to automatically open and close the valve. To eliminate friction and remove any possible chance of the valve sticking, the hole in the valve stem is round, whereas the end of the guide stem on which it is mounted is square, which insures a free and perfect movement.

The valve mechanism in all the Haines automatic valves and traps is mounted horizontally. This permits scale and foreign matter to drop clear of the valve and seat at each operation; and as the construction of the thermostatic tube is such as permits a long range of movement, the chances of the valve fouling with scale or foreign matter is reduced to a minimum.

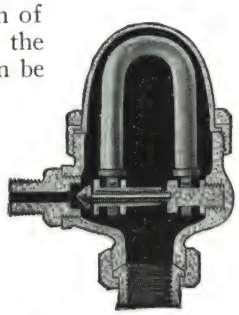
Advantages—They open quickly and close just as quickly.

They are made right—to stay tight.

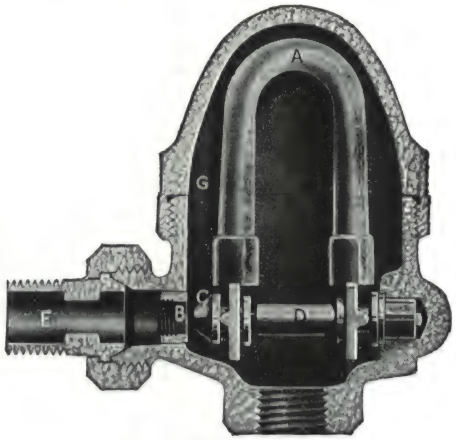
Not a particle of steam gets away.

Nothing that ought to stay in gets out.

Nothing that ought to get out stays in.

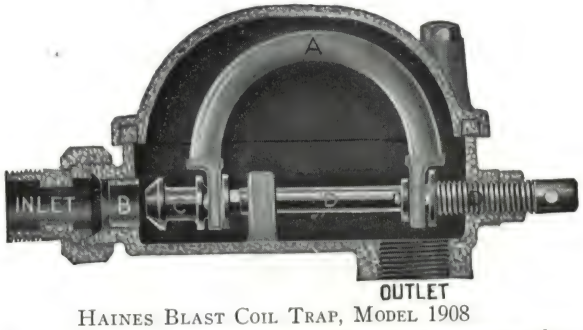


HAINES AUTOMATIC AIR LINE VALVE



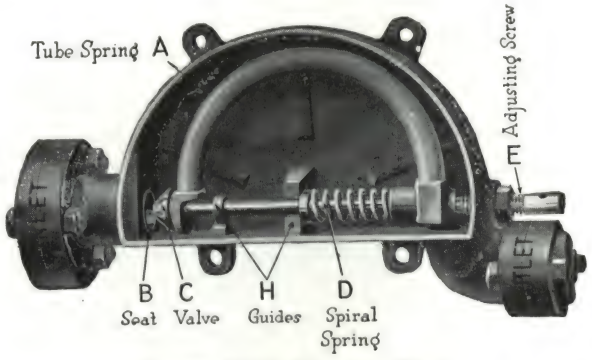
HAINES VENTO TRAP

Recommended for vacuum, vapor and low pressure heating systems



HAINES BLAST COIL TRAP, MODEL 1908

Recommended for any conditions where working pressure does not exceed 50 lbs.



HAINES HIGH PRESSURE TRAP

Recommended for any conditions where working pressure does not exceed 200 lbs.

THE HONEYWELL HEATING SPECIALTY CO.

WABASH, IND.

CANADIAN TRADE SUPPLIED FROM MONTREAL

Products

HONEYWELL HEAT GENERATOR.
HONEYWELL WATER REGULATOR.

Honeywell Method of Hot Water Heating

The Honeywell method of hot water heating is a method of installation which, by the use of the equipment listed above, insures a positive and uniform circulation throughout the entire piping system and radiation, with a wide range in water temperatures.

The Honeywell method gives all the advantages of vapor or steam heating without sacrificing the valuable features of ordinary hot water heating.

Pipe and valve sizes are intelligently proportioned to reduce as low as possible the volume of water, and connections from mains to branches are so designed as to give a perfectly balanced circulation.

Water passing so much more rapidly over the heating surfaces of the boiler assures the highest economy in operation.

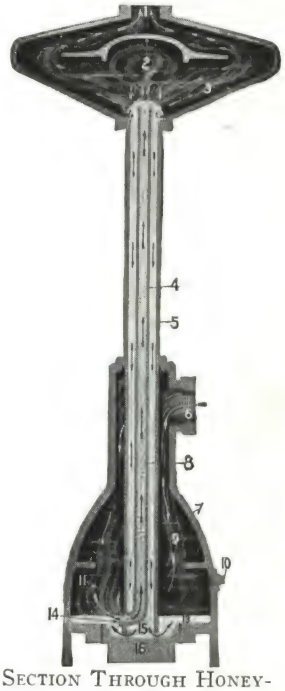
Honeywell Heat Generator

An automatic and absolutely safe mercury device for sealing hot water heating systems and producing a slight pressure on the water, which causes it to circulate more rapidly and makes possible a higher water temperature when required. It can be used on any hot water heating system and is suitable for all classes of buildings.

It is the only device providing a positive, interior circulation, making it possible to produce and maintain a pressure of 10 lbs., and permitting all water of expansion in excess of 10 lbs. to pass readily and freely to the expansion tank.

Has no mechanical parts to rust, stick, leak, become useless or cause dangerous pressure.

How It Operates—When the water in the plant is cold, mercury (13) lies on bottom of mercury pot (7), all other parts of generator being filled with water. When water begins to expand, it flows into generator at (6), thus exerting a pressure on the mercury and forcing it up through the circulating tube (4). As the mercury rises in the circulating tube, it will lower to a corresponding extent in the mercury pot.



SECTION THROUGH HONEYWELL HEAT GENERATOR

When the water has forced the mercury down slightly below the top of inlet (14), it will pass over the mercury and into the circulating tube, constantly carrying a quantity of mercury with it. When water and mercury reach the top of the circulating tube, the water will pass up and around the deflector (2) and out to the opening (1) to the expansion tank.

The mercury which is driven upward with the water will return through space (8) thus raising mercury level in mercury pot, and operates in a manner similar to a balanced valve.

Honeywell No. 30 Water Regulator

Furnished in connection with the Honeywell tank-in-basement method, for preventing boiling of the water, which should never occur in a tank-in-basement installation. The weights on the regulator lever can be adjusted to close the drafts at any desired water temperature below 240°, the boiling point of the Honeywell method. It operates the drafts by means of the water temperature, a more dependable way than regulation by pressure.

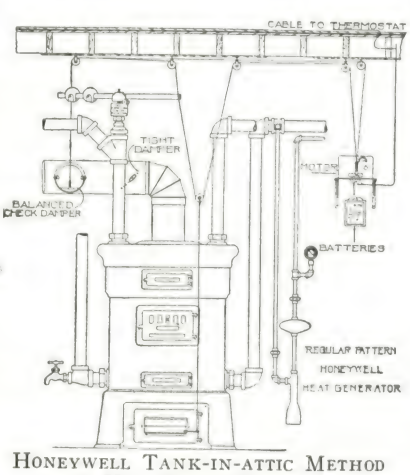
Desirable house temperatures are assured by installing a regulator of the room control type in connection with the Honeywell Water Regulator, with which it functions perfectly.

HONEYWELL, NO. 30, WATER REGULATOR

Piping Plans for the Honeywell Method

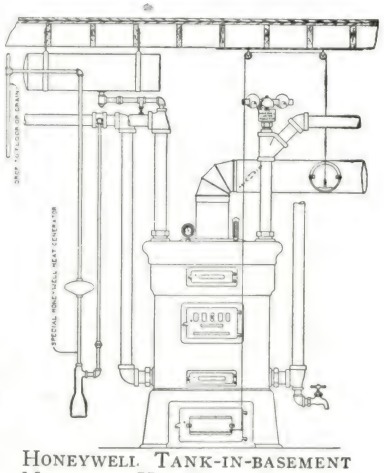
We prepare plans only for architects and the legitimate trade or those entitled to buy heating materials. Under no circumstances will we knowingly make plans for house owners or others not entitled to trade protection.

If architects will send us plans of the building in which they wish to install the Honeywell method, showing locations of boiler and radiators, also their capacities, we will prepare complete guaranteed piping plans for our method at the following rates: for plans of 500 sq. ft. or less, $2.00; 500 to 750 sq. ft., $2.50; 750 to 1000 sq. ft., $3.00; $1.00 for every 500 sq. ft. of radiation over 1000 sq. ft.



HONEYWELL TANK-IN-ATTIC METHOD OF HOT WATER HEATING

This is the regular Honeywell method employed whenever convenient to place expansion tank above the radiators or where there is no danger of water in tank freezing



HONEYWELL TANK-IN-BASEMENT METHOD OF HOT WATER HEATING

This method is employed in bungalows, one-story or flat roof buildings or any building where it is difficult or unsightly to place expansion tank above radiators or where water in tank is liable to freeze

MONASH-YOUNKER CO.

High Grade Return Line Traps, Air Relief Valves and Steam Specialties

CHICAGO, ILL. NEW YORK, N. Y.

Products

MONASH HIGH GRADE RETURN LINE TRAPS, ADJUSTABLE and NON-ADJUSTABLE AUTOMATIC AIR VALVES, QUICK ACTING VALVES; LIQUID THERMO AUTOMATIC AIR VALVES; DRIP LINE AUTOMATIC AIR VALVES, VALVE HOLDERS.

Also manufacturers of Packless Supply Valves and Auxiliary Traps; Automatic Steam Main Vents, Expansion Traps; Radiator Covers.

Trade-mark

Stands for 31 years of quality and service.

TRADE MONASH MARK

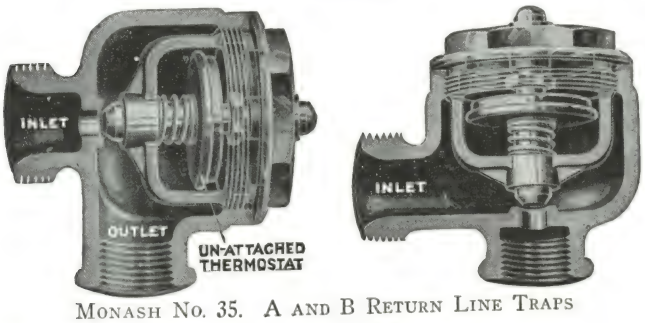
TRADE-MARK

Monash Return Line Traps

These traps are made of the best steam metal and are *guaranteed* for *ten years.* The *distinctive feature* of Monash traps is the *diaphragm,* a separate and independent unit so held in place that it eliminates all possibility of fracture or rupture, a source of trouble with thermostatic return line traps.

Traps are set and tested at the factory, are *non-adjustable,* and can be shipped with diaphragms removed, if so desired, to permit a new system to be blown out and cleaned. Temporary caps unnecessary.

Traps can be furnished with the diaphragm in either of the positions illustrated.



MONASH NO. 35. A AND B RETURN LINE TRAPS

Monash Thermostatic Return Line Traps

Made with *by-pass* and *clean-out* feature, making it possible to clean the trap without removing the cover or trap from the system.

For mains, risers, drips and blast coils in all classes of industrial plants.

No. 40 No. 42 No. 44

THERMOSTATIC RETURN LINE TRAPS

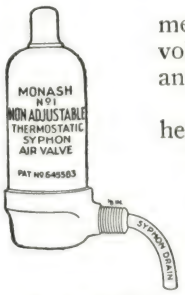
Monash No. 6 Four-way-drain Automatic Air Valve

This valve has been on the market for more than *twenty years* and is *guaranteed* in writing in the hands of the user for *ten years.* Can only be adjusted with the key which is furnished with the valve. Is the only valve made with a special air tube conducting the air from the radiator, permitting it to escape through the outlet. This equalizes the air pressure in the valve and makes it a perfectly working, automatic, adjustable air valve. The four-way-drain extending from the body of the valve into the radiator drains off the water of condensation, preventing flooding of floors and damage to ceilings below. Made with hexagon shaped base so that it can be distinguished from all other valves.

MONASH NO. 6 FOUR-WAY-DRAIN AUTOMATIC AIR VALVE

Monash No. 1 Non-adjustable Automatic Air Valve

Made with removable siphon, permitting the valve to be cleaned and siphon replaced.



MONASH NO. 1 NON-ADJUSTABLE AUTOMATIC AIR VALVE

The thermostatic member is controlled by volatile liquid, sensitive and quick in action.

Made throughout of heavy metal with the base and nipple cast in one piece and the body of the shell screwed into the base. *Guaranteed* for *five years.*

Monash Valve Holder

Prevents the valve from being turned or removed from the radiator. Especially adapted for use in schools and all classes of public buildings. The illustration shows the manner of fastening the valve to the radiator with the valve holder.

VALVE ATTACHED TO RADIATOR WITH MONASH VALVE HOLDER

Monash No. 27 Quick Acting Valve

Made with ⅜-in. connection for use on high points in mains, risers, pipe lines, coils and direct or indirect stacks. Insures rapid steam circulation. Has a thermostatic member controlling its action. Does not close against water. Adjusted and tested at the factory ready for use.

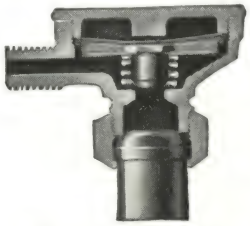
MONASH NO. 27 QUICK ACTING VALVE

Monash Liquid Thermo Automatic Air Valve

Used on ventos and air line systems, with or without pump. Non-adjustable. Rapid and positive in action.

No. 2, ⅛x¼-in. connection.

No. 3, ¼x⅜-in. connection.

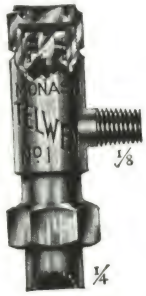


MONASH NO. 2 LIQUID THERMO DIAPHRAGM AUTOMATIC AIR VALVE

Monash Telwen Drip Line Automatic Air Valve

The Telwen feature "tells when" valve is properly adjusted, saving time and work due to careless adjustment. Compensating spring seat prevents buckling or bending of expansion member by undue pressure.

No. 1, ⅛x¼-in. connection. No. 3, ¼x⅜-in. connection.



MONASH TELWEN NO. 1 DRIP LINE AUTOMATIC AIR VALVE

THE OHIO BODY AND BLOWER COMPANY

Steam and Oil Separators, Steam Traps, Cast Iron Exhaust Heads, Feed Water Heaters

CLEVELAND, OHIO

For Branch Offices, see page 1000

Products

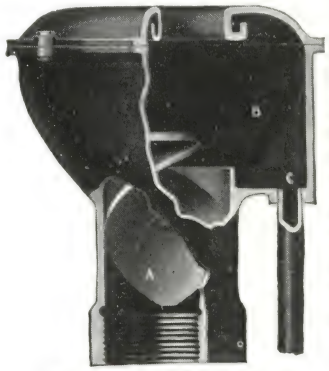
CAST IRON EXHAUST HEADS.
FEED WATER HEATERS.
STEAM and OIL SEPARATORS.
HYDROMATIC STEAM TRAPS.
SEDIMENT STRAINERS.

For Swartwout Rotary Ball Bearing Ventilators, see pages 1000-1003.

TRADE-MARK
Registered in
U. S. Pat. Off.

Swartwout Cast Iron Exhaust Head

Removes oil and water from exhaust steam. If exhausted direct, this water will rot roof and walls of a building in warm weather, while in cold weather it will form ice.



SWARTWOUT CAST IRON EXHAUST HEAD
(Patented)

The Swartwout cast iron exhaust head imbodies the same helico centrifugal principle as the Swartwout separators. Whirling motion given steam throws heavy water particles against side of chamber "B" where they flow out through drip "C". Positive in action without back pressure.

Of pleasing architectural design permitting its use on churches, public buildings, etc.

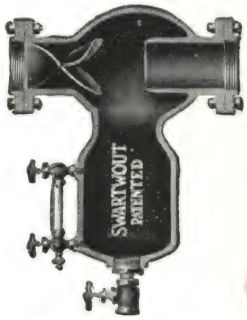
Swartwout Junior Feed Water Heater

Is of the open type and designed primarily for small power plants, with a boiler capacity of 250 h. p. or less. Costs nothing to operate. It is heated by exhaust steam that has passed through the oil separator.

Fresh water is controlled by a balanced valve, actuated by a float which keeps the water at the proper level at all times.

Swartwout Oil Separators

Whenever exhaust steam is used for any purpose, such as in heating systems, the oil should be removed and nothing but clean steam used. Oil separators are of special value where steam is purchased for heating and in such cases the oil separator should be placed in the line before steam enters any of the heating devices.

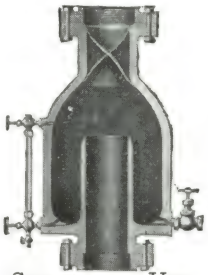


SWARTWOUT HORIZONTAL OIL SEPARATOR
(Patented)

Operation—Steam in entering the Swartwout separator passes through the helix (shown in the illustration) which gives to the steam a whirling motion. The centrifugal forces set up in this revolving steam column, being proportioned to the weight of the body, casts off in a radial direction the particles of oil and associated water. These entrained particles are thrown far beyond the moving column of steam against the sides of the separators where they collect, run down and are drawn off. Made in horizontal and vertical types. Built of cast iron of such analysis that they do not readily corrode. Made in sizes from 1½ to 24 in.

Swartwout Steam Separators

Built on the same principle and similar in design to those built for the separation of oil from steam. Placed in the steam line before it enters turbines, engines, pumps, etc. the Swartwout steam separator, when properly installed and trapped, will deliver steam 99% free from moisture. Made in receiver and non-receiver types, in sizes from 1½ to 12 in. Receiver type in sizes from 1½ to 20-ins.

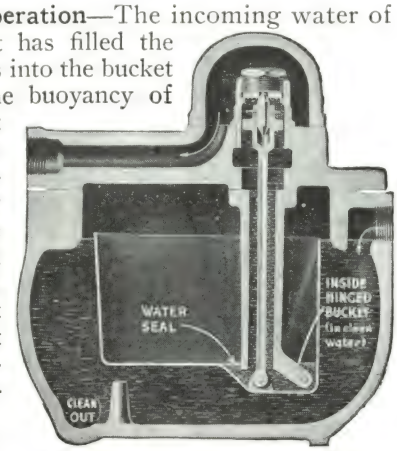


SWARTWOUT VERTICAL STEAM SEPARATOR
(Patented)

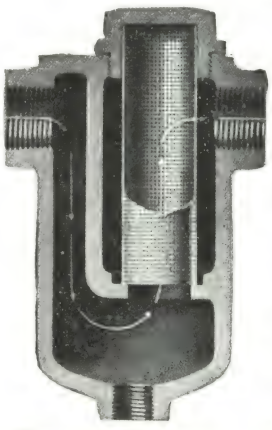
Swartwout Steam Traps

For removing all water of condensation from heating coils, steam separators, cooking apparatus, sterilizers, etc. Also used on the return line of vacuum heating systems in which case it is equipped with a vacuum attachment.

Simplicity of Operation—The incoming water of condensation, after it has filled the body of the trap, flows into the bucket until it overcomes the buoyancy of the bucket, causing it to drop and open the valve. The steam pressure blows the water from the trap; the bucket then rises and closes the valve. Enough water is left in the bucket so that the valve is water-sealed, absolutely preventing any loss of steam. Made in sizes from 1½- to 2-in. pipe connection.



SWARTWOUT HYDROMATIC TRAP
(Patented)



SEDIMENT STRAINER

Swartwout Sediment Strainer

Placed in the return line before it enters the steam trap or vacuum pump, the Swartwout sediment strainer protects the working mechanism of these devices. The pocket in the bottom of the strainer can be readily opened. Strainer cylinder can be removed for cleaning.

O-E SPECIALTY MANUFACTURING CO.

Manufacturers of Vapor-Vacuum-Pressure Heating Specialties

886 Third Street

MILWAUKEE, WIS.

Products

"O-E" PERFECT VAPOR-VACUUM-PRESSURE HEATING SYSTEM: "O-E" PACKLESS GRADUATED RADIATOR VALVES; "O-E" COMBINED RETURN ELBOW, CHECK VENT and SEAL; "O-E" AIR EXHAUSTER and VACUUM VALVE; THERMO-NICKEL RETURN LINE RADIATOR TRAP.

Also manufacturers of "O-E" Rouse Patent Balanced Swing Check Valves; Pressure Reducing Valves; Damper Regulators; Air Compressors; Direct Differential Return Traps; Vacuum Pressure Gauges; Brass Castings.

"O-E" Heating System

A two-pipe system admitting steam at the top of the radiator, discharging condensation and air at the bottom. Perfectly simple and entirely automatic—no mechanically operated units requiring attendance and power to operate.

Normally operated on the vapor-vacuum principle, will, without change or adjustment, operate as well on the pressure principle.

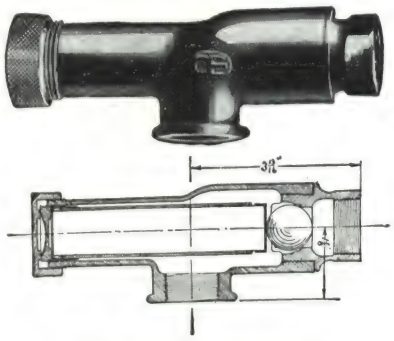
Operation—Vapor generated at the boiler passes up through a main supply pipe and is distributed to the several radiators through small individual supply pipes, the amount being governed by an "O-E" packless graduated valve. Air and condensation are discharged through a ½-in. "O-E" elbow into the main return pipe, where the air is separated out and discharged, preferably into the flue, through an "O-E" patent air exhauster. The water is returned to the boiler for re-use.

Both the elbows and air exhauster act as vacuum valves, so that, after the air has once been discharged, the system operates under vacuum, producing steam at temperatures considerably under 212° Fahr. with resultant saving in coal consumption.

"O-E" Packless Graduated Valve—Absolutely packless, can not stick, never leaks, is quick opening, and may be set to supply exactly the degree of heat desired.

"O-E" Ball Check Water Seal Union Elbow—Entirely automatic; always operates perfectly—can not stick, and there are no thermostatic diaphragms to get out of order. Easily cleaned—an important factor, as dirt is always present in newly installed heating systems. Air vent in adjustment screw equalizes pressure around water seal, and prevents siphoning.

"O-E" Air Exhauster and Vacuum Valve—Most simple; can not buckle, very sensitive. Remains open as long as there is any air in the system, but closes as soon as heat reaches the thermostatic control, a specially made composition post. After the exhaustion of air in the system, the ball seal is held to its seat by the vacuum created by the radiator condensation. A separate exhauster is recommended for each return line, as one line may be shorter or have less radiation than the other, in which case vapor from the short line would close the exhauster before the long line had been freed from air.

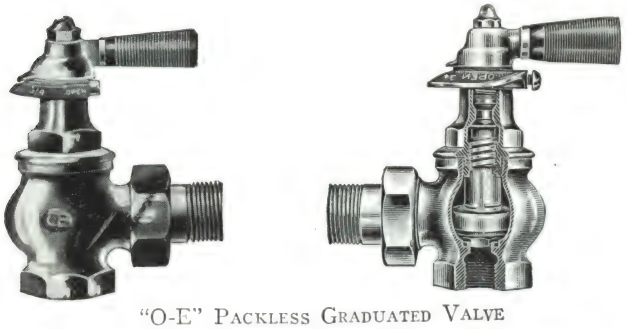


"O-E" AIR EXHAUSTER AND VACUUM VALVE

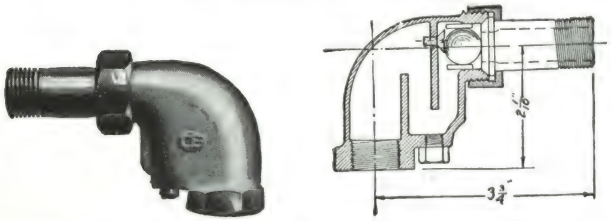
Advantages of the "O-E" System

"Simply Perfect and Perfectly Simple."

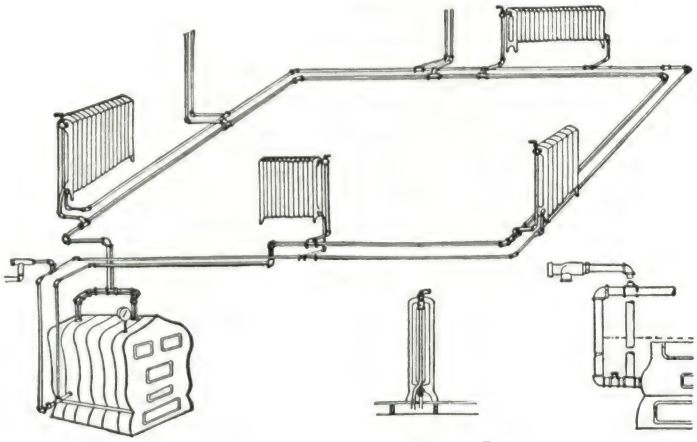
Economical of fuel and inexpensive to install—no royalties. Perfect local regulation irrespective of outdoor temperature. Noiseless. Rapid circulation—flexibility unexecelled. No leaky or annoying air valves. Smaller pipes and fittings. No complicated mechanical apparatus. Easier to install than steam or hot water; Three systems in one—vacuum ordinarily, vapor part of the time; instantly put under pressure when desired. Holds steady water line in boiler under all three systems.



"O-E" PACKLESS GRADUATED VALVE



"O-E" BALL CHECK WATER SEAL UNION ELBOW



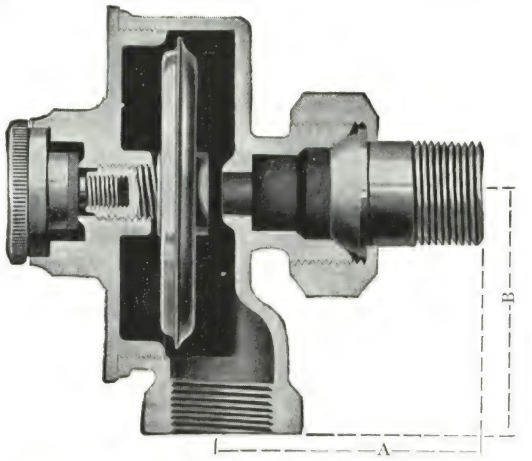
TYPICAL PIPE PLAN FOR A SMALL INSTALLATION

Continued on next page

Thermo-nickel Return Line Radiator Trap

No. 1 O-E trap is a return line radiator trap suitable for vapor, vacuum, or pressure, and all kinds of return line heating systems.

Construction and Operation—The O-E diaphragm is manufactured of high grade cross-rolled non-corrosive metal heavily corrugated, reinforced at point of heaviest duty, and is plated all over. The thermostatic member closes against the steam or vapor and not in it. As the discharge of condensation is continuous, it does not depend on an accumulation to cool before opening. The flat disc closes against a semi-ball seat. The vertical seat is practically self-cleaning. This trap is readily visualized in the accompanying illustration.



THERMO-NICKEL RETURN LINE RADIATOR TRAP

Size	A	B	Capacity
½ in.	2 in.	1⅛ in.	200 sq. ft.
¾ in.	2½ in.	2 5/16 in.	500 sq. ft.

Thermo-nickel Return Trap with Non-corrosive Ball Check

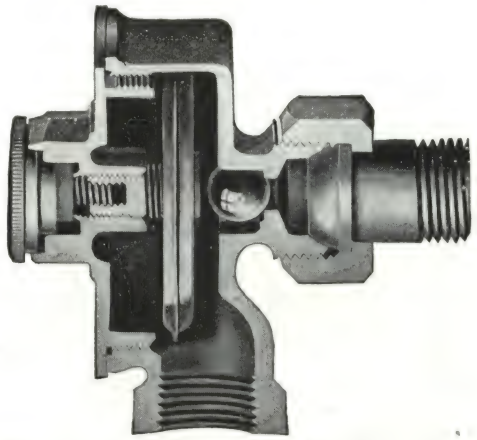
No. 2 O-E trap, as this is called, is a high grade combination thermostatic return trap with a check and is used for the same purpose and has practically the same construction as the No. 1 trap, only with the added ball-check feature shown in the illustration.

Operation—The non-corrosive ball check operates on a smooth guide or track, and is rolled to its seat against vapor or steam by the expansion of gas in the thermal member. When the radiator supply valves are closed, condensation of the steam forms a vacuum in the radiators which holds the balls to their seats, permitting all water in the return lines to flow freely back to the boiler, thereby eliminating the danger of broken boiler sections and preventing steam or vapor short-circuiting into radiators through return risers.

(Numerous heating boilers have been damaged on account of the vacuum, formed by condensation in the radiators when the supply valves are closed, holding water in the return lines, preventing its return to the boiler.)

When supply valves are opened, the balls are released from their seats permitting air and condensation to freely enter the return lines without pressure.

Exhaustive tests have demonstrated that O-E Thermo-nickel traps will hold tight on a vacuum pump installation, as well as on a vapor or pressure job, and that the non-corrosive balls in the traps with checks will not "chatter." (See Test Bulletin, No. 530.)



RETURN TRAP WITH NON-CORROSIVE BALL CHECK
Roughing-in dimensions same as No. 1

Points of Superiority of Thermo-nickel Traps

(1) They will not deteriorate as other traps do.
(2) They will not collapse from abnormal pressure nor will they freeze and become damaged.
(3) The diaphragm valve will not stick or bind.
(4) They can be easily and quickly adjusted.
(5) The vertical seat prevents foreign matter from adhering.
(6) The body is manufactured of best government bronze and not of cast iron.
(7) They are heavily nickelplated all over.
(8) Locking device for thermostatic member.
(9) Each trap tested by not less than 50 lbs. pressure.
(10) Guaranteed to remain closed at about 212° Fahr. when vacuum pump on return line is pulling 10 in. of vacuum.

Note: The above guaranty is conservative, since in actual test the traps remained closed when the vacuum pump was pulling 18 in. of vacuum on the return lines. We recommend a maximum of 5- to 10-in. vacuum be maintained by the installation of an O-E automatic pump governor, a low vacuum being just as effective as a higher vacuum, and means less duty on the pump and other heating apparatus. The special metal and liquid used in "O-E" thermal members account for the unusual test mentioned, and also assure maximum action.

The above points hold good for both No. 1 and No. 2 traps.

O-E Traps Protected by Patents

We do not propose to take advantage of the fact that the "O-E" thermo-nickel return traps, with and without ball check, are protected by patents, and that the "O-E" combination ball check trap is the only trap made with the check feature. On the contrary, we have placed our jobber distributers throughout the United States and foreign countries in a position to market these high grade patented traps at an extremely reasonable price, not more than is asked for the ordinary return traps being sold. This policy will, no doubt, be appreciated by the trade.

Specify

Engineers, architects and others should specify "O-E" No. 2 thermo-nickel traps with ball checks. The insurance against boiler damage is alone worth more than the reasonable price asked.

Guarantee

We guarantee that each and every "O-E" trap is thoroughly tested and carefully adjusted before being packed for shipment, and will cheerfully supply new parts to replace any that may prove defective within five years from date of installation.

RICHARDSON & BOYNTON CO.

SINCE 1837

Vapor-Vacuum-Pressure System of Heating

260 Fifth Avenue
NEW YORK, N. Y.

FACTORY
DOVER, N. J.

BOSTON, MASS., 60 High Street
ROCHESTER, N. Y., Rockwood Street
PHILADELPHIA, PA., 1332 Arch Street
PROVIDENCE, R. I., 429 Industrial Trust Building
CHICAGO, ILL., 171-173 West Lake Street

Products

RICHARDSON VAPOR-VACUUM-PRESSURE SYSTEM OF HEATING for all classes of buildings.

RICHARDSON AUTOMATIC HEATING SYSTEM for garages.

For Warm Air Furnaces, see pages 1662-1665; for Richardson Low Pressure Boilers for Steam, Vapor and Hot Water, also Domestic Hot Water Supply, Tank and Laundry Heaters, see pages 1675-1679; for Coal and Gas Cooking Ranges, see pages 2098-2103.

Richardson Vapor-Vacuum-Pressure System

This system is simple in operation and easy to control. The essential features consist of only five simple parts or fittings (see illustrations).

The amount of radiation is the same as for steam systems, but it must be of the hot water type.

The *five* Richardson parts are: (1) Richardson graduated supply valve and (2) the Richardson water seal back check union elbow at the radiator; (3) the Richardson air expeller and vacuum trap; (4) horizontal swing check valve and (5) compound pressure and vacuum gauge at the boiler, and a Richardson special vacuum-vapor-pressure damper regulator is supplied with the Richardson boiler. No pumps, floats or receivers are required.

Conspicuous Advantages—The Richardson vapor-vacuum-pressure system has all the advantages and none of the disadvantages of both steam and hot water heating. Properly installed the following results will be experienced from the Richardson system:

A material saving in fuel; a far better distribution of heat because each radiator can be regulated to give varying amounts of heat; quicker heat in the morning; closer regulation to suit temperature changes; no overheating in moderate weather or underheating in severe weather; a system easier to operate than either steam or hot water; longer life; fewer repairs; nothing to get out of order; no frozen radiators; no leaky air valves; no pounding in pipes or radiators; it is so simple and so automatic that any one can operate it successfully.

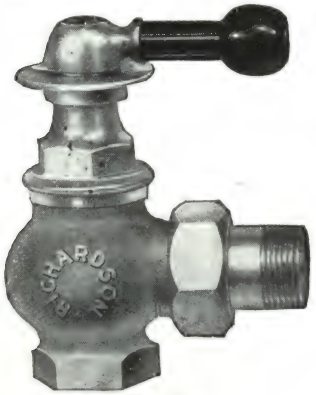
Underlying Principle of the Richardson System—This underlying principle is to remove the atmospheric pressure from the system, and to automatically maintain a partial vacuum for the purpose of permitting a quick and positive circulation of vapor throughout the entire system.

Water will give off vapor long before the water begins to boil. Under normal atmospheric pressure water boils at 212°. Remove this pressure by creating an absolute vacuum and water would boil at 98°, thus requiring only one-half the fuel. While it is impractical to produce an absolute vacuum, nevertheless the Richardson system, by automatically removing the air and closing the system against its return, does produce a partial vacuum which makes it possible to produce vapor and to boil water at much lower temperatures, and, consequently, with much less fuel than would be required in a steam system of corresponding size.

Simple Operation—The operation of the Richardson system is simple and easily understood. When the fire is started in the boiler vapor rises from the water, enters the radiators and replaces the air which is forced out through the Richardson water seal ball check union elbow and carried by the return air line to the Richardson air expeller, where the air is automatically expelled. When the vapor in the radiator condenses, the water passes through the water seal and is returned to the boiler.

Vacuum Is Maintained Automatically—The Richardson air expeller, placed at the end of each air line return, automatically releases all the air from the system. As soon as vapor reaches it, the air expeller closes by expansion, thus preventing air from getting back into the system. It is this air expeller, located at the boiler, which creates and maintains the vacuum in the system. The compound pressure and vacuum gauge, supplied with this system, indicates at a glance the amount of vapor pressure being carried, or the vacuum in inches.

Heat Controlled at Each Radiator — Each radiator is independently controlled by the Richard-

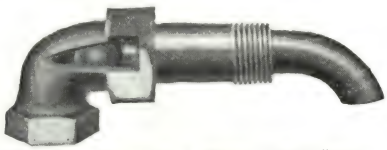


Side View

Top View

Part 1. Richardson Graduated Supply Valve

Part 3. Richardson Air Expeller



Part 2. Richardson Water Seal Check Union Elbow

Part 4. Richardson Horizontal Swing Check Trap

Part 5. Richardson Vacuum and Pressure Gauge

THE FIVE PARTS OF THE RICHARDSON VAPOR-VACUUM-PRESSURE SYSTEM

Continued on next page

son packless graduated valve, conveniently placed on the supply pipe at the top of one end of the radiator, so that it can be easily operated without stooping over. A three-quarter turn opens or closes the valve, which is graduated for adjustment to any degree of temperature desired. The valve is of packless construction and never leaks or requires attention.

Radiator Control By Richardson Packless Supply Valve

Richardson Packless Graduated Supply Valve

This valve is of heavy pattern, best steam metal, heavily nickelplated and furnished with hard rubber handle. A three-quarter turn opens or closes the valve, graduated for partial openings. Made in four sizes: ½ in. "A" type for radiators 30 sq. ft. and under; ½ in. "B" type for radiators over 30 sq. ft. to 50 sq. ft.; ¾ in. for radiators over 50 sq. ft. to 110 sq. ft.; 1 in. for radiators over 110 sq. ft.

Richardson Water Seal Ball Check Union Elbow

This fitting is made in only one size, ½ in., which is ample for all radiators. It is placed at bottom of radiator and operates as follows: When supply valve is opened, the ball check opens and allows the condensation to pass freely into the return. If the supply valve closes tight, the ball check closes to prevent water or vapor backing into the radiator. This return valve is entirely automatic. The air vent opening in the tail piece of the elbow, equalizes the pressure on both sides of water seal, preventing siphoning. It also allows the air in radiator to escape into return, as soon as supply valve is open.

Richardson Air Expeller and Vacuum Trap

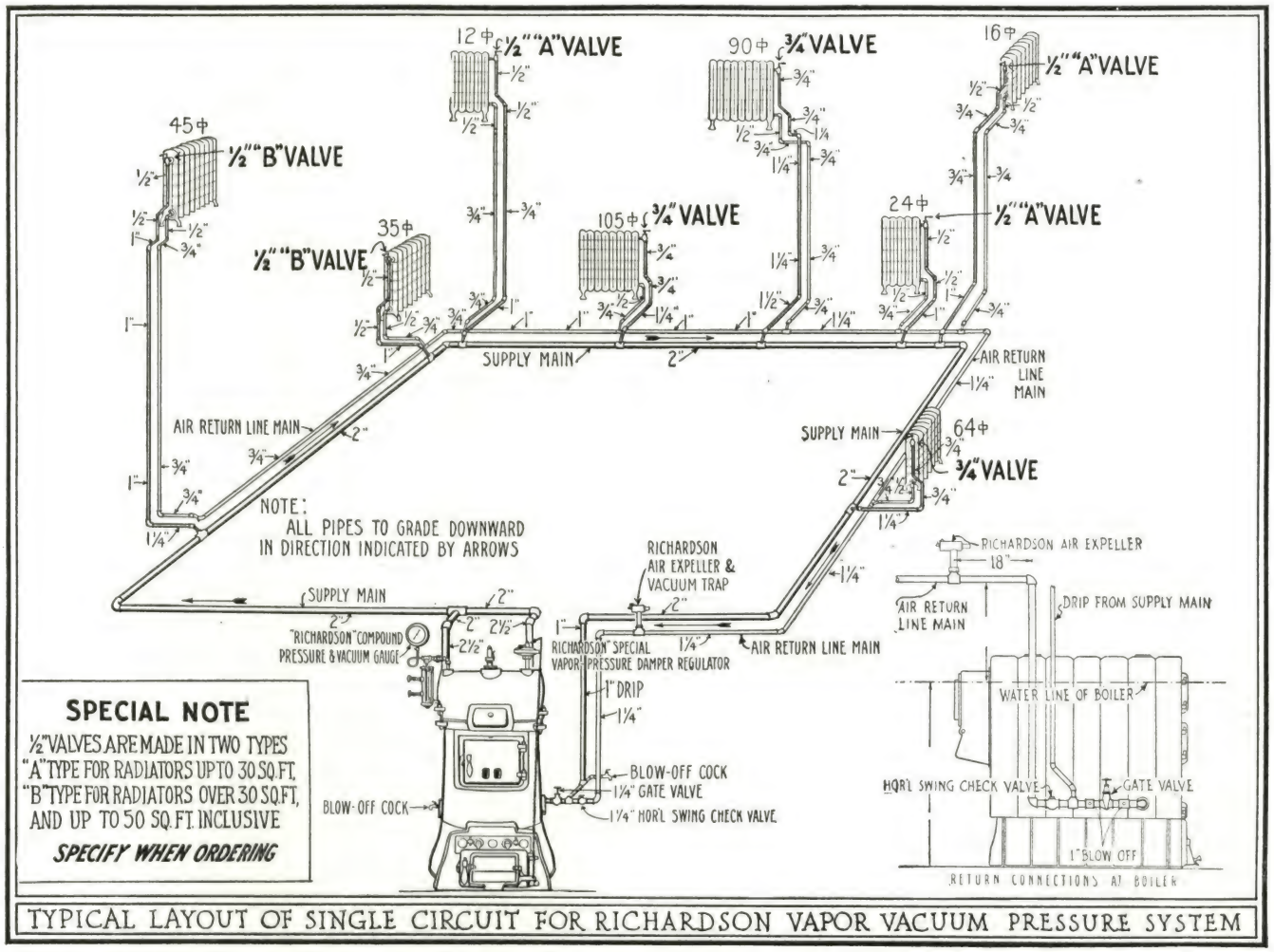
The air expeller and vacuum trap is placed at the end of each air line return at the boiler. It automatically releases the air from the system but closes by expansion as soon as steam or vapor reaches it, preventing waste heat. The vacuum attachment prevents air from re-entering the system through the air expeller, when it cools off.

Richardson Horizontal Swing Check Valves

These check valves are made of heavy pattern brass and were designed especially for use with the Richardson vapor-vacuum-pressure system and for all heating installations where quick acting, dependable check valves are required. Made in three sizes: 1 in., 1¼ in. and 1½ in.

Richardson Compound Pressure and Vacuum Gauge

The compound pressure and vacuum gauge supplied with the Richardson system indicates at a glance the vapor pressure in ounces or the vacuum being carried in inches.



TYPICAL LAYOUT OF SINGLE CIRCUIT FOR RICHARDSON VAPOR VACUUM PRESSURE SYSTEM

Note: Layout for moderate size job shows sizes of air return line main, also branches and risers. Note that the air line begins at radiator first supplied with steam. Side elevation of boiler shows proper method of connecting the air line and drip from supply main back into the boiler

Continued on next page

Directions for Figuring and Installing the Richardson Vapor-Vacuum-Pressure System

We recommend, in connection with the Richardson system, the use of exactly the same amount of radiation as would be required for a gravity steam job; using hot water pattern radiators.

Rule for Figuring Radiation—First, find the total square feet of glass surface in windows and outside doors, taking the full opening. Then measure the surface in exposed outside walls from which subtract the glass surface. The wall surface must then be reduced to equivalent glass surface by dividing the net amount of wall surface by:

10 if wall is 8 to 10 in. thick.
15 if wall is 12 to 26 in. thick.
20 if wall is 28 to 38 in. thick.

To this result add the actual glass surface, which gives the glass equivalent of wall and glass exposures. Multiply this total by 75, as 1 sq. ft. of glass surface cools 75 cu. ft. of air per hour. The result will give the total cubic feet of air to be heated to offset the loss from glass and wall exposures. To this total must be added the cubical contents of the room to be heated and the grand total multiplied by .0055 for a temperature of 70° Fahr. in zero weather, the result will be the square feet of radiation required. For each degree below zero, for which the heating is required, add 1% to the radiation.

It is necessary in using this or any rule, to use good judgment in increasing the amount of radiation on the first floor and also in the rooms on the cold side, exposed to the north and west, and reducing the radiation on the warm side. Also, making allowance for poorly constructed buildings and loose fitting windows, etc. Best results will be obtained by adding 10% to the radiation for the first floor. If rooms have open fireplaces, it is advisable to figure on at least two changes of air per hour which would require adding the cubical contents twice—this rule allows for only one change of air per hour. For indirect radiation increase the amount of heating surface 50%.

Piping System—The piping diagram shown on the preceding page is intended to give a general idea as to the arrangement of the supply and return mains, showing one circuit for a small building. It is not always advisable to use a single circuit system especially if mains are long, but rather to run two or more circuits, as the radiators will heat more quickly. A separate air line must be run in connection with each separate supply main, with an air expeller and vacuum valve for each separate air line main. *Do not connect two air line mains to one expeller.*

Air Line Return—Each air line return main must be started where the first radiator is taken off the supply main and extended through with and parallel to the steam main, graded the same and increasing in size to provide for the added connections. The tables and illustrations will give full information as to the size air line return necessary for different amounts of radiation.

Grade of Piping—All lateral pipes or branches in cellars and all horizontal pipes under floors (both supply and return) should have a grade of at least 1 in. in 2 ft. The supply mains and air return line mains should have a grade of 1 in. in 20 ft. and more if conditions will permit.

Pipe Sizes—The following table together with the diagram at bottom of the page are suggested pipe sizes for the Richardson system:

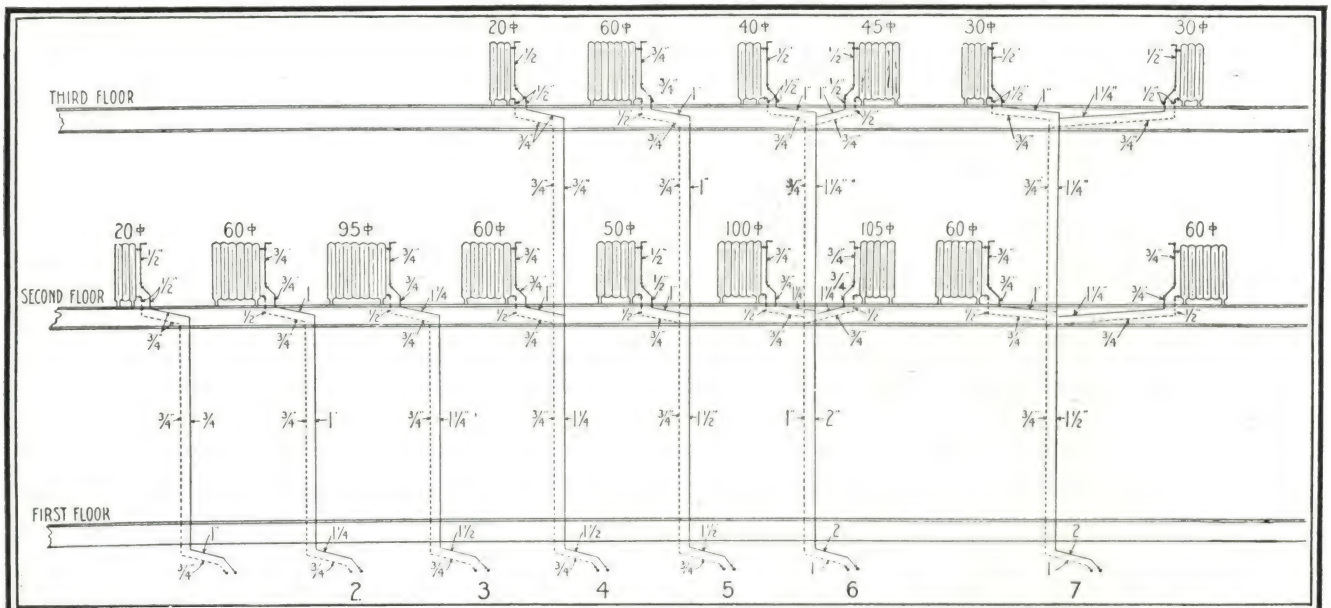
PIPE SIZES FOR THE RICHARDSON SYSTEM

Supply mains*		Air return line mains		Risers up to 30 lin. ft. high			Wet return mains	
Radiation, sq. ft.	Pipe size, in.	Radiation, sq. ft.	Pipe size, in.	Radiation, sq. ft.	Supply risers, in.	Return risers, in.	Radiation, sq. ft.	Pipe size, in.
150	1½	80	¾	20	¾	¾	400	1
400	2	200	1	60	1	¾	1000	1¼
600	2½	800	1¼	100	1¼	¾	1800	1½
1000	3	1500	1½	180	1½	¾	5000	2
1400	3½	4000	2					
2000	4							

*Not exceeding 100 lin. ft.

Specifications for Richardson System of Heating

The radiators, piping, boiler, covering, etc., required for the Richardson system of heating are the



RISER DIAGRAM FOR USE WITH RICHARDSON VAPOR VACUUM PRESSURE SYSTEM

Note: This diagram shows in general the amount of radiation which can be carried on risers of various sizes. Also where the pipe sizes reduce to size of valve, and the sizes of branches from mains to foot of risers. No. 7 shows condition where branches of unusual length are necessary. Note the larger size of lateral

Continued on next page

same as for any two-pipe steam system, with the exception that hot water type radiators should be used.

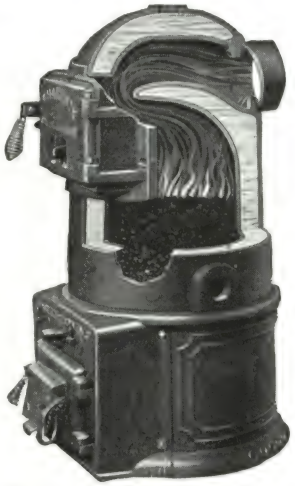
To specify the Richardson system it is only necessary to incorporate the following clause in the heating specifications:

Richardson Vapor-Vacuum-Pressure System—The system shall be the Richardson Vapor-Vacuum-Pressure System of Heating as manufactured by the RICHARDSON & BOYNTON CO., 260 Fifth Avenue, New York, N. Y., consisting of the following equipment: Each radiator to be equipped with one Richardson Packless Graduated Supply Valve of size required, and one Richardson Water Seal Ball Check Union Elbow; each air return line main to be equipped with one Richardson Air Expeller and one Richardson Horizontal Swing Check Valve. Equip boiler with Richardson Compound Pressure and Vacuum Gauge.

Richardson Automatic Garage Heating System

The Richardson automatic heating system is a hot water heating system designed for use in small garages (one to four cars), paint and repair shops, and many similar buildings which require a moderate amount of heat in a complete, compact, convenient and economical unit. It is shipped as a complete unit consisting of water heater, radiation, expansion tank, flue connection, piping and all fittings, complete ready to set. All parts being carefully cut and fitted, the work of installing the Richardson automatic system is simple, requiring little time to set up and make the necessary connections.

Heater—The heater is constructed of the highest grade of iron and thoroughly tested before shipment. It requires attention night and morning only, being equipped with an automatic damper regulator which controls the draft and maintains a uniform temperature. The fuel consumption is very low, averaging about one bucket or hodful of coal a day. It is fitted with a high ash pit fitting close to the floor. The firebox, cast in one piece, is of sufficient depth to hold an ample supply of fuel. The grates are adapted for burning any kind of coal—chestnut anthracite is recommended for best results.



RICHARDSON WATER HEATER

Radiators—Radiators are of the wall type, cast iron, with 35 sq. ft. of radiation to each section. Adjustable wall brackets are furnished for attaching to masonry or frame walls.

Expansion Tank—Tank is an open end galvanized expansion tank, 10-in. diameter by 14 in. high, supported on the air pipe connection from top of radiator.

Piping—Necessary pipe and fittings furnished as shown in illustration to make complete installation.

Smoke Pipe and Damper—Each system is furnished with a length of galvanized iron smoke pipe and elbow fitted with a patent lift check damper, and with a hand damper.

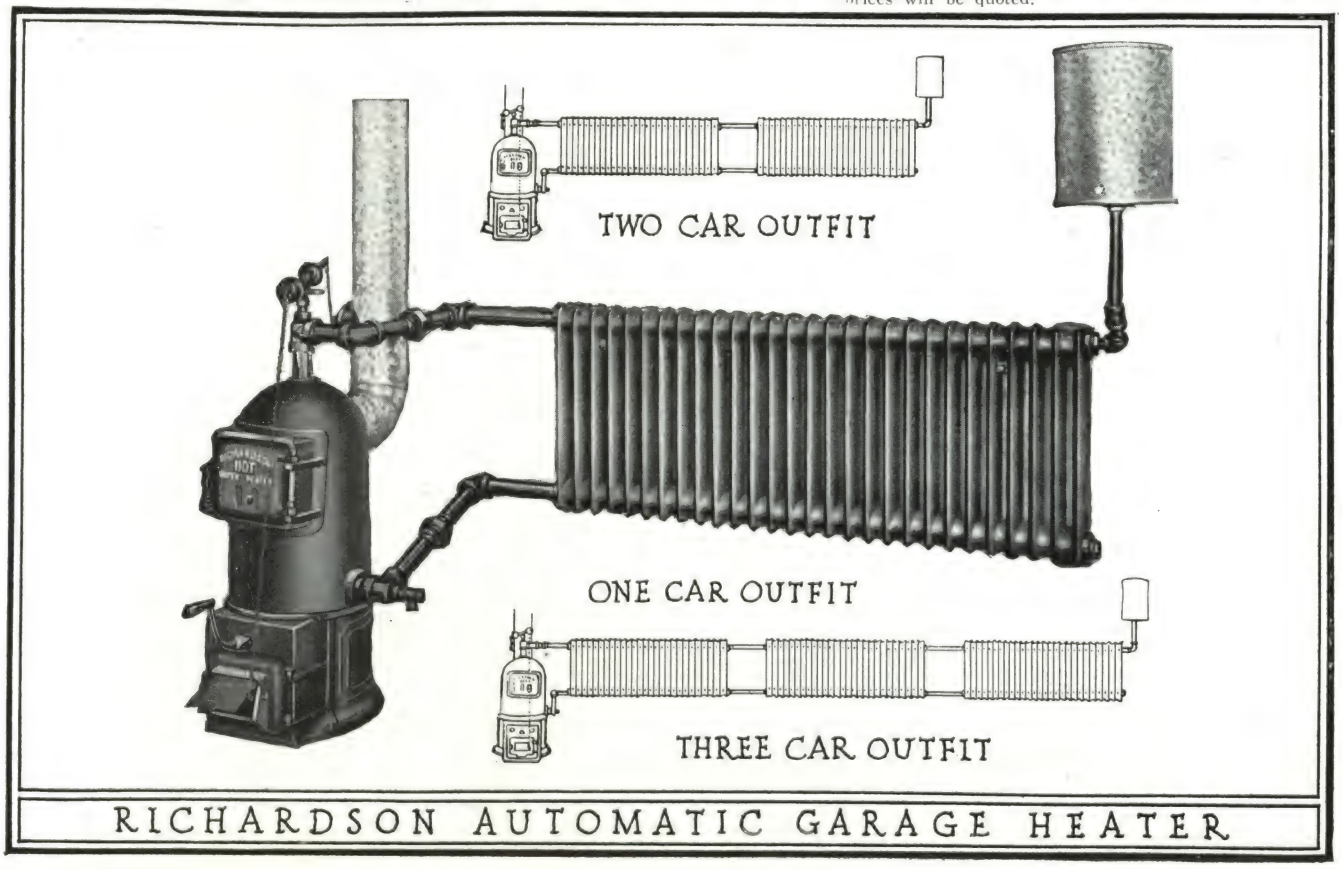
Special Hot Water Damper Regulator—All metal damper regulators furnished with necessary rod weights and chain to control fire and temperature of water.

Sizes and Capacities—The Richardson automatic heating system is made in six sizes as listed below. Based on the use of one radiator for a one-car garage (approximately 10x20-ft. ground area) experience has proved that the system will keep the temperature above freezing in the coldest weather and ordinarily will keep it at about 50° or 55°.

SIZES AND COST OF THE RICHARDSON AUTOMATIC HEATING SYSTEM
(Including everything ready to set up)

One-car garage.	No. 110 heater; 1 radiator	$110.00
Two-car garage.	No. 110 heater; 2 radiators	145.00
Two-car garage.	No. 112 heater; 2 radiators	165.00
Three-car garage.	No. 112 heater; 3 radiators	190.00
Three-car garage.	No. 114 heater; 3 radiators	215.00
Four-car garage.	No. 114 heater; 4 radiators	240.00

Prices, f.o.b. New York. For larger systems, special prices will be quoted.



STERLING ENGINEERING CO.

Manufacturers of Heating Specialties

419 Third Street

MILWAUKEE, WIS.

Products

STERLING HEATING SPECIALTIES for use in connection with STERLING VAPOR and VACUUM HEATING SYSTEMS: Thermostatic Traps, Graduated Packless Valves, Return Traps, Air Eliminators, Damper Regulators, Street Ells, Pump Strainers, Air Line Valves, Safety Valves, Pressure and Vacuum Gauges.

Sterling Vapor and Vacuum Heating Systems

Sterling Systems are adaptable to all classes and sizes of buildings or groups of buildings, and can be used to equal advantage regardless of whether the source of steam supply is high or low pressure boilers or exhaust steam from central station.

The advantages derived from Sterling Heating Systems are chiefly as follows:

Even distribution of steam to all radiators.

Elimination of air from radiators and pipes without necessitating the development of excessive steam pressure.

Complete extraction of all heat from the steam entering the radiators through the use of Sterling Thermostatic Traps, which prevent steam from leaving radiators until complete condensation has taken place. Elimination of leaky and sputtering air valves and consequent prevention of soiled walls, floors and draperies.

Control of the room temperature is placed in the hands of the occupant through the use of the graduated valve on each radiator.

Sterling heating specialties have proved in many installations of different character to be sound in principle and efficient in service.

Use the following standard specifications when specifying Sterling products.

Sterling Thermostatic Trap

Furnish and install at the return end of each unit of radiation, a Sterling Thermostatic Trap. Trap to be constructed with a flat disk seat attached to a single thermostatic diaphragm closing against the steam, making direct contact with raised seat on trap body. Vertical seat is to be so located that scale or other foreign matter will be washed off seat and drop down and out of trap into return line instead of collecting inside trap chamber. Diaphragm is to be so constructed as not to collapse from pressure. Discharge from trap must be continuous—not intermittent.

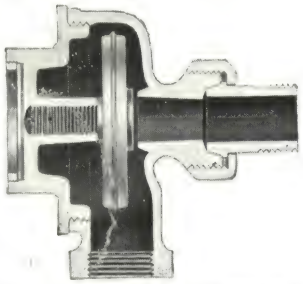


FIG. 1. STERLING THERMOSTATIC TRAP

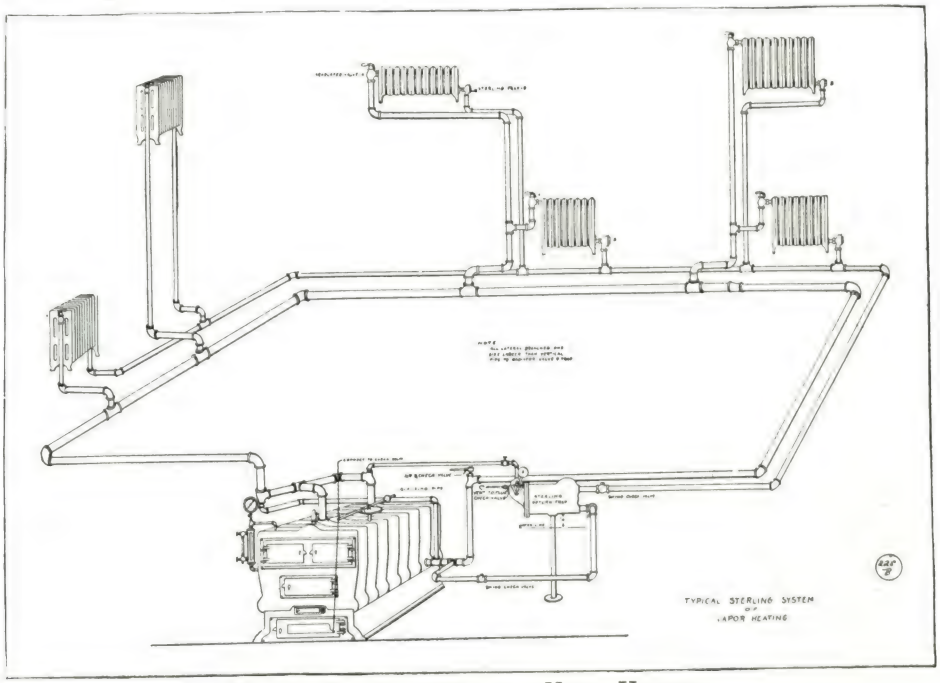
Cover must make steamtight contact with body without use of gasket. Trap shall be steamtight on pressures not in excess of 10 lbs.

Sterling Graduated Packless Valve

Install at supply end of each unit of radiation, a Sterling quick opening graduated packless valve so constructed that a half turn of the handle will completely open or close it.

Valve is to be of the Jenkins disk type. Disks to

FIG. 2. STERLING GRADUATED PACKLESS VALVE



TYPICAL STERLING SYSTEM OF VAPOR HEATING

Continued on next page

be of such composition as to withstand rapid changes of temperature.

Valve is to be equipped with a graduated dial and handle is to be provided with an indicator which will indicate degree of opening through valve.

Valve stem is to be provided with a flange on upper surface of which is machined a V-shaped seat. Another V-shaped seat is to be provided in upper portion of valve body concentric with opening for valve stem. A composition disk is to be provided between these two seats, forming an absolutely steamtight contact and preventing escape of any steam or moisture through valve bonnet, this combination thus taking the place of stuffing box and packing around valve stem.

Valve must be so constructed as to be easily dismantled without mutilation of parts, thus providing for easy access to Jenkins composition disks should renewal become necessary.

Sterling Slide Valve Return Trap

Install in return line near boiler, one Sterling slide valve return trap.

Trap is to be so constructed as to eliminate air from return line without loss of vapor and must be capable of discharging water to boiler against pressure at boiler up to 15 lbs.

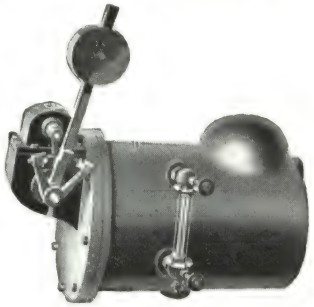


Fig. 3. Sterling Slide Valve Return Trap

Trap is to be constructed with a slide valve which never leaves its seat, thus making it impossible for accumulations of dirt and scale to prevent closing of valve.

Bottom of trap should be placed 6 in. or more above water line of boiler (where conditions will not permit, trap can be placed as low as 3 in. above the water line of boiler).

Slide valve and valve seats shall be constructed of such metal as to prevent formation of rust, which would thus interfere with proper action of trap (trap is used to raise liquids to higher levels as well as to deliver water to boilers against pressure).

Sterling Air Eliminator (Vapor Type)

At the point where main return drops to return opening of boiler and at least 24 in. above water line of boiler, install a Sterling Vapor Type Air Eliminator.

Fig. 4. Sterling Air Eliminator

Eliminator is to be constructed with a float operating an air-venting valve, the opening through which must be not less than $\frac{7}{16}$ in. in diameter.

Eliminator shall be equipped with a disk check located just above air-venting valve, which is to make airtight contact with a seat at top of venting valve. Disk check must be light enough so that the slightest pressure in air eliminator will lift same, allowing air to discharge to atmosphere, yet preventing return of air to the system.

Sterling Damper Regulator (Vapor Type)

At top of boiler, install a Sterling damper regulator constructed with a 12-in. double diaphragm, sufficiently sensitive to be actuated on a few ounces of pressure. Damper regulator is to be provided with a cross bar

Fig. 5. Sterling Damper Regulator

extending across top of regulator and with chains and pulleys to make connection with boiler, draft and check doors.

Sterling Street Ell

Fig. 6. Sterling Street Ell

When it is necessary to run a return line under or behind a radiator above the floor, install a Sterling nickelplated brass street ell at return end of radiator trap. Street ell is to be of such shape and dimensions as to make possible a short turn between trap and floor level.

Sterling Pump Strainer (for Vacuum Systems)

Fig. 7. Sterling Pump Strainer

In the return line just before same enters the pump, install one Sterling Pump Strainer.

Strainer is to be so constructed that screen is easily removable and so that double or triple screens may be used when necessary.

Screens are to be of brass and strainer is to be of the chamber type and of such construction as to form a water seal or lift fitting between intake and discharge opening, thus insuring priming of pump at all times.

Sterling Air Line Valve (for Air Line Systems)

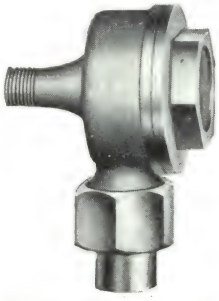


Fig. 8. Sterling Air Line Valve

In air valve opening at return end of each radiator install one Sterling Air Line Valve.

Valve is to be constructed with a single diaphragm closing against the steam.

Valve is to be of rough brass finish with polished trimmings.

Fig. 9 Sterling Safety Valve

Sterling Safety Valve (for Vapor Installation)

At top of boiler, install a Sterling Vapor Type Safety Valve set to blow off at 2 lbs. pressure.

Sterling Pressure and Vacuum Gauge

Fig. 10. Sterling Combination Gauge

At the boiler, install one Sterling Combination Pressure Vacuum Gauge graduated to indicate inches of vacuum and pounds and fractional pounds of pressure.

SARCO COMPANY, INC.

Radiator Traps and Temperature Regulators

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Products

Sarco Radiator Traps for vapor, vacuum or low pressure heating systems; Sarco Temperature Regulators for liquids or air.

Also manufacturers of Sarco Steam Traps for low and high pressure service.

Sarco Radiator Trap

The Sarco radiator trap is a development of the Sarco steam trap used everywhere for high and low pressure.

It uses a spirally corrugated tube of large diameter, containing a volatile liquid. This diaphragm is directly exposed to the steam or vapor. This arrangement results in quick action of the valve. Slight change of temperature within the trap, due to condensation collecting in same will give a wide open movement of the valve and permit the prompt discharge of condensation.

Special attention is directed to the Sarco diaphragm, as it is unique in design and conspicuously better than any hitherto used in radiator work. Spiral corrugations insure that when the tube is expanded or contracted the movement is equal on every turn of the spiral. Annularly corrugated tubes on the other hand contract and expand to the maximum degree at a given point; the movement at that point being considerable, the life of such tubes is restricted. With the Sarco spiral the movement is scarcely perceptible at any turn of the tube and the life of the diaphragm is consequently much longer than with the annular design.

Reference to the illustration will show other special points, notably the new valve head, which is a bronze metal ball, freely turning in a socket. This insures a perfect seat and offers a wearing surface many times greater than that of any other type of valve on the market.

The construction also permits the provision of a strainer of ample surface. The importance of this needs scarcely be emphasized. It effectively prevents clogging and protects the valve head and seat, eliminating practically all wear. The strainer has a discharge area some ten times that of the valve itself, and there is, therefore, no need for the cleaning of the strainer except at long intervals.

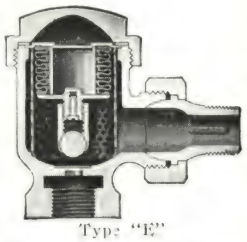
With this strainer the heating system can be started up at the beginning of the season without any danger of valves being blocked or injured by scale or rust.

The new Sarco radiator trap is tested and adjusted under conditions which reproduce the working conditions when installed. It is a *factory adjusted trap* and requires merely to be connected to the radiator and to the return line. It will work on any degree of vacuum and on any steam pressure to 20 lbs. per sq. in., without strain and without readjustment.

RADIATOR TRAP SARCO

Size, in.	½	¾
Length over all, in.	3⅝	3⅝
Distance center of inlet to face of outlet, in.	1½	1½
Distance center of valve to face of outlet, in.	2¾	2¾
Price, each	$6.00	8.00

Apply for discounts.



Type "E"
Radiator Trap Sarco

Sarco Temperature Regulators

For maintaining a constant temperature of liquids and atmosphere. Substantially constructed on same thermostatic principle as the radiator trap Sarco (above described), and steam trap Sarco (not illustrated or described here; full particulars furnished on request).

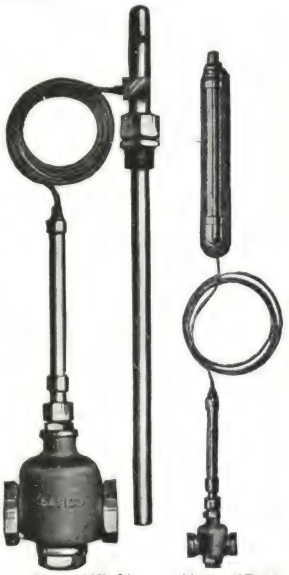
Operation—Slight increase in temperature of the surrounding liquid or atmosphere expands operating fluid, producing a powerful hydraulic pressure tending to close the valve; a decrease in temperature contracts the fluid, and gradually opens the valve.

Sarco regulators operate steam, water or gas valves.

Uses—They are being widely adopted and are suitable for public institutions, schools, hotels, packing houses, canning factories, bottling works, paper mills, gas condensers and producers, ammonia stills, hot water service tanks, blast heaters, etc.

SARCO TYPE TR-21 REGULATOR, FOR LIQUIDS

Size, in.	Weight, lbs.	Face to face of valve, in.	Price
½	8	2¾	$75.00
¾	8	3¾	80.00
1	9	3 11/16	85.00
1¼	13	4½	90.00
1½	22	5	95.00
2	28	6	100.00
2½	37	7¼	115.00
3	51	8¾	135.00
4	81	13¾	185.00
5	132	15¾	250.00
6	158	18	300.00



Type TR-21 for Tanks, etc. Type KR-14, for Rooms

Sarco Temperature Regulators

SARCO TYPE KR-14 REGULATOR, FOR ATMOSPHERE

Size of valve, in.	½	¾	1	1¼	1½	2	2½	3	4
Price	$60.00	65.00	70.00	75.00	85.00	95.00	110.00	130.00	170.00

Apply for discounts.

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NASHVILLE, TENN., 922 Stahlman Building
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DETROIT, MICH., 308 Scherer Building
DES MOINES, IOWA, 312 Walnut Street
DULUTH, MINN., 322 Lyceum Building
MINNEAPOLIS, MINN., 312 Third Street, S.
OKLAHOMA CITY, OKLA., 17 North Dewey Street
SALT LAKE CITY, UTAH, 204 Dooley Building
MILWAUKEE, WIS., 821 Merchants and Mfg. Bank Building

Products

THERMOGRADE VACUUM SYSTEM of STEAM CIRCULATION and THERMOGRADE MODULATION SYSTEM of HEAT REGULATION, including Thermograde Steam Heating and Hot Water Heating Specialties such as: Thermograde Modulation Valves, Thermograde Auto Valves, Belvac Thermofiers, Hot Water Modulation Valves, Thermograde Alternating Receivers or Return Traps, Coenco Steam Traps.

Also manufacturers of Full Opening Radiator Valves; Dirt Strainers; Settling Chambers; Pressure Regulating and Reducing Valves; Oil and Steam Traps and Separators; Back Pressure Valves; Automatic Receiving Tanks and Pump Governors; Electric Boiler Feed Pumps and Receivers; Vacuum Pump Governors, and Blast Traps.

Thermograde Modulation System of Heating

This is a two-pipe system adapted for use in connection with either live or exhaust steam where the water of condensation is returned to the boiler mechanically, or by gravity. It is adapted for use in all classes of buildings, high grade residences, apartment buildings, schools, hospitals, office buildings, factories, in fact any building where heat is desired.

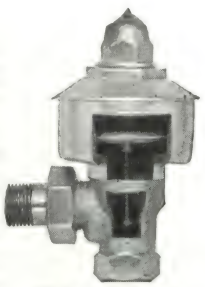
Modulation Valve

This valve has no stuffing boxes to leak, does not require repacking from time to time and with its self-indicating dial, hand regulation can easily be maintained.

THERMOGRADE CONTROL VALVE

Auto Valve

The new improved auto valve is factory adjusted, but is so constructed that adjustments can be made at installation, if necessary, due to unusual conditions existing. This valve is made entirely of bronze, highly nickel plated. It has a hand spun phosphor bronze diaphragm, no springs, entirely automatic, noiseless in operation and self-cleaning. It will not pass steam but will relieve air and condensation from the units of radiation, maintaining their efficiency at all periods.



THERMOGRADE AUTOVALVE

Belvac Thermofier

This is a float operated trap and is used mainly on vacuum systems. It passes no steam but the air and water are released as fast as they accumulate in the units. The trap is never closed against their free passage, they are positively and immediately removed.

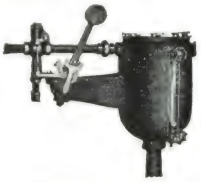
BELVAC THERMOFIER

Modulated Hot Water Valve

This valve has a self-indicating dial and can be adjusted to regulate the flow to the various units—this means hand temperature regulation for gravity or forced circulation hot water heating systems.

Thermograde Alternating Receiver

The Thermograde alternating receiver is used on open return line gravity installations to insure the return of the water of condensation to the boiler under varying pressure conditions. The alternating receiver is connected to the return main near the boiler. Should the boiler pressure increase, the water of condensation rises in the receiver, the pressures in the boiler and the receiver are equalized and the water flows back to the boiler by gravity without collecting in the return mains or risers, whether the boiler pressure be 2 or 10 lbs.



THERMOGRADE ALTERNATING RECEIVER

Coenco Steam Trap

The Coenco steam trap of the float type is designed for either high or low pressure service. It is perfectly balanced, of large overload capacity and convenient to connect. There is no better trap made for the efficient draining of blast coils and vento sections.

Our Aim Is Real Service

Our interest does not lie merely in selling a number of valves and traps—we aim at real service. Each and every installation must be an asset, and in our twenty years of experience we have made thousands of satisfied users.

Send for literature.

ESTABLISHED 1888 INCORPORATED 1895

WARREN WEBSTER & COMPANY

Steam Heating Systems and Steam Specialties

CAMDEN, N. J.

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MONTREAL TORONTO HALIFAX OTTAWA WINNIPEG CALGARY VANCOUVER QUEBEC

LONDON, ENGLAND: The Atmospheric Steam Heating Co., Ltd.

Products

Webster Vacuum System of Steam Heating; Webster Modulation System of Steam Heating.

Webster Feed-water Heaters; Steam Separators; Oil and Grease Traps; Radiator Traps; Air-separating Tanks; Vacuum-pump Governors; Expansion Joints; Gauges; Damper Regulators; Vent Traps; Dirt Strainers; Suction Strainers; Lift Fittings.

TRADE-MARK

Webster Service

Preliminary investigation and advice as to the choice and application of a Webster system for new or old plants involves no expense or obligation.

Thirty-five branch offices and service stations covering all parts of the country co-operate to the fullest extent with architects, engineers, contractors and owners.

Over 15,000 Webster Steam Heating Systems, 6,000 Webster Feed-water Heaters and minor Webster Steam Specialties too numerous to compute, have gone into service during the past 33 years.

Webster Vacuum System of Steam Heating

Briefly, the Webster Vacuum System is a method of circulating exhaust or low pressure live steam, or a combination of the two with minimum initial or back pressure and with entire freedom from waterhammer, air pockets, leaky air valves and all of the other annoyances which are common with ordinary steam heating systems. A partial vacuum is mechanically created and maintained by means of exhausting apparatus of suitable design and capacity, which may be steam driven or power driven vacuum pumps. Condensation from each heating unit is discharged through an automatic Webster Radiator Trap which permits the escape of air and water and prevents waste of steam.

A positive self-acting vacuum pump creates a pressure below atmosphere in the return piping and in the radiators so that when steam is turned into the system, it rapidly flows into the lower pressure until each heating unit is completely filled. The automatic radiator trap then closes and prevents further passage of steam until it has done its work of heating and has become condensation, which will freely pass through the automatic trap.

Water of condensation and air flow to the lowest point of the system and are discharged by the vacuum pump to a higher level into the Webster Air-separating Tank, from which air is vented to atmosphere, while condensation returns to boiler through boiler feed pump or by such means as may be required due to particular conditions.

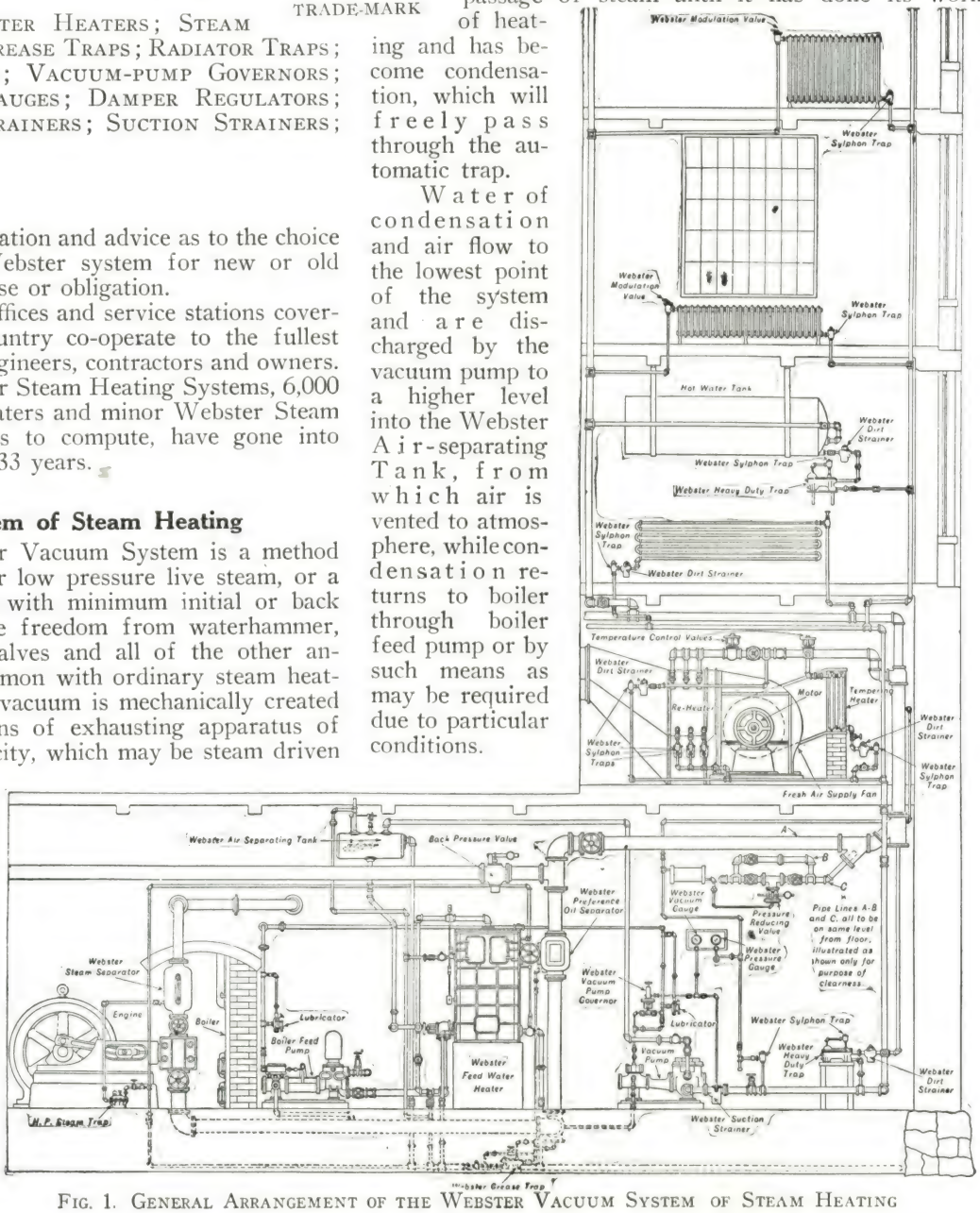


Fig. 1. General Arrangement of the Webster Vacuum System of Steam Heating

Continued on next page

Webster Modulation System of Steam Heating

A highly efficient modern type of low pressure steam heating system suitable for residences, store buildings, hotels and apartment houses where live steam only is used for heating, either direct from heating boilers or with steam supply furnished from outside sources.

Quick and efficient circulation of steam is obtained by carrying a differential in pressure between supply and return piping, with atmospheric pressure or slightly below in return piping, and atmospheric pressure or slightly above in supply piping.

Initial steam pressure is closely controlled at low point by means of extremely sensitive Webster Damper Regulator. Condensation is discharged automatically to boilers or elsewhere through a Webster Modulation Vent Trap which operates without adjustment or attention even under fluctuating boiler pressures. Steam is admitted to each radiator through a Webster Modulation Valve which permits close regulation of room temperature by simple hand manipulation. Condensation is discharged and air vented from each radiator through a Webster Radiator Trap which maintains full heating efficiency of radiation and eliminates entirely all annoyances, difficulties and noises which attend ordinary gravity steam heating systems.

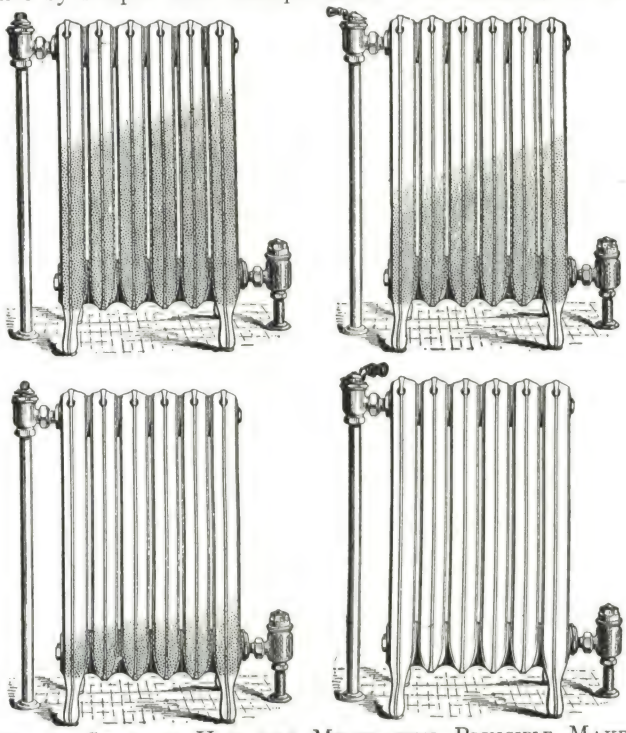


FIG. 2. SHOWING HOW THE MODULATION PRINCIPLE MAKES MORE OR LESS HEAT QUICKLY AVAILABLE FOR WEATHER CHANGES

The method of admitting more or less steam to each radiator by varying the degree of opening of the modulation valve is indicated above, showing respectively the part of the radiator heated for various settings of the above valve.

Condensation and air from each radiator are carried through a system of return risers and mains into Webster Modulation Vent Trap, where air is automatically vented, permitting system under favorable boiler conditions to operate for long periods under partial vacuum and, due to its flexibility, permitting higher pressures to be carried in severe weather when a maximum amount of heat is required. The system may be modified in various details to suit particular physical conditions of building under consideration.

Webster Heating Systems for Industrial Plants

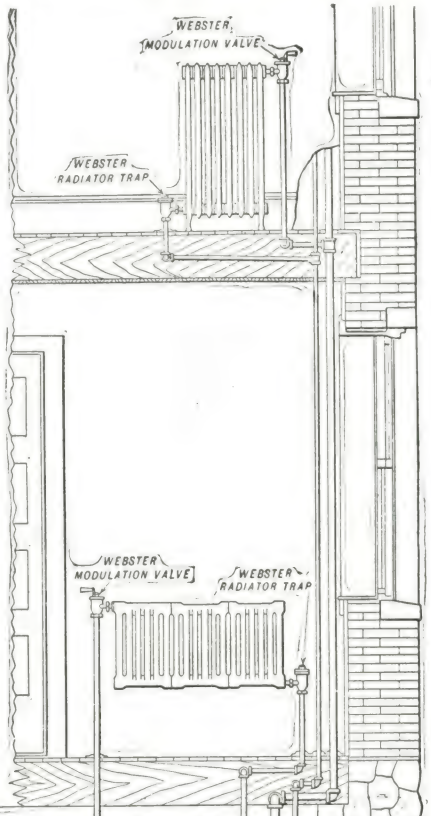
For industrial work, the Webster Vacuum System is desirable, not only for the saving of exhaust steam, which alone makes this system highly profitable, but also the returns are practically pure distilled water which, with its contained heat, can be fed back to the boilers. Make-up of live steam or temporary steam supply during intervals of suspended exhaust may be obtained direct through a reducing valve.

For buildings that must be heated entirely by outside live steam, the Webster Modulation System with low pressure differential, provides a simple, efficient and economical method.

Where a number of buildings at distances are heated from a central plant, special devices assure perfect circulation to most distant points.

Should the steam supply from a power plant later become available through plant changes, the heating system can be changed over easily and with nominal expense to take advantage of the exhaust steam supply.

This company also remodels old heating systems to avoid discomfort, inefficiencies and extravagances.



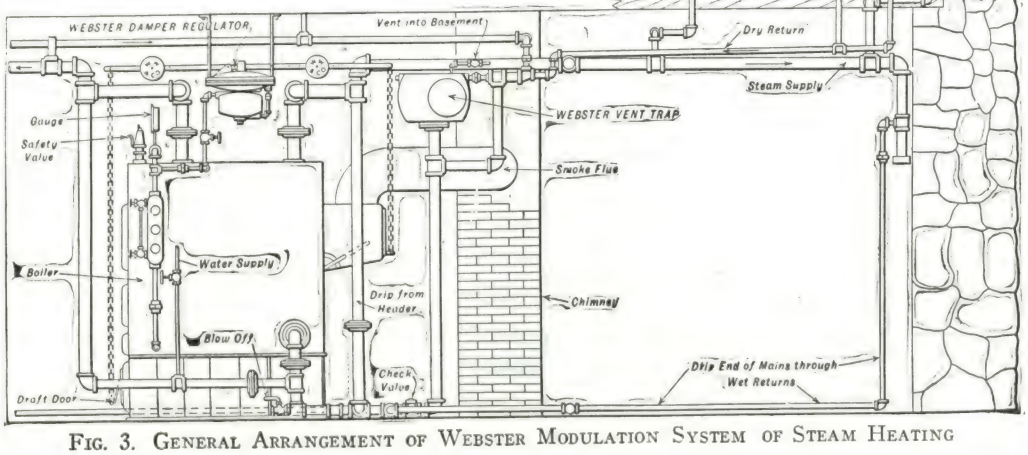


FIG. 3. GENERAL ARRANGEMENT OF WEBSTER MODULATION SYSTEM OF STEAM HEATING

Continued on next page

Webster Feed-water Heaters

Built in many special types and designs for obtaining the greatest benefits under any given plant condition. They will heat water to within 2° to 5° of the temperature of the exhaust steam.

The type EB is the standard rectangular pattern for capacities of 300 to 1200 h.p., combining with the heating function an efficient oil separator, filter and liberal storage capacity.

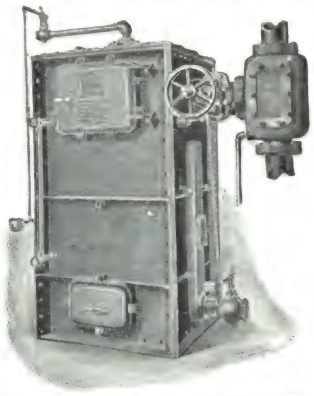


Fig. 4. Webster Feed-water Heater
Preference cut-out type

For intermittent demands for large quantities of hot water, this heater is modified by the addition of much larger storage capacity at the bottom.

The preference cut-out is a further development through the substitution of an extra large 3-way oil separator, by means of which all the exhaust steam (not merely that going through the heater) is purified from oil. The heater automatically takes what steam it needs while the rest passes to the heating system or to atmosphere. A cut-out valve between the oil separator and the heater permits isolation of the heater for cleaning, etc., without disturbing the flow of steam through the separator. This type is desirable where part of the engine exhaust goes to the heating system.

Webster Steam Separators

Made in plain and receiver types in all desirable sizes up to 12 in.

When properly installed, they deliver dry steam free from solid particles due to priming or foaming boilers.

Fig. 5. Webster Steam Separator

Webster Dirt Strainers

Placed in the return line of a steam heating system to catch the dirt, rust, scale and other particles and preventing them from impairing the tightness of the trap.

More dependable than pockets made of pipe and fittings and leaves no excuse for neglect.

Sizes up to 2 in.

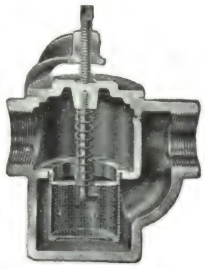


Fig. 16. Webster Dirt Strainer

Webster Suction Strainers

Placed in the return line of a vacuum heating system before the return line enters the vacuum pump. They protect suction valves and linings of the pump cylinders from damage.

Strainer baskets are easily removed, cleaned and replaced and the design is such that dirt may accumulate in considerable quantities before the vacuum is affected.

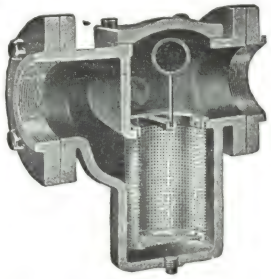


Fig. 17. Webster Suction Strainer

Webster Air-separating Tanks

Made in 2 standard sizes, 18 in. in diameter by 48 in. long and 24 in. in diameter by 72 in. long.

They receive and store returns from heating systems, affording space for liberation of entrained air and provide a suitable place for introducing "make-up" feed water.

Made in 3 styles: *Plain* with only the essential openings and provision for adding make-up water by hand; *water control type* with automatic regulating valve for admitting make-up water during periods when the heating system returns may fall off temporarily; *steam control type* with cold water admission, hand controlled, but with automatic regulating valve governing the operation of the feed pump and controlling the discharge of water from tank.

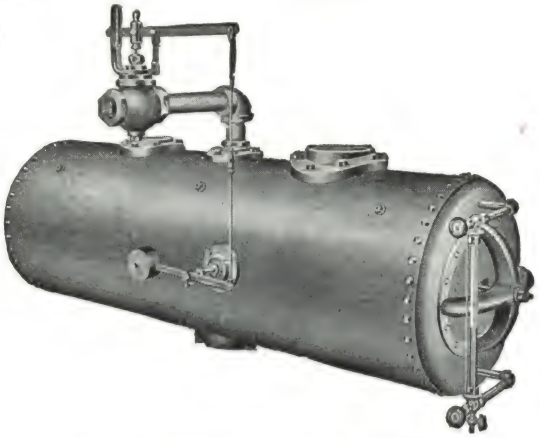


Fig. 7. Webster Air-separating Tank

Shell construction of $\frac{3}{16}$-in. steel and heads of $\frac{1}{2}$ in. unless otherwise specified.

Webster Heavy-duty Traps; Oil and Grease Traps

Both are of the same pattern, with valve mechanism entirely enclosed and operating on the ball float principle. Gauge glass furnished extra where desired.

Heavy-duty Trap—Used to remove condensation where it accumulates in unusually large quantities, as in large steam mains, hot water generators and fan heater coils. Discharge outlet is large to get drainage away as quickly as possible.

Sizes, $\frac{3}{4}$ to 2 in.

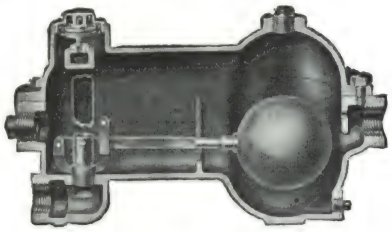


Fig. 6. Webster Heavy-duty Trap

Grease and Oil Trap—For use in draining oil separators on steam lines or feed-water heaters under non-condensing conditions. Operates under pressures from atmosphere to 15 lbs.

Sizes, $\frac{3}{4}$ to 2 in.

Webster No. Seven Trap

The operating member is a multiple flat diaphragm, made of phosphor bronze, that has many points of superiority over other diaphragm traps, both in design and construction and in the efficiency secured.

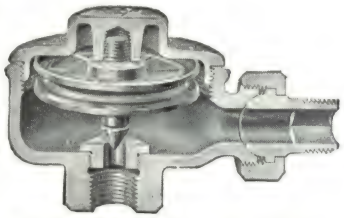


Fig. 9. Webster No. Seven Trap

Continued on next page

Webster Modulation Vent Trap

Installed in the last point of the dry return line of the Webster Modulation System before the returns are put back into the boiler as feed water. It affords a simple, dependable method of venting the entrained air to atmosphere and of automatically insuring the return of the water to the boiler under fluctuating boiler pressures.

Fig. 15. Webster Modulation Vent Trap

Webster Sylphon Trap

Relieves the radiator of air and permits free escape of water of condensation without loss of steam. Eliminates necessity for air valves with their usual leaks, noises and bad odors.

Gives no trouble when system is properely operated. Fully guaranteed against defects and faulty workmanship and material. Requires no adjustment after leaving shop and readily adjusts itself to any pressure and vacuum within a wide range of operation. Particularly free from troubles which arise in ordinary traps due to the presence of dirt and scale.

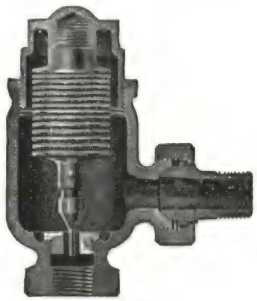


Fig. 8. Webster Sylphon Trap

Operating part is a metallic bellows filled with an element which expands and closes the valve port when steam is present, but contracts due to lower temperature of air and water of condensation, permitting free discharge of condensate without waste of steam.

Sizes up to 1¼ in. and in various models.

Webster Vacuum-pump Governor

Placed in the steam supply line to automatically control steam to the pump and regulate pump speed to maintain the degree of vacuum for which the governor is adjusted. Very sensitive and may be adjusted to any predetermined degree of vacuum.

Sizes up to 3½ in.

Fig. 11. Webster Vacuum-pump Governor

Webster Expansion Joints

Made in single and double slip sliding sleeve types for high and low pressure. They have anchor footings. The service connections save additional fittings in the line.

Sizes, 2 to 24 in.; pressure up to 200 lbs. per sq. in.

Fig. 12. Webster Expansion Joint

Webster Gauges

Standard gauge board set includes 2 gauges with full nickel trimmings and 5½-in. dials, combining pressure and vacuum readings. Mounting is a slate or marble panel. Special arrangements when desired.

Fig. 13. Webster Standard Gauge Board Set

Webster Damper Regulator

Used with the Webster Modulation System. Automatically controls opening of draft door and check damper of low pressure steam heating boiler. Extremely sensitive and accurate.

Controls the fire to maintain steam pressure always within a few ounces of that for which regulator is set.

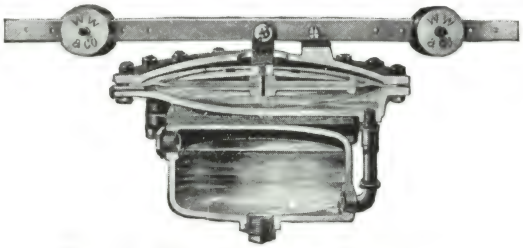


Fig. 14. Webster Damper Regulator

Webster Modulation Valve

Controls the amount of steam admitted into the radiator. Opens completely in less than one full turn of the handle, giving the desirable features of a quick opening valve. The handle carries a pointer and in connection with an indicator dial, shows the degree of opening in various positions of the handle. Modulation of temperature is obtained by partial opening or closing of the valve, the design being such that the flow of the steam through the orifice is progressive and in proportion to the degree of opening. Small, efficient, and easy to manipulate.

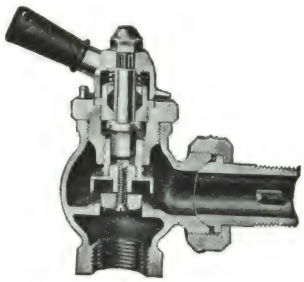


Fig. 10. Webster Modulation Valve

Webster Lift Fittings

Self-contained devices which take the place of similar pockets made up of pipe and fittings. They facilitate the "lifting" of condensation.

Lifting is accomplished by using a vertical column of small diameter with its lower end submerged in a well within the pocket, pressure on the surrounding surface being utilized to form alternate air cushions and slugs which cause the "lifting" of the condensate to a point higher than that due to the degree of vacuum employed.

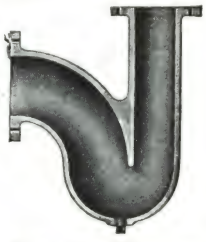


Fig. 18. Webster Lift Fitting

Specifications

Space does not permit giving detailed specifications of Webster equipment. These specifications will be found of considerable assistance in covering all the necessary requirements of effective heating systems and will be sent on application.

THE STARK SHEET METAL WORKS CO.

Manufacturers of Heat Regulating Devices

418 Second Street, S. E.
CANTON, OHIO

Product

COMBINED DAMPER LOCK, REGULATOR and INDICATOR.

For Roof Ventilators, see page 1006.

Perfecto Damper Regulator and Indicator

This indispensable device for heating and ventilating systems positively regulates and controls incoming tempered air and exhaust of vitiated air.

Its distinctive feature is that it locks the dampers in any desired position, thus preventing unauthorized persons from tampering with them.

A glass top, which can only be removed by using a key, permits visibility of the damper at all times.

Indications placed on this glass top designate the rooms to which ducts are directed.

It is easily installed in ducts of any size or shape, concealed or otherwise, and on plastered walls or ceilings regardless of distance from face of wall to duct.

Construction of the Perfecto

The Perfecto damper regulator and indicator is a stamped steel product consisting of four major parts, i. e., two stems fitted to receive standard ⅜-in. square damper rods, a case with mechanism to receive indicator attached to one of the stems, and a cover with numbered or lettered glass window.

The cap slides over the case, automatically locking with the aid of a spring catch. This cap must be removed to change position of the damper, and only the authorized person having a key can do this, therefore your system is safe and, being in competent hands, is always efficient.

A Few of Our Latest Installations

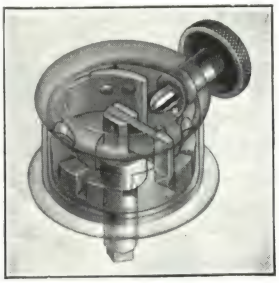
University of Buffalo (Chemical Laboratory), Buffalo, N. Y.
Fourth Church of Christ, Scientist, Cleveland, Ohio
Sioux Falls High School, Sioux Falls, S. D.
Miles Standish School, Cleveland, Ohio
Warner School, Cleveland, Ohio
McKinley High School, Canton, Ohio
John Lehman High School, Canton, Ohio
Central Clinic and Hospital, Salem, Ohio
New Hotel Statler, Buffalo, N. Y.
Eastern High School, Norfolk, Va.
Noel State Bank, Chicago, Ill.
Bunte Candy Factory, Chicago, Ill.
Winnetka High School, Winnetka, Ill.
Ottumwa High School, Ottumwa, Ia.
Lincoln School, New York, N. Y.
Niles High School, Niles, Mich.
National Lumberman's Bank, Muskegon, Mich.

Turn Damper to Desired Position

Push Handle Into Slot Which Holds Damper Securely in Position

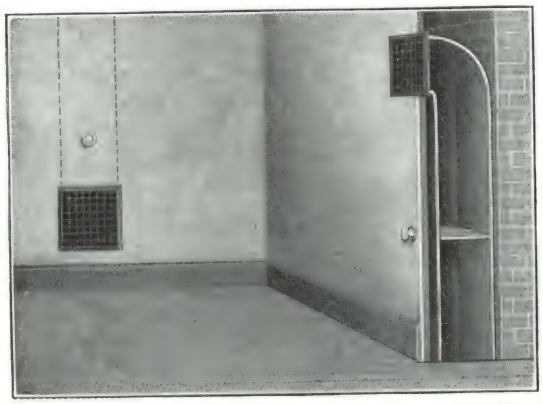
Slip Cover Over Housing

Lock with Key



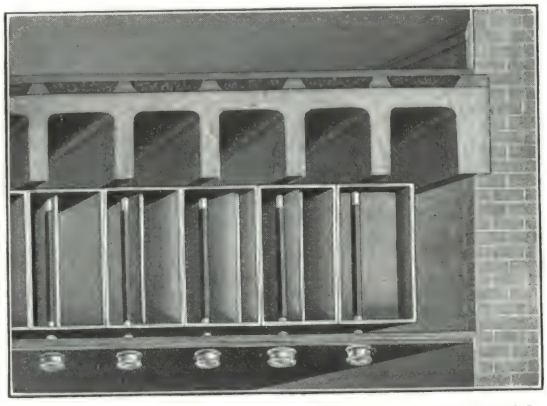
PERFECTO DAMPER REGULATOR AND INDICATOR INSTALLED IN HEATING DUCT

ILLUSTRATING METHOD OF ADJUSTING THE PERFECTO DAMPER REGULATOR AND INDICATOR



Perfecto Damper Regulator and Indicator Placed on Wall Where Ventilating Ducts are Concealed and Damper Connected by Extension of the Square Damper Rod

This arrangement is especially useful in schoolrooms to control inflow of tempered air and exhaust of vitiated air. When damper is set by engineer or janitor, it can not be altered by any one except the person in charge of the heating and ventilating system



Perfecto Damper Regulator and Indicator Placed on a Battery of Ducts in Collecting Chamber near Machinery Room

Affords an easy and convenient means of regulating flow of air, and also serves as a positive means of indicating room to which each duct leads by means of numbered or lettered cover windows

TYPICAL INSTALLATIONS OF THE PERFECTO DAMPER REGULATOR AND INDICATOR

THE FULTON COMPANY

Manufacturers of Sylphon Automatic Temperature Controlling Instruments

KNOXVILLE, TENN.

BRANCH OFFICES

NEW YORK, N. Y., Hudson Terminal Building, 50 Church Street — CHICAGO, ILL., Wrigley Building, Michigan Boulevard
DETROIT, MICH., Book Building, Washington Boulevard
REPRESENTATIVES IN ALL PRINCIPAL CENTERS

Products

Patentees and manufacturers of SYLPHON PRODUCTS: Sylphon Temperature and Pressure Regulators, Thermostats for regulating temperatures of homes heated by warm air furnaces, steam or hot water boilers; Temperature Regulating Radiator Covers; Automatic Air and Vent Valves; Packless and Leakless Valves and other Heating Specialties.

Sylphon TRADE MARK For Constant Temperatures

Advantages

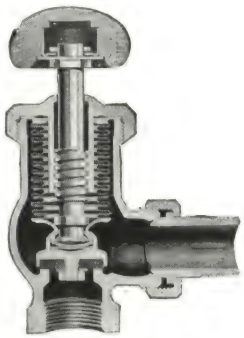
All Sylphon devices embody the seamless, one-piece bellows of drawn metal shown at right. There is not a bit of solder throughout its length—no chance for leaks or breaks. It is a feature found exclusively in Sylphon products. Sylphons are made in sizes ranging from 1⅛ to 12 in. outside diameter.

THE SYLPHON

No. 345 Sylphon Packless Valve

This valve can not leak water, steam or air around the stem, and is known as our Government type. Turning stem and its support are completely surrounded by the 2-ply laminated structure Sylphon, which is a one-piece metal bellows capable of being elongated as the stem descends and of being compressed as the stem rises. The operating parts are completely inside this protecting Sylphon which forms a forever-tight seal between the main passageway and the stem opening. The valve is packless, not so-called, but absolutely *packless*. It is furnished with a non-burning handle of rosewood finish.

Ask for Bulletin TPV-1.



No. 345
PACKLESS RADIATOR VALVE

Nos. 304 and 304 C Standard Pressure Packless Valve

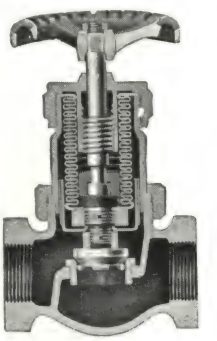
This valve is absolutely packless. No packing gland, no stuffing box and greatest of all, never a leak. It is designed for power plant use and pressures up to 150 lbs.

The Sylphon principle has proved itself equally suitable for high or low pressure work.

The No. 304 Standard Pressure Valve not only stands the working pressure for which it is intended, but it is also better equipped to stand the strain of expansion, contraction, weight of piping and settling and also the cutting effect of the steam on the disc and seat. The special phosphor bronze 2-ply laminated construction Sylphon bellows, without solder or gaskets, forms a permanent barrier to the passage of steam around valve stem.

These valves are well proportioned, are of good weight and are thoroughly tested under steam pressure before leaving the factory.

No. 304 C is similar to No. 304 but is equipped with Jenkins standard pressure composition disc.

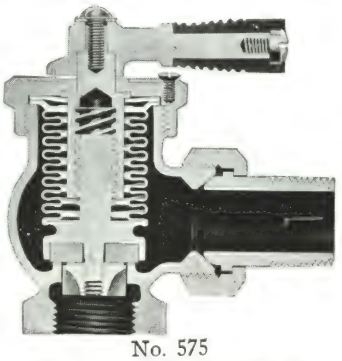


No. 304
STANDARD PRESSURE VALVE

No. 575 Sylphon Packless Modulation or Graduated Valve

Specified where quality and ultimate economy are the first consideration. Workmanship and finish are excellent.

Dial shows exactly how far valve is open. Can be set to any degree opening desired. Single turn of handle opens wide or closes valve positively tight against vapor, steam or water. Air can not enter around stem. Gives 100% satisfaction on all systems, especially vacuum.



No. 575
PACKLESS MODULATION OR GRADUATED VALVE

Sylphon bellows forms an unbroken metal barrier between steam or water and moving parts; permanent protection against leaks, friction or binding. Stem turns with perfect freedom, because shielded from corrosion. No packing whatever to harden and bind. A laminated structure Sylphon bellows abolishes the need for packing. The 2-ply laminated bellows, used only in Sylphon valves and protected by patents, will last for years, whereas singly-ply bellows have been found unsatisfactory.

Ask for special bulletin.

No. 465
STANDARD TYPE VALVE

No. 465 Standard Type Leakless Radiator Valve

A standard radiator valve of unusual quality as we use the same body, tail nut and tail pipe used in the leakless valve, which are of a superior quality to those generally made for standard valves. Fitted with the usual type of turned handle.

We can also supply a complete line of union elbows and hot water valves.

Ask for Bulletin TPV-1.

Continued on next page

No. 536 Sylphon Radiator Air Valve

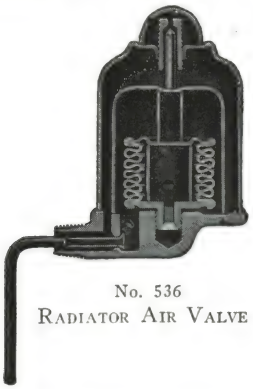
An improved radiator air valve with large thermostat and float which renders it extremely powerful and positive in action. It is pleasing in design, rigid in construction and durable.

The active principle is the Sylphon which for many years has been used by this company for heating boilers and water heaters.

It will not buckle or distort, and will never lose its efficiency. Has ample movement, thus insuring tight closing of the valve.

It is so durable that, practically speaking, it will never wear out.

Ask for Bulletin TAV-1.



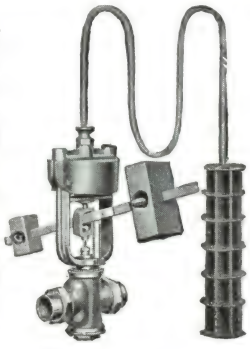
No. 536
RADIATOR AIR VALVE

No. 980 and No. 981 Temperature Regulators

These regulators are used to automatically control temperature of air in dry rooms, etc., and can be furnished with the same temperature ranges as our No. 930 and No. 931 Sylphon Temperature Regulators as described below.

The thermostatic bulb, of our special design, is so constructed that it may be placed at any point in the room in which the air is to be controlled, and is connected with the operating valve by a flexible tube of any required length up to 125 ft. It is furnished in either the lever and weight type, similar to the No. 930, or the spring adjustment type, similar to the No. 931. The latter is designated as our No. 981.

Ask for Bulletin TT-102.



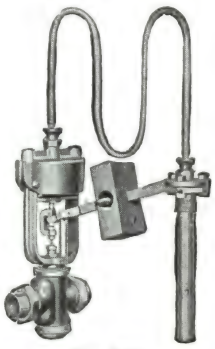
No. 980
TEMPERATURE REGULATOR

No. 930 and No. 931 Temperature Regulators

For nearly all requirements where liquids are heated by steam, and especially industrial uses. Regulators are regularly furnished with a temperature range of 140° to 180° Fahr.

Special regulators can be furnished with adjustment for 20° above or below the operating point for temperatures not lower than 20° nor higher than 320° Fahr.

The No. 930 Regulator is the same as the No. 931, except that it has the lever and weight method of adjustment instead of the spring type shown here. The extreme sensitiveness, positive action and simplicity of these regulators have placed them in a class by themselves, and made them applicable in hundreds of ways.



No. 930
TEMPERATURE REGULATOR

No. 931 Regulators are furnished regularly in sizes from ½ to 2½ in., inclusive, and the No. 930 Regulator in sizes from ½ to 8 in., inclusive.

Upon application a chart will be furnished showing size of regulator for any given condition.

Ask for Bulletin TT-101.

No. 931
TEMPERATURE REGULATOR

No. 952 Pressure Regulator

This regulator has as its operating medium a Sylphon bellows which permits extreme sensitiveness and makes it possible to reduce the pressure to as low as 2 lbs. It has a ball bearing spring adjustment such as is used in our No. 931 Temperature Regulator. With this regulator it is possible to take the controlling pressure from any desired point.

DATA

Size	Initial pressure not to exceed, lbs.	Reduced pressure not to exceed, lbs.
No. 952	50	25
No. 952A	150	25
No. 952B	150	40
No. 952C	150	100

They are also furnished in expanded outlet types. No. 952 gives excellent results as a pump governor where there is no excessive pulsation in the line.

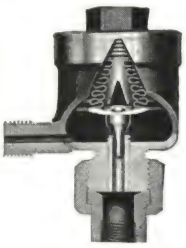
Ask for Bulletin TT-103.

No. 952
PRESSURE REGULATOR

No. 410 Air Line Valve

An automatic non-adjustable air line valve that will positively and silently expel air and condensation, but close against steam. The Sylphon Air Line Valve has as its basic principle the Sylphon Thermostat, which will quickly and effectively distinguish between steam and air, freely allowing the air and condensation to pass but preventing the passage of steam. This means that every inch of radiating surface becomes 100% efficient.

Ask for Bulletin TAV-1.

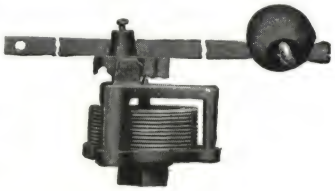


No. 410
AIR LINE VALVE

No. 22 Damper Regulator

This instrument is for the regulation of dampers on steam boilers and is composed entirely of metal, has no rubber diaphragms to wear out and become inoperative; is frictionless, sensitive, positive and invariable in its action. It operates with a slight change in pressure, thus closing the dampers at a very low steam pressure when desired. The position of the counterweight determines the pressure to be maintained.

Ask for Bulletin T-4.



No. 22
DAMPER REGULATOR

Continued on next page

No. 45-A Water Regulator

Used to control the dampers on hot water heating boilers. Simple, accurate regulators which will control the draft so as to maintain a constant temperature of the water at any point between 120° and 220° Fahr. They prevent the temperature of the water from rising higher than necessary, insuring faucet water of even temperature every hour of the day. They prevent the generating of steam in the system, thus eliminating the disagreeable sputtering and blowing off when the faucet is open.

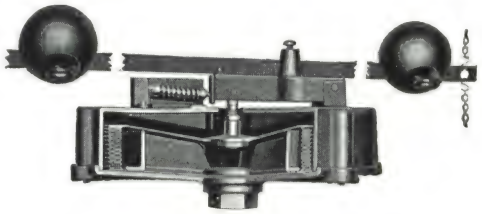
Ask for Bulletin T-3.

No. 45-A
Water Regulator

No. 925 Vapor Damper Regulator

Extremely powerful and sensitive. It will control any pressures as low as 2 oz. and any dampers found on the average boiler. The extra flexible Sylphon is 12 in. in diameter, giving 100-sq. in. effective area, and is fitted with a compensating device which overcomes friction in the moving parts and prevents the regulator from fluttering. The regulator is made entirely of metal and has no perishable rubber diaphragms.

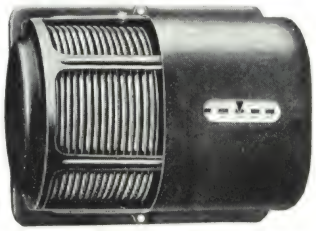
Ask for Bulletin T-1.



No. 925
Vapor Damper Regulator

Sylphon Regitherm

The most powerful heating thermostat on the market. Requires no electricity, compressed air or clockwork to operate. Responds to slight changes in temperature of air and is used to control valves, dampers and shutters. Works smoothly, never by jerks, and is noiseless in operation. Requires no attention. Standard range 60° to 80° Fahr. It is largely used in offices and industrial plants. Small and neat in appearance, being 6 in. wide by 7½ in. long.



Regitherm

Ja-Nar Radiator Cover

Made of fine furniture steel, lined with heat insulating material. Completely covers hot water and steam radiators. Can be installed in old homes as easily as in new. Furnished in seven standard finishes or to match any interior woodwork.

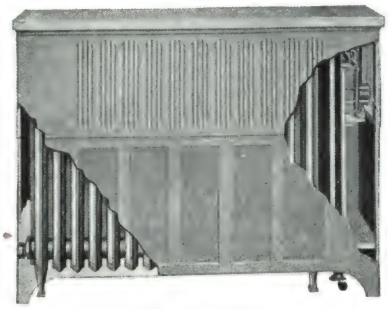
It protects walls and hangings from streaking and discoloration, and prevents damage to furniture from proximity to radiator. Conserves fuel and transforms an unsightly radiator into a beautiful and harmonious article of furniture.

Light or dark oak, mahogany, walnut and various tinted enamels. Furnished in three types: automatic temperature control; manual operated temperature control; uncontrolled type.

The first illustration shows radiator coils (either hot water or steam) covered with Ja-Nar which is cut away to show how it goes over radiator.

On the right is the Sylphon Regitherm which maintains an even temperature in the room by automatically opening or closing the openings or louvers shown on upper part of Ja-Nar.

Ask for pamphlet on the Ja-Nar.



The Ja-Nar
Cut away to show radiator

Illustration of Radiator with Ja-Nar Installed

Specification Data

Send for our "Specifications of Value" which gives complete engineering data in regard to the above products.

ESTABLISHED 1885

JOHNSON SERVICE COMPANY

Manufacturers of Heat Regulating Apparatus

MAIN OFFICE AND FACTORY

MILWAUKEE, WIS.

BRANCHES

BOSTON 18, MASS., 31 Waltham Street
BUFFALO, N. Y., Erie County Bank Building
CHICAGO, ILL., 177 North Dearborn Street
CINCINNATI, OHIO, 405 Gwynne Building
CLEVELAND, OHIO, 2028 East 22nd Street
DENVER, COLO., 517 Boston Building
DES MOINES, IOWA, 210 Masonic Temple
DETROIT, MICH., 42 Montcalm Street, West
INDIANAPOLIS, IND., 111 Pembroke Arcade
KANSAS CITY, MO., 411 East 10th Street
LOS ANGELES, CAL., 605 Van Nuys Building
MILWAUKEE, WIS., 149 Michigan Street
MINNEAPOLIS, MINN., 308 Third Avenue, South
NEW YORK, N. Y., 118 East 28th Street
PHILADELPHIA, PA., 258 South Van Pelt Street
PITTSBURGH, PA., Century Building
PORTLAND, ORE., 404 Failing Building
ST. LOUIS, MO., 14 North 12th Street
SALT LAKE CITY, UTAH, 610 McIntyre Building
SAN FRANCISCO, CAL., 314 Rialto Building
SEATTLE, WASH., 452 Colman Building

CANADIAN REPRESENTATIVE

JOHNSON TEMPERATURE REGULATING COMPANY OF CANADA, LIMITED

OFFICES

CALGARY, ALTA., 605 Second Street, West
MONTREAL, QUE., 284 Beaver Hall Hill
TORONTO, ONT., 145 Wellington Street
WINNIPEG, MAN., 259 Stanley Street
VANCOUVER, B. C., 550 Sixth Avenue, West

Products

HEAT REGULATION SYSTEMS, which include THERMOSTATS, AIR COMPRESSORS to operate the thermostats, RADIATOR VALVES, HUMIDOSTATS, HUMIDIFIERS, DAMPERS, VALVE and DAMPER CONTROLS.

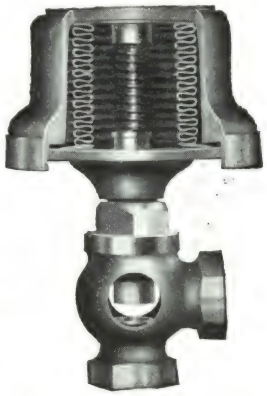
Johnson Positive Acting Metal Diaphragm Thermostat

The only thermostat on the market provided with positive snap-action for closing and opening the radiator valve quickly, positively and fully, which is necessary with steam valves.

Indicator and Cut-off—It is the only thermostat having an indicator which shows at a glance whether the thermostat has the heat turned on or off. A cut-off is provided for shutting the heat off permanently when desired.

"Sylphon" Radiator Valves

To get the very best in automatic temperature control, specify the Johnson metal diaphragm radiator valve with indestructible "Sylphon" metal bellows for steam or hot water heat. These valves are especially adaptable to radiators located in wall boxes, as these valves, unlike rubber diaphragm valves, are unaffected by the heat in the wall box.



"SYLPHON" METAL DIAPHRAGM RADIATOR VALVE

Johnson Graduated Acting Thermostat

Specify this type for controlling the temperature of rooms heated by steam hot blast or hot air furnaces. It controls a mixing damper located at the plenum chamber. The damper, which is furnished, together with thermostat, etc., is operated by a diaphragm damper motor connected with the thermostat in such a way that the damper blades will automatically assume the correct intermediate position necessary to deliver the right mixture of hot and tempered air to the room and to maintain a constant and proper temperature therein.

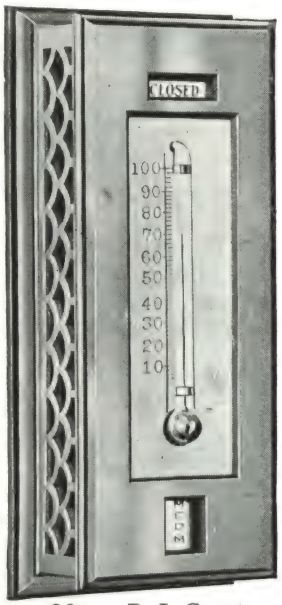
Thermostat Covers

The covers which conceal the thermostat proper are small, inconspicuous and very neat in design and workmanship.

There are two distinct styles: one called the R type and one called the P type.

The R type is a die-casting, very beautifully designed and used generally in residences and other handsomely decorated buildings.

The P type is a pressed metal cover, very finely finished but not as ornamental and artistic as the R cover, and used more generally in schools, office buildings, hospitals and places where simple and neat design is desired rather than artistic and ornamental.



MODEL R. I. COVER
4¾" x 2" x 1⅛" deep

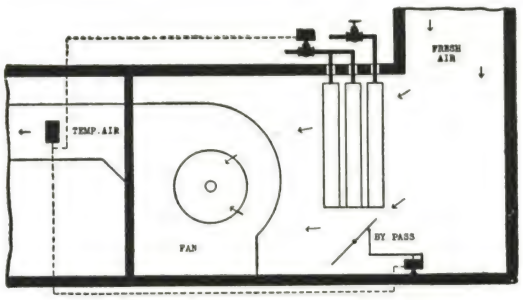
Air Compressors for Operation of the Thermostats

Electric, hydraulic, steam or belt driven air compressors in all sizes are furnished and installed by this company to supply the small amount of compressed air necessary to operate Johnson thermostats. They are entirely automatic in operation and require only occasional oiling.

Insertion Duct Thermostat

Controls the temperature of tempered air for heating or ventilation. It is inserted into tempered air duct and controls either valves on tempering coils, by-pass damper under coils, or both, as shown on following page.

Continued on next page



TEMPERED AIR FAN VENTILATION

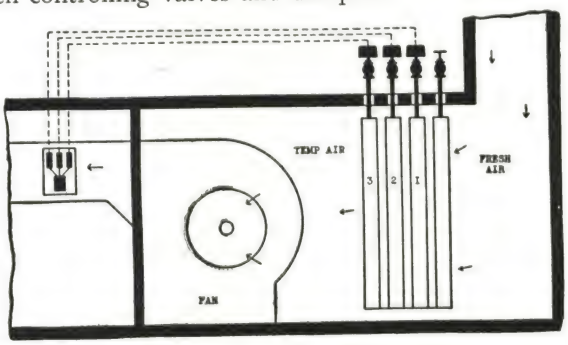
Thermostat, located in the duct from fan, controls by-pass damper under the tempering coils, or coils themselves, when there is no by-pass provided. Some engineers prefer to control both by thermostat. (See also multiple insertion thermostats)

Multiple Insertion Thermostat

Similar to the insertion duct thermostat, excepting that one multiple thermostat takes the place of a number of separate duct thermostats set for different temperatures.

The 3-point multiple thermostat shown will operate 3 separate diaphragm valves at as many different temperatures. It has become very popular with heating engineers for the control of heating and tempering coils where it is desired to have these coils turn on at different temperatures.

It is made to work with positive action when controlling valves; with graduated action when controlling dampers; or with both positive and graduated action when controlling valves and dampers.



TEMPERED AIR FAN VENTILATION

The 3-point multiple thermostat here takes the place of single insertion thermostat. There is no by-pass damper, and temperature of ventilating air is regulated by coil control. For instance, section 1 opens at 68°; section 2 at 67°; section 3 at 66°. Thus, as the weather gets colder, the thermostat has more radiation under control

Tank Thermostat

Designed for insertion through 1-in. tapped hole in tank and controlling, in the case of hot water tanks, a diaphragm valve on the supply pipe to the steam coils in the tank.

It can be used to control the temperature of any liquid, either hot or cold. It is especially adaptable for controlling the temperature of water in hot water boiler heating plants by its control of the boiler draft doors.

Humidity Control

The supplying of moisture to the heated air in buildings and the automatic control of the percentage of moisture in this air are recognized by authorities to be as important as maintaining proper temperatures.

Humidity is indispensable for museums and fine residences to protect valuable pictures, furniture, wood carvings, etc. It is even more valuable for the protection of human life in homes, schools, hospitals, etc.

Humidostats and Humidifiers

The humidostat automatically controls the supply of moisture delivered to the air by a humidifier and maintains a constant percentage of relative humidity. It operates a diaphragm valve on the steam coils in the pan humidifier. The pan is provided with float box to maintain constant water level and is located in the ventilating air duct leading throughout the building. Steam jet and water spray types of humidifiers are also furnished.

Pneumatic Switch Control

Remote valve and damper control plays, by means of our pneumatic switches, a very important part in the economical operation of the modern heating plant, especially in schools. It saves the janitor's time for other duties, and makes it possible to accomplish results in the operation of the heating plant which can not be obtained in any other way. It makes it easy to operate the fresh air, return air and vent dampers, with the corresponding assurance that these dampers will be economically operated as intended by the heating engineer.

PNEUMATIC SWITCH

How to Specify

Furnish and install a complete system of automatic temperature regulation and humidity control, furnishing all necessary thermostats, valves, dampers, humidifiers, special devices, air compressors, piping and fittings, and labor of installing system, except setting valves and dampers in position—all in accordance with the following schedule and detailed specification:

Schedule—State the rooms to be controlled and number of thermostats in each; the manner in which the tempered air, if there is any, is to be controlled; the manner in which the drafts of the boiler are to be controlled; and specify the manner of the control of any fresh air, vent or return air dampers, stating the location and number of switches.

Thermostats—Specify Johnson Metal Diaphragm Model Thermostat, size, 4½x2x1 in.; and state whether it is to have residence or school cover, indicating device, positive shutoff, and whether it is to be positive or intermediate motion. Specify the number and kind of inserted thermostats.

Valves—Specify Johnson Metal Diaphragm Valve having the "Sylphon" Metal Bellows for its diaphragm. State whether valves are to be plain or nickelplated with or without unions; add: Valves to be placed in position by heating contractor.

Air Compressors—Specify kind of air compressor (steam, hydraulic, electric or power driven), requiring that the air compressor shall be of sufficient size to operate the system, with a factor of safety not less than 3, and requiring that it be provided with all necessary governing devices, fittings, gage, etc.

Humidostats—Specify Johnson Humidostat and Humidifier, stating the kind of humidifier, whether perforated steam or copper evaporating pan.

Dampers—Specify that dampers shall be made by the heat regulating contractor, but installed by the galvanized iron contractor, and that dampers shall consist of wrought iron frames, sheet steel blades, strongly cleated, with brass bearings.

Guarantee—Require that system be complete in every respect, and that all necessary material and special fittings shall be furnished whether specifically mentioned or not. Require that entire system be guaranteed free from all original defects in material and workmanship, and that any parts proving defective or wearing out within 2 years from date of completion shall be replaced free of charge. Require that thermostats shall operate the valves or dampers to which they are attached, at a variation of not to exceed 1° above or below any given point.

Contracting

This company contracts to furnish and install in complete working order the Johnson System of Temperature Control, including thermostats, valves, piping, etc.

ESTABLISHED 1885

MINNEAPOLIS HEAT REGULATOR CO.

MINNEAPOLIS, MINN.

FACTORY SERVICE BRANCHES

BALTIMORE, MD., 709 North Howard Street
BOSTON, MASS., 157 Federal Street
CHICAGO, ILL., 714 Wrigley Building
CINCINNATI, OHIO, 2329 Ashland Avenue
CLEVELAND, OHIO, 1327 East 105th Street
DAYTON, OHIO, 15 North Jefferson Street
DENVER, COLO., 230 15th Street
DETROIT, MICH., 8025 Woodward Avenue
KANSAS CITY, MO., 5th Street at Broadway
MILWAUKEE, WIS., 400 Watkins Building
NEWARK, N. J., 812 Wiss Building, 671 Broad Street
NEW YORK, N. Y., 5635 Grand Central Terminal Office Building
PHILADELPHIA, PA., 323 Bulletin Building
PITTSBURGH, PA., 609 Chamber of Commerce Building
PORTLAND, ORE., 516 Artisan Building
ST. LOUIS, MO., 375 Arcade Building
SPOKANE, WASH., South 175 Howart Street
SPRINGFIELD, MASS., 16 Woodside Terrace
SYRACUSE, N. Y., 218 East Washington Street
WASHINGTON, D. C., 208 Union Trust Building

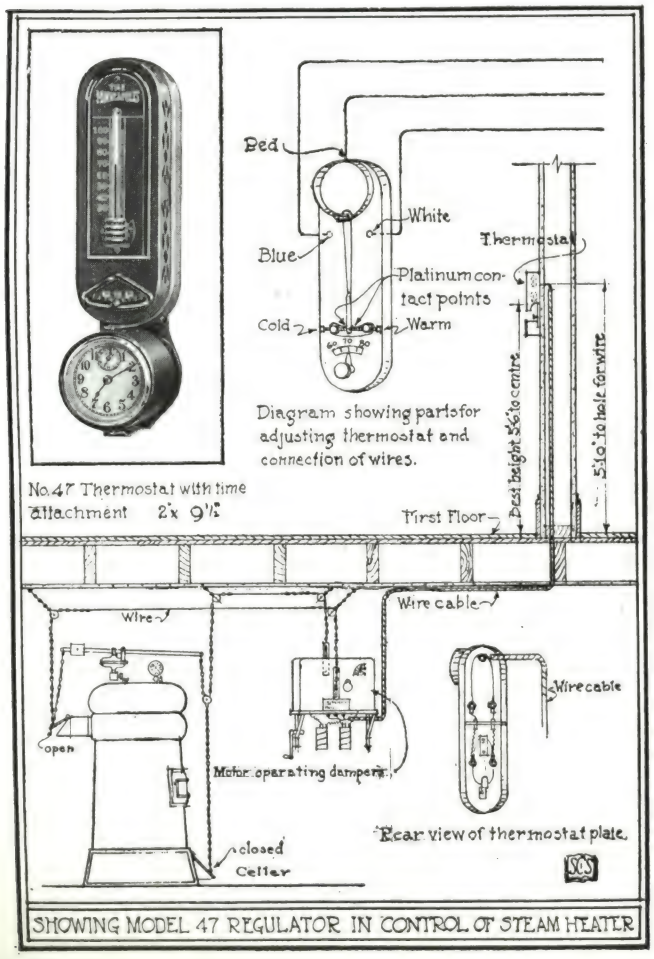
Products and Services

MINNEAPOLIS HEAT REGULATORS; THERMOSTATS; MOTORS; PRESSURE REGULATORS.

This company manufactures exclusively AUTOMATIC HEAT REGULATORS for warm air furnaces; for steam, vacuum, vapor and hot water boilers; for hot water tanks and heaters, gas and street steam service. In large cities the factory branches install heat regulators and maintain a staff of trained service salesmen to advise as to new installations, and to insure the most efficient service from the regulators already in use.

Minneapolis Heat Regulator

Made in various models as to style of both thermostats and motors. The application is simple. The thermostat (mechanical thermometer) is placed at an average temperature point in the living room, and is connected by concealed 3-wire cable to motor located in basement. The thermostat is adjustable on 1° or more temperature range.



SHOWING MODEL 47 REGULATOR IN CONTROL OF STEAM HEATER

Operation—The operation of the Minneapolis heat regulator is simple. The pointer on the thermostat is set at any desired temperature, usually 70°. A coil of thermostatic metal expands and contracts with every change in temperature, making an electrical contact closing the circuit. This operates the motor connected to the drafts of the heater, closing drafts when the desired temperature is reached and opening drafts when the temperature drops 1° below the point set on the thermostat.

Advantages—This regulator has been on the market for over 36 years, and is the most widely used device of its character. Nothing to wear out. Many sold 36 years ago are still in use. No special dampers required, and the device is practically noiseless in operation.

No. 47 Thermostat

Equipped with reliable 24-hour clock, it will raise the temperature at any predetermined hour in the morning to any day temperature desired. The clock is hinged in front and swings in a complete circle for winding, and is easily removed.

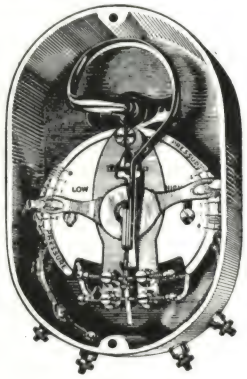
No. 55 DUPLEX THERMOSTAT WITH 8-DAY CLOCK
2½x9½ in.

No. 55 Duplex Thermostat

Equipped with reliable 8-day clock. At night, pointer automatically moves back to a lower temperature; and in morning, at predetermined hour, is moved to day temperature. Adjustment of time "set" can be made almost instantly.

De Luxe Model

This is equipped with a very high grade jeweled movement clock, manufactured especially for us by the Chelsea Clock Co. The movement is jeweled, with compensating watch balance. All pinions and pivots are polished. Every part is extra heavy, insuring rigidity to the movement, long life, and excellent time keeping qualities. The mechanism and operation is similar to the model No. 55. In keeping with the surroundings of the finest home the De Luxe is finished in brushed silver.



No. 70 PRESSURE REGULATOR
Used with or without thermostat in connection

No. 70 Pressure Regulator

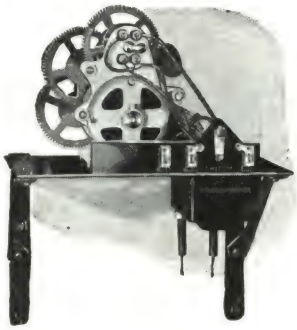
This model works on same principle as our regular thermostats but is actuated by pressure instead of temperature. It is furnished to operate on a range from 0 to 5 lbs. pressure. It can be used in combination with room thermostat on vapor and steam heating systems as an auxiliary and double control of both pres-

Continued on next page

sure and room temperature, or with a motor to control by pressure alone. It is extremely accurate and durable.

Electric Motors, Non-wind

The 110-volt, 60- or 25-cycle, alternating current motor operates directly from the lighting circuit of the house. The motor itself runs on 110 volts; but a small transformer is mounted on the bottom of the motor, furnishing a 7½-volt circuit for the operation of the thermostat and magnet coils. Ten cents will more than cover the cost of current consumed per heating season, and the motor requires absolutely no winding. The Minneapolis alternating current motor is absolutely safe. It has been tested and *approved by the National Board of Fire Underwriters.* Also furnished for 6- and 110-volts D. C.



Alternating Current Motor, with Cover Removed

Spring Motor

All parts of pressed steel and brass (no cast iron); bearings are lathe turned, running in brass bushings, finely adjusted and fitted. Requires winding every week or 10 days in coldest weather. All motors, *when run down, leave drafts closed.*

Winding Index—Index finger with scale travels as motor is wound and unwound. A glance shows condition with reference to winding.

Basement Switch—By this means motor can be operated in basement. Easily wound by means of crank key. This motor may be operated by 2 dry cell batteries or should house current be available a transformer may be used.

Motor Incased in Steel Cover

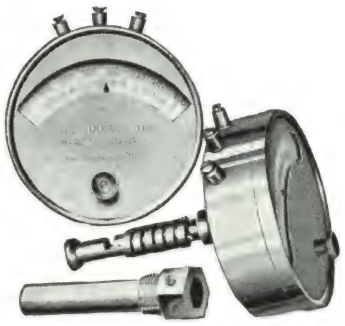
Minneapolis Regulator Applied to Street Steam and Gas

Especially serviceable in controlling temperature of buildings heated by gas or street steam, because it governs the supply of gas or steam to heater and admits only enough to maintain the desired temperature. Can be connected to any heating plant (hot air, hot water or steam), whether it be a straight gas heater or a coal heater with gas burners in it.

Motor connected to gas valve (usually a balanced disk) by chain and pulley. By-pass and pilot light are installed in connection with it.

Model 65 Hot Water Thermostat

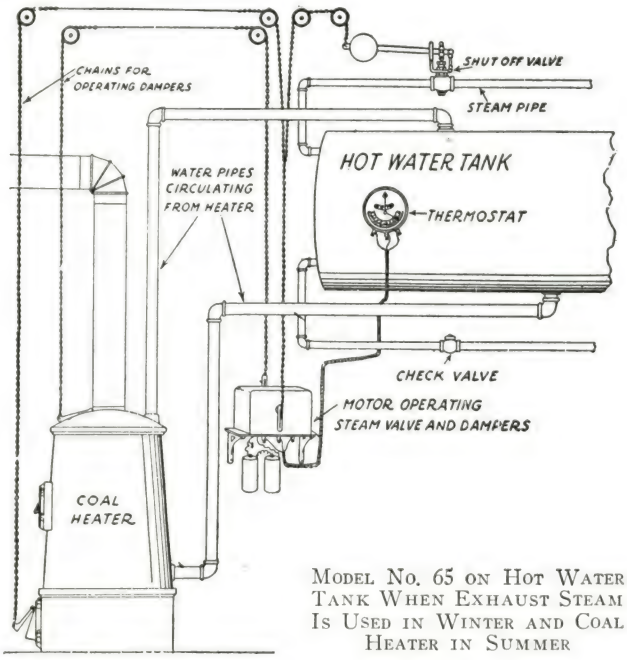
This instrument is built with adjustable scale, giving an approximate range of temperature control from 100° to 240° Fahr. It is suitable for use on any kind of hot water supply control and assures absolutely dependable reliable control on any kind of heat—steam, coal, gas or oil. Being moderate in cost, it is a practical installation on even small jobs. Note particularly its adaptability and range. It can be used during the winter months for controlling a steam valve and during the summer months can handle the draft control on the auxiliary heater, giving during the whole year evenly heated water at a minimum cost in fuel.



Model No. 65 Hot Water Thermostat

Dual Control—The No. 65 thermostat on hot water heating plants is a valuable aid in connection with the standard Minneapolis regulator as its use on the boiler gives a dual control in the temperature of the job, that is, room temperature and temperature of the water in the heating plant itself. This dual installation, particularly on gas and oil heated plants, absolutely prevents racing of boiler, overheating of the rooms when the temperature is raised from the lower night temperatures. The addition of the No. 65 regulator means absolutely even temperature, even and steady fire at the boiler and a still further saving in coal. We also manufacture the No. 65 thermostat with fully graduated scales in different ranges for temperatures from 0 to 500° Fahr.

Standard extension is 2 in. Extensions up to 24 in. to order.



Model No. 65 on Hot Water Tank When Exhaust Steam Is Used in Winter and Coal Heater in Summer

Specifications

Install in ..... room Model ..... Minneapolis Thermostat and connect by concealed 3-wire cable to .....Model Motor in heater room. (Designate thermostat by number and motor by letter—as De Luxe 110 volt A. C., etc.)

Contracting

In the cities where this company maintains factory service branches as listed, specifications should call for installation by Factory Service Branch, the Minneapolis Heat Regulator Company; in other cities by the heating contractor.

THE POWERS REGULATOR CO.

Manufacturers of Automatic Temperature Controlling Apparatus

GENERAL OFFICES AND FACTORY
2722 Greenview Avenue
CHICAGO, ILL.

GENERAL EASTERN OFFICES
950 Architects Building
NEW YORK, N. Y.

BRANCHES AND SERVICE STATIONS

BOSTON, MASS.
CINCINNATI, OHIO
DETROIT, MICH.
DES MOINES, IOWA
MINNEAPOLIS, MINN.
CLEVELAND, OHIO
BUFFALO, N. Y.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
PITTSBURGH, PA.
SEATTLE, WASH.
KANSAS CITY, MO.
SALT LAKE CITY, UTAH
INDIANAPOLIS, IND
GREENVILLE, S. C.
LOS ANGELES, CAL.
BUTTE, MONT.
MILWAUKEE, WIS.
PORTLAND, ORE.
BALTIMORE, MD.

CANADIAN POWERS REGULATOR CO., LTD., TORONTO, ONT.
BRANCHES AT: MONTREAL, WINNIPEG, CALGARY, VANCOUVER

Products and Services

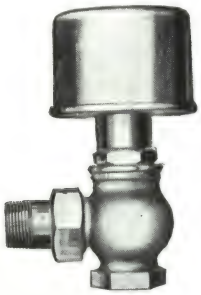
AUTOMATIC TEMPERATURE CONTROLLING SYSTEMS, applying them, under the supervision of the Powers engineers, to the heating plants, new or old, in residences, offices, factories, schools, institutions, and to any other condition of artificial heating where uniform temperature is desired. AUTOMATIC HEAT REGULATING DEVICES for controlling hot water and other tank heaters, hot water lines, shower baths, mixing hot and cold water, cold water and steam, and other operations of a similar character.

Heating systems, and the requirements for temperature control, vary widely in detail. Special study should be given each case, so that its particular requirements may be intelligently handled. Much of the dissatisfaction experienced with some temperature regulating apparatus is due to the attempt to force a ready-made inflexible system or device to meet special requirements, taking no account of the conditions peculiar to the situation to be treated.

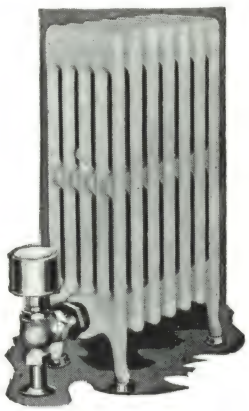
Temperature Controlling Appliances

Powers thermostats are accurate in their working and will maintain their adjustment. They are of the vapor disk type, exclusive with Powers regulators, and the only type not thrown out of adjustment by extremes of temperature or long disuse. For over 30 years this has been the standard of thermostatic control by which all other methods are measured. In design, Powers thermostats are second to none in beauty and perfection of finish; in size, as small as is consistent with the reliability so necessary in such instruments; in operation, sure, with gradual or positive action, as conditions require.

RESIDENCE THERMOSTAT



ALL-METAL RADIATOR VALVE



VALVE ATTACHED TO RADIATOR

Diaphragm radiator valves, diaphragm motors, mixing dampers and other equipment are especially rugged in construction, dependable, and durable; built regardless of expense, wherever strength is needed for efficiency and long service.

Motive power used in these systems is compressed air. The company builds its own air compressors, operated by steam, electricity or water, and characterized by their reliability, noiseless operation, perfect control and long life.

HEAVY DUTY THERMOSTAT

Installations — Installations of Powers systems are invariably made by this company. At each branch office is maintained a competent engineering and erecting force, sparing no expense to maintain the highest efficiency.

Powers special devices, however, are easily installed by any engineer or plumber.

DIAPHRAGM MOTOR

Prices — Price for Powers Regulation covers the system installed complete, and is only named after a careful study of the requirements.

Our price is not the lowest, but no other system will be found as efficient and economical. Customers are served with the sole aim of getting results for them; and experience shows that satisfactory service from a temperature controlling system is of much more importance than its first cost.

MIXING DAMPERS

Specifications—An opportunity is solicited to submit to any architect or engineer a detailed specification, accompanied by a guaranteed price, to cover complete system of temperature control installed, the price to hold if specification is used. This guarantees full protection to the client against advantage being taken of a close specification.

This company will gladly collaborate with architect or engineer in preliminary plans. As specialists in temperature control, THE POWERS REGULATOR CO. has unusual facilities for solving problems in this particular field.

Continued on next page

Tank Temperature Regulation

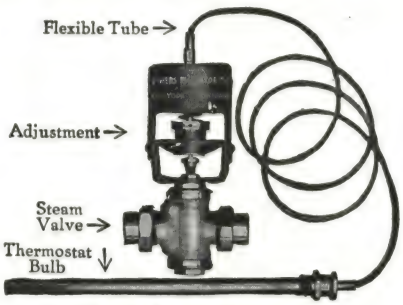
No. 11 Regulator — Controls temperature of liquids of all kinds under all conditions. Self-contained, requiring no water or other auxiliary operating power. All-metal. Of great durability, guaranteed accurate and positive in action. Very easily installed. Largely used on hot water tanks and heaters, glue heaters, paraffin and grease tanks, etc.

Bulletins 129, 138 and 139.

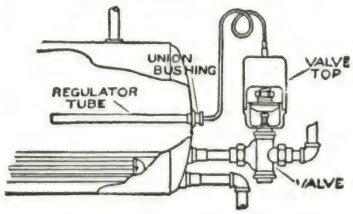
No. 12 Regulator — Same as No. 11, with lever instead of spring equipment.

On request, it is furnished complete with chains and pulleys, for control of dampers of auxiliary coal burning tank heater, both heat sources being controlled with one regulator.

For more detailed information ask for Bulletin No. 129.



No. 11 Regulator



Typical Installation of No. 11 Regulator in Hot Water Heater

PRICE LIST, NO. 11 AND NO. 12 REGULATORS COMPLETE WITH VALVE

Size of valve, in.	Price	Size of valve, in.	Price
½	$60.00	3	$100.00
¾	65.00	3½	110.00
1	70.00	4	120.00
1¼	75.00	5	175.00
1½	80.00	6	225.00
2	90.00	8	275.00
2½	95.00		

Screwed union valves up to 1½ in., inclusive. 2 in., 2½ in. and 3 in., screwed iron body; larger sizes, iron body flanged. Flexible connecting tube is 6 ft. long for sizes 1½ in. and smaller; 8 ft. for 2 to 4 in. inclusive; and 10 ft. for larger sizes. Extra charge for special lengths. Bulb lengths, 14 to 24 in. requiring 1-in. and 1¼-in. tapping.

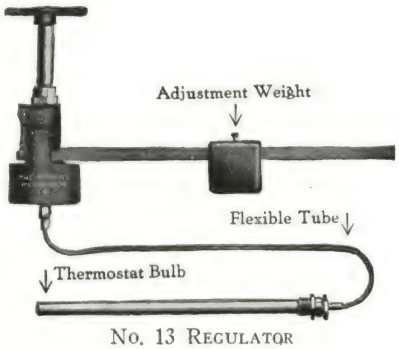
Liberal discount to the trade.

No. 13 Regulator—For hot water tank heaters and garbage burners. Self-contained unit, similar to No. 11, but always has weight and lever instead of spring balance. It operates draft dampers as shown in illustration.

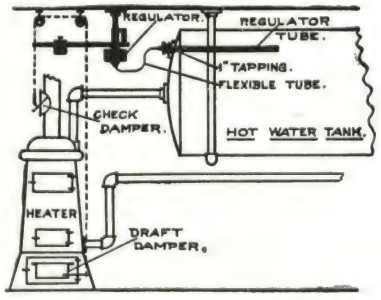
Furnished for 140° Fahr. operation unless otherwise specified.

Price — Complete, with 6-ft. flexible tube, chains, pulleys, $50.00. Liberal discount to the trade.

For further details ask for Bulletin No. 136.



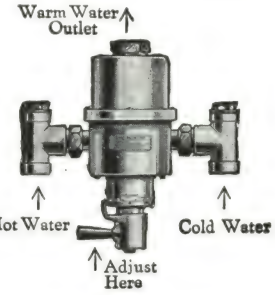
No. 13 Regulator



Typical Installation of No. 13 Regulator

Water Line Temperature Regulation

Shower Bath Controller — This device furnishes absolute thermostatic control of the water supply to shower baths, either singly or in gangs. Entirely automatic in operation, and positive anti-scald insurance. Will cut off hot water completely if cold water supply fails. Made in several sizes, to control from 1 shower to 50.



Water Controller

Smaller sizes, full nickel finish. Larger sizes, black enamel or aluminum finish.

The larger sizes may be installed in the hot water line, to prevent extremely hot water from going to the bathroom, saving wear and tear on the fixtures, but permitting the kitchen and laundry to take it as hot as may be desired. Furnished complete as illustrated, with unions, strainers, and check valves, ready to connect.

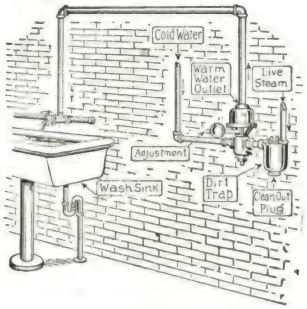
Regularly furnished with maximum temperature adjustment of 110° Fahr. Higher adjustment furnished when specified. Always state purpose for which controller will be used.

PRICE LIST, POWERS SHOWER BATH CONTROLLERS

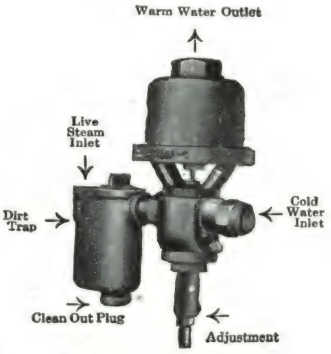
No.	Description	Pipe sizes, in. Inlet	Pipe sizes, in. Outlet	Capacity, gals. per min.	Price
1	Nickelplated brass body, screwed connections	½	¾	Individual shower	$100.00
3	Nickelplated brass body, screwed connections	¾	1	25	125.00
4	Nickelplated brass body, screwed connections	1	1¼	50	150.00
5	Galvanized iron bodies, painted, flanged connections	1¼	1½	80	175.00
6	Galvanized iron bodies, painted, flanged connections	1½	2	100	185.00
7	Galvanized iron bodies, painted, flanged connections	2	2½	150	200.00
8	Galvanized iron bodies, painted, flanged connections	2½	2½	200	225.00

Capacities are based on 40 lbs. water pressure. Liberal discount to the trade. For more detailed description ask for Bulletin No. 124.

Thermostatic Water Heater—A safe, sure, and accurate method of heating water with high pressure steam. Thermostatically controlled. Adapted to workmen's wash sinks, shower baths, etc., in factories, mines and other industrial plants, and to a great variety of purposes where a supply of warm or hot water of a specified temperature is desired at irregular intervals.



Typical Installation of Thermostatic Water Heater in Workmen's Wash Sinks



Thermostatic Water Heater

PRICE LIST, STEAM AND WATER MIXERS

No.	Pipe sizes, in. Inlet Steam	Pipe sizes, in. Inlet Water	Pipe sizes, in. Outlet	Capacity, gals. per min.	Shipping weight, lbs.	Price
1	1	¾	¾	25	60	$100.00
2	1¼	1	1	40	75	150.00

Liberal discount to the trade. For more detailed information ask for Bulletin No. 137.

ANDRE & WHITE

Manufacturers of Radiator Shields and Metal Grilles

TELEPHONE
PROSPECT 8650

63rd Street at Hoyne Avenue
CHICAGO, ILL.

Products

Manufacturers of ANDRE'S RADIATOR RECTIFIER, a combined Radiator Cabinet and Humidifier, which also serves as Radiator Cover, Shield and Seat or Shelf; PERFORATED METAL GRILLES.

"Exactly What It's Name Implies."

TRADE-MARK

Estimates, Catalogue, etc.

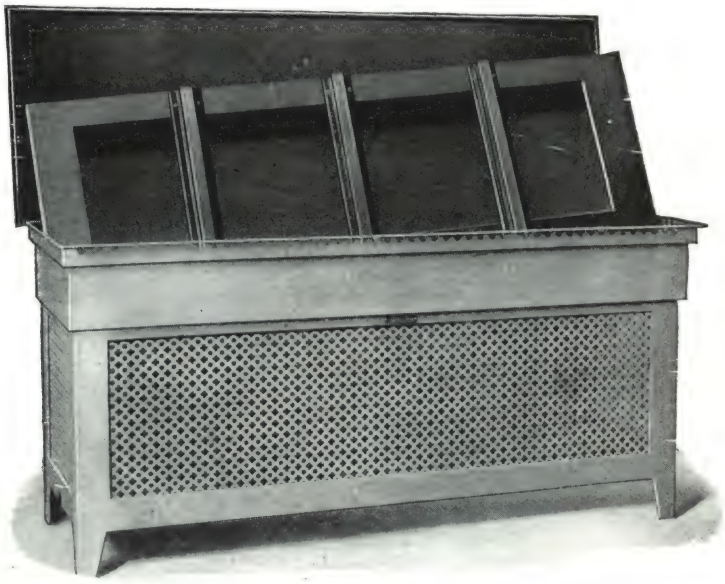
This company will gladly make estimates on any installation. Catalogue, color card of finishes and styles of perforated metal grilles furnished on request.

Andre's Radiator Rectifier

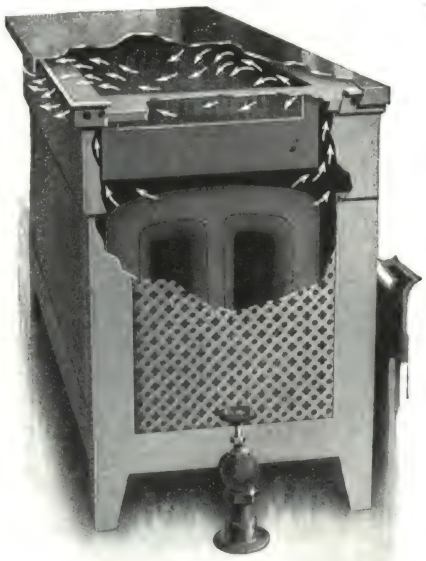
This device, the latest development in radiator covers, acts both as a shield to prevent discoloration of walls and as a humidifier to maintain a healthful degree of moisture in the room. Suitable for installation in homes, apartments, hospitals, hotels and office buildings. Made of Armco non-rusting cold rolled panel steel throughout, with a large selection of perforated metal grilles to choose from. These rectifiers are made to exact measure and will fit any type of radiator; finished with a primer and 3 coats of paint baked on and of color to match trim or decorations of rooms where they are to be installed.

The Andre radiator rectifier, by promoting a natural degree of moisture in the room creates a healthy atmosphere and prevents the drying up and consequent loosening of joints in furniture. Further, a marked saving in heating cost is effected: (1) by the fact that a humid atmosphere does not require as high a degree of temperature to maintain a comfortable heat in the room as does dry air; (2) rectifier, because it completely covers radiator, makes it unnecessary to paint same, which adds to its efficiency inasmuch as paint retards radiation of heat. Also, the redecorating and cleaning items, which bulk largely in the maintenance of apartment buildings, are cut considerably. Thus, it will be seen that, considering all of these saving features, the installation of Andre radiator rectifiers is not only a convenience, but an economy.

ANDRE'S RADIATOR RECTIFIER FOR STANDARD TYPE OF RADIATOR



ANDRE'S RADIATOR RECTIFIER SERVING DOUBLE USE AS WINDOW SEAT



PHANTOM VIEW OF RECTIFIER SHOWING CIRCULATION OF AIR

FRANK S. BETZ CO.

Manufacturers of All-steel Radiator Covers

HAMMOND, IND.

CONTRACT DEPARTMENT AND SALES ROOMS: CHICAGO, ILL., 30 East Randolph Street—Telephone, Central 6040
NEW YORK OFFICE, 6-8 West 48th Street—Telephone, Bryant 6142

Product

De Luxe All-Steel Radiator Covers.

For Enamel Steel Medicine Cabinets, see page 1636; for All-steel Standard "Kitchunits," see pages 2110-2111.

De Luxe All-steel Radiator Covers

Attractive and inexpensive. Constructed from full furniture steel with a 2-in. flange on all four sides. To assist radiation, front of cover has 1⅛-in. open squares. Corners are electric- and acetylene-welded so the cover is one solid piece.

Covers are finished, according to specifications, to match furniture or wood trim of room. Frames, back shield and deflecting plate are finished to match radiator. The enamel wood finishes applied to cover are smooth, beautifully grained and lasting: mahogany (light, dark or brown), walnut and a soft toned French gray.

De Luxe covers are built to fit any type of floor or wall radiator exactly according to specifications. They will not interfere with pipe connections.

Air currents passing over radiator and carrying dust and dirt are deflected by back shield and deflecting plate out into the room.

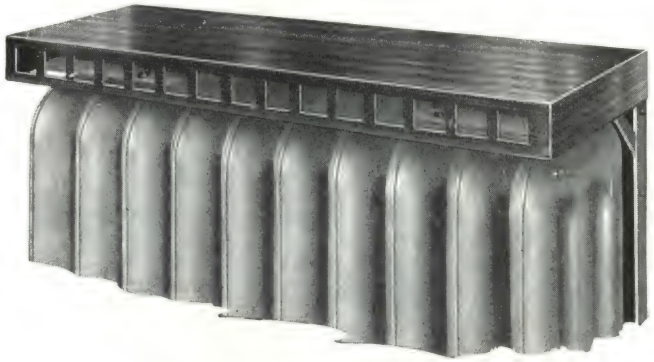
End brackets are made of 1-in. band iron and strongly welded to frame. Extra heavy back shield extends to within 6 in. of floor, protecting wall and allowing heated air to circulate upward and outward. Frame fits the radiator and is securely fastened by patent screw and chain attachment.

Curved deflecting plate is made of heavy sheet steel, rounded and securely bolted to end brackets. It deflects heat into the room without loss in heating value of the radiator. This curved deflecting plate and the ample space at top of radiator are distinctive features in the De Luxe covers. They insure full radiator efficiency.

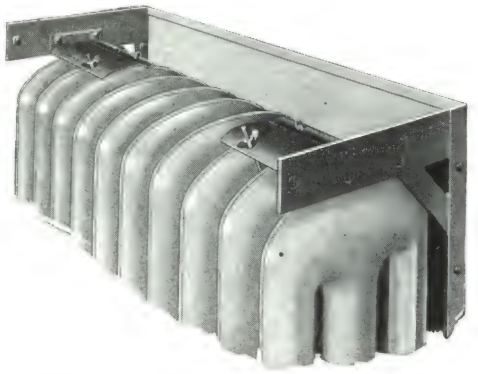
Directions for Ordering De Luxe All-Steel Radiator Covers

Letters refer to dimension diagram.

(1) Number of covers.



De Luxe Radiator Cover Installed



Cover and Deflecting Plate Removed, Showing the Strong Bracket and Method of Attaching to Radiators

Cover Removed Showing Deflecting Plate in Place
De Luxe Radiator Covers

(2) Length (dimension A) in inches.

(3) Height (dimension B) in inches.

(4) Width (dimension C) in inches.

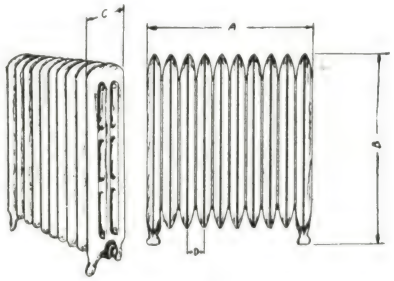
(5) Width (dimension D) in inches; from center to center of sections.

(6) Specify finish, whether light or dark mahogany, golden oak, walnut, white enamel, etc. Send sample of wood trim if possible.

(7) Location of radiator, name or number of room. If different sized radiators are in same room, specify separately on order blank. All covers will be shipped tagged, giving location to make installation easy.

(8) Specify type of radiator, whether water or steam.

Note: If cover is desired for wall radiator (hung on wall), furnish accurate sketch with dimensions.



Dimension Diagram

W. H. JOHNSON & SON CO.

Manufacturers of Shields for Radiators and Warm Air Registers

330 East St. Joe Street
INDIANAPOLIS, IND.

Products

ACME RADIATOR SHIELDS and WARM AIR REGISTER SHIELDS.

Acme Radiator Shields

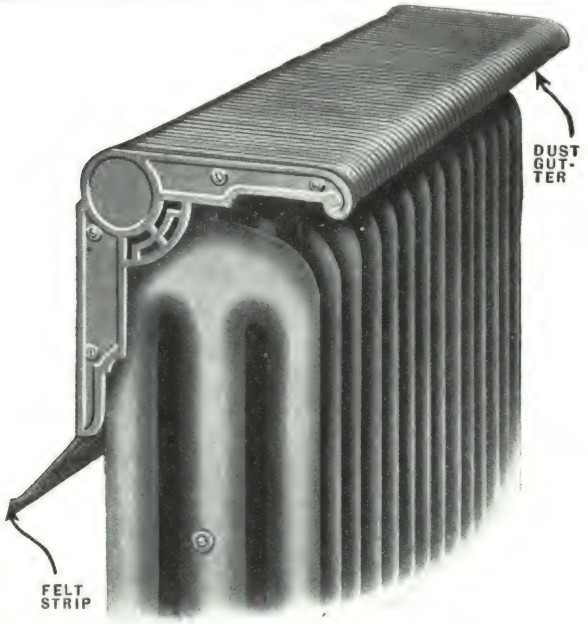
Acme radiator shields absolutely prevent the discoloration which inevitably appears above unshielded radiators. They stop the damage done to fine draperies by collecting in a special dust gutter the minute particles of dirt which are even in the cleanest of interiors and prevent them from being carried to the walls or curtains.

As an investment, Acme radiator shields will pay for themselves in a single year. The moderate cost of an Acme is easily saved over and over by eliminating the necessity of cleaning and redecorating as frequently as otherwise would be required.

The Acme shield is distinctly attractive and will harmonize with any radiator and with any room. They may be decorated to match the furnishings or finish. This may be done locally when installing them, or, if you so desire, we will do it at our factory.

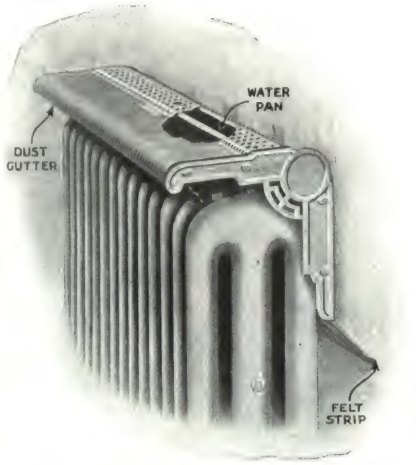
Construction—The body of the shield is made of crimped, galvanized iron, well reinforced with cast iron ends. It is supported on the radiator by cast iron standards that are locked in place by a simple hook and bolt on each standard. The shield may be easily removed when not in use. The back which fits tightly against the wall with a felt strip may be extended down to the floor if desired.

Advantages—Acme shields are made of a continuous sheet of galvanized iron and are so shaped that they do not in the least retard the radiation of heat—instead, they throw the heat out into the room. These shields are not merely deflectors which prevent the circulation of dust laden air coming in contact with the wall. They collect the particles of dust in the special dust gutter which is an important feature of construction. No dust carrying air is circulated in a room where the radiators are equipped with Acme shields. The dust gutter is easily cleaned by wiping out with a damp cloth.



DESIGN NO. 3, ACME RADIATOR SHIELD
Showing flat top shield without water pan

Humidifying Devices — Acme shields are made either with or without copper water pans. The water pan enables keeping the room at the proper degree of humidity, giving a more healthful heat and preventing cracking and warping of furniture.



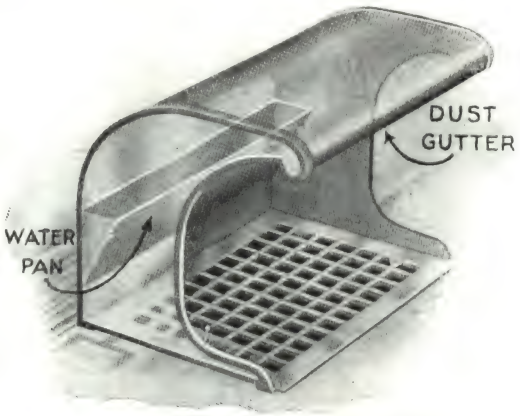
DESIGN NO. 2, ACME RADIATOR SHIELD
Showing shield with water pan

How to Order—Due to the wide variation in size of radiators it is impossible to give information regarding sizes, etc. in this limited space. We can fill orders or give quotations promptly when the following information is furnished:

(1) Number of radiators of each size requiring shields.
(2) Over-all width of each radiator.
(3) Over-all length of each radiator.
(4) Where possible, give radiator manufacturer's name, type and size of each radiator.
(5) Number of sections in each radiator.
(6) Who is to finish shields.
(7) What finish is wanted.
(8) Distance of radiator from wall.
(9) If shields are to extend to the floor give over-all height of radiator.

Acme Warm Air Register Shields

Constructed similar to the radiator shields, and are equally effective for the protection of walls.



ACME WARM AIR REGISTER SHIELD
X-Ray view showing water pan

HEALY-RUFF COMPANY

Manufacturers of E-Z Radiator Hangers

NEW YORK OFFICE
Architects Building

MINNEAPOLIS, MINN.

AGENTS IN PRINCIPAL CITIES

Product

E-Z ONE-BOLT RADIATOR HANGER or BRACKET, adapted for hanging all makes and sizes of radiators on the wall.

Styles

Style "H" places radiator 2½ in. from wall and provides for baseboard adjustment.

Style "R" places radiator 1½ in. from wall, but is not adjustable for baseboard.

Both styles are made for wall, 1-, 2-, 3-, 4- or 5-column, window and corto radiation.

All column radiation is held in at the top with an invisible washer.

Advantages

Easy to clean under and back of radiator.

Floors and carpets can be laid without disturbing radiator or connections.

No carrying of radiators over new floors.

Anchor bolts can be placed in walls during construction, if desired.

Entire hanger invisible.

Expansion can not affect anchor bolts in wall.

No accurate measurements required for locating anchor bolts.

Both horizontal and vertical adjustments.

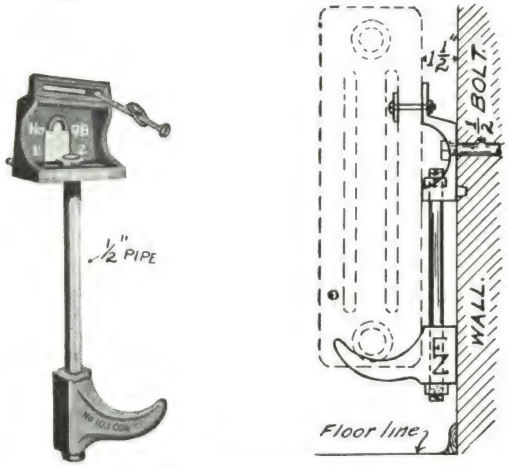
Adjustable for any height of baseboard.

Only one bolt in the wall for each hanger.

Saves time and labor.

Can be used with any make or style of radiator.

Radiators can be hung and permanent connections made before floors are laid.



STYLE R RADIATOR BRACKET

Applicable to wood, brick, tile or walls of any material.

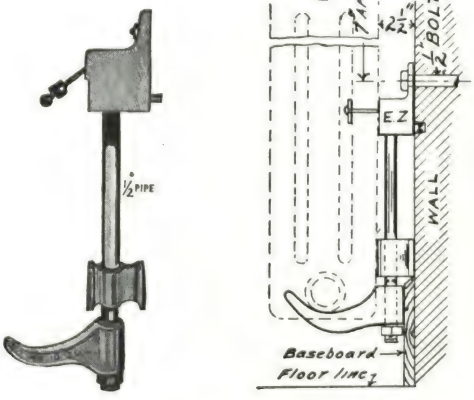
Desirable where vacuum cleaners are used.

Desirable where temperature control is used.

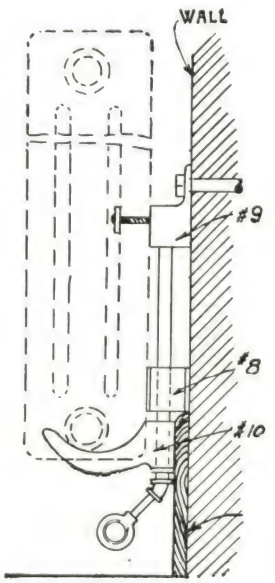
Typical Specifications

Where Baseboards Are Used—All radiation, unless otherwise noted, shall be supported on wall by means of E-Z Radiator Hangers, Style "H," or equal, and approved in writing by the archtect; arranged to support the radiator 2½ in. from the wall and with baseboard adjustment.

Where Baseboard Adjustment Is Not Desired—All radiation, unless otherwise noted, shall be supported on wall by means of E-Z Radiator Hangers, Style "R," or equal, and approved in writing by the architect; arranged to support the radiator 1½ in. from the wall.



STYLE H RADIATOR BRACKET, SHOWING METHOD OF APPLICATION



E-Z METHOD OF HANGING RETURNS

THE BEATON & CADWELL MFG. CO.

Heating and Plumbing Specialties

NEW BRITAIN, CONN.

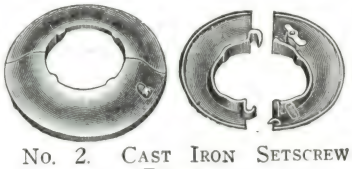
NEW YORK OFFICE: 234 Water Street—Telephone Connection

Products

Manufacturers of the Original Genuine Number 10 PERFECTION FLOOR and CEILING PLATES; PATENT IMPROVED ADJUSTABLE FLOOR and CEILING PLATES, for steam and other piping; ADJUSTABLE FLOOR SLEEVES; AIR VALVES; PATENT ADJUSTABLE WROUGHT STEEL PIPE HANGERS; STEEL PIPE HANGER ROLLS; TOWEL BARS; all in any finish desired.

Also, Wood Wheel Radiator Air Valves, Key Radiator Air Valves, Water Gages, Strap and other kinds of Pipe Hangers, Radiator Foot Rails, Lawn Sprinklers, etc.

No. 1. PATENT IMPROVED ADJUSTABLE FLOOR AND CEILING PLATE



No. 2. CAST IRON SETSCREW PLATE

No. 3. LATEST IMPROVED HINGED CAST PLATE

No. 4. PATENT IMPROVED ADJUSTABLE CAST IRON HINGED FLOOR AND CEILING PLATE

No. 5. NEW SOIL PIPE PLATE

No. 3A. HINGED CEILING PLATE WITH SET-SCREW

No. 6. CEILING PLATE

No. 9. 2-IN. FLANGE TWO-PART CAST PLATE

Floor and Ceiling Plates (Trade-name "Perfection")

"Perfection" plates are made of cast iron or brass, sheet steel or brass (according to design) and plain or nickelplated, as desired. They are furnished in a variety of types and sizes designed to meet every possible requirement. The ribs inside serve the double purpose of providing an air space between plate and pipe to prevent transmission of heat, and of aiding in centering the plate when in position on pipe.

A style for every known requirement.

LIST PRICES OF STANDARD SIZES OF FLOOR AND CEILING PLATES*

CAST METAL

Size, in		⅛	¼	⅜	½	¾	1	1¼	1½	2	2½
No. 1	Black	$ .14	.14	.15	.16	.17	.20	.22	.25	.30	.50
	N. P.	.25	.25	.26	.27	.28	.32	.35	.38	.45	.65
	C. B.	1.00	1.00	1.00	1.00	1.20	1.30	1.60	1.80	2.00	2.50

Size, in		3	3½	4	4½	5	6	7	8	10
No. 1	Black	$ .65	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.75
	N. P.	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.00
	C. B.	3.00	4.00	5.00	6.00	7.00	9.00	10.00	12.00	16.00

No. 2—In same finishes and sizes as No. 1; same list.
No. 3—In same finishes and sizes from ¾″ to 4″ as No. 1; same list.
No. 4—In same finishes and sizes from ½″ to 3″ as No. 1; same list.
No. 5—In same finishes and sizes, 2″, 3″, 4″ and 5″ only; as No. 1.
No. 3A—In same finishes and sizes from ¼″ to 4″ as No. 1; same list.
No. 6—In same finishes and sizes from ½″ to 2″ as No. 1; same list.
No. 7—In same finishes and sizes from ¼″ to 4″ as No. 1; same list.
No. 8—In same finisnes and sizes from ½″ to 4″ as No. 1; same list.
No. 9—In same finishes and sizes from ½″ to 4″ as No. 1; same list.

SHEET METAL

Size, in		¼	⅜	½	¾	1	1¼	1½	2
No. 10	Black	$ .14	.15	.16	.17	.20	.22	.25	.30
	N. P.	.25	.26	.27	.28	.32	.35	.38	.45
	S. B.	.60	.60	.62	.65	.72	.80	.85	1.00

Size, in		2½	3	3½	4	4½	5	6
No. 10	Black	$ .50	.65	.80	1.00	1.25	1.60	1.75
	N. P.	.65	.80	1.00	1.25	1.50	1.75	2.00
	S. B.	1.50	1.80	2.25	2.75	3.25	3.75	4.25

No. 10A—In same finish and sizes from ½″ to 2″ as No. 10; same list.
No. 11 —In same finish and sizes from ⅜″ to 4″ as No. 10; same list.

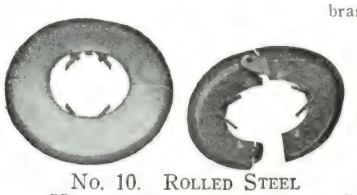
No. 12	Black	$ .07	.07	.08	.09	.10	.11	.12	.13	.20	.25	.30	.40
	Nickel	.11	.11	.12	.13	.14	.15	.16	.17	.30	.35	.42	.50
	N. P. or Pol. brass	.16	.16	.17	.18	.20	.23	.25	.30	.37	.45	.55	.65

No. 13—In same finishes and sizes as No. 12; same list.
No. 14—In same finishes and sizes, ½″ to 4″ as No. 10; same list.
No. 15—In same finishes and sizes, ½″ to 2″ as No. 12; same list.

*Discounts on application. N. P.—Nickelplated; C. B.—Cast brass; S. B.—Sheet brass

No. 15. NARROW FLANGED SOLID STEEL PLATE
Flange, ¾ in.

No. 16. CEILING PLATE FOR ANGLE OR CIRCLE COVE
Is adjustable, fits closely to pipe on any angle from 30° to 60°



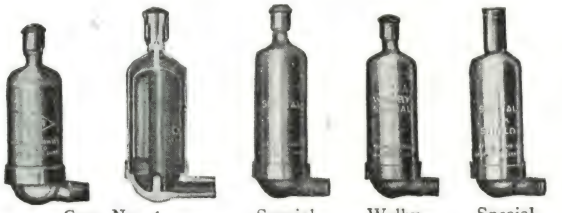
No. 10. ROLLED STEEL HINGED REINFORCED FLOOR AND CEILING PLATE

No. 12. COLD ROLLED STEEL SOLID FLOOR PLATE

TOWEL BAR
Opal and Crystal. Various lengths and sizes. Send for circular and price lists

COLD ROLLED STEEL HANGER ROLLS
As used with No. 5 hanger

PATENT IMPROVED ADJUSTABLE WROUGHT STEEL PIPE HANGERS



Gem No. 4 | Special | Welby No. 5 | Special Lock Shield

AUTOMATIC AIR VALVES

Made of best brass, having pressed shells and special bases. List prices, 60c; with lock shield 80c. Special No. 5 has longer shell and float than the Gem. Adjustable column is of high grade carbon reinforced with copper ferrules at top and bottom. For 10 to 15 lbs. steam pressure. List prices, "Special" 70c; "Welby Special" 90c; "Special" with lock shield 90c. Special valves made with extra heavy carbon post or with drain tubes

ADJUSTABLE FLOOR SLEEVE

No. 1 is adjustable from 10 to 16 in. No. 2 from 14 to 24 in. Made in 6 different styles

THE HERMAN NELSON CORPORATION

MOLINE, ILL.

SALES REPRESENTATIVES

BOSTON, MASS.	CLEVELAND, OHIO	DES MOINES, IOWA	SALT LAKE CITY, UTAH
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UNIVENT

"LIVE OUTDOORS - INDOORS"
(TRADE MARK)

Products

UNIVENT SYSTEM for HEATING and VENTILATING.

To the Engineers

Owing to the fact that each room is treated separately, Univents offer an extremely simple and satisfactory solution of the heating and ventilating problem.

Cabinet

The Univent cabinet is built of high grade furniture steel, reinforced where necessary to insure utmost rigidity and greatest durability. The front panel can be quickly removed, making the lower compartment accessible for cleaning and examination. All cabinets are furnished with olive green baked enamel finish. Special finishes may be had at additional cost.

Blower

The blowers or fans used in the Univent are of the most modern and efficient multiblade type. The fans are stamped from a single sheet of copper or other non-corrosive metal. The whole blower, including blades and rims, is made in practically one piece (instead of being assembled with a lot of rivets and parts which may become loose and vibrate).

Motor

The Univent motor is of a standard type and make, averaging ⅙ h. p., depending upon the capacity of the Univent. Its simple construction does not require the attention of experts. All motors are of the direct current type arranged for a maximum line current of 110 volts. Unless direct current is provided by the service company, a motor generator set should be provided to convert the alternating current to direct current.

Suspension Plate and Support

The blowers and motor are attached to a sheet steel suspension plate. An insulation of high grade felt between the two parts of the base, deadens any sound and eliminates the possibility of the plate coming in contact with the cabinet itself.

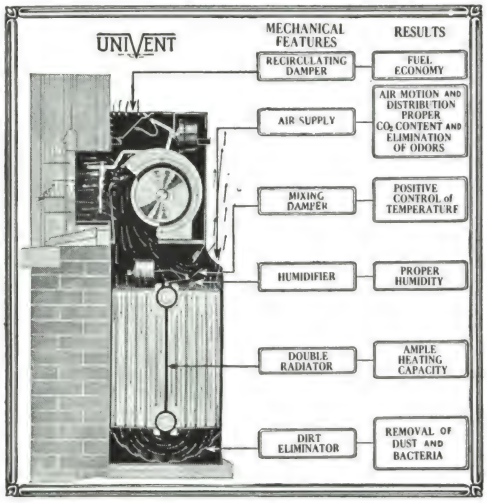
The Univent suspension plate is independently supported on a heavy Univent radiator upon specially constructed chairs and not supported by the cabinet. This is one of the important inventions applying to Univent construction and the result is noiseless operation.

Radiator

The Univent double radiator is a distinct Univent feature. The incoming air is blown down through the tempering half of the radiator, over the dirt eliminator, and up through the reheating half of the radiator. This practically doubles the length of air travel over heated surface, adding greatly to the heating capacity of the Univent.

Dust Eliminator

The lower compartment of the Univent is regularly fitted with a dust eliminator arranged for catching any particles of dirt that may be carried into the Univent by outside air currents. The air being blown directly through the radiator at a high velocity, passes over the surface of the eliminator, the dirt particles being caught and driven into a "dead" space by centrifugal force.



SECTIONAL VIEW OF THE UNIVENT SYSTEM

Automatic Temperature Control

The heat control of the Univent may be regulated either by hand or automatically. This is occasioned by a simple adjustment of the mixing damper. Where funds are available, automatic temperature control is recommended, although hand control requires little attention by the occupants.

Humidity

The Univent may be fitted with a vapor humidifier. It is connected with the steam supply pipe through which steam is admitted into the Univent radiator and is discharged into the room with the air travel. The humidifier may be furnished for either hand or automatic control.

Sizes

The Univent is manufactured in four different series. From this series may be selected machines for delivering the air in different capacities, ranging from 400 to 1500 cu. ft. of air per minute. The capacities of Univent radiators permit of the installation of Univents in all climates with outside temperatures ranging from 30° above to 30° below zero.

Note: It is advisable for the engineer to submit his preliminary plans to the manufacturers for their recommendations, or write for the special Architect's and Engineer's catalogue, containing complete engineering data and specifications.

THE PHILIP CAREY COMPANY

Manufacturers of Heat Insulation

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES
FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

PIPE COVERINGS and INSULATION.

Also Insulating and Refractory Cements, and Miscellaneous Asbestos Products of all kinds.

For Waterproofing and Dampproofing Materials, see pages 70-71; for Built-up Roofing, see pages 876-879; for Asphalt Shingles, see page 907; for Expansion Joints, see page 495.

Carey PRODUCTS
REG. U.S. PAT. OFF.
TRADE-MARK

Carey 85% Magnesia Covering

Consists of approximately 85% basic hydrated carbonate of magnesia and approximately 15% asbestos fiber. Furnished in sections 3 ft. long, canvas covered, with metal bands, for sizes up to and including 10 in.; for larger sizes, segmental blocks are furnished. It is particularly adapted for use on high pressure and superheated steam pipes.

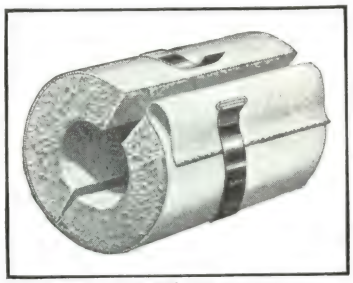
EFFICIENCY OF CAREY 85% MAGNESIA

Thickness	10 lbs.	120 lbs.	200 lbs.
1"	83.1%	86.2%	87.1%
2	88.1%	90.4%	91.1%
3"	90.7%	92.5%	93.1%

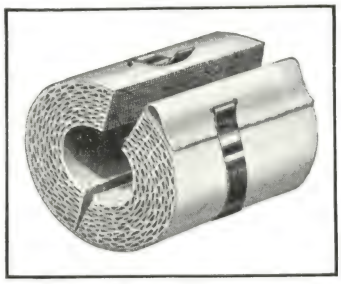
Standard size of blocks, 6x36 in.; thickness, ⅞ in. to 4 in., inclusive

Carey Impervo Covering

Composed of alternate layers of high grade porous wool felt and waterproof paraffin paper and has an inner lining of paraffin paper. Furnished in standard sections 36 in. long, finished with canvas jacket and bands for applying for all pipe sizes. Specifically designed for use on cold water and ice water lines to prevent sweating and to maintain the low temperature of the liquid. It should always be applied in double layers to break all seams and joints to prevent air reaching the pipe. The wool felt provides insulation and the paraffin paper prevents moisture or air penetration.



CAREY 85% MAGNESIA



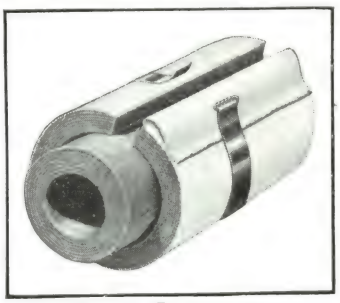
CAREY CAROCEL

MONETARY LOSSES RESULTING FROM HORIZONTAL BARE STEAM PIPE

Published by the courtesy of the Magnesia Association of America

Gauge pressure	Hot water	10 lbs.	80 lbs.	120 lbs.	160 lbs.	200 lbs.
Temperature	180° Fahr.	239.4° Fahr.	324.0° Fahr.	350.0° Fahr.	370.7° Fahr.	387.9° Fahr.
Pipe size	Loss per month, 24-hour day operation, per 100 lin. ft.					
1"	$1.94	$3.37	$5.95	$6.88	$7.68	$8.36
2"	3.09	5.40	9.63	11.15	12.48	13.65
3"	4.31	7.56	13.55	15.68	22.55	19.20
4"	5.40	9.48	17.95	19.70	22.08	24.15
6"	7.73	13.54	24.25	28.23	31.70	34.65
8"	9.90	17.38	31.40	36.28	40.73	44.55
10"	12.23	21.35	38.58	44.88	50.28	55.10
12"	14.41	25.43	45.50	53.00	59.48	65.05
14"	15.75	27.65	49.75	57.95	65.50	71.23
16"	17.95	31.55	56.73	66.03	74.20	81.18

NOTE—In these tables, coal has been figured at $4.00 per ton of 2000 lbs.; 13,000 B.t.u. per lb. of coal; labor, boiler room expense, etc., taken at $1.00 per ton, making total value of coal fired at $5.00 per ton. Boiler efficiency taken at 70%. Air temperature 70° Fahr. Experimental data obtained at the Mellon Institute and applied to Peclet's formulae.



CAREY IMPERVO

CAREY PROTECTO

Carey Carocel Covering

Consists of alternate layers of fine corrugated and flat sheets of asbestos paper. Furnished in standard 36-in. long sections, canvas jacketed with bands for applying for all pipe sizes. Specifically designed to give maximum insulating value on low and medium temperature steam pipes. Better adapted than any other type of covering for temperatures ranging from hot water up to 35 lbs. steam pressure.

The long flat corrugations provide a minimum number of points of contact between layers for heat transfer and maximum surface resistance to internal connection currents.

EFFICIENCY OF CAREY CAROCEL

Thickness	180° Fahr.	10 lbs.	80 lbs.
1"	82.5%	83.7%	85.0%
1½"	86.4%	87.1%	88.2%
2"	88.8%	89.6%	90.4%

Sheets or blocks furnished 6 in., 12 in. or 36 in. long and in any thickness

Carey Protecto Covering

Consists of an inner layer of hair felt and an outer layer of wool felt.

Furnished in sections 36 in. long, finished with canvas jacket with bands for applying for all pipe sizes. The insulating properties of these materials are well known and Protecto furnishes a combination resulting in high insulating value and neat appearance which is so often lacking when hair felt only is used.

Specifically designed to protect cold water and compressed air pipes from freezing.

Specifications for Insulating Power Plants

Boilers—Cover all exposed boiler tops, combustion chambers and drums with Carey 85% Magnesia Blocks 2 in. thick, firmly wired on and finished with a ½-in. coat of Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

On connections from boiler to smokestack, apply V-rib

Continued on next page

expanded metal lath to provide an air space of approximately ¾ in. Then apply Carey 85% Magnesia Blocks, 2 in. thick firmly laced in place and covered with hexagonal wire mesh, stretched tight and finished with a ½-in. coat of Carey No. 100 Hard Finish Asbestos Cement.

Apply a thin coating of Carey B. T. U. Cement over entire exposed brick boiler wall surface. Use from 45 to 50 lbs. of cement per 100 sq. ft. of surface. Then apply a 2-in. coat of Carey 85% Magnesia Cement reinforced with wire mesh fastened to brickwork and finish with a coat of Carey No. 100 Hard Finish Asbestos Cement.

High Pressure Steam Piping—Cover all high pressure saturated steam pipes 4 in. in diameter and larger with double standard thick 85% Magnesia Pipe Covering. Cover all high pressure steam pipes under 4 in. in diameter and all high pressure drip pipes with 2-in. Carey 85% Magnesia Pipe Covering.

For superheated steam pipes 4 in. in diameter and larger, use double 1½-in. Carey 85% Magnesia Pipe Covering; on pipes smaller than 4 in., use double standard thick 85% Magnesia Pipe Covering.

Exhaust Steam Piping—Cover all exhaust pipes and mains within buildings with 1 layer of 1½-in. Carocel Asbestos Sectional Pipe Covering.

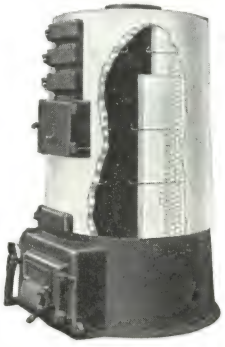
Feed Water Piping—Cover all feed water pipes with 1 layer of 1-in. Carocel Asbestos Sectional Pipe Covering.

Fittings—Cover all high pressure and exhaust steam fittings, valves and flanges with Carey 85% Magnesia Blocks and 85% Magnesia Cement, or all 85% Magnesia Cement, to a thickness corresponding to covering on adjacent pipe. Trowel smooth and finish with canvas jacket pasted on.

Finish—Over all pipe covering, apply a 16-lb. asbestos paper and an extra 8-oz. canvas jacket, tightly stretched and sewed on, approximately 3 stitches to the inch. All canvas surfaces are to be sized and finished with 2 coats of lead and oil paint of color to be selected by architect.

Heaters, Receivers, Tanks, Traps, etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of 1½ in., or with 1-in. Carocel Blocks and ½-in. Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2-in. hexagonal wire mesh, stretched tight, and apply Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

Finish with canvas jacket smoothly pasted on. Canvas jacket shall be of same weight as used on 85% Magnesia Pipe Coverings.



Method of Insulating Boilers, Heaters, Tanks, etc.

Specifications for Insulating Heating Systems

Boilers, Heaters, etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of 1½ in., or with 1-in. thick Carocel Blocks and ½ in. thickness of Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2-in. hexagonal wire mesh, stretched tight, and finish with Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

Heating Pipes—Cover all mains, risers and returns (except horizontal radiator connections) with 1 in. thick Carocel Asbestos Sectional Pipe Covering.

Fittings—Cover all fittings and valves (except radiator valves) with asbestos cement approximately 1 in. thick, troweled smooth, and finish with canvas jacket smoothly pasted on. The canvas shall be the same weight as that used on the pipe covering.

Finish—All exposed canvas jackets shall be sized and painted with 2 coats of lead and oil paint of color selected by the architect. Pipe covering bands shall be applied on 18-in. centers.

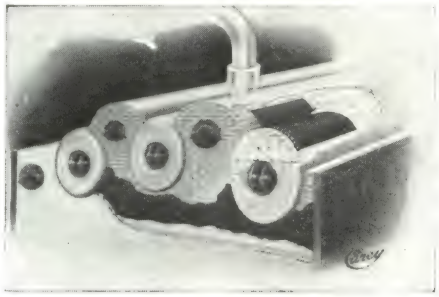
Specifications for Insulating Plumbing Systems

Hot Water Piping—Cover all hot water mains and piping with Carocel Asbestos Sectional Pipe Covering 1 in. thick.

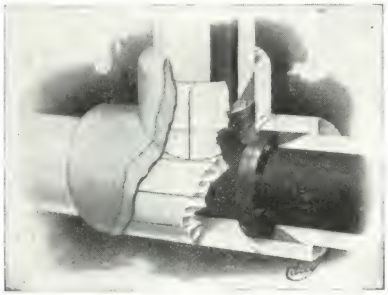
Cold Water Piping—Cover all cold water pipes within buildings, whether exposed or concealed, with Impervo Pipe Covering, in 2 layers, applied by the broken joint method, each layer being ½ in. thick. Cover all cold water pipes in entrances, areaways, unheated rooms or otherwise exposed to freezing, with Protecto Pipe Covering 1 in. thick.

Ice Water Piping—Cover all ice water pipes, whether exposed or concealed, with Impervo Pipe Covering, in 2 layers, applied by the broken joint method, each layer being ¾ in. thick.

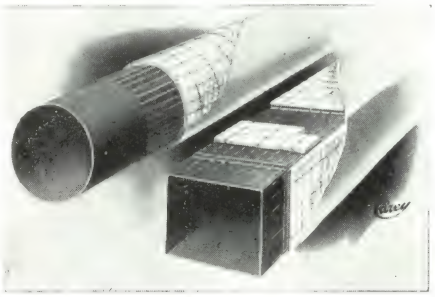
Finish—Same as for heating system.



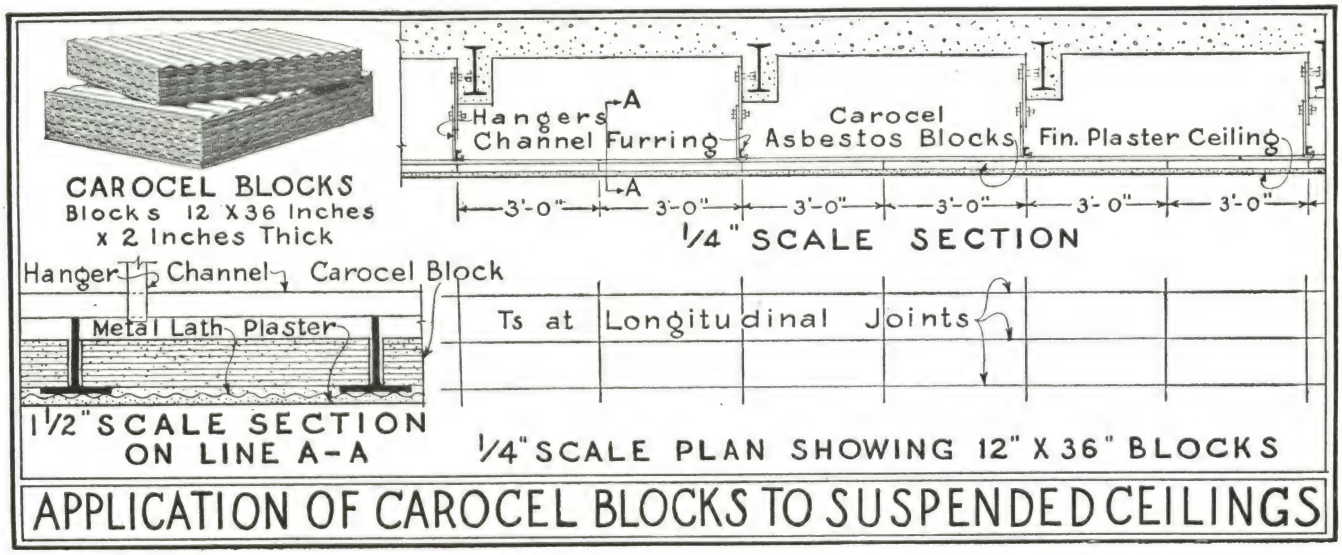
Method of Insulating Boiler Tops, Ends and Walls



Method of Insulating Fittings, Flanges, etc.



Methods of Insulating Boiler Breechings



CELITE PRODUCTS COMPANY

Producers of Insulating Materials

53 West Jackson Boulevard
CHICAGO, ILL.

SALES OFFICES

NEW YORK, N. Y., 11 Broadway
BOSTON, MASS., 79 Milk Street
CINCINNATI, OHIO, Union Central Building
DENVER, COLO., Symes Building
LOS ANGELES, CAL., VanNuys Building
PHILADELPHIA, PA., Bulletin Building
SAN FRANCISCO, CAL., Monadnock Building
BUFFALO, N. Y., Mutual Life Building
CLEVELAND, OHIO, Bulkley Building
DETROIT, MICH., Book Building
ST. LOUIS, MO., Railway Exchange Building
NEW ORLEANS, LA., Whitney Central Bank Building

Products

SIL-O-CEL INSULATING BRICK, BLOCK, POWDER AND CEMENT for heated equipment, for cold storage insulation and also for sound deadening and fireproofing in building construction.

TRADE-MARK

General Description

Sil-O-Cel insulation is a light weight indestructible mineral composed of an innumerable quantity of microscopic air cells and possesses remarkable insulating qualities. As a heat insulation, it is used as a backing to the refractory lining and prevents at least 60% of the heat radiation lost through uninsulated walls. It is unaffected by temperatures which completely destroy other kinds of insulation and can be furnished in forms which withstand direct heat as high as 2200° Fahr.

The minute, porous, cellular structure of Sil-O-Cel makes its use exceptionally advantageous in cold storage insulation. The passage of cold air is almost completely retarded and the installation of Sil-O-Cel has greatly facilitated the maintenance of uniform temperatures. Sil-O-Cel is an effective sound deadener and is more resistant to heat than asbestos. Fire can not penetrate it or even noticeably heat it.

BOILER SIDEWALL INSULATED WITH SIL-O-CEL INSULATING BRICK

Boiler Insulation

Great quantities of fuel consumed in uninsulated heated equipment are wasted by the passage of heat through walls and settings. Sil-O-Cel Insulation prevents most of this heat loss and results in fuel savings which generally pay for the slight additional cost of insulation in less than a year.

Tests prove that with an internal temperature of 2000° Fahr. and a room temperature of 100° Fahr., the exterior of an uninsulated wall showed a temperature of 400°, whereas the temperature of the exterior of a Sil-O-Cel insulated wall was only 210°.

This difference of 190° corresponds to a saving through Sil-O-Cel insulation of 31.7 lbs. of coal, 2.6 gals. of oil, or 634 cu. ft. of natural gas for each thousand square feet of radiating surface per hour.

Building Insulation

The interior of a properly insulated house or building is far less affected by daily and seasonal weather changes than the interior of one not so protected. Insulation prevents the sun's rays from penetrating roofs and walls, keeping a cool, refreshing interior in summer. In winter, insulation prevents the heat of the house from escaping through walls, roof and ground floor, keeping the interior warm and cozy with minimum fuel consumption. An ordinary uninsulated house varies 20° in temperature during the day, while with Sil-O-Cel building insulation the variation is less than 5° under the same conditions.

The use of Sil-O-Cel insulation requires no change in plans, but can be simply and easily applied to any standard construction.

Engineering Service

An engineering department is maintained for the purpose of providing additional data upon any specific insulating problem, and the services of our technical staff are available at all times without cost or obligation. Samples, blue prints, and specifications supplied on request. Address the nearest office given above.

GRINNELL COMPANY, INC.

Heating, Industrial and Power Plant Piping

EXECUTIVE OFFICES

PROVIDENCE, R. I.

For Branch Offices, see page 1544

Products and Services

Complete CONSTRUCTION SERVICE on POWER PLANT, HEATING and INDUSTRIAL PIPING, including Estimates and Materials, Installation, the Personal Supervision of all work, and where engineering talent is not otherwise retained, Complete Engineering Service.

CONSTANT LEVEL SIZE CIRCULATING SYSTEMS; HUMIDIFYING SYSTEMS; TRAY TYPE DRYERS; TEXTILE DRYING MACHINERY.

Also, Spray Cooling Systems; Compressed Air Cleaning Systems; Piping for Acids, Alkalis and other special materials; Fittings, Valves, etc.; Pipe Bending and Fabricating; Threading and Welding.

For Automatic Sprinkler Systems, see page 1544.

Evils of Poorly Designed Piping

Present high costs of coal and other supplies necessary to the operation of all kinds of power and heating plants, and the present scale of wages, make efficient and economical performance absolutely necessary. Plant owners must positively stop costly waste, hitherto regarded as unavoidable, and see to it that every unit is producing its maximum capacity at minimum cost.

High grade machinery, if served by poorly designed and indifferently installed piping, does not produce the expected results. This condition is frequently brought about either by too small a pipe line, producing a great drop in pressure at the discharge end, lines with too many short turns, headers and other steam lines so large that the low velocity of flow induces excessive condensation and heat loss, or too many parallel lines serving the same or similar purposes.

Lack of Flexibility—Too frequently an otherwise good arrangement is spoiled by insufficient flexibility, resulting in overstrained joints due to expansion and contraction. This condition inevitably means great expense for maintaining pipe joints and keeping the line in good repair, and imposes a great injustice on the operative who must spend his Sundays or leisure hours doing a job which proper design would have rendered unnecessary.

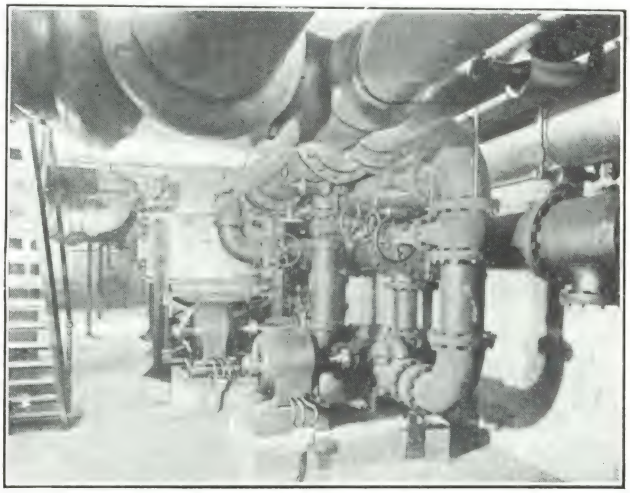
Poor Drainage—Considerable annoyance and expense is caused by piping which becomes pocketed, due to poorly selected hangers or indifferent workmanship, preventing proper drainage. Where low points in steam or exhaust piping systems are necessary, great care should be taken to provide proper means of automatically draining these points without depending on draining by hand.

Insulation—The question of the advisability of the use of insulation as a means of preventing heat loss is necessarily one to be determined by the engineers designing the piping. Great waste may be avoided by the installation of the proper type of insulating materials, applied to lines where the heat loss can not be used to good advantage for heating purposes. Too often pipe lines and other hot surfaces are not properly insulated. In many cases, however, insulation is used to correct faulty design of pipe size, whereas, if proper circulation could have been maintained by properly equalizing the pipe sizes, the bare surface of the pipe could be used as a very efficient heating surface in place of an equal or greater amount of radiation.

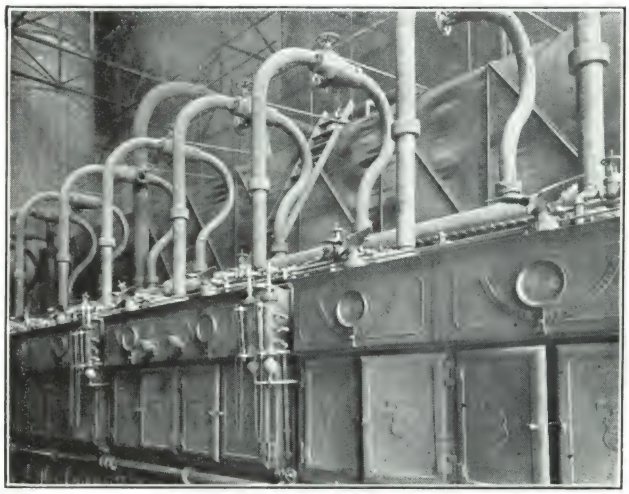
Improvements Effected by Grinnell Piping System

Correct Pipe Sizes—The size of pipe to be used is determined by weighing carefully the two prime factors of *first cost* and *frictional resistance*. There is obviously a correct size of pipe to be used in the case of every pipe line, and this size will be the economical size, both from the standpoint of first cost and the standpoint of frictional resistance caused. The frictional resistance means the power consumed in the transmission of the liquid or vapor.

Where proper engineering talent is retained these factors, of course, receive proper attention. In many cases, however, piping is installed without proper engineering supervision, with resultant waste and high maintenance cost. Where necessary, Grinnell is glad to supply an engineering service based on 70 years of practical experience. To architects and consulting engineers we offer a construction service that insures proper carrying out of their plans.



WELDED HEATING MAINS AND BRANCH TEES
Experienced Grinnell men welded these lines on the job



PIPE BENDS FROM BOILERS TO MAIN STEAM HEADER AND BEND FROM HEADER TO ONE PRIME MOVER
Illustrative of Grinnell pipe bending service

Continued on next page

Long Radius Bends—Short turn screwed fittings and ordinary globe cut-out valves, used in important pipe lines in many plants, cause great loss of pressure due to the sharp turns which result. Globe valves for cut-out purposes should be displaced by straightway gate valves and long radius bends used in place of short turn elbows. These bends offer no more resistance to the flow than an equal length of straight pipe, and the distance is actually less than when straight pipe is used with elbows. Long radius bends are almost invariably employed in Grinnell piping systems where it is necessary to provide for expansion and contraction of piping. They are also used in lines where resistance is a prime factor to cut down the friction caused by ordinary fittings.

Automatic Non-return Valves—These should be used in the steam branches from boilers to the header in every installation of two or more boilers. This type offers a greater protection to the boiler and to the employee than any other form of valve.

Elimination of Overloads—Many overloaded reciprocating engines are now "wire drawing" and straining at their tasks because of long, small pipe lines. They could easily carry the load if large receiver type separators were placed on the throttles. This permits the receiver to become filled with steam at *boiler pressure* while the engine admission valve is closed, and provides a great volume of full pressure steam ready to enter the cylinder the instant the valve opens.

Utilization of Waste Hot Water—Incalculable loss is incurred every day by permitting hot water waste from heating systems, slashers, drying machines, dry kilns and other steam consuming machines. Both the water and the valuable heat it contains should be recovered and returned directly to the boiler.

Savings Under Grinnell Systems

The installation of modern piping systems and appliances produces an immediate saving in coal consumption. In many cases such savings have paid the entire cost of the improvements in a few years.

In connection with modernizing old systems we are always glad to make a survey and estimate the cost of such changes as may be required.

Flexibility and Simplicity of Grinnell Systems

The necessity for flexibility in power piping design can not be too strongly emphasized. The piping systems must be laid out, and the valves so arranged that the operating engineer can, at will, cut out one or more boilers, engines, or other steam-using machines, for repairs or renewals, replacing them with standby machines which, unless the piping system is properly planned, may be found useless in time of need.

While it is desirable that an adequate number of valves, etc., be provided, it is equally necessary that they be kept down to the least number commensurate with efficiency and safety. Long circuitous lines should be made as direct as practicable and proper expansion bends provided on rigid lines to allow for the absorption of expansion and contraction.

Simplicity in piping design is of the utmost importance in order to keep first cost within reasonable limits, to insure economical operation and reduce upkeep.

Grinnell Heating Systems

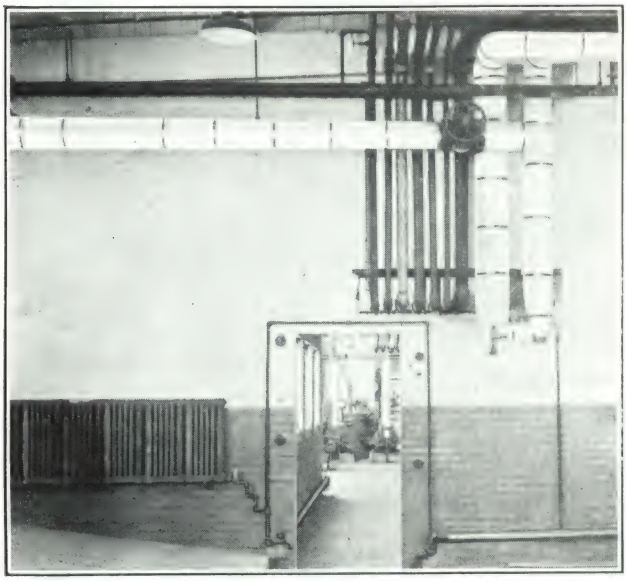
Many complaints of inefficient heating arise from improperly designed or unsuitable heating systems. The whole subject of economical heating should be approached from a purely scientific standpoint, covering not only the cubic contents of the building but also its structural details and the suitability of one or another heating system to the particular building under consideration.

It is by careful pre-consideration of all these elements that Grinnell heating engineers are able to install a system that not only produces the required degrees of heat but does so on a minimum coal consumption.

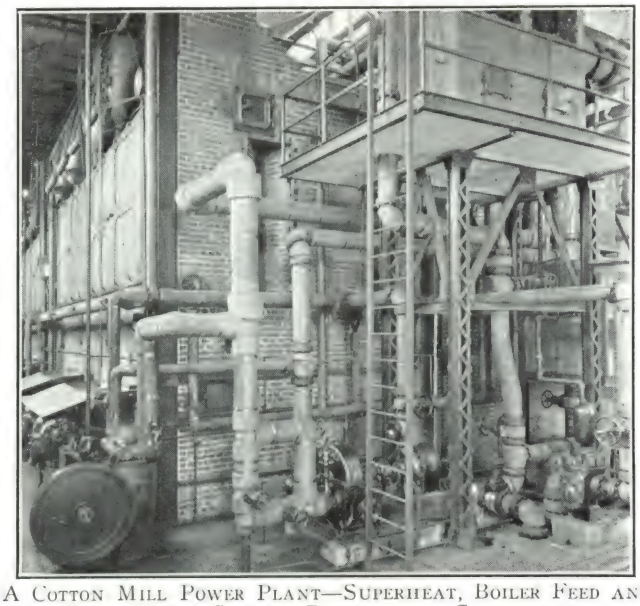
For many mills and other industrial plants the Grinnell system of semiautomatic temperature control will provide ample heat, graduated to meet internal conditions and, regardless of outdoor temperatures, at a far lower cost per unit than any other system.

Remodeling Old Heating Plants

Heating plants often give unsatisfactory results due to radiation additions without proper increase in the capacity of the piping. Natural deterioration of the system also causes low efficiency. We are in an excellent position to remodel such plants and put them in perfect working condition.



NOTE NINE DIFFERENT PIPING SYSTEMS, HEATING COILS AND AUTOMATIC SPRINKLERS
A part of the piping installed in this automobile tire factory by Grinnell



A COTTON MILL POWER PLANT—SUPERHEAT, BOILER FEED AND FEED WATER CONTROL PIPING, ALSO CONNECTIONS TO HEATER AND AUXILIARIES
Installed by Grinnell

Continued on next page

When factory buildings are increased in length a change in the method of heating is often made necessary. A careful study and analysis of every such case will be made by an expert heating engineer. Old systems, apparently obsolete and practically worthless, may be brought up to a state of high efficiency under such skilled remodeling, thereby saving many thousands of dollars.

The highly trained corps of specialized piping engineers maintained by GRINNELL COMPANY, INC., and its experienced construction department, insure proper design as well as satisfactory installation and operation. Capable and ready co-operation from these experts will be given in the development of the plant along the lines indicated above.

Steam Power Plants

GRINNELL COMPANY, INC., is prepared to handle all installation work and to co-operate fully on any engineering problem incident to complete piping systems for power plants serving textile mills, electric lighting plants, electric power plants, water works, steel rolling mills, blast furnaces, copper mines, saw mills, oil mills, pulp and paper mills, tanneries, bleacheries, dyeing plants, water filter plants, phosphate mines, fertilizer factories, or any others of similar nature.

We are prepared to furnish or fabricate in our shops all equipment and material required, erecting same in the most approved manner.

Piping for Chemical Plants and Other Special Purposes

Not only is GRINNELL COMPANY, INC., skilled in installing efficient steam or water lines for ordinary purposes, but we install all piping required in processing plants, or plants which involve the use or treatment of acids and alkalis.

We furnish pipe made of steel, cast iron, genuine wrought iron, and spiral riveted pipe, black or galvanized. We also furnish brass, copper, and aluminum pipe; pipe that is lined with various metals or alloys; and specially treated acid resisting pipes, with suitable valves and fittings for all the above classes of materials.

Gaskets, packings and specially designed joints will be provided as each specific condition requires.

Acting under the direction of the architect, consulting engineer, chemical engineer, or some qualified attache of the plant, GRINNELL COMPANY, INC., will cheerfully submit proposals for piping equipment for pulp and paper mills, sugar refineries, soap factories, fertilizer works, bleacheries, dyeing plants, phosphate works, cement mills, gas plants, oil refineries, cotton oil mills, etc.

Constant Level Circulating Size System for Textile Plants

This system while simple in design and operation is a great money saver in the slasher room. By keeping a constant level of prime size uniformly circulating it saves starch, gives uniform sizing, reduces the number of "seconds," allows the slasher tender to watch his yarn instead of bothering with size. A special booklet will be sent on request.

We are prepared to furnish and install complete outfits of design and material best suited to individual needs and conditions.

Grinnell Dryers

Tray Type Dryers—Grinnell tray type dryers establish a new measure of perfection in drying results, a new basis of economy in operating costs, a new standard of value in structural materials and workmanship.

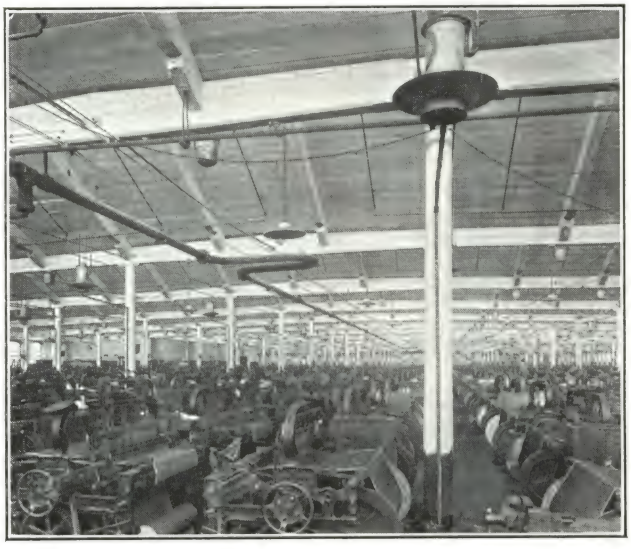
These new dryers are offered to the trade only after years of laboratory and field experience and satisfactory performance is absolutely guaranteed.

They dry uniformly over every inch of every tray and without disturbing even the finest product. These results are accomplished with the utmost economy. Air once heated is not wasted but is re-circulated through the cabinet until the saturation point is approached more nearly than is possible with any other dryer.

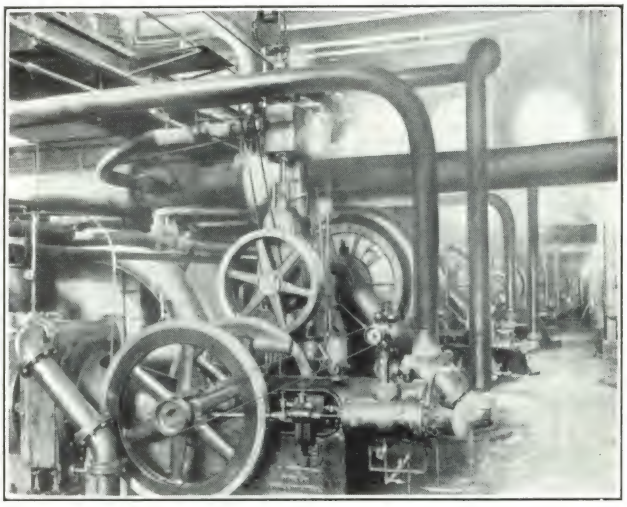
Textile Drying Machinery—In addition to its tray type dryers, Grinnell also manufactures a complete line of textile drying machinery, and through its engineering force is prepared to advise on any drying problem. The chief feature of our textile drying machinery is its more rugged construction and its double insulation.

Humidifying Systems

Through our affiliations with American Moistening Company, we are in a position to design and install complete humidifying systems, using devices long standard in this work. An especially reliable and sensitive control is a feature of all American Moistening Company equipments, which include sectional, fan type, high duty, and ventilating humidifiers; atomizer or compressed air systems; air conditioning room equipment, etc.



COMPLETE PIPING SERVICE BY GRINNELL IN WORLD'S LARGEST WEAVE ROOM—HEATING SYSTEM, AUTOMATIC SPRINKLERS, HUMIDIFIERS



STEAM SUPPLY AND EXHAUST PIPING FOR 10,000 KW. TURBINE AND AUXILIARIES IN A MUNICIPAL POWER STATION
A representative Grinnell power piping job

AMERICAN BLOWER COMPANY

DETROIT, MICH.

TROY, N. Y. CINCINNATI, OHIO

BRANCHES

ATLANTA, GA.	CINCINNATI, OHIO	GRAND RAPIDS, MICH.	NEW YORK, N. Y.	ST. LOUIS, MO.
BOSTON, MASS.	CLEVELAND, OHIO	INDIANAPOLIS, IND.	OMAHA, NEBR.	SAN FRANCISCO, CAL.
CHARLOTTE, N. C.	DALLAS, TEX.	KANSAS CITY, MO.	PHILADELPHIA, PA.	SALT LAKE CITY, UTAH
CHICAGO, ILL.	COLUMBUS, OHIO	PITTSBURGH, PA.	SEATTLE, WASH.	

Products

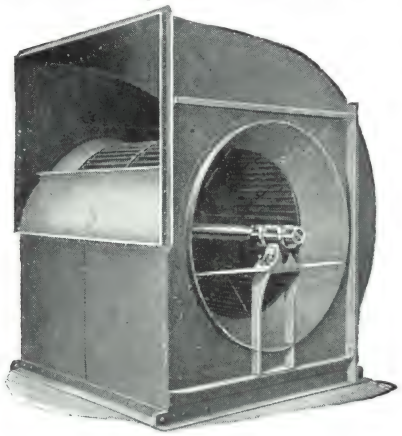
HEATING, VENTILATING and AIR CONDITIONING EQUIPMENT.

General

The following gives only a general idea of the line of heating, ventilating and air conditioning equipment bearing the "Sirocco" trade mark. Detailed bulletins on all such equipment or any special catalogue will be gladly sent to those interested.

"Sirocco" Fans

Made in various types to meet the varying requirements of a great number of classes of installations in heating, ventilating, air conditioning, mechanical draft, drying, mining and exhaust systems for handling shavings, chips and other materials.



"SIROCCO" FAN

"Sirocco" fans are the standard wherever ventilating fans are used. Their chief distinguishing feature lies in the design of the blast wheel, to which is due in a large measure the efficiency, durability and large capacity of these fans. It is a combination of mechanical refinements of design and details by which the "Sirocco" fan produces such high volumetric and mechanical efficiencies.

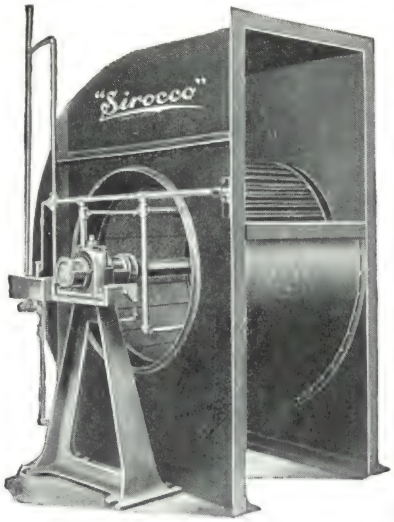
"Ventura" Fans

Equipped with either motor or pulley drive, for use as wall ventilators for exhausting fumes from metal pickling vats and paint fog from paint spray booths; ventilating basements, toilets, kitchens, offices, etc. Where rooms are very large, 4 or more "Ventura" Fans insure proper circulation of air. Fans can be installed in any convenient location, require very little space and their slight operating costs make them very economical.

"VENTURA" FAN

"ABC" Air Washing and Cooling Fan

A simple and efficient mechanical means of washing, humidifying and delivering a large volume of air at a low initial and operating cost, requiring a minimum of attention and floor space. It washes and purifies the air by removing solid particles, dust with its attendant bacteria, and similar impurities. Humidifies the air by evaporation of spray water continuously diffused through it. Cools the air because the evaporation withdraws heat. Combines a fan and washer in one unit, doing the work of both at practically the cost of operation of the fan alone.

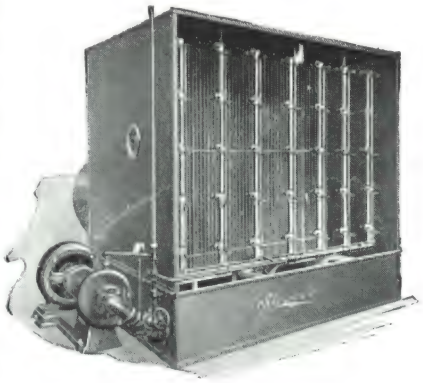


"ABC" AIR WASHING AND COOLING FAN

The "Sirocco" Air Washer

Used in public buildings, offices, manufacturing plants, or wherever necessary for conditioning the air for improved working conditions or better handling of goods. The "Sirocco" air washer incorporates all of the necessary qualifications for not only thoroughly cleansing the air of all foreign material but freeing it as well from obnoxious odors and bacteria. These qualifications are: mist spray from nozzles; large spray chamber that brings the air in contact with a bank of mist for a comparatively long period; wet, or scrubbing surfaces; sufficient eliminator surface for removal of entrainment.

Air conditioning systems are usually more or less permanent installations and as such should have lasting qualities. The air purifier unit in the system being most subjected to deteriorating influence, it is essential that special attention be given to its construction. The "Sirocco" design embodies all these features with a permanence and high grade of material so essential to the proper working of the purifier.



"SIROCCO" AIR WASHER

BUFFALO FORGE CO.

Heating, Ventilating, Drying, Exhausting and Mechanical Draft Equipment

BUFFALO, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 39 Cortlandt Street
CHICAGO, ILL., 562 W. Washington Boulevard
PHILADELPHIA, PA., 1303 Land Title Building
PITTSBURGH, PA., 917 Union Arcade
LOS ANGELES, CAL., 636 H. W. Hellman Building
ST. LOUIS, MO., 515 Chemical Building
BOSTON, MASS., 88 Broad Street
CLEVELAND, OHIO, 368 Kirby Building
MINNEAPOLIS, MINN., 840-846 Builders' Exchange
DENVER, COLO., Stearns-Roger Mfg. Co., 1718 California Street
PORTLAND, ORE., Power Equipment Co., Lewis Building
INDIANAPOLIS, IND., W. C. Fletcher, 617 Fletcher Savings & Trust Building
WASHINGTON, D. C., 9th and F Streets, N. W.
SAN FRANCISCO, CAL., 766 Folsom Street
CINCINNATI, OHIO, 607 Mercantile Library Building
DETROIT, MICH., Coon DeVisser Co., 1772 W. Lafayette Boulevard

COMPLETE LINE MANUFACTURED IN CANADA BY

CANADIAN BLOWER & FORGE CO., KITCHENER, ONT.

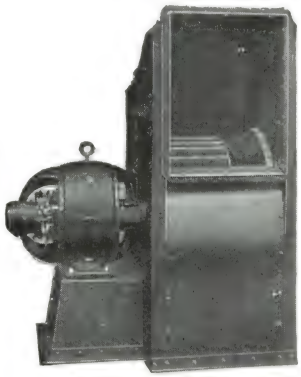
TORONTO, ONT., 1204 Bank of Hamilton Building
MONTREAL, QUE., 702 Southam Building

Products

Heating and Ventilating Equipment, including Centrifugal Fans, Heaters (pipe coil and cast iron), Exhaust Fans, Disc Fans; Exhaust Systems including Exhaust Fans, Blowers, Dust Collectors; Carrier Air Washers.

Also manufacturers of Forced Draft Fans, Drying Equipment for all materials, etc.

Buffalo Heating and Ventilating Equipment



Buffalo Duplex Conoidal Fan

Buffalo Duplex Conoidal Fans—A new multiblade fan added to the well-known Conoidal group. The wheel is of the backward curved type and its design combines the best characteristics of both the forward and backward curved blades. Speeds are enough higher than the forward curved wheels to effect a substantial saving in motor cost although well under the reasonable limits of absolute quiet operation of the most particular ventilating system.

It has a high operating efficiency over a wide range of capacity. Its constantly rising pressure characteristic insures even and steady air delivery and non-overloading of motors with change in duct resistance due to opening or closing of dampers.

Engineers will find this fan the best adapted for ventilation of hospitals, schools, banks, hotels, theaters, office buildings, public halls and other classes of work where quiet operation, high efficiency and reasonable cost of direct connected units are essentials.

Niagara Conoidal Fans—A multiblade fan which has no equal for high efficiency at high overloads and high outlet velocities. This characteristic is exceedingly desirable in industrial ventilating applications where large quantities of air are required to be removed and when high air velocities are permissible.

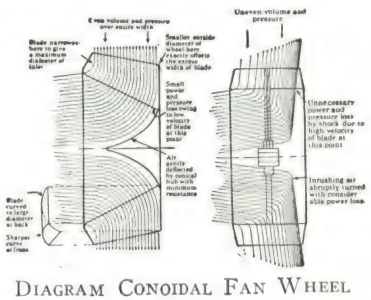


Diagram Conoidal Fan Wheel

It is essentially a low speed fan. The efficiency is good throughout the entire range. It is very quiet, handling the air with minimum shock, and is favored by many engineers who require low speed belted units for a noiseless installation.

A characteristic of all Conoidal fans is the careful design of blades and hubs so that the air has a smooth easy flow from inlet to outlet without abrupt change. The blade width is so proportioned that there is an even distribution of air over the entire surface of the blade.

Carrier Air Washers—Highly developed water spray machines for washing and humidifying air for ventilation, elimination of dust in manufacturing processes, removal of fumes and odors, recovery of valuable dust and vapors, cooling of overheated rooms or buildings and turbo-generator cooling.

Carrier Air Washer

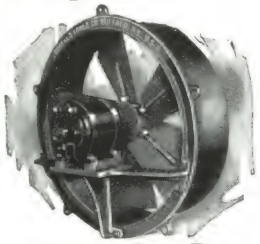
Aside from the ordinary application of air washers to ventilating systems, engineers should investigate the enormous possibilities of such apparatus for the recovery of valuable products, absorption of vapors and other special uses. Our engineers have specialized along these lines. The accumulated knowledge and experience for the solution of such problems are yours for the asking.

Carrier washers are extremely simple in construction; eliminators and scrubbing surfaces are of the one-piece demountable plate design; spray nozzles, absolutely non-clogging; flooding nozzles insure constantly wet surfaces on scrubbing portion of eliminators; suction screen extends entire width of tank under washer. A washer designed by engineers; constructed with the best materials and workmanship.

Baby Conoidal Fan

Baby Conoidal Fans—A small portable outfit that makes an ideal ventilating unit. Exceedingly quiet in operation and designed to furnish a large volume of air at relatively low pressures. Housing is cast iron, adjustable to discharge in any direction and blast wheel is the multiblade high efficiency type.

Buffalo Disc Fans—For all exhausting and ventilating service where no duct work is required. Handle large volumes of air against relatively low resistance. Extremely useful in shops, offices, factories to remove foul air, and in dye houses, bleacheries, paper mills and similar plants for removing steam, moist air, dust and odors. Equipped for belt drive or complete with motor. Can be set in sidewall or made with stand to set on floor.



Buffalo Disc Fan

Catalogues

Complete catalogues on request.

BUCKEYE BLOWER COMPANY

Manufacturers of Ventilating Apparatus

COLUMBUS, OHIO

BRANCH OFFICES

CHICAGO, ILL., 324 Monadnock Block
NEW YORK, N. Y., 1400 Broadway
ATLANTA, GA., 258 Candler Annex
PITTSBURGH, PA., 503 Wabash Building

Products

BUCKEYE
TRADE-MARK

MULTIBLADE FANS; STEEL PLATE FANS; DISC FANS; PLANING MILL EXHAUSTERS; CAST IRON VOLUME BLOWERS.

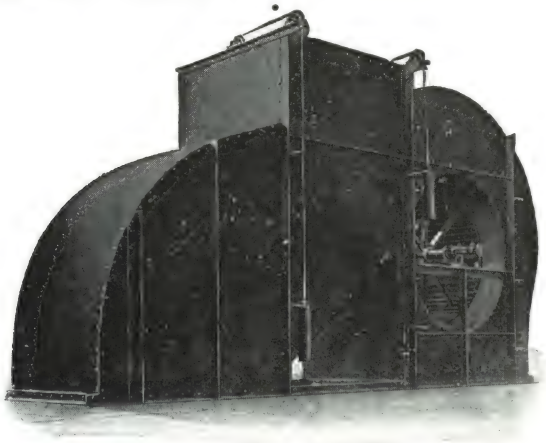
Also manufacturers of Cone Fans, Pipe Coil Heaters, Factory Heaters, Unit Heaters.

Scope of Utility of Buckeye Fans

Due to their peculiar design, Buckeye fans will operate efficiently in almost any situation where mechanical ventilation is required. They are particularly adapted for dry kilns, where hot blast is employed; waste heat installations, such as steam laundries, dye and bleaching works, etc.; mine ventilation; factory and public building ventilation, and for exhaust service in kitchens, boiler rooms, and similar places.

Distinctive Advantages of the Buckeye Multiblade Fan

The large, unrestricted openings in comparison to the size of the wheel, peculiar to this type of fan, permit large volumes of air to be handled with moderate velocities and minimum power consumption.



BUCKEYE REVERSIBLE MULTIBLADE FANS
For mine ventilation use

Buckeye fan wheels are carefully balanced before shipment on a special knife edge balancing apparatus, so that they remain in any desired position when supported on this balance. This insures smooth, quiet running at either high or low speed while delivering maximum volume of air for power consumed.

The correct design, expert construction and high grade of materials used combine to make this fan an efficient ventilating agent.

Buckeye fans are furnished with Hyatt roller bearings or ring oiling, self-aligning babbitted bearings at the option of the purchaser. The oil reservoir is large and each bearing is fitted with a sight level oil cup. For mechanical draft, waste heat installations, or wherever very hot gases are handled, water cooled ring oiling babbitted bearings are furnished.

Fan housings are regularly made of blue annealed steel sheets of the best quality, rigidly braced and stiffened with angle iron. For handling acid fumes, monel metal or other suitable alloys are used in both the housing and fan wheel.

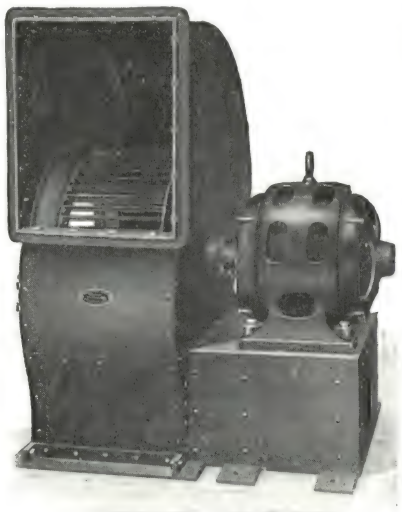
Shafts for very small fans are of cold rolled steel. All other fan wheels are mounted on forged shafts, turned and ground to size.

Blades are pressed to shape in dies insuring uniformity and accuracy in curvature and pitch. They are carefully inspected before assembly and finally assembled in a jig which turns out each wheel as near perfect as modern manufacturing methods can make it. The wheels are then placed on a ball bearing balancing machine for final test and inspection.

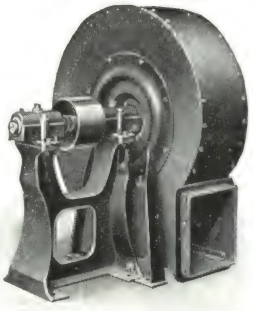
Buckeye multiblade fans are regularly built in size 5 and larger, with overhung pulley. The bearings are rigidly supported on the sides of the fan housing. If desired, these fans can be furnished with bearings independent of the housing and supported upon heavy cast iron floor pedestals.

Size 4 and smaller are built with overhung wheel. The casing and bearings are supported upon a rigid, cast iron pedestal and are so arranged that the casing may be removed from the pedestal and replaced to comply with any hand or discharge.

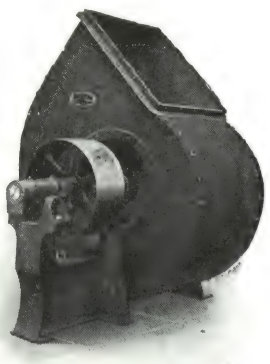
Buckeye fans are usually furnished for belt drive, but can be furnished for rope, chain or gear drive as desired.



MOTOR DRIVEN MULTIBLADE FAN



SLOW SPEED EXHAUSTER



STANDARD PLANING MILL EXHAUSTER

Continued on next page

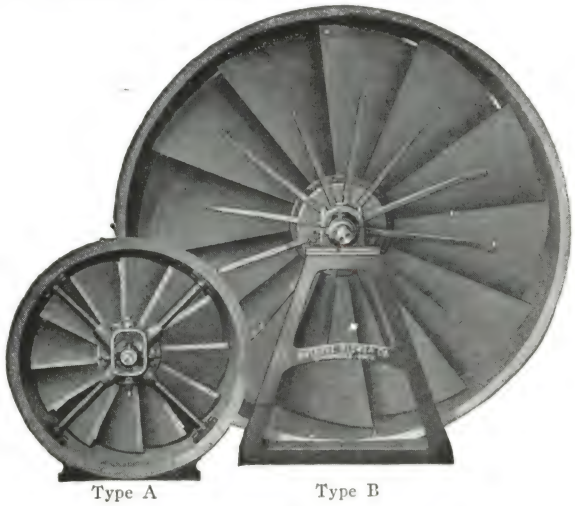
Direct connected Buckeye multiblade fans can be furnished for any available power, and in any required size or type. They can be constructed to fit any special conditions and arranged for either single or double inlet, and single or double discharge, as desired. They can be used for either blowing or exhausting.

Double inlet fans are more efficient than single inlet, and should be used wherever possible.

Write for Bulletin No. 101.

Noteworthy Points of the Buckeye Disc Fan

Designed to successfully overcome a moderate amount of resistance encountered in mine booster service, industrial plants, etc. All sizes of Buckeye disc fans are built with 12 blades, so assembled and secured as to overlap one another. This construction enables the Buckeye fan to maintain a higher pressure than ordinary disc fans, and therefore renders it more suitable for this class of service.

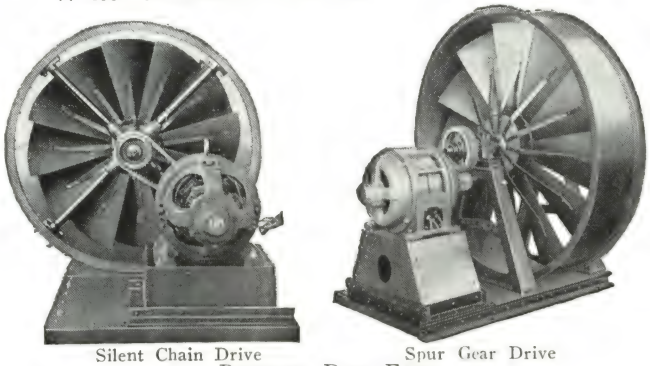


Type A Type B

BUCKEYE DISC FANS

Buckeye disc fans were carefully designed for continuous and efficient service. They are heavy duty fans, substantially built of the highest quality of materials, and are rigidly assembled and finished in a workmanlike manner. They will successfully withstand the severe service to which industrial ventilating fans are subjected.

Write for Bulletin No. 141.



Silent Chain Drive Spur Gear Drive

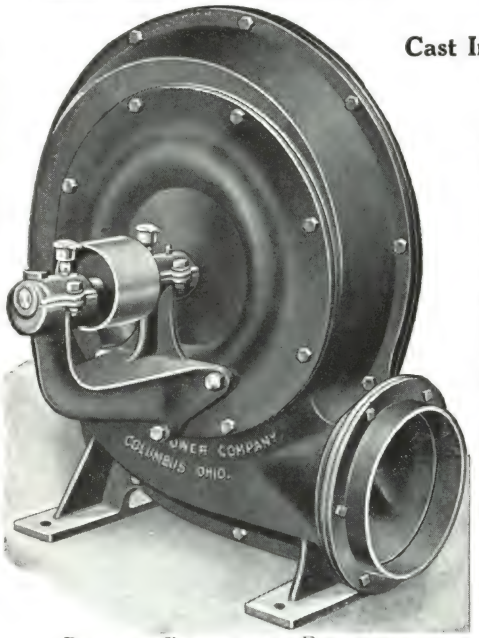
BUCKEYE DISC FANS

CAPACITIES, BUCKEYE DISC FANS

Fan size	¼-in. pressure			⅜-in. pressure			½-in. pressure		
	C.f.m.	R.p.m.	B.h.p.	C.f.m.	R.p.m.	B.h.p.	C.f.m.	R.p.m.	B.h.p.
36	5800	450	.55	7250	560	1.10	8900	680	2.10
42	8250	398	1.05	10000	485	1.87	11620	570	2.87
48	11100	353	1.38	13600	435	2.54	15650	500	3.90
54	14000	310	1.75	17100	380	3.18	19750	440	4.90
60	17300	280	2.14	21200	344	3.92	24400	398	6.05
72	24700	233	3.00	30000	287	5.55	34600	332	8.55
84	33500	200	4.12	41000	245	7.60	47300	274	11.70
96	43800	175	5.40	54600	215	10.10	62000	250	15.30
108	50000	155	6.25	68000	190	12.50	78000	220	19.50
120	67500	140	8.50	84000	170	15.50	97000	200	25.00

CAPACITIES, BUCKEYE DISC FANS—(Continued)

Fan size	⅝-in pressure			¾-in pressure			1-in. pressure		
	C.f.m.	R.p.m.	B.h.p.	C.f.m	R.p.m.	B.h.p.	C.f.m	R.p.m.	B.h.p.
36	98000	730	2.60	11000	790	3.90	12800	910	6.10
42	13000	640	4.00	14610	695	5.45	17000	700	8.25
48	17500	560	5.45	19700	612	7.40	22800	705	11.20
54	22000	492	6.85	24800	535	9.15	28750	620	14.26
60	27200	445	8.45	30500	485	11.40	35000	560	17.00
72	38600	371	12.00	43500	405	16.10	50500	464	25.45
84	52500	318	16.30	59500	342	22.00	69000	400	35.00
96	69000	278	21.50	78000	305	30.00	90000	350	45.00
108	88000	250	27.00	98000	270	38.00	113000	310	55.00
120	107000	225	35.00	120000	250	45.00	140000	280	70.00



Cast Iron Blower and Exhauster

These exhausters are used for removing smoke fumes and vapor; also refuse from woodworking and paper machinery, dust from grinding or cleaning machines, tumbling barrels, etc.; for ventilating toilet rooms.

Write for Bulletin No. 111.

BUCKEYE BLOWER AND EXHAUSTER

CAPACITIES, BUCKEYE BLOWERS AND EXHAUSTERS

Fan size	½ oz.			1 oz.		
	R. p. m.	C. f. m.	B. h. p.	R. p. m.	C. f. m.	B. h. p.
5	1700	110	.02	2400	150	.07
6	1400	260	.06	1975	370	.20
8	900	520	.12	1250	750	.38
10	750	920	.21	1050	1300	.65
Fan size	1½ oz.			2 oz.		
	R. p. m.	C. f. m.	B. h. p.	R. p. m.	C. f. m.	B. h. p.
5	3000	190	.15	3400	220	.25
6	2400	455	.35	2900	535	.60
8	1530	900	.70	1775	1050	1.20
10	1270	1600	1.2	1475	1860	2.05
Fan size	2½ oz.			3 oz.		
	R. p. m.	C. f. m.	B. h. p.	R. p. m.	C. f. m.	B. h. p.
5	3800	240	.30	4200	260	.40
6	3100	590	.75	3400	650	1.00
8	2000	1150	1.50	2200	1300	2.00
10	1650	2050	2.60	1800	2280	3.40
Fan size	4 oz.			6 oz.		
	R. p. m.	C. f. m.	B. h. p.	R. p. m.	C. f. m.	B. h. p.
6	4000	750	1.40	.....	.....	.....
8	2500	1500	2.75	3100	1800	4.60
10	2100	2640	4.80	2600	3250	8.10

For larger capacities, write for quotations.

DIRECT MOTOR DRIVEN FANS WITH FLEXIBLE TUBING

No.	R.p.m.	Motor h.p.	Use not over
8	1200	1	200 ft. of 8-in. tubing
8	1800	3	200 ft. of 8-in. tubing
10	1200	2	300 ft. of 10-in. tubing
10	1800	5	300 ft. of 10-in. tubing

Service and Facilities

The BUCKEYE BLOWER COMPANY maintains an engineering department composed of seasoned engineers, who are prepared to co-operate with client's engineers, superintendents, operators and owners in the solution of difficult ventilation problems as applied to industry. This service includes the submission of special designs and detailed installation plans and is at the free disposal of clients.

CLARAGE FAN COMPANY

KALAMAZOO, MICH.

BRANCH OFFICES AND AGENCIES

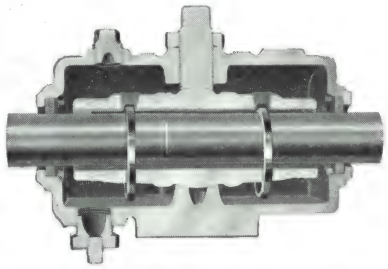
MINNEAPOLIS, MINN., 305 Metropolitan Bank Building
PHILADELPHIA, PA., 627 Commercial Trust Building
INDIANAPOLIS, IND., 305 Merchants Bank Building
CHICAGO, ILL., 111 West Washington Street
LOS ANGELES, CAL., 231 South Hope Street
PITTSBURGH, PA., 206 Wood Street
DETROIT, MICH., 507 Empire Building
CHARLOTTE, N. C., 122 Brevard Court
NEW YORK, N. Y., 149 Broadway
BOSTON, MASS., 164 Federal Street
CLEVELAND, OHIO, 5716 Euclid Avenue
ST. LOUIS, MO., 2211 Olive Street
ROCHESTER, N. Y., 925 Granite Building

Products

HEATING and VENTILATING APPARATUS; MULTIBLADE FANS; AIR WASHERS; EXHAUST FANS and BLOWERS; MECHANICAL DRAFT EQUIPMENT; HEATERS; VERTICAL ENGINES.

Clarage Standard Bearings

Since the only points of contact and points of greatest wear are in the bearings, the prime requisite of a good fan is good bearings. Perhaps, no single factor contributes more toward the recognition, which Clarage fans and blowers have received, than Clarage standard bearings.



SECTIONAL VIEW OF STANDARD BEARING

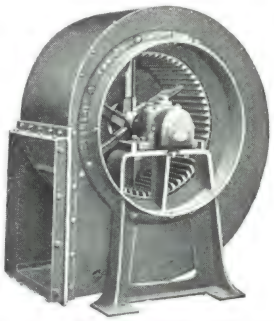
The Clarage bearing is self-aligning in every plane and within large limits. Inner sleeves are lined with high grade babbitt and are lubricated by means of two brass oil rings, which carry a copious supply of oil to bearing surfaces from large reservoir below. An exclusive Clarage feature is the felt washers, which fit snugly around shaft at each end of bearing case. Felt washers keep oil in and dirt out.

Multiblade Fans

Clarage Kalamazoo multiblade fans are guaranteed to be equal to any fans built for heating and ventilating work; or for any installation where large volumes of air or gases are handled at low pressures.

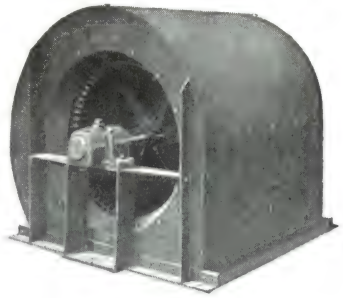
Especially suitable for heating and ventilating schoolhouses, theaters, churches, office buildings and factories. Can be used with equal success for ventilating mines and tunnels. The unusually high efficiency obtained, quietness of operation, small space required and adjustable features of the design are all points in which these fans have been found superior to other types.

For convenience in specifying, fans are numbered according to approximate diameter of wheel in feet: No. 1, 1-ft. wheel; No. 2½, 2½-ft. wheel, etc. Sizes up to and including No. 10. Full-housed fans, up to and including No. 3 size, are built with cast iron side plates, and are adjustable and reversible for hand and discharge. Built ⅞-housed in sizes larger than No. 3. Double width fans have twice the capacity of single width fans of same size.



SINGLE WIDTH MULTIBLADE FAN, RIGHT-HAND BOTTOM HORIZONTAL DISCHARGE, INLET SIDE

Clarage Kalamazoo multiblade fans can be motor, engine or turbine driven, either by belt or direct connected.



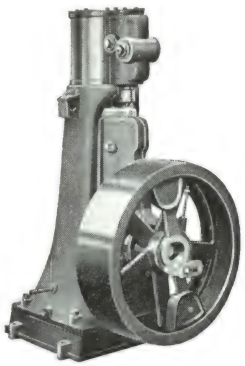
DOUBLE WIDTH MULTIBLADE FAN, ⅞-HOUSED, BOTTOM DISCHARGE

Air Washers

The efficiency of any air washer depends primarily on the quality of the spray. The bronze, center-jet nozzle used in Clarage air washers is simple in design, yet produces a spray entirely different and very superior to that of any other nozzle. With these special nozzles, the air may be handled at maximum velocity of 720 ft. per minute. This velocity, while higher than usual practice, results in a more compact apparatus than could otherwise be possible. Washer is also, of course, furnished to handle air at a velocity of 500 ft. per minute. Built in sizes for 2800 to 103,000 cu. ft. of air per minute.

Vertical Engines

Clarage vertical engines are fully enclosed and self-oiling. They are adaptable for direct connection to fans and blowers, pumps, motor generators, etc. Engines are built in four classes and are capable of developing up to 81 h.p.



AUTOMATIC HIGH PRESSURE ENGINE

Heaters and Accessories

In connection with Clarage fans this company is prepared to furnish pipe coil or cast iron vento heaters, and any accessories necessary or desirable for a complete heating and ventilating system.

Co-operative Service

The Engineering Department of this company has compiled elaborate data covering capacities, etc., concerning every Clarage product. This material will be of value in determining requirements. The department will gladly co-operate with architects in every way possible.

ILG ELECTRIC VENTILATING CO.

Manufacturers of Heating and Ventilating Apparatus

2849 North Crawford Avenue

CHICAGO, ILL.

BRANCHES

NEW YORK, N. Y., 13 Park Row
Telephone, Barclay 8787

CLEVELAND, OHIO, 1314 Schofield Building
Telephone, Main 776

PITTSBURGH, PA., Bessemer Building
Telephone, Smithfield 1213

PHILADELPHIA, PA., 327 Commercial Trust Building
Telephone, Spruce 2099

BOSTON, MASS., Tompkins-Stoddard Co., 136 Federal Street
Telephone, Fort Hill 6454

DETROIT, MICH., 203 Owen Building
Telephone, Cherry 5231

Products

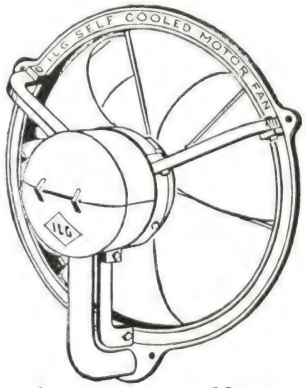
A complete line of Direct Connected Electric Propeller Fans; Exhaust Fans; Heating and Ventilating Fans; Universal Multiblade Blowers and Exhausters direct connected and belted; Volume Blowers; Automatic Louvers and Shutters; Ilgair Unit Heaters.

Also manufacturers of Residence Kitchen Ventilators; Farm Power Ventilators; Power Roof Ventilators; Steel Plate Fans; Ready-to-run Ventilating Sets; Mechanical Draft Apparatus; Fans and Blowers for drying; Humidifiers; Air Washing Systems.

Self-cooled Propeller Fans

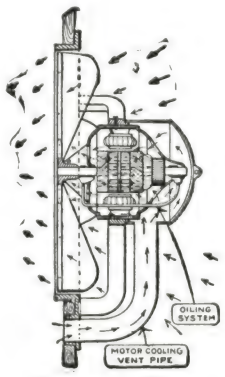
Used for general exhaust ventilating in industrial plants, restaurants, schools, halls, churches, residences, banks, stores, public buildings, theaters, etc. The self-cooled motor feature makes the fan especially effective in handling gases and extreme heat as high as 400° Fahr.

Furnished with direct-connected motor for any current or voltage. Sizes 12 to 72 in. Capacities 1100 to 45,000 cu. ft. per min.



Ilg Self-cooled Motor Propeller Fan

Fully enclosed motor self-cooled by patented cooling feature



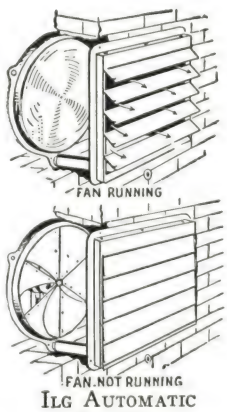
Sectional View

Automatic Shutters

Automatic shutters are used on the outside of propeller fans to protect fan when not running and to keep out wind, rain and cold.

When fan is running, shutter is held open by the force of the air current. When fan is shut off, shutter closes automatically by gravity.

Shutters built of special hard rolled aluminum leaves pressed on Whitney alloy, copper coated rods, supported in cast iron frame. Sizes 12 to 72 in. square.



Ilg Automatic Shutter

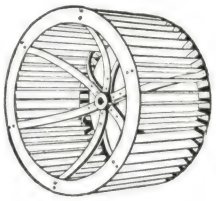
Universal Multiblade Blowers

Motor is machined circular and held in cast iron ring bolted to cast iron bowl avoiding necessity of pedestal. Bowl is bolted to cast iron side of blower.

Wheel is mounted directly on motor shaft and, as motor is pushed against bowl, hub of wheel is close to motor bearing, giving small overhang. No bearings exposed in suction or inlet; all reached on motor side.

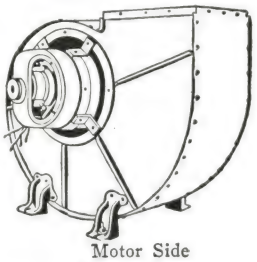
Blades of Ilg multiblade wheels are electrically welded to steel retaining rings. Spiders, hand forged wrought iron; hubs, malleable iron. The features are lightness, great strength, central suspension and drive.

Blower and motor are guaranteed as a unit; no split responsibility between blower and motor manufacturers. Furnished with any angle or discharge. Also furnished for belt drive.

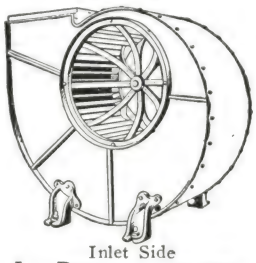


Ilg Multiblade Wheel

Made in sizes 25 in. to 80 in. single and double width



Motor Side

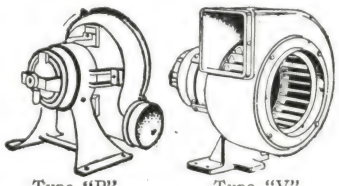


Inlet Side

Ilg Direct-connected Blower

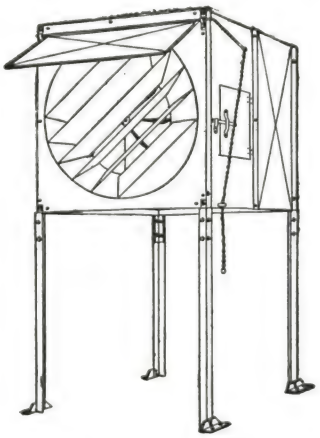
Volume Blowers

Type "P," 10, 15 and 20 in. for exhausting air, dust, acid fumes, etc., at high pressures. Type "V," for exhausting air at low velocities and quiet operation.



Type "P" Type "V"

Ilg Volume Blowers



Ilgair Floor Type Heater

Also made for ceiling suspension

Unit Heaters

Circulate heat at floor where it belongs. Consists of cabinet with two stacks of radiators, through which cold air is pulled and forced out at front by an Ilg self-cooled motor fan. Most economical system known for large open spaces.

Literature

Descriptive literature on all Ilg apparatus furnished on request.

KNOWLES MUSHROOM VENTILATOR CO.

TELEPHONE
WALKER 6967

202-204 Franklin Street
NEW YORK, N. Y.

Products

ADJUSTABLE MUSHROOM VENTILATORS; CAMELBACK AIR DIFFUSERS; AISLE HOOD AIR DEFLECTORS.

Uses and Operation of Air Controlling Heads

For use in connection with mechanical systems of air purifying or ventilation, for controlling the distribution of the supply of fresh air or the exhaust of vitiated air.

Particularly valuable in the ventilation of auditoriums of theatres, schools, public buildings and large rooms in manufacturing establishments.

Equally effective in up-draft or down-draft methods; the heads are usually located on the floor under seats or other fixtures, and connected with the plenum chamber or ducts supplying tempered fresh air forced by a blower fan, or exhausting vitiated air by suction.

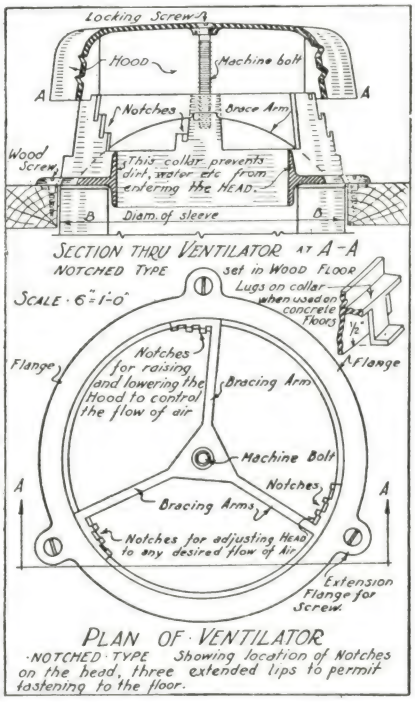
They are individually adjusted for their relative distances from the fan so that each will distribute an equal quantity of fresh air, or so that the distributing may be regulated for different parts of the room as desired.

Knowles "Notch" Mushroom

Construction—This air controlling head has three outer bearings and is absolutely rigid. Four recessed notches at each bearing point furnish sufficient adjustments. The head is positively locked in each position by tightening the head screw. It can not possibly collapse. There are no set-screws to become loosened. The cap is free from any dirt collecting depressions.

Three extended lips from the floor flange permit fastening to wood floor, or three drop L-shape lugs permit setting in concrete floor.

KNOWLES "NOTCH" MUSHROOM



STOCK SIZES

Diam. of Head A-A	Diam. at B-B	Area in sq. in.	Wt. lbs.
4½"	4"	12.566	2
5½"	5"	19.635	3
6½"	6"	28.274	4½
8½"	8"	50.625	8½

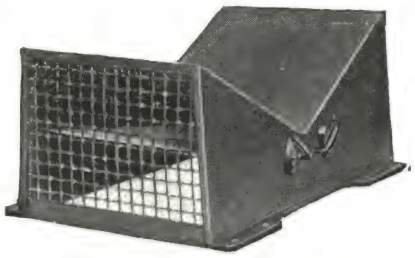
Specification Data—*For Concrete Floors*—Furnish and place 6-in. cast iron mushroom air diffusers with recessed notches for permanent adjustment of mushroom caps at any desired opening; to have center screw locking feature, and L-shape lugs as manufactured by KNOWLES MUSHROOM VENTILATOR CO. Provide for each opening No. 20 galvanized iron sleeve extending through concrete floor; to be set when floor slab is laid.

Knowles "Camelback" Air Diffuser

A device constructed with two-way air delivery at the ends, permitting discharge of the maximum volume of air with minimum number of diffusers, thereby requiring less duct work, saving a great expense in masonry. Its construction reduces friction loss to a minimum. It is made of cast iron with coarse wire screens over the ends. Nos. 1 and 3 are without dampers. Nos. 2 and 4 have two air controlling dampers, permitting air from the entire area to be thrown in one direction if desired.

No. 1 and No. 2 —14 in. long x 7 in. wide x 6 in. high at ends.

No. 3 and No. 4 —14 in. long x 7 in. wide x 5 in. high at ends.



"CAMELBACK" AIR DIFFUSER

Knowles Standard Aisle Hood Air Deflector

Where it is required to admit fresh air in one direction (as in theaters and churches in which it may be desirable to bring the air in at right angles to the aisle) this deflector gives positive results.

It is made of cast iron and has a curved damper which insures no friction loss and may be locked in any position. Furnished with or without front wire screen and in two sizes.

Large—8 in. long x 6 in. wide x 6 in. high. Weight, 13 lbs. Area, .333 sq. ft. 100 c.f.m. at 300 velocity.

Small—8 in. long x 4½ in. wide x 4½ in. high, weight 9½ lbs. Area, 25 sq. ft. 75 c.f.m. at 300 velocity.

AISLE HOOD AIR DEFLECTOR

Other Types

The following types can also be furnished; Knowles single damper air diffuser, all sizes; Knowles double damper air diffuser, 6-in. and 8-in.; Knowles bottom damper air diffuser (regulation in duct).

Service

Our engineering department is prepared to cooperate with architects in every way possible. In addition, booklets, service sheets and full size prints will be mailed on application.

MASSACHUSETTS BLOWER COMPANY

WATERTOWN, MASS.

REPRESENTATIVES

AMSTERDAM, N. Y., 447 Guy Park Avenue
ATLANTA, GA., 34 Cone Street
BIRMINGHAM, ALA., 216½ N. 21st Street
BOSTON, MASS., 12 Pearl Street
BALTIMORE, MD., 16 East Fayette Street
BUFFALO, N. Y., 311 White Building
CLEVELAND, OHIO, 1200 East 55th Street
NEW YORK, N. Y., 5613 Grand Central Terminal
PHILADELPHIA, PA., 30 S. 17th Street
NASHVILLE, TENN., 922 Stahlman Building
CHICAGO, ILL., 64 W. Randolph Street
DETROIT, MICH., 308 Scherer Building
DES MOINES, IOWA, 312 Walnut Street
DULUTH, MINN., 322 Lyceum Building
MINNEAPOLIS, MINN., 312 Third Street, S.
OKLAHOMA CITY, OKLA., 17 N. Dewey Street
SALT LAKE CITY, UTAH, 204 Dooley Building
MILWAUKEE, WIS., 821 Merchants and Mfg. Bank Building

Products

Manufacturers of FANS, BLOWERS, HEATERS and AIR WASHERS for Heating, Ventilating, Purifying, Cooling, Humidifying, Dehumidifying; FORCED and INDUCED DRAFT, COMMERCIAL DRYING, BLAST EQUIPMENT and CONVEYING SYSTEMS.

Squirrel Cage Multiblade Fans

For heating, ventilating, drying and mechanical draft, the squirrel cage fan will meet every requirement, except for moving material. Built in all sizes from 6-in. diameter wheels and up.

Steel Plate Blowers and Exhausters

Adapted for same purposes as the squirrel cage type fan. Can be designed for moving materials.

Massachusetts Propeller and Disc Fans

For moving large volumes of air under low pressures. Built for pulley drive or direct connection to motors or engine. Built in all sizes from 12-in. diameter and up, for horizontal or vertical shaft.

Cone Fans

Designed for installations where the conditions will not permit the usual housing.

Planing Mill Exhausters

Steel plate shell sufficiently thick to withstand abrasive action of material handled. No exposed bearings. Any discharge.

Portable Service Sets

Standard sizes. Right or left hand discharge. Belt or direct drive.

Pipe Coil Heaters

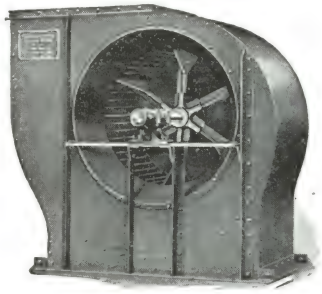
For hot water and steam. Adapted for high and low pressure work. Made in return bend and miter types.

Air Washers

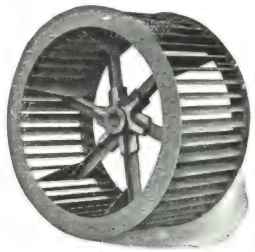
For purifying, cooling, humidifying and dehumidifying air for industrial and commercial purposes. Made in all sizes.

Drying, Cooling and Conveying Systems

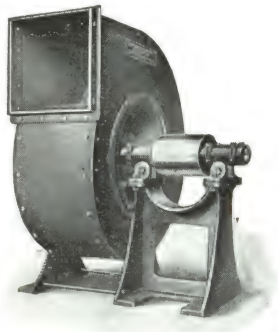
Drying, cooling and conveying systems designed and equipped to meet any requirements.



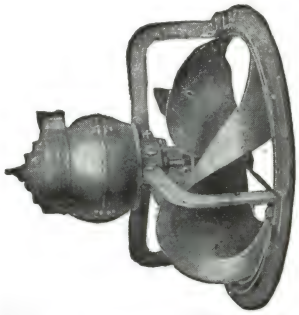
MODIFIED SQUIRREL CAGE FAN



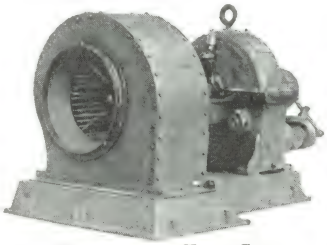
MODIFIED SQUIRREL CAGE FAN WHEEL



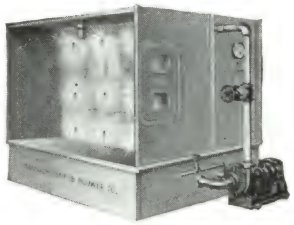
PLANING MILL EXHAUSTER



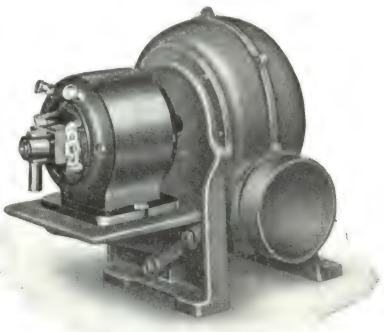
MASSACHUSETTS DAVIDSON PROPELLER FAN, DIRECT CONNECTED MOTOR



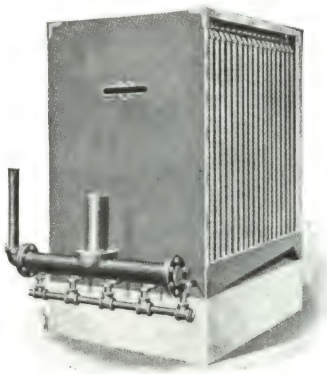
MOTOR AND FAN SET



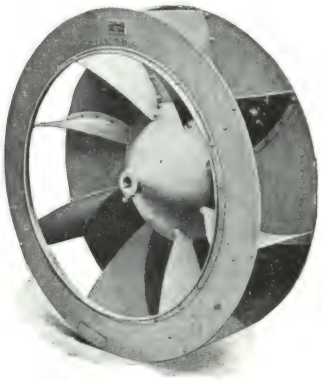
MASSACHUSETTS AIR WASHERS



PORTABLE SERVICE SET
Motor Side



COIL HEATER



CONE FAN WHEEL

MELLISH-HAYWARD COMPANY

Heating, Ventilating and Air Conditioning Apparatus

TELEPHONE
MAIN 3677

213 West Austin Avenue
CHICAGO, ILL.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

LYON TOAD STOOL VENT CAPS.
MEL-ROCK AIR WASHERS.
Also manufacturers of Ventilators, Bubbling Drinking Fountains, Radiator Shields, Pipe Sleeves, Light and Heavy Sheet Metal Work.

MEL-ROCK PRODUCTS
TRADE-MARK

Lyon Toad Stool Vent Caps

Purposes—For use in the floors of theaters, halls, churches and all places of public assembly having seats.

Construction—A circumference wall, with flange at bottom for fastening; and a cap to which are attached 3 sturdy lugs. The circumference wall is threaded with a large thread, so that one complete turn travels from bottom of wall to top. The lugs attached to cap engage these threads. The ends of lugs are fitted with square headed setscrews.

LYON TOAD STOOL VENT CAP

Operation—The opening of the vent cap is regulated by loosening the setscrews with pliers or wrench, and revolving the cap one-half turn, one-quarter, etc.

Advantages—Throat entirely unobstructed, so that greater capacity is obtained, permitting the use of smaller caps, or fewer caps for required volume.

Greater Strength—The cap, instead of resting on central pin supported by flying abutments, is supported solidly and directly by the circumference wall.

Other Advantages—Ease and quickness, and permanency of adjustment. Secureness against rattling.

Mel-Rock Air Washers

Purposes—For cleansing and purifying entering air in connection with ventilating systems of office buildings, theaters, schools, hotels, stores, cafes and other public buildings.

Capacities—Built in 4 standard types of styles to meet various requirements and conditions, in capacities to handle from 2,000 cu. ft. of air a minute up.

Velocity—500 ft. a minute through spray chamber.

General Description—Built in 3 elements: entrance louvers, mist or spray chamber, and eliminator system. According to conditions, tempering (heating) coils are used in connection with entrance louver, and reheating coils after air has passed through mist chamber and eliminator plates. The air is drawn through apparatus by fan.

Washing Process—Consists of drawing air through mist chamber, which is filled with a live and very minute spray of water; and then in contact with eliminators, a series of wet and dry plates so arranged as to eliminate such solid particles as may remain in air current, and also free particles of water. The spray water descends into tank at bottom of spray chamber, from which it is usually recirculated to spray nozzles by means of centrifugal pump.

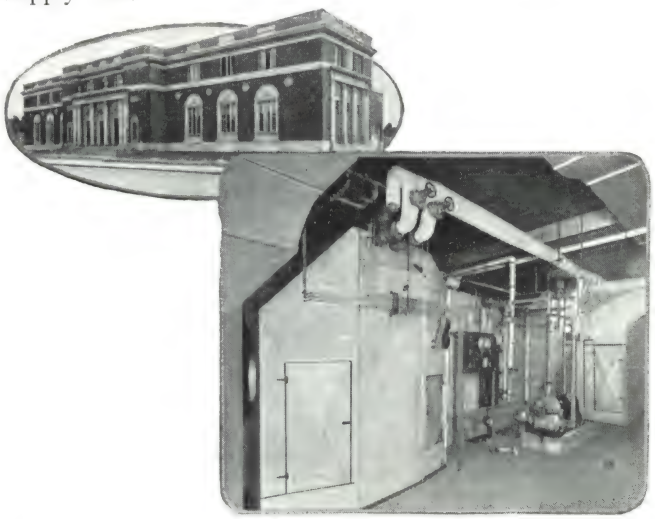
Advantages of Mel-Rock Design and Construction—*Mist Nozzles*—Patented spiral design, thoroughly atomizing water without making use of any interference, requiring fewer nozzles and lower water pressure. Absolutely non-clogging.

Less Friction—The header which feeds vertical pipes to which nozzles are attached is at top of spray chamber, so that the water ascends through single pipe, and descends through several vertical pipes to nozzles. All foreign particles are trapped at lower ends of vertical pipes, so that they do not enter nozzles.

Quicker and More Economical Set Up—The eliminator system is made in batteries, riveted at the factory, and each battery shipped intact, so that installation is simple and time saving.

Adaptability to Space Allotted—Each capacity is made in from 4 to 7 different sizes and proportions without affecting capacity, so that almost any space and headroom may be accommodated.

Suction Screen in Tank at Bottom of Spray Chamber—Of cylindrical type, presenting greatest surface for entrance of water, and may be quickly cleaned. In the Mel-Rock self-cleaning type of strainer, provision is made for flushing out by means of a series of flushing heads inside the cylinder, connected with the fresh water supply line.



THE MEL-ROCK AIR WASHER IN THE CRAWFORD AVENUE BRANCH OF CHICAGO PUBLIC LIBRARY

ROBINSON VENTILATING COMPANY

Manufacturers of Blowers, Fans, and Steel Plate Construction

6027 Jenkins Arcade
PITTSBURGH, PA.
WORKS: HARMONY, PA.

Products

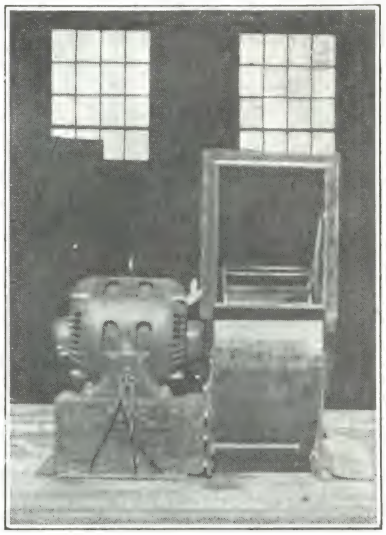
ROBINSON TURBINE FANS for blowing, exhausting or reversing; ROBINSON DISC FANS; HIGH PRESSURE BLOWERS; STEEL PLATE CONSTRUCTION.

Robinson Turbine Fans

The Robinson turbine fan is the latest development in fan construction for the ventilation of mines, buildings, cupolas, powerhouses, sand blast and waste heat systems, or for any purpose where the economical movement of air is required. Long and hard service is assured through its rugged construction. The interference with the passage of the air is avoided through the graduated expansion of the housing scroll and the proper position of the cut-off.

TURBINE FAN WITH DOUBLE INLET

The bearings are self aligning, either full ring oiling or grease cups. The turbine fan is made for blowing, exhausting, or with reversible features in sizes from 12 in. to 25 ft. in diameter with any position of discharge, either double or single inlet, either for belt driven or direct connected. Single inlet fans may also be had with overhung wheel mounted on motor shaft. More than 75% of our production is specially designed to meet the individual working conditions.



SINGLE INLET FAN WITH OVERHUNG WHEEL

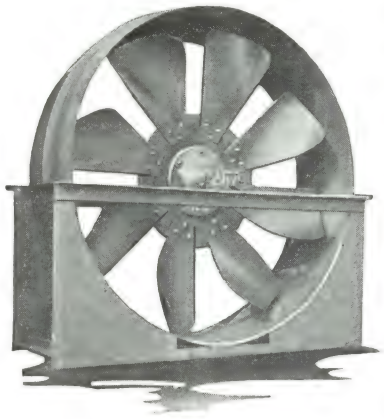
Fan Wheel or Rotating Unit—All blades have a forward pitch. The larger blades being riveted throughout their entire length to both the center web plate and cone hubs. This gives a box-like rigid construction free from vibration.

The curvature of the large blades passes the air to the circumference in a natural spiral, free from eddy currents and lost energy.

TURBINE FAN WHEEL

Robinson Disc Fans

Robinson conical flow disc fans are built very substantially, the blades being securely riveted to a circular web plate, which is in turn riveted to a cone casting. This cone is securely keyed to the shaft.



DISC FAN

Due to the proper curvature of the blades, the maximum flow of air is obtained with a minimum of power expended. Made in sizes from 2 to 10 ft. in diameter, with extended shaft to receive pulley. Regular equipment is ring oiler bearings.

CAPACITY TABLE—CONICAL FLOW DISC FANS

Size, ft.	¼-in. water gage			½-in. water gage			¾-in. water gage			1-in. water gage			Weight lbs.
	Capacity, cu. ft. per min.	R. p. m.	Brake h. p.	Capacity, cu. ft. per min.	R. p. m.	Brake h. p.	Capacity, cu. ft. per min	R. p. m.	Brake h. p.	Capacity, cu. ft. per min	R. p. m.	Brake h. p	
3	6000	450	.5	9000	700	2.2	11000	800	4.0	13000	900	6.0	350
4	11000	350	1.4	16000	500	4.0	20000	600	7.5	23000	700	11.0	600
5	17000	275	2.2	25000	400	6.0	30000	480	11.5	35000	560	17.0	850
6	25000	230	3.0	35000	330	8.5	45000	400	16.0	50000	460	25.0	1100
7	35000	200	4.0	50000	280	12.0	60000	340	22.0	70000	400	35.0	1400
8	45000	170	5.0	65000	250	16.0	80000	300	30.0	90000	350	45.0	1800

Steel Plate Construction

The steel plate construction section of our plant is fully equipped to build gear guards, exhaust heads, or anything in riveted or welded work from No. 16 gauge sheets to ⅜-in. plates. Tank steel sheets of a high grade are used in this work.

B. F. STURTEVANT COMPANY

Fans, Fan Systems, Blowers, Heating and Ventilating Apparatus and Power Plant Equipment

HYDE PARK, BOSTON, MASS.

BRANCH OFFICES

ATLANTA, GA. BOSTON, MASS. BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO DALLAS, TEX. DENVER, COLO. DETROIT, MICH. KANSAS CITY, MO. MINNEAPOLIS, MINN. NEW YORK, N. Y. OMAHA, NEBR. PITTSBURGH, PA. ROCHESTER, N. Y. ST. LOUIS, MO. WASHINGTON, D. C.
CINCINNATI, OHIO HARTFORD, CONN. PHILADELPHIA, PA.

THE B. F. STURTEVANT COMPANY (INCORPORATED IN CALIFORNIA)
LOS ANGELES, CAL. SALT LAKE CITY, UTAH. SAN FRANCISCO, CAL. SEATTLE, WASH.

THE B. F. STURTEVANT COMPANY OF CANADA, LIMITED
GALT, ONT. MONTREAL, QUE. TORONTO, ONT.

Products

Sturtevant
(Registered U. S. Patent Office)
TRADE-MARK

HEATING and VENTILATING EQUIPMENT: Fans; Blowers; Exhausters; Portable Ventilating Sets; Hot Blast Heaters; Air Washers; Galvanized Duct Work.

Also Steam Engines, Steam Turbines, Motors and Turbine, Steam Engine and Gasoline Electric Generating Sets.

Engineering Service

As each installation is unique, it is usually necessary that an engineer analyze the conditions before making recommendations.

The engineering staff of the B. F. STURTEVANT COMPANY has been trained to analyze all conditions and to properly apply the company's apparatus accordingly.

Consult this department, which is at the disposal of architects and others, without obligation.

Publications

The Sturtevant line is so varied, that a comprehensive presentation in one publication is not feasible. This company, has, therefore, issued a special bulletin on each particular line covering the mechanical details.

Drying Apparatus—No. 243, Paper Drying; No. 282, Lumber Drying; No. 273, Veneer Kilns; No. 289, Low Temperature Forced Circulation Hosiery Dryer.

Heating and Ventilating—No. 201, Electric Dust Blowing Sets; No. 227, Heating and Ventilating Layouts—Blue Print Book; No. 230, Heaters; No. 237, Ready-to-run Ventilating Sets; No. 238, Multivane Fans—Performance Charts; No. 271, Multivane Fans; No. 278, Air Conditioning; No. 279, Disc and Propeller Fans; No. 290, Silentvane Fans; No. 296, Unit Heaters; No. 1015, Heating and Ventilating Book Complete.

Mechanical Draft—No. 217, Direct Current, Type "D" Motors; No. 236, Forced Draft Fans; No. 256, Steam Turbines; No. 259, Vertical Engines; No. 276, Turbo Undergrate Blowers—Design 3.

Planing Mill Fans and Dust Conveying Systems—No. 185, Slow-speed Low Power Planing Mill Exhauster; No. 233, Slow-speed Low Power Reversible and Convertible Planing Mill Exhauster—Design 6; No. 234, Steel Plate Blowers and Exhausters; No. 252, Steel Plate Fan Performance Chart; No. 291, Pneumatic Dust Collecting and Conveying Systems.

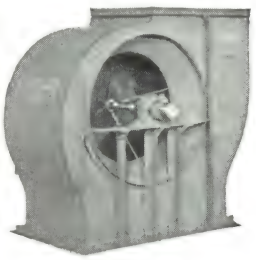
Power Apparatus—No. 150, Fuel Economizers; No. 217, Type "D" Direct Current Motors; No. 239, Steam Engine Generator Sets; No. 239, Vertical Single Cylinder Steam Engines; No. 255, Gasoline Electric Generating Sets; No. 256, Steam Turbines; No. 256, Steam Turbine Generating Sets; No. 264, Electrical Apparatus; No. 284, Polyphase Motors; No. 294, Stokers.

Pressure Apparatus—No. 257, Positive Pressure Blowers; No. 258, Design 4 and 5 Pressure Blowers; No. 260, Design 4 and 5 Pressure Blowers—Performance Tables; No. 265, Steel Pressure Blowers; No. 292, Monogram Blowers and Exhausters.

Miscellaneous—No. 195, General Catalogue; No. 250, Architects' and Engineers' Data Book. Carefully prepared, giving full technical information usually required. It contains 960 pages of valuable information covering heating and ventilating.

Silentvane Fans

Hitherto, it has been difficult to run a fan at high speed and yet have it silent.



SILENTVANE

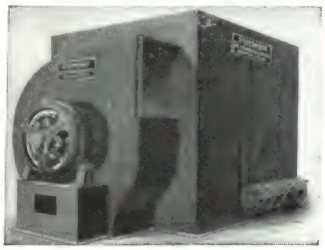
The new Silentvane, as its name implies, is particularly noted for its high speed and remarkable quietness of operation. In addition, the Silentvane is exceedingly economical in power consumption.

Used in connection with heating and ventilating systems and is especially recommended for auditoriums, schools and other large buildings.

Sturtevant Heaters

Sturtevant heaters may be installed in either "draw-through" or "blow-through" arrangement, depending upon the conditions of service. In the former, air is drawn over heater coils, passes through the fan and is forced through the distributing ducts. This is the usual arrangement where air of one temperature is required and is generally adopted in shop and factory heating.

Where air is required at more than one temperature a "blow-through" rig is necessary. In this arrangement, air enters the fan first and is then blown over the heater coils. Dampers and a by-pass in the heater casing are arranged so that some or all of the air from the fan may be diverted around the heater and through a cold air duct.



STURTEVANT HEATER

L. J. WING MFG. CO.

Manufacturers of Fans and Blowers

TELEPHONE
CHELSEA 7465, 7466

350-364 West 13th Street
NEW YORK, N. Y.

WORKS:
NEWARK, N. J.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

"WING-SCRUPLEX" (Screw Propeller) FANS and EXHAUSTERS; "WING-SCRUPLEX" UNIT HEATERS.

Also Wing Turbine Blowers for mechanical draft, etc.; Damper Regulators; Positive Pressure Blowers.

The "Scruplex" Principle

"Wing-Scruplex" fans, due to the screw propeller design of the blades, deliver a non-expanding column of air of the same diameter as the fan itself and of practically uniform velocity over its entire area. These features tend toward extremely high efficiency, particularly when working against heavy pressure or suction. This makes the fans specially suitable for drawing or forcing air through duct work, as well as for open ventilation. Static pressures as high as 1½ in. are easily obtainable.

"Wing-Scruplex" Fans

The fan and motor are mounted on a substantial supporting ring which may be bolted to a wall, window, framework, etc. The motor is fully enclosed and dustproof; no cooling device is necessary.

Fans also furnished for pulley or turbine drive.

"WING-SCRUPLEX" FAN DIAGRAM

DIMENSIONS OF "WING-SCRUPLEX" FANS IN INCHES

Size, in.	A	B	C
10	12½	10	10⅝
13	16	13	12
17	20	17	13¾
22	24½	22	13¾
25	29	25	15
30	34¾	30	18⅝
36	41½	36	20½
42	46¾	42	28
48	55	48	29
54	60	54	33
60	66	60	39

SIZES AND CAPACITIES OF "WING-SCRUPLEX" FAN

Size, in.	Speed, r.p.m.	Free air capacity, c.f.m.	Motor, h.p.	Size, in.	Speed, r.p.m.	Free air capacity, c.f.m.	Motor, h.p.
10 H-18	1750	950	1/20	30 I- 9	850	6000	¼
10 H-20	2000	1100	1/10	30 L-95	950	6300	3/10
13 L-18	1750	1400	1/10	30 H-60	600	7000	⅓
13 H-12	1150	1550	⅛	30 H-70	700	7600	4/10
13 H-15	1500	2080	⅙	36 L-60	600	8000	⅓
13 H-18	1750	2400	¼	36 L-70	700	8800	4/10
17 L-15	1500	2700	⅙	36 H-60	600	11000	6/10
17 L-12	1150	2100	⅛	42 L-60	600	12700	6/10
17 H-12	1150	3150	¼	42 H-45	450	14700	¾
17 H-18	1750	4800	¾	42 H-50	500	14700	¾
22 H- 9	850	3450	⅙	48 L-45	450	17500	¾
22 H-12	1150	4150	¼	48 L-50	500	17500	¾
22 H-18	1750	6300	¾	48 H-45	450	19500	1
25 H- 9	850	4500	¼	54 L-45	450	21000	1
25 H-10	1000	5200	3/10	54 H-45	450	24000	1¼
25 H-12	1150	6000	½	60 L-45	450	26000	1¼
25 H-18	1750	9100	1½	60 H-40	400	33000	2

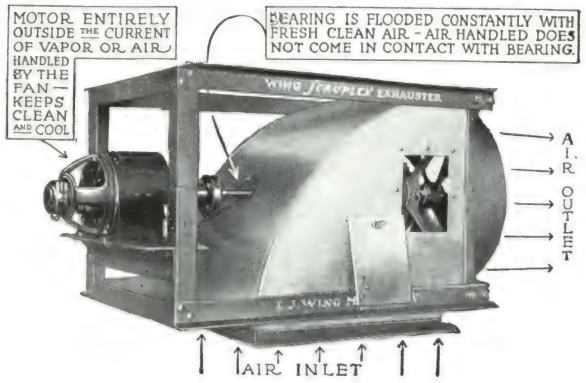
Table of capacities at various static pressures on request.

NOTE—The 13-, 17-, 22- and 25-in. sizes in speeds above 1500 r.p.m. are designed for industrial plants and locations where a little noise is not objectionable. All other speeds given are "quiet speeds."

"Wing-Scruplex" Exhausters

Combine the installation advantages of the centrifugal type of fan with the high efficiency, simplicity and compactness of the "Wing-Scruplex" fan. These units are made motor driven, the motor being located entirely outside of air handled by exhauster. Driving shaft and interior bearing are both protected by a tube through which fresh air is continually circulated. Motor is readily accessible. When installed, exhauster forms an elbow in run of duct, thus greatly economizing in space and installation cost.

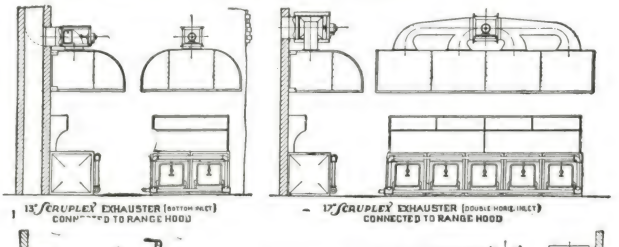
Air laden with grease, smoke vapors, chemical fumes or paint spray, or which is extremely hot, is handled without injury to any part of equipment.

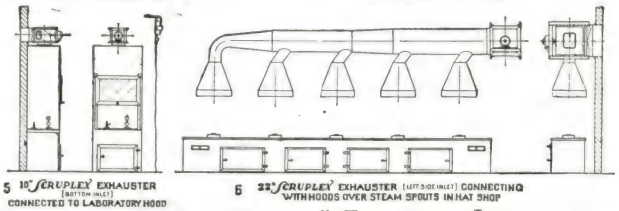


"WING-SCRUPLEX" EXHAUSTER
Furnished with inlet at top, bottom, or either side, or two inlets

Size	Speed, r.p.m.	Delivery, c.f.m.	Outlet, diam., in.	Size	Speed, r.p.m.	Delivery, c.f.m.	Outlet diam., in.
1-A	1750	900	10	4-C	1750	5400	21
2-A	1150	1400	14	5-A	1150	5500	25
2-B	1750	2100	14	5-B	1750	8300	25
3-A	1150	2900	17	6-A	600	6000	30
3-C	1750	4400	17	6-B	850	8500	30
4-A	1150	3550	21	6-C	1150	11500	30

Table of capacities at various static pressures on request.





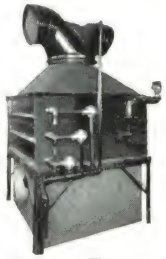
EXAMPLES OF "WING-SCRUPLEX" EXHAUSTER INSTALLATIONS

"Wing-Scruplex" Unit Heaters

Consists of a stack of heating coils, or a self-contained furnace, encased in a substantial housing. A "Wing-Scruplex" fan draws or forces air over the heating surfaces and distributes it where most needed.

These heaters economize in fuel by confining their effect to the working areas, eliminating the unnecessary heating of overhead space.

Specially suitable for factories, garages, etc. Made in various sizes and in floor, ceiling and wall types.



FLOOR TYPE UNIT HEATER

ATMOSPHERIC CONDITIONING CORPORATION

443 Chestnut Street

PHILADELPHIA, PA.

BRANCH OFFICES

YORK, N. Y.
PITTSBURGH, PA.
CLEVELAND, OHIO
DETROIT, MICH.
INDIANAPOLIS, IND.
CINCINNATI, OHIO
KANSAS CITY, MO.
OMAHA, NEBR.
DALLAS, TEX.
CHICAGO, ILL.
ST. LOUIS, MO.
MINNEAPOLIS, MINN.

CANADIAN REPRESENTATIVES: Darling Brothers, Ltd., MONTREAL, CALGARY, TORONTO, VANCOUVER, OTTAWA, HALIFAX, WINNIPEG

EUROPEAN REPRESENTATIVES: Atmospheric Steam Heating Co., Ltd., LONDON, ENG.

Products

Equipment for maintaining Artificial Atmospheric Conditions in industrial plants: Humidifying, Dehumidifying, Drying, Cooling Apparatus and Air Conditioning Apparatus for public buildings, etc., and for generator and transformer ventilation; Air Washers.

Organization and Services

The organization now known as the "Atmospheric Conditioning Corporation" had its origin in 1907 as a department of Warren Webster & Co., Camden, N. J., where Webster air washers and air conditioning apparatus were developed.

The tests and research work necessary for the development of the highly efficient apparatus now perfected, were made possible by the most complete laboratory equipment obtainable.

The executive, engineering and manufacturing departments are well organized to handle air conditioning equipment work of any scope, and the sales force includes not only an efficient force at the main office at Philadelphia, but territorial offices in the principal cities of the United States, Canada, and in London, England.

Webster Atmospheric Conditioning Apparatus for Industrial Plants

With the various types of atmospheric conditioning apparatus it manufactures, this company is equipped to serve any industrial plant problem requiring artificially regulated atmospheric control.

Such apparatus becomes essential where it is necessary to safeguard the health of employees by maintaining regular temperatures, removing all dangerous dust particles, fumes, etc., or to protect food products, delicate fabrics, sensitive photographic materials, paints, enamels, and all goods which undergo deterioration through injurious temperature conditions or contact with atmospheric impurities.

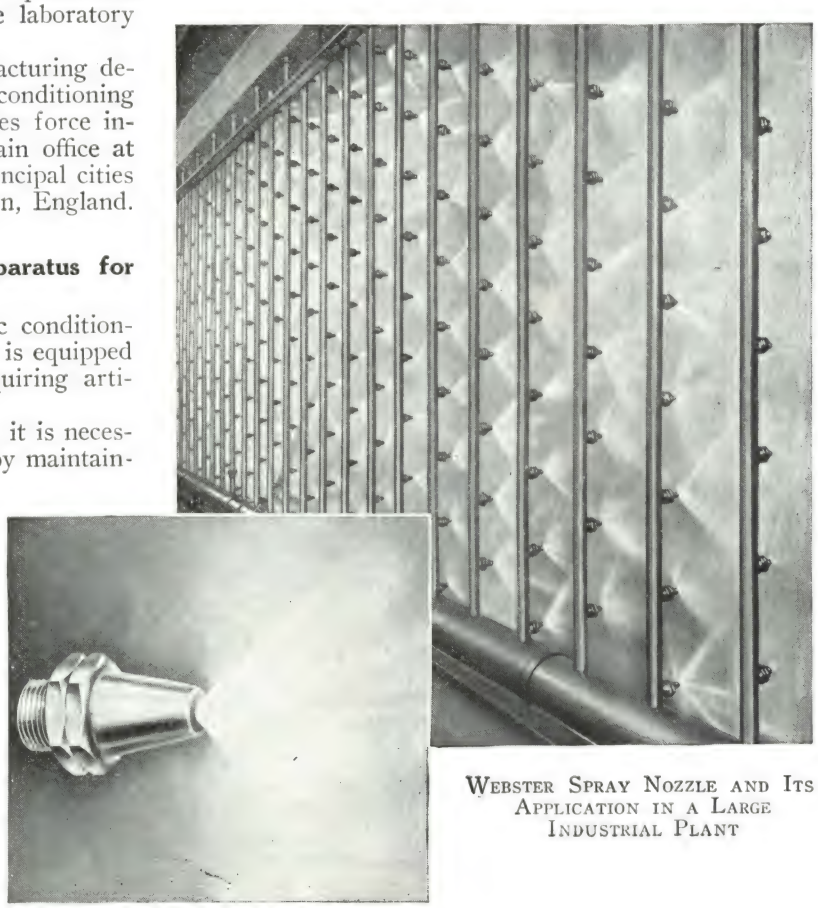
The nature of each problem dictates the type and construction of the equipment installed.

The introduction of moisture and the maintenance of certain relative humidities is often essential to the perfect working of certain products, and with a Webster humidifier ideal conditions can be maintained day in and day out the year around.

Apparatus using recirculated water may be required, in the simpler forms, or the use of deep well water may be necessary. Single or double stage types may be used, the latter being especially desirable where the quantity of well water is limited.

Where excessive humidity conditions are dangerous to the success of a given process or objectionable in the packing or storage rooms, the Webster dehumidifier will be found equal to any climatic variation.

In some cases sufficient cooling can be secured by recirculating the spray water, but more often it is necessary to design a special apparatus where artesian well water is employed.



Webster Spray Nozzle and Its Application in a Large Industrial Plant

Continued on next page

These are made in both the single and double stage types, the latter being among the highest developments of the art.

The refrigeration type of Webster dehumidifier is, of course, the last word in air conditioning, and with this type of apparatus results can be secured that will outdo nature itself.

Industrial ventilation and the details of equipment for maintaining artificial atmospheric conditions in industrial plants is a separate and advanced step in air washing, commonly termed air conditioning, or, as we term it, atmospheric conditioning.

Dehumidifier—Various types of Webster dehumidifiers are constructed to meet individual conditions.

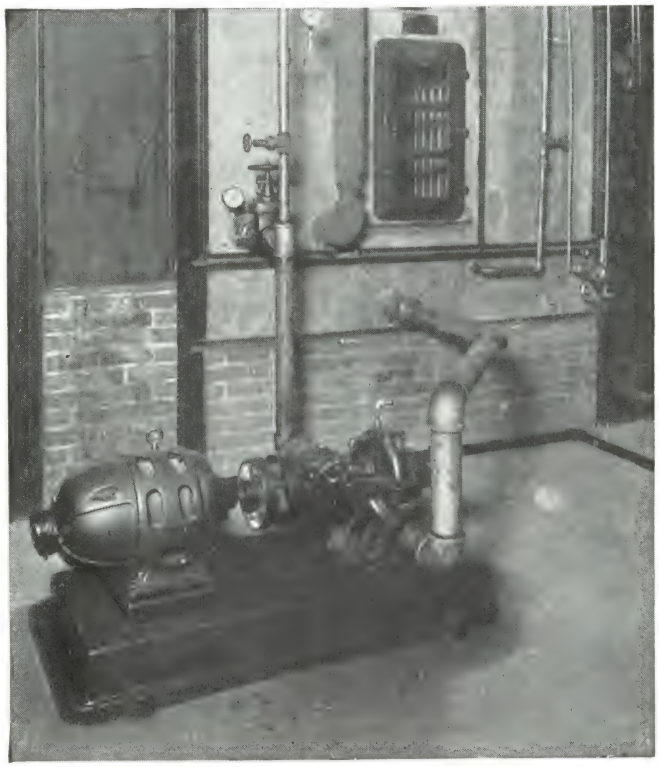
If well water at a temperature of from 50° to 60° is available in sufficient quantity, a single stage or multistage well water dehumidifier is recommended.

If well water is not available, an ingeniously designed dehumidifier embodying the use of mechanical refrigerating apparatus is used.

Among the advantages to be gained by the use of the Webster dehumidifying system, as compared with earlier methods of cooling and dehumidifying, are:

(1) Saving in power.
(2) Economy in space.
(3) More effective heat transfer.
(4) Elimination of frosting.
(5) Elimination of dirt and dust from air by washing.
(6) Greater accuracy of control possible.
(7) Automatic regulation can readily be secured by a simple scientific control system.

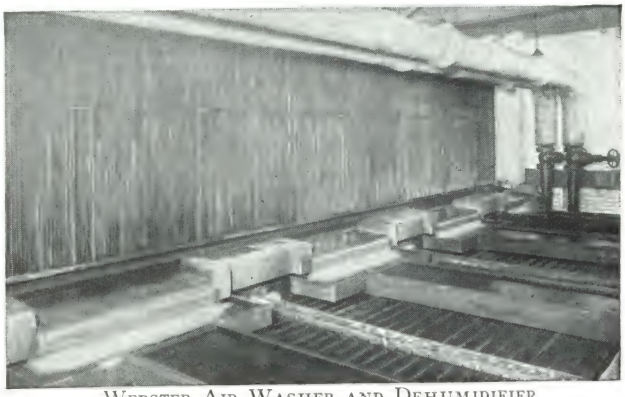
Humidifiers—The Webster humidifier is designed for use in connection with industrial plants, such as textile mills, where it is essential to the success and economy of production to add moisture to the air entering through the ventilating system and maintain automatically a uniform relative humidity.



Webster Humidifier Equipped with the Webster System of Humidity Control

Among the advantages gained by the use of the Webster humidifying system, may be mentioned:

(1) Central location and control of entire humidifying plant.
(2) Uniform humidity obtainable without the application of direct spray in rooms.
(3) Humidity may be maintained automatically at any desired point.
(4) Entering air freed from dust and dirt by washing.
(5) Lowering of temperature in summer by evaporation, using recirculated water in humidifier.
(6) Regain may be kept practically constant, assuring uniformity of product.
(7) Elimination of static electricity.
(8) Ample ventilation without opening of windows.
(9) Great economy may be effected during heating season by partial recirculation of air.



Webster Air Washer and Dehumidifier
Installed in a large industrial office building, showing eliminators and cooling coils

Air Washers

Webster air washers are adaptable to practically every type of building for either cleaning or cooling the air or both, for the comfort of the occupants, or to maintain high efficiency among employees or students.

The Webster "Type A" air washer is designed primarily for cleansing and cooling where a moderate cooling effect by evaporation is desired. It is guaranteed when operating at its rated capacity to remove 98% of all solid matter contained in the air, and to cool this air 70% of the wet bulb depression.

The Webster "Type B" air washer is designed for cleansing and cooling the air in public buildings and industrial plants, where the greatest possible cooling effect by evaporation is desired.

Webster Air Conditioning Apparatus for Generator and Transformer Ventilation

One of the most important factors in securing maximum output and efficiency of turbo-generators and electric transformers is that the air used for ventilation shall be free from dust, dirt and foreign material and that it be delivered to the unit at as low a temperature as possible during summer months.

Webster apparatus designed for this purpose is made in two types; that designed as "G.W." is primarily for cleansing, while type "G.C." will deliver air to the generator at the saturation point.

Every installation of air conditioning apparatus for whatever purpose intended must be considered as a separate engineering problem and it is impossible to furnish information here which would apply except as to general results to be secured.

THE AMERICAN WARMING & VENTILATING CO.

Manufacturers of Sheet Metal Products for Public Buildings

MAIN OFFICE AND FACTORY
1017-1019 Summit Street
TOLEDO, OHIO
BRANCH OFFICE
CLEVELAND, OHIO, 1869 East 55th Street

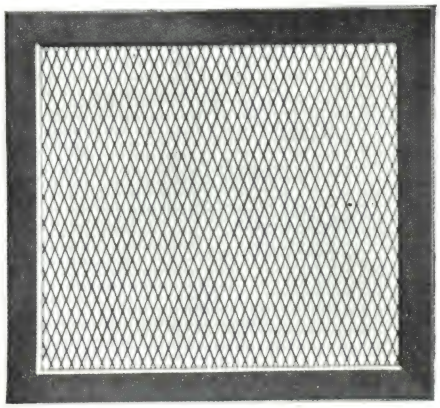
Products

WARM AIR and VENTILATING SIDEWALL REGISTERS.
ALUMINUM BACK PRESSURE DAMPERS.
FRESH AIR SCREENS and LOUVERS.
Also Mixing, Louver and By-pass Dampers.

"American" Warm Air and Ventilating Sidewall Registers

These registers fit into the warm air and vent openings in the sidewall, and are made of heavy pressed steel frames and expanded metal centers. Furnished in any color and any size.

Advantages of the "American" Register over Cast and Steel—Our warm air and ventilating registers have an open air space inside the framework of 85%, which is much greater than any type of wrought or cast metal registers. *It means smaller openings for the delivery of the same amount of air, and consequently a smaller register to do* the same work. They are made in any size without the *delay and cost of making patterns. Lighter in weight,* more air space, and less horsepower in the delivery of air.



"AMERICAN" WARM AIR BLACK ENAMEL REGISTER FOR SIDEWALL

"American" Fresh Air Louver and Screen Combined

This combination screen and louver takes the place of the regular fresh air screen with a window. The frame and screen are constructed the same as our regular "American" warm air register with the exception that it is of heavier material. The dampers are of the ball-bearing type and are constructed to be used either with automatic control or hand control. They are finished in standard black enamel unless otherwise ordered. We make them in any size. If another type of fresh air screen is contemplated, these louvers and frames can be fitted for the use of the same.

"AMERICAN" FRESH AIR LOUVER AND SCREEN COMBINED

"American" Back Pressure Damper and Ventilating Register Combined

These back pressure dampers and registers fit into the vent openings at the base of the ventilating flues in the sidewall. The frames and centers are the same as the warm air registers. The louvers which are simply an addition to the registers are made of aluminum and are so constructed both as to shape and weight, that they automatically close when the fan is not in operation and when ventilation is not required.

The louvers as above stated are made of aluminum and are arranged in such a manner that they are noiseless in operation. The felt padding which is securely placed on the edge of *each louver, makes it noiseless* in its operation. These are made in any size.

"AMERICAN" BACK PRESSURE DAMPER AND VENTILATING REGISTER COMBINED

The back pressure dampers are made not only to fit in our own make of registers but can be fitted into the vent openings at the base of the ventilating flues and any type of register used in connection with it.

The construction of this louver is somewhat different from any other manufactured. In most all other makes of back pressure dampers the combined weight of all of the upper louvers are resting upon the lowest one in the frame. This means that the upper louvers must all open before the lowest one in the frame opens which is the essential one to open, for the reason that the lowest louver is located at a point where the foulest air of the room is located. Hence, it naturally should open first. It does, the way we make them.

References

We have hundreds of schools, churches, and theaters throughout the United States equipped with our product. Many leading architects and engineers are specifying our goods.

Catalogues and Prices

Illustrated catalogues showing our complete line of sheet metal products, with designs and prices, will be sent on request.

THE AUER REGISTER CO.

Manufacturers of Wrought Metal Registers, Grilles and Ventilators

CLEVELAND, OHIO

Products

REGISTERS, GRILLES and RADIATOR ENCLOSURES.

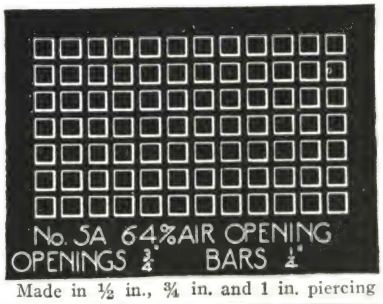
Metal and Finish

Solid bronze, brass and copper, steel, prime coat, black and white japanned, and electroplated in bronze, brass and copper.

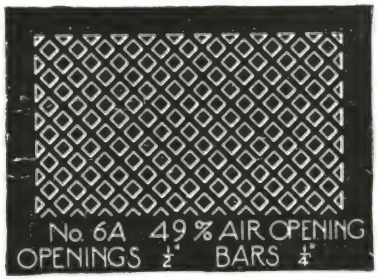
Designs as shown and many other combinations.

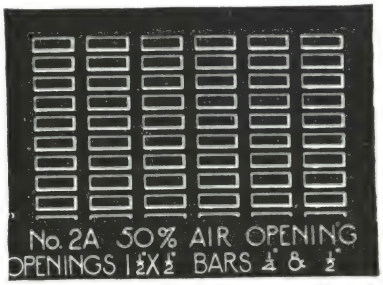
Advantages of Wrought Metal Grilles

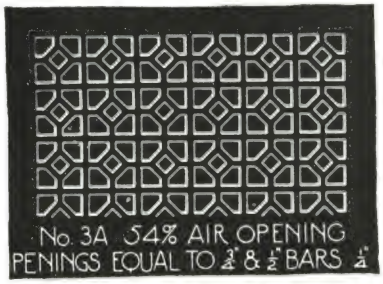
Odd sizes and shapes can be made without cost of pattern making and delaying the building. Wrought grilles being lighter are better suited and more easily fastened to walls or ceilings. Wrought grilles can not be broken in transit nor after being installed. Wrought grilles are the more sanitary as lodging surface for dust is reduced to a minimum.

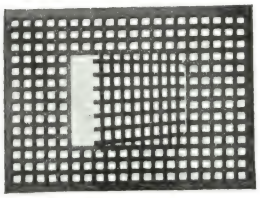


Made in ½ in., ¾ in. and 1 in. piercing

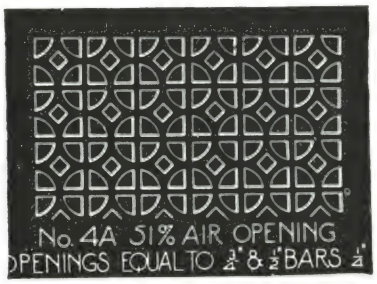


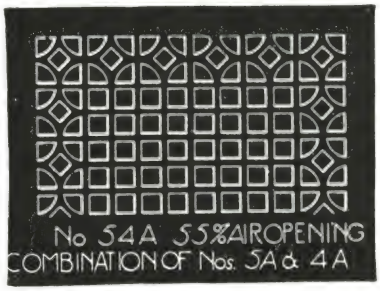


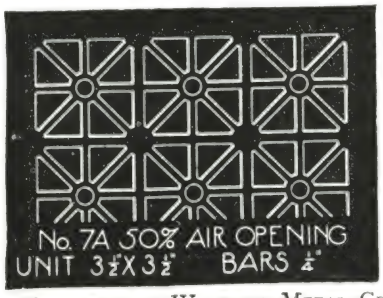


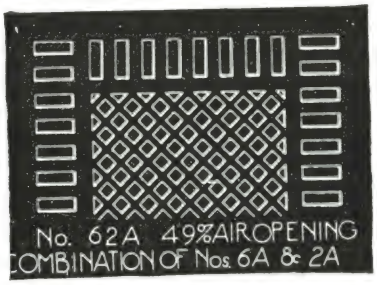


Invisible doors for access to radiator valves can be incorporated in any of the designs



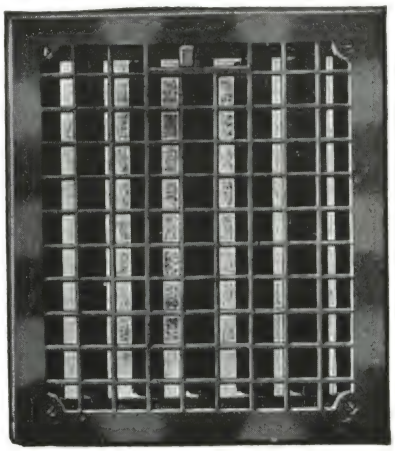






A FEW EXAMPLES OF WROUGHT METAL GRILLES

Grilles or registers can be hinged in angle iron frames. All grilles can be made into registers with louvers



STEEL AND SEMISTEEL REGISTERS WITH LOUVERS

For floor, wall or ceiling. Also in key-lock types

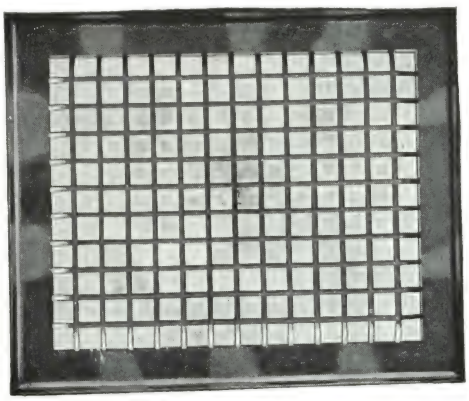
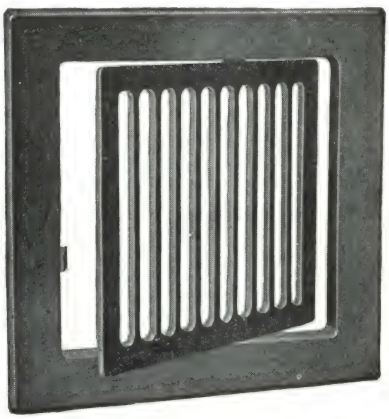


FIG. Y. GRILLE, 76% AIR OPENING

Specially suited for heating and ventilating flues and ducts. Mounted on angle frame to extend into flue or duct opening, dispensing with wall frames. Costs less and better suited than wire and other types of grilles



SANITARY DESIGN GRILLE AND FRAME

With catch and hinged for opening. Also made as register with louvers

THE BEST REGISTER COMPANY

Registers, Ventilators, Grilles and Screens

1500 Oklahoma Avenue
MILWAUKEE, WIS.

Products

REGISTERS, VENTILATORS, GRILLES and SCREENS, of stock or special designs and finishes, in Bronze, Brass, Copper, White Porcelain Enamel, White or Black Japan, etc., made in Cast Iron, Semisteel, Brass or Bronze Metal, and Steel; MUSHROOM VENTILATORS.

Specialists in SEMISTEEL REGISTERS.

Also manufacturers of Gratings, Wall Frames, Sheet Steel Boxes, Floor Borders, Double Slide Dampers, Perforated Steel Grilles, Wire Screens, etc.

Facilities

The factory is equipped throughout with the most improved modern machinery. The capacity is unlimited; and the efficiency of the entire equipment, together with new methods of construction, insure a high quality of workmanship and finish.

"Best" Semisteel Register

Patented July 14, 1908; August 9, 1910.

The faces are made of cast iron; the boxes, valves, operator, etc., of sheet steel. Each register is coated with heavy rustproof metal coating, and carefully inspected.

Manufactured regularly in two designs.

Special Designs

Special design goods are made to order only. In all cases, pattern work is necessary to produce. Any design can be produced from architect's drawings or sketches, and can be made to conform to any conditions and be supplied in any finish.

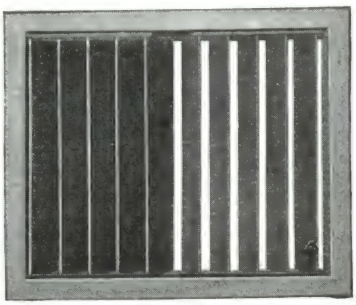
"Best" Mushroom Ventilator

Made in 5 sizes to fit ducts or flues of the following diameters (dimensions being the size of the flue opening of duct): 4, 5, 6, 8 and 10 in

"BEST" MUSHROOM VENTILATOR

Adjustable Diffuser

Eliminates friction. Diffuses air in any horizontal direction.



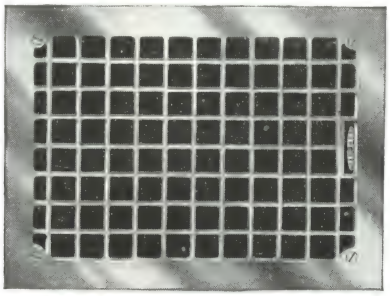
ADJUSTABLE DIFFUSER

References

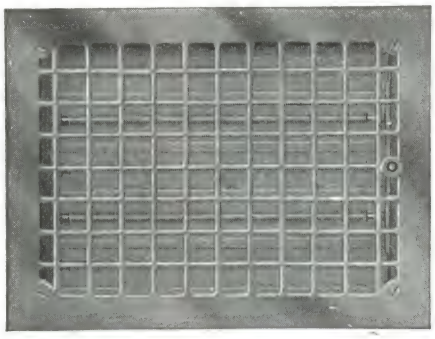
Goods are sold solely on merit. Used and accepted by leading architects and engineers, and installed in many hotels, hospitals, postoffices, and other public buildings.

Catalogues and Prices

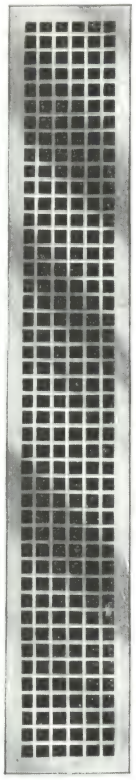
Illustrated catalogues, showing a large variety of register designs and prices, sizes and finishes, as well as further information concerning "Best" deflecting wall and baseboard registers and other products, will be sent on request.



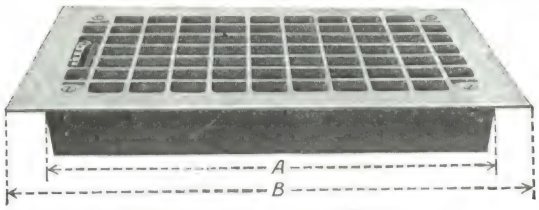
PLAIN LATTICE DESIGN
Made in any style



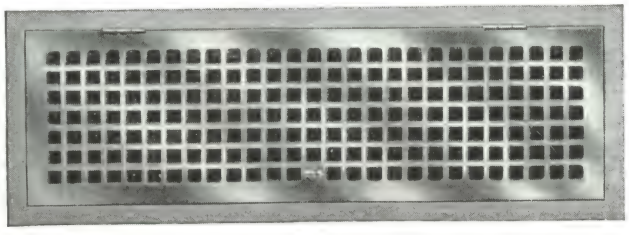
KEY-OPERATED REGISTER
Phosphor bronze operator parts. Can not wear or rust out



PLAIN LATTICE VENTILATING FACE
This design made to order only in any length and width desired



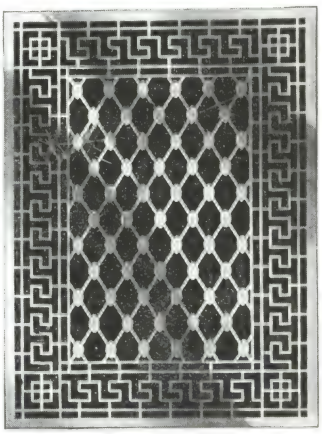
METHOD OF MEASURING REGISTERS
A—Flue or opening size
B—Extreme measurement



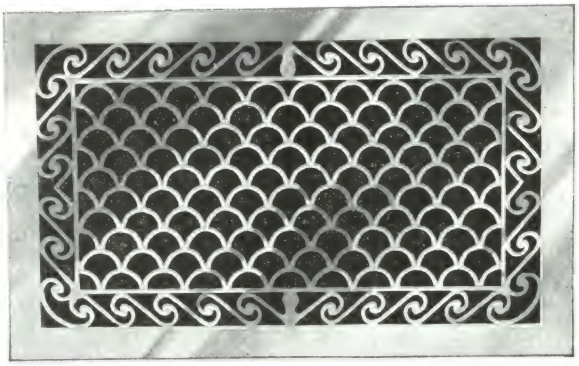
GRILLE HINGED IN ANGLE IRON FRAME

Continued on next page

No. 503-B



No. 12



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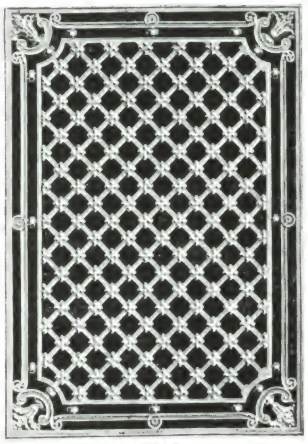

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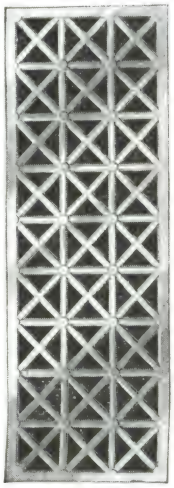

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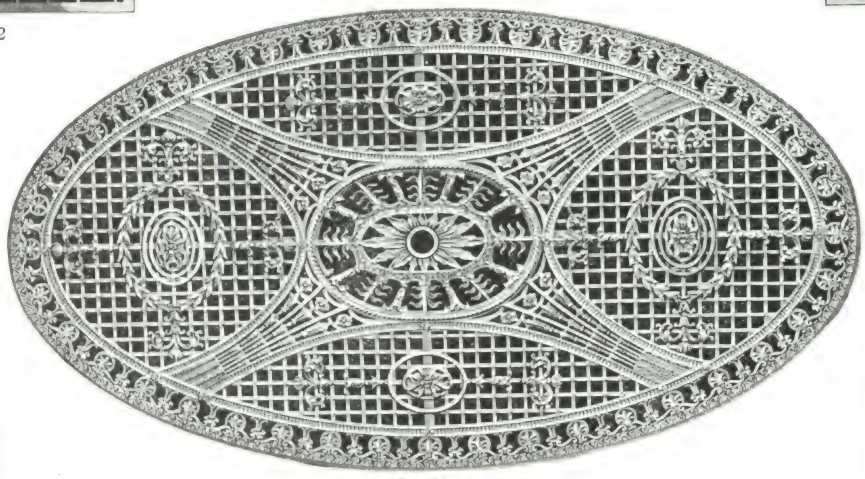
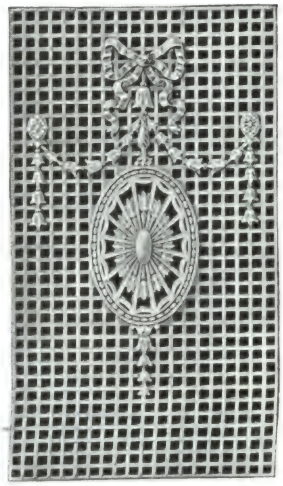


No. 504-A



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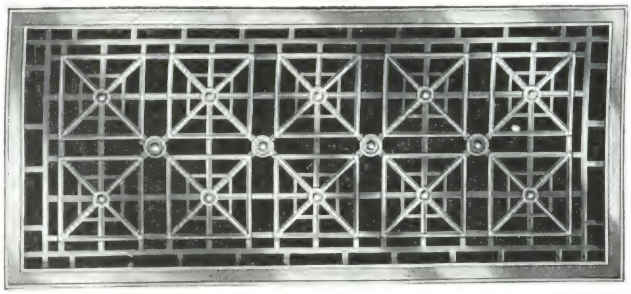

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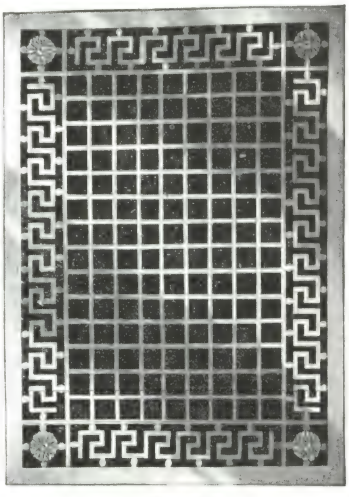

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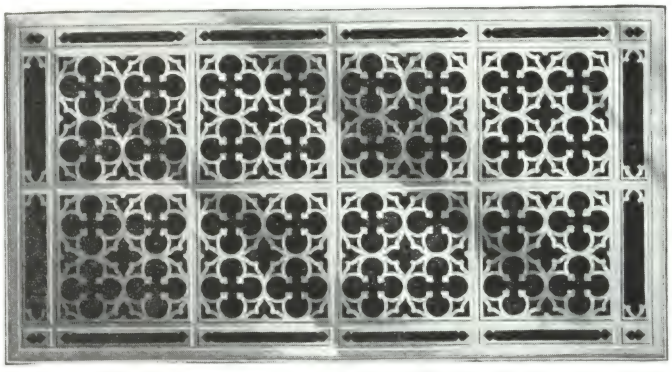

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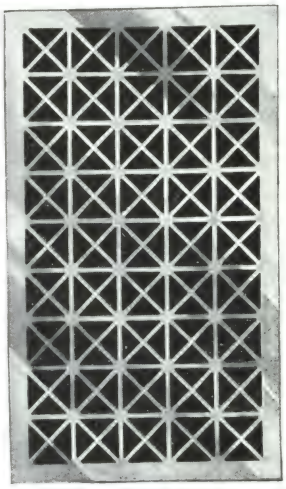


No. 110

SOME OF MANY SPECIAL DESIGNS PRODUCED

This company will make any register. Nothing too small, too large or too complicated

THE HARRINGTON & KING PERFORATING CO.

Grilles and Ventilators of Perforated Metal

MAIN OFFICE AND FACTORY
613 North Union Avenue
CHICAGO, ILL.

TELEPHONE
MONROE 0073

BRANCH OFFICE: NEW YORK, N. Y., 110 Liberty Street—Telephone, Rector 1733

Products

PERFORATED METAL FOR GRILLES, REGISTERS and VENTILATORS.

Also Screens for cleaning and grading sand, gravel and cement.

Significance of "H & K"

For forty years "H & K" has meant superior workmanship and quality in every sort of perforated metal.

Harrington & King Perforated Metal Grilles

Made up of steel, brass, bronze, copper, etc., by punching holes in metal sheets or plates. It is possible to show only a few designs here—send for our complete grille catalogue. Special designs can be made up from architects' drawings.

Why "H & K" Grilles Should Be Specified

Attractive designs without weight or expense of cast grilles.

Made to fit odd shapes or sizes of openings.

Can be made light or as thick as cast grilles in plain rich designs.

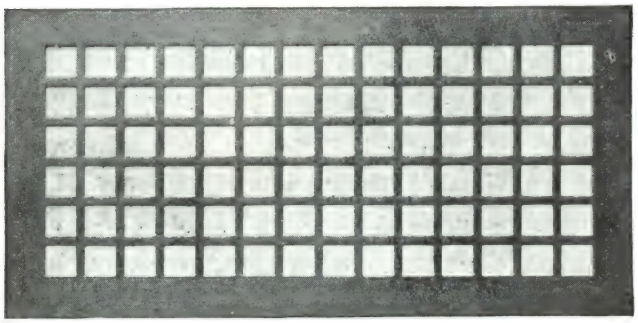
The least expensive of all grilles.

Every grille perfect.

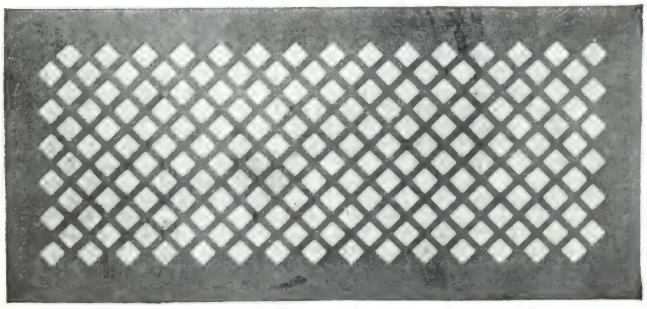
Prompt shipment.

Finish

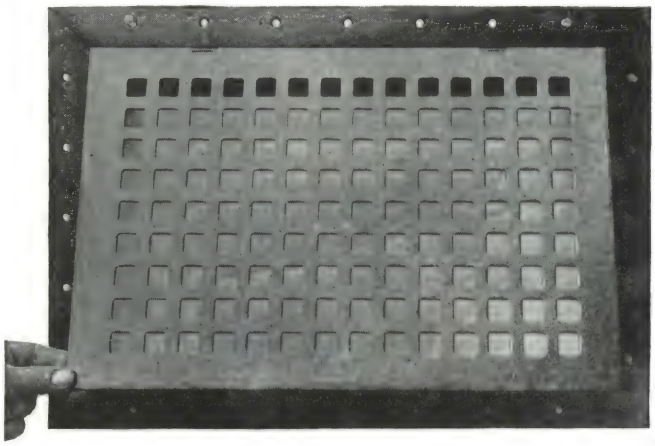
Furnished ready for plating or special finish or if wanted we can plate or enamel to match any sample. Unless otherwise specified we will furnish with coating of oil or shop paint.



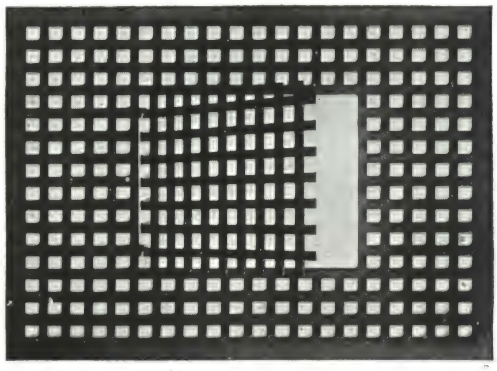
PLAIN LATTICE, 7/8-IN. HOLES, 60% OPENINGS



DIAGONAL LATTICE, 1/2-IN. HOLES, 53% OPENINGS
See table for other sizes of this design



PLAIN LATTICE, 11/16-IN. HOLES, 3/16-IN. THICK STEEL, 38% OPENINGS
A grille hinged on an angle iron framework



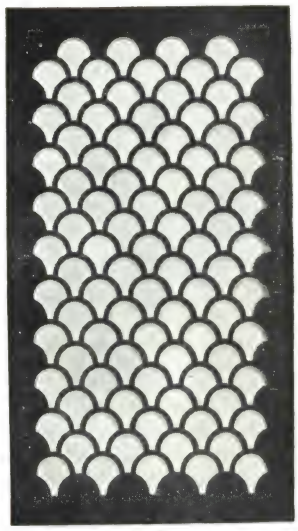
PLAIN LATTICE GRILLE WITH DOOR
Door is invisible when closed

GRILLES AND VENTILATORS OF PERFORATED METAL

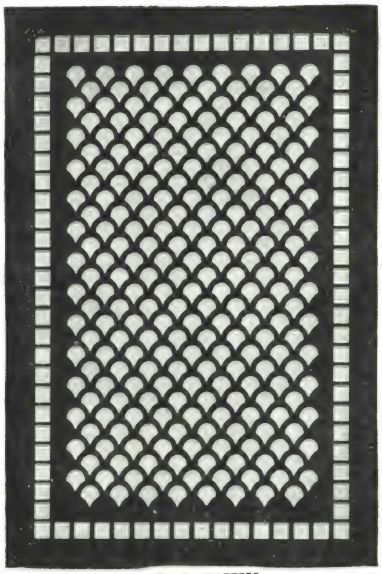
Holes (square), in.	Bridges, in.	Openings, per cent
PLAIN LATTICE DESIGNS		
3/8	3/16	45
1/2	1/4	45*
3/4	3/8	45
7/8	1/4	60*
1	3/8	53
1 5/16	5/16	65
DIAGONAL DESIGNS		
3/8	3/16	45
1/2	3/16	53
7/8	1/4	60
1	1/4	64

*Can be made up at lowest cost.

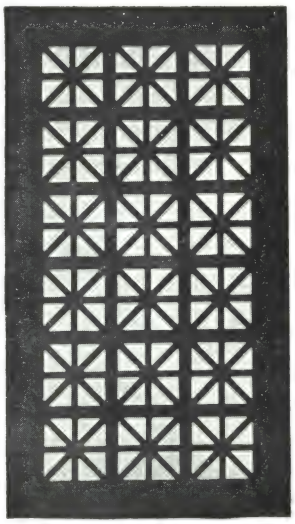
Continued on next page



Style J

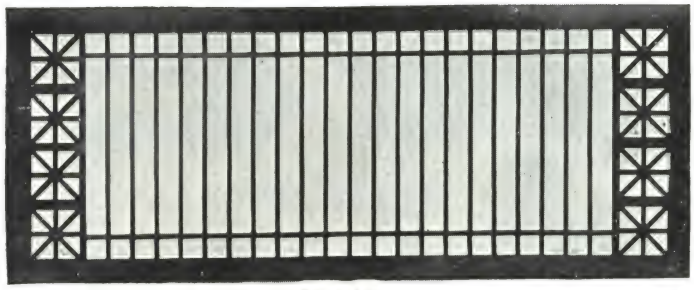


Style KHW



Style L

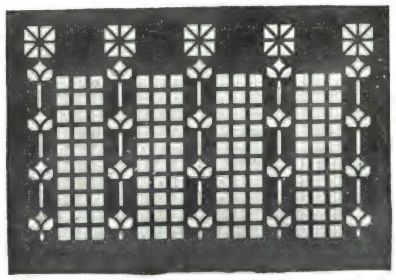
Style L



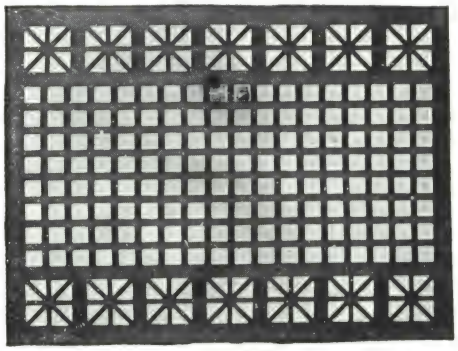
Style LT

Style M3

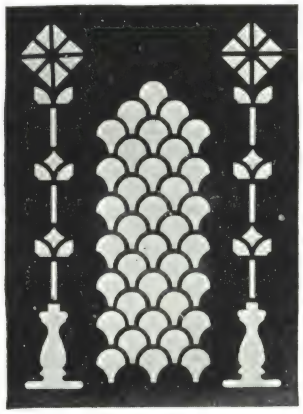
Style P. Metal Cane
Actual size



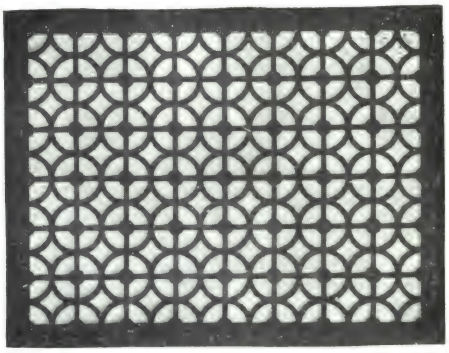
Design 54



Style LK



Design 53



Style M

A Few Grille Designs

For description and full size illustrations of these and other grilles see our booklet "Grilles of Perforated Metal" which will be sent on request

THE HART & COOLEY CO., INC.

Manufacturers of Registers, Grilles and Ventilators

NEW BRITAIN, CONN.

BRANCH OFFICES AND WAREHOUSES

NEW YORK, N. Y., 501 Fifth Avenue — CHICAGO, ILL., 73 East Lake Street

Products

STEEL REGISTERS, FACES, VENTILATORS, and GRILLES.

Rigid Construction of "H & C" Steel Registers

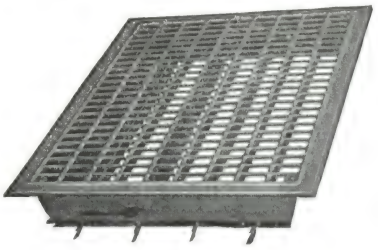
Claims for the superiority of the "H & C" line of registers embrace the finely rounded fretwork of the face, which adds strength and beauty to the register; the heavy braces (see illustration) reinforce the face and afford strength much in excess of any possible requirements; the capacity of free flow of warm air reaches the maximum.

Throughout the entire "H & C" line are combined all the best features in register construction:

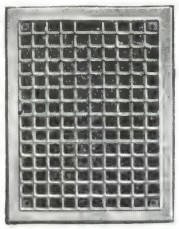
(1) Strength.
(2) Durability of finish.
(3) Maximum air capacity.
(4) Simple construction.
(5) Effectiveness of design.

"H & C" Wrought Steel Floor Registers (Class 200)

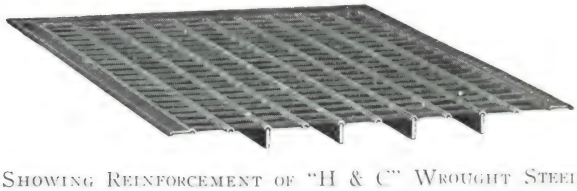
The steel in these registers is of sufficiently heavy gauge to make them rigid and durable, features which have not been sacrificed to obtain light weight. The louvers have solid trunnions securely riveted to each end, insuring free and easy operation. The braces are securely riveted to the box, distributing the strain when in use, an exclusive "H & C" feature. Heavy angles at the corners, insure against stripping threads when attaching face.



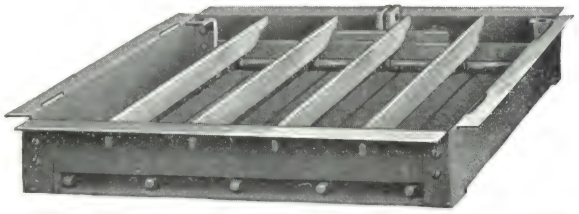
CLASS 200. FLOOR REGISTER



CLASS 250. REGISTER FACE



SHOWING REINFORCEMENT OF "H & C" WROUGHT STEEL REGISTER FACES



CLASS 200. WROUGHT STEEL REGISTER BODY SHOWING HEAVY REINFORCING BRACES

Standard Finishes

This company is equipped to furnish any electroplated finish desired to match hardware. The following finishes are standard and complete details for types of registers, grilles, etc. to which they apply will be sent on request.

Electroplated light bronze, statuary bronze, polished brass, copper (not shaded), oxidized copper, dull brass (brushed), dead black, nickel.

Black japanned, white japanned, white porcelain enamel, gold bronze paint, silver bronze paint, copper bronze paint.

DIMENSIONS OF LEADING SIZES OF "H & C" WROUGHT STEEL FLOOR REGISTERS

Corresponding in Size with the Standard Cast Iron Makes

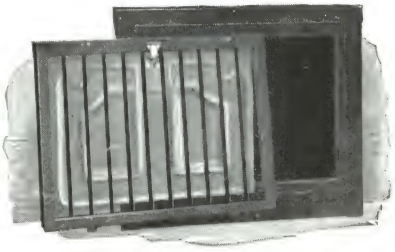
4x6 to 14x22 in. inclusive: Uniform depth open, 2 1/8 in.; closed, 1 1/2 in.
16x16 to 30x42 in. inclusive: Uniform depth open, 5 in.; closed, 3 in.

Body, in.	Register face, in.	Body, in.	Register face, in.	Body, in.	Register face, in.	Body, in.	Register face, in.	Body, in.	Register face, in.
4x 6	5 1/4 x 7 1/4	6x30	7 11/16 x31 5/8	10x10	11 15/16 x11 15/16	14x48	16 1/4 x50 3/16	22x32	24 3/8 x34 3/8
4x 8	5 1/4 x 9 3/4	6x32	7 11/16 x33 3/8	10x12	11 15/16 x13 15/16	16x16	18 5/16 x18 5/16	22x36	24 3/8 x38 3/8
4x10	5 1/4 x11 3/4	7x 7	8 11/16 x 8 11/16	10x14	11 15/16 x15 7/8	16x18	18 5/16 x20 5/16	22x38	24 3/8 x40 3/8
4x12	5 1/4 x13 3/4	7x 9	8 11/16 x10 11/16	10x15	11 15/16 x16 15/16	16x20	18 5/16 x22 5/16	22x40	24 3/8 x42 3/8
4x13	5 1/4 x14 1/4	7x10	8 11/16 x11 11/16	10x16	11 15/16 x17 7/8	16x22	18 5/16 x24 5/16	22x42	24 3/8 x44 3/8
4x15	5 1/4 x16 3/4	7x12	8 11/16 x13 11/16	10x17	11 15/16 x18 7/8	16x24	18 5/16 x26 5/16	24x24	26 3/8 x26 3/8
4x18	5 1/4 x19 1/4	7x14	8 11/16 x15 11/16	10x18	11 15/16 x19 7/8	16x26	18 5/16 x28 5/16	24x26	26 3/8 x28 3/8
4x22	5 1/4 x23 1/4	7x15	8 11/16 x16 11/16	10x19	11 15/16 x20 7/8	16x28	18 5/16 x30 5/16	24x27	26 3/8 x29 3/8
4x24	5 1/4 x25 1/4	8x 8	9 3/4 x 9 3/4	10x20	11 15/16 x21 7/8	16x30	18 5/16 x32 5/16	24x30	26 3/8 x32 3/8
5x 8	6 5/16 x 9 5/16	8x 9	9 3/4 x10 3/4	10x22	11 15/16 x23 7/8	16x32	18 5/16 x34 5/16	24x32	26 3/8 x34 3/8
5x 9	6 5/16 x10 5/16	8x10	9 3/4 x11 3/4	10x24	11 15/16 x25 7/8	16x36	18 5/16 x38 5/16	24x34	26 3/8 x36 3/8
5x10	6 5/16 x11 5/16	8x12	9 3/4 x13 3/4	10x30	11 15/16 x31 7/8	18x18	20 5/16 x20 5/16	24x36	26 3/8 x38 3/8
5x11	6 5/16 x12 5/16	8x14	9 3/4 x15 11/16	12x12	14 1/16 x14 1/16	18x21	20 5/16 x23 5/16	24x38	26 3/8 x40 3/8
5x12	6 5/16 x13 5/16	8x15	9 3/4 x16 11/16	12x14	14 1/16 x16 1/16	18x22	20 5/16 x24 5/16	24x40	26 3/8 x42 3/8
5x13	6 5/16 x14 5/16	8x16	9 3/4 x17 11/16	12x15	13 15/16 x17	18x24	20 5/16 x26 5/16	24x42	26 3/8 x44 3/8
5x14	6 5/16 x15 5/16	8x17	9 3/4 x18 11/16	12x16	14 1/16 x18	18x27	20 5/16 x29 5/16	24x45	26 3/8 x47 3/8
5x15	6 5/16 x16 5/16	8x18	9 3/4 x19 3/4	12x17	14 1/16 x19	18x28	20 5/16 x30 5/16	26x26	28 3/8 x28 3/8
5x16	6 5/16 x17 5/16	8x19	9 3/4 x20 3/4	12x18	14 1/16 x20	18x30	20 5/16 x32 1/4	26x28	28 3/8 x30 3/8
5x17	6 5/16 x18 5/16	8x20	9 3/4 x21 3/4	12x19	14 1/16 x21	18x36	20 5/16 x38 1/4	26x30	28 3/8 x32 3/8
5x18	6 5/16 x19 5/16	8x22	9 3/4 x23 3/4	12x20	14 1/16 x22	20x20	22 3/8 x22 3/8	26x32	28 3/8 x34 3/8
6x 6	7 11/16 x 7 11/16	8x24	9 3/4 x25 3/4	12x22	14 1/16 x24	20x22	22 3/8 x24 3/8	26x34	28 3/8 x36 3/8
6x 8	7 11/16 x 9 11/16	8x27	9 3/4 x28 11/16	12x24	14 1/16 x26	20x24	22 3/8 x26 3/8	28x28	30 3/8 x30 3/8
6x 9	7 11/16 x10 11/16	8x30	9 3/4 x31 11/16	12x30	14 1/16 x32	20x26	22 3/8 x28 3/8	28x30	30 3/8 x32 3/8
6x10	7 11/16 x11 11/16	9x 9	10 7/8 x10 7/8	12x32	14 1/16 x34	20x28	22 3/8 x30 3/8	28x32	30 3/8 x34 3/8
6x12	7 11/16 x13 11/16	9x12	10 7/8 x13 7/8	12x36	14 1/16 x38	20x29	22 3/8 x31 3/8	28x34	30 3/8 x36 3/8
6x14	7 11/16 x15 11/16	9x13	10 7/8 x14 7/8	12x40	14 1/16 x42	20x30	22 3/8 x32 3/8	28x36	30 3/8 x38 3/8
6x15	7 11/16 x16 11/16	9x14	10 7/8 x15 7/8	14x14	16 1/4 x16 1/4	20x32	22 3/8 x34 3/8	28x40	30 3/8 x42 3/8
6x16	7 11/16 x17 11/16	9x15	10 7/8 x16 13/16	14x15	16 1/4 x17 5/16	20x34	22 3/8 x36 3/8	30x30	32 3/8 x32 3/8
6x17	7 11/16 x18 11/16	9x16	10 7/8 x17 13/16	14x16	16 1/4 x18 5/16	20x36	22 3/8 x38 3/8	30x32	32 3/8 x34 3/8
6x18	7 11/16 x19 11/16	9x18	10 7/8 x19 7/8	14x17	16 1/4 x19 5/16	22x22	24 3/8 x24 3/8	30x33	32 3/8 x35 3/8
6x19	7 11/16 x20 11/16	9x20	10 7/8 x21 7/8	14x18	16 1/4 x20 5/16	22x24	24 3/8 x26 3/8	30x34	32 3/8 x36 3/8
6x20	7 11/16 x21 11/16	9x22	10 7/8 x23 7/8	14x19	16 1/4 x21 5/16	22x26	24 3/8 x28 3/8	30x36	32 3/8 x38 3/8
6x22	7 11/16 x23 11/16	9x24	10 7/8 x25 7/8	14x20	16 1/4 x22 5/16	22x28	24 3/8 x30 3/8	30x40	32 3/8 x42 3/8
6x24	7 11/16 x25 11/16	9x28	10 7/8 x29 13/16	14x22	16 1/4 x24 1/4	22x29	24 3/8 x31 3/8	30x42	32 3/8 x44 3/8
6x28	7 11/16 x29 5/8	9x30	10 7/8 x31 13/16	14x24	16 1/4 x26 1/4	22x30	24 3/8 x32 3/8		

Continued on next page

"H & C" Baseboard Registers (Class 170 Series) Quick Detachable Face

The quick detachable register face is formed with vertical round edge bars, which offer slight resistance to free flow of air, insuring a maximum free air capacity of 87½%. Construction is sufficiently rigid to withstand hard usage and lends itself superbly to finishes to match any hardware. Easily attached to tin box or stackhead. As tension is exerted at center of face, one screw regulates the tension. Wood screws are furnished to attach register to studding.



CLASS 170 REGISTERS
(Patent applied for)

CLASS 170 REGISTERS

Last figure and fraction of Class No. indicates depth
Height of all registers from floor to stockhead, 2¼ in.

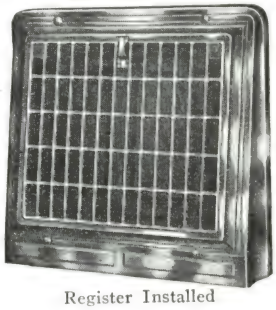
Class No.	Size of body, in.	Class No.	Size of body, in.	Class No.	Size of body, in.
171¼	8x10 8x12	172¼	9x12	174¾	11x13 12x14
		172¾	10x12		
172¼	8x10 8x12	173¼	9x13 11x13	176	12x14

"H & C" Baseboard Registers (Class 140 Series)

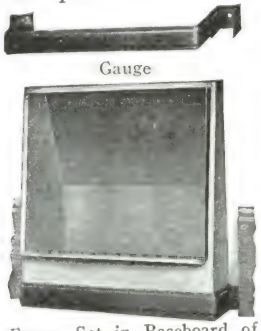
There are two distinct features embodied in this type—the design of the register and the gauge for setting. The refinement of face and generous lines make it especially desirable for high grade work.

By use of the gauge sent with these registers, the installer can practically complete the installation when putting in the rough work and all that is necessary afterward is to slip the register in place. This is done after the completion of the room, thus leaving the finish of the register unimpaired.

Registers are two-piece—the frame formed from a solid piece of metal and the convex quick detachable face. Frame is so arranged that the tin box can be bent over the edge to prevent escape of dust and discoloration of walls.



Register Installed

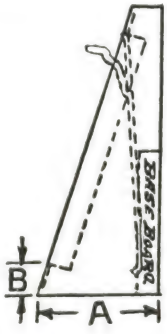


Gauge

Frame Set in Baseboard of Unfinished Room

CLASS 140. BASEBOARD REGISTER

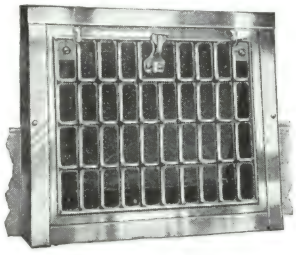
Classes	Size of body, in.	Dimensions, in.	
		A	B
141	8x10	1	3
	8x12	1	3
	9x12	1	3
	10x12	1	3
142¼	9x12	2¼	3
143	10x12	3	3
143½	11x13	3½	3
144	12x14	4	3
145	10x12	5	3
	11x13	5	3
	13x14	5	3



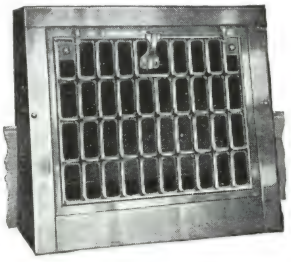
"H & C" Baseboard Registers (Classes 130 and 150 Series) Quick Detachable Face

A quarter turn of the two locking clips at the top of the face securely fastens the face and valve to the frame. Register can be attached to the tin box or stackhead by means of straps, holes for which are provided. Wood screws are furnished for attaching registers to studding.

THE BASEBOARD REGISTER WITH THE QUICK DETACHABLE FACE



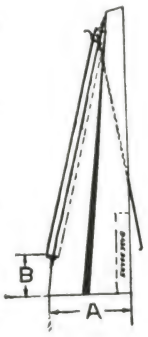
Class 130



Class 150

CLASSES 130 AND 150. QUICK DETACHABLE BASEBOARD REGISTERS

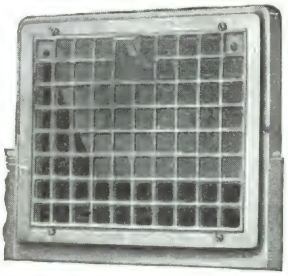
Size of body, in.	Class 130 Series	Dimensions, in.		Class 150 Series	Dimensions, in.	
		A	B		A	B
8x10	131¼	1¼	1 3/16	151¼	1¼	2¼
8x12		1¼	1 3/16		1¼	2¼
9x12		1¼	1 3/16		1¼	2¼
10x12		1¼	1 3/16		.....	.....
8x10	132¼	2¼	1 3/16	152¼	2¼	2¼
8x12		2¼	1 3/16		2¼	2¼
8x13		2¼	1 3/16		.....	.....
9x12		2¼	1 3/16		2¼	2¼
10x12		2¼	1 3/16		2¼	2¼
10x12	132¾	2¾	1 3/16	152¾	2¾	2¼
10x13		2¾	1 3/16		.....	.....
10x14		2¾	1 3/16		.....	.....
11x13	133¼	3¼	1 3/16	153¼	3¼	2¼
12x14		3¼	1 3/16		.....	.....
11x13	134¾	4¾	1 3/16	154¾	4¾	2¼
12x14		4¾	1 3/16		4¾	2¼



"H & C" Baseboard Register (Class 125)

Designed for upper floor work where capacity of riser pipe limits amount of air that can be brought to the register and there is nothing gained by cutting out the floor.

The use of this register avoids the necessity of placing registers above baseboard or building special moulding on which to mount them. Wood screws furnished for attaching registers to studding. Sizes, 8x10, 8x12, 9x12 and 10x12 in.



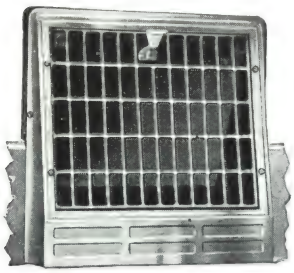
CLASS 125. 1-IN. BASEBOARD REGISTER

Continued on next page

"H & C" Baseboard Registers (Classes 100 and 115)

Class 100—So constructed that floor can be cut out 3 in. from wall line, permitting use of larger supply pipe from heater. Sizes, 7x10, 7x12, 8x13, 10x12, 10x14 and 12x14 in.

Class 115—Designed primarily for use where two registers are connected with one supply pipe. By cutting the floor a greater distance from baseboard (5 in.), a larger supply pipe can be brought from heater, giving a greater amount of air for each register. Sizes, 10x12, 10x14 and 12x14 in.

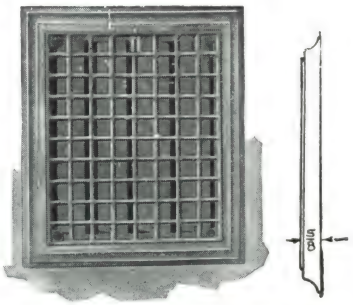


CLASS 100. 3-IN BASEBOARD REGISTER

CLASS 115. 5-IN. BASEBOARD REGISTER

"H & C" Convex Side Wall Register (Class 220)

A multiple valve register for shallow flues. The convex face brings out prominently the beauty of the corrugated design which is a predominant "H & C" feature. Sizes, 8x10, 8x12, 9x12, 10x12 and 10x14 in.



CLASS 220. CONVEX SIDE WALL REGISTER

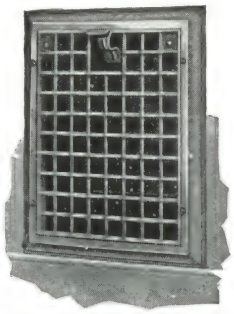
"H & C" Single Valve Side Wall Registers (Classes 340 and 350)

Very easily installed.

Class 340 is for horizontal setting; class 350 for vertical setting.

Face and valve shipped assembled and need not be taken apart.

A small frame is the third member, which can be fastened to the tin box by loops; to this the face and valve are screwed and the register is in position. Sizes, 8x10, 8x12, 9x12, 10x12 and 10x14 in.



CLASS 350. SINGLE VALVE REGISTER WITH CONVEX FACE, VERTICAL

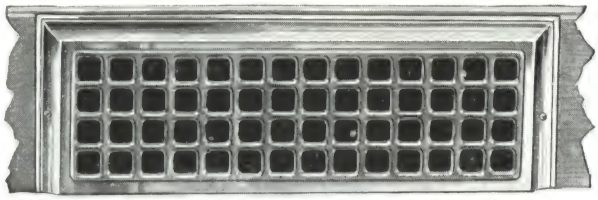
Operating Device for Single Valve Registers

All "H & C" single valve baseboard and sidewall registers are equipped with standard "H & C" operating mechanism.

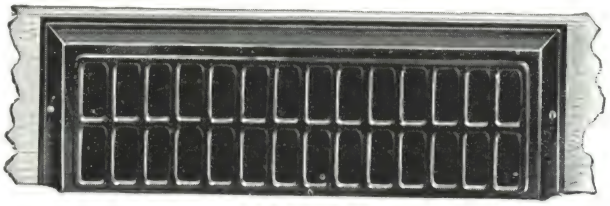
This includes an operating handle of neat design, operated with either hand or foot. It does not project to catch clothing. Action is positive. Screws for adjusting tension take up all play and increase or diminish friction as desired.

"H & C" Convex Baseboard Ventilating Plates

The openings in these plates come close to the floor, making them very efficient in removing foul air and creating a thorough circulation. The edges fit tight to the baseboard, another important feature.



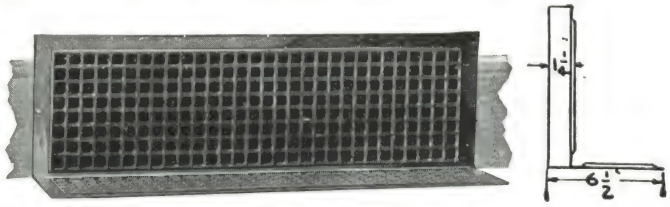
CLASS 645. CONVEX VENTILATING PLATES
Sizes, 5x14 and 5x30 in.



CLASS 655. CONVEX VENTILATING PLATE
Sizes, 5x14 and 5x30 in.

"H & C" Cold Air Intake (Class 635)

This intake is an entirely new pattern which has openings on both wall and floor, taking cold air from the lowest possible point. One part sets flush with the baseboard and the other part flush with the floor.



CLASS 635. COLD AIR INTAKE

4" on wall, 4" on floor, 8"x30" opening	5½"x5½"x32" over all
8" on wall, 5" on floor, 13"x30" opening	9½"x6½"x32" over all

"H & C" Cold Air Intake (Class 600)

This intake is made to project 3 in. from the wall.

The sizes on all intakes are so arranged that joists do not have to be cut. Two round head wood screws are packed with each intake.

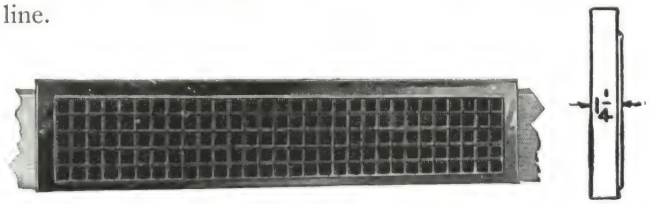
CLASS 600. COLD AIR INTAKE

Opening, in.	10 x14	10 x30
Over all, in.	11½x16	11½x32

"H & C" Cold Air Intake (Class 625)

This intake is the sidewall type which can be installed without cutting floor and does not interfere with the use of rugs or carpets. Sets flush with baseboard.

All intakes have square holes with rounded fretwork, which is a distinctive feature of the "H & C" line.



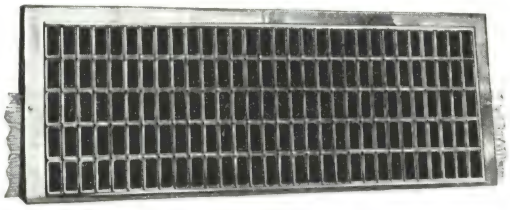
CLASS 625. COLD AIR INTAKE

Opening, in.	4 x14	4 x30	5 x14	5 x30
Over all, in.	5½x16	5½x32	6½x16	6½x32

Continued on next page

"H & C" Cold Air Intake (Class 605)

This intake is designed for those who prefer side-wall intakes and outlets to gratings for pipeless furnace work. Can be used with any standard single casing furnace. Intake is made with depth or throat varying from 3 to 6½ in. Two round head wood screws are packed with each intake.



CLASS 605. COLD AIR INTAKE

Opening, in....	8 x13	10 x12	10 x14	10 x30	11 x13	12 x14
Over all, in....	9½x15½	11½x14¼	11¼x16⅜	11½ x32	12⅛ x15⅜	13½ x16⅜
Opening, in....	12 x15	12 x30	14 x15	14 x30	16 x15	16 x30
Over all in....	13⅜x17⅛	13⅜x31 13/16	15 11/32x17⅛	15 11/32x31 13/16	17⅜ x17⅛	17⅜ x31 13/16

"H & C" Grilles

For ventilation, indirect heating, inserting in stair risers, etc. Furnished in lengths not exceeding 8 ft., in steel, solid brass or bronze metal, formed to any radius. In ordering, give both size of opening and over-all dimensions.

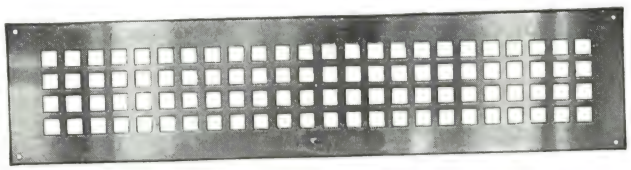
Class 550—Similar to our register faces; ¾-in. holes, ¼-in. crimped bars. Adaptable to small grilles and made in widths up to 16 in. over all.

Made from No. 16 gauge metal.

CLASS 550. GRILLE

Class 570—Has ½-in. square holes and ¼-in. bars—best adapted to grilles of narrow widths, but can be made up to 30 in. wide.

Made from No. 12 gauge metal or thinner.



CLASS 570. GRILLE

Class 575—Our most popular design. Similar to class 570, with ¾-in. square holes and ¼-in. bars. Adapted to all sizes of grilles. Made up to 50 in. wide over all in one piece.

Made from No. 12 gauge metal or thinner.

Class 580—Designed for use where a light grille will answer. Widths, 3 to 16 in. over all. Made of No. 16 gauge metal but are not corrugated, therefore not as strong as class 550. Unless otherwise specified, holes will be drilled in margin for No. 9 round head wood screws.

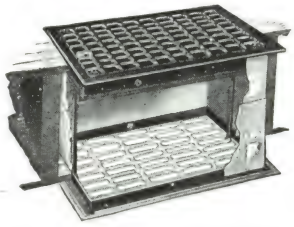
Class 590—Designed for ventilation without permitting a view to space beyond. Louvers or hoods can be 7½ or 4 in. Widths, 6 to 30 in.

Made from No. 16 gauge metal or thinner.

CLASS 590. GRILLE

"H & C" Adjustable Ventilators

Designed to carry surplus heat from a lower to an upper floor room, each consists of one "H & C" black floor register and one "H & C" white face, attached to a tin box which is adjustable from 7 to 12 in. in depth.



CLASS 2250. ADJUSTABLE VENTILATOR

Easy to install.

Allow a maximum of heat to pass through and create warm upper rooms.

Sizes, 8x10, 9x12, 10x12, 10x14, 12x14, 12x15 and 14x22 in.

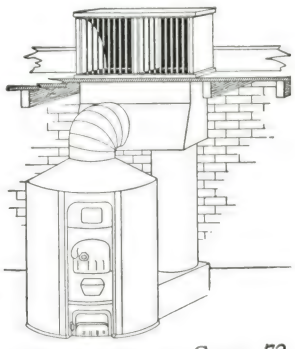
"H & C" Wall Seats (Class 70 Series)

These wall seats have combination warm and cold air openings. Designed for use against walls or partitions. Made in sizes adapted for 14-, 16-, 18- and 20-in. warm air pipe.

Class 71—In connection with this warm air wall seat, various forms of cold air intakes can be used; either Class 250 floor faces or any style of baseboard intake—preferably Classes 6025 or 605. Cold air can be taken from the most desirable place.

Class 72—A combination warm and cold air wall seat not requiring a special boot. Can be used with a single casing furnace.

CLASS 72. WALL SEAT



INSTALLATION OF CLASS 72 WALL SEAT

ESTABLISHED 1854 INCORPORATED 1909

WM. HIGHTON & SONS COMPANY

Registers, Ventilators, Grilles and Screens

HOME OFFICE AND WORKS

NASHUA, N. H.

BRANCH WAREROOMS

BOSTON, MASS., 48 Portland Street
NEW YORK, N. Y., E. H. Page, 39 Cortlandt Street
CINCINNATI, OHIO, Wm. Grier
PHILADELPHIA, PA., 129-131 Bread Street
BALTIMORE, MD., Edwin Cugle & Co., 328 North Charles Street
DETROIT, MICH., L. T. Ollesheimer, Penobscot Building

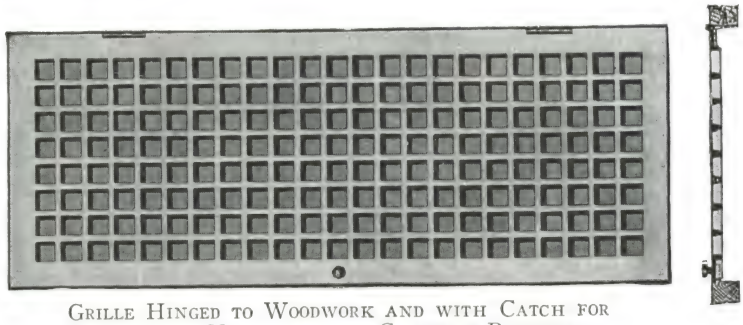
Products

Manufacturers of a complete line of Regular and Lock Controlled Registers, Ventilators, Grilles, Screens and Register Borders, in Brass, Bronze, Cast Iron, Steel and Wire.

For Memorials and Tablets in cast bronze, see page 612.

"Highton" Quality

The "Highton" make of registers has stood the test of 61 years. In design, workmanship and materials, the registers represent a high standard of quality, every phase of their production being carefully supervised by trained men.



Grille Hinged to Woodwork and with Catch for Access to Valves and for Cleaning Purposes

Designs and Finishes

"Highton" stock registers, grilles, screens, etc., are made in a large variety of designs and sizes which will regularly meet the requirements of various styles of decoration. When specially desired, however, exclusive designs can be produced from architects' or this company's special drawings.

Standard finishes are black japanned or priming coat, white japanned, gold bronzed, white porcelain enameled and electroplated. Electroplated finish and solid bronze or brass can be furnished to match hardware if desired.

Registers

Cast—The cast register admits of a large variety of designs, is the most durable register made, and presents a more substantial appearance than any other type.

Semisteel—Large air capacity, light weight, and strength are secured in this type of register. The face is cast iron; all other parts are of wrought steel.

Grilles and Screens

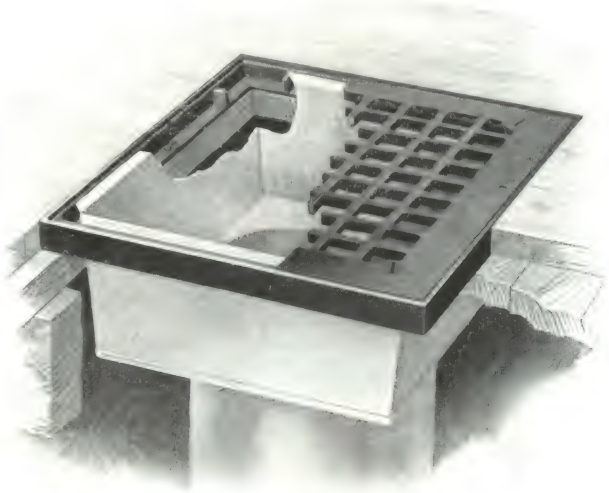
Cast brass, cast bronze and cast iron are recommended as the most suitable materials for finely finished grilles to cover steam coils and enclosed radiators, or for ventilation. These are made also in perforated steel and woven wire. All finishes.

Grille No. 261

Concealed Border

The concealed border forms a frame in which to place a floor register so that it can be readily removed. The border is screwed to the rough floor and the finished floor is butted against the border when laid and no further fitting of the register in the floor is required. The border is only about ⅛ in. larger all around than the register face.

Patented, October 18, 1921.



Concealed Register Border
Patented October 18, 1921

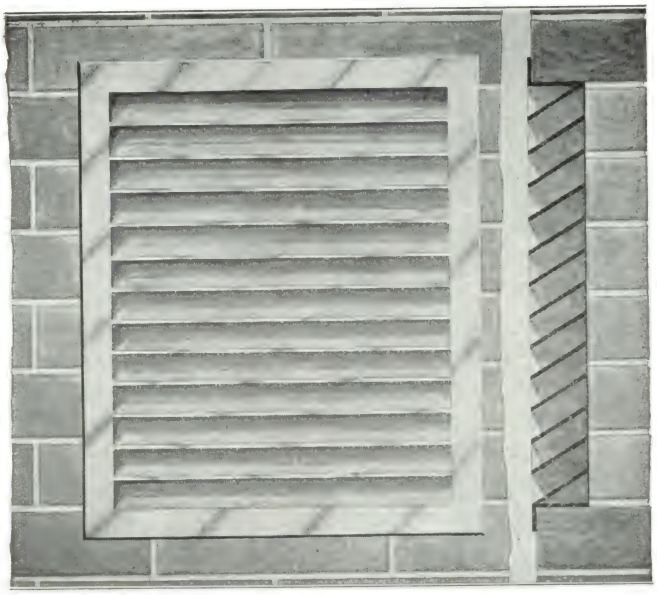
The Highton Special Side Wall Air Inlet Ventilator

With stationary louvers for use on outside of building as a fresh air inlet.

Made in any size and to order only, cast iron, brass or bronze metal.

Extra heavy and constructed so as to exclude rain or snow.

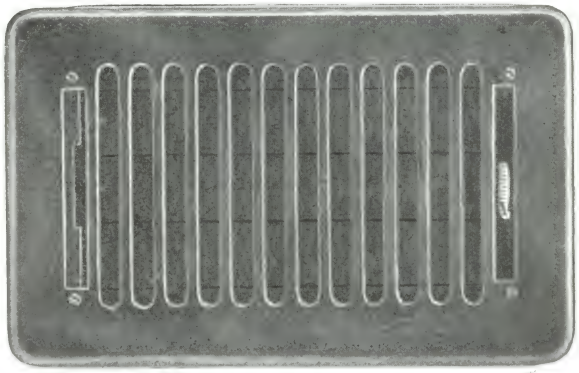
Continued on next page



THE HIGHTON SPECIAL SIDE WALL AIR INLET VENTILATOR

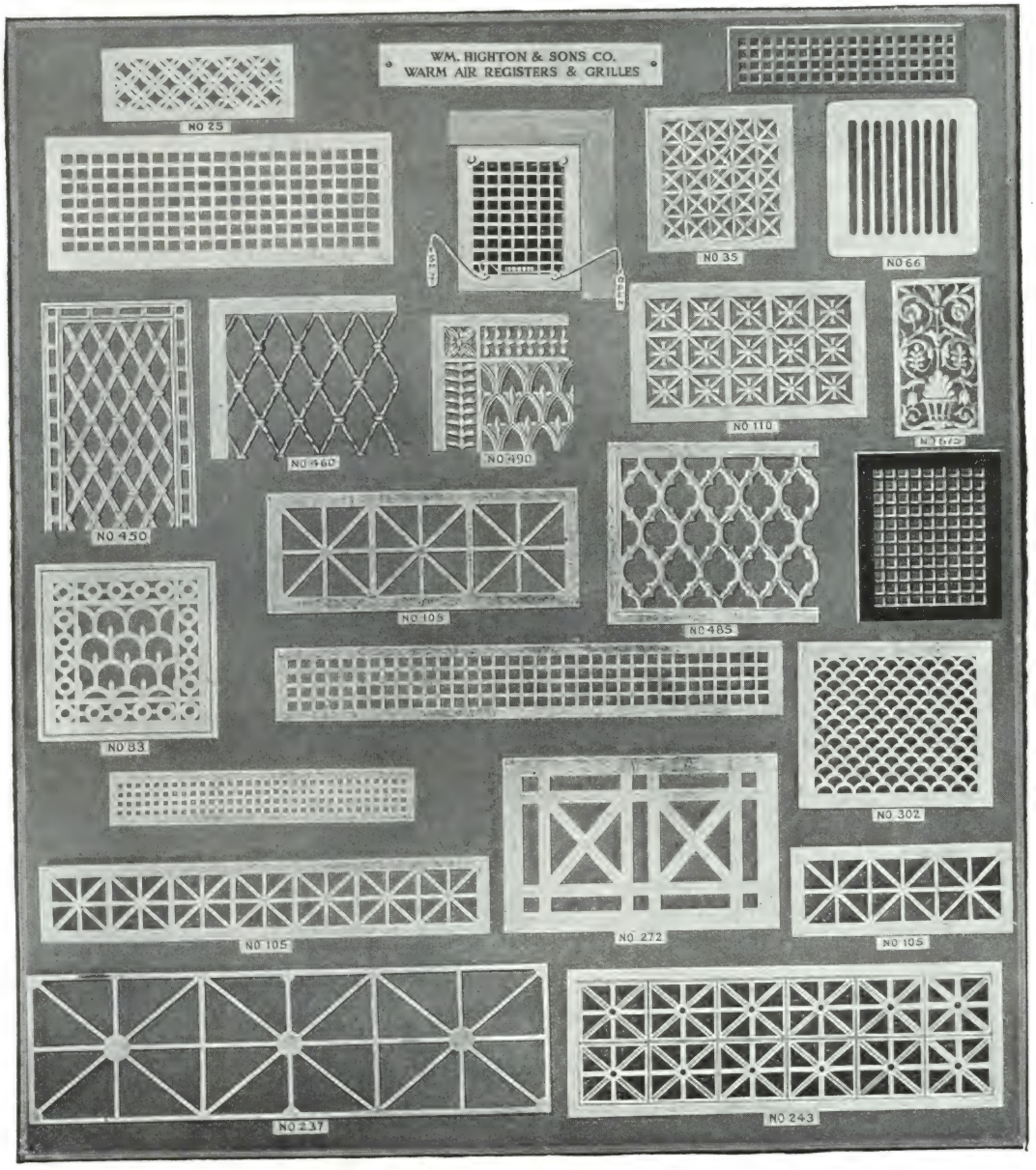
When ordering give horizontal dimension first, and mark "wide" and "high" after the dimensions.

Write for further information.



SANITARY DESIGN REGISTER

For hospitals and other public institutions, office buildings and wherever the best sanitary conditions are desired



SPECIAL DESIGN GRILLES

ESTABLISHED 1846

TUTTLE & BAILEY MFG. CO.

Registers, Ventilators, Grilles and Screens

2 West 45th Street
NEW YORK, N.Y.

FACTORIES
BROOKLYN, N. Y.
BRIDGEBURG, ONT.

BRANCH OFFICES

CHICAGO, ILL., 1123 West 37th Street

BOSTON, MASS., 36 Portland Street

Products

REGISTERS, VENTILATORS, GRILLES and RADIATOR ENCLOSURES of stock or special design, in wire, stamped metal (steel), cast iron, cast Ferrocraft metal, bronze or brass.

Registers and Ventilators

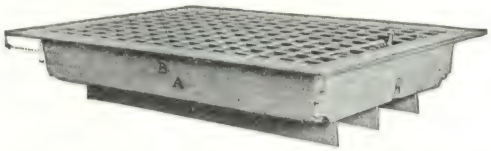
When a register or ventilator is specified we understand it to mean complete with valves to open and close (see cut "A"). When necessary to operate by chain or cord it should be ordered as a sidewall pulley register or a ceiling pulley register. Registers and ventilators are made in the styles described below.

Stamped Metal (All-wrought Steel)—Steel registers are lighter in weight than either Ferrosteel or Ferrocraft goods and there is a consequent saving in freight. They are especially well adapted for export trade but are also used for domestic consumption, particularly in the cheaper class of work. They are non-breakable and the face is rigidly braced with strengthening bars. The movement is our patent roller bearing one; the valves open and close smoothly without any catch or hitch, and when fully closed lock automatically. This self-locking feature is extremely important, especially when the register is used with a forced draft, as it is impossible for the draft to open the valves. The bevelled bottom insures easy setting. The design is limited to the Plain Lattice.

Ferrosteel (Semi-steel)—To secure the advantages of the cast face—that is, ornamental design, large air capacity, strength and durability—with the light weight of the steel bottom, the Ferrosteel register has been designed. All parts except the face are all-wrought steel. The valves, operating movement, etc. (including the self-locking feature) are the same as on the stamped metal register described above. The Ferrosteel register can be supplied with any design of face, either stock (Plain Lattice or Indian Lattice), or special.

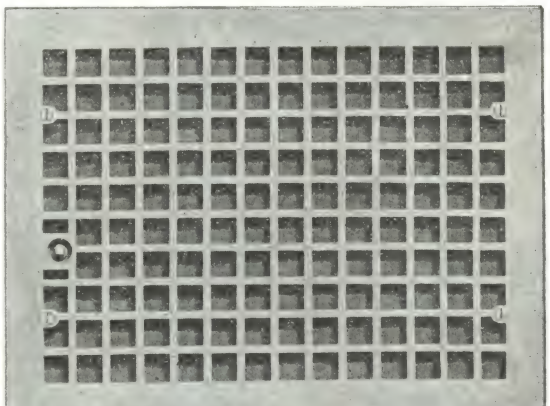
Ferrocraft (All-cast)—Ferrocraft registers are the best that can be made. They are cast throughout, no stampings to bend or rust. They are more durable than the stamped metal or the Ferrosteel. They are made in an infinite variety of design and have a most substantial appearance. The vertical wheel movement, patented by us in 1846, remains today the most satisfactory device for operating the valves of the register. It works smoothly, does not become clogged by dirt, and is practically noiseless. Ferrocraft is more expensive and heavier, but where used for interior decoration, especially in period rooms, registers should receive all the care that would ordinarily be bestowed on any fine hardware. (See Ferrocraft metal grilles on following page.)

Bronze or Brass Metal (Cast)—Registers with either cast iron or stamped steel bottoms can be made with faces of cast bronze or brass. They are carefully hand chased and finished with all the care that is given to Ferrocraft goods.



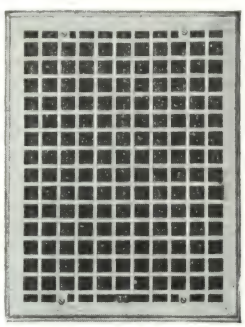
STYLE 30. CUT "A" FERROCRAFT REGISTER, PLAIN LATTICE, ALL CAST

Suitable for floor, wall or ceiling. "A" is size of opening in floor or wall; "B," extreme size register face. In ordering specify "Ferrocraft registers" giving opening size "A" which in stock goods runs to even inches

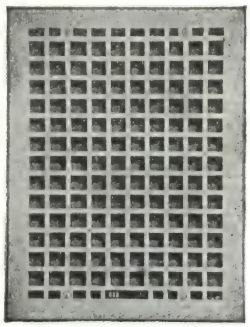


CUT "B" FERROCRAFT KEY OPERATING (LOCK) REGISTER

Made only in "all-cast," the valves are operated by use of key. In ordering specify "Ferrocraft lock registers." Made in all standard sizes of plain lattice design



STYLE 70. PLAIN LATTICE ALL-STEEL



STYLE 60. PLAIN LATTICE FERROSTEEL

Sizes and method of ordering same as Ferrocraft registers. See Cut "A" above

Continued on next page

Grilles and Radiator Enclosures

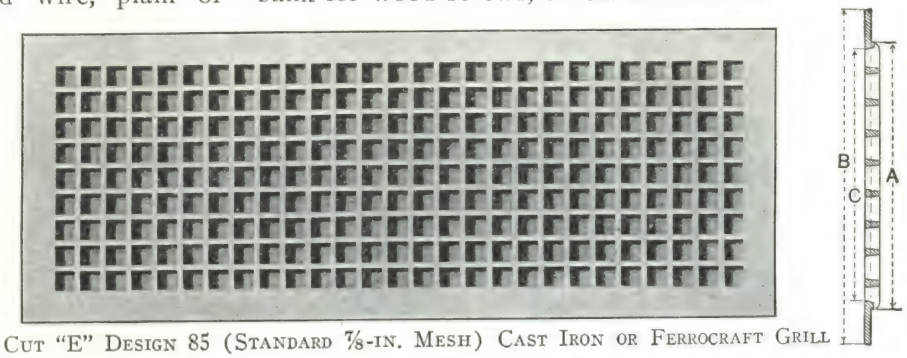
These are the largest and most conspicuous pieces of hardware in a room and they are receiving a corresponding amount of attention in any scheme of decoration. The old-fashioned style of direct steam heat has given way to direct and direct-indirect heating with plenty of air and no radiators to disfigure the room. This permits the use of ornamental grilles designed to suit the various styles of decoration. Where radiators project into the room, radiator enclosures, either three or four sided, are furnished with suitable top. The enclosure may be entirely of metal, or wood with metal grilles. Wire, stamped metal (steel), cast iron, Ferrocraft metal, brass and bronze are the materials used, each of which is briefly described below.

Wire Grilles—Flat or round wire, plain or crimped, of all gages, sizes of mesh and finishes, are furnished with channel iron or angle iron frames with mitered or ornamental corners. They are cheap in cost and appearance.

Stamped Metal (Steel) Grilles—These are the cheapest form of grilles and by their very nature have marked limits of design. They lack distinction and their common use makes the effect monotonous. Although ordinarily made in No. 12 gage cold rolled steel, they are more flimsy looking than cast grilles. Four designs are shown: Plain Lattice 7/8-in. mesh; Plain Lattice 1/2-in. mesh; Diagonal Lattice 1/2-in. mesh; Grecian Lattice 4-in. unit; known respectively as Styles 01, 02, 03 and 04.

For convenience in laying out opening sizes which will correspond as nearly as possible with the daylight openings, the table below is given showing the daylight openings as they work out for each of these 4 designs by using various numbers of punched holes or units. In cut "E" it will be noted that "C" is the daylight opening and "B" the extreme dimensions of the grille. This latter can be any desired size, except that in steel grilles if both daylight and extreme dimensions are specified rims may not work out evenly all round. Where daylight size is specified with no extreme given we make rims approximately 3/4 to 1 in. all around over daylight size. Where opening in wall and extreme size of grille is given, we make daylight opening the nearest approximation to wall opening that will allow a slight overlap of material over opening. It is desirable, however, that daylight openings should be specified so that they will work out to the dimensions indicated in the table.

Cast Iron Grilles—If cast iron grilles are specified we understand that a quality comparing favorably with the ordinary ornamental iron grilles will be acceptable. Such grilles can be furnished in any of our special designs in any japan or electroplated finish, or with a prime coat suitable for painting or decorating, if so ordered. Cut "E" shows construction of an ordinary cast iron grille and unless otherwise stated we assume that sizes given are in every case the size of opening "A." Not drilled or countersunk for wood screws, unless so ordered.



CUT "E" DESIGN 85 (STANDARD 7/8-IN. MESH) CAST IRON OR FERROCRAFT GRILL

Ferrocraft Metal Grilles—The height of the grillemaker's art. Real oldtime craftsmen make the patterns in metal and lovingly hand-chase every choice little detail. The use of Ferrocraft metal makes their final rendering a faithful reproduction of the design. Instead of losing in the finished subject, it is enhanced as only the touch and handling of master craftsmen can give. As the grilles are used for interior decoration, no expense is spared. The name "Ferrocraft" is on the back of every piece. They do not compete in cost with job foundry work but their value is apparent.

Brass or Bronze Metal Grilles—Made in any design and hand-chased and finished with all the care that is bestowed on Ferrocraft goods. Specifying and ordering details are the same as outlined under cast iron grilles.

DAYLIGHT OPENINGS "C" FOR STEEL GRILLES OF VARIOUS DESIGNS SHOWN ON FOLLOWING PAGE

Number of punch holes or units	Size of opening "C," in. Styles 01	02	03	04
1	27/32	1 1/2	1 3/32	3 1/2
2	1 29/32	1 3/16	2 1/16	7 3/8
3	2 15/16	1 7/8	3 1/32	11 1/4
4	4	2 9/16	4	15 7/8
5	5 1/16	3 1/2	5	19
6	6 3/32	3 15/16	5 31/32	22 7/8
7	7 3/32	4 5/8	6 15/16	26 3/4
8	8 3/32	5 5/16	7 29/32	30 5/8
9	9 3/32	6	8 7/8	34 1/2
10	10 5/16	6 11/16	9 27/32	38 3/8
11	11 3/8	7 3/8	10 13/16	42 1/4
12	12 7/16	8 1/16	11 25/32	46 1/8
13	13 15/32	8 3/4	12 25/32	50
14	14 1/32	9 7/16	13 23/32	53 7/8
15	15 1/32	10 1/8	14 23/32	57 3/4
16	16 5/8	10 13/16	15 11/16	61 5/8
17	17 11/16	11 1/2	16 1/32	65 1/2
18	18 3/4	12 3/16	17 5/8	69 3/8
19	19 25/32	12 7/8	18 19/32	73 1/4
20	20 27/32	13 9/16	19 9/16	77 1/8
21	21 29/32	14 1/4	20 17/32	81
22	22 31/32	14 15/16	21 1/2	84 7/8
23	24	15 5/8	22 15/32	88 3/4
24	25 1/16	16 5/16	23 7/16	92 5/8

Number of punch holes or units	Size of opening "C," in. Styles 01	02	03
25	26 1/8	17	24 7/16
26	27 5/32	17 11/16	25 13/32
27	28 7/32	18 3/8	26 3/8
28	29 5/32	19 1/16	27 11/32
29	30 5/16	19 3/4	28 5/16
30	31 3/8	20 7/16	29 9/32
31	32 5/16	21 1/8	30 1/4
32	33 15/32	21 13/16	31 7/32
33	34 17/32	22 1/2	32 9/16
34	35 19/32	23 5/16	33 5/16
35	36 5/8	23 7/8	34 5/32
36	37 11/16	24 5/16	35 1/8
37	38 3/4	25 1/4	36 5/32
38	39 25/32	25 15/16	37 1/16
39	40 27/32	26 5/8	38 1/32
40	41 29/32	27 5/16	39
41	42 31/32	28	39 31/32
42	44	28 11/16	40 15/16
43	45 1/16	29 3/8	41 29/32
44	46 1/8	30 1/16	42 29/32
45	47 5/32	30 3/4	43 7/8
46	48 7/32	31 7/16	44 27/32
47	49 9/32	32 1/8	45 13/16
48	50 11/32	32 13/16	46 25/32

Number of punch holes or units	Size of opening "C," in. Styles 01	02	03
49	51 3/8	33 1/2	47 3/4
50	52 7/16	34 3/16	48 33/32
51	53 1/2	34 7/8	49 11/16
52	54 17/32	35 9/16	50 21/32
53	55 19/32	36 1/4	51 1/32
54	56 21/32	36 15/16	52 5/8
55	57 23/32	37 5/8	53 19/32
56	58 3/4	38 5/16	54 9/16
57	59 13/16	39	55 17/32
58	60 27/32	39 11/16	56 1/2
59	61 29/32	40 3/8	57 15/32
60	62 31/32	41 1/16	58 7/16
61	64 1/32	41 3/4	59 13/32
62	65 3/32	42 7/16	60 3/8
63	66 5/32	43 1/8	61 3/8
64	67 3/16	43 15/16	62 11/32
65	68 1/4	44 1/2	63 5/16
66	69 9/32	45 3/16	64 9/32
67	70 11/32	45 7/8	65 1/4
68	71 13/32	46 9/16	66 3/32
69	72 15/32	47 1/4	67 5/16
70	73 1/2	47 15/16	68 5/32
71	74 9/16	48 5/8	69 1/8
72	75 5/8	49 5/16	70 3/32

Number of punch holes or units	Size of opening "C," in. Styles 01	02	03
73	76 21/32	50	71 3/32
74	77 23/32	50 11/16	72 1/16
75	78 25/32	51 3/8	73 1/32
76	79 27/32	52 1/16	74
77	80 7/8	52 3/4	74 31/32
78	81 15/16	53 7/16	75 15/16
79	83	54 1/8	76 29/32
80	84 1/32	54 13/16	77 7/8
81	85 3/32	55 1/2	78 27/32
82	86 5/32	56 3/16	79 13/16
83	87 7/32	56 7/8	80 13/16
84	88 1/4	57 9/16	81 25/32
85	89 5/16	58 1/4	82 3/4
86	90 3/8	58 15/16	83 23/32
87	91 13/32	59 5/8	84 11/16
88	92 15/32	60 5/16	85 21/32
89	93 17/32	61	86 5/8
90	94 9/16	61 11/16	87 19/32
91	95 5/8	62 3/8	88 9/16
92	.....	63 1/16	89 17/32
93	.....	63 3/4	90 17/32
94	.....	64 7/16	91 1/2
95	.....	65 1/8	92 15/32
96	.....	65 13/16	93 7/16
97	.....	66 1/2	94 13/16

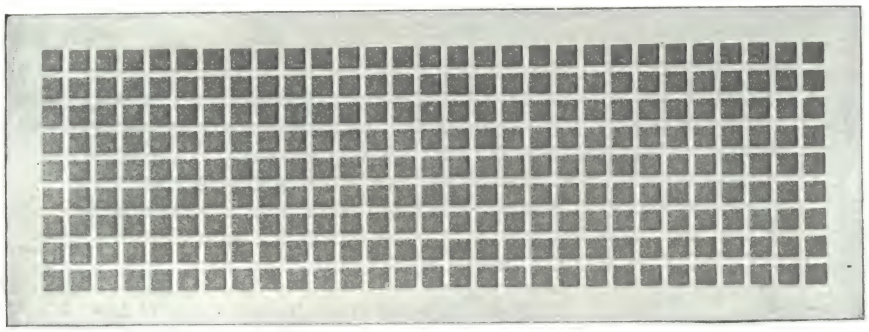
Number of punch holes or units	Size opening "C," in. Styles 02
98	67 5/16
99	67 7/8
100	68 9/16
101	69 1/4
102	69 15/16
103	70 5/8
104	71 5/16
105	72
106	72 11/16
107	73 3/8
108	74 1/16
109	74 3/4
110	75 7/16
111	76 1/8
112	76 13/16
113	77 1/2
114	78 3/16
115	78 7/8
116	79 9/16
117	80 1/4
118	80 15/16
119	81 5/8
120	82 5/16
121	83

Number of punch holes or units	Size opening "C," in. Styles 02
122	83 11/16
123	84 3/8
124	85 1/16
125	85 3/4
126	86 7/16
127	87 1/8
128	87 13/16
129	88 1/2
130	89 3/16
131	89 7/8
132	90 9/16
133	91 1/4
134	91 15/16
135	92 5/8
136	93 5/16
137	94

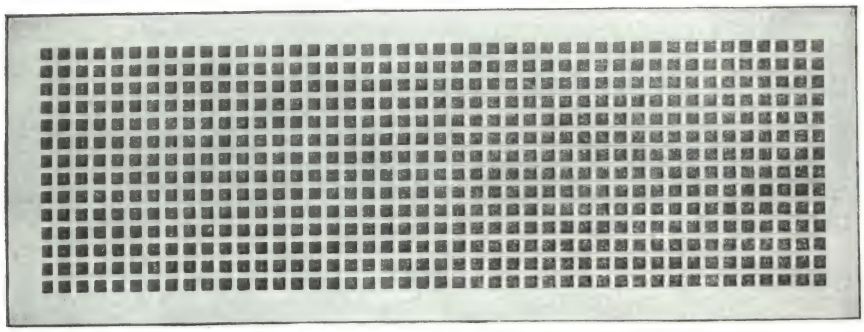
Continued on next page

Stamped Metal (Steel Grilles)

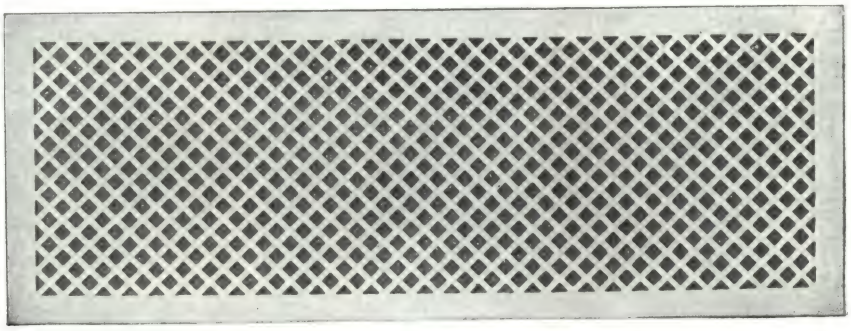
The table on previous page shows the daylight openings "C" as they work out for the designs shown on this page by using various numbers of punched holes or units.



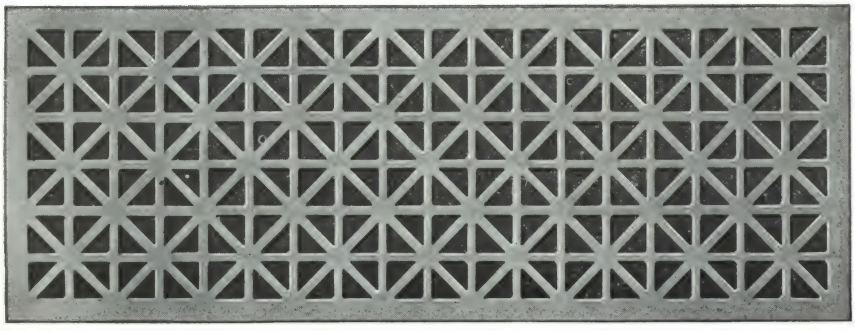
STYLE "O1" STANDARD ⅞-IN. MESH GRILLE



STYLE "O2" ½-IN. MESH GRILLE



STYLE "O3" ½-IN. DIAGONAL MESH GRILLE



STYLE "O4" 4-IN. GRECIAN MESH GRILLE

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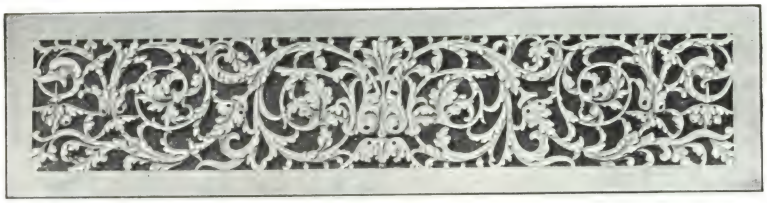

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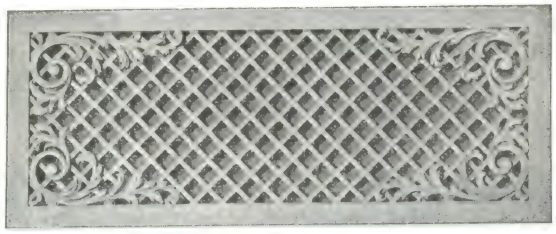

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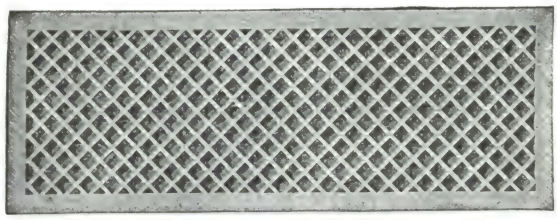

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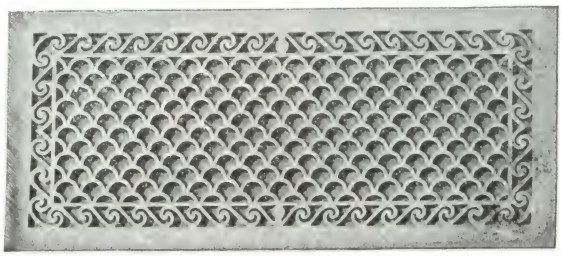

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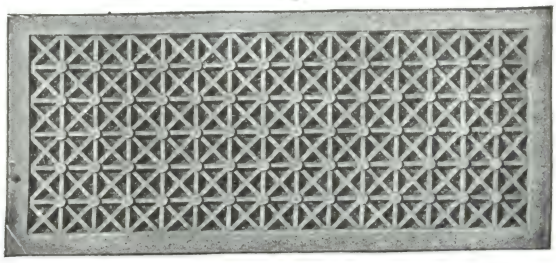

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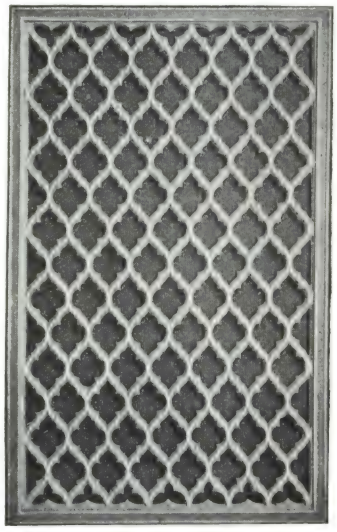

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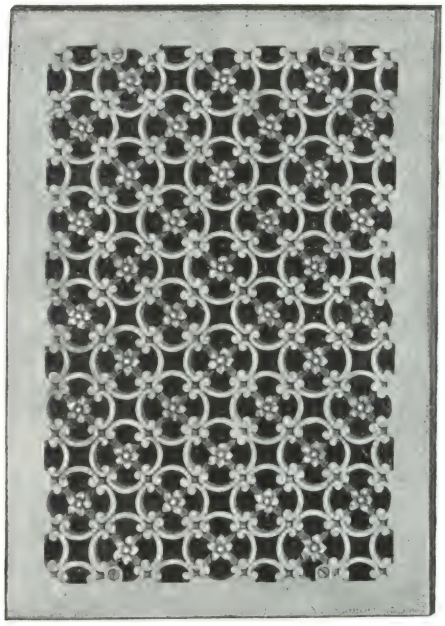

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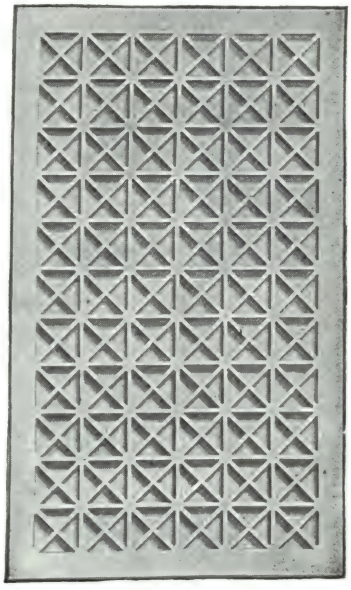

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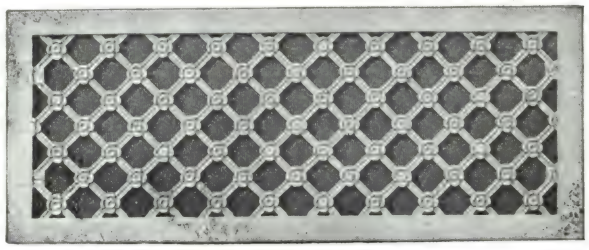

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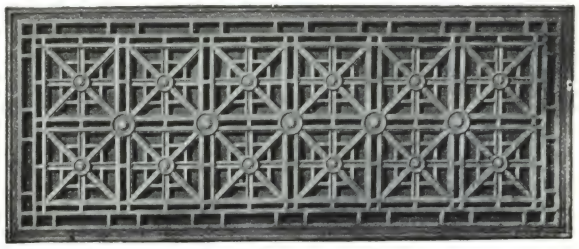


Design No. 298

A Few Examples of Ferrocraft Grilles

UNITED STATES REGISTER CO.

BATTLE CREEK, MICH.

BRANCH OFFICES AND FACTORIES

MINNEAPOLIS, MINN. KANSAS, CITY, MO. DES MOINES, IOWA ALBANY, N. Y.

Products

BASEBOARD REGISTERS.
FLOOR REGISTERS.
VENTILATING SCREENS and FACES.

Registers and Cold Air Intakes

Jones-National Registers — These registers are mechanically perfect, are made of solid drawn cold rolled steel and are perfectly embossed and finished. Furnished with double metal boxes complete.

Center of Jones-National Register is removable. Note how sealing strip on register box bends over frame to make a tight box connection—this keeps the walls clean. The same superior features prevail in all sizes and styles.

JONES-NATIONAL REGISTER
Complete with double box

JONES-NATIONAL REGISTERS

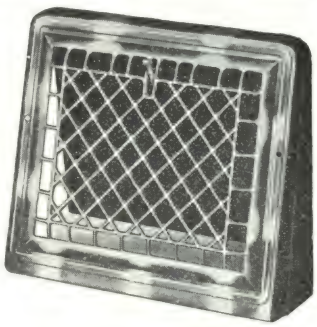
First floor single head sizes				First floor double head sizes				Second floor single and double head sizes			
Catalogue No.	Register face, in.	Base extension from plaster, in.	Basement pipe, in.	Catalogue No.	Register face, in.	Base extension from plaster, in.	Basement pipe, in.	Catalogue No.	Register face, in.	Base extension from wall, in.	Single wall stack, in.
811	10x 8	2 1/4	8	826	2–12x 9	2 3/8	10	810	1–10x 8	1 1/8	3 1/2x10
813	12x 9	2 3/8	9	829	2–12x10	2 3/8	12	812	1–12x 9	1 1/8	3 1/4x12 or 3 1/2x12 1/2
814 1/2	12x10	2 3/8	10	830	2–13x11	3 1/4	14				
815	13x11	3 1/4	12	836	2–14x12	3 7/8	14 or 16	814	1–12x10	1 1/8	3 x13 or 3 1/2x13 1/2
818	14x12	3 7/8	12 or 14	8529	2–12x10	5	12				
8514 1/2	12x10	5	10 or 12	8530	2–13x11	5	14	820	2–10x 8	1 1/8	3 x10 or 3 1/2x10 1/2
8515	13x11	5	12 or 14	8536	2–14x12	5	16				
8518	14x12	5	14 or 16					824	2–12x 9	1 1/8	3 1/4x12 or 3 1/2x12 1/2
								828	2–12x10	1 1/8	3 x13 or 3 1/2x13 1/2

International Registers—These registers are made of a cold rolled steel perfectly formed and embossed. Center is removable. Same design as the Jones-National, but furnished without register box.

The same attractive practical, and pleasing features prevail with International as with Jones-National registers.

All sizes of International registers are of same design and boxes set same distance from floor line. No welded corners to break or harsh lines to displease—an improvement to any home.

Furnace installers welcome Jones-National and International registers wherever introduced.



INTERNATIONAL REGISTER

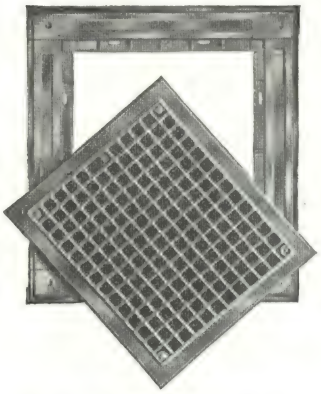
No.	Size, in.	Base extension from Wall, in.	Warm air pipe in.
SECOND FLOOR			
153	10x 8	1 1/8	3 1/2x10
152	12x 8	1 1/8	3 1/2x12
154	12x 9	1 1/8	3 1/2x12
FIRST OR SECOND FLOOR			
153 1/2	10x 8	2 3/8	8
152 1/2	12x 8	2 3/8	8 or 9
154 1/2	12x 9	2 3/8	9
FIRST FLOOR			
155	12x10	2 3/8	10
156	13x11	3 1/4	12
1556	13x11	5	14

U. S. Lock Registers—These are same in construction and design as our floor registers but are equipped with a lock device that readily locks.

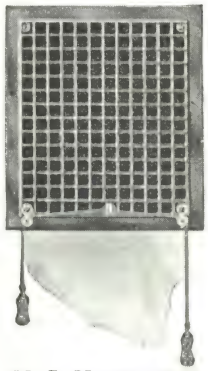
Baseboard Cold Air Intakes—These are made in same design as Jones-National Registers and can be furnished in all finishes to match special finish of hardware.

Screens, Faces and Grilles

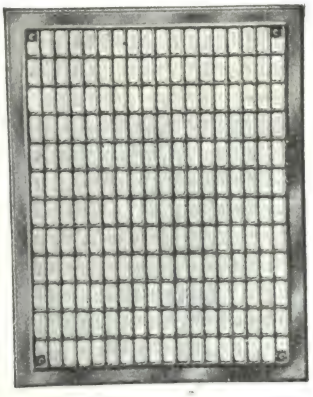
U. S. Steel Screens and Faces—These are made of cold rolled steel embossed and strongly reinforced so as to stand greater pressure than cast iron faces.



U. S. FLOOR REGISTER AND BORDER



U. S. VENTILATING REGISTER



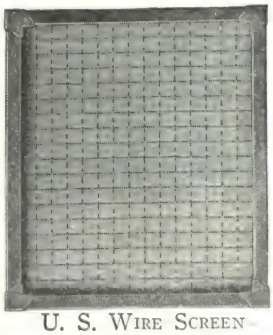
U. S. STEEL SCREEN

Faces 16 in. and wider are made with openings 1x2 in. on centers of bars. Sizes 14 in. and narrower are made with openings 1 in. square on centers of bars.

U. S. Steel screens are made any required width or length and in any finish.

Flat Perforated Steel Grilles—These can be furnished of any standard gauge of metal, and in any size or finish.

U. S. Wire Screens—These are made in design 62, unless otherwise specified. Design 61 is same as 62 only diagonal square mesh. For other special designs see our general catalogue or grille booklet. When specifying wire screen give: Size of mesh and design, gauge of wire and if round or flat wire, if angle or channel frame. State finish and sizes of openings in which screens are to be placed, also state size and locations of holes for fastening.



U. S. WIRE SCREEN

Standard Finishes

All registers, faces and grilles are finished in black japan, white japan, oxidized copper, nickel brass, bronze and sand blast as well as special finishes to match hardware.

WICKWIRE SPENCER STEEL CORPORATION

SUCCESSOR TO CLINTON-WRIGHT WIRE COMPANY

Manufacturer of Grilles

WORCESTER, MASS. BUFFALO, N. Y.

DISTRICT OFFICES

BOSTON, MASS., 120 Franklin Street
PHILADELPHIA, PA., 237 North Sixth Street
DETROIT, MICH., 3044 West Grand Boulevard.
NEW YORK, N. Y., 41 East 42nd Street
CHICAGO, ILL., 215 West Ontario Street
TULSA, OKLA., 861 Mayo Building
SAN FRANCISCO, CAL., 111 Townsend Street
LOS ANGELES, CAL., 316 Market Street

Product

PERFORATED METAL GRILLES.

For Electrically Welded Wire Fabric for Concrete Reinforcement, see pages 44-47; for Wire Lath and Welded Sheathing, see pages 280-287; for Ornamental Metal Work and Wire Fencing, see page 638.

Perforated Metal Grilles

This company manufactures all kinds of perforated metal grilles for ventilator and register faces, cupboard doors, etc.

An unusually complete assortment of dies makes possible a wide variety of artistic combinations and designs.

Perforated metal grilles are lighter, stronger and much less expensive than those of cast metal.

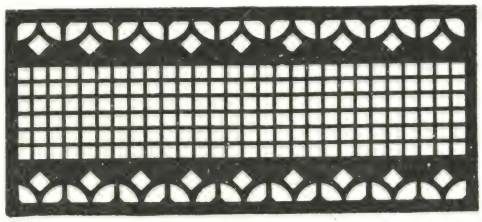
Grilles made to order only, in one piece of steel, brass, copper or bronze, in any size up to 56x156 in.

Steel grilles may be electroplated up to 56x72 in., or enameled with vitreous porcelain enamel up to 36x72 in.

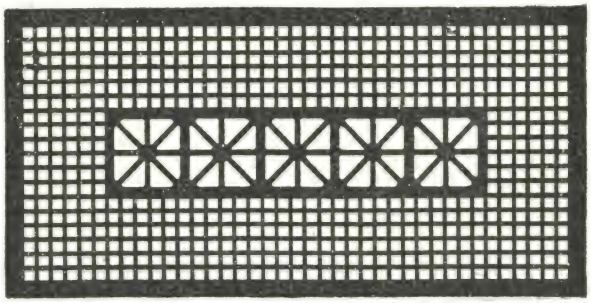
Electroplating to match hardware if desired.

Catalogue

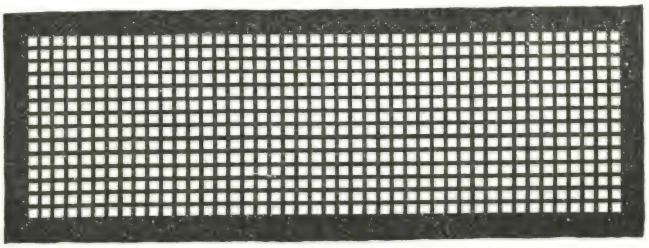
Perforated metal grille and perforated metals catalogues sent on request.



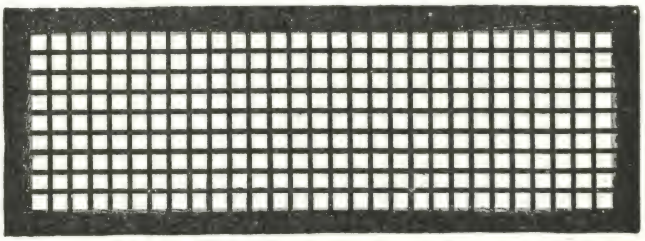
Design No. 124—46.1% Openings



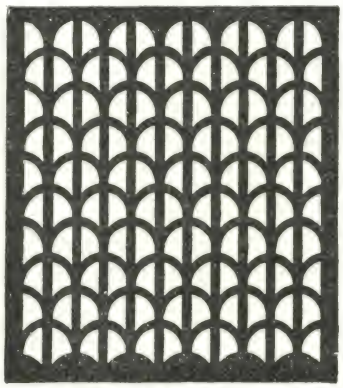
Design No. 114—59.6% Openings; Center Portion is Design No. 105, giving 49.4% Openings



Plain Lattice Grille, ½-in. Mesh—49.5% Openings

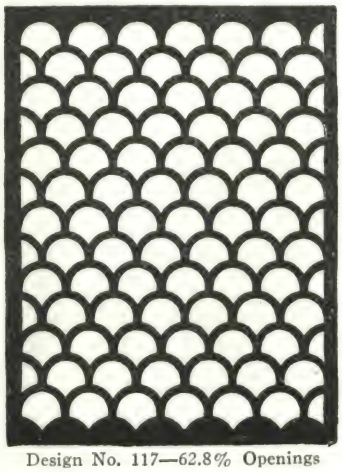


Plain Lattice Grille, ⅞-in. Mesh—73% Openings

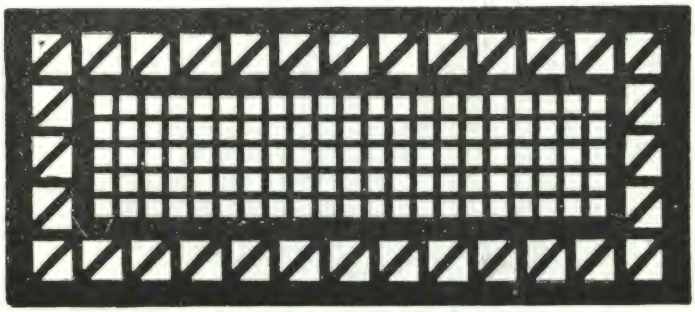


Design No. 121—50% Openings

Design No. 113—40% Openings



Design No. 117—62.8% Openings



Design No. 116—55.2% Openings

A FEW EXAMPLES PERFORATED METAL GRILLES

HERRICK REFRIGERATOR COMPANY

WATERLOO, IOWA

Products

HERRICK REFRIGERATORS; SPECIAL BUILT-IN RESIDENCE REFRIGERATORS with HERRICK OUTSIDE ICING CONVENIENCE.

Also manufacturers of Display Cases, Ice Chests, Ice Cream Cases and Soda Fountain Bases, Water Cooler Attachments.

The "Aristocrat of Refrigerators" for Every Use

The Herrick refrigerator has 22 quality features which assure serviceability, durability, beauty and economy in the highest degree possible. Every refinement known to refrigerator specialists is found in the Herrick. Quality of material and workmanship are the best, based on refrigerator building experience (nearly thirty years).

There are models specially designed for homes, hotels, clubs, cafes, stores, dining cars, hospitals, etc. Government buildings, state institutions, and United States battleships are Herrick equipped. Hundreds of architects specify this refrigerator.

A Feature of Many Exclusive Apartment Buildings

A large number of high class apartment buildings are equipped with Herrick refrigerators, matching the magnificence and refinement of the apartments earning rentals as high as $1,000.00 a month. Names and locations of such buildings may be obtained by writing to the manufacturer named above.

Unmatched Insulator, Proved by Test

Every wall and panel door is packed heavily and absolutely tight with genuine mineral wool, sterilized by melting, then blown to small particles.

In it no form of animal life can exist. Hence the walls are kept perfectly dry, cold and absolutely clean. We advertise an open offer to bore clear through the walls of any Herrick, exposing the inside construction and insulation in competition with any other refrigerator made.

Correct Dry Air Circulation System

Scientifically correct interior design guarantees perfect circulation of air, giving a dryness, frigidity and purity that keeps food free from mould, taint, decay, and interchange of odors and flavors indefinitely.

Three Kinds of Sanitary Non-metal Linings

The Herrick line offers three classes of linings. The finest styles have white opal plate glass throughout. Some styles lined with high quality, fine gloss, durable white enamel. Others, in the medium priced class, are lined with a sanitary, odorless white spruce lining that never gets damp and requires no scrubbing. In each class the ice chamber is lined exactly like the food chamber.

Outside Icers for Convenience and Saving

During the summer the iceman need not enter the house to fill an outside icing Herrick. In the winter he need not come at all, for the outer door can be left open, allowing the outside air to enter the ice chamber and circulate. See opposite page for stock sizes.

Drainage System, Parts are Removable

The lower end of the drain pipe in a Herrick has a patented trap. This prevents the entrance of warm air through the tube and yet allows easy exit of water from the ice. It is heavily galvanized, will not rust, and every part of this drainage system is easily removable for cleaning without taking the ice from the chamber.

Lifetime Cases, Superbly Finished

All Herrick refrigerators of stock sizes are built of solid oak. Quarter sawed oak is used in opal plate glass lined cases. Special sizes, solid mahogany, oak, birch, etc.

Trimmings, Better than Average

All trimmings are nickelplated on heavy brass. Hinges have long bearings. Improved lever fasteners keep the doors practically airtight.

Specification Data

Dimensions given are the sizes of the framed finished opening to be cut in the wall of the house. The casing on refrigerator around the outside icing door just fits into this opening.

"G" in table of dimensions represents height from floor to bottom of opening in wall, which is computed without the casters under the refrigerator, except where marked; "E," the height of the opening; "A," the width of the opening; "K," the distance from the flush right end of refrigerator (facing the front) to edge of finished opening in wall of house.

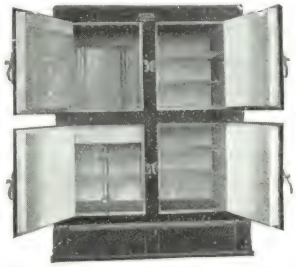
For sizes up to and including second 4-door size (No. 411), if the refrigerator sets against left wall, finished edge of opening in wall of house for back icing is 1⅝ in. from corner of room or from left end of refrigerator. In all sizes above this allow 3⅞ in. from corner of refrigerator to edge of opening, which does not include moulding on top, but does allow for ⅞-in. base block and casing on lower part of refrigerator. If top moulding on end is desired, edge of opening should be 5⅜ in. from corner of room on sizes No. 212 and larger.

Back outside icing door is made regularly in back ice chamber. This can be reversed to other side if necessary.

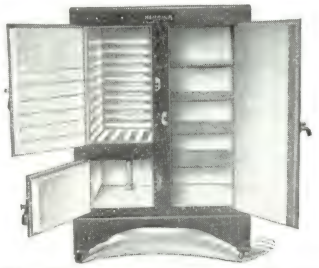
No. 428. Mesh Wire Shelves, Enamel Lined, Latest Design
Width, 86 in.; depth, 31 in.; height, 72½ in.; weight, 1050 lbs.

No. 55. Residence Model. White Opal Plate Glass Lined, Mesh Wire Shelves
Width, 38 in.; depth, 22¾ in.; height, 54¼ in.; weight, 550 lbs.

No. 766. Display Model. All Storage Doors Glass. French Plate Mirror on Ice Door
Width, 86 in.; depth, 31 in.; height, 77¾ in.; weight, 1200 lbs.
List price, $199.50



No. 412. Residence Model. Mesh Wire Shelves. Enamel Lined
Width, 52 in.; depth, 30½ in.; height, 66½ in.; weight, 525 lbs.
No. 512. Opal Glass Lined



No. 220. Residence Model Spruce Lined. Mesh Wire Shelves
Width, 36 in.; depth, 20¾ in.; height, 48 in.; weight, 220 lbs.
Nos. 42 to 45 are same style as above, but all enamel lined

A FEW TYPES OF HERRICK REFRIGERATORS

Continued on next page

or refrigerator can be iced from left-hand end (facing the front) if desired, and right-hand end if found necessary to conform to space.

The outside icing door on back or end refrigerator swings through opening in wall.

The outside of the opening in the wall, as shown in the plan, should be finished with a small batten door.

BACK ICING STYLE, DIMENSIONS IN INCHES

Refrigerator No.	*Size of refrigerators, outside, without moulding or casters			Opening in wall of house for outside icing			Refrigerator back icing door		Location of drain pipe under refrigerator, from end of refrigerator to center of hole		Edge of refrigerator to edge of opening in wall, not including moulding
	Width	Depth	Height	Height from floor	Opening		Width	Height	From back	From end	
					Width	Height					
	D	C	H	G	A	E	B	F	I	J	K
200, 300	34	18	41	20¼	16½	19½	13	15¾	3¾	9	16
210, 41	34	19	44	22¼	16½	20½	13	16¾	3¾	9	16
42, 220	36	19	46	20	18½	23¼	14	19½	4¼	9⅝	16
43, 230	36	20	48	20¾	18½	24	14	20¼	4¼	9⅝	16
44, 54, 240	36	20	50	20½	18	27¾	13¼	23	4¼	9⅝	16⅞
45, 55, 250	38	22	52	22½	18½	27¾	13¼	23	4½	10⅜	18⅜
43T, 230T, Texas	36	20	48	18½	18	27¾	13¼	23	4¼	9⅝	16⅞
215, 415	32	19	48	18½	18	27¾	13¼	23	3¾	7¾	12½
9, 29, 39, 49, 59, 290	42	24	56	26¾	21¼	27¾	15¾	21⅜	4½	11	20⅛
†11, 211, 311, 411, 511	46	24	59	29	22½	27¾	17¾	22⅜	4½	13	22⅛
†212, 312, 412, 512, 612	50	28	64½	30	23¾	32¼	19¾	28¼	4¾	14½	24¾
†214, 314, 414, 514, 614, 714	54½	28	70	33	25¾	35	21¾	31	5	14½	26½
†216, 316, 416, 516, 616, 716	60½	30¼	73	34	28	36	24	32	5	15½	29¾
†Chef, 228, 328, 428, 528 also 628, 628P, 628E, 619, 319	85¾	30¼	71	32½	27	36¼	23	32¼	4¾	42⅞	28
†766, 466	85¾	30¼	78	36	27	37½	23	33½	4¾	42⅞	28
580½	64	26¼	68	27	22	38½	16¼	33	5½	33	21
HERRICK GRAND WITH CORNER BLOCKS											
50, Herrick Grand	44½	26½	55	24	19	28½	15	24½	5½	13½	20¼
90, Herrick Grand	47	28	62	27¼	21	28¼	15½	24	5½	14	23

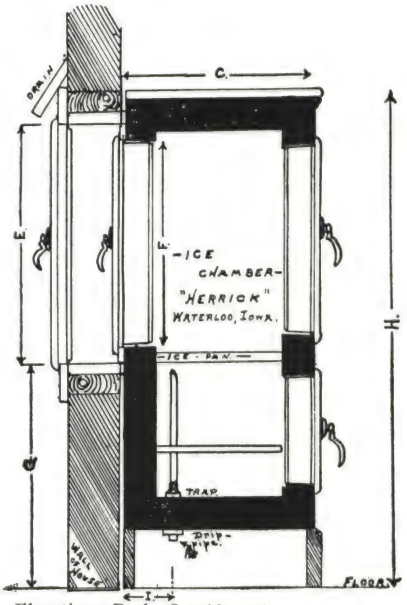
*For "over-all" dimensions, including mouldings, refer to catalogue. †With casters (2 in. high) (Chef casters 1 in.). Texas style has long ice chamber for 22-in. artificial ice.

END ICING STYLE, DIMENSIONS IN INCHES

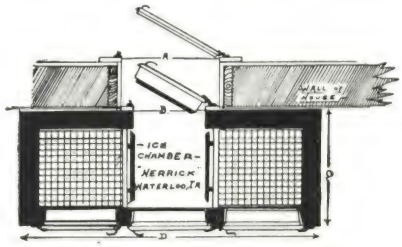
Refrigerator No.	*Size of refrigerators, outside, without moulding			Opening in wall of house for outside icing			Refrigerator end icing door		Location of drain pipe under refrigerator, from end of refrigerator to center of hole		Edge of refrigerator to edge of opening in wall, not including moulding
	Width	Depth	Height	Height from floor	Opening		Width	Height	From back	From end	
					Width	Height					
	D	C	H	G	A	E	B	F	I	J	L
200, 300	34	18	41	20¼	16½	19½	13	15¾	3¾	9	1½
41, 210	34	19	44	22¼	16½	20½	13	16¾	3¾	9	⅞
42, 220	36	20	46	20	18½	23¼	14	19½	4¼	9⅝	¾
43, 230	36	20	48	20¾	18½	24½	14	20½	4¼	9⅝	¾
44, 54, 240	36	20	50	20½	18	27¾	13¼	23	4¼	9⅝	¾
45, 55, 250	38	22	52	22½	18½	27¾	13¼	23	4½	10⅜	1¾
43T, 230T, Texas	36	20	48	18½	18	27¾	13¼	23	4¼	9⅝	¾
215, 415	32	19	48	18½	18	27¾	13¼	23	3¾	7¾	½
29, 39, 49, 59, 290	42	24	55	26¾	21¼	27¾	15¾	19	4½	11	1⅜
211, 311, 411, 511	46	24	59	29½	22½	27¾	16¾	20	4½	13	⅞
†212, 312, 412, 512, 612	50	28	64½	29½	23¾	32¼	19¾	28¼	4¾	14½	2⅛
†214,314,414,514,614,714	54½	28	70	33	25¾	35	21¾	31	5	14½	1
216,316,416,516,616,716	60½	30¼	73	34	28	36	24	32	5	15½	1¼
HERRICK GRAND WITH CORNER BLOCKS											
†50, White House	44½	26½	55	24	19	28½	15	24½	5¼	12¼	2¾
†90, America	47	28	62	27¼	21	28¼	14¾	23¼	5¼	13¼	3

*For "over-all" dimensions, including mouldings, refer to catalogue. †With casters (1⅝ in. high). Texas style has long ice chamber for 22-in. artificial ice.

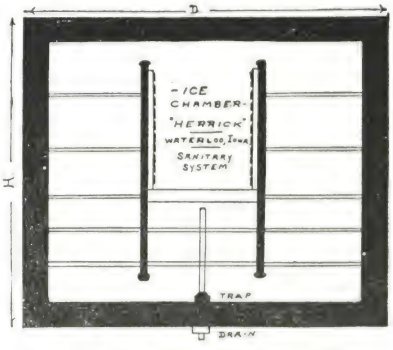
Specify if back or end icing, and if regular left-hand ice chamber, as in illustrations, or the opposite right-hand facing front of refrigerator.



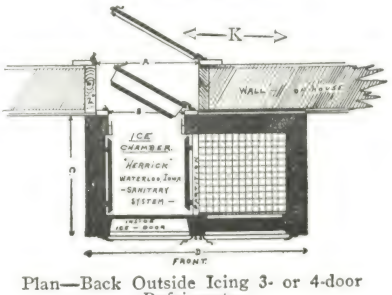
Elevation—Back Outside Icing—3- and 4-door Refrigerator



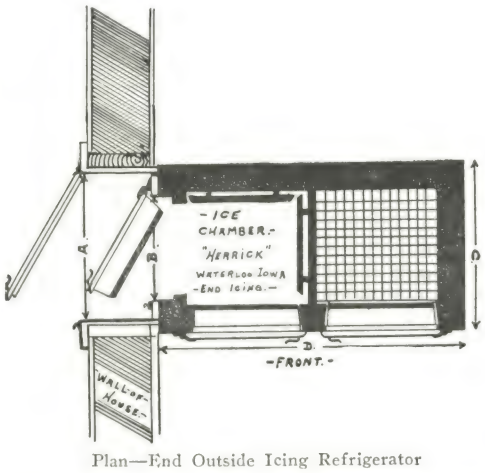
Plan—Back Outside Icing Refrigerator



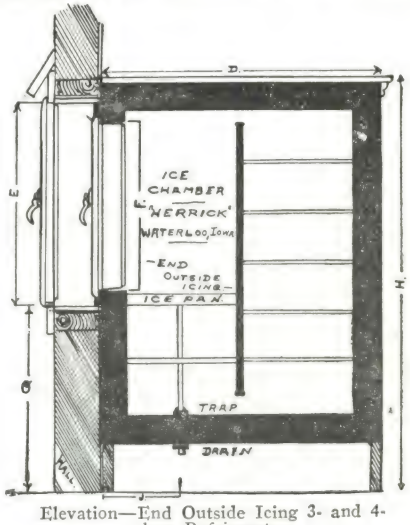
Elevation—Back Outside Icing 6-Door Refrigerator



Plan—Back Outside Icing 3- or 4-door Refrigerator



Plan—End Outside Icing Refrigerator



Elevation—End Outside Icing 3- and 4-door Refrigerator

SPECIFICATIONS AND DIMENSION DIAGRAMS FOR HERRICK OUTSIDE ICING REFRIGERATORS

THE JEWETT REFRIGERATOR CO.

GENERAL OFFICE AND FACTORY
BUFFALO, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 16 East 40th Street
CHICAGO, ILL., 38 South Dearborn Street
BOSTON, MASS., 80 Boylston Street
CLEVELAND, OHIO, 347 Leader News Building
LOS ANGELES, CAL., 722 Story Building
MONTREAL, QUE., 603 New Birks Building

PORCELAIN WORKS: LACKAWANNA, N. Y.
CANADIAN WORKS: BRIDGEBURG, ONT.

Products

Builders of REFRIGERATORS for Residences, Hotels, Hospitals, Clubs, Industrial Restaurants, Institutions, Steamships, etc.

Also Mortuary Refrigerators for Hospitals.

Jewett Solid Porcelain Lined Refrigerators

The interior linings in both food and ice compartments are of one piece of solid porcelain ware 1¼ in. thick, having all corners fully rounded. There is not a seam, joint, crack or square corner.

They can be wiped clean, quickly and easily. This feature assures absolute cleanliness and eliminates the leaky ice chambers and consequent dampness so often encountered with refrigerators with metal lined ice chambers.

JEWETT SOLID PORCELAIN REFRIGERATOR LINING
The one-piece compartments of immaculate, snowy white solid porcelain ware with full rounded corners do not provide a single lurking place for the slightest contamination

JEWETT SOLID PORCELAIN REFRIGERATOR
Nos. 6672, 7072, 7472 and 7872

Insulation

Consists of the exterior case of ⅞-in. tongued and grooved ash, two courses of heavy waterproof insulating paper, 1-in. thickness of sheet cork, two courses of heavy waterproof insulating paper, ⅞-in. tongued and grooved lumber, 1¼-in. thickness of pure cork, 1¼-in. thickness of solid porcelain ware—a total thickness of over 5 in., all arranged to most effectively lock out the heat.

Finish and Hardware

Exposed outer cases are of thoroughly seasoned ash, finished natural or in any special finish desired, including white enamel where wanted.

Hardware is of solid polished brass and of heavy and substantial type. Fasteners close automatically with the slamming of the door.

Shelves

Shelves are constructed of ¼-in. rod spot welded to $\frac{5}{16}$-in. cross bars, heavily coated with pure block tin after fabrication and supported by lugs cast integrally with the porcelain interior.

Drainage

Melted ice is carried through a passage or channel in the porcelain compartment. This channel is of large bore and readily accessible for cleaning and terminates in a trap cast integrally with the solid porcelain lining, the water seal being formed by a loose porcelain bell. From the trap, the drainage is

Recent Contracts

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Vincent Astor, Rhinebeck, N. Y.
L. C. Tiffany, Cold Spring Harbor, N. Y.
E. J. Marshall, Pasadena, Calif.
S. Reading Bertron, New York, N. Y.
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Cornelius Vanderbilt, New York, N. Y.
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James A. Farrell, South Norwalk, Conn.
Mrs. L. Z. Leiter, Beverly Farms, Mass.
Wm. Fahnestock, Katonah, N. Y.
Mrs. W. L. McKee, Bristol, R. I.
Ernest Crawford May, Pasadena, Calif.
F. D. Stout, Chicago, Ill.
H. P. Davison, Locust Valley, N. Y.
Samuel Mather, Cleveland, Ohio
Mrs. R. H. Townsend, Washington, D. C.
Henry Phipps, New York, N. Y.
George Eastman, Rochester, N. Y.
John D. Rockefeller, Pocantico Hills, N.Y.
William R. Coe, Oyster Bay, N. Y.
Sir Mortimer B. Davis, Montreal, Que.
John D. Rockefeller, Jr., New York, N. Y.

CLUBS AND INSTITUTIONS

Detroit Athletic Club, Detroit, Mich.
University Club, New York, N. Y.
New York Athletic Club New York, N. Y.
Michigan Union, Ann Arbor, Mich.
New York Yacht Club, New York, N. Y.
Harvard Club, New York, N. Y.
Kansas City Club, Kansas City, Mo.
National Club, Toronto, Ont.
Dedham Country and Polo Club, Dedham, Mass.
Cornell University, Ithaca, N. Y.
Jekyl Island Club, Brunswick, Ga.
The Royal Montreal Golf Club, Montreal, Que.
Larchmont Yacht Club, Larchmont, N. Y.
Athletic Club of Columbus, Columbus, O.
Newark Athletic Club, Newark, N. J.
Rockefeller Institute, New York, N. Y.
Post Graduate Hospital, New York, N. Y.
Mun. Contagious Disease Hospital, Chicago, Ill.
New Bellevue Hospital, New York, N. Y.
Perkins Institute, Watertown, Conn.
Lying-In Hospital, Chicago, Ill.
New York Orthopædic Hospital, New York, N. Y.
New Haven Hospital, New Haven, Conn.

HOTELS

Hotel Pennsylvania, New York, N. Y.
Hotel Statler, Detroit, Mich.
Hotel Statler, Cleveland, Ohio
Hotel Statler, St. Louis, Mo.
Hotel Statler, Buffalo, N. Y.
The Drake, Chicago, Ill.
The Commodore, New York, N. Y.
The Biltmore, Los Angeles, Calif.
The Mount Royal, Montreal, Que.
King Edward Hotel, Toronto, Ont.
Sheridan Plaza Hotel, Chicago, Ill.
The Ritz-Carlton, New York, N. Y.
Hotel Fontenelle, Omaha, Neb.
Fort Shelby Hotel, Detroit, Mich.
Vanderbilt Hotel, New York, N. Y.
The Green Brier, Wh. Sulphur Springs, W. Va.
Davenport Hotel, Spokane, Wash.
The Royal Connaught, Hamilton, Ont.
The St. Regis, New York, N. Y.
Hotel Palliser, Calgary, Alta.
Chateau Frontenac, Quebec
The Bancroft, Worcester, Mass.
The Ten Eyck, Albany, N. Y.

Continued on next page

carried into a short iron pipe with threaded end, and 1½ in. in diameter, projecting below refrigerator floor.

Outside Icing Doors

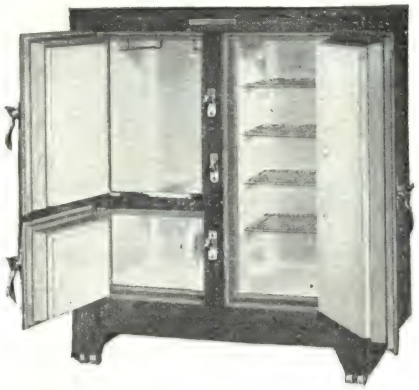
Refrigerators can be provided with extra icing door in the rear or end. See data below.

Mechanical Refrigeration

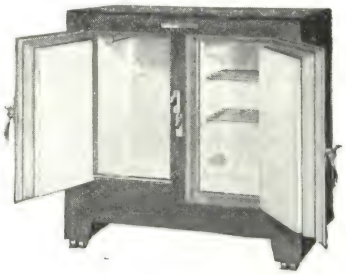
Jewett solid porcelain refrigerators are especially adapted for use with mechanical refrigeration and where wanted for use with a refrigerating machine, we can provide the necessary holes at the factory for machine piping.

Service to Architects

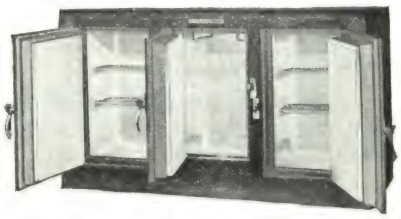
A catalogue of solid porcelain residence refrigerators and data on hotel, hospital, club and institution refrigerators is at the service of architects on request. Inquiries are given detailed attention.



JEWETT SOLID PORCELAIN REFRIGERATOR
No. 4054

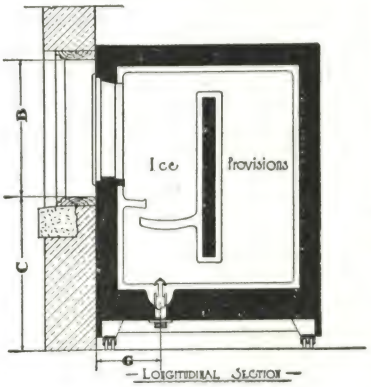


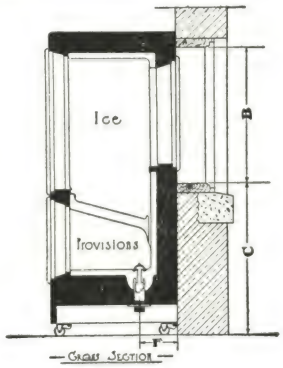
JEWETT SOLID PORCELAIN REFRIGERATOR
NOS. 4440 AND 4432



JEWETT SOLID PORCELAIN REFRIGERATOR
No. 6432 FOR BUTLER'S PANTRY

JEWETT SOLID PORCELAIN REFRIGERATOR
Nos. 4460, 4860, 5260, 4472, 4872 AND 5272

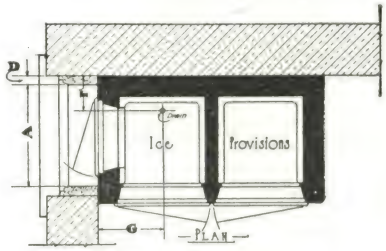




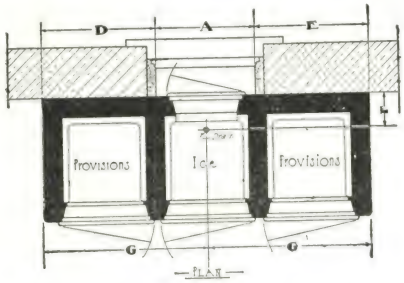
The architect can make provision in building plans and the builder can arrange the proper wall openings from these tables.

Floor plan shows side ice compartment refrigerators with ice at the left. Refrigerators can be furnished with ice at the right without extra charge, in which event dimensions "D" and "G" will show distance from the right end.

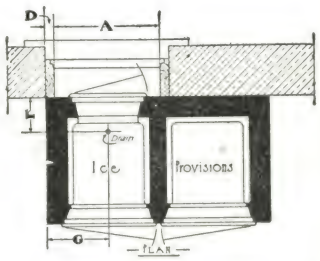
Drain is properly trapped and projects through floor of refrigerator, being finished with 1½-in. standard pipe thread



END ICING DOORS



REAR ICING DOORS WITH CENTER ICE COMPARTMENT



REAR ICING DOORS WITH LEFT HAND ICE COMPARTMENT

JEWETT SOLID PORCELAIN LINED REFRIGERATORS

Model No.	Overall dimensions, in.			Number of doors	Ice capacity, lbs.	Ship'g weight, lbs.	Dimensions, in. *With rear (outside) icing doors						*With end icing doors					
	Width	Depth	Height				A	B	C	D	F	G	A	B	C	D	F	G
4054	40	25	54	3	100	950	18	27	24	1 3/4	7	11 1/2	20	27	24	1 3/4	7	11 1/2
4460	44	25	60	4	150	1100	20	27	30	1 3/4	7	12 1/2	20	27	30	1 3/4	7	12 1/2
4860	48	25	60	4	180	1200	24	27	30	1 3/4	7	14 1/2	20	27	30	1 3/4	7	14 1/2
5260	52	25	60	4	180	1300	24	27	30	1 3/4	7	14 1/2	20	27	30	1 3/4	7	14 1/2
4472	44	25	72	4	190	1300	20	31	38	1 3/4	7	12 1/2	20	31	38	1 3/4	7	12 1/2
4872	48	25	72	4	190	1400	20	31	38	1 3/4	7	12 1/2	20	31	38	1 3/4	7	12 1/2
5272	52	25	72	4	240	1500	24	31	38	1 3/4	7	14 1/2	20	31	38	1 3/4	7	14 1/2
6672	66	25	72	6	190	1900	20	31	38	23	7	33	No end icing door					
7072	70	25	72	6	240	2100	24	31	38	23	7	36	No end icing door					
7472	74	25	72	6	240	2200	24	31	38	23	7	35	No end icing door					
7872	78	25	72	6	240	2300	24	31	38	27	7	39	No end icing door					
4432	44	25	32	2	75	775	20	25	6	1 3/4	13 1/2	12 1/2	No end icing door					
4440	44	25	40	2	100	775	No outside icing				13 1/2	12 1/2	No end icing door					
6432	64	25	32	3	90	950	20	25	6	22	13 1/2	32						

*"A" is the width in the clear of opening in building wall.
"B" is the height in the clear of opening in building wall.
"C" is the distance from finished floor to sill of opening.
"D" is the distance from left end of refrigerator (with rear icing door) to opening in building wall. For end icing door, "D" is distance from back of refrigerator to opening in building wall.
"F" is the distance from back of refrigerator to center of drain.
"G" is the distance from left end of refrigerator to center of drain.

McCRAY REFRIGERATOR CO.

GENERAL OFFICE AND FACTORY
2255 Lake Street
KENDALLVILLE, IND.

SALESROOMS IN ALL PRINCIPAL CITIES

Products

REFRIGERATORS for all purposes.

McCray Refrigerators

Construction—*Exterior*—Stock sizes of McCray refrigerators are furnished in quarter sawed or furniture oak.

Special built-to-order refrigerators are furnished in any desired wood or finish.

Interior—Lining may be of white opal glass, white enamel or odorless wood.

Wall Construction—Walls are insulated with heavy waterproof insulating sheathing and mineral wool.

The McCray opal glass lined refrigerators are insulated with 2 in. of corkboard.

Special Features—Any McCray refrigerator can be arranged with rear or left end icing door, so that it may be iced from side or rear porch. See tables on next page.

Facilities—The McCRAY REFRIGERATOR Co. build refrigerators and coolers and carry them in stock for residences, hotels, restaurants, clubs, hospitals, institutions, florists, grocery stores, meat markets, steamships and dining cars. They also build mortuary coolers for morgues and hospitals.

McCray refrigerators may be arranged for either ice or mechanical refrigeration. The list of refrigerators found on this page are carried in stock, ready for shipment.

Special Built-to-order Refrigerators—A special designing department for planning refrigerators and coolers for all purposes, to fit any desired space, is maintained by this company, and is at the service of every architect and builder.

Orders for special refrigerators are executed promptly.

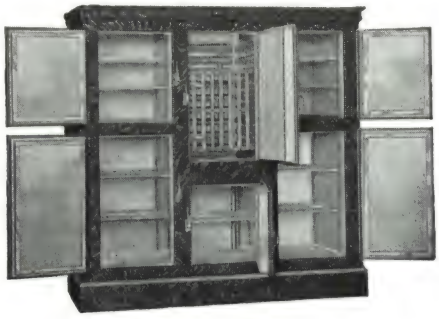
SUMMARY OF SPECIFICATIONS FOR McCRAY RESIDENCE REFRIGERATORS

No.	Dimensions, in.			Number of shelves	Shelf space, sq. ft.	Ice capacity, lbs.	Shipping weight, lbs.	Interior lining
	Width	Depth	Height					
420	72½	29¼	72	11	35½	360	1850	Opal glass
480	65½	27¼	66	9	27¼	375	1275	Opal glass
475	56½	27¼	72	6	23½	300	1285	Opal glass
470	50½	27¼	70	6	20	270	1210	Opal glass
460	46½	26¾	62	6	18	200	980	Opal glass
450	40½	24¾	54	5	11	100	770	Opal glass
455	43½	26¾	58	5	13	170	885	Opal glass
150	40½	24¾	54	5	14	140	435	White enamel
155	43½	26¾	58	5	16	200	500	White enamel
130	34½	20¾	46	3	7	60	310	White enamel
140	37½	22¾	50	4	11	100	365	White enamel
128	29½	20¾	54	3	7½	75	315	White enamel
120	72½	29¼	72	11	36½	360	1160	Odorless wood
132	87½	31¼	75	11	52½	480	1400	Odorless wood
75	56½	27¼	72	6	26½	340	880	Odorless wood
70	50½	27¼	70	6	23	300	665	Odorless wood
50	40½	24¾	54	5	14	140	435	Odorless wood
55	43½	26¾	58	5	16	200	500	Odorless wood
60	46½	26¾	62	6	20	210	560	Odorless wood
30	34½	20¾	46	3	7	60	310	Odorless wood
40	37½	22¾	50	4	11	100	365	Odorless wood

Catalogues—For the convenience of architects, five distinct catalogues are issued, any or all of which will be mailed on request, as follows:

No. 96—for Residences; No. 73—for Grocers; No. 64—for Meat Markets and General Stores; No. 53—for Hotels and Restaurants; and No. 75—for Florists.

Four-door Type
Styles Nos. 460, 450, 455, 150 and 155 (see summary of specifications)



Six-door Type
Styles Nos. 420, 120 and 132 (see summary of specifications)

No. 171 Cooler
For hotels, clubs, hospitals and institutions
McCRAY REFRIGERATORS

Continued on next page

Instructions

Measurements and instructions for locating wall openings and drain pipes for stock size McCray residence refrigerators, listed on the previous page, with either end or rear icing door, can be determined by the table and floor plans on this page.

Cornice—If cornice is to be removed from the ends of refrigerator, deduct ¾ in. from "D" or "E" in Tables 1 and 3.

The dimension "G" includes the width of the cornice. If the cornice is to be removed, deduct ¾ in. from "G" for all refrigerators, except Nos. 70, 75, 120, 132, 470, 475, 480 and 420—and for these refrigerators deduct 1¼ in.

Casters—If no casters are desired, deduct 2 in. from the dimension "C" for all refrigerators, except Nos. 75, 120, 132, 475, 420 and 480, which are not furnished with casters.

Reversing Ice Chamber—If the conditions are such that the ice chamber must be reversed—that is, arranged on the right-hand instead of the left-hand side of the refrigerators—this change can be made at an additional charge.

MEASUREMENTS IN INCHES FOR LOCATING WALL OPENINGS FOR OUTSIDE ICING REFRIGERATORS AND DRAIN LOCATION

TABLE NO. 1

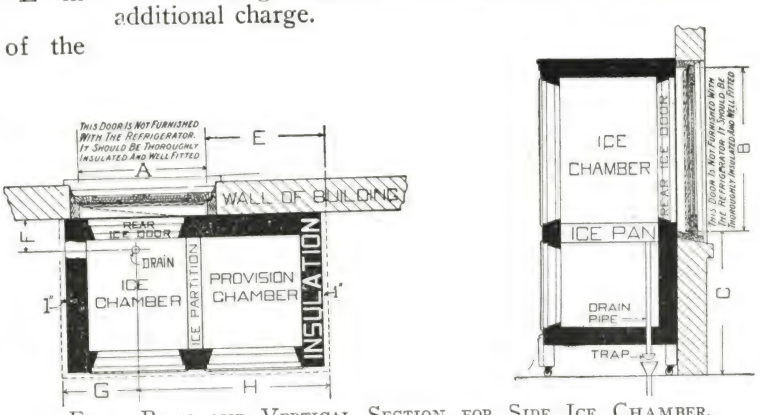
No.	For Side Ice Chambers, Rear Icing Doors Over Cornice				Table for Location of Drain Pipe	
	A	B	C	E	F	G
30	18½	22	22	14½	5¼	10
130	18½	22	22	14½	5¼	10
40	20	25½	22½	16	5¼	10¾
140	20	25½	22½	16	5¼	10¾
50	22	27	24½	17	5¼	11½
150	22	27	24½	17	5¼	11½
450	22	27	24½	17	6½	10⅞
55	23½	29	26½	18½	5¼	12¼
155	23½	29	26½	18½	5¼	12¼
455	23½	29	26½	18½	6½	11⅝
60	25	31	28½	19¾	5¼	13
460	25	31	28½	19¾	6½	12⅜
70	26	37	30½	22	6¾	22½
470	26	37	30½	22	7½	21½
75	29	37	32½	25	6¾	25⅜
475	29	37	32½	25	7½	24½

TABLE NO. 2

No.	For Side Ice Chambers, End Icing Doors Over Cornice			Table for Location of Drain Pipe	
	A	B	C	F	G
30	19	22	22	5¼	9¼
130	19	22	22	5¼	9¼
40	21	25½	22½	5¼	10
140	21	25½	22½	5¼	10
50	23	27	24½	5¼	10¾
150	23	27	24½	5¼	10¾
450	23	27	24½	6½	10⅛
55	25	29	26½	5¼	11½
155	25	29	26½	5¼	11½
455	25	29	26½	6½	10⅞
60	25	31	28½	5¼	12¼
460	25	31	28½	6½	11⅜
70	25	37	30½	6¾	21¼
470	25	37	30½	7½	20¼
75	25	37	32½	6¾	24⅛
475	25	37	32½	7½	23¼
480	25	28	35	7½	37¼

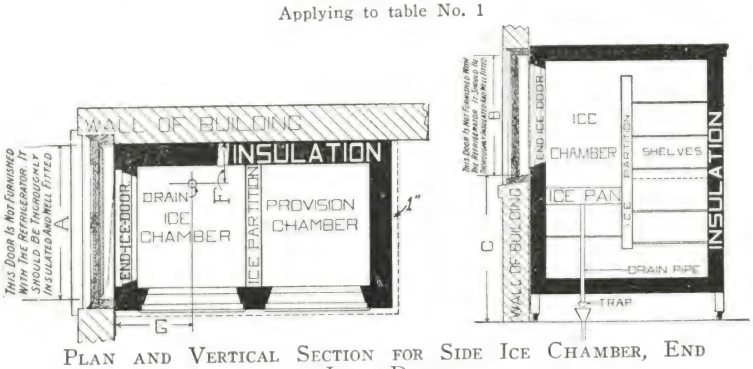
TABLE NO. 3

No.	For Center and Overhead Ice Chambers, Rear Icing Doors Over Cornice					Table for Location of Drain Pipe	
	A	B	C	D	E	F	G
128	25½	16½	35½	3¼	¾	5	14¾
120	29	40	29	20¾	22¾	7¾	45¾
420	**29**	**40**	**29**	**20¾**	**22¾**	7½	**44¾**
480	30	28	35	9	26½	7½	38½
132	32	38	34½	26¾	28¾	7¾	55¾



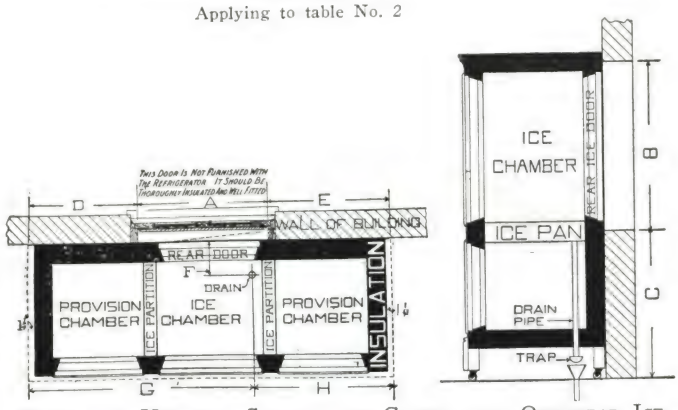
FLOOR PLAN AND VERTICAL SECTION FOR SIDE ICE CHAMBER, REAR ICING DOOR

Applying to table No. 1



PLAN AND VERTICAL SECTION FOR SIDE ICE CHAMBER, END ICING DOOR

Applying to table No. 2



PLAN AND VERTICAL SECTION FOR CENTER AND OVERHEAD ICE CHAMBER, REAR ICING DOOR

Applying to table No. 3

EXPLANATION OF LETTERS IN TABLES AND PLANS

A—Width of wall opening in the clear
B—Height of wall opening in the clear
C—Distance from floor to bottom of wall opening
D—Distance from left-hand (facing front) end of refrigerator to wall opening.
E—Distance from right-hand (facing front) end of refrigerator to wall opening
F—Distance from back of refrigerator to center of drain pipe
G—Distance from left-hand end of refrigerator to center of drain pipe

THE C. SCHMIDT CO.

Designers and Manufacturers of "Thesco" Refrigerators and Store Fixtures

John and Livingston Streets
CINCINNATI, OHIO
REPRESENTATIVES IN EVERY STATE

Products

REFRIGERATORS and STORE FIXTURES which include:

Refrigerators and Cold Storage Rooms for hotels, clubs, restaurants, hospitals and residences.

Mortuary Refrigerators for hospitals and for public and private morgues.

Cold Storage Doors and Insulation.

Refrigerators for meat markets, groceries, delicatessen, florists' shops and creameries.

Display Cases, Ice Chests, Ice Cream Cabinets and Refrigerator Display Counters.

Fixtures and Equipment for municipal market houses, meat markets, grocery and delicatessen stores.

Abattoir, Packing House and Slaughter House Equipment including Hoists, Tracking and Operating Appliances, Packing House and Sausage Room Machinery, Tools and Supplies.

THE HOME OF THESCO PRODUCTS
TRADE-MARK
(Registered)

Service and Facilities

The long experience of this company (since 1870) and ample facilities enable it to successfully execute contracts in all parts of the country.

This company makes a specialty of preparing layouts and specifications for all classes of refrigerator construction and store, market and packing house equipment, which it is always ready to furnish promptly and without charge together with detail drawings, specifications and estimates covering any size, style, arrangement or finish.

The experts of the company are ready to assist the architect at all times in laying out the equipment or refrigerators best suited for his particular requirements. Their experience and knowledge are offered without obligation. Inquiries are invited.

Construction

Thesco refrigerators and fixtures are famous for their high grade cabinet finish and workmanship. The exterior can be constructed in any desired finished wood, white opal with nickelplated trimmings or plaster to match the finish of the room.

The interiors are lined with white opal glass, white enamel steel, white enamel paint, galvanized iron, odorless wood or cement plaster. The hardware used is the heaviest substantial type in any desired finish.

Mineral wool, pure sheet cork or any other dependable insulation can be furnished.

Thesco fixtures and equipment feature the latest improvements and are modern in design.

Refrigerators can be arranged with a rear or end door so that they can be iced from the outside of the building. Plans showing wall openings and drain locations will be sent on request. Thesco refrigerators can be arranged for either ice or mechanical refrigeration and this company works in co-operation with any refrigerating machine contractor.

Literature

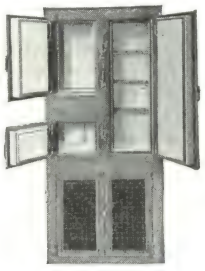
Any or all of the following catalogues, illustrating and describing the complete Thesco line of stock sizes, will be mailed on request:

No. S-86—Refrigerators and Fixtures for the Meat Market and Grocer.

No. S-84—Refrigerators for Hotels, Clubs, Institutions and Residences.

No. S-72—Packers' and Sausage Room Machinery, Tools and Supplies.

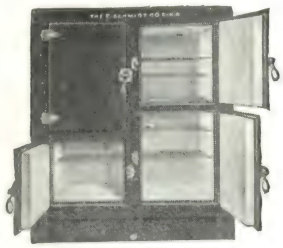
No. 5434
33 in. long, 22 in. deep, 58 in. high



No. 5435
33 in. long, 22 in. deep, 71 in. high

No. 5053
Made to order

No. 5433
30 in. long, 24 in. deep, 60 in. high

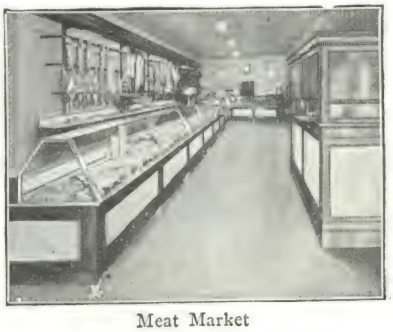


No. 5439
44 in. long, 26 in. deep, 60 in. high

THESCO RESIDENCE REFRIGERATORS

Grocery

Municipal Market



Meat Market

EQUIPPED WITH THESCO REFRIGERATORS AND STORE FIXTURES

THE AUTOMATIC REFRIGERATING COMPANY

Manufacturers of Household Electric Air Refrigerators

HARTFORD, CONN.

BRANCH, SALES AND SERVICE OFFICES

ATLANTA, GA.
BOSTON, MASS.
CHICAGO, ILL.
CINCINNATI, OHIO
DENVER, COLO.
HONOLULU, T. H.
HUNTINGTON, W. VA.
JACKSONVILLE, FLA.
LOS ANGELES, CAL.
NEW HAVEN, CONN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
PHILADELPHIA, PA.
ROCHESTER, N. Y.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
WASHINGTON, D. C.

DIRECT REPRESENTATION: BALTIMORE, MD., and HOUSTON, TEX.

Product

ODIN, the new ELECTRIC AIR REFRIGERATOR.

For Compression Refrigerating Machinery with automatic control, see pages 1786-1789.

TRADE-MARK

Odin Air Refrigerator

ODIN, the new air refrigerator, is a development that has made mechanical refrigeration safe and practical for household use. This development has been undertaken by a concern that for thirty years has built the highest grade of commercial refrigerating machinery and fully appreciates the requirements and limitations of both domestic and commercial uses of such machinery. This long standing experience in the design of commercial refrigerating plants has brought a realization of the necessity for this radical departure from the prevailing practice in the design of refrigerators for the home.

Each unit air refrigerator comprises a food compartment and a built-in electrically operated refrigerating machine.

ODIN employs atmospheric air instead of noxious chemicals as a refrigerating medium. This machine has neither valves, piping, water cooling nor brine tank, and requires and has no adjustments. It is supplied to the customer complete and being integral with the refrigerator requires only connection to the electric lighting circuit in order to operate.

Automatic Operation—A thermostat installed in the food compartment controls its temperature by automatically starting and stopping the refrigerating machine. Any desired temperature, therefore, is maintained in accordance with the setting of the thermostat.

Dependability and Safety—The application of this new principle of using air under slight pressure for producing cold lends itself like no other to the construction of a machine having long life of service, and absolute reliability as well as sustained efficiency of performance.

The elimination of mechanism for the control of a chemical refrigerant has enormously simplified the apparatus and increased its dependability, eliminating the necessity and expense of expert attention.

There being no chemical refrigerating medium in ODIN, no gradual or accidental loss of refrigerant can prevent the effective functioning of the machine. Likewise, since no water cooling is used, troubles either due to the failure of the water supply by freezing or with clogged drainage pipes can not arise.

The complete absence of either compressor or hand operated valves insures freedom from inefficient performance caused by imperfection in such delicate parts found in other types of household refrigerating equipment.

Convenience—The unit is entirely portable. Because no piping or drain is necessary with the air machine, it may be moved as easily as any other piece of furniture.

The absence of a brine tank from which accumulated frost must be periodically removed is an additional convenience. The cooling surface of this remarkable refrigerator is self-defrosting and the condensate is automatically evaporated.

Economy—The current consumption of this size air refrigerator is about 4 kw. h. per day under average summer conditions. There are no other operating costs. No expense for the renewal of the refrigerant. No expense for cooling water. The saving over the use of ice is marked.

Size—Food compartment space, 15½ cu. ft. Outside dimensions, 51x27x69 in. Other sizes are in preparation.

Electrical Equipment—¼ h.p. repulsion induction type motor for alternating current. ¼ h.p. compound wound motor for direct current. A push button switch is provided for putting the machine in and out of service.

A plug receptacle is furnished for attaching refrigerator to the electric light circuit. A thermal overload circuit breaker is installed in every unit for motor protection.

Box—Porcelain lined, sanitary, non-corrosive and non-destructible. The inside lining is surrounded by an unbroken insulated envelope of thick compressed pure corkboard.

The outside case is made of enameled sheet steel. The box is fire and vermin-proof.

ODIN, THE NEW AIR REFRIGERATOR

Operated by electricity. Uses atmospheric air as cooling medium. No ice—no chemicals—no water

Literature

Descriptive literature containing detailed information will be gladly furnished on request.

DELCO-LIGHT COMPANY

SUBSIDIARY OF GENERAL MOTORS CORPORATION

Manufacturers of Electrically Operated Automatic Refrigerators

DAYTON, OHIO

DEALERS IN PRINCIPAL CITIES

Product

FRIGIDAIRE, an Electrically Operated Refrigerator.

Also manufacturers of the famous Delco-Light Farm Electric Plants, the Delco-Light water systems, and the Delco-Light Washing Machines.

Frigidaire
THE ELECTRIC REFRIGERATOR for MODERN HOMES
TRADE-MARK

Facts About Frigidaire

Frigidaire is a practical, self-contained electric refrigerator which is operated by ordinary electric light and power current. It is entirely automatic and maintains a dry, constant temperature at least 10° colder than is possible with ordinary ice boxes.

Frigidaire is designed as a single, complete unit. It is not an adaptation of the electrical refrigeration idea to ice boxes already built, but a complete plant, all features of which are designed to work together toward the best and cheapest refrigeration.

It represents the most modern development in practical mechanical refrigeration for the home. It does away with the cares, food spoilage and insanitary conditions that exist in ordinary ice boxes and it eliminates the ice man, dirt, drip pan, slime and dirty kitchen floors. Its dry air keeps food wholesome and pure. The dryness prevents mold, the coldness prevents fermentation.

In the three trays located in the brine chamber, may be frozen as many as 72 cubes of ice (a total of 9 lbs.) for table use. These trays may also be used for freezing desserts, chilling salads, etc. Maximum freezing time is 8 hours.

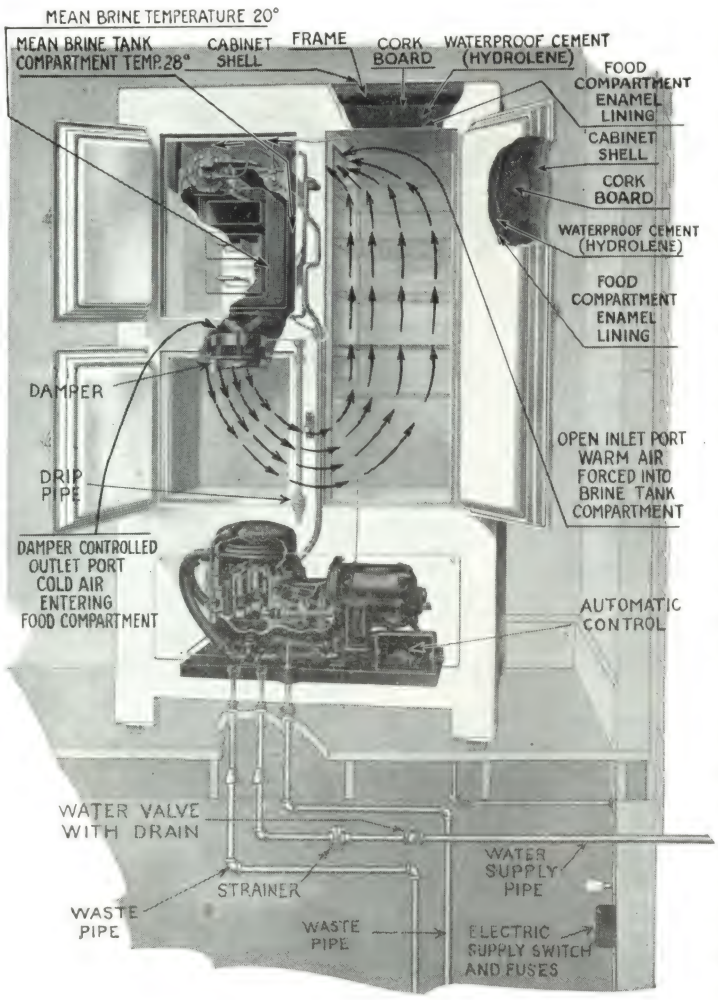
The mechanical unit is enclosed in the lower section of the cabinet—there is no noise or vibration.

Because it is a complete unit with the refrigerating mechanism exactly suited to the requirements of the cabinet, Frigidaire is giving economical and constant service in thousands of residences and apartment houses.

How Frigidaire Operates

Liquid sulphur dioxide (SO_2), non-poisonous, non-explosive and non-inflammable, is the refrigerant used in Frigidaire. The original charge lasts as long as the machine.

The "cold producer" is located in what is commonly known as the ice chamber. It consists of a "boiler" quite like an ordinary water tube steam boiler in form. This boiler is surrounded by brine which is contained in a copper tank, securely suspended from the framework of the cabinet.



TYPICAL FRIGIDAIRE INSTALLATION

The air circulating system within the cabinet forces the warm air into contact with the brine tank. This heat is transmitted by the brine to the boiler and causes the SO_2 to boil. The act of boiling absorbs the heat and produces the opposite condition, namely, cold. As the SO_2 boils into gas, the gas is drawn out of the boiler by the compressor, is liquefied under pressure by the chilling action of the water coils in the condensing chamber, and is supplied to the boiler again by means of an automatic valve in the boiler itself.

The brine tank compartment is completely insulated by cork from the food compartment except through an air duct which is at all times under perfectly balanced control. In this air duct is a damper which is controlled by hand. When the food needs more cold, this damper may be opened and the cold air

Continued on next page

falls by gravity from the brine compartment through the duct into the food compartment, where it drives the hot air upward, out of the top flue and over into the brine compartment to give up its heat to the brine, as has been already described. Thus the temperature of the food compartment is maintained at all times at 38° to 44° Fahr., depending on the room temperature.

For the purpose of making ice for table use or for freezing desserts, etc., the temperature of the brine is automatically maintained at about 20° by an entirely distinct thermostat which controls the starting and stopping of the motor.

Frigidaire Cabinet

The Frigidaire cabinet has two characteristics distinguishing it from all other mechanical refrigerator cabinets—strength and insulation. It is staunchly built of strictly high grade materials and insulated with pure corkboard. Doors are equipped with double rubber seals to prevent air leakage.

The white porcelain enameled steel food compartment is without seam or crevice and is the most sanitary construction yet devised.

Cabinet is covered on all sides, top and bottom with a shell of 5-ply laminated wood, with perfectly smooth, unbroken surface.

Furnished in finishes to harmonize with the treatment of the kitchen.

Current Characteristics

The Frigidaire is operated by a ¼ h.p. motor, 110 or 220 volts, single phase, 25, 30, 50 or 60 cycles A.C.; 32, 110 or 220 volts D.C.

The normal electric load is 250 to 300 watts for Model B-9 and 275 to 350 watts for Model B-15.

At 8c per kw.h., the cost of operation is 14c per day for Model B-9 and 25c per day for Model B-15.

Price

The price of Frigidaire has been reduced from $775.00 to $595.00, f.o.b. Dayton, Ohio.

Model B-5 Frigidaire for Apartment Houses

The Model B-5 Frigidaire is somewhat smaller in dimensions than the Model B-9, having been developed for the requirements of those who live where space is at a premium.

Dimensions of the Model B-5 are: height, 61 in.; width, 32 in.; depth, 24¾ in. Total food storage capacity 4.1 cu. ft.; weight, 695 lbs.

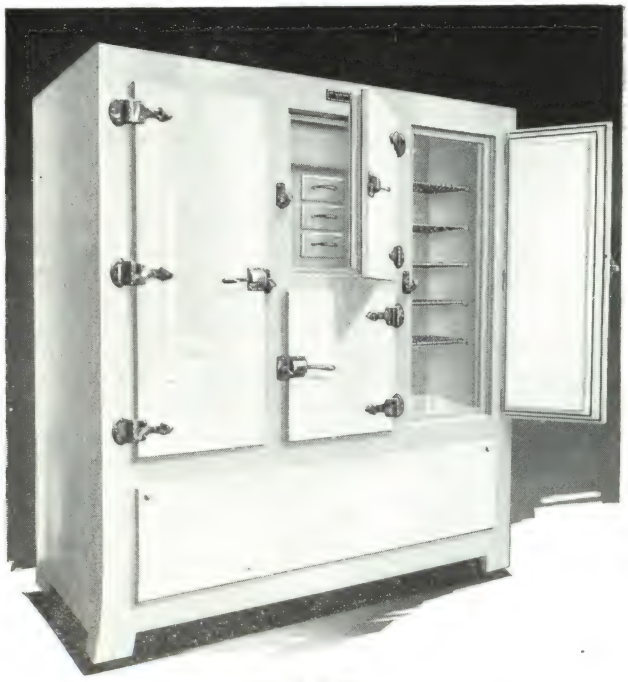
The Model B-5 has the same features of excellence that have been incorporated in both the Model B-9 and Model B-15 Frigidaire illustrated below.

Wide Usefulness of Frigidaire

Apartments, bakeries, boarding houses, cafes, cafeterias, clubs, confectioneries, dairies, dining rooms, factories, groceries, homes, hospitals, laboratories, schools, and yachts are finding the Frigidaire invaluable.

Model B-9

Height, 67¼ in.; width, 39 in.; depth, 24¾ in. Large food compartment, 38¾ in. high, 14¾ in. wide, 18½ in. deep. Small food compartment, 15¼ in. high, 16½ in. wide, 18½ in. deep. Weight, 835 lbs.



Model B-15

Height, 67½ in.; width, 59 in.; depth, 24¾ in. Large food compartments each 38¾ in. high, 14½ in. wide, 18½ in. deep, small food compartment, 15¼ in. high, 19½ in. wide, 18½ in. deep. Weight, 950 lbs.

Size of water supply pipe, ½ in.; waste pipes, ⅜ in. connected as shown on opposite page

TWO MODELS OF FRIGIDAIRE

KELVINATOR SALES CORPORATION

Electric Refrigeration for the Home

DETROIT, MICH.

Product

KELVINATOR, the oldest DOMESTIC REFRIGERATING UNIT on the market.

The Kelvinator

A quiet, automatically controlled motor driven domestic refrigerating unit, for installation in any refrigerator. The refrigerating element goes into the refrigerator. The condensing element, which is air cooled, thus obviating water connections and expensive installation, goes anywhere convenient.

Installation

The standard methods of installing the Kelvinator are as follows:

(1) Machine on top of refrigerator.

(2) Refrigerator on top of machine. This method is good in restricted places. It raises the refrigerator to a more convenient height for the user. The machine is placed in a cabinet with louvers or gratings and refrigerator set on top.

(3) Machine on floor beside refrigerator.

(4) Machine in basement or garage. Here the refrigerator should not be more than 30 ft. above or 50 ft. away from the machine.

Description

A copper brine tank completely tinned on outer surface goes in the ice compartment of refrigerator. Its size depends on the size of the ice compartment and cubic contents of refrigerator; as does the footage of expansion coil contained within brine tank. (See table.)

In this tank are sleeves in which copper trays are inserted for freezing ice cubes, desserts, etc. 21 cubes to a tray, 1½ in. square.

On top of the tank is the automatic thermostatic control, of metal bellows type, operating a toggle switch. This is positive in its action, and controls temperature within a range of 6°.

The tank is filled with calcium chloride brine, non-freezing to 6° above zero.

The condenser is mounted on the same base with motor and compressor, and completely surrounds them, thus forming a guard for all moving parts. It is composed of half-inch seamless copper tubing, and completely air cooled.

The motor is 1/6 h. p. for the 06, 610 and 1014 sizes, and ¼ h. p. for larger sizes. 110- or 220-volt D. C. or 60-cycle A. C. (Odd frequencies or voltages subject to a slight extra charge.)

The compressor is reciprocating, 1 cylinder for 1/6 h. p. sizes and 2 cylinders for larger. Because sulphur dioxide is used as a refrigerant, condensing pressure necessary is rarely above 75 lbs. The compressor is permanently gastight as a "gas seal" of antifriction metal is used, eliminating all stuffing boxes.

Power Consumption

Running time under ordinary conditions averages 8 hours a day. Thus power consumption with the 1/6 h.p. motor averages 1.6 kw. h. per day and 48 kw. h. per month. With the ¼ h.p. motor, 2.4 kw. h. per day and 72 kw. h. per month.

Temperatures

Temperatures maintained depend entirely upon local conditions, but will always be a minimum of 11° lower than the lowest attainable with ice in the same box, with the added advantage of being absolutely dry, uniform and clean.

DIMENSIONS AND DATA FOR DIFFERENT UNITS

Size of Unit	Over-all dimensions of brine tank and *attachments, in.			Minimum recommended dimensions of brine tank compartment, in.			Max. cu. contents of refrigerator	Max. connected loads in watts	Ice cube capacity	Over-all dimensions of condensing element, in		
	Width	Depth (front to rear)	Height	Width	Depth	Height				Width	Length	Height
06 Side	10	12	17	13	15	18	6	200	21	15½	30	24½
610 Side	10	12	19	13	15	20	10	200	42	15½	30	24½
1014 Side	10	12	21	13	15	22	14	200	42	15½	30	24½
1420 Side	12	13	23	15	16	24	20	300	63	15½	30	26
2030 Side	12	13	27	15	16	28	30	300	63	15½	30	26
3040 Side	16	16	32	19	19	33	40	300	63	15½	30	26
06 Top	17	12	9	19	15	11	6	200	21	15¼	30	24½
610 Top	21	12	11	23	15	13	10	200	42	15½	30	24½
1014 Top	24	12	12	26	15	14	14	200	42	15½	30	24½
1420 Top	29	13	12	31	16	14	20	300	63	15½	30	26
2030 Top	33	13	12	35	16	14	30	300	63	15½	30	26
3040 Top	35	13	14	37	16	16	40	300	63	15½	30	26

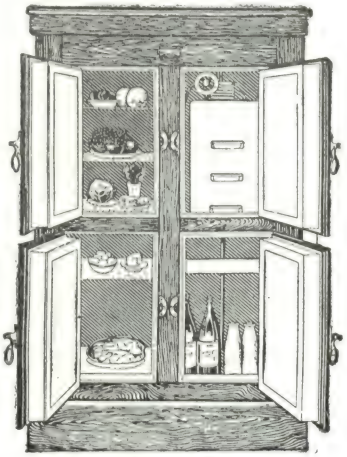
*Include thermostat and expansion valve mounting for which 8 in. are allowed.

Guarantee and Service

The Kelvinator is guaranteed for one year as to parts and workmanship. Free service is maintained for three months after installation by the local service station. No order for Kelvinator will be accepted unless installable by the factory trained Installation and Service Departments. These are maintained in 127 cities in the United States at present, August, 1922. The number is constantly increasing.

Specifications

For special use of architects, a complete set of specifications and blue prints is prepared, of size to fit architects' files. This gives comprehensive data for installation and will prove very valuable. (Copies on request.)



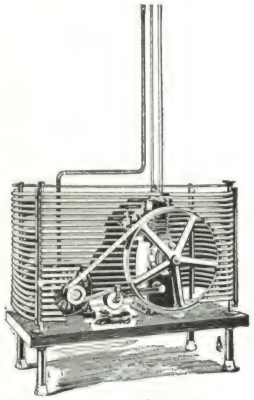
REFRIGERATING ELEMENT

Indorsement

Kelvinator is tested and indorsed by both the New York Tribune Institute and Good Housekeeping Institute. It is on the specifications of the United States Government. It is on permanent display at the Architect's Samples Corporation, New York, N. Y.; Builders' Material Exhibit, Chicago, Ill., and in 127 cities.

List of Users

A users' list is printed January 1st of each year showing the total number of users in the United States, with names and addresses.



CONDENSING ELEMENT
KELVINATOR
INSTALLATION
Using Method No. 4 in paragraph on Installation

THE AUDIFFREN REFRIGERATING MACHINE CO.

TELEPHONE
RECTOR 5140

140 Cedar Street
NEW YORK, N. Y.

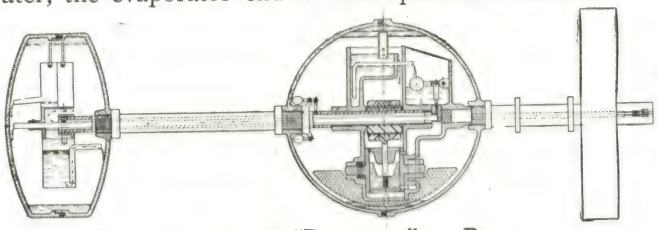
CABLE ADDRESS
"AUDREFMACO"

Product

AUDIFFREN-SINGRUN ICE MACHINE; AUDIFFREN DRINKING WATER SYSTEM; AUDIFFREN SYSTEMS FOR REFRIGERATION.

Description of Audiffren Machine

The Audiffren machine is so designed that the mechanism, the refrigerant—sulphur dioxide—and the lubricating oil are permanently and hermetically sealed inside the dumbbell shaped rotor. This cast bronze rotor thus combines the functions of compressor, condenser and evaporator. There are no external glands, valves or gauges. There is nothing to adjust or to set, nothing can leak and no replacement or refrigerant is ever needed. To produce refrigeration, the dumbbell must only be rotated, with the condenser end dipping in a tank of cooling water, the evaporator end in the liquid to be cooled.



CROSS SECTION OF "DUMBBELL" OR ROTOR

Sizes

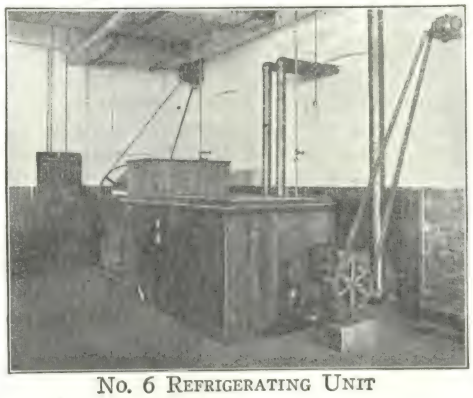
Built in four sizes, with nominal ratings of 1/3, 1/2, 1 and 2 tons. Within this scope they provide ideal refrigerating service with minimum expense and no technical supervision.

SIZES AND CAPACITIES

No. of Machine	H. p required	Condensing water per hour, gals.	Refrigerat'n ice equivalent, lbs. per 24 hrs.	Drinking water		
				Water cooled 77°-50° per hr.	Average length pipe line, ft.	Population served, persons
2	½	20	300- 600	15 gals.	200	50- 100
3	1½	50	750-1500	35 gals.	400	100- 500
4	2½	100	1500-3000	75 gals.	900	500-1000
6	5	200	3000-6000	150 gals.	1400	1000-3000

Application

The Audiffren machine is peculiarly adapted to direct cooling of drinking water in factories, public buildings and hotels; to ice making up to 2500 lbs. daily, to cooling refrigerators in residences, stores, florist shops, restaurants, cafeterias, and factories; and to various industrial processes.

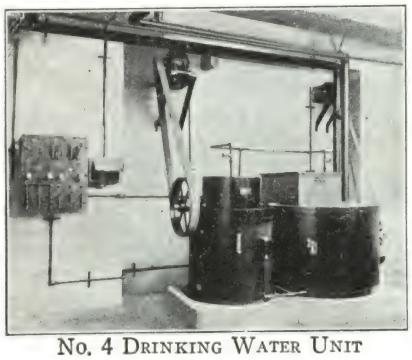


NO. 6 REFRIGERATING UNIT

Performance

The Audiffren machine may be operated by belt drive from any available source of power—electric motor, steam engine, gas engine or water power. With electric power it lends itself readily to automatic control and requires only routine attention. When used for the refrigeration of storage boxes and cold rooms, brine is maintained at constant temperature in the insulated brine tank (in which ice may be made if desired) and circulated through the cooling coils of the refrigerator.

Applied to the refrigeration of drinking water, brine is eliminated and the rotor, turning directly in the water, cools and aerates it. From the cooling and storage tank, the chilled water is continuously circulated through the "loop" pipe system to all the fountains and back to the tank. The machine operation is automatically controlled from a thermostat in the drinking water tank, which thus maintains the water throughout the system within any desired limits and at any desired temperature. There is no fluctuation. The Audiffren system provides drinking water service of unequalled quality. Send for 24-page bulletin of important installations with piping plans and references.



NO. 4 DRINKING WATER UNIT

The net capacities of the machine vary with maximum external air and condensing water temperatures and the required temperatures in refrigerator, or liquid being cooled. In preparing estimates we should have this information and data as to refrigerator size and insulation, lengths of piping for brine or drinking water and electric current characteristics.

Advantages

The Audiffren machine is absolutely safe. It can be installed anywhere without danger to life or property. It does not create a fire hazard, since the refrigerant is not inflammable. It works at low pressures and the inherent principle of design prevents generation of excessive pressure under any circumstances. It refrigerates by simply *rotating the rotor.* It is economical to operate, simple and durable to a most unusual degree. It costs twice as much, and is worth all it costs. It gives permanent satisfaction.

THE AUDIFFREN SYSTEM

Facilities

The rotors are completely standardized and have been built for us since 1911 by the General Electric Company at the Fort Wayne Works. A stock of all sizes is maintained. The tanks, cabinets and accessory equipment are made and assembled at the Audiffren factory in Jersey City. The Audiffren company furnishes the complete unit erected and in operation, or will advise with the architect when part of the system is to be installed by others.

THE AUTOMATIC REFRIGERATING COMPANY

Automatically Controlled Refrigerating and Ice Making Plants

HARTFORD, CONN.

BRANCH, SALES AND SERVICE OFFICES

ATLANTA, GA.
BOSTON, MASS.
CHICAGO, ILL.
CINCINNATI, OHIO
DENVER, COLO.
HONOLULU, T. H.
HUNTINGTON, W. VA.
JACKSONVILLE, FLA.
LOS ANGELES, CAL.
NEW HAVEN, CONN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
PHILADELPHIA, PA.
ROCHESTER, N. Y.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
WASHINGTON, D. C.

DIRECT REPRESENTATION: BALTIMORE, MD. and HOUSTON, TEX.

Products

AUTOMATICALLY CONTROLLED REFRIGERATING and ICE MAKING PLANTS (fully patented), designed to provide mechanical refrigeration without the necessity of an operating engineer; AUTOMATIC REFRIGERATED DRINKING WATER SYSTEMS.

For Electrically Operated Air Refrigerators for domestic use, see page 1781.

TRADE-MARK
Reg. U. S. Pat. Off.

Uses for Automatic Refrigerating Plants

They can be adapted to every use where cooling is desired or where ice is now used. They are particularly desirable for hospitals, office buildings, hotels, industrial plants, clubs, packing houses, dairies, meat markets and restaurants.

Significance of the Word "Automatic" When Used to Describe a Refrigerating System

When the word "Automatic" is applied to any other than the system manufactured by THE AUTOMATIC REFRIGERATING COMPANY of Hartford, Conn., it is erroneously used as a description of that system.

To be "Automatic," a refrigerating system must be so designed that the cut-off device that supplants the thermostatic control and automatically puts the plant out of commission, if abnormal conditions arise, will just as automatically restore the plant to the control of the thermostat as soon as the emergency has passed. This is accomplished in Automatic refrigerating plants by an exclusive patented automatic control that is widely recognized for its reliability and positive action.

Thirty years of experience (1892-1922) in handling refrigerating problems by utilizing dependable automatic control places this institution in an unusually enviable position.

As an organization, devoting its entire attention to automatic refrigeration exclusively, it has left behind it the necessary period of experimentation and from its thousands of successful Automatic plants installed throughout the country can draw a precedent that will give the most satisfactory solution to any problem of refrigeration in a practical, automatic way.

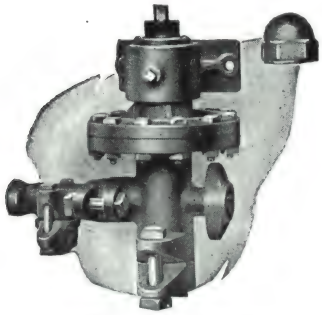
"Automatic" Refrigerating System

Minimum Operating Expense—After the plant is once put into operation, it is seldom necessary for a person to go near it except possibly once a week to see that enough oil is in the compressor. Further attention is rarely necessary. No skilled mechanic is required to operate it, so that the cost of supervision is reduced to a minimum. A yearly inspection by one of the company's skilled erecting engineers is recommended. It is the aim of the company to maintain its service offices so as to take care of this inspection at times when instructions are received from the customer and in this way to keep all plants operating at their highest efficiency and at low cost.

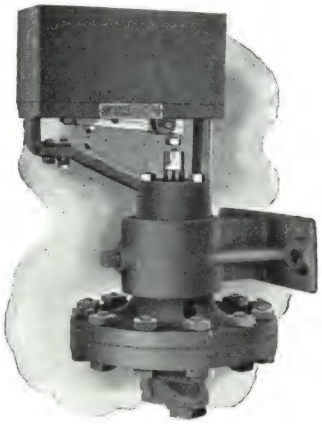
What the Plant Consists of—The plant consists of the compressor, condenser, coils, oil separator, oil pump and scale trap, thermostat, Automatic expansion valve, Automatic water regulator, Automatic high pressure safety cut-off and Automatic control panel. These parts are all of rugged construction, built to accurate dimensions with all parts interchangeable and thoroughly tested. All wearing parts are removable and replaceable by duplicate parts, which can be shipped from the nearest stock.

The All-important Automatic Parts and Operation—The *Automatic thermostat* controls the starting and stopping of the motor that drives the ammonia compressor, and it functions within 2° or less, thus saving electric power.

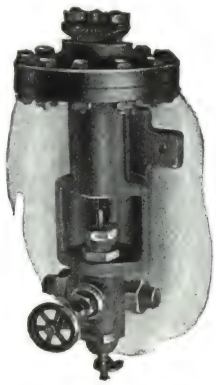
The *Automatic expansion valve* keeps the am-



AUTOMATIC EXPANSION VALVE



AUTOMATIC HIGH PRESSURE SAFETY CUT-OFF



AUTOMATIC WATER REGULATOR

Continued on next page

monia pressure at the most economical point for whatever temperature is desired. The *Automatic water regulator* maintains the most economical rate of flow of water through the condenser. The *Automatic high pressure safety cut-off* automatically stops the machine if for any reason—such as a valve closed by mistake, or because of a variance of the water supply—the pressure starts to rise above normal. At the same time a warning bell is sounded. When the conditions become normal, the machine is started automatically.

The *Automatic motor control panel* protects and controls the motor, Instead of unreliable fuses, positive acting electric overloads are used, which absolutely protect the motor and save the expense and annoyance of renewing fuses. At every turn safety is made just as automatic and certain as the satisfactory automatic operation of the machine itself.

New Temperature Control System

This company has perfected a new temperature control system that is overcoming refrigerating problems heretofore considered beyond solution.

The new system provides individual temperature control for each refrigerated storage room. It is particularly adapted for any installation where there is a wide difference of temperature in various rooms or where there is an extreme fluctuation of refrigeration demand such as in ice cream plants, beef and provision houses or where ice making is a large portion of the refrigeration load. It is also ideal for large dairy installations where the pasteurization load is heavy.

With the new control system, each refrigerated room has a thermostat controlling (see below) a motor operated valve located in the liquid line to the room.

Each room has a thermostatic expansion valve (see illustration) and a chamber for controlling the rate of flow of ammonia through the expansion coils in the room.

The motor operated valve regulates the flow of ammonia to the expansion valve in accordance with the refrigeration demand of that room. This valve is always wide open when refrigeration in this room is needed and closed when the room is cooled.

The compressor, in this type of installation, is not directly controlled by a thermostat, but rather by a back pressure regulator and is started and stopped in accordance with the pressure in the expansion coils.

It is now possible to have as many circuits in parallel as desired, each equipped as above described, with one back pressure regulator controlling the switchboard for each compressor.

A Typical Case—The motor operated valve system was installed in a branch packing house having a large beef cooler and a rather small freezer where difficulty was experienced in winter in keeping the freezer cool enough without the beef cooler getting too cold and in keeping the frost off of the compressor. This system overcame the defects; the freezer circuit would open and close three or four times to one of the cooler circuit and the compressor operated seven or eight times a day of 24 hours, running about 45 minutes each time during the winter months.

Automatic Refrigerated Drinking Water Systems

In recent years, the refrigerated drinking water system has become firmly recognized not only as a marked convenience, but as a requisite of health, economy and efficiency in factories and mills, hotels, office buildings and other public and semipublic buildings. Such a system delivers properly cooled water in exactly the quantity needed, when and where wanted.

Improves Health—In industrial plants particularly, the excellent results of the refrigerated water system contributes in a very positive manner to better morale and efficiency and reduces labor turn-over and time lost by sickness.

Time Saving—Refrigerated water systems save much time formerly spent by the employees going to and from the drinking place. It permits the installation of as many bubblers or faucets as required, all supplied from the one drinking water tank cooled by one plant.

Convenience—The Automatic drinking water system assures a positive supply of cool water at a proper temperature when and where desired. No worry about the non-delivery of ice; no handling of ice required.

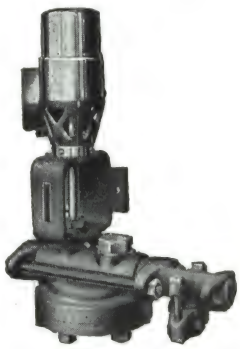
Standard Refrigerating Specifications—Direct Expansion

(*Note:* The following specifications become a part of the written contract. They should form a separate contract and should not be included with the heating and plumbing contract.)

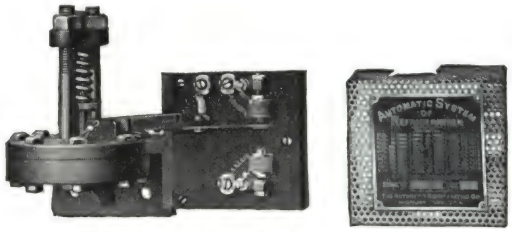
COMPRESSION SYSTEM (AMMONIA)

(1) General—This contractor shall furnish and install as hereinafter specified and as shown on architect's drawings automatic refrigerating equipment of sufficient size and capacity to cool compartments specified under paragraph 26.

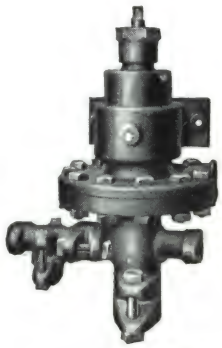
(2) These specifications are intended to provide an automatic refrigerating system as manufactured by.....



AUTOMATIC MOTOR OPERATED VALVE



AUTOMATIC BACK PRESSURE REGULATOR



AUTOMATIC THERMOSTATIC EXPANSION VALVE

Continued on next page

(3) The refrigerating system shall be fully protected by automatic safety devices as described in paragraphs 16, 17, 18, 20 and 21, and as required by local ordinance. The system shall be of the ammonia compression type using the direct expansion method of cooling.

(4) Work Furnished by Other Contractors Under Separate Specifications—

(a) All foundations for the refrigerating machinery (Paragraph 7.)

(b) All water lines required for the refrigerating machinery.

(c) The necessary sanitary trap and all drain connections from the refrigerating equipment.

(d) All electric wiring and connections to motor, automatic control panel, thermostat and auxiliaries.

(e) All necessary chases.

(f) All refrigerators and insulation or equipment of same other than direct expansion coils and hangers.

( ) (Insert here any other work to be done by others, not included in the above.)

(5) Work Included in This Contract—This contractor shall furnish all labor necessary for the complete erection of this equipment, excepting for that work specified to be done by others. This work shall be supervised by a skilled erecting engineer during the course of construction and temporary operation. The plant shall be turned over to the owner in complete working order by this contractor.

(6) Cutting, Openings and Chases—*On New Construction and Alterations*—The General Contractor shall do all cutting and patching and furnish necessary chases in connection with this work.

Installation in Existing Buildings—This contractor shall do all cutting and patching necessary in connection with this work and will leave premises in good condition.

Note: All necessary chases required in connection with this work shall be furnished by other contractor and shall be specified by other specifications.

(7) Foundations—(See 4A). The foundations shall be constructed under another contract. All pouring of cement and setting of bolts shall be personally supervised by the refrigerating contractor's engineer. This contractor shall furnish necessary drawings, showing exact position of all apparatus to be placed on the foundation, and shall also furnish all anchor bolts, sleeves and washers required for same.

(8) Compressors—This contractor shall furnish, install and properly connect (one or more) belt driven ammonia compressors of ... tons capacity at 25 lbs. suction pressure and 185 lbs. discharge pressure at ... r.p.m.

Each compressor shall be of the vertical, single acting, two-cylinder, self-oiling, enclosed type. (Compressors 3½x3½ in. and larger shall be mounted on a cast iron base which also shall hold an outboard ring oiled bearing.)

The compressor body shall be equipped with a drain connection and a well protected oil gauge.

The compressor cylinders shall be of ... inches diameter and ... inches stroke. (Compressors 3x3 in. and larger shall have cylinders cast separately from the body and fastened to it by means of studs and nuts; cylinders shall be of special cylinder metal.)

Each compressor cylinder shall have safety head equipped with working discharge valve. Each piston shall be of the double head type. The discharge chambers of the cylinders shall be water jacketed. Water jacket shall be cast separately from cylinders.

Each compressor shall have the usual by-pass connections for reversing the direction of flow. There shall be a pump out connection from the body to the suction line with suitable valve.

Illustration showing compressor to be furnished shall be attached to the contract.

(9) Oil Pump—This contractor shall furnish a hand operated oil pump for pumping oil into the body of the compressor against the normal pressure therein. The pump shall be mounted on, and the discharge piped to the compressor with proper shut-off valve and drain cock. The pump shall be provided with about 3 ft. of flexible tubing.

(10) Oil Separator—This contractor shall furnish and install one oil separator on the discharge line from the compressor. The separator shall be equipped with a drain valve.

(11) Scale Trap—This contractor shall furnish and install one scale trap in the suction line to the compressor, capable of properly withstanding the maximum compressor discharge pressure. The trap shall have a blow-off valve.

(12) Ammonia Receiver—This contractor shall furnish a liquid receiver of sufficient capacity to hold the entire charge of ammonia; of the horizontal type, mounted on floor stands and equipped with inlet, outlet and drain valves. Receiver shall be lap-welded pipe and shall not have autogenously welded longitudinal joint. The design of the receiver shall be acceptable to insurance companies.

(13) Ammonia Condenser—This contractor shall furnish, erect, properly support and connect double pipe counter current condensers, consisting of at least 25 lin. ft. of 1¼-in. full weight (commercial wrought iron or steel) pipe inside of 2-in. full weight (wrought iron or steel) pipe for each ton of refrigerating effect specified for 24 hours. (For 70° condensing water.)

Note: If 80° water must be used, double the condensing surface shall be specified.

The condenser shall be mounted on pipe supports and shall consist of ... stands, ... pipes high, each ... feet overall; each section provided with inlet and outlet ammonia valves, purge valves, inlet and outlet water valves.

(14) Pipe, Valves and Fittings—All ammonia piping and nipples of 1½ in. or less shall be extra heavy pipe and over 1½ in. shall be full weight pipe. All threads shall be cut clean and true; exactly to suit the fittings intended for them. The ends of all pipe lengths shall be reamed out and cleaned inside thoroughly before being installed. All joints in pipe lines shall be made up with litharge and glycerine.

All ammonia valves shall be extra heavy and designed especially so that the stuffing boxes can be packed with pressure still on the lines.

All flanges shall be male and female with lead gaskets. No rubber gaskets shall be used on ammonia connections or in ammonia valve bonnets. Flanges up to and including 1¼ in. shall be of the two-bolt type, larger sizes shall be four-bolt type.

All ammonia fittings shall be extra heavy.

(15) Ammonia and Oil—This contractor shall furnish all ammonia and oil necessary for the first charge.

(16) Automatic Water Regulator—This contractor shall furnish an Automatic water regulating valve to be placed in the water line to the condenser and to be operated by the ammonia condensing pressure acting on a spring balanced diaphragm. The water valve shall be guaranteed to limit the consumption of cooling water to the requirements of the condenser.

(17) Thermostat—This contractor shall furnish an adjustable automatic thermostat of the blade type with slate base and protecting cover. The thermostat shall act in conjunction with the high pressure safety cut-off and shall be guaranteed to control the operation of the motor controlling devices so as to start the motor when the temperature rises above a predetermined point and to stop the motor when the temperature falls below a predetermined point, functioning within 2° Fahr.

(18) Automatic High Pressure Safety Cut-off—This contractor shall furnish an Automatic electric switch to be mounted on the starting panel and to be operated by the compressor discharge pressure acting on a spring balanced diaphragm. This switch shall be guaranteed to ring an alarm bell and automatically stop the compressor should the pressure within the condenser rise above a predetermined point. This shall be accomplished by breaking, not making, the electrical contact. This switch shall automatically restore control of the compressor to the thermostat when the pressure becomes normal.

(19) Alarm Bell—This contractor shall furnish and locate one 4-in. iron box alarm bell so connected to the Automatic high pressure safety cut-off that it rings should the discharge pressure rise above a predetermined point. (On alternating current) a bell ringing transformer shall be provided. (On direct current) dry batteries shall be furnished for operating alarm bell.

(20) Automatic Expansion Valve—Furnish . . . Automatic ammonia expansion valve(s) to be operated by the pressure in the expansion coils acting on a spring balanced diaphragm. These valves shall be guaranteed to control the flow of the ammonia to the direct expansion coils and to maintain within practical limits a proper pressure within said coils while the compressor is in operation. Each valve shall be required to automatically interrupt the flow of ammonia after the compressor stops.

Unless otherwise specified, there shall be but one ammonia expansion valve.

(21) Automatic Control Panel—This contractor shall furnish an Automatic panel to control the operation of the

Continued on next page

motor driving the ammonia compressor. The panel shall have overloads and low voltage release and shall be provided with a main line enclosed safety switch.

All electrical apparatus supplied with this refrigerating system shall comply with the underwriters' requirements.

(22) Motor—This contractor shall furnish an electric motor of the following rating: —— horse power, —— r.p.m., —— current, —— voltage, —— phase, ——cycle. The motor shall be equipped with sliding base and cast iron pulley.

(23) Countershaft or Idler—This contractor shall furnish and install either (a) an adjustable floor type countershaft having a 12-in. horizontal adjustment equipped with ring oiled self-aligning bearings and supplied with cast iron pulleys; or (b) where a short drive is desired, a floor type self-adjusting idler.

(24) Belts—Furnish necessary double, endless oak tanned leather belts for operating the ammonia compressor.

(25) Gauges—Furnish and mount on control panel one high pressure gauge and one low pressure gauge with back connections piped to discharge and suction headers on the compressor. Gauges to have 4½-in. dial and nickelplated rims.

(26) Ammonia Coils—This contractor shall furnish direct expansion (steel or wrought iron) piping and connections sufficient to cool the following to the temperatures specified.

Note: Insert here a list of all refrigerating duty to be performed giving location, exact dimensions, insulation specifications and required temperatures of all places to be cooled.

This contractor shall specify the number of lineal feet and size of pipe he proposes to install in each cooled compartment.

(27) Coil Hangers—*If Wall Coils are Specified*—This contractor shall furnish either angle iron hangers equipped with wrought iron hooks or flat iron strips bolted between the pipes and attached securely to the wall. No wooden supports will be permitted.

(28) Pipe Covering—*For Ammonia Lines*—After all ammonia lines have been tested and made tight, this contractor shall cover all exposed low pressure ammonia pipes throughout the installation with sectional moulded cork covering of brine thickness. (Approximately 2½ in. thick.)

All foreign materials, such as plaster, shall be removed from the surface of the pipe and also from the inside of the covering before it is applied. All end joints shall be broken by making one-half of the first section of the covering 18 in. long, leaving the other half 36 in. in length. All longitudinal joints shall be on the top and bottom of the pipe and not on the sides. In all cases where a pipe passes through an insulated wall into a refrigerated room, the covering shall extend 1 in. beyond the wall inside the room. The covering shall be applied with waterproof cement on all joints and wired in place with copper clad steel wire, using not less than six wires to a section. Care shall be taken to see that all wires are drawn up tight all around the covering and not just at the point where the twist is made. After the covering is applied, all seams and chipped surfaces shall be filled with seam filler so as to leave a smooth, even appearance.

All screwed fittings shall be covered with moulded cork fittings covering applied with waterproof cement on all joints and wired in place with copper clad steel wire, using not less than four wires to a fitting. All spaces between the cork covering and fittings shall be filled with brine putty.

The entire covering shall be finished with an 8-oz. canvas jacket neatly sewed over rosin paper and painted one coat of glue sizing and two coats of lead and oil paint.

(29) Pipe Hangers—All ammonia lines shall be carried on all-metal hangers on the outside of the covering.

These hangers shall have a flat bearing surface against the covering of not less than 1⅛ in. in width.

(30) Thermometers—This contractor shall furnish and erect in each cooled compartment, one 12-in. scale galvanized case thermometer with range of minus 20° to plus 120° Fahr. (2° graduation).

(31) Pressure Test—All castings shall be shop tested to at least 300 lbs. per sq. in. air pressure. All ammonia coils shall be shop tested to at least 300 lbs. per sq. in. air pressure.

All ammonia piping after erection shall be tested by air pressure to 300 lbs. per sq. in. All joints shall be gone over with a solution of soap and water and all leaks shown shall be made absolutely tight. Piping which is not tight under test shall be taken down and re-assembled. Caulking of joints or makeshift methods of repairing leaks shall not be allowed.

(32) Painting—This contractor shall paint the compressor and accessories with one coat of red oxide paint before same leave the shop and a coat of enamel after the plant has been thoroughly tested.

Likewise, the receiver and pipe lines shall be given one coat of black asphaltic paint after the plant has been tested.

All metal surfaces to be painted shall be thoroughly cleaned of rust, scale and grease before paint is applied.

Paint shall be tinted colors as directed by the architect or engineer.

(33) Instructions—This contractor shall furnish printed instructions for the operation and maintenance of the entire refrigerating equipment to the operator and engineer and have a competent engineer at the plant for at least three days after the plant is placed in operation.

(34) Guarantee—This contractor shall guarantee that the plant will meet the specified requirements of temperature and efficiency.

He shall guarantee to leave the entire equipment complete in perfect working order and free from any defects in material or workmanship and should inherent defects appear in any part within one year from the time that plant is put in operation, this contractor shall promptly replace the defective part at his own expense.

Architect Please Note—The following paragraphs should be included with the proper specifications as noted:

Supply and Drainage for Refrigerating System—Supply and drain lines (See 4B and 4C) shall be run to the satisfaction of the refrigerating contractor who will furnish the drawings necessary for the proper installation.

Specifications for Electrical Work—Wiring for motor, thermostat, control panel and auxiliaries of the refrigerating plant (see 4D). This work shall be done to the satisfaction of the refrigerating contractor who will furnish the drawings necessary for the proper installation of the required wiring, switches, etc.

Partial List of Representative Architects With Whom This Company Has Worked

Donn Barber, New York, N. Y.
Bargleburgh, Whitson & Barnes, Houston, Tex.
John C. Bramble, Baltimore, Md.
R. C. Clark, Chicago, Ill.
Cross & Cross, New York, N. Y.
Davis & Brooks, Hartford, Conn.
Delano & Aldrich, New York, N. Y.
Fred F. French & Co., New York, N. Y.
C. T. H. Gilbert, New York, N. Y.
Hollis French & Allen Hubbard, Boston, Mass.
J. F. Jackson, New York, N. Y.
Maginnis & Walsh, Boston, Mass.
F. L. Maline, Los Angeles, Cal.
Benjamin Wistar Morris, New York, N. Y.
Frank L. Packard, Columbus, Ohio
Parish & Schroeder, New York, N. Y.
Parker, Thomas & Rice, Boston, Mass.
C. A. Platt, New York, N. Y.
W. J. Rogers, New York, N. Y.
Houghton Sawyer, San Francisco, Cal.
W. L. Stoddart, New York, N. Y.
D. E. Waid, New York, N. Y.
Walker & Gillette, New York, N. Y.
B. H. & C. N. Whinston, New York, N. Y.
Wright & Rushforth, San Francisco, Cal.

ESTABLISHED 1853

THE BRECHT COMPANY

Manufacturers of Packing House Machinery and Equipment, Vegetable Oil Refining Plants, Butcher Supplies, Refrigerators and Refrigerating Machinery

MAIN OFFICE AND FACTORIES

ST. LOUIS, MO.

BRANCH OFFICES

NEW YORK, N. Y., 174-176 Pearl Street
CHICAGO, ILL., Monadnock Building
CAPE TOWN, S. A., 40 Mansion House Chambers
BUENOS AIRES, A. R. Calle San Martin 201
MADRID, SPAIN, Apartado 802
SAN FRANCISCO, CAL., 67 Second Street
LONDON, E. C., ENG., 12 Bow Lane
SHANGHAI, CHINA, New Fetco Building, 62 Kiangse Road
MEXICO CITY, MEX., Isobel La Catolica 40 Despacho 12
SIDNEY, N. S. W., 8a Castlereagh Street
LIVERPOOL, ENG., 6 Stanley Street

Products

PACKING HOUSE MACHINERY, EQUIPMENT and APPLIANCES.

TOOLS for MEAT and ALLIED INDUSTRIES.

BUTCHER SUPPLIES, LARD and LARD REFINING PLANTS.

VEGETABLE OIL REFINING PLANTS.

LARD COMPOUND PLANTS.

FERTILIZER DRYERS and GARBAGE RENDERING PLANTS.

DEAD ANIMAL RENDERING PLANTS.

EVAPORATORS.

MEAT CANNING MACHINERY.

COMMERCIAL REFRIGERATORS for markets, hotels, restaurants and institutions.

REFRIGERATING MACHINERY and EQUIPMENT.

Packing House Machinery, Equipment and Appliances

THE BRECHT COMPANY has the advantages of 69 years' experience in the design and manufacture of machinery and equipment for the packer, slaughterer, renderer, sausage maker, and refiner.

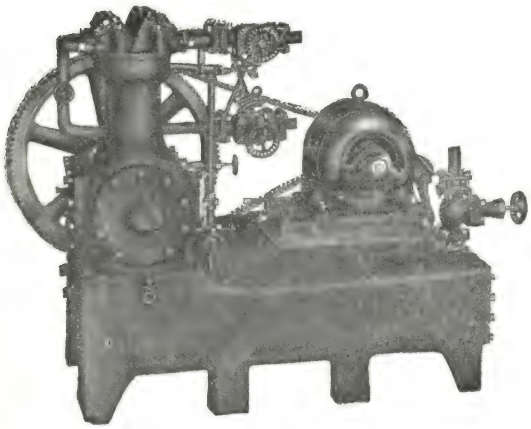
This valuable experience is at your command through the co-operation of the Brecht service and technical departments.

Prospective buyers or owners of plants who would like to increase the efficiency of their output are invited to communicate their problems or needs to THE BRECHT COMPANY.

Complete Installations for Refrigeration

THE BRECHT COMPANY specializes in complete installations for the proper refrigeration of hotels and institutions of all types—complete refrigerating machinery and refrigerators for all needs.

Outline your needs to THE BRECHT COMPANY'S Engineering Department for suggestions, data, etc., with no obligation on your part.



THE BRECHT COMPRESSOR
As shown, the Brecht compressor is compact, rugged, and free from complications

BRECHT REFRIGERATORS
The style shown is very popular in hotels, large institutions, etc.

Continued on next page

Tools for the Meat and Allied Industries

There is no tool or machine used in the meat and allied industries which THE BRECHT COMPANY does not manufacture or supply.

And the volume of this class of business handled by the company has resulted in lowered costs of production and lower prices to the buyer. Write for catalogue and price lists.

Butcher Supplies, Lard and Lard Refining Plants

THE BRECHT COMPANY has long been recognized as headquarters for every type of butcher supplies: machinery and equipment for the packer, slaughterer, renderer, sausage maker and refiner.

No matter if it may be kettle rendered, neutral, prime steam or compound lard you have in mind, you will find that the Brecht service covers such plants complete.

Brecht service does not end with the sale of the machinery—it includes the successful demonstration and turning out of a high class product.

Vegetable Oil Refining Plants

Brecht refineries represent the latest developments in engineering—economical and efficiently arranged units. The Brecht equipment for the refining, bleaching and deodorizing of vegetable oils is particularly adapted for cottonseed oil, but may also be successfully used for a great many other oils which require any of these processes.

Brecht installations can be made complete in every detail: Filter presses to be used in the refining process, pumps for handling vegetable oils, wintering plants for the production of "winter" or salad oils, and complete equipment for the hydrogenation of vegetable oils, under the patents of Carleton Ellis and the Hydrogenated Oil Company.

Lard Compound Plants

Packers interested in lard compound plant equipment will receive suggestions and designs for complete plants to suit their requirements, on request.

Fertilizer Dryers and Garbage Rendering Plants

THE BRECHT COMPANY'S Engineering Department has developed highly efficient machinery to get the maximum profit out of the by-product.

Plans for complete fertilizer dryers and garbage rendering plants will gladly be furnished without any obligation.

Dead Animal Rendering Plants

THE BRECHT COMPANY manufactures rendering tanks, digesters, storage and receiving tanks—everything needed for an efficient rendering plant.

The special designs and materials used are the result of many years of practical experience, assuring the purchaser of high quality, satisfactory products.

Evaporators

The Brecht all-cast iron evaporator has established a world-wide reputation for efficient, economical service.

Vertical tube type, cast iron throughout, and including the Brecht improved cast iron heating chambers. Resists corrosive effects of organic acids contained in tank water accruing in rendering tanks from the cooking of animal offal, garbage, etc.

Write for interesting details.

Meat Canning Machinery

THE BRECHT COMPANY supplies everything needed for can making, meat canning, and meat extract plants, grinders, presses, automatic can machinery, liquid compound appliers, thermometers, testers, solder pots and furnaces, cooking tanks, stuffing machines, evaporators, etc.

Prospective purchasers will find it of advantage to communicate with our engineering department in regard to proposed installations.

Commercial Refrigerators

Many exclusive features, such as 4⅜-in. actual insulation, proper packing of mineral wool, ⅞-in. overlap on windows, automatic fasteners, etc., make Brecht refrigerators real ice savers. That is why they are standard equipment in markets, hotels, restaurants and institutions of all kinds. It is a line on which THE BRECHT COMPANY has specialized for 69 years.

Refrigerating Machinery and Equipment

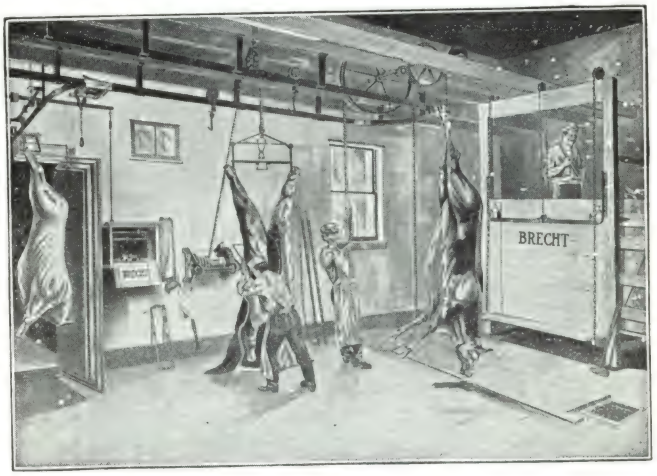
Brecht refrigerating machines combine strength and freedom from complications. Easily installed, easily operated. They do away with ice bills and effect real economy.

The Brecht refrigerating unit is today giving satisfactory service in thousands of packing plants, retail markets, hotels, restaurants, institutions, etc.

Write for interesting information regarding mechanical refrigeration together with details of Brecht installations.

Co-operation

Architects will find it to their interest to consult with THE BRECHT COMPANY. Drawings, data and suggestions for installations in abattoirs, packing houses, lard refining plants, oleo and fertilizer plants, retail markets, hotels, institutions, etc., will be gladly sent on request without any obligation whatever. The 69 years of experience gained by THE BRECHT COMPANY experts is at your service—make use of it.



BRECHT BEEF KILLING EQUIPMENT
A typical Brecht installation for hand power

BRUNSWICK-KROESCHELL COMPANY

Refrigerating Systems and Plants

MAIN OFFICE AND WORKS
440-472 West Erie Street
CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 30 Church Street

DETROIT, MICH., Majestic Building

Products

CARBONIC ANHYDRIDE REFRIGERATING SYSTEMS; BRINE CIRCULATING SYSTEMS; SMALL REFRIGERATING PLANTS.

For Boilers, see page 2017.

Carbonic Anhydride Refrigerating Systems

The Kroeschell carbonic anhydride refrigerating systems are applicable to all cases where refrigeration or ice making is required.

The Kroeschell machine is so highly developed and perfected that the greatest economy and highest efficiency are guaranteed.

The refrigerating plant comprises three parts:

(1) A compressor, in which the gas is compressed.

(2) A condenser, in which the compressed warm gas imparts its heat to cold water and liquefies.

(3) Expansion coils, in which the liquid carbonic anhydride re-expands into its original gaseous state, thereby absorbing heat and performing the refrigerating work.

In order to make the operation continuous, the three parts are connected; the charge of carbonic anhydride, originally put into the machine being used over and over again, going progressively through the process of compression, condensation and evaporation. Thus only a small quantity of gas is required to replace any losses.

Carbonic anhydride is supplied in steel cylinders and can be procured in any part of the world. The cost of this gas is but a few cents per pound and the quantity required for a complete charge is very small.

The compressor draws the gas from the expansion coils, compressing it to the liquefying pressure (pressure depending upon the temperature of the cooling water in the condenser). The compressed gas is discharged into the condenser, where it imparts its heat to the water in the condenser and becomes a liquid. The liquid is then returned to the expansion or cooling coils, expanding through same and thereby absorbing heat.

The surface of the cooling coils is so proportioned that all of the liquid evaporates as it passes through the same. From there the gas again returns to the compressor to resume the cycle of operation. The pressure of the gas in the coils is controlled by means of a valve.

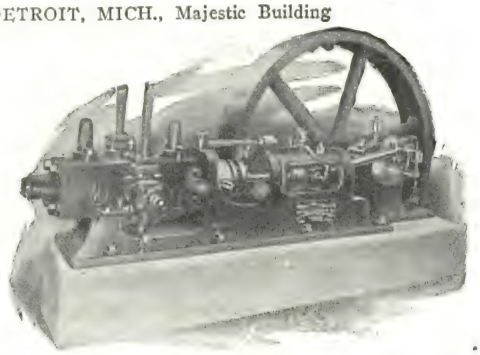
The Kroeschell compressor is built for either steam or electric drive.

Advantages—The Kroeschell carbonic anhydride refrigerating machine is more compact and requires less space than any other. It is simple in construction and easy to operate, economical in the use of power and water and is highly efficient. Safety in operation places it above all other refrigerating machines, as carbonic anhydride is harmless and odorless.

The gas used in the Kroeschell system is non-combustible, can not cause explosions and is a fire extinguisher. It is neutral toward all materials and food products and cost is about one-fourth that of ammonia.

Brine Circulating System

In some plants the brine circulating system is used. In this type of plant calcium chloride brine is cooled and circulated through the coils in refrigerators and cooling rooms.



KROESCHELL MOTOR DRIVEN CARBONIC ANHYDRIDE COMPRESSOR AND CONDENSER

Small Refrigerating Plants

Small, self-contained refrigerating units are also built, the condenser and machinery being mounted on a combined brine and ice tank. These units are also built for either steam or electric drive.

The special design enables this company to install complete equipments in a very small space. This equipment is especially suitable for small institutions, markets, restaurants, etc.

By means of a small pump the brine from the tank is circulated through the coils in the refrigerators. The compressor is operated a sufficient length of time to cool the brine. This cold brine is kept in constant circulation, doing the work of cooling all of the time.

Where desired, automatic thermostatic control system may be used with this equipment and uniform temperatures maintained without any special attention of the operator.

Information for Estimating

Send sketch showing location and dimensions of rooms or refrigerators to be cooled and location of machinery.

Purpose for which plant is to be used; temperature of water supply in summer, and source of supply.

Power for operation; if steam driven, give pressure; if electric driven, give current and voltage, etc.

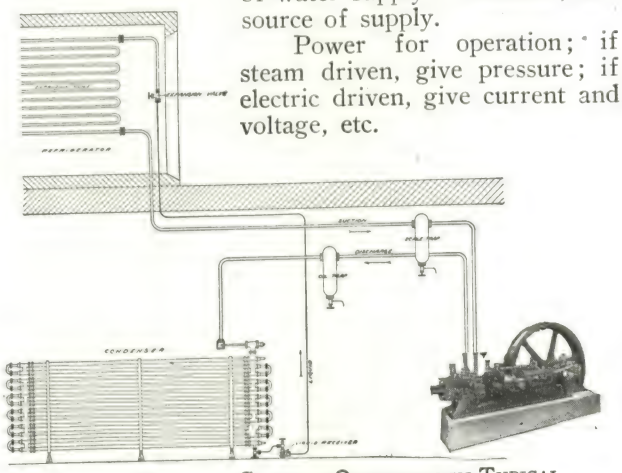


DIAGRAM SHOWING CYCLE OF OPERATION IN TYPICAL INSTALLATION OF KROESCHELL ICE MACHINE

CARBONDALE MACHINE CO.

Manufacturers of Refrigerating and Ice Making Machinery

CARBONDALE, PA.

BRANCH OFFICES

NEW YORK, N. Y., 171-3-5 Christopher Street
BUFFALO, N. Y., 380 Ellicott Square Building
KANSAS CITY, MO., 1403 Waldheim Building
PHILADELPHIA, PA., 1009 Harrison Building
PITTSBURGH, PA., 1122 Alleghany Avenue
CHICAGO, ILL., 1637 Prairie Avenue
LOS ANGELES, CAL., 726 Black Building
BALTIMORE, MD., 304 Continental Building
LOUISVILLE, KY., 210 Keller Building
NEW ORLEANS, LA., 638 Camp Street

Products

REFRIGERATING and ICE MAKING MACHINERY for Ammonia Compression or Exhaust Steam Absorption Systems.

Refrigeration

We are prepared to supply all the necessary machinery for ammonia compression or "Carbondale" exhaust steam absorption systems.

Ammonia Compression System—This system consists of a Worthington Feather Valve (Reg. U. S. Pat. Off.) ammonia compressor, expansion coils, brine cooler, condenser, anhydrous receiver, brine pump and fittings.

Feather Valve compressors are built in various sizes from the 2-ton vertical type to a 500-ton type compressor or over.

"Carbondale" Exhaust Steam Absorption System—The CARBONDALE MACHINE Co. builds three types of machines for this system:

(1) the shell, admirably suited where floor space is restricted and where the water used is free from dirt and encrusting solids.

(2) the atmospheric, in case of warm or muddy water.

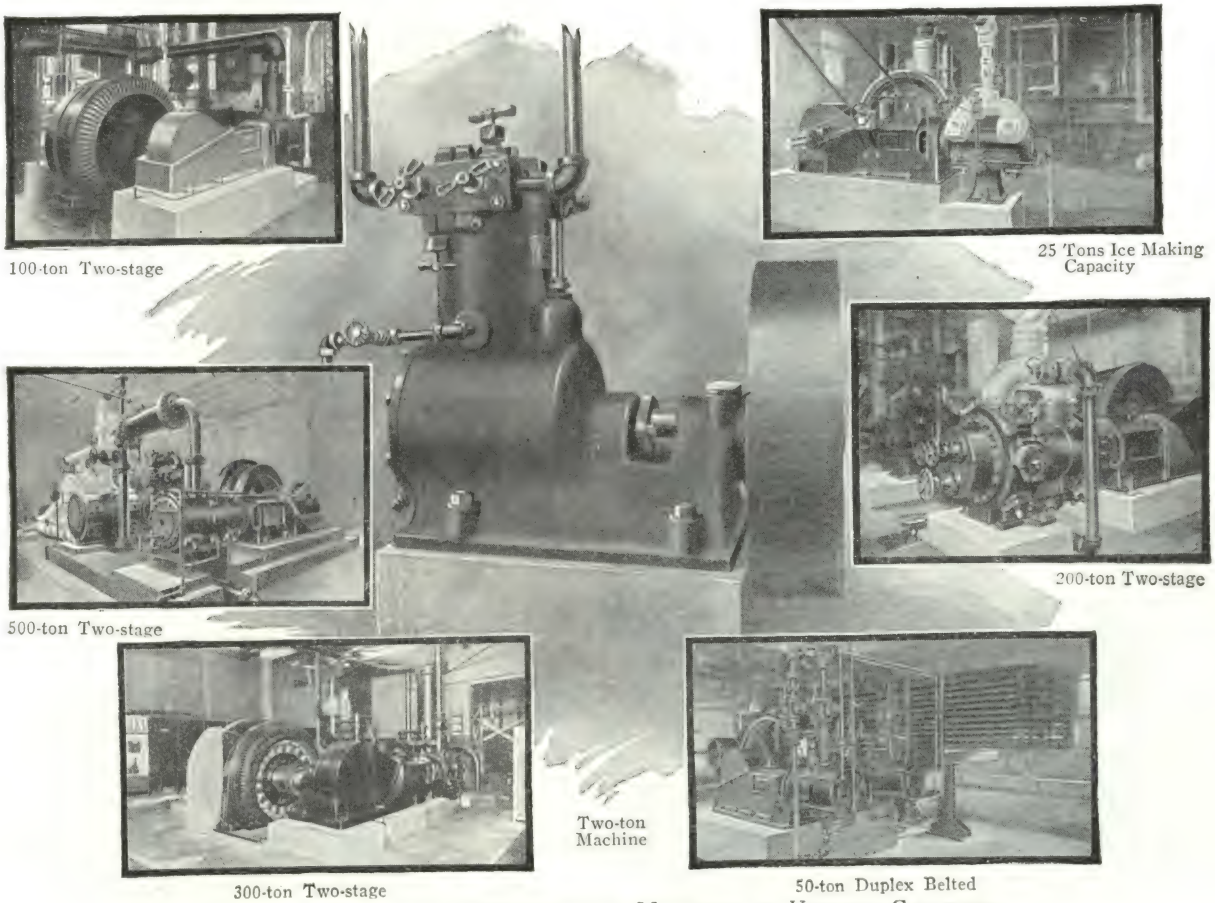
(3) the double pipe, which may be used to better advantage than the atmospheric type under certain conditions.

The machines consist of: ammonia gas generator, operated by exhaust steam in coils; rectifier; condenser; anhydrous ammonia receiver; brine cooler; exchanger; weak ammonia liquor cooler; absorber; aqua receiver; ammonia liquor pump; brine pump and fittings. This system requires no compressor.

Carbondale Service

Our engineers are specially trained to solve difficult problems as well as to design complete plants which our organization is prepared to install.

Our service is offered to architects, engineers and purchasers without charge. Our co-operation has been a large factor in our placing successful installations in such buildings as the Equitable Building, New York, the Ritz-Carlton Hotel, Atlantic City, and many others of equal note.



AMMONIA COMPRESSION REFRIGRERATION MACHINES OF VARIOUS CAPACITIES

CONTINENTAL MACHINERY COMPANY

Builders of Quality Refrigerating Machines

GENERAL OFFICES
111 West Monroe Street
CHICAGO, ILL.

DISTRIBUTING CENTERS
PITTSBURGH, PA. BALTIMORE, MD. DETROIT, MICH. MILWAUKEE, WIS. NEW ORLEANS, LA.
LITTLE ROCK, ARK. MEMPHIS, TENN. MINNEAPOLIS, MINN. CHICAGO, ILL.

Products

REFRIGERATING MACHINERY for modern refrigerating and ice plants, including Ammonia Valves and Fittings, Condensers, Brine Coolers, Compressors, Ice Cans and all accessories or parts required for Complete Refrigerating and Ice Making Plants.

Engineering Co-operative Service

Architects are cordially invited to consult our technical service bureau and refrigerating engineers who are organized to co-operate with architects in the designing or planning of refrigerating systems for all purposes. They will cheerfully serve you without obligating you in any way. Write us or send in your plans and our engineers will submit designs and recommendations for correct refrigerating equipment together with specific information showing the advantages and economies obtained by the use of Continental equipment.

Continental Ammonia Safety Compressors

Made in self-contained and detached units.

Self-contained Unit — A compact, powerful, economical machine in which the entire high pressure portion of the refrigerating system is in the base of the machine. This outfit includes all necessary parts. Suitable for purposes where small capacities are required. The same principles apply as in any compression system of refrigeration. No special foundation required; readily attached to any substantial wood or cement floor; easily and inexpensively moved.

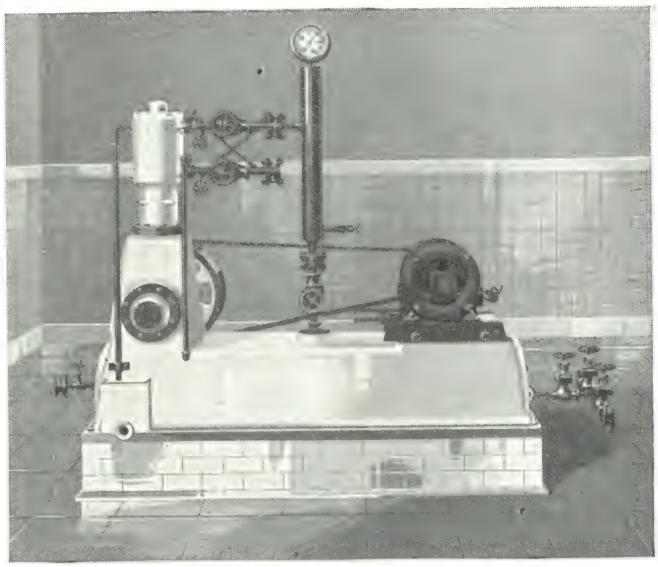
Detached Unit—Made with 1, 2 and 3 cylinders, with refrigerating capacities from 1½ tons and up.

Advantages of Continental Safety Compressors

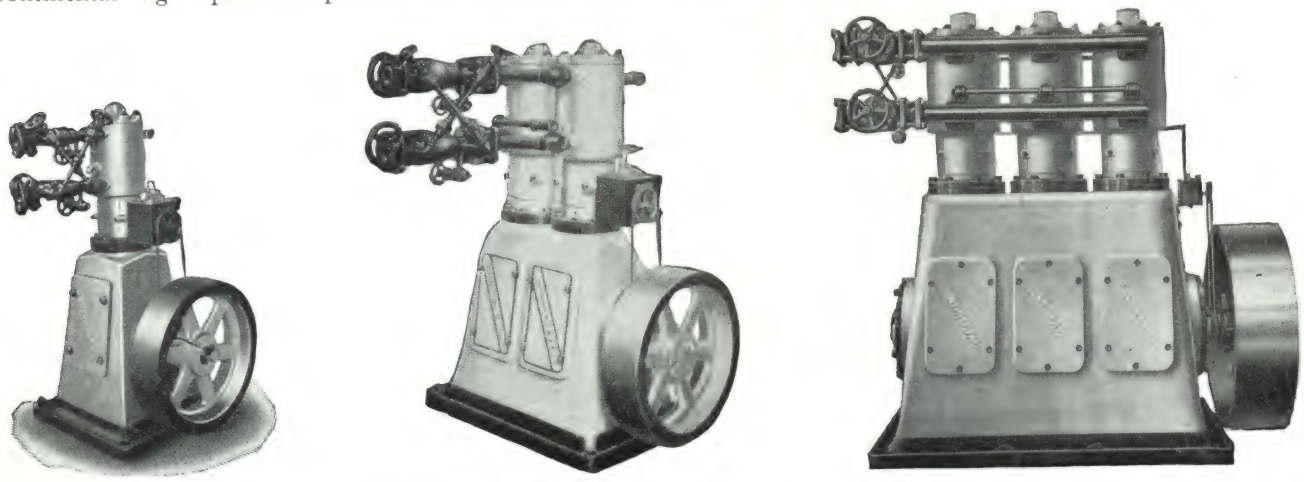
"Intensity of ammonia control" is the key-note of true efficiency in refrigeration. This intense control is possible only with high speed, ribbon valve and avoidance of oil contamination in refrigerating coils. The Continental high speed compressor has features built into it that raises the standard of refrigerating efficiency, with these specific advantages:

(1) Capable of a wide range of speeds and capacity with perfect safety and lowest power cost. (2) Accessible; easy to get at all moving parts. (3) Dependable; sturdy, long life, minimum upkeep cost. (4) Compact; occupies minimum space with maximum results. (5) Perfectly balanced; silent, smooth-running and free from destructive vibration. (6) Ammonia intensely controlled; confined entirely to the refrigerating system and forced to deliver maximum service.

Everything about Continental equipment is engineered to exact precision and conforms to the highest ideals of real quality to secure the utmost in long years of genuine service.



CONTINENTAL SELF-CONTAINED UNIT



CONTINENTAL HIGH SPEED AMMONIA SAFETY COMPRESSORS

PEERLESS ICE MACHINE COMPANY

Manufacturers of Automatic Refrigerating Machinery

TELEPHONE
WABASH 2411

503 South Jefferson Street
CHICAGO, ILL.

Product

PEERLESS AUTOMATIC REFRIGERATING MACHINES.

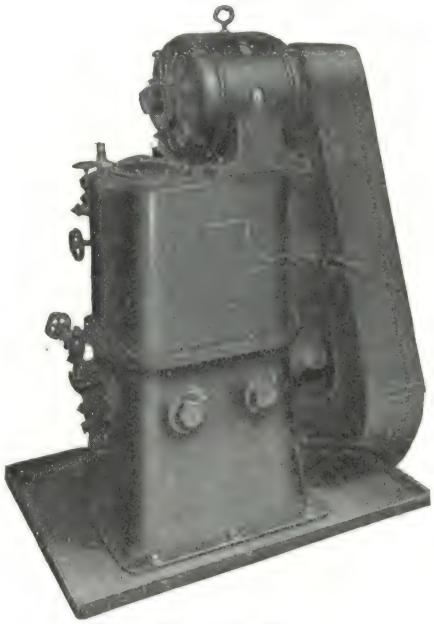
Scope of Use

Hotels, apartment houses, hospitals, packing houses, butterine factories, butter factories, cheese storage, fruit storage, fur storage, restaurants, florists, candy factories, soda fountains, bottling works, etc.

Description

Right on the premises any desired temperature can be maintained without buying ice. Automatic refrigeration "makes cold" just as a heating system "makes heat."

The temperature in a refrigerator filled with commercial ice varies much more rapidly than where mechanical refrigeration is used. The ice is usually kept in a separate chamber from the produce, and the latter is chilled by the circulation of cold air. Each time the doors in the refrigerator are opened, a certain amount of warm air gets in and raises the temperature of the interior above the point desired.



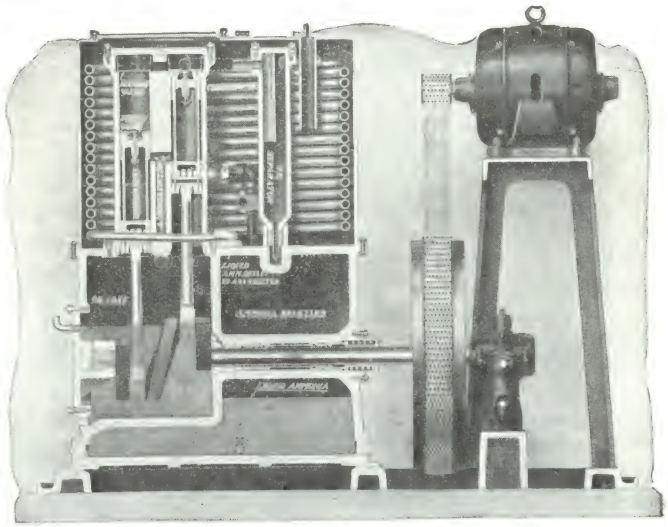
Type D. M.
SINGLE CYLINDER MOTOR DRIVE PEERLESS AUTOMATIC REFRIGERATING MACHINE

A complete refrigerating plant. Note compactness, freedom from cumbersome joints and connections which are storehouses of trouble and expense. Furnished in half-ton, ton and 2-ton capacities

But Peerless automatic refrigeration produces and maintains a dry, even cold temperature in coils of pipe, which keeps the refrigerator thoroughly chilled. Any warm air that may come in through the refrigerator doors will not disturb the uniform coldness of the interior, because enough extra "coldness" is automatically produced to offset the warm air instantly.

Details of the Peerless

An ice machine consists of a compressor, oil trap, condenser and ammonia receiver. In the Peerless these parts are all on one base, assembled, connected and thoroughly tested under operating conditions at the Peerless factory.



SECTIONAL VIEW OF COMPLETE 3- TO 10-TON PEERLESS REFRIGERATING MACHINE
Motor mounted on frame

The compressor is vertical, single acting, self-oiling and perfectly balanced to run without vibration. The condenser coils, of extra heavy ammonia pipe, surround the cylinders and oil trap, and the whole is enclosed in a jacket and water cooled. The ammonia receiver is in the base of the machine.

The Peerless is absolutely odorless. All high pressure ammonia piping is water jacketed, allowing no fumes to escape. Owing to the dependable way in which the Peerless high pressure piping is constructed, no fumes can escape, as it is one continuous coil. This eliminates the many joints and connections necessary in the ordinary type of construction.

The electrically driven Peerless machines, operated under thermostatic control, require no attention whatever except an occasional oiling.

Capacity

From ½ ton to 10 tons.

DIMENSIONS AND WEIGHTS PEERLESS REFRIGERATING MACHINES*

No. machine	Rated cap., lbs.	Maximum over-all dimensions			Net weight complete machine, lbs.	Sizes crated for export			Shipping weight for export, lbs.
		Length ft. in.	Width ft. in.	Height ft. in.		Length ft. in.	Width ft. in.	Height ft. in.	
3	1,000	2 9	2 2	4 4	1,600	3 6	2 10	5 2	1,750
4	2,000	3 8	2 10	5 8	3,500	4 6	3 8	6 6	3,700
5	4,000	4 0	3 0	6 7	4,300	4 10	3 10	7 6	4,600
6	6,000	6 0	3 2	5 5	6,000	7 0	4 0	6 6	6,500
7	10,000	6 10	3 2	5 6	7,300	7 10	4 0	6 6	7,900
9	20,000	9 0	3 0	6 6	10,000	10 0	4 0	7 6	11,000

*Weights and measurements of entire high pressure side of Peerless, consisting of compressor, oil trap, condenser coils, and ammonia receiver, all on one base, also sizes and weights of machines crated for export.

ESTABLISHED 1894

THE PHOENIX ICE MACHINE COMPANY

Designers and Builders of Refrigerating Equipment

2711 Church Avenue

CLEVELAND, OHIO

Products

REFRIGERATING AND ICE MAKING MACHINERY AND PLANTS.

PHOENIX ICE MACHINE

TRADE-MARK

Phoenix Ice Machine

The Phoenix ice machine embraces the universally adopted compression process. The most important part of this machine is the compressor which is built by the company. Phoenix compressors can be had in all sizes from 1 ton and up, either in the single or twin cylinder type as space and operating conditions demand. The double pipe condenser, ammonia receiver, cooling coils and necessary valves and fittings are of the best materials and highest skilled workmanship.

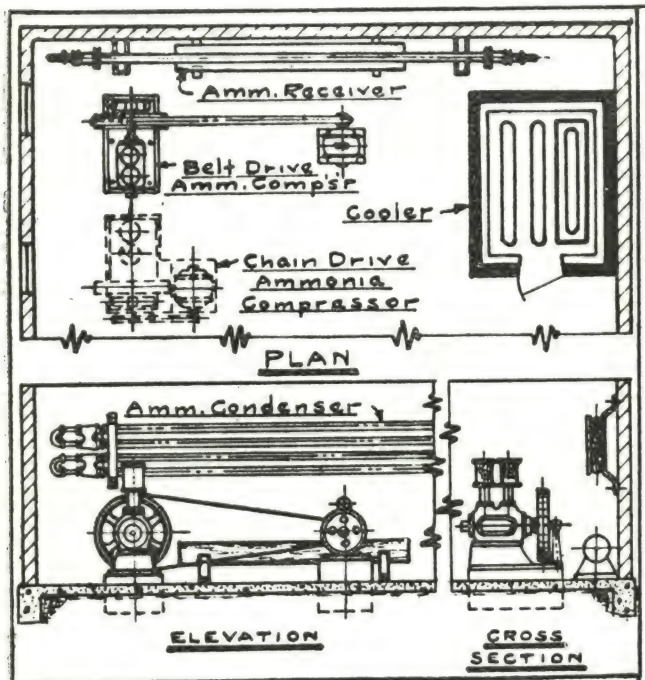
Uses

The Phoenix equipment is adaptable for use in ice plants, cold rooms, refrigerators and general refrigeration, for restaurants, hotels, stores, fur storage, markets, cold storage houses, hospitals, etc.

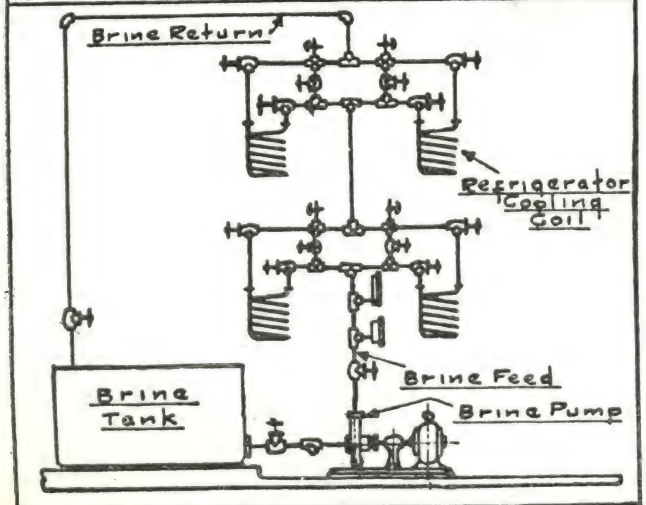
In fact, any degree of temperature can be obtained with Phoenix ice machines—economically and unfailingly.

Special Engineering Service

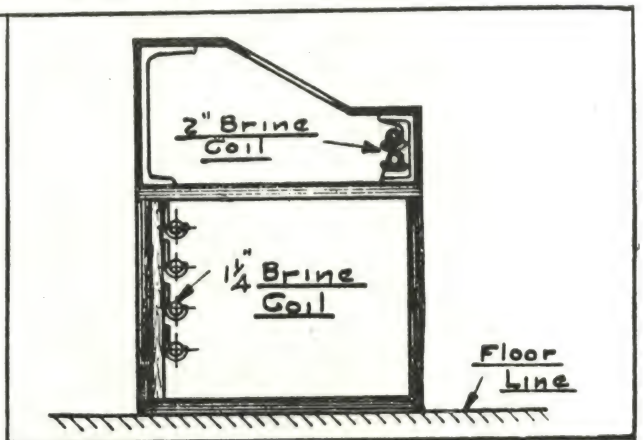
Every refrigerating problem requires a specific solution, and we maintain for that purpose a force of refrigerating engineers thoroughly experienced in all branches of refrigeration.

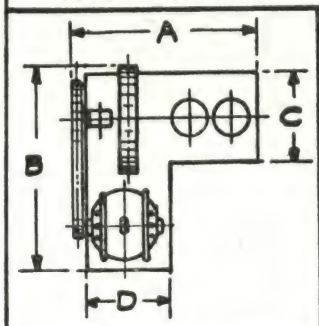


A PHOENIX REFRIGERATING PLANT



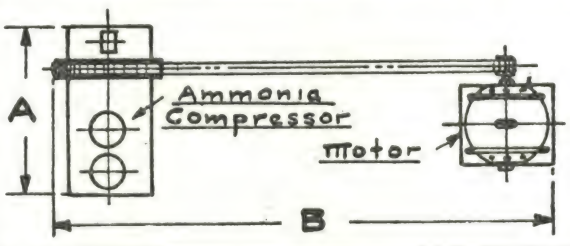
BRINE SYSTEM FOR APARTMENT HOUSES





Chain Drive Floor Space

TONS	A	B	C	D
1	28"	51"	51"	28"
2-3	41"	60"	28"	28"
7½	55"	81"	35"	30"
4-6	57"	74"	26"	29"
8-10	69"	81"	33"	33"
15	85"	102"	34"	39"
25	101"	120"	41"	44"



Belt Drive Floor Space

TONS	1	2-3	7½	4-6	8-10	15	25
A	28"	41"	55"	57"	69"	85"	101"
B	86"	150"	207"	156"	207"	236"	270"

SUGGESTION FOR MARKET HOUSE COUNTER REFRG'N

WINKLER ICE MACHINE CO.

Automatic Refrigerating Machines

1752 North 29th Street

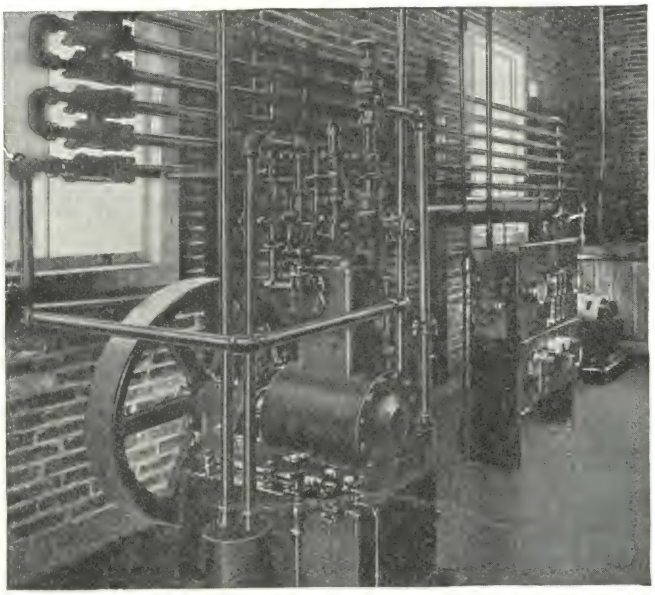
PHILADELPHIA, PA.

Products

Manufacturers and Installation Engineers for AUTOMATIC and NON-AUTOMATIC REFRIGERATING and ICE MAKING PLANTS, including complete equipment: Compressors, Condensers, Coils, Piping, Traps, Motors and all Automatic Controlling Devices; Ice Making Systems: Improved Raw Water Stationary Can System, Drop Pipe System, Distilled Water System.

Winkler System of Automatic Control (Patented)

The Winkler system of automatic single or multiple control is a patented system, consisting of all the latest and most up-to-date automatic controlling devices, the result of long years of experience in this mode of refrigeration. The automatic controlling system is applied to refrigerating plants installed by the WINKLER ICE MACHINE CO. only to do away with the necessity of an experienced engineer or attendant.



A WINKLER ICE MACHINE

The Winkler system of automatic control includes apparatus for taking care of the starting and stopping of the refrigerating plant on the variation of temperature in one or more compartments; also automatic ammonia control for controlling the supply of ammonia to expansion coils and water to condenser. The safety devices, which are also patented, include the latest and most reliable mechanical and electrical apparatus, so as to immediately stop the operation of the plant in case of trouble with water or electric service. There is also a safety feature for the motor which stops operation of same in case of trouble with the electric current.

The Winkler system of automatic control can be used with either a direct expansion system or brine, or combination of same, according to requirements. The use of an automatic plant is recommended wherever possible, as it does away with an experienced attendant and is far less trouble to operate and take care of than a manually controlled plant, especially in the smaller sizes of machines. We furnish and install automatic plants from one-half to one hundred tons capacity. The oiling system on our automatic plants is superior, and great precaution is taken in the installation of our apparatus to have all parts of ample capacity so that the customer will have lasting satisfaction.

Equipment

The compressors can be had in both vertical and horizontal style, single or multiple cylinder; are very substantial and heavily built and all parts are equally proportioned. All material used is of extra heavy malleable iron and steel, and thoroughly tested before leaving the shop, thus avoiding the possibility of leakage and blowouts. The very best makes of electric motors are used, operating at a reasonable speed. In order to insure satisfaction, high speed motors are not recommended for use with any refrigerating plant. A plant that operates at too great a speed will not stand up and will not give the customer lasting satisfaction. A stock of repair parts are always at hand in our shops, and can be had promptly.

It is recommended that architects place refrigeration under a separate contract, as this work is a specialty and can not by any means be performed by an ordinary plumber or pipe fitting mechanic.

Specifications

It is our aim to place before the architects and engineers the advantages of our refrigerating plants, and we would be glad to supply, on request, full information and data concerning any of the equipment manufactured and installed by us.

Installations

A few of our installations are:

New Delaware Trust Co. Building, Wilmington, Del.
Frankford Grocery Association, Frankford, Pa.
Wilkes-Barre Beef Co., Wilkes-Barre, Pa.
American Preserve Co., Third and Lehigh Avenues, Philadelphia, Pa.
Wilson & Co., Wholesale Packers
Parkway Apartments, Harrisburg, Pa.
Freihofer Baking Co., Atlantic City, N. J.
U. S. General Hospital No. 2, Fort McHenry, Baltimore, Md.
U. S. Naval Ammunition Department, Fort Mifflin, Philadelphia, Pa.
Pennsylvania R. R., 15th and Filbert Streets, Philadelphia, Pa.
City Produce Exchange, Harrisonburg, Va.
Mills Provision Co., Camden, N. J.
State Home for Boys, Jamesburg, N. J.
Philadelphia General Hospital, Philadelphia, Pa.
Mitchell Fletcher & Co., Philadelphia, Pa.
Johnsons Hotel, 15th and Spring Garden Streets, Philadelphia, Pa.
Viscose Co., Roanoke, Va.
Georgetown University, Washington, D. C.
Delaware University, Newark, Del.
Disston Saw Works, Tacony, Philadelphia, Pa.
Baldwin Locomotive Works Cafeteria, Eddystone, Pa.
Kuglers Restaurant, 32 S. 15th Street, Philadelphia, Pa.
Jno. S. Trowers Sons, Philadelphia, Pa.
Mercantile Club, Broad and Master Streets, Philadelphia, Pa.
Corinthian Yacht Club, Essington, Pa.
Lackawanna Hotel, Scranton, Pa.
Reynolds Tobacco Co., Winston-Salem, N. C.
J. B. Van Sciver Co., Camden, N. J.

YORK MANUFACTURING CO.

Ice Making and Refrigerating Machinery Exclusively

MAIN OFFICE AND WORKS

YORK, PA.

BRANCH OFFICES

BOSTON, MASS., 88 Broad Street
BROOKLYN, N. Y., 42nd Street and Second Avenue
PHILADELPHIA, PA., 2222-24 Arch Street
PITTSBURGH, PA., 47 Terminal Ways, S. S.
CLEVELAND, OHIO, 1106 Woodland Avenue
ATLANTA, GA., 116-18 Central Avenue
CHICAGO, ILL., 1113-23 Cornelia Avenue
OMAHA, NEBR., 1213-17 Jackson Street
ST. LOUIS, MO., 117-19 South 11th Street
DENVER, COLO., 2121-31 Market Street
HOUSTON, TEX., 2201 Texas Avenue
NEW ORLEANS, LA., 619 Tchoupitoudas Street
LOS ANGELES, CAL., 308 Boyd Street
SAN FRANCISCO, CAL., 832 Folsom Street
SEATTLE, WASH., 508 Terry Avenue, N.

TORONTO, CAN., CANADIAN ICE MACHINE CO., LTD., Villiers and Munition Streets

Products

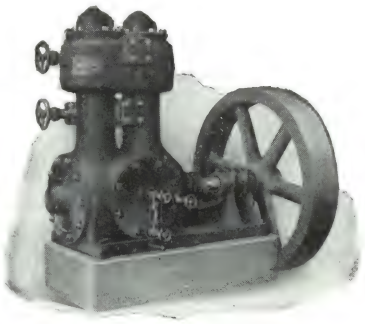
ICE MAKING and REFRIGERATING MACHINERY which includes: Compression Refrigerating Machines, Absorption Refrigerating Machines, Ice Making Plants, Refrigerating Plants, Ammonia Valves, Ammonia Fittings, Ammonia Condensers, Brine Coolers, Aqua Ammonia Pumps, Ice Cans, and all parts needed to equip a complete ice making or refrigerating plant.

Description

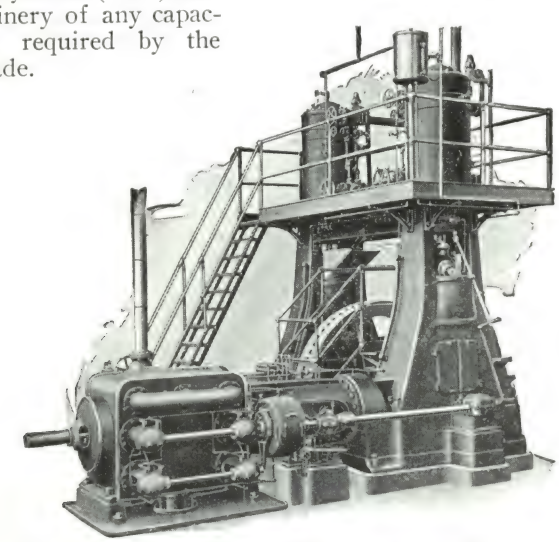
We make, in our own factory, all the machinery and apparatus used in ice making and for general refrigeration, confining ourselves to the ammonia system, both compression and absorption types, and the CO_2 system.

Sizes

The enclosed machine is built in sizes from ¼ ton refrigerating capacity upwards; the vertical single-acting machines from 20 to 600 tons; the horizontal double-acting machines from 10 to 600 tons—either belt or steam driven type. Ammonia absorption and carbonic anhydride (CO_2) machinery of any capacity required by the trade.



VERTICAL SINGLE-ACTING ENCLOSED REFRIGERATING MACHINE



VERTICAL SINGLE-ACTING REFRIGERATING MACHINE
Direct connected to Uniflow poppet valve engine

Application

These machines can be used wherever ice making or refrigeration is required, the style of machine being determined, to a great extent, by local conditions.

The enclosed machine is particularly adapted for residences, apartment houses, small hotels, creameries, ice cream factories, etc.

Valves and Fittings

York ammonia valves and fittings are guaranteed to give satisfaction under all usual working pressures.

Service

All York agencies carry in stock a complete line of ammonia valves and fittings, also a line of enclosed machines.

What a service department is to the owner of an automobile, the York Sales Organization is to the user of ice making and refrigerating machinery.

Both *quality* and *service* can be secured by patronizing the York Organization.

References

A few installations are given below:

HOTELS
Hotel Adelphia, Philadelphia, Pa.
Pennsylvania Hotel, New York, N. Y.
Hotel McAlpin, New York, N. Y.
Hotel Sherman, Chicago, Ill.
Copley-Plaza Hotel, Boston, Mass.
Hotel Traymore, Atlantic City, N. J.

STORES
Rosenbaum & Co., Pittsburgh, Pa.
Lord & Taylor, New York, N. Y.
B. Altman & Co., New York, N. Y.

HOSPITALS
Homeopathic Hospital, Pittsburgh, Pa.
Bellevue Hospital, New York, N. Y.
Government Hospital for the Insane, Washington, D. C.
Pennsylvania State Sanitarium for Tuberculosis, Hamburg, Pa.
Medico Chirurgical Hospital, Philadelphia, Pa.

SCHOOLS
Cornell University, Ithaca, N. Y.
University of Illinois, Urbana, Ill.

OFFICE BUILDINGS
Singer Building, New York, N. Y.
Metropolitan Life Building, New York, N. Y.
Whitehall Building, New York, N. Y.
Curtis Publishing Co., Philadelphia, Pa.
North American Building, Philadelphia, Pa.

CLUBS
New York Yacht Club, New York, N. Y.
Players' Club, New York, N. Y.
Army and Navy Club, Washington, D. C.
Union League Club, Philadelphia, Pa.
Chevy Chase Club, Chevy Chase, Md.

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Cold Storage and Cold Pipe Insulation

135 Twenty-fourth Street
PITTSBURGH, PA.
BRANCH OFFICES IN THE LARGER CITIES

Products

NONPAREIL and EUREKA CORKBOARD and GRANULATED CORK for the insulation of cold storage and freezing rooms, tanks, constant temperature rooms, etc.

NONPAREIL CORK COVERING for brine and ammonia, ice water, and other cold lines, coolers, tanks, etc.

NONPAREIL CORK MACHINERY ISOLATION.

For Linotile and Armstrong's Cork Tile, see pages 456-457.

Nonpareil Corkboard Insulation

Nonpareil Corkboard Insulation consists of clean granulated cork, slightly compressed in sheets and baked at a moderate temperature. This process liquefies the natural waterproof gum in the cork, which binds the mass together firmly and protects it against moisture penetration.

Advantages—The heat conductivity of Nonpareil Corkboard is the lowest of any commercial insulator. Being cellular in structure, it is free from capillary attraction and will not absorb moisture. Hence, it is proof against rot, mold and vermin, and will not give off offensive odors or deteriorate in any way. It has been tested and officially approved by the National Board of Fire Underwriters.

Nonpareil Corkboard can be installed against frame, concrete or masonry construction. It can be sawed and nailed like lumber or erected in asphalt or portland cement. Portland cement plaster is applied directly on the surface. Nonpareil Corkboard is also supplied with an asphalt mastic finish, ironed on at the factory, for use where moisture conditions are severe.

Sizes and Weight—Nonpareil Corkboard is made in standard sheets 12x36 in., and in the following thicknesses: 1, 1½, 2, 3, 4 and 6 in. Net weight, approximately 8/10 lb. per ft. board measure.

Catalogues, Samples and Service—A 152-page book, "Nonpareil Corkboard Insulation," containing complete information, specifications, etc., will be sent on request. Samples also will be furnished.

With a thoroughly trained construction force, this Company is prepared to handle contracts of any size. Branch offices in the principal cities will gladly co-operate with architects and engineers in solving insulation problems. This service is entirely without charge or obligation.

Nonpareil Machinery Isolation

Nonpareil Machinery Isolation, similar to Nonpareil Corkboard, but more densely compressed, is used for the reduction of noise and vibration from machines. Placed under the bases of fans, motors, drills, presses, rolls, etc., it effectually deadens sound and absorbs vibration.

Samples and Literature—Samples and descriptive literature will be furnished on request.

Nonpareil Cork Covering

Nonpareil Cork Covering is the only thoroughly satisfactory insulation for brine, ammonia, and ice water lines, and cold surfaces generally. It is made of clean cork granules compressed and moulded in sectional form, and coated inside and out with a moistureproof mineral rubber finish. Its high insulating efficiency is due to the sealed air cells of the natural cork. It is light, clean, and easy to handle, and gives the insulated lines a neat and finished appearance. Made in accurately moulded sections for pipes and fittings, screwed or flanged, it can be easily and quickly applied. Beveled lags are supplied for the larger sizes.

Service Details—Nonpareil Cork Covering is manufactured in three thicknesses to meet different service conditions:

(1) *Special Thick Brine Covering*—From 3 to 4 in. in thickness, for temperatures below 0° Fahr.

(2) *Standard Brine Covering*—From 2 to 3 in. in thickness, for temperatures from 0° to 25° Fahr.

(3) *Ice Water Covering*—Approximately 1½ in. in thickness, for temperatures above 25° Fahr.

Literature and Samples—A 64-page book, "Nonpareil Cork Covering," containing full information, will be sent on request. Samples will also be furnished.

Drinking Water Systems

A copy of the 48-page book entitled, "Drinking Water Systems," in which is collected much valuable data on the installation and operation of refrigerated water supply and distribution for industrial plants, will be sent to any one interested.

NONPAREIL CORKBOARD INSULATION IN PROCESS OF ERECTION IN PLANT OF BEATRICE CREAMERY CO., CHICAGO, ILL.

NONPAREIL CORK COVERING AND LAGGING BEING APPLIED ON PIPES, FITTINGS AND TANKS, CRYSTAL ICE AND STORAGE CO., PORTLAND, ORE.

JUNIUS H. STONE CORPORATION

Pure Compressed Corkboard and Cork Pipe Covering

1400 Broadway
NEW YORK, N. Y.

ATLANTA BALTIMORE BOSTON BUFFALO CLEVELAND CHICAGO PHILADELPHIA ST. LOUIS

Products

STONE'S PURE COMPRESSED CORKBOARD; CORK PIPE COVERING for cold storage insulation; STONEWALL CORKBOARD FINISH.

For Rubberstone Flooring, Pure Cork Tile and Architectural Acoustics, see page 473.

Stone's Pure Compressed Corkboard

Quality—Stone's Pure Compressed Corkboard is made from the cork left over when manufacturing cork discs for crown caps, fine wine corks, cork lined summer helmets and cork paper for cigarette tips. As all these products require the best grade of cork, the waste from their manufacture is necessarily fine and is kept clean and dry. Fine quality, clean, dry stock means uniform baking, when baked by skilled workmen in such modern ovens as are used in our plant.

As a result, every sheet of Stone's Corkboard is a medium chocolate color throughout with no "green" centers or burnt corners. "Green" centers occur principally in 3-in. and 4-in. sheets and are due either to wet cork

STONE'S PURE COMPRESSED CORKBOARD

or too hot an oven that bakes the surface too quickly, thereby insulating the center of the sheet from the oven heat and preventing proper baking. There is no stable cohesion between the cork particles in an underbaked or "green" sheet, and, if moisture enters, it will disintegrate in time. For this same reason very light colored sheets are not durable.

That our material is well baked in the center is evident for the reason that all sheets are moulded and baked 24 in. wide and then cut into 12-in. widths, thereby exposing the center of every sheet, and preventing any underbaked material from passing inspection unnoticed. No other pure corkboard is manufactured in this way. Other brands are moulded and baked in 12-in. widths.

The average weight of all of Stone's Corkboard shipped last year was almost exactly 87 lbs. per 100 sq. ft. board measure; low shipment averages 83 lbs. and high shipment 90 lbs.

Serviceability—In 1894 and 1895 cold storage rooms of the steamships St. Louis and St. Paul were insulated with pure compressed corkboard manufactured by Stone & Duryee, of which firm Junius H. Stone was senior member. Recently these cold storage rooms were inspected and the engineers then stated that the insulation was still giving entire satisfaction and apparently as good as when installed over 27 years ago.

Stone's Corkboard will not break and crumble in transit or when being installed, and it will not disintegrate *after* it has been properly installed. The method of manufacture and careful inspection render it very difficult for poor quality material to leave the factory.

A large stock of Stone's Pure Corkboard is maintained in the warehouse at all times, which insures prompt delivery.

Policy and Service—Our policy is that of working with and through engineers and contractors as far as possible, preferring to sell corkboard at a close price to contractors and to assist them in all ways—in short, to have the work done by the building or other contractors. However, when owners prefer to deal direct, we are prepared to handle contract work, and have a well equipped and thoroughly efficient staff for that purpose.

Stonewall Corkboard Finish

This finish is a complete and permanent protection to your insulation on the room side.

It is either applied to the cork sheets at the factory, ironed on hot; or furnished in sheets to be applied to the corkboard after erection. When ironed on at the factory, a paste seam filler is furnished to fill the joints. This is applied cold after the corkboard has been erected, and gives a one-piece, smooth finish.

The application of Stonewall sheets to the insulation after it is erected permits all joints to be covered and a smooth finish is obtained without the use of a seam filler.

STONEWALL CORKBOARD FINISH

Stone's Pure Cork Sectional Pipe Covering

Stone's Pure Cork Covering has thoroughly proved its efficiency and permanence as an insulator for all cold and refrigerated piping. We can show sections of this covering in good serviceable condition after twenty-three years of continuous service.

The only difficulty that has arisen with this kind of covering in the past has been with the covers for fittings. As there is no uniformity in the outside dimensions of fittings and valves, a cover can not be moulded to fit all tees, ells, valves, etc. Consequently, it has been the practice to make the cover large enough to take the largest dimensioned fitting and to fill in the voids with some plastic material when fittings of smaller dimensions are to be covered. This naturally has not been satisfactory.

We have now overcome this difficulty by increasing the thickness of Stone's Pipe Covering and counterboring same at each end, so that by cutting out the inner shell the cover will fit over the band of the fitting. Cutting out the inner shell takes but a moment and permits the pipe covers to meet at the center of the fitting. The increased thickness of the cover prevents loss of efficiency at fittings due to the counterbore and, in addition, gives added insulation on all the piping.

Full description of Stone's Pipe Covering and Fittings sent on request.

UNITED CORK COMPANIES

Manufacturers and Erectors of Cork Insulation

LYNDHURST, N. J.

SELLING OFFICES

NEW YORK, N. Y., 50 Church Street
CHICAGO, ILL., Westminster Building
PHILADELPHIA, PA., 1042 Ridge Avenue
CLEVELAND, OHIO, 1200 West 9th Street
ST. LOUIS, MO., 1420 North Broadway
PITTSBURGH, PA., Jenkins Building
BOSTON, MASS., 268 State Street

AGENCIES

MILWAUKEE, WIS., Federal Asbestos Co. SEATTLE, WASH, Seattle Asbestos Factory LOS ANGELES, CAL., Warren & Bailey Co.

Products

Pure Corkboard, Crescent Brand; Impregnated Corkboard, Economy Brand; Granulated and Regranulated Cork; for heat and cold insulation, dampproofing, soundproofing, etc.

Also Cork Brick and Cork Tile.

Crescent Pure Corkboard

Crescent pure corkboard is 100% pure, screened, granulated cork compressed into moulds to the thickness desired, and then baked for several hours at a moderate temperature.

No foreign binder is used.

Baked cork is less absorbent and more waterproof than the natural cork itself.

It has great structural strength and is adaptable to all kinds of construction.

Crescent corkboard has the highest non-conductive value of any commercial insulator, its heat transmission being equal to 7 B.t.u. per sq. ft. per degree difference of temperature per 24 hours.

Economy Impregnated Corkboard

This corkboard is made from selected regranulated cork, carefully screened and mechanically mixed with a special, odorless, waterproof binder, then compressed into board form without the aid of extreme heat or undue pressure, the proportion of mixture being about 90% pure baked cork and 10% binder.

Economy corkboard has excellent insulating qualities; it meets the demand for a cheaper insulation material and is especially recommended for floor work.

SIZES AND WEIGHTS OF CORKBOARD

Brands	Width, in.	Lgth., in.	Thickness, in.	Weights, lbs. Per cu. ft.	Per ft. b. m.	Per ft. b. m. crated
Crescent	12	36	½, ¾, 1, 1½, 2, 3, 4	9	.75	.90
Economy	12	36	1, 1½, 2, 3, 4, 6	16	1.35	1.50

Natural Granulated and Regranulated Cork

These materials are suitable for insulating walls, ceilings, partitions, and sides of tanks, where the use of corkboard would be impracticable.

Natural Granulated Cork

Natural granulated cork is furnished in two sizes known as 8/20 C. S. and 12/20 C. S. meaning that they are sifted through screens of 8 or 12 meshes and over screens of 20 meshes to the inch.

Natural granulated cork is much superior to other fillings because the cork is odorless, non-absorbent, does not support combustion, is not subject to decay and has a very low heat conductivity.

Regranulated Cork

This is a by-product obtained in the manufacture of corkboard. It is more waterproof and its insulation value is still higher than that of granulated natural cork.

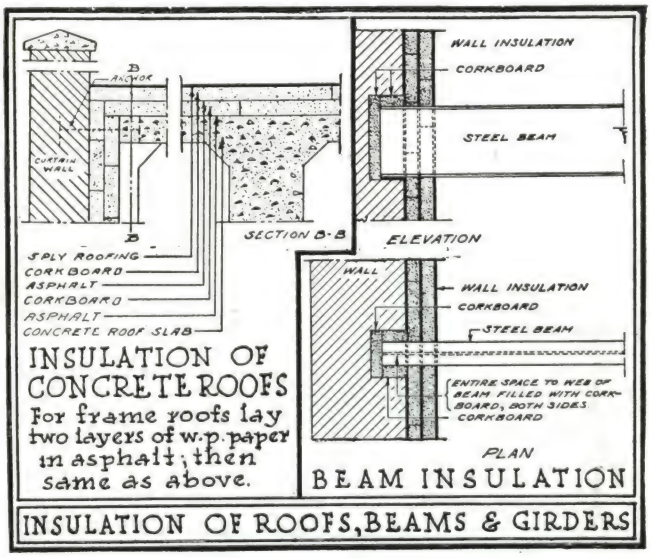
The grades generally used are known as Fine Regranulated, from dust up to 3/32-in. granules; Coarse Regranulated, from ⅛ to ⅜-in. granules; and Mixed Regranulated, a combination of both.

For general use the Fine or Mixed Regranulated is recommended, but where dust would prove objectionable the Coarse is preferable.

WEIGHTS OF GRANULATED AND REGRANULATED CORK

Brands	Weights, lbs. (approximate) Per cu. ft.	Per bag	Weight of bag
8/20 C. S. Granulated	12	90	2
12/20 C. S. Granulated	14	100	2
Fine or Mixed Regranulated	6½	45	2
Coarse Regranulated	6	40	2

All brands are packed in burlap bags holding approximately 7 cu. ft.



STEVENSON COLD STORAGE DOOR CO.

Manufacturers of Cold Storage and Freezer Doors

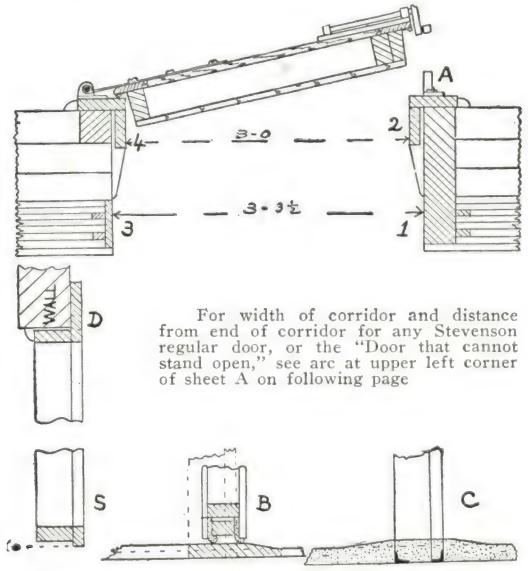
CHESTER, PA.

Products

COLD STORAGE and FREEZER DOORS:
Stevenson's Standard Cold Storage Door.
Stevenson's "Door that cannot stand open"—an unequalled fire stop.
Overhead Track Door—a positive port shutter.
Special Freezer Doors for icy doorways.
Vertical Sliding Counterbalanced Doors.
Combined Self-acting Ice Doors and Chutes.
Fireproof Cold Storage Doors.
Little 1912 Platform Ice Doors.
Revolving Ice Cream Doors—metal, non-swelling.
Passing Vestibules to pass ice cream.
Cold Storage Windows.
1922 Stevenson Door-Closer—for doors of any kind.
Doors and windows made either plain or fireproof.

Advantages

Straight, clean, sanitary jambs. No frail rabbet strips in doorway. Adjustable, flexible door frames, set to conform to door, not to wall. Hinges are self-adjusting, spring tempered steel, galvanized; with big generous bearings, three times their former size. A powerful hinge guard on lower hinge protects the hinge from excessive strains, and insures tight sealing at that point. Door swings off to one side entirely out of the way of injury, hence doorway can be 6 in. less in width than with other doors, economizing in refrigeration.



For width of corridor and distance from end of corridor for any Stevenson regular door, or the "Door that cannot stand open," see arc at upper left corner of sheet A on following page

INSTALLATION DIAGRAMS COLD STORAGE DOOR

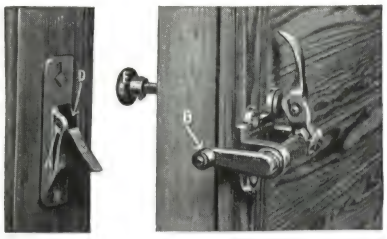
FIG. A shows how flat closure is secured; also, how Stevenson door frame sets in wall. Opening in wall should be 3½ in. wider and 4½ in. higher than clear size of doorway. (Follow construction Nos. 1 and 2.) Overhead track doors require rough opening extending 11 in. above upper edge of track; the overhead track "Door that cannot stand open," 12 in. above. Door frames are secured with lag screws ⅜x4 in., inserted through front casing at A. Set door frame to conform to door, not to conform to wall.

FIG. D shows head of door frame used on all sizes of Stevenson regular doors, and indicates method of setting in wall.

FIG. S shows door frame with full standard sill; not suited for trucking.

FIG. B shows wooden beveled threshold, which connects lower ends of door frame and forms part of it. Let down into floor. No featheredge, no splinters, no jolt; ideal for trucking or sliding ice.

FIG. C shows Stevenson patented construction for concrete floors. Lower ends of door frame connected by angle irons extending across doorway and embedded in floor 3 in. below surface.



STEVENSON'S AUTOMATIC ROLLER FASTENER

Roller latch (B) passes over knuckle of keeper (C), drops into pocket (D) before door strikes face of door frame, and reaches its locked position at the instant gasket is most tightly compressed. No bending of latch. No lost motion to be taken up. No slackening as it latches. No walking around edge of door to enter. A padlock shackle, through hole (A), prevents roller from lifting out.

Door can be unlatched, opened, closed and latched again 40 times per minute

STOCK SIZES, STEVENSON'S STANDARD COLD STORAGE DOORS

List number	Size of doorway in clear, ft. in. x ft. in.	Size of wall opening to receive door frames, ft. in. x ft. in.	Estimated weight, crated, lbs.
Ice doors	2 3 x 2 0	2 6½ x 2 4½	100
2	2 0 x 4 0	2 3½ x 4 4½	140
3	2 0 x 5 0	2 3½ x 5 4½	170
4	2 0 x 5 6	2 3½ x 5 10½	185
5	2 0 x 6 0	2 3½ x 6 4½	200
6	2 6 x 6 0	2 9½ x 6 4½	250
7	3 0 x 6 0	3 3½ x 6 4½	300
8	3 6 x 6 0	3 9½ x 6 4½	350
9	4 0 x 6 0	4 3½ x 6 4½	400
10	3 0 x 6 6	3 3½ x 6 10½	325
11	3 6 x 6 6	3 9½ x 6 10½	380
12	4 0 x 6 6	4 3½ x 6 10½	440

Regular overhead track doors require openings in wall to extend 11 in. above upper edge of track bar (see sheet "A," next page, left end).

Overhead track "Door that cannot stand open," to extend 12 in. above.

Form of Specification for Architects

Doors for refrigerators, cold storage and ice rooms to be Stevenson's overlapping, non-binding regular doors; for hardening or freezing rooms, Stevenson's special freezer doors. All vestibule air locks—high temperatures or low, frequent use or infrequent—to be replaced with Stevenson's "Door that cannot stand open."

For Trucking — Use Stevenson's beveled threshold in wood floors. With concrete floors, lower ends of door frame connected by angle irons extending across doorway below surface of floor.

STEVENSON'S STANDARD COLD STORAGE DOOR

Door Frame with Sill

Most users prefer the patented beveled threshold or patent angle iron arrangement for concrete floors. See following page, Figs. 0, 1-2, 3.

For Walking Through—Use Stevenson's sill.

Hardware—All doors to be fitted with Stevenson's automatic roller fastener, and hung with Stevenson's elastic clamping hinges, as manufactured by the STEVENSON COLD STORAGE DOOR CO., Chester, Pa.

To prevent overstraining of hinge use Stevenson's 1911 hinge guard on every door sealing against floor.

To avoid regular doors standing open, use Stevenson's 1922 Door-Closer.

Shipping Note

All Stevenson doors and windows are shipped ready to set in the wall. Adjustable door frame, hinges and fastener included.

Continued on next page

Sheet A—Details of Stevenson's Cold Storage Doors

At this end of the sheet is shown the plan, elevation and section of track doors for beef houses.

Arc on plan shows least width of corridor and distance from doorway to end of corridor.

Note the seven methods, shown by numerals enclosed in circles, of forming jambs or bucks to provide for regular Stevenson door frames.

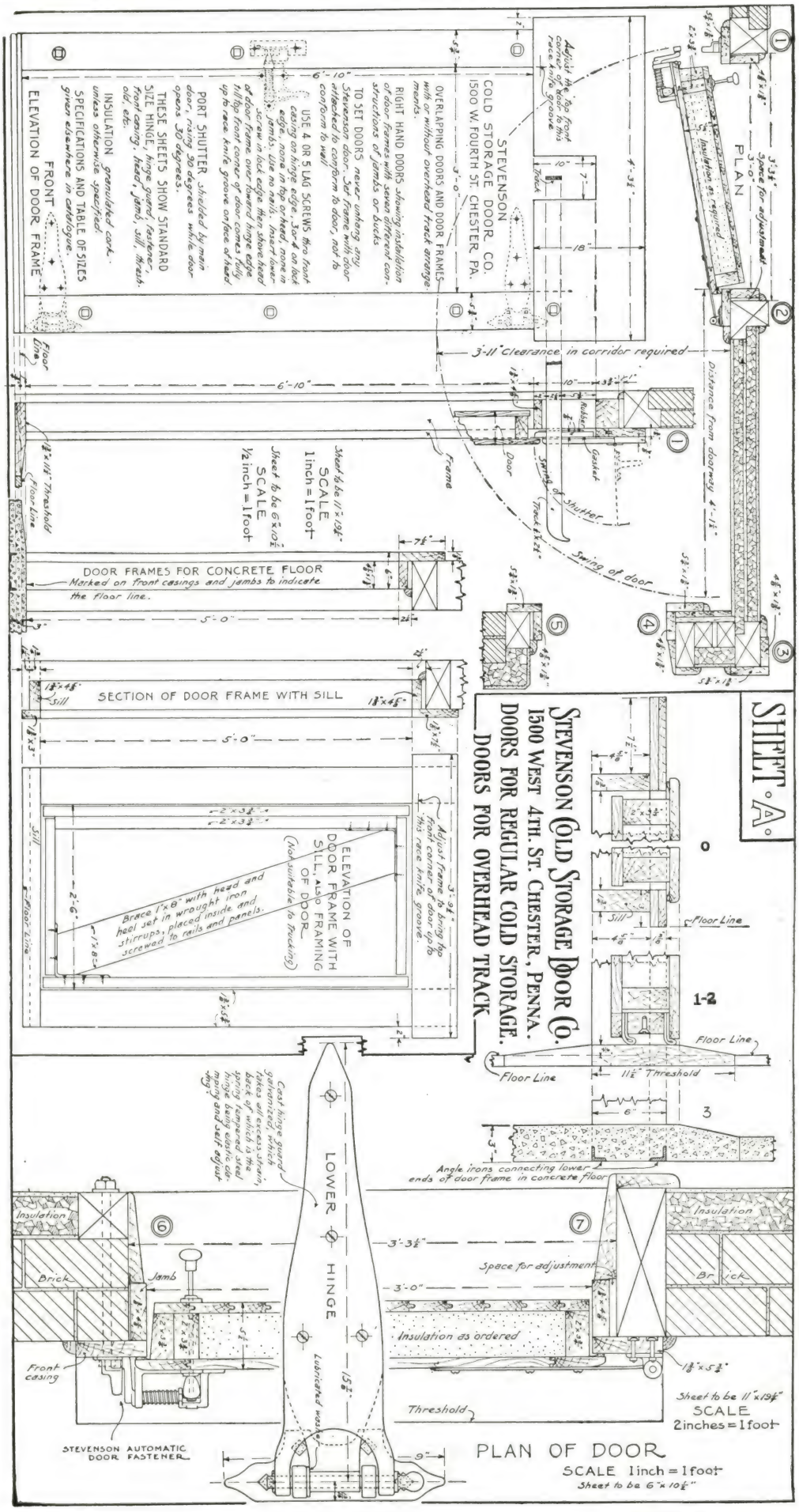
In the center of the sheet are shown the details of regular door:

Section of head and sill, 0;

Threshold, 1-2;

Concrete floor arrangement, 3.

At this end of the sheet are shown an enlarged section of regular door, and details of fastener, hinge and hinge guard.



Continued on next page

Stevenson's Latest—The "Door That Cannot Stand Open"

Ends the losses due to operation and neglect of cold storage doors. Always shut unless filled with passing goods or man. Can not stand anywhere except in closed position. Just "butt" into it and go on. In two seconds the main door has been unlatched, thrown open, you're through and gone, and the double swing doors are closed again behind you.

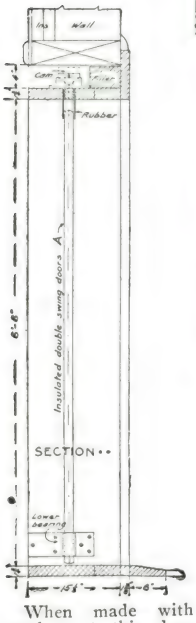
Rids itself of ice; hence is an ideal freezer door. Makes sharp freezers and hardening rooms just as easily, quickly and surely accessible as high temperature rooms.

Stand 'round any regular door—open 60 seconds for a truck to pass, often four times that. Note the ice loaded pipes, the mould-spotted rooms and goods.

The Stevenson "Door that cannot stand open" stops that ruinous inrush of warm moisture-laden air. Brings in just the touch to make a success of old plants; to make thousands of successful new users out of those who have been afraid; to revolutionize cold storage.

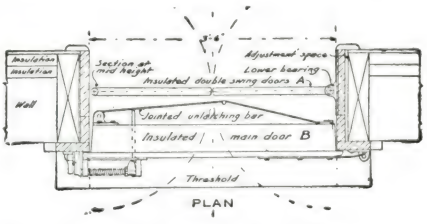
Compare losses—remembering that area is required to permit flow, time to establish speed. Any regular door, to pass a 3-ft. truck, stands widely open 1 to 4 minutes. For example, a door 4x6 ft. 6 in. equals 26 sq. ft. area. Multiply by 60 seconds (but a single minute) gives 1560 ft.-seconds minimum flow; four minutes equal 6240 ft.-seconds flow.

Same size—Stevenson "Door that cannot stand open" starts at nothing comes back to nothing. Average opening 3 sq. ft. for 2 seconds, multiplied, gives 6 ft.-seconds. Through so small an opening, flow is impossible in so short a time. Actually there is no flow; just a flutter. Does it appeal to your good judgment? How many days can any plant afford to do without it?



When made with track port this door requires wall opening extending 12 in. above top edge of track

Stevenson's "Door That Cannot Stand Open"
With port for overhead track, as above—or without

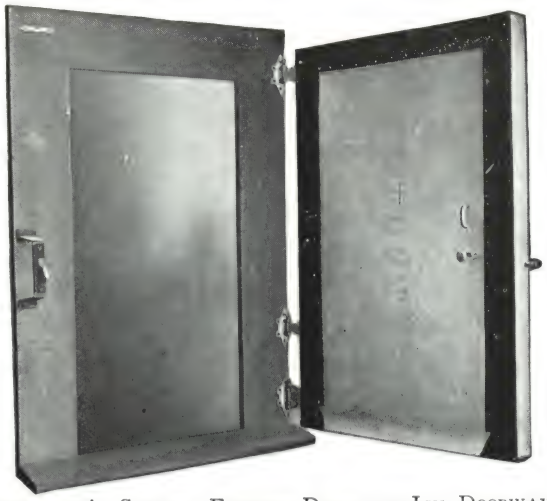


Stevenson's "Door That Cannot Stand Open"
With—or without—port for overhead track

Double swing doors "A" strike the jointed unlatching bar on rear of main door "B," releasing fastener and throwing that door open. Trucks go through without a halt.

Double-swing doors lift a little as they open; no short bevels needed in floor, hence no jolts to liquids in wheel-tanks.

No frail spring hinge nuisance to renew every little while, each time put off till the old set has wasted enough refrigeration to pay for this door. A 2-way cam at top, operating in an oil reservoir, carries weight of door and is the actuating device. Unequalled fire stop—metal covered double door always closed. Rids itself of ice; hence ideal on sharp freezers.



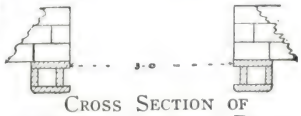
Stevenson's Special Freezer Door for Icy Doorways
Beveled threshold (as in Fig 3, sheet B). Perfectly tight and perfectly free regardless of temperature, moisture, or accumulation of ice. No portion fits within the opening. Fastens itself. Has latest Stevenson hinge, hinge guard and roller fastener.

Stevenson's Vertical Sliding Doors

Especially adapted for use in breweries, milk depots, etc. They are perfectly insulated and counterbalanced; windproof, but free. Equipped with wire rope and roller sheaves. Then can have rounded galvanized corner guards on exposed corners. When installed in bottling houses, a 4-in. gap in the conveyor allows door to rise and fall.

Stevenson's Cold Storage Window
Frame made same as door frame. Has two or more thicknesses of glass, as required, with dead air space between

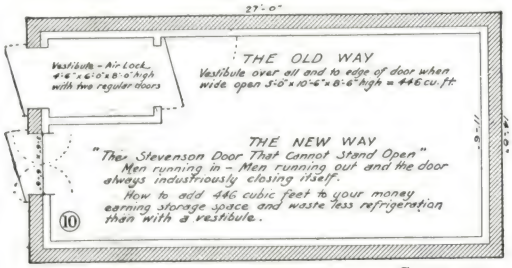
Stevenson's Vertical Sliding Door



Cross Section of Vertical Sliding Door

Stevenson's Service Sheets

Stevenson's Service Sheets, four times the size of the following illustration, sent to any architect on request. They show various arrangements to minimize corridor space and refrigeration loss, to cut labor costs.



Specimen of Stevenson's Service Sheets

Continued on next page

Sheet B—Details of Stevenson's Special Freezer Doors, etc.

At the top of the illustration are shown the details of the special freezer door for icy doorways, made with threshold for trucking, also with sill to step over.

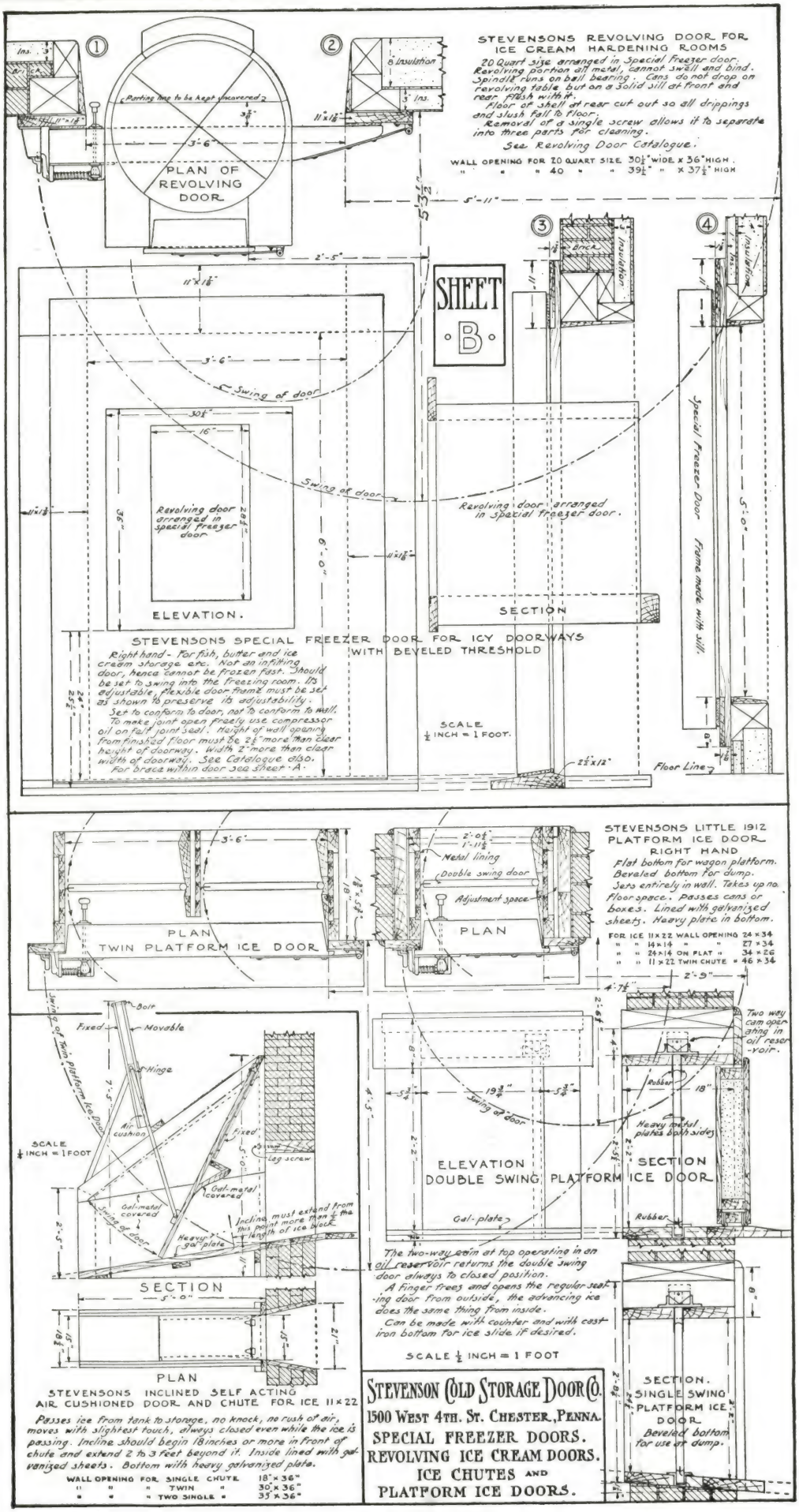
Arcs on plan show least width of corridor, and distance from doorway to end of corridor.

On plan, elevation and section is shown revolving door as installed in special freezer door.

Note the four methods, shown by numerals enclosed in circles, of forming jambs or bucks to provide for the door frames of Stevenson special freezer doors for icy doorways.

In the center, and at the lower right of the illustration are shown the details of the little platform ice door, single or twin, both flat bottom and inclined.

At the lower left of the illustration are shown the details of the inclined self-acting air cushioned door and chute for use at dump. Single or twin.



J. V. JAMISON, JR., PRESIDENT T. B. SOUTH, VICE-PRESIDENT R. L. JAMISON, SECRETARY AND TREASURER

JAMISON COLD STORAGE DOOR CO., INC.

FORMERLY JONES COLD STORE DOOR CO., INC.

HAGERSTOWN, MD.

Products

COLD STORAGE and FREEZER DOORS of two distinct types: "JAMISON" formerly "Jones" type and "NOEQUAL" type: VESTIBULE DOORS; COLD STORAGE WINDOWS; AUTOMATIC ICE CHUTES, for passing and recording blocks of ice.

Also manufacturers of Vertical Sliding Cold Storage Doors; Revolving Ice Cream Doors, with automatic unloading device; Ice Cream Can Passing Vestibules; Built-in Refrigerator Fronts; Ice Can Covers and Framework to specifications.

"Jamison," Formerly "Jones," and "Noequal" Doors

The "Jamison," formerly "Jones," cold storage door (see details) is built with two seals of contact between the door and frame, providing a confined air space entirely around the door, making double protection against leakage at this usually weak point. The air space (k) prevents the door from swelling enough to stick fast in the frame.

The "Noequal" cold storage door (see details) is built with round jambs and three seals of contact and two air spaces (k) between the door and frame. The advantages of the round jambs are obvious—no sharp corners to get knocked off by the trucks.

Gasket Seals—The seals of contact are formed with a special gasket or packing of our own make. The seals at the corners to keep the door true and rigid and free from sagging.

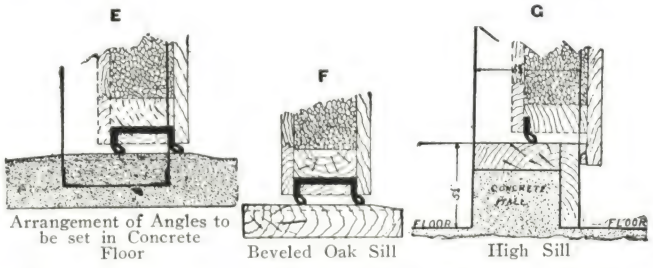
Insulating and Bracing—The door has inserted a diagonal 2 by 4-in. brace and heavy angle irons in the bottom are made by two rows of heavy hair felt and can be easily replaced when worn out.

It is insulated with pure live granulated cork, corkboard, or any standard kind of insulating material specified.

Construction, Standard Doors—Doors are built of spruce, pine or cypress on the inside; the exterior may be of any wood desired, either in plain ceiling boards or paneled; they may be solid doors or arranged for glass panels, the latter formed like windows, of several thicknesses of glass.

Hardware, heavily galvanized by the hot process; frame fitted with either beveled oak sill, angle irons for cement floor, or high sill.

FIG. 1. "JAMISON," FORMERLY "JONES," STANDARD DOOR
Right hand, raised panel front



Arrangement of Angles to be set in Concrete Floor — Beveled Oak Sill — High Sill

SILLS APPLICABLE TO BOTH "JAMISON," FORMERLY "JONES," AND "NOEQUAL" COLD STORAGE DOORS

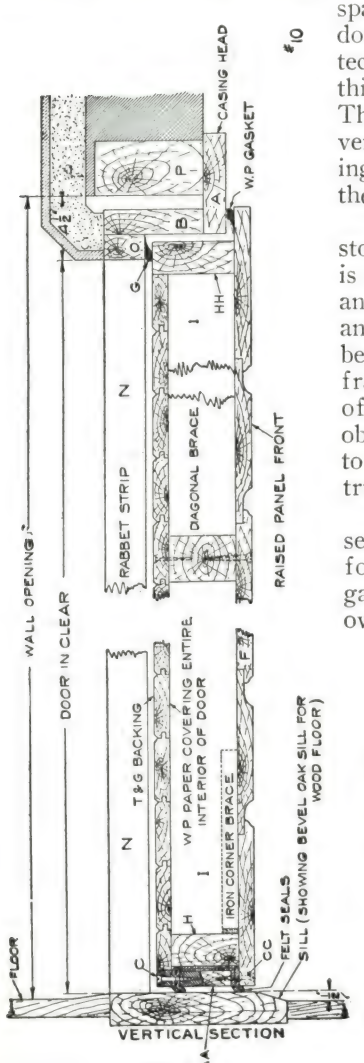


Fig. 3

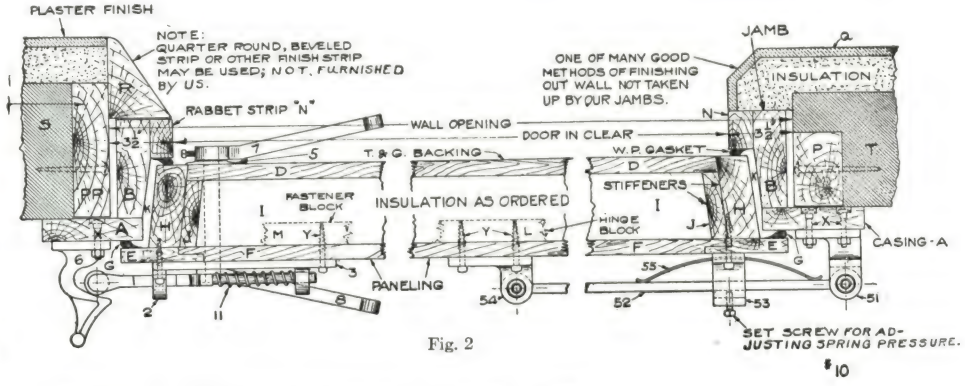


Fig. 2

DETAILS OF "JAMISON," FORMERLY "JONES," DOOR

Continued on next page

Nothing used but the highest grade of lumber and other materials; workmanship is of the best; and this company guarantees the doors satisfactory to the purchaser.

Hardware—The pressure of the powerful adjustable spring hinge is regulated by a setscrew, by turning which a new seat is given the door from time to time, thus keeping it as tight as when new.

The automatic self-tightening fastener is a spring projected slide bolt worked by a lever; a strong, reliable device that draws the door up tight.

The same hardware (60 lbs. per set) is used upon doors of both types.

The automatic trap lift for doors with overhead rail is a simple, reliable mechanical device that will not get out of order.

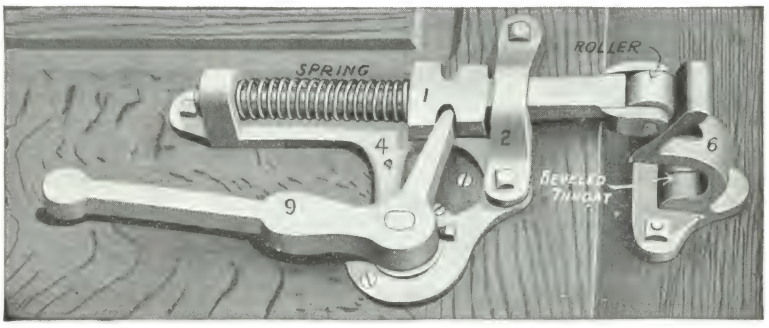


FIG. 11. FASTENER

FIG. 10. HINGE

STANDARD SIZES, "JAMISON," FORMERLY "JONES," DOORS

Stock door No.	Dimensions inside of frames (Door in the clear) Width ft.	in.	Height ft.	in.	Size of wall opening Width ft.	in.	Height ft.	in.
00	2	6	2		3	1	2	5
0	2		3		2	7	3	5
1	2		6		2	7	6	5
2	2	6	6		3	1	6	5
3	2	6	6	6	3	1	6	11
4	3		6		3	7	6	5
5	3		6	6	3	7	6	11
6	3	6	6		4	1	6	5
7	3	6	6	6	4	1	6	11
8	3		7		3	7	7	5
9	3	6	7		4	1	7	5
10	4		6		4	7	6	5
11	4		6	6	4	7	6	11
12	4	6	6		5	1	6	5
13	4	6	6	6	5	1	6	11
14	4		7		4	7	7	5
15	4	6	7		5	1	7	5
16	5		6	6	5	7	6	11
17	5		7		5	7	7	5

In ordering doors use stock numbers in first column of table and add "Jamison." Large stocks of standard sizes always on hand

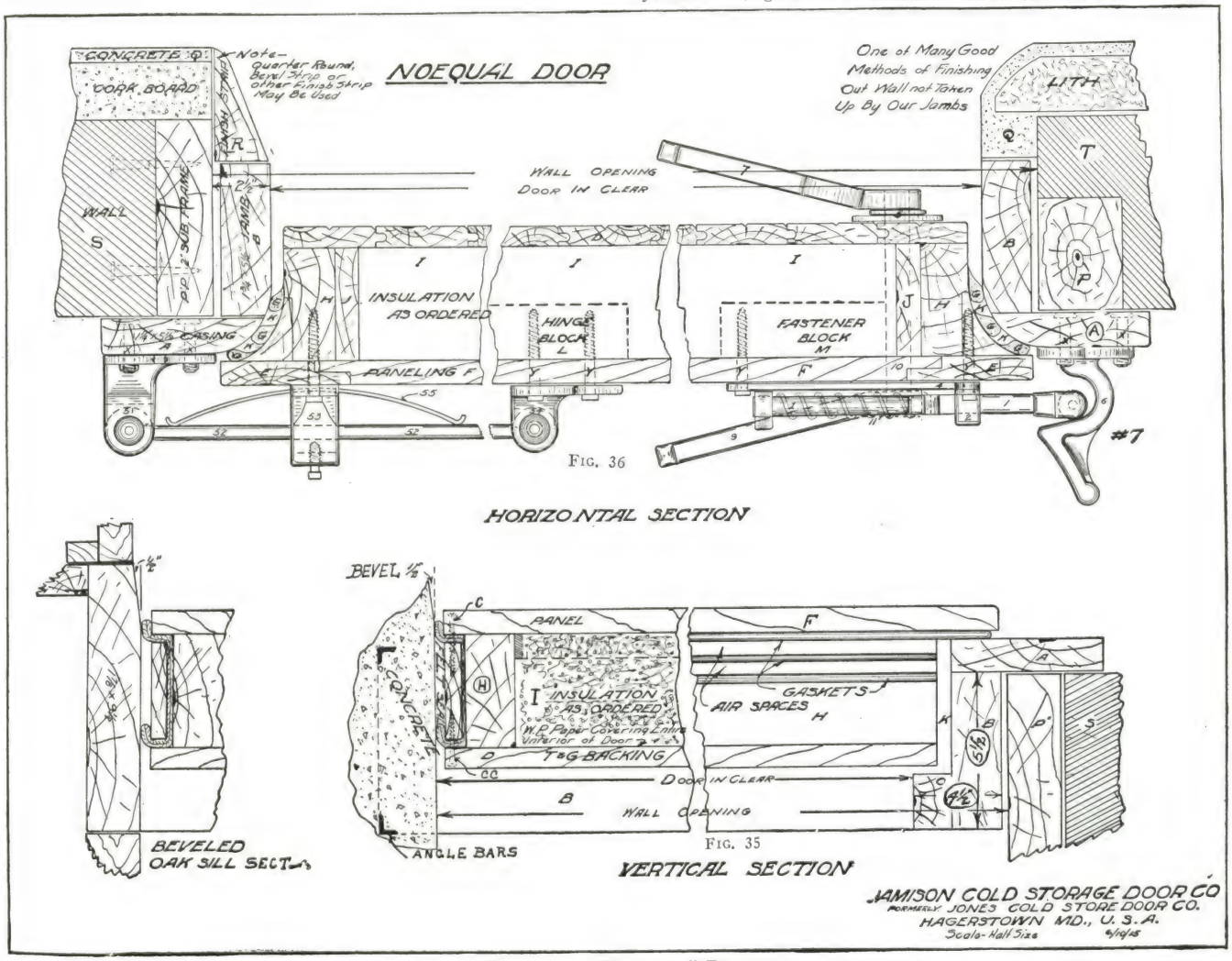


FIG. 36

FIG. 35

DETAILS OF "NOEQUAL" DOOR

Continued on next page

STANDARD SIZES, "NOEQUAL" DOORS

Stock door No.	Dimensions inside of frames (Door in the clear) Width ft.	Width in.	Height ft.	Height in.	Size of wall opening Width ft.	Width in.	Height ft.	Height in.
00	2	6	2		2	10	2	5
0	2		3		2	4	3	5
1	2		6		2	4	6	5
2	2	6	6		2	10	6	5
3	2	6	6	6	2	10	6	11
4	3		6		3	4	6	5
5	3		6	6	3	4	6	11
6	3	6	6		3	10	6	5
7	3	6	6	6	3	10	6	11
8	3		7		3	4	7	5
9	3	6	7		3	10	7	5
10	4		6		4	4	6	5
11	4		6	6	4	4	6	11
12	4	6	6		4	10	6	5
13	4	6	6	6	4	10	6	11
14	4		7		4	4	7	5
15	4	6	7		4	10	7	5
16	5		6	6	5	4	6	11
17	5		7		5	4	7	5

In ordering doors use stock numbers in first column of table and add "Noequal"

"Jamison" Vestibule Door

The "Jamison" vestibule door combines a "Jamison" type cold storage door with a pair of double swing, metal clad, batten doors, in the same frame, forming a vestibule, or air check, as shown below.

The standard door has a pine front and spruce, pine or cypress back and jambs.

The cold storage door is insulated for either cooler or freezer temperatures, as ordered. The cooler insulation consists of granulated cork and paper. Freezer insulation is 4-in. or 6-in. pure corkboard laid in asphalt or paper.

The double swing doors are made of 7/8-in. T & G lumber, in two thicknesses, with insulating paper between, oak framed, with each layer diagonally opposed. It is covered 30 in. high with No. 16 galvanized steel, in a single sheet. The remaining height is covered with lighter sheet.

Furnished either right or left hand. The frame is cross connected with angles to be set in concrete floor; also furnished with beveled oak sill.

The track frame head is furnished when an overhead rail passes through the opening.

The hardware used on this door is this company's standard type and design. The double swing doors are hinged with powerful, automatic, double swing hinges that insure its coming back to closed position instantly.

The Jamison Cold Storage Door Co. will be pleased to advise those who contemplate the installation of vestibule doors, if they will write before making their plans.

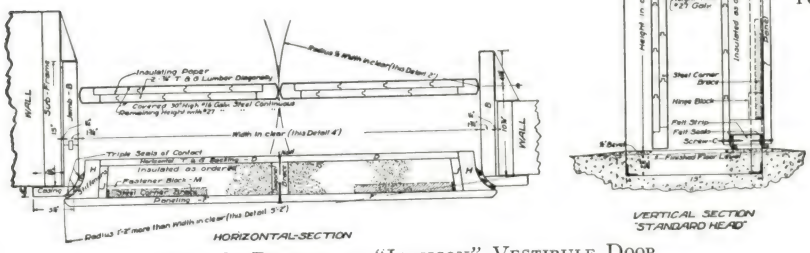


Fig. 32. Details of "Jamison" Vestibule Door

Fig. 31. Front View of "Jamison" Vestibule Door

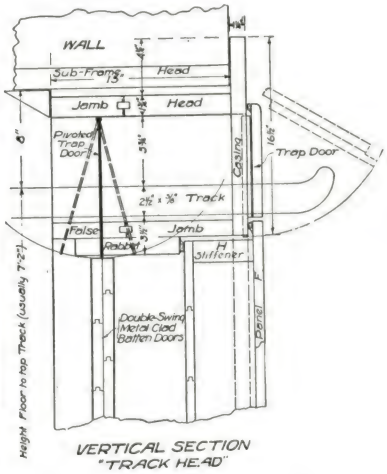


Fig. 30. Track Frame Head

Track, Freezer, Fireproof and Ice Recording Doors

Note the simplicity and durability of the automatic trap lift device for track doors. Freezer doors are of the same construction as the standard, but with heavier insulation. Fireproof doors (refrigerator and cold storage) are of Jamison regular wood construction, metal covered; carrying the same temperature as the standard door. Ice recording doors, platforms and chutes, of three distinct types, for passing and recording number of blocks passed. Made of wood or steel; strong and reliable in action.

Fig. 22. Track Door with Glass Opening

Cold Storage Windows

Built either fireproof or non-fireproof and of general construction, like the doors. From 4 to 6 thicknesses of glass are nested in one sash, 5½ in. thick with air spaces between them. Ask for list of stock sizes, but they should always be made as small as practical to suit conditions, usually about half the size of doors used.

Fig. 54. Cold Storage Window

To Specify

Specify type of door and add, "Made by Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A."

Write for new catalogue No. 10.

THE AMERICAN WIREMOLD COMPANY

Manufacturers of Conduit and Conduit Fittings

HARTFORD, CONN.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

METALLIC CONDUIT for surface wiring.
CONDUIT FITTINGS.
FLEXIBLE NON-METALLIC CONDUIT.

Wiremold Conduit

Wiremold is an enameled steel tubing for surface wiring.

Base and capping are *permanently assembled,* thus wires are "fished in" as in rigid conduit.

The base is galvanized and the capping is finished with a high grade enamel of a neutral buff color.

Wiremold is easily and quickly installed. The only tools required are a screwdriver, hack saw and bender.

Wiremold is made in both 3- and 4-wire sizes in 10-ft. lengths, one coupling being furnished with each length.

Inspected and labeled by Underwriters' Laboratories, Inc.

Conduit fittings for use with Wiremold are furnished by us and are illustrated below.

Wireduct Flexible Non-metallic Conduit

A high grade interwoven conduit having a smooth, clean raceway that insures easy, long distance "fishing."

Wireduct will not break down or obstruct the passage of wire should it be "kinked" or damaged in installation. Cuts cleanly without burrs; the tight closely braided outer jacket will not burr out at cut ends and obstruct fishing the material through close openings or over rough places in walls or partitions.

Treated with special compounds which will not become brittle in cold weather nor too soft in hot weather, which makes Wireduct clean to handle. Compounds are carefully selected and their quality maintained by constant tests.

Made in inside diameters from $\frac{7}{32}$ to $2\frac{1}{2}$ in.

WIREDUCT FLEXIBLE NON-METALLIC CONDUIT

WIREMOLD CONDUIT AND FITTINGS

NATIONAL METAL MOLDING COMPANY

PITTSBURGH, PA.

Products

A complete line of Electrical Conduits, Cable and Fittings—everything for the interior wiring of every type of building, including "SHERARDUCT" SHERARDIZED RIGID STEEL CONDUIT and FITTINGS; "ECONOMY" BLACK ENAMELED CONDUIT and FITTINGS; "FLEXSTEEL" ARMORED CONDUCTORS and FLEXIBLE METALLIC CONDUIT and FITTINGS; "FLEXTUBE" FLEXIBLE NON-METALLIC CONDUIT; "NATIONAL" METAL MOLDING and FITTINGS; "LIBERTY" RUBBER COVERED WIRE and CABLE; EXTERIOR WIRING INSULATOR BRACKETS; "NATIONAL" OUTLET BOXES and COVERS; SWITCH BOXES; LOCKNUTS and BUSHINGS; FIXTURE STUDS, etc.

TRADE-MARK

Slogan

"All you require—when you wire."

Sherardized Rigid Steel Conduit

"Sherarduct" sherardized rigid steel conduit is manufactured from tubing made from the highest grade mild spellerized steel. Both interior and exterior surfaces are given the famous sherardizing treatment—a process by which zinc is alloyed with the steel surface of the pipe, forming a part of it. This makes "Sherarduct" absolutely rustproof. In addition, both inner and outer surfaces are coated with a clear, transparent acidproof and alkaliproof enamel, baked on. This double protection makes "Sherarduct" rustproof and acidproof; both inside and outside.

SHERARDIZED RIGID STEEL CONDUIT

Black Enameled Rigid Conduit

"Economy" black enameled rigid conduit is made of the same high grade tubing as "Sherarduct." It differs only in the protective treatment applied.

BLACK ENAMELED RIGID CONDUIT

We claim that there is no better enameled conduit made than "Economy." It is giving satisfactory service in buildings of all types throughout the country.

BLACK ENAMELED RIGID CONDUIT

*Size in.	Diameter, in. External	Diameter, in. Internal	Thickness, in.	Weight per ft., lbs.
¼	.540	.364	.088	.425
⅜	.675	.493	.091	.568
½	.840	.622	.109	.852
¾	1.050	.824	.113	1.134
1	1.315	1.094	.133	1.684
1¼	1.660	1.380	.140	2.281
1½	1.900	1.610	.145	2.731
2	2.375	2.067	.154	3.678
2½	2.875	2.469	.203	5.819
3	3.500	3.068	.216	7.616
3½	4.000	3.548	.226	9.202
4	4.500	4.026	.237	10.889
4½	5.000	4.506	.247	12.642
5	5.563	5.047	.258	14.810
6	6.625	6.065	.280	19.185

Furnished in 10-ft. lengths, threaded on both ends, with one coupling.
*Conduit pipe is known and spoken of by its nominal inside diameter.

Armored Conductors and Flexible Metallic Conduit

"Flexsteel" armored conductors and flexible metallic conduit can be used for wiring either old or new buildings.

FLEXIBLE METALLIC CONDUIT

ARMORED CONDUCTOR

SINGLE STRIP CONDUCTOR

The distinctive construction and extreme flexibility of "Flexsteel" make it easy to work with under all conditions.

Its smooth, flat surface, inside and outside, makes it much easier to cut, strip and "fish" and it will not catch or bind when pulling around joists or beams.

The interlocking of its armor strips prevents the walls of "Flexsteel" from opening or spreading, no matter how short the radius to which it is bent or how severe the strain.

Continued on next page

The thorough galvanization of its armor coat gives permanent protection against corrosion.

Non-metallic Flexible Conduit

"Flextube" non-metallic flexible conduit is seamless, non-collapsible and inseparable. Its "roller bearing" interior makes it easy to "fish" the wires through under all conditions. "Flextube" is double compounded. The interwoven insulating tubing is treated with a moistureproof and flameproof compound, over which is a strong, tough braiding, also compounded. "Flextube" will stand any amount of rough usage, it does not get sticky in hot weather or brittle in cold, and every foot of every coil can be used.

Non-metallic Flexible Conduit

Metal Molding

National metal molding—"The Standard for Surface Wiring"—is a small, flat section of sherardized steel designed for carrying and enclosing electric wires that run over walls, ceilings or other surfaces. It does away with unsightly surface wires, providing instead, a neat, inconspicuous and absolutely safe installation. It can be painted any color and made to match the woodwork or finish of practically any room. Its surface

No. 333 Molding

No. 222 Molding

is sherardized, making it rustproof and non-corrosive and difficult to damage in any way.

Metal molding is the material of many uses. There is no limit to the variety and size of installations to which it can be applied. By providing a neat, safe and inexpensive means of bringing electricity to wherever needed, it enables electric light and power to be used to the fullest extent in every home, office, store, factory or building of any kind. In new work, where it is necessary or desirable to run the wires on the surface, metal molding can be used for complete installations.

Brackets

National brackets cut distribution costs, improve the appearance of service connections and increase line efficiency. They are furnished complete with insulators; they do not require tie wires; they are practically universal in application. The same brackets can be used in practically any position; the 2- and 3-point types may be used as break arms.

Single-point Two-point

Three-point

National Brackets

Rubber Covered Wire and Cable

Liberty rubber covered wire and cable is made in all sizes from No. 14 to 1,000,000 circular mils.

Liberty wire and cable is made strictly in accordance with the rules of the National Electrical Code. It is carefully manufactured of the best materials and under expert supervision.

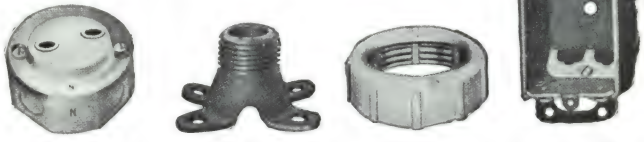
Liberty rubber covered wire and cable is of the same dependable quality as all other National products. It will give complete satisfaction in every installation.

Liberty Rubber Covered Cable

A National Product for Every Wiring Need

There is a National Product for every wiring need—the line is complete.

Switch boxes, outlet boxes and covers, locknuts and bushings, fixture studs, bush caps, etc. are a few products comprising the extensive National line.



Outlet Box Fixture Stud Bushing Switch Box

Using all the National Products for electric installations, large or small, in new or old buildings, means quality electrical work—installations that will give complete and permanent satisfaction.

JOHNS-MANVILLE

INCORPORATED

Sole Selling Agents for Orangeburg Underfloor Duct System

Madison Avenue at 41st Street
NEW YORK, N. Y.

Products

ORANGEBURG UNDERFLOOR ELECTRIC DUCT SYSTEM, a non-metallic rigid duct with fittings.

For Asbestos Roofing, Insulation, etc., see pages 904-905.

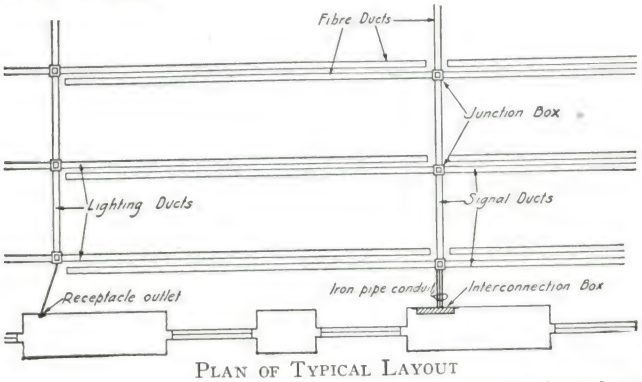
Orangeburg Underfloor Duct System

A universal wire-way incorporated in the finished floor of modern buildings through which electric wire service of all classes may be had to any location on the floor. Consists of parallel lines of fiber duct laid on centers which give a comprehensive grid over the entire floor area. Access is had through cast iron junction boxes with brass tops, and wires are brought out through brass fittings at locations determined by the occupation of the floor space. All classes of electric service are available, as electric light and power, telephone, call bells, telegraph, etc.

Outlets are quickly and easily installed and, if later abandoned, are closed in a neat and sightly manner.

The system is adaptable to all buildings in which electric service may be required. Its first cost is not higher than that of methods hitherto employed and its flexibility makes certain large savings in future changes in occupation.

Buildings designed for manufacturing purposes in which electrically operated machinery may be used are served to the same advantage as those devoted to commercial offices.

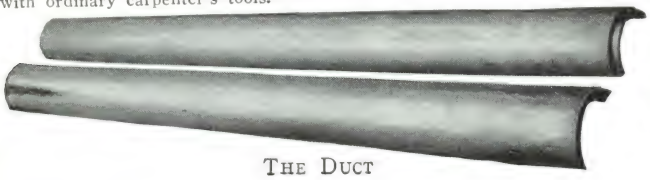


PLAN OF TYPICAL LAYOUT

Double Duct System; used where electrical restrictions demand separate conduits. Note that neither circuit crosses the other, although serving the same area

Buildings for rental in which changes of occupants are usual will show a marked reduction in maintenance expense and lower depreciation through the use of this system which precludes the necessity of disturbing floors or defacing walls incident to change of tenancy.

The Duct—Made of the same materials and in the same manner as Orangeburg fiber conduit, but is semi-circular, open on the bottom. Approximately 4 in. across and 2 in. high, inside and 4½ in. across and 2¼ in. high over all. Regularly furnished in 5-ft. lengths, with a mortise and tenon joint connection. Will not corrode or rust and can be worked with ordinary carpenter's tools.



THE DUCT

JUNCTION BOX

Junction Boxes—These are made with cast-iron bodies and adjustable brass covers. The cover may be brought exactly flush with the floor surface by means of this adjustment. The cover is recessed and is to be filled in with cement, linoleum or whatever floor surfacing is used, leaving only a narrow rim visible when the work is completed. The boxes are furnished with 4 outlets or less for the duct, and will be drilled and tapped for metallic conduit as required.

Crossunder Fitting—Made of cast iron with the ends shaped for suitable connection with the fiber duct. Serves to offset the duct down to allow water or other piping present in the floor fill to cross the duct line. May also be used to permit the crossing of 2 ducts at intersections where junction boxes are not required.

Floor Outlets—The regular outlet fitting on insert is made of brass, 1¾ in. in diameter x 1¾ in. long over all with a 1-in. inside thread. The outside thread is sharply cut and cuts its own thread in the fiber as it is screwed into the duct. A plug is furnished for use where an outlet is not in service. This type is used for cement surface floors.

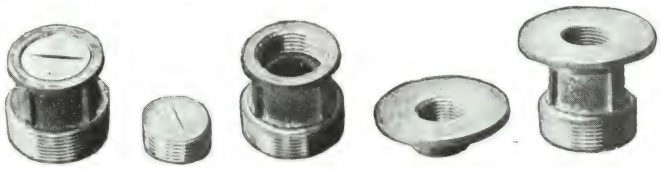
A special fitting is made for use with linoleum or other composition floor coverings, and is screwed into the top of the regular insert. It has a flange 2⅝ in. in diameter, making a neatly finished job without patching.

Connections above the floor are made by means of a nipple made of brass or other material, one end of which screws into the floor outlet fitting, the other end being provided with a suitable connector.

CROSSUNDER FITTING

Installing Outlets—*Before Floors Are Finished*—Such outlets as can be located in advance may be placed as the duct is laid. A hole about 1/16 in. less than the outside diameter of the threads on the insert is cut with a wood auger or metal drill. The insert is then screwed down to a point flush with the floor surface when finished.

After Floors Are Finished—A hole about 2¼ in. in diameter is cut through the cement to the duct, which is preferably located about 1 in. below the floor surface. A hole is then bored in the duct with a wood auger bit or a metal drill. This hole can be cut without in any way disturbing or injuring any wire which may be already installed in the duct.



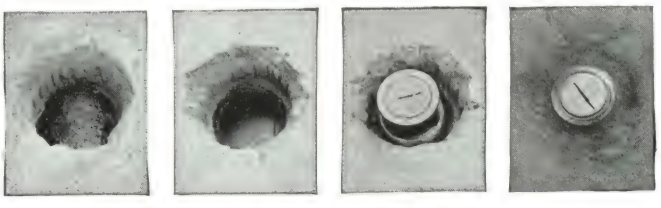
OUTLET FITTINGS

OUTLET IN DUCT

The outlet fitting is then screwed into the opening, cutting its own thread in the fibre, until the top is flush with the floor surface, using a special wrench for this purpose. The small space left around the fitting is then filled in with cement.

Where a linoleum or similar floor has already been laid, an outlet can be installed without damaging the linoleum in any way, and without requiring any patching, by the use of the special fitting designed for this purpose, the opening in the linoleum being completely filled by the flange of the fitting.

Send for catalogue giving complete details.



INSTALLING NEW OUTLET IN DUCT SYSTEM

THE STEELDUCT COMPANY

Rigid Steel Conduit and Fittings

YOUNGSTOWN, OHIO

REPRESENTATIVES

BOSTON, MASS.
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PHILADELPHIA, PA.
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SAN FRANCISCO, CAL.
LOS ANGELES, CAL.

Products

"Steelduct" Rigid Steel Conduit, Elbows and Couplings.

Conduit

"Steelduct" rigid steel conduit is manufactured as "Steelduct" enameled or "Steelduct" electro galvanized, thus meeting the demand for either type according to class of work, personal taste or specification.

"Steelduct" Enameled Conduit—Manufactured from mild steel full weight wrought pipe, conforming to our own specifications for the peculiar needs of rigid steel conduit to meet the most exacting demands of architects and engineers. This special pipe is thoroughly pickled and cleaned of all surface defects, such as mill scale, and the exterior and interior surface rendered perfectly smooth. It is then threaded with improved automatic machines, using good sharp dies. By following this sequence in production no acid bath comes in contact with the sharp clean cut threads to dull them, thus insuring as nearly mechanically perfect threads as possible.

It is needless to dwell on the advantages of such clean sharp threads as regards rapid installation and ease of coupling. To protect these threads not only during handling at the mill and in shipment but in the subsequent handling on the "job," each length of our enameled conduit is fitted with a thread protector on one end and the usual coupling on the other. Having these advantages as a foundation, the pipe so carefully prepared is coated inside and out with an elastic yet sufficiently hard enamel. The manner of its application, as well as the special heat treatment, makes possible a beautiful finish, yet one that will not flake nor chip and will stand all sorts of abuse.

To the interior is imparted a clean and lasting raceway, through which wires may be fished with ease and rapidity without harm to the most delicate insulation.

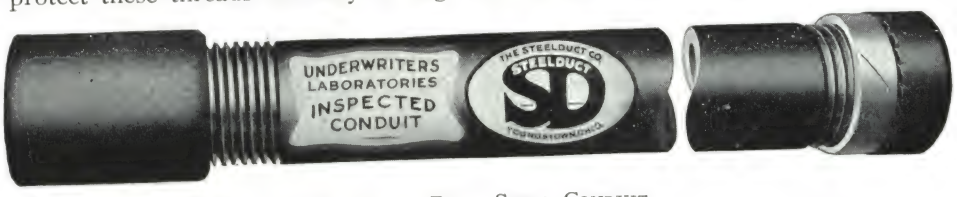
"Steelduct" Electro Galvanized—In offering our "Steelduct" electro galvanized conduit we do so with the aim to meet the most severe specifications of architects and engineers, who insist on this class of material, not only for its unusual clean appearance but for its very serviceable qualities. It is made from the same high grade mild steel full weight wrought pipe as "Steelduct" enameled conduit, the process of manufacture being identical up to the stage where the coating is applied. The utmost care is taken to have the pipe clean and with a perfectly smooth surface inside and out. Each length is carefully inspected and as it is passed by the inspectors it is next subjected to a copper flash and then electro galvanized by a process that gives it a uniform dense coating of zinc, perfectly fluxed or amalgamated with the surface of the pipe assisted by the agency of the copper flash. This accomplished, the interior is coated with a flexible, tough, glasslike enamel that will withstand the same rigid test and punishment as the white zinc coated exterior.

"Steelduct" Elbows and Couplings

"Steelduct" elbows and couplings are manufactured with the same degree of care and to the same rigid specifications as our conduit, and we offer them with full confidence as the best we know how to produce.

Underwriters' Laboratories Inspection

Every length of "Steelduct" conduit bears the stamp of approval of the Underwriters' Laboratories, Inc., and is regularly inspected and tested by them. "Steelduct" also bears the approval and good will of all who have used our product—owners, architects, engineers, contractors, and the jobbers who distribute it. Complete satisfaction is reflected from the owner in whose building it is installed to the jobber who has sold it. For the reference of owners, architects and engineers, we will submit on request specifications for rigid steel conduit which conform in every detail to the requirements of the National Electrical Code.



Steelduct Rigid Steel Conduit

"STEELDUCT" CONDUIT, COUPLINGS AND ELBOWS*
(Weights and Dimensions are Nominal)

Size	Conduit: Price per ft.	Conduit: Weight per ft., lbs.	Conduit: Diameter, in. External	Conduit: Diameter, in. Internal	Conduit: Thickness, in.	Conduit: Thrds. per in.	Couplings: Price each	Couplings: Weight per 100, lbs.	Elbows: Price each	Elbows: Weight per 100, lbs.	Elbows: Radius in.	Elbows: Offset, in.
¼	$.08½	.425	.540	.364	.088	18	$0.05	6.0	$0.19	42	4.250	7.500
⅜	.08½	.568	.675	.493	.091	18	.06	9.5	.19	53	4.250	7.500
½	.08½	.852	.840	.622	.109	14	.07	11.6	.19	75	4.250	7.375
¾	.11½	1.134	1.050	.824	.113	14	.10	20.9	.25	120	5.375	8.375
1	.17	1.684	1.315	1.049	.133	11½	.13	34.3	.37	200	5.750	9.500
1¼	.23	2.281	1.660	1.380	.140	11½	.17	53.5	.45	300	7.250	10.875
1½	.27½	2.731	1.900	1.610	.145	11½	.21	74.3	.60	427	8.250	12.625
2	.37	3.678	2.375	2.067	.154	11½	.28	120.8	1.10	700	9.500	15.250
2½	.58½	5.819	2.875	2.469	.203	8	.40	172.0	1.80	1300	10.500	17.375
3	.76½	7.616	3.500	3.068	.216	8	.60	249.8	4.80	1700	13.000	19.500
3½	.92	9.202	4.000	3.548	.226	8	.80	424.1	10.60	2300	15.000	21.250
4	1.09	10.889	4.500	4.026	.237	8	1.00	474.1	12.25	2700	16.000	22.500
4½	1.27	12.642	5.000	4.506	.247	8	1.50	550.0	18.55	3100	18.000	24.375
5	1.48	14.810	5.563	5.047	.258	8	1.65	700.0	25.75	5500	24.000	32.000
6	1.92	19.185	6.625	6.065	.280	8	2.40	750.0	32.00	9000	30.000	39.750

Conduits in 10-ft. lengths, threaded both ends, with one coupling.
Conduit pipe is known and spoken of by its nominal inside diameter.
*Price list Effective August 1st, 1913: subject to change without notice.

FRANK ADAM ELECTRIC CO.

GENERAL OFFICE AND FACTORY
3650 Windsor Place
ST. LOUIS, MO.
(Mail Address, 3649 Bell Avenue)
DISTRICT OFFICES

CHICAGO, ILL., 2518 Cullom Avenue
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CLEVELAND, OHIO, 4209 Euclid Avenue
DALLAS, TEX., 222 Interurban Building
DETROIT, MICH., 522 Brush Street
KANSAS CITY, MO., 828 New York Life Building
LOS ANGELES, CAL., 308 East Third Street
MINNEAPOLIS, MINN., 442 Builders Exchange Building
NEW ORLEANS, LA., 509 Conti Street
NEW YORK, N. Y.
SAN FRANCISCO, CAL., 583 Howard Street
SEATTLE, WASH., 552 First Avenue, South

Products

Full and complete line of: PANELBOARDS and CABINETS, both with the Live Face and Safety Type; ELECTRIC LIGHT and POWER SWITCHBOARDS; HANGER OUTLETS; ADJUSTABLE FLOOR BOXES; THEATER and AUDITORIUM SWITCHBOARDS.

Also Safety Type and Knife Switches.

Engineering Service

The Engineering Department of the FRANK ADAM ELECTRIC CO. is at the disposal of architects for engineering, design, and construction information on our products.

Catalogue

Illustrative and descriptive catalogue and bulletins on our products are available to architects on request.

Preparation of Specifications

In the following pages we have made as little descriptive matter as possible, believing that our products are well known to architects generally, and that the illustrations and synopsis of specification accompanying same, will enable the architect to write his electrical specification to the best advantage.

The General Specifications for Electric Light and Power Wiring should have the following paragraphs:

System—The contractor must investigate what kind of a feeder system is to be connected-up with this installation, and the contractor must forward to the manufacturer of the switchboards and panelboards the exact information as to the feeder system that must be used in the building.

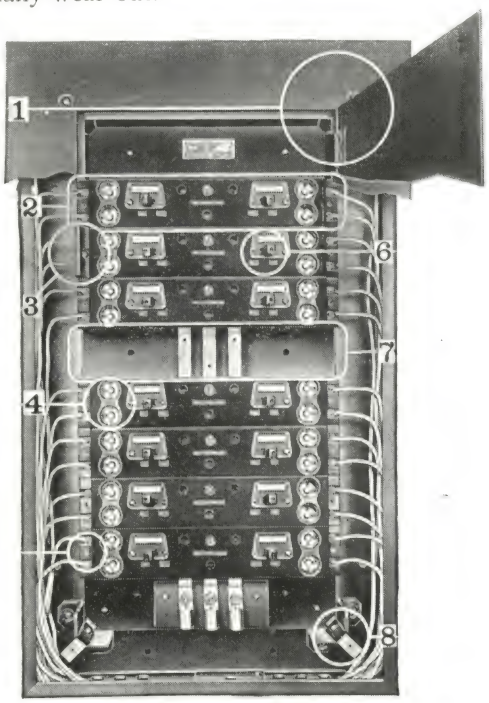
Label Service—All material used in this installation must show the Underwriters' Laboratories' label, unless that entire classification of material is not in the label service, when it must be listed in the Underwriters' Laboratories' approved list of material.

Inspection—The contractor must notify in writing the inspection department having jurisdiction, and notify them that the specifications call for the inspection departments to base their inspection on both the specifications and accompanying plans, and that the certificate for the completed job must particularly signify that the inspection has been made according to plans and specifications. The contractor is to pay the fee for the inspection certificate.

Triumph Line of Standardized Safety Type Panelboards

The standardization of safety type panelboards comes very close to perfection in the New Triumph "F-A" Line. By building a panelboard of complete sections the following advantages are gained: (1) It standardizes production, and a *better* panel can be built for less money than the old type one-piece could with equal materials. (2) It permits quick and safe delivery. As all parts are standard, a complete board to meet all specifications can be shipped within a very few days after receipt of order. If through accident one unit be broken in transit another can be quickly supplied, whereas in accident to panelboards of the old one-piece type, weeks had to be given to build a new one. (3) Much time can be saved on installation as necessary connections are reduced to a minimum and terminal screws always accessible. (4) Standardization of panels permits standardization of practice and where Triumph Safety Type panelboards are specified, both architect and contractor benefit by reduced amount of varying panelboard detail. (5) Owner of a Triumph equipped building saves both on long active life of the Triumph and low cost of replacing parts when they finally wear out.

TRADE-MARK



THE NEW TRIUMPH "T-P" PANELBOARD

(1) An absolutely safe one-door panelboard. Also built with 2 doors.
(2) Two-circuit unit construction.
(3) Continuous barriers, one for each side, cover and conceal terminal connections.
(4) Standard N. E. C. fuse plug connections.
(5) Terminals easily accessible.
(6) Heavy duty 30-amp. tumbler switches.
(7) Easy replacement of unit without disturbing other units or balance of panel.
(8) "F-A" patented adjustable corner supports, for adjustment of panel, to bring it flush with plaster and centered and plumb.

Blank sections at top and bottom cover busbar connections, lugs may be placed at top or bottom

Triumph "T-P" panelboards are made with main lugs only, main fuses only, and with both brush type safety main switch and knife main switch with main fuses

Note: Where circuits are controlled from the panelboard, it has always been considered good practice to furnish snap switches on the branches, and today the safety type panelboards with 30 ampere branch

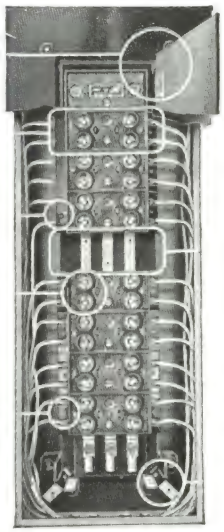
Continued on next page

switches and plug type fuse connections cost no more than any other panelboards with snap switches.

Specifications for "T-P" Branch Circuit Safety Type Panelboards with Tumbler Switches in the Branches—At each distributing center for branch circuits where marked on plans, and about 5 ft. to center, furnish and install "F-A" Triumph "T-P" standardized panelboards, with a total number of branches for all branch circuits centering at this point, and two additional branches for future circuits. Panelboards to be complete with steel cabinet set flush with finished plaster, covered with a filler of two coats of lead and oil, and a final dead black finish. (*Note:* Insert main feeder description, whether with or without main switch.)

Triumph Type "P" Panelboard

A branch circuit safety type panelboard with plug fuses only for the branches. The "P" type is a very narrow panelboard that parallels all the "T-P" advantages. While it is narrow it still can be placed flush in a 5-in. wall without offsetting and has ample gutter room for all wiring. It is sectionally constructed of standardized units which are very like the "T-P" unit, illustrated on the opposite page except without the switches. Service wires can either enter the top or the bottom and end sections and barriers effectually cover and conceal all wiring and terminals.



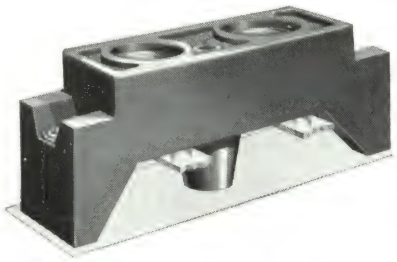
TRIUMPH TYPE 'P' PANELBOARD

Note: It is considered good practice to furnish panelboards with fuses only at the branches where the circuits are controlled either by the feeder switch or the outlets are controlled by local switches. The safety type panelboards of this kind cost no more than the old-fashioned live face. "P" type also supplied with main knife switch.

Specifications—At all distributing centers for branch circuits as marked on plans, furnish and install "F-A" Triumph "P" type standardized panelboards, with a total number of branches for all branch circuits centering at this point, and two additional branches for future circuits. Panelboards to be complete with steel cabinet set flush with finished plaster, covered with a filler of two coats of lead and oil, and a final dead black finish.

Triumph Type "R" Panelboard for Residences

This is the first absolutely safe residence panelboard having the advantages of unit construction, standardized manufacture and installation, and the only one that fits every requirement with one model. It is really a "sold-in-the-package" panelboard, for it comes completely mounted in a cabinet ready for installing and wiring.



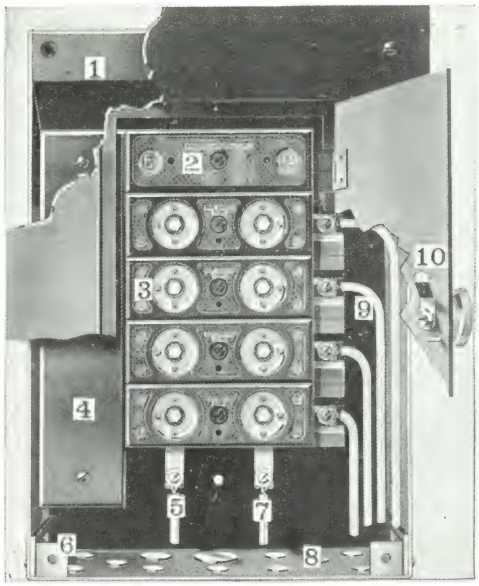
"R" TYPE SECTION OR UNIT

The complete unit that forms the panel itself; fully practical. Each unit carries 2 fuses (1 pair) and the neutral main busbar is always at the left. Simple and strong. Though it fastens to busbars of the mains it is also supported by the steel back of the cabinet. Base is unbreakable composition, impervious to moisture and without mineral veins.

(1) Steel angle barriers top and bottom fully protect end gutters. Easily put in place after all connections are made. Slope or angle at bottom prevents any refuse gathering there—as it will in the old style cabinets.

(2) Blank composition end section covers main terminal connection at top or bottom. Bottom end section has been removed to show main terminals.

(3) Standard N. E. C. fuse plug connection. No possibility of even the slightest injury. Only back contact points are live when fuses are out.



"R" RESIDENCE SAFETY TYPE PANELBOARD AND CABINET

(4) Composition barrier and side gutter cover. All wiring and circuit terminals completely covered. Held in place by only 2 screws, wiring easily accessible.

(5) This busbar is always connected to the neutral—one of the unique points that makes the "R" adaptable to all conditions.

(6) Threaded metal clip to hold angle metal barrier and front with door.

(7) Main service connection can be made either top or bottom, both ends of busbars having terminals.

(8) Plenty of knockouts to permit service and all branch conduits to come in either top or bottom. Sides of cabinet have one $\frac{11}{16}$-in. hole for each circuit for loom in open wiring work.

(9) Note how accessible the branch terminals and roomy gutter, making quick work of wiring this panelboard. Barrier is removed to show circuit terminals.

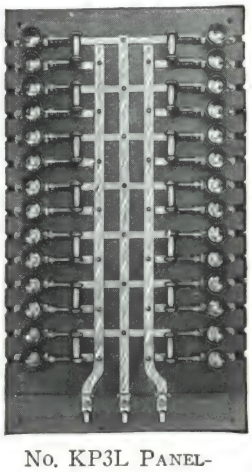
(10) Good strong latch and knob holds door flush with trim. Always presents a smooth, neat appearance. Front is adaptable to either flush or surface installations.

The type "R," being absolutely safe, can be put in the kitchen, hall or other first floor location, where it can be more definitely located at the center of distribution and more convenient to the owner for fuse changing. Its neat appearance, with the "F-A" smooth front, makes it adaptable to any interior, as it can be finished to harmonize with other trim. Also made with main switch and fuse connections.

Specifications—At load side of meter and at most convenient place where fuses can be easily replaced, and close to the center of distribution, install a complete Triumph safety type "R" panelboard for a distributing center for branch lighting circuits, as shown on general and wiring plans. The box of which must be at an average height of 4 ft. 6 in. to the center of panel and mounted flush with finished plaster. Panelboard to be equipped with 2 branch circuits in addition to the number of circuits shown on wiring plans. Main switch must be externally operated and installed on line side of meter. (*Note:* When "R" type with main switch is used, change specifications to apply.)

"F-A" Standard Live Face Panelboards

We make a full line of standard panelboards, thousands of which are in use daily throughout the country. They are built on $\frac{7}{8}$-in. slate base, dead black finish (or marble where specified) with main and branch busbars of satin finished copper branches spaced for 125 volts (or special 250 volts) and mains spaced for 125, or 125 to 250 volts. Specifications for our No. KP3L given here.



NO. KP3L PANELBOARD

Continued on next page

Note: The small difference in price between the live face 30-ampere knife switch branch panelboard, and the present up-to-date safety type panelboards with 30-ampere tumbler switches, is so small that there is hardly an excuse to use the live face board today excepting in places absolutely kept under lock and key.

Specifications—At each distributing center for branch circuits where marked on plans, and about 5 ft. to center, furnish and install "F-A" live face 30-ampere knife switch and plug fuse connections, No. KP3L panelboard. Each panelboard to be equipped with the necessary branches to take care of all the branch circuits distributed from this point, and also with two extra branches for future circuits. Panelboard to be complete with steel cabinet set flush with finished plaster, and covered with a filler of two coats of lead and oil, and with a final dead black finish.

"F-A" Feeder Panelboards Safety Type

Safety Type—For light and power distribution where absolute safety is desired. Built for 125-250 volt d. c. or 600-volt a. c. service. Made single and double branch according to capacity with individual doors over the fuses which automatically lock when the switch is in the closed position. It is impossible to get at live fuse. No locking of doors required. This is a super-safety feature and eliminates accidents by careless workmen.

"F-A" Feeder Panelboard, Safety Type

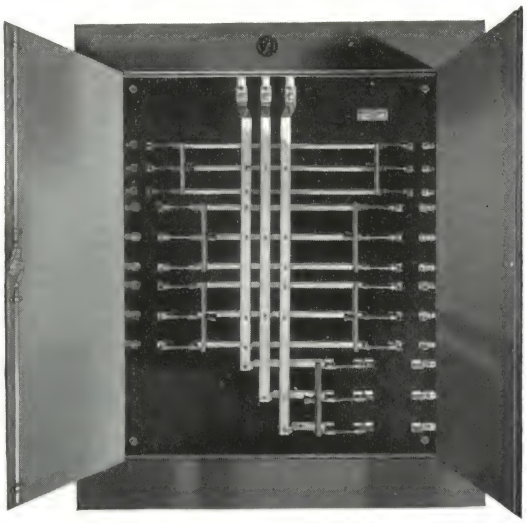
Specifications. Electric Light and Power Feeder Panelboards, Complete with Steel Cabinet, Safety Type—At each center of distribution for lighting or power feeders, there must be located a feeder panelboard enclosed in steel cabinet, made as per standard code rules. Both panelboard and cabinet must be made by the Frank Adam Electric Co. as a complete unit and must show both panelboard and cabinet label of the Underwriters' Laboratories, Inc., label service.

Switches—Each feeder panelboard shall be built up of interchangeable "F-A" interlocking brush contact safety type switches, of number and of full capacity of each branch feeder centering at this panelboard.

Main Busbar—Main busbar shall be of full carrying capacity of the main feeder connected to this panelboard, and must be fitted with ample size lugs to take the stranded cable without reducing capacity of the cable.

Branches—Each branch switch unit must be connected to main busbar so that when switch is opened both switch and fuse terminals are dead, and switch mechanism must have an interlocking attachment, so that it will be impossible to open the fuse connections when switch is "on."

Cabinet—Cabinet must be equipped with door or doors with latch and lock so as to cover switch control, and must be of necessary depth to allow handles of switch to be left in any position, or if handles are detachable, they must be arranged with spring clips to hold them in position when main cabinet doors are closed. Cabinet fronts must be made of sheet steel, covered with a filler of two coats of lead and oil, and with a final dead black finish.



"F-A" Feeder Panelboard, Live Face

Specifications. Electric Light and Power Feeder Panelboards, Complete with Steel Cabinet, Live Face—At each center of distribution for lighting and power feeders, there must be located a feeder panelboard enclosed in steel cabinet, made as per standard code rules. Both panelboard and cabinet must be made by the Frank Adam Electric Co. as a complete unit and must show both panelboard and cabinet label of the Underwriters' Laboratories, Inc., label service.

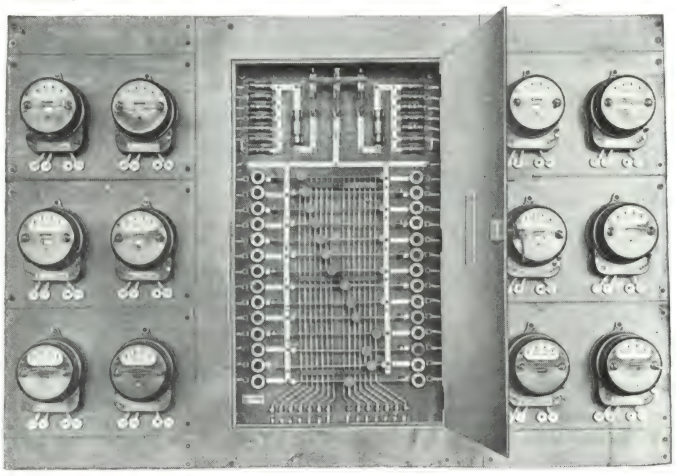
Panel—Panelboard to be clear electrical slate or ebony asbestos wood, or marble, and having dead black marine finish.

Main Busbars—Main busbars must be the full carrying capacity of main feeder attached to this panelboard, and must be fitted with ample size lugs to take the stranded cable without reducing capacity of the cable.

Branches—Each feeder panelboard must be equipped with knife switch with fuse connections on hinge side, blades of switch and fuse connection to be dead when switch is open, branch knife switch and fuse connection to be not less than full rated capacity of each feeder distributed from this panelboard.

Finish—All exposed metal on feeder panelboards must be copper satin finished, and lacquered only where there is no contact made.

Cabinets—Cabinet to be made of steel, of the gutter type, with gutter size of the standard adopted by the A.M.E.S., and furnished with adjustable corner supports that will adjust in and out, and for centering and plumbing the panel. Box must be of ample depth to take care of all connections of panelboards, and furnished with barrier sections all around of not less than ½-in. thickness. Front must be of sheet steel, covered with a filler of two coats of lead and oil, and with a final dead black finish.



"F-A" Meter Control Panelboard and Cabinet

One compartment for meter control panel and separate compartments with sectional covers for mounting meters on face

"F-A" Meter Control Panelboard and Cabinet

"F-A" meter control panelboards are designed espe-

Continued on next page

cially for use where tenants' space in buildings is liable to be increased or decreased. They are also rapidly becoming recognized as a necessity in many of the large factories making diversified products, where it is essential to record the cost of manufacturing in the different departments.

Specifications—Furnish and install where located on plans, "F-A" meter control panelboard and cabinet built as a complete unit.

Panelboard—Panelboard shall be made of electrical slate not less than ⅞ in. thick, and with black marine finish.

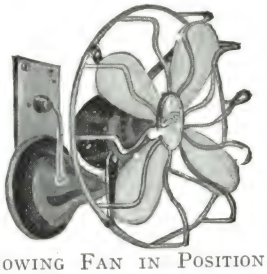
Panelboard shall be equipped with main knife switch with fuse connections, and meter fuse connections and meter busbars equal to, at least, two-thirds of the number of circuit branches centering at this panel, with double pole Edison plug fuse connections with circuit busbars for all of the branch circuits centering at this point and for two additional circuits.

Cabinet—Cabinet to be N. E. C. standard, gutter type, with the box extended on one or both sides of panel, and arranged with covers with Federal bushings for two meters side by side, meter wires for which must be so brought out that either two 2-pole meters can be used, or one 3-pole. Steel covers of the front for supporting meters shall also be furnished with a meter board of not less than ⅞-in. thickness, and the cabinet front and meter boards are to be finished in three coats of paint finished dead black.

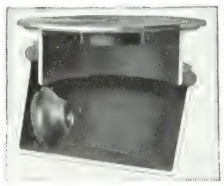
"F-A" Hanger Outlets

Particularly designed for fan outlets, yet practical as well for glow heaters and lighted pictures, the "F-A" hanger outlets are a refinement to any electrical installation. They securely support the fan, heater or picture and form a convenient, safe source of current. No bracket or shelf needed. They are adjustable to plumb and are flush with the finished plaster. Cover finished brush brass or black or special in any finish.

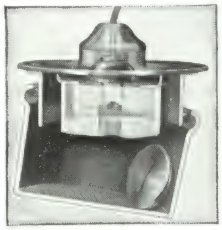
Fan Hanger Outlet



Showing Fan in Position



Floor Box Out of Service



Floor Box In Service

Plug can be inserted and taken out without removing cover

Specifications—At all outlets marked for hanger outlets on plans install "F-A" catalogue No. 45, hanger outlets, placing them 7 ft. 6 in. from floor. These outlets must be completely and securely fastened to studs of partition or into brick walls, so as to support either fan, heater, or a picture with lights.

"F-A" Reversible Cover Floor Boxes

Substantially made of pressed steel with standard knockouts to use in both wood and granolithic type floor. Have patented adjustable, watertight fittings and require but one reversible cover for both in and out of service conditions. Any standard flush receptacle can be installed in them, connection plug can be inserted and removed without removing cover plate, split bushing keeps box assembled intact. Standard pipe threading in cover permits conduit extensions where desired. Double floor ring furnished with every "F-A" floor box.

Specifications—Where floor outlets are indicated on plans install complete "F-A" reversible cover floor boxes catalogue No. FB345. Cover must be flush with finished floor and where placed in immediate service put brass cap in box, or when out of service the split bushing in box for future use. Wiring for floor boxes to be for devices as indicated on plans.

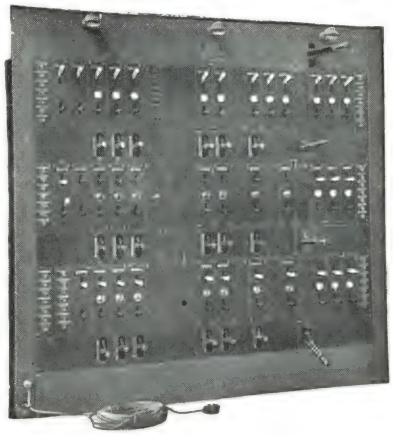
Major System Theater Lighting Control

MAJOR FA SYSTEM

TRADE-MARK

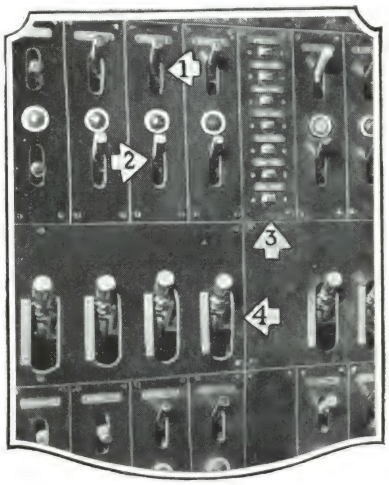
Because of the fact that both theater buildings and auditoriums are built specially for a certain location and for a certain classification of show or public gathering it is hardly possible to have any standard requirements for the entire illumination control, but the architect should get in touch with an engineering office who specializes on this class of installations, for, unless the specifications and plans for the electrical work in theaters and auditoriums are complete, the contractor must use his own judgment as to what the requirements are, and the consequence is that no two bids will be based on the same value of installation. Very essential information is the question of how complete the grouping of the feeder and circuit control will be, and naturally the more complete the more expense there will be for switchboard and also the wiring, and the more modified the less the cost of the switchboard and wiring.

We therefore suggest that the architect, before even taking up the question of the electrical installation, asks for our Bulletin No. 28 on the Major system for better illumination in theaters and auditoriums.



Major Pilot Switchboard

Major system of pre-selective remote control of theater lighting



Section of Switchboard Enlarged

(1) This lever closes the circuit.
(2) This lever opens it.
(3) These tumbler switches subdivide the circuit.
(4) This dimmer handle dims the lights of the switch just above it

SPRAGUE ELECTRIC WORKS

OF GENERAL ELECTRIC COMPANY

Panelboards and Accessories

527-531 West 34th Street

NEW YORK, N. Y.

FACTORIES

MASPETH, L. I., N. Y. BLOOMFIELD, N. J. NEW KENSINGTON, PA.

BRANCH OFFICES

ATLANTA, GA., Citizens & Southern Bank Building
BALTIMORE, MD., American Building
BOSTON, MASS., 84 State Street
CHICAGO, ILL., Fisher Building
CINCINNATI, OHIO, Provident Bank Building
CLEVELAND, OHIO, Illuminating Building
KANSAS CITY, MO., Dwight Building
MILWAUKEE, WIS., Public Service Building
PHILADELPHIA, PA., Witherspoon Building
PITTSBURGH, PA., Oliver Building
ST. LOUIS, MO., Pierce Building

PACIFIC COAST REPRESENTATIVES

LOS ANGELES, CAL., Corporation Building
PORTLAND, ORE., Electric Building
SAN FRANCISCO, CAL., Rialto Building
SEATTLE, WASH., Colman Building
SPOKANE, WASH., Paulson Building

Products

SPRAGUE ELECTRIC PANELBOARDS and CABINETS; SWITCHBOARDS; WIRING MATERIAL, including BX FLEXIBLE ARMORED CONDUCTOR; GREENFIELD FLEXIBLE STEEL CONDUIT; SPRAGUEDUCT (black enameled conduit); GREENFIELDUCT (hot galvanized conduit); OUTLET BOXES and COVERS (complete line); SPRAGUELETS: (all-combination bodies for exposed wiring); CONNECTIONS, COUPLINGS and FITTINGS for outlet boxes.

TRADE-MARK

General

The SPRAGUE ELECTRIC WORKS, pioneers in this branch of the industry, manufacture everything the architect desires for the wiring system from the service switch cabinet to the outlet on the wall.

Sprague wiring materials have for years been recognized as the standard. Full information, prices, etc., furnished on request.

Spraguelets—All-combination Conduit Bodies for Exposed Wiring

The Spraguelet line of simplified conduit bodies for *exposed wiring* by which practically all branch combinations with standard wiring devices can be accomplished through the use of three knockout bodies and a few standardized covers, is illustrated below.

BX FLEXIBLE STEEL ARMORED CABLE

BX (DOUBLE STRIP TYPE)—Adapted to new building construction and remodeling work.
BX (SINGLE STRIP TYPE)—Same as above with single strip armor; and less weight.
BXL—Lead covered, steel armored conductor for damp places. Single, double and triple conductor—standard sizes

GREENFIELDUCT

A rigid conduit distinguished by its heavy hot dip galvanized coating from end to end, inside and out. Standard sizes, ¼, ⅜, ½, ¾, 1, 1¼, 1½, 2, 2½, 3, 3½, 4, 4½, 5 and 6 in. approximately inside)

SPRAGUEDUCT

A superior black enameled conduit. Same sizes as Greenfielduct. All sizes in 10-ft. lengths. Coupling at one end

SPRAGUE FLEXIBLE STEEL CONDUIT

Commonly known as Greenfield.

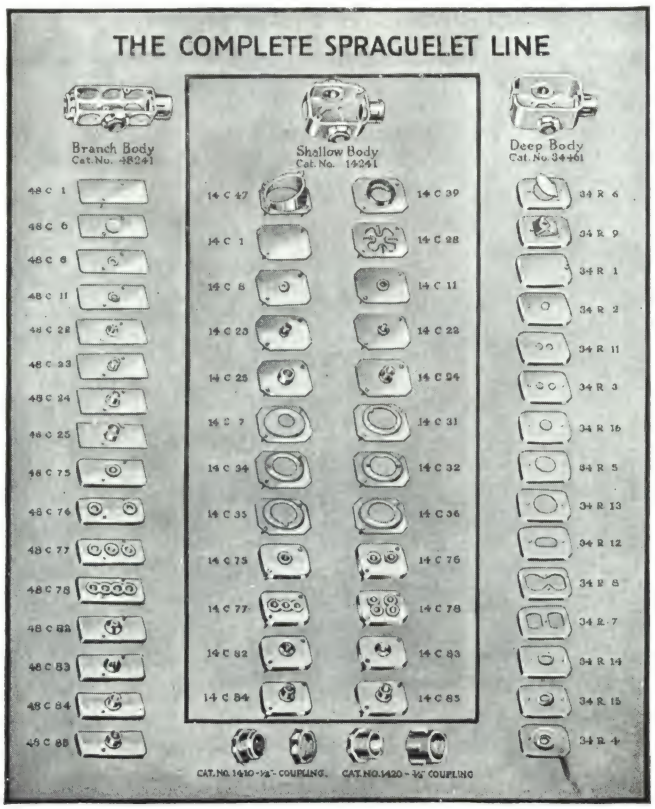
One of the best and safest ducts for electric wiring. Quick to install, easy to pull in and shape around contours of walls or ceilings.

Made in both double and single strip, galvanized.

Standard sizes, ⅜, ⅝, ½, ¾, 1, 1¼, 1½, 2 and 2½ in. inside diameter. Lengths, 25 to 250 ft. per coil

OUTLET BOXES, COVERS AND FITTINGS

A complete line of outlet boxes with knockouts in galvanized and black enameled finish, for *concealed conduit wiring*, including types for concrete work, with covers to match



THE SPRAGUELET LINE OF CONDUIT BODIES

Continued on next page

Sprague Electric Panelboards and Cabinets

Sprague panelboards and cabinets have been installed in many notable hotels and office buildings. Among these are such structures as the Woolworth Building, the New York Municipal Building, and the Ritz-Carlton Hotel of Atlantic City.

These panelboards are especially adapted to the better type of buildings, not only because their refined appearance conforms with the finest architecture, but also because their rugged mechanical construction fits them to stand up under the most severe and constant use.

There is nothing flimsy about their construction as all the parts are liberally designed and substantially built.

The branch switches are of the quick break G-E tumbler type with all steel parts nickelplated. They are designed to embody the minimum of joints and are aligned with their clips in a way which insures clean, broad contacts. Their positive indicating feature leaves no question as to whether they are turned "on" or "off." The unfailing reliability of these switches is appreciated for years after they are put in service.

The main switches are equally reliable. These are of the quick break double gap, brush contact type, with the brush ends machined to insure perfect wiping contacts.

The clips in our power panels are of the milled, sweated, and pin type, which we consider superior to the ordinary punched and riveted construction.

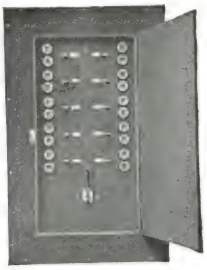
The patented corner iron arrangement permits perfect adjustment of barriers after the wiring is done and all parts on the board subject to wear are readily removable from the front.

Panels and barriers are of black marine finished slate.

Copper parts are satin finished and the steel cabinets of N.E.C. standard construction, black enamel.

These panelboards have also proved their worth in theaters, schools, hospitals, industrial plants, etc., where lights are often operated by persons unfamiliar with electricity and utmost safety is demanded.

A few standard types of panels are illustrated below, but special panels of all types and sizes can be quickly made, of stock parts, to architects specifications.



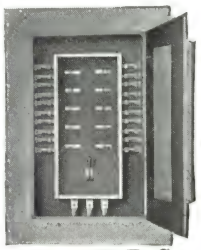
Type T. P. S.

Standard Safety Front Panels —*Type T.P.S.*—Branches made up with plug fuses in combination with D-P, or T-P, 30-amp. tumbler switches, 125 volts.

Mains made up with lugs only, fused or unfused brush contact switch.

Type T.E.S.—Branches made up with N.E.C. enclosed fuses in combination with D-P, or T-P, 30-amp. tumbler switches, 125 or 150 volts.

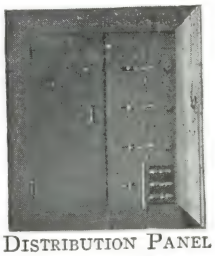
Mains made up with lugs only, fuses, fused or unfused brush contact switch.



Type T. E. S.

Distribution Panel—Branches made up with N.E.C. enclosed fuses in combination with D-P, T-P, or four-pole brush contact switches in capacity up to 600 amp., 500-volt, A.C. Individual fuse compartment for each switch, so arranged that fuses are accessible only when dead.

Mains made up with lugs only, fuses, fused or unfused brush contact switch.

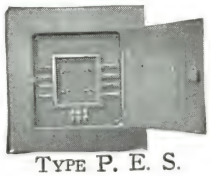


Distribution Panel

Type P.E.S.—Branches made up with N.E.C. enclosed fuses in combination with 10-amp. push button or tumbler switches, 125 to 150 volts.

Plug fuses in combination with 10-amp. push button or tumbler switch, 125 volts.

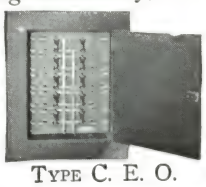
Mains made up with lugs only, fuses, fused or unfused knife switch.



Type P. E. S.

Standard Live Front Panels —*Type C.E.O.*—Branches made up with N.E.C. enclosed fuses only, 125 or 150 volts; plug fuses only, 125 volts. N.E.C. enclosed fuses in combination with D-P, or T-P, 30-amp. spool handle switches, 125 or 150 volts.

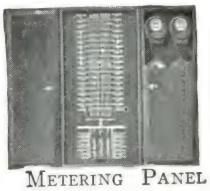
Mains made up with lugs only, fuses, fused or unfused knife switch.



Type C. E. O.

Sprague Metering Panels—Sprague metering panels are applicable when it is desirable to connect any one of a number of circuits to a particular meter, which can be done by merely changing the location of the connectors on the panel.

This enables the building owner to keep a check on current expended and to charge any current used by the tenants, no matter in what part of the building, to the correct meter. This eliminates putting a meter in each room and is a great saving to the building owner.



Metering Panel

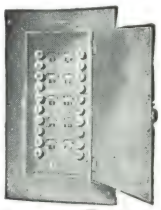
Switchboards and Special Panels

Sprague panelboards and switchboards are not assembled from parts made by other manufacturers. All parts are manufactured in our factories and a large supply stock kept on hand.

Switchboards for any form of service can be built from specification on short notice. Let Sprague furnish the complete distribution system.

Switchboard

A neat, new design, only 10 in. wide, yet possessing all the essential features of the regulation sized panels. It has 20-amp. tumbler type switches, moulded bases and barriers that are practically indestructible, and is of convenient sectional construction. This panel economizes in wall space and price.



Special Panel

AMERICAN STEEL & WIRE COMPANY

Manufacturers of Electrical Wires and Cables

SALES OFFICES

CHICAGO, 208 South La Salle Street
NEW YORK, 30 Church Street
WORCESTER, 94 Grove Street
BOSTON, 185 Franklin Street
PHILADELPHIA, Widener Building
PITTSBURGH, Frick Building
BUFFALO, 337 Washington Street
DETROIT, Foot of First Street
CINCINNATI, Union Trust Building
CLEVELAND, Western Reserve Building
BALTIMORE, 32 South Charles Street
WILKES-BARRE, PA., Miners Bank Building
ST. LOUIS, MO., Liberty Central Trust Co. Building
ST. PAUL-MINNEAPOLIS, Pioneer Building, St. Paul
KANSAS CITY, MO., 417 Grand Avenue
OKLAHOMA CITY, First National Bank Building
BIRMINGHAM, ALA., Brown-Marx Building
DENVER, First National Bank Building
SALT LAKE CITY, Walker Bank Building

EXPORT REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., 30 Church Street, New York
PACIFIC COAST REPRESENTATIVES, UNITED STATES STEEL PRODUCTS CO., San Francisco, Los Angeles, Portland, Seattle

Products

	Page
ELECTRICAL WIRES and CABLES:	
RUBBER COVERED WIRES and CABLES	1820
AMERICORE RUBBER COVERED WIRES and CABLES	1820
AMPARAK RUBBER COVERED WIRES and CABLES	1821
AMERITE RUBBER COVERED SIGNAL WIRES	1821
AMERICORE LAMP and PORTABLE CORD	1822
ANNUNCIATOR and OFFICE WIRE	1823
AMERICORE BREWERY, PACKING HOUSE, and CANVASITE CORD	1823
AMERICORE THEATER or STAGE CABLE	1824
BORDER LIGHT and ELEVATOR LIGHTING and CONTROL CABLES	1824
RUBBER COVERED TELEPHONE WIRE	1824
WEATHERPROOF and SLOW BURNING WIRES and CABLES	1824
FLAT STEEL TAPED PARK or SUBURBAN CABLES	1826
BARE WIRES and CABLES, COPPER, IRON and STEEL	1827

For Wire Rope, see pages 22-25; for Concrete Reinforcement, see pages 27-31; for Triangle Mesh for Stucco Base, see pages 278-279.

Facilities

The company's extensive factory facilities are well equipped with chemical, physical, and electrical laboratories, wherein the problems incident to the solution of every difficulty encountered are handled by thoroughly reliable experts and up-to-date methods. All steel and copper used is rolled and drawn in the mills and is under the company's supervision throughout every operation. All raw materials are tested and inspected before being used, the manufacturing processes are constantly checked, and finally the finished material is subjected to an exhaustive series of tests that determine beyond question whether or not it is of proper quality. With such facilities, this company is enabled to manufacture electrical conductors of all kinds to the severest specifications and to give the users of the product a standard of quality that is unexcelled.

Specifications and Instructions

General specifications for dwelling houses are given on pages 1827-1828; instructions concerning industrial plants, pages 1828-1829.

Rubber Covered Wires and Cables

Used for general interior light and power wiring.

The conductor consists of uniformly soft annealed, commercially pure copper wire, insulated with code thickness of high grade vulcanized rubber protected with closely woven, strong, and elastic cotton braids saturated in waterproof compound.

All conductors are thoroughly and evenly coated with tin to protect the copper from any injurious effect from the sulphur in the rubber insulation.

Grades of Rubber Insulation—Three standard grades of rubber compound are made for rubber covered conductors. In addition, the company insulates wire to any specifications covering particular requirements, such as 20% or 40% rubber compounds.

Americore Rubber Covered Wire—This grade meets all requirements of the National Electric Code. It is recommended for all service conditions in which the working pressure is 7000 volts or under.

Amparak Rubber Covered Wire—This is an "intermediate" grade commonly known as *engineers'* wire. The insulation is of a high grade of compound made to suit the demand of engineers and architects desiring a better wire than Americore but not so high a quality as Amerite. This grade is recommended especially for open wiring (knob and tube system) in dwellings, industrial plants, etc.

Amerite Rubber Covered Wire—This is the highest grade of rubber covered wire. It answers all requirements of the 30% Para rubber grade. It is used for high voltage circuits. It has great strength and elasticity, high insulating qualities, and long life.

Identification—Every wire insulated with the company's standard compounds has a distinguishing woolen tracer thread placed lengthwise of the conductor between the rubber and the braid as follows: Americore, *uncolored* thread; Amparak, *dark green;* Amerite, *crimson.*

Americore Rubber Covered Wires and Cables

This wire is made to comply with the National Electrical Code requirements and every coil is regularly examined and labeled under the supervision of the Underwriters' Laboratories, Inc. A strictly high grade wire for interior light and power wiring.

AMERICORE WIRE
Solid tinned copper conductor

Gauge, B. & S., or cir. mils	Thickness of insulation in in., for					
	0 to 600 volts Type R. S.	600 to 1500 volts Type R. S.-15	1500 to 2500 volts Type R. S.-25	2500 to 3500 volts Type R. S.-35	3500 to 5000 volts Type R. S.-5	5000 to 7000 volts Type R. S.-70
14–8	3/64	6/64	8/64	10/64	12/64	16/64
7–2	4/64	7/64	9/64	10/64	12/64	16/64
1–4/0	5/64	8/64	10/64	10/64	12/54	16/64
225,000 to 500,000	6/64	9/64	10/64	11/64	12/64	16/64
525,000 to 1,000,000	7/64	10/64	10/64	12/64	12/64	16/64
Over 1,000,000	8/64	10/64	10/64	12/64	14/64	18/64

NOTE—Type R. S. as given above signifies single braid rubber covered wire. Double braid or tape and braid would be designated as Type R. D.

Continued on next page

AMERICORE LIGHT INSULATION FIXTURE WIRE

Solid tinned copper conductor, rubber insulation, single braid, black finish

Size, B. & S. gauge	Thickness of rubber, in.	Diameter over braid, in.	List No.	Standard coils, ft.
12	1–64	9–64	....	500
14	1–64	8–64	8004	500
16	1–64	6–64	8006	1000
18	1–64	5–64	8008	1000
19	1–64	5–64	....	1000
20	1–64	5–64	....	1000

AMERICORE TWIN RUBBER COVERED WIRE

AMERICORE TWIN RUBBER COVERED CABLE

AMERICORE TWIN RUBBER COVERED WIRES AND CABLES

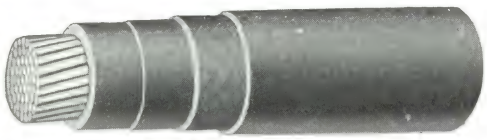
Size, B. & S. gauge	Thickness of rubber, in.	Solid Conductor		Stranded Conductor			Shipped on reel No.
		List No.	Weight per 1000 ft., lbs.	Number of wires	List No.	Weight per 1000 ft., lbs.	
4/0	5–64	917	1653	19	687	1762	1020
3/0	5–64	918	1328	19	688	1444	1013
2/0	5–64	919	1091	19	689	1176	1013
0	5–64	920	896	19	690	966	1013
1	5–64	921	743	19	691	796	1002
2	4–64	922	576	7	692	622	1002
3	4–64	923	479	7	693	513	1002
4	4–64	924	399	7	694	431	335
5	4–64	925	334	7	695	362	335
6	4–64	926	280	7	696	301	335
8	3–64	928	181	7	698	195	1004
10	3–64	930	123	7	700	141	Coils
12	3–64	932	92	7	702	107	Coils
14	3–64	934	71	7	704	83	Coils
16	2–64	936	.....	.....	.....	.....	Coils
18	2–64	938	.....	.....	.....	.....	Coils

Underwriters' rules permit use of above in sizes No. 14 and larger. No. 6 and larger shipped on reels containing 100-ft. lengths; smaller sizes shipped in coils containing 500-ft. lengths.

AMERICORE CABLE, STRANDED TINNED COPPER CONDUCTOR

AMERICORE RUBBER COVERED WIRES AND CABLES

Size, B. & S. gauge	Thickness of rubber, in.	Solid		Stranded			Standard packages, amounts, ft.
		List No.	Weight per 1000 ft., lbs.	Number of wires in strand	List No.	Weight per 1000 ft., lbs.	
Single Braid							
4/0	5–64	810C	784	19	557	832	1000 Reels
3/0	5–64	810B	633	19	558	678	1000 Reels
2/0	5–64	810A	517	19	559	550	1000 Reels
1/0	5–64	810	423	19	560	454	1000 Reels
1	5–64	811	348	19	561	372	1000 Reels
2	4–64	812	268	7	562	289	1000 Reels
3	4–64	813	221	7	563	237	1000 Reels
4	4–64	814	183	7	564	197	1000 Reels
5	4–64	815	152	7	.....	.....	1000 Reels
6	4–64	816	127	7	566	137	1000 Reels
8	3–64	818	80	7	568	86	500 Coils
10	3–64	820	57	7	570	61	500 Coils
12	3–64	822	42	7	572	45	500 Coils
14	3–64	824	32	7	574	34	500 Coils
16	2–64	826	19	.....	.....	.....	500 Coils
18	2–64	828	15	.....	.....	.....	500 Coils
Double Braid							
4/0	5–64	850C	820	19	867	871	1000 Reels
3/0	5–64	850B	666	19	868A	715	1000 Reels
2/0	5–64	850A	547	19	869	583	1000 Reels
1/0	5–64	850	450	19	870	485	1000 Reels
1	5–64	851	374	19	871	400	1000 Reels
2	4–64	852	291	7	872	314	1000 Reels
3	4–64	853	242	7	873	260	1000 Reels
4	4–64	854	201	7	874	218	1000 Reels
5	4–64	855	169	7	.....	.....	1000 Reels
6	4–64	856	144	7	876	155	1000 Reels
8	3–64	858	94	7	878	101	500 Coils
10	3–64	860	69	7	880	74	500 Coils
12	3–64	862	53	7	882	57	500 Coils
14	3–64	864	42.2	7	884	44.8	500 Coils
16	2–64	866	25	.....	.....	.....	500 Coils
18	2–64	868	20	.....	.....	.....	500 Coils



AMERICORE FEEDER CABLE

Capacity in cir. mils	Number and diameter of wires in strand, in.	Thickness of rubber, in.	Diameter over tape and braid, in.	List No. single braid	Weight per 1000 ft., lbs.	Shipped on reel No.
250,000	37 x .0822	3–32	56–64	340	1018	1013
300,000	37 x .0901	3–32	59–64	341	1194	1013
350,000	37 x .0973	3–32	62–64	342	1368	1013
400,000	37 x .1040	3–32	65–64	343	1541	1013
450,000	37 x .1103	3–32	68–64	344	1714	1020
500,000	37 x .1162	3–32	72–64	345	1894	1020
600,000	61 x .0992	7–64	79–64	346	2282	1020
750,000	61 x .1109	7–64	86–64	347	2795	1020
1,000,000	61 x .1280	7–64	96–64	348	3640	1021
1,250,000	91 x .1172	8–64	107–64	348A	4534	1021
1,500,000	91 x .1284	8–64	115–64	349	5406	1015
2,000,000	127 x .1255	8–64	129–64	349 A	7062	.....

Shipped in reels containing 1000 ft. lengths.

AMERICORE RUBBER COVERED SWITCHBOARD CABLE

National Electrical Code Standard; low potential, 0-600 volts; Class A

Size, B. & S. gauge	Number of wires in strand	Thickness of rubber, in.	Diameter over single braid, in.	Diameter over double braid, in.	List No.		Weight per 1000 ft.		Standard packages, amounts, ft.
					Single braid	Double braid	Single braid	Double braid	
1	259	5–64	37–64	40–64	221	271	376	406	1000
2	210	4–64	33–64	36–64	222	272	302	329	1000
3	151	4–64	30–64	33–64	223	273	231	255	1000
4	133	4–64	27–64	30–64	224	274	210	231	1000
5	82	4–64	23–64	26–64	226	276	144	163	1000
6	49	4–64	23–64	26–64	226	276	145	164	1000
8	49	3–64	19–64	22–64	228	278	87	101	500
9	40	3–64	18–64	21–64	229	279	73	87	500
10	19	3–64	17–64	20–64	230	280	61	74	500
12	19	3–64	15–64	18–64	232	282	45	57	500
14	19	3–64	14–64	17–64	234	284	34	45	500

Amparak Rubber Covered Wires and Cables

Made in sizes and styles as above described for Americore covering.

Amerite Rubber Covered Signal Wires

These rubber covered wires and cables are made to meet the rigid specifications of the Railway Signal Association. Insulation contains only highest grade of pure dry Para rubber and other necessary preservative ingredients. Exact composition of the rubber compound used and thickness of the rubber insulation is in every case determined by working voltage and by nature of service. Furnished in any size and finish and for all services and voltages.

AMERITE RUBBER COVERED SIGNAL WIRES

30% Fine Para Rubber Compounded

Size, cir. mils or A. W. gauge (B. & S.)	Thickness of insulation, in.									
	3–64	2–32	5–64	3–32	7–64	4–32	5–32	6–32	7–32	8–32
Megohms per Mile After a One-minute Electrification at 60° Fahr.										
1,000,000	.....	.....	.....	.....	650	725	900	1025	1150	1350
900,000	.....	.....	.....	.....	675	750	925	1100	1250	1400
800,000	.....	.....	.....	.....	700	800	950	1150	1300	1450
700,000	.....	.....	.....	.....	750	850	1000	1200	1400	1550
600,000	.....	.....	.....	.....	800	900	1100	1300	1450	1650
500,000	.....	.....	.....	750	850	950	1150	1400	1550	1700
400,000	.....	.....	.....	850	950	1100	1300	1500	1700	1850
300,000	.....	.....	.....	950	1100	1200	1400	1700	1900	2150
250,000	.....	.....	.....	1000	1150	1300	1550	1800	2050	2250
4/0	.....	.....	1000	1200	1300	1450	1750	2000	2250	2600
3/0	.....	.....	1050	1300	1450	1600	1850	2250	2500	2800
2/0	.....	.....	1200	1450	1600	1750	2100	2350	2700	3050
1/0	.....	.....	1300	1550	1750	1950	2250	2600	2950	3250

Continued on next page

AMERITE RUBBER COVERED SIGNAL WIRES (CONTINUED)
30% Fine Para Rubber Compounded

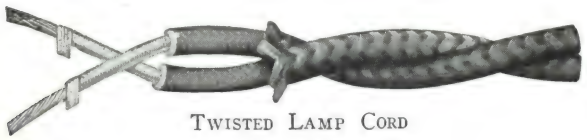
Size, cir: mils or A. W. gage (B. & S.)	Thickness of insulation, in.									
	3–64	2–32	5–64	3–32	7–64	4–32	5–32	6–32	7–32	8–32
MEGOHMS PER MILE AFTER A ONE-MINUTE ELECTRIFICATION AT 60° FAHR., SOLID WIRE										
1	....	....	1600	1850	2100	2350	2750	3100	3500	3825
2	....	1500	1750	2000	2300	2550	3000	3350	3750	4150
3	....	1600	1850	2250	2500	2750	3250	3700	4050	4500
4	....	1750	2100	2500	2750	3000	3500	3950	4360	4700
5	....	1950	2300	2700	3000	3250	3750	4250	4600	5050
6	....	2100	2500	2850	3250	3500	4050	4500	4950	5400
8	1800	2500	3000	3350	3750	4100	4700	5200	5600	5950
9	2000	2750	3250	3600	4050	4350	5000	5500	6000	6400
10	2400	3000	3500	3900	4350	4700	5300	5850	6300	6800
12	2700	3500	4000	4500	4950	5300	6000	6550	7000	7550
14	3000	4050	4600	5100	5600	6000	6750	7300	7800	8300
MEGOHMS PER 1000 FT. AFTER A ONE-MINUTE ELECTRIFICATION AT 60° FAHR., STANDARD WIRE										
1,000,000	....	....	....	....	3430	3830	4750	5420	6080	7140
900,000	....	....	....	....	3560	3960	4880	5810	6600	7400
800,000	....	....	....	....	3700	4230	5020	6070	6870	7650
700,000	....	....	....	....	3960	4480	5280	6350	7400	8200
600,000	....	....	....	....	4230	4750	5810	6870	7650	8720
500,000	....	....	....	3960	4480	5020	6070	7400	8200	9000
400,000	....	....	....	4480	5020	5810	6870	7920	9000	9770
300,000	....	....	....	5020	5810	6350	7400	9000	10000	11350
250,000	....	....	....	5280	6070	6870	8200	9500	10800	11900
4/0	....	....	5280	6350	6870	7650	9250	10550	11900	13750
3/0	....	....	5550	6870	7650	8450	9770	11900	13200	14800
2/0	....	....	6350	7650	8450	9250	11100	12400	14250	16100
1/0	....	....	6870	8200	9250	10300	11900	13750	15600	17200
MEGOHMS PER 1000 FT. AFTER A ONE-MINUTE ELECTRIFICATION AT 60° FAHR., SOLID WIRE										
1	....	....	8450	9770	11100	12400	14520	16400	18500	20200
2	....	7920	9250	10550	12150	13500	15900	17700	19800	21900
3	....	8450	9770	11900	13200	14520	17200	19600	21400	23800
4	....	9250	11100	13200	14520	15900	18500	20805	22700	24800
5	....	10300	12150	14250	15900	17200	19800	22450	24300	26700
6	....	11100	13200	15050	17200	18500	21400	23800	26150	28500
8	9500	13200	15900	17700	19800	21650	24800	27500	29600	31450
9	10560	14520	17200	19000	21400	23000	26400	29050	31700	33800
10	12700	15900	18500	20600	23000	24800	28000	30900	33300	35900
12	14250	18500	21100	23800	26150	28000	31700	34600	37000	39900
14	15900	21400	24300	27000	29600	31700	35650	38600	41200	43800
VOLTAGE TESTS FOR A FIVE-MINUTE PERIOD										
14 to 2	3000	4500	6000	7500	9000	10500	13500	16300	19200	22100
1 and larger	....	....	3800	5200	6800	8250	11250	14250	17250	20250

Americore Lamp and Portable Cord

The term "cord" applies to any small and very flexible cable consisting of at least two conductors substantially insulated to withstand wear. Single conductor material is classified as flexible fixture wire.

Lamp cord is used in short lengths for exposed wiring in offices and residences to connect the concealed wiring with droplights, brackets and portables. It is also used for bell and annunciator wiring, and for other purposes where a short, flexible connecting conductor having an ornamental covering would be desirable.

The conductor consists of a number of small, untinned annealed copper wires, each No. 30 American Wire gauge (B.&S.), twisted into a cable of the required carrying capacity. The conductor is then covered with a tight, close wind of fine cotton, after which it is insulated with seamless rubber and then covered with an ornamental braid of silk or cotton. Two of the finished conductors are then twisted about each other, or in some cases they are laid parallel and braided overall with silk or cotton, in each case forming the two branches of a circuit.



TWISTED LAMP CORD

Reinforced portable cord consists of two lamp-cord conductors twisted together and covered with an additional layer of rubber and one or more braids of cotton or silk over all.

A combination of green and yellow is the color usually furnished for cotton covered lamp cords; portable cords generally furnished with black cotton braid. Other colors to order.

These cords also furnished to order in standard colors with cover of silk either natural or artificial.

Lamp cord is usually put up in coils of 250 ft. each. Coils will be packed in specially prepared paper cartons, upon request.

Portable cord is usually put up in coils of 500 ft. each.

Types—The following is an extract from the National Board of Underwriters' specifications dated 1920, and covers this company's Americore (new code) lamp cord and portable cord:

These flexible cords and cables consist of copper wires having rubber insulation and protective coverings. They are intended for pendant or portable use where not subjected to temperature greater than 120° Fahr., and where the difference in potential does not exceed 300 volts; except that flexible cords of No. 14 B. & S. gauge and larger, with $\frac{3}{64}$-in. or greater insulation thickness, may be used for voltages up to 600.

Lamp Cord, Type C—For pendant or portable use. Hanging free in air, in dry places and not subject to hard usage. Construction: Twisted pair, with glazed cotton or silk braid on each conductor. No outer covering. Insulation not less than $\frac{1}{32}$ in. for No. 18 and No. 16 B. & S. Gauge; for larger sizes, same as for rubber covered wire.

Reinforced Cord, Type P—For pendant or portable use in dry places only, and where subject to hard usage. Construction: Twisted pair, with glazed or plain cotton or silk braid on each conductor; rubber jacket not less than $\frac{1}{64}$ in. thick around twisted pair; outer covering of glazed cotton or silk. Insulation not less than $\frac{1}{32}$ in. for No. 18 and No. 16 B. & S. gauge; for larger sizes same as for rubber covered wire.

Reinforced Portable, Type PWP—Same as Type P except must be furnished with a saturated braid; for use in damp places.

PORTABLE CORD

Parallel Cord, Type PO—For portable or pendant use in offices, dwellings and similar dry places where not likely to be subjected to rough usage and where appearance is an essential feature. Construction: Parallel wires, with glazed or plain cotton braid on each conductor; glazed cotton or silk outer covering around parallel wires. Insulation not less than $\frac{1}{32}$ in. for No. 18 and No. 16 B. & S. gauge; for larger sizes, same as for rubber covered wire.

Twisted Portable, Type PD—For pendant or portable use in offices, dwellings or similar dry places where not likely to be subjected to rough usage and where appearance is essential. Construction: Twisted pair, with glazed or plain cotton braid on each conductor; outer covering of glazed cotton or silk . Insulation not less than $\frac{1}{32}$ in. for No. 18 and No. 16 B. & S. gauge; for larger sizes, same as for rubber covered wire.

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PORTABLE LAMP CORD

AMERICORE LAMP CORD, TYPES C AND P O

Size, AW. gage B. & S.	Number of wires	Rubber, in.	Twisted Pair (Type C) Cotton covered List No.	Twisted Pair (Type C) Cotton covered Weight per 1000 ft., lbs.*	Twisted Pair (Type C) Silk covered List No.	Twisted Pair (Type C) Silk covered Weight per 1000 ft., lbs.	Duplex Parallel (Type P.O.) Cotton covered List No.	Duplex Parallel (Type P.O.) Cotton covered Weight per 1000 ft., lbs.	Duplex Parallel (Type P.O.) Silk covered List No.	Duplex Parallel (Type P.O.) Silk covered Weight per 1000 ft., lbs.
10	104	3–64	1100	122.00	1120	116.71	1400	120.0	1420	117.0
12	65	3–64	1102	89.36	1122	84.77	1402	88.99	1422	86.1
14	41	3–64	1104	65.49	1124	61.53	1404	66.1	1424	63.6
16	26	1–32	1106	37.70	1126	34.61	1406	38.7	1426	36.8
18	16	1–32	1108	29.33	1128	26.47	1408	30.2	1428	28.5
20	10	1–32	1110	23.44	1130	20.83	1410	24.5	1430	22.9
22	6	1–32	1112	20.15	1132	17.50	1412	20.9	1432	19.3

REINFORCED PORTABLE CORD, TYPES P AND P W P

Size, A.W. guage B. & S.	Number of wires	Rubber, in.	Type P. Dry Cotton Braid List No.	Type P. Dry Cotton Braid Weight per 1000 ft., lbs.	Type P. Silk Braid List No.	Type P. Silk Braid Weight per 1000 ft., lbs.	Type P W P Saturated Braid List No.	Type P W P Saturated Braid Weight per 1000 ft., lbs.
10	104	3–64x1–64	....	214.7	....	204.0	....	222.4
12	65	3–64x1–64	1162	169.2	1172	159.8	1182	175.6
14	41	3–64x1–64	1164	131.2	1174	125.9	1184	135.9
16	26	1–32x1–64	1166	77.9	1176	73.9	1186	81.4
18	16	1–32x1–64	1168	67.4	1178	62.7	1188	69.9
20	10	1–32x1–64	1170	58.2	1180	53.3	1190	59.8
22	6	1–32x1–64	....	53.2	....	48.5	....	54.3

Amcord Woven Braid

This is a braided weave in which fillers are woven diagonally about a warp placed lengthwise of the conductor. It is usually made of hard twisted cotton cord saturated with a weatherproof compound. It is very flexible and possesses extreme durability under hard service conditions. It can be furnished on any size cable and is especially adapted for portable cords and mining machine cable.

Tubular Weave Loom

This is a loom weave, similar to that on fire hose, made up of hard twisted cotton saturated with a weatherproof compound. It is very durable and offers an excellent protection to the insulation for portable cords.

Annunciator and Office Wire

Annunciator Wire—Commercially pure, soft copper wire from No. 14 to No. 22 B. & S. is used. This is insulated with two wraps of cotton saturated with specially prepared paraffin wax compound.

The outside wrap is made of any color or combination of colors, the most common being bright and fast red or blue with white. Put up in spools weighing about 7 lbs. net.

ANNUNCIATOR WIRE

Size, B. & S. gauge	List No.	Length in 1 lb., ft.	Size, B. & S. gauge	List No.	Length in 1 lb., ft.
14	3114	67	20	3120	221
16	3116	101	22	3122	311
18	3118	155			

Can also be furnished in "dampproof."

Office Wire—Standard grade consists of copper conductor from No. 14 to No. 20 B. & S., insulated with one wind and one braid of cotton, both applied tight and even and saturated with special paraffin wax compound. The outer braid is given high polish and is made in any color, or combination of colors, specified. Standard colors are red and white or blue and white. The wire is put up in coils of about 20 lbs.

Used largely by telephone and telegraph companies for inside wiring, extending from the instruments to the junction where they connect with outside wires and cables as they enter building.

Also used as high grade bell and annunciator wire.

OFFICE WIRE

Size, B. & S. gauge	List No.	Length in 1 lb., ft.	Size, B. & S. gauge	List No.	Length in 1 lb., ft.
14	3314	56	18	3318	115
16	3316	80	20	3320	154

Can also be furnished in "dampproof."

Americore Brewery, Packing House and Canvasite Cords

Brewery Cord (Type C. B., Class A)—Each conductor is lamp cord strand, cotton wound, insulated with Americore rubber and covered with a weatherproof braid; two such conductors twisted together (no braid over all).

BREWERY CORD

List No.	Construction of conductor	Thickness of rubber insulation, in.	Size, B. & S. gauge,	Weight per 1000 ft., lbs.
8930L	104–30 B. & S. wires	3–64	10	120
8932L	65–30 " "	3–64	12	89
8934L	41–30 " "	3–64	14	68
8936L	26–30 " "	1–32	16	39
8938L	16–30 " "	1–32	18	30
8940L	10–30 " "	1–32	20	23

Canvasite Cord (Type C. C.)—Each conductor is lamp cord strand, cotton wound, insulated with Americore rubber and covered with a weatherproof braid; two such conductors twisted together with one weatherproof braid over all.

This is the same as brewery cord except that there is a weatherproof braid over both conductors.

CANVASITE CORD

List No.	Construction of conductor	Thickness of rubber insulation, in.	Equal in capacity to	Weight per 1000 ft., lbs.
8910	104–30 B. & S. wires	3–64	10 B. & S.	140
8912	65–30 " "	3–64	12 "	105
8914	41–30 " "	3–64	14 "	85
8916	26–30 " "	1–32	16 "	48
8918	16–30 " "	1–32	18 "	39
8920	10–30 " "	1–32	20 "	32
8222	6–30 " "	1–32	22 "	29

Continued on next page

Packing House Cord (Type P. K. W. P.)—Each conductor is lamp cord strand, cotton wound, insulated with Americore rubber and covered with a dry braid; 2 such conductors twisted together, jute filled, and covered with 2 weatherproof braids.

PACKING HOUSE CORD

List No.	Construction of conductor	Thickness of rubber insulation, in.	Size, B. & S. gauge	Weight per 1000 ft., lbs.
8950L	104–30 B. & S. wires	3–64	10	142
8952L	65–30 " "	3–64	12	107
8954L	41–30 " "	3–64	14	84
8956L	26–30 " "	1–32	16	52
8958L	16–30 " "	1–32	18	41
8960L	10–30 " "	1–32	20	33

Americore Theater or Stage Cable

Sizes No. 10 to No. 16, Type T—Each conductor regular lamp cord strand, cotton wrapped, insulated with code thickness of rubber and covered with single weatherproof braid; two or three such conductors twisted together with jute fillers and covered with two weatherproof braids.

THEATER OR STAGE CABLE

Sizes No. 2 to No. 8—Same as above, except have standard rubber covered tinned copper concentric strand and are not covered by type T.

THEATER OR STAGE CABLE

Size, B. & S. gauge	Number of wires in strand	Thickness of rubber insulation, in.	List No.	Weight per 1000 ft., lbs.
2	210	4–64	8972	...
3	151	4–64	8973	...
4	133	4–64	8974	654
6	49	4–64	8976	468
8	49	3–64	8978	286
10	104	3–64	8980L	196
12	65	3–64	8982L	153
14	41	3–64	8984L	118
16	26	3–64	8986L	70

Border Light and Elevator Lighting and Control Cables

Furnished to National Code specifications.

Rubber Covered Copper Telephone Wire

No. 14 B. & S. TWISTED PAIR "OUTSIDE DISTRIBUTION WIRE"

No. 18 B. & S. TWISTED PAIR "BRIDLE WIRE"

No. 19 B. & S. SINGLE CONDUCTOR TWISTED PAIR, AND TRIPLE CONDUCTOR "INSIDE" OR "SUBSTATION" WIRE

"POT HEAD" WIRE, PLAIN TELEPHONE CONDUCTOR

Weatherproof and Slow Burning Wires and Cables

These have moderate degree of insulation and are less expensive than rubber insulated conductors. Double and triple braid. Reliance weatherproof wire meets every requirement for outdoor service, while Reliance slow burning wire is superior for indoor uses.

Wires and cables are made in strict accordance with all requirements of the National Board of Fire Underwriters, sizes varying from No. 20 B. & S. to the largest feeder cables used. Sizes No. 4/0 B. & S. and smaller are usually made of solid wires, while larger sizes have stranded conductors.

Unless hard drawn copper be specified, wires of purest grade of annealed copper, uniform in softness and having minimum conductivity of 98% Matthiessen's standard, will be used.

Reliance Weatherproof Insulation—For use outdoors where moisture is certain and where fireproof qualities are not necessary; also where, on account of small separation, bare wires would be liable to swing into contact with each other or with other low tension cables.

The wires are first covered by two or three closely and evenly woven braids of strong fibrous material, which is then completely saturated with weatherproof insulating compound. After drying thoroughly, the wire receives dressing of mineral wax, when the surface is thoroughly burnished and polished, reducing to a minimum trouble from sleet and ice.

The insulation will withstand all ordinary climatic conditions.

RELIANCE WEATHERPROOF WIRE

Solid copper wire, double braid, black finish
National Electrical Code Wire

Size, B. & S. gauge	Diameter, in., bare wire	Area, cir. mils	List No.	Weights Lbs. per 1000 ft.	Weights Lbs. per mile	Standard packages, amounts, ft.	Shipped on reel No.
4/0	.4600	211600	2040	723	3817	2400	315
3/0	.4096	167772	2030	587	3098	2500	315
2/0	.3648	133079	2020	467	2467	3200	315
0	.3250	105625	2000	377	1989	4300	315
1	.2893	83694	2001	294	1553	1000	302
2	.2576	66358	2002	239	1264	1300	302
3	.2294	52624	2003	185	977	1600	302
4	.2043	41738	2004	151	795	2100	302
5	.1819	33088	2005	122	646	2500	322
6	.1620	26244	2006	100	529	3400	322
8	.1285	16512	2008	66	349	5000	322
9	.1144	13087	2009	54	283	6000	322
10	.1019	10384	2010	46	241	35 to 50	Coils
12	.0808	6528.6	2012	30	158	25 to 40	Coils
14	0641	4108.8	2014	20	107	25 to 40	Coils
16	.0508	2580.6	2016	16	83	20 to 30	Coils
	0403	1624.1	2018	12	64	20 to 30	Coils

RELIANCE WEATHERPROOF WIRE

Solid copper wire, triple braid, black finish
National Electrical Code Wire

Continued on next page

RELIANCE WEATHERPROOF WIRE
Solid copper wire, triple braid, black finish
National Electrical Code Wire

Size, B. & S. gauge	Minimum thickness of insulation, in.	List No.	Weights		Standard packages, amounts, ft.	Shipped on reel No.
			Lbs. per 1000 ft.	Lbs. per mile		
4/0	.0781	2140	767	4050	2400	315
3/0	.0781	2130	629	3320	2500	315
2/0	.0781	2120	502	2650	3200	315
0	.0781	2100	407	2150	4300	315
1	.0781	2101	316	1670	1000	302
2	.0625	2102	260	1370	1300	302
3	.0625	2103	199	1050	1600	302
4	.0625	2104	164	865	2100	302
5	.0625	2105	135	710	2500	322
6	.0625	2106	112	590	3400	322
8	.0469	2108	75	395	5000	322
9	.0469	2109	62	325	6000	322
10	.0469	2110	53	280	35 to 50	Coils
12	.0469	2112	35	185	25 to 40	Coils
14	.0469	2114	25	130	25 to 40	Coils
16	.0469	2116	20	105	20 to 30	Coils
18	.0469	2118	16	85	20 to 30	Coils

RELIANCE WEATHERPROOF CABLE
Stranded copper conductors, double braid, black finish
National Electrical Code Wire

Size	No. and diam. of wires in strand, in.	Diam. bare strand, in.	List number	Weights	
				Lbs. per 1000 ft.	Lbs. per mile
2,000,000	91 x .1482	1.6302	2250	6690	35323
1,750,000	91 x .1386	1.5246	2251	5894	31119
1,500,000	91 x .1284	1.4124	2252	5098	26915
1,250,000	91 x .1172	1.2892	2253	4264	22516
1,000,000	61 x .1280	1.1520	2254	3456	18246
900,000	61 x .1215	1.0935	2257	3137	16513
800,000	61 x .1145	1.0305	2259	2799	14779
750,000	61 x .1109	.9981	2260	2635	13913
700,000	61 x .1071	.9639	2261	2471	13046
600,000	61 x .0992	.8928	2263	2093	11052
500,000	37 x .1162	.8134	2265	1765	9318
450,000	37 x .1103	.7721	2267	1601	8452
400,000	37 x .1040	.7280	2268	1436	7584
350,000	37 x .0973	.6811	2269	1248	6589
300,000	19 x .1257	.6285	2270	1083	5721
250,000	19 x .1147	.5735	2271	907	4788
4/0	19 x .1055	.5275	2240	745	3935
3/0	19 x .0940	.4700	2230	604	3190
2/0	7 x .1378	.4134	2220	482	2544
0	7 x .1228	.3684	2200	388	2051
1	7 x .1093	.3279	2201	303	1599
2	7 x .0973	.2919	2202	246	1301
3	7 x .0867	.2601	2203	190	1004
4	7 x .0772	.2316	2204	155	820
5	7 x .0687	.2061	2205	126	668
6	7 x .0612	.1836	2206	103	544
8	7 x .0485	.1455	2208	68	359

SOLID COPPER WEATHERPROOF COILS

Size, B. & S. gauge	Weights per coil, lbs.		Outside diameter of coil, in.	Diameter of eye of coil, in.	Thickness of coil, in.	Covering of coil	How shipped
	2 braids	3 braids					
4/0	360	383	30 to 34	19	7½	Paper and burlap	Loose coils
3/0	352	377	30 to 34	19	7½		
2/0	326	350	30 to 34	19	7½		
0	301	325	30 to 34	19	7½		
1	294	316	30 to 34	19	7½		
2	310	338	30 to 34	19	7½		
3	305	330	30 to 34	19	7½		
4	317	344	30 to 34	19	7½		
5	317	350	30 to 34	19	7½		
6	320	180	30 to 34	19	6		
8	171	195	30 to 34	19	6		
10	50	50	18 to 20	12	5	Paper	Coils packed in barrels
12	40	40	18 to 20	12	5		
14	40	40	18 to 20	12	5		
16	30	30	18 to 20	12	5		
18	30	30	18 to 20	12	5		

RELIANCE WEATHERPROOF CABLE
Stranded copper conductors, triple braid, black finish
National Electrical Code Wire

RELIANCE WEATHERPROOF CABLE
Stranded copper conductors, triple braid, black finish
National Electrical Code Wire

Size	Minimum thickness of insulation, in.	List No.	Weights		Standard packages, amounts, ft.	Shipped on reel No.
			Lbs. per 1000 ft.	Lbs. per mile		
2,000,000	.1250	2350	7008	37000	600	324
1,750,000	.1250	2351	6193	32700	700	324
1,500,000	.1250	2352	5380	28400	850	324
1,250,000	.1250	2353	4508	23800	1000	324
1,000,000	.1250	2354	3674	19400	1320	324
900,000	.1094	2357	3332	17600	1320	324
800,000	.1094	2359	2992	15800	1320	324
750,000	.1094	2360	2822	14900	1320	333
700,000	.1094	2361	2650	14000	1320	333
600,000	.1094	2363	2235	11800	1320	333
500,000	.1094	2365	1894	10000	1320	333
450,000	.0938	2367	1724	9100	1320	333
400,000	.0938	2368	1553	8200	1320	333
350,000	.0938	2369	1345	7100	2640	333
300,000	.0938	2370	1174	6200	2640	333
250,000	.0938	2371	985	5200	2640	333
4/0	.0781	2340	800	4220	2000	315
3/0	.0781	2330	653	3450	2000	315
2/0	.0781	2320	522	2760	2640	315
0	.0781	2300	424	2240	2640	315
1	.0781	2301	328	1735	1000	302
2	.0625	2302	270	1425	1300	302
3	.0625	2303	206	1090	1600	302
4	.0625	2304	170	900	2100	302
5	.0625	2305	140	740	3000	322
6	.0625	2306	115	610	3400	322
8	.0469	2308	78	410	4000	322

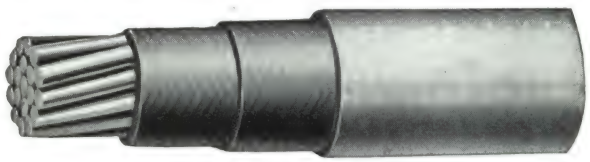
RELIANCE WEATHERPROOF IRON WIRE, DOUBLE BRAID

RELIANCE WEATHERPROOF IRON WIRE, TRIPLE BRAID

For fire alarm, telephone, telegraph and burglar alarm construction where danger of short circuits with other wires or trees exists

Reliance Slow Burning Wires and Cables—Have insulation that will not carry flame. Especially useful in hot, dry places, and where wires are brought together, as on the back of a large switchboard or in a wire tower. Each insulating braid completely saturated with white, slow burning compound, and outside thoroughly slicked down and given a hard, smooth, white surface.

RELIANCE SLOW BURNING WIRE, NATIONAL CODE STANDARD
Solid conductor, triple braid, white finish



RELIANCE SLOW BURNING CABLE
Stranded copper conductor, triple braid, white finish

Special Weatherproof and Slow Burning Wires—A combined insulation of black weatherproof and white, slow burning coverings is often required. The wires may have a single coating of each kind, or 3 coatings, 2 of slow burning and 1 of weatherproof, or conversely. When weatherproof covering is inside, the conductor is known as "white finish weatherproof"; and when flameproof covering is inside, it is called "black finish slow

Continued on next page

burning." Outside surfaces are finished smooth and hard. The white finish weatherproof wire only is approved by National Electric Code.

Any of these weatherproof or slow burning wires furnished twisted into pairs, or formed into cables having any number of conductors, the conductors so formed being incased in 1 or more finished braids or with tape.

RELIANCE SLOW BURNING WIRE, NATIONAL CODE STANDARD

Solid conductor, triple braid, white finish

*Size B. & S. gauge	Stranded			Solid			Standard packages, amounts, ft.	Shipped on reel No.
	List No.	Weights		List No.	Weights			
		Lbs. per 1000 ft.	Lbs. per mile		Lbs. per 1000 ft.	Lbs. per mile		
2000000	2400A	7540	39800	.....	.....	.....	600	...
1750000	2401A	6700	35400	.....	.....	.....	700	...
1500000	2402A	5830	30800	.....	.....	.....	850	...
1250000	2403A	4940	26100	.....	.....	.....	1000	...
1000000	2404A	3980	21000	.....	.....	.....	1320	324
900000	2406A	3640	19200	.....	.....	.....	1320	324
800000	2408A	3280	17300	.....	.....	.....	1320	324
700000	2410A	2920	15400	.....	.....	.....	1320	333
600000	2412A	2460	13000	.....	.....	.....	1320	333
500000	2414A	2080	11000	.....	.....	.....	1320	333
450000	2415A	1900	10000	.....	.....	.....	1320	333
400000	2416A	1700	9000	.....	.....	.....	1320	333
350000	2417A	1500	7900	.....	.....	.....	2640	333
300000	2418A	1310	6900	.....	.....	.....	2640	333
250000	2419A	1120	5900	.....	.....	.....	2640	333
4/0	2640	960	5070	2440	925	4890	2000	315
3/0	2630	785	4150	2430	760	4020	2000	315
2/0	2620	625	3300	2420	600	3170	2640	315
0	2600	510	2700	2400	495	2610	2640	315
1	2601	380	2000	2401	365	1930	1000	302
2	2602	335	1770	2402	320	1690	1300	302
3	2603	280	1480	2403	270	1425	1600	302
4	2604	230	1220	2404	220	1160	2100	302
5	2605	195	1030	2405	190	1000	2500	322
6	2606	165	870	2406	160	845	3400	322
8	2608	105	555	2408	100	530	40–60 lbs.	Coils
10	.....	.....	.....	2410	80	420	35–50 lbs.	Coils
12	.....	.....	.....	2412	55	290	25–50 lbs.	Coils
14	.....	.....	.....	2414	40	210	25–40 lbs.	Coils
16	.....	.....	.....	2416	30	160	25–40 lbs.	Coils
18	.....	.....	.....	2418	24	130	20–30 lbs.	Coils

*Size and number of wires in strands same as in weatherproof cables

Flat Steel Taped Park or Suburban Cables (Rubber, Cambric, or Paper Insulated)

This type of cable is becoming standard for lighting purposes in parks and boulevards, suburban ornamental lighting, private estates, service laterals and pole connections, and in places where installation is difficult or impossible owing to the absence of ducts. It is installed by being laid in trenches 15 to 30 in. deep (depending on locations), and sufficient in width to permit cables being laid at this depth. This style of cable is not only economical and easy to install, but really makes a safe and reliable substitute for the more expensive conduit system.

Single Conductor

Twin Conductor

Three Conductors

FLAT STEEL TAPED PARK OR SUBURBAN CABLES

Rubber, cambric, or paper insulated

Steel taped cables carry their own protection. Being lead covered, they are waterproof. A serving of saturated jute is placed over the lead covering and 2 steel tapes of suitable width are laid spirally in the same direction with an additional serving of saturated 2-ply jute on the outside. This cable is then drawn through a bath of hot preservative compound and compressed, giving it a smooth and hard finish.

The jute and steel armoring protects the cable against mechanical injury and thus permits of its being laid in the trenches, which are afterwards filled with sand and gravel. However, it is desirable to give such cables an additional protection by putting a layer of sand beneath and over the cable as it is laid in the trench, tamping the sand lightly around the cable, and putting in place a covering of brick or plank before the trench is filled up with gravel. Such extra precaution protects the cable from damage from picks, etc., in case of future excavations.

These cables are usually shipped from the factory in long lengths on reels which, when received at destination, are mounted on a shaft with 2 wheels or on a truck alongside of the trench and, as the reel is being pulled forward, the cable is unwound and laid into the open trench, thus avoiding the necessity of making many joints. Where joints are required, the same method is followed as in all other lead covered cables and, in addition to this, a split cast iron joint box (straightway or branch; details covering joining material on application) is put over the lead sleeve and protects it against injury.

Cables of this kind can be constructed with any desired number or size of conductors. Each conductor is insulated with a suitable thickness of rubber, cambric, or paper, to meet any standard commercial working voltage.

The standard requirements for single-conductor are in size No. 8 B. & S. gauge up to 1,000,000 circular mils. Twin-conductor in sizes from No. 8 B. & S. gauge up to 500,000 circular mils. Three-conductor in sizes from No. 8 B. & S. gauge up to 4/0 B. & S. gauge.

If the number of joints and other details are stated, a sufficient amount of joining material—such as tinned copper jointing sleeves, insulation, filling compound and cast iron joint boxes of proper dimensions, can be furnished.

For low working potentials, the practice of using lead sleeves, solder-wiped, can be eliminated, as the joint can be made within the split cast iron joint box, which after the completion of the joint, is filled with hot insulating compound and, after cooling, makes the joint absolutely waterproof.

All this company's steel taped cables are subjected to a factory test equal to two and one-half times the working voltage, also high insulation resistance guaranteed.

STANDARD SHIPPING LENGTHS OF CABLES

Outside diameter, in.	Length, ft.	Outside diameter, in.	Length, ft.
.75	2000	1.75	1000
1.00	1750	2.00	800
1.25	1500	2.25 and over	700
1.50	1200		

It is possible to manufacture these cables in longer lengths, but for the convenience of handling, customer will find the above lengths most desirable.

Continued on next page

A large variety of electric light and power cables are made; so many different sizes, and with so many different thicknesses of insulation, and finished in so many different ways, that it would be impracticable to tabulate them all. This class of the product is making an enviable record and is well and favorably known in all parts of the country. Inquiries containing full information are solicited. If desired, this company can furnish competent men to make installations at a reasonable charge.

Bare Wires and Cables—Copper, Iron and Steel

Copper wire for all purposes in any required shape or size; for telephone and telegraph, high voltage long distance transmission, and industrial purposes in general. Copper cables of all capacities and degrees of flexibility, hard drawn or annealed, bare or insulated.

HARD DRAWN COPPER TELEGRAPH AND TELEPHONE WIRE

Size, B. & S. gauge	Diameter, in.	Weight per mile in lbs.	Size, B. & S. gauge	Diameter, in.	Weight per mile in lbs.
8	.1285	264	12	.0808	104
9	.1144	209	14	.0641	66
10	.1019	166			

PROPERTIES OF HARD DRAWN COPPER WIRE
(Adopted by the A. S. T. M.)

Size, B. & S.	Diameter in.	Area, cir. mils	Tensile strength, lbs. per sq. in.	Per cent elongation in 10 in.	Size, B. & S.	Diameter in.	Area, cir. mils	Tensile strength, lbs. per sq. in.	Per cent elongation in 10 in.
0000	0.460	211,600	49,000	3.75	8	0.128	16,380	63,400	1.4
000	0.410	168,100	51,000	3.20	9	0.114	12,996	64,200	1.3
00	0.365	133,200	52,800	2.70	10	0.102	10,404	64,800	1.2
0	0.325	105,600	54,500	2.4	11	0.091	8,281	65,400	1.1
1	0.289	83,520	56,000	2.1	12	0.081	6,561	65,700	1.0
2	0.258	66,560	57,500	2.0	13	0.072	5,184	66,000	0.9
3	0.229	52,440	58,500	1.9	14	0.064	4,096	66,200	0.9
4	0.204	41,620	59,500	1.8	15	0.057	3,249	66,400	0.8
5	0.182	33,120	60,500	1.7	16	0.051	2,601	66,600	0.8
6	0.162	26,240	61,500	1.6	17	0.045	2,025	66,800	0.7
7	0.144	20,740	62,500	1.5	18	0.040	1,600	67,000	0.7

Galvanized iron and steel wire is also made in all shapes and sizes, bare or insulated, and for all purposes; telephone and telegraph wires, armor wires, strand and wire rope of all kinds.

W. & M. TELEPHONE WIRE

Size, B. W. G.	Diameter in.	Bdls. per mile	Weight per 1000 ft., lbs.	Size, B. W. G.	Diameter in.	Bdls. per mile	Weight per 1000 ft., lbs.
4	0.238	4	153	10	0.134	2	49
6	0.203	3	112	11	0.120	2	39
8	0.165	2	74	12	0.109	2	32
9	0.148	2	60	14	0.083	2	19

Electrical Specifications for Residential Work

(1) **Scope**—These specifications are intended to provide for a complete electric light wiring equipment and power wiring to motors and other apparatus requiring electric current from point where illuminating company's service terminates to each and every light, switch, receptacle outlet, power outlet, etc., shown on the drawings; all call bell and telephone conduits; together with such other labor and material as may be directed hereinafter, or which may be clearly indicated on the drawings as electrical work.

(2) **Code Rules**—All work shall be done in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the local ordinances, and the rules of the local lighting and power company. Certificates of inspection shall be obtained by the contractor at his expense from the local department of the National Board of Fire Underwriters or from the city inspector and turned over to the architect before final payment is made.

(3) **Test**—On completion of the work the installation shall be entirely free from ground and short circuits.

(4) A thorough test shall be made with a magneto in the presence of the architect or his representative.

(5) **Symbols**—The various electric symbols on the plans are those adopted and recommended by the National Electric Contractors' Association and the American Institute of Architects, except that instead of the number of sockets being indicated at each outlet the number of watts is indicated.

(6) **Permits**—The Contractor for electric work shall obtain and pay for all permits required in connection with his work.

(7) **Current Supply**—Supply for lighting and power shall be taken from the local lighting and power company, and their rules, as well as those of the National Board of Fire Underwriters, shall govern in all installation work and meter connections.

(8) **Service**—The lighting company will bring their current supply to the point indicated on drawings (or, ... name point of entrance). The contractor for electrical work shall provide and install his work from that point.

(9) **Wiring System**—The circuit wiring shall be installed as a (include one of the following systems):

9a. 2-wire 110-volt direct current system.
9b. 2-wire 110-volt—phase—cycle A. C. system.
9c. 3-wire 110-220-volt direct current system.
9d. 3-wire 110-220-volt—phase—cycle A. C. system.

(10) Not more than 16 outlets or a maximum of 660 watts shall be placed on any one circuit.

(11) **Distribution**—The mains are to run from the point of entrance to main fuse and switch, thence to the meter and thence to the various panelboards forming the various centers of distribution. Branch mains and circuits to be run from the centers of distribution as needed.

(12) **Service Switch and Cut-out**—Provide and set near point of entrance an approved service switch and cut-out mounted on porcelain base with connections for plug fuses [mounted on slate base with connections for cartridge fuses] [enclosed in an approved iron box].

(13) **Meter Service**—Provide and set complete in position meter service panel, said panel and connections to be in accordance with the requirements of the local lighting company, as well as to the satisfaction of the architect, and shall have all provisions for light and power service.

(14) **Electric Light Wiring and Conduits**—

(15) *Knob and Tube System*—All wiring shall be installed as a concealed knob and tube system.

(16) All wires shall be rigidly supported on porcelain insulators which separate the wire at least 1 in. from the surface wired over.

(17) Wires passing through floors, studding, etc., shall be protected with porcelain tubes, and where wires pass vertically through bottom plates, bridging, etc., of partitions, an extra tube shall be used to protect wires from plaster droppings.

(18) Wires must be supported at least every 4 ft. and where near gas or water pipes extra supports shall be used.

(19) All porcelain material shall be non-absorptive and broken or damaged pieces must be replaced.

(20) Tubes shall be of sufficient length to bush entire length of hole.

(21) At outlets wires shall be protected by flexible tubing, the same to be continuous from nearest wire support to inside of outlet box.

(22) Wires installed in masonry work shall be protected by approved rigid iron conduit which shall be continuous from outlet to outlet.

(23) *BX Cable*—All wiring shall be installed with flexible steel armored cable (BX cable).

(24) All runs must be rigidly secured in place with pipe straps and where same terminate in outlet box or panel box, an approved box connector with locknut and bushing shall be used if the box is not designed with this feature.

(25) Care should be taken that the rubber insulation is not damaged or rough cutting edges remain when armor is stripped, this operation being performed with an approved armor stripper.

(26) No bends shall be made with an inside radius of less than 4 in., and conductors must be securely fastened out of contact with gas, water or other pipes.

(27) If necessary, each and every run of conductor must be thoroughly grounded with a mechanically and electrically perfect connection to the water system on the street side of meter. At least one point of the system shall be grounded in this way.

(28) *Rigid Iron Conduit*—All wiring shall be installed in rigid enameled (galvanized) iron conduit.

(29) All conduit runs, except where buried in cement or concrete, must be rigidly held in place with pipe straps. All bends and offsets shall be avoided where possible and when same are made, an approved hickey, similar to the "Lakin" or a conduit bending machine shall be used. The use of a pipe tee or a vise will not be permitted. All conduit deformed or crushed in any way shall not be installed and must be removed from the building without delay.

(30) All conduit must have an inside diameter of at least ⅝ in. and no bend shall have less than a 3½-in. inside radius.

(31) Conduit shall be cut with a hack saw. The ends must be square after cutting and conduit shall be reamed after threading.

(32) Conduits must be securely fastened to all outlet boxes with locknuts and bushings of approved make, care being exercised that the full number of threads project through the bushings. Conduits shall be jointed with approved conduit

Continued on next page

couplings or right and left couplings. No running threads will be permitted.

(33) All joints in conduit must be leaded and made watertight.

(34) No wires shall be installed until all work which might cause damage to the conduits or wires has been completed.

(35) Conduits must be kept away from hot water pipes, steam pipes, and flues at least 6 in.

(36) A ground connection of approved size shall be extended from water service at street side of meter to panel box, and each home run and feeder conduit must be thoroughly and effectively grounded at both points.

(37) Conduits shall be plugged and kept clean and dry during installation.

(38) **Outlet Boxes**—At each light and switch outlet, furnish and install a standard pressed steel outlet, junction or terminal box of form to suit each individual requirement, arranged to set flush with the adjoining finish and have sufficient room left in box for fixture studs. Outlet boxes to be enameled [sherardized] [hot dipped galvanized].

(39) All outlet boxes shall be rigidly secured in place and those intended for fixtures shall be provided with a fixture stud, or, in case of large fixtures, a hanger to furnish support independent of the outlet box.

(40) *Position of Outlets*—The exact location of all outlets shall be obtained from the architect before same are placed in position, and any moving of outlets necessary to bring same out in proper place in trim, decoration, etc., shall be done by the contractor at the contractor's expense, provided outlets are not located in accordance with these instructions.

(41) **Wires**—The wire shall be solid, tinned annealed copper wire of highest conductivity, insulated with code thickness of high grade vulcanized rubber, protected with closely woven, elastic cotton braids saturated with waterproofing compound.

(42) *Lighting Wires*—All lighting wires shall be "Americore" brand, made by the AMERICAN STEEL & WIRE COMPANY.

(43) *Underground Cables*—Underground cables, shall be "Americore" rubber insulated, lead sheathed, suburban cable.

(44) *For Heating and Cooking Devices*—"Americore" electric heater cord rubber insulated and covered with asbestos braid and hard glazed cotton braid.

(45) *For Fans, Lamps, etc.*—Type P.S. incandescent lamp cord.

(46) *For Motor Equipment*—No. 4814, "Americore" portable cord.

(47) *Sizes of Wires*—No wire smaller than No. 14 B. & S. gauge shall be used, and for all circuits 100 ft. or longer, No. 12 B. & S. gauge shall be used. All conductors of No. 8 B. & S. gauge or larger shall be stranded.

(48) Wires shall be of sufficient length at outlets to make connection to apparatus without straining connections.

(49) Splices shall be made both mechanically and electrically perfect, and the proper thickness of rubber and friction tape shall then be applied.

(50) **Panelboards**—Panelboards to be of the best quality of black marbleized slate, guaranteed free from all imperfections, and of proper dimensions to accommodate all circuits, as required in strict accordance with the "National Code"; thickness of slate, 1 in. All slate exposed to view shall be carefully finished.

(51) They are to be mounted on the double box system, the outer box being made of steel, the inner box and panelboard to be of marbleized slate. The sides of said inner box being bored, and then bushed, with turned polished hard rubber bushings where conductors enter. Doors of boards shall be lined with ½-in. thick marbleized slate and trim shall be lined with sheet steel. Door and trim shall be of same material and finish as adjoining woodwork, and provided under this specification.

(52) For the door of each panel box provide and set cylinder lock and two flat keys, and hang with butts; all hardware to be of the same type and finish as surrounding hardware.

(53) Panels for lighting circuits to be equipped with 3-wire mains with fuses and switches, and 2-wire branches with knife switches and N. E. cartridge fuses. Extension on lugs must be furnished as required.

(54) Panels for power circuits shall be equipped with 3-wire mains with fuses and switches, and 2-wire branches each controlled by knife blade and N. E. cartridge fuses.

(55) The panelboard shall be of (mention manufacturer). Each panel shall have 2 extra or spare circuits.

(56) On the inside of door to each panelboard, provide printed directions clearly indicating the location of lights controlled by each circuit and protect same by polished plate glass with ground and polished edges. Secure same to door by copper corner pieces. Also install key socket on a gooseneck in side of panel, on side near top, to light each board.

(57) **Local Switches**—Local wall switches shal lbe made by (mention manufacturer. See Switches, Electric, SWEET'S ARCHITECTURAL CATALOGUE).

(58) All switches shall be of ample capacity to carry their loads.

(59) All switches shall have face plates to match color and finish of hardware.

(60) Where more than one switch occurs in same location, furnish an approved lettered gang plate to cover all fixtures.

(61) Where indicated on the plan, closets shall be equipped with automatic door switches to connect light when door is open.

(62) *Pilot Lights*—Switches controlling cellar, attic, and porch lights shall have pilot lamp in parallel on load side of switch.

(63) **Base and Wall Receptacles**—Base and wall receptacles shall be made by (mention manufacturer. See Receptacles, Electric, SWEET'S ARCHITECTURAL CATALOGUE).

(64) *Floor Receptacles*—All floor receptacles shall be made by (mention manufacturer. See Receptacles, Electric, SWEET'S ARCHITECTURAL CATALOGUE).

(65) **Power Circuits**—A set of feeders, with switch and fuse, shall be run from street connection to switchboard for power in the same manner as specified for light.

(66) A set of feeders shall be run from switchboard to each power outlet indicated on the drawings.

(67) At each motor shall be placed a double pole knife switch and proper fuse for control of motor.

(68) **Call Bells**—Provide and install a complete system of call bells with all necessary wiring, buttons, bells, buzzers, and annuciators, as shown on plans and herein described.

(69) *Wiring*—All wiring shall be installed in metal conduit similar to electric light wires.

(70) (Alternative) All wiring shall be cleated in joists, studs, etc., with insulated staples. Damp places, metal pipes of all description, flues, etc., must be avoided and wire fastenings must be applied in such a way that insulation is not damaged. No splices shall be made where same will not be accessible at any time after completion of building.

(71) *Wires*—Wires shall not be smaller than No. 18 B. & S. gauge. They shall be "Americore" rubber covered wires as manufactured by the AMERICAN STEEL & WIRE COMPANY (or, AMERICAN STEEL & WIRE COMPANY'S dampproof annunciator wire).

(72) *Bells, Buzzers, Annunciators, etc.*—Shall be of approved make (mention type and manufacture. See specific headings SWEET'S ARCHITECTURAL CATALOGUE).

(73) *Batteries*—Furnish and install where directed [three] cells of carbon cylinder battery in a substantial cabinet.

(74) *Schedule of Bells*—Give schedule of bells, as, front door push to ring bell in hall; dining room push to ring buzzer in pantry; etc.)

Industrial Plant Wiring

While factory wiring does not often have to be concealed, nor to be so neatly installed as in a residence, its installation is not on this account as simple as it seems.

Two Requirements—(1) The primary requirement of factory wiring is to serve as the reliable means of furnishing energy to motors, lamps, heating devices, etc. (2) It must be safe and free from fire or accident hazards.

Two Principal Wiring Systems Used in Factory Buildings—(1) Open wiring, in which the insulated wires are supported on porcelain knobs or cleats and are not enclosed in any protection except where exposed to probable injury. (2) Conduit wiring in which the wires are run in metal ducts that are either exposed on ceilings, walls or columns, or concealed in walls and floors, or partly exposed and partly concealed. Because of its superior safety, conduit wiring is insisted on for factory buildings in the largest cities, and is coming more and more into use everywhere.

Selection of System—In general, it may be said that the less expensive open wiring system may be used in any factory building where no special effort at fireproofing has been made and in which no hazardous materials or processes are used, and further, where wires may be so arranged that they will not be readily disturbed. If building is of substantially fireproof con-

Continued on next page

struction, open wiring is entirely out of place because every feature of the wiring also should be practically fireproof. If so-called mill construction is used, open wiring may be used with slow burning insulation on wires. Conduit wiring may be used in almost any type of building; but is especially desirable in concrete or other fireproof buildings.

Economy Precautions—In concealed conduit systems, circuits should be run as direct and as free of bends as possible. All wires for a circuit should be run in the same conduit, especially if alternating current is used. Distribution, junction, cut-out and switch boxes or cabinets should be of ample size to accommodate additional feeders and branch circuits that it may be anticipated to add later, even if these are not installed for some time. This may be easily done by having these boxes of ample size, and provided with blank knockouts to permit ready addition of other feeders or branches without interfering with existing service. In the case of concealed conduit in a concrete building it pays to install ample conduit runs for any possible future demands.

Separate Feeders for Lighting and Power—Separate feeders should always be installed for lighting and power. Starting and stopping of motors causes serious fluctuation of the circuit voltage; large changes of load also produce such fluctuations, which are very noticeable in the light emitted by lamps. The second reason is that motor circuits are more often overloaded or short circuited, and therefore interrupted by blowing of fuses, than lighting circuits.

Illumination Requirements Must Be Determined—In laying out lighting circuits, illumination requirements of different rooms must first be known. These depend on kind of work done, size and light absorbing conditions of room and on nature of the lighting equipment selected. On account of these variables, power consumption for lighting ranges from 0.5 to 2.5 watts per sq. ft. in different departments of different plants.

For any chosen lighting intensity and related conditions it is possible to find corresponding unit watt consumption. Assume it to be 1.2 watts per sq. ft., the floor area in square feet multiplied by 1.2 will then give total wattage to be provided for the room in question. Not more than 660 watts is allowed on any ordinary lighting circuit. From these facts it is possible to lay out the requisite circuits, arrangement of which in a large room should usually permit switching on the lamps in rows parallel to windows, so those furthest from windows may be turned on first.

The table shows capacity of different sizes of wires as lighting feeders. Second column gives capacity of the wire in amperes, third column gives it in watts based on 220 volts between the outer wires. Last six columns give number of 25-, 40-, 50-, 60,- 75- and 100-watt lamps, respectively, that can be supplied by the particular size of wire. The neutral wire is not taken into account, serving chiefly as a means for overcoming unbalance. These capacities have nothing to do with the branch circuits, which are normally limited to 660 watts.

CAPACITY OF WIRES FOR LIGHTING FEEDERS

B. & S. wire gauge	Ampere capacity	3-Wire System, 220-110-220						
		Feeder wattage	Lamp wattage					
			25	40	50	60	75	100
1,250,000	750	165000	6600	4125	3300	2750	2200	1650
1,000,000	650	143000	5720	3575	2960	2383	1906	1430
900,000	600	132000	5280	3300	2640	2200	1760	1320
800,000	550	121000	4840	3025	2420	2016	1613	1210
750,000	525	115500	4620	2887	2310	1925	1540	1155
700,000	500	110000	4400	2750	2200	1833	1466	1100
650,000	475	104500	4180	2612	2090	1741	1393	1045
600,000	450	99000	3960	2475	1980	1650	1320	990
550,000	425	93500	3740	2337	1870	1558	1246	935
500,000	400	88000	3520	2200	1760	1466	1173	880
450,000	372	81840	3272	2040	1636	1364	1090	818
400,000	325	71500	2860	1787	1430	1191	953	715
350,000	300	66000	2640	1650	1320	1100	880	660
300,000	275	60500	2420	1512	1210	1008	806	605
250,000	240	52800	2112	1320	1056	880	704	528
4/0	225	49500	1980	1237	990	825	660	495
3/0	175	38500	1540	962	770	641	516	385
2/0	150	35000	1320	825	660	550	440	330
0	125	27500	1100	687	550	458	366	275
1	100	22000	880	550	440	366	293	220
2	90	19800	792	495	396	330	264	198
3	80	17600	704	440	352	293	234	176
4	70	15400	616	385	308	256	205	154
6	50	11000	440	275	220	183	146	110
8	35	7700	308	192	154	128	102	77
10	25	5500	220	137	110	91	73	55
12	20	4400	176	110	88	73	58	44
14	15	3300	132	82	66	55	44	33

Independent System for Emergency Lighting—Since failure of light at a critical time, as at the outbreak of a fire, might easily contribute to serious loss of life in a factory with many employes, because of the great difficulty in finding exits in a dark, smoke filled room, a number of communities require installation of an independent system for emergency lighting. This is an excellent provision in any medium size or large plant. Such a system should have separate circuits and be fed from a source separate from that normally supplying the lighting.

Installation of Open Wiring System—Installation of an open wiring system is relatively simple. The wires must have either a rubber, slow burning, or slow burning weatherproof insulation; rubber covered wires smaller than No. 6 may have a single outer braid, but No. 6 or larger must have a double braid. In very moist rooms rubber insulation is required. In places where there are corrosive vapors, insulation may be either rubber or weatherproof; in the latter case a coating of shellac or varnish is sometimes applied over the wires after they have been put up.

In all cases wires must be properly supported and spaced. Where exposed to mechanical injury they must be protected by conduit, running boards or guard strips.

Installation of Conduit Wiring System—Rubber covered wiring is used almost exclusively in installations of conduit wiring unless temperature of room is quite high when slow burning insulation is required. In places where there is liability of condensation inside the conduits due to changes of temperature, as in cold storage or refrigerating rooms, conduit must be well drained or open wiring with suitable guard strips where necessary must be used.

ATLANTIC INSULATED WIRE & CABLE CO.

TELEPHONE
VANDERBILT 2607

52 Vanderbilt Avenue
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 557 West Monroe Street
BOSTON, MASS., 156 Purchase Street
BALTIMORE, MD., 2 East Redwood Street
PITTSBURGH, PA., Keenan Building
LOUISVILLE, KY., Starks Building
PHILADELPHIA, PA., 419 Perry Building
ST. PAUL, MINN., 906 Merchants' Bank Building

FACTORY: STAMFORD, CONN.

Products

INSULATED WIRES and CABLES, which include Interior, Aerial, Underground, Lead Incased and Submarine, in the following brands: "Neptune," "Triton," and "Dolphin." All sizes and for every service.

Trade-names

The trade-names under which Atlantic wires and cables are sold indicate definite grades of quality, which are absolutely maintained by us. These brands of wire have established standards for high class rubber insulation for the purposes for which they are intended, and

BRAND MARKS

should not be classed with wire sold under named brands whose specifications are not definitely fixed.

The following extracts cover essential points of complete specifications for these brands, which will be forwarded on request.

"Neptune"

"Neptune" 30% Para, is the best commercial product of this company, compounded with pure Para rubber and ingredients selected after years of tests and trial which our experience, and not a technical specification, dictates.

"Neptune" insulation is recommended as most enduring and economical for every condition and service. We guarantee wire manufactured under this brand to meet the following test:

A sample of vulcanized compound, 4 in. in length, shall be cut from the wire and marks placed on it 2 in. apart; stretched until the marks are 6 in. apart and immediately released; 1 minute after such release the marks shall be not more than 2¼ in. apart; then stretched until the marks are 12 in. apart before breaking.

Tensile strength, 1200 lbs. per sq. in.

Insulation resistance at 60° Fahr., 2000 megohms per mile for No. 14 B & S. Other sizes in proportion.

"Triton"

"Triton," a high grade intermediate insulation to meet the requirements of engineers, architects and contractors, for a high grade, long service insulation of moderate cost.

"Triton" insulation contains 25% of Para rubber, and it is guaranteed that every foot of this wire is of uniform quality that measures, under rigid tests, to established standards, as follows:

A sample of vulcanized compound, 4 in. in length, shall be cut from the wire and marks placed on it 2 in. apart; stretched until the marks are 6 in. apart and then immediately released; 1 minute after such release the marks shall be not more than 2¼ in. apart; then stretched until the marks are 10 in. apart before breaking.

Tensile strength 900 lbs. per sq. in.

Insulation resistance at 60° Fahr., 1500 megohms per mile for No. 14 B & S. Other sizes in proportion.

"Dolphin"

"Dolphin," a dependable high grade code wire passing all the latest rules of the National Board of Fire Underwriters by a wide margin.

The same care in its manufacture is guaranteed as in our higher grade products. The test follows:

A sample of vulcanized compound, 4 in. in length, shall be cut from the wire and marks placed on it 2 in. apart; then stretched until the marks are 5 in. apart and immediately released; 1 minute after such release the marks shall be not more than 2⅝ in. apart; then stretched until the marks are 8 in. apart before breaking.

Tensile strength 600 lbs. per sq. in.

Insulation resistance at 60° Fahr., 800 megohms per mile for No. 14 B & S. Other sizes in proportion.

Underwriters' Stamps

Atlantic insulated wire is approved by the underwriters and carries underwriters' test stamps.

Representative Installations

Name of architect or electrical engineer, and building.

Limited space allows only single installations and prevents listing of many notable references.

Adams, Henry, Baltimore, Md., Maryland Casualty Building, Baltimore, Md.
Andrews, Rantoul & Jones, Boston, Mass., Hunt-Spiller Mfg. Corp. Foundry, South Boston, Mass.
Ashley, E. E., New York, N. Y., Third National Bank Building, Springfield, Mass.
Atterbury, Grosvenor, New York, N. Y., First Presbyterian Church, New York, N. Y.
Ballinger & Perrot, Philadelphia, Pa., Atlantic & Pacific Tea Company Buildings, Jersey City, N. J.
Barber, Donn, New York, N. Y., Travelers Insurance Co., Hartford, Conn.
Barnett, Haynes & Barnett, St. Louis, Mo., Jefferson Hotel, St. Louis, Mo.
Blackall, C. H., Boston, Mass., Hotel Avery, Boston, Mass.
Bonsack, F. C., St. Louis, Mo., American Theater, St. Louis, Mo.
Bosworth, W. W., New York, N. Y., J. D. Rockefeller, Jr., Residence, New York, N. Y.
Brueggeman, G. F. A., St. Louis, Mo., Warwick Hotel, St. Louis, Mo.
Brunner, Arnold, New York, N. Y., Mt. Sinai Hospital, New York, N. Y.

Continued on next page

Carrère & Hastings, New York, N. Y., A. I. du Pont Residence, Roslyn, L. I., N. Y.
Chambers, Walter, New York, N. Y., O. G. Jennings Residence, New York, N. Y.
Clark, MacMullen & Riley, New York, N. Y., City-County Building, Pittsburgh, Pa.
Clinton & Russell, New York, N. Y., American Exchange Bank, New York, N. Y.
Cory, Russell G., New York, N. Y., Pathé Freres Building, Brooklyn, N. Y.
Cross & Cross, New York, N. Y., Guaranty Trust Building, Madison Avenue, New York, N. Y.
Davis, Brinton B., Louisville, Ky., Inter-Southern Life Building, Louisville, Ky.
Delano & Aldrich, New York, N. Y., Sterling Chemical Laboratory, Yale University, New Haven, Conn.
DeVore Co., Toledo, Ohio, The Libby-Owens Glass Works, Kanawha City, Charleston, W. Va.
Eames & Young, St. Louis, Mo., Warner & Werner Building, St. Louis, Mo.
Eswein-Johnson, Buffalo, N. Y., Penn-Harris Hotel, Harrisburg, Pa.
Flagg, Ernest, New York, N. Y., Scribner Building, New York, N. Y.
Flagg, Montague, New York, N. Y., Astor Trust Building, New York, N. Y.
Francisco & Jacobus, New York, N. Y., Nucoa Butter Co., Bayonne, N. J.
French & Hubbard, Boston, Mass., Chemical Laboratory, Brown University, Providence, R. I.
Friz, Clyde N., Baltimore, Md., Standard Oil Building, Baltimore, Md.
Gilbert, Cass, New York, N. Y., New Haven R. R. Station, New Haven, Conn.
Gilbert, C. P. H., New York, N. Y., F. W. Woolworth Residence, Glen Cove, L. I., N. Y.
Glidden, E. H., Baltimore, Md., Cochran Residence, Baltimore, Md.
Goldschmidt, Otto, New York, N. Y., Hotel Farragut, Knoxville, Tenn.
Goodhue, Bertram G., New York, N. Y., St. Bartholomew's Church, New York, N. Y.
Guilbert & Betelle, Newark, N. J., North Seventh Street School, Newark, N. J.
Hellmuth & Hellmuth, St. Louis, Mo., Soulard Library, St. Louis, Mo.
Holabird & Roche, Chicago, Ill., Lane-Bryant Building, New York, N. Y.
Hutchins & Sons, John Bacon, Louisville, Ky., Courier-Journal Building, Louisville, Ky.
Hyland, Paul V., Chicago, Ill., Terminal Building, Lincoln, Nebr.
Ittner, W. B., St. Louis, Mo., Central High School, St. Louis. Mo.
Jallade, L. E., New York, N. Y., Brandegee Building, New York, N. Y.
Jansen & Abbott, Pittsburgh, Pa., H. W. Croft Residence, Greenwich, Conn.
Jensen, Mundy & Jensen, Chicago, Ill., Jefferson Building, Peoria, Ill.
Jones & Tabor, Houston, Tex., Cotton Hotel, Houston, Tex.
Kahn, Albert, Detroit, Mich., Ford Building, St. Louis, Mo.
Kendall & Smith, Washington, D. C., Masonic & Eastern Star Home, Washington, D. C.
Kimball, R. D., New York, N. Y., Missouri State Capitol, Jefferson City, Mo.
Knox, C. E., New York, N. Y., Revere Sugar Refinery, Boston, Mass.
Lamb, Thomas W., New York, N. Y., Capitol Theater, New York, N. Y.
Lang & Witchell, Dallas, Tex., Southwestern Life Building, Dallas, Tex.
Layton, Hawke & Smith, Oklahoma City, Okla., Levy Bros. Building, Oklahoma City, Okla.
Link, Theo. C., St. Louis, Mo., Washington Medical College, St. Louis, Mo.
Lockwood, Greene & Co., Boston, Mass., New Departure Plant, Bristol, Conn.
Lowell, Guy, New York, N. Y., Phillips-Andover Buildings, Andover, Mass.
McKenzie, Voorhees & Gmelin, New York, N. Y., Knickerbocker Telephone Building, New York, N. Y.
McKim, Mead & White, New York, N. Y., University Club, New York, N. Y.
Marshall & Fox, Chicago, Ill., Lyon & Healy Office Building, Chicago, Ill.
Mauran, Russell & Crowell, St. Louis, Mo., Rice Hotel, Houston, Tex.
Maynicke & Franke, New York, N. Y., Rhinelander Apartment, New York, N. Y.
Meyer, Henry C., New York, N. Y., Orthopaedic Hospital, New York, N. Y.
Milburn, Heister & Co., Washington, D. C., Southern Railway Building, Washington, D. C.
Moore, James Robert, New York, N. Y., Y. M. C. A. Building, Greenwich, Conn.
Morris, Benjamin, New York, N. Y., J. C. Baldwin Residence, Mt. Kisco, N. Y.
Morse, H. G., New York, N. Y., Engineering Societies' Building Addition, New York, N. Y.
Moses, P. R., New York, N. Y., Reisenweber's Restaurant, New York, N. Y.
Murchison, Kenneth, New York, N. Y., Columbia Club, New York, N. Y.
Murphy & Bro., D. X., Louisville, Ky., Nazareth Academy, Louisville, Ky.
Murphy & Dana, New York, N. Y., Loomis Institute, Windsor, Conn.
Osterling, F. J., Pittsburgh, Pa., Union Arcade Building, Pittsburgh, Pa.
Parker, Thomas & Rice, Baltimore, Md., Lexington Building, Baltimore, Md.
Pattison Bros., New York, N. Y., De Jonge Factory, Clifton, S. I., N. Y.
Pelton, H. C., New York, N Y., Susquehanna Silk Building, New York, N. Y.
Pilcher, Lewis F., Albany, N. Y., State Laboratory, Albany N. Y.
Place, Clyde, New York, N. Y., Equitable Trust Building, New York, N. Y.
Platt, Chas. A., New York, N. Y., Astor Court Apartment, New York, N. Y.
Pope, John R., New York, N. Y., Robert Bacon Residence, Westbury, N. Y.
Posey, James, Baltimore, Md., Federal Reserve Bank, Richmond, Va.
Post & Sons, Geo. B., New York, N. Y., Statler Hotel, Cleveland, Ohio
Rapp, C. W. & Geo. L., Chicago, Ill., Keith Theater and Office Building, Cleveland, Ohio
Renwick, Aspinwall & Tucker, New York, N. Y., Baker Williams Building, New York, N. Y.
Rich & Fitz-Simons, Washington, D. C., Harrington Hotel, Washington, D. C.
Richer, A. A., Reading, Pa., Lebanon High School, Lebanon, Pa.
Rogers, James Gamble, New York, N. Y., Harkness Memorial Group, Yale University, New Haven, Conn.
Rowland, John T., Jersey City, N. J., Lincoln High School, Jersey City, N. J.
Schmidt, Garden & Martin, Chicago, Ill., Illinois Central R. R. Hospital, Chicago, Ill.
Shattuck & Hussey, Chicago, Ill., Union Medical College, Rockefeller Foundation, Peking, China
Snooks Sons, John B., New York, N. Y., W. & J. Sloane Building, New York, N. Y.
Snyder, C. B. J., New York, N. Y., Manhattan Trade School, New York, N. Y.
Starrett & Van Vleck, New York, N. Y., Columbia Graphophone Building, Fifth Avenue, New York, N. Y.
Stoddart, Wm. L., New York, N. Y., Durant Hotel, Flint, Mich.
Taylor, Isaac S., St. Louis, Mo., Jefferson Memorial Building, St. Louis, Mo.
Thomas, John H., Louisville, Ky., Louisville Herald Building, Louisville, Ky.
Timmis & Chapman, New York, N. Y., Hills Bros. Plant, Brooklyn, N. Y.
Trowbridge & Livingston, New York, N. Y., Sherman National Bank, New York, N. Y.
Trumbauer, Horace, Philadelphia, Pa., H. C. Brokaw Residence, Brookville, L. I., N. Y.
Walker & Gillette, New York, N. Y., H. P. Davison Residence, New York, N. Y.
Walker & Weeks, Cleveland, Ohio, Union National Bank, Cleveland, Ohio
Warren & Wetmore, New York, N. Y., Biltmore Hotel, Providence, R. I.
Wells, G., Oklahoma City, Okla., Terminal Building, Oklahoma City, Okla.
Wight, Oliver B., Baltimore, Md., Parkway Theater, Baltimore, Md.
Worcester, J. R. & Co., Boston, Mass., Manufacturers' Warehouse, Boston, Mass.
York & Sawyer, New York, N. Y., Assay Office, New York, N. Y.

BOSTON INSULATED WIRE & CABLE CO.

MAIN OFFICE AND FACTORY
BOSTON, MASS.

BRANCH OFFICE, DETROIT, MICH.

CANADIAN FACTORY: Boston Insulated Wire & Cable Co., Ltd., HAMILTON, ONT., CAN.

Products

Rubber Covered Wires, Lamp Cords and Special Cables.

Rubber Covered Wires

This company manufactures solid and stranded conductors for general electric wiring of buildings, for railroad signal work, and for car wiring, motor leads, etc.

Regulation Grade—This wire is made to not only meet the National Electrical Code requirements, but great care is taken regarding the lasting qualities of the rubber insulation and to the grade of weatherproof finish of the wire.

"REGULATION" GRADE
TRADE-MARK

30 Per Cent Para—This grade is made to meet specifications often issued for 30 Per Cent Para insulation.

"30% PARA" GRADE
TRADE-MARK

Boston High Grade—In this grade is offered a rubber compound of the highest standard that this company is capable of producing. It is the result of careful study, many tests and long experience. The compound is the same as they have used in high tension cables for automobiles to meet the severe service. While the cost of this grade is no more than that of the 30 Per Cent specification, it is recommended as being superior.

"HIGH GRADE" GUARANTEED
TRADE-MARK

Identification Markings—For the rubber covered braided wires, a single coarse uncolored thread is woven clockwise spirally in the braid; for cords and cables, a blue thread in the spiral wrapping of cotton over the copper strands.

Special Cables and Cords

Elevator and Annunciator Cables—In 2 to 19 conductors, No. 18 B&S gauge, each of 16 No. 30 untinned wires, double wrapping of cotton over the copper, then a single braid, the wires cabled together with jute core and two braids placed over all, the outer braid being of black glazed cotton.

Elevator Control Cables—2 to 12 conductors, each somewhat larger than No. 16 B&S and stranding 30 No. 30 untinned wires, with cotton wrapping over the copper, 1/32-in. wall of rubber insulation, single braid in colors to distinguish the wires. The wires are laid around a core made up of steel-supporting wire and a filling of jute. Overall covering consists of a braid of coarse white cotton, a layer of rubber-faced tape, an outer braid of heavy cotton and finished with a waterproof and non-inflammable compound.

Elevator Lighting Cables—2 conductors, each of size No. 14 B&S gauge, stranding 41 No. 30 untinned wires, cotton wrapping over the copper, 3/64-in. wall of rubber insulation, single braid in colors to distinguish the wires, then the 2 conductors cabled up with jute around a steel-supporting wire. The outer covering consists of a single braid of white cotton, a layer of rubber-faced tape, an outer heavy braid finished with weatherproof and flameproof compound.

Stage Cable—Made in 2 or 3 conductors in sizes No. 18 to about No. 2, each with code standard insulation. The wires are cabled together with jute filling to make round, an overall covering of tape and braid or a double braid, the outer braid being of heavy, tough thread.

Border Light Cable—Made up of 4 or more flexible wires in sizes required. The wires are twisted together with tape and braid or double braid overall.

Charging Cable—For battery charging stations. Furnished in practically the same construction as stage cable.

Portable Cord for Hard Service—Made in size Nos. 18, 16 and 14 with conductors of special flexible stranding and with a reinforcing of high grade rubber without outer covering, or with a fabric covering woven and finished to withstand abrasion.

Lamp Cords and Reinforced Cords—Made with cotton or silk braid.

Deck Cable—Size Nos. 18, 16 and 14. The wires are twisted together with a filler and a heavy jacket of rubber reinforcing, then a substantial braid.

Boston Plant at Savin Hill Station, N. Y., N. H. & H. R. R.

McGILL MANUFACTURING COMPANY

Manufacturers of Electrical Specialties

VALPARAISO, IND.

Products

FLUSH PULL WALL SWITCHES; SILK PULLS.

Levolier
TRADE MARK
Reg. U. S. Pat. Office

Levolier Switches

The Levolier flush wall switch offers a marked improvement in wall switch design. It consists of a single solid brass lever, finished to match the plate, extending straight out from the plate and returning to this position when released. A "make and break" is made alternately by a push or pull on the lever in any direction.

The construction is substantial and durable. Has same rating as all standard flush switches; fits standard switch boxes; has successfully met the tests and been given the approval of the National Board of Fire Underwriters. (The difference between the Levolier and other toggle switches is the self-restoring lever which permits the addition of the artistic and convenient pendents and pulls. Detailed information, samples, etc. furnished quickly by writing the McGILL MANUFACTURING COMPANY at Valparaiso, Ind., manufacturers of electrical specialties of unquestionable quality for seventeen years).

Flush plates of stamped brass (.040 in. in thickness) are furnished with beveled edges or flat edges for painting and furnished in any finish. Standard finish of brush brass will be furnished unless other finish is called for.

The switch is made with plain beveled and luminous lever, slotted lever for attaching Levolier silk pulls, with chain for attaching Levolier silk tassels and with brass pendent.

Levolier Pulls and Tassels

Levolier silk pulls and tassels are distinctive and ornamental. They lend themselves to the decorative treatment of the room and may be had in a shade to harmonize in any scheme of decoration.

When the flat plate is mounted near the ceiling or cornice, painted and used with the long Levolier silk pulls having a tassel at the bottom to pull with and leaving only the rosette exposed at the top, a very distinctive effect is obtained similar to the old fashioned bell rope. In addition to the artistic effect, there is a saving in conduit, wire and labor as the extra wiring to the low switch is eliminated.

SWITCH NO. 22
PLATE NO. 41
PULL NO. 51

They are furnished in seven standard colors—Old Gold, Rose, Ecru, Taupe, Blue and Wisteria. No special colors will be furnished.

Specifications

Outlet Boxes—For all switch outlets there is to be provided and installed approved iron or steel switch boxes similar to those specified for fixtures. "Gang" boxes are to be provided where two or more switches are set together with switches set side by side.

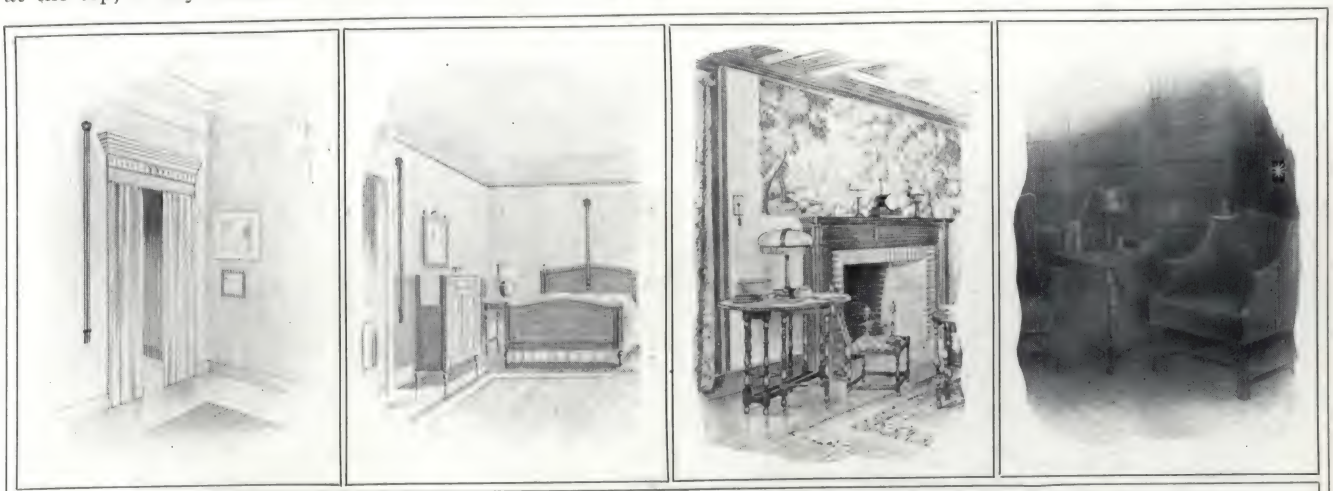
Location of Switches—The location of switches shown on drawings is subject to modification depending upon the "swing" of doors or placing of furniture and no switches shall be installed until the definite location is determined and approved by the architect. Center of switches shall be 4 ft. 4 in. above finished floor except for high installations which shall be as shown on drawings (or 8 ft. 8 in. above the finished floor).

Switches—Switches shall be of the Levolier flush pull wall type as manufactured by the McGILL MANUFACTURING COMPANY, Valparaiso, Ind., and shall be single pole, except where three-way are called for on drawings, with a capacity of 10 amperes, 125 volts for single pole and 5 amperes, 125 volts for three-way.

Switches in rooms.....shall have:

(a) Plain Beveled Lever
(b) Luminous Lever
(c) 9-in. Levolier Silk Pulls (No. 51) for standard installation.
(d) 56-in. Levolier Silk Pulls (No. 52) for high installation.
(e) Chain and Levolier Tassel
(f) With Brass Pendent

Flush plates of .040-in. brass, shall have beveled edges and finish to match finished hardware or fixtures except in rooms..... which shall be flat edge brass plates.



SUGGESTIONS FOR USES AND LOCATIONS OF LEVOLIER SWITCHES

Continued on next page

LEVOLIER SWITCHES

Cat. No.	Price	Std. Pkg.	Pkg. Wgt	Description
SINGLE POLE—10 AMPERES 125 VOLTS=5 AMPERES 250 VOLTS				
*20	.45	100	60	With plain lever
*21	.70	50	30	With luminous lever
*22	.55	50	30	With lever for Levolier pulls Nos. 51 and 52
†23	.60	50	30	With 4″ chain detach. ball for No. 50 tassel
†24	.60	50	35	With brass pendent
THREE-WAY—5 AMPERES 125 VOLTS=3 AMPERES 250 VOLTS				
*30	.70	50	35	With plain lever
*31	.95	20	15	With luminous lever
*32	.80	20	15	With lever for Levolier pulls Nos. 51 and 52
†33	.85	20	15	With 4″ chain detach. ball for No. 50 tassel
†34	.85	20	18	With brass pendent

Standard finish—brush brass (all switches)
*For special finishes on these numbers no extra charge.
†For special finishes on these numbers add 7c to list.

For plates above 3 gang—prices on request.

100 single plates or equivalent in gangs constitute a standard package.

Switches in gangs spaced $1\frac{13}{16}$″ on centers.

No. 40 flat plate is used where it is desired to paper or tint over the plate and can be mounted near the ceiling or below, leaving only the lever protruding to which can be attached a long or short pull.

Switch No. 24 is recommended for hotels, bathrooms, kitchens, and in places where the silk pull would not do. It is built to withstand abuse and gives an artistic touch that is not obtainable in any other make of switch.

LEVOLIER FLUSH PLATES .040″ BRASS

Cat. No.	Price	Pkg. Wgt.	Description	Vertical	Horizontal
40	.14	25	For one switch—flat edge	$4\frac{1}{2}$″	$2\frac{3}{4}$″
41	.14	26	For one switch—bevel edge	$4\frac{1}{2}$″	$2\frac{3}{4}$″
42	.35	50	For two switches—bevel edge	$4\frac{1}{2}$″	$4\frac{9}{16}$″
43	.42	70	For three switches—bevel edge	$4\frac{1}{2}$″	$6\frac{3}{8}$″

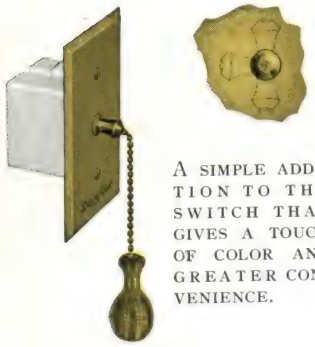
LEVOLIER PULLS

Cat. No.	Price	Description
50	.25	Tassel for switch No. 23
51	2.25	Short pull for switch No. 22
52	4.50	Long pull for switch No. 22
53	.15	Brass pendent and lever

For additional length on pull No. 52 add 20c per inch list.

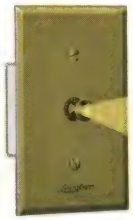
Pulls Nos. 51 and 52 provided with special hook for lever furnished in seven standard colors as shown below.

For special finishes on No. 53 add 7c to list.



A SIMPLE ADDITION TO THE SWITCH THAT GIVES A TOUCH OF COLOR AND GREATER CONVENIENCE.

SWITCH NO. 20
PLATE NO. 41

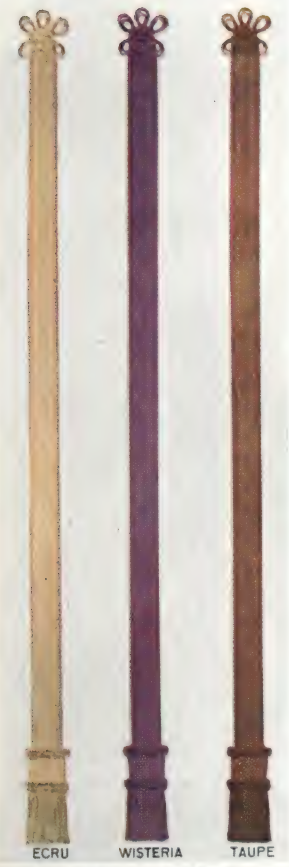


SWITCH NO. 21
PLATE NO. 41

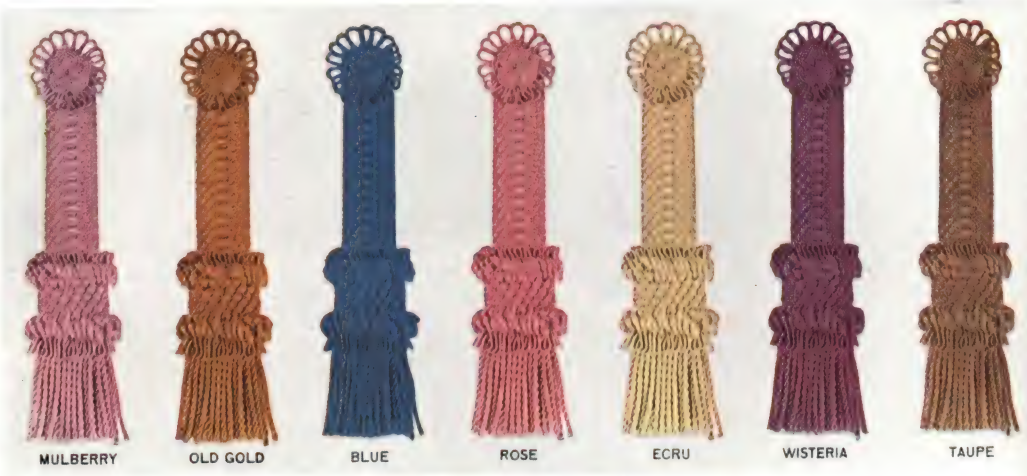
SWITCH NO. 22
PLATE NO. 40

SWITCH NO. 23
PLATE NO. 41

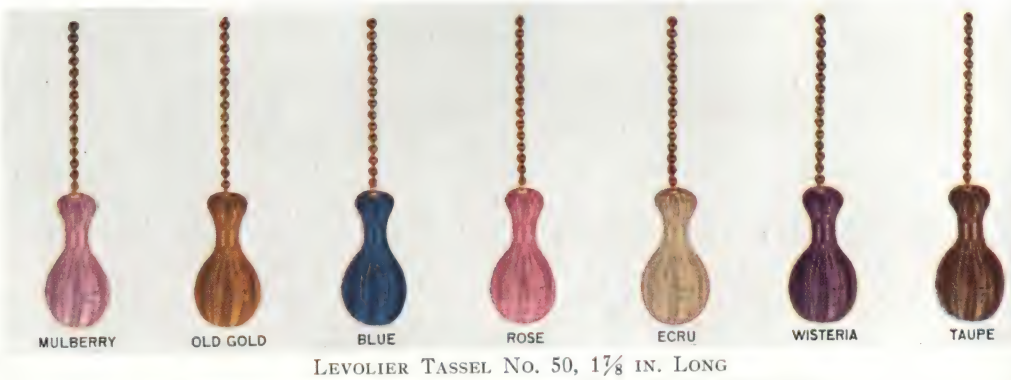
SWITCH NO. 24
PLATE NO. 41



LEVOLIER PULL NO. 52
56 in. long



LEVOLIER PULL NO. 51
9 in. long



LEVOLIER TASSEL NO. 50, $1\frac{7}{8}$ IN. LONG
The chain shown is not furnished with the tassel but supplied on switch No. 23

ECONOMY FUSE & MFG. CO.

Greenview Avenue at Diversey Parkway
CHICAGO, ILL.

ATLANTA, GA. BUFFALO, N. Y. DETROIT, MICH. LOS ANGELES, CAL. NEW YORK, N. Y. ST. LOUIS, MO.
BALTIMORE, MD. CINCINNATI, OHIO DENVER, COLO. MILWAUKEE, WIS. PHILADELPHIA, PA. SAN FRANCISCO, CAL.
BOSTON, MASS. CLEVELAND, OHIO KANSAS CITY, MO. MINNEAPOLIS, MINN. PITTSBURGH, PA. SEATTLE, WASH.

ECONOMY FUSE & MFG. CO. OF CANADA, LTD., MONTREAL, CANADA

Complete Stocks Carried by All Leading Electrical Jobbers and Dealers

Products

CLEARSITE NON-RENEWABLE PLUG FUSES; IMPROVED ECONOMY RENEWABLE CARTRIDGE and PLUG FUSES; "DROP OUT" RENEWAL LINKS; "ARKLESS" NON-RENEWABLE INDICATING FUSES.

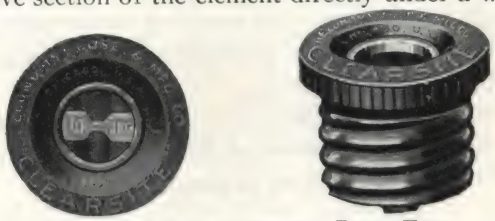
Licensed manufacturers of Elexit Devices.

Molded Insulation, Screws for Electrical Work, and S.&C. High Potential Fuses (in Canada).

Clearsite Non-renewable Plug Fuses

"Clear Indication Always."

Clearsite fuses are the only non-renewable plug fuses using the famous Economy "Drop Out" link. This link, with amperage stamped upon it, is mounted with the operative section of the element directly under a window



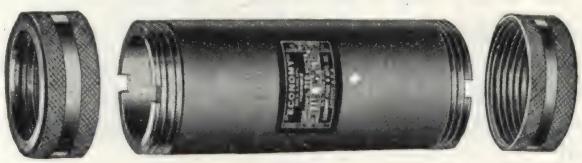
CLEARSITE NON-RENEWABLE PLUG FUSE
Approved by Underwriters' Laboratories, Inc.

of unusual design. Clearsite fuses never fail to indicate. When blown on an overload a gap at the operative section is clearly visible; when blown on short circuit the window is blackened and vision of link is made impossible. Clearsite fuses, in capacities of from 3 to 30 amp. are sold in cartons of 500 and of 50, and in retail packages of 4 for 25¢.

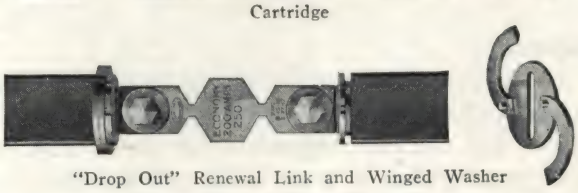
Improved Economy Renewable Fuses

Economy fuses are made in three general types: (ferrule, plug, and knife blade) with a full line of capacity ranges for all commercial voltages. This is the first line of fuses using an inexpensive bare link for restoring a blown fuse to its original efficiency to be approved *in all capacities* by Underwriters' Laboratories, Inc.

The fusible elements are of the "Drop Out" renewal type, accurately rated and of definite design. Study this



Cartridge



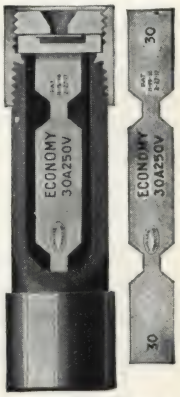
"Drop Out" Renewal Link and Winged Washer

ECONOMY KNIFE BLADE TYPE FUSE DISASSEMBLED

renewable link. See the two narrow bridges of metal holding the drop-out portion in place. In operations on short circuits, the entire fuse metal does not volatilize, only these two narrow bridges fuse. The internal pressure is much less than when an entire strip of fusible metal is instantly converted into gases. There is no powdered filler to deteriorate or solidify. The winged washer makes replacement of the link quick and easy.

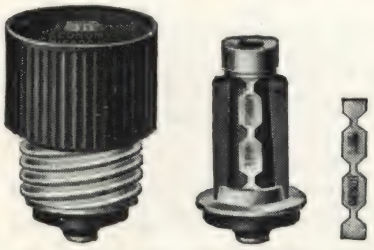
Economy Fuse Savings—Since only the inexpensive link needs to be renewed and the rest of the fuse is good for years of service, an annual saving of 80% in fuse maintenance costs may be obtained as compared with the use of "one-time" fuses.

"Drop Out" Renewable Link—The heart of an Economy Fuse. Instantly restores a blown Economy fuse to its original efficiency at the absolute minimum of cost. A stock of "Drop Out" links, always on hand, represents a very small investment.



FERRULE TYPE FUSE AND "DROP OUT" RENEWAL LINK

Economy Renewable Plug Fuses



PLUG TYPE FUSE AND "DROP OUT" RENEWAL LINK

Use of the "Drop Out" renewal link in this plug type fuse results in similar operation and saving as in the Economy cartridge type fuses. No tools are required to replace the blown link and restore the plug to its original efficiency.

"Arkless" Non-renewable Indicating Fuses

Sole manufacturers of "Arkless," the non-renewable fuse with the "100% guaranteed indicator." For use on circuits not subject to frequent overloads.

Samples

Any capacities sent on request, provided they are to be used for comparison and tests. Ask for Catalogue 19 when ordering samples.

"Hang a Fixture Like a Picture"

The ECONOMY FUSE & MFG. CO. is producing and marketing, under license agreement, Economy Elexit receptacles and Economy Elexit plugs. Our service and co-operation is offered to the fixture manufacturer and dealer, to the architect and to the electrical trade, in order to develop the universal standardization and use of this modern method of installation of electric lighting fixtures. See Electric Outlet Company, Inc., pages 1852-1853.

THE BRYANT ELECTRIC COMPANY

Manufacturers of Electric Wiring Devices

BRIDGEPORT, CONN.

BRANCHES

NEW YORK, N. Y., 342 Madison Avenue
CHICAGO, ILL., 844 West Adams Street
SAN FRANCISCO, CAL., 149 New Montgomery Street

Products

ELECTRIC WIRING DEVICES of all kinds.

- Adapters
- Appliance Plugs
- Attachment Plugs
- Bell Push Buttons
- Bull's-Eye Receptacles
- Candelabra Sockets and Receptacles
- Candle Sockets
- Chain for Pull Sockets
- Combinations for Heater Control
- Conduit Box Bodies
- Cut-outs
- Door Switches
- Elexit Devices—"Places for Lights"
- Entrance Switches
- Fan Switches
- Fixture Specialties
- Fuses
- Panelboard Switches
- Receptacles
- Rosettes
- Shade Holders
- Signaling Systems for Hospitals
- Sockets of all Descriptions
- Switches of all Descriptions

TRADE-MARK
(Reg. U. S. Pat. Off.)

General

Bryant wiring devices cover practically every need for residential, institutional and commercial building wiring. Our catalogue lists such a large number of designs for particular uses that it would be impractical to list them here. A copy of this catalogue will be sent to any one who requests it.

Hospital Signaling Systems

The Bryant Silent Call Hospital Signal System is a simplified nurses' call which has been in successful use for 10 years and is installed in over 300 institutions in America and foreign countries.

Recent improvements and simplifications have allowed substantial reductions in the cost of this equipment, and all architects who are interested in hospital work are invited to ask for a copy of the bulletin describing the system.

Electrical Wiring Specification

As the result of a questionnaire sent to 3,000 architects in all parts of the country, we publish on the following pages an Electrical Wiring Specification, believing that it will be of assistance to architects in their work. It is divided into two parts, "Electrical Specifications for a Residence" and "Electrical Specifications for an Apartment House." By using the numbered paragraphs as guides, much time can be saved in laying out electrical work.

Instructions to Stenographer

Architects who use this specification may obtain from our nearest office supplies of "Stenographer's Sheet No. SS-622." These sheets have numbers corresponding to the specification paragraphs. The architect checks off the numbers corresponding to the paragraphs he wants to use and the stenographer copies the paragraphs into the specification.

Stenographer's Sheets are supplied without cost. Unless a quantity is specified five are supplied at one time. They are 8½x11 in. in size.

Reprints of Specification

Reprints of this specification will be supplied without cost and are very useful, as they are easily handled.

Ask our nearest office for as many as you want.

Standard Symbols for Wiring Plans

At this writing, September, 1922, the Standard Symbols for Wiring Plans are being revised by the Sectional Committee of the National Association of Electrical Contractors and Dealers. The new symbols will be available soon after the publication of this edition of SWEET'S ARCHITECTURAL CATALOGUE.

Our nearest office will send as many copies as are desired.

Suggestions

We would much appreciate your suggestions for the improvement of this specification. If you use it and want to see it continued, please so advise our Advertising Department, Bridgeport, Conn. It will be a pleasure to publish it each year if it is found generally useful.

Catalogue

The Bryant Catalogue of wiring devices is almost an encyclopedia. It not only gives prices but shows dimensions and contains suggestions for uses. You will find it very helpful in your work. If you have not received a copy, send for one.

Continued on next page

Electrical Specifications for a Residence

GENERAL

(1) Scope—The aim and object of these specifications are to include all that is necessary for a complete wiring system from the local light company's service to each and every outlet throughout the house (*1a*—and garage), including (*1b*—service feeder), service switch, feeders, distributing panel, circuit wiring, plug receptacles, local switches, bells, etc., as hereinafter specified.

(2) All of the above to be done in accordance with these specifications and plans and in a manner satisfactory to the architect.

(3) Code Rules, etc.—The work shall be in accordance with the rules of the National Board of Fire Underwriters and any local department having jurisdiction. All necessary certificates shall be obtained by the contractor at his expense and delivered to the architect before work is accepted. All work shall also be in accordance with the rules of the lighting company.

(4) Guarantee—The contractor shall guarantee to make good any defects in his work which shall develop within one year from date of acceptance.

(5) Test—On completion of the work, the installation shall be entirely free from grounds and short circuits.

(6) A thorough test shall be made with a magneto in the presence of the architect or his representative.

(7) Cutting and Repairing—The contractor shall do all cutting necessary to the proper installation of his work and shall repair any damage done by him or his workmen, employing the services of the contractor whose work is damaged when so directed by the architect.

ELECTRIC LIGHT WIRING

(8) System—

Note: The following information should be obtained from the lighting company in each instance.

The circuit wiring shall be installed as a

8a—2-wire 110-v., direct current system.

8b—2-wire 110-v., single phase, ... cycle, a.c. system.

8c—3-wire 110- 220-v., direct current system.

8d—3-wire 110- 220-v., single phase, ... cycle, a.c. system.

(9) Number of Outlets per Circuit—Not more than 16 outlets or a maximum of 660 watts shall be placed on any one circuit. Where wattage is not noted, allow 110 watts for each baseboard plug connection or extension outlet and 55 watts for each light indicated at the various wall and ceiling outlets on plans. It shall be understood that if any local rule requires a higher wattage rating of outlets, that such rule shall be complied with.

(10) Wiring Diagrams—Before installing any work, the contractor shall submit to the architect for approval, in duplicate, drawings showing all circuit work. These may be in colored crayon on blue prints.

(11) Wiring System—All wiring shall be installed:

11a—As a concealed knob and tube system.

Note: This is the most economical system of wiring, but is adaptable only to wood frame construction. It is not permitted in New York and other large cities.

11b—With flexible steel armored conductors.

Note: This is generally known as BX work. It is adaptable only to non-fireproof and semi-fireproof construction.

11c—In flexible steel conduit.

Note: This system consists of a raceway of conduits whereby the wires can be replaced at any time without damage to woodwork, plaster, etc. Not adaptable to fireproof construction.

11d—In rigid iron conduit.

Note: This is the only system adaptable to fireproof construction. It is also adaptable to non-fireproof work, but is more expensive than 11a, 11b and 11c.

General Note: It is possible that a wire may become overheated through excessive load, short circuit, or ground, and the resulting heat or arc from wires parting may cause a destructive fire. With a metal protection over conductors, as in 11b, 11c and 11d, the hazard is greatly minimized, as the metal confines the fire and acts as a conductor or return path to ground for the current. The metal covered conductors are also verminproof.

11d possesses the advantage of 11c besides being entirely moisture-proof and waterproof if installed properly.

(12) Installation of Wires, etc.—

12a—Note: Specify in connection with 11a.

All wires shall be rigidly supported on porcelain insulators which separate the wire at least 1 in. from the surface wired over.

Wires passing through floors, studding, etc., shall be protected with porcelain tubes, and where wires pass vertically through bottom plates, bridging, etc., of partitions, an extra tube shall be used to protect wires from plaster droppings. Wires must be supported at least every 4 ft. and where near gas or water pipes, extra supports shall be used.

All porcelain material shall be non-absorptive, and broken or damaged pieces must be replaced. Tubes shall be of sufficient length to bush entire length of hole.

At outlets the wires shall be protected by flexible tubing, the same to be continuous from nearest wire support to inside of outlet box. Wires installed in masonry work shall be protected by approved rigid iron conduit which shall be continuous from outlet to outlet.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

12b—Note: Specify in connection with 11b.

All runs must be rigidly secured in place with pipe straps and where same terminate in outlet box or panel box, an approved box connector with lock nut and bushing shall be used.

Care should be taken that the rubber insulation is not damaged or rough cutting edges remain when armor is stripped.

No bends shall be made with an inside radius of less than 4 in. and conductors must be securely fastened out of contact with gas, water or other pipes.

If necessary, each and every run of conductor must be thoroughly grounded with a mechanically and electrically perfect connection to the water system on the street side of meter. At least one point of the system shall be grounded in this way. If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

12c—Note: Specify in connection with 11c.

All runs must be rigidly secured in place with pipe straps and where same terminate in outlet box or panel box, an approved box connector with locknut and bushing shall be used.

No conduit shall be used with an inside diameter of less than ⅝ in. and no bends shall be made with an inside radius of less than 6 in.

No splicing of conduit will be permitted; the conduit must be continuous from outlet to outlet.

Conduit shall be cut to proper length to make shortest run possible with easy bends. Care must be taken to remove all rough cutting edges when flexible conduit is cut.

No wires shall be installed until all work which may cause damage to the conduits has been completed.

Conduits must be plugged and kept clean and dry during installation.

A ground connection of approved size shall be extended from water service at street side of meter to panel box and each home run and feeder conduit must be thoroughly and effectively grounded at both points. If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

12d—Note: Specify in connection with 11d.

All conduit runs, except where buried in cement or concrete, must be rigidly held in place with pipe straps. All bends and off-sets shall be avoided where possible and when same are made, an approved hickey, similar to the "Lakin," or a conduit bending machine shall be used. The use of a pipe tee or a vise will not be permitted. All conduit deformed or crushed in any way shall not be installed and must be removed from the building without delay.

All conduit must have an inside diameter of at least ⅝ in. and no bend shall have less than a 3½-in. inside radius. Conduit shall be cut with a hack saw. The ends must be square after cutting and conduit shall be reamed after threading.

Conduits must be securely fastened to all outlet boxes with locknuts and bushings of approved make, care being exercised that the full number of threads project through for the bushings. Conduits shall be joined with approved conduit couplings or right and left couplings. No running threads will be permitted.

All joints in conduit must be leaded and made watertight.

No wires shall be installed until all work which might cause damage to the conduits or wires has been completed.

Continued on next page

Conduits must be kept at least 6 in. from hot water pipes, steam pipes, and flues.

A ground connection of approved size shall be extended from water service at street side of meter to panel box, and each home run and feeder conduit must be thoroughly and effectively grounded at both points.

If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

Conduits shall be plugged and kept clean and dry during installation.

(13) Conductors—Conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet boxes.

(14) No wire smaller than No. 14 B & S gauge shall be used and for all circuits of 100 ft. or longer, No. 12 B & S gauge shall be used.

All conductors of No. 8 B & S gauge or larger shall be stranded.

(15) Wires shall be of sufficient length at outlets to make connection to apparatus without straining connections.

(16) Splices shall be made both mechanically and electrically perfect, soldered, and the proper thickness of rubber and friction tape shall be then applied.

(17) Materials—All materials used in carrying out these specifications shall be acceptable to the National Board of Fire Underwriters and to any local departments having jurisdiction.

Where no make or brand is specified or where the expression "equal to" is used, the contractor must notify the architect of the make or brand to be used and receive his approval before any of said material is installed. Where a particular brand or make is definitely specified, no substitution will be permitted.

(18) Conduit—

Note: This paragraph is to be included only where paragraph 11d is specified.

18a—All rigid iron conduit shall be enameled.

18b—All rigid iron conduit shall be galvanized.

(19) Wire—The insulation of all conductors shall be rubber, with protecting braids. Insulation shall

19a—Be N. E. C. Standard.

19b—Be "Intermediate" grade.

19c—Have a rubber compound containing not less than 30% by weight of Para rubber.

Note: 19c is the highest grade.

(20) Service Connection—Install service feeder from the lighting company's line to the service switch and make all connections complete to the satisfaction of the lighting company and the architect.

Service feeder shall be same size as house feeder.

Feeder shall be installed:

20a—Overhead with weatherproof wire.

20b—Underground in galvanized iron pipe conduit with lead covered wires.

Conduit shall be painted with asphaltum.

Trenching and backfilling by this contractor.

Note: The architect should consult with the lighting company as to whether or not they will install the service feeder. Some companies require that this be installed by others, while some will not permit the electrical contractor to make the installation.

(21) Connection for Range—At the point of service entry, install a switch of proper capacity and provision for meter as required by the lighting company. From this point install a feeder as specified for lighting feeder to the location of range as indicated on drawings and connect to range.

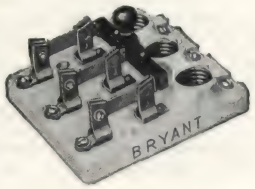
Feeder shall be of proper size to carry the full load of range, which is ..... watts.

Feeder, switch, etc., shall be designed for the voltage and number of wires required by the lighting company for this class of service.

Note: Obtain capacity of range from the manufacturer. An average range with oven, broiler and with four "hot plates" requires about 9000 watts.

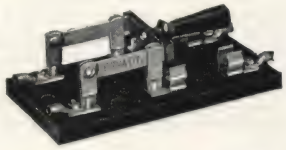
(22) Service Switch—The service entrance switch shall be:

22a—30-amp. porcelain base with connections for plug fuses (Bryant).



CATALOGUE No. 1693

22b—Of proper capacity mounted on a slate base with connections for cartridge fuses (Perkins).



CATALOGUE No. 3557

(23) Installation of Service Switch—Service switch shall be installed in a moistureproof metal box with hinged door.

(24) Provision for Meter—Make all provision for installation of meter as required by the lighting company.

(25) House Feeder—The size of the feeder from the service switch to the distributing panel shall be figured in accordance with the National Code rules for carrying capacity, allowing for all circuits being fully loaded. The feeder shall be of sufficient size, however, to confine the drop in voltage with all circuits fully loaded to not more than 2% of the line voltage.

Feeder shall be rubber insulated.

Size of feeder must be submitted to the architect for approval.

(26) Distributing Panel—

Note: The use of switches on distributing panel is to be recommended, particularly if cartridge type fuses are used, so that the circuit may be opened to replace fuses.

The distributing panel shall consist of:

26a—2-wire 125-v. branch cut-outs (Bryant No. 62587).

CATALOGUE No. 62587

26b—3-wire 125-v. branch cut-outs (Bryant No. 62199).

CATALOGUE No. 62199

26c—2-wire 250-v. branch cut-outs (Bryant No. 1922).

CATALOGUE No. 1922

26d—3-wire 250-v. branch cut-outs (Bryant No. 1923).

CATALOGUE No. 1923

26e—2-wire 125-v. porcelain base panelboard units (Perkins No. 2300).

CATALOGUE No. 2300

26f—3-wire 125-v. porcelain base panelboard units (Perkins No. 2360).

CATALOGUE No. 2360

26g—2-wire 250-v. porcelain base panelboard units (Perkins No. 2535).

CATALOGUE No. 2535

26h—3-wire 250-v. porcelain base panelboard units (Perkins No. 2536).

Continued on next page

26j—2-wire 125-v. porcelain base dead front panelboard units (Perkins Nos. 2599, 2699; Bryant Nos. 72587, 72199).

CATALOGUE No. 2599

CATALOGUE No. 72587

26k—3-wire 125-v. porcelain base dead front panelboard units (Perkins Nos. 2600, 2700; Bryant Nos. 82587, 82199).

CATALOGUE No. 2600

CATALOGUE No. 2700

CATALOGUE No. 82199

26l—2-wire 250-v. porcelain base dead front panelboard units (Perkins Nos. 2685, 2688).

CATALOGUE No. 2688

26m—2-wire 125-v. porcelain base knife switch panelboard units (Bryant No. 1852).

CATALOGUE No. 1852

26n—30-amp. fusible branch circuit switches, with ample size busbars and main fusible switch of proper capacity, all mounted on a black finished slate slab at least 1 in. thick. Jaws and hinges of all switches shall be milled and sweated construction (Bryant Nos. 3086 and 3087).

CATALOGUE No. 3086

CATALOGUE No. 3087

(27) **Fuses**—Distributing panel shall be fully equipped with fuses and 25% in excess shall be furnished to the owner. All fuses for branch circuits shall be not more than 10-amp. capacity.

27a—125-v. plug type (Bryant "Pyrotite," No. 66327 to 66341).

Note: Specify 27a in connection with 22a, 26a, 26b, 26e, 26f, 26j, 26k, 26m.

27b—250-v. cartridge type (Bryant Nos. 1853 to 1865).

Note: Specify 27b in connection with 22b, 26c, 26d, 26g, 26h, 26l, 26n.

CATALOGUE No. 66341

CATALOGUE No. 1853

(28) **Panel Cabinet**—The distributing panel cabinet shall be:

28a—Flush type of steel not less than No. 12 gauge bent up or reinforced with angle iron frames, which shall be securely riveted in place.

28b—Flush type constructed of hardwood and lined with ⅛-in. sheet asbestos.

Note: Specify 28b for 12a class of work only.

28x—Cabinet shall be larger than panel to give at least 4-in. wire space around panel and shall be given 2 coats of moisture repellent paint.

(29) The distributing panel shall be surrounded with an ebony asbestos or slate partition ½ in. thick which will form a wire space around panel.

(30) **Panel Trim and Door**—The panel trim and door shall be:

30a—Of steel, with brass cylinder lock and concealed hinges, all furnished under this contract.

30b—Of paneled hardwood, finished as directed and lined with ⅜-in. asbestos wood, all furnished under this contract.

30c—Furnished under another contract, but ⅜-in. asbestos wood lining shall be installed by this contractor.

30x—A directory of circuits and outlets served by panel shall be enclosed in glass with metal frame, mounted on inside of panel door.

(31) **Feeder, etc. to Garage**—From a branch connection on the distributing panel, install a circuit to the garage. The portion of this circuit between the house and the garage shall be installed:

31a—Overhead, using weatherproof wires supported by approved insulators at each end.

31b—Underground, using lead covered wires installed in galvanized iron pipe conduit. Conduit shall be painted with asphaltum. Trenching and backfilling by this contractor.

Near the point at which the circuit enters the garage building, install an approved entrance switch and cut-out in steel box and extend circuits from this switch to the various outlets in garage.

(32) **Outlets**—At each and every switch, wall, ceiling, receptacle or other outlet shown on plans, install a standard deep type, stamped steel, knockout type, outlet box and cover of a style most suitable for the purpose of the outlet.

Where directed, wall bracket outlet covers shall be French fixture type.

Outlet boxes shall be:

32a—Enameled.

32b—Galvanized.

(33) All outlet boxes must be rigidly secured in place by approved methods and those intended for fixtures shall be provided with a fixture stud, or, in the case of large fixtures, hangers to furnish support independent of the outlet boxes.

(34) **Position of Outlets**—Unless otherwise indicated or directed, plug receptacles shall be located just above baseboard; wall brackets, 5 ft. above finished floor in bedrooms, and 5 ft. 6 in. in all other rooms; wall switches, 4 ft. above finished floors.

(35) All outlets shall be centered with regard to paneling, furring, trim, etc., and any outlet which is improperly located on account of failure to take account of above conditions must be corrected at the contractor's expense.

(36) All outlets must be set plumb and extend to finish of wall, ceiling or floor, as the case may be, without projecting beyond same.

(37) **Local Switches**—Local wall switches, except where otherwise noted on drawings, shall be:

37a—Two-button flush type completely enclosed in a box of non-breakable insulating material with brass beveled edge cover plate finished to match surrounding hardware (Bryant Nos. 601 to 610).

Note: This is the highest grade push switch made.

It is standard 2-button type and the mechanism is completely enclosed in a 2-piece box made of indestructible insulating material, thereby eliminating breakage, excluding dirt and preventing electrical grounds.

The screws which attach the plate to the switch enter bushings that are under spring tension, which automatically aligns the plate on the wall.

Single pole (catalogue No. 601) for loads not in excess of 660 watts.

Double pole (catalogue No. 602) for loads greater than 660 watts or where a double pole switch is required.

Three-point (catalogue No. 603) to be used where a given light or group of lights is to be controlled from two places.

Four-point (catalogue No. 604) to be used in connection with two 3-point switches at each additional point where lights are to be controlled from any one of more than two places.

Double pole 20-amp. type (catalogue No. 609) to be used for heater or other heavy duty service.

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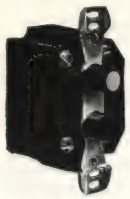

CATALOGUE No. 602

37b—Two-button flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Nos. 2201 to 2204).

Note: This is the standard flush switch for residence work.

Single pole (catalogue No. 2201) for loads not in excess of 660 watts.

Double pole (catalogue No. 2202) for loads greater than 660 watts or where a double pole switch is required.

Three-point (catalogue No. 2203) to be used where a given light or group of lights is to be controlled from two places.

Four-point (catalogue No. 2204) to be used in connection with two 3-point switches at each additional point where lights are to be controlled from any one of more than two places.

Double pole 20-amp. (catalogue No. 2623) to be used for heater or other heavy duty service.

CATALOGUE No. 2202

37c—Single button flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Type "O").

Note: This is a type of flush switch which is preferred by many as standard for the reason that all combinations of connections are provided in the one style.

The operation is by means of successive pushes on a single button.

They are furnished as follows

No. 2457, single pole.

No. 2491, single pole, indicating.

No. 2458, three-point.

No. 2459, four-point.

No. 2460, two-circuit electrolier.

No. 2492, two-circuit electrolier, indicating.

No. 2461, three-circuit electrolier.

No. 2493, three-circuit electrolier, indicating.

No. 2462, double pole.

No. 2494, double pole, indicating.

They may also be arranged to control the speed of fan motors and other small motors.

The indicating feature is by means of a dial which shows through a small hole in the end of the button.

The choice of single pole, double pole, three-point and four-point switches is determined in the same manner as under 37a.

Electrolier switches are used to obtain varying degrees of illumination; as for instance, a 6-light fixture controlled by a 2-circuit switch might give on the first operation of the switch, 2 lights; on the second, 4 lights; on the third, 6 lights; on the fourth, all off.

The same fixture in connection with a 3-circuit switch might give on the first operation, 1 light; on the second, 3 lights; on the third, 6 lights; on the fourth, all off.

CATALOGUE No. 2457

37d—Rotary flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Nos. 2205 to 2210).

Note: This is the oldest type of flush switch and has been largely discarded in favor of the styles specified in 37c and 37g. It may be furnished to provide the same variety of connections.

37e—Two-button flush type with brass beveled edge cover plate finished to match surrounding hardware (Bryant Nos. 2901 and 2903).

Note: This "Yankee" switch is extensively used where the highest quality switch is not necessary.

It is supplied only in single pole (No. 2901) and 3-point (No. 2903) types.

CATALOGUE No. 2901 SWITCH

37f—Toggle flush type with brass beveled edge cover plate finished to match surrounding hardware (Bryant Nos. 2951-2954).

Note: Because of the simplicity of operation, the toggle switch is gaining in popularity.

Supplied in single pole, (No. 2951), double pole, (No. 2952), 3-point, (No. 2953), and 4-point, (No. 2954). See description in note under 37a for explanation.

CATALOGUE No. 2951

37g—Duplex 2-button flush type with brass beveled edge cover plate finished to match surrounding hardware.

Note: This switch consists of two Type "O" switch mechanisms (see note under 37c) mounted in a single porcelain cup of standard dimensions.

The variety of combinations of circuits offered by this arrangement of switches is too wide to be catalogued here. Full information may be found in our catalogue, copy of which will be furnished on request.

CATALOGUE No. 2709

(38) Where noted on drawings, local switches shall be supplied with "Undark" genuine radium luminous buttons or handles.

Note: The switches described in paragraphs 37a, 37b, 37e, and 37f can be supplied with "Undark" luminous buttons which shine in the dark for 25c each list additional. This feature is a great convenience, and as the luminosity is permanent, the added first cost is the only cost.

CATALOGUE No. 2901 SWITCH WITH LUMINOUS BUTTON AND No. 3665 FLUSH PLATE

(39) Where noted on drawings, local switches shall be:

39a—3-point.

39b—4-point.

39c—Electrolier.

(40) Plates shall be:

40a—.040 in. thick.

40b—.060 in. thick.

40c—Solid type.

(41) Where more than one switch occurs in same location, furnish an approved lettered gang plate to cover all switches.

(42) Where indicated on the drawings, closets shall be equipped with automatic door switch to connect the light when the door is open (Perkins No. 2355).

(See illustration on next page.)

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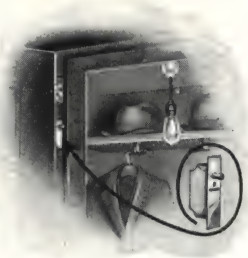


APPLICATION OF CATALOGUE NO. 2355

(43) **Three-point Control**—Where noted on drawings, outlets shall be controlled by 3-point or 4-point switches.

(44) **Electrolier Control**—Wherever noted on drawings, three wires with distinctively colored braids shall be run between the switch box and the outlet box, and local switches shall be electrolier type.

(45) **Dining Room Circuit**—Furnish and install in dining room where indicated on plans an approved box containing an approved 10-amp. dead front plug receptacle (Bryant No. 120, 115, or 116.) Furnish 6 ft. of No. 14 B & S gauge silk covered flexible cord with plug (Bryant No. KA, KB, KC, KD or KN) for the 10-amp. receptacle on the end and with composition cord connector body (Bryant No. 103) with composition duplex adapter (Bryant No. KH) on the other end.

CATALOGUE NO. 103

CATALOGUE NO. KH

(46) **Hardware**—All hardware including flush plates, metal covered attachment plugs, etc., furnished under this contract shall match in quality and finish other adjacent hardware.

(47) **Pilot Lights**—Switches as noted on drawings shall have:

47a—Pilot lamp in plate with switch (Bryant No. 413).

Note: This switch requires for its installation a 2-gang outlet box. The ruby bull's-eye which covers the lamp is practically flush, extending from the wall no further than the buttons of the switch.

CATALOGUE NO. 413

47b—Pilot lamp in plate with switch (Bryant No. 465).

Note: This switch is installed in a single-gang box. The lamp extends through the plate and is protected by a perforated cage which extends about an inch from the plate.

CATALOGUE NO. 465

(48) **Elexit Devices—"Places for Lights"**—All wall and ceiling fixture outlets as noted on drawings shall be equipped with Elexit receptacles of proper and approved type (Bryant).

Note: See pages 1852-1853 in this edition of SWEET'S ARCHITECTURAL CATALOGUE.

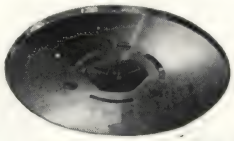
LX101-301 is the standard wall Elexit receptacle with standard oval plate. Can be installed in standard outlet boxes by means of ⅜-in. fixture stud or by means of 8x32 screws which support it to the ears of the box.

LX111-311 is the narrow wall Elexit receptacle with narrow oval plate for use with wall brackets having narrow backs. It is the type to specify on new work. It can be installed only with types 52 c 63 and 54 c 63 outlet box covers. Such covers are made by a number of prominent box manufacturers.

LX101 ELEXIT WALL RECEPTACLE WITH LX301 OVAL PLATE

LX111 ELEXIT WALL RECEPTACLE WITH LX311 NARROW OVAL PLATE

LX200-400 is the single circuit ceiling Elexit receptacle with flat plate. Two-circuit Elexit receptacles and raised plates are also available where needed. Can be installed in standard ceiling outlet boxes by means of ⅜-in. fixture stud or by means of screws which support it to the ears of the box.



LX200 ELEXIT CEILING RECEPTACLE WITH LX400 CEILING PLATE

(49) **Plug Receptacles**—Plug receptacles shall be:

49a—Of the disappearing door type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant D. D. No. 430).

Note: In this receptacle the doors are pushed inward by the insertion of the plug, and upon its withdrawal, close automatically, effectually excluding dirt and concealing the live terminals. It is the best plug receptacle obtainable. The plug is of Bakelite and is practically unbreakable, and there are no protruding contacts to become bent or loosened.

49b—Spartan type (single) (duplex).

Note: This type of receptacle has been standardized by a number of manufacturers and its use is recommended for this reason. Most of the separable plugs furnished with heating devices will fit this receptacle. Tandem is preferable.

CATALOGUE NOS. 430 RECEPTACLE, 431 PLATE AND 432 PLUG

CATALOGUE NO. 120 AND NO. 429 PLATE

CATALOGUE NO. 122 AND NO. 550 PLATE

49c—Of the Chapman type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant Chapman No. 1363).

Note: In this receptacle the doors open outward, but are flush whether the plug is in or out.

49d—Of the screw plug type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant No. 1708).

Note: This type will receive any style of Edison screw base attachment plug.

CATALOGUE NO. 1363 RECEPTACLE, NO. 1100 PORCELAIN PLUG AND NO. 1364 PLATE

CATALOGUE NO. 1700 RECEPTACLE AND NO. 1709 PLATE

Continued on next page

(50) **Wall and Ceiling Sockets and Receptacles**—One-light wall and ceiling receptacles shall be:

50a—Keyless, of a type to fit standard 3¼-in. or 4-in. outlet boxes (Bryant 4100, 4102).

50b—Pull chain of a type to fit standard 3¼-in. or 4-in. outlet boxes (Bryant 4104).

CATALOGUE No. 4102

CATALOGUE No. 4104

50c—Of the insulated base type ("New Wrinkle" BL 12 or 13 or 15 or 35; or BM 12 or 13 or 15 or 35).

Note: If wall brackets are desired, Bryant Nos. 674, 675, 684 and 685 may be found suitable.

CATALOGUE No. BL13

CATALOGUE No. BM15

CATALOGUE No. 674

CATALOGUE No. 684

(51) Sockets in cellar and bathrooms shall be porcelain.

Note: Where outlets are controlled by local switches, specify Keyless receptacles—otherwise specify key or pull chain type.

(52) All lamp sockets used in fulfilling these specifications shall have an approved rating of 660 watts, 250 volts.

(53) **Drop Lights**—Drop lights shall consist of the necessary length of reinforced cord supported by:

53a—An insulated rosette with brass base and cover (Bryant "New Wrinkle" BL or BM 26).

53b—A porcelain rosette with binding screw terminals (Bryant No. 298).

CATALOGUE No. BL26

CATALOGUE No. 298

53c—A combination rosette and pull switch ("New Wrinkle" BL or BM 25).

CATALOGUE No. BM25

53X—And furnished with a:

53d—Key socket ("New Wrinkle" AT 10, 11 or 12).

53e—Keyless socket ("New Wrinkle" AT 13).

53f—Pull socket ("New Wrinkle" AT 15 or AT 35).

CATALOGUE No. AT12

CATALOGUE No. AT13

CATALOGUE No. AT35

53Y—Complete with a:

53g—2¼-in. shade holder (Bryant "Uno" catalogue No. 501 or 532, with setscrews) or Bryant "Uno" Catalogue No. 502 or 533, with spring grip).

Note: Specify for brass shell sockets.

CATALOGUE No. 501

CATALOGUE No. 533

53h—Sockets in cellar and bathrooms shall be porcelain (Bryant No. PT 71, 73, 70 or 76).

53k—And finished with 2¼-in. shade holder (Bryant No. 628).

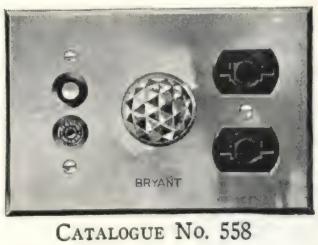
Note: Specify for porcelain sockets.

CATALOGUE No. PT70

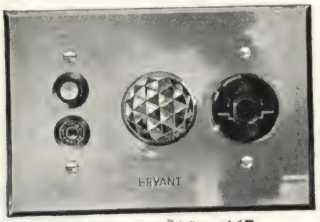
CATALOGUE No. 628

53Z—Each drop cord shall have an adjuster.

(54) **Heater Switch, Pilot and Receptacle**—Heating device outlets shall be equipped with combination of switch, pilot light and receptacle (Bryant).



CATALOGUE No. 558



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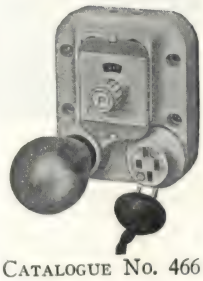


CATALOGUE No. 466

COMMUNICATION AND SIGNALING SYSTEMS

(55) **Call Bells, etc.**—The contractor shall furnish, install and connect all push buttons, bells, buzzers and annunciators, etc., as shown on plans or herein described.

(56) All wiring shall be:

56a—Cleated on joists, studs, etc., with insulated staples. Damp places, metal pipes of all description, flues, etc., must be avoided and wire fastenings must be applied in such a way that insulation is not damaged.

No splices shall be made where same will not be accessible at any time after completion of building.

Note: 56a for wood construction only.

Continued on next page

56b—Installed in metal conduit similar to electric light wires.

(57) Wires shall not be smaller than No. 18 B & S gauge and shall be:

57a—Dampproof insulated.

Note: 57a for wood frame construction only.

57b—Rubber insulated, as specified for electric lighting.

(58) Bells, buzzers, buttons, etc. shall be of approved type and make (see paragraph 17) and shall be designed to operate on the current supply as hereinafter specified.

(59) Push button for main entrance door shall be provided with approved ornamental brass plate with approved finish. Push button in dining room shall consist of combination floor push, with necessary length of flexible cord and approved portable foot push.

(60) Furnish and install where directed:

60a—Three approved dry battery cells in a substantial cabinet.

Note: Specify where electric light service is direct current.

60b—An approved bell transformer of ample capacity to operate the system.

Note: Use where service is alternating current, as bell transformer is economical and requires no attention.

(61) **Schedule of Bells**—

Note: Give stenographer schedule of bells similar to following:

Front door push rings bell in hall.
Dining room push rings buzzer in kitchen.
Bedroom No. 1 push rings annunciator in first hall.
Bedroom No. 2 push rings annunciator in first hall.
Bedroom No. 3 push rings annunciator in first hall.

(62) **Conduit for Telephone Wires**—From an approved point of entrance of telephone company, install ⅜-in. or ½-in. approved rigid iron conduit to telephone locations as shown on plans or where directed, providing a bushed opening (Bryant Nos. 3649, 3651) at each end of conduit.

Note: Specify the above where exposed telephone wire is objectionable.

CATALOGUE No. 3649

(63) **Speaking Tubes**—Furnish and install a complete system of speaking tubes as shown on plans or herein described:

63a—Speaking tube to be heavily plated block tin pipe, 1-in. diameter. All seams and joints shall be perfectly soldered and tube must be properly supported with pipe straps. Tube shall not be twisted or bent, all changes in direction being made with the proper fittings.

Note: 63a is for wood frame construction only.

63b—Speaking tube to consist of 1-in. rigid enameled conduit securely fastened in place with pipe straps. All joints must be made with threaded couplings and leaded so as to be airtight.

Note: 63b can be used in both non-fireproof and fireproof construction.

(64) Mouthpieces shall be porcelain with indicating flaps and whistles, installed 4 ft. 10 in. above floor.

(65) **Burglar Alarm**—Furnish and install complete burglar alarm system consisting of the necessary wires, window springs, door springs, night latch cut-out for front door, bell, batteries, cabinet, interconnection strip, etc., and everything required for a complete open circuit system.

(66) Each window sash and door throughout the building shall be equipped with contact spring of approved make and all springs on same side of building on each floor shall be wired on one circuit and terminated on single pole knife switch on interconnection strip. One polarity shall be common throughout the system.

(67) The interconnection strip shall be located as directed and shall have single pole cut-out switches for each circuit as well as a double pole battery switch.

(68) The battery shall consist of at least three approved dry cells in suitable cabinet placed where directed. Both positive and negative leads shall be carried direct to battery switch on interconnection strip.

(69) The burglar alarm wires shall be not less than No. 18 B & S gauge, insulated and installed as specified for call bells.

(70) **Intercommunicating Telephones**—Furnish and install an intercommunicating telephone system complete with all telephone sets, wiring, batteries, etc. Locations of instruments are shown on drawings.

(71) All wires to be cables containing the necessary number of No. 22 B & S gauge conductors for each station and a pair of No. 16 B & S gauge conductors for talking and ringing battery respectively. Each pair of wires shall be twisted and all pairs shall be twisted around each other.

(72) The wires shall be silk and cotton insulated, with a moisture repellant of beeswax or varnish and the whole covered with a lead sheath.

(73) Where cables terminate in outlet boxes, they shall be fanned out and laced in an orderly manner and secured to connecting terminals, one of which shall be provided for each wire.

(74) Install where directed in an approved cabinet at least four cells of approved dry battery each, for talking and ringing purposes.

(75) **Installation of Interphone Cable**—

75a—Intercommunicating cables shall be supported with pipe straps and liberal clearance shall be observed where near steam or other pipes.

Note: 75a for frame construction or exposed work only.

75b—Intercommunicating cables shall be installed in approved rigid iron conduit with necessary approved metal outlet boxes, as specified for lighting system.

Note: 75b for all types of construction.

(76) Cable to garage shall be installed underground in galvanized iron pipe conduit painted with asphaltum. Trenching and backfilling by this contractor.

(77) Instruments shall be of approved make, of wall or desk type, as noted on drawings. System shall be:

77a—Common talking, selective ringing type.

Note: Specify where it is not necessary for more than one conversation to be carried on at a time. This system is simpler and more reliable than the full automatic push button type.

77b—Full automatic push button type, so that as many conversations as desired may be carried on simultaneously.

Electrical Specifications for an Apartment House

GENERAL

(1) **Scope**—The aim and object of this specification is to include all that is necessary for a complete wiring system from the local light company's service to each and every outlet through the building, including (*1a*—service feeders), service switch feeders, distributing panel, circuit wiring, plug receptacles, local switches, bells, etc., as hereinafter specified.

(2) All of the above to be done in accordance with this specification and plans and in a manner satisfactory to the architect.

(3) **Code Rules, etc.**—The work shall be in accordance with the rules of the National Board of Fire Underwriters and any local department having jurisdiction. All necessary certificates shall be obtained by the contractor at his expense and delivered to the architect before work is accepted. All work shall be in accordance with the rules of the lighting company.

(4) **Guarantee**—The contractor shall guarantee to make good any defects in his work which shall develop within one year from date of acceptance.

(5) **Test**—On completion of the work, the installation shall be entirely free from grounds and short circuits.

(6) A thorough test shall be made with a magneto in the presence of the architect or his representative.

(7) **Cutting and Repairing**—The contractor shall do all cutting necessary to the proper installation of his work, and shall repair any damage done by him or his workmen, employing the services of the contractor whose work is damaged when so directed by the architect.

ELECTRIC LIGHT WIRING

(8) **System**—

Note: The following information should be obtained from the lighting company in each instance:

The circuit wiring shall be installed as a

8a—2-wire 110-v., direct current system.

8b—2-wire 110-v., single phase, ... cycle, a. c. system.

Continued on next page

8c—3-wire 110-220-v. direct current system
8d—3-wire 110-220-v. single phase, ... cycle, a.c. system.

(9) **Number of Outlets per Circuit**—Nor more than 16 outlets or a maximum of 660 watts shall be placed on any one circuit. Where wattage is not noted, allow 110 watts for each baseboard plug connection or extension outlet and 55 watts for each light indicated at the various wall and ceiling outlets on plans. It shall be understood that if any local rule requires a higher wattage rating of outlets, that such rule shall be complied with.

(10) **Wiring Diagrams**—Before installing any work, the contractor shall submit to the architect for approval, in duplicate, drawings showing all circuit work. These may be in colored crayon on blue prints.

(11) The owner's portion of building and each apartment shall be wired as a separate system with its own meter.

(12) Apartments containing more than the equivalent of sixteen 40-watt lamps, or more than one circuit, shall have a distributing center located within the apartment where directed, the same to consist of the necessary number of fused branch circuit switches mounted in a cabinet as hereinafter specified. Apartments with not more than one circuit shall be wired direct from service board.

(13) It is intended that all meters be placed:

13a—In basement and this contractor shall extend a feeder of capacity as specified hereinafter under "Feeders" from distributing center in each apartment to the general meter board in basement.

13b—In apartments approximately where shown on drawings. This contractor shall install a system of feeders extending from general service switchboard in basement to top floor, the same to loop through the various distributing centers. At distributing centers proper provision shall be made for meter connections, with meter protecting fuses, switch, meter loops, etc., all in accordance with the requirements of the lighting company. Provide for owner's meter where directed.

(14) All wiring shall be installed:

14a—As a concealed knob and tube system.

Note: This is the most economical system of wiring, but is adaptable only to wood frame construction. It is not permitted in New York and other large cities.

14b—With flexible steel armored conductors.

Note: This is generally known as BX work. It is adaptable only to non-fireproof and semi-fireproof construction.

14c—In flexible steel conduit.

Note: This system consists of a raceway of conduits whereby the wires can be replaced at any time without damage to woodwork, plaster, etc. Not adaptable to fireproof construction.

14d—In rigid iron conduit.

Note: This is the only system adaptable to fireproof construction. It is also adaptable to non-fireproof work, but is more expensive than 14a, 14b and 14c.

It is possible that a wire may become overheated through excessive load, short circuit, or ground, and the resulting heat or arc from wires parting may cause a destructive fire. With a metal protection over conductors, as in 14b, 14c and 14d, the hazard is greatly minimized, as the metal confines the fire and acts as a conductor or return path to ground for the current. The metal-covered conductors are also vermin-proof.

14d possesses the advantages of 14c besides being entirely moisture-proof and waterproof if installed properly.

(15) **Installation of Wires, etc.**—

15a— *Note:* (Specify in connection with 14a.)

All wires shall be rigidly supported on porcelain insulators which separate the wires at least 1 in. from the surface wired over.

Wires passing through floors, studding, etc., shall be protected with porcelain tubes, and where wires pass vertically through bottom plates, bridging, etc., of partitions, an extra tube shall be used to protect wires from plaster droppings.

Wires must be supported at least every 4 ft. and where near gas or water pipes, extra supports shall be used.

All porcelain material shall be non-absorptive, and broken or damaged pieces must be replaced.

Tubes shall be of sufficient length to bush entire length of hole.

At outlets the wires shall be protected by flexible tubing, the same to be continuous from nearest wire support to inside of outlet box.

Wires installed in masonry work shall be protected by approved rigid iron conduit which shall be continuous from outlet to outlet.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection department having jurisdiction.

15b— *Note:* (Specify in connection with 14b.)

All runs must be rigidly secured in place with pipe straps and where same terminate in outlet box or panel box, an approved box connector with locknut and bushing shall be used.

Care should be taken that the rubber insulation is not damaged or rough cutting edges remain when armor is stripped.

No bends shall be made with an inside radius of less than 4 in. and conductors must be securely fastened out of contact with gas, water or other pipes.

If necessary, each and every run of conductor must be thoroughly grounded with a mechanically and electrically perfect connection to the water system on the street side of meter. At least one point of the system shall be grounded in this way.

If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

15c— *Note:* (Specify in connection with 14c.)

All runs must be rigidly secured in place with pipe straps and where same terminate in outlet box or panel box, an approved box connector with locknut and bushing shall be used.

No conduit shall be used with an inside diameter of less than ⅝ in. and no bends shall be made with an inside radius of less than 6 in.

No splicing of conduit will be permitted, it must be continuous from outlet to outlet.

Conduit shall be cut to proper length to make shortest run possible with easy bends.

Care must be taken to remove all rough cutting edges when flexible conduit is cut.

No wires shall be installed until all work which may cause damage to the conduits has been completed.

Conduits must be plugged and kept clean and dry during installation.

A ground connection of approved size shall be extended from water service at street side of meter to panel box and each home run and feeder conduit must be thoroughly and effectively grounded at both points.

If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

15d— *Note:* (Specify in connection with 14d.)

All conduit runs, except where buried in cement or concrete, must be rigidly held in place with pipe straps. All bends and offsets shall be avoided where possible and when same are made, an approved hickey, similar to the "Lakin," or a conduit bending machine shall be used. The use of a pipe tee or a vise will not be permitted. All conduit deformed or crushed in any way shall not be installed and must be removed from the building without delay.

All conduit must have an inside diameter of at least ⅝ in. and no bend shall have less than a 3½-in. inside radius.

Conduit shall be cut with a hack saw. The ends must be square after cutting and conduit shall be reamed after threading.

Conduits must be securely fastened to all outlet boxes with locknuts and bushings of approved make, care being exercised that the full number of threads project through for the bushings. Conduits shall be joined with approved conduit couplings or right and left couplings. No running threads will be permitted.

All joints in conduit must be leaded and made watertight.

No wires shall be installed until all work which might cause damage to the conduits or wires has been completed.

Conduits must be kept at least 6 in. from hot water pipes, steam pipes and flues.

A ground connection of approved size shall be extended from water service at street side of meter to panel box, and each home run and feeder conduit must be thoroughly and effectively grounded at both points.

If water system is not available, install an approved ground connection.

Install a ground conductor from one wire of the system to water system or to an approved ground connection as may be required by the inspection departments having jurisdiction.

Conduits shall be plugged and kept clean and dry during installation.

(16) **Conductors**—Conductors shall be continuous from

Continued on next page

outlet to outlet and no splices shall be made except in outlet boxes.

(17) No wire smaller than No. 14 B & S gauge shall be used and for all circuits of 100 ft. or longer, No. 12 B & S gauge shall be used. All conductors of No. 8 B & S gauge or larger shall be stranded.

(18) Wires shall be of sufficient length at outlets to make connection to apparatus without straining connections.

(19) Splices shall be made both mechanically and electrically perfect, soldered, and the proper thickness of rubber and friction tape shall be then applied.

(20) **Materials**—All materials used in carrying out these specifications shall be acceptable to the National Board of Fire Underwriters and to any local departments having jurisdiction. Where no make or brand is specified, or where the expression "equal to" is used, the contractor must notify the architect of the make or brand to be used and receive his approval before any of said material is installed. Where a particular brand or make is definitely specified, no substitution will be permitted.

(21) **Conduit**—

Note: This paragraph is to be included only when paragraph 14d is specified.

21a—All rigid iron conduit shall be enameled.

21b—All rigid iron conduit shall be galvanized.

(22) **Wire**—The insulation of all conductors shall be rubber, with protecting braids. Insulation shall

22a—Be N. E. C. Standard.

22b—Be "Intermediate" grade.

22c—Have a rubber compound containing not less than 30% by weight of Para rubber.

Note: 22c is the highest grade.

(23) **Service Connections**—Install service feeders for light and power from the lighting company's line to the service entry and make all connections complete to the satisfaction of the lighting company and the architect. Lighting feeder shall be of sufficient size to carry the entire lighting load with all circuits fully loaded with a voltage drop not to exceed 2% of the line voltage or less if required by the lighting company. The power feeder shall be equal in capacity to the combined capacity of motor feeders. Feeders shall be installed:

23a—Overhead with weatherproof wire.

23b—Underground in galvanized iron pipe conduit with lead covered wires. Conduit shall be painted with asphaltum. Trenching and backfilling by this contractor.

Note: The architect should consult with the lighting company as to whether or not they will install the service feeder. Some companies require that this be installed by others, while some will not permit the electrical contractor to make the installation.

(24) **Feeders**—The size of feeders shall be figured in accordance with the National Code rules for carrying capacity, allowing for all circuits being fully loaded. Feeders shall be of sufficient size, however, that the drop in voltage with all circuits fully loaded will not exceed 2% of the line voltage.

(25) The contractor shall submit for the architect's approval a sketch of the arrangement of feeders, together with the size of each before such work is installed.

(26) Arrangement of meters, switches, cut-outs, meter loops, service feeder and feeders, etc., shall be installed in every particular in accordance with the requirements of the lighting company and subject to the approval of the architect. This contractor shall make all connections necessary to a complete installation from service to each and every outlet except those made by lighting company.

(27) Contractor shall install in hatchway, where directed by elevator contractor, an approved outlet box for lighting trail cable and extend circuit for same from owner's distributing panel where a separate circuit switch shall be provided for same.

(28) **Motor Feeders**—Provide a power distributing board at service entrance consisting of the necessary knife switches, cut-outs, fuses, space for meter, etc., and extend feeder from this board to each motor as indicated on plans. Power distributing board shall be installed in a cabinet with door and trim as specified for lighting distributing panel.

(29) Wiring shall be:

29a—2-wire, ...-v., direct current.

29b—2-wire, ...-v., single phase, ...cycle, alternating current.

29c—....-wire, ...-v., 2-phase, ...cycle, alternating current.

29d—3-wire, ...-v., 3-phase, ...cycle, alternating current.

General Note—This information should be obtained from the lighting company in each instance.

(30) Feeder for elevator shall be based on 150% of full load current rating of motor.

(31) The size of other motor feeders shall be based on 125% of full load current rating of each motor; otherwise all feeders shall be as specified under "Feeders."

(32) Provide and install in a steel box near each motor a fused knife switch of proper capacity and furnish and make all connections to starters and motors.

(33) Starters will be furnished by others but shall be erected by this contractor.

Note: Paragraphs 27 to 33, inclusive, provide for power wiring entirely separate from lighting. This is desirable as the fluctuation in voltage due to stopping and starting of motors will cause a disagreeable flicker in lamps if they are on same feeder.

(34) **Service Board**—

34a— *Note:* (Specify the following in connection with 13a.)

Where indicated in basement, install a meter and cut-out board, consisting of 1¼-in. hardwood, properly battened and securely mounted on wall. This board shall be of ample size to provide space for meters, etc., without crowding, and shall be given at least 2 coats of moisture repellant paint. Provide for meter for each apartment and one for the owner. The meters will be mounted in a horizontal row. Furnish and install a steel box extending the entire length of the board consisting of No. 12 gauge steel with self-closing door of same thickness, with hinges, catch and hasp for padlock. Porcelain bushings with clamp or lock attachment shall be provided for each and every wire entering box. Install in above box the necessary number of branch circuit, plug fuse cut-out bases (Bryant 61935 if 2-pole, or Bryant 8042, if 3-pole).

CATALOGUE No. 61935

CATALOGUE No. 8042

Each feeder to an apartment having only one circuit without a distributing center in the apartment shall be protected with an additional cut-out on the house side of its meter.

Arrangement of meter board and cut-outs must be approved by the lighting company before work is installed.

From the above meter board, extend a feeder of size as specified under "Feeders" to the point of entrance of lighting company, and provide all entrance fuses, switches, etc., required by the lighting company.

34b— *Note:* (Specify the following in connection with 13b.)

Where indicated in basement, install an approved service panel consisting of 1¼-in. black finished slate, mounted in a steel cabinet with steel door as specified for distributing panels.

Provide on this panel a fused knife switch of proper capacity for each and every feeder, together with an unfused main knife switch. All fuses shall be N. E. C. standard enclosed type. Extend from this service panel a lighting feeder of size as specified under "Feeders" to point of entrance of lighting company, and provide all entrance fuses, switches, etc., required by the lighting company.

(35) **Connections for Ranges**—Contractor shall install a feeder to the location of each range as indicated on drawings and shall connect to each range. Install service feeder, service fuses, switches, etc., branch cut-outs, provision for meters, etc., all of proper capacity and in general as specified for lighting system. Feeders shall be of proper size to carry the full load of each range, which is .... watts. Service feeder shall be of proper capacity to carry the full load of all ranges. Feeders, switches, etc., shall be designed for the voltage and number of wires required by the lighting company for this class of service. Arrangements for meters and service connection must be approved by the lighting company before work is installed.

Note: Obtain capacity of range from the manufacturer. An average range with oven, broiler and four "hot plates" requires about 9000 watts.

(36) **Distributing Panels**—

Note: For description of panel units, see paragraph 26 of Electrical Specifications for a Residence.

The destributing panels shall consist of:

36a—2-wire 125-v. branch cut-outs (Bryant No. 62587).

36b—3-wire 125-v. branch cut-outs (Bryant No. 62199).

36c—2-wire 250-v. branch cut-outs (Bryant No. 1922).

36d—3-wire 250-v. branch cut-outs (Bryant No. 1923).

36e—2-wire 125-v. porcelain base panelboard units (Perkins No. 2300.)

Continued on next page

36f—3-wire 125-v. porcelain base panelboard units (Perkins No. 2360).

36g—2-wire, 250-v. porcelain base panelboard units (Perkins No. 2535).

36h—3-wire 250-v. porcelain base panelboard units (Perkins No. 2536).

36j—2-wire 125-v. porcelain base dead front panelboard units (Perkins Nos. 2599, 2699; Bryant Nos. 72587, 72199).

36k—3-wire 125-v. porcelain base dead front panelboard units (Perkins Nos. 2600, 2700; Bryant Nos. 82587, 82199).

36l—2-wire 250-v. porcelain base dead front panelboard units (Perkins Nos. 2685, 2688).

36m—2-wire 125-v. porcelain base knife switch panelboard unit (Bryant No. 1852).

36n—30-amp. fusible branch circuit switches, with ample size busbars and main fusible switch of proper capacity, all mounted on a black finished slate slab at least 1 in. thick. Jaws and hinges of all switches shall be milled and sweated construction. No punched clip construction will be accepted (Bryant Nos. 3086, 3087).

(37) **Fuses**—Distributing panel shall be fully equipped with fuses and 25% in excess shall be furnished to the owner. All fuses for branch circuits shall be not more than 10-amp. capacity.

37a—125-v. plug type (Bryant "Pyrotite," Nos. 66327 to 66341).

Note: Specify 37a in connection with 34a, 36a, 36b, 36e, 36f, 36j, 36k, 36m.

37b—250-v. cartridge type (Bryant Nos. 1853 to 1865).

Note: Specify 37b in connection with 34b, 36c, 36d, 36g, 36h, 36l, 36n.

(38) **Panel Cabinets**—The distributing panel cabinets shall be:

38a—Flush type of steel not less than No. 12 gauge bent up or reinforced with angle iron frames, which shall be securely riveted in place.

38b—Flush type constructed of hardwood and lined with ⅛-in. sheet asbestos.

Note Specify 38b for 15a class of work only.

38x—Cabinets shall be larger than panels to give at least 4-in. wire space around panels and shall be given 2 coats of moisture repellant paint.

(39) The distributing panel shall be surrounded with an ebony asbestos or slate partition ½ in. thick which will form a wire space around panel.

(40) **Panel Trims and Doors**—The panel trims and doors shall be:

40a—Of steel, with brass cylinder lock and concealed hinges, all furnished under this contract.

40b—Of paneled hardwood, finished as directed and lined with ⅜-in. asbestos wood, all furnished under this contract.

40c—Furnished under another contract, but ⅜-in. asbestos wood lining shall be installed by this contractor.

40x—A directory of circuits and outlets served by panel shall be enclosed in glass with metal frame, mounted on inside of panel door.

(41) **Outlets**—At each and every switch, wall or ceiling receptacle or other outlet shown on plans, install a standard deep type, stamped steel, knock-out type outlet box and cover of a style most suitable for the purpose of the outlet.

Where directed, wall bracket outlet covers shall be French fixture type.

(42) Outlet boxes shall be:

42a—Enameled.

42b—Galvanized.

(43) All outlet boxes must be rigidly secured in place by approved method and those intended for fixtures shall be provided with fixture studs, or, in the case of large fixtures, hangers to furnish support independent of the outlet boxes.

(44) **Position of Outlets**—Unless otherwise indicated or directed, plug receptacles shall be located just above baseboards; wall brackets, 5 ft. above finished floor in bedrooms, and 5 ft. 6 in. in all other rooms; wall switches, 4 ft. above finished floors.

(45) All outlets shall be centered with regard to paneling, furring, trim, etc., and any outlet which is improperly located on account of failure to take account of above conditions must be corrected at the contractor's expense.

(46) All outlets must be set plumb and extend to finish of wall, ceiling or floor, as the case may be, without projecting beyond same.

(47) **Hall Lighting**—All outlets in halls, entrance, etc., are to have double switch control with two circuits carried through all outlets, and shall have lock type switches located as directed in entrance hall. All hall and stair lights shall be wired from owner's distributing panel.

Note: This scheme permits economizing in lighting current by extinguishing part of the lights at certain periods.

(48) **Local Switches**—

Note: For descriptions of local wall swtiches, see paragraphs 37 of Electrical Specifications for a Residence.

Local wall switches, except where otherwise noted on drawings, shall be:

48a—Two-button flush type completely enclosed in a box of non-breakable insulating material with brass beveled edge cover plate finished in match surrounding hardware (Bryant Nos. 601 to 610).

48b—Two-button flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Nos. 2201 to 2204).

48c—Single-button flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Type O).

48d—Rotary flush type with brass beveled edge cover plate finished to match surrounding hardware (Perkins Nos. 2205 to 2210).

48e—Two-button flush type with brass beveled edge cover plate finished to match surrounding hardware (Bryant Nos. 2901 and 2903).

48f—Toggle flush type with brass beveled edge cover plate finished to match surrounding hardware (Bryant Nos. 2951 to 2954).

48g—Duplex two-button flush type with brass beveled edge cover plate finished to match surrounding hardware.

(49) Where noted on drawings local switches shall be supplied with "Undark" genuine radium luminous buttons or handles.

(50) Where noted on drawings, local switches shall be:

50a—3-point.

50b—4-point.

50c—Electrolier.

(51) Plates shall be:

51a—.040 in. thick.

51b—.060 in. thick.

51c—Solid type.

(52) Where more than one switch occurs in same location, furnish an approved lettered gangplate to cover all switches.

(53) Where indicated on the drawings, closets shall be equipped with automatic door switch to connect the light when the door is open (Perkins No. 2355).

(54) **Three-point Control**—Where noted on drawings, outlets shall be controlled by 3-point or 4-point switches.

(55) **Electrolier Control**—Wherever noted on drawings, three wires with distinctively colored braids shall be run between the switch box and the outlet box, and local switches shall be electrolier type.

(56) **Dining-Room Circuits**—Furnish and install in each dining room where indicated on plans an approved box containing an approved 10-amp. dead front plug receptacle (Bryant No. 120, 115, or 116). Furnish 6 ft. of No. 14 B & S gauge silk covered flexible cord with plug (Bryant No. KA, KB, KC, KD or KN) for the 10-amp. receptacle on one end and with composition cord connector body (Bryant No. 103) with composition duplex adapter (Bryant No. KH) on the other end.

(57) **Hardware**—All hardware including flush plates, metal covered attachment plugs, etc., furnished under this contract shall match in quality and finish other adjacent hardware.

(58) **Pilot Lights**—Switches as noted on drawings shall have:

58a—Pilot lamp in plate with switch (Bryant No. 413).

Note: This switch requires for its installation a 2-gang outlet box. The ruby bull's-eye which covers the lamp is practically flush, extending from the wall no further than the buttons of the switch. See paragraph 47a of Electrical Specifications for a Residence.

58b—Pilot lamp in plate with switch (Bryant No. 465).

Note: This switch is installed in a single-gang box. The lamp extends through the plate and is protected by a perforated cage which extends about an inch from the plate. See paragraph 47b of Electrical Specifications for a Residence.

(59) **Elexit Devices—"Places for Lights"**—All wall and ceiling fixture outlets as noted on drawings shall be equipped with Elexit receptacles of proper and approved type (Bryant).

Note: See paragraph 48 of Electrical Specifications for a Residence, and pages 1852-1853 of this edition of Sweet's Architectural Catalogue.

Continued on next page

(60) **Plug Receptacles**—Plug receptacles shall be:

60a—Of the disappearing door type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant "D. D." No. 430).

Note: See paragraph 49a of Electrical Specifications for a Residence.

60b—Spartan type (single) (duplex).

Note: See paragraph 49b of Electrical Specifications for a Residence.

60c—Of the Chapman type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant No. 1363).

Note: See paragraph 49c of Electrical Specifications for a Residence.

60d—Of the screw plug type, with beveled edge brass cover plate finished to match surrounding hardware (Bryant .No 1708).

Note: See paragraph 49d of Electrical Specifications for a Residence.

(61) **Wall and Ceiling Sockets and Receptacles**—

Note: For illustrations of devices mentioned in this paragraph, see paragraph 50 of Electrical Specifications for a Residence.

One-light wall and ceiling receptacles shall be:

61a—Keyless, of a type to fit standard 3¼-in. or 4-in. outlet boxes (Bryant 4100, 4102).

61b—Pull chain of a type to fit standard 3¼-in. or 4-in. outlet boxes (Bryant 4104).

61c—Of the insulated base type "New Wrinkle" BL 12 or 13 or 15 or 35; or BM 12 or 13 or 15 or 35.

(62) Sockets in cellar and bathrooms shall be porcelain.

Note: Where outlets are controlled by local switches, specify keyless receptacle—otherwise specify key or pull chain type.

(63) All lamp sockets used in fulfilling these specifications shall have an approved rating of 660 watts, 250-v.

(64) **Drop Lights**—

Note: See illustrations in paragraph 53 of Electrical Specifications for a Residence.

Drop lights shall consist of the necessary length of reinforced cord supported by:

64a—An insulated rosette with brass base and cover (Bryant "New Wrinkle" BL or BM 26).

64b—A porcelain rosette with binding screw terminals (Bryant No. 298).

64c—A combination rosette and pull switch ("New Wrinkle" BL or BM 25).

64X—And furnished with a:

64d—Key socket ("New Wrinkle" AT 10, 11 or 12).

64e—Keyless socket ("New Wrinkle" AT-13).

64f—Pull socket ("New Wrinkle" AT-15), or, (AT-35).

64Y—Complete with a:

64g—2¼-in. shade holder (Bryant "Uno," No. 501 or 532 with set screws) (Bryant Uno, No. 502 or 533 with spring grip).

Note: Specify for brass shell sockets.

64h—Sockets in cellars and bathrooms shall be porcelain (Bryant No. PT-73, 71, 70 or 76).

64k—And finished with 2¼-in. shade holder (Bryant No. 628).

Note: Specify for porcelain sockets.

64Z—Each drop cord shall have an adjuster.

(65) **Heater Switch, Pilot and Receptacle**—Heating device outlets shall be equipped with: combination of switch, pilot light and receptacle (Bryant). The switch and receptacle shall be as hereinbefore specified.

Note: See illustrations in paragraph 54 of Electrical Specifications for a Residence.

COMMUNICATION AND SIGNALING SYSTEMS

(66) **Call Bells, etc.**—The contractor shall furnish, install and connect all push buttons, bells, buzzers and annunciators, as shown on plans or herein described.

(67) All wiring shall be:

67a—Cleated in joists, studs, etc., with insulated staples. Damp places, metal pipes of all descriptions, flues, etc., must be avoided and wire fastenings must be applied in such a way that insulation is not damaged.

No splices shall be made where they will not be accessible at any time after completion of building.

Note: 67a for wood frame construction only.

67b—Installed in metal conduit with outlet boxes similar to electric light wires.

(68) Wires shall not be smaller than No. 18 B & S gauge and shall be:

68a—Dampproof insulated.

Note: 68a for wood frame construction only.

68b—Rubber insulated as specified for electric lighting.

(69) Install a 3-in. bell in each apartment where indicated on drawings, and wire it so it will be operated by separate push button in entrance vestibule.

(70) Install a buzzer in each apartment where directed and wire it so it will be operated by a button on hall side of apartment entrance door. Bells and buzzers shall be installed on approved hardwood mats installed to cover outlet boxes.

(71) Install a buzzer in the kitchen of each apartment where directed and wire it to a combination push located in dining room floor where directed. Also supply necessary length of flexible cord and approved portable foot-push.

(72) Install a push button in each apartment where indicated on drawings and wire it so it will operate door latch on main entrance door to building.

(73) Install in basement near dumbwaiter of each apartment section a bank of push buttons mounted on common plate of ⅛-in. brass with name card holders above each button and wire so each button will operate a buzzer located in each apartment near dumbwaiter opening. Button mechanisms shall be on back of plate and no parts shall be removable from the front.

(74) Battery feeders shall consist of riser feeders from basement to each vertical row of apartment entrance door push buttons and each vertical row of apartment door-openings push buttons with both battery leads accessible at all push buttons. Also install battery feeders to each of the dumbwaiter and entrance door push button banks.

(75) All battery feeders shall terminate on an approved interconnection strip with fuse for each feeder installed in battery cabinet which shall be located in basement where directed. The interconnection strip shall have a separate terminal for each wire.

(76) Furnish and install the necessary number of dry cells of approved make in an approved hardwood cabinet to make entire system work properly.

(77) **Letter Boxes, etc.**—In entrance hall where directed, furnish and install a bank of letter boxes consisting of a push button and letter box for each and every apartment, all to be mounted in an approved frame. The letter boxes shall be fitted with approved locks and keys, no two to be alike. A holder for name card must be provided on each section with glass to cover card. All exposed parts shall be of brass finished as directed by architect.

(78) **Telephone Conduits**—Furnish and install an approved rigid iron conduit system for telephone wires, consisting of telephone service conduit from point where telephone company enters building to a main interconnection box located where shown on drawings.

(79) From this interconnection box extend the necessary number of riser conduits to provide a raceway of sufficient size to accommodate, without crowding, at least 2 pairs of telephone company's inside twisted pair wires for each apartment; also conduit to telephone switchboard.

(80) Furnish and install an outlet box with approved cover in above system in each apartment and provide conduit extension to this outlet box from base board or picture mould as directed.

(81) This contractor shall furnish all necessary interconnection boxes with approved doors, trims, hinges and locks, and shall obtain approval of telephone company on entire contemplated system before any work is installed.

(82) **Vestibule Telephone**—Install a wall telephone instrument in the vestibule as a part of the bank of letter boxes and a wall telephone instrument in each apartment near the entrance door as directed. Instruments shall be of approved type and manufacture. Instrument in vestibule shall have a button to ring the instrument in any apartment and all connections shall be installed for the system which shall be common talking type. Mouthpiece in lobby shall be of metal and shall not be removable from the face. Receiver in lobby shall be attached in an approved manner to make malicious removal difficult. Wiring shall be No. 18 B & S gauge and shall be installed as specified for call bells. Install the necessary number of dry cells for the proper operation of this system in an approved cabinet located as directed.

Note: If telephones are specified, buttons in vestibules and bells in apartments operated by these buttons may be omitted.

THE ARROW ELECTRIC COMPANY

Manufacturers of Electrical Wiring Devices

PRINCIPAL OFFICE AND FACTORY
HARTFORD, CONN.

BRANCH OFFICES

NEW YORK, N. Y., 350 Madison Avenue
Telephone, Murray Hill 3012

CHICAGO, ILL., 560 West Monroe Street
Telephone, Franklin 4174

SYRACUSE, N. Y., Seitz Building
Telephone, Warren 6852

BOSTON, MASS., 10 High Street
Telephone, Congress 0436

PITTSBURGH, PA., Chamber of Commerce Building
Telephone, Grant 8741

SAN FRANCISCO, CAL., 579 Howard Street
Telephone, Sutton 982

BALTIMORE, MD., 804 Continental Building—Telephone, Calvert 3471

Products

SWITCHES:
- Surface Snap
- Push Button
- Rotary
- Door
- Pendent
- Heater
- Lock
- Wall Pull
- Ceiling Pull
- Toggle

RECEPTACLES:
- Flush
- Ceiling
- Standard
- Plug
- Outlet Box
- Porcelain
- Weather-proof
- Sign
- Bullseye

LUMINOUS PENDANTS

ROSETTES

SOCKETS:
- Mogul and Medium Base
- Candelabra
- Miniature
- Brass Shell
- Porcelain

(With all types of fittings for various uses)

Also, Attachment Plugs; Brass Plates for outlet boxes, flush receptacles, flush switches, and special combinations; Current Taps, Fuse Plugs, Plug Cut-outs; Shade Holders; Switch Blocks.

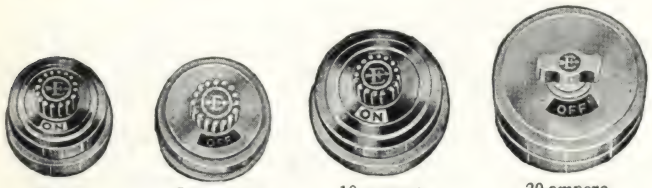
TRADE-MARK

Underwriters' Approval

All Arrow material is subject to underwriters' approval and inspection.

Arrow Surface Snap Switches

Type ordinarily used in cellars and garages. Cheaper and less ornamental than push button switches.



Pony — 5-ampere — 10-ampere — 20-ampere

ARROW SURFACE SNAP SWITCHES

Capacities—Range from 5 amperes, 250 volts, to 30 amperes, 250 volts.

Styles—*Single Pole*—Breaks one side of the line.

Double Pole—Breaks two sides of the line.

Three-point—Controls lights from two different points.

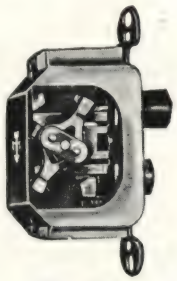
Four-point—Inserted between three-point switches to give additional points of control as desired.

Electrolier—Controlling two or three circuits from one switch.

Bases—Made on four different size bases and can be furnished with metal or porcelain covers, either indicating or plain. Bases can be supplied slotted for open wiring or solid for concealed wiring.

Arrow Push Button Switches

Type of switch ordinarily used for all inside wiring. Made in four styles: single and double pole, and three and four-point switches. These switches can be arranged in gang boxes and used with gang plates, making as many units as desired. The porcelain is bevelled at the back, allowing more room for wires. Indicating handle has pearl center. This switch fits all makes of standard switch boxes.



No. 6800
PUSH BUTTON SWITCH

DIMENSIONS OF ARROW PUSH BUTTON SWITCHES

Number	Type	Length, in.	Width, in.	Depth, in.
6800	Single pole	2 9/16	1 7/16	1 5/8
6801	Double pole	2 9/16	1 11/16	1 5/8
6802	Three-point	2 9/16	1 11/16	1 5/8
6803	Four-point	2 9/16	1 11/16	1 13/16

TABLE OF USES FOR VARIOUS TYPES OF ARROW SWITCHES FOR INTERIOR WIRING

TYPE	USES
Surface Snap Switches	Used mainly for garages, cellars, attics and industrial work.
Standard Push Button Switches	For residences, hotels, office buildings and finished interior wiring.
Push Button Lock Switches	For railway stations, schools, insane asylums and places where prevention of public use is desired.
Luminous Handle Push Button Switches	Recommended for houses and hotels as an added convenience in locating switches in the dark.
Adjustable Electrolier Switches	Recommended wherever there are two or more lights. Takes the place of two or *three* single pole switches.
Push Switch Combinations with Pilot Light Receptacles	For kitchens, bathrooms, cellars, attics and stairways where light can not be seen from the switch, or appliances are apt to be used.
Pendent and Pull Switches	Used with overhead units for control of individual lights.
Door Switches	For use in closets or dark rooms.
Toggle Switches	Flush type for residential work. Surface type for cellars and garages.

Continued on next page

No. 6804
Lock Switch

Arrow Lock Switches

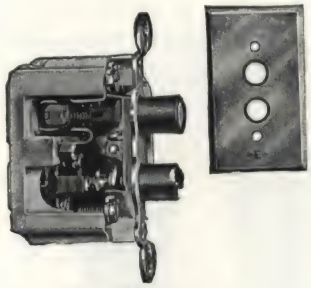
For public buildings, insane asylums, schools and similar institutions where their operation is restricted to persons having a key. They can be arranged in gang boxes and used with gang plates, making as many units as desired. The width, depth and length of these switches are exactly the same as standard Arrow push button switches. One key is furnished with each switch.

Arrow Luminous Push Button Switches

The standard Arrow push button switches of all different types can be supplied with a radium luminous insert moulded into the handle to take the place of the pearl center ordinarily used for the purpose of indication. This forms an effective method of indication both during the day and at night. The luminous feature advances the cost of the switch slightly but this is more than offset by the added and permanent convenience. The use of push switches with the luminous indication is recommended for all types of installations, particularly where the lighting system may be used by persons unfamiliar with it.

No. 6820
Luminous
Push Button
Switch

Typical Installation of Arrow Luminous Push Button Switch



No. 6528
Adjustable
Electrolier Switch

Arrow Adjustable Electrolier Switches

This switch takes the place of the two or three single pole switches and does away with the necessity of gang plates and gang boxes. It is adaptable to large rooms for the control of different lights and also for indirect lighting fixtures with more than one lamp. The switch allows complete flexibility for lighting systems controlled from one point. Switch is made up in different two or three-circuit combinations suitable to various needs and will fit into all standard makes of switch boxes.

Flush Toggle
Switch

Flush Toggle Switches

Flush toggle switches are for that class of people who want something different. A characteristic of this type of switch is that it need not be operated by the finger but may be set by the hand or arm. A luminous insert can be used if desired.

ARROW FLUSH TOGGLE SWITCHES

Number	Type	Amperes 125V.	Amperes 250V.
6144	Single pole	10	5
6145	Double pole		10
6146	Three-point	10	5
6147	Four-point	10	5

Surface Toggle Switches

The surface toggle switch is fundamentally the same as the flush toggle described above but is for use in garages, cellars and all surface work. One decided advantage over the ordinary snap switch is that the handle will not fly off and get lost.

ARROW SURFACE TOGGLE SWITCHES

Number	Type	Amperes 125V.	Amperes 250V.	Diameter base, in.	Screw holes c. to c., in.
6184	Single Pole	5	3	2 3/16	1 7/16
6186		10	5	2 1/2	1 21/32
6258	Three Point	5	3	2 3/16	1 7/16
6338		10	5	2 1/2	1 21/32
6188	Double Pole		5	2 3/16	1 7/16
6190			10	2 1/2	1 21/32

Push Button Switch Combinations with Pilot Light and Receptacle

Typical combination plates are illustrated below.

Fig. 1 is suitable for kitchens and bathrooms where the receptacles can be used in connection with heating devices, flat irons, vacuum cleaners, etc.

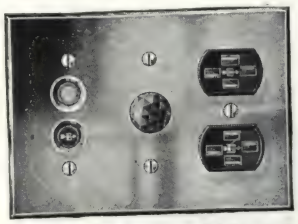


Fig. 1. Switch, Pilot Light and Receptacles

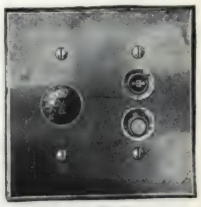


Fig. 2. Switch and Pilot Light only

Typical Combination Plates

Fig. 2 is suitable for stairways, attics, cellars and cold storage and refrigerating rooms where the light can not be seen from the switch.

In both cases the bullseye acts as a warning that the circuit is open or closed.

Continued on next page

Arrow Pull and Pendent Switches

These switches are used for independent control of ceiling lights, the selection of the type to be used depending on the character of installation. Pull switches can be supplied in a great variety of caps or bases.

No. 6679

No. 6600

PENDENT SWITCHES

M-21

K-1

PULL SWITCHES

Arrow Door Switches

No. 6550
ARROW DOOR SWITCH

Door switches are now installed in most modern homes in closets and dark rooms. They operate automatically in the hinge side of the jamb of the door, putting on the light when the door is opened and shutting off the current when the door is closed.

Arrow Standard Attachment Plugs and Bases

The following illustrations show types of Standard attachment plugs which fit all Standard receptacles. These plugs are similar in design to and interchangeable with the Standard plugs made by other manufacturers and will fit all Standard receptacles.

No. 8301
CONVENIENCE PLUG

RB

TA

No. 8300

RC

STANDARD ATTACHMENT PLUGS AND BASES

Arrow Standard Flush Receptacles

No. 550

No. 8212

STANDARD DUPLEX FLUSH RECEPTACLE

The Standard line of baseboard and wall receptacle is fast coming into common use. The No. 8219 receptacle is perhaps the most commonly installed device, but we recommend the Duplex receptacle, No. 8212, which costs only slightly more and gives double the service. Receptacle No. 8230 may be used where a round receptacle and plate is desired.

No. 8230
STANDARD RECEPTACLE WITH ROUND PLATE

No. 429

No. 8219

STANDARD FLUSH RECEPTACLE

DIMENSIONS OF ARROW STANDARD FLUSH RECEPTACLES

Number	Length, in.	Width, in.	Depth, in.
8219	2 9/16	1 5/8	7/16
8212	2 9/16	1 5/8	7/8
8230	2 9/16	1 1/2	1

Arrow Standard Porcelain Receptacles for Surface Work

There are many types of Arrow Standard porcelain receptacles which can be installed in connection with concealed and open wiring or in wood moulding and conduit boxes, with or without covers.

No. 8204 is a typical porcelain receptacle for use in cellars and garages where appearance is not so important.

No. 8204
STANDARD PORCELAIN RECEPTACLE

Arrow Flush Receptacles

Nos. 1708-9 and 1363-4 are two types of flush receptacles which have been in common use for a number of years. They are fast being supplanted, however, by the Standard line of receptacles shown above, due to the advantages of the latter in being adaptable to the Standard attachment plugs adopted by the appliance manufacturers.

The No. 1363 type has one advantage which adapts it for floor work in that the plug when inserted is flush with the plate.

No. 1708-9

No. 1363-4

FLUSH RECEPTACLES

No. 1110
STANDARD PLUG

Arrow Sockets

We manufacture a complete line of sockets of all types with a large variety of interchangeable caps and bases. Arrow sockets have been adopted as standard by many of the best fixture manufacturers. The types made include key, keyless, lock, porcelain, brass shell, aluminum shell and weatherproof, in mogul, medium base, candelabra and miniature sizes, also complete line of bayonet sockets for continental fixtures.

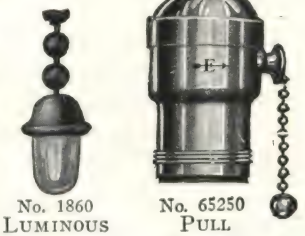
KEYLESS SOCKET

KEY SOCKET

Continued on next page

Arrow Pull Sockets and Luminous Pendants

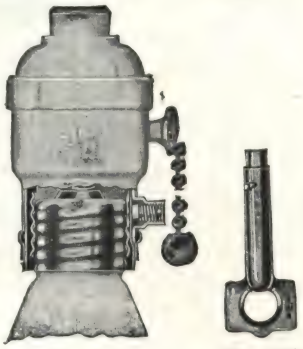
We manufacture a complete line of pull chain devices. Arrow pull sockets can be furnished with permanently attached luminous pendants, not subject to removal or theft. Where pull chain devices are installed and luminous pendants would add to their convenience, we are prepared to furnish detachable luminous pendants separately. These can be easily attached to the chain after cutting off the regular ball or acorn with a pair of scissors.



No. 1860 Luminous Pendant — No. 65250 Pull Socket

Arrow Lock Sockets

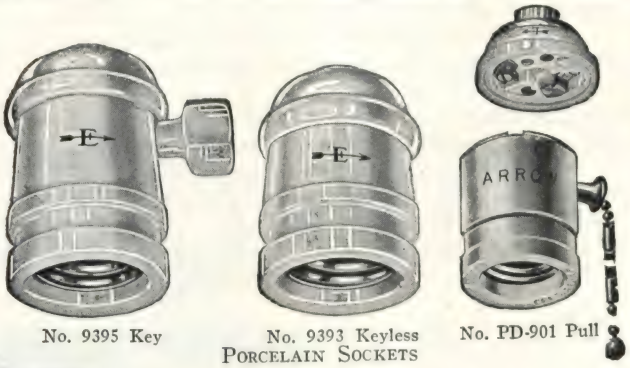
The installation of this type of socket is highly recommended for public buildings, telephone booths and factories to prevent the theft of lamp bulbs. Lock sockets can be furnished in standard pull, key, keyless and extension attachment types with all kinds of fittings.



No. I-1 Lock Socket — No. 1849 Key

Arrow Porcelain Sockets

Porcelain sockets are recommended for basements and bathrooms. Manufactured in three styles as shown with a complete line of interchangeable caps and bases.



No. 9395 Key — No. 9393 Keyless Porcelain Sockets — No. PD-901 Pull

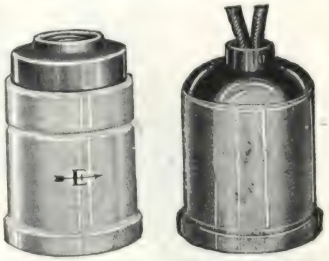
No. 8120

Arrow Porcelain Lined Aluminum Shell Keyless Sockets

These sockets are particularly suitable for outdoor use, or where conditions make inadvisable the use of brass shell sockets. They are commonly known as weatherproof sockets and are largely used with reflectors over garages.

Arrow Mogul Sockets

The illustrations are typical Mogul sockets used in connection with Mogul base lamps. They are generally used in ceiling units with nitrogen lamps of high wattage. We also manufacture a complete line of medium base porcelain sockets for gas filled lamps of smaller wattage. Both types use a special heat resisting compound instead of sealing wax for holding the screws.



No. 5015 — No. 5078 Mogul Sockets

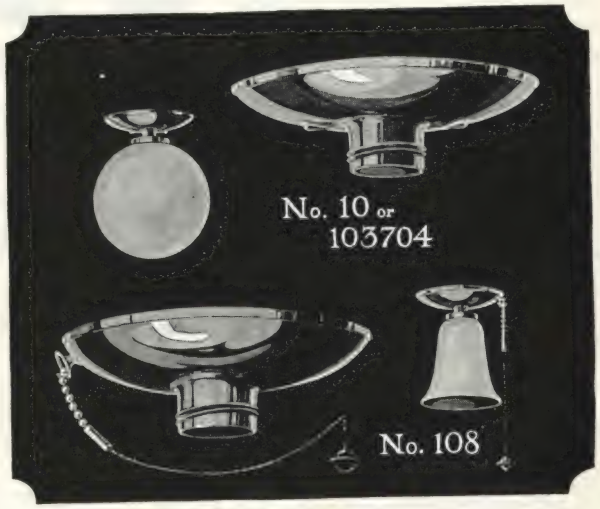
Arrow Removable Ring Pull Receptacle for Ceiling Lights

This receptacle is particularly adapted for use in a brass canopy or ceiling unit, and is equipped with a long-skirted removable ring which insulates the screw shell from the metal fitting. The width of this receptacle is approximately 1½ in. An extra bell piece is provided which can be riveted or spun into the ceiling unit to guide the chain.

No. 998 Removable Ring Pull Receptacle

Arrow Metal Covered Receptacles and Rosettes

A keyless or pull receptacle with a shade holder and shade or even with only a frosted lamp makes a very practical fixture for halls, pantries, stairways and porches. It would also be suitable for overhead lighting in industrial work. The keyless receptacle should be used where there is a wall switch and the pull receptacle when there is no switch.



Arrow Metal Covered Receptacles

The metal cover can be finished to match the other fixtures if desired, although the standard finish, brush brass, would be in keeping with most work where these receptacles would be used.

The rosettes can be used to make up attractive fixtures and can be supplied in pull switch type if desired.

Arrow Rosettes

ELEXITS

MANUFACTURED BY THE FOLLOWING COMPANIES

ARROW ELECTRIC COMPANY, Hartford, Conn.
BENJAMIN ELECTRIC MFG. CO., Chicago, Ill
THE BRYANT ELECTRIC CO., Bridgeport, Conn.
CUTLER-HAMMER MFG. CO., Milwaukee, Wis.
ECONOMY FUSE & MFG. CO., Chicago, Ill.
HART & HEGEMAN MFG. CO., Hartford, Conn.
HARVEY HUBBELL, INC., Bridgeport, Conn.
H. T. PAISTE CO., Philadelphia, Pa.
PASS & SEYMOUR, INC., Solvay, N. Y.
WEBER ELECTRIC CO., Schenectady, N. Y.
GENERAL ELECTRIC COMPANY, Bridgeport, Conn.

Products

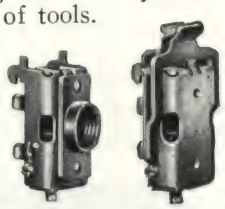
ELEXIT RECEPTACLES and PLUGS.

Elexits
"Places for Lights"
TRADE-MARK
(Reg. U. S. Pat. Off.)

Purpose

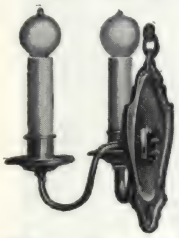
Elexit receptacles are designed to finish off all lighting outlets and provide a standard condition so that any type of lighting fixture may be installed at any time without the use of tools.

By specifying Elexit receptacles for all lighting outlets, the electrical wiring contractor is enabled to complete the wiring installation ready for final inspection without delays or division of responsibility with lighting fixing contractors.



TWO TYPES OF ELEXIT WALL PLUGS

Elexits provide a simple, safe, dependable and definite finish which enables the lighting fixture manufacturer to furnish lighting fixtures ready to be placed on the outlets without expense. When a building is finished with Elexits, the lighting fixtures become furniture and may be purchased, delivered, placed or experimented with the same as other furnishings.



WALL BRACKET WITH ELEXIT PLUG ATTACHED
Ready to be "plugged in" to any wall Elexit

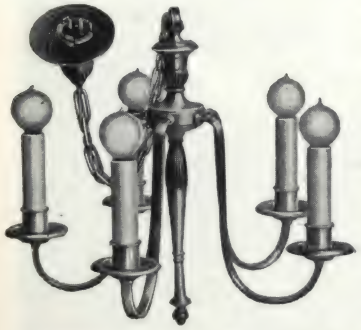
Ceiling Elexits are adapted to receive any type of ceiling lighting fixture properly fitted with an Elexit ceiling plug.

Wall Elexits are adapted to receive any type of electric wall bracket properly fitted with an Elexit wall plug. Being within easy reach, they are also adapted to receive the caps of standard attachment plugs which now come on practically all portable lamps and electrical appliances.

Underwriters' Approval

All Elexit devices are made subject to approval of the Underwriters' Laboratories, Inc. and are included in the Laboratories' List of Inspected Electrical Appliances.

AN ELEXIT CEILING PLUG



CHANDELIER WITH ELEXIT PLUG ATTACHED
Ready to be "installed" without tools by any one

Interchangeability

Elexit receptacles and plugs may be used interchangeably, regardless of which licensed manufacturer makes either part. For convenience in specifying, the same catalogue numbers are used by all of the above licensed manufacturers to describe similar Elexit devices.

A complete catalogue of Elexit devices will be sent promptly on receipt of request addressed to any of the manufacturers listed above.

Some Advantages of Elexits

Adequate wiring layouts can be carried out without the prohibitive cost of buying lighting fixtures for every outlet.

It costs less to install a fixture on an Elexit *once* than to install it permanently the old way.

In addition, great flexibility and increased usefulness of all outlets is accomplished.

Plugging lighting fixtures in or out of Elexits does not ruin finished decorations.

Lighting fixtures may be purchased anywhere.

Lighting fixtures for important locations can be easily submitted on approval.

Elexits enable the home builder to buy better lighting fixtures when he can afford them.

Lighting effects may be experimented with in finished rooms.

Re-arrangements of furniture will not destroy the utility of the lighting arrangements, as an adequate number of Elexits can be provided in each room at low cost.

Elexits are not injured by being painted to harmonize with walls or ceilings, if desired.

In the matter of quality, Elexit devices represent the best designing ability and experience of all the wiring device manufacturers who make them.

Enough manufacturers make interchangeable Elexit devices so that any electrical contractor can procure them through his regular jobber.

Electric lighting can be arranged—and rearranged—by the owner or tenant without technical aid.

ELEXIT DEVICES ARE STRONG ENOUGH
These two illustrations indicate what can easily be proved, viz., that Elexit devices are more than strong enough for "portable fixtures"

Continued on next page

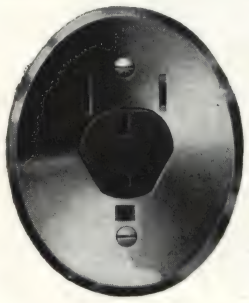
CEILING ELEXITS

Adapted to receive all types of ceiling lighting fixtures properly fitted with Elexit ceiling plugs

Elexit material to be specified (Cat. Nos. used by all Elexit manufacturers)	Outlet boxes recommended (Cat. Nos. used by ten outlet box manufacturers)
FINISHED CEILING ELEXIT	Note: All outlet boxes must set flush or back of finished surface.
	No. 24151 3¼-in. octagon, 1½ in. deep. Tapped ears spaced 2¾ in. on centers.
	No. 54151 4-in. octagon, 1½-in. deep. Tapped ears spaced 3½ in. on centers.
For 1-Circuit Elexits **LX-200** Elexit ceiling receptacle. with **LX-400** Elexit finishing plate.	**No. 51151** 4-in. square, 1½-in. deep. with **No. 52C3** Cover 2⅞-in. round opening, tapped ears spaced 2¾-in. on centers.
For 2-Circuit Elexits **LX-230** Elexit ceiling receptacle. with **LX-400** Elexit finishing plate.	(For additional ceiling outlets to be installed in buildings already completed) **No. 20** Collar clamp outlet box

WALL ELEXITS

Adapted to receive all types of electric wall brackets properly fitted with Elexit wall plugs; also receive caps of standard attachment plugs used on portable lamps and appliances.

Elexit material to be specified (Cat. Nos. used by all Elexit manufacturers)	Outlet boxes recommended (Cat. Nos. used by ten outlet box manufacturers)
 FINISHED WALL ELEXIT Standard finish, burnished brass. Special finishes to order. Sand blast finish recommended for painting.	Note: All outlet boxes must be set flush or back of finished surface.
	No. 24151 3¼-in. octagon, 1½-in. deep. Tapped ears spaced 2¾-in. diagonally. This outlet box will not accommodate the narrow wall Elexit
LX-101 Elexit wall receptacle with **LX-301** Elexit finishing plate	**No. 54121** 4-in. octagon, 1½-in. deep with **No. 54C63** Cover.
NARROW WALL ELEXIT Standard finish burnished brass. Special finishes to order. Sand blast finish recommended for painting.	**No. 51151** 4-in. square, 1½-in. deep with **No. 52C63** Cover.
LX-111 Elexit wall receptacle. with **LX-311** Elexit finishing plate.	For additional wall outlets to be installed in buildings already completed: **No. 11** Collar-clamp outlet box.

THE HART MANUFACTURING CO.

Manufacturers of Switches, Receptacles and Appliances

HARTFORD, CONN.

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
BOSTON, MASS., 170 Summer Street
CHICAGO, ILL., 312 So. Green Street
DENVER, COLO., 13th Avenue and Broadway
TORONTO, ONT., 331 King Street, West
LOS ANGELES, CAL., 253 So. Broadway
LONDON, ENG., 76-77 Rochester Row, Westminster, S. W.

Products

"Diamond H" Push Button and Lever Switches, Automatic Door Switches, Automatic Flush Receptacles, Remote Control Switches.

Also Series Parallel Heater Switches, Feed Through and Pendent Switches, Momentary Contact Switches, Surface Switches, Door Bolt Control Switches.

"Diamond H" Specialties

"Diamond H" specialties are the original creations of Gerald W. Hart, the founder of The Hart Manufacturing Co., whose inventions and manufactures have, for the past 25 years, received general recognition as standards of efficiency and construction.

Push Button Switches

"Diamond H" switches are radically different in construction from all other switches of this type, as the porcelain base entirely encloses the mechanism and is dustproof and dirtproof. This construction is found only on "Diamond H" switches and obviates the necessity of using temporary plates when the switch is installed before the walls are plastered. Binding screws are of extra length and are easily accessible. Sheet mica is used exclusively to insulate the mechanism from the current carrying parts.

All parts subject to wear are made of case hardened and tempered steel, blued to prevent rusting.

Contacts are made of spring temper phosphor bronze, and are of sufficient size to safely carry any reasonable overload.

The make and break is accomplished with unusual rapidity.

An exclusive feature is the straight line movement of the push buttons, obviating the swinging motion common to other switches of this type.

Push Button Switch with Plate

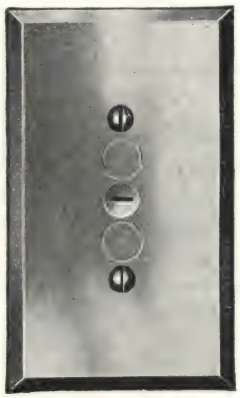
Lock Push Button Switch with Plate

"Diamond H" Push Button Switches

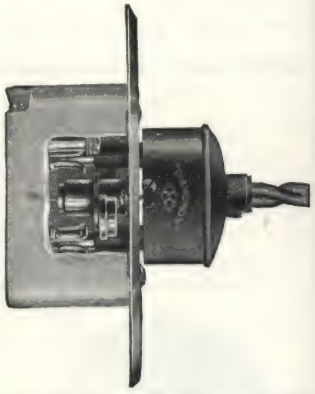
Flush Receptacles

"Diamond H" receptacles operate automatically by inserting or withdrawing the plug.

This automatic feature entirely obviates the necessity of prying open lids or shutters when it is desired to insert the plug. It is only necessary to enter the pilot pin in the small slot in the face plate and *push*—the desired connection is instantly established. To break the connection, simply withdraw the plug and the holes in the plate automatically close, effectually excluding dust, dirt and foreign substances which will invariably find their way into the ordinary flush receptacle.



Receptacle with Plug Withdrawn

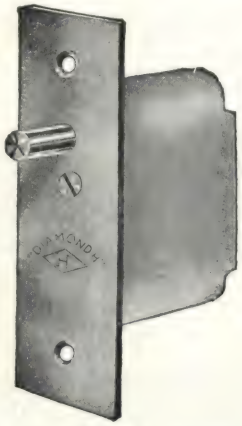


Section Showing Receptacle with Plug Inserted

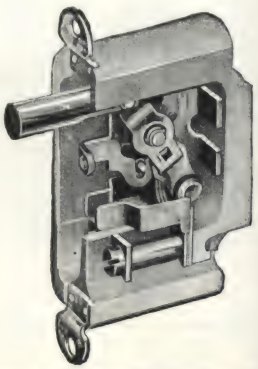
"Diamond H" Flush Receptacle

Door Switches

"Diamond H" door switches are made on the principle of the push button switch and will give satisfactory results under hard and continuous service. The mechanism is strong and durable and is insulated by sheet mica from the current carrying parts. It is made in two types, No. 601 Light "On" with door open and No. 602 Light "Off" with door open.



Door Switch Nos. 601 and 602



Section Showing Mechanism of Door Switch No. 602

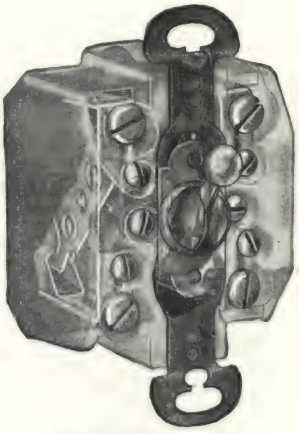
"Diamond H" Door Switches

Continued on next page

Lever Switches

"Diamond H" lever switches have a lock and release movement and not a "tumbler" or "toggle" movement. They are made both with and without a luminous button in end of lever.

Lever Switch with Plate

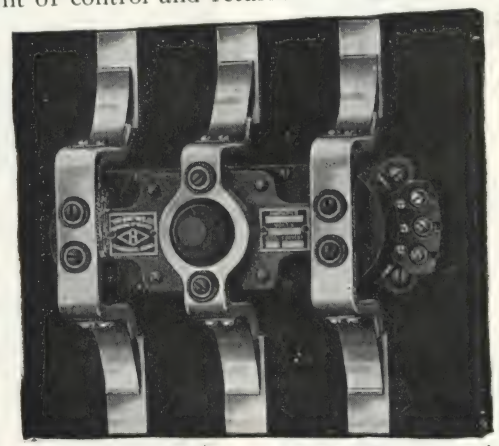


Section Showing Mechanism

"Diamond H" Lever Switches

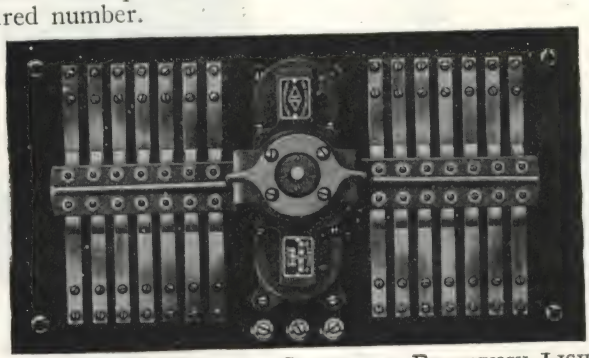
Remote Control Switches

A remote control or magnetically operated switch is used where it is desired to control a certain load from a remote point, so remote that it would be inexpedient and expensive to run the heavy mains from the load to the point of control and return.



Type F Remote Control Switch for Direct or Alternating Current

A remote control switch is installed as near the load as practicable and three small wires, for moderate distances No. 14, are run from this switch to the manual momentary contact switch located at the desired point of control. The points of control may be increased to any desired number.



Multi-Current Switch for Control of Emergency Lights or Burglar Alarm Systems

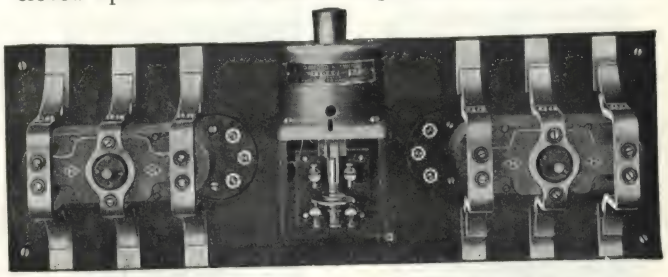
The two Type F remote control switches and relay illustrated are adapted for use as a double throw switch when two sources of current supply are available. Upon the failure of one source, the load is automatically transferred to the second source and automatically retransferred to the first upon its return to normal voltage.

The momentary contact switch is normally in an open position, and connects the common control wire alternately with the other two which are in series with the opening and closing coils respectively of a remote control switch.

The principal use of the remote control switch is for the control of large groups of lights in public buildings, trainsheds, isolated sections of plants or docks, individual buildings, etc.

They are also used largely for the control of motors, such as motors for elevators, pumps, vacuum cleaners or individual machines or printing presses.

Remote control switches are also used in connection with automatic devices of many kinds, such as thermostats, pressure gages, clocks, tank floats, fire engine house relays, high and low voltage relays, or in any place where it is desired that a circuit shall be opened or closed upon the existence of a predetermined condition.



Double Throw Combination Remote Control Switch

The coils of remote control switches are wound to operate either at line potential or by an auxiliary circuit of lower voltage, such as a battery circuit.

Type F is built in 7 sizes, from 30 to 300 amp.

In Type A switch, the closing coil is of comparatively low resistance and requires current only while the switch is closing.

An interruption of the coil circuit, either from failure of current supply or by the opening of the control switch, allows the armature, which this high resistance coil holds suspended, to drop, releasing the ball-locking device of the main armature and allowing the switch to open by gravity.

The manual control is effected by a single pole switch, or, when more than one point of control is desired, by three-way and four-way switches.

The switch is built for both A.C. and D.C., but with different windings.

Type A switch is used principally on intermittent work.

Type A Remote Control Switch
No voltage release

HARVEY HUBBELL, INC.

Manufacturers of Electrical Specialties

MAIN OFFICE AND FACTORY
BRIDGEPORT, CONN.

BRANCH OFFICES
NEW YORK, N. Y., 30 East 42nd Street
CHICAGO, ILL., 318 West Washington Street
SAN FRANCISCO, CAL., 612 Howard Street
DENVER, COLO., 231 Fifteenth Street

Products

Approved Wiring Devices, including HUBBELL TE-SLOT RECEPTACLES of all types, BRASS SHELL and PORCELAIN SOCKETS, FLUSH-DOOR RECEPTACLES, TOGGLE SWITCHES, PLUGS and CAPS, PUSH BUTTON SWITCHES, etc.

TRADE-MARK

Hubbell Wiring Devices

Hubbell Convenience Outlets (Flush Receptacles)—10-ampere, 250-volt capacity, have Hubbell Te-Slots, concealed contacts, individual contact chambers, and strong double (phosphor bronze) contact springs. Te-Slots admit all attachment plug cap blades, whether tandem or parallel. Concealed contacts confine any spark at make or break to the individual contact chambers. Only the cap blades can reach the contact springs. Double contact springs grip each blade on two or more sides, and insure firm contact. Large binding screws are conveniently located. Single Convenience Outlet No. 6618 is provided with adjustable aligning lugs, which automatically align receptacle with wall surface.

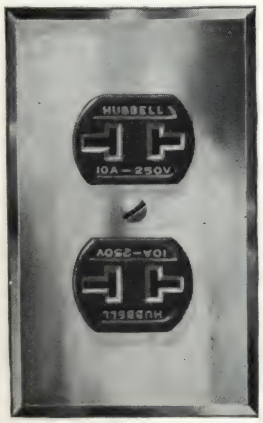
Body No. 5547. Plate No. 5548

Body No. 5579. Plate No. 5580
With Double Hinge Lift Cover

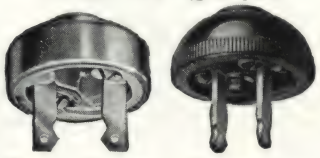
SINGLE CONVENIENCE OUTLET

Plates are of stamped or solid brass, single or in gangs, and may be obtained in any finish required.

SINGLE CONVENIENCE OUTLET WITH ROUND PLATE
No. 6282 with 2¾-in. plate
No. 6283 with 3¼-in. plate



DUPLEX CONVENIENCE OUTLET
Body No. 6257. Plate No. 6258

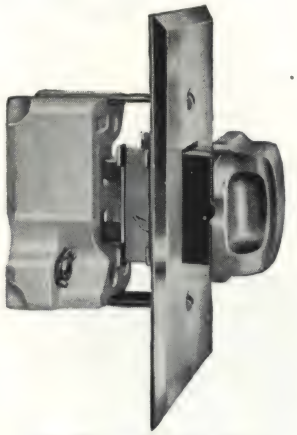


BRASS COVERED COMPOSITION ATTACHMENT PLUG CAP WITH TANDEM BLADES
No. 5523

COMPOSITION ATTACHMENT PLUG CAP WITH PARALLEL BLADES
No. 5964

Hubbell Flush Door Receptacles—10-ampere, 250 volts, meet architects' requirements for a *DeLuxe* receptacle. Two self-closing doors in face plate are opened as the cap blades are pressed against them. Double contact springs are concealed in individual contact chambers back of narrow slots in the porcelain body, through which blades pass before contact is possible.

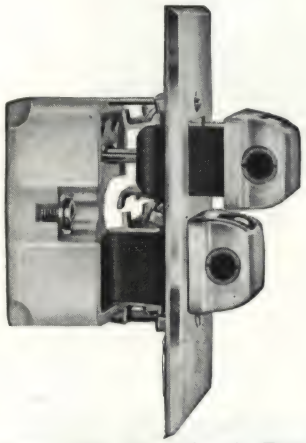
This *DeLuxe* receptacle is available in single and duplex types, with four styles of caps as shown. Brass plates and brass covered caps are furnished to match, in any finish required.



Cap Blades Entering Slots

Body No. 6775. Plate No. 6776

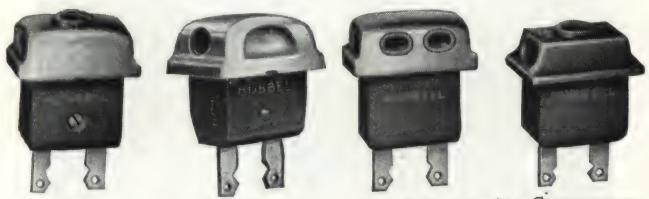
SINGLE FLUSH DOOR RECEPTACLE



Contact Only When Cap Is Fully Inserted

Body No. 6755. Plate No. 6756

DUPLEX FLUSH DOOR RECEPTACLE



Top Outlet No. 6758
End Outlet No. 6759
2-cord Outlet No. 6778
ALL COMPOSITION TOP OUTLET CAP No. 6779

BRASS COVERED COMPOSITION CAPS

Continued on next page

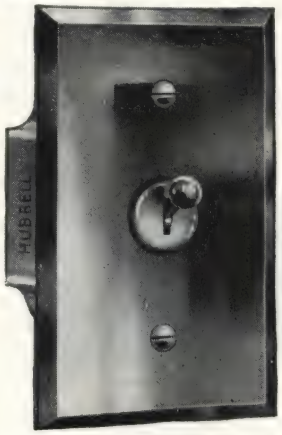
Hubbell DeLuxe Toggle Flush Switches—Meet the desire for a better switch for fine buildings. The toggle mechanism operates instantaneously with minimum strain. Made single pole, double pole (10 or 20 amperes, 250 volts) three-way, and four-way. Toggle arm furnished plain or with UNDARK radium luminous tip. Plates 2¾x4¼ in., with or without screw holes, in any finish. Cast bronze plates may be employed with this type of switch. They can not shift on the wall. Switch bodies provided with adjustable aligning lugs, assuring permanent alignment with the wall surface.

Showing Luminous Tip. Plain or ornamental plates without screw holes may also be used with this type of switch

Type No. 8122, with Small Size Cast Bronze 4-in. Plate Assembled. Plate can not shift when once fastened down

DELUXE TOGGLE FLUSH SWITCH

Hubbell Service Type Toggle and Push Button Flush Switches—Made single pole and three-way, in 5-amperes, 125 volts, and 3 amperes, 250 volts. These are excellent switches for all "service" locations. Made with porcelain body; brass plate fastened with screws as shown.



Three-quarter View
A movement of the toggle arm opens or closes the circuit

Push Button Single Pole and Three-way Flush Switch No. 8501, with Plate No. 8511

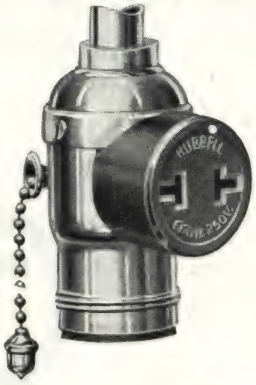
SERVICE TYPE SWITCHES

Hubbell Surface Type Toggle Wall Switches—Provide a simple and reliable current control for all locations where a flush type switch need not be specified. No. 8102 (shown) is 10-amperes, 250 volts, and Nos. 8171 and 8241 (with export type terminals) are 5-amperes, 125 volts.

SURFACE TYPE TOGGLE WALL SWITCH No. 8102 (COMPLETE)

Porcelain base and lower capacity mechanism.

Hubbell Pull Socket Current Tap—May be installed on any chandelier or wall bracket. It provides a Te-Slot current tap which can supply current to any electrical appliance, and affords the convenience of a flush receptacle, at a considerable saving in cost. The one shown is No. 3193, a standard pull socket, taking lamp, shadeholder, and shade. Chain controls the lamp independently of plug outlet. Shell cap shown is ⅜ in. for tube; also available in ¼ in., ⅛ in., and pendent types.

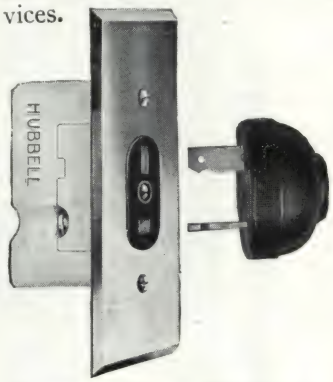


PULL SOCKET CURRENT TAP

Hubbell Porcelain Wall Receptacles—10-ampere, 250 volts, made for every type of wiring. One of eight standard types is here shown. Te-Slots, taking both types standard cap blades, concealed contacts, individual contact chambers, double springs, and large binding screws are features of this complete, standard line.

CONCEALED BASE No. 5617

Hubbell 20-ampere, 250-volt Caps and Receptacles—Give industrial plants and farm lighting units large, interchangeable line, providing the same safety and convenience as distinguish our 10-ampere devices.



20-AMPERE FLUSH RECEPTACLE No. 5552, WITH PLATE No. 5554, ASSEMBLED, AND POLARIZED COMPOSITION CAP No. 6720

20-AMPERE CONCEALED BASE No. 5621, WITH POLARIZED BRASS COVERED CAP No. 5553.

Hubbell Brass Shell Sockets—In pull, key, keyless, and push-button types, embody all the refinements of 25 years' manufacturing experience. Standard *quick catch* socket shell makes any of these types interchangeable with more than 30 shell caps and bases. All but the keyless type are made in two capacities; 250 watts=250 volts, and 660 watts=250 volts.

PULL SOCKET
Standard 3618
Electrolier 3821

KEY SOCKET
Standard 3664
Electrolier 3822

KEYLESS SOCKET
Standard 3667
Electrolier 3756

PUSH BUTTON SOCKET
Electrolier 3950

THE TRUMBULL ELECTRIC MFG. CO.

PLAINVILLE, CONN.

SALES OFFICES

BOSTON, MASS., 76-78 Pearl Street
NEW YORK, N. Y., 114 Liberty Street
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Products

TRUMBULL ELECTRICAL SAFETY DEVICES: "Circle T" Safety Switches; "Snuf-Arc" Safety Switches.

Also Dead Front Panelboards with Cabinets.

TRADE-MARK

Quality of Trumbull Electrical Devices

Excellence of materials, design and workmanship are the three essential qualities conscientiously adhered to by THE TRUMBULL ELECTRIC MFG. CO., and are the three qualities that are found in every Trumbull device. Special attention is given to every detail which will add to safety and efficiency.

A splendid record for service and durability stands behind all Trumbull electrical devices, which is testified to by the large number of leading architects and engineers who regard them as standard.

Extract from National Electrical Code Rulings on Knife Switches for 1921

Rule 24. Switches. Section a:

"Must be placed on all service wires either overhead or underground in the nearest readily accessible place to the point where the wires enter the building and arranged to cut off current from all circuits and devices, except that when service switch, service fuses and meter are combined in an approved device, or a compact combination of such approved devices, having no exposed wiring or live parts, the switch may be so arranged that it does not disconnect the fuses or meter from the supply line.

"Except where such devices are used or switches are mounted on switchboards, the service switch must be enclosed and preferably of a type that may be operated without exposing the live parts to accidental contact."

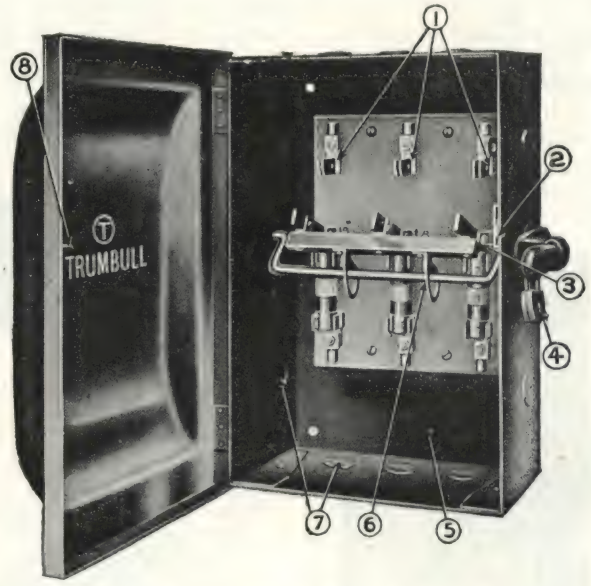
Safety Switches Are Necessary

Because of the great number of lives needlessly sacrificed by wilful tampering with an unprotected switch or by accidental contact with live parts, there is an increasing demand for safety switches which will make accidents impossible. Not only in factories but also in the home there is always an element of danger where there is an unprotected switch. To be absolutely "safe," the live parts of a switch must be covered.

Trumbull "Circle T" Safety Features

The Trumbull "Circle T" safety switch fulfils all the above requirements. Its locking device makes it impossible to open the box directly on a closed knife switch, and equally impossible to close the switch before the door is closed. Fuses and switch blades are dead when case is open.

To make it safer, a shield may be attached to protect the switch jaws on line side which are necessarily alive even when switch is in "off" position and door is open. Being externally operated, there is no danger from arcing.



"CIRCLE T" SAFETY SWITCH FEATURES

1. "Build-up" contact jaws
2. Safety catch
3. Hinge pivot upset—can not loosen
4. Can be locked open
5. Room for running wires
6. Quick break
7. Knockouts—ends and sides
8. Pin with which catch operates

FIG. 1
Milled Foot Block

FIG. 2
Blades Sweated and Pinned into Foot Block

FIG. 3
Machinemade Contact Jaw-post, Not Punch Clip

CONSTRUCTION OF TYPE "A" BUILT-UP, MACHINE-MADE CONTRACTS

FIG. 4. BOX CLOSED
Switch running. Can not be opened until switch is in "off" position

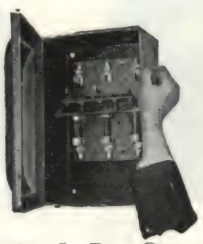


FIG. 5. BOX OPEN
Switch can not be closed until cover is closed

FIG. 6. PROTECTIVE SHIELD
No live part can be touched

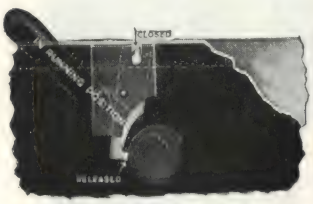


FIG. 7
In "On" Position
Catch holds box closed until switch is thrown into "off" position

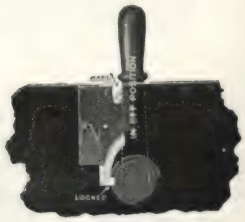


FIG. 8
In "Off" Position
Catch thrown back enables cover to be raised. Handle hub locks switch open until cover is down.

"SAFETY" INTERLOCKING DEVICE

Continued on next page

Workmanship and Construction of Switches

The parts are all machinemade and are mechanically and electrically efficient. Blades are ground in to give perfect contact, and adjustment and alignment are absolutely correct. No punched clip or bent-up type is used. Contact area of lugs is milled. On smaller switches, hinge rivet is spun over and can not work loose. All fuse clips are of bronze, and will hold their position firmly. They have more than ample contact area and will carry from 50% to 100% overload without burning. (See illustrations on previous page.)

Types of Externally Operated Safety Switches

Switches are made externally operated, with and without shield, with quick break, or quick make and quick break attachments, and with fusible bottom, or without fuse. (See table below.)

Quick Make and Quick Break Attachment

A very important safety feature is the quick make and quick break attachment, which minimizes arcing and prolongs the life of the switch. A compression spring working between handle and bearing to which switch yoke is attached causes the blade to spring into full "on" or full "off" position with a quick, positive throw when the handle passes the center, thus making it impossible to leave the blade in partial contact with the jaw post.

Switch in "Off" Position

Switch in Horizontal Position

Switch in Running Position

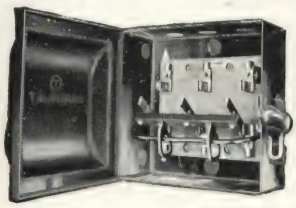
"Safety" Switch with Quick Make and Quick Break Attachment

With this quick make and quick break attachment, with or without the 100% safety shield, it is impossible to have a "frozen" switch.

A locking arrangement prevents the switch from being closed while repair work is being done on some other part of the installation.

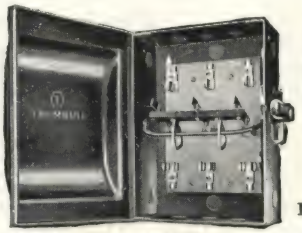
"Snuf-Arc" Type Safety Switches

The "Snuf-Arc" type switch is of regular knife switch design and material except that it has in addition a swinging moulded barrier hinged on each side of the contact jaw posts. This barrier is operated by an insulated connecting rod attached to each blade in such a way that when the blade leaves the jaw post, the barrier instantly swings between the break-



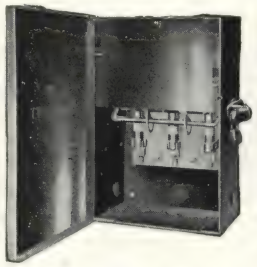
No Fuse. Quick Break without Shield

No Fuse, Quick Make, and Quick Break, without Shield

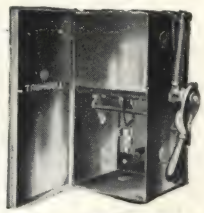


Fusible, Quick Break, without Shield

Fusible Quick Make and Quick Break, without Shield



Fusible Quick Break, with Shield



Fusible, Quick Make and Quick Break, with Shield

"Safety" Switches, Externally Operated

CATALOGUE NUMBERS, EXTERNALLY OPERATED "SAFETY" SWITCHES, 250 VOLTS D. C. AND 500 VOLTS A. C.

NO FUSE						FUSIBLE							
			Quick break, without shield		Quick make and quick break, without shield, single throw				Quick break			Quick make and quick break, single throw	
									Without shield		With shield, single throw		
Amp.	Pole	Voltage	Single throw	Double throw		Amp.	Pole	Voltage	Single throw	Double throw		Without shield	With shield
30	2	250	30221	35221	36221	30	2	250	60221	70221	61221	72221	75221
30	3	250	30321	35321	36321	30	3	250	60321	70321	61321	72321	75321
30	4	250	30421	35421	36421	30	4	250	60421	70421	61421	72421	75421
30	2	500 A.C.	30251	35251	36251	30	2	500 A.C.	60251	70251	61251	72251	75251
30	3	500 A.C.	30351	35351	36351	30	3	500 A.C.	60351	70351	61351	72351	75351
30	4	500 A.C.	30451	35451	36451	30	4	500 A.C.	60451	70451	61451	72451	75451
60	2	250–500	30222	35222	36222	60	2	250	60222	70222	61222	72222	75222
60	3	250–500	30322	35322	36322	60	3	250	60322	70322	61322	72322	75322
60	4	250–500	30422	35422	36422	60	4	250	60422	70422	61422	72422	75422
						60	2	500 A.C.	60252	70252	61252	72252	75252
100	2	250–500	30223	35223	36223	60	3	500 A.C.	60352	70352	61352	72352	75352
100	3	250–500	30323	35323	36323	60	4	500 A.C.	60452	70452	61452	72452	75452
100	4	250–500	30423	35423	36423								
						100	2	250	60223	70223	61223	72223	75223
200	2	250–500	30224	35224	36224	100	3	250	60323	70323	61323	72323	75323
200	3	250–500	30324	35324	36324	100	4	250	60423	70423	61423	72423	75423
200	4	250–500	30424	35424	36424	100	2	500 A.C.	60253	70253	61253	72253	75253
						100	3	500 A.C.	60353	70353	61353	72353	75353
400	2	250–500	30225	35225	36225	100	4	500 A.C.	60453	70453	61453	72453	75453
400	3	250–500	30325	35325	36325								
400	4	250–500	30425	35425	36425	200	2	250	60224	70224	61224	72224	75224
						200	3	250	60324	70324	61324	72324	75324
600	2	250–500	30226	35226	36226	200	4	250	60424	70424	61424	72424	75424
600	3	250–500	30326	35326	36326	200	2	500 A.C.	60254	70254	61254	72254	75254
600	4	250–500	30426	35426	36426	200	3	500 A.C.	60354	70354	61354	72354	75354
						200	4	500 A.C.	60454	70454	61454	72454	75454
800	2	250–500	30227	.....	.....								
800	3	250–500	30327	.....	.....	400	2	250	60225	70225	61225	72225	75225
800	4	250–500	30427	.....	.....	400	3	250	60325	70325	61325	72325	75325
						400	4	250	60425	70425	61425	72425	75425
1000 }	2	250–500	30228	.....	.....	400	2	500 A.C.	60255	70255	61255	72255	75255
1200 }						400	3	500 A.C.	60355	70355	61355	72355	75355
1000 }	3	250–500	30328	.....	.....	400	4	500 A.C.	60455	70455	61455	72455	75455
1200 }													
1000 }	4	250–500	30428	.....	.....	600	2	250	60226	70226	61226	72226	75226
1200 }						600	3	250	60326	70326	61326	72326	75326
						600	4	250	60426	70426	61426	72426	75426
						600	2	500 A.C.	60256	.....	61256	72256	75256
						600	3	500 A.C.	60356	.....	61356	72356	75356
						600	4	500 A.C.	60456	.....	61456	72456	75456
						800	2	250	60227	.....	.....	.....	.....
						800	3	250	60327	.....	.....	.....	.....
						800	4	250	60427	.....	.....	.....	.....
						1000 }	2	250	60228	.....	.....	.....	.....
						1200 }							
						1000	3	250	60328	.....	.....	.....	.....
						1200	4	250	60428	.....	.....	.....	.....

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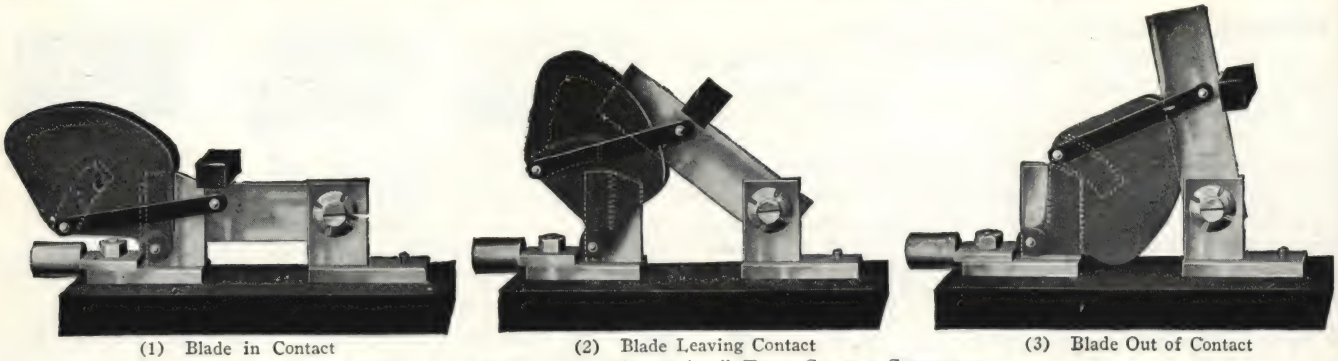


(1) Blade in Contact (2) Blade Leaving Contact (3) Blade Out of Contact

METHOD OF OPERATION, "SNUF-ARC" TYPE SAFETY SWITCHES

ing points, effectually extinguishing the arc by preventing side flare and immediately cutting it in two.

The barrier is substantially made of fireproof insulating material moulded into one piece. It consists of two wide, flat side sections which inclose each side of the jaw post and end of blade, and a heavy center piece which swings closely over the contact jaw post. The center piece stretches and breaks the arc. The flat side sections prevent side flare and the spreading of the arc to adjoining posts or to the sides of the inclosing cabinets.

The "Snuf-Arc" type switch is designed for 600-volt work, and assures 100% safety under all conditions that may arise.

"Safety" Motor Starting Switches

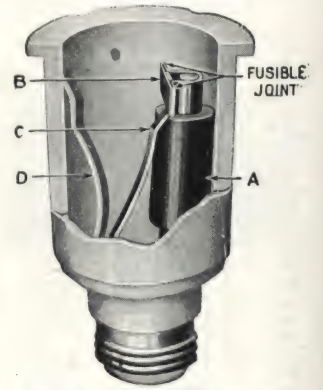
For motors rated 5 h. p. and under, 110, 220, 440, 550 volts A. C. This line of motor starting switches consists of our regular 30-ampere no fuse switches with inverse time, protective plugs giving carefully adjusted overload protection. Boxes are very compact and easily mounted on motor-driven machinery.

Handle is moved forward to close switch and backward to open switch. The protective plugs take care of zig-zag movements commonly necessary to operate various motor starting switches which depend on short circuiting the fuses to start the motor.

Overload Protection—Furnished by two inverse time protective plugs. Plug contains a stationary contact post with heating coil (A) and fusible link (B) which binds a spring contact arm (C) to the stationary post. Motor circuit is completed through heating coil, contact post, link and spring contact arm. In case of overload, the fusible link separates, releasing the spring contact arm which takes position (D). After circuit has been opened, a new link should be installed.

By reason of the time lag in the heating coil, the momentary inrush of the starting current will not cause the plugs to open the circuit.

Plugs are sold separate from the switches, and the proper plug must be selected for any given motor. In order to select the proper plug, it is necessary to know the amperage, voltage, phase and horse power and whether a 50° or 40° rated motor is used. New links can be obtained from the factory or from any Trumbull distributor.



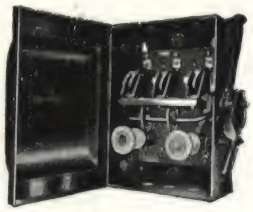
INVERSE TIME PROTECTIVE PLUG

CATALOGUE NUMBER AND WEIGHTS, "SNUF-ARC" SWITCHES, 600 VOLTS, A. C., SINGLE THROW

Amp.	Pole	Quick break				Quick make and quick break			
		No. fuse		Fusible		No fuse		Fusible	
		Cat. No.	Weight each, lbs.	Cat. No.	Weight each, lbs.	Cat. No.	Weight each, lbs.	Cat. No.	Weight each, lbs.
30	2	30261	13	60261	17	36261	13½	72261	17½
30	3	30361	17	60361	20	36361	17½	72361	20½
30	4	30461	23	60461	28	36461	23½	72461	28
60	2	30262	13	60262	18	36262	13½	72262	18½
60	3	30362	17	60362	21	36362	17½	72362	21½
60	4	30462	23	60462	29	36462	23½	72462	29
100	2	30263	22	60263	30	36263	22½	72263	30½
100	3	30363	27	60363	35	36363	27½	72363	35
100	4	30463	34	60463	50	36463	34½	72463	50½
200	2	30264	32	60264	46	36264	32½	72264	46½
200	3	30364	42	60364	50	36364	42½	72364	50½
200	4	30464	51	60464	75	36464	51½	72464	75

DIMENSIONS OF "SNUF-ARC" SWITCHES AND BOXES*

Catalogue numbers		Size of box, in.			A, in.	B, in.	J, in.	
Quick break	Quick make and quick break	Width	Height	Depth			Q. b.	Q. m. and q. b.
NO FUSE								
30261	36261	6¾	9½	5½	4¾	7 15/16	2⅛	2¼
30361	36361	9½	9½	5½	7½	7 15/16	2⅛	2¼
30461	36461	12½	9½	5½	10½	7 15/16	2⅛	2¼
30262	36262	6¾	9½	5½	4¾	7 15/16	2⅛	2¼
30362	36362	9½	9½	5½	7½	7 15/16	2⅛	2¼
30462	36462	12½	9½	5½	10½	7 15/16	2⅛	2¼
30263	36263	7¾	14	7	5¾	12 7/16	2⅛	2¼
30363	36363	11½	14	7	9½	12 7/16	2⅛	2¼
30463	36463	16	14	7	14	12 7/16	2⅛	2¼
30264	36264	9½	17	7¾	7½	15	2⅛	2⅜
30364	36364	14	17	7¾	12	15	2⅛	2⅜
30464	36464	18	17	7¾	16	15	2⅛	2⅜
FUSIBLE								
60261	72261	9½	14¼	5½	7½	12 11/16	2⅛	2¼
60361	72361	9½	14¼	5½	7½	12 11/16	2⅛	2¼
60461	72461	12½	14¼	5½	10½	12 11/16	2⅛	2¼
60262	72262	9½	16	5½	7½	14 7/16	2⅛	2¼
60362	72362	9½	16	5½	7½	14 7/16	2⅛	2¼
60462	72462	12½	16	5½	10½	14 7/16	2⅛	2¼
60263	72263	11½	22	7	9½	21 7/16	2⅛	2¼
60363	72363	11½	22	7	9½	21 7/16	2⅛	2¼
60463	72463	16	22	7	14	21 7/16	2⅛	2¼
60264	72264	14	27	7¾	12	25	2⅛	2⅜
60364	72364	14	27	7¾	12	25	2⅛	2⅜
60464	72464	18	27	7¾	16	25	2⅛	2⅜



"SAFETY" MOTOR STARTING SWITCH

Catalogue Numbers and Weights, "Safety" Motor Starting Switches

Amp.	Pole	Volt, A.C.	Quick break		Quick made and quick break	
			Cat. No.	Weight each, lbs.	Cat. No.	Weight each, lbs.
30	2	110–250	81221	13	83221	17
30	3	110–250	81321	15	83321	19
30	4	110–250	81421	18	83421	22
30	2	251–600	81261	19	83261	22
30	3	251–600	81361	23	83361	27
30	4	251–600	81461	32	83461	36

251-600 volt A. C. switches are of the "Snuf-Arc" type.
Extra links furnished with each switch, being placed inside of box on a rod so they will be readily accessible.

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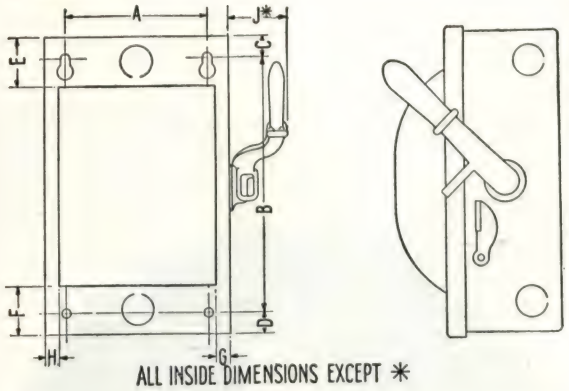
Dimension Diagrams for "Safety" Switches Externally Operated



ALL INSIDE DIMENSIONS EXCEPT *

DIMENSIONS OF "SAFETY" SWITCHES AND BOXES

Catalogue numbers	Size of box, in.			A, in.	B, in.	J, in.	
	Width	Height	Depth			Q. b.	Q. m. and q. b.
No Fuse, Without Shield, Single Throw							
30221		5	7½	5⅛	3	5 15/16	2⅛	2¼
30321		7¾	7½	5⅛	5¾	5 15/16	2⅛	2¼
30421		10½	7½	5⅛	8½	5 15/16	2⅛	2¼
30251	36221, 36251	6¾	9½	5½	4¾	7 15/16	2⅛	2¼
30351	36321, 36351	9½	9½	5½	7½	7 15/16	2⅛	2¼
30451	36421, 36451	12½	9½	5½	10½	7 15/16	2⅛	2¼
30222	36222	6¾	9½	5½	4¾	7 15/16	2⅛	2¼
30322	36322	9½	9½	5½	7½	7 15/16	2⅛	2¼
30422	36422	12½	9½	5½	10½	7 15/16	2⅛	2¼
30223	36223	7¾	14	7	5¾	12 7/16	2⅛	2¼
303..3	36323	11½	14	7	9½	12 7/16	2⅛	2¼
30423	36423	16	14	7	14	12 7/16	2⅛	2¼
30224	36224	9½	17	7¾	7½	15	2⅛	2⅜
30324	36324	14	17	7¾	12	15	2⅛	2⅜
30424	36424	18	17	7¾	16	15	2⅛	2⅜
30225	36225	12	23	10⅛	10	21	2⅛	2⅜
30325	36325	16¼	23	10⅛	14¼	21	2 11/16	2⅜
3042[illegible]	36425	20½	23	10⅛	18½	21	2 11/16	2⅜
30226	36226	12	29	11	10	27	2 11/16	2⅜
30326	36326	16	29	11	14	27	2 11/16	2⅜
30426	36426	20	29	11	18	27	2 11/16	2⅜
30227	.....	14	31½	10½	12	29½	2 11/16	.....
30327	.....	20	31½	10½	18	29½	2 11/16	.....
30427	.....	24	31½	10½	22	29½	2 11/16	.....
30228	.....	15	37	11½	13	35	2 11/16	.....
30328	.....	22	37	11½	20	35	2 11/16	.....
30428	.....	27	37	11½	25	35	2 11/16	.....
No Fuse, Without Shield, Double Throw, Quick Break							
35221	.....	6½	10½	5¾	4½	8 15/16	2⅛	.....
35321	.....	10	10½	5¾	8	8 15/16	2⅛	.....
35421	.....	11½	10½	5⅜	9½	8 15/16	2⅛	.....
35251	.....	8½	12½	6¼	5½	10 15/16	2⅛	.....
35351	.....	11	12½	6⅜	8½	10 15/16	2⅛	.....
35451	.....	14	12½	6¼	11½	10 13/16	2⅛	.....
35222	.....	8½	12½	6¼	5½	10 15/16	2⅛	.....
35322	.....	11	12½	6⅜	8½	10 15/16	2⅛	.....
35422	.....	14	12½	6¼	11½	10 15/16	2⅛	.....
35223	.....	9	17	9½	7	15 7/16	2⅛	.....
35323	.....	13	17	9½	11	15 7/16	2⅛	.....
35423	.....	17½	17	9½	15½	15 7/16	2⅛	.....
35224	.....	11	19½	9½	9	17½	2⅛	.....
35324	.....	16	19½	9½	14	17½	2⅛	.....
35424	.....	20	19½	9½	18	17½	2⅛	.....
35225	.....	13½	28	10½	11½	26	2 11/16	.....
35325	.....	18	28	10½	16	26	2 11/16	.....
35425	.....	22	28	10½	20	26	2 11/16	.....
35226	.....	14	35	11½	12	33	2 11/16	.....
35326	.....	19	35	11½	17	33	2 11/16	.....
35426	.....	23	35	11½	21	33	2 11/16	.....
Motor Starting Switches, Quick Break							
81221	.....	5	9¾	5½	3	8 3/16	2⅛	.....
81321	.....	7¾	9¾	5½	5¾	8 3/16	2⅛	.....
81421	.....	10½	9¾	5½	8½	8 3/16	2⅛	.....
81261	.....	6¾	13	5½	4¾	11 7/16	2⅛	.....
81361	.....	9½	13	5½	7½	11 7/16	2⅛	.....
81461	.....	12½	16	5½	10½	14 7/16	2⅛	.....
Motor Starting Switches, Quick Make and Quick Break							
83221	83261	6¾	13	5½	4¾	11 7/16	2¼	.....
83321	83361	9½	13	5½	7½	11 7/16	2¼	.....
83421	83461	12½	16	5½	10½	14 7/16	2¼	.....

DIMENSIONS OF "SAFETY" SWITCHES AND BOXES

Catalogue numbers	Size of box, in.			A, in.	B, in.	J, in.	
	Width	Height	Depth			Q. b.	Q. m. and q. b.
Fusible, Without Shield, Single Throw							
60221	.....	5	9¾	5⅛	3	8 3/16	2⅛	2¼
60321	.....	7¾	9¾	5⅛	5¾	8 3/16	2⅛	2¼
60421	.....	10½	9¾	5⅛	8½	8 3/16	2⅛	2¼
60251	.....	9½	14¼	5½	7½	12 11/16	2⅛	2¼
60351	.....	9½	14¼	5½	7½	12 11/16	2⅛	2¼
60451	.....	12½	14¼	5½	10½	12 11/16	2⅛	2¼
60222	72221, 72222	6¾	13	5½	4¾	11 7/16	2⅛	2¼
60322	72321, 72322	9½	13	5½	7½	11 7/16	2⅛	2¼
60422	72421, 72422	12½	16	5½	10½	11 7/16	2⅛	2¼
60252	72251, 72252	9½	16	5½	7½	14 7/16	2⅛	2¼
60352	72351, 72352	9½	16	5½	7½	14 7/16	2⅛	2¼
60452	72451, 72452	12½	16	5½	10½	14 7/16	2⅛	2¼
60223	72223	7¾	20½	7	5¾	18 15/16	2⅛	2¼
60323	72323	11½	20½	7	9½	18 15/16	2⅛	2¼
60243	72423	16	22	7	14	20 7/16	2⅛	2¼
60253	72253	11½	22	7	9½	20 7/16	2⅛	2¼
60353	72353	11½	22	7	9½	20 7/16	2⅛	2¼
60453	72453	16	22	7	14	20 7/16	2⅛	2¼
60224	72224	9½	25	7¾	7½	23 7/16	2⅛	2⅜
60324	72324	14	25	7¾	12	23 7/16	2⅛	2⅜
60424	72424	18	27	7¾	16	25 7/16	2⅛	2⅜
60254	72254	14	27	7¾	12	25 7/16	2⅛	2⅜
60354	72354	14	27	7¾	12	25 7/16	2⅛	2⅜
60454	72454	18	27	7¾	16	25 7/16	2⅛	2⅜
60225	72225	12	30	10⅛	10	28	2⅛	2⅜
60325	72325	16¼	30	10⅛	14¼	28	2 11/16	2⅜
60425	72425	20½	33	10	18½	31	2 11/16	2⅜
60255	72255	12	33	10⅛	10	31	2 11/16	2⅜
60355	72355	16¼	33	10⅛	14¼	31	2 11/16	2⅜
60455	72455	20½	33	10	18½	31	2 11/16	2⅜
60226	72226	12	37	11	10	35	2 11/16	2⅜
60326	72326	16	37	11	14	35	2 11/16	2⅜
60426	72426	20	39⅞	11	18	37⅞	2 11/16	2⅜
60256	72256	12	39⅞	11	10	37⅞	2 11/16	2⅜
60356	72356	16	39⅞	11	14	37⅞	2 11/16	2⅜
60456	72456	20	39⅞	11	18	37⅞	2 11/16	2⅜
60227	.....	17	36	10½	15	34	2 11/16	.....
60327	.....	25	36	10½	23	34	2 11/16	.....
60427	.....	32	36	10½	30	34	2 11/16	.....
60228	.....	19	44	11½	17	42	2 11/16	.....
60328	.....	27	44	11½	25	42	2 11/16	.....
60428	.....	35	44	11½	33	42	2 11/16	.....
Fusible, Without Shield, Double Throw, Quick Break							
70221	.....	6½	14½	5¾	4½	12½	2⅛	.....
70321	.....	10	14½	5¾	8	12½	2⅛	.....
70421	.....	11½	14½	5⅜	9½	12½	2⅛	.....
70251	.....	8½	24	6½	5½	21½	2⅛	.....
70351	.....	11	24	6½	8½	21½	2⅛	.....
70451	.....	14	24	6½	11½	21½	2⅛	.....
70222	.....	8½	19	6¼	5½	16½	2⅛	.....
70322	.....	11	19	6¼	8½	16½	2⅛	.....
70422	.....	14	19	6½	11½	16½	2⅛	.....
70252	.....	8½	24	6½	5½	21½	2⅛	.....
70352	.....	11	24	6½	8½	21½	2⅛	.....
70452	.....	13½	24	6½	11½	21½	2⅛	.....
70223	.....	9	29	9½	7	27	2⅛	.....
70323	.....	13	29	9½	11	27	2⅛	.....
70423	.....	17½	29	9½	15½	27	2⅛	.....
70253	.....	9	34	9½	7	32	2⅛	.....
70353	.....	13	34	9½	11	32	2⅛	.....
70453	.....	17½	34	9½	15½	32	2⅛	.....
70224	.....	11	35	9½	9	33	2⅛	.....
70324	.....	16	35	9½	14	33	2⅛	.....
70424	.....	20	35	9½	18	33	2⅛	.....
70254	.....	11	39½	9½	9	37½	2⅛	.....
70354	.....	16	39½	9½	14	37½	2⅛	.....
70454	.....	20	39½	9½	18	37½	2⅛	.....
70225	.....	13½	42½	10½	11½	40½	2 11/16	.....
70325	.....	18	42½	10½	16	40½	2 11/16	.....
70425	.....	22	42½	10½	20	40½	2 11/16	.....
70255	.....	13½	48½	10½	11½	40½	2 11/16	.....
70355	.....	18	48½	10½	16	40½	2 11/16	.....
70455	.....	22	48½	10½	20	40½	2 11/16	.....
70226	.....	14	52½	11½	12	50½	2 11/16	.....
70326	.....	19	52½	11½	17	50½	2 11/16	.....
70426	.....	23	52½	11½	21	50½	2 11/16	.....

Boxes for switches with shields have flat covers.

Boxes for fusible, single throw, quick break switches *with* shield have same dimensions, except depth, as those for fusible, single throw, quick break switches *without* shield.

Boxes for fusible, single throw, quick make and quick break switches *with* shield have same dimensions, except depth, as those for fusible, single throw, quick make and quick break switches *without* shield.

BEARDSLEE CHANDELIER MANUFACTURING CO.

216 South Jefferson Street
CHICAGO, ILL.

Products and Services

A complete line of CHANDELIERS and ORNAMENTAL BRONZES for every lighting requirement, including DENZAR.

DENZAR
THE UNITY OF DAY BRIGHTNESS
TRADE-MARK

A staff of illuminating engineers, designers and metal workers is employed to plan and suggest suitable lighting equipment for every requirement. The designers and metal workers are exceptionally skillful in producing replicas of period designs and in creating appropriate forms to harmonize with architectural and decorative features. Many architects use Beardslee Home Lighting Suggestions to advantage. A set of plans facilitates making recommendations.

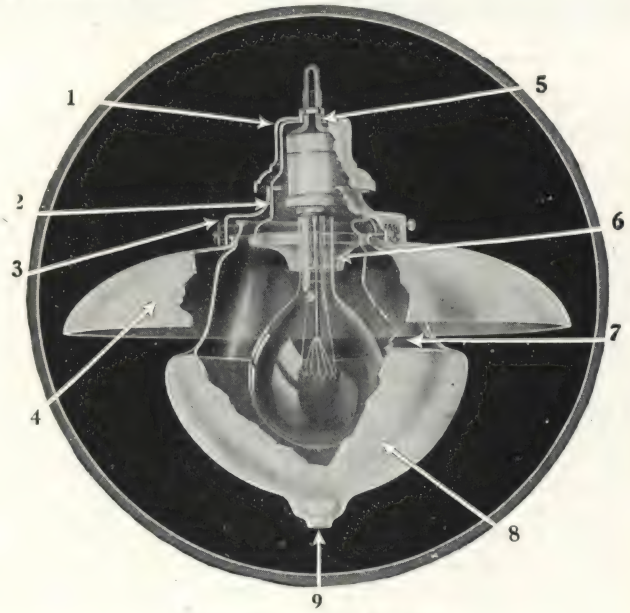
A Word About Denzar

The enviable reputation which Denzar has earned in the commercial lighting field is perhaps its greatest asset. Hundreds of electrical dealers and thousands of users proclaim its illuminating value the best among numerous other commercial lighting units.

Some attribute the success of Denzar to one or more of its nine distinctive features. Others prefer Denzar for its simplicity of design and symmetrical proportions, which harmonize with any surroundings. Many architects show their preference by specifying Denzar for schools, offices, stores, churches, hospitals, railroad stations, hotels, and other public and semipublic buildings.

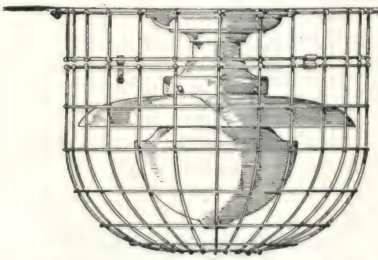
The exceptional efficiency of Denzar is due to the Denzar bowl and reflecting dome, which jointly determine the quality and distribution of light. The reflecting dome of opal glass gathers upward rays of light and re-distributes them downward. At the same time it permits sufficient light to filter upward to ceiling, thereby eliminating black spots and light streaks, while the deflector within the neck of reflecting dome checks any possible waste of light within the holder. No opaque reflectors or supporting rods to cast unsightly shadows, nor is Denzar in any way dependent upon the ceiling as a reflector.

No set rule can be given to govern every installation, as color of walls and ceiling, together with local conditions, materially affect the results obtained. However, Beardslee illuminating engineers and designers may be freely consulted on any special lighting problem. Valuable data covering spacing, hanging height, etc., for Denzar may be had on request.

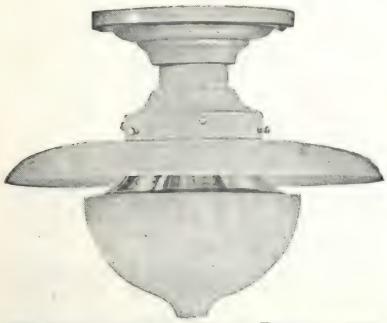


CONSTRUCTION OF DENZAR

(1) Housing, of steel, white porcelain enameled.
(2) Yoke, of spring steel supporting metal holder.
(3) Metal holder, supporting reflecting dome and lower bowl.
(4) Reflecting dome, of opal glass, softens and distributes light.
(5) Adjustable hanger, for adjusting lamp without removing glassware.
(6) Deflector, diverts upward rays downward onto working plane.
(7) Upper part of bowl, clear glass, protects lamp from dust and dirt.
(8) Lower part of bowl, white enameled glass, softens and diffuses light.
(9) Air intake, allows cool air to pass upward continually around lamp.

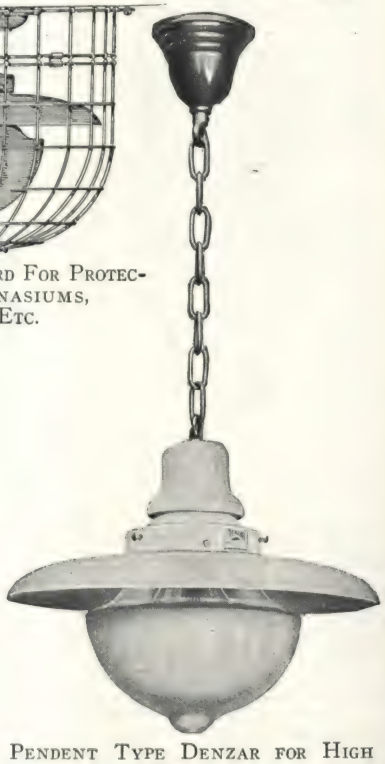


DENZAR WIRE GUARD FOR PROTECTION IN GYMNASIUMS, SCHOOLS, ETC.



COMPACT CEILING TYPE DENZAR FOR VERY LOW CEILINGS

FLEXIBLE CEILING TYPE DENZAR



PENDENT TYPE DENZAR FOR HIGH CEILINGS

BRASCOLITE CO.

DIVISION OF THE ST. LOUIS BRASS MFG. CO.

ST. LOUIS, MO.

BRANCH OFFICES

ATLANTA, BOSTON, CINCINNATI, CHICAGO, OMAHA, DETROIT, KANSAS CITY, LOS ANGELES, MINNEAPOLIS, NEW YORK, NEW ORLEANS, PHILADELPHIA

Products

LIGHTING FIXTURES for every type of building.

Special designs furnished for public buildings, hotels, clubs, churches, fine homes, theaters, etc.

BRASCOLITE DIFFUSION, PLUS REFLECTION

AGLITE ALL GLASS

INDUSTROLITE THE FACTORY FIXTURE

LUMO VITRO SWITCH PLATES PORCELAIN ENAMELED

E-Lite

TRADE-MARKS

Brascolite Semi-indirect Lighting Fixture

The high efficiency of the Brascolite is obtained by the arrangements of the bowl and reflector which direct all emitted light to the working plane with a minimum absorption. Photometric tests indicate an average efficiency of the Brascolite of over 80%. By comparison with photometric tests of direct reflectors, it will be found to be more efficient than 90% of the direct reflectors and that it shows an average efficiency of effective lumens on the working plane of 65% as against an average efficiency of 35% for ordinary semi-indirect systems and of 25% for totally indirect systems.

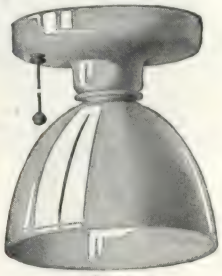
Mechanical features are simple, substantial and practical. Brascolites are made and shipped complete for installation on any standard outlet. They are packed in unit cartons made to railroad specifications and can be delivered on the job without assembling.

BRASCOLITE

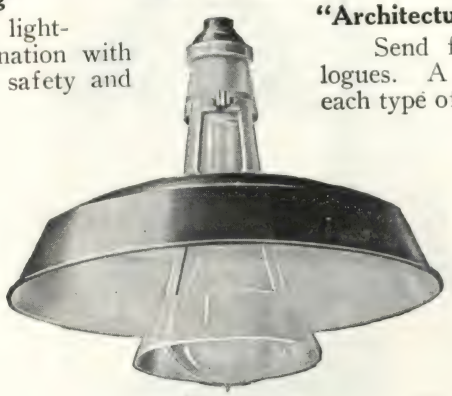
TRIPOD MADE FOR MISSOURI CAPITOL

Industrolite—For Industrial Lighting

A new development for factory lighting, providing highly efficient illumination with absence of glare. Its use promotes safety and increases production.



AGLITE
All-white Glass



INDUSTROLITE
All-porcelain enameled

Aglite All-glass Lighting Fixture

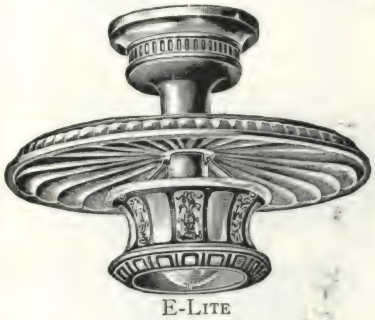
The Aglite, a new all-glass fixture with marble-like appearance, is the ideal lighting unit for use in bathrooms, hospitals or wherever sanitation or cleanliness are essential.

It harmonizes with hospital furniture and will not discolor or become tarnished.

E-Lite All-glass Lighting Fixture

The E-Lite, a new all-glass ornamental unit, is a most beautiful and efficient unit for bedrooms, reception halls, small parlors, under balconies in hotels and other locations where the unit must harmonize with decorative surroundings.

Simplicity of construction, economy of service and the ease with which E-Lite fixtures may be installed are factors that have gained for this new unit a widespread popularity. Being all glass, it is easily kept clean.



E-LITE

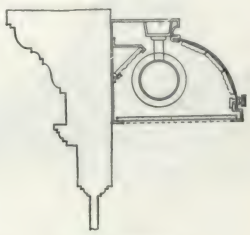
Concealite Reflectors

Send for our catalogue of bank screen lighting, showcase, show window and cove reflectors.

Estimates will be furnished on special reflectors for any purpose.

"Architectural Series" Catalogues

Send for our "Architectural Series" catalogues. A separate catalogue is published for each type of building.



CONCEALITE

J. G. BRAUN

Manufacturers of Lighting Fixtures and Steel Ornaments

609-615 South Paulina Street
CHICAGO, ILL.

TELEPHONE
WEST 0713-2373

EASTERN BRANCH AND WAREHOUSE: NEW YORK, N. Y., 158-160 Green Street—Telephone, Spring 0863

Products

HAND WROUGHT IRON ORNAMENTAL LIGHTING FIXTURES, including Side Wall Brackets, Chandeliers, Drop Lights, Floor and Table Lamps, Desk Lamps, Electroliers and Ferneries, Candlesticks; hand wrought and pressed Steel Ornaments, Rosettes, Leaves, Cups, Husks, Wreaths, Flowers, Roses, for lighting fixtures and lamps.

For Steel Mouldings, Special Rolled Steel Shapes, see pages 582-583.

Stocks

We carry a complete stock of fixtures and ornaments in our Chicago and New York warehouses embracing a wide selection to suit any need or taste.

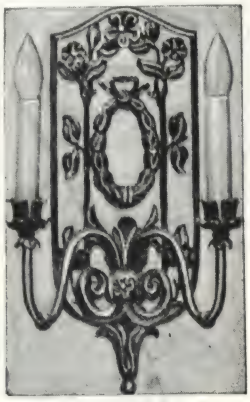
Catalogue

Catalogues 18 and 19 illustrating the various designs sent on request.

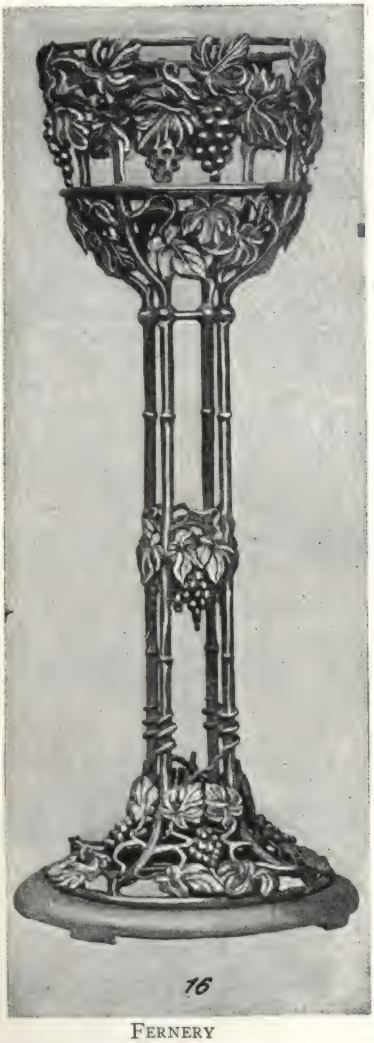
CEILING LIGHT

SIDE WALL BRACKET

CHANDELIER



SIDE WALL BRACKET



FERNERY

TABLE LAMP

SIDE WALL BRACKET

SIDE WALL BRACKET

DUPLEX LIGHTING WORKS

OF GENERAL ELECTRIC CO.

6 West 48th Street

NEW YORK, N. Y.

Product

DUPLEXALITES.

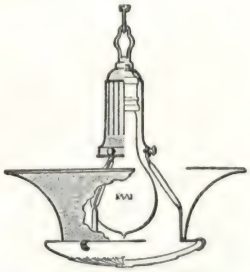
Advantages

First: Widest distribution of light. (82% of output is indirect.) Complete diffusion of illumination. Absolutely no glare (circular eyeshield around lamp).

Second: Simplest construction possible. Easiest and quickest to clean. Most durable construction. Practically unbreakable.

Construction

The suspension consists of a canopy, chain and socket cover, all finished in a beautiful antique brass color. The deflector has an inside reflecting surface of white porcelain. The outside of the deflector on the D-161 series Duplexalites is a mat-surfaced, cream porcelain enamel. On the D-171 series, an ornamental cuirass of brass is secured to the porcelain deflector. The bottom discs of the D-161 series (commercial type) are of special formula, Moonstone type, heavy, moulded glass. The D-171 (residence type) discs are denser and of a creamy warm color.



SECTIONAL VIEW SHOWING THE CONSTRUCTION OF THE DUPLEXALITE

STANDARD DUPLEXALITE D-161 SERIES

Standard and Ornamented Duplexalites are made in three sizes

D-171 SERIES DUPLEXALITE

Finished in antique brass or silver

DUPLEXALITE WITH SILK SHADE S-5010

Furnished in old gold, old rose, ecru, blue or gray

Home Lighting

Because of the quality of light diffusion produced with Duplexalites they greatly improve ease of seeing and eye comfort. Moreover, this perfect, even illumination brings out best the full attractiveness of an interior. In addition to the silver and antique brass Duplexalites, silk shades may be used, when desired, to harmonize with any decorative scheme. Due to construction the shades do not affect the illumination.

Hotels and Clubs

Duplexalites make hotels and clubs homelike and comfortable. They are extensively used in this field.

Commercial Lighting

The better one sees, the better one works. Duplex lighting is ideal lighting for offices, stores, etc., or any place where perfect visual conditions are an essential. *Duplexalites are used in many of the largest buildings in the country where they have been chosen on the basis of economy and service.*

Information

Lists of installations and complete catalogues and data sent on request. Plans or specifications sent to the Engineering Department will be carefully studied and lighting layouts and recommendations made without charge.

DUPLEXALITE WITH RING R-800 AND TASSEL

These trimmings may be applied to any standard Duplexalite

IVANHOE-REGENT WORKS

Of General Electric Company

Manufacturers of Ivanhoe Illuminating Glassware and Metal Reflectors

CLEVELAND, OHIO

Products

COMMERCIAL LIGHTING UNITS; BOWLS and SHADES for Decorative and Commercial Lighting; ILLUMINATING GLASSWARE for the Home; GLASS TOP REFLECTORS and RLM STANDARD METAL REFLECTORS and FITTINGS for Industrial Illumination, and Illuminating Service.

TRADE-MARK

Ivanhoe Commercial Lighting Units

Ivanhoe Keldon—A totally enclosed, semi-indirect commercial lighting unit made in 14-, 16-, and 18-in. diameters for Mazda lamps ranging from 100 to 500 watts. The glass globe is blown in one piece and enameled on the sides and bottom. Light of high intensity without uncomfortable glare from its source is produced. Recommended for stores, offices, schools, hospitals, and all places where diffused light of high intensity is needed.

Ivanhoe Trojan—A totally enclosed unit made in 9-, 12-, 14-, 16-, and 18-in. sizes to serve Mazda lamps up to and including 500-watt size. Made of one piece of light density Genco glass of high diffusing quality and low light absorption. Provides light distribution in all directions without sharp shadows or lines of contrast. The Trojan has a pleasing appearance and is recommended for all kinds of commercial lighting.

Ivanhoe Ace—An enclosing unit made in 14-, 17-, and 20-in. sizes for Mazda C lamps from 100 to 500 watts. Made of one piece of crystal glass, enameled on the upper surface to reflect the light downward, and on the outer surface of the bowl to diffuse the light and prevent glare with very little light absorption. An efficient and pleasing unit for all kinds of commercial lighting.

Ivanhoe Ornamental Glassware (Veluria, Druid, Sudan)

Ivanhoe ornamental glassware is designed to harmonize with artistic interiors. It is made in a variety of architectural styles and in several textures, the specific trade names of which are Veluria, Druid and Sudan. Veluria glass is a light density opal which shows a true pink opal "fire" when lighted. Druid is an opal of medium intensity and has a smooth surface. Sudan is an opal glass which gives splendid diffusion and is especially suitable for semi-indirect lighting.

No. 2129 Veluria — No. 6033 Druid — No. 2131 Sudan

IVANHOE COMMERCIAL REFLECTORS

Industrial Lighting

IVANHOE-REGENT WORKS supplies Ivanhoe RLM metal reflectors for every industrial lighting use—dome reflectors, bowl reflectors, angle type reflectors, glass top reflectors and reflectors for special service—and furnishes illuminating service on request.

IVANHOE GLASS-TOP REFLECTOR

Ivanhoe Keldon — Ivanhoe Trojan — Ivanhoe Ace

IVANHOE COMMERCIAL LIGHTING UNITS

Ivanhoe Keldon, Trojan, and Ace are regularly supplied with either suspension or ceiling type fixtures

Continued on next page

Store Window Lighting

Ivanhoe Iris equipment for store window lighting is available with color globes in four colors—red, amber, green and blue. The Ivanhoe Iris spotlight uses a 250-watt stereopticon or flood lighting lamp and throws a beam of pure white light that easily penetrates colored light.

IVANHOE IRIS EQUIPMENT

IVANHOE IRIS SPOTLIGHT

Ivanhoe Ornamental Glassware (Rozelle Color Decorations)

Rozelle colors as applied to Veluria, Ivre and Crystal glass produce the harmonious color effects of the best hand painted work. The colors are fixed, and are permanent. The Rozelle catalogue shows the entire line in process colors.

The Ivanhoe Ivadine

The Ivanhoe Ivadine supplies that combination of abundant light and soft color tints so desirable in dining room illumination. The lighted Ivadine floods the table with a cone of white light and tones the remainder of the room with a soft, warm light. Supplied in Crystal and Ivre glass with Rozelle color decorations.

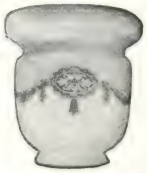
No. 5141x16 CRYSTAL ROZELLE 337

Distribution

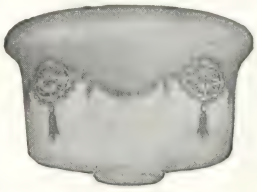
Ivanhoe lighting glassware and metal reflectors are distributed by 300 representative jobbers and more than 10,000 selected dealers.

No. 5135½
Rozelle 291

No. 538x17 Rozelle 291

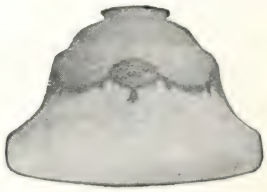


No. 5133½
Rozelle 291



No. 5136 Rozelle 291

No. 5129x12 Rozelle 291

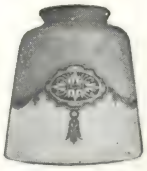


No. 5130 Rozelle 291

No. 5118½
Rozelle 291

No. 296½
Rozelle 291

No. 5128x12 Rozelle 291



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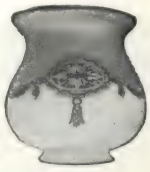
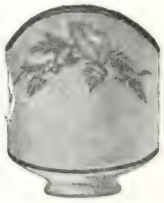
Rozelle 291



No. 521½
Rozelle 291

IVANHOE ORNAMENTAL GLASSWARE—ROZELLE COLOR DECORATIONS

No. 358x8
Crystal Rozelle 433



No. 296½
Crystal Rozelle 410

No. 296½
Ivre Rozelle 294

No. 296½
Crystal Rozelle 409

No. 5500x8
Crystal Rozelle 476

FIVE ADDITIONAL DESIGNS OF THE VARIOUS ROZELLE DECORATIONS

NATIONAL PLASTIC RELIEF CO.

DIVISION OF NEWMAN MANUFACTURING CO.

Lighting Fixtures and Plastic Relief Ornaments

416-18 Elm Street
CINCINNATI, OHIO

Products

CEILING and SIDE WALL LIGHTING FIXTURES and PLASTIC RELIEF ORNAMENTS.

Also, Portable Fountains and Cement Garden Furniture.

TRADE-MARK

Services

This company will gladly manufacture composition lighting fixtures and plastic relief ornaments to any special designs desired, and at all times solicits the opportunity of submitting estimates on any amount of work in this line, being fully equipped to execute ornamental work of every description from drawings.

Lighting Fixtures and Ornaments

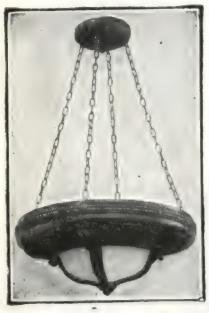
The fixtures and ornaments manufactured by the NATIONAL PLASTIC RELIEF CO. include designs for every purpose, all made from special Fiberolitic composition.

Richness and individuality characterize each piece, while the scope and variety of the designs offer an almost unlimited opportunity of selection.

The finest details of uniqueness and beauty have been thoroughly worked out in fixtures, glassware and ornamental pieces.

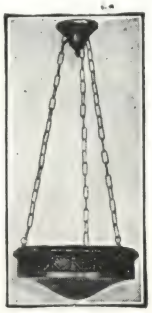
The finishes used will harmonize with the most exquisite appointments.

In the side wall fixtures, each is complete, electric lamps not included, and is wired for one light, except where two are called for. Extra wiring can also be had.



CEILING FIXTURE

ORNAMENTAL CEILING FIXTURE



CEILING FIXTURE

Standard Finishes

The standard finishes are: No. 1, standard gold. No. 2, ivory and gold. No. 3, old ivory. No. 4, Roman gold. No. 5, French gold. No. 6, verde antique.

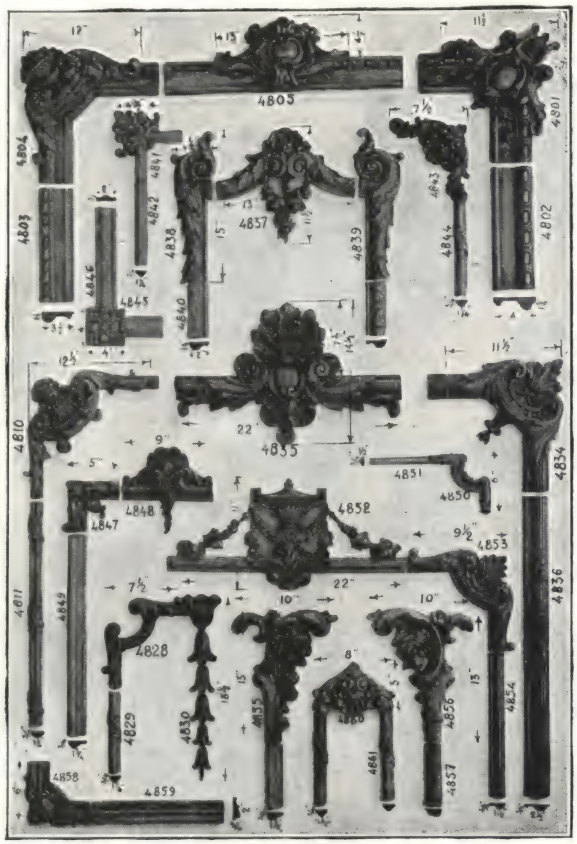
Catalogues

Complete, illustrated catalogues of these lighting fixtures and ornaments will be sent on request.

GRAND BALLROOM, HOTEL SINTON, CINCINNATI, OHIO
Plastic sidewall and ceiling ornaments made by us

OTHER INSTALLATIONS

Gordon Theater, Middletown, Ohio
Bethel Temple, Newcastle, Ind.
St. Mary's Greek Catholic Church, Windber, Pa.
High Schools (2), Birmingham, Ala
High School, Saginaw, Mich.
Southern Railway Building, Cincinnati, Ohio



CORNERS AND MOULDINGS OF PLASTIC RELIEF
Miniature reproduction of one of the hundreds of cuts in our catalogue

THE PERFECLITE MFG. CO.

1599 St. Clair Avenue
CLEVELAND, OHIO

119 Main Street
SEATTLE, WASH.

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BUFFALO, N. Y., McCarthy Bros. & Ford
BUTTE, MONT., Montana Electric Co.
DULUTH, MINN., Duluth Electrical Supplies Co.
HUNTINGTON, W. VA., Emmons-Hawkins Co.
KANSAS CITY, MO., Kansas City Chandelier Co.
MILWAUKEE, WIS., G. Q. Electric Co.
MINNEAPOLIS, MINN., Sterling Electric Co.
SAN DIEGO, CAL., Coast Electric Co.
PITTSBURGH, PA., Sargent Electric Co.
ST. LOUIS, MO., Brown & Hall Supply Co.
WASHINGTON, D. C., White & Boyer Co.
WORCESTER, MASS., E. M. Fay Electric Co.

Product

Perfeclite Lighting Units for every type of building.

PERFECLITE

TRADE-MARK

Patented

Upward rays are ordinarily lost through absorption, and usual attempts to utilize them result in striations (light streaks and ceiling shadows). Perfeclite mirror reflector successfully accomplishes this utilization of the upward rays, and our reflector is patented. No other unit contains this kind of reflector. The illustration below shows a full view of this mirror reflector.

Glassware

Monax.

Guarantee

Perfeclite mirror reflectors are made of selected glass and produced under a secret process and are therefore not to be confused with the ordinary glass mirror. They are unconditionally guaranteed not to peel, check, nor crack, under any heat generated by the lamp.

Ceiling Type, Plain

Pendant Type, Plain

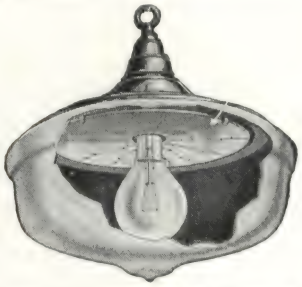
DIMENSIONS AND LIST PRICES*

Type No.	Watts	Bowl diam., in.	Price
	Pendant Types—Plain		
62	75–100	10	$14.00
64	100–200	12	14.40
66	–300	14	18.40
68	300–500	16	20.80

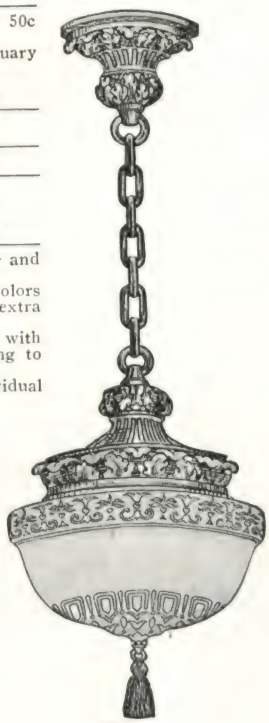
Standard length, 4 ft. over all. Additional lengths 50c per ft. extra list. Pull switch $2.00 extra list.
Standard finish, old gold. Special finish in statuary bronze is 10% extra.

	Period Design Units—Gothic, Classic, and Adam		
1712	100–200	10	$38.00
1716	300–500	16	47.00
	Ceiling Types—Plain		
61	75–100	10	$10.40
63	100–200	12	12.80
65	–300	14	16.40
67	300–500	16	18.80

Standard colors on etched glassware are French gray and mauve.
Standard color on fixture, old Roman gold. Other colors or statuary bronze furnished on sufficient notice without extra charge.
Come complete, wired ready to install. Wired with No. 14 or No. 16 asbestos cotton covered wire according to wattage of fixture. Color or wire to match chain.
*All Perfeclite units are packed complete in individual cartons ready to install.



Section of Perfeclite Fixture
At an angle in order to fully show patented mirror reflector



Classic

Gothic

Adam

Period Design Units

THE REFLECTOLYTE COMPANY

Manufacturers of Standardized Lighting Fixtures

914-H Pine Street
ST. LOUIS, MO.

Products

"REFLECTOLYTE" Standardized Lighting Fixtures, which include "Supreme," "U," "H," "Standard," "J," and "Institutional" Types.

General

The Reflectolyte lighting fixtures illustrated and described on the following pages were designed especially for use with nitrogen gas-filled lamps.

The Reflectolyte line consists of 6 distinct types ranging in design from ornate to simple forms, each type efficiently controlling the distribution of light, and each with a full complement of sizes to accommodate lamps from 50 to 500 watts.

Each Reflectolyte type is equipped with glass designed especially for that type; this glassware is blown in our own moulds, of special glass made to our specifications, and in quality and tonal values, is the choicest product of the glassmakers' art.

The stamped metal parts are drawn of the highest quality, rust-resisting and rust-proofed, special composition ingot iron sheet-metal, and are of extra heavy gauge—very much thicker than usually supplied; and, when finished by our special process which encases them in a hard, horn-like covering of celluloid and metal, are guaranteed to equal brass in lasting and wearing qualities (and to greatly exceed it in strength) and to be superior to plated metals. These parts can also be finished in fused-on porcelain-enamel, or supplied in brass or bronze metal, to special order.

All close Reflectolytes and suspended types up to and including the 12½-in. size, are provided with a special stamping which permits quick attachment to the ears or stud of standard 4-in. outlet boxes, or to wood or plaster ceilings; the larger suspended sizes are provided with crowfoot or hickey, as may be specified.

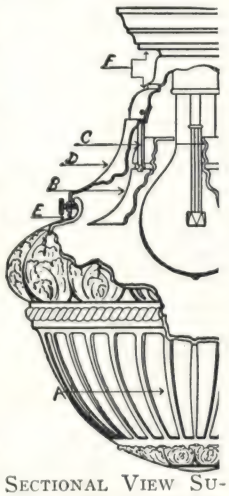
Porcelain receptacles and No. 14 wire are regular equipment with all types of Reflectolytes, hence 13 outlets totaling 1,320 watts, are permissible on each circuit.

The Reflectolyte Engineering Department is in charge of experts who have had many years' experience in planning lighting installations; their services are at the disposal (without obligation) of those desiring advice or recommendations on illuminating subjects.

All jobbers and dealers in electrical merchandise are in position to quote competitive prices on Reflectolytes. Illustrations of the various types, with description, specifications and distribution curves, follow.

Description of "Supreme" Reflectolyte

In "Supreme" Reflectolyte diffusers we offer an enclosing unit, within which is a porcelain enameled reflector (B) which controls the distribution of light. This reflector, detachably supported by three spring-fingers (C), is so positioned in relation to the light-source, that all the horizontal and upwardly inclined rays are reflected downwardly. These reflected rays together with the direct rays from the source, are diffused by the urn of special white glass, and distributed over a wide area beneath the fixture.



SECTIONAL VIEW SUPREME REFLECTOLYTE

"Supreme" Reflectolytes maintain the maximum of unimpaired illumination for long periods because of their dustless system of ventilation. The cool air enters at the junction (E) of the urn and the metal holder, rises between the body (D) and the non-reflecting surface of the reflector (B), and passes out at "F."

While the maximum of light is directed towards the working plane, the ceiling is also softly illuminated, providing a pleasing daylight effect.

"Supreme" Reflectolytes are supplied in a variety of styles and sizes, sufficient to carry out a harmonious scheme of illumination in office and public buildings, department and retail stores, banks, hotels, theaters, churches, schools, hospitals, and wherever a large volume of well diffused light is required.

Stock: Satin brass finish. Ornamental types: Antique gold finish.

See illustrations on pages 1871 and 1872.

SIZE AND EQUIPMENT OF "SUPREME" REFLECTOLYTES
(Illustrated on following pages)

Types	Urn diam., in.	Lamp, watts	Length, in.	Types	Urn diam., in.	Lamp, watts	Length, in.
S.C.	8½	75	11	S.L.	8½	75	12
S.G.	10½	100–150	13	S.G.L.	10½	100–150	14
S.C.O.	12½	200	16	S.L.O.	12½	200	17
S.G.O.	14½	300–500	18	S.G.L.O.	14½	300–500	19
	16½	300–500	20		16½	300–500	21
S.I.	8½	75	11	S.D			
S.G.I.	10½	100–150	13	S.G.D.	12½	200	48
S.I.O.	12½	200	16	S.D.O.	14½	300–500	48
S.G.I.O.	14½	300–500	18	S..G.D.O.	16½	300–500	48
	16½	300–500	20				
				S.T.	12½	200	48
				S.G.T.	14½	300–500	48
				S.T.O.	16½	300–500	48
				S.G.T.O.			

Specification for "Supreme" Reflectolyte

The lighting fixtures called for shall be "Supreme" type Reflectolyte diffusers. They shall consist of a bell shaped metal body, or holder, within which there shall be a vitreous porcelain enameled steel reflector, detachably held in position by three spring-fingers. This reflector shall be positioned so that the lower edge of the body and reflector and the lamp filament, shall lie within a horizontal plane. Enclosing these elements, and securely supported by the metal body or holder, there shall be an acorn shaped ornamental urn blown of translucent glass of low absorption and high diffusing power.

All suspended types shall be wired with No. 14 flameproof wire.

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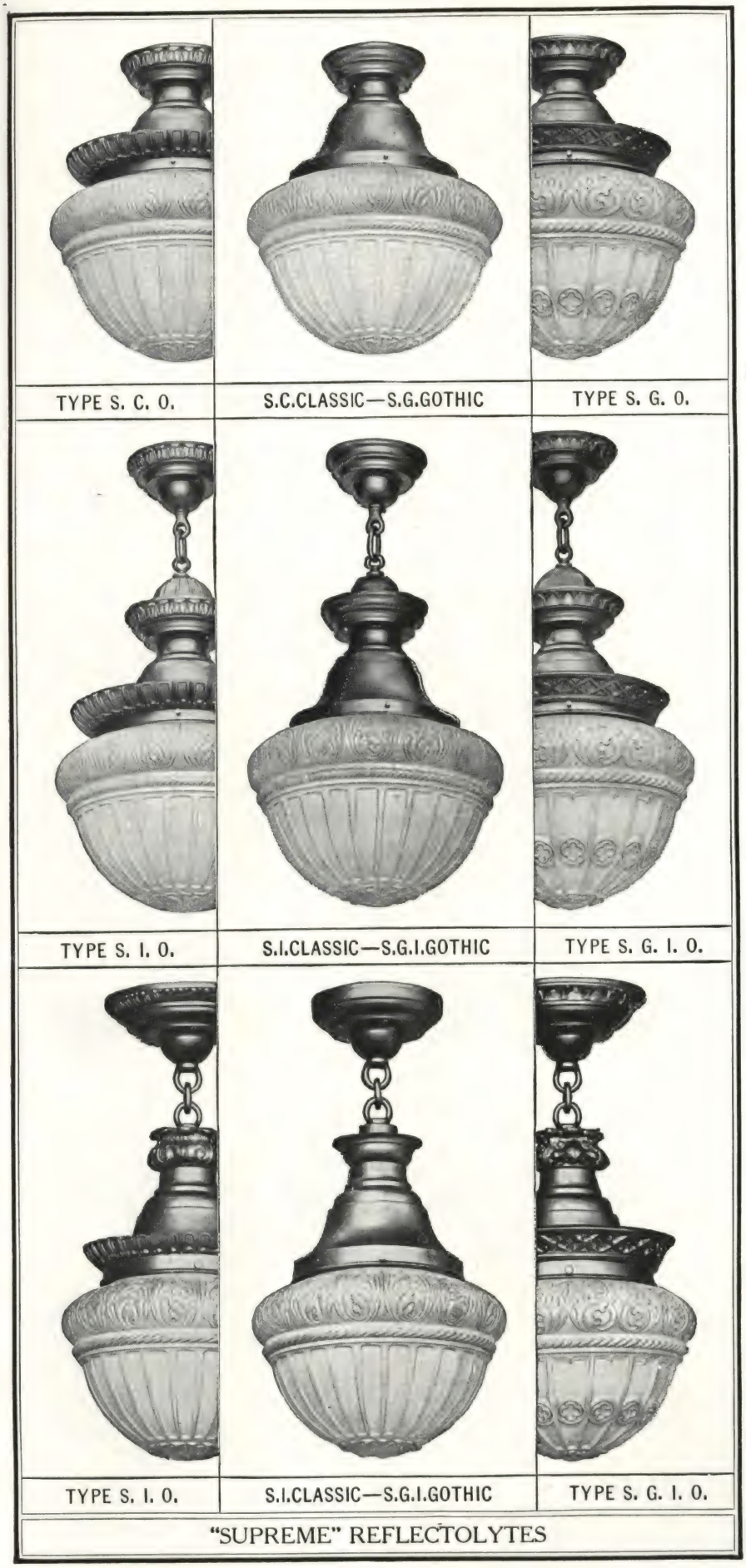
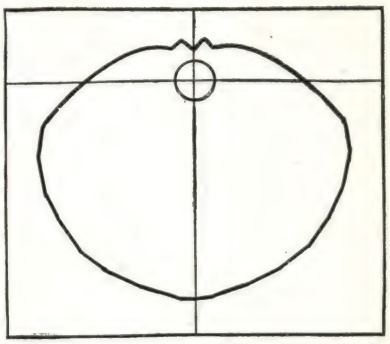


"SUPREME" REFLECTOLYTES



TYPICAL LIGHT DISTRIBUTION CURVE
"SUPREME" REFLECTOLYTE

Description of "Standard" Reflectolyte

In "Standard" Reflectolytes we offer a lighting fixture consisting primarily of a metal reflector and deep hemispherical diffusing bowl. This unit embodies all the elements necessary for permanency, efficiency and eye-comfort.

An important feature of this fixture is its porcelain enameled steel reflector, having angularly disposed oppositely inclined reflecting surfaces, which reflect and diffuse the greatest possible amount of light to the working plane. The white porcelain enamel is not baked on; it is fused on, at a temperature which melts glass.

The ornamental bowl is blown of finest diffusing glass, of low absorption and high reflecting power.

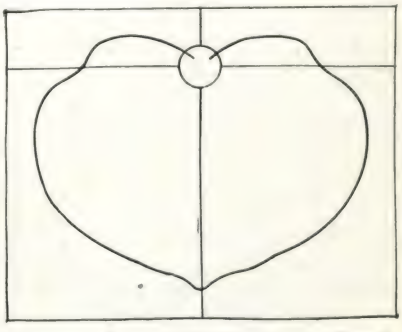
"Standard" Reflectolytes are regularly stocked in satin brass finish.

See illustrations on page 1878.

Specification for "Standard" Reflectolyte

The lighting fixtures called for shall be "Standard" Reflectolytes, consisting of a drawn steel upper member provided with angularly disposed oppositely inclined reflecting surfaces which shall be vitreous porcelain enameled, and a diffusing bowl blown of special white glass of low absorption and high diffusing and reflecting power, which shall be suspended below the reflecting member by means of flexible supports, each consisting of an eye and link—the eye securely attached to the reflector, and the link of such length as to correctly position the bowl beneath the reflecting member.

All suspended types shall be wired with No. 14 flameproof wire.



TYPICAL LIGHT DISTRIBUTION CURVE
"STANDARD" REFLECTOLYTE

Continued on next page

Description of "J" Reflectolyte

In "J" or "Junior" Reflectolytes we offer a lighting fixture consisting of a 13-in. opal glass reflector and a hemispherical diffusing bowl.

The fixture has characteristics which differentiate it from other units; briefly: an adjustable feature permitting the use, in the same fixture, of either a 75-, 100-, 150-, or 200-watt lamp—this flexible feature providing for a wide range in the volume of illumination, sufficient to meet the requirements of almost any lighting condition and assuring economical operation and eye-comfort; a 13-in. depolished opal glass reflector, having angularly disposed oppositely inclined reflecting surfaces which reflect and diffuse the greatest possible amount of light to the working plane; this reflector being of dense opal glass, permits the ceiling to be softly lighted without impairment of downward illumination.

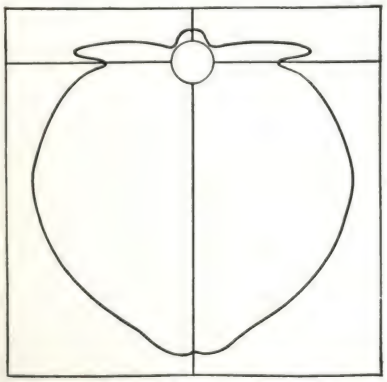
The hemispherical diffusing bowl is blown of finest white glass of low absorption and high diffusing and reflecting power, and is supplied perfectly plain, or in Classic or Gothic periods.

"J" Reflectolytes are regularly stocked in satin brass finish.

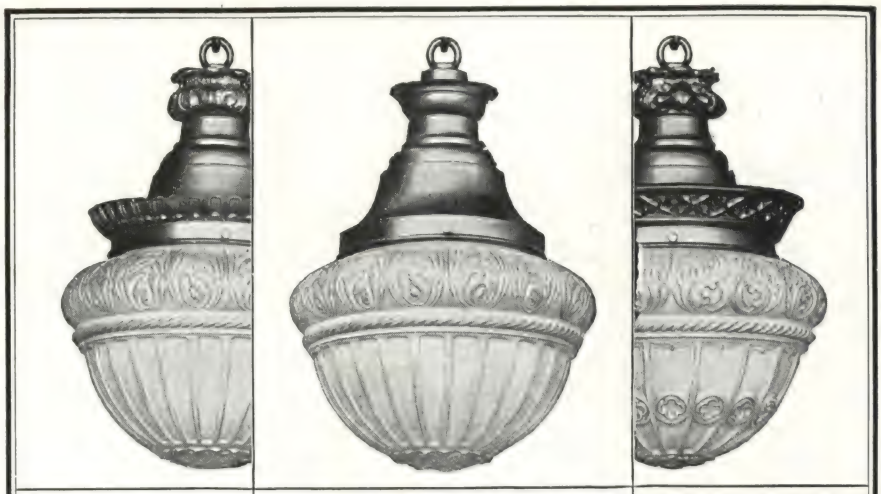
See illustrations on page 1878.

Specification for "J" Type Reflectolyte

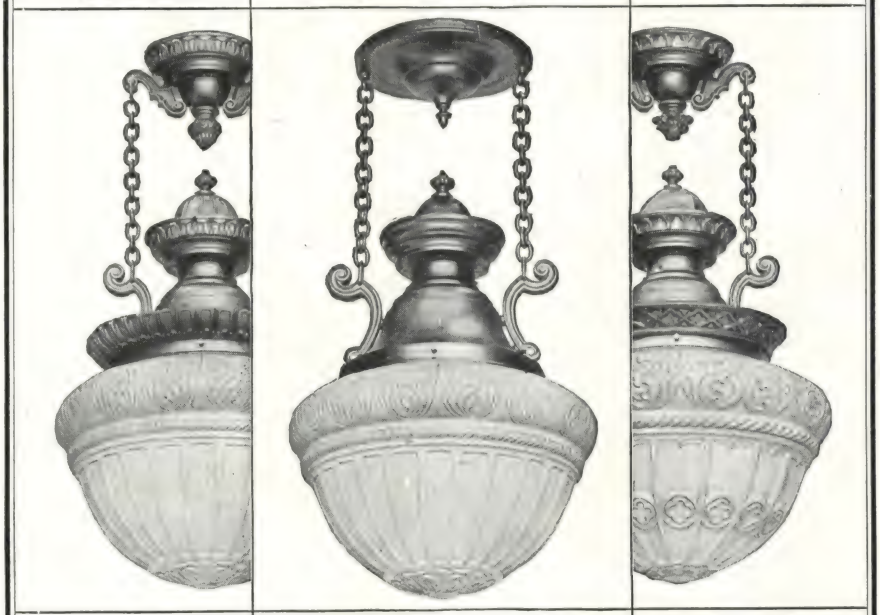
"J" or "Junior" Reflectolyte lighting fixtures called for shall be the open two-piece-glass type consisting of a metal holder with a double set of perforations for adjustment, a dense depolished opal glass reflector with angularly disposed oppositely inclined reflecting surfaces, and a hemispherical diffusing bowl blown of special translucent glass of low absorption and high diffusing and reflecting power. These glass members must be adjustably supported by three rods, the ends of which are formed to hook into the slotted perforations in metal holder.



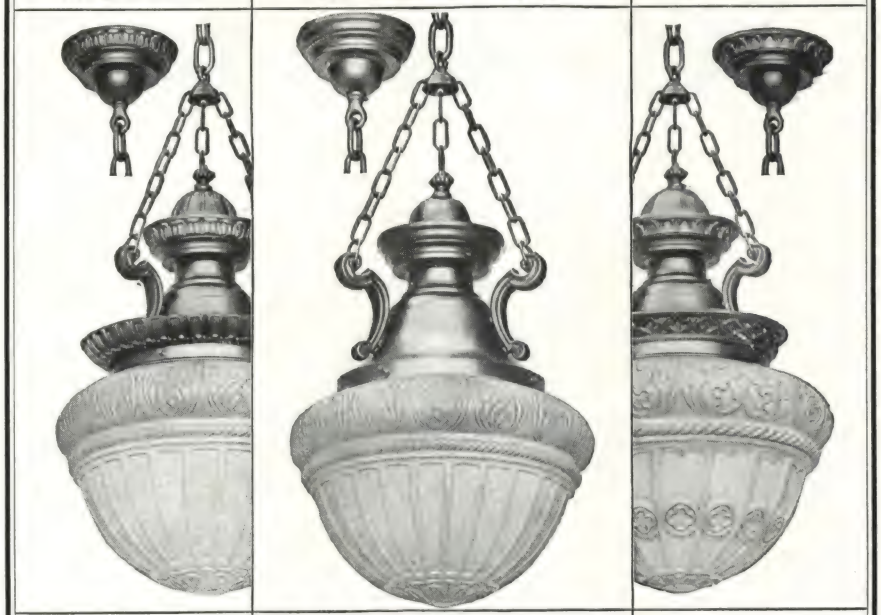
TYPICAL LIGHT DISTRIBUTION CURVE "J" OR "JUNIOR" REFLECTOLYTE



TYPE S. L. O. | S.L.CLASSIC—S.G.L.GOTHIC | TYPE S. G. L. O.



TYPE S. D. O. | S.D.CLASSIC—S.G.D.GOTHIC | TYPE S. G. D. O.



TYPE S. T. O. | S.T.CLASSIC—S.G.T.GOTHIC | TYPE S. G. T. O.

"SUPREME" REFLECTOLYTES

Continued on next page

U. C.

U. C. O.

U. I.

U. I. O.

U. I. O. T.

U. I. O. C. T.

"U" TYPE REFLECTOLYTE DIFFUSERS

Description of "U" Type Reflectolyte

In "U" type Reflectolyte Diffusers, we offer an enclosing unit, the urn of which is blown in one piece of light density white glass of high diffusing quality and low light absorption and bears beautiful surface ornamentation in the classic period. Made with glass in four sizes: 8½, 10½, 12½ and 15½ in., to accommodate Mazda C lamps from 50 to 500 watts.

"U" type Reflectolytes distribute the light in all directions; however, a majority of the rays are diffused in the lower hemisphere (see photometric curve). The bell shaped upper portion of the urn functions as a reflector, directing the rays from the light source downwardly to be diffused over a wide area by the bowl shaped bottom.

In "U" type Reflectolyte Diffusers, the highest art and most exact science have been combined and harmonized to produce a lighting fixture of unusual beauty, utility and eye-comfort.

"U" type Reflectolytes are supplied in close, suspended and multiple types, with brackets to match, sufficient to carry out a harmonious scheme of illumination in public and office buildings, department and retail stores, banks, hotels, apartment buildings, theaters, churches, schools, hospitals, and wherever a large volume of well diffused light is required.

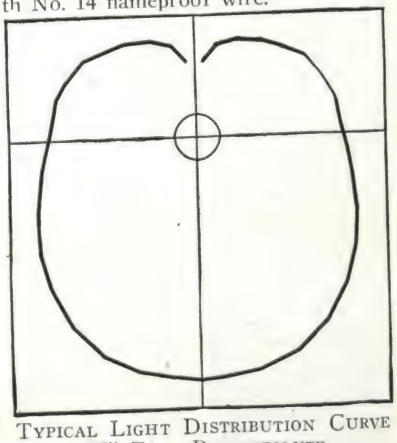
Stock: Satin brass finish. Ornamental types: Antique gold finish.

Specification for "U" Type Reflectolyte

The lighting fixtures called for shall be "U" type Reflectolyte Diffusers. They shall consist of an ornamental one-piece translucent glass urn, the upper portion of which is hyperbolic or bell shaped and the bottom bowl shaped, with metal supporting means as shown on types specified.

The glass urn shall bear surface ornamentation of Classic configuration, link border and reed-and-ribbon at top, triple interlaced band on torus, and laurel leaves on bottom.

All suspended types shall be wired with No. 14 flameproof wire.



TYPICAL LIGHT DISTRIBUTION CURVE
"U" TYPE REFLECTOLYTE

SIZE AND EQUIPMENT OF "U" TYPE REFLECTOLYTE

TYPES	Urn diam., in.	Lamp, watts	Length, in.
U.C. and U.C.O.	8½	25–75	9
	10½	100–150	11
	12½	200	13½
	15½	300–500	16½
U.I. U.I.O. U.I.O.T. & U.I.O.C.T.	8½	25–75	30
	10½	100–150	30
	12½	200	48
	15½	300–500	48

Continued on next page

Description "H" Type Reflectolyte

"H" type Reflectolyte Diffusers are enclosing units designed to function with the ceiling in distributing light. The Urn, without surface ornamentation, is blown in one piece of crystal glass. the top or neck remaining crystal, lightly frosted, and the lower portion opal-enamel. Light emitted by the source above an angle of 100°, also that reflected from the enameled lower portion, is transmitted to ceiling practically unobstructed, there reflected and widely diffused. Rays emitted below this angle are diffused through the enameled lower portion.

Supplied in close and suspended types, with plain and ornamental metal parts, sufficient to carry out a harmonious scheme of illumination in hospitals and institutions, hotel guest rooms, apartment and office buildings and schools.

Stock: Satin brass finish. Can also be supplied in white.

Specification "H" Type Reflectolyte

Lighting fixtures called for shall be "H" type Reflectolyte Diffusers, consisting of a plain one-piece urn of crystal glass, the upper portion being hyperbolic or bell shaped, lightly frosted, and an opal enameled lower portion, dish shaped at its widest diameter, with a hemispherical bottom of less diameter than the dish shaped portion, and metal supporting means as shown on types indicated. All suspended type wiring shall be No. 14 flameproof.

SIZE AND EQUIPMENT OF "H" TYPE REFLECTOLYTE

Types	Urn diam., in.	Lamp, watts	Length, in.
H.C. and H.C.O.	8½	25–75	9½
	10½	100–150	11½
	12½	200	13
	14½	300–500	15½
H.S.	8½	25–75	30
	10½	100–150	30
	12½	200	48
	14½	300–500	48
H.S.O.	8½	25–75	30
	10½	100–150	30
H.S.T.	12½	200	48
	14½	300–500	48

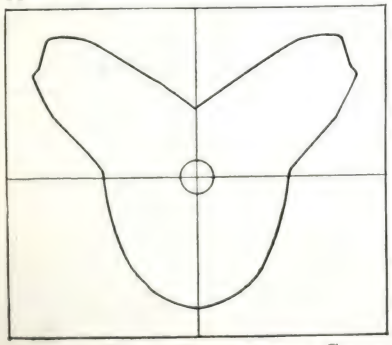
Description "H. R." Bracket

The half-shade supplied with "H. R." Bracket Diffusers is blown in one piece of crystal glass opal-enameled, except the flat lower horizontal face which remains crystal to permit the unmolested exit of light reflected forward and downward by the opal-enameled wall of the shade.

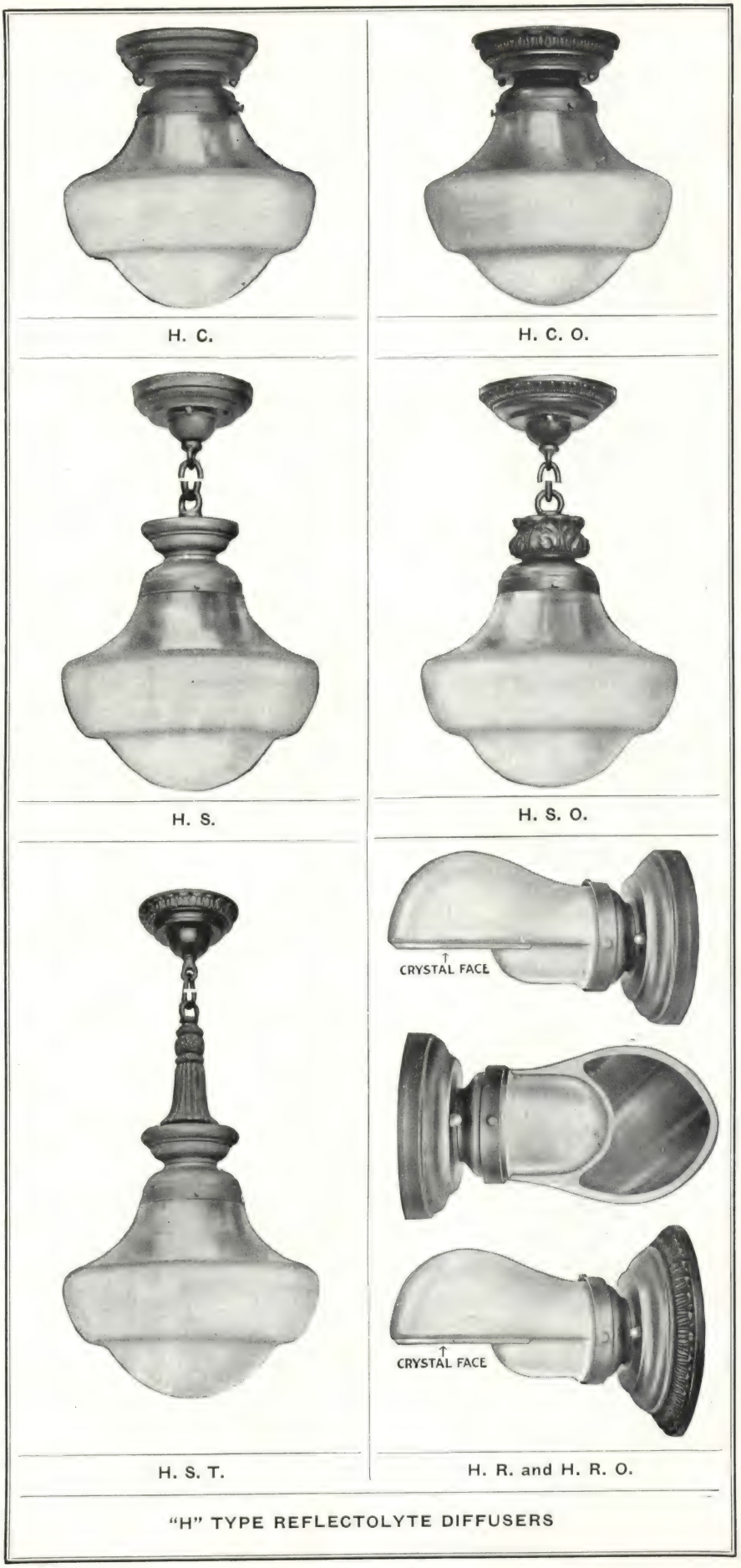
"H. R." brackets are made with metal parts plain and ornamental; they accommodate standard 10-, 15- and 25-watt S-17 lamps, and 25- and 50-watt P-19 mill type lamps.

"H. R." Bracket Diffusers are ideal for use in hospitals, in tellers' cages and over check desks in banks, and many locations in hotels, apartment buildings, and homes.

Stock: Satin brass finish. Can also be supplied in white.



TYPICAL LIGHT DISTRIBUTION CURVE "H" TYPE REFLECTOLYTE



"H" TYPE REFLECTOLYTE DIFFUSERS

Continued on next page

Type F. U. P.

Urn diam., in.	Lamp, watts	Back plate, in.
10½	{ 100 { 150 Metal	14¼x8¼

Type F. U. R.

Urn diam., in.	Lamp, watts	Back plate, in.
8½	75 Metal	6

Type F. U. C.

Urn diam., in.	Lamp, watts	Back plate, in.
8½	75 Metal	10x5½

Type F. S. P.

Urn diam., in.	Lamp, watts	Back plate, in.
8½	75 Metal	14¼x8¼

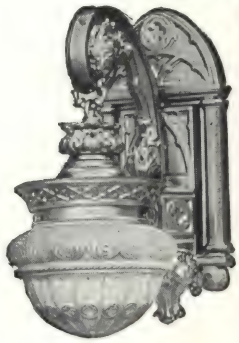
Type F. S. C.

Urn diam., in.	Lamp, watts	Back plate, in.
8½	75	15x8½

Metal and composition

Type F. S. D.

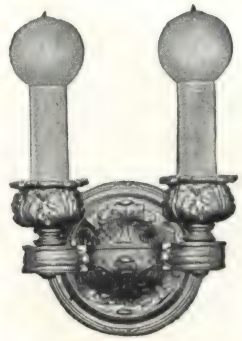
Urn diam., in.	Lamp, watts	Back plate, in.
8½	75 Metal	14¼x8¼



Type F. S. G.

Urn diam., in.	Lamp, watts	Back plate, in.
8½	75	17x8

Metal and composition



Type F. I. R.

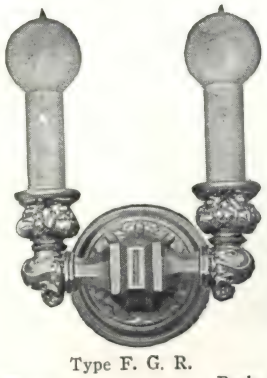
Extreme spread, in.	Back plate, in.
10	7

Metal and composition

Type F. I. L.

Extreme spread, in.	Back plate, in.
10	15x8½

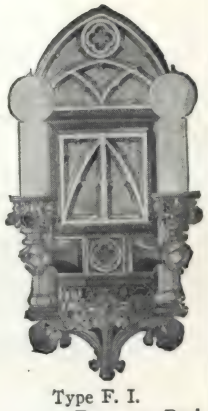
Metal and composition



Type F. G. R.

Extreme spread, in.	Back plate, in.
11	6½

Metal and composition



Type F. I.

	Extreme spread, in.	Back plate, in.
1-lt.	8	17x8
2- and 3-lt.	11	17x8

Metal and composition

TYPICAL REFLECTOLYTE WALL BRACKETS

All the above brackets in antique gold finish

Continued on next page

Types S.R. and S.G.R.

Types
S.R. and S.G.R.
Metal and Compo,
antique gold finish.
S.M. and S.G.M.
Metal,
satin brass finish.

Types S.M. and S.G.M.

No. of lights	Urn diam., in.	Outside diam., in.	Lamp, watts	Length, in.
3	8½	26	75	48
4	8½	26	75	48
4	10½	32	100–150	48
5	10½	32	100–150	48

No. of lights	Urn diam., in.	Outside diam., in.	Lamp, watts	Length, in.
5	10½	44	100–150	72
	14½		300–500	
6	10½	44	100–150	72
	14½		300–500	
7	10½	44	100–150	72
	14½		300–500	

Types U.R. and U.R.I.

Types
U.R. and U.R.I. can be
made in any diameter
and number of lights.
All-metal,
satin brass or
antique gold finish.
U.M.O. and U.M.O.I.
All-metal,
satin brass or
antique gold
finish.

Type U.M.O.

No. of lights	Urn diam., in.	Outside diam., in.	Lamp, watts	Length, in.
5	All 10½	35	100–150	72

No. of lights	Urn diam., in.	Outside diam., in.	Lamp, watts	Length, in.
5	Four 10½ Center 15½	51	100–150 300–500	72

TYPICAL REFLECTOLYTE COMBINATIONS

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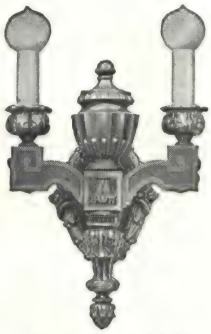
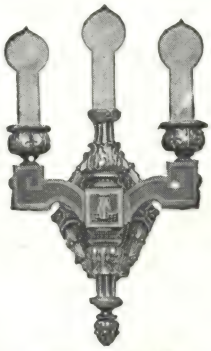


Type F.B. 2-Light

Extreme spread, in.	Back, in.	Extreme height, in.
14	11 by 8	22

Metal and composition

Type B.S.



Type F.B. 3-Light

Extreme spread, in.	Back, in.	Extreme height, in.
14	11 by 8	23½

Metal and composition

TYPE B.S.

Number lights	Glass diam., in.	Outside diam., in.	Lamp, watts	Length, in.	Weight, lbs.
2	Upper — 5 Lower — 12½	21	Upper — 50 Lower — 200	60	100
2	Upper — 8 Lower — 16½	31	Upper — 75 Lower — 300–500	72	175

TYPES S.M.O.—S.G.M.O.

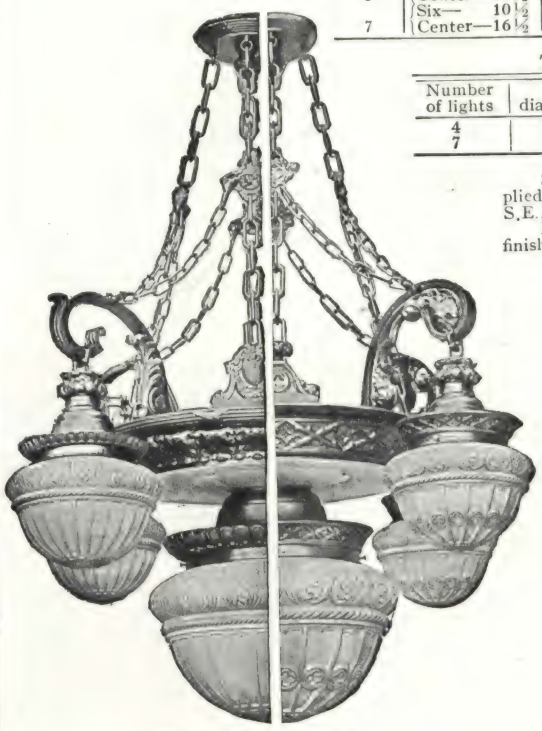
Number of lights	Glass diam., in.	Outside diam., in.	Lamp, watts	Length, in.	Weight, lbs.
5	Four — 10½ Center — 16½	44	Four — 100–150 Center — 300–500	72	180
6	Five — 10½ Center — 16½	44	Five — 100–150 Center — 300–500	72	220
7	Six — 10½ Center — 16½	44	Six — 100–150 Center — 300–500	72	260

TYPES S.E.X. and S.G.E.X.

Number of lights	Urn diam., in.	Outside diam., in.	Lamp, watts	Length, in.
4	12½	26	200–25	60
7	16½	34	500–25	60

S.M.O. and S.G.M.O. regularly supplied with one-chain extension as on S.E.X. and S.G.E.X.

Metal and composition, antique gold finish.



Types S.M.O—S.G.M.O.

Types S.E.X. and S.G.E.X.

TYPICAL REFLECTOLYTE COMBINATIONS

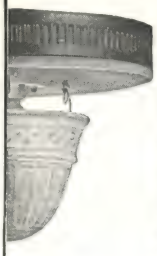
Continued on next page

C.F.

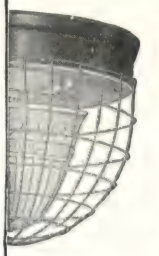
G.F.

B.F.

TYPE P.F.

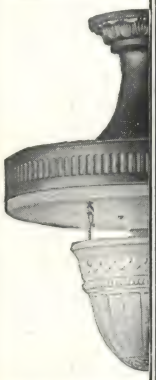


D.F.



P.W.G.

A.



D.N.

TYPES—"STANDARD," AND "JUNIOR" REFLECTOLYTES

Close ceiling	C. F.	G. F.	B. F.	P. F.	D. F.	PWG	.....	D. N.	A. N.	J. E.	J.	J. G.
One-chain...	COC	GOC	BOC	POC	DOC	.....	AOC	DNOC	ANOC	JEOC	JOC	JGOC
Three-chain..	CTC	GTC	BTC	PTC	DTC	.....	ATC	.....	.....	.....	.....	.....

"STANDARD" AND "JUNIOR" REFLECTOLYTES

Type	Reflector diam., in.	Glass diam., in.	Lamp, watts
"Standard".....	12	6½	100–150
	16	8¾	200
	20	12	300–500
	24	13½	750–1000
"Junior".....	13	7	75–100
			150–200

"INSTITUTIONAL" REFLECTOLYTES

Type	Base	Glass diam., in.	Lamp, watts
H. C..... H. C. O.....	Metal	8½	50–75
		10½	100–150
		12½	200
		14½	300–500
Y. B..... Y. B. O.....	Metal	6	25
		8	25–60
		10	25–75
		12	100–150–200

"INSTITUTIONAL" REFLECTOLYTES (Continued)

Type	Base	Glass diam. in.	Lamp, watts
U. C..... U. C. O....	Metal	8½	50–75
		10½	100–150
		12½	200
		15½	300–500
Y. G. S.	Metal	6½	25–75
Y. G. S...	Metal	9½	75–150
Y. G. S. O...	Compo. Bud	6½	25–75
Y. G. S. O...	Compo. Bud.	9½	75–150
R. L; R. L. S.	Metal	12 "ref"	75–200
Y. G..... Y. G. O....	Metal	6½	25–75
		9½	75–150
W. R.....	Porcelain	6x4½	10–60
W. B.....	Porcelain	6	25–40
W. G.....	Porcelain	6½	25–60
Y. X. O; Y. X.	Metal	None	25–40
P. R.....	Metal	6x4½	10–60

A.N.

H. C. H. C. O.

JUNIOR

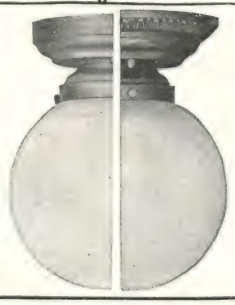
J. E.

JUNIOR

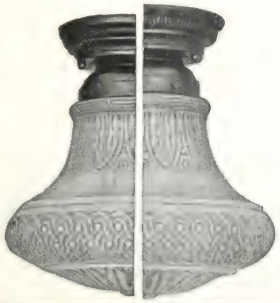
J.

JUNIOR

J. G.



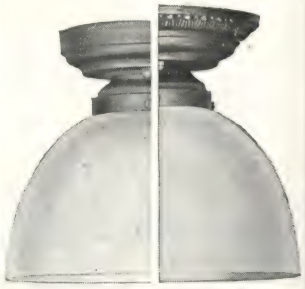
Y. B. Y. B. O.



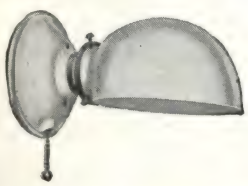
U. C. U. C. O.

Y. G. S. Y. G. S. O.

R. L. R. L. S.



Y. G. Y. G. O.

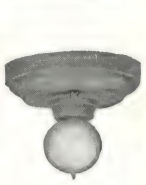


W. R.

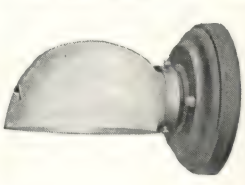
W. B.

W. G.

Y. X. O.



Y. X.



P. R.

STANDARD, JUNIOR AND INSTITUTIONAL REFLECTOLYTES

L. ERIKSON ELECTRIC COMPANY

Lighting Specialties and Reflectors

6 Portland Street

BOSTON, MASS.

Products

Designers and manufacturers of REFLECTORS for the Effective Lighting of banks, show windows, showcases, art galleries and churches.

Bank Lighting

Erikson reflectors for bank lighting are designed to present an attractive appearance as well as to direct a well diffused illumination just where it is desired. Erikson standard reflectors for screen illumination, customers' desk, coupon booth and concealed cornice lighting are drawn from bronze and finished in any color desired.

Store Specialty Lighting

Erikson standard reflectors for store window illumination are designed to take up the smallest space possible in order to light the whole window correctly. They are opal or mirror lined with spray finish on the outside. Standard window footlight reflectors are usually equipped with special decorative shields made of bronze to the design of the customer.

Erikson showcase reflectors are made of drawn brass and the standard finish is nickel. These reflectors differ from other makes on the market as they are equipped with special patented porcelain sockets which fit the channel of the reflector, and it is not possible for lamps to drop below line of same; they are supported by special brackets on which reflectors can be drawn out and case and reflector cleaned without removing them.

Art Gallery Illumination

In order to specify reflectors for this type of lighting it is essential that the dimensions of the gallery be given and size of portraits.

Recommendation for this style of lighting will be given on receipt of above data.

Special Lighting Effects

When reflectors are desired to direct light from a concealed source such as in cove lighting or church lighting, it is always necessary that complete details be given.

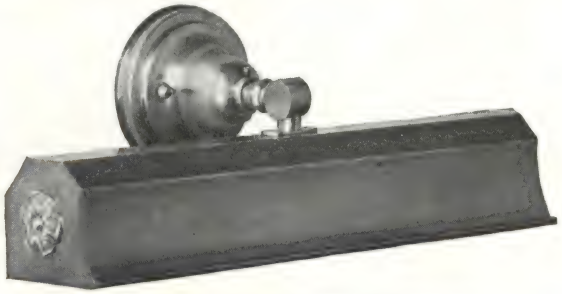
This company is well experienced in this class of work and recommendations and advice on anything of this nature will be cheerfully given.

Finish

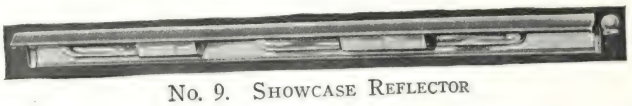
All reflectors are finished by a special electroplating process to match the color desired by the customer.

Advantages

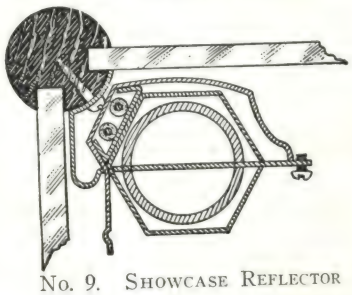
Erikson reflectors are equipped with special porcelain sockets which fit the channel in which the wires are run and thereby unsightly fittings are eliminated. These reflectors are backed by 25 years' experience in this class of work and thereby we understand the demands on material of this sort.



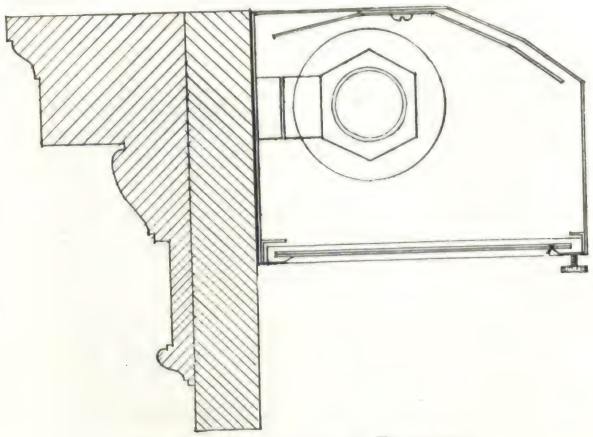
No. 15M. COUPON BOOTH REFLECTOR



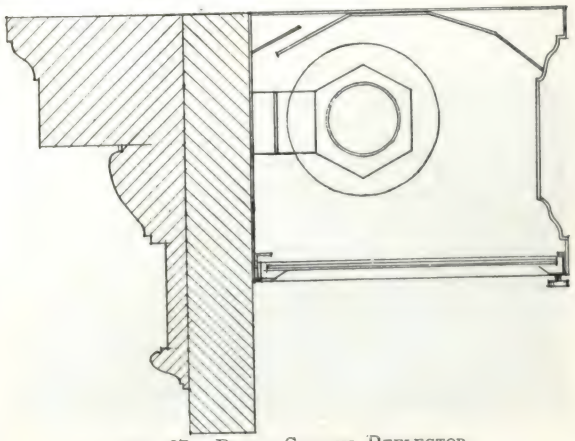
No. 9. SHOWCASE REFLECTOR



No. 9. SHOWCASE REFLECTOR



No. 47. BANK SCREEN REFLECTOR
Height, 4 in. Width, 5 in.



No. 37. BANK SCREEN REFLECTOR
Height, 4 in. Width, 5¼ in.

I. P. FRINK, INC.

Reflectors, Scientific and Artistic Lighting Specialties

TELEPHONE
CHELSEA 7802

Twenty-fourth Street and Tenth Avenue
NEW YORK, N. Y.

CABLE ADDRESS
"FRINKLET, NEW YORK"

BRANCH OFFICES

CHICAGO, ILL., Monadnock Building
BOSTON, MASS., 161 Summer Street
DETROIT, MICH., 325 State Street
SAN FRANCISCO, CAL., 77 O'Farrell Street
CLEVELAND, OHIO, 336 The Arcade
SEATTLE, WASH., 609 Seaboard Building
PHILADELPHIA, PA., Franklin Trust Building
CINCINNATI, OHIO, 17 Greenwood Building
LOUISVILLE, KY., 415 West Main Street

Products

Designers and manufacturers of LIGHTING SYSTEMS and SPECIALTIES for banks, stores, show windows, showcases, churches and cathedrals, picture galleries, hospitals, etc., including REFLECTORS, LIGHTING FIXTURES, ILLUMINATED SIGNS, POLARALITE SIGNS, LINOLITE LAMPS.

Service

Frink lighting experts are thoroughly familiar with modern illumination, and their development of those types of units most efficient for particular locations, and their ability to recommend and install the proper lighting equipment for any condition places this organization in a position to obtain for its clientele complete satisfaction in illuminating stores, show windows, display cases, banks, offices, churches, hospitals, hotels, picture galleries, public buildings, etc.

The Frink service department is in charge of experts who have had many years experience in illumination work and their services are at the disposal of those desiring advice or recommendations on illumination of any description. They will furnish full information, submit sketches and estimates, and will carry out the ideas of prospective purchasers without obligation.

Bank Illumination

The Frink system of bank illumination adapts itself ideally to solid, substantial bank architecture.

The principle on which Frink reflectors are built allows for any working condition, whether it be an isolated desk lamp, a long bank screen or concealed cornice lighting, and affords a perfect light distribution all along the working plane, approaching the ideal as to restful, efficient and well diffused illumination.

It is possible to design Frink reflectors in detail to any motif in bank architecture. Shadows or glare are eliminated where the Frink system is employed, because all rays are thoroughly broken up and the reflected light is so diffused as to approach daylight in quality.

In view of the great number of banking installations where the Frink system has been employed, it can reasonably be said that it has proved in competition to be the most perfect localized bank lighting system in existence.

Designs and recommendations for this class of lighting will be made without obligation.

Store Illumination

Effective lighting of show windows, counter cases, wall display cases and interiors increases the attractiveness of retail stores, contributing largely to their selling power.

Correctly diffused light *of the proper intensity* displays materials to the best advantage and is the foremost factor in sales promotion. Quality and tonal values are the prime requisites for efficient store lighting, rather than the volume of light heretofore demanded.

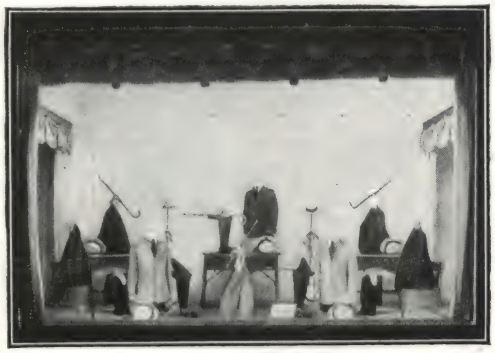
The Frink system of store lighting is known and recognized to be based upon lighting principles that are scientifically correct.

As local conditions govern the size and type of reflectors, the engineering department will recommend the correct type of reflector for any condition upon receipt of proper data.

Frink Direct-indirect Reflecting Electroliers—These electroliers are a combination of efficiency, art and science and are the latest development in scientific lighting fixtures.

In competitive tests, they have proved more efficient than either direct or wholly indirect lighting and have the advantage of throwing a practically uniform light on the working area, yet sufficient shadow is obtained to

GUARANTY TRUST CO., NEW YORK, N. Y.
Showing perfect illumination of counters by Frink screen reflectors



EXTERIOR VIEW OF ILLUMINATED SHOW WINDOW,
LORD & TAYLOR, NEW YORK, N. Y.

Continued on next page

One of the Numerous Frink Direct-Indirect Units

bring out details of display without the hollow, unnatural appearance so often found with purely indirect lighting.

Made in square, round or octagon shapes, plain or ornamental in design, of brass, bronze, steel, copper, armor bronze or composition, in any finish desired.

Recommendations will be submitted on receipt of detailed information as to color, height of ceiling, size of room and spacing of outlets.

Church Illumination

For over 60 years I. P. Frink, Inc., has been manufacturing church reflectors and chandeliers for lighting auditoriums, pulpits, chancels, classrooms, and every other place in a church or cathedral where light is necessary. During this time, it has successfully lighted over 25,000 churches and cathedrals, among them being the finest buildings of this kind in the country.

This organization has originated and developed the following successful methods of church illumination:

Frink ventilated ceiling diffuser system, Frink indirect and direct-indirect systems, Frink concealed lighting from coves and Frink concealed system either from specially placed Frink reflectors or through skylights or glass ceilings. These four systems and modifications are applicable to every style of architecture.

Cathedral of St. John the Divine, New York, N. Y.
Showing effects produced by concealed Frink reflector

By application of these methods, a revolution in church and cathedral lighting has been brought about, supplanting the dim and gloomy light of the past with a light that is soft, cheerful and yet which is powerful enough to bring out architectural effects to the best advantage.

The services of the illuminating department of this organization are at the disposal of those desiring advice or recommendations on church or cathedral illumination of any description.

Picture Gallery Illumination

This organization has made a careful study of the lighting of picture and art galleries.

Thousands of pictures and most of the prominent galleries, both public and private, have been lighted by the Frink organization, whose extended experience and thorough knowledge of the requirements in this particular field is an assurance of satisfactory results.

The engineering department will make recommendations for this class of lighting without obligation.

Scheme of Picture Gallery Lighting Through Stained Glass Ceiling Panels

Hospital Illumination

The Frink system of hospital lighting has been installed in the majority of the first class hospitals in this country. The line embraces operating table reflectors, ward lights, bed lights, floor lights and microscopic reflectors.

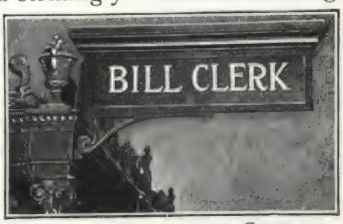
Where the recommendations of the Frink service department are followed, satisfactory results are guaranteed.

Frink System of Lighting in an Operating Room

Illuminated Signs

For all purposes where an ornate and effective sign is required and for all permanent positions in theaters, hotels, banks and public buildings, the Frink polaralite sign has no equal. The source of illumination is entirely hidden and the light is reflected up or down edgeways through the glass, giving a strikingly beautiful and original effect.

Frink polaralite signs are artistic, economical, durable and will outlast any other kind of sign, because there is nothing to deteriorate or wear out.



Frink Polaralite Sign in Hotel Commodore, New York, N. Y.

Furnished in any style of wording or lettering with white or colored ground, and made to read from one or both sides. Special designs and sketches furnished upon request.

Linolite Lamps

A tubular lamp with double contact and single filament; ideal for bank, showcase and cove lighting. Write for full details.

PITTSBURGH REFLECTOR & ILLUMINATING CO.

Manufacturers of Silvered Glass Reflectors
Third Avenue and Ross Street
PITTSBURGH, PA.

BRANCH OFFICES
CHICAGO, ILL., 565 W. Washington Street
NEW YORK, N. Y., 1452 Broadway
SAN FRANCISCO, CAL., 90 New Montgomery Street

Products and Services

SILVERED GLASS REFLECTORS of special design for Show Window, Showcase, Wall Case, and other display lighting; Cove and other forms of Concealed Lighting for theaters, churches, public buildings; Industrial Lighting, bench and general; Reflectors for Indirect Fixtures; Reflectors and Fixtures for stock board, picture and pool table lighting; "COLOR-LITE" and COLOR-GLOBES for show windows, theater and decorative work; "FLOOD-O-LITE," "SPOT-O-LITE;" "EASY-TO-INSTALL" CONDUIT.

"Pittsburgh" Reflectors

Made of the highest quality of crystal glass. Having our own glass factory, devoted exclusively to the making of our blanks, we are able to make the special glass necessary for this purpose. The glass is blown in moulds specially designed to produce the proper shape and with flutings to break up the light rays. A characteristic of "Pittsburgh" reflectors is the vertical flutings. These accomplish the desired purpose without the loss of light by cross reflections as is the case with spiral or concentric flutings. This clear crystal glass is double plated with pure silver; the most efficient reflecting surface known. The silver coat is then covered and sealed with an electroplating of copper which prevents the silver from tarnishing, and also makes such a foundation for the coat of baked enamel that this will not check and peel when subjected to the heat of the type "C" lamps.

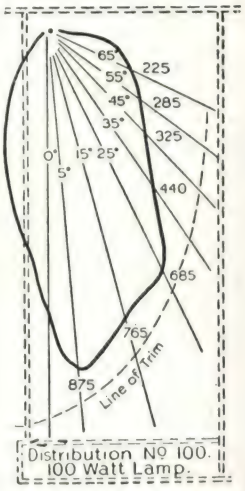
Guarantee

Back of each "Pittsburgh" reflector stands this guarantee: "We absolutely and unconditionally guarantee that the backing on 'Pittsburgh' silverplated glass reflectors will not crack, check nor peel and that the silver will not tarnish for a period of five years from date of purchase." During the past six years we have not been called upon to replace a single reflector nor have we been advised of the failure of one.

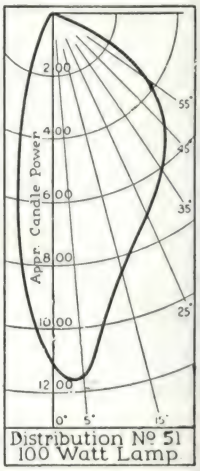
Show Window Lighting

For this purpose a one-piece glass silvered reflector of the proper design is today the recognized standard. "Pittsburgh" show window reflectors are so designed as to give maximum efficiency. These reflectors are installed at the top of the window, close to the glass line, and being asymmetrical in shape they gather up and redirect all of the light downward and forward with a flood of light so controlled as to give an even illumination over the entire trim. For window lighting we recommend 100-watt lamps as the standard and with the proper re-

"PITTSBURGH" SHOW WINDOW REFLECTOR NO. 100
Designed for the average window



"PITTSBURGH" SHOW WINDOW REFLECTOR NO. 51
Designed for use in high shallow windows, windows without backgrounds, or with upper part of glass; island windows. Lamp concealed and light cut off at about 55°



EXAMPLE OF "PITTSBURGH" WINDOW LIGHTING, MARSHALL FIELD & CO., CHICAGO

Continued on next page

flectors spaced on 12-in. centers along the glass line. In the smaller cities a wider spacing may be used and in some locations a higher intensity is desired. This can be accomplished by closer spacings or by the use of 150-watt lamps in place of the 100-watt, or by the use of 200-watt lamps as is now quite frequently the case.

Showcase Lighting

The same improvement can be obtained in showcase lighting as in window lighting by using "Pittsburgh" reflectors. These are designed for use with the standard 40- and 50-watt lamps, S-19; an even illumination being obtained over the entire trim of a much higher intensity than is usually obtained.

Indirect Lighting

We manufacture a full line of reflectors for indirect fixtures. Also a full line particularly suitable for use in coves, pedestals, wall boxes, for lighting theaters, churches, public buildings from concealed sources.

Stock Quotation Boards

This difficult field of lighting has been successfully solved by us. "Pittsburgh" stock board lighting fixture can be placed within 2 ft. of the board and illuminate the entire board to the proper intensity with an entire absence of the disagreeable reflections usually seen in this work. The board can be viewed from any part of the customers' room without reflection or glare. The same principle is used in fixtures for picture lighting, eliminating all high lights and reflections at the top and securing an even distribution over the entire picture.

"Pittsburgh" Flood-O-Lite

Designed for 500- and 1000-watt type "C" lamps placed in a vertical position. The outstanding feature of this fixture is the glass, silvered-copper plated reflector of unique design surrounding the lamp and thus utilizing about double the light flux ordinarily used. The reflector is parabolic with some modifications so that when the lamp is thrown out of focus the beam is spread but an even illumination over the entire field is maintained.

"Pittsburgh" Flood-O-Lite

Color Lighting

"Pittsburgh" Color-Lite consists of two rings with means of attaching to "Pittsburgh" show window reflectors and provided with colored gelatine discs. We can also furnish globes of colored glass with means of attaching easily and readily to the lamp itself—particularly useful in theaters, show windows and decorative work.

Example of Modern Store Lighting, Kerman's Inc., Chicago

"Easy-to-Install" Conduit

"Pittsburgh" conduit is made up containing receptacles, raceway for wires and with or without shade holders attached. It is strong, portable, economical conduit for window work, outline lighting, cove lighting or other places where receptacles are placed on close centers.

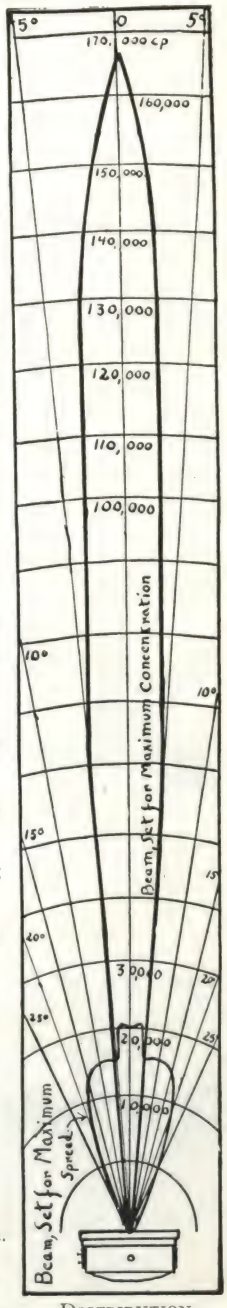
Catalogue

A full and complete catalogue with engineering and other data gladly furnished on request.

"Pittsburgh" Show Window Installations

The following are a few representative concerns using "Pittsburgh" Reflectors in their windows:

Marshall Field & Co., Chicago, Ill.
Commonwealth-Edison Co., Chicago, Ill.
Republic Building Shops, Chicago, Ill.
Maurice Rothchilds, Chicago, Ill.
United Cigar Stores Co., Chicago, Ill.
J. L. Hudson Co., Detroit, Mich.
Newcomb-Endicott Co., Detroit, Mich.
Frank & Seder Co., Detroit, Mich.
Boyd-Richardson, St. Louis, Mo.
Bond Clothing Co., Cleveland, Ohio.
Boggs & Buhl, Pittsburgh, Pa.
Rosenbaum Co., Pittsburgh, Pa.
Kaufmann Dept. Stores, Pittsburgh, Pa.
B. Altman & Co., New York, N. Y.
R. H. Macy & Co., New York, N. Y.
Museum of Heads & Horns, New York, N. Y.



Distribution 500-Watt Lamp

BENJAMIN ELECTRIC MFG. CO.

SALES AND DISTRIBUTING OFFICES
NEW YORK, N. Y. — CHICAGO, ILL. — SAN FRANCISCO, CAL.

BRANCH OFFICES
MONTREAL, TORONTO AND WINNIPEG, BENJAMIN ELECTRIC MFG. CO. OF CANADA, LTD.
LONDON, ENGLAND, THE BENJAMIN ELECTRIC, LTD.

FACTORIES: CHICAGO AND DES PLAINES, ILL.

Products

BENJAMIN
Makers of Things More Useful
TRADE-MARK

BENJAMIN INDUSTRIAL LIGHTING FIXTURES, including Acidproof, Gasproof, Vaporproof and Weatherproof Fixtures, and Porcelain Enameled Reflectors and Specialties.

PANELBOARDS and CABINETS.

Also manufacturers of Industrial Signals, Wiring Devices and other Electrical Specialties.

Benjamin Reflector Sockets for Industrial Lighting

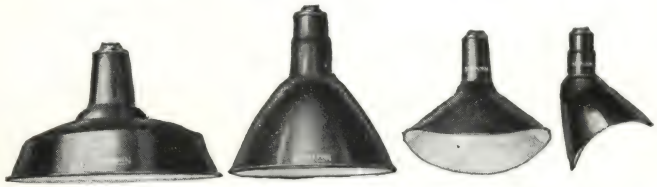
Construction — One-piece porcelain enameled steel reflector, Benjamin green outside, white inside. Heavy porcelain two-piece keyless sockets; strong supporting fitting tapped ½ in. or ¾ in. or bushed for drop cord.

Dome (R.L.M.) Reflector Socket—The reflector and lamp manufacturers' standard. For general illumination where the lighting of vertical surfaces is required.

Bowl Reflector Socket—For general illumination where lighting of vertical surfaces is not required. It also possesses advantages for the local lighting of machines, benches, etc.

Elliptical Angle Reflector Socket—For illuminating places where the light must come from the side. The elliptical shape gives more uniform longitudinal distribution.

Parabolite—For long narrow aisles, platforms, areas adjacent to fences, etc.



Dome (R.L.M.) — Bowl — Elliptical Angle

REFLECTOR TYPES WITH CHARACTERISTIC DISTRIBUTION CURVES

Plane Through Minor Axis

Plane Through Major Axis
PARABOLITE

Type "RR" Threaded Fixtures

For conditions requiring a heavy duty unit where easy removal, for cleaning reflector surface, is essential. Finish: steel hoods are green porcelain enameled; cast hoods are green paint enameled. Reflectors are green porcelain enameled outside; white inside. Hoods tapped ½ or ¾ in. as specified.

Type "RR" dome and bowl units have same uses as corresponding types of reflectors described in left-hand column. Type "RR" angle units are for illuminating places where light must come from side.

TYPE "RR" DOME FIXTURE
Catalogue Nos. 26001 and 26014

METHOD OF ATTACHING TYPE "RR" REFLECTOR

Type "RR" Hoods—

Porcelain Enameled Steel Pendent Hood with Keyless Socket
Catalogue No. 26030

Cast Pendent Hood with Locking Socket
Catalogue No. 26003

Cast Outlet Box Hood with Keyless Socket. For 4 in. std. box
Catalogue No. 26002

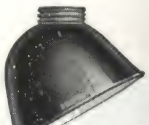
TYPE "RR" THREADED HOODS FOR THREADED REFLECTORS

Kind of socket	Pendent Type: Por. enam. steel Cat. No.	Pendent Type: Cast Cat. No.	Outlet box type Cat. No.
Med. base keyless	26030	26001	26002
Med. base locking	26033	26003	26004
Mogul base keyless	26035	26005	26008

Type "RR" Reflectors—

Type "RR" Dome R.L.M Standard

Type "RR" Bowl



Type "RR" Angle

TYPE "RR" THREADED REFLECTORS FOR THREADED HOODS

Lamp size, watts	Dome Diam., in.	Dome Ht., in.	Dome Cat. No.	Bowl Diam., in.	Bowl Ht., in.	Bowl Cat. No.	Angle Diam., in.	Angle Ht., in.	Angle Cat. No.
75	12	5¼	26012	8	5⅞	26108	..	....	....
100, 150	14	6½	26014	9	6¾	26109	10	12⅛	26210
200	16	7⅝	26016	10	7¾	26110			
300, 500	18	9¼	26018	12	9	26112	12	16⅝	26212
750, 1000	20	12¼	26020	..	..	.....	14	19½	26214

SCHEDULE OF REFLECTOR SOCKETS

Lamp, watts	Dome (R. L. M.) Diam., in.	Dome (R. L. M.) Height, in.	Dome (R. L. M.) Cat. No.	Bowl Diam., in.	Bowl Height, in.	Bowl Cat. No.	Elliptical Angle Diam., in.	Elliptical Angle Height, in.	Elliptical Angle Cat. No.	Parabolite Length, in.	Parabolite Height, in.	Parabolite Cat. No.
40, 50, 60	.....	.....	.....	7	7⅜	x6166	.....	.....	.....	.....	.....	.....
50	12	7	5640	.....	.....	.....	.....	.....	.....	.....	.....	.....
60, 75	.....	.....	.....	.....	.....	.....	8½x13½..	12⅜	5522	20	8⅜	1234
75	12	8	5641	8¼	8¾	x6161	.....	.....	.....	.....	.....	.....
100, 150	14	9¼	5642	9	9½	x6189	8½x13½..	13¼	5525	20	9¼	1235
200	16	10⅜	5643	10	10⅝	x6169	10¾x15....	15⅜	5526	20	10⅛	1236
300, 500	18	12	5644	12	12	x6173	14x20.....	18¾	5537	20	11½	1237
750, 1000	20	15	5645	.....	.....	.....	14x20.....	20½	5538	.....	.....	.....

Continued on next page

Benjamin Gas and Vaporproof Fixtures with Dome Reflectors

Catalogue Nos. 1543-1546 are safety units for general illumination and for conditions requiring that the lamps be tightly enclosed against contact with explosive gases, vapors or inflammable particles—present in benzol plants, paint manufactories, powder mills, etc.

Construction—Cast iron hood tapped ½ in. Porcelain enameled steel dome reflector and clear screw globe. Socket is fitted with lamp grip—preventing lamp from falling and breaking. Iron parts are galvanized. Reflector is green outside, white inside.

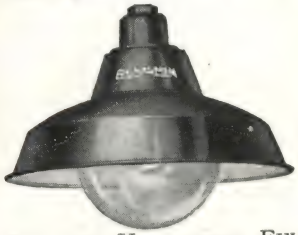
Catalogue Nos. 1563-1570, inclusive, have the same general construction as above, less reflectors, and are for the same purpose.

Benjamin Moistureproof and Dustproof Fixtures

Catalogue Nos. 660-665 used in refrigerating plants, plating rooms or where electrical parts must be protected from moisture or dust. Aluminum or copper hood (see table below) tapped for ⅜ or ½ in., as specified. Socket, with or without lamp grip, and clear screw globe.

Guards

Catalogue No. 1415 is a protective guard, which screws on to threaded portion of hood. Guard will fit Catalogue Nos. 662 and 663 only.



GAS AND VAPOR-PROOF FIXTURE WITH DOME REFLECTOR
Catalogue No. 1545

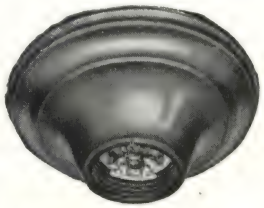
GAS-PROOF AND VAPOR-PROOF FIXTURE LESS REFLECTOR
Catalogue No. 1565

MOISTURE-PROOF AND DUST-PROOF FIXTURE
Catalogue No. 662

Lamp, watts	Gas- and Vaporproof fixture with dome reflector			Gas- and Vaporproof fixture less reflector			Moisture- and Dustproof fixture *WAH †WCH			
	Diam., in.	Ht., in.	Cat. No.	Diam., in.	Ht., in.	Cat. No.	Diam., in.	Ht., in.	Cat. No.	Cat. No.
25—40	..	....	....	4	8¼	1563	3⅜	7¼	660	661
50—60	12	8½	1543	4	8¼	1563	4⅛	7⅝	662	663
60—75				....	....	....	....	....	....	....
75	..	....	....	....	....	....	....	....	....	....
75—100				5⅛	9¾	1565	5⅛	9½	664	665
100—150	14	10	1544	....	....	....	....	....	....	....
150—200	..	....	....	8¼	13¼	1568	....	....	....	....
200	16	13⅜	1545	....	....	....	....	....	....	....
300—500	18	15½	1546	10¼	15½	1570	....	....	....	....

*WAH—with aluminum hood. †WCH—with copper hood.

BEN-OX INTERCHANGEABLE DEVICES



BASIC (TYPICAL) UNIT

Provides a permanent covering for outlet box or fixture stud to which may be attached a wide range and free choice of lighting equipment, to best suit any change in conditions or requirements. Bulletin on request.

Store and Office Fixtures

Nos. 1035-1038, Inclusive—Have 5x4 in. canopy, chain suspension, hood of brass or steel as indicated, two-piece porcelain socket with lamp grip and diffusing bowl of Doric design. Finish: Steel hoods are baked enamel, black; brass hoods, brushed brass.

Nos. 761C-763C, Inclusive—Have 5x4 in. canopy chain suspension, Benco porcelain lined socket, "S" type holder, and Stalactite diffusing bowl. Socket with lamp grip, to prevent loosening of lamp, furnished if specified. Finish: brush brass.

Cat. No. 1035 Cat. No. 762C
STORE AND OFFICE FIXTURES

STORE AND OFFICE FIXTURES

Lamp, watts	Length fixture, in.	Size bowl, in.	Kind of hood	Cat. No.
200	26½	6x12	Brass, Brushed	1035
200	26½	6x12	Baked Enamel	1036
300, 500	27½	6x14	Brass, Brushed	1037
300, 500	27½	6x14	Baked Enamel	1038

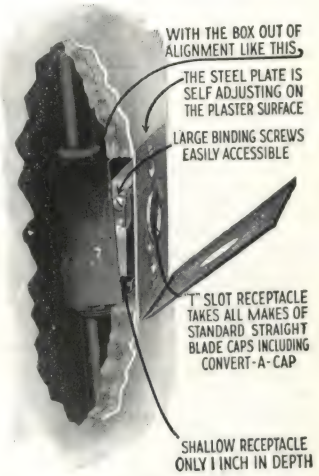
Lamp, watts	Length fixture, in.	Size of globe		Cat. No.
25—75	23	6x4		761-C
75, 100, 150	24	7x5		762-C
200	26	8x6		763-C

Convenience Outlets with Double "T" Slots, 10-Amp., 250-V

Any 10-Amp. standard straight blade cap will fit Benjamin receptacles with double "T" slots.

A steel mounting plate extends over the surface of the wall and automatically adjusts the receptacle to an accurately flush position. In cases where the outlet box does not come up squarely to the plaster, but is tilted out of line at the top or bottom or either side, this steel plate insures a perfectly flush installation with respect to the surface of the wall. The brass plate which fits over the steel plate is always aligned correctly and meets the surface of the wall or baseboard snugly on all sides.

Cover plate is 4½x2¾ in.



APPLICATION OF OUTLET

CATALOGUE No. 7656

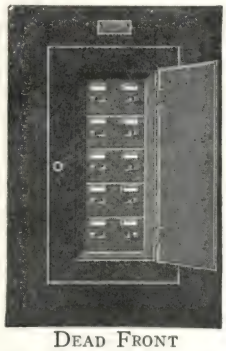
CATALOGUE No. 7653

Continued on next page

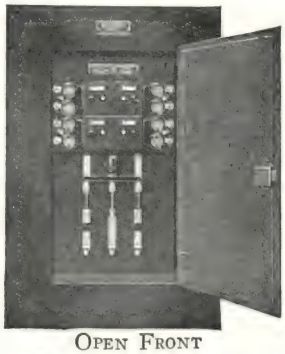
Benjamin-Starrett Panelboards with Cabinet

The methods of construction peculiar to this panelboard result in neatness of appearance, perfect uniformity and accurate mounting of parts, and impressive safety features that gain for the architect who specifies it the instant commendation of his client.

All Benjamin-Starrett panelboards are built on bases of moulded composition, which is mechanically and electrically superior to slate, and permits the manufacture of a smaller, lighter and better arranged panel. Bus bars are never mounted on the face of the panel, where they are likely to be short circuited or to shock the operator. In the case of the standardized panelboard, they are mounted at the back of the base; in the case of the residence panelboards, they are buried in the base.



DEAD FRONT
STANDARDIZED PANEL
Range—4 to 30 circuits.
Wire mains—2-2 or 3-2, 125 volts.
Main connections—lugs only, fusible mains, fuseless main switch, fusible main switch.
Cabinet mountings—flush or surface.



OPEN FRONT
STANDARDIZED PANEL
Range—4 to 30 circuits.
Wire mains—2-2 or 3-2, 125 volts.
Main connections—lugs only, fusible mains, fuseless main switch, fusible main switch.
Cabinet mountings—flush or surface.

STANDARDIZED PANELBOARDS

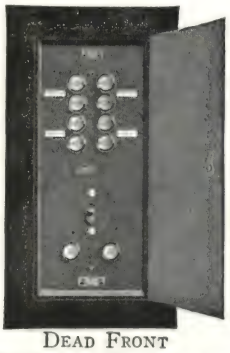
Switches in branches	Dead Front		Open Front	
	Branches arranged for Edison plug fuses	Branches arranged for cartridge fuses	Branches arranged for Edison plug fuses	Branches arranged for cartridge fuses
None	.....	.....	Type OP	Type OC
Knife	.....	.....	Type OPK	Type OCK
Tumbler	Type DPT	Type DCT	Type OPT	Type OCT
Push	Type DPP	Type DCP	Type OPP	Type OCP

Dead Front Standardized Panelboards—This, the highest type of safety panel, is equipped with a "double" door, one small door within a larger one. The large door opening exposes the full face of the panel, the smaller gives access only to the switches of the branch circuits. This panel is recommended for installations where branch circuit switches are manipulated by inexperienced persons and fuses are renewed by a maintenance man. The large door has a combined Yale lock, latch and knob, which effectively prevents the theft of fuses or any tampering with the branch or main connections.

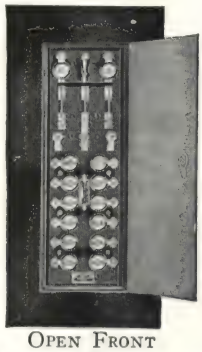
Open Front Standardized Panelboards—The open front panelboard is identical with the dead front, except that it has a single door, which gives access to all the switches and fuses on the face of the panel. It is usually installed in places where the board is operated by some authorized person. The combined Yale lock, latch and knob, excludes all others.

Dead Front Residence Panelboards—Designed for the protection and reassurance of home owners and dwellers who, having little or no knowledge of electrical equipment, fear to change a fuse or throw a switch in the center of distribution. All live parts are covered by a safety shield and the various circuits are readily identified. Fuses are easily renewed by the most inexperienced person with safety and a sense of perfect security.

Open Front Residence Panelboards—In the open front residence panelboard, 90% of all current carrying parts are concealed in the composition base. The only exposed live parts are the terminals for main and branch service wires. Terminals are at a safe distance from operator's hand while fuses are being renewed.



DEAD FRONT
RESIDENCE PANELBOARD
Range—2 to 10 circuits.
Wire mains—2-2 or 3-2, 125 volts.
Main connections—lugs only or fusible main tumbler switch.
Cabinet mountings—flush or surface.



OPEN FRONT
RESIDENCE PANELBOARD
Range—2 to 10 circuits.
Wire mains—2-2 or 3-2, 125 volts.
Main connections—lugs only or fusible main knife switch.
Cabinet mountings—flush or surface.

RESIDENCE PANELBOARDS

Dead Front		Open Front	
Lugs only in mains	Fusible tumbler switch in mains	Lugs only in mains	Fusible knife switch in mains
Type RDL	Type RDF	Type ROL	Type ROF

Other Types of Panelboards—Benjamin-Starrett standardized panelboards are furnished with increased capacities as, for example, panels with 1320-watt branches—and with additional equipment, such as subfeed and through feed panels, meter loops, etc. There are also stock panelboards, from 4 to 10 circuits, which are carried at the factory and the jobber's, packed and ready for shipment on receipt of the order; and panel cut-outs, from 4 to 10 circuits, which provide a better distribution center than porcelain blocks for small inexpensive installations.

How to Specify Benjamin-Starrett Panelboards—The architect can secure the installation of Benjamin-Starrett panelboards on his jobs by specifying a panel: (1) built upon a base of strong, fireproof composition of high dielectric strength and impervious to the action of oils, acids and moisture; (2) with all main and branch bus bars concealed.

The Panelboard Division of the BENJAMIN ELECTRIC MFG. CO. is prepared to assist the architect in obtaining the panelboard installation best suited for any particular job.

Ben-ox Pull Chain and Keyless Sockets

The strongest brass shell socket—for hard service. Furnished in copper for weatherproof work or brushed brass for use indoors. Has sturdy rolled thread for attaching Benjamin porcelain enameled steel reflectors or glass ware for which a threaded holder is provided. Furnished with or without pull chain switch. Sockets are tapped for ½ or ¾ in. pipe.

(KEYLESS TYPE)
CAT. NO. 4700

FRANK E. PLOWMAN CO.

Glo-Letr Interior Electric Signs, Reflectors and Lighting Specialties

400 North Michigan Avenue

CHICAGO, ILL.

EASTERN REPRESENTATIVE: Richard C. Barsch, 203 East 12th Street, NEW YORK, N. Y.

Products

Designers and manufacturers of Mirror Lined Trough Reflectors for lighting bank and office cages, counters and desks, theaters, churches, auditoriums, banquet and lodge rooms, show windows and display cases, rug racks, stained glass windows, switchboards, etc.

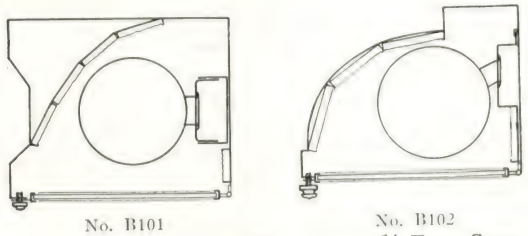
Glo-Letr Signs for banks, theaters, hotels, stores, and all places where a distinctive directional sign of highest quality is required.

Service

This company specializes in building trough reflectors to meet individual requirements. With the exception of two bank cage reflectors, we have no stock designs, consequently the prospective purchaser is assured of obtaining maximum efficiency when the recommendation of our engineering department is followed. The services of our engineering department are offered to architects and prospective customers without charge or obligation.

Cage Reflectors for Banks and Offices

The types illustrated are made in both bronze and steel metal, are corrugated mirror lined, have removable wiring troughs, and polished plate prism or crystal ground glass diffusing doors. Reflectors should be 2 ft. shorter than the counters they are to light.



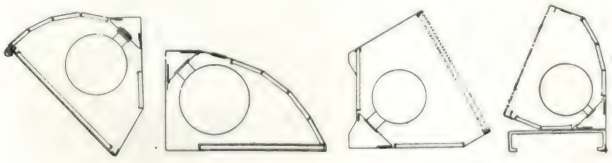
No. B101 No. B102

Cross Sections, Cage Reflectors, ¼ Full Size

Show Window Reflectors

Today the window trimmer and the store owner appreciate the great value of the direct, paying sales appeal of the *effectively lighted* window. Unit reflectors are designed to meet general average conditions, while the trough reflector is designed to meet specific requirements, with the result that the properly designed trough reflector is more efficient, more pleasing in appearance, and the concealment of the light source is more easily accomplished.

Complete equipment for a show window includes a footlight reflector, preferably made of bronze on account of its exposed position, and both top and foot reflectors should be equipped with grooves to take color screens. On receipt of blue prints or pencil sketches our engineering department will design reflectors to meet individual requirements.



Top reflectors Foot reflectors

Cross Sections, ⅛ Full Size, Various Types of Show Window Reflectors

Made with or without grooves for color screens

Cove Reflectors

For theaters, churches, etc., are made in a variety of forms, and designs will be cheerfully furnished on receipt of complete information as to exact conditions.

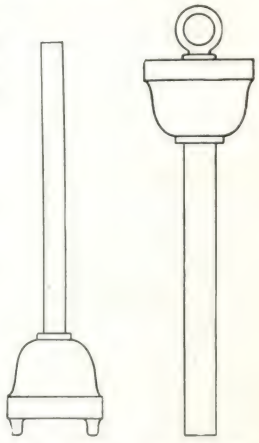
Glo-Letr Signs

These signs consist of an ornamental steel or bronze housing containing and concealing the lamps, a sheet of plate glass on which is deeply sandblasted the desired lettering, cold drawn steel or bronze channel to form a frame and support the glass and the necessary wiring and means of support.

FRANK E. PLOWMAN CO. ELECTRIC GLO-LETR SIGNS CHICAGO

TRADE-MARK

When lighted the effect is that of softly glowing embossed lettering on a dead black background. They are made in sizes ranging from 5 to 14 in. wide and from 15 to 84 in. long, and are arranged to stand, hang or fasten flat on wall and to read from one or both sides. Used in banks to designate bond, savings and safe deposit departments, and over wickets; in hotels to designate porter, check room, cashier, grill, elevators, etc.; in theaters to designate aisles, mezzanine, ladies' room, smoking room, etc.; in public buildings and stores as directional signs. Write for illustrated price list.



Single Face, Standing Sign Double Face, Hanging Sign

Cross Sections, ¼ Full Size Glo-Letr Signs

Glo-Letr Sign

Type S, Single or double face standing

LU-MI-NUS SIGNS, INC.

Electric Signs of Every Type

TELEPHONE
CALUMET 5670, 5671, 5672

EXECUTIVE OFFICES
1400 South Michigan Avenue
CHICAGO, ILL.

REPRESENTATIVES IN MOST LARGE CITIES

Products

ELECTRIC SIGNS (ANIMATED) for Theaters.

ELECTRIC ATTRACTION BOARDS (INTERIOR ILLUMINATED) with interchangeable LU-MI-NUS LETTERS; also EXPOSED LAMP LETTERS.

ELECTRIC ROOF SIGNS and DISPLAYS.

ELECTRIC OUTLINING for Buildings.

ELECTRIC SIGNS for Industrial Plants, Office Buildings, Hotels, Banks, etc.

Also Stage Lighting: Foots, Borders, Proscenium, Strips, Program Letter Boxes, etc.

TRADE LU-MI-NUS MARK

Advantages of the Lu-Mi-Nus Letter

Readability—Due to the *flat* snow white glass it is possible to give a most even distribution of light for night effect. The white glass in contrast with the (22-k) genuine gold bevel outline makes a highly readable letter, at long range, in the day-time.

Durability — Lu-Mi-Nus letters, being made of zinc, are absolutely impervious to rust and corrosion. All surfaces are finished in baked enamel.

Breakage—On account of the *flat opal glass,* breakage is reduced to a minimum, and replacement cost is inconsiderable. The flat glass prevents accumulation of dirt and is easily cleaned when necessary.

Letters Removable—In all signs built with Lu-Mi-Nus letters, the letters are easily removable and interchangeable (construction patented).

Wide Selection of Sizes—Lu-Mi-Nus letters for attraction boards are furnished in the following sizes: 6, 9, 12 and 15 in.; other sizes for regular signs range from 3½ to 24 in., inclusive.

CAPITOL THEATER, CHARLESTON, WEST VA.

Entire canopy by LU-MI-NUS SIGNS, INC. 9-in. interchangeable letters in attraction boards on three sides; boards surrounded with double-row traveling border, vertical sign, grooved exposed lamp letters (double row of sockets), triple-row traveling border

Exposed Lamp Letters

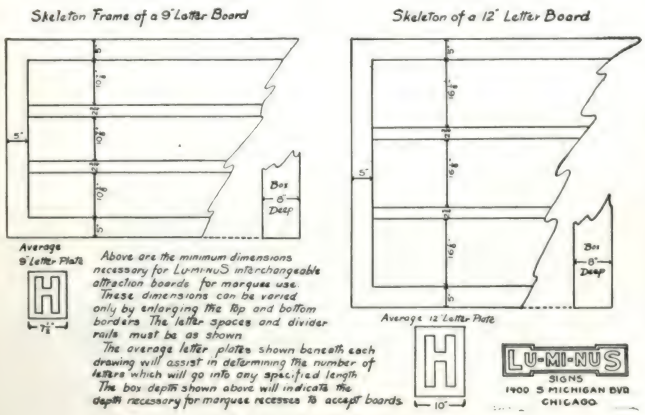
Where the exterior lighted letter is desirable, grooved, raised block or flush type letters, with sockets exposed, are furnished in any size or style. Traveling borders, chasers and animated effects can be worked out to suit your needs.

Roof Signs (Skeleton)

This company builds and installs every type, including reproductions of trade-marks, spectacular flashing effects, etc.

ROOSEVELT THEATER, CHICAGO, ILL.

Lu-Mi-Nus attraction boards built into marquise and over entrances following out architectural design of building. 12-in. letters in marquise; 9-in. letters over door. Exposed lamp letters in vertical signs. Signs can be built to form entire canopy facia



DIMENSION DATA LU-MI-NUS LETTERS

Special Service for Architects

This company has a special architectural department,—a corps of men who know sign requirements and are designers and mechanical experts, whose services are yours to command.

NEW PARK BUILDING, CHICAGO, ILL.

Commercial signs built into recess panels, forming a part of store front. Unusual readability at great angles is possible with the use of Lu-Mi-Nus letters. Signs embody uniformity of design

UNIVERSAL ELECTRIC STAGE LIGHTING CO.

KLIEGL BROS., PROPRIETORS
321 West 50th Street
NEW YORK, N. Y.

TELEPHONE
CIRCLE 0094, 0095

ESTABLISHED 1897

Products

STAGE, THEATRE and MOTION PICTURE STUDIO LIGHTING: Complete Lighting Plants, Apparatus, Equipment and Supplies; Specialties in Lighting, Electrical Spectacular and Electro-Mechanical Stage Effects.

Guarantee

All Kliegl apparatus and effects are sold under full guarantee. Any defects in the material or workmanship will be promptly rectified.

Spot Lights and Stage Lamps

Kliegl spot lights, arc and nitrogen, for short throw or long distance, for 3 ft. spot to any spread, for either alternating current or direct current. From 25 to 200 amperes.

Bunch Lights

Furnished either with square or round head, wired for 40-, 60- and 100-watt lamps. Nitrogen type for 500- and 1000-watts. Single head or double head, with adjustable stand for any height.

FIG. 7 ARC SPOT LIGHT WITH COLOR WHEEL

FIG. 641 BUNCH LIGHTS

FIG. 1N

FIG. 75 SCIOPTICON WITH SNOW EFFECT

FIG. 756 MUSIC STAND

Music and Leader Stands

Furnished in several styles, plain and fancy; adjustable stand, iron base, wood or metal top with lighting fixture. Metal top all enclosed on sides best adapted for motion picture theatres, arranged so no light will escape to annoy the audience or interfere with the screen projection.

Aisle and Step Lights

Cast aluminum face with sheet metal light box, can be set flush with step or wall.

FIG. 677. STEP LIGHT

Exit Signs

Carried in stock with 3-, 5- and 8-in. letters; face, ruby glass or leaded glass, or letters cut in metal.

FIG. 695. EXIT LIGHT

Connectors

Made for 5, 15, 30, 60, 100 and 200 amps., 2-wire, 3-wire and 4-wire. Made of solid block of fiber, practically "indestructible."

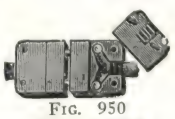


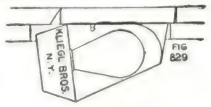
FIG. 950 CONNECTOR

Foot Lights

Made of No. 20 galvanized iron with trough hood rolled in one piece. Hood extends 3 in. above stage level, and the foot light strip with receptacles and wiring is removable.

Disappearing type foot light furnished in complete sections with flooring 1 in. thick by 14 in. wide, ready to be installed, for either straight or curved foot light. When closed they are flush with the floor.

Open



Closed

DISAPPEARING FOOTLIGHTS

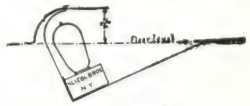


FIG. 622A

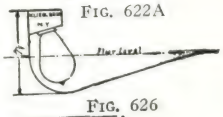


FIG. 626

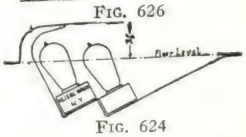


FIG. 624

STANDARD FOOTLIGHTS

Strip Lights

Stock sizes, 5 ft., 6 lights; 8 ft., 10 lights. Other sizes made to order.

Border Lights

Made in any lengths required, of No. 20, galvanized iron, receptacles and wiring enclosed provided with cable splicing box and piping for suspension. Fig. 600 has lamp spacing of four 60-watt to the foot. Fig. 612 is latest type of border designed for 200- or 500- watt nitrogen lamps and furnished with slide grooves and metal frames for color mediums.

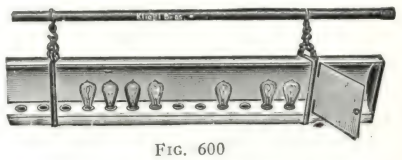


FIG. 600

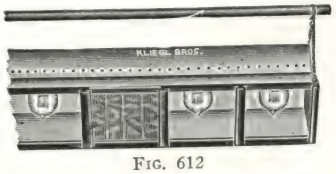


FIG. 612
BORDER LIGHTS

Baby Spot Lights for Window Display

Very effective for all types of displays, particularly window displays where it can be placed on floor and concealed behind draperies or other objects. Bracket arm with swivel adjustment permits lamp to be mounted on wall, ceiling, pillars or floor, to throw light in any direction. Used in conjunction with colored gelatine mediums.

Wall bracket reflector for side walls, beams or pillars or over windows, used with equally good effect.

FIG. 66A
BABY SPOT LIGHT

Stage Pockets and Receptacles

All types of stage pockets and plugging boxes, flush wall, flush floor and waterproof receptacles in iron and brass, with or without lock and key. Made in 2- and 3-wire circuits, 25 to 200 amperes.

FIG. 374 POCKET PANEL

FIG. 350

FIG. 301

FIG. 310

STAGE POCKET, WALL POCKET AND FIBER PLUG

Catalogue

Complete catalogue K sent on request.

EDISON LAMP WORKS

OF GENERAL ELECTRIC COMPANY

GENERAL SALES OFFICE

HARRISON, N. J.

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For other Sales Offices, see General Electric Company's Sales Offices on page 1891

Products

EDISON MAZDA LAMPS.

Lamps for Every Lighting Need

There is a correct size and type of Edison MAZDA lamp for every artificial lighting requirement. A well designed and decorated building may be greatly marred by employing the wrong lighting equipment and lamps. Large Edison MAZDA B lamps may be obtained in sizes from 10 to 60 watts and MAZDA C lamps from 50 to 1000 watts.

Of the most recent developments in incandescent electric lighting are the diffusing bulb MAZDA lamps consisting of the 15-, 25- and 40-watt MAZDA B lamps and the 50- and 75-watt white MAZDA C lamps designed especially for homes.

The 25- and 50-watt MAZDA B mill type lamps find particular use where the lamp is subjected to severe vibrations and jars.

The MAZDA C daylight lamps in sizes from 50 to 500 watts are adaptable for use where approximate daylight is desired, such as in stores, show windows, printing plants, medical diagnosis, etc.

In order to prevent the glare from bare MAZDA C lamps in open reflectors, they may now be obtained with a coating of white enamel on the bowl of the lamp. These are known as bowl enameled MAZDA C lamps.

More detailed information regarding any type of lamp may be obtained from the most convenient office noted above.

Engineering Service to Architects

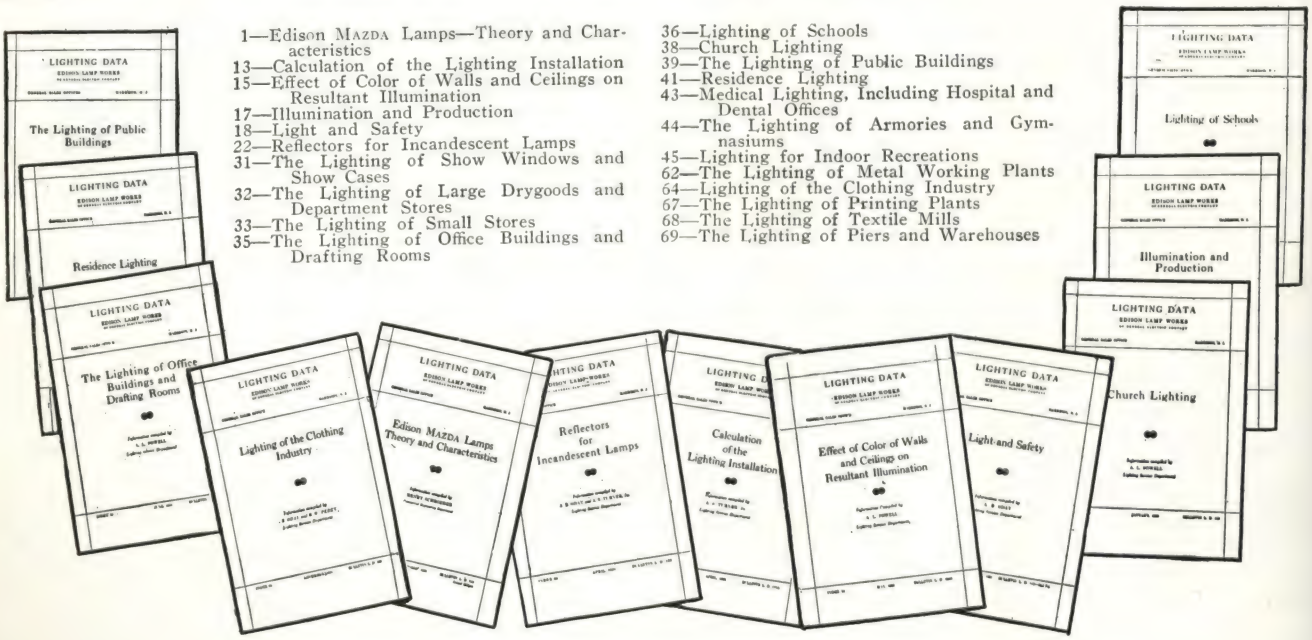
Lamp data and general illumination practice is continually changing from year to year, so that the lighting ideas of a few years ago may be antiquated and inefficient today. A lighting service department is maintained at the general sales offices, Harrison, N. J., consisting of a corps of lamp and illuminating engineers who combine the theoretical with a wide practical experience in all fields of illumination. The results of their research and practice are available to architects on request. No charge is made for this service.

Lighting Bulletins—Not Advertising

In order to broadcast some of the lighting data obtained through many investigations, non-technical bulletins have been prepared covering the most important illumination problems. The mastery of the subjects covered is strengthened by the following additional features. A complete synopsis of the text of each bulletin will save much time for the hurried reader. Information on related subjects is kept in logical order by means of index numbers. Of particular note is the inclusion of a bibliography of all important articles published in the technical and trade journals, during recent years, on the subjects covered by the bulletins.

The bulletins listed below have been selected for their particular interest to architects. Any of these bulletins may be obtained on application to the Edison Lamp Works, Harrison, N. J.

1—Edison MAZDA Lamps—Theory and Characteristics
13—Calculation of the Lighting Installation
15—Effect of Color of Walls and Ceilings on Resultant Illumination
17—Illumination and Production
18—Light and Safety
22—Reflectors for Incandescent Lamps
31—The Lighting of Show Windows and Show Cases
32—The Lighting of Large Drygoods and Department Stores
33—The Lighting of Small Stores
35—The Lighting of Office Buildings and Drafting Rooms
36—Lighting of Schools
38—Church Lighting
39—The Lighting of Public Buildings
41—Residence Lighting
43—Medical Lighting, Including Hospital and Dental Offices
44—The Lighting of Armories and Gymnasiums
45—Lighting for Indoor Recreations
62—The Lighting of Metal Working Plants
64—Lighting of the Clothing Industry
67—The Lighting of Printing Plants
68—The Lighting of Textile Mills
69—The Lighting of Piers and Warehouses



NON-TECHNICAL BULLETINS COVERING THE MOST IMPORTANT ILLUMINATION PROBLEMS

GENERAL ELECTRIC COMPANY

GENERAL OFFICE

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ARIZONA, Phoenix	
ARKANSAS, Little Rock	
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CALIFORNIA, San Francisco§†	Pacific States Electric Co.
COLORADO, Denver†	The Hendrie & Bolthoff Mfg. Sup. Co.
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CONNECTICUT, New Haven	New England Eng. Co.
CONNECTICUT, Waterbury‡	
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GEORGIA, Savannah‡	Carter Electric Supply Co.
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	Royal Eastern Elec'l. Sup. Co. (Also Borough of Brooklyn, Long Island City and Jamaica, L. I.)
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	Frank H. Stewart Electric Co.
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FOR HAWAIIAN BUSINESS: Catton, Neill & Co., Ltd., Honolulu

‡No G-E Office †Warehouse §Service Shop

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120 Broadway, NEW YORK, N. Y. SCHENECTADY, N. Y.

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GREECE AND COLONIES: Cie. Hellenique d'Electricite, Athens.

HOLLAND: Philips Gloeilampen Fabrieken, Eindhoven.

HUNGARY: United Incandescent Lamps and Electrical Co., Ltd., Ujpest, near Budapest.

INDIA: British Thomson-Houston Co., Ltd., Calcutta and Bombay; International General Electric Company, Inc., Calcutta and Bombay.

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URUGUAY: General Electric, S. A., Montevideo.

VENEZUELA: Wesselhoeft & Poor, Caracas.

Continued on next page

GENERAL ELECTRIC AND ALLIED COMPANIES' PRODUCTS

Building Equipment Manufactured *	General Electric Co.	Sprague Electric Works of General Electric Co., 527-531 West 34th St., N. Y.	Edison Elec. Appliance Co., 5660 W. Taylor St., Chicago	Ivanhoe-Regent Works of General Electric Co., Cleveland, Ohio	Trumbull Elec. Mfg. Co., Plainville, Conn.	Edison Lamp Works of General Electric Co., Harrison, N. J.	National Lamp Works of General Electric Co., Cleveland, Ohio	Victor X-Ray Corporation 236 Robey St., Chicago, Ill.	Duplex Lighting Works of General Electric Co., 6 W. 48th St., New York	Cooper Hewitt Electric Co., 95 River St., Hoboken, N. J.	Warren Clock Co., Ashland, Mass.
Power Plant Equipment	1893										
Mercury Arc Rectifiers	1893										
Circuit Breakers and Switches	**	1819			1858						
Switchboards	1894	1819									
Panelboards	1895	1819									
Electrical Instruments	1894										
Conduit and Outlet Boxes		1818									
Wire and Cable	1894										
Transformers	1895										
Battery Charging Equipment	1893										
Motion Picture Equipment	**										
Electric Welding Equipment	1900										
Motors and Control	1899	**									
Ventilating Fans	1899	**									
Coal and Ash Handling Equipment		**									
Industrial Electrical Heating Equip.	1900										
Home Electrical Appliances	1900		1910								
Wiring Devices	1896										
Mazda Lamps						1890	**				
Mercury Vapor Lamps										**	
Street Lighting Systems	1898										
Lighting Fixtures	1898			1866					1865		
Searchlights and Floodlights	1898										
Electric Clocks	1900										**
Hospital Equipment	1900										
X-ray Apparatus								**			

*Figures refer to pages giving information.
**For information, write the company at address given.

Sales Channels

The General Electric Company has established various means of marketing its products, such as: direct sales to purchasers, sales through distributing jobbers, sales to manufacturers of appliances, manufacture and sales by allied companies and sales through dealers. It is possible to obtain through these channels every kind of apparatus, machinery, device or material necessary for the generation, transmission, distribution and use of electrical energy. The following pages give but a limited description of the many products of this company. With this as a foundation it is quite practicable for architects or engineers to obtain necessary information for complete electrical systems.

TRADE-MARK

Guarantee

The General Electric Company provides for a reasonable and liberal guarantee on all of its products.

G-E Architectural Service

The factories, engineers, laboratories, and equipment of the General Electric Company and allied companies are at the disposal of architects and engineers.

Broadly, the architect in practicing his profession is confronted with certain problems in which these companies can be of assistance. In all important cities there will be found representatives to give authoritative advice regarding use of all electrical products.

While it is impossible to portray by description or illustration the many diversified G-E products on the following pages, there is given a general outline of the electrical requirements of architectural work. More detailed information on the products manufactured by allied companies may be obtained by referring to their pages tabulated above or by writing direct to these companies at their principal offices.

Continued on next page

Electric Power Available

Whenever a building structure receives electrical supply from a public utility company, the supply may be in one or more of the following ways:

3-Wire Direct Current, 125-250 Volts—In small buildings (residences, stores, etc.) there should be installed at the service entrance for each feeder one externally operated Trumbull "Safety" switch with fuses of capacity as shown on plans (sizes 30 to 200 amp.), manufactured by the Trumbull Electric Manufacturing Company. See page 1858.

3-Wire Alternating Current, 110-220 Volts—Requires same provision as for 3-wire direct current.

Alternating Current, 440 or 550 Volts—As 440- or 550-volt service is generally used for industrial buildings, a switchboard of General Electric manufacture should be installed. Separate panels should be used for lighting, power, and elevator service. (See Switchboards and Appliances, page 1894.)

Alternating Current, High Potential—When contracts for electrical service are made at primary voltages (2300 volts, 6600 volts, 13,200 volts and above) Type H oil cooled transformers, manufactured by the General Electric Company should be installed in cells shown on plans for stepping down or reducing the voltage. Type H transformers are made in standard sizes from 1½ to 200 kv-a., and can be furnished for underground or other special service.

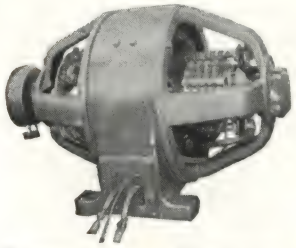
Transformer

When possible, transformers should be located outside of the building and mounted on a pole or placed in a specially-built, fireproof compartment which may be either above or under the ground. If underground, it should be waterproof with provision for ventilation and drainage, and with a fireproof door if above ground. For inside location there should be a separate fireproof compartment that is vented to the outside air. Provision must also be made for adequate drainage.

"Safety" enclosed panels of General Electric manufacture should be provided on the primary side as shown on plans. G-E switchboards should also be provided on the secondary side, all as shown on plans. (See Switchboards and Appliances, on the following page.)

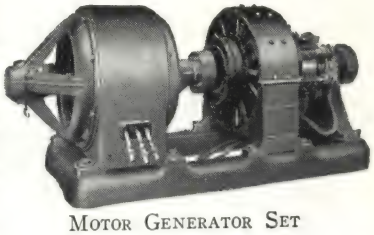
Alternating Current Available, Direct Current Required—When the power supply is alternating current and direct current is required, there should be installed where shown on plans on foundations supplied by others, one or more of the following equipments, depending on the needs of the building:

(A) Synchronous converters (a direct current generator with winding arranged so as to be self-starting and operate on alternating current) with the necessary transformers and starting panels, all of General Electric manufacture (30 to 3000 kw. and above).



Synchronous Converter

(B) Synchronous motor-generator sets (a synchronous motor direct connected to a direct-current generator) with necessary alternating-current motor panels and direct-current generator panels, all of General Electric manufacture (100 to 1800 kw. and above).



Motor Generator Set

(C) Induction motor generator sets (an induction motor and direct-current generator direct connected) with necessary motor starting compensator and direct-current generator panel, all of General Electric manufacture. (250 watts to 35 kw. sizes standard. Others equal to motor and generator sizes).

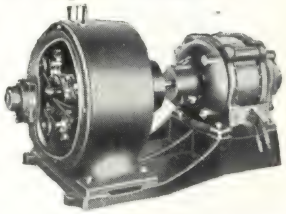
Rectifier

(D) Mercury arc rectifiers (essentially a mercury vapor arc enclosed in an exhausted glass receptacle containing electrodes which permit current to flow in only one direction)

Tungar Battery Chargers

for conversion of alternating current to direct current for use in charging storage batteries, operating arc lamps, motors, electrolytic baths, etc., of General Electric manufacture. (10 to 50 amp. sizes with various direct-current voltages operating on 110- or 220-volt alternating-current circuit. Special rectifiers for higher voltages.)

(E) Compensarcs of General Electric manufacture for supplying direct current for motion picture projection from alternating-current circuits. Motor generator type furnished with motor to operate from any commercial circuit, single-, 2- or 3-phase.



A-C. to D-C. Compensarc

For small theaters where more costly equipment is not warranted, or for use as a reserve in connection with the a-c. to d.-c. motor generator compensarcs, the a-c. to a-c. transformer type compensarc is recommended.

For use where direct current is available, a d-c. to d-c. motor generator compensarc can be furnished for supplying proper voltage.

(F) Other conversion apparatus for changing the form of electric current from alternating to direct is also manufactured by the General Electric Company.

Direct Current Available, Alternating Current Required—Direct-current motor generator sets with necessary motor starting and generator panels, all of General Electric manufacture (250 volts up to any motor and generator sizes).

Where it is necessary to change any direct-current supply voltage G-E motor generator sets, consisting of two direct-current machines, can be furnished.

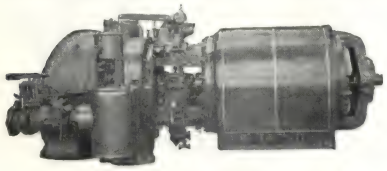
Generation of Electric Power

Whenever a power plant is installed in a building structure or when generating apparatus is required for a powerhouse to supply a group of buildings, the plant will require equipment of one or more of the following types:

Alternating Current Required—Curtis steam turbine driven alternating-current generators (10 to 4500 kw.) of General Electric manufacture. Generators

Continued on next page

are built in all standard voltages, either 2- or 3-phase, self-excited, and separately excited. Turbine and generator are mounted as a separate unit. Steam pressure, superheat and power pressure should be specified and whether for condensing or non-condensing operation.



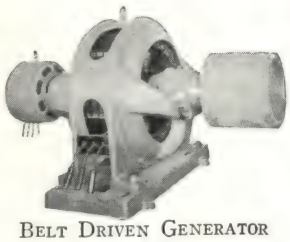
CURTIS TURBINE GENERATOR

Horizontal and vertical water wheel driven alternating-current generators (30 to 22,500 kw.) of General Electric manufacture, built for separate excitation and for a wide range of speeds and voltages.

Engine driven alternating-current generators, 240-480-600-2300 volts, 60 cycles, 3- or 2-phase, of General Electric manufacture. Built for a full range of steam and gas engine speeds (30 to 1400 kw.).

Belted alternating-current generators of General Electric manufacture, self-excited and separately excited. Voltage range from 120 to 2300 volts (9 to 600 kw.)

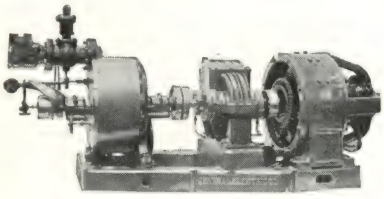
Direct Current Required—Curtis steam turbine driven direct-current generators, direct and gear connected, of General Electric manufacture. Generators 2-wire and 3-wire, 125 to 250 volts. Turbines condensing and non-condensing for various steam pressures and conditions (10 to 2000 kw.).



BELT DRIVEN GENERATOR

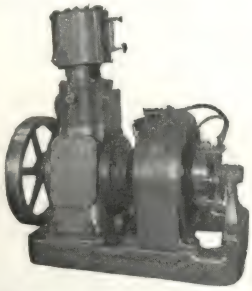
Waterwheel driven direct-current generators manufactured by the General Electric Company in various sizes and for various speeds, for vertical or horizontal operation.

Steam driven direct-current generators. Compound wound commutating pole machines for all modern steam engine speeds (250 volts, 35 to 2000 kw.; 125 volts, up to 250 kw.) particularly adapted for supplying elevator circuits or where there is considerable fluctuation in load. For 3-wire, 125-250 volts, balancer sets should be used but generator with self-contained compensator can be furnished. Manufactured by the GENERAL ELECTRIC COMPANY.

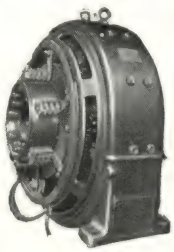


GEARED TURBINE-GENERATOR

Belted direct-current generators of General Electric manufacture, shunt or compound wound with commutating poles for voltages 120-125, 240-250, 550-575; 2-wire; and 125-250 volts, 3-wire (625 watts to 175 kw.).



STEAM ENGINE GENERATOR SET



D-C GENERATOR FOR CONNECTION TO ENGINE

Switchboards and Appliances

Slate, marble, steel or other materials for switchboards may be specified, to be supported by pipe or angle iron framework and on which shall be mounted all voltmeters, ammeters, watthour meters, switches, circuit breakers, relays, fuses, pilot lamps, indicators, bus copper, or other fittings to make a complete switchboard for generator, feeder, or other circuits. Panels and all instruments, devices and fittings are manufactured by the GENERAL ELECTRIC COMPANY. They can be furnished in any size and for any voltage or current in use.

SWITCHBOARD, BANKER'S TRUST CO., NEW YORK, N. Y.

Standard Unit Panels—These have been developed to meet certain conditions which have been found to occur repeatedly. They have not been developed for voltages above 1200 direct current or 3500 alternating current. It is advisable whenever possible to use standard unit panels, for they are less expensive than the other classes, requiring less time to build and ship. Manufactured by the GENERAL ELECTRIC COMPANY.

Safety Enclosed Switchboards—Whenever possible in building construction, safety enclosed switchboards with fully enclosed live parts should be specified.

The GENERAL ELECTRIC COMPANY has developed several types of safety panels which have proved very successful. Enclosed dead front stationary panels are standard units especially applicable where inexperienced or unskilled employes have access to the switchboard. A sheet steel door on the steel front of each switch unit directly back of the operating handle can not be opened when the switch is closed. The panels may be combined into a switchboard which presents a pleasing appearance. Made up with switches and air circuit breakers in capacities desired, 250 or 600 volts, General Electric manufacture.

SAFETY ENCLOSED PANEL

Conduit and Fittings

A full line of conduit and fittings is manufactured at the Sprague Works of the General Electric Company. In the best building construction "Greenfielduct" hot dipped galvanized conduit should be specified. Where enamel conduits are desired "Sprague duct" should be specified and where the requirements better warrant a flexible conduct or flexible armored conductor "Sprague BX" should be specified. Sprague conduit boxes and fittings are manufactured for every requirement. Conduit bodies for open conduit work should be specified as "Spraguelets."

Wires and Cables

No building can be considered modern unless adequately wired for the varied applications of electricity. Not only should provision be made for apparatus al-

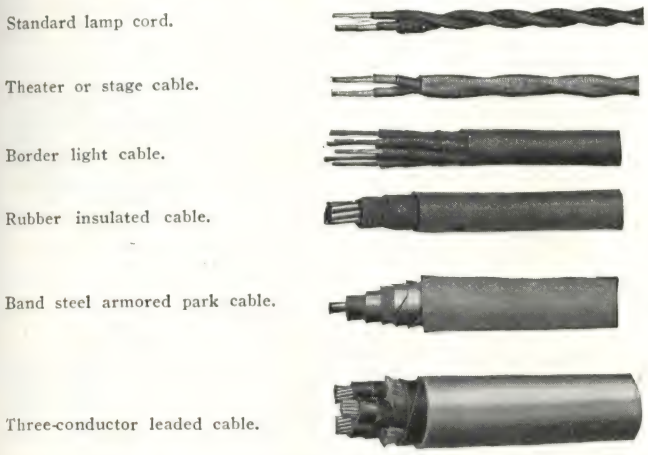
Continued on next page

ready on the market, but buildings should be so planned that the improvements of the future can readily be adopted.

The following are important factors in planning the wiring of any building:

(1) Liberal size of wires.
(2) Ample number of outlets for lighting.
(3) Good switch control.
(4) Sufficient appliance outlets (for heating, cooking, power).

In planning various circuits, one should endeavor to locate distribution centers in easily accessible places.



A Few G-E Wires and Cables

The primary considerations for writing specifications for insulated conductors are:

1. **Size of Conductor**
   - American Wire Gauge
   - Circular Mil
   - Circular Inch
   - Diameter in Inches
2. **Kind of Conductor**
   - Solid
   - Stranded—Standard
   - Stranded Flexible
   - Stranded—Extra Flexible
   - Special Stranding
   - Number — Single—Duplex—3-conductor, etc.
   - Sector
3. **Type of Insulation**
   - Cotton
   - Silk
   - Enamel
   - Combination of above
   - Rubber
   - Varnished Fabric
   - Paper
   - Graded
4. **Covering**
   - Single Braid
   - Double Braid
   - Triple Braid
   - Tape and Braid

   (Double Braid, Triple Braid, Tape and Braid: weather-proof)
   - Cotton or Silk
   - Glazed Braid
   - Asbestos
   - Flameproof—Mineral Paint
   - Special Covering
5. **Metallic Protection**
   - Lead (C.L.)
   - Flexible Steel Armor (BX)
   - Lead and Jute (C.L.A.)
   - Braided Steel Wire Armor
   - Spiral Wrapped Armor
   - Band Steel Armor (C.L.A.I.)
   - Steel Wire Armor (C.L.A.W.)

Every form of insulated conductor except telephone cable is manufactured by the General Electric Company. For buildings in which the requirements are not too severe specify "G-E Red Core," a grade better than "National Electrical Code" requirements. In the better types of buildings specify "G-E 30%," a wire meeting any requirement for rubber installation. In large cables G-E varnished cambric may be advantageously used. For installation in wet places or underground, lead incased wire or cables should be used for whatever insulation selected.

The following list gives some idea of the scope of G-E wire and cable manufacture:

1. Paper-insulated cables for power circuits up to 33,000 volts working pressure.
2. Rubber or varnished cambric-insulated, braided, leaded or armored cables to meet specifications for interior, aerial, underground or submarine, lighting and power circuits of any commercial voltage.
3. Car and locomotive wiring cables and motor leads.
4. National Electrical Code, Marine Code and United States Government standard wires and cables.
5. Lamp cords and portables.
6. Rubber-insulated telephone, telegraph, fire alarm and signal cables.
7. Auto lighting, starting and ignition cables.
8. Triple braid weatherproof and triple braid flameproof wires and cables.
9. Magnet wires, enamel-, cotton-, silk- and asbestos-covered.
10. Friction and splicing tapes.
11. Splicing and filling compounds.
12. Junction and fuse boxes, for manhole and armored cable distribution.
13. Coupling boxes for underground and submarine cables.
14. Cable end bells for interior use.

Panelboards

Switchboards for commercial buildings, etc., and panelboards for distribution systems are manufactured at the Sprague Works of the General Electric Company. (See page 1818.) Panelboards, and also knife, or lever, switches in all sizes are manufactured by the Trumbull) Electric Manufacturing Company. (See page 1858.) The principal types of panelboards are:

(a) "Safety Type" panelboards with heavy duty (30 amp.) G-E tumbler switches in the branch circuits.

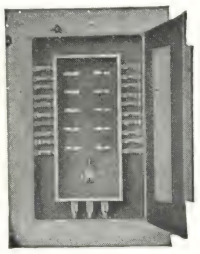
(b) "Safety Type" panelboards with standard (10 amp.) G-E tumbler switches in the branches.

(c) "Safety Type" panelboards with G-E push button switches in the branches.

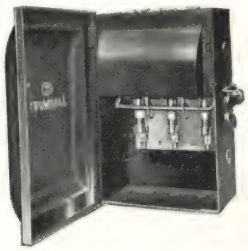
(d) Live front lighting and power panelboards.

(e) Metering Panels.

All panelboards are made to specifications with or without safety or knife main switches or main lugs. D & W enclosed fuses in the branches and on mains when specified. Cabinets in all standard forms to comply with specifications of the Architect.



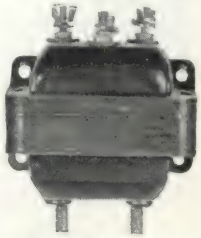
Sprague Panelboard



Trumbull Switch

Miniature Transformers

Bell Ringing Transformers, in capacities 5 to 50 and 100 watts, are manufactured by the General Electric Company in potentials 110 or 220 volts primaries and have various secondary voltages to accommodate the operation of bells, annunciators or other devices requiring approximately from 8 to 30 volts. Heavy duty transformers are manufactured for operation of large gongs, annunciators, complete signal systems, etc. These devices will afford the most convenient means of utilizing the electric lighting circuit for all low potential requirements.



Bell Ringing Transformer

Sign Lighting Transformers can be furnished in capacities 250 to 2000 watts, primary 110/220-volt, secondary 11/22-volt.

Auto Transformers, 1 to 15 kilowatt amperes, are manufactured for various potential transformer requirements.

Continued on next page

All-nite-lite Transformers are manufactured for adaptation to any standard screw shell socket for use in burning continuously miniature lamp to be installed in hallways, sick rooms and other places requiring economical continuous lighting.

Wiring Devices

Every form of wiring device is manufactured by the GENERAL ELECTRIC COMPANY. A few that will always meet with architectural approval are listed and shown. Full information is given in Catalogue Y1270.

(a) Sockets and Socket Receptacles—All Varieties—

For general use:
- GE Fluted Catch—Standard and Electrolier
  - Key, keyless, pull
- GE Snap Catch—Porcelain
- GE 2-screw type—Porcelain
  - Key, keyless, pull and push button

Especially recommended for industrial and commercial buildings:
- GE Threaded Catch—Standard and Electrolier
  - Key, keyless, pull
  - Key and keyless with husks for 2¼- and 3¼-in. shade holders
- GE "9386" Type—Standard
  - Key and keyless
  - With removable ring
- GE Snap Catch and 2-screw Porcelain types
- Locking Types—Standard
  - Fluted catch
  - Threaded catch
  - Porcelain—2-screw type
- 600-watt 600-volt Porcelain Lined
- Weatherproof Pendent
  - Porcelain and composition
- 1500-watt 600-volt Mogul
  - Brass shell and porcelain

(b) Switches—All Varieties—

Surface Types
- Snap—metal and porcelain covers
- Tumbler
- Ceiling pull
- G-E fluted catch pull

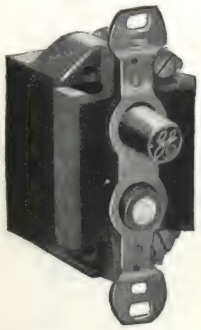
Pendent Types
- G-E fluted catch
- Push Button

Flush Types
- Tumbler
- Push button
- Locking
- Door switches

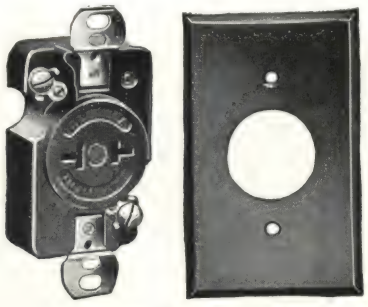
(c) Convenience Outlets—All Varieties—

Surface Types
- G-E Snap—catch
- Center screw

Flush Types
- Single or twin outlet
- Double door
- Disappearing door
- 25-amp. heavy duty

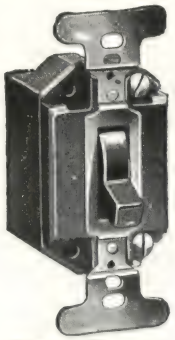


FLUSH PUSH BUTTON SWITCH

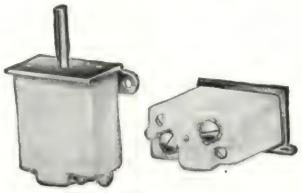


SINGLE CONVENIENCE OUTLET AND PLATE

TWIN CONVENIENCE OUTLET AND PLATE



FLUSH TUMBLER SWITCH



DOOR SWITCH

SURFACE TYPE TUMBLER SWITCH

THREADED-CATCH SOCKET (DISASSEMBLED)

FLUTED-CATCH SOCKET

BAYONET-JOINT-CATCH SOCKET

KEY SOCKET

LOCKING SOCKET

CEILING SNAP SWITCH

Illumination

The GENERAL ELECTRIC COMPANY and allied companies have laboratories devoted to illuminating engineering located at Schenectady, N. Y.; Cleveland, Ohio; Harrison, N. J., and Hoboken, N. J. Lighting recommendations will be gladly furnished from these laboratories. Some of the products of the various companies are:

Complete street lighting systems for arc lamps or MAZDA lamps

Searchlights and floodlights

High intensity studio lamps and high intensity projection lamps for motion picture work

MAZDA lamps for all lighting requirements

Cooper-Hewitt lamps for industrial, photographic and motion picture use

Duplexalite fixtures for office, school and home lighting

Ivanhoe-Regent glassware, metal reflectors and lighting units for all purposes

See pages 1865, 1866 and 1890.

Systems of lighting have been classified in accordance with the characteristics of light distribution. These systems are known as direct, indirect, semi-indirect and diffusing, and have the essential characteristics shown by the chart (Fig. 1) on the following page.

Continued on next page

CHARACTERISTICS OF LIGHTING SYSTEMS

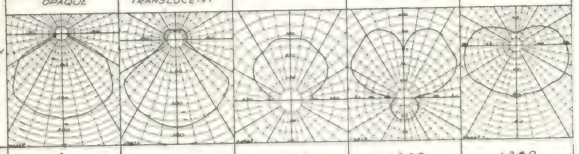
	DIRECT LIGHTING		INDIRECT LIGHTING	SEMI-INDIRECT LIGHTING	DIFFUSED LIGHTING
	OPAQUE	TRANSLUCENT			
DISTRIBUTION CURVES.					
LUMENS (BARE 100W LAMP)	1260	1260	1260	1260	1260
LUMENS DELIVERED BY FIXTURE	803	1031	1036	1032	847
UPWARD LUMENS	0	227	1036	806	328
DOWNWARD LUMENS	803	804	0	246	519
RELATIVE WATTAGE REQUIRED FOR EQUAL HORIZONTAL ILLUMINATION	114%	100%	151%	129%	131%

FIG. 1

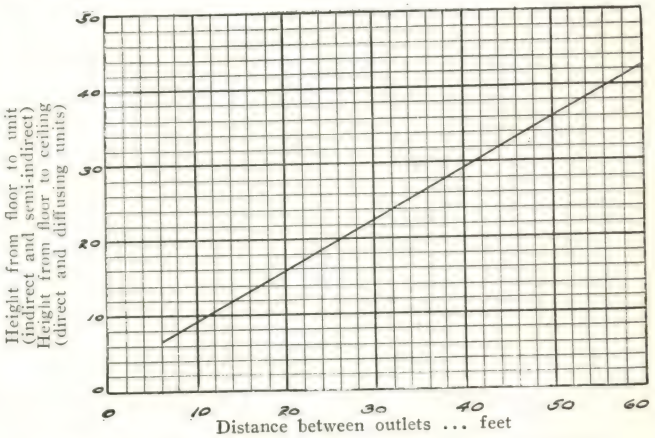
Direct Lighting—In this system the light is delivered directly to the working plane. This is, therefore, the most efficient system in terms of actual light delivered per unit of power. Care must be exercised to avoid objectionable glare; shadows and lack of diffusion are also likely to result unless properly designed. Bowl enameled lamps are preferable to clear lamps in equipment of this type in order to obscure the lamp filament from view. Confined largely to factory buildings.

Indirect Lighting—In this system the light is directed to the ceiling from which it is diffused to the useful plane. This method shows the least efficiency in terms of effective lumens per watt but gives the maximum of diffusion and eye protection.

Semi-Indirect Lighting—This lighting system embodies the principles of direct and indirect lighting; part of the light is directed to the ceiling and diffused throughout the room and part delivered directly to the useful plane. By choosing the proper density of glassware the desired proportions of these two components may be obtained for any desired effect. The lumens per watt efficiency is proportional to the relative proportions of the above components as is also the diffusion and degree of eye protection. The system is capable of a wide range of variation and is the most widely used method of lighting buildings other than factory space.

Diffused Lighting—In the diffused system the lamp is entirely enclosed within a diffusing glass envelope. The distribution of light is practically independent of the shape of the globe and gives very satisfactory illumination. The efficiency, eye protection, etc., depend on the density of the glassware.

Spacing and Mounting Height—The spacing and mounting height are usually determined by the structural features of the building. It is essential to give these matters serious consideration if the distribution of light is to be satisfactory and objectionable glare is to be avoided. Fig. 2 gives approximately correct values for spacing and mounting heights for uniform illumination on a working plane 30 in. above the floor.



SPACING AND MOUNTING HEIGHTS FOR LIGHTING UNITS

In industrial buildings with bays varying from 12 to 20 ft., and ceiling heights varying from 8 to 20 ft., the number of outlets should be in keeping with the area and ceiling height. Where ceilings are low (8 to 9 ft.), four outlets should be installed, while on high ceilings (15 to 20 ft.), one outlet per bay may be installed.

Having determined the type of lighting and the location of outlets, the required intensity of illumination should be decided on. This depends, of course, on the character of the work. Values of illumination which conform to good practice for various classes of service are tabulated in Table 1.

TABLE No. 1. VALUES OF ILLUMINATION

	Foot-candles
Auditoriums, churches	2– 4
Armories	3– 5
Exhibition halls	4– 6
Schools, classrooms, study rooms, libraries	5–10
STORES	
Show windows	10–70
First floor of department store, shop on bright street or corner	7–10
Other floors of department store, clothing, drygoods, haberdashery	5– 8
Drug, grocery, meat, bakery, book, florist, furniture, etc.	4– 7
OFFICES	
Private, general	6–10
Drafting room	10–15
INDUSTRIAL	
Yards	25– 5
Stairways, passageways and corridors	1– 2
Rough manufacturing on large materials, such as foundry, pottery, wood work, rough assembling, forge shop and boiler rooms	3– 6
Medium rough manufacturing, such as rough machining, rough bench work, laundries, etc.	5–10
Fine manufacturing, such as fine machining, machine woodwork, pattern and tool making, textiles, press rooms	10–50

TYPICAL EXAMPLE OF DIRECT LIGHTING

ENCLOSED DIFFUSING UNITS

SEMI-INDIRECT LIGHTING

Continued on next page

TABLE No. 2. UTILIZATION CONSTANTS—PER CENT LUMENS EFFECTIVE. Allowing a 25% service depreciation

Ceiling		Light			Medium			Dark	
Walls		Lt.	Med.	Dark	Lt.	Med.	Dark	Med.	Dark
Reflector	Mazda C Lamp								
RLM standard dome	Clear	.49	.47	.45	.48	.46	.44	.45	.44
RLM standard dome	Bowl enameled	.42	.41	.39	.41	.40	.38	.39	.38
Deep bowl, steel	Clear*	.41	.39	.37	.39	.38	.37	.38	.37
Reflector cap diffuser	Clear	.35	.34	.32	.34	.33	.31	.32	.31
Deep bowl, glass	Bowl enameled	.40	.38	.36	.37	.35	.33	.32	.31
Diffusing enc. globe	Clear	.37	.34	.32	.35	.33	.31	.31	.30
Light opal, semi-ind.	Clear	.34	.31	.28	.29	.26	.23	.21	.19
Dense opal, semi-ind.	Clear	.29	.27	.25	.22	.20	.19	.16	.14
Totally indirect	Clear	.27	.25	.23	.20	.18	.16	.12	.10

*Bowl enameled lamp, not generally recommended with the deep bowl opaque reflectors on account of the pocketing of light and resultant low utilization.

Values given are applicable for general or localized general lighting. Where localized lighting is required for especially fine work, 50 or more foot-candles may be necessary. The higher values are advisable where work being done is on dark goods or surfaces.

To determine the required size of lamp use the formula:

$$L = \frac{A \times F}{N \times K}$$

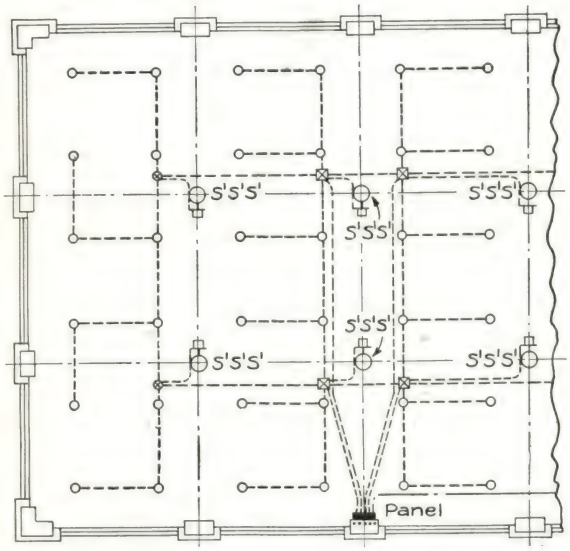
L = lumens required per outlet (By referring to Table 3 the size of lamp may be obtained. It is advisable to use the next larger size lamp.)

A = area to be lighted (sq. ft.)

F = foot-candles required (See Table 1)

N = number of outlets

K = utilization constant (See Table 2). This constant also includes a depreciation of 25% to compensate for normal dust and dirt accumulation on lamps and reflector equipment.



Typical Four Lamps Per Day Industrial Lighting

Example:

Above factory floor has 20x20-ft. bays = 400 sq. ft. of area per bay.

Ceiling height 12 ft., so spacing of 10x10 ft. or four outlets per bay is permissible (Fig. 2).

Space is to be used as machineshop (fine work) requiring 12 foot-candles. (Table 1.)

The RLM standard dome and bowl enameled Mazda lamp selected for the unit, and walls and ceiling are medium tone. Referring to Table 2, K = .40.

$$\text{Lumens per outlet} = \frac{400 \times 12}{4 \times .40} \text{ from formula given above}$$

$$= 3000 \text{ lumens}$$

Referring to Table 3, the nearest standard size of Mazda lamp is 200 watts.

TABLE NO. 3. LAMPS

Mazda B Lamps, 110 to 125 Volts

	Regular type						Mill type	
Watts	10	15	25	40	50	60	25	50
Total lumens	80	130	240	400	510	610	210	450

Mazda C Lamps, 110 to 125 Volts

Watts	50*	75	100	150	200	300	500	750	1000
Total lumens	450†	890	1300	2100	3000	4900	9000	14400	20000

*White Mazda lamp. Made in tipless white diffusing bulb.
†Approximate values.

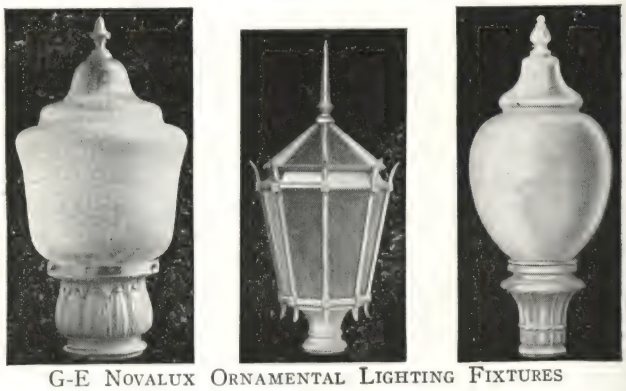
Daylight Mazda Lamps, 110 to 125 Volts

Watts	75	100	150	200	300	500
Total lumens	600	900	1400	2100	3400	5800

Ornamental Lighting

The increased use of ornamental standards for supporting street lighting units requires careful architectural consideration. Each street may well be viewed as a unit to be studied and developed in accordance with its character. Very decided factors in the forming of the character of a street are the methods and means of lighting employed. All municipalities must maintain some sort of lighting system and each has to meet its severely practical needs before considering the aesthetic. When the engineering requirements are met by an architectural treatment of the visible parts of the system in such a manner that they do not mar, but add to whatever existing excellence the thoroughfare may possess, the accomplishment is something more than merely fulfilling a civic necessity; it is a definite gain toward the creation of the city beautiful.

After many conferences with leading architects on the subject of the decorative design of street lighting apparatus, in efforts to solve definite problems, it apparently develops that there is a condition in the decorative treatment of streets wherein the lighting standards play an important role, which must be fulfilled by applying the principles of design and proportion without the customary reference to precedent so generally imperative in the creation of things having a decided architectural aspect.



G-E Novalux Ornamental Lighting Fixtures

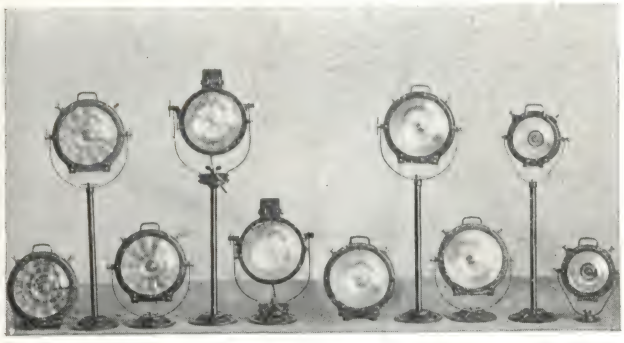
In the design of the G-E street lighting units, careful consideration has been given to the architectural requirements. Selections from standard types can be made to meet usual conditions. G-E architectural engineers are always available to study unusual cases and to design and create types which will conform.

Flood Lighting

The flood lighting of building exteriors, statuary groups and other monumental structures requires skillful handling if satisfactory results are to be obtained.

Continued on next page

The appearance of architectural forms is dependent upon the distribution of light and shadow. It, therefore, becomes necessary, if the daylight appearance of the architecture is to be preserved at night, to have proper direction to the artificial light. It is further necessary to study the angular dispersion of the flood lighting units with respect to the location of the light sources and building area to be covered.



G-E Flood Lighting Projectors

The following table indicates the intensities of illumination found practical for various types of buildings under varying conditions of surroundings. It is not practical to include all the essential data covering angular dispersion, lumens, areas, etc., necessary for the complete solution of flood lighting problems but we offer the assistance of our engineers to architects wishing additional data or assistance.

TABLE OF INTENSITIES FOR FLOOD LIGHTING

Building Surfaces	Character of surroundings		
	White way	Residences	Parks
Dark colored buildings, i.e., surfaces of red brick, clinker brick, brown stone, etc.	20 F.C.	15 F.C.	10 F.C.
Medium colored buildings, i.e., surfaces of concrete, granite, etc.	15 F.C.	10 F.C.	5 F.C.
Light colored buildings, i.e., surfaces of glazed terra cotta, marble, etc.	10 F.C.	5 F.C.	3 F.C.

Motors and Control

Motors of every type, kind or size from 1/200 h.p. to 6000 h.p. are manufactured by the General Electric Company.

They are manufactured to operate on alternating or direct current for any commercial voltage, and for direct, belt, chain or gear drive. Depending upon the duty, they may be open, semienclosed, totally enclosed, moistureproof, dripproof or waterproof. Where necessary they can be provided with special insulations to resist heat, fumes or acids.

Motor control equipment for starting, accelerating, speed regulating, predetermined starting and stopping, braking and other functions, is manufactured by the General Electric Company. Wherever possible, automatic control should be specified to insure the best operation of apparatus and to provide for all safety requirements.

Some of the motor and control applications for buildings other than industrial in which the companies have specialized are enumerated in the following paragraphs. In cases where the electrical equipment is furnished as a part of apparatus built by other manufacturers, such as pumps, compressors, elevators, fans, laundry equipment, etc., architects will receive valuable assistance by applying to the nearest GE office. See page 1891.

Pump Motors—Practically all pumps should be electrically driven. As the operating characteristics vary widely for different kinds of pumps especial consideration should be given to the selection of both motors and control apparatus. The General Electric Company manufactures motors and control devices for the following pumps: fire, house, sump, boiler feed, ejector and vacuum.

Coal Handling—Special electrical equipment can be furnished for coal and ash handling.

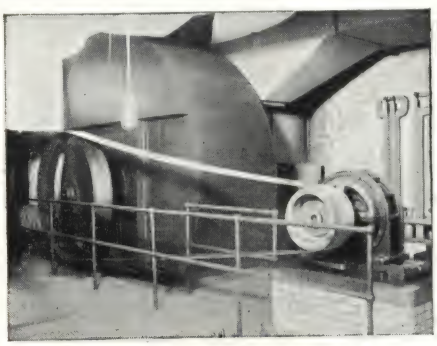
Compressors—The General Electric Company manufactures air compressors for certain applications and supplies electrical equipment—motors and control apparatus—to other air compressor manufacturers.

Refrigeration—The General Electric Company should be consulted regarding electrical equipment for refrigeration, whether for small electrically operated house refrigerators or larger refrigeration equipments. Motors with automatic or thermostatic control are manufactured for use in connection with brine pumps, agitators, compressors, ice hoists, ice crushers, ice cubers, ice shavers, etc.

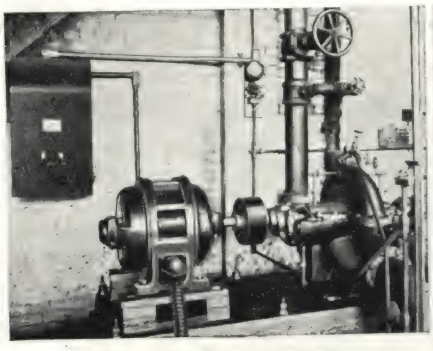
Elevators—Motors and control, direct-current or alternating-current, are regularly manufactured for both freight and passenger elevators. The General Electric Company has many motor equipments installed for freight and passenger service, and list will be furnished architects on request.

Heating and Ventilating—Motors and control apparatus for driving large fans can be furnished. Small exhaust fans complete with motor for ventilating and air washing purposes are also available. Motors are furnished for both vertical and horizontal operation.

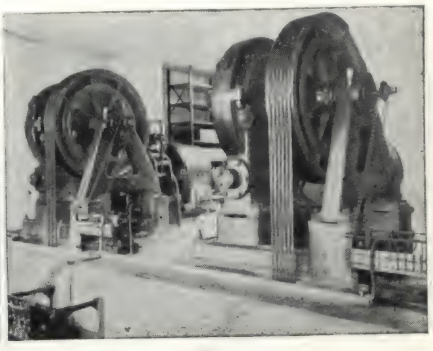
Exhaust fans are made in disk and propellor types, with either alternating- or direct-current standard-voltage motors. Sizes range from 12½ to 48 in. in diameter; capacities from 750 to 25,900 cu. ft. of air per minute.



Fan Installation



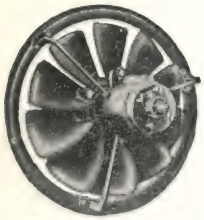
Pumping Installation



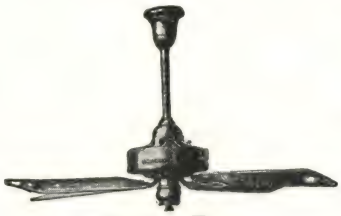
Elevator Installation

Continued on next page

G-E ceiling fans are equipped with four blades, in 32- and 52-in. sizes.



EXHAUST FAN



CEILING FAN

Laundry Equipment—Motors and control apparatus for laundry equipment are manufactured by the GENERAL ELECTRIC COMPANY. Special consideration is given to electric equipment of ironers, shaper tables, press, dry room, marking machines, dampers, extractors, etc.

Kitchen Equipment—Motors and control apparatus manufactured by the GENERAL ELECTRIC COMPANY are available for operating the following equipment. Names of the manufacturers of the devices will be furnished on request.

Meat
- Cutters
- Choppers
- Grinders

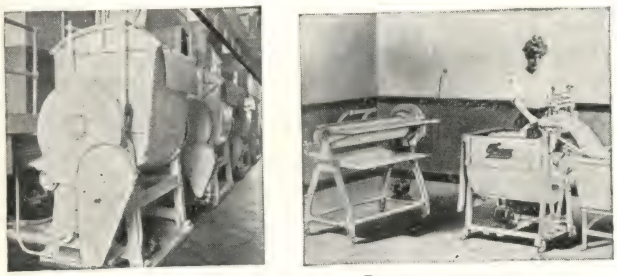
Vegetables
- Parers
- Slicers
- Mashers
- Beaters

Bakery
- Mixers
- Sifters
- Beaters

Tableware
- Dishwashers
- Silver Burnishers
- Knife Sharpeners
- Buffers

Liquids
- Coffee Grinders
- Coffee Refiners
- Cream Separators
- Mixers

Confections
- Mixing Machines
- Nut Cracking Machines
- Beaters



BAKERY AND LAUNDRY INSTALLATIONS

Garage Equipment

The GENERAL ELECTRIC COMPANY manufactures many devices indispensable to a modern garage, be it large or small, public or private. Information on all products including Tungar battery chargers, mercury arc rectifiers, motor generator sets, "Pyrotip" lead burners, electric heating and welding apparatus and the lighting, wiring and other requirements will be furnished on request.

Industrial Building Equipment

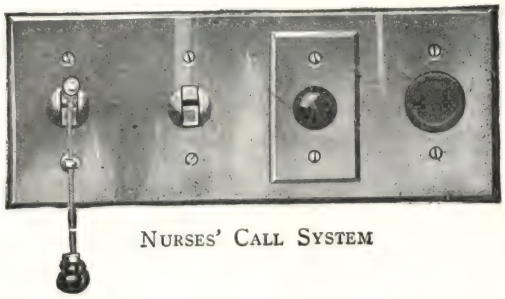
The GENERAL ELECTRIC COMPANY and other listed companies can supply every electrical want for industrial buildings from complete electrical equipment for power plants to that for tool operation, electric welding apparatus, electric furnaces, industrial heating equipment and motors for all applications. Advice will be gladly furnished on the best means for power transmission and lighting requirements.

Hospital Equipment

The representative companies manufacture a complete line of electrical equipment for hospitals.

Lighting equipment is furnished by the Duplex Lighting Works and Ivanhoe-Regent Works. Nurses' call systems and other electrical materials are manufactured by the GENERAL ELECTRIC COMPANY. X-Ray outfits and medical equipment are manufactured by the Victor X-Ray Corporation. Clock systems maintaining synchronous time are manufactured by the Warren Clock Company.

Service will be gladly rendered architects contemplating the design of any hospital.



NURSES' CALL SYSTEM

Electric Heating Appliances

The Edison Electric Appliance Company manufactures all electric heating appliances for the home, hotel or restaurant. Owing to the very low rates charged in certain communities for current for electric heating it is necessary that architects should avail themselves of the economic and convenient use of electric energy for heating purposes. Some of the many products manufactured are as follows:

Hotpoint irons for all purposes.
Hotpoint table and kitchen servants.
Hotpoint servants for comfort and convenience.
Hotpoint Hughes ranges and water heaters.
Toasters for household, hotel and restaurant service.
Other bakery, hotel and restaurant equipment: griddles, bakers, broilers, warmers, bake ovens, and heaters of various kinds.

Electric Clocks

The Warren Clock Company manufactures master and secondary clocks that give accurate time. The clocks are operated on an alternating-current circuit, the frequency of which is maintained either by a public utility company or in buildings by motor generator sets. The frequency of the system is automatically kept such that the synchronous motors operating the clocks are running at all times in accurate relation to the master clock. As the operation of the secondary clocks is by synchronous motors, obviously all clocks on the system must read absolutely alike.

WARREN ELECTRIC CLOCK

The Warren synchronous motor is adaptable to any device where time operation is desired, such as: time stamps, steam flow meters, recording instruments, "in" and "out" recorders, etc. Specify "Telechron" for all secondary time clocks and "Warren" for master clocks.

WESTINGHOUSE ELECTRIC & MFG. COMPANY

Apparatus for the Generation, Application and Control of Electric Power

EAST PITTSBURGH, PA.

City and State	Westinghouse Offices	Agent-Jobbers
ALBANY, N. Y.	Journal Building	
ATLANTA, GA.	Candler Building	Gilham-Schoen Electric Co.
BALTIMORE, MD.	Westinghouse Building	Moore-Handley Hardware Co.
BIRMINGHAM, ALA.	Brown-Marx Building	Superior Supply Co.
BLUEFIELD, W. VA.	Law and Commerce Building	
BOSTON, MASS.	Rice Building	McCarthy Bros. & Ford
BUFFALO, N. Y.	Ellicott Square Building	Montana Electric Co.
BUTTE, MONT.	Montana Electric Co. Building	
CHARLESTON, W. VA.	Kanawha National Bank Building	
CHARLOTTE, N. C.	Commercial Bank Building	
CHATTANOOGA, TENN.	Hamilton National Bank Building	
CHICAGO, ILL.	Conway Building	Illinois Electric Co.
CINCINNATI, OHIO	Westinghouse Building	Johnson Electric Supply Co.
CLEVELAND, OHIO	Swetland Building	Erner Electric Co.
COLUMBUS, OHIO	Interurban Terminal Building	
DALLAS, TEX.	Exchange Building	
DAYTON, OHIO	Reibold Building	
DENVER, COLO.	Gas and Electric Building	Mine & Smelter Supply Co.
DES MOINES, IOWA	608 Securities Building	
DETROIT, MICH.	Dime Savings Bank Building	Commercial Electric Supply Co.
DULUTH, MINN.	Alworth Building	
EL PASO, TEX.	Mills Building	Mine & Smelter Supply Co.
EVANSVILLE, IND.		Varney Electrical Supply Co.
FRESNO, CAL.	J and Mariposa Streets	
HOUSTON, TEX.	Union National Bank Building	Tel-Electric Co.
HUNTINGTON, W. VA.	Traction Terminal Building	Banks Supply Co.
INDIANAPOLIS, IND.		Varney Electrical Supply Co.
JACKSONVILLE, FLA.	Union Terminal Warehouse	Pierce Electric Co.
KANSAS CITY, MO.	Orear-Leslie Building	Satterlee Electric Co.
LOS ANGELES, CAL.	I. N. Van Nuys Building	Illinois Electric Co.
LOUISVILLE, KY.	Paul Jones Building	Tafel Electric Co., Inc.
MEMPHIS, TENN.	Exchange Building	Riechman-Crosby Co.
MILWAUKEE, WIS.	First National Bank Building	Julius Andrae & Sons Co.
MINNEAPOLIS, MINN.	Metropolitan Life Insurance Building	
NEW HAVEN, CONN.		Hessel & Hoppen Co.
NEW ORLEANS, LA.	Maison Blanche Building	Electrical Supply Co.
NEW YORK, N. Y.	City Investing Building	Northwestern Electric Equipment Co.
NIAGARA FALLS, N. Y.	205 Fall Street	
OKLAHOMA CITY, OKLA.		United Electric Co.
OMAHA, NEB.		McGraw Co.
PHILADELPHIA, PA.	Widener Building	H. C. Roberts Electric Supply Co.
PITTSBURGH, PA.	Union Bank Building	Robbins Electric Co.
PORTLAND, ORE.	Northwestern Bank Building	Fobes Supply Co.
RICHMOND, VA.		Tower-Binford Electric & Mfg. Co.
ROCHESTER, N. Y.	Chamber of Commerce Building	Rochester Electrical Supply Co.
ST. JOSEPH, MO.		Columbian Electrical Co.
ST. LOUIS, MO.	300 North Broadway	Central Telephone & Electric Co.
ST. PAUL, MINN.		St. Paul Electric Co.
SALT LAKE CITY, UTAH	Walker Bank Building	Intermountain Electric Co.
SAN FRANCISCO, CAL.	First National Bank Building	Electric Railway & Manufacturers Supply Co.
SCRANTON, PA.		Penn Electrical Engineering Co.
SEATTLE, WASH.	Westinghouse Building	Fobes Supply Co.
SIOUX CITY, IOWA		McGraw Co.
SPOKANE, WASH.		Washington Electric Supply Co.
SYRACUSE, N. Y.	University Building	H. C. Roberts Electric Supply Co.
TAMPA, FLA.		Pierce Electric Co.
TOLEDO, OHIO	Ohio Building	
TUCSON, ARIZ.	Immigration Building	
TULSA, OKLA.		United Electric Co.
WASHINGTON, D. C.	Hibbs Building	
WILKES-BARRE, PA.	Miner's Bank Building	
WICHITA, KAN.		United Electric Co.

Products

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Bell Ringers	1905
Electric Ranges	1905
Fans	1904
Fuses	1905
Krantz Safety Enclosed Switches	1907
Krantz Safety and Straight Line Panel Boards	1907
Lighting Fixtures:	
Cutter Industrial Lighting Fixtures	1909
Holder-Socket-Reflectors	1909
Standards and Brackets	1909
Meter Service Switches	1906
Motor Starters	1907
Motors:	
For Driving Laundry Equipment	1903
For Driving Ice and Refrigerating Machines	1903
For Operating Elevators	1903
For Driving Vacuum Cleaner Systems	1903
For Operating Pumps	1903
For Driving Fans and Blowers	1903
Steam Turbine Generating Sets	1902
Switchboard Instruments	1908
Switchboards	1907
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TRADE-MARK

Continued on next page

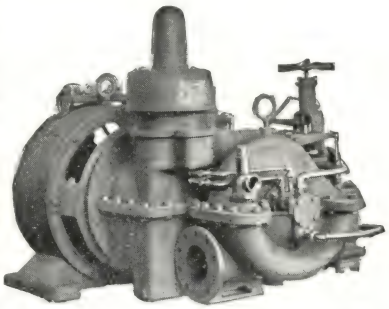
Co-operative Service

Architects and engineers are invited to use the facilities of the Westinghouse Engineering and Sales Departments in the planning and selection of material and electrical equipment to solve special problems.

Westinghouse Generators

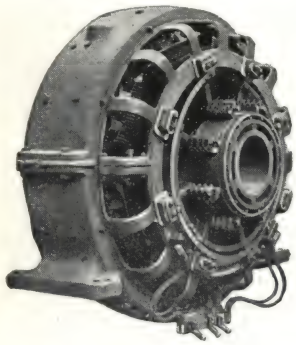
Westinghouse manufactures direct current generators in capacities from a fraction of a horsepower to 1000 h.p. in standard voltages for direct connection turbine or belt drive, and alternating current generators in capacities from 25 to 1750 kv-a. Some of the more important types are described below.

Small Geared Turbine Generator Units—These units consist of a small Westinghouse turbine, gear connected to standard Westinghouse generators. For direct current the generators range from 15 to 50 kw., and for alternating current, from 30 to 50 kw. The turbine comprises every refinement of design for safety and successful operation contained in a large turbine or reciprocating engine. It is designed for steam at boiler pressures ranging from 75 to 250 lbs. for condensing service. Fully described in leaflet 2021.



Westinghouse Geared Turbine Generator Unit

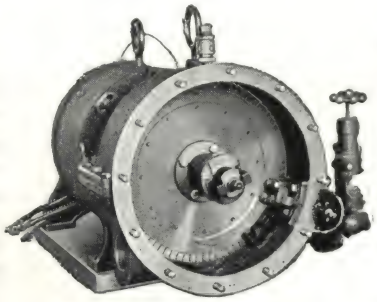
Type Q Engine Driven Direct Current Commutating Pole Generators—Cool operation, high overload capacity, sparkless commutation under all loads and fixed brush position characterize this type. Each armature is arranged for mounting on a prime mover shaft which is furnished together with the bearings by the engine or turbine builder. For capacities up to 250 kw., the standard voltages are 125 and 250; from 100 to 400 kw., 275 and 600 volts; from 250 to 1000 kw., 250 volts. Any type Q machine can, at increased price, be arranged for 3-wire service.



Type Q Engine Driven Direct Current Commutating Pole Generator

Ventilation is exceptionally effective. Full particulars are given in leaflet 2371-A.

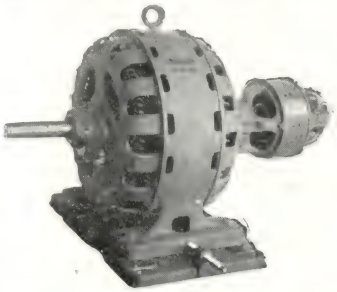
Direct Connected Turbine Generator Units—Built in capacities of 5, 7½, 10 and 15 kw. Especially developed to meet the demand for a small direct current, non-condensing turbine generator set for lighting and power work. Designed to serve as 125-volt exciters for alternating current generators, for lighting small industrial plants, coal mines, construction operations and for furnishing current (250 volts) for locomotive crane magnets. See leaflet 2000-A.



Westinghouse Direct Connected Turbine Generator Unit
Steam end-cover removed

Type G Belt Driven Alternating Current Generators—Capacities, 25 to 312 kv-a. Small industrial plants requiring belt driven alternators find the type G line of 60-cycle generators well suited for this service. Generators up to 125 kv-a. have bracket type supports for shaft and bearings. Larger generators have pedestal type bearings. Furnished for belted exciter of direct connected exciter.

These generators are highly efficient at all loads; well ventilated; simple in electrical and mechanical construction; made of high grade material; economical to operate and maintain; carefully inspected and tested before shipment.

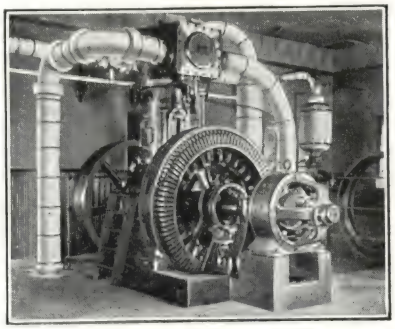


Type G 75 KV-A. Bracket Type Generator with Direct Current Exciter

For further information, see leaflet 2389.

Type E Engine Driven Alternating Current Generators—Capacities from 62½ to 1750 kv-a. The practical experience of the Westinghouse Electric & Mfg. Company in the design and construction of various types of alternators has been embodied in Type E generators, which constitute a standard line of 60-cycle alternators and which are applicable to all prime movers. They are suitable for direct connection to steam, gas or oil engines and slow speed horizontal water turbines.

They are efficient at all loads; rugged and long lasting; economical to operate and maintain; carefully inspected and tested before shipment. See leaflet 2390.



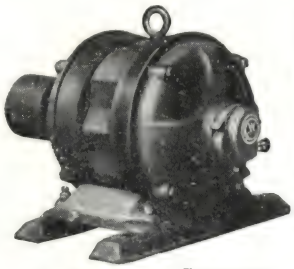
250 KV-A. Steam Engine Driven Unit with Direct Connected Exciter

Westinghouse Motors

Westinghouse motors and control are supplied for practically all machines within the architect's field of activity. Special motors have been developed for certain specialized service. Others, for more general service where no special characteristics are required, can be applied to a wide variety of machines.

They can be mounted directly on the machine or on the floor, wall or ceiling, and may be belted, geared or direct connected to the driven machine.

For special cases above 1½ h.p., vertical motors may be supplied.



Alternating Current Westinghouse Motor

If the architect states in his specification the exact service under which the motor is to be operated, a Westinghouse motor and controller will be furnished, which perfectly fit the conditions.

Continued on next page

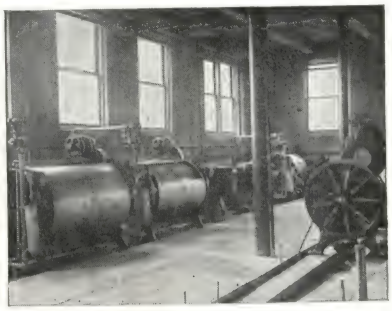
DIRECT CURRENT WESTINGHOUSE MOTOR

Engineering Co-operation and Data Sheets—The Westinghouse Engineering Department will be only too glad to give assistance in the selection of the proper motor and controller for any application. The wide experience of Westinghouse engineers, gained through designing many different motor applications, is at the architect's disposal.

Prices and information will be supplied on request.

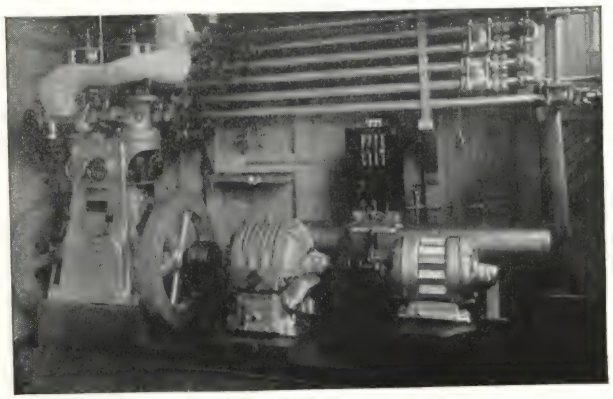
Motors for Driving Laundry Equipments—The moist atmosphere of the laundry, the presence of dripping water, and the lack of technical knowledge on the part of the operators make laundry service especially severe for electric motors.

Westinghouse laundry machine motors are adapted in every respect for their purpose, as is proven by the fact that the leading laundry machine manufacturers have standardized on their use.



LAUNDRY EQUIPMENT DRIVEN BY WESTINGHOUSE CS MOTORS

Motors for Driving Ice and Refrigerating Machines—Westinghouse motors can be supplied for driving all types and sizes of ice and refrigerating machines from any power circuit. These motors are characterized by high efficiency and great reliability.



CS MOTOR DRIVING COMPRESSOR

Motors for Operating Elevators—Westinghouse elevator motors and controllers have been specially designed and built for elevators of all types, high and moderate speed passenger and low speed freight elevators. The Westinghouse elevator motors and controllers are quiet in operation, start the car quickly but smoothly, and can be stopped quickly without jolts.

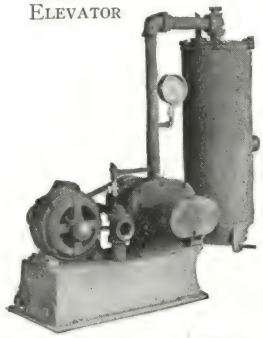
Alterating-current motors can be furnished in both squirrel cage and wound rotor types, single and two speed. The selection of the type is determined by the service. Low speed elevators can use single speed motors, while high speed, with the necessity of making accurate car stops, require the two speed motor.

C I MOTOR DRIVING ELEVATOR

Direct current motors commutate sparklessly. They are available in several classes in order to suit the different kinds of service.

Motors for Driving Vacuum Cleaner Systems—Westinghouse motors for driving vacuum cleaners can be operated successfully by unskilled operators.

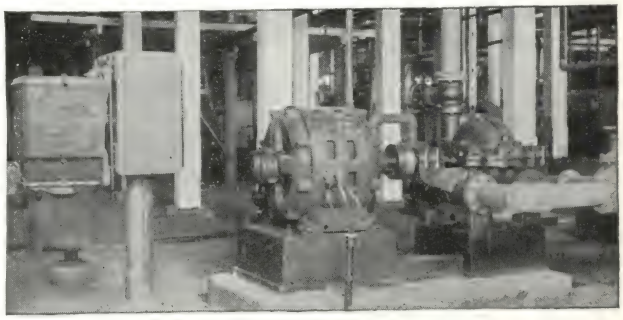
This service has been carefully studied by the WESTINGHOUSE ELECTRIC & MFG. COMPANY.



VACUUM CLEANER EQUIPMENT DRIVEN BY WESTINGHOUSE MOTOR

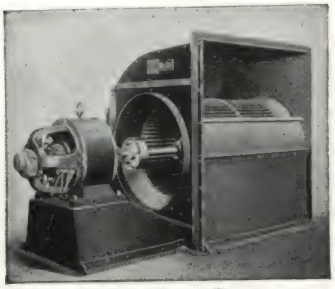
It is customary for most of the manufacturers of vacuum cleaners to supply their machines complete with the motors attached.

Motors for Operating Pumps — Westinghouse motors and control are supplied for all types of pumps and all classes of pumping service, including centrifugal, triplex, duplex, single acting, deep well and fire pumps. Special protection from moisture may be given where conditions require it. Automatic control permits operation to be controlled from a distance or, if desired, entirely automatically. A full line of motors is available for small house pumps.



PUMP DRIVEN BY WESTINGHOUSE MOTOR

Motors for Driving Fans and Blowers—A line of Westinghouse motors has been specially designed for ventilating fans and blowers of any type and size. Some of their features are quiet operation, cleanliness, economy in the use of current, and reliability.



VENTILATING FAN DRIVEN BY WESTINGHOUSE MOTOR

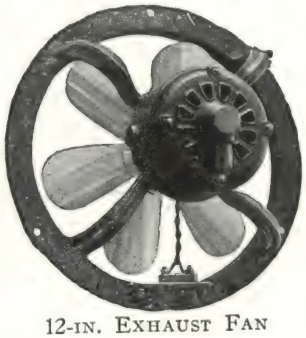
Continued on next page

SCHENLEY HIGH SCHOOL, PITTSBURGH, PA.
Ventilating equipment driven throughout by Westinghouse motors

ROCHESTER, N. Y., HIGH SCHOOL
Blower ventilating equipment run by Westinghouse SK motors

Westinghouse 12-in. and 16-in. Exhaust Fans

These fans are for ventilation rather than cooling. They should exhaust freely, not into flues or pipes. Where there is back pressure, or where the exhausted air contains smoke, fumes, dust, etc., blowers should be used instead.



12-IN. EXHAUST FAN

WESTINGHOUSE EXHAUST FANS

Cycles	Blades	Over all dimensions: Diam. in.	Over all dimensions: Depth, in.	Watts	Cu. ft. air per min.	Weight, lbs.
12-INCH FANS						
60	6	15¼	9¼	36	725	25½
50	6	15¼	9¼	36	625	25½
40	6	15¼	9¼	31	750	25½
25-30	4	15¼	9¼	50	580	24½
D. C.	6	15¼	9¼	24	725	25
16-INCH FANS						
60	6	19¼	9¾	90	1500	30½
50	6	19¼	9¾	85	1300	30½
40	6	19¼	9¾	80	1500	30½
25-30	4	19¼	9¾	80	1175	29½
D. C.	6	19¼	9¾	62	1500	30

Diameter for bolt holes—12-in. fan, 13⅛ in.; 16-in. fan, 17⅛ in.
Made for 110 and 220 volts.

Westinghouse-Ventura Exhaust Fans

Used for the same purpose as the exhaust fans listed above, but are made in larger sizes.

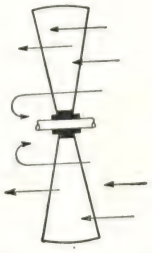
The fan consists of four main parts: the fan wheel, ring, arms, and motor. The fan wheel has 10 steel blades, so designed that it runs very quietly, with high efficiency, and no back-flow through the center of the fan. The ring is a substantial iron casting provided with holes for mounting. The arms are bolted rigidly to the ring and to the motor. The motor is especially designed for this service and is totally enclosed.

WESTINGHOUSE-VENTURA EXHAUST FAN

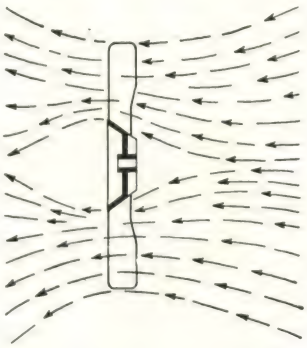
WESTINGHOUSE-VENTURA EXHAUST FANS

Size	Diam., in.	Cu. ft. air per min.	Size	Diam., in.	Cu. ft. air per min.
3½	25¾	1260	7	45¾	9830
4	28¼	2770	8	51¼	12650
5	34½	4420	9	56¾	16850
6	40¼	6530			

Voltage either 110 or 220.



OLD STYLE FAN CONSTRUCTION SHOWING AIR CURRENTS



VENTURA FAN CONSTRUCTION
No back-flow

Ceiling, Bracket and Desk Fans

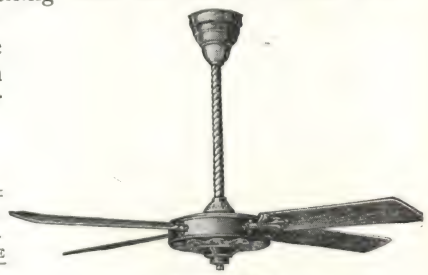
Oscillating Fans—The oscillating mechanism lets the oscillation stop when the fan strikes an obstruction. Can not drop oil. Oscillaters over 45° to 90°, as desired. Fan can be tilted 20° forward when arranged either for upright or for bracket mounting. Oscillation can be stopped or started with the fan running.

Ceiling Fans—56-in. for stores and other large interiors. Where ceiling fans can not be used, 56-in. column fans of similar type are available, for both counter and floor mounting.

CEILING FANS

Diam., in.	Watts	Speeds
60-CYCLE A.C. 4-BLADE TYPE		
56	150	2
D. C. 4-BLADE TYPE		
56	110	3
60-CYCLE A. C. GYRATING TYPE		
2 x 12	88	3
D. C. GYRATING TYPE		
2 x 12	64	1

Made also for 50-, 40- and 25- to 30-cycle alternating current. Made for 110 and 220 volts.
All fans black enamel.

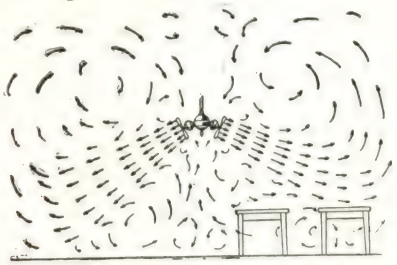


CEILING FAN

CEILING TYPE GYRATING FAN

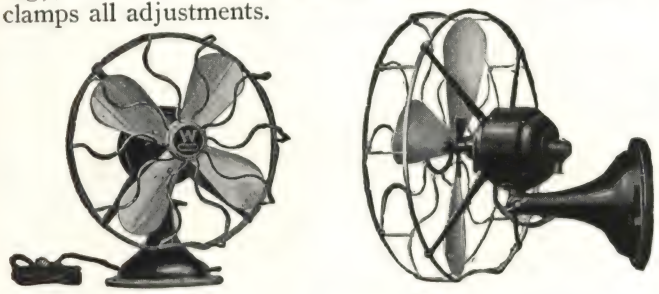
Continued on next page

Gyrating Fans—These have been called the "Scientific Breeze Makers." They keep all the air stirring, not just a draft. Moving part rests on a ball bearing, and is revolved by mechanical drive, not by air reaction; can not run too fast. Made in ceiling, counter-column and floor-column types. Special bearing arrangement prevents the escape of oil.



CURRENTS OF AIR STARTED BY A GYRATING FAN
Wide zone of moving air. Two columns of air constantly revolving

Stationary Fans—The stationary fans can be tilted forward 15°, backward 90° (for bracket mounting), and the 12- and 13-in. rotated 340°. A wing nut clamps all adjustments.



DESK AND BRACKET FANS

Diam., in.	Blades	Non-oscillating		Oscillating	
		Watts	Weight, lbs.	Watts	Weight, lbs.
60-CYCLE ALTERNATING CURRENT FANS					
8	4	29	6	.....	.....
10	4	32	7	34	9
12	4	42	15	44	17
12	6	.....	.....	44	17½
16	4	83	19	85	21
16	6	.....	.....	85	21½
DIRECT CURRENT FANS					
8	4	24	4½	.....	.....
10	4	22	6	23	8
12	4	25	13	27	15
16	4	63	16	65	18

Made also for 50-, 40-, and 25- to 30-cycle alternating current.
Made for 100 to 120, and for 200 to 230 volts.

Bell Ringer

The bell ringer, connected to a 110-volt, 60-cycle lighting circuit, produces a voltage suitable for operating door bells, buzzers, annunciators, miniature incandescent lamps, or for any similar purpose for which 1 to 15 dry or wet cell batteries are used. The transformer replaces the batteries and precludes the trouble of keeping them in condition, the expense of replacing them when worn out, and, finally, the annoyance of having the bell out of order.

BELL RINGER

Shurvent Renewable Cartridge Fuses

Shurvent renewable cartridge fuses can be safely applied to all circuits heretofore protected by standard non-renewable enclosed cartridge fuses. Renewals are inexpensive making Shurvent especially adaptable on circuits on which frequent interruptions occur.

RENEWABLE FUSE

"Drop-Out" Type of Link—The drop link with two or more resisted areas is used exclusively.

The large portions quickly radiate the heat away from the decreased parts so that the cross-section of the decreased parts is less than otherwise would be required to carry the rated current. In operation on short circuits, these restricted areas only melt and volatilize. The intermediate parts immediately drop away from the remainder of the link without melting. The gases released are therefore reduced to a minimum.

Safety in Operation—The distinctive feature of design is the positive method of venting and cooling the hot gases generated when the fuse volatilizes. The usual method for emitting these gases is along the threads between the ferrule and the casing. This tends to cause the ferrule to freeze on the casing and to burn the threads of the casing and thus to decrease the life of the fuse. "Shurvent" fuses have a series of fixed washers at each end of casing. These washers are separated by chambers, connected to the inside of the casing, to each other and to the outer air by staggered openings. The hot gases follow these courses more readily than along the threads but are retarded sufficiently to quench the arc in the casing without damage to the casing itself and to cool the gases so that they leave the fuse at a safe temperature.

Made with both ferrule and knife blade connections in capacities from 1 to 600 amperes and for voltage up to 600.

Non-Renewable Indicating Fuses

For use on circuits where interruptions are very infrequent.

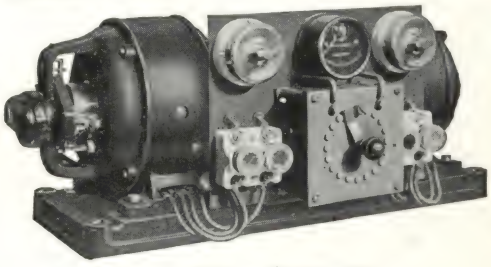
These fuses meet the demand for reliable and accurate devices that will carry their rated current and can be depended upon to open currents where overloads are within the specified limits.

Each fuse is provided with a simple but reliable device which indicates whether the fuse has blown or is still intact.

Made for voltages up to 25,000.

Battery Charging Motor-Generator

For charging batteries used for starting, lighting and ignition on gasoline cars. Complete with control panel mounted directly on frame. Provides most convenient means of control. Several sizes furnished.



SMALL MOTOR GENERATOR

Electric Ranges

Electric ranges furnish the ideal means for cooking meals automatically—without personal supervision. Can be kept clean and sanitary, as all equipment can be easily removed. Absolutely no dirt, dust, soot or disagreeable odors.

Westinghouse ranges are approved by the National Board of Fire Underwriters and by the Good Housekeeping Institute.

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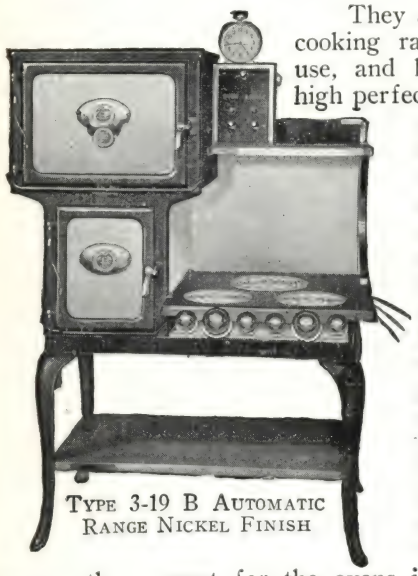
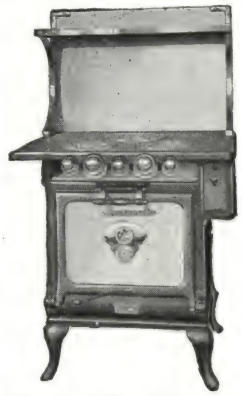


TYPE 3-19 B AUTOMATIC RANGE NICKEL FINISH

They are full size family cooking ranges for domestic use, and have reached their high perfection in convenience and economy through many years of experience. In addition to the cleanliness, safety, saving in food—both in weight and in flavor—they have the further advantage of saving a great deal of care, trouble and expense. The Westinghouse ranges are furnished with automatic features. In the automatic ranges the current for the ovens is either turned on by hand or automatically turned on by the proper setting of the clock, and is turned off automatically by the thermostat and circuit breaker when the predetermined temperature has been reached. All the ranges operate on the heat storage principle; that is, they require electric current only for raising the temperature to the proper cooking point, after which no further current is required, as the food continues to cook on *stored heat,* as the heat insulation of the oven retains and utilizes this stored heat for hours. Ovens are properly ventilated. They have special aluminized finish and all oven burners are removable. The ovens are properly ventilated, and are heat-insulated with the highest grade of mineral wool.



TYPE 2-19 B AUTOMATIC RANGE WITH HIGH BACK (EXTRA)

TABULATION OF CURRENT CONSUMPTION

Consumer	June	July	Aug.	Sept.	Oct.	Nov.	Total	Average per month
1	174	10	10	119	32	197	542	90
2	100	108	95	87	107	100	597	99
3	88	105	77	88	85	100	543	90
4	100	91	100	100	99	100	590	98
5	...	114	106	138	143	175	676	135
6	82	100	105	100	159	126	672	112
7	184	78	97	100	96	100	655	109
8	60	71	82	89	74	113	489	82
9	97	97	100	97	74	100	565	94
10	...	...	...	...	43	91	134	67
11	102	96	96	77	85	98	554	92
12	...	...	...	...	...	91	91	91
13	129	125	122	126	129	144	775	129
14	95	91	100	97	73	75	531	89
15	128	95	118	98	101	107	647	108
16	96	89	100	97	93	105	580	97
17	...	100	141	179	155	170	745	149
18	114	128	104	35	100	49	530	88
19	100	100	98	77	86	97	558	93
20	72	83	77	104	53	138	527	88
21	100	100	70	71	82	98	521	87
22	98	93	100	62	58	...	411	82
23	65	101	...	...	...	...	165	83
24	...	...	...	...	...	68	68	68

Total, 24 consumers 1 month 2320
Average, 1 consumer 1 month 97

DATA, ELECTRIC RANGES

Type	Tota watts	Length, in.	Height, in.	Depth, in.
5-15 Non-automatic	5000	24½	31	16½
2-19 B. Automatic	6000	32	34	24½
2-19 B. Combination, automatic	2000	32	34	24½
3-19 B. Automatic	8000	43	59	25
3-19 B. Combination, automatic	4000	43	59	25

Ask for catalogue 8-10-1

Type 5-15 is a medium priced non-automatic electric range, similar to type 2-19 B. To be used where space is a consideration and especially adaptable for apartment houses.

Combination Gas and Electric Ranges—Electric ovens and gas stove tops are also furnished for localities where the cost of electricity is high. For oven cooking, owing to the fireless cooker principle and the automatic features, electricity is as cheap as gas.

Economy—The average monthly current consumption of 24 families, of from 4 to 6 persons each, and having widely varying requirements, is between 75 and 100 kw. hours. The thable at foot of column 1 shows the current used by these consumers over a 6-months' period.

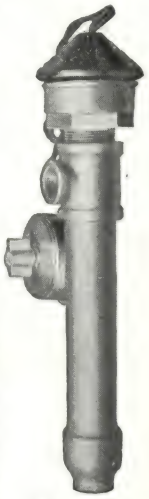
Water Heaters

The bayonet or circulation heater is adapted for hot water storage systems, various forms of sterilizers, steam generators, and other uses of this nature. The complete heater is provided with a pipe casing and tees arranged for ¾-in. connections by means of which it may be attached to a water system. The connections are made in the same manner as those of gas or circulation type of heater. Supplied with 6-ft. flexible cord and control switch.

WATER HEATERS

Capacity of boiler, gals.	Watts: Uninsulated galvanized boiler and piping	Watts: Boiler insulated with 2-in. covering and piping with 1-in. cover
12	550	220
18	600	240
21	650	260
24	700	280
27	775	300
30	850	320
35	900	340
40	950	360
63	1450	500

The above table suggests size of heater required for various sizes of boilers, when uninsulated and when completely insulated, including piping, assuming that 10 gals. of water are used per day, and that heater is on the circuit continually. Water is assumed to enter boiler at 60° Fahr. and to be drawn off at 160° Fahr. Allow 10 watts additional for each additional gallon used per day. Larger heaters must be used for heavy service.



TYPE C
1000 to 2000 watts

Meter Service Switches

Where two or more meters are connected to a common service, the switches may be banked and the common wires run through standardized "U" troughs, with protective covers provided for this purpose. With this arrangement the switches may be wired complete and the protective covers of the "U" troughs installed as the final operation before closing the switch cabinet covers, which action locks them in place. Porcelain bus connector-block and copper bus connector-straps, such as shown, also are available. They simplify the job of wiring.

METER SERVICE SWITCH

Continued on next page

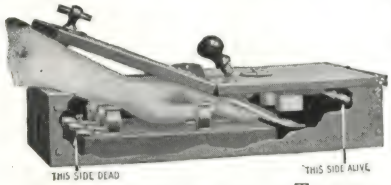
Krantz Safety Enclosed Auto-Lock Switches

Distinctive Features—These switches were developed to prevent the possibilty of operator touching any live part in operating a switch or in re-fusing a circuit. They are 100% safe; are equipped with double-break brush-type movable switches, which can not weld shut from slow closing by careless operators (a decided improvement over ordinary knife switch construction), with brushes having arcing tips that protect brush leaves, and with easily replaceable contacts. They reduce insurance rates considerably. Approved by the Underwriters' Laboratories, Inc., under classification A.

Construction—Switch enclosed in No. 12 gage sheet steel box. Stationary contacts are hard drawn copper, and, with fuse clips and terminals, are mounted on slate bases. Moving contacts are laminated spring copper brushes, double-ended with auxiliary arcing at each end. Fuse connections provided for National Electrical Code enclosed fuses up to 600 amperes, 3-pole inclusive.

Cover easily removable for inspection; the insulation of brushes from cross bar and movement is waterproof and acidproof. Holes are provided in the ends of switch boxes for a single conduit for the incoming and outgoing leads. Switches with other than standard size or arrangement of conduit holes will be supplied on special order without extra charge.

Operation—The door over the fuses is automatically locked when switch is in "closed" position. When switch is in "open" position, door can be opened. With door open, switch can not be closed. When switch is in "open" position, brushes completely obstruct the passage between fuse chamber and live contact chamber, making it impossible to reach the hand in far enough to touch the live stationary contacts. Switches are all made with fuse holders at the bottom, which is the outgoing end so that fuse holders are always "dead" when switch door is opened. Thus fuses can be replaced in perfect safety. Box can be padlocked in "on" and "off" positions.



SHOWING IMPOSSIBILITY OF TOUCHING LIVE PARTS

Where Used—Wherever ordinary knife switches may be applied, especially factories, boiler and engine rooms, etc., where operators have limited knowledge of electricity and its attendant dangers, and where switches are placed in exposed locations subject to damage.

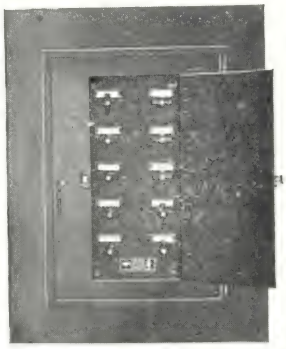
Types and Voltages—Made in 2-, 3- and 4-pole types; 250 volts A.C. or D.C., 30 to 1000 amperes, fused; 500-600 volts A.C., 30 to 600 amperes, fused; 250 volts D.C. and 600 volts A.C., 30 to 1000 amperes, unfused.

Safety Motor Starters WK-10 and WK-20

For starting small single-phase and three-phase motors on 125-, 250-, 440-, and 550-volt service. The WK-10 starter is suitable for motors up to 2 h.p., 550 volts, and the WK-20 is suitable for motors up to 5 h.p., 550 volts. Their small size makes these switches particularly valuable in the textile industry. Both the starters are equipped for thermal cutouts which resemble plug fuses in appearance, but are provided with left hand threads making it impossible to use plug fuses instead.

TYPE WK-10

Krantz Type S Safety Panel Boards


KRANTZ TYPE S SAFETY PANEL BOARD

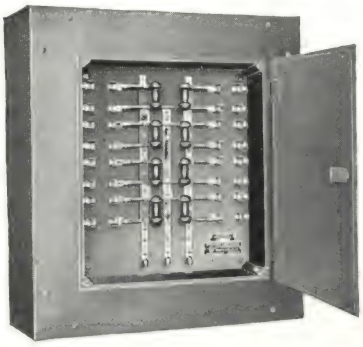
HORIZONTAL SECTION THROUGH TYPE S SAFETY PANEL BOARD

Distinctive Features—These panel boards were developed to provide maximum safety for operators of such apparatus. They are standardized so as to make them applicable wherever the standard form of live-face panel boards have formerly been applied.

Fuses are in a separate locked compartment; all branch switches are of quick-break and quick-make snap switch type, of extra heavy construction and large capacity; main switches, where used, are of quick-break type construction. Approved by the Underwriters' Laboratories, Inc.

Construction and Operation—Branch and main switches covered by a safety cover; operating handles only project through the cover. A ⅜-in. slate frame surrounds the cover, forming a separate safety compartment for the switch handles covered by a steel door provided with a catch. Fuse holders are mounted on the base outside of the safety frame, covered by a steel door. Yale lock on door prevents access to compartment by unauthorized persons. Branch fuse connections provided either for National Electrical Code enclosed fuses or standard plug fuses. The quick-make and quick-break features make it impossible for a careless operator to leave a branch switch partly closed; extra heavy construction provides long life without renewal of parts.

Krantz Straight Line Panel Boards


TYPE B STRAIGHT-LINE PANEL BOARD COMPLETE IN STEEL CABINET
Branches fused with N.E.C. fuses

Adapted for use where safety features represented by Krantz Type S safety panel boards are not required. Standardized to meet all ordinary conditions and for control of lighting circuits up to a total capacity in the mains of 200 amperes at 125 volts or 100 amperes at 250 volts.

Krantz panel boards have straight line mains, requiring fewer contact joints and allowing narrower panels than ordinary construction; base and frame are of slate with black marine finish, strongly constructed.

Made up of knife blade switches and other National Electrical Code enclosed fuses or plug fuses. The standard panel boards are not made with fuses in the mains but will be supplied on special order. Approved by the Underwriters' Laboratories, Inc. Send for Catalogue 12-A, which gives complete details of construction.

Switchboards

Truck-Type Switchboards—The progress of the Safety First movements resulting in the enactment of laws in many states has created a strong demand for them in this country.

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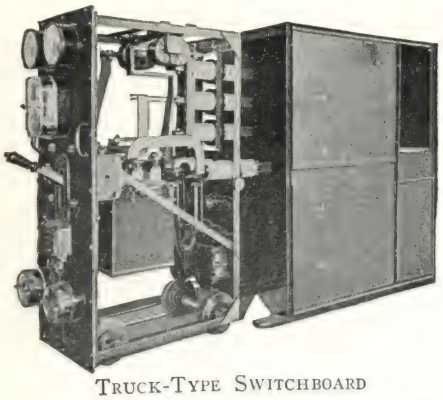


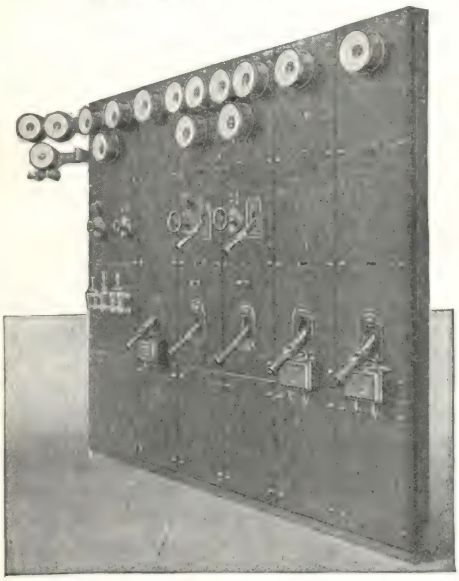
TRUCK-TYPE SWITCHBOARD

The Westinghouse truck-type switchboards are the result of years of study of this development in this country and abroad. They embody features found desirable by large users under actual service conditions.

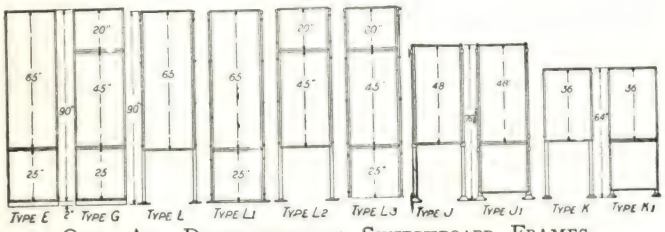
The most logical application of these switchboards is found in industrial plants, industrial substations, and public utility substations.

Descriptive Leaflet 3433 gives detailed information.

Switchboards are built by the WESTINGHOUSE ELECTRIC & MFG. COMPANY to cover all requirements from the smallest plant to the largest. They are built to conform to the specifications of the architect or engineer where necessary; but in order to save the time of the designer, a complete assortment of switchboard panels has been standardized. To make up a switchboard for any desired installation, all that is necessary is to select the panels for the required purposes. All panels bearing the same type designation match up in appearance and in the alignment of apparatus, and can be combined to form a complete switchboard. Special care is taken with the arrangement of apparatus on both the front and the rear of panels. Apparatus on the front is arranged with special reference to the convenience of operation, and apparatus on the rear, to provide access to all connections. The rear of a Westinghouse switchboard is arranged as neatly as the front.



TYPE EA SWITCHBOARD



OVER ALL DIMENSIONS OF SWITCHBOARD FRAMES

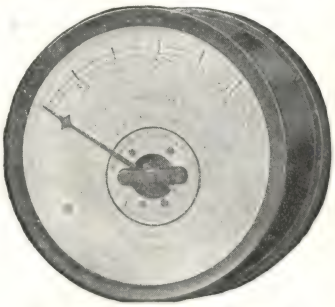
NOTE—The type does not cover width, thickness or material of slabs

Finish—Standard finish is a dull velvety black. Any special finish can be had on order. Current carrying parts on front of panel are polished copper.

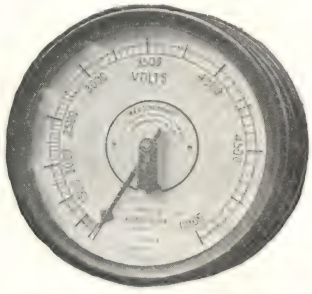
Delivery—On standard panels of the smaller capacities listed in the Westinghouse Catalogue of Electrical Supplies, delivery can be made within 15 days of receipt of order. The higher capacity panels and panels with special features require longer time for delivery.

Switchboard Instruments

The Westinghouse 7-in. round pattern instruments are a distinct advance in switchboard instrument practice. They can be enclosed in a rectangle of 55 sq. in., and have scales approximately 7 in. long in the direct current meters and 14½ in. long in the alternating, the former being twice as long as scales of the 9½-in. size of other makes. These scales are as long as the largest types of instruments of other manufacturers and yet occupy no more switchboard space than the smallest edgewise instruments with scales 6 in. long.



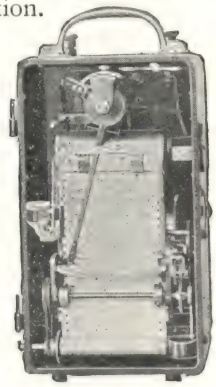
TYPE SL 7-INCH DIRECT CURRENT AMMETER



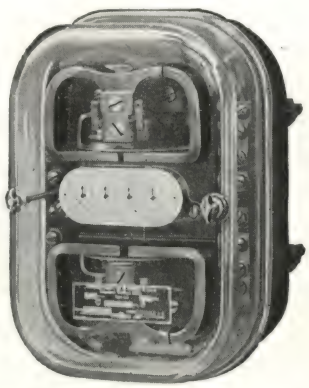
TYPE SM 7-INCH ALTERNATING CURRENT VOLTMETER

This company is the only manufacturer able to offer a complete line of 7-in. instruments for both alternating and direct current. Instruments are uniform in size and match up in general appearance, permitting mounting side by side in a horizontal line, two instruments on a 16-in. panel, or three on a 24-in. panel. High degree of accuracy and permanence of calibration.

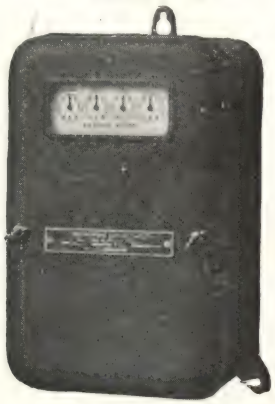
In addition to long scales, the flat glass front eliminates troublesome reflections found in curved covers of edgewise types of instruments, when dial is illuminated. The whole pointer is visible, rendering accurate readings possible from a distance and from any angle. This company also manufactures a complete line of portable instruments, watthour meters, graphic instruments, and relays. Full details obtained from the regular catalogues, or on request.



TYPE U PORTABLE GRAPHIC METER



TYPE OA POLYPHASE SWITCHBOARD WATTHOUR METER, GLASS COVER



TYPE CW-6 DIRECT CURRENT WATTHOUR METER

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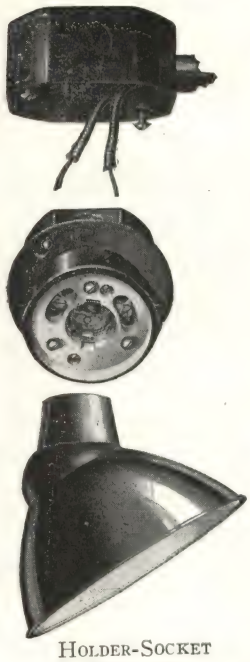
Cutter Industrial Lighting Fixtures

Good illumination on an average saves 30 minutes of each man's time per day. It gives increased production for the same labor costs and overhead, reduces the amount of spoilage and seconds, decreases eye strain and creates better sanitary and more cheerful conditions for employees.

The engineering department will assist in making plans and estimates. When submitting sketches, give class of work to be performed, dimensions of rooms, height of ceilings, location of work benches, color of walls, and whether conduit or open wiring is used.

The following Cutter fixtures, with their elimination of glare and "easy to wire" features will solve practically any problem in industrial lighting.



HOLDER-SOCKET REFLECTOR
Outlet box mounting. Two operations

Cutter Holder-socket-Reflectors—Consist of one-piece porcelain enameled steel reflectors fastened securely to a porcelain body holder-socket. Gaskets between the porcelain sockets and reflectors make the fixtures weatherproof.

Cutter holder-socket-reflectors are easy to wire (see illustrations). One complete fixture can be installed by one man in two minutes. The wires are pulled through the vertical openings in the porcelain socket and connected to the terminals; the reflector is then fastened to the socket by three screws which engage in bayonet slots in the top of the reflector. There are no loose wires to stuff back or washers and lock nuts to adjust.

Holder-socket-reflectors are held rigidly, level, and in correct position with reference to the lamp filament. They insure permanent high efficiency. They are well protected from dust accumulations and are easily cleaned.

Holder-socket-reflectors are interchangeable. Reflectors of different types may be substituted at any time; reflectors for medium base and mogul base lamps may be interchanged respectively with medium screw and mogul screw sockets.

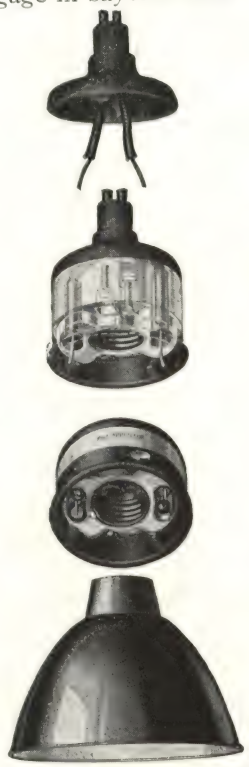
Methods of Attachment—Holder-socket-reflectors may be used on any type of installation and for either interior or exterior lighting purposes. They may be suspended:

(1) On ½- or ¾-in. conduit.

(2) Directly from the outlet box or condulet.

(3) On chain or cord by using suspension eyes.

(4) On reinforced drop cord by using porcelain bushings.

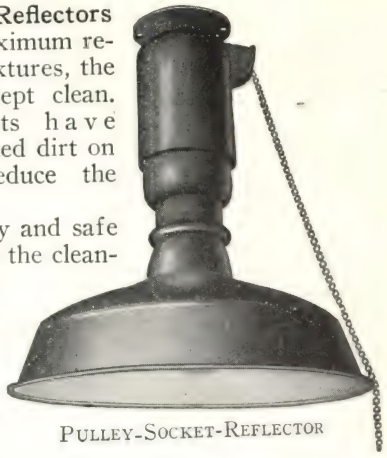


HOLDER-SOCKET REFLECTOR
Conduit mounting. Three operations

Approved Construction—Cutter holder-sockets are approved by the National Board of Fire Underwriters.

Pulley-Socket-Reflectors—In order to get maximum results from lighting fixtures, the reflectors must be kept clean. Experience and tests have shown that accumulated dirt on a reflector may reduce the light 50%.

Unless some easy and safe means is supplied for the cleaning of reflectors, this important function is certain to be more or less neglected. Cutter pulley-socket-reflectors furnish this means.



PULLEY-SOCKET-REFLECTOR

Briefly stated, the advantages of installing this fixture are:

(1) Time saved in cleaning.

(2) Elimination of danger in using ladder.

(3) Safety from short circuits and accidental contact with live parts.

(4) Fixtures can be more thoroughly cleaned with less effort.

(5) No obstruction of aisles and reduced distraction of workmen.

(6) An angle reflector may be used as it will always come back to its true position when raised.

Fixtures for Mazda "C" Lamps

The WESTINGHOUSE ELECTRIC & MFG. COMPANY carries a complete line of ornamental posts, newels, brackets, and other fixtures for use with the high efficiency Mazda "C" lamp. The Arcadian post, as shown, is popular on account of its unique design and simplicity. It is made of gray cast iron, coated with black waterproof paint, resists corrosion, and, at the same time, has a pleasing appearance.

3-LIGHT CORRIDOR BRACKET

BRIDGE NEWEL

Two other popular designs are also shown. The 3-light corridor bracket is 16 in. center to center of opposite globes; height over all, 40 in. The bridge newel has a 14-in. base, 24 in. high; column is 5 in. in diameter above the base, tapering to 3½ in. near the top. Total height from base plane to base of globe, 6 ft. Designed for 6x12 or 6x14-in. globes.

ARCADIAN POST
Extension capital and octagonal senior globe

EDISON ELECTRIC APPLIANCE CO., INC.

Manufacturers of Electric Ranges and Household Electric Appliances

NEW YORK, N. Y. CHICAGO, ILL. ONTARIO, CAL. ATLANTA, GA. BOSTON, MASS.
ST. LOUIS, MO. DALLAS, TEX. SEATTLE, WASH. PORTLAND, ORE. LOS ANGELES, CAL
SAN FRANCISCO, CAL. SALT LAKE CITY, UTAH NEW ORLEANS, LA.

Products

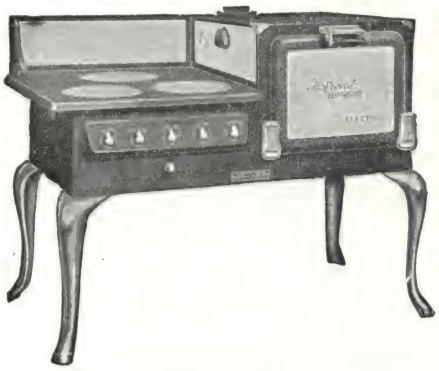
ELECTRIC RANGES; BAKERS' ELECTRIC OVENS.

Also, Electrically Heated Table Appliances; Electric Hot Plates and Portable Electric Ovens; Electric Water Heaters, Electric Air Heaters; Hotel Equipment, including large Electric Toasters, Broilers, Plate Warmers, Frying Griddles, Coffee Urn Heaters.

Hotpoint
Hotpoint HUGHES
EDISON
TRADE-MARKS

Hotpoint Hughes Electric Ranges

Made in a variety of types and sizes representing most complete line of electric cooking apparatus in the world. Tested and approved by National Board of Fire Underwriters. Furnished with either left- or right-hand ovens. Write main office at Chicago for catalogues and other information.



HOTPOINT HUGHES RANGE R-63

One of the most popular ranges as it can be placed under a window. 3 surface burners and large size oven. Height 41½ in. Floor space 28¼x52½ in.

HOTPOINT HUGHES RANGE R85

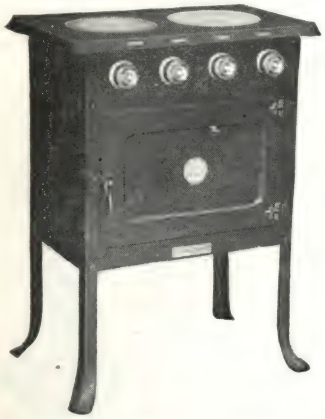
For families with limited floor space. 3 surface burners, low oven. Height of cooking surface 33½ in. Height of stove if warming shelf is used, 58¼ in. Floor space, 26½x28 in.

HOTPOINT HUGHES SUPERAUTOMATIC RANGE RS-67

The last word in electric cooking efficiency. Has automatic temperature and time control. 4 surface burners, cabinet oven and warming compartment. Total height, 57¼ in. Floor space 28¼x52½ in.

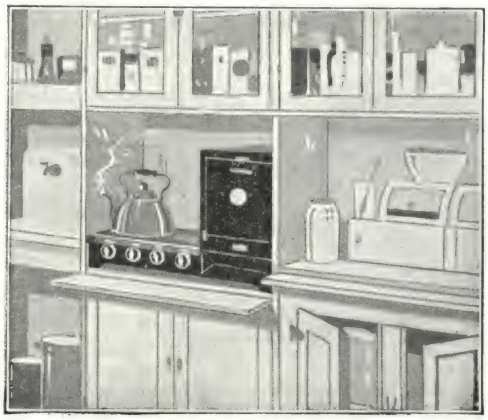
HOTPOINT HUGHES RANGE R79

For large families, boarding houses, clubs, restaurants, etc. 6 surface burners, 2 large cabinet ovens, warming closet and canopy. Total height, 70 in. Floor space, 26½x62¾ in.



HOTPOINT HUGHES RANGE C18

Plain black enamel range for small families. 2 surface burners and cabinet oven. Total height, 35½ in. Floor space, 18¼x26½ in.



KITCHENETTE RANGE C1

For cabinet or "In-a-wall" type kitchen of 1-, 2- or 3-room apartment. 2 surface burners and oven with top and bottom burner, the top burner for broiling. Height, 22 in.; length, 33 in.; width, 16½ in.

BAKER'S OVEN NO. 220

For medium sized retail bakeries, hotels, restaurants, etc. Capacity, 120 1-lb. loaves. Height, 71 in.; depth, 58 in.; width, 38 in. Maximum consumption, 16 kw.

Continued on next page

Specifications

The following specifications should be used where a system is installed for the electric ranges or other electric equipment, separate from the lighting system.

Range Wiring System—(1) A wiring system to furnish power for electric ranges and electric heating (and other electric equipment) shall be installed at the same as the lighting system.

(2) Requirements as to general conditions of the installation, guarantee, cutting and patching of the work of other trades, testing the system, necessary certificates, underwriters' requirements and state and local laws and regulations, shall apply to the range system as specified for the lighting system.

(3) Service connection for range and water heating system will be brought into the building together with that for the lighting system.

(4) Main line switch shall be a T.P.S.T. fused knife switch of sufficient capacity to carry all current entering building for both lighting and range systems. Switch shall be installed in an approved metal cabinet. Outside legs of switch shall be fused with rated amperage capacity of fuses equal to 150% of the connected load. Neutral wire shall be grounded on load side of switch, but shall *not* be fused.

(5) From the service switch extend a feeder to range meter, which will be installed by the service company.

(6) *Wiring*—Range circuits shall be 3-wire (No. 8 or larger, depending on size of installation and distance from meter to load) G-E rubber covered stranded wire conductor; size of conductor shall be ample to carry the total load of all ranges at the same time with a maximum drop in voltage from service switch to any range in the system of 3%.

(7) *Conduit*—Wiring shall be carried in rigid conduit of not less than 1 in. inside diameter, which shall be installed in strict accordance with underwriters' requirements, and as specified for lighting system conduits.

(8) *Grounding*—Frame of each range shall be thoroughly grounded.

(9) All conduits shall be grounded by means of No. 6 G-E stranded wire fastened in an approved manner by approved ground clamps.

(10) Joints or taps in the ground wire shall be soldered; and where the wire runs in an exposed position, it shall be protected from mechanical injury by means of metal moulding.

(11) Ground connections shall be made to street side of water meter (where possible). Connections to pipes shall be made with approved clamps and pipe shall be thoroughly cleaned of all paint and dirt so that a good connection is obtained.

Ranges—(12) Furnish and install in (location), as shown or noted on drawings, an electric range, in accordance with the following specifications:

(13) [Fill in from table below.] Range shall be that known as Hotpoint Hughes ..... and shall have a cooking surface .... with .. hot plates; oven located [on right or left side of, above or below] same, size ..; broiling compartment located above said oven, size ..... and warming closet located above broiling compartment, size ... Total floor space ... Over all height ...

(14) *Heat Control*—Range shall have 3 degrees of heat on each coil, with indicating switches. Each switch shall have an indicator plate showing burner controlled by it.

(15) *Hot Plates*—Shall have a nickel chromium resistance wire and each plate shall have its own fuse located in a fuse box so that, should any plate be short circuited, the rest of the range will not be affected.

(16) *Oven*—Oven shall be thoroughly insulated and protected against rust and provided with heat indicator, also provided with proper vent.

(17) Oven units shall be located, one at top and the other at bottom of oven. Each oven shall be equipped with two adjustable wire shelves, one with baffle and one without, and a broiling pan with rack.

(18) *Guarantee*—Manufacturer shall guarantee the range against mechanical and electrical defects and shall further agree to replace, without charge, any parts proving defective within 1 year from the date of delivery.

Water Heating

Bulletin on electric water heating may be secured by addressing request to Edison Electric Appliance Co., Inc., Chicago, Ill.

HOTPOINT HUGHES ELECTRIC RANGES

	Known as	Cooking surface, in.	Number hot plates	Oven size, in.	Position of oven	Size broiling compartment, in.	Size warming closet, in.	Floor space, in.	Height, in.
For large families	R79	24½x62¾	6	18x18x14 Two ovens	R or L		22½x22½x12	26½x62¾	70
For average families	RS67	24½x26½	4	18x18x14	R or L		22½x22½x12	28¼x52½	57¼
	R87	24½x27½	4	18x18x14	Low			26½x28	58¼
	R83	24½x27½	4	18x18x14	Above			28½x38¼	66
	R75	24½x26	4	18x18x14	R or L	18x18x8	22½x22½x12	26½x52	64
For smaller families	C4	22¾x24½	3	18x18x12	R or L			26 x50½	54
	C18	25 x14	2	18x12x12	Low			18¼x26½	35½
	R85	24½x27½	3	18x18x14	Low			26½x28	58¼
	R63	24½x26	3	18x18x14	Right only			26½x52	41½
Kitchenette	C1	15 x20	2	10x10x12	R or L			33 x16½	22

WESTERN ELECTRIC COMPANY

INCORPORATED

Electrical Equipment for the Home and Office

DISTRIBUTING POINTS

NEW YORK	ATLANTA	CHICAGO	KANSAS CITY	SAN FRANCISCO
BROOKLYN	SAVANNAH	INDIANAPOLIS	OKLAHOMA CITY	OAKLAND
NEWARK	NEW ORLEANS	DETROIT	ST. LOUIS	LOS ANGELES
SYRACUSE	BIRMINGHAM	MILWAUKEE	MEMPHIS	SEATTLE
BUFFALO	JACKSONVILLE	GRAND RAPIDS	OMAHA	PORTLAND
NEW HAVEN	RICHMOND	CLEVELAND	CINCINNATI	SPOKANE
BOSTON	NORFOLK	MINNEAPOLIS	COLUMBUS	TACOMA
PROVIDENCE	CHARLOTTE	ST. PAUL	NASHVILLE	DENVER
PITTSBURGH	YOUNGSTOWN	DULUTH	DALLAS	SALT LAKE CITY
	PHILADELPHIA	BALTIMORE		HOUSTON

Products

ELECTRICAL HOUSEKEEPING APPLIANCES; COUNTRY HOME POWER and LIGHT OUTFITS; MAZDA LAMPS; HEAT REGULATORS; INTER-PHONE SYSTEMS.

Also Fans, Motors, Generators, Wiring Materials, Wire and Cable; Safety Switches.

Through the 48 distributing points listed above, this company makes available every thing electrical; in fact, every thing to transmit, control and apply electricity in factories, hotels, apartments, stores, theaters and the modern home, "The Home Electrical."

Among those appliances particularly adapted to "The Home Electrical" are the Western Electric Clothes Washer, Vacuum Sweeper, Dishwasher and Kitchen Table, Portable Sewing Machine and the Ironer with Ruffler.

Provision for Modern Office and Housekeeping Appliances

To meet the requirements of modern lighting and energize the appliances increasing in use in home and office, convenience outlets should be provided. In the home electrical, every room should have at least two outlets. In office buildings, the probable allotment of the space will govern the need and location of outlets for fans, adding machines, etc.

Ceilings outlets for lighting in both houses and offices should be considered. If ceiling beams are deep, there should be at least one outlet for each panel, preferably in the center. Baseboard outlets should be arranged with reference to the purpose of the room and the probable arrangement of furniture as influenced by installed lighting fixtures and windows. All outlets should be arranged to take the different arrangements of contacts used on standard plugs.

In homes, installation spaces and the required convenience outlets for the most generally used electrical housekeeping appliances should be provided. The Western Electric Clothes Washer is 25½ in. wide and 36 in. deep. The Dishwasher and Kitchen Table is 47½ in. long, 27 in. wide and 31 in. high. The Ironer and Ruffler is 21 in. deep and 67 in. long. Alternating or direct current motors are supplied according to the local current. The Western Electric Sewing Machine and Vacuum Sweeper being portable must be considered only when locating the convenience outlets. They are equipped with universal motors operating on direct or alternating current.

Sunbeam Mazda Lamps

These lamps provide efficient and economical lighting. They give a brilliant white light. Various sizes available make it possible to give every kind of room scientifically correct illumination.

SUNBEAM MAZDA LAMP

Heat Regulator

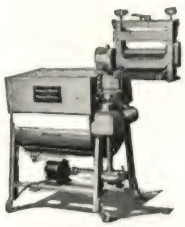
A heat regulator connected to the furnace draft maintains an even temperature, keeping the house constantly warm, yet preventing overheating. The regulator is set (as an alarm clock is set) to open the drafts at a predetermined hour in the morning, and warms the house before the occupants arise.

A change of 1° in temperature operates the motor which opens or closes the draft as required.

Country Home Power and Light Outfits

These outfits provide current for lighting and for operating household appliances and motors where there are no electric light and power lines. Compact, easy to operate and require a minimum of attention. The complete line includes 32- and 110-volt outfits.

Washer and Wringer



AS TYPE WASHER

The Western Electric Washer and Wringer does the washing quickly, easily and economically. It is operated with either an alternating or direct current motor according to the local current.

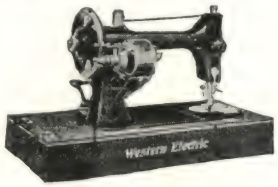
Vacuum Sweeper

The Western Electric Vacuum Sweeper, with its attachments make this sweeper a complete cleaning equipment for floors, walls, ceilings, furniture and hangings. It is operated by a universal motor adaptable to either alternating or direct current.

VACUUM SWEEPER

Portable Sewing Machine

Western Electric Portable Sewing Machines are complete high grade sewing machines on which a universal motor does all the labor of pedalling. No larger than a typewriter. They may be carried from room to room. This is one of the appliances which should be borne in mind when the installation of convenience outlets is planned.



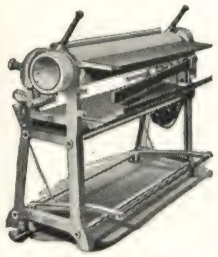
PORTABLE SEWING MACHINE

Continued on next page

Dishwasher and Kitchen Table

The Western Electric Dishwasher washes, rinses and dries without breaking the dishes. When not in use, its white enameled top can be used for a table as illustrated. Its universal motor operates on either alternating or direct current.

DISHWASHER AND KITCHEN TABLE



IRONER AND RUFFLER

Ironer and Ruffler

The Western Electric Ironer and Ruffler will take care of all the heavy ironing of the household and a big majority of the small pieces. Either an alternating or direct current motor is provided according to the current available. Besides the convenience outlets to provide power for the ironer, an outlet for gas to heat the rolls should also be provided.

Inter-phones

"Inter-phone" is the trade-name adopted by the WESTERN ELECTRIC COMPANY for what is commonly known as intercommunicating telephone apparatus. Inter-phones are intended to provide intercommunication between various points in one or several buildings without necessitating a connection through a telephone switchboard.

HAND SET

No operator is required. The signaling and talking circuits can be controlled from any station. It is an ideal system for homes, apartment houses, hotels, manufacturing establishments, schools, hospitals, asylums, prisons, and, in fact, wherever there is much intercommunications in or between buildings and no outside calls to an exchange.

Various systems are available to cover various service requirements. A few of these follow:

SURFACE TYPE INTER-PHONE

INTERCOMMUNICATING:
Selective Talking and Selective Ringing.
5 to 24 stations. (See description following.)

INTERCOMMUNICATING:
Common Talking and Selective Ringing.
3 to 12 stations.

INTERCOMMUNICATING:
Common Talking and Code Ringing.
2 to 6 stations. (See description of system 15-C.)

MASTER STATION SYSTEMS:
3 to 12 stations.

ANNUNCIATOR TELEPHONE SYSTEMS:
6 to 70 stations.

APARTMENT HOUSE SYSTEMS:
Selective Talking or Common Talking.
3 to 70 stations. (See description of system 10.)

FLUSH TYPE INTER-PHONE

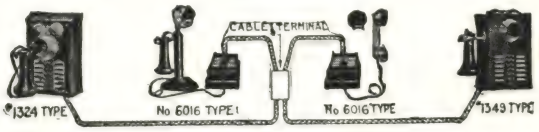
The following types of Inter-phones are available for use in the various kinds of systems:

(1) Wall Sets, Surface Mounting.
(2) Wall Sets, Flush Mounting.
(3) Desk Sets.
(4) Hand Sets, Surface Mounting.
(5) Hand Sets, Flush Mounting.

APARTMENT HOUSE SET

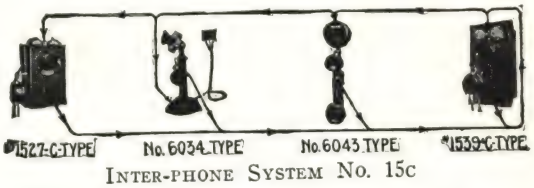
System No. 1—System No. 1 illustrated is a typical layout of an installation in an office or industrial plant. It shows ringing service only and should not be considered a wiring diagram.

Selective Ringing—Selective talking service 3 up to 24 stations. (1) Any station can ring selectively any other station. (2) More than one conversation can take place simultaneously.



INTER-PHONE SYSTEM NO. 1

System No. 15-C—*Code Ringing*—Common talking service 2 up to 6 stations. A simple private line system (requires only 3 line wires between stations). When a button is pressed at any station the bells of all other stations will ring simultaneously. The various stations are called by signalling each one with a different code. Only one conversation can be carried on at a time.

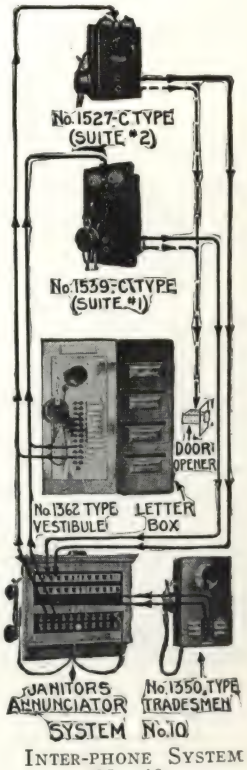


INTER-PHONE SYSTEM NO. 15C

System No. 10—System No. 10 is a typical apartment home layout. It shows the ringing service only and should not be considered a wiring diagram.

The non-interfering service connecting one janitor's switchboard, two or more vestibule and tradesmen's Inter-phones and any number of suite Inter-phones up to 70. It is intended for use where several vestibules in the same or adjoining apartments are to be served by one janitor. A maximum of 24 suite Inter-phones can be connected to each vestibule set.

Bulletins—Bulletins completely describing Inter-phones and installation instructions are available, also a cloth bound volume of illustrations and typical architects' specifications on Inter-phones may be had for the asking. Communicate with the nearest Western Electric Distributing House.



INTER-PHONE SYSTEM NO. 10

Other Western Electric Quality Products

The Western Electric Year Book contains a complete listing of electrical household appliances, and a large variety of supplies, as for example:

Annunciators, conduits, dry batteries, flood lamps, motors, outlet boxes, receptacles and two-way plugs.

THE MATTHEWS ENGINEERING COMPANY

Manufacturers of Direct Connected Full Automatic Light and Power Plants

SANDUSKY, OHIO

Product

DIRECT CONNECTED "FULL AUTOMATIC" LIGHT and POWER PLANTS suitable for consolidated schools and country estates.

A Complete Line of Sizes up to 1000-Light Capacity

THE MATTHEWS ENGINEERING COMPANY, Sandusky, Ohio, supplies electric lighting plants for consolidated schools and country estates. It builds a complete line of electric light plants, from the plant of moderate size suitable for furnishing light for modest country homes up to the large 75-kw. plants with a capacity of 1000 lights, sufficient to light a village of 2500 population, and is the only concern building such a complete line.

"Full Automatic" Type

Matthews plants are of the "Full Automatic" type, the nearest approach to city light and power, and are both economical and durable.

It is worth noting that THE MATTHEWS ENGINEERING COMPANY is one of the pioneers in the manufacture of high-grade electric light and power plants, having been engaged in the manufacture of such equipment exclusively since 1914. The reliable service afforded by Matthews products is indicated by the fact that they are specified for and are in use by the U. S. Government Light House Service in various parts of the country.

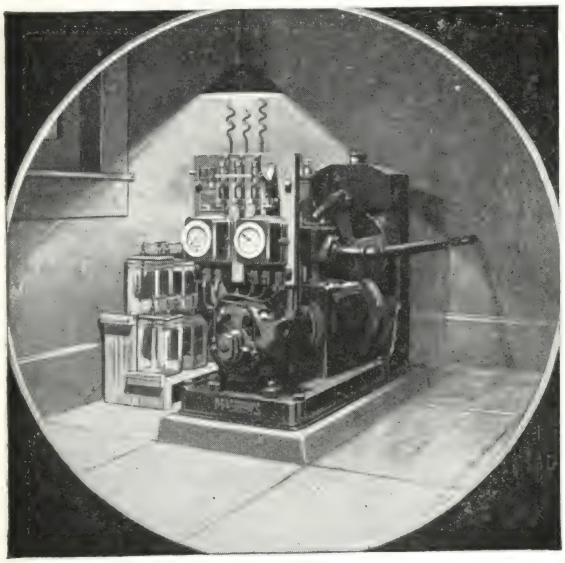
Special Applications for Consolidated Schools

The rapid spread of the consolidated school idea and the high type of buildings generally demanded, with all modern facilities including electric light and mechanical ventilation, has resulted in numerous requests for complete information concerning the ability of THE MATTHEWS ENGINEERING COMPANY to furnish electric light and power plants suitable for consolidated school service.

In order to place this information in the hands of interested architects, a comprehensive special folder has been prepared containing complete specifications covering the application of electric lighting plants to schools.

Send for the special folder giving full data and complete specifications for architects.

The consolidated school idea while still in its infancy is spreading very fast. Therefore, whether or not you have immediate need of this data you will naturally desire to have the information available in proper form, hence we suggest writing for it at once. Address, THE MATTHEWS ENGINEERING COMPANY, Sandusky, Ohio.

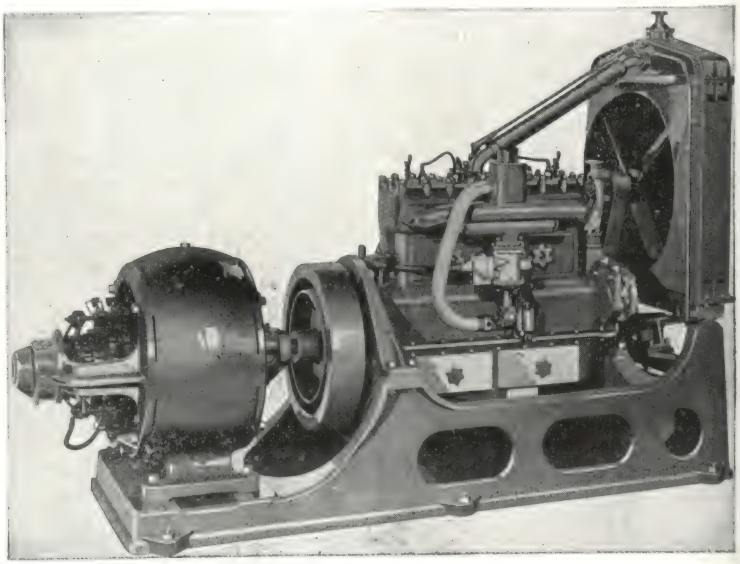


Model JR. 1-Kw. 32-Volt, 50-Light

Matthews engine coupled to General Electric generator, mounted on rigid base; electro-magnetic governor, make-and-break timer and non-vibrating coil; radiator; Stewart vacuum feed tank; carburetor; 80-ampere-hour storage battery; 16 glass cells and counter cell; full automatic switchboard.

All complete with necessary equipment ready to run and give light with the attaching of the battery wires to the switchboard.

Length over all	32	in.
Height over all with vacuum tank	29	in.
Height over all without vacuum tank	23	in.
Width over all	16½	in.



Model E, 6-Kw. 110-Volt, 300-Light

A most desirable plant for lighting large suburban residences and estates, for community lighting, for villages and for factories or groups of homes, etc.

The engine is a 4-cylinder, 4-cycle standard Matthews engine, 3½-in. bore x 5-in. stroke.

Other details given in catalogue sent on request.

Height over all	42	in.
Length over all	80	in.
Width over all	32	in.

MATTHEWS "FULL AUTOMATIC" LIGHT AND POWER PLANTS

THE AUTOCALL CO.

Manufacturers of Signaling Systems

GENERAL OFFICES

SHELBY, OHIO

BRANCH OFFICES IN ALL LARGE CITIES

Products

THE AUTOCALL COMPANY are manufacturers of standard high grade, Electrical Signaling Equipment for interior installation, which includes AUTOCALL WATCHMAN'S SUPERVISORY SERVICE, AUTOCALL FIRE ALARM SERVICE, AUTOCALL PAGING SERVICE, or any Combination of above systems.

Engineering Data and Handbooks

Our staff of engineers will provide blue prints and detailed specifications and estimates to meet your expressed requirements. In addition, our catalogues, organization booklets "How to Organize Fire Drills" and "What to Do When the Fire Alarm Sounds," will be forwarded on request.

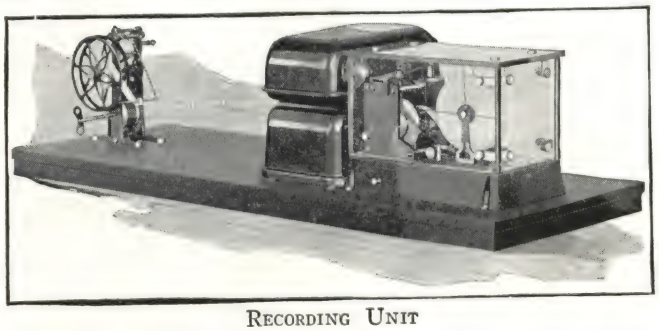
Autocall Signaling Systems

All equipment is of uniformly high quality and installed on electrically supervised closed circuits.

The systems described and illustrated are designed to render maximum service in each of their capacities and where the conditions for which they are made are thoroughly understood, they become indispensable for use in industrial plants, schools, hospitals, institutions, hotels, warehouses, etc.

Autocall Night Watch Supervisory Service

Means regularity of wachman's records as well as protection to watchman and property under his jurisdiction by providing immediate, local, notification of any failure to register at boxes supplied for his use.



RECORDING UNIT

Autocall night watch service consists of:

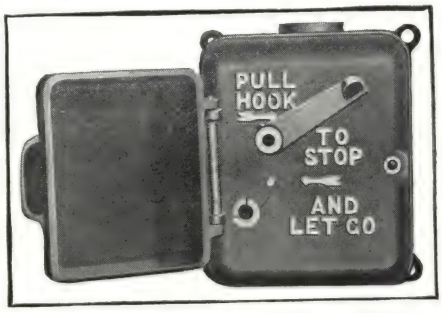
Standard approved watch boxes, or combination fire and watch boxes (from which watchman records his rounds hourly), control board and complete recording unit comprised of self-winding punch register, time stamp and tape winder mounted on ebony asbestos wood base. Approved by the underwriters.

Autocall Fire Alarm System

Affords accurate and immediate alarm of fire by giving coded signal indicating exact location; provides means of getting preventive measures on the scene promptly, and at the same time empties the premises of employees without confusion and panic.

Autocall fire alarm consists of:

Standard approved fire gongs, fire boxes (break glass or pull lever) and control board. Approved by the underwriters.



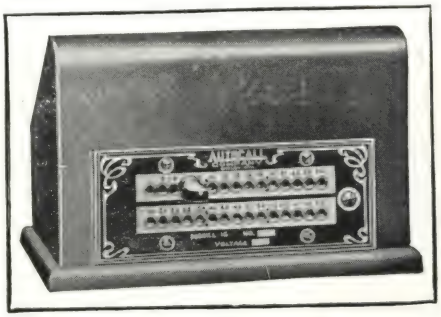
COMBINATION FIRE AND WATCH BOX

Autocall Paging System

Makes each important member of an organization promptly available for consultation, advice or telephonic communication without disturbance to any but the person wanted.

Autocall paging service consists of:

Suitable signals (bells, buzzers, horns or whistles) to meet the most exacting requirements from hospitals to boiler shops, relay and central sending station, in sizes to call from 10 to 60 people. Approved by the underwriters.



30-CALL CENTRAL SENDING STATION

All Products Standard

All products of THE AUTOCALL COMPANY are standard and designed for operation on direct or alternating current.

Each Autocall service listed above is complete in itself but any combination of the three services may be effected to advantage.

The combination of paging and fire alarm services makes the double-value "Dual Service"; the combined fire and watchmen's service is a most popular combination; while the combination of paging, fire alarm and watchman's supervisory services is known as our effective "Tri-Service." All equipment is adaptable to varying conditions and designed to meet the widest variety of requirements.

EDWARDS AND COMPANY, INC.

Electrical Signaling Apparatus

140th and Exterior Streets

NEW YORK, N. Y.

ATLANTA, GA. BOSTON, MASS. BUTTE, MONT. CHICAGO, ILL. DENVER, COLO.
LOS ANGELES, CAL. MINNEAPOLIS, MINN. MONTREAL, QUE. NEW ORLEANS, LA. WINNIPEG, MAN.

Products

FIRE ALARM SYSTEMS and ACCESSORIES.
BELLS, BUZZERS and SIGNAL GONGS.
ANNUNCIATORS.
PUSH BUTTONS.
Also Watchman's Time Detectors; Burglar Alarms.

1872 EDWARDS
TRADE-MARK

Fire Alarm Systems

There are but two distinct classes of fire alarm systems—open circuit and closed circuit—and all systems are therefore one of these or a combination of both.

Open Circuit Systems — These include simple break-glass boxes, vibrating bells and sometimes an annunciator.

While serving the purpose for certain types of buildings, this class is not considered desirable for larger or more important buildings. The reason is that it is not under electrical supervision and there is no way of knowing whether it is in operating condition until an attempt is made to sound an alarm.

Closed Circuit Systems—They usually include single-stroke bells, code ringing boxes and control panel.

This class is constantly under supervision, a current being on the line at all times. Failure of the line or current supply for any reason causes the trouble bell to ring. In some systems, the full operating current is kept on the line at all times. This is, of course, expensive to maintain. Great economy is effected in this respect by the control panel used with Edwards systems, which reduces the supervising current to a very small fraction of the operating current. The full operating current is on the line for the period of alarm only and is automatically cut off and on.

A Fire Alarm System for Every Condition—Special problems present themselves from time to time in choosing the proper system to meet the conditions. We have endeavored to provide a standard system for every ordinary need, but there are many cases where peculiar conditions or special results desired make necessary the modification of one of these standard systems. We have for half a century specialized in this work and a competent engineering department is at your service without obligation.

The chart below has been arranged with as great a degree of accuracy as a subject of such diversity will permit. It presents the different systems at a glance and enables one to estimate what will be needed to make up the complete system for a particular installation.

Break-Glass Fire Alarm Boxes—For open or closed circuits. All flush boxes fit standard switch boxes. Test keys, hammer and chain furnished with box. When used for exteriors, weatherproof case No. 1290 should be added.

No. X224 Fire Alarm Boxes—Flush type, $4\frac{3}{4}$x$3\frac{7}{16}$x$1\frac{1}{2}$ in. over all. Raised lettering and border brass; background black.

No. X224 FIRE ALARM BOX

EDWARDS FIRE ALARM SYSTEMS

Class of system	No. of system	Operated by	Alarm indication	Supervising current	Operating current	Bells used	Boxes used	*Control panel	Limit of system	Designed for	Relative Cost		Relative protective value
											Initial	Operating	
Open circuit	VO-1	Battery or 110 to 120 volts D. C.	Continuous ringing bells or **annunciator	None	Varies with size and arrangement	Vibrating Recti and Economy	Break-glass Nos. *77, *224, *2240 and *2241	None	Local conditions	See footnotes 1, 2, 3 and 8	Minimum	Low	See text above
	VO-2	110 to 120 volts, A. C.	Code ringing on vibrating bells	None	2 amps. approx. for 6 bells	Vibrating Recti and Transformer	Code ringing Nos. *1275 and *1276 in all arrangements and styles	None	6 bells	See footnotes 1, 2, 3 and 8	Medium	Low	See text above
Closed circuit	EMBD-1	Battery direct	Code ringing on single-stroke bells	1/10 amp.	1/10 amp.	Single-stroke Electro-mechanical	Code ringing Nos. *1275 and *1276 in all arrangements and styles	None	Practically none	See footnotes 4, 5, 6 and 9	Lowest of closed circuit	Highest of closed circuit	See text above
	EMB-	Battery through control panel	Code ringing on single-stroke bells	1/50 amp.	1/7 amp.	Single-stroke electro-mechanical	Code ringing Nos. *1275 and *1276 in all arrangements and styles	Yes	Practically none	See footnotes 4, 5, 6 and 9	Medium	Low	See text above
	SS-	110 to 120 volts D. C.	Code ringing on single-stroke bells	1/12 amp.	2 amps. per circuit	Single-Stroke vigilant	Code ringing Nos. *1275 and *1276 in all arrangements and styles	Yes	Practically none	See footnotes 4, 5, 6 and 9	Medium	Lowest of closed circuit	See text above
	§PSS-	Battery or 110 volts D.C. through control panel	Code ringing on single-stroke bells	1/10 to 1/12 amp. depending on arrangement	Depends on size of system	Single-stroke electro-mechancial and vigilant	Code ringing Nos. *1275 DO and *1276 DO in all arrangements and styles	Yes	Practically none	See footnotes 7 and 8	Maximum	Low	See text above

1—Office buildings
2—Small factories
3—Lodging houses
4—Large factories
5—Groups of industrial buildings
6—Yards and docks
7—Hospitals
8—Hotels
9—Small towns

*Complete, including trouble bell, millimeter, resistance, etc.
**Usually for general alarm purposes. Can be modified by use of an annunciator to indicate where alarm was turned in. General or individual alarm rung by switches on annunciator.
§This system is so arranged that the alarm, when turned in from any box, rings certain predetermined bells only in such places as engine room, superintendents office, etc. If it is necessary, after investigation, the general alarm is turned in from any box by any authorized person holding a key

Continued on next page

No. X2241 Fire Alarm Box

No. X224A Fire Alarm Boxes—Same as No. X224, but for surface mounting.

Size over all, including plate, 4⅜x4¾x1½ in.

No. X2241 Fire Alarm Boxes—For 110 volts D.C. or A.C., or battery. Heavy phosphor bronze springs mounted on slate. For surface mounting. Raised lettering.

Separable conduit fitting allows wires to be drawn through and connected before mounting box. Drilled for ½- or ¾-in. conduit.

Red enamel substantial cast iron base.

Oval shaped, 5⅛x4½x2⅜ in.

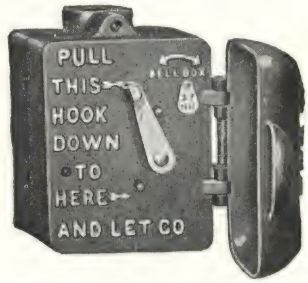
No. X2240 Fire Alarm Box

No. X2240 Fire Alarm Boxes—Same as No. X2241, but for concealed conduit.

Fits standard switch box.

Code Ringing Fire Alarm Boxes—Closed or open circuit. Simple, yet very reliable. Gear wheels are cut, not stamped. No winding ever necessary. Strong spring mechanism.

No. X1275 Fire Alarm Boxes—Signal sounded 4 times at each operation. Silent or bell tests with key. Spring hinged door. Pull the lever to sound alarm. Raised lettering.



No. X1275 Fire Alarm Box

For surface conduit. Size, 7½x5½x5 in. over all. Substantial cast iron case. Separable conduit fitting.

Finish, red.

No. X1276 Fire Alarm Boxes—Same as No. X1275, but for concealed conduit.

No. X1275-2 Fire Alarm Box

No. X1275-2 Fire Alarm Boxes—Same as No. X1275 except that locked door is substituted, making two operations necessary to sound alarm — break glass to open door and pull lever to sound alarm. May be opened by special key without breaking glass.

For surface conduit.

No. X1276-2 Fire Alarm Boxes—Same as No. X1275-2 but for concealed conduit.

No. X1275DO Pre-signal Fire Alarm Boxes—For use where it is not desirable to sound general alarm until extent of fire has been investigated.

Same design and construction as above except alarm sounds signal in a certain place, after which general alarm may be sounded by authorized person with key at any box.

Made in same styles as above boxes.

Add the letters DO to numbers to designate pre-signal boxes, for example, X1276-2DO.

Panels—*SS-1 Panel*—For direct connection of the system to 110-volt D.C. lighting service. Where 220-volt, 3-wire service is available, the trouble bell may be operated directly on the 110-volt circuit, but if this is not available, trouble bell battery is supplied.

Pre-signal Panel—Same as SS-1 panel, except arranged for pre-signal system.

EMB-2 Panel—For use with EMB-2 system.

Fire Alarm Accessories—Pen registers, paper winders, relays and all other accessories supplied.

Bells and Buzzers

This company furnishes bells and buzzers of all designs and for all purposes in addition to those described below.

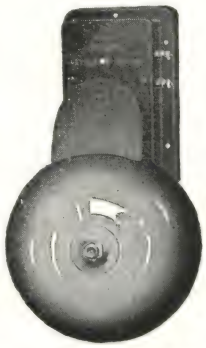
Recti Bells and Buzzers — A heavy duty type to withstand severe service under most adverse conditions. Patented design. Carbon contacts can not stick, oxidize or corrode. For all voltages up to 600 D.C. and all alternating current lighting voltages. Every bell is weatherproof, bugproof and dustproof. Used as general signal bells for schools, factories, institutions, etc.

No. X100 Recti Bell

Approved by National Board of Fire Underwriters. Gongs, 3 to 18 in.

For interior or exterior installations. Conduit or non-conduit types.

Electro-mechanical Bells No. X133 (Non-conduit) and No. X1331 (Conduit)—Single stroke.


No. X133 Electro-Mechanical Bell

Constant ringing as long as circuit is closed (or open); constant ringing when circuit is closed even though it be opened again (or reverse).

The foregoing types are available for battery, 110-volt D.C. or A.C. A strong spring mechanism is released by a very small flow of current.

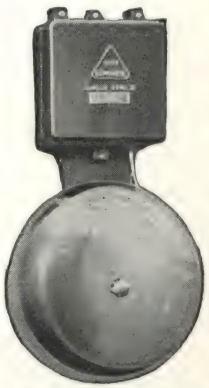
For fire alarms, schools and all signals.

Gongs, 6 to 18 in.

For interior or exterior installations.

Vigilant Single-stroke Bells—Made in sizes from 4 to 12 in.

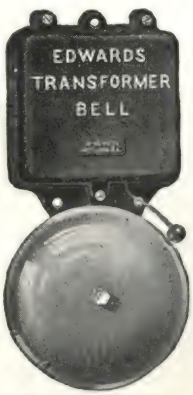
Battery or lighting voltage.


No. X21 Vigilant Single-stroke Bell

For fire alarms, warehouses and all signals.

For interior or exterior installations.

With or without conduit fitting.



No. X510 Transformer Bell

No. X510 Transformer Bells and Buzzers—Operate on 6 to 24 volts A.C., 60 cycles; 25 to 40 cycles when desired. Carbon contacts can not stick, oxidize or corrode.

Approved by National Board of Fire Underwriters.

For surface or concealed conduit. Gongs, 3 to 12 in. For interior or exterior installations.

Continued on next page

Push Buttons

In addition to the push buttons shown below, this company manufactures for all classes of work a very complete line of plates, floor plugs and supplies of like description.

No. X190 Directory Push Button—For desk or table use.

Phosphor bronze contacts; weighted; felt covered base.

Brass plate on top takes name cards through slots on side.

All finishes.

Any number of buttons.

No. X190 Directory Push Button

No. X191 Directory Push Button—Same as No. X190, but without wood mat.

For mounting flush in desk or wall.

No. X85 High Voltage Push Button—For 110 volts A.C. or D.C., open circuit. Used extensively for hotel work where apparatus is operated on storage batteries. Will pass up to 1½ amperes. Condensite center. Fits ¾-in. hole.

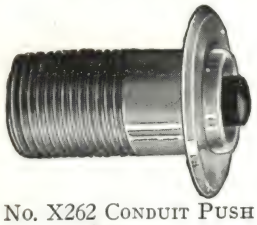
No. X85 High Voltage Push Button

No. X85A High Voltage Push Button—Same as above, but for 220 volts A.C. or D.C. Fits 1⅛-in. hole.

No. X85C Push Botton—For 110 volts closed circuit. Fits 1⅛-in. hole.

No. X262 Conduit Push Button — Complete with attachment as shown, to fit on ¾-in. or ½-in. conduit.

Allows vaporproof installations.



No. X262 Conduit Push Button

Used extensively in hotels and apartment houses for bathrooms, etc.

Inside the threaded brass pipe is a vertical rod allowing attachment to be screwed on the conduit with pliers, piece of slotted pipe, etc., eliminating the use of a Stillson wrench, which mars the surface.

Annunciators

Made in hand and electrical reset types.

No. X800 gravity drop, used in all hand-reset instruments, is constructed to withstand the most severe service. Positively locked until released by current flow. Of shallow design to permit compact and neat case.

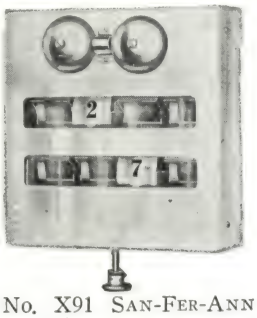
No. X400 semaphore gravity drop is a combination of two drops, throwing a perfectly balanced shutter from one position to the other. Automatically locked in either position. Indications are large, plain and immediate, and are changeable by merely inserting a new card.

Hand-reset annunciators are used in all general installations such as residences, offices, factories, etc.

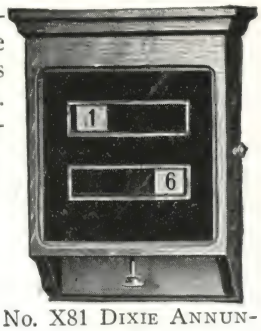
Electrical-reset annunciators are used where remote control is wanted and for higher class installations in offices, residences, hospitals, hotels, etc.

This company also makes annunciators of all designs and for all purposes in addition to those shown.

Dixie Annunciators—Hand reset only. Plain oak case for use in low cost installations such as flats, residences, etc. Battery or transformer operation. See table for sizes.



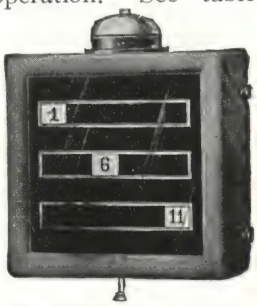
No. X91 San-Fer-Ann Annunciator



No. X81 Dixie Annunciator

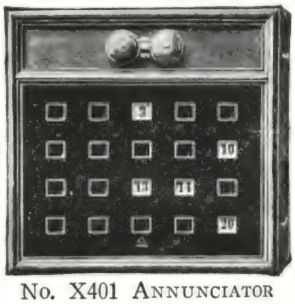
San-Fer-Ann Annunciators—Hand reset. Neat appearing metal case, white enamel finish. Battery or transformer operation. See table for sizes.

No. X125 (Wood) and No. X125M (Metal, Annunciators—Hand reset. Have fine and substantial cases that may be finished to suit surroundings. See table for sizes. Battery or transformer operation. Adjustment is finer than on those previously described. Suitable for high grade residences, banks, offices and all installations.



No. X125 Annunciator

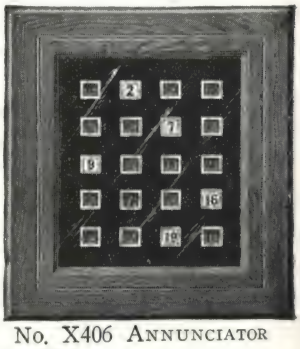
No. X401 (Wood) and No. X407 (Metal) Annunciators — Electrical reset. Reliable and attractive for high grade work and electrical reset or remote control. Furnished with reset button on case if desired. Button for each drop, group of drops or total number. All finishes. See table for sizes.



No. X401 Annunciator

No. X406 (Wood) and No. X407 (Metal) Annunciators — Same as above but have flush cases. See table for sizes.

No. X215 (Wood) and No. X215M (Metal) Annunciators — Hand reset, otherwise same as No. X406 and X407. See table for sizes.



No. X406 Annunciator

DIMENSIONS OF ANNUNCIATORS

Number of drops	No. X-81 Dixie			No. X-91 San-Fer-Ann			No. X-125 wood No. X-125M metal			No. X-401 wood No. X-407 metal			No. X-406 wood No. X-405 metal			No. X-215 wood No. X-215M metal		
	Dimensions, in.																	
	*H	*W	*D	H	W	D	H	W	D	H	W	D	§H	§W	D	§H	§W	D
2	9⅜	9	3⅝	4¾	6⅞	2⅛												
3	9⅜	9	3⅝	4¾	6⅞	2⅛												
4	9⅜	9	3⅝	4¾	6⅞	2⅛	5⅝	7⅞	3½	9⅝	7¼	2½	7¾	8½	2⅜	6⅞	9⅛	2⅛
6	11⅛	9	3⅝	7¼	6⅞	2⅛	7⅜	7⅞	3½	9⅝	9½	2½	7¾	10¾	2⅜	8⅝	9⅛	2⅛
8	11⅛	9	3⅝	7¼	6⅞	2⅛	7⅜	7⅞	3½	9⅝	11⅞	2½	7¾	13	2⅜	8⅝	9⅛	2⅛
10	11⅛	10⅝	3⅝	7¼	8⅜	2⅛	7⅜	9½	3½	11⅝	11¾	2½	9¾	13	2⅜	8⅝	10¾	2⅛
12	11⅛	12¼	3⅝	7¼	9⅞	2⅛	7⅜	10⅞	3½	11⅝	11¾	2½	9¾	13	2⅜	11⅛	9⅛	2⅛
14	13⅝	10⅝	3⅝	9	8⅜	2⅛	9⅞	9½	3½	11⅝	14½	2½	9¾	15¼	2⅜	11⅛	10¾	2⅛
16	13⅝	12¼	3⅝	9	9⅞	2⅛	9⅞	10⅞	3½	11⅝	16¼	2½	9¾	17½	2⅜	11⅛	12⅛	2⅛
18	13⅝	12¼	3⅝	9	9⅞	2⅛	9⅞	10⅞	3½	11⅝	16¼	2½	9¾	17½	2⅜	11⅛	12⅛	2⅛
20	15½	10⅝	3⅝	13¾	6⅞	2⅛	11¾	9½	3½	13⅝	14	2½	11¾	15¼	2⅜	13	10¾	2⅛
22	15½	12¼	3⅝	11⅜	9⅞	2⅛	11¾	10⅞	3½	13⅝	16¼	2½	11¾	17½	2⅜	13	12¼	2⅛
24	15½	12¼	3⅝	11⅜	9⅞	2⅛	11¾	10⅞	3½	13⅝	16¼	2½	11¾	17½	2⅜	13	12⅛	2⅛

*H=height; W=width; D=depth. §Add 3 in. for trim.

THE HOLTZER-CABOT ELECTRIC CO.

Electric Signaling Systems

HOME OFFICE AND FACTORY
125 Amory Street
BOSTON, MASS.

BRANCH OFFICES

CHICAGO, ILL., 6161-65 South State Street
NEW YORK, N. Y., 101 Park Avenue
DETROIT, MICH., 1051 Book Building
CLEVELAND, OHIO, 517 Union Building
BALTIMORE, MD., 1104 Union Trust Building
PHILADELPHIA, PA., 807 Otis Building
SAN FRANCISCO, CAL., 408 Claus Spreckels Building
MINNEAPOLIS, MINN., 627 Metropolitan Life Building

Products

HOSPITAL CALLING SYSTEMS.

FIRE ALARM SYSTEMS.

SIGNAL and ALARM BELLS.

Also Factory Signaling Systems; Watchman's Recording Systems; Fire and Watch Systems; Indicating Systems; Horn Calling Systems; Factory Calling Systems; School Signal Systems; Fractional Horsepower Motors; Motor Generators and Dynamometers.

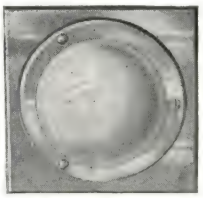
Hospital Calling Systems

The simplicity and convenience of Holtzer-Cabot systems are largely due to the patented push locking button which contains all the working parts. Lighting of lamps, sounding of buzzers and operation of annunciators are all controlled from the button. This type of safety-operating button is exclusive to the Holtzer-Cabot systems.

WARD CALLING STATION

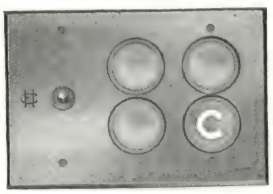
PRIVATE ROOM CALLING STATION

Should a station become temporarily out of order, a nurse or attendant can readily plug in another cord and button; there can be no interruption of service at that station or any other station. This is because there are no mechanical or electrical contrivances within the walls—simply the wires coming to a standard wall plate.



DOME CORRIDOR LAMP STATION

The button locks when pressed by the patient, and operates the various signals considered necessary. It is only at the patient's bedside that the signals may be extinguished by the nurse.



GB ANNUNCIATOR, PILOT AND BUZZER STATION

These simple, safe, reliable systems are operated from any 10-volt source of current (direct or alternating). A transformer, motor generator set, or storage battery of adequate capacity, (giving normally 10 volts) may be used. While we manufacture signaling apparatus of the relay, solenoid, high or low voltage types, we recommend emphatically the low voltage system with push locking button. It precludes all possibility of serious shock to the patients, should cords become worn.

During the course of construction and reconstruction is the most satisfactory time for installing a signaling system, but Holtzer-Cabot systems may be very readily installed in existing institutions with very little trouble and expense.

We will be glad to co-operate with any architect who may be interested in hospital signaling systems.

Fire Alarm Systems

Even in "fireproof" buildings, fire alarm systems are necessary to avoid panic. It has been truly said that the first five minutes in fire fighting are worth more than the next five hours. Every fire starts small, and arrested in time will never grow into a large fire.

N.Y.S. FIRE ALARM STATION

THE HOLTZER-CABOT ELECTRIC COMPANY specializes in the manufacture of fire alarm systems suitable for practically all classes of service. These fire alarm systems are designed particularly for the type of building in which they are to be installed and for the type of service required, i. e., for schools, hospitals, hotels, factories, warehouses, banks, etc. Send us your requirements and our engineers will be pleased to supply blue prints and specifications for a "safety first" system for any building.

"AD" Bell

This is an entirely new type of signal or alarm bell for use on alternating current. The hammer operates entirely independent of the frequency, therefore the gong is struck a succession of powerful blows, with a slight interval of time between each. Resonance is thus brought out, making the "AD" bell an extremely loud and penetrating type of signal or alarm.

"AD" BELL WITH COVER REMOVED

Bulletins

There are bulletins issued to assist the architect in his work, describing and illustrating in detail all Holtzer-Cabot products. Any of these bulletins will be forwarded on request.

THE SCHWARZE ELECTRIC CO.

Manufacturers of Electrical Bells, Buzzers, Horns and Specialties

FACTORY AND MAIN OFFICE
ADRIAN, MICH.

Products

ELECTRICAL SIGNALLING BELLS, BUZZERS and HORNS.

Schwarze Electric Signal Devices

There is a Schwarze electric signalling device designed for practically every purpose where a high grade product is required.

When an audible signal is required, a few considerations in the choice of signal apparatus should be borne in mind. (1) The type of signal, whether the sound is to be continuous or intermittent. (2) The loudness of the signal. (3) The quality of the sound and sweetness of tone. (4) Conditions of installation, indoor or outdoor. (5) Available current, whether alternating or direct current.

All these considerations are covered in the large variety of electric bells, buzzers and horns manufactured by THE SCHWARZE ELECTRIC CO.

Schwarze Electric Bells

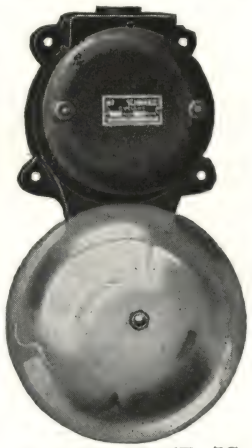
Schwarze bells are particularly adapted to use for fire alarm signals in schoolhouses, public buildings and industrial plants. They are a fit and dependable signal for sprinkler systems, telephone systems, etc.

Schwarze bells are fully guaranteed and are approved by the Underwriters' Laboratories, Inc.

Schwarze Cyclone Vibrating Bells Nos. 6, 6C, 6E and 6F—These bells are of the single gong plunger type, dustproof and weatherproof. The types given are for direct current operation only.

No. 6 has exposed terminals only for operation on 30 volts direct current or less.

No. 6E has the general appearance of No. 6C, except that it is equipped with a rubber gasket between cover and frame, making it waterproof; circuit application 30 volts or less. No. 6C is for direct operation on 110 volts or less and the casting is tapped for ½-in. conduit, making it weatherproof and dustproof. No. 6F is for direct operation on 110 volts only and has rubber gasket between cover and frame; it is waterproof.



Nos. 6C, 6E, 6F, 7C CYCLONE VIBRATING BELL

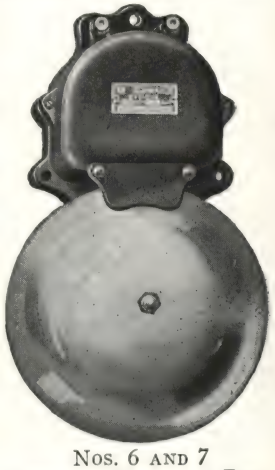
All Schwarze direct current cyclone bells mentioned above can be used on higher voltages than those stated by using external resistance in series with the bell.

Gongs can be hard steel or cast bell metal as required in the following sizes: Hard steel gongs furnished in nickel, brass or galvanized plate, 6, 8, 10 and 12 in. Galvanized hard steel gongs are recommended for outside installations or in damp places on account of their rust resisting qualities. Standard winding of the No. 6 direct current. Cyclone in its various types is 10 ohms.

The mechanisms are entirely insulated from the frame and are constructed for multiple operation, although a small number can be operated in series.

Schwarze Universal Direct Current Double Gong Bells—These bells are most practical for series operation, using as many as 20 bells on one circuit.

Cyclone Bells Nos. 7, 7C, 75 and 77—These bells are for alternating current from any secondary transformer voltage or direct on 110 or 220 volts, 25 to 60 cycles. These bells are of the same construction and quality as the direct current Cyclone bells, except they are wound for alternating current and have no contact points, thereby eliminating any spark during operation. All Schwarze bells are instant starting and stopping; therefore are practical for code calling systems, which require these features.



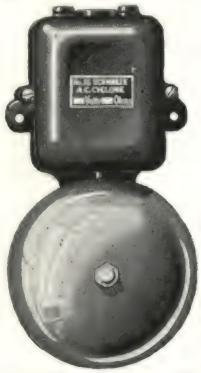
NOS. 6 AND 7 CYCLONE VIBRATING BELL

The alternating current Cyclone Bell No. 7 has outside terminals, and No. 7C has inside terminals and is tapped for ½-in. conduit. These types are furnished with 6-, 8- and 10-in. gongs, hard steel, nickel, brass or galvanized plate; or with cast bell metal gongs of the same sizes.

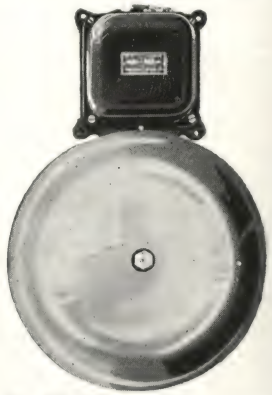
Cyclone Bell No. 75 is of the latest design; is weatherproof, dustproof, for operation on transformer voltage or direct on 110 or 220 volts, 25 to 60 cycles. It has enclosed terminals and is tapped for ½-in. conduit, also holes for entrance of line wires, for which in either plugs are furnished to close the line entrance not in use. It is equipped with 3-, 4- and 5-in. hard steel nickel, brass or galvanized plate or cast bell metal gongs, as required.

Cyclone Bell No. 77 is of the same construction as Bell No. 75, and has the same fundamental principles as all the other alternating current Cyclone bells except that the mechanism and frame of the bell is much heavier to produce the greatest volume of tone from gongs 10 to 14 in. in diameter. All terminals are enclosed, the same as No. 75, and plugs are furnished for closing the entrance not in use. This bell is also for direct operation on transformer or 110 to 220 volts.

These bells are especially recommended for school houses and industrial plants; in fact any place where signals are required.



No. 75 CYCLONE VIBRATING BELL



No. 77 CYCLONE VIBRATING BELL

Continued on next page

Special Equipment—Manual trip device with chain and pull knob can be furnished with Schwarze Cyclone Bells so that bell can be operated when current is shut off.

Schwarze D. C. Single Stroke No. 21—This is a single type of bell for use with direct current only.

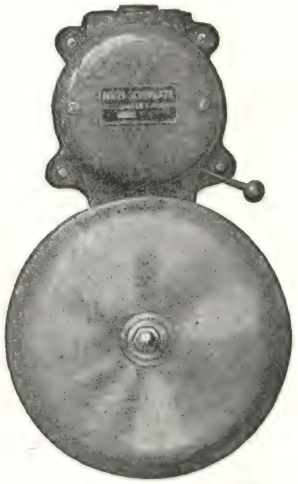
Construction—The mechanism of the bell is entirely insulated from the frame. It is made with inside terminals only, and tapped for ½-in. conduit. It can be operated in multiple or in series. It can be furnished with back boxes if so required.

Uses—The bell is designed for fire alarm service, factory signalling, superintendent's calls, etc., and is an excellent bell for code signalling work.

The No. 21 standard winding is 3 ohms.

Gong Equipment—Hard steel or cast bell metal. Hard steel gongs are furnished with nickel plate, brass plate or galvanized plate.

Size of Gongs—6, 8, 10, 12 and 14 in.



No. 21 Single Stroke Bell

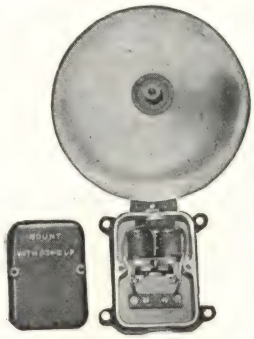
Single A. C. Stroke No. 24—This is a single gong type for use on alternating current only, and not to exceed 60 cycles.

Construction—Made with inside terminals only and tapped for ½-in. conduit. It is designed for multiple operation but a small number can be operated in series, and should be mounted with gongs up.

No. 24 standard winding is 25 ohms.

Gong Equipment—Hard steel or cast bell metal. Hard steel gongs are furnished with nickel plate, brass plate or galvanized plate.

Size of Gongs—6, 8, 10 and 12 in.



No. 24 Single Stroke Bell

Polarized Bells No. 9, 9A and 11—These are of the double gong type for use with alternating current only, not to exceed 60-cycle frequency.

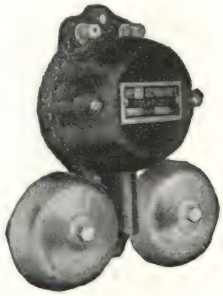
Construction—No. 9 and No. 11 are for alternating current only from secondary transformer circuit or direct on 110- or 220-volt circuit. No. 9 and No. 11 have outside terminals; No. 9A has inside terminals and is tapped for ½-in. conduit. These bells can be operated in multiple or in series.

Nos. 9 and 9A standard winding is 8 ohms.

No. 11 standard winding is 5 ohms.

Gong Equipment—Hard steel or cast bell metal.

Size of Gongs—Nos. 9 and 9A: 2½, 3, 4 and 5 in. No. 11: 6, 8 and 10 in.



Nos. 9 and 11 Polarized Vibrating Bell

Buzzers

This type is for alternating current circuits only, not to exceed 60-cycle frequency.

Construction—No. 16 polarized or magneto buzzers are absolutely dustproof and weatherproof. The mechanism in this buzzer is entirely insulated from the frame, and has no contact points to arc or spark as is the case with all other Schwarze alternating current bells, the action of the working parts being absolutely controlled by magnets. This buzzer can be operated either in multiple or in series.

No. 16 standard winding is 8 ohms.

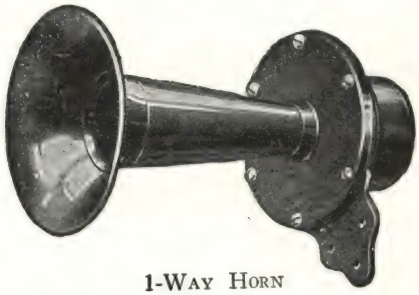
Buzzer

Electric Vibrating Horns No. 3

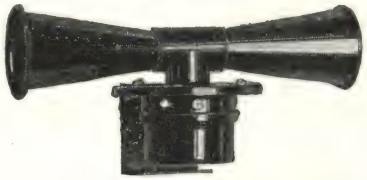
This horn is made with 1-way, 2-way and 3-way projectors.

Finish—Standard black enamel, with nickel screws.

Tone—Volume of tone produced is very great; the tone is deep, resonant and penetrating, which are the qualifications necessary for a reliable warning signal.



1-Way Horn



2-Way Horn

Construction—No. 3 horn has two binding posts for open wiring circuit or can be furnished for conduit installation. It is for operation on dry cell or high voltage direct current transformer or high voltage circuit alternating current. These horns are recommended for operation in multiple only although it is possible to operate a small number in series.

3-Way Horn

Uses—For dormitories or hallways of hotels and public buildings as fire alarm and calling signals where alarms must be thrown in different directions. These horns are a very practical alarm.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

AND ASSOCIATED COMPANIES

Telephone Service

The engineers of the Bell System will be glad at any time to give architects, owners or builders, the benefit of their experience in connection with the provision of facilities in buildings to accommodate cables and wires for telephone service, and to assist them in planning the best system for each individual case.

SYMBOL OF SERVICE

In modern office buildings, hotels and apartment houses, large numbers of telephones are required. It would be inconvenient and impracticable to run a pair of wires through these large buildings each time a telephone was installed, as is ordinarily done in residences or small business buildings, in order to establish a connection with the outside wire plant of the telephone system. To overcome this difficulty, when the plans are prepared for office buildings, hotels, or apartment houses, a forecast should be made of the probable future requirements of the building as a whole for telephone service, and facilities should be provided for a certain amount of cabling with the necessary terminals and subsidiary wiring. All large cities contain many buildings that are cabled and wired for telephone service according to a comprehensive plan, and of the smaller places there are few that do not have some buildings of a character requiring more or less provision of this kind.

The extensive use of the telephone at the present time, in hotels, apartment houses and office buildings, renders it essential that some provision be made in the plans for new buildings of these types to care for the large numbers of wires necessary in connection with furnishing telephone service. When it is realized that in a number of buildings there are as many as a thousand telephones in service, and that it is necessary to carry two wires from each telephone to some central point in the building, the importance of making adequate provision of this service is apparent.

Owing to the type of building construction generally employed and the large number of telephones to be served, unless suitable facilities are provided in advance for accommodating the cables and wires and for running them through walls and floors, the work will be unsightly, in spite of all precautions to the contrary, or costly alterations will be required after the completion of the building to admit of effectively concealing the wires. It is therefore of great importance to owners and architects that in preparing plans and specifications for office buildings, hotels, apartment houses or other buildings requiring extensive telephone service, suitable arrangements should be made for such telephone wiring and terminal boxes as the character and use of the building will demand. While the general manner of wiring buildings of the same class will be similar, the particular requirements may differ considerably on account of special conditions. It is therefore desirable that the probable needs of the building with respect to its telephone service be forecast as closely as possible.

As every large building to a certain extent presents problems of its own, advantageous and economical arrangements can frequently be suggested by those who are especially familiar with work of this kind. The engineers of the Bell System have gained experience in these matters which peculiarly fits them to assist architects, owners or builders in planning the best system for each individual case.

The engineers of the Associated Bell Telephone Company operating in your city will be glad, at any time to be of assistance in these matters.

WIRING PROBLEMS OF THE SPECIFICATION WRITER QUICKLY SOLVED THROUGH BELL SYSTEM SERVICE

THE SCREW MACHINE PRODUCTS CORPORATION

Manufacturers of the Select-O-Phone, an Automatic Telephone and "Paging" System

PROVIDENCE, R. I.

Product

The SELECT-O-PHONE, an Automatic Central Station Interior Telephone System which eliminates both operator and complicated cables.

Adaptability

The Select-O-Phone is adaptable to the varying service requirements of such institutions as industrial plants, administration buildings, state institutions, offices, mines, private estates, and residences, both large and small.

Description

The Select-O-Phone system is made in 12-, 36- and 55-line capacity, and the station capacity may be doubled or tripled by party lines. The system is built on the unit plan, permitting as few stations as are needed to be installed initially, and stations added one by one up to the ultimate capacity. The line wiring is exceedingly simple, consisting merely of a single strand of triple conductor wire from each station to the switchboard.

Service Features

The general call, or "paging," feature (optional) provides a ready means for quickly finding a party who may be away from his regular station.

Secret conversation between any two stations without cut-off or interruption.

Secret conference, or general conversation between three or more stations.

Select-O-Phone handles separately and simultaneously as many calls as may be initiated.

Executive right-of-way for the chief to all telephones whether busy or not.

Provides watchman's call and auxiliary fire alarm service.

The Select-O-Phone for the Home

We feature the Junior type Select-O-Phone for residences and estates of moderate size where not more than 12 stations are needed; the standard system for larger homes.

The advantages of using either the standard or the Junior type Select-O-Phone, to both architect and owner will be evident when it is realized that because of the simple wiring, and the flexibility of the Select-O-Phone system itself, it is not necessary to definitely and carefully plan the exact number of telephones or the exact locations when the plans are drawn. If all the probable locations are planned for by a run of inexpensive triple wire from a baseboard plug in each room to a central point where a switchboard may be placed, the owner's requirements can always be cared for readily whether his ideas change before the completion of the building, or several years later.

Because the wiring is a single strand of triple wire instead of a cable, a change of location in a room can easily be accomplished; therefore it is not necessary to restrict the owner's plans for furnishings by telephones located before his ultimate ideas have been formulated.

In new buildings where conduit is to be installed, use the ½-in. size. The single strand of triple wire may be run without conduit, and in old buildings or during alterations may readily be pulled into the walls from attic or cellar.

The Junior system has all the features of the standard system except secrecy and paging features, and may be operated from a battery of dry cells.

Select-O-Phone Instruments

The three types of Select-O-Phones most generally used are shown below. Other types are shown in our catalogue. All instruments are finished in dull black enamel and polished nickel. Similar to standard city service instruments, with addition of numbered dial.

STANDARD WALL SELECT-O-PHONE

STANDARD DESK SELECT-O-PHONE

HAND MICRO-PHONE DESK SET

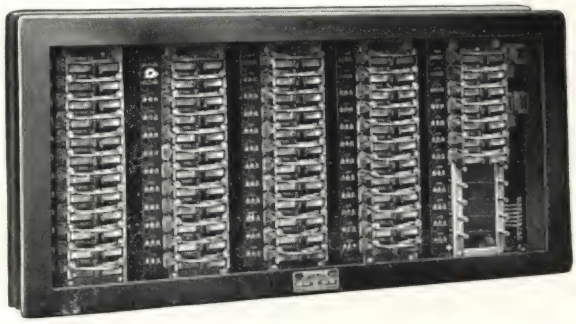
Automatic Central Switchboards

Switchboards are made in three capacities, 12, 36 and 55 lines.

Type M-55—Capacity, 55 lines. Dimensions, 45x24x9 in.

Type M-36—Capacity, 36 lines. Dimensions, 30x24x9 in.

Type M-12 and Junior Type—Capacity, 12 lines. Dimensions, 15x24x9 in.



TYPE M-55 AUTOMATIC CENTRAL SWITCHBOARD

Catalogue and Specifications

Our catalogue, descriptive of Select-O-Phone apparatus and service, and our standard specifications, which should be in the files of every architect and engineer, will be sent on request. Ask for No. 185 and No. 186 respectively.

AUTOMATIC ELECTRIC COMPANY

Automatic Telephone Equipments

FACTORY AND HOME OFFICE

Corner Morgan and Van Buren Streets

CHICAGO, ILL.

BRANCH OFFICES

BOSTON, MASS., 445 Tremont Building
NEW YORK, N. Y., 21 East 40th Street
PHILADELPHIA, PA., The Bourse Building
ROCHESTER, N. Y., 612 Mercantile Building
WASHINGTON, D. C., 905 Munsey Building
SAN FRANCISCO, CAL., 320 Market Street
PITTSBURGH, PA., 608 Fulton Building
DETROIT, MICH., 525 Ford Building
CLEVELAND, OHIO, 415 Cuyahoga Building
COLUMBUS, OHIO, 516 Ferris Building
KANSAS CITY, MO., 1001 New York Life Building
LOS ANGELES, CAL., 238 San Fernando Building

ASSOCIATED COMPANIES

INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, 21 East 40th Street, New York, N. Y.
INTERNATIONAL AUTOMATIC TELEPHONE CO., LTD., 60 Lincoln's Inns Field, London, W. C. 2
NORTHERN ELECTRIC CO., LTD., 121 Shearer Street, Montreal, P. Q., Canada
AUTOMATIC TELEPHONE MANUFACTURING CO., LTD., Milton Road, Edge Lane, Liverpool, England
AUTOMATIC TELEPHONES AUSTRALASIA, LTD., 207 Macquarie Street, Sydney, Australia
COMPAGNIE FRANCAISE POUR L'EXPLOITATION DES PROCÉDÉS THOMSON-HOUSTON, 13 Passage des Favorites, Paris, France

Products and Services

Manufacturers and installers of AUTOMATIC TELEPHONE SYSTEMS for private and public service.

History and Adoption

The Automatic system was first utilized for city exchanges and has been thus serving in numerous cities in America and abroad for over 25 years.

During the past 20 years, this equipment has been adopted extensively for private interior exchange service, and is now in operation in many of the most representative organizations throughout the world.

Among these users may be mentioned, as typical, the Federal Reserve Bank of New York, Sears, Roebuck & Co., the Goodyear Tire and Rubber Co., Bellevue Hospital of New York, James Deering's residence at Miami, Fla., and many important government institutions in America and abroad.

Instruments

The instruments in this system are similar to those of the ordinary telephone system, with the exception of raised dial 2¼ in. in diameter, which has around its rim 10 holes numbered from 1 to 0, and is revolved by means of the finger.

Of the instruments there are various types; wall, desk, hand, mine, and others specially designed for particular purposes.

HAND TELEPHONE
Light, compact, handy; 9 in. long. When not in use hangs from hook under desk

Automatic Exchange

This apparatus takes the place of the manual switchboard and the operator, and is placed in any convenient or available space, the size of which depends on the size of the system. Neither natural light nor ventilation is essential.

The apparatus is entirely self-contained, enclosed in a glass cabinet, and sufficiently attractive in design and finish to be installed in a conspicuous place.

AUTOMATIC DESK TELEPHONE
No larger and no heavier than the manual

AUTOMATIC WALL TELEPHONE
6¼x7½x4 in.; ebony finish

The private automatic exchange switchboard is designed to serve any number of stations from 20 to 2000 or more.

Automatic Electric Services

In addition to interior telephone service this equipment renders a group of affiliated services all controlled and operated by the Automatic exchange and involving but slight extra wiring or expense.

Any or all of these services may be included in the initial installation, or added later, as required. Some of these services are:

Continued on next page

Code Call—By which code signals can be sent out to horns, bells, lights, etc., in all parts of the establishment, to locate a person not at his desk.

Conference Wire—By which three or more persons can meet and confer telephonically.

Emergency Alarm—For fire or other emergencies. This may be a general alarm, or may give both "still" and general alarms.

Watchman's Service—Giving a complete check on the activities of watchmen, co-ordinating their activities and keeping them constantly in touch with the chief watchman or other official.

Method of Operation

The person who is calling lifts the receiver in the customary manner, and connection is then made by rotating the dial. If station 65 is wanted the finger is placed on the dial hole over 6 and drawn around to the finger stop. Then the finger is removed, and the dial revolves back to its original position. The operation is repeated for the number 5. This completes the connection and rings the bell at Station 65. It requires but two seconds to make such a call.

The ring is heard in the receiver of the calling station, and is repeated at intervals until the called station answers or the receiver is hung up at the calling station. If the station wanted is engaged, a distinct buzz is heard by the person calling. The hanging of the receiver on the hook breaks the connection, and another call can be made immediately.

The system is so flexible that those who do not wish to make their own calls can have their telephones so arranged that a clerk or stenographer can dial the connections for them.

Guarantee

The Automatic system is warranted to give absolutely satisfactory service and is guaranteed against defects of material or workmanship for one year.

Full and precise data and specifications gladly furnished on request.

Specifications for the P-A-X Type Interior Telephone

(A) In General—This contractor shall furnish and install a two-wire automatic telephone system of the Automatic Electric Company's P-A-X type, or equal, as approved by architect, to consist of the apparatus described below. The system shall provide the following services:

a—All stations shall be able to communicate with each other.

b—Any two stations shall be able to communicate without the possibility of being overheard or interfered with by a third station.

c—Access by any station to any line already in talking relation with another line to be automatically prevented, and a busy signal shall be transmitted to station attempting such connection.

d—Selection of number shall be made by a dial attached to each telephone.

e—Ringing of bells shall be automatically controlled from the switchboard without necessity of a ringing key or button at the telephone.

f—Provision shall be made for allowing a conference of three or more persons on one predetermined switchboard number.

g—Switchboard must be designed so that a full automatic code call system may be added at any time at the option of the purchaser.

h—Switchboard shall be so designed that the system can be expanded indefinitely, retaining all features specified above.

(B) Switchboard—The switchboard shall have a capacity of ..... lines and be equipped at present with ..... lines. Additional lines to be added without any alterations in the original equipment up to specified capacity.

Switchboard to be complete with switching mechanism. Also power panel containing voltmeter and ammeter and an automatic device for maintaining storage battery charge. Approved alternating current ringing and busy machine to be mounted on the switchboard.

(C) Telephones—The telephones shall be of the wall and desk types as follows:

..... Wall Type
..... Desk Type

Finish of telephones to be standard black enamel with nickel trimmings. Each telephone shall have a calling dial as an integral part of itself. Such dial to consist of a revolving disc having ten finger holes under which shall be mounted a stationary plate containing the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

All telephones shall be provided with long distance type transmitters and receivers. Ringers shall be of the polarized double gong type.

(D) Battery—The necessary current for all operating, transmission and ringing purposes shall be furnished by one storage battery of approved telephone type, battery to be a ..... ampere hour battery, type Electric Storage Battery Co.'s make or approved equal. Battery to have glass jars.

Motor generator charging set to be of ..... watt capacity.

(E) Wiring—All telephone wiring shall be of No. 19 B. & S. gauge copper twisted pair, braided, rubber covered interior telephone wire of first quality. A single pair of wires shall be used from each telephone directly to the automatic switchboard, or to the nearest distributing cable terminal. Where found more convenient standard No. 22 gauge silk and cotton insulated lead covered switchboard cable may be used from local distributing points to the switchboard. Cable wires and telephone distributing wires shall be terminated on approved terminal blocks mounted in approved cabinets.

(F) Conduits—Contractor shall run conduits in the switchboard room between the various pieces of apparatus according to the manufacturer's blue print layout.

(G) Installation—This contractor shall install all apparatus and connect all telephones, and shall turn the entire system over to the owner in first class operating condition.

Switchboard installation shall be according to specifications furnished by the manufacturer.

FEDERAL TELEPHONE & TELEGRAPH CO.

Engineers and Manufacturers of Telephone, Telegraph and Radio Apparatus

FACTORY AND GENERAL OFFICES
BUFFALO, N. Y.

BRANCH OFFICES
NEW YORK, N. Y., 2158 Woolworth Building
BRIDGEBURG, ONTARIO, CAN.
SAN FRANCISCO, CAL., 693 Mission Street
LONDON, ENG., 124 Tooley Street
ALSO SOLD BY ELECTRICAL DEALERS IN ALL PRINCIPAL CITIES

Products

INTER-COMMUNICATING TELEPHONE SYSTEMS for use in banks, hospitals, stores, offices, factories, and residences.

APARTMENT HOUSE TELEPHONE SYSTEMS, including Flush and Surface Type Telephones, Mail Boxes, Annunciators, Switchboards, and theftproof, loud speaking "Cordless" Vestibule Equipment.

PRIVATE BRANCH EXCHANGE SYSTEMS, including Switchboards and Telephones of the economical series lamp line type for schools, hospitals, factories, hotels and apartment houses.

Inter-communicating Telephone Systems

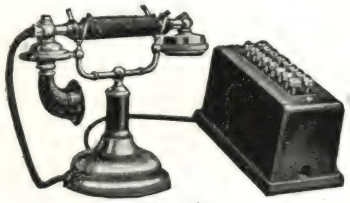
These may be divided into two general classes: non-interfering "Selective Talking Selective Ringing" and "Multiple or Common Talking" Systems.

The first provides a service wherein as many separate conversations may be carried on at a time, without interference, as there are pairs of telephones. No operator is required.

The following types of telephones may be used:

No. 1408

No. 1001



No. 1534

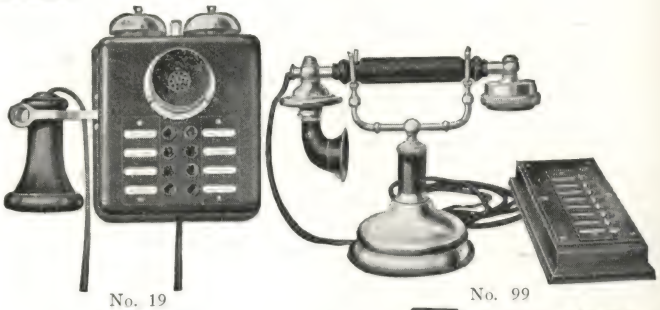
No. 1233

TYPES OF APPARATUS

The "Multiple or Common Talking Systems" are subdivided into three classes: "Common Talking Code Ringing Systems"—all bells ring simultaneously and a code signal must be employed: "Common Talking-Selective Ringing Systems"—each station may signal, without interference, any other station; "Common Talking Master Stations Systems"—calls from and between outlying stations, must be through the "Master Station" which is provided with selective ringing button to signal all outlying stations.

As common talking systems have but a single pair of talking wires only one conversation may be carried on at a time. Only "Master Station Systems" require an attendant.

The following types of telephones may be used:



No. 19

No. 99

No. 69

No. 17

No. 39

TYPES OF APPARATUS

Flush Types Nos. 22 and 22-H, shown under "Apartment House Telephone Systems," supplied to operate on any inter-communicating or private branch exchange system.

Apartment House Telephone Systems

This company manufactures a complete line of standardized equipment for apartment house use.

Three classes of systems supplied—First, the theftproof loud speaking *"cordless"* systems—the vestibule telephone being of the *"cordless"* type; second, systems wherein the vestibule telephone is of the standard hand receiver, common talking type; third, systems wherein the vestibule telephone is of the hand receiver non-interfering type.

Classes one and two are designed to supply common talking service, limiting systems to but one conversation at a time.

Class three provides a non-interfering service which permits of more than one conversation being held at a time. Example: the suite may converse with the vestibule and the janitor may be in communication with either the tradesman or with another suite at one and the same time.

Vestibule Equipment—Can be supplied in 2-, 3-, 4-, 5- or 6-gang sizes. Wall openings and outside dimensions of apparatus figured from chart:

Gang size	Dimensions based on one telephone and one letter box unit				
	Outside dimensions, in.		Wall openings, in.		Add to width of wall openings for each additional unit desired, in.
	Width	Height	Width	Height	
2	11 3/4	9 3/4	11 1/4	9 1/4	5 7/8
3	11 3/4	12 7/8	11 1/4	12 3/8	5 7/8
4	11 3/4	16 5/16	11 1/4	15 11/16	5 7/8
5	11 3/4	19 7/16	11 1/4	18 15/16	5 7/8
6	11 3/4	22 11/16	11 1/4	22 3/16	5 7/8

Continued on next page

Telephones for the front entrance are furnished usually in connection with letter boxes; two types are illustrated herewith.

No. 4312. Telephone With No. 3 Letter Boxes

The first, No. 4312, is a very popular type of equipment. The telephone is equipped with our standard "long distance" transmitter mounted on back of the plate with a formed metal mouthpiece, and the popular "pony" bi-polar received mounted on front of the plate. Push buttons and name designation plates are provided on telephone. Letter boxes are nested type, amply large, equipped with locks and keys (no two alike), plate glass windows and patented card holders inside the boxes.

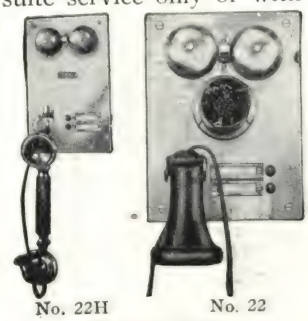
Entire outfit is finished in brush brass and altogether presents a very attractive appearance. Supplied with push buttons mounted on letter boxes if preferred.

No. 3030. Telephone With No. 3P Letter Boxes

The second type of equipment, No. 3030, is the latest development and absolutely the most modern of vestibule apparatus. The telephone transmitter of "long distance" quality is mounted back of the plate with a formed metal mouthpiece on the front. The loud speaking receiver is also mounted back of the plate, the sound coming through dustproof openings as shown below the transmitter. This telephone equipment was primarily designed to protect system from theft and breakage of mouthpieces, receivers and receiver cords, thereby lessening the chances for trouble and the system becoming unusable because of such theft.

The letter boxes are the same as described above with the exception that the push buttons are mounted under the plate glass windows instead of on the telephone. Finished in brush brass.

Suite Telephones—These are furnished without push buttons for vestibule to suite service only or with one, two or three buttons as required to operate door opener and to signal janitor and laundry. Flush telephones finished in brush brass. Wall openings, $7\frac{13}{16}$ x $5\frac{5}{16}$ in. Surface types Nos. 19 and 39, shown under "Inter-communicating Telephone Systems," supplied to operate on any apartment house system.



No. 22H No. 22

Flush Type

Rear Entrance Telephones—The most serviceable telephone for use at the "tradesman's entrance" is Type No. 19. Any of the foregoing types may be supplied for this station but we recommend the above named to withstand the rough usage of the average delivery boy.

Janitor's Telephone Equipment—The same telephones may be used in the janitor's apartment as for the suite, the number of call buttons depending on whether provision is to be made for calling individual suites, or receiving incoming calls only from tenants.

Annunciators and Annunciator Switchboard—When call recording is desired, annunciator is employed. Annunciator-switchboards supplied, to be operated by the janitor, to inter-connect suites, if desired.

Laundry Telephones—Specify Type No. 19.

Batteries—Dry cells are used to operate all of the above systems, the number of cells depending upon the size and type of system desired.

Wiring Diagrams—These are furnished with each shipment of telephones.

Private Branch Exchange Systems

Private branch exchange systems which include switchboards of the series lamp line common battery type provide not only the very highest class of service but are the most economical type of switchboard.

Switchboards can be supplied in the standard floor and wall types, and where the operator is to do clerical work, the double or the single pedestal desk type, illustrated herewith may be furnished.

Federal Switchboards—Are regularly finished in a golden oak shade and are constructed from the very best grade of American white oak.

Large apartment houses requiring a very high and flexible class of service should be provided with a private branch exchange system.

Trunk lines may be installed for connection to outside city exchange lines.

Batteries—Either dry cells or storage battery can be used to supply all operating current.

Telephones—Any of the types of telephones illustrated may be used in connection with P.B.X. Systems with the omission of push buttons.

Wiring — Three wires are necessary at each station; two being direct talking wires running from the switchboard and the third is a wire common to all outlying stations used for ringing purposes.

Federal Switchboard, No. 7221

Engineering Service

We invite the architects, the general and electrical contractors, dealers, etc., to communicate with us relative to their specific telephone problems and requirements.

We maintain an Engineering Department with over 22 years of experience at your command for the asking. The application of our systems and apparatus to your installation is absolutely without cost or obligation to you. A thorough study of the problem frequently leads to the saving of a considerable amount and is sure to be fruitful of the very best results. A telephone system wrongly applied leads to grave disappointment.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY

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ROCHESTER, N. Y.

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DEALERS AND INSTALLERS IN ALL PRINCIPAL CITIES

Products

Manufacturers of INTER-COMMUNICATING TELEPHONE SYSTEMS and TELEPHONE APPARATUS.

Also manufacturers of Telephone Cables and Supplies.

Apartment House Telephone System No. 5

System No. 5 covers what is known as an apartment house telephone system, offering to architects, contractors and owners a standardized line of apartment house telephones which are equipped with commercial standard transmitters and receivers, thus insuring greater talking efficiency and much clearer articulation of speech than that obtained through the use of telephones equipped with transmitters and receivers designed for short distance service only.

In other words, this apartment house line of inter-communicating telephone apparatus is equipped with the same standard transmitters and receivers as used on Stromberg-Carlson public exchange telephone apparatus.

The No. 5 inter-communicating telephone system provides communication between the vestibule, apartments, janitor's quarters, laundry and tradesmen's entrances. There are different combinations of the No. 5 system, differing from each other in the way that they are connected for inter-communicating service. The operation, however, is the same with any combination, as the system is wired on a common-talking basis.

Vestibule Telephone Outfits—The vestibule outfit consists of 1 vestibule telephone and any number of 3-gang letter boxes, each equipped with push buttons to signal the suite telephones; or a vestibule telephone and a call unit which is equipped with push buttons for signalling the suite telephones, and the 3-gang letter boxes without push buttons.

Upon referring to Plates No. 23 and 24 below, it will be noticed that the vestibule telephone outfits for less than 12 apartments are always furnished with the push buttons in the letter boxes, while for 12 apartments or more it is at the option of the customer as to whether the push buttons would be mounted in the letter boxes or in the call unit referred to above, the price in both instances being the same.

The vestibule telephone is equipped with the necessary talking instruments and 1 push button for calling the janitor. Push buttons associated with the letter boxes or mounted in the call unit when depressed will ring the corresponding suite telephone. No other telephone in the system will be signalled but the one selected.

Letter Boxes—Each nest of letter boxes is designed with 3 compartments, equipped with locks and card holders for indicating the name or number of the apartment. Duplicate keys (no two alike) are furnished for each letter box.

Suite Telephones—Suite telephones are furnished in 3 types—non-flush wall, flush brush brass wall and micro-phone type, equipped with 1 or 2 buttons, depending upon the type of service selected. These push buttons, when depressed, will operate the door opener, call the janitor or any other combination selected—such as the laundry or the tradesmen's entrance telephone.

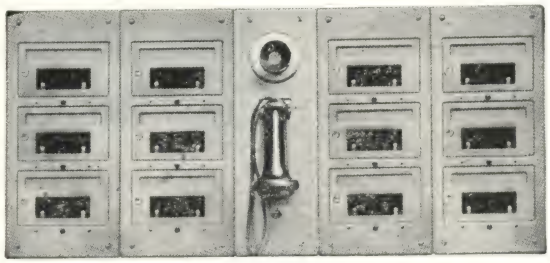


Plate 23. Equipped with Push Buttons Associated with Each Letter Box

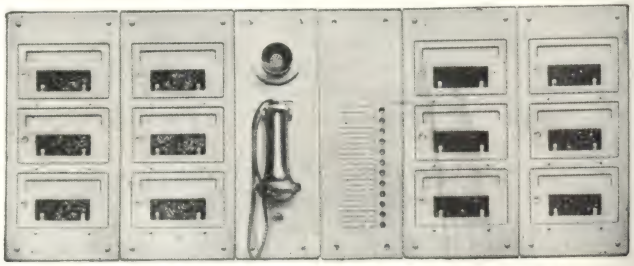


Plate 24. Equipped with Push Buttons Located in Call Unit

APARTMENT HOUSE VESTIBULE TELEPHONE OUTFITS WITH THREE-GANG LETTER BOXES

DIMENSION DATA, PLATE 23

Outfit No.	Number of suites	Number of 3-gang boxes	Outside dimensions, in.		Wall opening, in.	
			Width	Height	Width	Height
1	3	1	12	15	11	12¼
2	6	2	19	15	18	12¼
3	9	3	26	15	25	12¼
4	12	4	33	15	32	12¼
5	15	5	40	15	39	12¼
6	18	6	47	15	46	12¼
7	21	7	54	15	53	12¼
8	24	8	61	15	60	12¼
9	27	9	68	15	67	12¼
10	30	10	75	15	74	12¼

DIMENSION DATA, PLATE 24

Outfit No.	Number of suites	Number of call units	Number of call unit buttons	Number of 3-gang boxes	Outside dimensions, in.		Wall opening, in.	
					Width	Height	Width	Height
4-A	12	1	12	4	38	15	37	12¼
5-A	15	1	15	5	45	15	44	12¼
6-A	18	1	18	6	52	15	51	12¼
8-A	24	2	24	8	71	15	70	12¼
10-A	30	2	30	10	85	15	84	12¼
12-A	36	2	36	12	99	15	98	12¼

Continued on next page

No. 1148 Flush Type—Standard suite telephone set for flush wall installation. Furnished with brush brass finished face plate and metal outlet box. Carries 2 push buttons—one for calling janitor's telephone and the other for electric door opener.

Mounting space 5x9 in. Wall opening required $4\frac{11}{16}$x$8\frac{7}{16}$ in.

No. 1148
Flush Type

No. 965
Non-flush Type

Apartment House Suite Telephones

No. 965 Non-flush Type—Standard suite telephone set for non-flush wall installations. Furnished in metal, finished with a semiglossy black finish. Carries 1 or 2 push buttons as per list below. Mounting space $5\frac{7}{8}$x$7\frac{3}{8}$ in.

Code	Use	No. of push buttons
965-G	Suites	1
965-F	Suites	2
965-H	Janitor's set	1

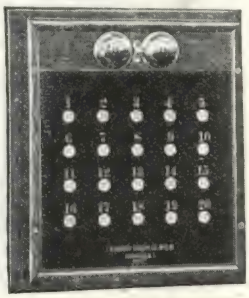
No. 10 Micro-phone Type—A suite telephone that may be installed as either a wall or desk telephone to any vertical surface. Always within convenient reach yet never in the way. Furnished in semiglossy black enamel.

Code	Use	No. of push buttons
10-D	Suites	1
10-J-D	Suites	2

No. 10
Combination
Type Suite
Telephone

Janitor's Telephone, etc.—The janitor's and laundry telephones can be arranged for either receiving calls from the other stations without being able to signal back, or for receiving calls and signalling and talking back to the suite telephones. They can also be equipped with an annunciator which records all calls during the absence of the janitor or laundress, permitting them to get in touch with any desired suite upon their return, should some one have called during their absence.

For less than 15 suites it will be necessary to use a No. 965-H janitor's telephone in conjunction with a push button block and the annunciator as shown. For 15 suites or more it is at the customer's option to use this type of set or a janitor's annunciator switchboard.

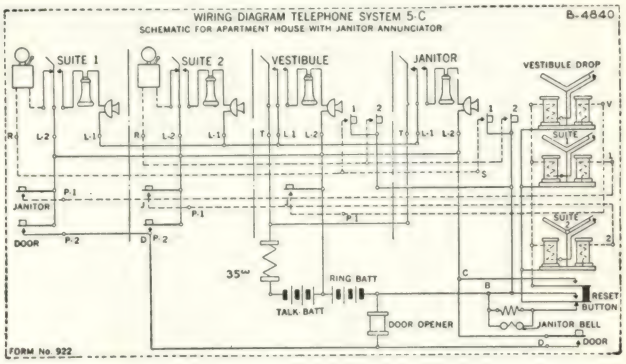


Janitor's Annunciator

The tradesmen's set consists of a No. 965-H wall telephone and a push button block equipped with a sufficient number of push buttons to call each and every suite.

Wiring of the System—The plate below shows the general wiring scheme for an apartment house system and the following data will provide information covering the number of wires to be run for any of the systems listed.

For connections between the various stations either cable or loose wires can be used, depending largely upon the layout of the building. Naturally where there is a



Wiring Diagram, Telephone System 5-C

long run of a large number of wires, as in the case of the various vertical risers from floor to floor, it is recommended to use cable and to install terminal blocks at the various distributing points.

For connecting the suite telephones to the various distributing points twisted pair wires are generally run and these should be No. 19 gauge B. & S. rubber covered and braided telephone wire.

Specification Data

The following is a list of the different combinations of system No. 5, the service given; apparatus required; wiring and battery requirements.

System No. 5-A—*Service*—Vestibule can call apartments, apartments can open door.

Apparatus Required—One group vestibule telephone outfit with 3 or more 1-button suite telephones.

Wiring and Batteries Required—3 wires common to all telephones, 1 wire for each suite telephone. Dry batteries to furnish current for talking, ringing and door opening.

System No. 5-B—*Service*—Vestibule can call apartments and janitor, apartments can open door and call janitor.

Apparatus Required—One group vestibule telephone outfit with 3 or more 2-button suite telephones and a single janitor's telephone of the No. 965 type.

Wiring and Batteries Required—4 wires common to all telephones; 1 wire for each suite telephone. Dry batteries to furnish current for talking, ringing and door opening.

System No. 5-C—*Service*—Vestibule can call apartments and janitor, apartments can open door and call janitor, janitor can call apartments.

Apparatus Required—One group vestibule telephone outfit with 3 or more 2-button suite telephones and a janitor's telephone with push buttons and with or without annunciator or janitor's annunciator switchboard.

Wiring and Batteries Required—5 wires common to all telephones; 1 wire for each suite telephone. Dry batteries to furnish current for talking, ringing and door opening.

Note: Where common wires are spoken of it means that these 3 wires run throughout the entire system and terminate at each and every telephone, but one wire refers to an individual wire, the number depending upon the number of suites in the system. For example, 6 suites under system No. 5-A would require 3 common wires and 6 individual wires in the system.

Door Opener—A door opener is not listed, as it is assumed that the contractor carries them in stock. For a door opener only 2 or 3 additional dry batteries are required on the system. The working of the door, and the adjustment of the opener, control the amount of extra batteries required.

THE E. HOWARD CLOCK CO.

TELEPHONE
MAIN 643

373 Washington Street
BOSTON, MASS.

NEW YORK OFFICE, 305 Broadway—Telephone, Worth 9354 CHICAGO OFFICE, 31 North State Street—Telephone Connection

Products

CLOCKS: Tower Clocks; Magneto Watchman's Clocks; Electric Clock Systems for public buildings; Program Clocks for ringing bells at stated intervals; Post and Bracket Clocks; Astronomical Clocks for observatories; Westminster Chiming Clocks for private estates; Library, Church and Banking Room Clocks; Hall, School and Office Clocks, Employee's Time Recorders; and specially designed clocks from architects' drawings.

Tower Clocks

Description and Materials—Howard clocks are made of the highest grade materials, the wheels of hard hammered brass with teeth accurately cut, and arbors and pinions of best open hearth steel. The escapements are the Graham dead beat or the Denison gravity. The frame and supports are of cast iron and bearings of bronze metal. The striking part is a repeater, making it impossible for the clock to strike wrong. A simple device is provided, so that the large hands on the tower can be easily and accurately set at the clock movement. The pendulum rod is of wood or of iron compensated with zinc. Clocks may be made to strike the half and quarters of the hour, either on the same or on different bells from those on which the hours are struck.

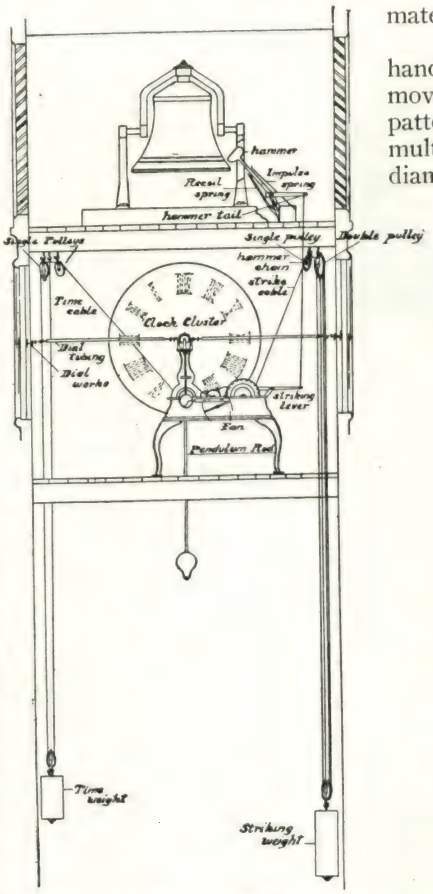


DIAGRAM OF RECOMMENDED RELATIVE POSITION IN TOWER CLOCKS OF DIAL CLOCK MECHANISM AND BELL

Installation—This company will contract for these clocks delivered and put up, as it prefers to do the work itself, having trained men for that purpose.

Caution: The diameter of the dial should not be less than one-tenth of the height of its center from the ground.

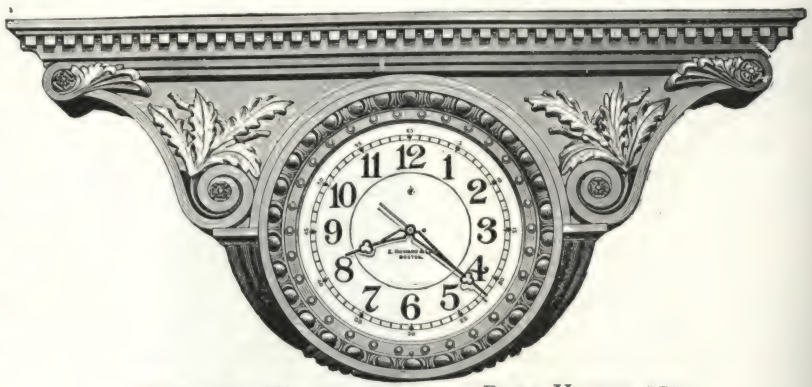
Illuminated Dials—It is recommended that all dials for illumination over 36 in. in diameter be made with skeleton iron frame. The advantages of such construction are:

(1) Should any one section of the glass become broken, it can be replaced at small cost, and any accident that would break a section would, of course, if a whole plate had been used, destroy the entire dial.

(2) When figures are painted on the glass or fastened to it with cement, they are quite short lived, because storms and extremes of heat and cold soon wear them off; and when they are fastened on by drilling holes in the glass, the glass is very materially weakened and will break much easier.

(3) On sectional dials when figures and hands need repainting, it is only necessary to remove one or more of the section glasses. Stock patterns for illuminated dials advance in sizes by multiples of 6 in., commencing at 3 ft. 6 in. diameter.

CUPOLA OF CITY HALL, PORTLAND, ME.
CARRERE & HASTINGS, New York, Architects
JOHN CALVIN STEVENS and JOHN HOWARD STEVENS, Portland, Associate Architects



CLOCK NO. 141. FOR GALLERIES, BANK VAULTS, ETC.
Dial, 24 in.: length, 7 ft. 2 in.: height, 38 in.
May be used as a hanging clock affixed to the ceiling, a ceiling beam or under a gallery railing, or may be reversed, to be set on a partition bank vault, or any other such structural feature

Continued on next page

Automatic Illumination Regulators—Automatic illumination regulators made in several sizes for governing gas jets or electric lights; time for lighting and extinguishing being made adjustable to conform to varying hours of darkness.

Accurate and Long Lived—Howard clocks do not vary more than 20 to 30 seconds in a month. A first class clock, properly made, will last 50 years with little or no expense. St. Lawrence Market Tower, at Toronto, Canada, has a clock made by this company that has been running for 75 years and is still in excellent condition.

Cost

A question blank has been prepared which, when properly filled out, will enable the company to give quickly and accurately the desired quotation.

Gallery, Partition, Bank, Vault and Ceiling Clocks

These can be furnished single or double faced. Cases are of oak, mahogany, walnut or other wood to match interior trim. Dials may be of fine marble or onyx; of metal finish in gold, silver and bronze; of glass, or of carved wood, and are always in harmony with, and appropriate to, the design and surroundings. Figures on dials may be painted on or made in metal and attached. They may be finished in gold or oxidized silver, various bronzes or steel blue.

Guarantee

Howard clocks are warranted to be first class in every respect, and free from all original defects for 5 years.

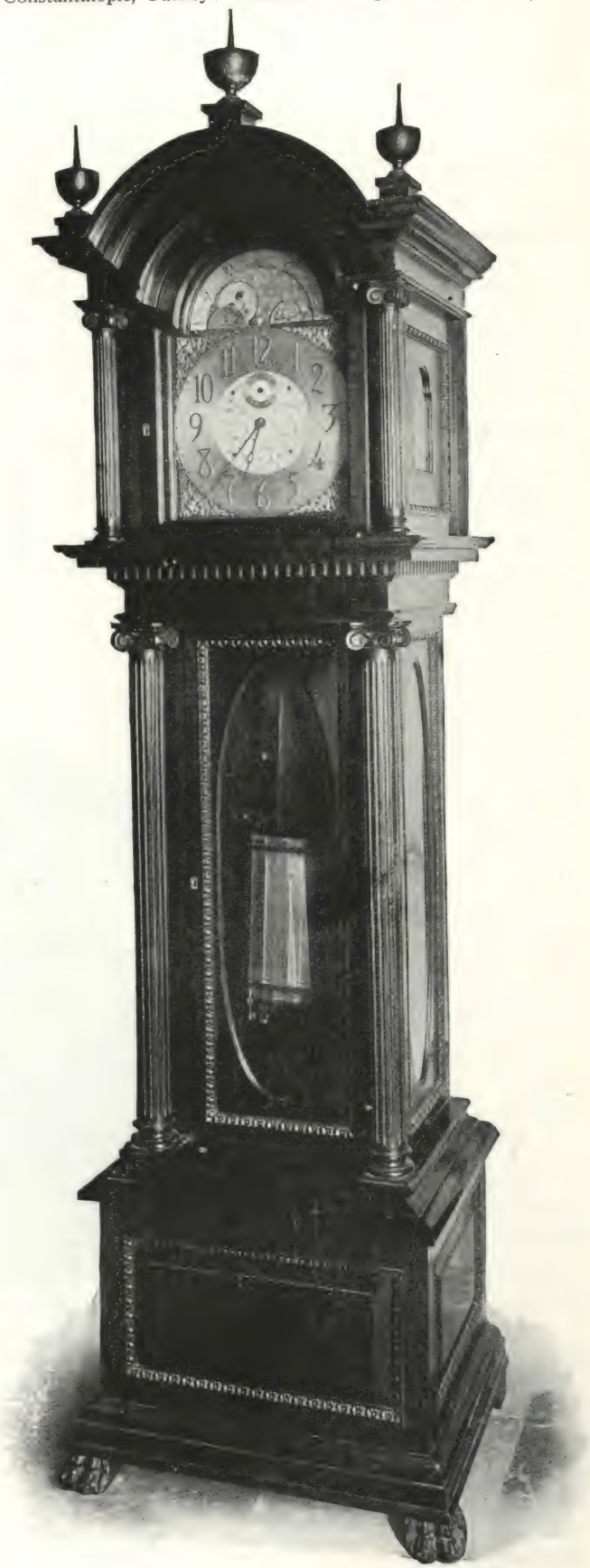
Co-operative Service

This company will conform to the ideas of the purchaser, and submit special designs to meet requirements.

References

Thousands of Howard clocks are in use all over the United States, in municipal, public and private buildings. Among others, are the following:

New York, N. Y.: Trinity Church; St. Patrick's Cathedral; J. P. Morgan & Co.; Bankers Trust Co.; Yale Club; B. Altman & Co.; City Hall; Fifth Avenue Hospital; Cunard Building; Lincoln School; Columbia University
Washington, D. C.: Library of Congress; National Museum; Smithsonian Institution; Scottish Rites Temple
Boston, Mass.: U. S. Custom House; City Hall; Wentworth Institute; Wm. Filene's Sons; Webster & Atlas National Bank; Massachusetts Trust Co.; Federal Reserve Bank
Chicago, Ill.: Wrigley Building
Texas: Dallas, Fort Worth and Waco City Halls and Courthouses
Detroit, Mich.: Hotel Statler; Henry Ford Hospital; Public Library
Danielson, Conn.: Danielson Cotton Co.; Quinebaug Co.
Waltham, Mass.: Waltham Watch Co.
Kewanee, Ill.: Walworth Mfg. Co.
Hastings, Nebr.: Junior High School
New Bedford, Mass.: Dartmouth Mfg. Corp.
E. Millinocket, Me.: Great Northern Paper Co.
Columbia, S. C.: Pacific Mills
Mt. McGregor, N. Y.: Metropolitan Life Insurance Company's Sanitarium
Wauregan, Conn.: Wauregan Co.
Pawtucket, R. I.: J. & P. Coats
New Orleans, La.: Hibernia Bank & Trust Co.
Richmond, Va.: First National Bank
Louisville, Ky.: St. Martin's Church
New Haven, Conn.: Harkness Tower, Yale Memorial Quadrangle; Sterling Chemical Laboratory, Yale University
Spartanburg, S. C.: High School
Utica, N. Y.: Country Day School
Jersey City, N. J.: First National Bank
Cleveland, Ohio: St. Thomas Aquinas Church
Pocantico Hills, N. Y.: Union Church
Terre Haute, Ind.: State Normal School
Montpelier, Vt.: National Life Insurance Co.
Toronto, Canada: Technical High School
Montreal, Canada: Royal Victoria Hospital
Constantinople, Turkey: American College for Girls



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Electrically operates 62 clocks scattered through this large hotel. Beautiful hall clock case suggests a club or a fine residence

SETH THOMAS CLOCK CO.

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PHILADELPHIA, PA., Herbert Bryan, The Bourse
MINNEAPOLIS, MINN., White & Converse, 915 Metropolitan Life Building

Products

Manufacturers of Tower Clocks of every description for public buildings, churches, factories, schools, private estates, etc.; Electric Clock and Program Systems.

Also Self-Winding Clocks, Street Clocks, Bracket Clocks.

Tower Clocks

For every purpose: timepiece only; strike hours and half hours; strike the quarters (ding dong) on 2 or 3 bells; play Westminster chimes on 4 or 5 bells; strike the "Angelus"; strike ship's time. Also electric release tower clocks to operate on secondary clock circuits for any size dial.

Description — Movements are substantially constructed. The wheels are of cast bronze, machine cut, pinions of steel (heat treated) all steel parts heavily copper plated. The mechanism mounted on a heavy cast iron bed frame. On the clock is a small dial to indicate the position of the hands on the outside dial; also a seconds dial for close regulation; a safety catch to prevent the fall and breakage of the pendulum rod should the suspension spring break. Escapement either Graham's dead beat, mahogany pendulum rod, or Dennison's double 3-legged gravity escapement, the pendulum of zinc and steel to insure accurate compensation.

Silencing Devices — On all striking movements we can fit an automatic attachment to silence the striking train for whatever hours desired; or a hand switch to silence the clock for special occasions.

Bell and Clock Tower, Mills College, Cal.

Automatic Light Switch—We can attach a double pole single throw Trumbull switch operated by a 24-hour wheel for automatically turning on and off the lights for illuminating the dials.

Self-winding Movements — (See illustration). We can equip movements with motors to operate on any current with automatic double pole single throwing Trumbull switches in weatherproof iron boxes automatically operated by the rise and fall of weight for automatic winding.

Dials—The diameter of dials should be 1 ft. for every 10 ft. of elevation.

Glass Dials—For illumination, can be furnished with safety in whole plate not exceeding 5 ft. in diameter. Over 5 ft. in diameter we furnish sectional cast iron or bronze numerals, the frame made in six sections rabbeted in the back to receive the glass and fastened together with brass clamps. The glass is ⅜ in. thick ground on both sides.

Wood Dials—Two layers of ½-in. boards, tongued and grooved with grain crossed to prevent shrinkage, the surface painted and smalted; metal numerals and minute dots painted black or gold leaf.

Iron Dials—Heavy galvanized iron with a wood backing 1½ in. thick. Numerals and finish same as for wood dials.

Skeleton Metal—Cast Roman or Arabic (no minute dots) mounted on 2 rings placed 2 or 3 in. from the face of the wall. Finish to be in contrast to color of wall.

Estimate — On account of the various arrangements and individual requirements, each clock is made to order and in order to make an estimate it is necessary for us to know whether it is a time or strike movement, the number, diameter and style of dials. On request we will gladly send a question sheet which, when properly filled in, will enable us to quote intelligently.

Guarantee—Our tower clocks are of first-class material and workmanship and guaranteed against original mechanical defects for a period of 5 years, and, when fitted with Graham's escapement, to run within a variation of thirty seconds per month, or with Dennison's double 3-legged gravity, ten seconds per month if given proper attention.

References

Colgate & Co., Jersey City, N. J.—1 dial, 38 ft. diam.
Emerson Drug Co., Baltimore, Md.—4 dials, 24 ft. diam.
Maryland Casualty Co., Baltimore, Md.—4 dials, 17 ft. diam.
C. Schmidt Sons, Philadelphia, Pa.—4 dials, 23 ft. diam.
W. Grundy & Co., Bristol, Pa.—4 dials, 14 ft. diam.
Daniels & Fisher Stores Co., Denver, Colo.—4 dials, 15 ft. 7 in diam.
Sears, Roebuck Co., Philadelphia, Pa.—4 dials, 11 ft. 6 in. diam.
Firestone Tire & Rubber Co., Akron, Ohio—3 dials, 8 ft. diam.

Continued on next page

Seth Thomas Electric Clock Systems

Self-winding master clocks, program clocks, secondary clocks, automatic charging panels, connector boards, push button boards, self-winding tower clocks for schools, office buildings, banks, hospitals, factories, railroad stations, etc.

Specifications—*Master Clock*—Case shall be of plain, neat design, 56 in. high, 20 in. wide, 8½ in. deep, finished to match adjacent woodwork, glass front, 14-in. white painted dial, black Roman figures. Highest grade 60-beat pendulum movement, weight driven, self-winding. Heavy brass plates, machine cut gears, solid cut steel pinions, polished. Graham escapement, jeweled pallets. Movement mounted on heavy cast iron frame and so arranged that it may be readily removed for the purpose of inspection. Oscillating type of circuit closers iridium platinum tipped. Winding contact non-adjustable, quick breaking and provided with non-inductive graphite shunt to prevent sparking. Equipped with wood rod and zinc ball pendulum guaranteed to operate within a variation of 30 seconds per month or with mercurial compensating pendulum to operate within 10 seconds per month with proper care and attention.

Secondary Clocks—Cases shall be of (mention pattern, see illustrations below). Equipped with minute impulse lever type movements and so constructed that the hands are locked at all positions and it is impossible to move the hands except by direct impulse of the armature, thus preventing slipping by shock or vibration. The wheels of brass, machine cut, all steel parts heavily nickelplated to prevent rust. No oiling or adjustments required. Magnets wound with enamel covered wire and provided with a non-inductive graphite shunt.

Program Clock—Furnish program instrument for automatically ringing bells (mention No. of schedules—2, 4 or 6). Furnish fitted in master clock (or in separate case). Equipped with minute interval program instrument of the ribbon type, with platinum tipped circuit closers and so constructed to automatically silence the bells on Saturdays, Sundays or any other 12-hour periods. Separate relays switch and push button for each circuit.

Connector Boards, Push Button Boards—Furnish connector board by means of which any bell or gong can be changed from one circuit to another by simply removing plug, without the use of tools and without changing wiring. Also a push button board having a button for each bell and gong so that any individual bell or gong may be rung manually.

Power Supply—Furnish sufficient number of storage cells of ampere hour capacity to operate all clocks and bells and installed in ventilated cabinet, hinged front door, painted inside and outside with 2 coats of acid-proof paint. Also charging board of 1 in. Munson slate for mounting on wall equipped with Weston voltmeter, ammeter, switches, fuses and tungar rectifier for charging the storage cells at the proper charging rate from A. C. current. Also automatic charger mounted on charging board to operate from master clock for automatically charging the batteries.

Guarantee—Manufacturer to guarantee against all original mechanical and electrical defects for a period of 2 years from date of installation.

References—We will gladly send on request, a list of installations, and names of architects and engineers who have given unqualified approval of our equipment.

"A"
6 to 30-in. Dials

"B"
6 to 30-in. Dials

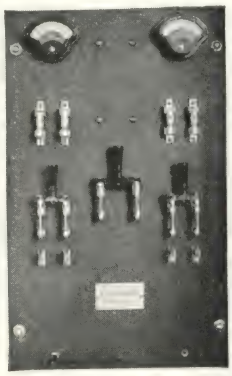
"F"
Flush Type, Mechanism Recessed in Wall

"C"
Marble Dial and Raised Bronze Numerals

Boiler Room Clock
Cast brass case

Program Clock
Push button and connection board

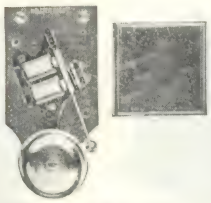
Master Clock



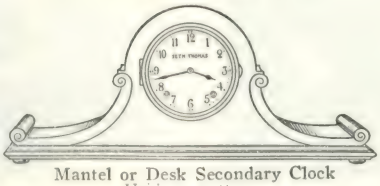
Charging Panel

Buzzer

Hub Dome Bell, 2½-in. Diameter



Wood Box Bell, 2½ or 3-in.



Mantel or Desk Secondary Clock
Various patterns

Corridor Gong
4 to 8-in.

Weatherproof Yard Gong
8 to 16-in.

MASTER CLOCKS, PROGRAM CLOCKS, AND AUDIBLE DEVICES
Wiring diagrams, estimates given on any size installation

INTERNATIONAL TIME RECORDING CO. OF NEW YORK

GENERAL OFFICES
50 Broad Street
NEW YORK, N. Y.

FACTORIES: ENDICOTT, N. Y., and TORONTO, ONT.

BRANCH OFFICES AND SERVICE STATIONS IN ALL THE PRINCIPAL CITIES OF THE WORLD

Products

ELECTRIC TIME SYSTEMS; MASTER CLOCKS: SECONDARY CLOCKS; PROGRAM DEVICES; TIME RECORDERS: Card, Dial and Autograph; ELAPSED TIME RECORDERS; JOB TIME RECORDERS; TIME STAMPS; RECORDING DOOR LOCKS, WATCHMAN'S STATIONS etc., for schools, banks, hospitals, hotels, public buildings, railroad terminals, manufacturing plants, etc.

International Service

This company will furnish without cost specifications, layouts of conduit, wiring diagrams and estimates covering installations of electric clock systems on receipt of necessary information, plans, etc.

Special designs or styles to suit architect's specifications can be secured in any model of International time systems and time recording devices.

The company will contract for installing its products where necessary, but apparatus is so simple and substantial that the average electrical contractor can install to the company's specifications and render perfect satisfaction.

International products are the result of thirty-five years of experience in the manufacture of time systems. They are made in a variety of models and sizes that makes it possible for this company to satisfy every conceivable time recording or time indicating demand.

The company employs a large force of skilled engineers and mechanics and through its branch offices and service stations located in all sections of the country is able to give prompt, expert advice and service at all times. International products embody the best materials obtainable. They are scrupulously inspected at various times during the progress of their manufacture and must measure up to a rigid standard before they reach and pass final inspection.

The INTERNATIONAL TIME RECORDING CO. OF NEW YORK are not only the pioneers in their line but are the largest manufacturers of time systems in the world.

TYPE D MASTER CLOCK

TYPE A MASTER CLOCK

Synchronized Time Systems

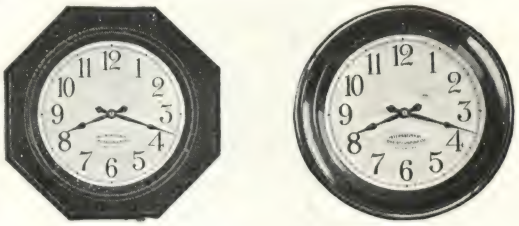
The International electric synchronized time system permits the maintenance of uniform time in any number of clocks and recorders regardless of their location. This system operates on either direct or alternating current without the use of batteries. The master clock which is self-winding, also controls and automatically sets at frequent intervals during every 24-hour period all other clocks on the circuit. This is an exclusive feature.

Impulse Time System

The International electric impulse time system maintains uniform time in any number of clocks by means of minute impulses distributed from the master clock to each secondary unit.

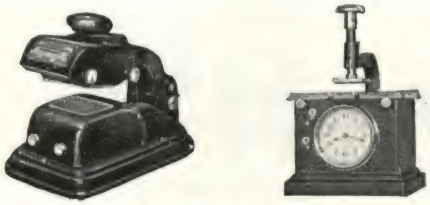
Master Clocks—These as well as the secondaries are made in various models in cases to meet any architectural requirements.

Secondary, or Wall Clocks—May be equipped with either the company's silent polarized movement or with the ordinary ratchet and pawl movement.



SECONDARY CLOCKS

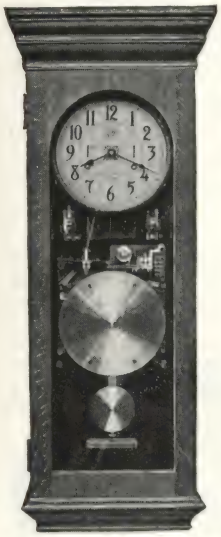
International Time Stamps—These are manufactured in electrically and clock driven models and print the exact time that letters, messages, important papers, etc., are received, dispatched or filed.



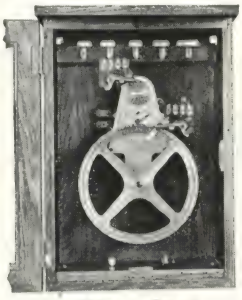
TIME STAMPS

Continued on next page

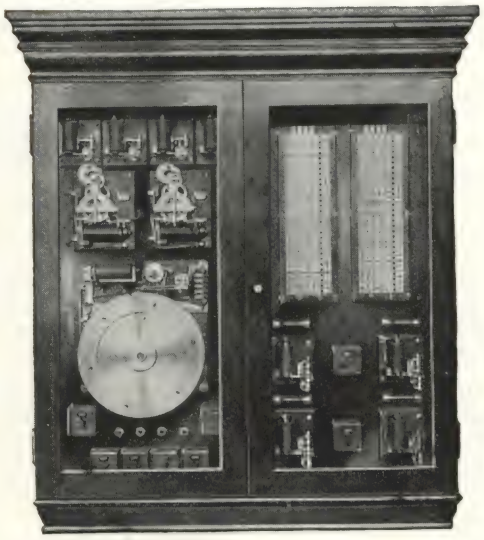
Program Clocks and Devices—These are used either in connection with or independent of electric time systems to automatically sound bells and other signals, to eliminate non-working hours on recorders, and to change printing space. These devices maintain definite schedules without manual attention.



SELF-CONTAINED PROGRAM CLOCK
Disc Type



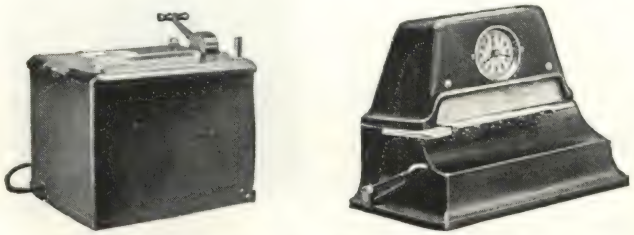
WOOD CASE
PROGRAM DEVICE



UNIVERSAL PROGRAM AND CLOCK DISTRIBUTION CABINET

Elapsed Time Recorder—This device produces a printed record of the starting, stopping and elapsed time on any job or operation. One press of the lever registers the stopping time and at the same instant automatically computes and prints the elapsed time in hours and minutes, hours and tenths or hours and hundredths.

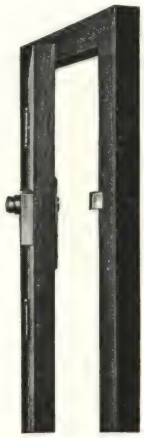
The Job Time Recorder—This device offers a means of securing accurate cost records by printing the time of each employee on every job or operation.



ELAPSED TIME AND JOB TIME RECORDERS

International Recording Lock—Its operation automatically furnishes a printed record of the identity of the person operating the lock, shows which door was locked or unlocked, whether locked or unlocked and whether from the outside or the inside and the exact day, hour and minute the operation took place. This record appears on a master recorder.

Watchman's Stations—Distributed throughout a building, these make a printed record on a roll of tape in the master recorder, showing the exact time each station was visited.

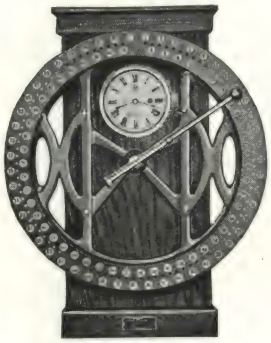


RECORDING
LOCK SET
IN DOOR

WATCHMAN'S STATION

MASTER
RECORDER

Attendance Time Recorders—These include card, dial and autograph models, print records of the arrival and departure of all employees on card forms or payroll sheets (automatically showing irregular registration in red), or on a roll of tape. They are manufactured in various models of electrically and clock driven designs to produce records in any manner required by payroll schedule.



DIAL RECORDER

ELECTRICAL CARD
RECORDER

CARD
RECORDER

AUTOGRAPH
RECORDER

Bulletins

The International Time Recording Co. has published a series of highly instructive illustrated bulletins on its many devices which it will gladly furnish, on request, to architects and electrical contractors.

TIME SYSTEMS COMPANY

Manufacturers of Automatic Clock Systems

7700 Grand River Avenue
DETROIT. MICH.

CHICAGO OFFICE, 503 W. Huron Street CLEVELAND OFFICE, 530 Leader-News Building
SALES OFFICES IN ALL PRINCIPAL CITIES

Products

PNEUMATIC CLOCK, BELL, and PROGRAM SYSTEMS.

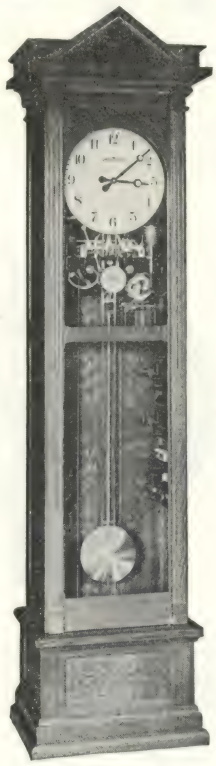
Also manufacturers of Electrical Apparatus, including Bells, Transformers, Fire Alarm Stations, and Push Button Boards.

Hahl Pneumatic Clock Systems

Pneumatic clock systems were first installed about 35 years ago, and although many improvements have been made, the principle has remained virtually as originally invented.

A clock system consists of three distinct parts: the master clock, the secondary clocks, and the pipe line.

The master clock furnishes the power, keeps the time, and operates the bells. The secondary clocks receive the impulse each minute from the master clock and advance in step with it every minute. The pipe line, consisting of tubing or ⅛-in. iron pipe, acts as the conductor, distributing the air each minute to the secondary clocks. The average pressure required to operate the system is from 1 to 2 oz.



MASTER CLOCK CASE, STYLE 1

Master Clock

The master clock is not only a time keeper but also the air and power distributor, controlling all secondary and program mechanisms.

It is divided into three main groups: motor train, time train, and program. The motor train operates exclusively the air line and winds the time train and program spring every minute by means of weights. The program rings the bells, blows the whistles, operates switches, and performs various other acts of this nature that must be done at a certain set time. The time train keeps the time and receives its power from a small coil spring of uniform tension which is automatically wound every 60 seconds. The time train can be regulated so as to keep accurate time within 10 seconds a month by merely adjusting the length of the pendulum a little at a time.

Secondary Clocks

The secondary clocks are regulated automatically by the master clock; the hands move forward once every 60 seconds, but *without the irritating click* that characterizes many automatic time systems.

These clocks require no attention except a periodical renewal of the diaphragm rubbers about once every 3 years.

Style 01
Quartered Oak or Birch
Mahogany

Style 010
Sanitary Spun Steel Case Furnished in Any Shade

SECONDARY CLOCKS

Hahl Junior Program System

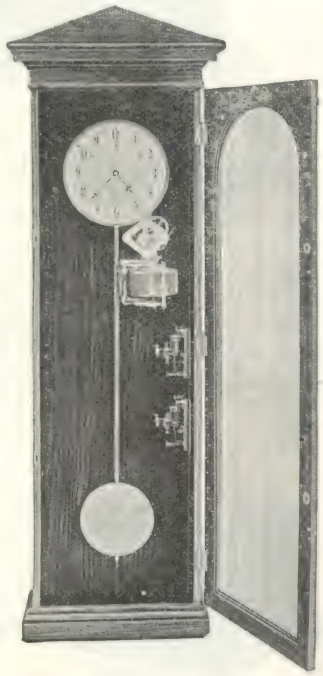
The Hahl Junior program clock is intended especially for use in school buildings where a moderate priced signal system for dismissing classes and announcing recess periods is desired. It is also serving to advantage in many manufacturing plants, offices, and public buildings.

The Hahl Junior program clock will ring bells on any number of different circuits at one-minute intervals, thus making possible the passing of different classes in different departments at different hours, or the ringing of an outside bell at recess periods only. It can also be arranged to ring different schedules on different days if desired. Fire alarm signals or special rings may be made at any time without interference with the regular schedule.

The Hahl Junior program clock is mounted in a neat and attractive oak or birch mahogany case about 5 ft. tall, arranged so that it may stand on the floor or be suspended from hooks on the wall. The movement is entirely of brass, with jeweled escapement.

The clock as furnished is complete in itself and can be installed readily without any adjustment whatever; the bells are connected at the top merely by attaching the wires to the terminals provided.

The Hahl Junior program clock will *not* operate secondary clocks.



HAHL JUNIOR PROGRAM CLOCK, STYLE 101

Continued on next page

Specifications for Synchronized Clock, Program and Bell Systems

Guarantee—All work called for in this specification is to be executed in a thorough and workmanlike manner, to the entire satisfaction of the architects.

The system, as a whole, must be guaranteed free of all defects of workmanship and material, and all defects in workmanship and material that are discovered during the 24 months subsequent to date of final payment, must be rectified by this contractor without expense to the owner.

General—This contractor shall furnish and install complete a synchronized clock and bell system throughout the building, consisting of a master clock, program apparatus and ..... secondary clocks.

The system shall be a recognized manufacturer's product, of best material and workmanship, and all parts must be rustproof and carefully machined.

This contractor shall state in his bid upon what system he is quoting.

Master Clock—Furnish and install, according to plans and specifications, a 60-beat, weight driven master clock, equipped with self-compensating pendulum and self-contained power device, of ample capacity to operate all secondary clocks and program apparatus herein mentioned, without the aid of auxiliary apparatus of any kind.

Time train is to be automatically wound every minute and to be an independent unit in the master clock, performing no other function than the keeping of time, thereby insuring uniform tension and exact time-keeping qualities.

The master clock movement is to be mounted in a cabinet of quarter-sawed oak, finished to match the adjoining woodwork, of the standing type, approximately 8 ft. in height, of neat design and fitted with a 15-in. white enameled, planished steel dial.

Alternate proposal on hanging clock will be considered.

This master clock to be guaranteed to vary not more than 10 seconds per month after proper regulation.

Program Apparatus—The master clock shall be provided with a suitable program apparatus for ringing bells at 1-min. intervals on ..... circuits. Program to cover period from 8:00 A. M. to 8:00 P. M.

Program adjustment to be automatically wound and to be contained within the master clock case and so arranged that it will automatically cut out signals on any 2-hr. period throughout the week when not desired.

Furnish suitable switch and push button for each program circuit for manual operation of bell system when desired; to be located at the side of the master clock, so as to be easily accessible.

Secondary Clocks—All secondary clocks, except for the auditorium, gymnasium, assembly hall, etc., are to have 12-in. dials, and to be mounted in round spun steel, dustproof cases of neat design, approved and selected by the architect. Secondary movements to be silent in operation.

The secondary clocks in the auditorium, gymnasium, assembly hall, etc., are to have 18-in. dials.

Piping for Pneumatic Clock System—If a pneumatic system is installed, all pipe shall be strictly wrought iron, Byer's or equivalent, and all fittings galvanized; end of all pipe and fittings to be reamed smooth, and free from burrs and scale.

Start with two ¼-in. pipe lines, from location of master clock in the principal's office; outlets to be 8 ft. 3 in. above floor level; branch into ⅛-in. pipe to the secondary clock outlets. No more than four secondaries shall be fed by one ⅛-in. pipe.

All pipe to be concealed in the walls surrounding the corridors and to be in position before plastering.

After this pipe system is installed, this contractor is to subject same to a test pressure of 25 lbs., under which it is to be perfectly airtight, during a test of 1 hr.

Do not test pipe system with water, but use only ether.

Bells—This contractor shall provide and install ..... 6-in. gongs in the corridors and ..... outside gongs, as indicated on the drawings. Same to be of transformer type, as manufactured by the Holtzer-Cabot Electric Company, polarized No. 151,110 or the Schwarze Electric Co., their style No. 7.

Transformer—Furnish and install suitable transformer to operate on six (6), twelve (12) and twenty (20) volts, such as manufactured by the Dongan Electric Company, Jefferson Electric Company or equal; to ring the bells called for in this specification. Transformer to be located near the main switchboard. All circuits from the transformer to be carried direct to the master clock, located in the office.

Conduit and Wiring for Bell System—All wire is to be run in rigid, approved metallic iron conduit. Whenever conduits are bent the tube must be in no way dented or damaged.

Wiring for the bell system is to be of the common return type, using No. 16 double braided, rubber covered wire, placing the corridor bells on one circuit and the outside bells on another. All wires to be brought to the outlet box, to be provided at the master clock location in the office.

Bring two No. 16 rubber covered, double braided wires from the transformer to the same outlet box over the master clock.

In no case is wire for the bell system to be pulled through conduit to be used for any other purpose.

Electric Clock System—*In case an electric clock system is bid upon, the specifications heretofore mentioned shall be used to govern the material furnished.*

Master Clock—The master clock shall be weight-driven, and equipped with mercurial pendulum, arranged to regulate and synchronize all the secondary clocks and program apparatus herein specified, and must be guaranteed to vary not to exceed 10 seconds per month after proper regulation.

Conduit and Wiring for Electric Clock System—All wires shall be run in rigid, approved conduit throughout the building, using No. 16 rubber covered, double braid wire from all secondary clocks to the master clock. Not more than 10 secondary clocks shall be installed on any single circuit and each circuit is to be equipped with necessary relays to operate same.

Wiring for the clock system shall be run in separate conduit so as to provide an independent system of clocks, free from outside influence of any description whatsoever.

Batteries—Provide and connect up ready for use in basement where directed, a storage battery cabinet containing six (6) cells to operate clock system. Cells to be of the Electric Storage Battery Company, The Willard or other approved make of equivalent capacity.

Provide and erect oak battery cabinet with glass door, sand trays, etc., to contain the above cells. Cabinets to receive three (3) coats of white lead and oil on inside, outside to be filled and finished with three coats of varnish. Hardware to be bronze.

Battery Charging Motor Generator—There shall be furnished and installed a Holtzer-Cabot Company's or equal, automatic charging motor generator set and panel board complete.

The motor generator set shall consist of a Type H. S.-16, 110-volt 60-cycle, single phase, A. C. Motor, directly connected on a common sub-base by flexible coupling to a Type P. D.-15, 16-volt, 3-amp., 50-watt shunt wound charging generator to charge 6 cells, Type P. T. electric chloride batteries.

The panel shall consist of a single panel, 1-in. black oiled slate, to be supported from floor and side wall, panel to contain a two pole single throw N. E. C. fused knife switch for motor, a D. C. volt meter Scale 0-25; a D. C. ammeter, scale 0-10; a high and low voltage relay, complete with all necessary resistance and auxiliary relays; and automatic motor starting switch to automatically start the motor generator set when the battery voltage drops to 11 volts, and automatically stop the motor generator set when the battery voltage rises to 15½ volts.

Specifications for Installation of Hahl Junior Program Clock and Bell System

This contractor will furnish a suitable program clock to operate automatically the bells and buzzers hereinafter called for. The movement must be of the 8-day type, spring driven, with at least 2 heavy steel springs, capable of furnishing all the necessary power to drive the clock and program movement required. All gears to be machine cut, and parts entirely rustproof. Clock to be equipped with an adjustable pendulum, beating seconds and sturdily built. Clock movement to be mounted in a neat case of quarter sawed oak (of birch mahogany) finished to match any desired woodwork. Case to be approximately 5 ft. tall and 21 in. wide, fastened to the wall. Clock to have a 12-in. planished steel dial with arabic numerals. General design to conform to Style No. 101 as shown in catalogue of TIME SYSTEMS COMPANY.

Program Apparatus—The program clock shall be provided with a program apparatus for ringing bells at 1-minute intervals on 2 circuits (any number of circuits up to 6 is available). The program to cover the period from 8:01 A. M. to 4:00 P. M., and from 6:00 P. M. to 10:00 P. M. (or any 12-hour period. If a 24-hour period is desired, it requires a 2-circuit program for each circuit). Program attachment to be automatically wound, with spring driven movement, and to be so arranged that it wiil automatically cut out signals on days and hours when not wanted.

For bells, transformers, conduit, wiring, see foregoing specifications.

ESTABLISHED 1884 INCORPORATED 1888

THE STANDARD ELECTRIC TIME CO.

SPRINGFIELD, MASS.

SALES OFFICES AND SERVICE STATIONS

CHICAGO, ILL., 1361 Monadnock Building
BOSTON, MASS., 261 Franklin Street
NEW YORK, N. Y., 50 Church Street
BUFFALO, N. Y., Mutual Life Building
COLUMBUS, OHIO, 421 New First National Bank Building
BIRMINGHAM, ALA., Brown-Marx Building
SAN FRANCISCO, CAL., 461 Market Street
MINNEAPOLIS, MINN., 414 Essex Building

Products

"STANDARD" ELECTRIC TIME SYSTEMS.
Also Tower Clocks and Street Clocks.

Free Service to Architects

We will prepare and submit, *without charge,* complete specifications, wiring diagrams and estimates covering installations of electric time systems.

This service is rendered gratis to architects and prospective purchasers whether our equipment is purchased or not.

"Standard" Electric Time Systems

These systems consist of:

Master Clocks—Operate and synchronize any number of secondary clocks, program clocks and devices, time recorders, time stamps and other time keeping apparatus. Self-wound every minute.

Secondary Clocks—Operated and controlled by minute or half-minute impulses from the master clock, therefore require no winding, setting, regulation or oiling and may be located at best points for observation without reference to their accessibility.

Program Clocks—Automatically control the sounding of signals such as bells, gongs, horns, whistles, or other devices according to predetermined schedules. Located in a separate case or in the master clock case. They silence signals nights, Sundays, etc., as desired, or ring at minute intervals on any minute of the 24 hours, and will automatically shift from one daily schedule to another.

Time Recorders—For recording employees' time and for cost recording. We can electrically operate and control any make of time or cost recorder; also furnish them in a number of styles for any possible requirement.

Time Stamps—For printing date in hour, minute or decimal on correspondence, etc.

Signals—Comprise bells, buzzers, horns and electric attachment for operating steam whistle. Wired in multiple and as many circuits are used as there are schedules to be sounded. Any number of signals may be controlled on one schedule or program circuit with the use of suitable relays.

Complete Battery Equipment—Comprises storage or primary battery, electrolytic or hot bulb rectifiers, panel boards and transformers, battery equipment being furnished in ventilated cabinet. Automatic charging unit can also be furnished for keeping storage battery fully charged directly from master clock.

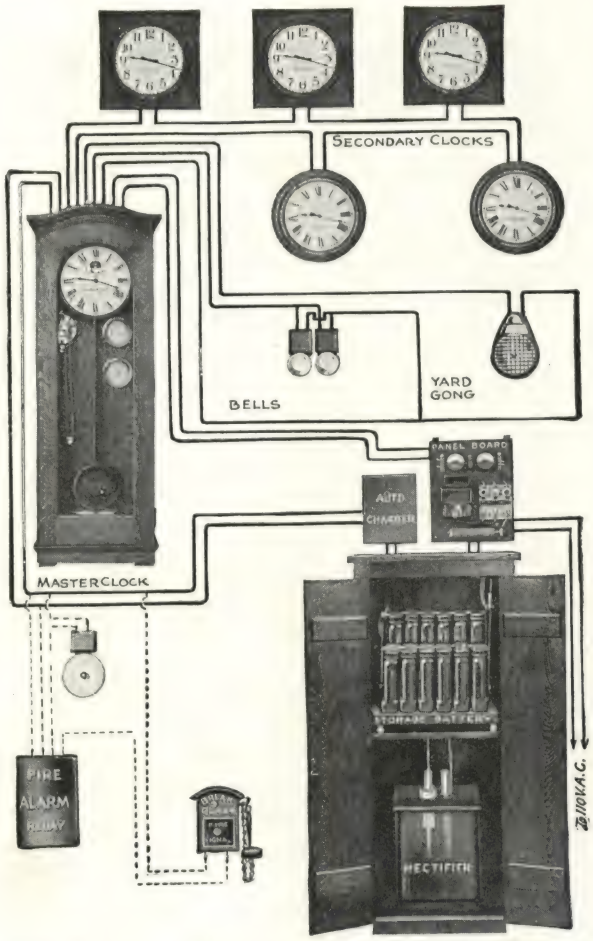


DIAGRAM SHOWING METHOD OF OPERATION AND DIFFERENT PARTS OF STANDARD ELECTRIC TIME CO.'S SYSTEM

References

Bureau of Standards Building, Washington, D. C.
U. S. Senate Office Building, Washington, D. C.
Bureau of Printing and Engraving and 11 other Public Buildings in Washington, D. C.
State Educational Building, Albany, N. Y.
Massachusetts Institute of Technology, Boston, Mass.
City Hall and Public Schools, Oakland, Cal.
Grover Cleveland High School and 18 other Public Schools, St. Louis, Mo.
Hughes High School and 30 other Public Schools, Cincinnati, Ohio
22 Public Schools, Bridgeport, Conn.
Harvard Medical School and Dormitories, Boston, Mass.
Hotel Astor, New York, N. Y.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Ford Motor Car Co., Detroit, Mich.
Underwood Typewriter Co., Hartford, Conn.
Cheney Bros. Silk Mills, South Manchester, Conn.
Fisk Rubber Co., Chicopee Falls, Mass.
U. S. Penitentiary, Atlanta, Ga.
Brown & Sharpe Mfg. Co., Providence, R. I.
Arlington Building, Washington, D. C.
Tuley High School, Chicago, Ill.

ECO CLOCK CO.

Manufacturers of Electric and Portable Watchman's Clocks

MAIN OFFICE AND FACTORY
197 Congress Street
BOSTON, MASS.

BRANCH OFFICES
NEW YORK, N. Y,. 26 Cortlandt Street
ATLANTA, GA., Walton Building

Products

"Boston" and "Eco" Electrical Watchman's Clock Systems, with and without timepiece dials.

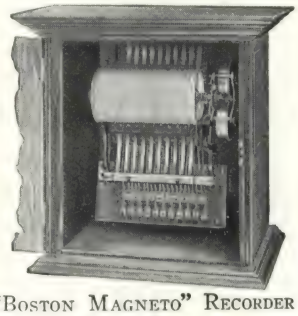
Description

"Boston Magneto" Tri-record Recorder (Rectangular Paper Dial)—Provides for registrations covering Saturday, Sunday and Sunday night without change of dial. Dial drum automatically shifts every 12 hours. Each day's or night's record in separate column. Made in 3 sizes, 20, 40 and 60 stations, respectively.

Every part of mechanism is visible, accessible, interchangeable and easily removed without disarrangement of mechanism. The absence of springs to restore needles after recording is a valuable feature.

"Boston Sixty-hour" Recorder—Similar to "Boston Magneto Tri-record," but provides for holidays following Sunday, without change of dial. Made in 2 sizes, 20 and 35 stations, respectively.

"Boston" Dial and Drum



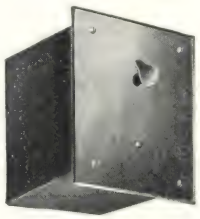
"Boston Magneto" Recorder
Standard case

"Eco Magneto" (Circular Dial)—Perforating needle is separate from armature and will not stick. The needle arm and armature are both restored to original positions by gravity.

Operation

"Eco" System—Recorder is usually placed in office. Stations may be located at any place desired. Each station is connected with recorder by separate wire. Any number of watchmen can record on the same dial, with independent record for each.

Steel or Fiber Covers for General Use

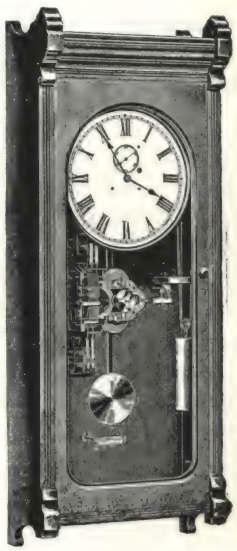


Inset with Plain or Fancy Face Plates

Standard Type Generators

Motive Force—4-volt hand generator. Storage battery or 12-volt motor generator; single or in combination.

Usual Equipment—Small hand generator at each station, surface or flush type. One full turn of the crank handle (which the watchman carries with him) generates sufficient current to perforate paper dial in space corresponding to number of station operated, and at exact time record is made.



Regulator Combined with Recorder
When desired, either "Boston" or "Eco" recorders combined with office regulator timepieces will be furnished

Advantages

Can be installed by any careful electrician. Can not be tampered with without detection. Meets stringent requirements of all insurance companies. First cost is low. No current except at the actual moment of making record. No record can be made by short circuiting. Record dials are reduced to smallest size consistent with accurate and easy reading.

Finish

Recorder cases and face plates furnished to match woodwork and hardware finish.

Insurance

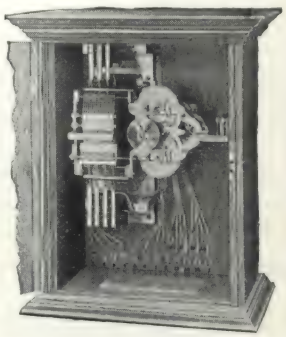
Approved by the National Fire Protection Association for use under the rules and requirements of the National Board of Fire Underwriters and by all Mutuals.

Co-operation

The Eco Clock Co. solicits difficult propositions which relate to a proper control of day or night watchmen.

Catalogue

This company would be pleased to mail illustrated catalogue to any interested party, on request.



"Eco" Magneto Recorder, Open
Standard case; 12- or 24-hour circular dial

NEWMAN CLOCK COMPANY, INC.

ESTABLISHED 1872

Manufacturers of Watchman's Clocks

428 Broadway
NEW YORK, N. Y.

565 West Washington Boulevard
CHICAGO, ILL.

424 Howard Street
SAN FRANCISCO, CAL.

ASSOCIATED COMPANIES
NEWMAN-MUNDERLOH CLOCK CO., LTD., 51 Victoria Square, MONTREAL, CANADA
NEWMAN CLOCK CO., LTD., 2 Whitechapel Road, LONDON, ENGLAND
C. E. CARPENTER CO., S. A., 57 Rue du Richelieu, PARIS (2e) FRANCE

Products and Services

WATCHMAN'S PORTABLE CLOCKS for office buildings, hotels, hospitals, stores and factory plants.

Manufacturers of Watchman's Clocks for over *fifty years.*

Our extensive experience in Watch Clock Installations is at the service of architects. On request, detail specifications of installations to meet requirements of any particular proposal will be furnished.

Description

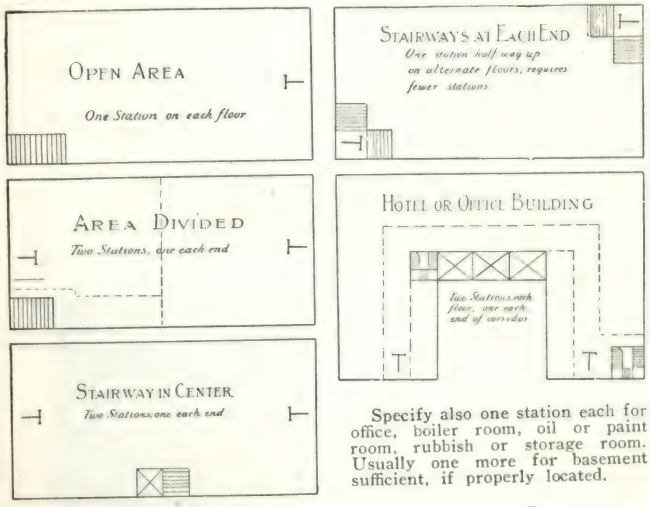
Outfits complete consist of watch, leather pouch with carrying strap, key boxes or stations with marking keys attached, patrol box, seals and one year's supply of dials. Standard model key boxes furnished unless otherwise specified.

Regular sizes with capacities of 6, 9, 12, 16, 20, 25 and 30 stations. Larger sizes to meet requirements.

GRILLE MODEL

Advantages

Provide an accurate check upon the watchman. Inefficiency at once detected. Tampering impossible without detection. Carry highest rebate in insurance rates allowed for this class of device. Initial cost low. Maintenance slight. Eliminate wiring and electrical troubles.



Specify also one station each for office, boiler room, oil or paint room, rubbish or storage room. Usually one more for basement sufficient, if properly located.

TYPICAL FLOOR PLANS SHOWING LOCATIONS OF STATIONS

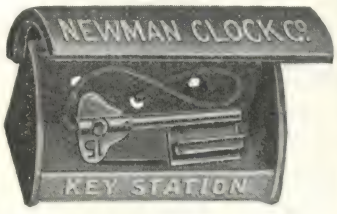
Underwriters' Approval

The Newman system is approved by the National Fire Protection Association for use under the rules and requirements of the National Board of Fire Underwriters, and by all Mutuals. It reduces fire insurance rates.

Specification

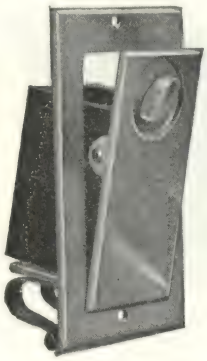
To specify, write as follows:

Furnish .... Newman Grille Model Watchman's Clock[s] having a capacity of .... stations with .... key boxes .... model. Install at locations as marked on plans.

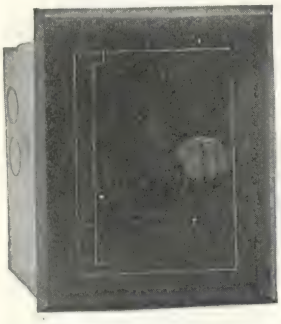


STANDARD MODEL BOX
Lift cover, iron, with aluminum finish

PENN. R. R. MODEL BOX WITH BACK PLATE
Iron, with bronzed finish



RITZ-CARLTON MODEL BOX, FLUSH TYPE



TEMPLE MODEL BOX, FLUSH TYPE

Key boxes finished to match hardware trimmings

Representative Installations

Aeolian Hall, New York, N. Y.
Architects Building, New York, N. Y.
J. P. Morgan & Co., Bank Building, New York, N. Y.
Ritz-Carlton Hotel, New York, N. Y.
Underwriters' Building, New York, N. Y.
Underwriters' Salvage Corps Building, New York, N. Y.
Pennsylvania Terminal, New York, N. Y.
Pan-American Union (Carnegie), Washington, D. C.
United States Naval Observatory, Washington, D. C.
United States Capitol, Washington, D. C.
Blackstone Hotel, Chicago, Ill.
La Salle Hotel, Chicago, Ill.
Underwriters' Laboratories, Inc., Chicago, Ill.
Pennsylvania State Capitol, Harrisburg, Pa.
Bank of Toronto, Toronto, Can.
Bank of England, London, Eng.
Houses of Parliament, London, Eng.
Utah State Capitol, Salt Lake City, Utah.
Oklahoma State Capitol, Oklahoma City, Okla.
Missouri State Capitol, Jefferson City, Mo.
Waldorf-Astoria Hotel, New York, N. Y.
West Point Military Academy, West Point, N. Y.
United States Subtreasury, New York, N. Y.

E. J. VALLEN ELECTRICAL CO.

Manufacturers of Automatic Curtain Operating Machines

13 South Canal Street
AKRON, OHIO

Product

The VALLEN AUTOMATIC ELECTRIC MACHINE for automatically operating any object to be moved a given distance.

Scope of Use

This machine is especially adapted for the operation of theater curtains. It automatically operates a curtain or any other object to be moved by simply throwing a switch, which may be located at any point in the building. Controls can be adjusted for any length of movement, and when set, they automatically cut off current at the instant the curtain or object being moved has traveled to its required position.

Safety to Curtain or Object to be Moved Assured

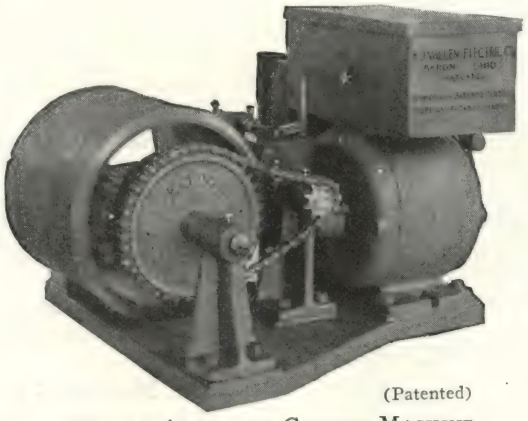
An automatic clutch prevents curtain from becoming injured through mishap to mechanism operating the curtain. When load greater than normally exerted by curtain or object is put on cables, the clutch automatically throws the drum out of action and allows the motor to run to a given point, when it is automatically shut off.

Simple and Economical Operation

Automatic and positive in action. Operates on any lighting circuit and consumes only 6 amperes. Operating time for average curtain approximately 10 seconds. Oiling and current consumed brings total operating expense to but a few dollars per year.

Installation

The machine, 18 in. wide and 21 in. long, can be located wherever cables can be conveniently attached. Installation requires a 2-wire feed direct from machine to source of supply and 3 wires from machine to control switch, which is the manually-operated switch used to start the machine. The machine automatically stops. Where either of the above-mentioned runs exceeds 75 ft., use No. 12 wire. All equipment to hang and operate a straight draw curtain, weight not to exceed 100 lbs., is furnished with machine without extra charge. For curtains weighing over 100 lbs., or operating on an arc, we manufacture a noiseless wood track which is easily installed.



(Patented)

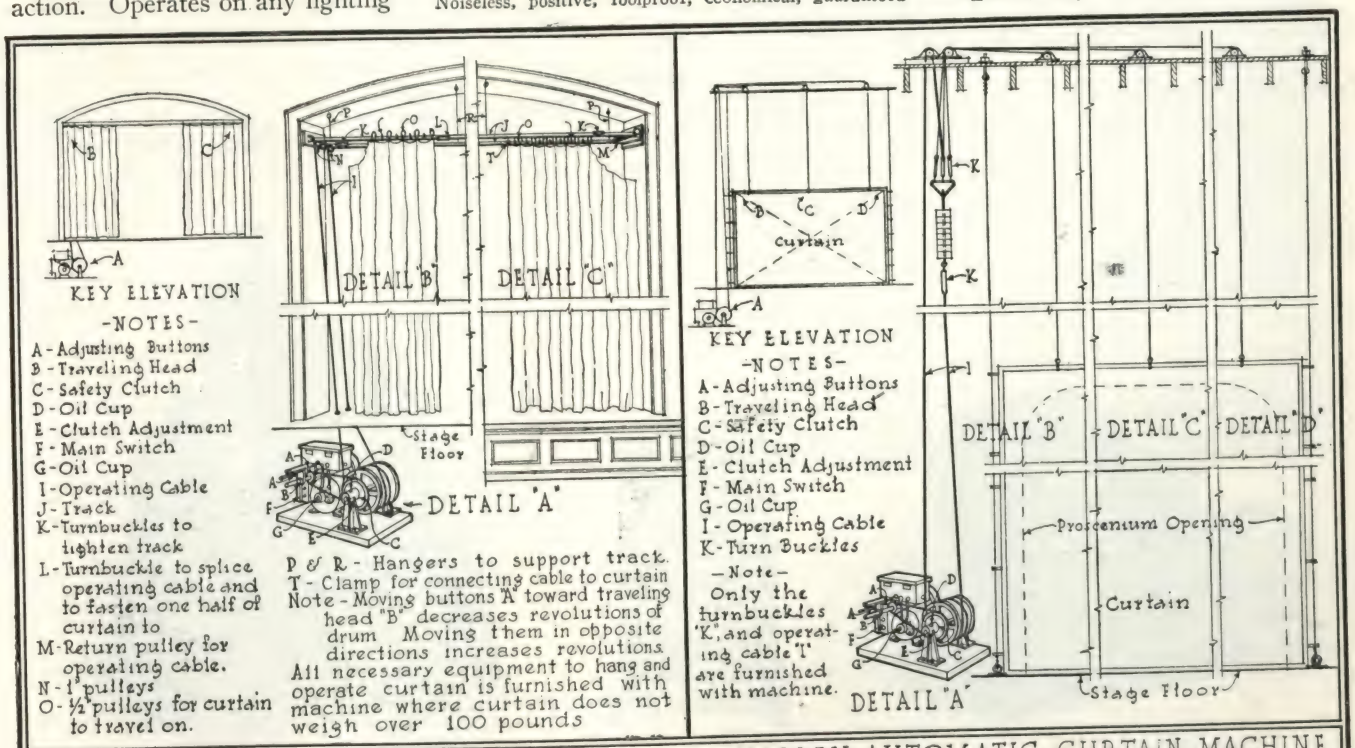
VALLEN AUTOMATIC CURTAIN MACHINE
Noiseless, positive, foolproof, economical, guaranteed

Equipment

Standard equipment is 115-volt 60-cycle, single phase A.C., or 115-volt D.C. motors. Other voltages can be furnished.

Guarantee

This machine is positively guaranteed in its operation and against any mechanical defects.



DETAILS SHOWING METHODS OF INSTALLING THE VALLEN AUTOMATIC CURTAIN MACHINE

ESTABLISHED 1883

A. B. SEE ELECTRIC ELEVATOR COMPANY

NEW YORK, N. Y.

OFFICES

NEW YORK, N. Y., 52 Vesey Street
BOSTON, MASS., 82 Devonshire Street
HARTFORD, CONN., 36 Pearl Street
PHILADELPHIA, PA., 13th and Market Streets
BALTIMORE, MD., Lexington and Liberty Streets
WASHINGTON, D. C., 14th and H Streets, N.W.
CLEVELAND, OHIO, 750 Prospect Avenue
DETROIT, MICH., 56 Henry Street

FACTORY: JERSEY CITY, N. J.

Products

Manufacturers of all types of DIRECT CONNECTED ELECTRIC PASSENGER and FREIGHT ELEVATORS; PUSH BUTTON ELEVATORS; SIDEWALK TYPE ELEVATORS.

Design

The A. B. See electric elevators are designed and manufactured under the direction of the engineers of the A. B. SEE ELECTRIC ELEVATOR COMPANY and every part is designed for its specific work and is in no way an assembled product.

Gearless Traction Elevator

The gearless traction elevator was developed for high speed service where speeds of 450 to 700 f.p.m. are desirable.

The gearless traction machine consists of a large slow speed multipole shunt wound motor, having the armature, brake wheel and drive sheave mounted on one sleeve. This sleeve is mounted on two sets of roller bearings and rotates around a stationary shaft, which in turn is keyed to two cast iron hangers that bolt direct to a heavy ribbed cast iron base. This rigid patented self-aligning design used in connection with roller bearings is an exclusive feature of A. B. See gearless traction machines.

Low operating cost and ease of control make this elevator desirable for high speed service.

Geared Traction Elevator

The geared traction elevator is the standard machine for buildings of moderate height requiring speeds of 150 to 450 f.p.m.

This machine has a high speed interpole motor of special design for elevator work, and a gear reduction to the drive sheave through steel worm and bronze gear which is directly connected to the drive sheave. The roping of this type machine is exactly the same as the gearless one-to-one machine. This type is made for both direct and alternating current and is suitable for one or two speed motors.

Freight Elevator

A. B. See freight machines for heavy duty have a further gear reduction obtained by driving the drum or traction sheave through internal steel gears accurately cut, which insures strength and smooth running. Capacities up to 30,000 lbs. and speeds of 25 to 150 f.p.m. are obtained.

Push Button Elevator

The full-automatic push button control elevator has become very popular in the last few years, because this type eliminates the elevator operator. It is especially adapted for use in residences, hospitals and apartment houses.

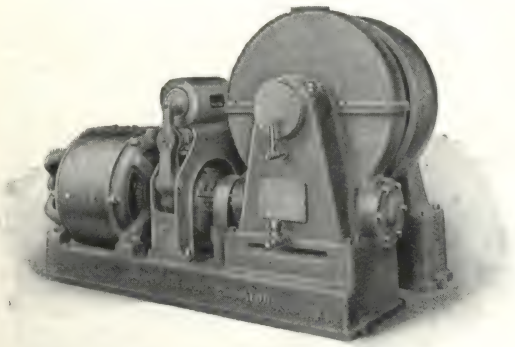
This type of elevator can be operated on both direct and alternating current.

Sidewalk Machines

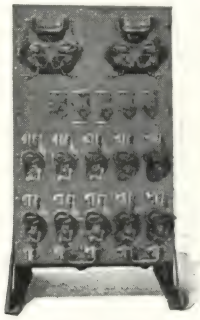
This company's sidewalk machines for both direct and alternating current are made in sizes 1000 to 6000 lbs. and speeds 25 to 50 f.p.m.

Co-operation

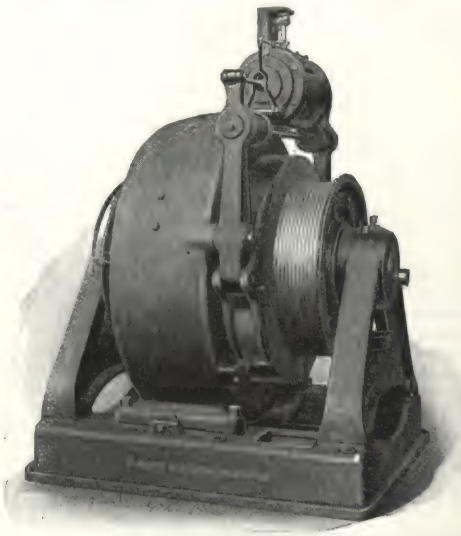
Specifications, drawings and estimates for elevator installations will be furnished, without obligation, to those who will communicate with our nearest office.



A. B. SEE GEARED TRACTION MACHINE



A. B. SEE CONTROLLER



A. B. SEE GEARLESS TRACTION MACHINE

Continued on next page

A Few of Our Representative Elevator Installations

ALBANY, N. Y.
New York State Telephone Co. 6

BALTIMORE, MD.
Consolidated Gas Co. 9
Standard Oil Co. 4

BOSTON, MASS.
Park Square Building 13
Brewer Building 7
Copley-Plaza Hotel 12
Fargo Real Estate Trust 20
S. S. Kresge Co. 6
Little Building 9
Minot Building 3
National Shawmut Bank 10
Quincy Market Cold Storage & Warehouse Co. 10
Stock Exchange Building 10
U. S. Custom House Tower 6

BROOKLYN, N. Y.
Oppenheim, Collins & Co. 7
Abraham & Straus 8
Court & Remsen St. Building 4
Brooklyn Trust Co. 5

CLEVELAND, OHIO
W. B. Davis Co. 5
Olmstead Hotel 5

DETROIT, MICH.
S. S. Kresge Co. 10
Michigan State Telephone Co. 6
Moffat Building 3

HARTFORD, CONN.
Aetna Life Insurance Co. 6
American Industrial Bank & Trust Co. 5
Connecticut Mutual Life Insurance Co. 4
Steiger-Vedder Co. 5

NEW YORK, N. Y.
Bonwit Teller & Co. 17
Canadian Pacific Building 15
Guaranty Trust Co. 10
Hyde Building 14
International Mercantile Marine Co. 10
Jackson Heights Apartments 16
J. P. Morgan & Co. 5
Munson Steamship Co. 11
National Bank of Commerce 12
National Park Bank 7
New York Stock Exchange Annex 14
Oppenheim, Collins & Co. 10
New York Telephone Co. 28
Postal Life Building 4
Printing Crafts Building 14
230 Fifth Avenue Corporation 16

PHILADELPHIA, PA.
Colonial Trust Building 5
Reyburn Bailey Building 5

PROVIDENCE, R. I.
R. I. Hospital Trust Co. 12
Gladdings Dry Goods Co. 3

RICHMOND, VA.
Federal Reserve Bank 5

ROCHESTER, N. Y.
Eastman Kodak Co. 5
Union Trust Building 2

SYRACUSE, N. Y.
Onondaga Hotel 5
Syracuse Herald 2

TOKYO, JAPAN
Marunouchi Building 11
Nippon Yusen Kaisha Building 8
Osaka Shosen Kaisha Building 4

WASHINGTON, D. C.
Chesapeake & Potomac Telephone Co. 5
Commercial Security Co. 7
Lansburgh & Bro., Inc. 8
U. S. Government Liberty Loan Building 4

WORCESTER, MASS.
Park Building 4
New York Central & Hudson River R. R. Co. 16

MUNSON BUILDING
KENNETH MURCHISON, Architect GEO. A. FULLER, Co. Builders
Eleven elevators
A typical office building gearless elevator installation

PAID UP CAPITAL $250,000.00

AMERICAN ELEVATOR & MACHINE CO.

INCORPORATED

LOUISVILLE, KY.

REPRESENTATIVES

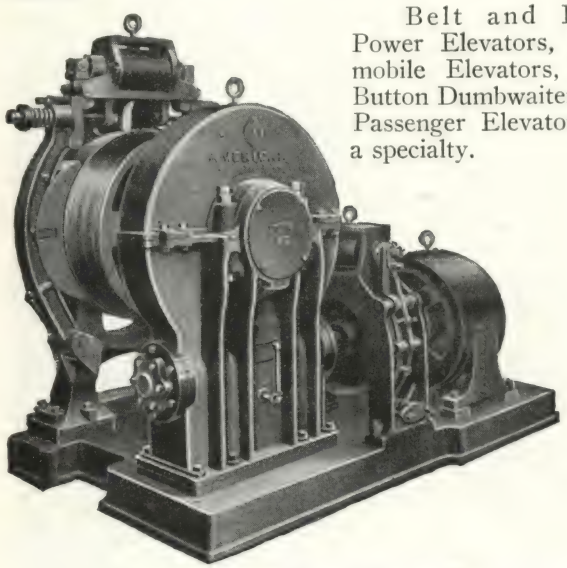
CLEVELAND, OHIO, J. M. Woods
CUBA, Thrall Electric Co., Havana
FLORIDA, Lev. G. Taylor, Tampa
IOWA AND NEBRASKA, Standard Engineering Co., Omaha
KANSAS CITY AND KANSAS, James E. King, Kansas City, Mo.
NASHVILLE, TENN., J. Bouchard & Sons Co.
NEW ORLEANS, LA., American Elevator & Electrical Co.
PEORIA, ILL., H. F. Kircher & Co.
ST. LOUIS, MO., Wm. A. Miller Machine & Elevator Co.
TEXAS AND OKLAHOMA, J. Peyton Hunter, Dallas.

Products

A complete line of Electric Elevators for Direct or Alternating Current in Single or Tandem, Drum or Traction Types.

Also manufacturers of Elevator Motors and Controllers.

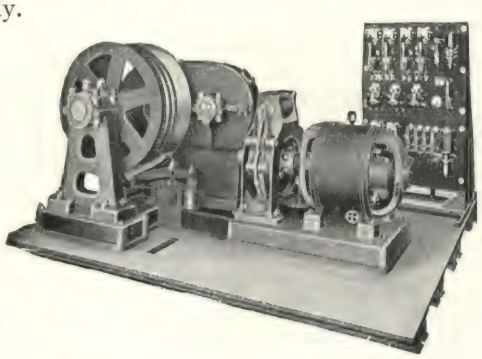
Belt and Hand Power Elevators, Automobile Elevators, Push Button Dumbwaiters and Passenger Elevators are a specialty.



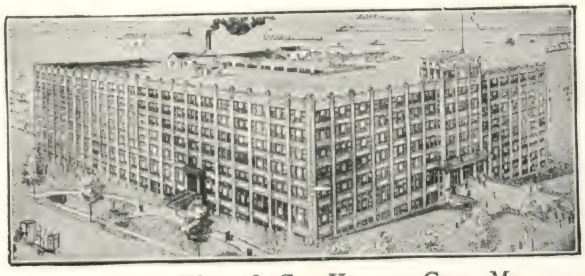
V-Groove, Traction Type, Single Gear
For high speed service, operated by switch in car

Facilities

The company has one of the largest independent elevator plants in the United States, completely equipped for building elevators, elevator motors, controllers and other parts, thereby enabling it to execute orders promptly.



V-Groove, Traction Type, Tandem Gear
For high speed service, operated by switch in car



Montgomery Ward & Co., Kansas City, Mo.

Two passenger elevators	5000-lb. 400-ft.
Eight freight elevators	4000-lb. 400-ft.

Stewart Drygoods Co., Louisville, Ky.

Five passenger elevators	3300-lb., 300-ft.
One passenger elevator	3000-lb., 250-ft.
One freight elevator	6000-lb., 150-ft.

National Cloak & Suit Co., Kansas City, Mo.

Three passenger elevators	4000-lb., 300-ft.
Two freight elevators	4000-lb., 300-ft.
Two freight elevators	5000-lb., 300-ft.
Three freight elevators	5000-lb., 200-ft.

BAY STATE ELEVATOR CO.

Manufacturers of Passenger and Freight Elevators

SPRINGFIELD, MASS.

HARTFORD, CONN. WORCESTER, MASS.

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS.
ELECTRIC and HYDRAULIC SIDEWALK ELEVATORS.
Also Electric and Hand Driven Dumbwaiters; Hydraulic, Belt Driven and Hand Power Elevators.

Types of Machines

Our product consists of passenger and freight elevators of any capacity from 1000 to 24,000 lbs. and speeds ranging from 25 to 400 f. p. m. We strongly recommend the traction type elevator with overhead installation for winding machine. Where construction will permit, this type is much more simple and efficient. However, there are cases where customers prefer the drum type, which we can furnish equally as well.

Data Required for Estimates

In order that we may quote intelligently, the following data is required:

Construction of building—concrete, brick or wood.

Elevator shaft—open or closed. (If closed, state class of material.)

Kind of elevator required—passenger or freight, sidewalk hoist or dumbwaiter.

Type—electric, hydraulic, belt power, hand power or push button.

Maximum capacity or load—If for passenger service, state number of passengers per trip, estimating 75 lbs. per sq. ft. of cab area for capacity.

Car travel in feet—state number of floors and height of each floor.

Approximate car speed in feet per minute.

Guides—steel or wood.

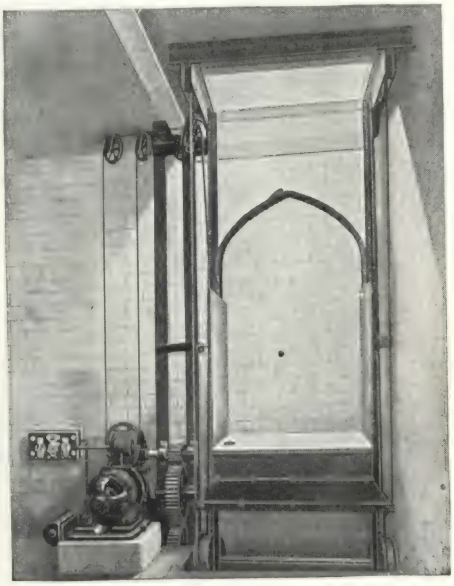
Value of cab.

Type of control—push button, car switch or hand cable.

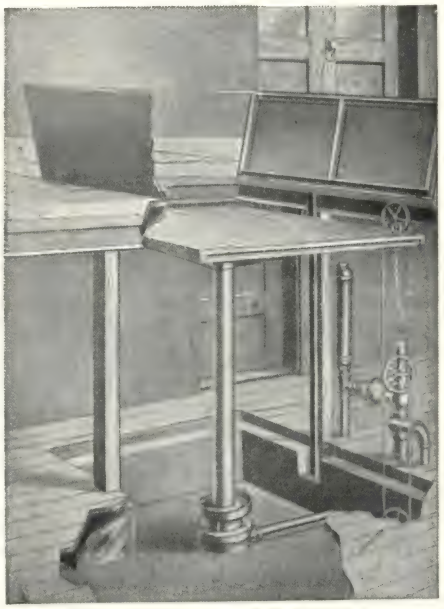
Power—For electric elevators, state whether current will be direct or alternating. If direct, state voltage. If alternating, state voltage, phase and cycles.

For hydraulic elevators, state water pressure at valve.

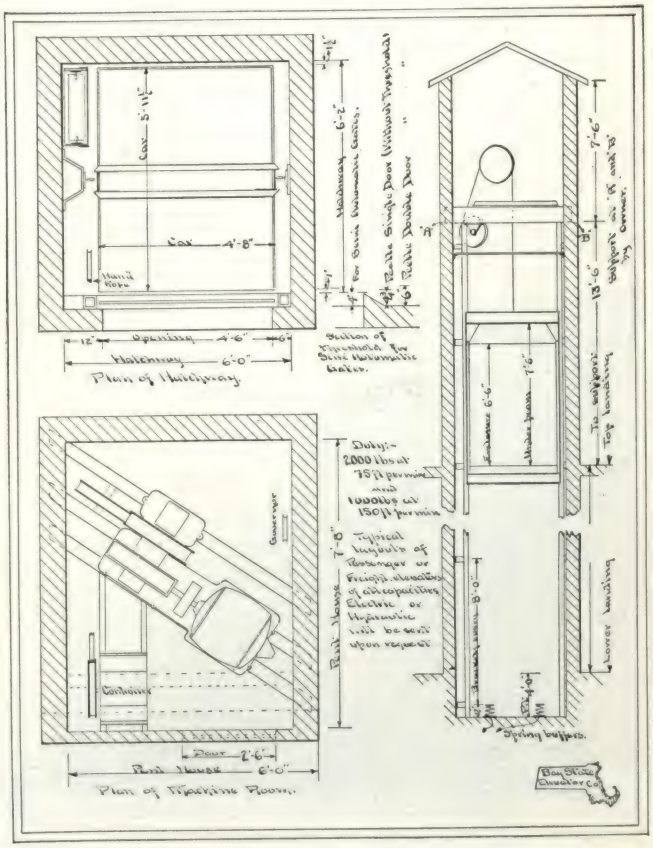
A rough sketch showing details of building will assist very much in making up estimate.



TYPICAL ELECTRIC SIDEWALK ELEVATOR INSTALLATION



BAY STATE HYDRAULIC ELEVATOR INSTALLATION



TYPICAL LAYOUT FOR ONE-TON ELECTRIC FREIGHT ELEVATOR

BURNETT MANUFACTURING COMPANY

Manufacturers of Electric Elevators

719-721 East First Street
LOS ANGELES, CAL.

QUALITY
B
ELEVATORS
TRADE-MARK

Products

ELECTRIC ELEVATORS for passenger or freight service with car switch, automatic push button or dual control.

Also manufacturers of Electric and Hydraulic Dumbwaiters, Hydraulic Elevators, Portable Electric Hoists.

Service

Our engineers are ready to supply any technical information that may be needed. Specifications and drawings showing hatch sizes, clearance, etc., will be gladly furnished for proposed buildings. Figures for estimating purposes can be given on short notice. In other words we are ready to serve the architect, engineer and builder at all times.

Manufacture

Our plant is fully equipped to manufacture complete elevators and elevator parts and is in charge of elevator experts. All parts are accurately made and standardized so as to be interchangeable.

Design

Burnett elevators are designed by competent engineers, with quality, quiet and economical operation, and long service as their goal. Every part of the complete machine is designed to serve its purpose in the best possible manner and to function properly with all related parts.

Elevator Types

Overhead geared traction with speeds ranging from 25 to 450 f.p.m. using either alternating or direct current.

Overhead gearless traction with either variable speed or variable voltage control for speeds from 450 to 600 f.p.m.

Gearless Traction

The gearless traction elevator has been developed for high speeds in high buildings for use with direct current or can be satisfactorily used where only alternating current is available by using the variable voltage system of control. These machines have the greatest efficiency of all elevator machines.

Geared Traction

The geared traction is used for speeds up to 450 f.p.m. in moderately high buildings and for freight service. These machines give very satisfactory service at high speeds using either alternating or direct current.

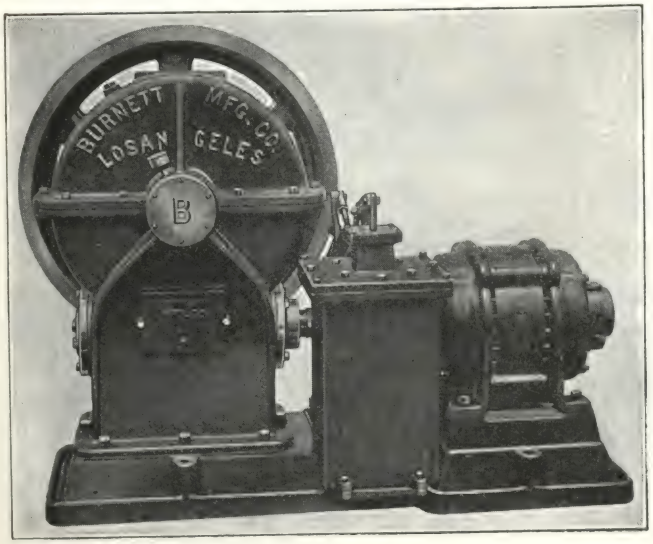
Special Features

Our guaranteed *no-slippage* traction sheave is the latest development in traction elevators.

Timken radial thrust bearings insuring less friction and greater efficiency.

All bearings automatically lubricated.

High speed with quiet operation and smooth acceleration on alternating current.



V-GROOVE TRACTION TYPE SINGLE GEAR
High speed for car switch control

LANE MORTGAGE BUILDING, LOS ANGELES, CAL.
LOY L. SMITH, Architect — CLINTON CONSTRUCTION CO., Builders
Two passenger elevators, 600 f. p. m.
One combination passenger and freight elevator, 300 f. p. m.

THE CAPITAL LIFT & MANUFACTURING CO.

Manufacturers of Electric and Hand Power Lifts

209 South High Street

COLUMBUS, OHIO

Products

ELECTRIC and HAND POWER LIFTS, including:

Electric Elevators, Electric Dumbwaiters, Electric Newspaper Lifts, Electric Form Lifts, Electric Packing House Lifts, Electric Sidewalk Lifts, Automatic Stereotype Plate Droppers, Automatic Roll Paper Droppers, Hand Power Elevators, Hand Power Dumbwaiters, Hand Power Sidewalk Lifts.

Also Stereotype Plate Trucks, Roll Paper Trucks, Warehouse Trucks and Capital Guide Lubricators.

Service

We are specialists in vertical lifting devices.

Our Engineering Department is at the disposal of architects, engineers and owners in designing equipment for unusual conditions.

Useful Information for Designing Elevator Shaftways and for Specifying Elevators

It is hoped that the information on this page may be of service to the reader. The data given is not peculiar to our own make of elevators but will meet the requirements of most manufacturers. To those not familiar with elevator specifications, the following may be of interest:

It is general practice for the owner to prepare the shaftway ready to receive the elevator. Depth of pit, at bottom, depends on speed of elevator and local regulations. Minimum depth of pit for slow speed elevators is usually 3 ft. and of the same size as the shaftway.

Supports for the machine beams are usually provided by the surrounding walls. In the absence of these walls, suitable supports should be supplied.

Machine room, at top of shaft, should be not less than 6 ft. 6 in. high for the ordinary small elevator.

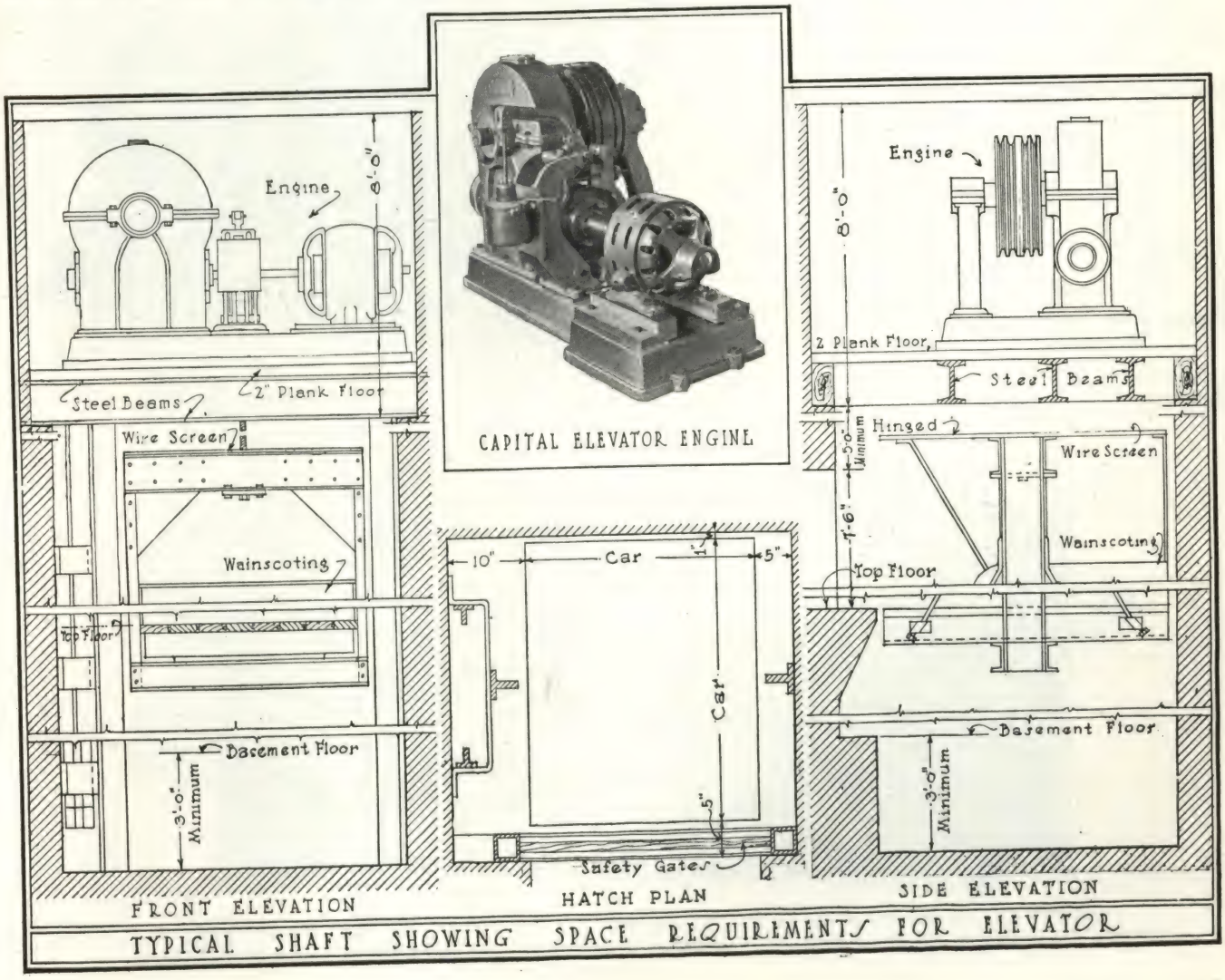
The power line should be brought inside the machine room and provided with fuse blocks and cut-out switches.

All entrances to shaft should be protected by elevator gates or doors or both, installed inside shaftway.

For freight service, the size of the platform, in relation to the capacity of the machine, varies greatly, depending on the material to be handled.

For passenger elevators, 400 sq. in. is usually allowed per person and the capacity is rated at approximately 75 lbs. per sq. ft. of car area.

The elevator contract should be awarded before and not after the shaftway is constructed. The manufacturer's shop drawings should be consulted during the construction of the shaftway.



THE EASTERN MACHINERY CO.

Manufacturers of Electric Elevators

NEW HAVEN, CONN.

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS; ELEVATOR EQUIPMENT.

Experience and Services

This company has had 27 years' experience in the elevator business.

Its exceptional manufacturing facilities enable it to produce machines which are designed on the most advanced mechanical ideas that have proved practical and reliable for improved safety, speed and ease, and economy of operation.

The company maintains a corps of experienced engineers which will furnish layouts and detailed specifications for the proper installation of elevator equipment and give expert advice as to the necessary requirements for the building.

Architects and others having elevator problems to solve are invited to submit them to this company, and a satisfactory solution is assured, without obligation.

Electric Passenger and Freight Elevators

Electric Passenger Type—In use in office buildings, banks, hotels, hospitals, department stores, apartment houses, ships, and in private homes for the comfort and convenience of invalids.

Freight Type—Our many installations, of all capacities and for all requirements, have been thoroughly tried out by long and satisfactory use.

Worm Gear Direct Connected Elevator Machines

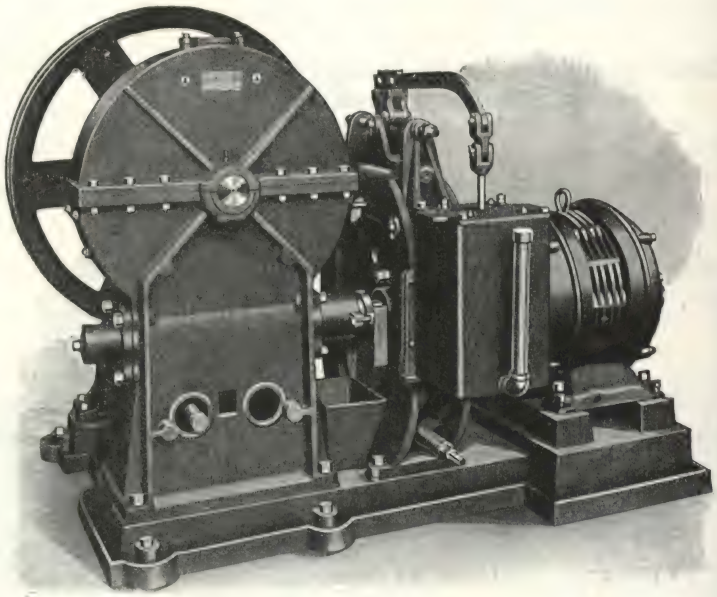
Adaptability—Adapted for first class passenger or freight service, for all speeds.

Control—Operated by push buttons or by full magnet control from switch in car, with direct or alternating current.

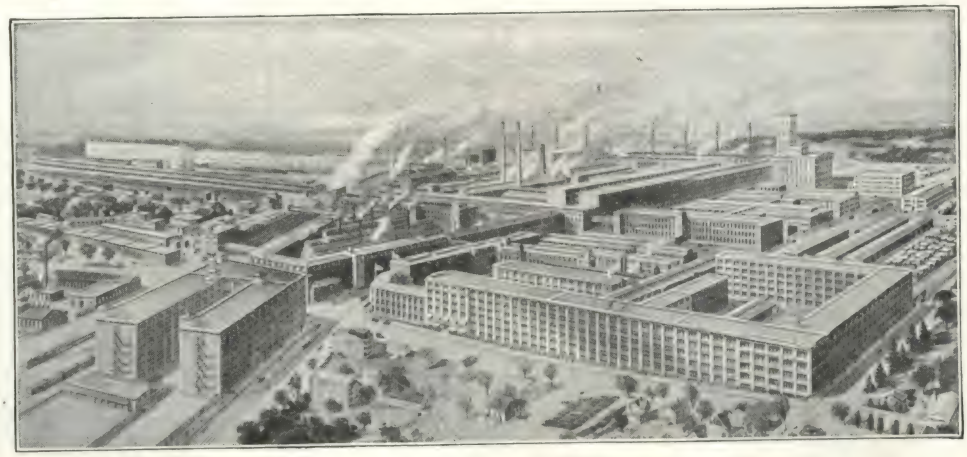
Operation—Smooth, reliable and safe.

Construction—All parts are accurately machined, correctly assembled, and are interchangeable, insuring efficient and satisfactory service.

Safety Devices—Machines are provided with approved safety devices that are substantially constructed, and comply with every requirement.



TRACTION TYPE ELEVATOR MACHINE



FACTORY AND OFFICE BUILDINGS OF THE WINCHESTER REPEATING ARMS CO., NEW HAVEN, CONN.
This 80-acre plant is satisfactorily served by 35 electric elevators built and installed by THE EASTERN MACHINERY CO.

ELEVATOR COMPANY OF AMERICA

Manufacturers of Passenger and Freight Elevators

GENERAL OFFICES
190 North State Street
CHICAGO, ILL.

Products

PASSENGER and FREIGHT ELEVATORS of all types.

Also manufacturers of Automatic Push Button Elevators for hospitals, residences, etc.; Dumbwaiters, Electric and Hand Power.

Superiority

Our products are recognized as of distinction and quality.

They are the best that can be made.

Service

Our highly trained organization of engineers insures the maximum safety and efficiency of our installations, as well as service at all times to architects and engineers on details of all vertical lifting devices.

Estimates

Estimates and specifications furnished on request. When needed, detail sheet listing all information required by us for furnishing an accurate estimate will be sent.

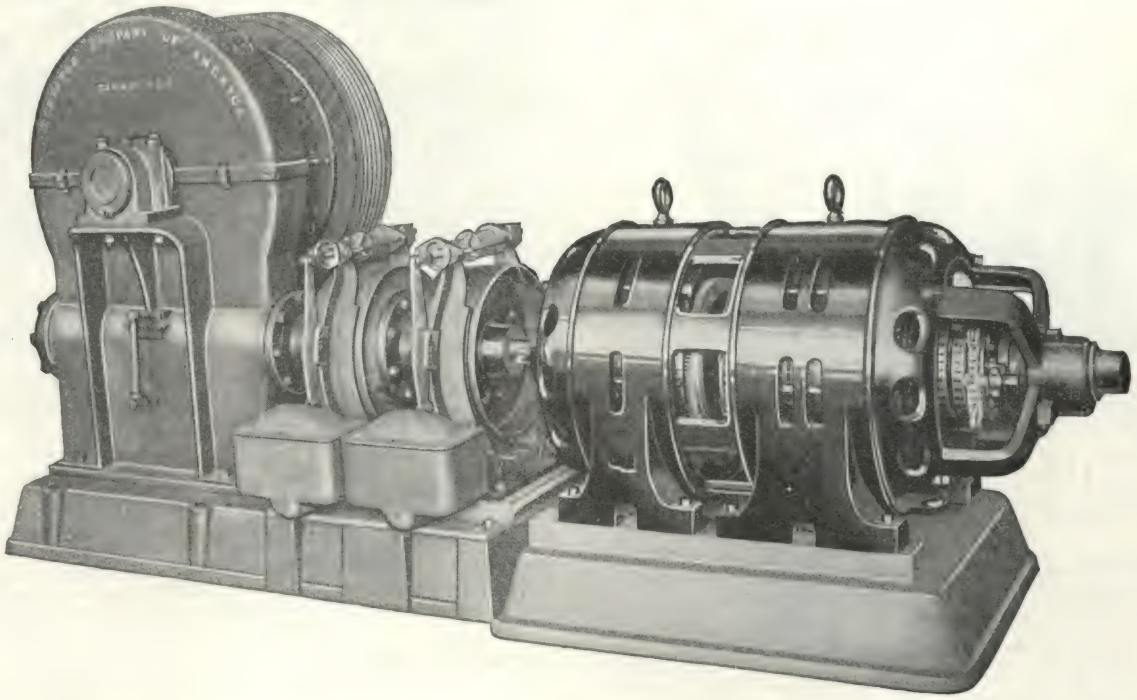
References

CHICAGO, ILL.

American Car & Foundry Co.
Anchor Leather Co.
Theo. Ascher Co.
Belden Hotel
S. Birkenstein & Sons
E. J. Brach & Sons
Calumet Refrigerating Co.
Chicago Sporting Goods Mfg. Co.
Chicago Theater
City of Chicago, Ill.
Chicago Surface Lines
Columbus Hospital
Corn Products Refining Co.
David Fireproof Storage Co.
De Luxe Cab Co.
Denifer Apartments
Elgin Motor Car Sales Co.
Garrick Theater
General Furniture Co.
Gutmann & Co.
Hotel Sherman Co.
Huntington Hotel
Illinois Smoked Meat Co.
Independence State Bank
Klee Bros. & Co.
Manufacturers Exhibition Building
North Pier Terminal Co.
Park Gate Hotel
Albert Pick & Co.
Sherwin-Williams Co.
Splitdorf Electrical Co.
State-Lake Building
Thom Building
Webster Hotel
Wells Building Corp.
West End Hospital
Weyman-Bruton

OTHER LOCALITIES

Hotel La Salle, South Bend, Ind.
Keith Theater, Dayton, Ohio
Miller Amusement Co., Wichita, Kans.
Roosevelt Building, Indianapolis, Ind.
St. John's Hospital, Springfield, Ill.
Orpheum Theater Building, Minneapolis, Minn.
Orpheum Theater Building, Los Angeles, Cal.
Orpheum Theater Building, San Francisco, Cal
Orpheum Theater Building, New Orleans, La.
Orpheum Theater Building, Kansas City, Mo.



TWO SPEED, 50 H.P., TWO BEARING ELEVATOR MOTOR DYNAMIC BRAKING SET, DIRECT CONNECTED TO ELEVATOR BRAKES AND SHEAVE

GRAVES ELEVATOR CO., INC.

426 Exchange Street
ROCHESTER, N. Y.
SERVICE STATIONS: BUFFALO, ROCHESTER, UTICA, ALBANY, N. Y.

Products

Manufacturers of PASSENGER and FREIGHT ELEVATORS; ELECTRIC TRACTION ELEVATOR MACHINES, for overhead or basement installation.

Graves Electric Traction Elevators

Construction—In the construction of Graves traction elevators, passenger and freight, the tractive force is exerted directly on the car cables by passing same over a driving sheave, without any attachment thereto. Cables, anchored in car, pass over sheave, then down over an idler, thence down to counterweight where fastening is made.

Adaptability—Height of car travel bears no relation to size of drive sheave; therefore, the Graves elevators, freight and passenger, are adapted for efficient use in all kinds of buildings, high or low (Fig. 2).

Graves Traction Type Elevator Machines

Construction—Simple and durable; built compact, to occupy small space; all working parts are accessible for adjustment and oiling; driving sheave shaft is short and bearings are large, giving strength, great rigidity and long life; a phosphor bronze gear is used, with a steel worm cut integral with worm shaft; worm thrust is taken care of on one end of worm shaft, permitting entire thrust bearings to be removed without disturbing balance of machine. Thrusts are S.K.F. Special (Fig. 1).

Machines are built in two types and different sizes to suit requirements and service—straight worm geared for passenger and high speed freight service, and compound geared for slow speed freight service.

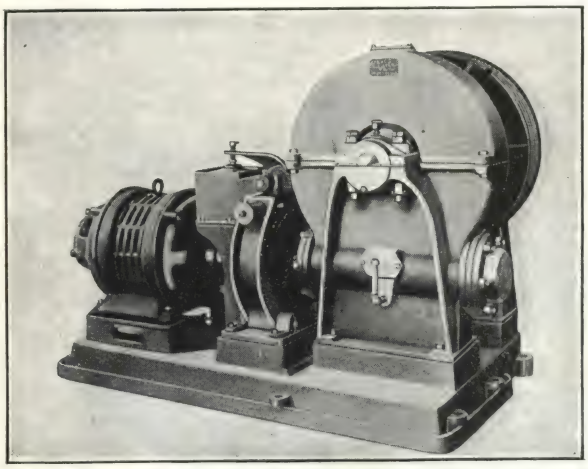
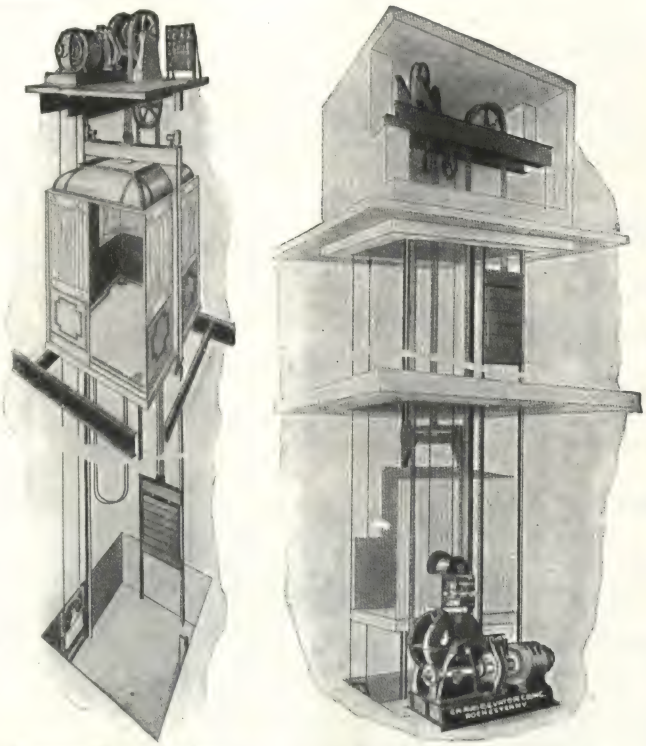


FIG. 1. DIRECT CONNECTED ELECTRIC WORM GEARED V-GROOVE TRACTION ELEVATOR MACHINE

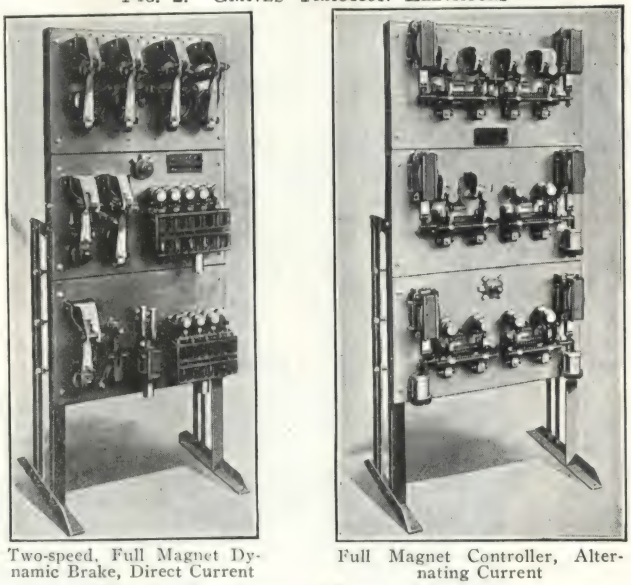
Equipped with electric brake. For either overhead or basement installation. Mechanically and electrically correct

Operation—These machines provide for operation of the elevator quietly on direct or alternating current, either with push button, car switch or hand rope control. Elevator can not travel into overhead work, being prevented by reason of the special design of the traction feature. The service is efficient, with economical operation.



Passenger Type, Overhead — Freight Type, Basement

FIG. 2. GRAVES TRACTION ELEVATORS



Two-speed, Full Magnet Dynamic Brake, Direct Current — Full Magnet Controller, Alternating Current

FIG. 3. THE GRAVES MAGNET CONTROLLERS

Specification Data for Architects—Depth of pit and overhead clearance is governed by car speed, and is specified in State requirements. Size of hatch for wood guides is approximately 18 in. wider post-wise and 2 in. wider front to back than car size. Size of hatch for steel guide is approximately 15 in. wider post-wise and 2 in. wider front to back than car size.

Co-operative Service

Estimates and specifications for complete traction elevators which prospective purchasers propose to install will be furnished on application.

ESTABLISHED 1883

INCORPORATED 1901

KIMBALL BROTHERS COMPANY

Electric Elevators

TELEPHONE, 149

1000 Ninth Street
COUNCIL BLUFFS, IOWA

DETROIT, MICH.
DENVER, COLO.
SALT LAKE CITY, UTAH
OKLAHOMA CITY, OKLA.
NEW ORLEANS, LA.
SOUTH BEND, IND.
CLINTON, IOWA
KANSAS CITY, MO.
MINNEAPOLIS, MINN.
PEORIA, ILL.
FORT SMITH, ARK.
SIOUX CITY, IOWA
DES MOINES, IOWA
DALLAS, TEX.
WATERLOO, IOWA
ST. LOUIS, MO.
DULUTH, MINN.
LINCOLN, NEBR.

Products

ELEVATORS: Traction and Drum Type, Passenger, Freight, Hand, Electric and Belt Power for public buildings, residences, banks, garages and factories; Automatic Push Button Elevators for apartment buildings, hospitals, etc.

Also manufacturers of Electric and Hand Power Dumbwaiters, Sidewalk and Automobile Elevators, and a Special Machine for changing Hand Power Elevators to Electric.

TRADE-MARK

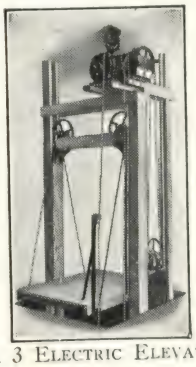
Service and Information

Our designers and engineers are desirous of co-operating with architects, engineers, and builders to secure the best results.

Write for information and data.

Illustrations and descriptive matter are on file for your use—plans, illustrations and descriptions of all types of electric elevators.

Send for our general catalogue.



No. 3 ELECTRIC ELEVATOR
Inexpensive, light, for general use. 1000 to 2000 lbs.

Statement

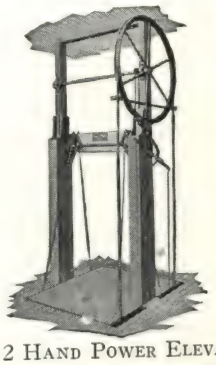
Forty years of service. KIMBALL BROTHERS COMPANY, an independent company having no trust affiliations, enjoys the reputation of being of high financial standing in the elevator business.

Kimball elevators are in operation all over the country, from a house dumbwaiter to a 40,000-lb. electric.

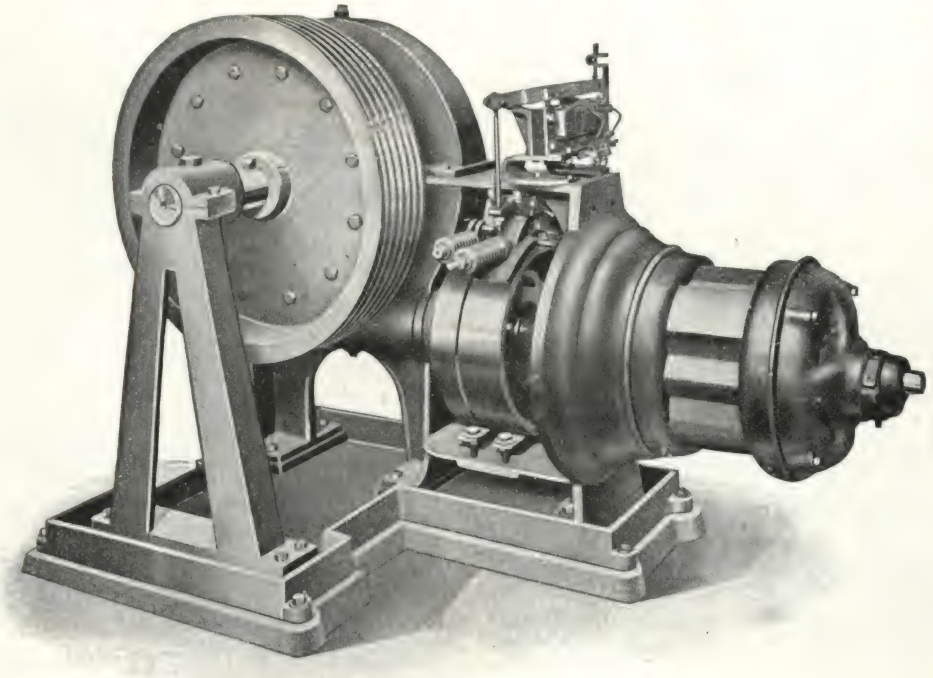
Facilities

A modernly equipped factory devoted to the exclusive design and manufacture of standard hand power and electric elevator equipment, for every type of building. Prompt shipment guaranteed. Ten trunk lines lead out of Council Bluffs.

Our new $30,000.00 factory addition is now completed and occupied.



No. 2 HAND POWER ELEVATOR
Quick rising, easy operating. Roller bearing, antifrictional



"STRAIGHT LINE DESIGN V-GROOVE" TRACTION ELEVATOR MACHINE

ESTABLISHED 1863

KAESTNER & HECHT CO.

Electric Elevator Builders

CHICAGO, ILL.

BRANCH OFFICES

DETROIT, MICH., 331 East Fort Street
CLEVELAND, OHIO, Leader-News Building
BIRMINGHAM, ALA., Lyric Building
DALLAS, TEX., Andrews Building
INDIANAPOLIS, IND., Merchants Bank Building
ST. LOUIS, MO., Federal Reserve Bank Building
PHILADELPHIA, PA., Otis Building
PITTSBURGH, PA., Union National Bank Building
MILWAUKEE, WIS., 428 Jefferson Street
MINNEAPOLIS, MINN., Metropolitan Life Insurance Building

Products

ELECTRIC ELEVATORS for passenger and freight service, controlled by car switch or automatic push buttons, or both.

Also Hydraulic Lifts and Electric Dumbwaiters.

TRADE-MARK

Service

Intelligent engineering co-operation is offered to architects, engineers and builders to assist them in incorporating in their plans and specifications the types of elevator equipment that will best serve their requirements.

Architects and engineers find our preliminary service of practical value. Even in the smallest installations, great expense is often saved by ascertaining from our Engineering Department those sizes and types of standard machines best suited to the particular job, and their most efficient arrangement.

Consultation, recommendations and approval of plans are rendered without cost or obligation.

Experience and Responsibility

"The Quality Product of a Responsible Organization" is the slogan which describes the character and purpose of this company. A background of successful manufacturing experience since 1863 enables us to know what quality means in fine machinery. Responsibility that is seasoned and has for its evidence satisfactory results for many years is the kind of responsibility that goes with the service of this company.

Owing to the importance of elevators in the modern building, we have adopted for our practice, standards of quality higher than generally followed in elevator work. These standards, faithfully maintained, have caused K&H elevators to be regarded favorably by

WRIGLEY BUILDING, CHICAGO, ILL.
GRAHAM, ANDERSON, PROBST & WHITE, Architects
Served by 7 K&H elevators

FEDERAL RESERVE BANK BUILDING, CLEVELAND, OHIO
WALKER & WEEKS, Architects. JOHN GILL & SONS, Contractors
Served by 14 K&H elevators

Continued on next page

architects who want the best possible equipments for their buildings.

With a modern manufacturing plant located in Chicago, we are able to concentrate our efforts and produce elevators that meet all requirements and at the same time obtain the advantages of large production, which means economical production.

The complete service we offer is available throughout the country today, and successful evidences of our work will indicate the advisability of carefully considering K&H recommendations. Designed to be superior, K&H elevators are actually proving the claims of their designers and manufacturers, both in freight and passenger service.

The buildings illustrated are typical of the class of fine buildings served by our product. A more complete list of buildings and owners' comments upon our service will be interesting to architects desiring responsible elevator competition.

Variable Voltage Control

Variable-voltage control, a new K&H feature, brings about an important improvement in elevator performance.

Elevators operating with this control are smoother in starting and stopping. The landings are made with greater ease and accuracy. Passenger capacity is increased by the higher rates of acceleration and deceleration, which reduce running time.

Variable voltage control eliminates the large contactor controller and insures lower maintenance cost and noiseless operation.

Alternating current may be applied with this type of control for high speed elevators, with the assurance of smooth and quiet operation.

Finally, variable voltage control effects a notable reduction in power consumption.

DRAKE HOTEL, CHICAGO, ILL.
MARSHALL & FOX, Architects
Served by 14 K&H elevators

Data Necessary for Bids

To secure comprehensive descriptive matter, our bids or recommendations such as outlined in paragraph entitled "Service," all inquiries for elevators should give the following:

Estimate wanted by.....
Name of building.....Location.....
Name of owner.....Address.....
Architect .....Engineer .....Contractor .....

OUTLINE SPECIFICATIONS

Kind of service and operation.....
Capacity .....
Speed .....
Travel in feet.....
Travel in floors.....Openings.....
Location of machine.....
Electric current.....
Size of hatch (P-W and F-B).....
Size of platform { Side post..... / Corner post.....
Cabs and number of cab sides enclosed.....

THE NEW EQUITABLE LIFE INSURANCE BUILDING, DES MOINES, IOWA
PROUDFOOT, BIRD & RAWSON, Architects
Will be served by 9 K&H elevators

THE KERSCHER ELEVATOR CO.

Electric, Hydraulic, Power and Hand Elevators

TOLEDO, OHIO

Introduction

Changing conditions continually create new needs. What was customary once is antiquated today. Only those thoroughly alive to present day needs and demands, keep abreast of the times. Kerscher elevators are results of constant study of present day conditions and requirements as to their relation in solving vertical transportation.

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS.

Also Hydraulic Hoists and Hand Elevators for factory, office building, foundry, garage and any commercial or industrial installation.

Experience

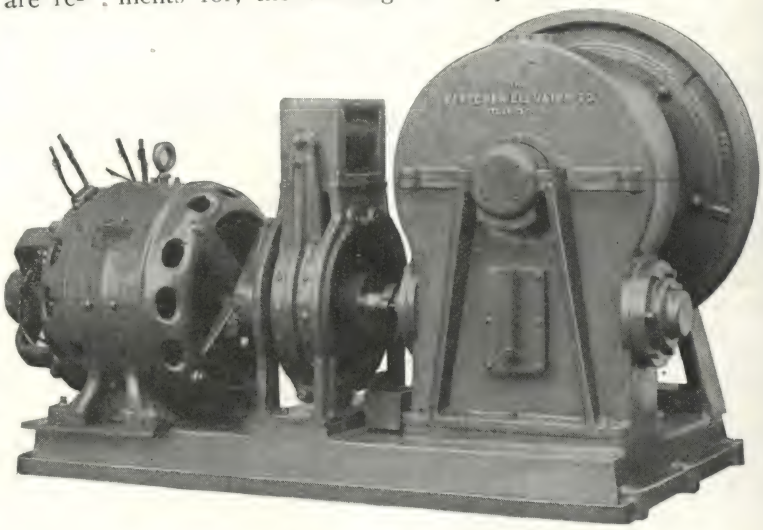
There are 20 years' experience in the building of Kerscher elevators. Instead of working by rule-of-thumb, our engineers choose to believe that elevators should be built to fit the job. That is one explanation for Kerscher performance. And always it has been our aim to "do it better"—and progress has been the natural result.

Facilities

Through our long experience we are able to produce machines designed on the most advanced mechanical ideas, that are practical as to safety, speed and nicety of operation. We are in a position to take care of any problem submitted to us.

Service

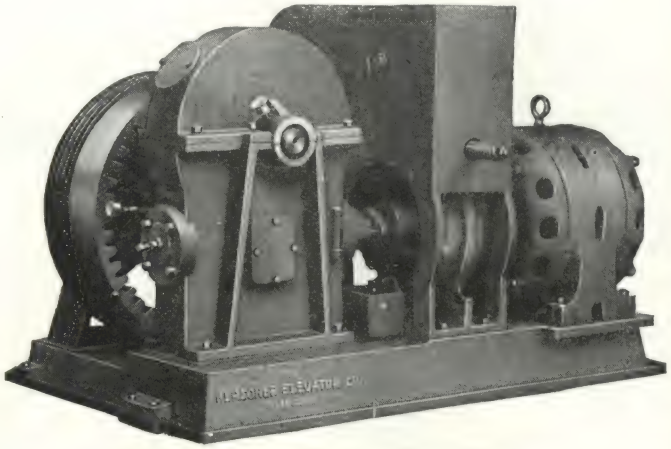
A competent corps of skilled and experienced men are ever ready to furnish layouts and specifications in detail for the installation of, and the necessary requirements for, the building of every elevator installed.



KERSCHER ELEVATOR MACHINE

Reasons for Kerscher Designs

Our theory has always been that if there were a better way to design or build a machine we wanted it. The result has been a continual flow of ideas, of which we are justly proud. Only recently we have perfected a new design for our type of machine, resulting in a more compact mechanism and bringing to light a number of safety features of great importance.



KERSCHER ELEVATOR MACHINE

Continued on next page

Safety Features

Kerscher construction takes care of all overload emergencies in the original design. The immense driving gears of our machines prove they are built to withstand overloads. Then there is the stopping and starting—that is where the wear and tear comes in. But there is no jumping or jerking in Kerscher built machines for both are eliminated by the "worm." This worm is made of solid machine steel which works against a phosphor bronze gear, thereby reducing friction to the minimum. The power is so evenly distributed and constant that only a smooth, quiet and steady pull results the instant power is applied.

KERSCHER MACHINE SHOWING SAFETY FEATURES

Information Desired

In order to co-operate efficiently with architects and builders, please give the following information:

Approximate weight to be handled; size of platform; number of landings; speed desired and kind of power to be used. If electric, state whether alternating or direct current, giving phase, cycles, and voltage. If hydraulic, state water pressure. Also state whether machine will be installed in pent-house or in basement.

Shaft and Hatchway Designs

Different types of buildings necessitate different types of shaft and hatchways to meet the individual requirements. On this page are shown some of the types, or designs, which are commonly used.

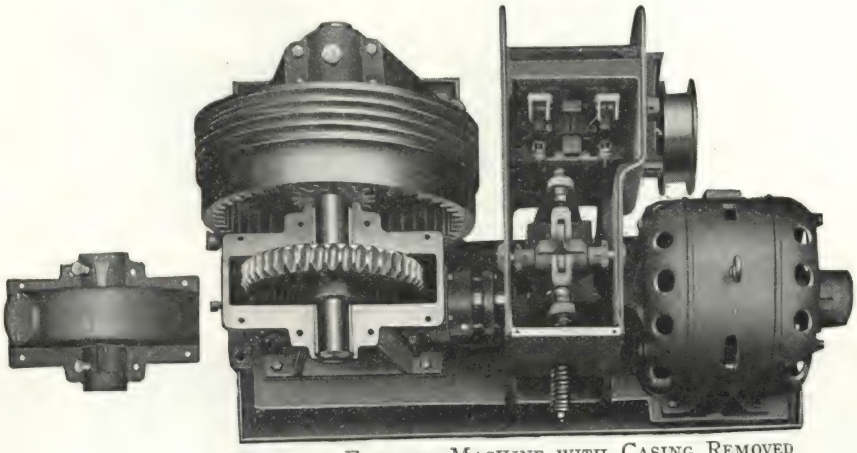
Liberal clearance should be allowed both in pit and penthouse. Clearance is usually based on the speed of car operation. A car moving 100 ft. per minute should have a pit at least 3 ft. deep and 3-ft. clearance at top of shaft; a car moving 200 ft. per minute should have a 4-ft. pit and top clearance; while a car moving 300 ft. per minute should have a 5-ft. pit and top clearance.

Hatchways should be squarely plumb over each other and provide the spaces for clearance as indicated on accompanying sketches.

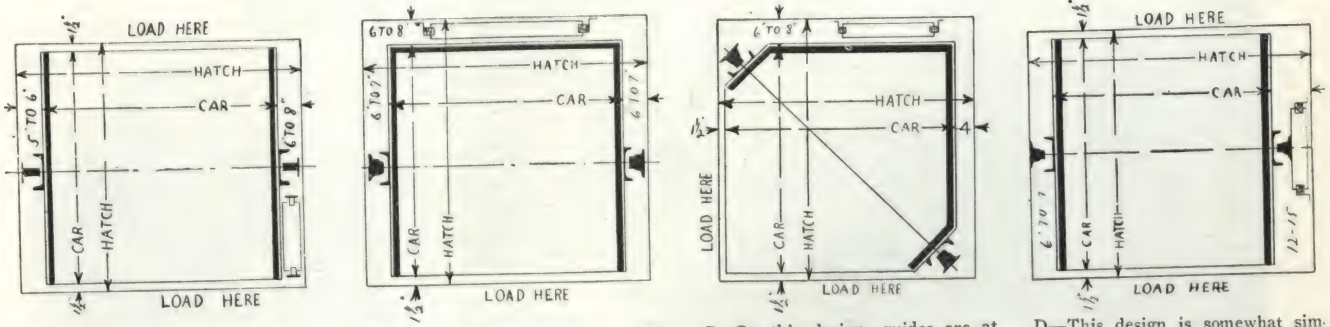
Ample provision should be made when building is erected for the support of overhead beams, etc. These supports should be built-in on all brick and concrete work.

All machines used for hatchways shown here, are the V-groove traction type for overhead construction.

In the final analysis "per ton cost" of operation is the big question. A careful study of the basic features of Kerscher construction will amply justify the claims made for Kerscher quality and performance.



KERSCHER ELEVATOR MACHINE WITH CASING REMOVED



A—This design shows guides at sides arranged to load car from opposite sides.

B—Here guides are at sides, and car is arranged to load from one side only. Counter-weight is located as shown when machine is overhead.

C—On this design, guides are at corners when it is necessary to load car at right angles. This design should be avoided whenever possible, because of greater cost.

D—This design is somewhat similar to "A" in that guides are placed at sides, and car is arranged to load from opposite sides when machine is overhead.

TYPICAL SHAFT AND HATCHWAY DESIGNS

EDWARD KOPPELL ELEVATOR WORKS, INC.

101 North 8th Street

BROOKLYN, N. Y.

Products

High Grade ELECTRIC PASSENGER and FREIGHT ELEVATORS.

Services

This company is equipped to make all repairs, alter and install all types of electric elevators.

Estimates will be gladly furnished on request.

Types and Capacities

Koppell elevators are made in both drum and traction types for pushbutton, car switch or hand rope control.

Capacities are from 500 to 20,000 lbs. with speeds ranging from 25 to 500 ft. per min.

Koppell Elevators

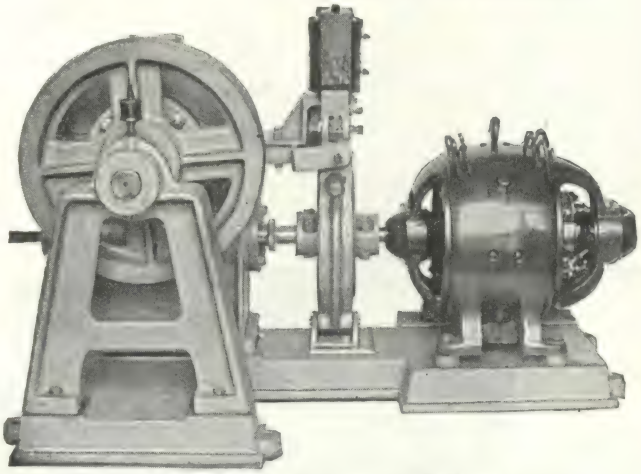
All parts of Koppell elevators are standard and interchangeable.

Hoisting Machine—Of the worm and gear type. Worm and gear shafts are made of a one-piece crucible steel forging. Worm wheel is of the best quality phosphor bronze, securely bolted to spider. Teeth in both worm and worm wheel are accurately cut by special machinery. End thrust is composed of roller or ball bearings which makes a noiseless and most durable construction. All moving parts are enclosed in a heavy cast iron dust-tight and oiltight housing, and submerged in an oil bath.

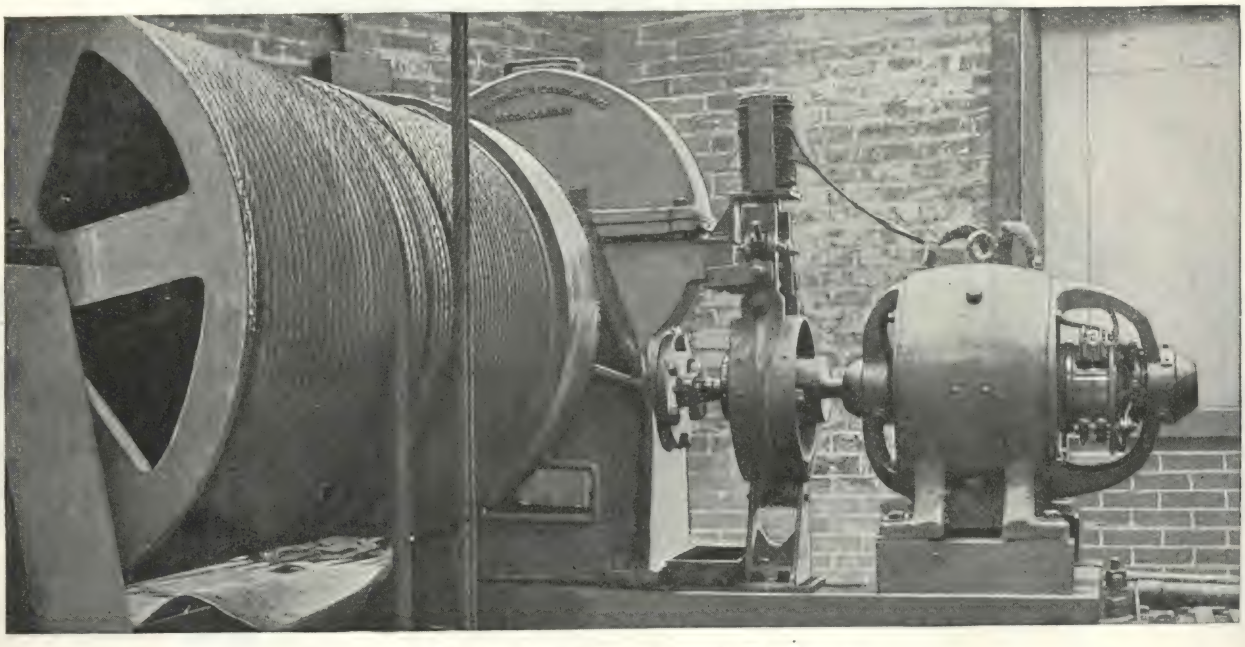
Gear case and motor are mounted on a heavy cast iron plate, keeping various parts in permanent alignment.

Driving Drum—Made extra heavy of best grade cast iron, turned and grooved to receive suitable cables.

Controller—Is of a new improved pattern, full magnet, full automatic.



TRACTION TYPE KOPPELL ELEVATOR



20,000-LB. DRUM TYPE KOPPELL ELEVATOR

MARSHALL BROTHERS CO.

Freight and Passenger Elevators

21st and Mary Streets, South Side
PITTSBURGH, PA.

MARSHALL ELEVATORS
TRADE-NAME

Products

PASSENGER and FREIGHT ELEVATORS: Electric, Hydraulic, Belt and Hand Power; DUMBWAITERS.

Also, Sidewalk Lifts, Invalid Elevators and Telescopic Ash Hoists: Electric, Hydraulic and Hand Power.

Electric Elevators

Passenger Elevators—Controlled by car switch or push button. Designed for office buildings, residences, factories, apartments, etc.

Freight Elevators—Built in all sizes and capacities. Operated by car switch, push button or hand cable.

Our automobile electric elevators are specially designed for extra heavy duty.

Dumbwaiters—Electric dumbwaiters, operated by push button, made to suit any size hatchway.

Note: All of the above types of elevators are for alternating or direct current.

Hydraulic Plunger Elevators

For all water pressures and for freight purposes, as well as for dumbwaiter service.

Belt Power Elevators

Made for freight service where it is more desirable to use belts from main shaft or countershaft for driving power.

Hand Power Elevators

These are for use in stores, factories, residences, etc., where no electric or other power is available.

Special Types of Elevators

We also manufacture sidewalk lifts, invalid elevators and ash hoists, operated by electric, hydraulic or hand power.

Construction of Marshall Elevators

All Marshall elevators are of the latest design. The safety features and equipment throughout are in full compliance with state and city elevator codes.

One of the safety features for preventing accidents through careless operation of the doors is our *electric contact and locks* so arranged that the elevator can not be moved while any door is open. No door can be opened unless the elevator is at the floor level. The opening of the door instantly locks the elevator at the floor and it can not be started until the door is closed and locked.

Our balance gate with electric contact is a special safety feature used on automobile and large freight elevator platforms.

The emergency switch is installed in all elevators having electric door contacts.

The safety governor exercises a positive control over the speed of our elevators in their descent.

We build freight elevators with steel platforms and steel guides, also with hardwood platforms and maple runways.

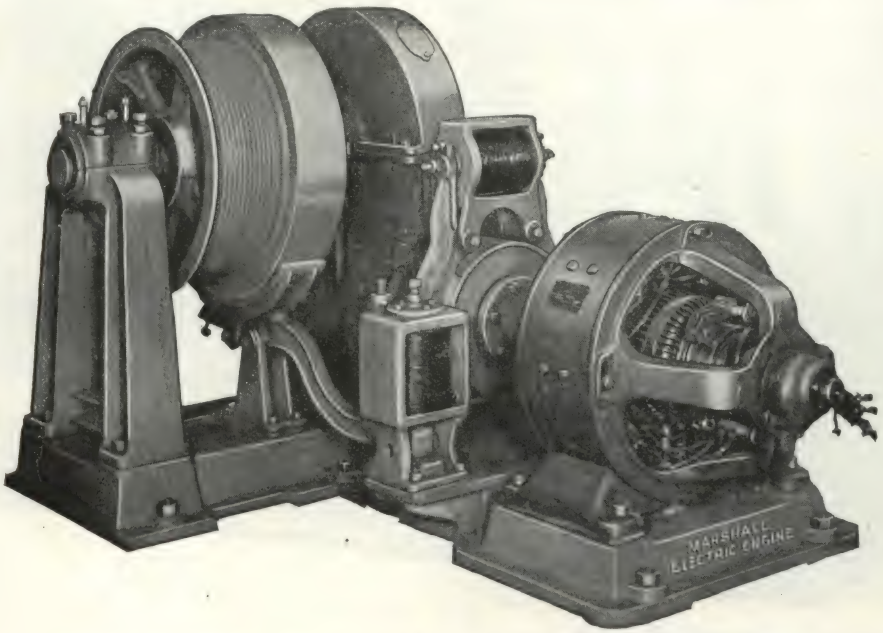
Data Required for Estimates

We will furnish on application our data sheets showing information required for making estimates.

Co-operative Service

We have been in business for many years and maintain a service department, enabling us to supply repair parts promptly.

We will gladly give to engineers, architects and owners the benefit of our experience in connection with the installation of all types of elevators.



DIRECT CONNECTED HEAVY DUTY ENGINE WITH SPECIAL ELECTRIC BRAKES

MONTGOMERY ELEVATOR COMPANY

MOLINE, ILL.

BRANCH OFFICES

CHICAGO, ILL. KANSAS CITY, MO.

Products

ELECTRIC ELEVATORS: Medium Duty Passenger Elevators; Freight Elevators in all capacities.

Also, Electric Power Dumbwaiters, and a complete line of Automatic Electric Passenger Elevators and Dumbwaiters for hospitals, apartment houses and residences.

Electric Passenger Elevator

Below is shown a typical traction type electric passenger elevator, full magnet control, alternating current drive. Quiet operation, smooth and accurate control, and high efficiency are characteristics of this line of equipment. Illustrations and descriptive matter of machine or equipment for any service or duty, will be promptly and cheerfully furnished on request.

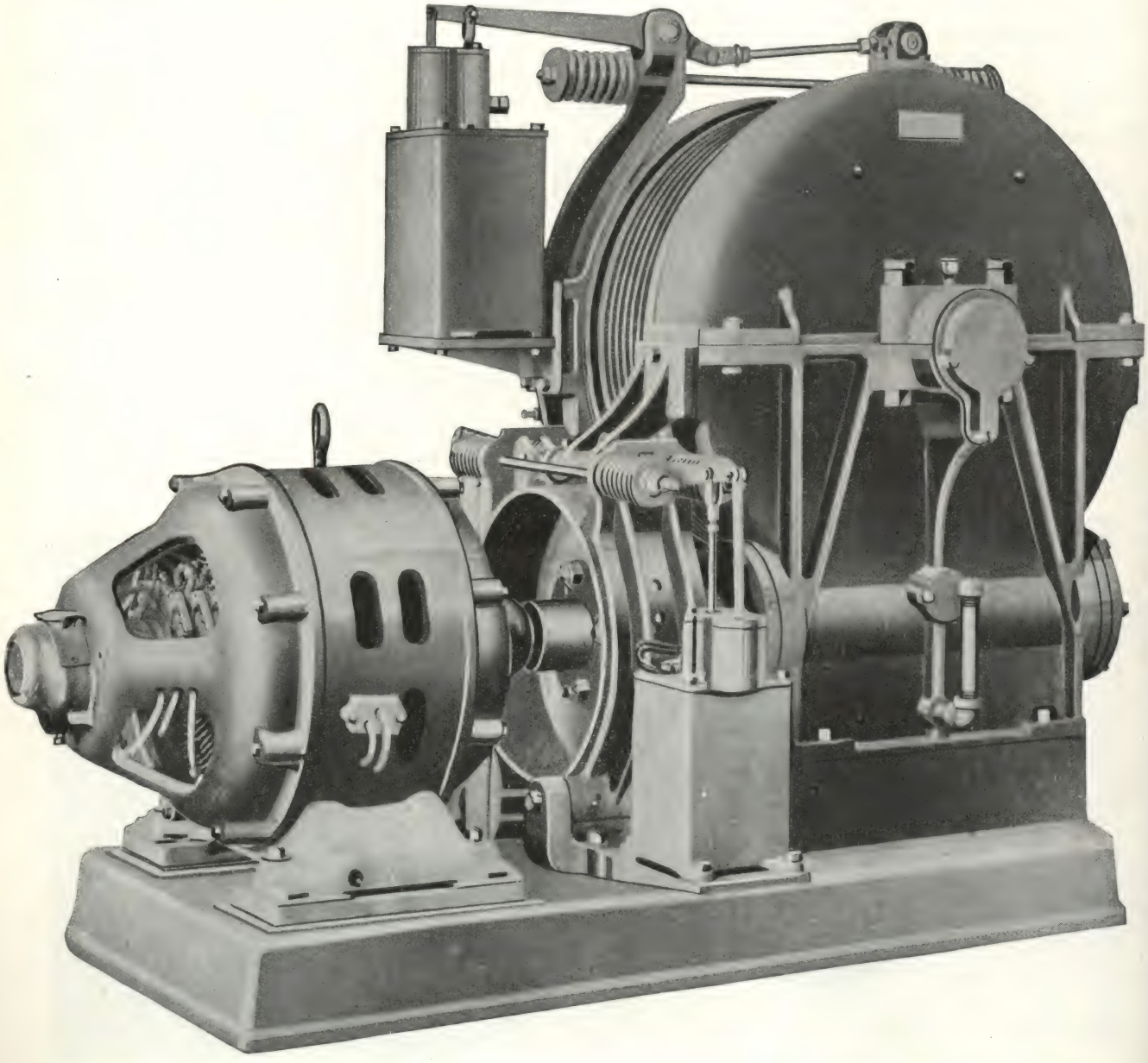
Facilities

A completely equipped plant enables this company to execute orders without delay and at reasonable prices.

Co-operative Services

Our engineering department is at the service of architects and engineers.

Any required information concerning construction data relative to elevators and dumbwaiters, preliminary layout showing loading stresses, etc., also estimates, will be sent on request.



TRACTION TYPE ELECTRIC PASSENGER ELEVATOR ENGINE, FULL MAGNET CONTROL, ALTERNATING CURRENT DRIVE

OTIS ELEVATOR COMPANY

GENERAL OFFICES
Otis Building, 260 Eleventh Avenue
NEW YORK, N. Y.

OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD
For Addresses or Telephone Numbers, see Local Directories

FACTORIES

BUFFALO, N. Y. HARRISON, N. J. QUINCY, ILL. YONKERS, N. Y.

Products

ELEVATORS: ELECTRIC, of all kinds, including Operatorless, Micro-Drive (self-leveling) and with Multi-Voltage Control.

ELEVATORS: HYDRAULIC, STEAM, BELT, and HAND POWER.

ESCALATORS or MOVING STAIRWAYS.

CONVEYORS: GRAVITY SPIRAL.

HOISTS: AUTOMATIC SKIP, BLAST FURNACE, MINE.

INCLINE RAILWAYS.

Also manufacturers of Inclined Elevators: Dock Elevators.

TRADE-MARK

Planning Service

Elevator service is a transportation and engineering problem, especially in the larger class of buildings housing thousands of tenants. The Otis Organization, with its nearly 70 years of experience in the elevator industry, is well qualified to co-operate with architects, owners and tenants in determining upon the best type of elevator equipment suited to any individual elevator installation. The OTIS ELEVATOR COMPANY maintain over 160 offices in this country, and information will be gladly given at any of these offices regarding the information required in planning a building of any kind, from the most simple to the most complex.

In the large office buildings where the number, size and speed of the elevators, as well as the details of control, must be carefully worked out so as to properly care for the tenants and give satisfactory service, the records available in the Otis offices are of valuable assistance in laying out the elevator plant. Drawings showing hatchway sizes, clearances, overhead supports, loads on beams, and all other details will be gladly furnished, as a means of assistance in preparing building plans.

Design and Manufacture

When an Otis elevator is purchased you do not buy an assembly of non-related manufactured articles, but an equipment which is designed in its entirety by Otis engineers with their years of experience; equipment which is entirely fabricated in Otis factories—machine, motor, controller, brake, gearing, safety devices of all kinds—they are all Otis manufactured, and especially designed for the work which they are to do.

All parts are standardized and can be obtained in stock at the many offices maintained for the purpose of taking care of the machines.

Electric Elevators

Practically all elevators installed at the present time are of the electric type. These range from the simple slow speed factory or store elevator, through the various duties of freight elevators, up to capacities of several tons at high speed, and with operatorless control. The passenger elevators range from the small automatic elevator for residences, through the range of duties required for department and other stores, apartment houses, hotels, office buildings of all types. The electric elevator is the most efficient and reliable type; it requires less space, is more easily operated, and costs less to install and operate.

The principal types in use are the single wrap traction and the gearless traction; both of these may also be furnished with Micro-Drive (self-leveling) feature. They may also be equipped with the latest development in the way of multi-voltage control for banks of three or more elevators in larger buildings.

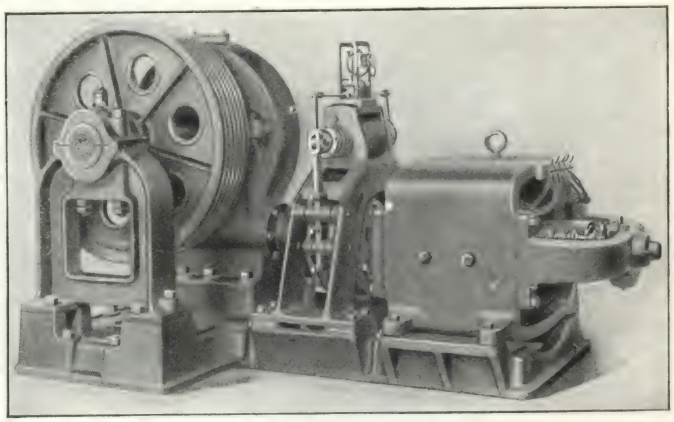
Current Characteristics—All single wrap traction elevators can be operated on direct or alternating current of commercial current characteristics. We are now prepared to offer alternating current passenger elevators for a car speed of 350 ft. per minute with two-speed motors and car switch control.

The gearless traction machines are operated only on direct current circuits.

Traction Elevators

The traction type of electric elevator, both single wrap traction and gearless traction, has superseded the older drum type, on account of saving in space required for the machine, efficiency and consequent economy of operation, ease of control, and the inherent safety feature of traction drive which prevents any possibility of the car or counterweight being drawn into the overhead work.

Single Wrap Geared Traction Elevators—On this type of elevator the car is driven through a driving sheave, operated through worm gearing by a motor of 700 to 900 r.p.m. Car speeds range up to 400 ft. per



SINGLE WRAP GEARED TRACTION ELEVATOR MACHINE

Continued on next page

minute. This type of machine is generally used for freight work and for moderate passenger requirements where conditions of rise, load, speed, and required service would not warrant the use of the higher grade gearless elevator.

Gearless Traction Elevators—The gearless traction elevator is the highest development of the traction idea, and provides car speeds up to the maximum allowable by local regulations, which at the present time is 700 ft. per minute in New York.

This type of elevator employs a slow speed high torque motor, with a driving sheave mounted on a spider which is integral with the armature shaft. All intermediate gearing is thus eliminated, as the slow speed motor enables the car to be driven directly from the sheave by means of ropes, which pass around the sheave and then to the car and the counterweight.

Easy and smooth operation, starting and stopping, and very high efficiency are features of this machine.

In cases where larger capacities at more moderate car speeds are required, this type of machine can still be utilized by roping up the car and counterweight on a 2:1 arrangement.

Control Systems for Electric Elevators

Hand Rope—This type of operation is fast becoming discarded for all except the small slow speed freight elevator, where the service is so light as not to warrant the expense of an operator.

This control subjects the equipment to greater wear and tear, and has the inherent danger of allowing the car to be started from any floor, with consequent possibility of accident. Insurance and public safety regulations have largely eliminated its use for these reasons.

Push Button—Automatic push button control meets, with full safety, the requirements of service without an operator. Call buttons at each floor and a full set of operating buttons in the car, provide for the operation. Safety and non-interference devices, together with gate and door locks and contacts, prevent confusion of service and provide safety for the passengers and the general public using the building.

This form of control is usually limited to use in private residences, private office buildings, hospitals, apartment houses, etc. It may, however, be used with heavy duty Micro-Drive elevators, as later described.

Car Switch Control—The most generally used form of control for freight work and practically all passenger work, is the switch in the car. The switch is arranged to return to stop position if released by the operator, and the entire control system is fitted with every safeguard to prevent accident.

Car Safety Devices

All elevators are provided with a car frame or sling, in which the platform is securely fastened and braced. Safety devices are mounted underneath the car platform and are operated by means of a centrifugal governor at the top of the hatchway.

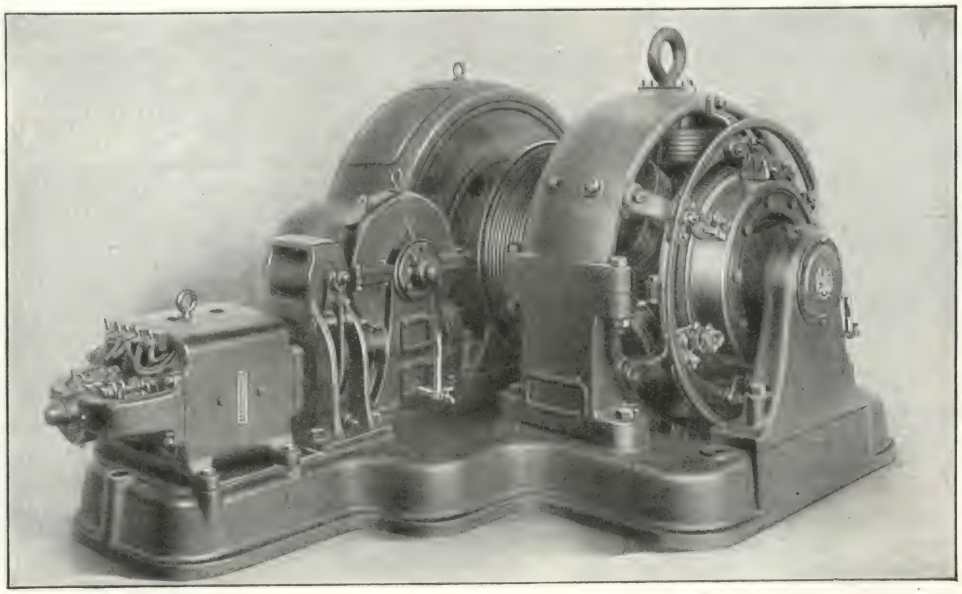
If the car attains excessive speed from any cause, the governor operates the safety device, so as to grip the guides and prevent further descent of the car. On the high speed elevators the governor acts to electrically slow down the speed of the elevator, if the car speed should become excessive, before the safety begins to operate.

Micro-Drive or Self-leveling Elevators

Increasing demands for higher efficiency in elevator service, for both high speed passenger and heavy duty freight elevators, have been met by the Otis Elevator Company in the Otis Micro-Drive (Self-leveling) electric elevator with either car switch or automatic control.

The single wrap traction type of machine with Micro-Drive feature, consists of a regular elevator machine and motor to give the rated duty of the elevator, and an auxiliary machine and motor mounted on an extension of the main bed plate. When the car reaches the micro zone at the floor where it is intended to stop, the small micro machine, at reduced speed, brings the car exactly level with this landing, irrespective of load, and also maintains the platform at that level regardless of whether the load on the platform is increased or decreased.

All this leveling operation is performed entirely automatically and independently of the operator. The elimination of all "inching" to the floor results in a



Gearless Traction Micro-Drive Elevator Machine

Continued on next page

great saving in current, in addition to that saved by the fact that this final approach to the landing is accomplished by the small motor instead of the larger main motor.

This control allows of much more rapid service, as it eliminates false stops at the floors, also permits of the use of less skilled operators, due to the automatic leveling at the landing.

There is greater safety on an elevator of this type, as the tripping hazard on passenger elevators is entirely eliminated, and on freight elevators the level stops do away with broken boxes and packages, which are often caused by trucks hitting the floor sills when the car is not exactly at the landing.

The gearless traction Micro-Drive elevator is built as a single unit, but with the various operations following in the same sequence, and with the same results as on the single wrap traction elevators. The saving in power is greater, due to the larger motor used for the main drive, with consequent greater decrease in current consumption when approaching the floors.

Operatorless Electric Freight Elevators

In large plants requiring a large number of elevators carrying industrial trucks, Micro-Drive elevators are essential to proper and efficient operation, and in some cases it has been found advantageous to group the elevators into banks of from six to ten, and control all of those in each bank by a central dispatcher working with an automatic telephone system and a conveniently located push button control board. Examples of such installations are the enormous army base warehouses and terminals at Brooklyn, N. Y., and Boston, Mass. Automatic door operating machines facilitate the service.

A single elevator arranged for the heaviest and most exacting freight service may be also equipped with push button control and the micro leveling feature, and thus eliminate the regular attendant.

Multi-Voltage Control

The latest development in the elevator art is the Multi-Voltage control.

This form of control can be applied to any bank of elevators, and eliminates the use of resistance for starting and stopping, with consequently greatly decreased power consumption, particularly with a large number of stops. Due to smooth starting and stopping, high rates of acceleration and retardation can be employed, and owing to better speed control, higher car speeds can be advantageously employed than have heretofore been possible; consequently the same number of passengers can be carried with less elevators than similar installations having other form of control.

Other Elevator Types

Hydraulic—Practically no geared hydraulic elevators are now being installed, as they are justified only in cases where electric power is not available. Direct lift plunger elevators can still be used advantageously for sidewalk, foundry, and other short rise service.

Belt Driven—This type is driven from a line shaft, and only for car speeds not over about 50 ft. per minute.

Steam—Used only under exceptional circumstances.

Hand Power—Used only where service requirements are very light and infrequent, mostly in smaller towns where the conditions do not justify the expense of higher class equipment.

Escalators or Moving Stairways

Used wherever it is desired to move people in great numbers continuously and rapidly—in subways, elevated railways, railroad terminals, theaters, department stores—and even in industrial buildings where many employes must be transported between levels quickly and with the maximum conservation of their working energy.

May be made reversible so as to conform to the changes in flow of traffic during the day, and can be installed for both up and down service. They operate continuously, with no waiting interval, and carry people comfortably, quickly and without exertion. They require small motors on account of being constant running, hence the operating cost is very low.

Gravity Spiral Conveyors

The principal use for this class of apparatus is in department stores and warehouses, where it facilitates the delivery of packages from the upper floors, and relieves the elevator system of a great deal of work, as well as saves manual labor.

These conveyors are of the open or closed type, built of metal, and utilize gravity entirely, thus eliminating all operating expense. The diameter of the conveyor, and pitch of the delivery blades depend upon the size and character of packages to be handled, and which range from the smallest parcel to large packing cases. Several blades may be installed in one shell, and with the other features afford a selective service of considerable range.

Automatic Skip Hoists

The Otis automatic push button controlled skip hoist raises and delivers bulk material, such as coal, ashes, etc., and automatically returns to the loading position. The form of control may be varied to suit the conditions.

This machine has enabled plants using them to effect a considerable saving in operating expense, due to the reduction in manual labor required for this class of work. It is rugged in design and built to withstand the heaviest character of service.

Blast Furnace and Mine Hoists

Otis engineers have had broad experience in meeting the severe requirements of equipment of this character, as evidenced by the Otis apparatus in use in a large number of such plants. Each installation is usually an individual engineering problem, and carefully studied and worked out as such.

Incline Railways

These are also a case of selecting apparatus to meet the varying conditions of each individual case, and are studied accordingly.

They are used for a variety of purposes, such as handling passengers for sight-seeing purposes, or for ordinary business transportation, also for handling teams and motor trucks between separate levels.

THE OHIO ELEVATOR AND MACHINE CO.

Manufacturers of Elevators, Enclosures and Cabs

MAIN OFFICE AND FACTORY

COLUMBUS, OHIO

DISTRICT REPRESENTATIVES

BALTIMORE, MD., General Elevator Co.
CHARLESTON, W. VA., Kanawha Equipment Co.
PITTSBURGH, PA., Elevator Equipment & Repair Co.
RALEIGH, N. C., William Walker Jones
ST. LOUIS, MO., Klug Elevator Co.
WASHINGTON, D. C., Blake Palm & Bro.

Products

Direct Connected Electric Elevators; Hydraulic Elevators; Elevator Enclosures and Cabs; Safety Gates, Cable Locks and Electric Door Switches.

TRADE-MARK

Direct Connected Electric Elevators

The Ohio standard equipment in this line is capable of lifting a maximum load of 10,000 lbs. at a speed of 50 ft. per minute or a maximum speed of 300 ft. per minute with a load of 2,500 lbs.

The machine is direct connected, provided with a continuous cast iron bed plate under drum, gear and motor.

The car is provided with a steel sling and side sills, and is equipped with a positive safety device under the platform.

The guides may be either of steel, semisteel or wood construction.

Control may be either push button, car switch, pilot wheel, or hand cable.

For heavy load duty select the Ohio Tandem worm geared machine, which will lift a load of 40,000 lbs. at a slow speed.

For high speed duty, the Ohio V-Groove Traction machine is used. This type may be operated at any speed up to 400 ft. per minute.

Hydraulic Elevators

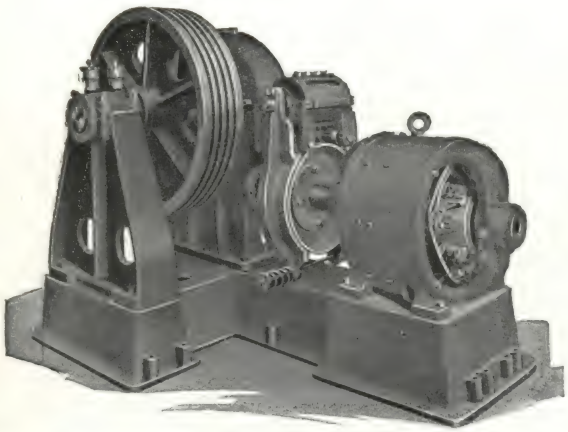
Vertical cylinder, direct plunger elevators are used for passenger or freight service, and are operated by means of hand cable, lever or pilot wheel in car.

Safety Gates

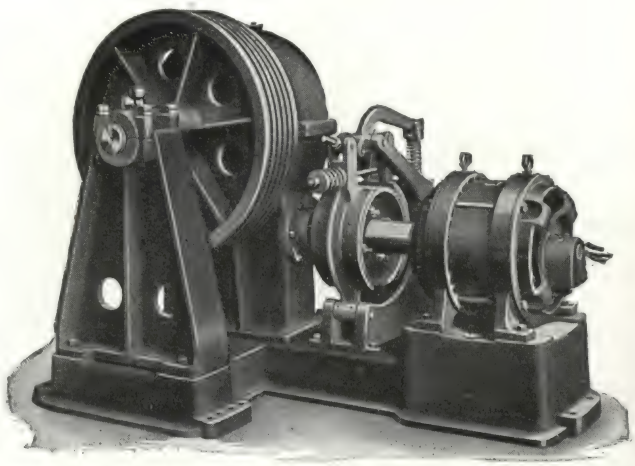
A complete line of safety gates is manufactured for both semi-automatic and full-automatic operation.

Cable Locking Devices

This company furnishes automatic locks for cable operated elevators, by means of which the operation of the elevator may be precluded unless the operator is on the car.



Direct Connected Single Worm Geared Elevator Engine, V-Groove Traction Type, Direct Current
For high speed or heavy duty



Direct Connected Single Worm Geared Elevator Engine, V-Groove Traction Type, Alternating Current
For high speed or heavy duty

Continued on next page

Electric Door Switches

Protection against possible accidents is one of the most desirable features of elevator service. This may be secured in a practical way by the use of Ohio electric door switches, which are so arranged that they may be installed on present or prospective equipment at small additional expense.

Enclosures and Cabs

A thoroughly equipped ornamental iron department is operated by this company, in which cabs and enclosures are made.

Architects, owners and builders will find it decidedly advantageous to have the elevator, cab and enclosures furnished and installed by a single contractor.

For passenger elevators, provide not less than 18 ft. of clearance from top landing to ceiling of penthouse, if machinery is in basement. If machinery is over hatchway, make this distance 24 ft. For freight elevators this can be reduced about 2 ft. At a point about 15 ft. above top landing make provision for supports for overhead beams or machinery.

Make penthouse 2 ft. wider than hatch on post sides. If walls are of brick or concrete, fastenings for posts should be built in as the building is erected.

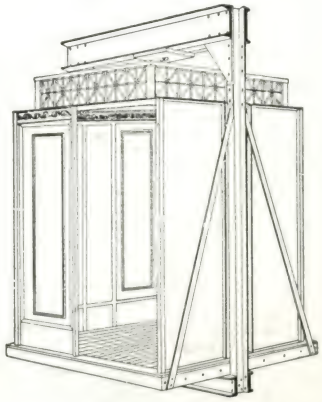
Co-operative Service

Many hours of tedious detail work for the architect are saved by this company's furnishing, without obligation, plans and specifications covering equipment suited to his needs.

Ohio Design 254

Ohio Design 276

Ohio Design 277



Ohio Design 1363

Elevator Cabs Made by The Ohio Elevator and Machine Co.

Important to Architects

At bottom of elevator shaft provide a pit same size as shaft and not less than 3 ft. deep for freight elevators, or 5 ft. for passenger elevators.

For traction type elevators the pit should be at least 5 ft. deep; this allows space for oil buffers, which are placed both under car and counterweights.

Hatchways should be plumb over each other, and about 1 ft. wider than car on post sides and 2 in. longer than car from front to back.

A Few Nationally Known Users of Ohio Elevators

Allen Motor Company
American Sheet & Tin Plate Company
American Steel & Wire Company
G. & J. Tire Company
Hoover Suction Sweeper Company
Jeffrey Manufacturing Company
Jones & Laughlin Steel Company
Pierce-Arrow Motor Car Company
Pennsylvania R. R. Company
Quaker Oats Company
State Institutions of Ohio
United States Government

F. S. PAYNE CO.

Elevator Manufacturers

GENERAL OFFICE AND WORKS
CAMBRIDGE, MASS.

BRANCH OFFICES
BOSTON, MASS. LOWELL, MASS. NEW HAVEN, CONN.

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS.

For Hydraulic Ash Hoists, see page 569; for Dumbwaiters, see pages 1986-1987.

TRADE-MARK

Experience and Services

This company was organized in 1903 under the present name and although its progress has been almost unparalleled, there have been few changes in personnel or policy.

During this period the expansion in equipment and facilities has anticipated the requirements of customers for new elevators and repairs or remodelling old apparatus.

Payne Electric Elevator Machines

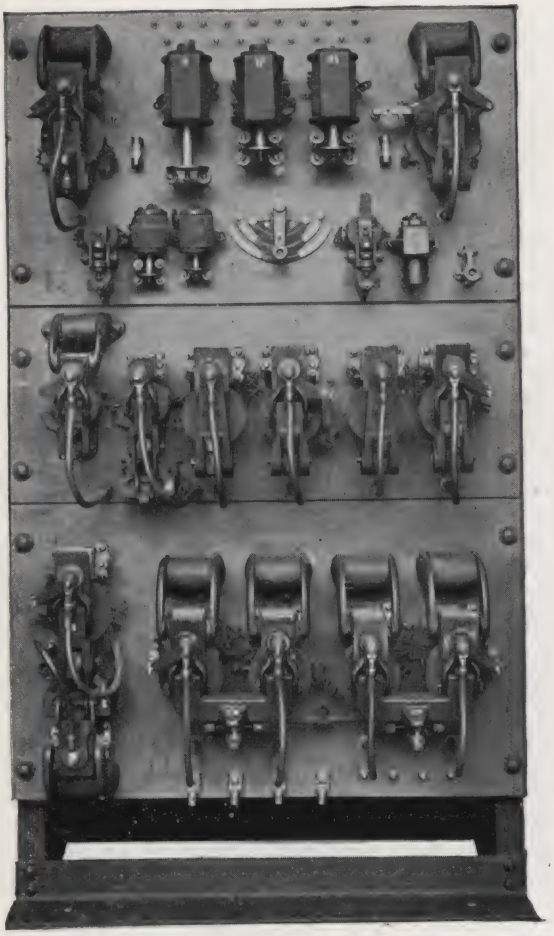
Payne machines are manufactured in two types—drum and geared traction—both of which are driven by a steel worm and bronze gear with the drum or driving sheave mounted directly on the gear shafts. No spur gears with steel working against steel are used.

This design is the most serviceable and efficient for all service.

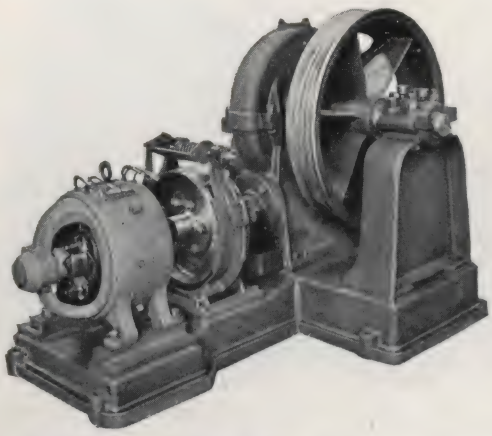
All machines with the exception of the smaller sizes have heavy continuous cast bed plates with an oil reservoir on all edges.

Electric brakes are a part of every Payne electric machine. The Payne brake is unequalled in the elevator industry.

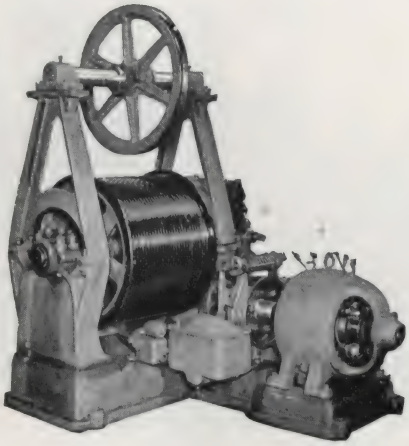
Slow speed motors with long bearings especially designed for elevator service are connected directly to the worm shaft.



PAYNE ELECTRIC ELEVATOR CONTROLLER



PAYNE DIRECT CONNECTED ELECTRIC ELEVATOR TRACTION MACHINE



PAYNE DIRECT CONNECTED ELECTRIC ELEVATOR DRUM MACHINE

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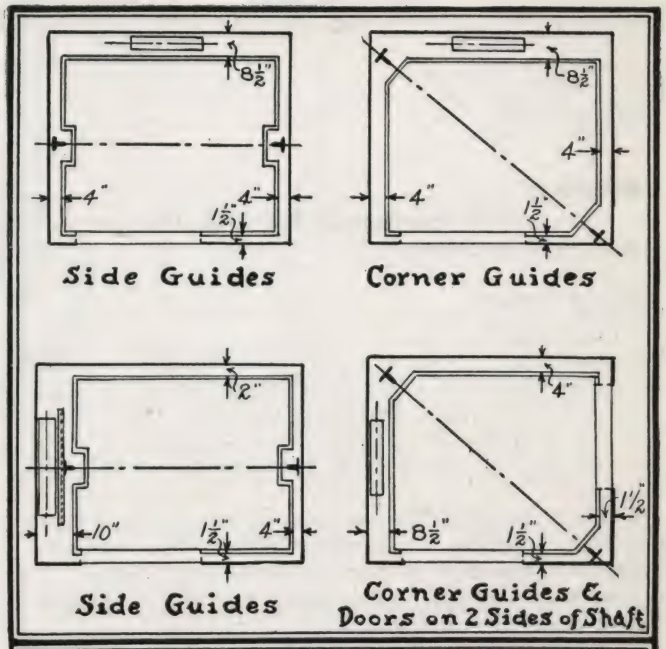
Payne Elevator Controllers

Payne controllers are the product of an engineering corps who have designed elevator controllers for 25 years. These controllers are manufactured for every service and method of operation and embody no mechanical or electrical compromise. (See illustration on previous page.)

Automatic Push Button Control—Particular attention is directed to automatically operated elevators as they can be adapted to every service and effect a great economy by eliminating the cost of an operator's services, reducing electric current consumption and lengthening the life of the entire apparatus as it is not subjected to carelessness and abuse as are manually operated elevators.

The speed of automatic elevators should be as slow as is consistent with service required, as the car will stop more accurately at slower speeds and there will be no necessity of adding any further complicated apparatus to the equipment in an effort to obtain more accurate stops.

Payne automatic control systems are a model of simplicity in design, which is the greatest assurance of continuous service.



TYPICAL ELEVATOR CAR LAYOUTS.

Information Required for Estimates

Building .....
Address .....
Service (passenger or freight) .....
Water pressure available (for plunger elevator) .... lbs.
Size of car desired (....ft. .... in. by .... ft. .... in.)
Location of machine (in penthouse over hoistway or on basement floor adjacent to hoistway) .....
Construction of hoistway (brick, concrete, steel, tile or wood. If tile or wood, also advise floor construction) .....
.....
Control desired (hand rope, car switch or automatic push button) .....
Load to be lifted ..... lbs.
Electric current—
Direct: ..... volts.
Alternating: ..... phase; ..... cycles; ..... volts.
Travel: Number of floors to be served .....
Actual distance elevator is to travel, i. e.:
Floor heights from lowest to top landing ..... ft. ..... in.
Distance from top floor level to underside of roof over hoistway .... ft. .... in.
Gates required, number and type preferred (semiautomatic or full automatic) .....
Number of openings to elevator hoistway on each floor....
Are all openings on one side or adjacent or opposite sides of hoistway? .....

General Information Regarding Elevators

In deciding upon the most advisable capacity, car size and car speed and number of elevators for a building, there are many questions which arise in regard to the number of people or weight and area of freight to be carried in a given time. All these questions are usually disposed of by specifying a high car speed due to the false impression that increased speed necessarily expedites service proportionately.

High speed means high initial, operating and maintenance costs and not infrequently there is little or no return for these charges.

All elevators are stopped at various landings, more particularly freight elevators, the greater part of the time and the actual time elevators are in motion is very small.

More consideration should be given to increasing the width of the entrance to the car and having liberal sized corridors or loading areas at each floor, as delays at landings, due to congestion, are the principal cause of unsatisfactory service.

As the car speed increases, greater premium is placed on the human element—that is, the operator—which is contrary to the general practice of the day. An operator loses more time, and does untold damage to the apparatus, in endeavoring to make accurate stops than can be gained by having the car operate at a high speed.

If any apparatus is added to the equipment to assure accurate stopping, the operator will depend upon it entirely, which, with the additional complications involved requiring repairs and adjustments, will defeat the purpose of the increased expenditure.

The engineering facilities and experience of this company are at the service of all without any obligation being entailed.

References

Aberthaw Construction Company
Marc Eidlitz & Son, Inc.
Swift & Company
Stone & Webster
Turner Construction Company
Hollis French & Allen Hubbard
United States Rubber Company
American Woolen Company
General Fire Extinguisher Company
Colts Patent Fire Arms & Ammunition Co.
Manning, Maxwell & Moore
Boston and Albany Railroad
Boston and Maine Railroad
Central Vermont Railroad
U. S. War Department
U. S. Navy Department
U. S. Treasury Department
U. S. Emergency Fleet Corporation
Traveler's Insurance Company
Hartford Fire Insurance Company
Harvard College
Wellesley College

WATSON ELEVATOR COMPANY, INC.

407-409 West 36th Street

NEW YORK, N. Y.

TELEPHONE
LONGACRE 0670

FACTORY
HOBOKEN, N. J.

Products

ELECTRIC ELEVATORS for both Passenger and Freight Service.

TRADE-MARK

Watson Service

WATSON ELEVATOR COMPANY, INC. is prepared to render elevator service of every kind in connection with new installations, repairs or inspection. This Company specializes in elevator service—the placing of its many years' experience with elevators is at the disposal of those interested.

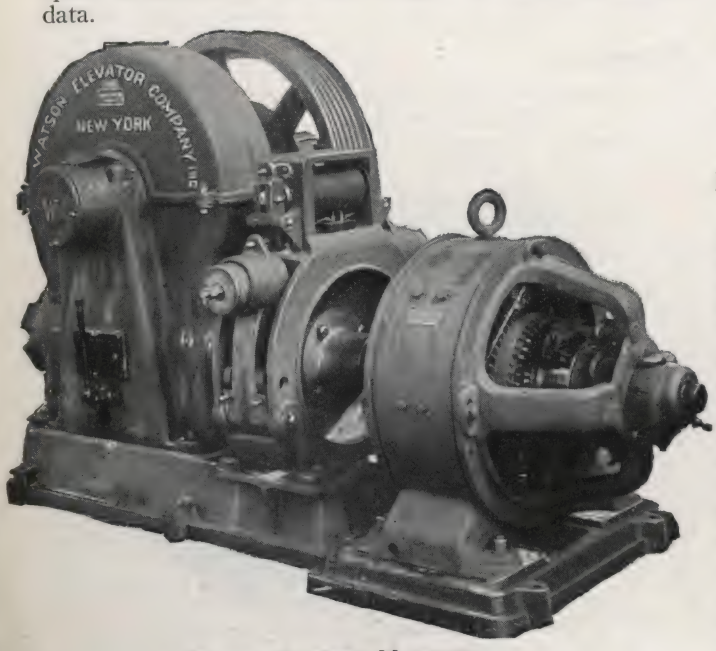
There is no obligation incurred on the part of an architect, engineer or property owner who sends for Watson to assist in solving his elevator problems. An experienced elevator man is frequently able to save the owner an expensive mistake.

In an existing elevator plant, the Watson Company is prepared to enter into an inspection-repair contract (weekly, semimonthly or monthly) whereby the actual repair bills may be kept at a minimum, or will contract to keep the elevator in perfect condition. In a Watson elevator installation, this service is furnished gratis for 3 months.

Specifications, Drawings and Inquiries

Specifications and drawings covering specific electric elevator equipment will be gladly supplied to architects and engineers. A set of typical drawings (of which one is reproduced herein) will also be sent on request.

A general description should be given of the work the elevator is to be put to, including nature of the building, etc.; also the size of the shaft, the car speed in feet per minute, capacity in pounds, and the current available for operation—whether direct or alternating current—its voltage, and, if alternating current, its phase and cycles. A sketch locating doors to shaft and space available for elevator engine should accompany data.



WATSON ELEVATOR MACHINE

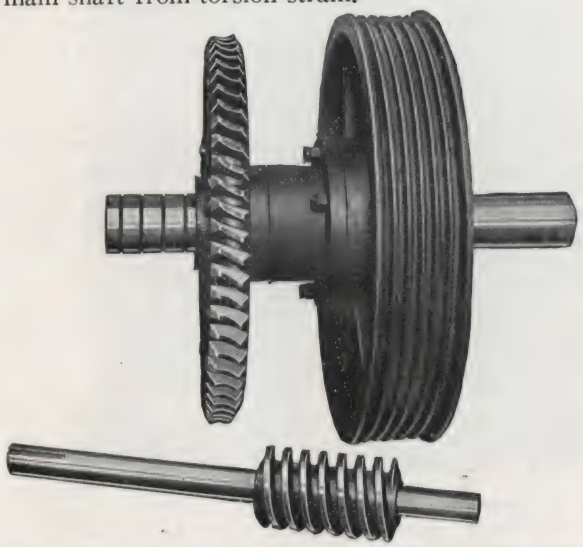
Description of Watson Elevator Machine

The Watson electric elevator machine is the finished product of 25 years of elevator engineering. It is durable, efficient, economical in operation and is adapted to use in office buildings, apartments, stores, factories, warehouses and residences.

The Watson machine is of what is known as the worm gear traction type. The feature of this construction is the reduction from motor speed to drum speed by means of an enclosed worm gear drive traveling in oil. In the Watson machine, the gear case, pedestal, brake and motor are all mounted on a one-piece bedplate.

Worm and Worm Gear

The worm and worm shaft is cut from a solid steel blank. The worm wheel is of phosphor bronze, accurately cut to insure smooth running and is fastened to the traction sheave by means of a cast iron spool, as shown in the illustration. This construction relieves the main shaft from torsion strain.



WORM, WORM GEAR AND TRACTION SHEAVE OF WATSON ELEVATOR MACHINE

Range of Watson Elevator Machines

The capacities of Watson elevator machines vary from 1,000 to 16,000 lbs. load in the car, and car speeds from 25 to 450 ft. per minute. The motors are from 5 to 40 h.p. and are suited for 115, 230, or 500 volts, D.C., and 220 and 440 volts, 2- or 3-phase, A.C.

Watson Elevator Cars and Cabs

Cars—The Watson elevator car is built from steel sections and is provided on the underside with safety attachments, operated by means of a centrifugal governor placed at the top of the shaft, whereby, if the predetermined speed is exceeded, the car is gradually slowed down and finally locked to the guide rails.

Cabs—The cab is the enclosure forming the sides and top of car. In passenger elevators it is of sheet steel or grill of desired finish, provided with folding gates having electric contact for all sides of car where

Continued on next page

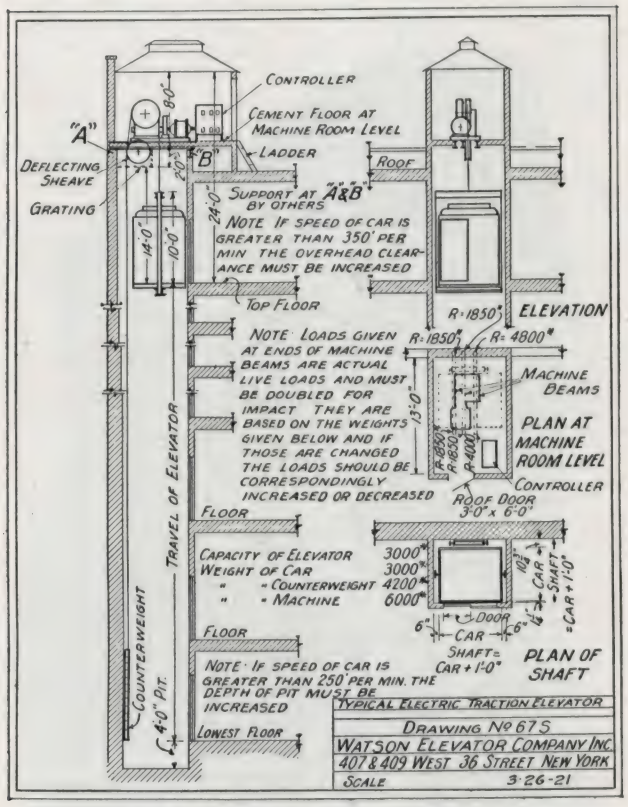
there are shaft doors. In some cases the cab is constructed of wood, or finished in imitation of wood, to correspond with the trim of the building.

On freight elevators, the cab is of sheet steel or grill reinforced to withstand rough use.

Change of Motive Power from Existing Steam or Hydraulic Drives

It is real economy to change an existing steam or hydraulic elevator to electric drive by using the Watson electric elevator machine placed at the top of the shaft. A machine so placed does not increase the load on the building and may often be placed within the area now occupied by the overhead sheaves. This saves basement space which is often valuable.

The change of motive power does not necessarily imply that an entirely new elevator is required. The present car, the guides, and other parts may be retained if suitable. Watson will gladly go into these details in any specific case and will prepare drawings showing what material can be re-used.



DETAILS ELECTRIC TRACTION ELEVATOR

References

This company refers to owners or agents of any building where Watson electric elevators are in use and there are several hundred installations in New York City alone. Attention is called to the following:

OFFICE BUILDINGS

East 45th & 46th Street Realty Corp., 17 East 45th St., New York, N. Y.
Bush Terminal Co., 133 W. 41st St., New York, N. Y.
Bradish Johnson Estate, 921 Broadway, New York, N. Y.
Insurance Co. of North America, 122-26 William St., New York, N. Y.
Angelo Building, 160-62 Pearl St., New York, N. Y.
Studebaker Corp., Broadway & 70th St., New York, N. Y.
Wurlitzer Building, 120 W. 42nd St., New York, N. Y.

FACTORIES

Kahn & Feldman, 360 Suydam St., Brooklyn, N. Y.
Atlantic Macaroni Co., Vernon Avenue and 14th St., Long Island City, N. Y.
Englander Spring Bed Co., Johnson & Stewart Aves., Brooklyn, N. Y.
Rigney & Company, 68-72 Emerson Pl., Brooklyn, N. Y.
Park & Tilford, 513-19 W. 43rd St., New York, N. Y.
Hill-Ware Co., Inc., 165th St. and Park Ave., New York, N. Y.
Knitwear Mfg. Co., 10 Stanwix St., Brooklyn, N. Y.
A. Trenkmann Estate, 255 Centre St., New York, N. Y.
MacCrellish & Quigley Co., Trenton, N. J.
William R. Noe & Sons, Willoughby Ave. and Raymond St., Brooklyn, N. Y.
Fordham Fireproof Warehouse, 181st St. and Jerome Ave., New York, N. Y.
Treo Company, Inc., Jamaica and Van Wyck Aves., Jamaica, L. I., N. Y.
Ault & Wiborg Company, 12th and Monmouth Sts., Jersey City, N. J.

LOFT BUILDINGS

Fred T. Ley & Co., 234-42 W. 39th St., New York, N. Y.
Sommerfield & Steckler, 48 E. 25th St., New York, N. Y.
Hartmann Building, 45 E. 34th St., New York, N. Y.

WAREHOUSES

Bronx Refrigerating Co., 520 Westchester Ave., New York, N. Y.
Emergency Trucking Co., 586-88 Washington St., New York, N. Y.
Hungerford Brass & Copper Co., 90 White St., New York, N. Y.
H. D. Bahr Trucking Co., 285-87 E. 137th St., New York, N. Y.
Bernheimer & Schwartz, 460 W. 128th St., New York, N. Y.
Oriental Steamship Co., Pier 86, North River, New York, N. Y.
National Paper & Type Co., 247 Water St., New York, N. Y.

GARAGES

Hulett Motor Car Co., 1886 Broadway, New York, N. Y.
Studebaker Corp., 223 W. 77th St., New York, N. Y.
Thirty-sixth Street Garage, Inc., 105 W. 108th St., New York, N. Y.
Northold Garage, 518-20 W. 147th St., New York, N. Y.
Reilly & Latimer, 185-87 Pacific St., Brooklyn, N. Y.
Sterling Garage, 309 E. 80th St., New York, N. Y.
Bell & Clapp, 77 S. Broadway, Yonkers, N. Y.

STORES

Wallach Bros., 265 Broadway, New York, N. Y.
Page & Shaw, 114 E. 29th St., New York, N. Y.
J. W. & W. H. Reid, 383 Pearl St., Brooklyn, N. Y.
Edw. Vom Hofe & Co., 92 Fulton St., New York, N. Y.

APARTMENT HOUSES AND HOTELS

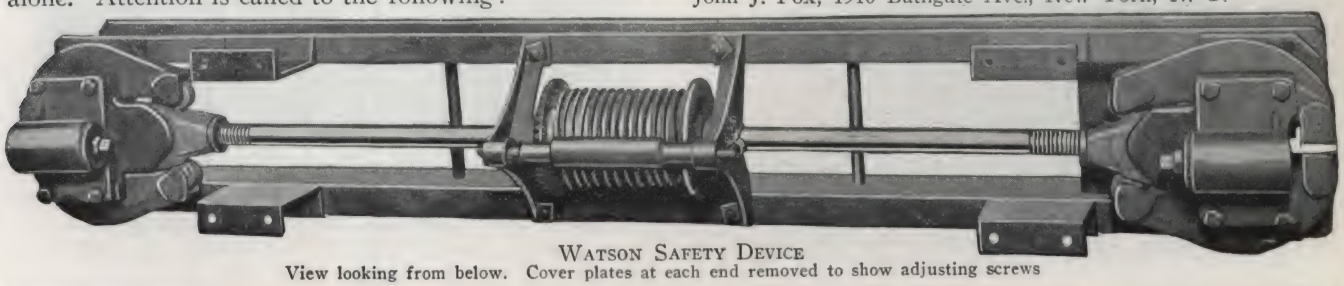
Holbrook Hall, 145 W. 55th St., New York, N. Y.
Town House Club, 67th St. and Central Park W., New York, N. Y.
M. I. Halperin, 8th Ave. and 4th St., Brooklyn, N. Y.
The Coliseum, 181st St. and Bennett Ave., New York, N. Y.
Hotel Chelsea, 222 W. 23rd St., New York, N. Y.
Hotel Patterson, 58 W. 47th St., New York, N. Y.
Milano Apartments, 125-127 E. 58th St., New York, N. Y.

THEATERS

Town Hall, 113-23 W. 43rd St., New York, N. Y.
Famous Players-Lasky Corp., Long Island City, N. Y.
Selwyn Theater, 229 W. 42nd St., New York, N. Y.

MISCELLANEOUS

Montefiore Home, Gunhill Rd. and Steuben Ave., New York, N. Y.
Times Square Post Office, 233 W. 38th St., New York, N. Y.
Varick Street Post Office, 34-50 Varick St., New York, N. Y.
John J. Fox, 1910 Bathgate Ave., New York, N. Y.



WATSON SAFETY DEVICE
View looking from below. Cover plates at each end removed to show adjusting screws

ESTABLISHED 1860

THE WARNER ELEVATOR MFG. CO.

MAIN OFFICE AND FACTORY

CINCINNATI, OHIO

BRANCH OFFICES

ATLANTA, GA. CHARLESTON, W. VA. CLEVELAND, OHIO JACKSONVILLE, FLA. MOBILE, ALA.
TACOMA, WASH. INDIANAPOLIS, IND. NEW YORK, N. Y. PITTSBURGH, PA. DAYTON, OHIO

SERVICE STATIONS IN MANY OTHER CITIES

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS.

Also manufacturers of Auto Lifts, Push Button Elevators, Electric Dumbwaiters, Electric Motors and Controllers, Electric Sidewalk Hoists.

Service

A special department has been created for consultation with architects in connection with proposed elevator installations, and customers are invited to use this service freely.

Bulletins—These have been printed and fully describe in detail the various elements of our equipments.

Typical Layouts—These have been printed showing overhead loads and clearances required.

Specifications—Furnished on request. When asking for preliminary information, please give rentable floor area above first floor, number of floors, length of travel, nature of tenancy (for passenger service) maximum load and nature of service (for freight elevators); kind of current and type of doors to be used.

Capacities

Elevator codes usually specify that passenger elevators have a capacity of 75 lbs. per sq. ft., and hospital cars 50 lbs. per sq. ft. of car floor area.

Freight elevators should have a capacity sufficient to carry the heaviest load encountered in normal service. Special provision should be made for very exceptional loads.

Speeds

For heavy capacities and short lifts on intermittent service, 25 ft. per minute may be sufficient.

For intermittent light freight service on short lifts, 50 ft. per minute is satisfactory.

For normal freight service where an operator is not used, 75 ft. per minute gives excellent service for medium lifts.

100 ft. per minute is approximately the limit for hand rope control and this speed should be used where the travel is long and trips frequent.

200 ft. per minute is often used for constant freight service or light passenger service when the car is controlled by an operator. This speed is not justified on short runs for freight service where the time required to load and unload and to open and close the doors is the predominant time consuming factor.

Current

The current available often influences the speed to be recommended. Two speeds are easily obtainable with direct current motors and the slow speed is used in making accurate landings.

The limit for single speed alternating current elevators for passenger service is approximately 300 ft. per minute.

More accurate stops are required for freight service and, if considerable time is required for adjusting to the floor level, there is very little gain in the high speed.

HOTEL LINCOLN, INDIANAPOLIS, IND.
RUBUSH & HUNTER, Architects
Equipped with three Warner 3000-lb., 400-f.p.m., single worm gear traction elevators

WARSAW ELEVATOR CO.

WARSAW, N. Y.

BALTIMORE, MD.
BUFFALO, N. Y.
JAMESTOWN, N. Y.
NEW YORK, N. Y.
PHILADELPHIA, PA.
ROCHESTER, N. Y.
SPRINGFIELD, MASS.
WILKES-BARRE, PA.

Products

ELECTRIC PASSENGER and FREIGHT ELEVATORS of all capacities and speeds.

Also manufacturers of Hydraulic Passenger and Freight Elevators; Belted and Hand Power Elevators; Push Button Dumbwaiters and Sidewalk Elevators.

Types of Machines and Facilities

We specialize on single and double wrap traction machines, also geared and 2:1 types, both overhead and basement installations; capacities range from 100 lbs. to 24,000 lbs. Any problem involving special construction by reason of peculiar conditions we can handle perfectly without extra cost. We have one of the finest and most efficient new plants with foundry in connection, which enables us to turn out work of this character to the entire satisfaction of customers.

Our engineering force is prepared at any and all times to discuss special problems with architects and engineers. With 30 years' experience in manufacturing elevators, we can guarantee customers efficient service.

Recommendations for Elevators

Passenger Elevators—In buildings 12 to 15 stories or more, we recommend car speeds ranging from 250 to 400 f. p. m. In smaller cities where the demands are not so great, we find speeds of 150 to 200 f. p. m. very satisfactory.

In estimating capacity, figure 75 lbs. per sq. ft. of cab area inside; with a cab which measures 5x5 ft. on the inside, estimate capacity at 1,875 lbs. Our experience shows an average allowance of 400 sq. in. per person is about correct, and the limit of comfortable capacity.

Steel guides should be used on all passenger elevators.

Automobile Elevators—For automobile elevators we recommend capacities of 5,000 to 6,000 lbs. for pleasure cars, and 8,000 to 10,000 lbs. where it is desired to carry trucks. The size of platform for larger pleasure cars and trucks should be about 9 to 10 ft. wide and 20 to 24 ft. long. Usually it is safe to figure about 25 lbs. per sq. ft. of car area for pleasure cars and 35 to 40 lbs. per sq. ft. for trucks.

Freight Elevators—Freight elevators usually give best results with cars about 6x6 ft. for small plants, to 6x8 ft. and 8x10 ft. for larger installations.

We recommend making platforms wider postway (or side to side) than the depth (front to back). This proportion is more efficient in loading and unloading.

Platforms of all freight elevators should be enclosed with steel or wood on all sides except the entrance. A heavy screen over the top of the car should be provided.

Hand Power Elevators and Dumbwaiters

We also manufacture a full line of hand power elevators and push button dumbwaiters of the latest improved type.

References

We manufacture the largest line of elevators of all kinds built today and can meet any existing conditions.

A long list of references of large buildings and manufacturing plants will be sent on request.

RECENT INSTALLATION OF THREE HIGH SPEED PASSENGER ELEVATORS

Installed in one of the largest office buildings in the East

THE RUBAY COMPANY

Elevator Doors, Cabs and Enclosures

CLEVELAND, OHIO

Products

ELEVATOR CABS, DOORS and ENCLOSURES, complete and installed.

Facilities

THE RUBAY COMPANY are well established as high class enclosed automobile body builders and finishers, and are well and favorably known in that line.

Thus, having unusual facilities, and to meet the strong demand for really fine work, they have established a new department for the manufacture of the best grade of elevator doors and cabs, and aim to excel in this line.

Their extensive capacity enables them to handle large quantities of this work, and to make prompt delivery on large jobs.

Materials

THE RUBAY COMPANY builds elevator cabs in either steel, bronze, aluminum or wood.

Finishes

They are equipped to produce the very best grade of enamel finishes in plain colors, wood grain, or bronze enamel finish.

Catalogue

Catalogue of illustrations will be furnished on request; also special designs prepared when desired.

ELEVATOR CAB No. 2001

ELEVATOR CAB No. 2003

ELEVATOR SUPPLIES COMPANY, INC.

SUCCESSOR TO ELEVATOR SUPPLY AND REPAIR CO. and BURDETT-ROWNTREE MFG. CO.

Manufacturers of Elevator Accessories

MAIN OFFICE AND WORKS

HOBOKEN, N. J.

BRANCH OFFICES

CHICAGO, ILL., 111 South Jefferson Street SAN FRANCISCO, CAL., 186 Fifth Street ST. LOUIS, MO., Railway Exchange Building
CLEVELAND, OHIO, 1039 Walnut Avenue PHILADELPHIA, PA., 1716 Ludlow Street

Products

Manufacturers and installers of the following ES EQUIPMENT for ELEVATORS: FLASHLIGHT SIGNALS, MECHANICAL INDICATORS, POSITIVE ELECTRIC INTERLOCKS, PNEUMATIC DOOR OPERATORS, ELECTRIC DOOR OPERATORS.

ELECTRIC DUMBWAITERS.

STEEL THEATER CURTAINS.

Also Positive Guide Lubricators, Ricketts and Moore Threshold Illuminators, Travel Recorders, and other accessory equipment.

For Elevator Door Hangers and Norton Elevator Door Closers, see page 1211.

ES TRADE-MARK

Flashlight Signals

The operating cost of elevators is reduced and the efficiency of their service markedly increased by the use of the proper signal system. In fact, groups of more than two elevators demand an automatic signal system.

There are three main divisions of the ES Flashlight Signals: namely, the ES Complete Flashlight Signal System, for office and other buildings having three or more elevators in one group, that travel continuously; the ES Flashlight Annunciator Signal System, where the elevators ordinarily run on call, as in the majority of hotels; and the ES Department Store Flashlight Signal System, where the elevators travel continuously, but stop at every floor.

Large groups of elevators require additional accessory signal equipment, such, for instance, as Night Service Annunciators for the elevators set aside for night or holiday service; Starter's Call Back System, to permit communication between the starter and elevator operators; Electric Position Indicators; Safe Lift Telephones, etc.

Mechanical Indicators

ES Mechanical Indicators, of the familiar clock face design, should invariably be used at the ground floor, to indicate to the starter the position of the elevators. They should also be installed at the upper floors in connection with Flashlight Annunciator Signal Systems on small groups of elevators, as a passenger will wait more patiently, if he can, by observing the indicators, see that an elevator is approaching in answer to his call. Designs of ES Mechanical Indicators may be selected from a large variety of patterns.

Electric Door Operator

ES Electric Door Operating Mechanism, for the operation of bi-parting, center opening, vertically sliding doors on freight elevators is especially valuable where the doors are too heavy to be operated quickly by hand on account of the size of the opening.

Positive Electro-Mechanical Interlock

The ES Positive Electro-Mechanical Interlock invariably should be used if Norton Elevator Door Closers (see page 1211) are not installed.

It is applicable to all types of horizontally sliding or swinging, elevator doors.

The ES Positive Electro-Mechanical Interlock is the only device that embodies every principle of an ideal elevator interlock, as indicated by the following enumeration of its features:

It prevents the movement of the elevator if any door is open or unlocked. Note that the elevator is interlocked not only by the door opposite which it is standing, but by every door in the shaft. Also, that the doors must positively be locked as well as fully closed.

The ES Positive Electro-Mechanical Interlock has only one moving part and that part is actuated solely by gravity. If, through damage, unusual friction or deliberate intent it is prevented from functioning, safe conditions will exist as the elevator can not be moved.

The one moving part, the contact making element, is attached to the door. Consequently, when the door is opened, the elevator control circuit is also positively opened.

The ES Positive Electro-Mechanical Interlock is exceptionally sturdy, has no springs and requires neither lubrication, cleaning nor any other attention.

In connection with all interlock installations an emergency release switch is provided in each elevator. This is enclosed in a "break glass" case, and its function is to permit the interlock to be temporarily disconnected in case of fire or other emergency.

Pneumatic Door Operator

The ES Pneumatic Door Operator is a door opening and closing engine that is controlled by the elevator man through a small handle in the cab. The action of the pneumatic door operator is quicker and quieter than manual operation, and if desired it can be arranged to operate simultaneously both the corridor door and collapsible gate on the elevator. These operators can be applied to any type of horizontally or vertically sliding doors or gates for either passenger or freight elevators.

Electric Dumbwaiters

ES Electric Dumbwaiters are installed to operate on any available commercial electric current. Different loads, speeds and types of push button controls are used, depending on the class of building and the service desired.

Steel Theater Curtains

ES Steel Theater Curtains are built to comply with all fire regulations. They are operated by hydraulic power.

KERR ELEVATOR APPLIANCE CORPORATION

17 East 42nd Street
NEW YORK, N.Y.

BRANCH OFFICES
PHILADELPHIA, PA. WASHINGTON, D. C. CHICAGO, ILL. CLEVELAND, OHIO RICHMOND, VA.

RANDALL CONTROL AND HYDROMETRIC CORPORATION
For All Territory West of the Mississippi River
523 Central Building,
LOS ANGELES, CAL.

Products

PNEUMATIC ELEVATOR DOOR OPERATORS.

MANUALLY OPERATED ELEVATOR DOOR LOCKS; AUTOMATIC DOOR LOCKS for push button electric elevators; SELF-CENTERING NON-CREEP DEVICE for hydraulic elevators.

All devices fully covered by patents.

Randall Pneumatic Elevator Door Controls

Randall elevator door controls are designed for completely operating and controlling elevator doors. Their use greatly simplifies and makes absolutely safe the operation of elevators, it being impossible to operate the car unless all the doors in the shaft are closed and locked, or to open doors while car is in motion. These devices are operated principally by compressed air. They are applicable to electric, hydraulic and automatic elevators.

The pneumatic control mechanism is mounted on top of the car or over each door and the equipment opens and closes both car gate and shaftway door simultaneously, and mechanically interlocks the car control while either gate or door is open.

The interlocking feature is part of all devices or systems manufactured by us and no other device, lock or interlock is required.

The control consists of three principal parts: A pair of air cylinders or an air machine for opening and closing the doors, a strap lock for locking the doors, and a master switch which breaks the operating circuit when any door is opened and closes circuit again when all doors are closed and locked.

These devices are all operated by a hand lever within the car, it being unnecessary for the operator to change position.

Controls are made for two types of installations: "Multiple Engine" type with one air machine for each door or set of doors, and "Single Engine" type with air machine on the elevator car.

Materials and Workmanship—All equipment is constructed of the best materials obtainable. All working parts are of case hardened steel. Tubing and valves are of the highest grade brass. Durability has been secured in every detail, and high grade workmanship and construction insure satisfactory operation, actual and dependable safety.

Advantages—*Safety*—Randall controls give absolute elevator safety. Doors are securely locked from the shaft side. They can not be left open carelessly since all doors must be closed and locked before the car can be operated. This reduces accidents to a minimum.

Simplicity of Operation—A hand lever completely controls the operation of the door. At no time during the operation of the car is it necessary for the operator to reach in front of the passengers. This gives added convenience to passengers, and gives maximum passenger space.

Speed of Operation—Randall controls open the doors to full opening and close them very rapidly. This saves time in starting and stopping and increases speed of operation. Efficiency of elevator service is increased by from 15% to 20% over hand-operated doors.

Quietness—The air cylinders provide a cushioning effect at the ends of opening and closing strokes. This prevents slamming of doors, which in addition to eliminating noise, also reduces wear.

Operating Engine or Air Machine—This device consists of a pair of air cylinders, one at each end of a piston rod. The piston rod is connected by means of a cross head to an arm which opens and closes the door. Admitting air into one cylinder opens the door and admitting air into the other cylinder closes the door. Admission of air into the cylinders is controlled by means of a hand lever.

If for any reason the air is cut off, the doors may be operated by hand, without excessive friction, since the piston heads in each cylinder are of the loose or floating type and do not move with the piston rod when the doors are hand operated.

The Air Compressor System—The air compressor system furnished with Randall pneumatic elevator door controls includes standard electric air compressor of the proper size and latest improved type, together with air receivers or reservoirs for high and low pressure, piping, and all necessary devices for automatically controlling the compressor.

Strap Lock and Master Switch—The elevator door is locked by means of a latch attached to the inside of the shaft above the door. A lever in the car operates a cam or shoe which is mounted on the top of the car. This shoe engages an arm which lifts the latch. The same movement also breaks the circuit at the master switch which shuts off the car control circuit, thus holding the car in position. When the door is closed the latch drops back into place, locking the door and closing the circuit. The elevator car may then be operated.

Only one master switch is required for each elevator shaft instead of one switch at each door as in other systems. The master switch is operated by a spring steel tape running through each door lock and is counterbalanced. When any door latch is lifted the master switch is opened. Dropping the latch reverses the operation and throws the switch into contact position. The master switch may be located at any convenient place in the shaft.

An emergency switch is provided in car for bridging masterswitch in emergencies.

This equipment is exceptionally rigid. There are no springs in the lock, and it requires no lubrication nor attention.

This lock and master switch are designed for use with either pneumatically or manually controlled elevator doors.

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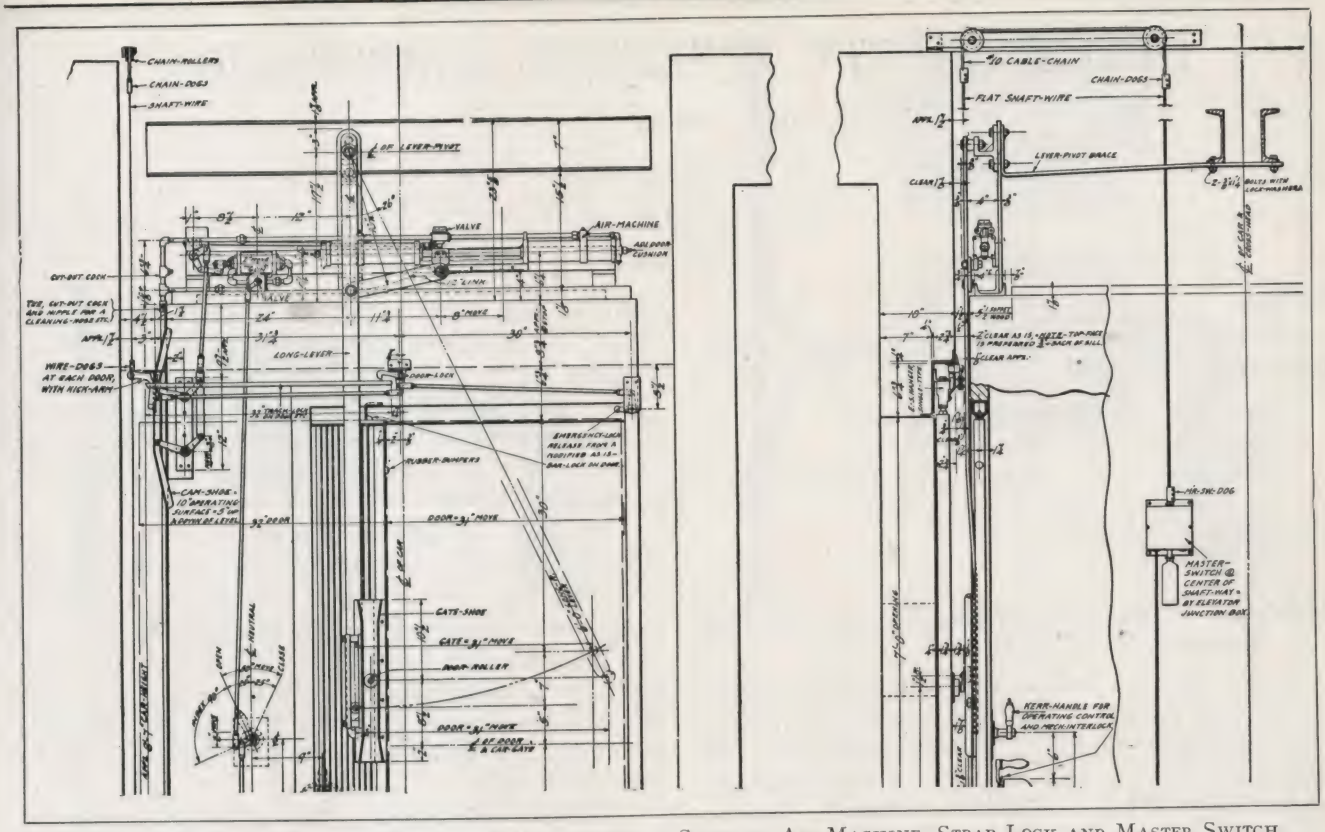


RANDALL "SINGLE ENGINE" ELEVATOR DOOR CONTROL—SHOWING AIR MACHINE, STRAP LOCK AND MASTER SWITCH

Randall Pneumatic Elevator Door Control, "Single Engine" Type

In this type of control, an air machine is mounted on the top of the car, with a strap lock at each door and one master switch in the shaft. A shoe is attached to the door opening lever on the car. This shoe engages a roller on the door and opens or closes door when air machine is operated. Opening lever also operates elevator gate.

With full pneumatic control the air machine is controlled by a small hand lever in the car, which also controls the kickover shoe for operating the locks. Doors can be rapidly opened or closed, as desired, by a simple twist of the hand lever.

The kickover shoe for the strap locks may also be arranged for direct operation by means of a foot pedal or hand lever.

This type of control may be used for all types of sliding doors such as single, double, two-thirds or "two-speed," three-quarters or "three-speed," and double two-thirds, and is recommended where all doors in shaft are of similar design and weight.

Randall Pneumatic Elevator Door Control, "Multiple Engine" Type

In this type of control, an air machine is mounted over each door or set of doors. A master switch is fitted in each shaft.

With full pneumatic control, turning of the hand lever opens valve underneath car. This operates a lever at top of car, which admits air into opening cylinder, which opens door. Reversing hand lever closes and locks door.

With manual control, air machine is operated directly by foot pedal or hand lever.

This device is very compact, the space required above door for air machine being 17 in. high by 4 in. deep by about 5 ft. long; 1 in. is required between car and shaft for door opening levers.

Automatic Door Lock for Push Button Electric Elevators

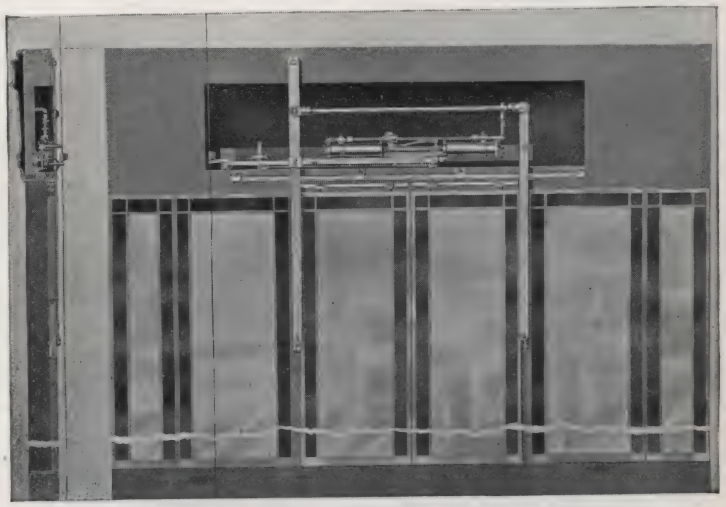
The automatic door lock system embodies the features of the pneumatic control and is positive in operation. Automatic door locks prevent the car being "stolen" by others after pressure of button.

Non-creep Device for Hydraulic Elevators

The Randall non-creep device is located under the car and provides automatic stability; the car can not creep while doors are open.

References

Randall elevator appliances are in use in all parts of the country. A list of buildings in your vicinity, equipped with Randall devices, will be sent on request.



RANDALL "MULTIPLE ENGINE" ELEVATOR DOOR CONTROL, APPLIED TO DOUBLE SLIDING DOORS

UTILITY SAFETY APPLIANCE CORPORATION

Elevator Safety Devices
325 Church Street
NEW YORK, N. Y.

Products

UTILITY SAFETY ELEVATOR INTERLOCK SYSTEM consisting of:

Electro-Mechanical Elevator Bar Lock.
Electro-Mechanical Safety Interlock.
Electrical Non-interference Control Cabinet.
Non-interference Emergency Release.
Electrical Gate Switch.

Description of the Utility Safety Elevator Interlock System

The Utility interlock consists of a cast iron switch box fixed to the door frame and a manually operated lock bar constructed of steel or brass, mounted on the door (Fig. 1). The lock bar carries a switch member which co-operates with contact plates, the latter being arranged within the casing and inserted into a control circuit.

The switch member is properly insulated from the lock bar and casing by a member. Contact plates are mounted upon holders of insulating material. The lock bar is guided in its movement by guides, being provided with a handle of non-corrosive material, within which is placed a spring.

The control circuit is completed only after the door has been securely locked (Fig. 2). The lock bar must be fully inserted into the casing, first preventing the door from being opened and then completing the control circuit. In opening the door, the circuit is positively interrupted before the door is unlocked.

The arc interrupter of non-combustible insulating material in the casing is held by the lock bar in an elevated position when lock bar is in locking position, and slides by gravity downwards between the contact plates when the lock bar is withdrawn from the casing, preventing arcing between the contact plates. The arc interrupter serves also as an indicating device, the word "open" appearing through an opening in the cover plate of the casing when the lock bar is withdrawn. The opening is covered with mica permitting inspection of contact plates without removal of the box cover.

Interlocks and gate switches are in an electrical circuit which includes two 110-volt relays and a 220-volt centering relay. This circuit is completed by the closing of the main line circuit by two main line magnets.

Whenever any door in the series is open, the main line circuit is interrupted; no current flows to the car switch. The elevator controller is so inserted into the circuit that no current will flow to it when any of the doors are open.

The two 110-volt relays, the 220-volt centering relay and main line magnets are enclosed in a securely locked cabinet (Fig. 5). In this cabinet are also enclosed switches which are so located that the main line and auxiliary circuits are opened before access can be had to the magnets.

The 110-volt protecting relays are so located in the circuit that in case a ground occurs in the interlock circuit, no blowout will result, but one of these relays will hold its switch element in its closing position, thereby not interfering with the operation of the elevator circuit.

In each elevator is located an emergency release, which is inserted in the control circuit, allowing the elevator to be operated in case of emergency. The emergency release includes a switch which is manually operated and completes the circuit as long as the operator holds it in closed position. The emergency release is in a glass covered casing and access can be had to it only

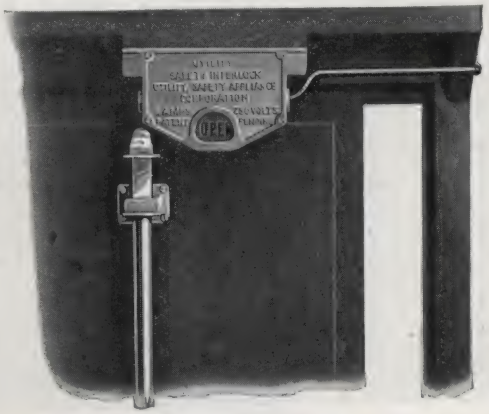


FIG. 1. UTILITY SAFETY INTERLOCK AS IT APPEARS ON OPEN ELEVATOR DOOR

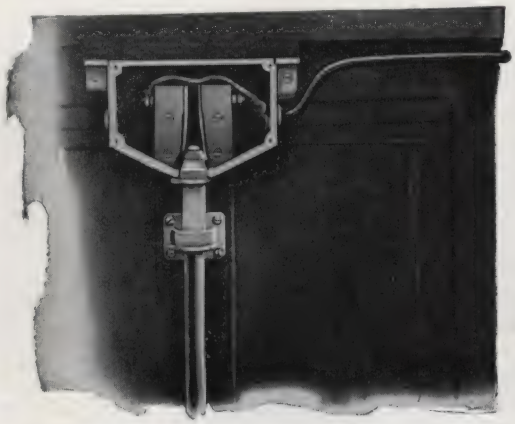


FIG. 2. UTILITY SAFETY INTERLOCK WITH COVER OFF TO SHOW CONTACT WHEN DOOR IS CLOSED

Continued on next page

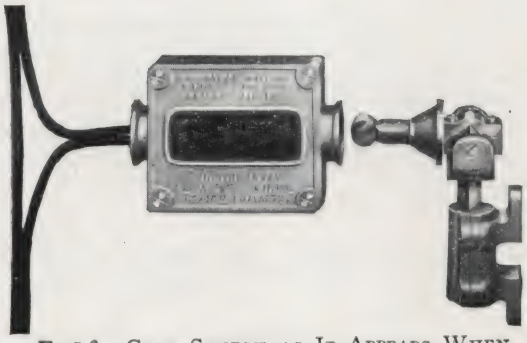


FIG. 3. GATE SWITCH AS IT APPEARS WHEN ELEVATOR GATE IS OPEN

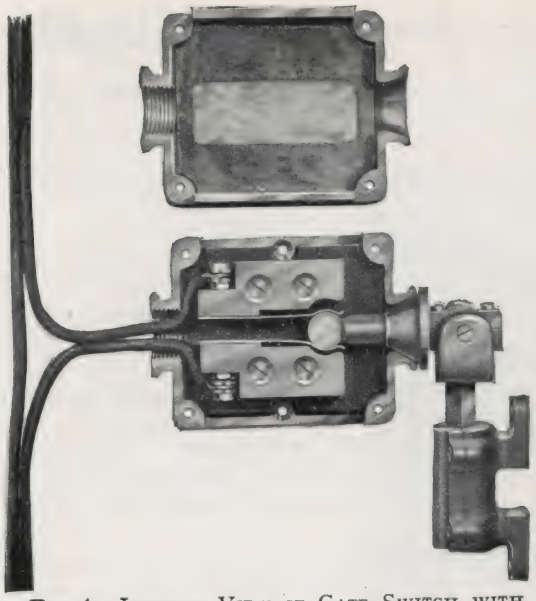


FIG. 4. INTERIOR VIEW OF GATE SWITCH WITH COVER OFF TO SHOW CONTACT WHEN ELEVATOR GATE IS CLOSED

after breaking the glass cover. Means are provided for breaking the glass without the aid of tools.

Cover is easily mounted on the casing after glass has been broken, being held in position without the aid of screws or other fastenings. It is also provided with a device which indicates whether it is being used or not.

Advantages of the Utility System

The Utility system is electro-mechanical in operation, absolutely safe, and has the following exclusive advantages:

(1) Removable parts are reduced to a minimum.

(2) All shaftway doors must be closed and locked, and the gate, if any, must also be closed before it is possible for the operator to move the car.

(3) An indicator, actuated by gravity, shows at all times whether door switch is open or closed and prevents insertion of foreign contact-making material.

(4) Any disarrangement on any part of the elevator system, instead of creating a hazard, prevents operation of the elevator.

(5) A grounded (short-circuited) traveling cable does not affect the safety of the elevator.

(6) While any elevator door or gate is open, there is no electricity in any part of the elevator equipment.

(7) Manual operation of the electrical controllers in the motor room is absolutely prevented while any elevator door or car gate is open.

(8) Any interference with the non-interference control cabinet prevents operation of the car.

(9) All essential live control parts are enclosed in a cabinet which is locked and can only be opened by an authorized person.

(10) It is absolutely impossible to "jump" the main line currents or to "tie in" controller switches or to block this system in any way. The Utility system is absolutely foolproof and tamperproof.

Official Approval

The Utility system is the only electro-mechanical elevator interlocking system which has been approved by the New York State Industrial Board and the City of New York.

We have the approval of the leading safety engineers of the United States and the engineering departments of the larger casualty companies.

Approval by Underwriters' Laboratories, Inc. is pending.

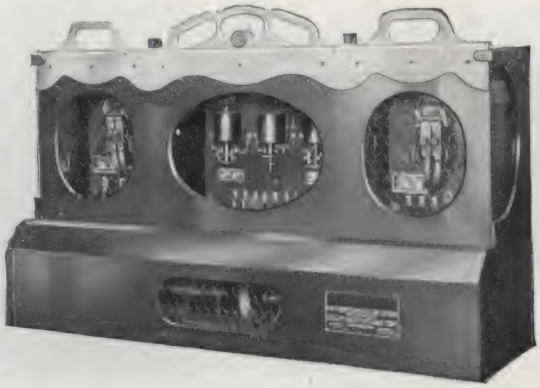


FIG. 5. NON-INTERFERENCE CONTROL CABINET

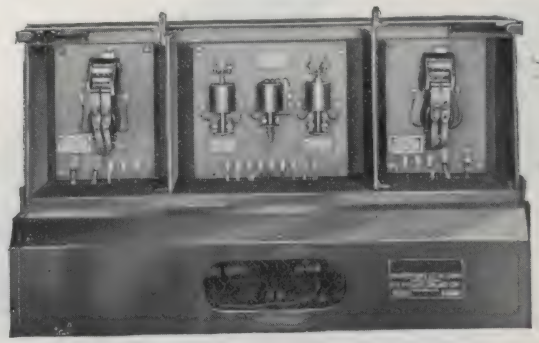


FIG. 6. INTERIOR VIEW OF NON-INTERFERENCE CONTROL CABINET

STANDARD GAUGE STEEL CO.

Manufacturers of Finished Steel Elevator Guides

MAIN OFFICE AND PLANT

BEAVER FALLS, PA.

Product

FINISHED STEEL ELEVATOR GUIDES.

Finished Steel Elevator Guides

No single feature in elevator building has increased safety and economy in construction as much as has the introduction of finished steel guides. They eliminate all the dangers that have been experienced in the use of wooden guides and the various old styles and types of metal guides.

Strength—Special tests conducted by the Pittsburgh Testing Laboratory and the Pennsylvania State College have shown finished steel guides to be greatly superior to all hot rolled, planed guides in rigidity and resistance to transverse bending under load. The deflection and permanent set under loads is considerably less for finished steel guides. This means an added element of safety.

Shipped Ready for Installation—Our guides are made in standard 16-ft. sections with matched joints and are fitted with fish plates, bolts and the necessary drilling, therefor. When desired, we can assemble them in runs of any required length without extra cost. They can then be easily and quickly erected as they are finished all over and do not require any filing or shimming on the part of the erector.

Low Cost—Our methods of production permit us to offer finished steel guides at a price which makes them cost less than the ordinary hot rolled, planed guides, taking into consideration the cost of erection.

Types and Sizes—Our guides are made in two types, "Standard" and "Undercut," as illustrated. Both types are made in three sizes: car, intermediate, and counterweight guides. All sizes are carried in stock for immediate shipment. We also manufacture the Jumbo "Undercut" guide which weighs 30 lbs. to the foot.

References

During the last twenty years we have furnished finished steel elevator guides for over 5000 of the largest buildings constructed in all parts of the world without a single complaint being recorded.

A few prominent installations with the name of the elevator manufacturer are listed below:

Bellevue-Stratford Hotel, Philadelphia, Pa., Standard Plunger Elevator Co.
Wanamaker Store, Philadelphia, Pa., Standard Plunger Elevator Co.
Bureau Printing & Engraving, Washington, D. C., Blake Palm & Bro.
Interior Departmen. Building, Washington, D. C., Blake Palm & Bro.
Aeronautical Tower, Pensacola, Fla., Blake Palm & Bro.
Masonic Temple, Columbus, Ohio, Ohio Elevator & Machine Co.
Commercial National Bank Building, Raleigh, N. C., Ohio Elevator & Machine Co.
Pittsburgh Athletic Club, Pittsburgh, Pa., Ohio Elevator & Machine Co.
The Avon Apartments, Cincinnati, Ohio, Shephard Elevator Co.
St. Elizabeth's Hospital, Dayton, Ohio, Shephard Elevator Co.
Kroger Grocery & Baking Co., Cincinnati, Ohio, Shephard Elevator Co.
Hotel Williams, Indianapolis, Ind., Home Elevator Co.
S. M. Bixby & Co., Indianapolis, Ind., Home Elevator Co.
Hotel Washington, Indianapolis, Ind., American Elevator & Machine Co.
K. M. & T. Office Building, Dallas, Tex., American Elevator & Machin. Co.
Swift & Co. Branch, Havana, Cuba, American Elevator & Machine Co.
Roosevelt Building, Chicago, Ill., Reliance Elevator Co.
Mayo Bros. Clinic, Rochester, Minn., Kieckhofer Elevator Co.
Allis-Chalmers Mfg. Co., Milwaukee, Wis., Kieckhofer Elevator Co.
Minnesota Steel Co., Duluth, Minn., Kieckhofer Elevator Co.
Gross Building, Milwaukee, Wis., Rosenberg Elevator Co.
La Salle Building, Minneapolis, Minn., Rosenberg Elevator Co.
Gimbel Brothers, Milwaukee, Wis., S. Heller Elevator Co.
Caswell Block, Milwaukee, Wis., S. Heller Elevator Co.
Security Building, Milwaukee, Wis., S. Heller Elevator Co.
Capital National Bank Building, Lansing, Mich., Pitt Engineering Co.
Cerveceria Cuauhtemoe, S. A. Monterey, N. L. Mexico, Pitt Engineering Co.
United States Post Office Annex, Kansas City, Mo., Pitt Engineering Co.

Specifications

To specify finished steel elevator guides include the following:

All elevators to be equipped with Finished Steel Guides as manufactured by the STANDARD GAUGE STEEL COMPANY.

"Standard" Type "Undercut" Type

FINISHED STEEL ELEVATOR GUIDES—SHOWING MATCHED JOINTS AND FISH PLATE

ESTABLISHED 1876

CHELSEA ELEVATOR CO.

INCORPORATED 1912

TELEPHONE
CHELSEA 5448

439-441 West Nineteenth Street
NEW YORK, N. Y.

CABLE ADDRESS
"CHELELCO"

Products

ELECTRIC and HAND OPERATED DUMBWAITERS and ELEVATORS: Private House, Traction, Apartment House, Automatic Brake, Hospital, Plain Sheave, Hotel, Restaurant, Band Brake, Library, Book Lift, Brass and Steel Tube, Compensating Dumbwaiters; Invalid, Store, Trunk, Freight, Sidewalk and Automobile Elevators; Ash Hoists; Ash Cranes; Hoist Wheels.

Also manufacturers of Tellerwaiters, Film Conveyors, Automatic and Semiautomatic Gates.

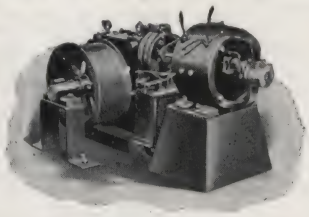
CHELSEA
TRADE-MARK

Experience

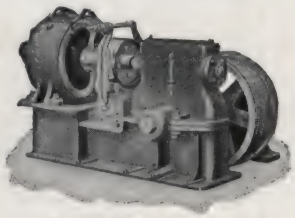
46 years of experience with progressiveness in equipment and design.

Chelsea Electric Dumbwaiters

Many stock combinations of capacities, speeds and sizes to suit any requirement. Data page following gives two classes of machines, four types of controls and several sizes of cars. We will furnish any special equipment desired and architects are invited to submit their problems.



CLASS "A" ENGINE



CLASS "B" ENGINE

DUMBWAITER No. 2

Chelsea Traction Dumbwaiters No. 2

For high class residence work.

Specify as Follows—The machine to be of the two-to-one traction type as manufactured by the CHELSEA ELEVATOR CO., New York, N. Y. Wheels of full diameters between centers, reducing friction and wear on ropes and almost noiseless in operation. All wheels of cast iron with steel shafts running in iron frames with rope guards. Weight wheel to have band and leather cushioned brake to hold loads of 100 lbs. Loads to be lowered by means of brake rope. Car of first quality ash, *dovetailed*, filled and varnished, shelved as directed, wrought iron eyes for weight rope. Iignum vitae sheaves in casting piece on top and bottom of car. Counterweight of size and weight to properly balance car. Guideways of North Carolina pine, grooved for guiding car and counterweight. Cast iron guide shoes. Rope for counterweight, manila. Hand and check ropes, Russian hemp. All necessary hardware, rubber bumpers, etc.

Guaranteed for 1 year.

Chelsea Automatic Brake Dumbwaiter No. 5

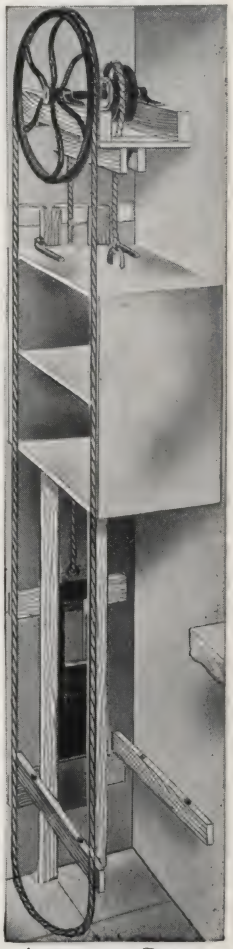
For apartment houses, stores and residences.

Specify as Follows—Machine of the double automatic brake type as made by CHELSEA ELEVATOR CO., New York, N. Y., to hold any load within the capacity of the machine which is .... lbs. without the use of check line or fastening. Cold rolled steel shafts. Steel roller bearings. Cast iron flywheel of proper diameter, securely fastened to steel shaft. Cast iron center wheel bored to fit shaft. Lock full automatic both on down and up motion of car set in a reinforced casing with a *phosphor bronze brake shoe*, with ample braking surface. Car of first quality ash *dovetailed* and varnished, of size to suit hatchway, shelved as directed. Wrought iron eye for weight rope. Cast iron guide shoes. Guide runs, Georgia pine, grooved for guides on car and counterweight. Counterweight of size and weight to properly balance car. Rope for counterweight, manila. Hand rope, Russian hemp. All necessary hardware, rubber bumpers, etc. Machine timbers, Georgia pine. Sheaves, cast iron.

Guaranteed for 1 year.

Data Tables

Data tables will be found on the two following pages, illustrating and pricing a variety of types.



AUTOMATIC BRAKE DUMBWAITER No. 5

Hand Operated Elevators

Chelsea hand operated elevators insure ease of operation and a factor of safety far in excess of ordinary practice.

Invalid or Passenger Lift No. 7

Easy running and reliable, fitted with all safety precautions.

Store Elevators Nos. 8 and 9

For heavy service, constant and lasting qualities.

Sidewalk Lift or Ash Hoist No. 10

For merchandise, ashes, etc., it is often used inside of the building. Operation is by means of a windlass.

Automobile Lifts Nos. 11 and 12

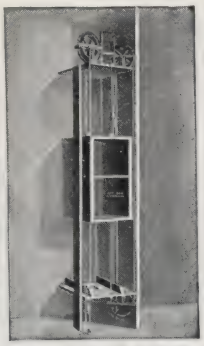
For a capacity as high as 6000 lbs.; although slow in operation, they are sturdy and capable of doing the work they are called upon to perform. Double geared; can also be furnished in crosshead type with safety attachment.

Electric Drum Type Elevators

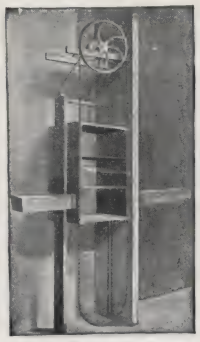
Equipments embracing the whole line of elevator requirements from the slow speed sidewalk lift to the massive freight and high speed passenger elevator.

Continued on next page

No. 1. One-to-One Traction Dumbwaiter
1 to 50 lbs. capacity



No. 2. Two-to-One Traction Dumbwaiter
50 to 100 lbs. capacity



No. 3. Plain Sheave Dumbwaiter
50 to 150 lbs. capacity

No. 4. Band Brake Dumbwaiter
50 to 150 lbs. capacity

No. 5. Automatic Brake Dumbwaiter
75 to 250 lbs. capacity

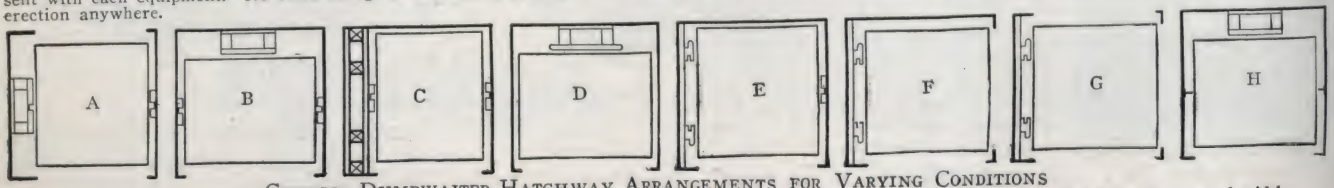
No. 6. Patent Frame Dumbwaiter
100 to 500 lbs. capacity

DATA AND PRICES OF SOME OF THE CHELSEA HAND OPERATED DUMBWAITERS

No.	Type	Car size	Hatchway size, single face	Hatchway size, double face	Headroom required above door for mach.	Capacity in lbs.	Complete ship. wt., approx. lbs.	Price, machine only	Price, complete outfit, height 20 ft. or less	Price, machine, ex. double face	Add each extra ft., single face	Add each extra ft. double face	Service best adapted for	Specification Writers' Data and General Description
1A	One-to-one Traction Brake	22″x 18″	26″x 21″	26″x 22″	2′ 2″	50	400	$50.00	$100.00	$24.00	$0.50	$0.76	High class residence work. Pantry service. Quick service. Small packages. Almost noiseless in operation. Ropes very lasting, on account of full diameter wheels.	MACHINE—Iron wheels set in iron frames, with oil holes, rope guards, etc. All wheels full diameters between centers; weight wheel fitted with band and leather cushioned band brake. CAR—Ash, dovetailed, varnished, shelved as directed, fitted with eyes for ropes and guides for runs; manila hemp hand and check ropes; manila weight rope; heavy double groove hardwood runs; cast iron counterweight fitted with eye and guides; platform at bottom fitted with rubber bumpers; check weights, bullseyes, pulleys, etc.
1B	One-to-one Traction Brake	26″x 22″	30″x 25″	30″x 26″	2′ 6″	50	450	55.00	110.00	28.00	.50	.76		
2A	Two-to-one Traction Brake	22″x 18″	26″x 21″	.....	2′ 8″	100	430	52.00	120.00	.....	.56	.....	High class residence work where heavier duty is required than one-to-one. Almost noiseless in operation. Ropes very lasting, on account of full diameter wheels.	MACHINE—Same as above with eye at top of shaft for hand rope fastening. CAR—Ash, dovetailed, varnished, shelved as directed, fitted with eyes for ropes and guides for runs and casting pieces with lignum vitae sheaves; manila hemp hand and check ropes; manila weight rope; heavy double groove hardwood runs; cast iron counterweight fitted with eye and guides; platform at bottom fitted with rubber bumpers and fastening for adjustment to hand rope; check weights, bullseyes, pulleys, etc.
2B	Two-to-one Traction Brake	26″x 22″	30″x 25″	.....	3′ 0″	100	475	56.00	135.00	.....	.56	.....		
3A	Plain Sheave Rig	22″x 18″	26″x 21″	26″x 22″	2′ 2″	75	240	20.00	48.00	12.00	.50	.65	For general requirements where a moderate price good quality dumbwaiter is desired.	MACHINE—Steel shaft, fitted with proper diameter flywheel and weight wheel securely fastened; also, leading sheaves and boxes for shaft. CAR—Ash, dovetailed, varnished, shelved as directed, fitted with eyes and guides; manila hemp hand rope; manila weight rope; hardwood guide runs; cast iron counterweight, eyes and guides; crosspieces at bottom fitted with rubber bumpers; bullseyes, fair leaders, etc.
3B	Plain Sheave Rig	26″x 22″	30″x 25″	30″x 26″	2′ 6″	100	300	24.00	60.00	14.00	.54	.70		
4A	Brake Sheave Rig	22″x 18″	26″x 21″	26″x 22″	2′ 6″	75	290	36.00	80.00	12.00	.54	.70	A serviceable dumbwaiter where it is desirable to lower loads, controlling speed with the brake rope.	MACHINE—Steel shaft fitted with proper diameter flywheel and weight wheel and boxes for shaft; flywheel fitted with band and band brake. Necessary leading sheaves. CAR—Ash, dovetailed, varnished, shelved as directed, fitted with eyes and guides; manila hemp hand and check ropes; manila weight rope; hardwood guide runs; cast iron counterweight, eyes and guides; cross pieces at bottom fitted with rubber bumpers; bullseyes, fair leaders, check weights, etc.
4B	Brake Sheave Rig	26″x 22″	30″x 25″	30″x 26″	3′ 0″	100	365	39.00	95.00	14.00	.56	.78		
5A	Automatic Brake	22″x 18″	26″x 21″	26″x 22″	2′ 2″	75	275	36.00	72.00	12.00	.50	.66	Residence and apartment housework, where a number of different people have the use of car. No check line required, as automatic brake holds loads within the capacity of machine.	MACHINE—Steel shaft fitted with proper diameter flywheel and weight wheel, and boxes for shaft. To back timber there is fastened an automatic brake of first class construction, so designed as to eliminate as much lost motion, noise and friction as possible; lock to automatically hold car at any point without the use of check lines or fastenings; car to remain stationary with load within capacity of machine until released by a pull on hand rope. CAR—Same as for 3A and 3B, above.
5B	Automatic Brake	26″x 22″	30″x 25″	30″x 26″	2′ 6″	100	350	44.00	87.00	14.00	.54	.70		
5C	Automatic Brake	30″x 24″	35½″ x27″	35½″ x28″	2′10″	150	450	50.00	104.00	16.00	.56	.80		
5D	Automatic Brake	34″x 28″	39½″ x31″	39½″ x32″	3′ 2″	250	635	60.00	122.00	18.00	.64	.90		
6A	Patent Frame Geared Brake	34″x 28″	40″x 32″	40″x 33″	4′ 0″	350	975	140.00	215.00	34.00	.98	1.16	Strong and substantial. Store service. Heavy packages, etc. Good for lowering.	MACHINE—Shafts of steel; wheels of full diameters; gears of size to suit hatch and capacity of machine; flywheel proper diameter; band and leather cushioned band brake; heavy babbitted boxes; necessary pulleys for check; lever for brake. CAR—As for 3A and 3B, above.

NOTES—Enclosed weight box, add 50c each ft. of height. Steel guide rails for car, add $3.00 per ft. of height. Brass guides for steel rails, $9.00 a set. Automatic catch serviceable for a 2-story dumbwaiter where brake and automatic lock are omitted, $6.00. Rope clamps to fasten hand ropes, 90c each.

Steel cars are made special and prices are quoted on request. All prices given are f. o. b. New York City. A detailed plan and instructions are sent with each equipment. No extra charge if size varies slightly from these given. Ropes spliced before shipment, if requested. Prices quoted for erection anywhere.



CHELSEA DUMBWAITER HATCHWAY ARRANGEMENTS FOR VARYING CONDITIONS

In ordering, state preferable arrangement, and give clear inside measurements and total height of hatchway; also, door size in height and width

Continued on next page

DATA AND PRICES OF SOME OF THE CHELSEA ELECTRIC DUMBWAITERS

Class engine	Type control	Car size, width and depth	Hatchway size, width and depth, doors 1 side only	Capacity, lbs.	Speed per minute, ft.	H. p. motor, 110-220 volts, D. C.	Price of engine, motor and controller only: Machine above hatchway	Price of engine, motor and controller only: Machine at side, below	Shipping weight of engine, controller, motor and (approx.) lbs.	Price complete equipment, 20-ft. height, 2 doors: Machine above hatchway	Price complete equipment, 20-ft. height, 2 doors: Machine at side, below	Shipping weight, lbs. (approx.)	Additional for each extra 10-ft. height: Machine above hatchway	Additional for each extra 10-ft. height: Machine at side, below	Additional for each extra door opening	Additional for any door opening on opposite side or at angle	For 220 volt A. C. multiphase, add or deduct as noted
A	1	22″x 18″	28″x 21″	100	200	1½	$ 855.00	$ 965.00	1100	$ 980.00	$1125.00	1800	$30.00	$35.00	.....	$12.00	+$22.00
A	2	22″x 18″	28″x 21″	100	200	1½	945.00	1025.00	1050	1115.00	1275.00	1800	36.00	45.00	.....	23.00	— 35.00
A	3	22″x 18″	28″x 21″	100	200	1½	955.00	1035.00	1100	1165.00	1330.00	1900	38.00	48.00	$33.00	16.00	— 35.00
A	4	22″x 18″	28″x 21″	100	200	1½	1260.00	1340.00	1300	*1560.00	*1935.00	2200	45.00	56.00	48.00	16.00	— 35.00
A	1	22″x 18″	28″x 21″	150	75	1½	855.00	935.00	1100	980.00	1125.00	1800	30.00	35.00	.....	12.00	+ 22.00
A	2	22″x 18″	28″x 21″	150	75	1½	945.00	1025.00	1050	1115.00	1275.00	1800	36.00	45.00	.....	23.00	— 35.00
A	3	22″x 18″	28″x 21″	150	75	1½	955.00	1035.00	1100	1165.00	1330.00	1900	38.00	48.00	33.00	16.00	— 35.00
A	4	22″x 18″	28″x 21″	150	75	1½	1260.00	1340.00	1300	*1560.00	*1935.00	2200	45.00	56.00	48.00	16.00	— 35.00
A	1	26″x 22″	32″x 25″	200	100	1½	955.00	1035.00	1300	1095.00	1240.00	1900	30.00	35.00	.....	12.00	+ 60.00
A	2	26″x 22″	32″x 25″	200	100	1½	1045.00	1090.00	1250	1230.00	1400.00	1900	36.00	45.00	.....	23.00	— 35.00
A	3	26″x 22″	32″x 25″	200	100	1½	1055.00	1140.00	1300	1280.00	1445.00	2000	38.00	48.00	33.00	16.00	— 35.00
A	4	26″x 22″	32″x 25″	200	100	1½	1360.00	1440.00	1500	*1675.00	*1850.00	2300	45.00	56.00	48.00	16.00	— 35.00
A	1	30″x 24″	36″x 27″	400	50	1½	970.00	1050.00	1500	1130.00	1275.00	2200	32.00	37.00	.....	15.00	— 50.00
A	2	30″x 24″	36″x 27″	400	50	1½	1060.00	1145.00	1500	1265.00	1425.00	2400	37.00	46.00	.....	25.00	— 50.00
A	3	30″x 24″	36″x 27″	400	50	1½	1070.00	1155.00	1600	1315.00	1480.00	2500	40.00	49.00	33.00	18.00	— 50.00
A	4	30″x 24″	36″x 27″	400	50	1½	1375.00	1455.00	1800	*1710.00	*1885.00	2600	47.00	57.00	48.00	18.00	— 50.00
B	1	30″x 24″	36″x 27″	300	200	3	1245.00	1325.00	1600	1405.00	1550.00	2500	33.00	38.00	.....	16.00	— 60.00
B	2	30″x 24″	36″x 27″	300	200	3	1330.00	1450.00	1600	1535.00	1700.00	2500	38.00	47.00	.....	26.00	—100.00
B	3	30″x 24″	36″x 27″	300	200	3	1350.00	1430.00	1650	1600.00	1755.00	2600	40.00	50.00	33.00	22.00	—100.00
B	4	30″x 24″	36″x 27	300	200	3	1650.00	1735.00	1850	*1990.00	*2165.00	2800	47.00	57.00	63.00	22.00	—100.00
B	1	34″x 28″	40″x 31″	400	150	3	1245.00	1325.00	1600	1435.00	1595.00	2900	40.00	45.00	.....	17.00	— 60.00
B	2	34″x 28″	40″x 31″	400	150	3	1330.00	1415.00	1600	1565.00	1745.00	2900	45.00	54.00	.....	28.00	—100.00
B	3	34″x 28″	40″x 31″	400	150	3	1350.00	1430.00	1650	1630.00	1800.00	3000	47.00	57.00	33.00	21.00	—100.00
B	4	34″x 28″	40″x 31″	400	150	3	1650.00	1735.00	1850	*2020.00	*2210.00	3200	54.00	64.00	63.00	21.00	—100.00
B	1	38″x 32″	45″x 35″	500	100	3	1315.00	1400.00	1700	1525.00	1685.00	3400	40.00	45.00	.....	19.00	—120.00
B	2	38″x 32″	45″x 35″	500	100	3	1400.00	1485.00	1700	1640.00	1815.00	3400	46.00	55.00	.....	29.00	—175.00
B	3	38″x 32″	45″x 35″	500	100	3	1420.00	1500.00	1750	1700.00	1875.00	3500	48.00	58.00	33.00	26.00	—175.00
B	4	38″x 32	45″x 35″	500	100	3	1725.00	1805.00	1950	*2095.00	*2275.00	3700	54.00	64.00	63.00	26.00	—175.00
B	1	36″x 36″	43″x 39″	800	50	3	1340.00	1420.00	1700	1580.00	1765.00	3700	42.00	47.00	.....	19.00	—145.00
B	2	36″x 36′	43″x 39″	800	50	3	1420.00	1500.00	1700	1700.00	1900.00	3700	48.00	57.00	.....	29.00	—190.00
B	3	36″x 36	43″x 39″	800	50	3	1440.00	1520.00	1750	1745.00	1945.00	3800	50.00	60.00	33.00	26.00	—190.00
B	4	36″x 36″	43″x 39″	800	50	3	1740.00	1825.00	1950	*2160.00	*2370.00	4000	56.00	66.00	63.00	26.00	—190.00

*Prices for complete equipment, 30 ft., 3 doors, one side only.

NOTE—This company furnishes 2 types of door contacts—mortised and exposed. Mortised type, $12.00 each; exposed type, $13.00 each. If door contacts are used, add $15.00 for conduit, wiring, etc., for each contact. When door locks are used, add for each door $8.00. When slack cable switch is used, add $22.00. For enclosed weight box, add $1.00 for each foot of height. Steel rails for car and counterbalance, including fishplates, screws, brackets, $3.00 per foot of height. Brass guides for steel rails, $9.00 per set. Steel cars are made special. Prices on request.

Above table gives stock sizes, speeds and capacities. Prices for variations given on request. No extra charge if car sizes vary slightly. Erection anywhere. All prices given are f.o.b. New York, N. Y. Sketches prepared on request. All parts are guaranteed free from defects for a period of 1 year. Detailed instructions for erection with each f.o.b. shipment.

DATA REQUIRED WHEN MAKING INQUIRIES

Specification Writers' Data and General Description

DATA REQUIRED—Car and hatchway size; total height; car travel; capacity, speed, current; control; location and number of doors; location of machine.

SPECIFICATIONS—*Engine*—Classes A and B. Bedplate, drum, gearing and motor constituting hoisting engine, securely bolted to foundation.

Worm and Worm Shaft—Made of one steel forging accurately turned in lathe. Gear of bronze and accurately cut. Both worm and gear enclosed in heavy iron housing with suitable openings for inspection, and run in oil.

Drum—Cast iron, accurately turned and grooved for cables, insuring increased wear.

Brake—Engine has electric safety brake, so arranged that when service is interrupted, brake automatically applies to stop car and holds it securely at landings.

Limit Devices—Connected directly to drum shaft to interrupt main and brake circuits and automatically stop engine when car reaches upper or lower limits of travel.

Electric Motor—Slow speed type, long bearings, self oiling boxes made especially for dumbwaiter work, having high efficiency, great starting power and durability.

NOTE: A. C. multiphase motors are squirrel cage type. Iron housing, brake and motor mounted on heavy cast iron bedplate. When engine is located at side of hatchway, this company furnishes templet, foundation bolts, vibrator sheaves, shafts and hangers. When overhead, this company furnishes templet only; all beams and supports furnished by others. This company includes rigid iron conduit, locknuts, bushings, boxes and wiring between motor limit and controller; others to bring electric power mains to controller and connect to terminals on same, including any line switches and reverse phase relays or cutouts necessary to meet local requirements.

Controllers—Select the type most suitable from the four specified below.

Control Type 1—Hand rope, consisting of operating cable, located as preferred.

Control Type 2—2 buttons, 1 for calling and 1 for sending at each terminal landing.

Control Type 3—Up, down and stop. 3 buttons at each landing. Up and down buttons send to terminal landings, unless halted by stop buttons.

Control Type 4—Full automatic. A gang of buttons is furnished for each floor, consisting of buttons to correspond to each floor. A person desiring to call or send the car to any floor, presses the button corresponding to the number of the floor to which he desires the car sent or called, and the car will at once (unless already in use) start for that floor. Floor stop device used with this controller is connected to machine to perform the functions mentioned.

DATA FOR COMPLETE EQUIPMENT ONLY—*Control Type* 1—This company furnishes sheaves, shafts and boxes for leading operating cable to controller. No supports included.

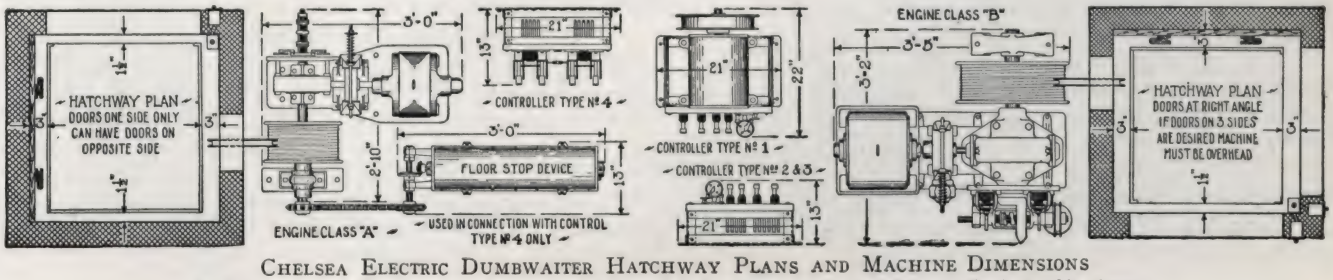
Control Types 2, 3 and 4—This company furnishes rigid iron conduit and outlet boxes.

Sheaves—This company furnishes overhead sheaves, boxes and beams; supports furnished by others.

Car—Ash, dovetailed, varnished and shelved as directed, fitted with eyes for cable, and iron guides for runs. Stock cars, 3′6″ in height.

Guide Runs—For car and counterbalance; hardwood, heavy double groove type.

Counterbalance—Cast iron weight fitted with guides for runs and eye for cable. Based on weight of car plus ⅓ live load.



CHELSEA ELECTRIC DUMBWAITER HATCHWAY PLANS AND MACHINE DIMENSIONS

In ordering, send sketch showing location of hatchway and machine room, also data required in table above

ESTABLISHED 1887

ENERGY ELEVATOR COMPANY

214-218 New Street

PHILADELPHIA, PA.

Products

HAND POWER DUMBWAITERS.
HAND POWER ELEVATORS.
INVALID ELEVATORS.
ELECTRIC DUMBWAITERS.
SIDEWALK ELEVATORS.
AUTOMOBILE ELEVATORS.
ELECTRIC FREIGHT ELEVATORS.
BELT DRIVEN FREIGHT ELEVATORS.

TRADE-MARK

"Energy" or Residence Dumbwaiter

Capacity—75 lbs. Adapted for high class residences, apartment houses, etc.

Description—The machine is of the automatic type, which securely sustains the car at any point without the use of lines or cords. The shaft is polished turned steel, revolving on roller bearings, and is mounted in an iron frame containing the entire mechanism, including the wheels for deflecting the hoist rope. All parts are accurately bored and carefully fitted, resulting in a perfect machine.

The car is of well-seasoned hardwood, finished with filler and varnish, and has adjustable guide shoes.

The hoist rope is finest quality flexible wire cable, and the operating rope is hemp, free from splinters. The guides are so arranged that they guide both the car and the weight, thereby saving space in the shaft and insuring free and quiet operation.

Quotations for double face and special types on request.

"Little Beauty" Dumbwaiter

Capacity—25 lbs. Adapted for restaurants, stores, offices, etc., where noiseless, quick service is required.

Description—This installation stands open in the room, easily accessible. The operation gear consists of hemp rope passing over iron wheels, one at the top, the other at the bottom. These wheels are mounted in iron stands; they turn on roller bearings, and have guards to prevent the rope from jumping off. A self-holding brake, which may be applied or released by one line from any floor, securely sustains the car, loaded or empty, at any point.

The car is made of highly finished hardwood trays, spaced with square brass tubes, and has re-inforced corners. It is fitted with adjustable brass guide shoes, polished brass rope connections, and, on the bottom, rubber bumpers. If desired, the car can be made accessible from both the front and back.

The guides consist of two polished brass tubes, one of them equipped with a mouthpiece and whistle at each story, making a perfect speaking tube.

The top wheel with brake device is enclosed in a hardwood panelled cabinet, which can be finished to match the surrounding woodwork, or the car, as preferred.

"Little Giant" Dumbwaiter or Trunk Lift

Capacity—300 lbs. Adapted for residence and apartment house work, hotels, stores, etc.

Description—The machine is entirely contained in an iron frame, is automatic in action, and securely sustains the car at any point without the use of lines or cords. It has spur gearing cast from machine cut patterns, and the shafts are turned steel revolving on antifriction bearings.

The car is well seasoned hardwood, with adjustable guide shoes, and it is well braced with irons and reinforced with angles where necessary to make it strong and rigid.

It is lined on the back and sides with yellow pine fencing.

The hoist rope is cast steel cable, and the operating rope is hemp, free from splinters. The counterweight runs in a closed box.

If preferred, the car can be made the same as the "Energy," with the weight running in guides.

Invalid Elevator

Capacity—500 lbs. For residences.

Description—The hoisting mechanism has machine cut gearing and steel antifriction roller bearings, which eliminate noise, all enclosed in an iron frame. The brake acts automatically and holds the car at any point in its travel, positively safe against excessive speed or a runaway.

The car is made with oak sides, oak panels 4 feet high, with bronze grille work for the upper panels, and oak panels overhead. It is equipped with a spring grip safety device that will prevent the car from falling more than an inch should both cables part. The woodwork is filled, and finished in golden oak. The guide runs are hard white maple.

The two steel hoist cables have an ultimate strength each of 13,000 lbs., and are attached to an equalizing bar that insures equal tension on each cable. The operating rope is hemp.

The counterweight is made in cast iron sections, and overweighted to assist the car in going up.

Electric Dumbwaiter

Capacity—100 to 400 lbs. Adapted for heavy packages, trunks and light freight service.

Description—This lift is connected direct to the motor by a steel chain belt. The capacity is determined by the horsepower of the motor, and whether a counterweight can be used.

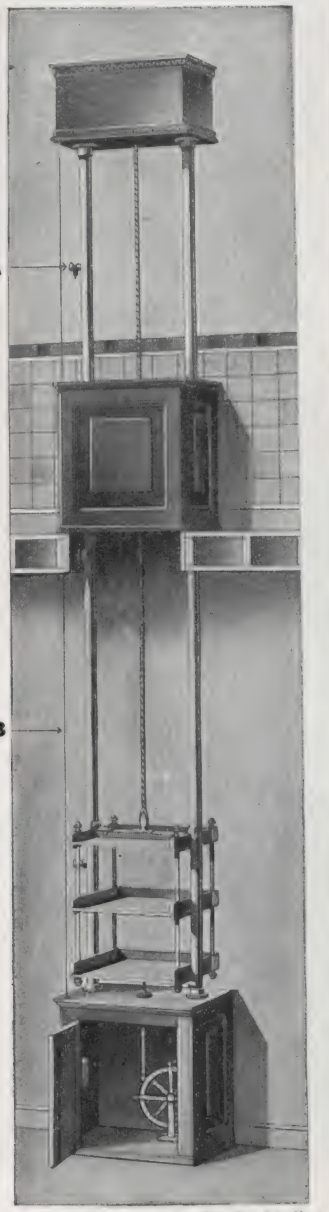
The car is hardwood, iron reinforced, and has adjustable guide shoes. It can be cabinet or platform shape, as desired.

The automatic band brake will easily sustain a full load; it is quick in action, operates without jar or vibration, and is so arranged that it automatically takes up the wear.

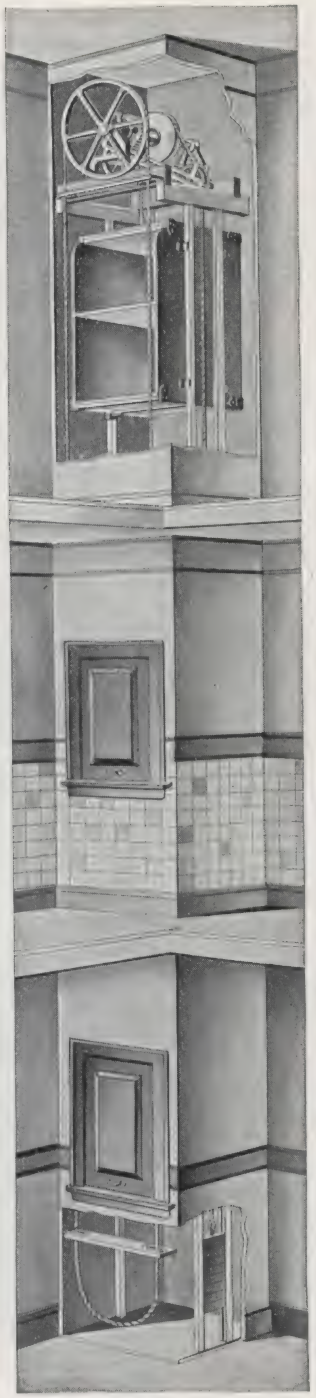
Installation Details

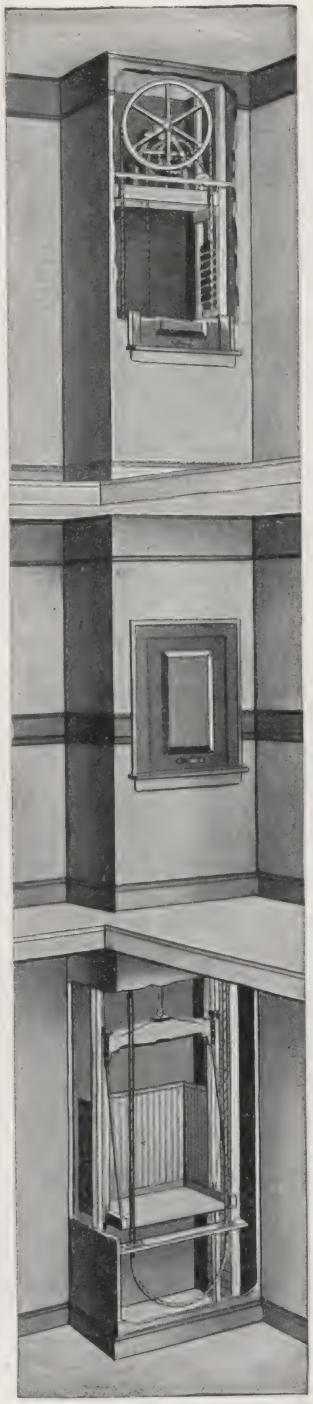
Complete drawings and detailed instructions are provided to direct the mechanic in setting up the dumbwaiters and elevators furnished by us.

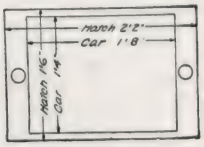
Continued on next page



A—Speaker B—Brake line







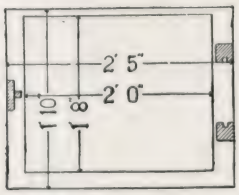
Plan for Car 20x16 in.

"Little Beauty" Dumbwaiter

Equipment: Wheels and brake, hardwood car (20x16 in.), leadweight, cabinet to cover top wheel, operating rope, brass tube guides.

Shipping weight: For 10-ft. travel (standard size), 275 lbs.; with bottom stand and guard for upper floor, 375 lbs.

Prices: For 10-ft. travel, $120.00; each extra foot travel, $2.00; each extra inch car area, $0.05



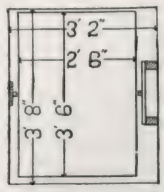
Plan for Car 24x20 in.

"Energy" or Residence Dumbwaiter

Equipment: Machine, hardwood car (up to 24x20 in.), counterweight, pull rope, hoist cable, rope guards, car runs, weight runs.

Shipping weight: For 10-ft. travel (standard size), 300 lbs.

Prices: For 10-ft. travel, $80.00; each extra foot travel, $0.60; each extra inch car area, $0.06



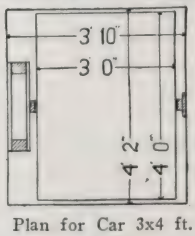
Plan for Car 2 ft. 6 in. x 3 ft. 6 in.

"Little Giant" Dumbwaiter or Trunk Lift

Equipment: Machine, hardwood car (2 ft. 6 in. x 3 ft. 6 in. x 4 ft. high maximum) counterweight, hand rope, hoist cable, car runs.

Shipping weight: For 10-ft. travel (standard size), 500 lbs.

Prices: For 10-ft. travel, $140.00; each extra foot travel, $0.50



Plan for Car 3x4 ft.

Invalid Elevator

Equipment: Machine, hardwood car (3 ft. wide x 4 ft. deep) counterweight, hand rope, hoist cable, car runs, weight runs.

Shipping weight: For 10-ft. travel (standard size), 1600 lbs.

Prices: For 10-ft. travel, $375.00; each extra foot travel, $3.00

Continued on next page

Hand Power Elevator

Capacity—500, 1000, 1500 and 2000 lbs.

Description—The machine has steel shafts, anti-friction roller bearings, and gearing of extra strength and durability. The main shaft, which revolves in self-oiling bearings, is turned steel of large diameter, to resist the torsional strain to which it is subjected.

The brake is the double area self-holding type, consisting of a steel band 4 in. wide, compressing on two flat surfaces on the outside of the large pull wheel. It is released or applied by one line from any floor, and will securely sustain a full load at any point.

The car is made of first quality hardwood, with all requisite iron braces and angles to secure strength and rigidity. It is equipped with our improved spring grip safety device that is sure in action and will lock the car to the guides instantly, should the cable part.

The cable is cast steel, fitted with the necessary attachments to connect it to the car and counterweight. It has a breaking strain ten times greater than the rated capacity of the elevator.

The elevator is balanced by counterweights made in sections, so that the desired adjustment may be made or altered at any time. It is customary to have sufficient weight to cause the car to rise when empty, and we include this amount in our prices.

The hand rope is best quality manila, and amply large and strong for the work. The check line is of the proper diameter and length to operate the brake.

The guide runs are first quality hard white maple, machined to fit the guides on the car, and bored and countersunk for screws.

Equipment—Machine, car with safety catch, counterweight, hand rope, hoist cable, check line, car runs, weight runs.

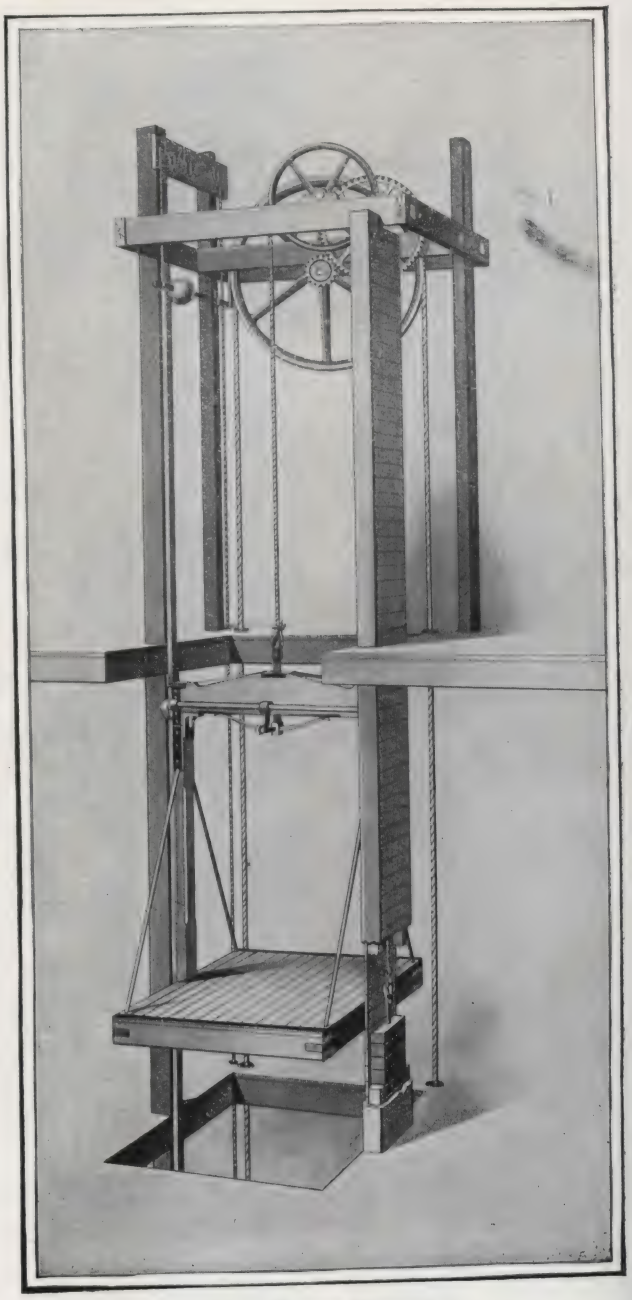
Note: The guide posts, machine supports, weight box, and bolts for installing the elevator are not included in the shipment, as they can be purchased to better advantage locally.

PRICES

Capacity, lbs.	Shipping weight, lbs.	Car size, outside measurements	Price for 10-ft. travel	Each additional ft. travel
500	1000	Not over 3 ft. wide by 3 ft. 6 in. deep	$160.00	$0.70
1000	1300	Not over 3 ft. 6 in. wide by 4 ft. deep	180.00	.80
1500	1600	Not over 4 ft. wide by 4 ft. 6 in. deep	220.00	.90
2000	1900	Not over 4 ft. 6 in. wide by 5 ft. deep	250.00	1.00

The 500-lb., 1000-lb., and 1500-lb., cars are not made larger than the sizes here given.

The 2000-lb. car will be made larger for $4.00 each square foot increased area.



Hand Power Elevator

500 lbs. 1000 lbs. 1500 lbs. 2000 lbs.

Shaft Plans for Hand Power Elevators

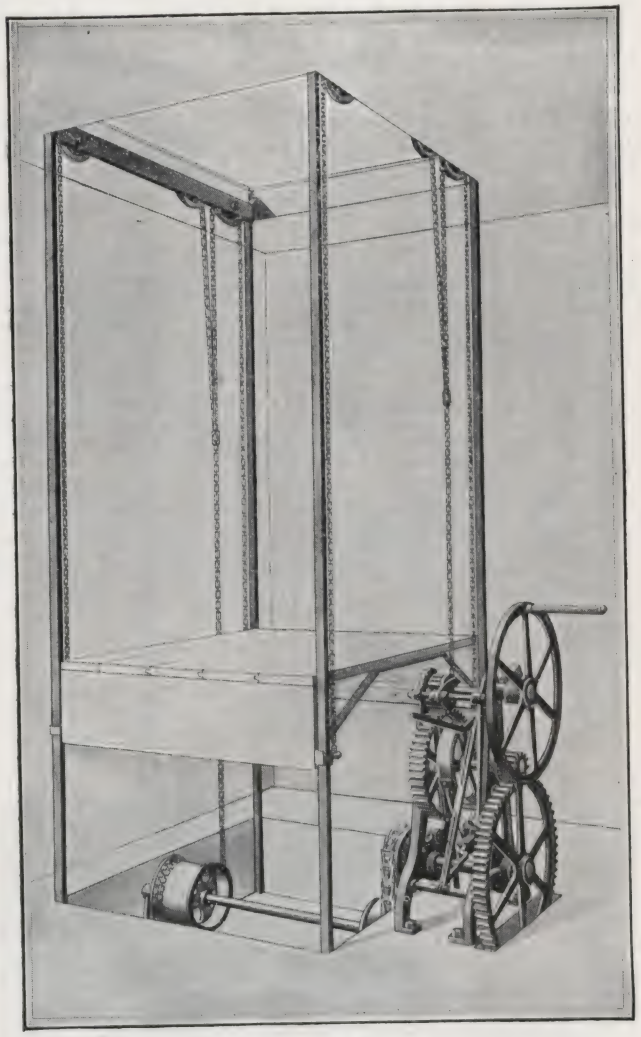
Continued on next page

Sidewalk Elevator, Type KD-24

Capacity—1500 lbs.

Description—The machine has compound gearing, steel shafts, iron drums and a powerful self-holding band brake, all set in an iron frame ready to bolt to the floor. The car is wood, braced with iron, and is suspended by four $\frac{5}{16}$-in. chains of 20,000 lbs. ultimate strength.

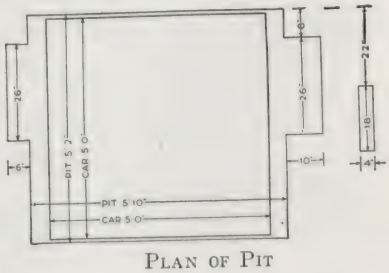
The gearing disengages for rapid lowering, thus eliminating the driving wheel, which does not revolve. The driving wheel is used instead of a crank to give momentum, and to provide greater safety for the operator.



Sidewalk Elevator

The construction is strong throughout, with a good margin of safety allowed over its rated capacity of 1500 lbs.

This elevator can be arranged for hatches that project from the building line.



Plan of Pit

Equipment—Machine, car, top wheels in suspension irons, chains, steel guide runs, all necessary connections.

Shipping weight, 2000 lbs.

Prices

For 10-ft. travel (with car not over 5 ft. square)	$240.00
Each additional foot of travel	3.00
Each additional square foot of car area	3.00

Automobile Elevator

Capacity—4000 lbs.

Description—The machine has heavy duplex gearing, band brake of the self-holding type, antifriction rollers and self-oiling bearings, which are set in iron yokes to prevent them from pushing apart or losing alignment.

The car is made of yellow pine sills with heavy plank floor, reinforced on the underside.

There are four cast steel cables, having an ultimate strength ten times greater than the rated capacity of the elevator.

Wherever possible we use two counterweights to apportion equally the strain on the drums, cables and shafts and if conditions permit, we advise four guides.

Equipment—Machine, car, steel suspension connections for car, 2 counterweights, 4 hoist cables, 2 weight cables, pull rope, brake rope, maple guide runs.

Shipping weight, 5000 lbs.

Prices

For 10-ft. travel (car not over 7 ft. 10 in. x 16 ft.)	$480.00
Each additional foot of travel	5.00
Each additional square foot of car area (not over 8 ft. x 18 ft.)	5.00

Electric Freight Elevator

Capacity—1000 and 2000 lbs.

Description—This elevator is driven by a steel belt direct to the hoisting gear from a reversible motor. The worm and wheel of the machine are cut from solid blanks, of a pattern to give a maximum wearing surface for a minimum of power. They are in an oil-tight case for protection from dust and grit, and to insure complete lubrication. The lateral friction of the worm is reduced to its lowest point by ball bearing thrusts on each end.

The car is the side post type, made of hardwood, built in a substantial, workmanlike manner, with all irons requisite to secure strength, and furnished with adjustable slide guide shoes. The cables suspending the car are cast steel, having an ultimate strength ten times greater than the capacity of the elevator.

The automatic band brake is amply powerful to sustain a full load, operates without jar or vibration, and automatically takes up the wear. The automatic stops, placed on the drum shaft, stop the car at the top and bottom floors, can be easily adjusted, and are always reliable in action.

A sectional counterweight is supplied for the purpose of economizing power.

The safety appliances also include a spring grip device that will prevent the car from falling, in the event of the cable parting; a slack cable stop that shuts off the machine and prevents the cable from disarrangements, should the car be obstructed in its descent; and floor locks at each story for holding the car while loading and unloading.

Belt Driven Freight Elevator

Capacity—1000 and 2000 lbs.

Description—This elevator is similar in construction to the one-belt electric, but is used where the driving power is a steam engine, or other non-reversible type. Two belts are used, one for lifting, the other for lowering.

ESTABLISHED 1897

HIGHWOOD DUMBWAITER CO.

(ROBERT M. SYPHER)

Hand Power Dumbwaiters and Elevators

CLOSTER, N. J. TELEPHONE CONNECTION

Products

HAND POWER DUMBWAITERS and ELEVATORS Exclusively—All Types for All Purposes.

Service

We specialize in the shipment and delivery of hand operated equipment only.

Our entire energy and experience is devoted toward assisting those in the trade who do not manufacture hand operated types, and also the building trade in general, in obtaining, at a very moderate cost, equipment that can be erected in the shortest possible time by inexperienced persons, and yet be entirely satisfactory when put in operation.

Installation

Entirely confined to factory output. The instructions for erection which are furnished with each and every equipment are simple and yet complete. Explanations are illustrated by diagram, showing the easiest and quickest way to erect.

All parts are interchangeable. Equipment is shipped assembled as far as possible so as to save time on the field and at the same time make a satisfactory installation.

Freight rates are taken into consideration and all materials are packed and shipped so that a minimum freight rate is obtained.

Guarantee

Any machine needing repairs will be repaired free of charge, if returned, freight charges prepaid.

The purchase price will be refunded to any one who does not find machines or equipment satisfactory to perform the duty claimed for them, if returned in good order within 90 days from date of purchase.

Specialties

The "Highwood"—A simple, satisfactory, low price utility dumbwaiter.

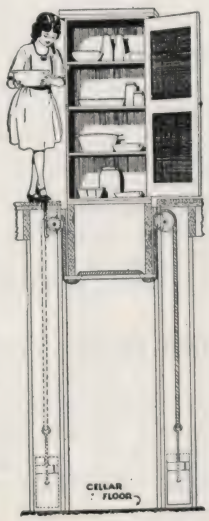
The "Sylvan"—An automatic brake dumbwaiter of moderate price. Absolutely self-retaining.

The "Herculean"—A geared, automatic brake dumbwaiter which performs a heavy duty in a satisfactory manner.

The "Glen"—A vanishing dumbwaiter or food conservator, sometimes used as a fuel lift.

"Glen" Vanishing Dumbwaiter

A dumbwaiter that is made in the form of a cupboard, and disappears into the cellar from the floor above.



"GLEN" VANISHING DUMBWAITER

When down, the top forms part of the floor itself and can be walked upon. A catch holds it in the cellar. When the catch is released, the cupboard rises of its own accord. Push it down and it disappears and locks itself in the cellar.

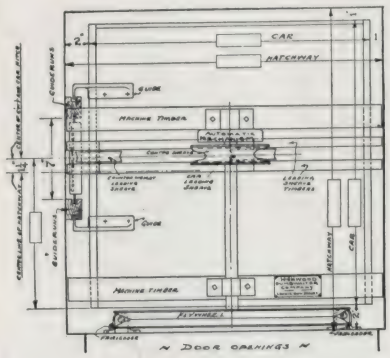
Sent complete as shown in the accompanying illustration. Any handy person can install it.

Provisions can be kept in the cool cellar and the housewife will save many steps from cellar to kitchen and kitchen to cellar in a day.

This equipment must be classed with all labor saving devices.

Plans and Elevations of Dumbwaiters

A typical plan and elevation for a "Highwood," "Sylvan" or "Herculean" outfit is given below.



PLAN OF DUMBWAITER

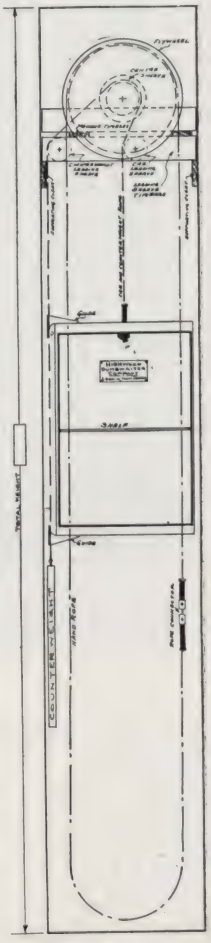
DATA AND PRICES OF DUMBWAITERS

Name	Capacity, lbs.	Size of car, in.	Size of hatch	Price
"Highwood"	50	*	See above	$34.50
"Sylvan"	60	*	See above	40.00
"Herculean"	125	*	See above	90.00
"Glen"	*	22x18	Send for plan	65.00

Prices for "Highwood," "Sylvan" and "Herculean" are for 20 ft. total height. Add .50 for each additional foot of height.

Prices for machines sent only on request.

*As required.



ELEVATION OF DUMBWAITER

Specifications for Dumbwaiters

Specify as follows:

The dumbwaiter materials to be furnished by the HIGHWOOD DUMBWAITER CO., Closter, N. J., and erected by general contractor according to plans and instructions of manufacturer.

Allow the sum of $..... for one (name equipment) dumbwaiter, f.o.b. New York, N. Y.

Elevators

A general line of hand power elevators supplied at reasonable prices.

Quotations on materials supplied on request.

IDEAL ELECTRIC DUMBWAITER COMPANY, INC.

HOME OFFICE AND FACTORY

BUFFALO, N. Y.

Product

PUSH BUTTON DUMBWAITER.

Slogan

"Let The Ideal Lift It."

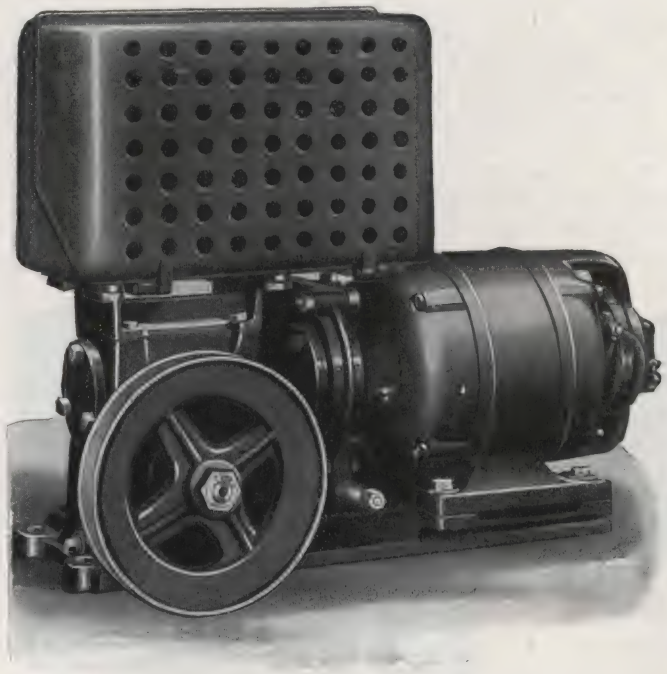
Uses

We make one type of push button dumbwaiter with two operations by *constant pressure;* the *up* and *down* and the *call* and *send* for any height of travel. They are "ideal" for apartments, cafeterias, clubs, hospitals, libraries and any place for light loads to be handled quickly.

Prices

Price $377.50 for Up and Down type.
Price $395.50 for Call and Send type.
Both prices f.o.b. factory (less discount).

Note: Covering three floors and basement, one front opening in basement and each floor, and includes machine, motor, controller, all assembled and wired; weight, sheaves, posts, rope, push buttons, switches, conduit, condulets, wire, and instructions and drawings for erecting all boxed ready for shipping. Approximate shipping weight, 700 lbs. Extra floors and openings at a small increase in price.



DUMBWAITER MACHINE

Capacity

Machine will lift 75 lbs. at 100 f.p.m. or 100 lbs. at 75 f.p.m. and stands a reasonable overload. It will operate on 10 amperes 110 volts; direct current or single-phase alternating.

Cars are 20x16x36 in. and 24x20x36 in. built standard with one shelf and one face. Special cars at a small increase in price.

Construction

This construction is the simplest and most substantial, allowing the largest size car possible in a given size hatchway.

The worm and worm gear shaft are made of high grade steel and run on the best make of ball bearings. The gear is made of best phosphor bronze, accurately cut on machines built exclusively for this work.

Hoisting machine is thoroughly tested before being shipped.

Dimension sheets are sent on request.

Guarantee

We guarantee the material and workmanship, and if any part or parts prove defective within one year, we will supply the defective part or parts free of charge f.o.b. our factory.

DUMBWAITER INSTALLATION

F. S. PAYNE CO.

Dumbwaiter Manufacturers

CAMBRIDGE, MASS.

BRANCH OFFICES

BOSTON, MASS. LOWELL, MASS. NEW HAVEN, CONN.

Product

PAYNE ELECTRIC DUMBWAITERS.

For Hydraulic Ash Hoists, see page 569; for Passenger and Freight Elevators, see pages 1964-1965.

TRADE-MARK

Payne Electric Dumbwaiter Construction

The Payne "AA" electric machine represents the very latest in dumbwaiter machine construction, several distinctive features of which are new in the dumbwaiter field.

(1) Its design is such that it may be easily assembled for duty either as a *drum winding* or *traction machine.*

(2) By the use of universally mounted motors and brake magnets, the machine may be readily modified for either alternating or direct current service.

(3) The location of motor and brake combines to give a very compact unit.

LIFTING CAPACITIES AND SPEEDS OF PAYNE ELECTRIC DUMBWAITERS

For both alternating and direct current

Load, lbs.	100	100	150	150	200	300	750
Speed, ft. per min.	75	150	75	150	100	75	*40

Loads and speeds are standard. Special machines furnished for any purpose. Lifting capacities are the maximum allowable loads on car when machine is overbalanced, an amount equal to one-third the rated capacity. Maximum load on drum or driving sheave shaft is not to exceed 800 lbs.
*With 2.1 hitch on car.

Control Systems for Payne Electric Dumbwaiters

The following standard control systems for Payne electric dumbwaiters will be found to meet the usual requirements. Special forms of control furnished where required.

System "A," Hand Rope Control—Starting, stopping and reversing of machine controlled by means of hand rope in hatchway near landing doors.

System "B," Two-landing Push Button Control—(*"B-1"*) *"Call" and "Send" at Each Landing*—A two-button station at each landing marked "up" and "down." Momentary pressure of either the "up" or "down" button will send the car in corresponding direction.

(*"B-2"*) *Single Button Control*—A single button station at each landing, both being either "call" or "send."

System "C," Three-landing Push Button Control—(*"C-1"*) *"Call" and "Send" at Each Landing*—A three-button station at each landing marked "1—2—3" giving full selective control without a floor stop device.

(*"C-2"*) *Call and Car Control*—A gang of sending buttons marked "1—2—3—Stop" is located in car while calling buttons only are at landings. Momentary pressure of sending button pre-sets control and car will proceed to selected floor as soon as landing door is closed.

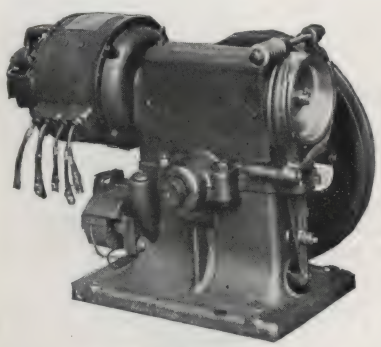
System "D," Semiselective Push Button Control—A three-button station marked "up," "down," "stop" is provided at each landing. Momentary pressure of either "up" or "down" button will send car in corresponding direction and it will continue to either terminal unless stopped at an intermediate landing. Landing doors should be provided with glass windows to permit seeing car as it approaches an intermediate landing.

System "E" Full Selective Push Button Control—(*"E-1"*) *Multistation Control*—A control station is provided at each landing with a button for each floor served by the car, thus allowing complete control from any landing.

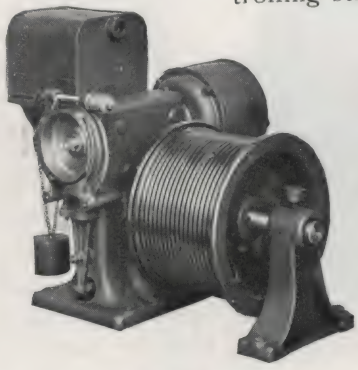
(*"E-2"*) *Call and Car Control*—A gang of sending buttons marked to correspond with the floors served by the car is located in the car. Calling buttons only are at landings. Momentary pressure of sending button pre-sets control and car will proceed to selected floor as soon as landing door is closed.

System "F," Single Station Full Selective Push Button Control—A gang of buttons marked to correspond to the floors served by the car is located at one floor, giving complete control of car from this floor. Single button stations only are provided at other floors for returning car to controlling station.

System "G," Single Station Full Selective Push Button Control with Call and Return—A gang of buttons marked to correspond to the floors served by the car is located at one floor, giving complete control of car from this floor. A two-button station is located at all of the other floors, permitting car to be called to different floors and then returned to controlling station.



Traction Machine



Drum Winding Machine

PAYNE "AA" ELECTRIC DUMBWAITER MACHINE

Furnished for 115 and 230 volts D.C. and for 220, 440 and 550 volts, 2- or 3-phase, 60-cycle A.C. as standard units. Special machines made for 500 volts D.C. and 25 or 40 cycles A.C.

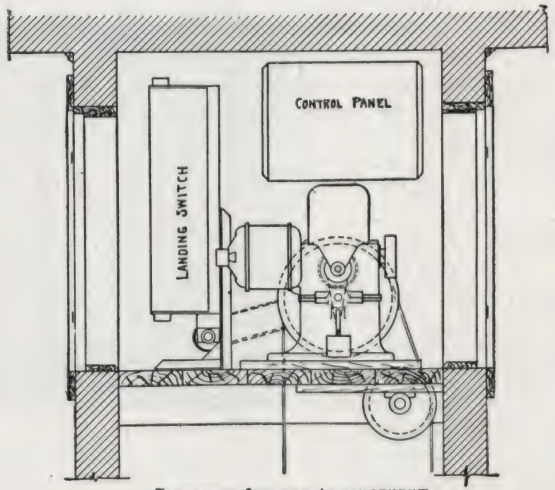
No. 12 D. C. CONTROL PANEL

With relays for push button operation

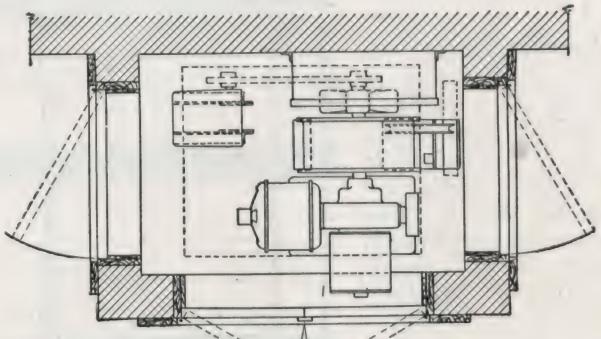
Continued on next page

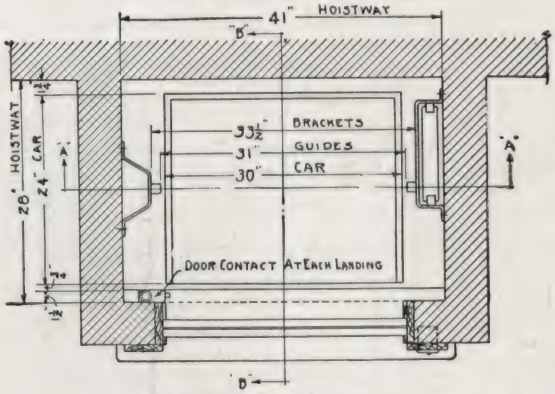
Information Required for Estimates

Location of building.
Type of machine, whether drum or traction.
Live load capacity; car speed per minute; car travel.
Outside dimensions of car; whether side or corner post, wood or metal; number of shelves and whether stationary, removable or hinged; whether single face or double face.
Give current characteristics (whether A. C. or D. C., also phase, cycles and voltage.
Type of control system desired (specify by symbol).
How gang switches are to be marked.
Number of landings and landing doors.
Style of door, whether swinging or vertical slide.
Location of machine, whether directly overhead, in basement, on shelf on top floor or intermediate floor.
Kind of guides, whether steel or wood.
Number of door locks (if desired).

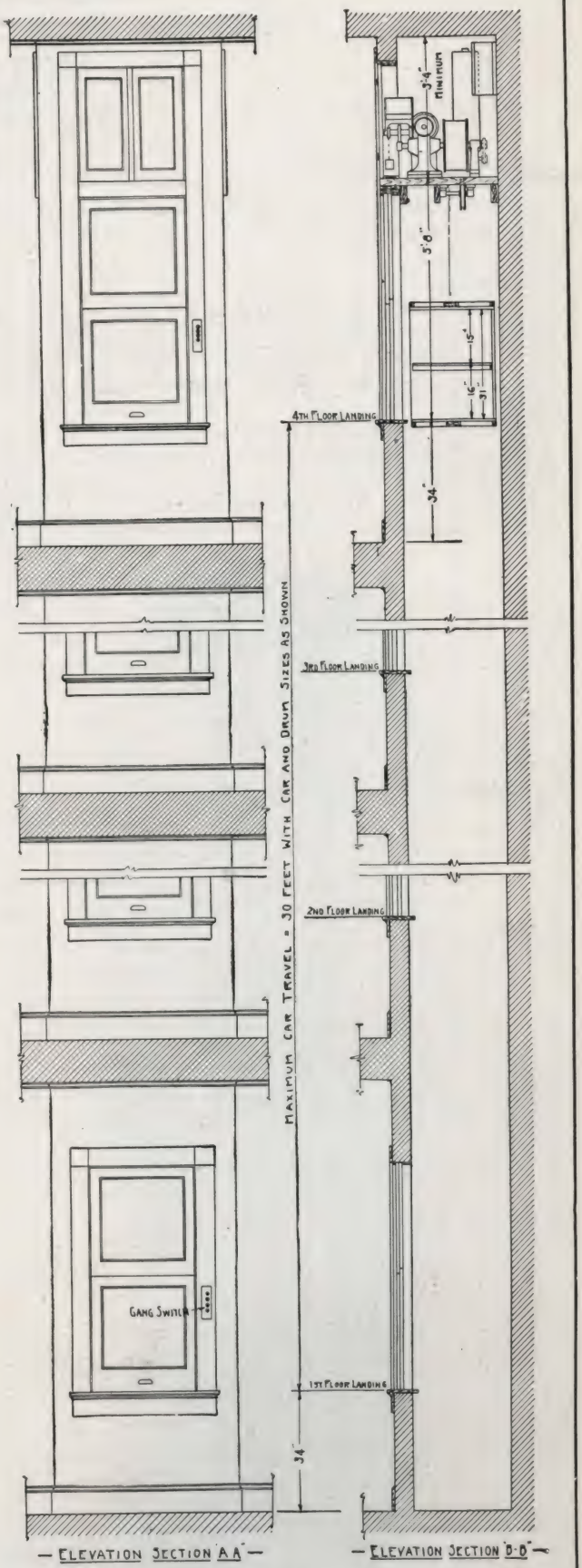


— Elevation Showing Arrangement —
— Of Machine Room —


— Plan Showing Arrangement —
— Of Machine Room —



— Plan Of Hoistway —



— Elevation Section A-A —
— Elevation Section B-B —

Note: Layout as shown is for four landings. Arrangement and dimensions can be modified to meet other conditions.

Type "AA" Dumbwaiter Machine Layout with Full Automatic Pushbutton Control

ESTABLISHED 1868

GEORGE MASSA

Manufacturer of Tube Guide Dumbwaiters

OFFICE AND FACTORY
245 South 6th Street
PHILADELPHIA, PA.

Product

Specialist in HAND POWER TUBE GUIDE DUMBWAITERS for all purposes.

Description

Tube guide dumbwaiters are operated by hand power, and are especially desirable wherever a first class dumbwaiter is required. They are used in restaurants, hotels, libraries, stores, banks, and fine residences.

Guides are made of steel or brass tubes, in one of which runs the counterweight which balances car. The other guide may be equipped as a speaking tube.

The sheave type dumbwaiter, Fig. 1, is widely used in restaurant work with car as in Fig 3. With a small brass wire mesh car as in Fig. 2, or a neatly finished hardwood car, it is very desirable as an office lift. Capacity to 25 lbs. This capacity may be increased to 40 lbs. by addition of a single hand rope at front of car.

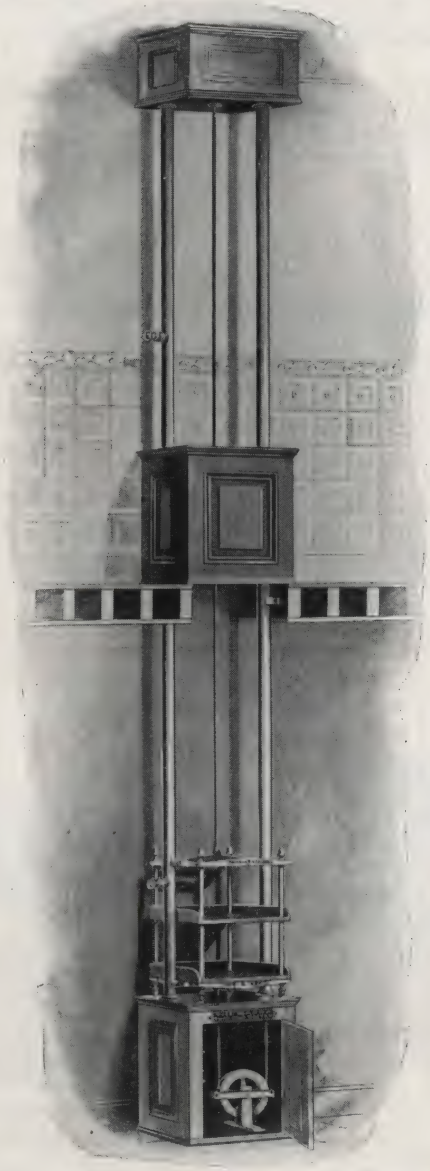


FIG. 1. QUICK SERVICE DUMBWAITER FOR RESTAURANTS, CAFES, ETC.

For book lift, store, factory, institution and residence work, self-retaining types are used, in 100-lb. and 300-lb. capacities.

FIG. 2. CAR SUITABLE FOR BOOK LIFT OR STORE USE

In addition to car types shown, hardwood and sheet steel box type cars are regularly furnished to order.

All types of tube guide dumbwaiters are easily operated, and are as nearly noiseless as any dumbwaiter can be made. Installation can be made by any good mechanic.

FIG. 3. CAR SUITABLE FOR CAFE, RESIDENCE, ETC.

Further Information

On receipt of data as to car size and capacity, number of stories to travel, height of same, and a statement of the purpose for which dumbwaiter is required, prices and blue prints will be promptly furnished.

Table below gives wellhole sizes for those sizes of cars in general use. Special size cars can be furnished. If special conditions are to be met, write for information.

CLEAR WELLHOLE SIZES REQUIRED

Car sizes, in.	25 lbs.	40 and 100 lbs.		300 lbs.	
	Single or double face, in.	Single face, in.	Double face, in.	Single face, in.	Double face, in.
12x10	17x12	.....	.....	.....	.....
15x12	20x14	.....	.....	.....	.....
18x12	23x14	.....	.....	.....	.....
18x15	23x17	.....	.....	.....	.....
20x16	26x18	.....	.....	.....	.....
20x18	26x20	.....	.....	.....	.....
24x18	30x20	30x21	30x22	.....	.....
24x20	30x22	30x23	30x24	30x23	30x24
24x24	.....	30x27	30x28	30x27	30x28
30x20	.....	37x23	37x24	37x23	37x24
30x24	.....	.....	.....	37x27	37x28
30x30	.....	.....	.....	37x33	37x34

SEDGWICK MACHINE WORKS

Manufacturers of Hand Power Dumbwaiters and Elevators

TELEPHONE
WATKINS 9416

152 West 15th Street
NEW YORK, N. Y.

FACTORY
POUGHKEEPSIE, N. Y.

Products

HAND POWER DUMBWAITERS and ELEVATORS of all types and for every purpose:

Private House Dumbwaiters; Apartment House Dumbwaiters; Hospital Dumbwaiters and Elevators; Hotel and Restaurant Dumbwaiters; Library Book Lifts; Fuel Lifts; Brass Tube Dumbwaiters; High Speed, Automatic Brake, Band Brake, and Geared Dumbwaiters; Outdoor Dumbwaiters; Trunk Lifts, Invalid Elevators, Domestic Elevators, Freight Elevators, Sidewalk Elevators, Carriage Elevators, Automobile Elevators, Ash Hoists, Hatchway Hoists, Iceless Refrigerators, etc.

Special Features

Long life, easy operation, freedom from trouble, low repair cost—all the result of superior design and principle, executed from the best of materials by skilled workmen in a factory devoted exclusively to the manufacture of hand power dumbwaiters and elevators, and equipped with special machinery for this purpose.

Quantity production on the interchangeable part system guarantees a uniformly high grade product.

Installation

Proper installation is essential to satisfactory operation. Blue prints and full directions for installing are furnished with each outfit, from which local labor may install. Or, experienced mechanics will be sent by the company, to install, on request. Customers will always secure better results by purchasing complete outfits from the company, rather than by securing part of the equipment from local sources.

Guarantee

"Sedgwick" dumbwaiter machines are guaranteed for 5 years from date of purchase and will be repaired free of charge at any time within that period if returned to the factory at Poughkeepsie, N. Y., charges prepaid.

Prices, Drawings, etc.

On the following pages are listed some of the standard Sedgwick types and sizes, the prices given being net to the consumer. Whenever further data is desired, drawings, estimates, and more complete descriptive matter will be gladly submitted.

Deliveries

Catalogue sizes are carried in stock, and shipment is made the day order is received. Special sizes require three to four days—principally to allow for proper finishing.

Sedgwick Service

Complete satisfaction depends upon the selection of dumbwaiters or elevator outfits exactly suited to the conditions and requirements of each case. Sedgwick service places at the disposal of architects and others, without charge, the benefit of specialized experience of more than 25 years. The Service Department will work with architects in deciding upon the proper dumbwaiter or elevator equipment to give specific results under specific conditions.

Special Outfits

Thousands of special drawings and designs have been developed, during a long experience, for special purposes.

If these pages do not offer what is needed, consult Sedgwick service. Special constructions can be furnished on very short delivery, without sacrifice of quality and with the usual guarantee.

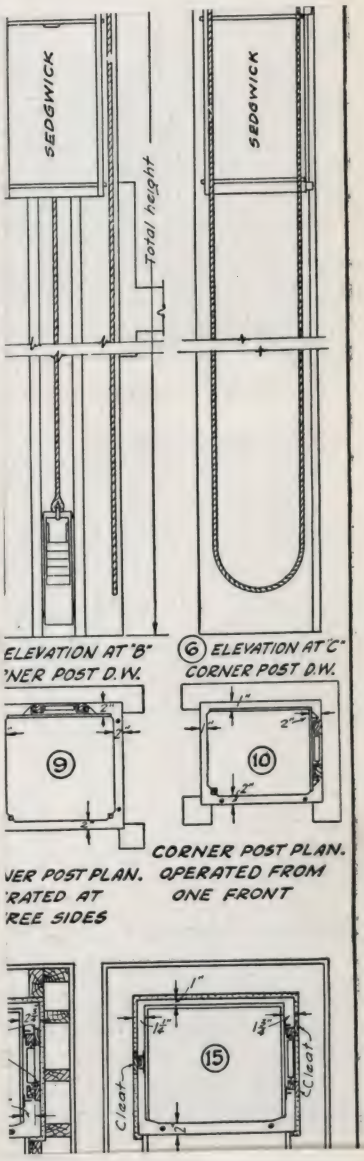


FIG. B. "SEDGWICK" AUTOMATIC BRAKE DUMBWAITER ERECTED
Enclosure removed

Specifications

Specify as follows: "The Dumbwaiter [or Elevator] to be manufactured and installed by the SEDGWICK MACHINE WORKS, 152 West 15th Street, New York, N. Y."

Thus all contractors may figure on the same equipment, the owner gets maximum value, and the architect has the guarantee that the outfit will be satisfactory and the work properly done. If local mechanics are to install, simply omit the words "and installed."

Continued on next page

Plain Dumbwaiters (Figs. A and B)

The word "plain" is used in contradistinction to the "geared" type described later. The three plain dumbwaiter types here described are the ones most largely used for average service, where usual loads are less than 25 lbs. The automatic brake dumbwaiter is for general work in private houses. The load can not

Product

Specialist in HAND P rake line.
WAITERS for all purposes. iter is for high wells, as in als, etc., where a harder

Description

Tube guide dumbwait r is a good, low priced out- power, and are especially g check on the hand ropes. class dumbwaiter is requ machine on platform, car, restaurants, hotels, librarie de runs for car and weight, residences.

Guides are made of st f 20 ft. over all, f. o. b. of which runs the counterw
The other guide may be eq

The sheave type dum used in restaurant work w

DUMBWAITER OUTFITS
A and B)

	f single face outfits			Prices of double face outfits*	
	Sim- lex"	"Band Brake"	Add for extra height per ft.	Add for double face	Add for extra height per ft.
	50.00	$ 90.00	$ 0.65	$15.00	$ 0.90
	70.00	110.00	.70	15.00	.95
	90.00	130.00	.75	15.00	1.00
	10.00	150.00	.80	20.00	1.05

ularly for locations where he average private house, urants, factories and com- the usual load will exceed

types—the automatic and ow.

machine on platform, car, le runs for car and weight, f 20 ft. over all, f. o. b.

"SEDGWICK" GEARED DUMBWAITER OUTFITS

No.	Size of car (outside), in.*	Size of ceiled well (inside), in.*	Shipping weight, lbs.	Prices of single face outfits "Automatic" or "Band Brake"	Prices of single face outfits Add for extra height per ft.	Prices of double face outfits* Add for double face	Prices of double face outfits* Add for extra height per ft.
1	20x16	23x19	300	$130.00	$ 0.90	$15.00	$ 1.30
2	24x20	27x23	400	150.00	1.00	15.00	1.35
3	28x24	31x27	500	170.00	1.10	15.00	1.40
4	34x30	37x33	600	190.00	1.20	15.00	1.45

*No extra charge for outfits of different sizes and smaller dimensions. Price of special sizes is that of the regular size, out of which the special size could be made.

Inside dimensions of ceiled well is specified, as the guide runs may be screwed direct to the ceiling boards. If the shaft be fireproof or lath and plastered inside, grounds or cleats must be provided, to which the guide runs may be screwed.

If these grounds or cleats are not provided in the walls and must be put on the face of the plaster, add 2 in. to the inside finished width of the well for this cleating.

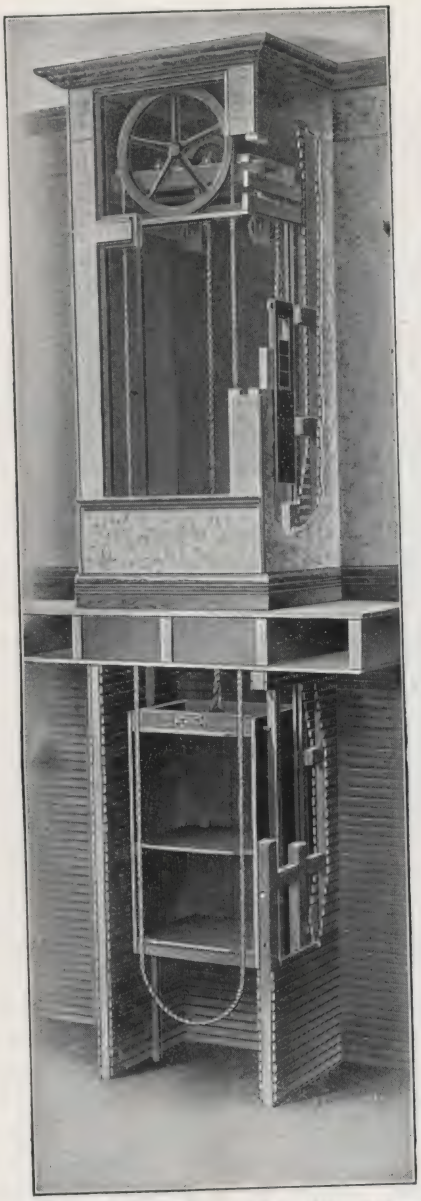
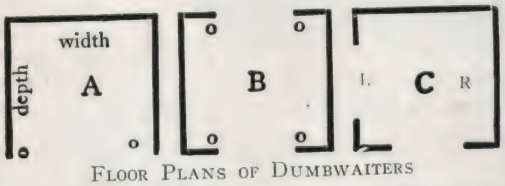


FIG. A. "SEDGWICK" AUTOMATIC BRAKE DUMBWAITER ERECTED IN PLASTERED SHAFT



FLOOR PLANS OF DUMBWAITERS

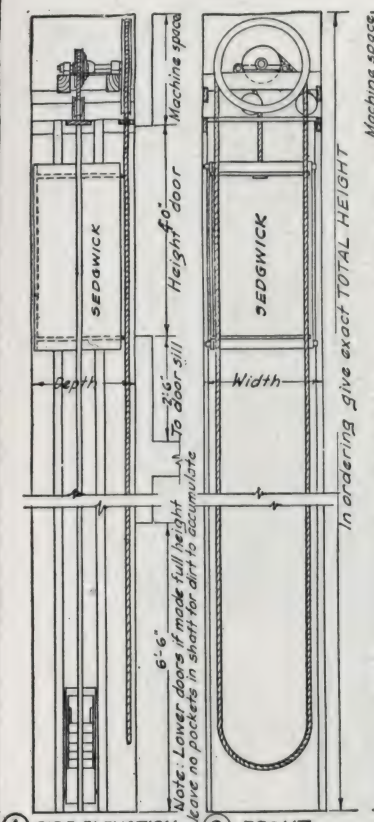
A—Open at front on all floors; the best arrangement where it can be used
B—Requires a double face outfit to operate from both fronts
C—Open at front and right or left; say which. This arrangement is to be avoided, if possible

Dumbwaiter Cars

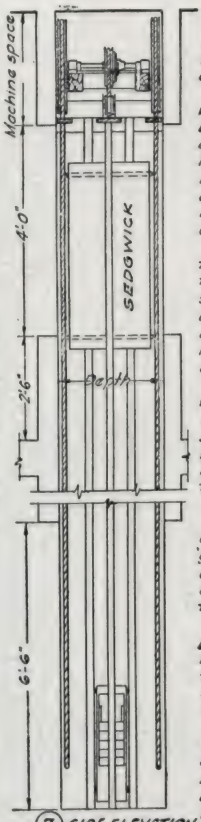
These are regularly built 3 ft. high inside, with one hinged shelf; or 3 ft. 6 in. high inside, with two fixed shelves in addition to top and bottom; except that No. 1 cars are usually 6 in. less in height.

In the tables, the first measurement given is the width from right to left; the second, the depth from front to rear. Thus, a No. 2 car is 24 in. wide, right to left, and 20 in. deep, front to rear.

Continued on next page



1 SIDE ELEVATION. SINGLE FACE D.W.



2 FRONT ELEVATION

3 SIDE ELEVATION. DOUBLE FACE D.W.

GENERAL NOTES

Always specify usual and heaviest load.

Doors for dumb waiter shafts should be as wide as the car desired and 4'0" high, located 2'6" above floor, making top of door 6'6" above floor thus permitting operator a long pull on the hand rope

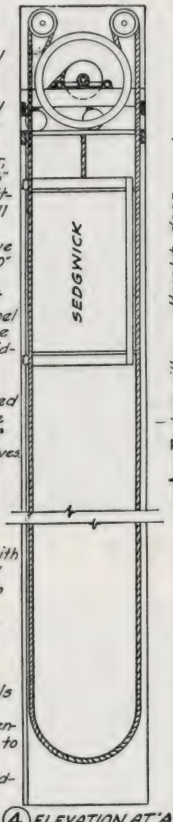
Machine space above top door should be 2'0" to 3'6" depending on size and type of outfit desired. A door or panel at top for access to the machine should be provided.

Single face dumb waiter cars are carried in stock in catalogue sizes with one hinged shelf or two solid shelves. Double face cars with two solid shelves

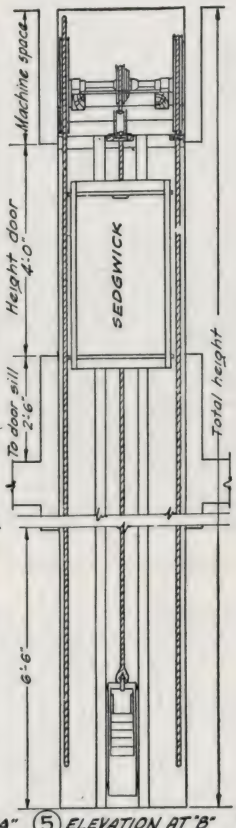
Unless otherwise ordered single face cars are furnished with one hinged shelf and double face cars with two solid shelves.

Dumb waiter guide runs both for car and weight are always fastened with wood screws. Never use nails for this purpose

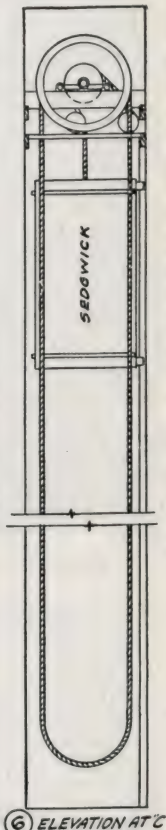
At least one door opening sufficiently large to admit car into well must always be provided until after outfit is installed



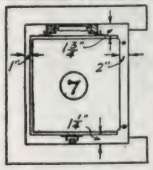
4 ELEVATION AT "A" CORNER POST D.W.



5 ELEVATION AT "B" CORNER POST D.W.



6 ELEVATION AT "C" CORNER POST D.W.

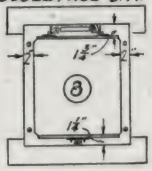


SINGLE FACE PLAN.

DESIGN NOTE:

Wherever possible dumb waiter shafts should be designed either single face as No1, 2 & 7 or double face as No. 2, 3 & 8 to insure the utmost satisfaction.

No. 2 above shows the front elevation of either single or double face shaft.



DOUBLE FACE PLAN.

DESIGN NOTE

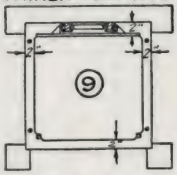
Where absolutely necessary to have door openings in adjacent sides of well, locate and identify each door and specify door chiefly used.

Corner post dumb-waiter, with double face machine can be operated in both directions from all doors by reversing one hand rope as shown in No. 4, 5, 6, & 9.

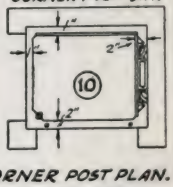
Corner post dumb waiter, single face machine shown No. 6 & 10 can be operated in both directions from front only.

Specify right or left for side door: Dumb waiter may be conveniently lowered from the side door.

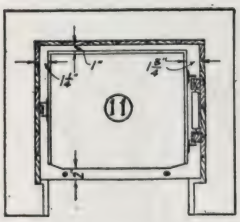
It is much better to arrange the outfit either single face as 1 & 7 or double face as 3 & 8 if possible



CORNER POST PLAN. OPERATED AT THREE SIDES



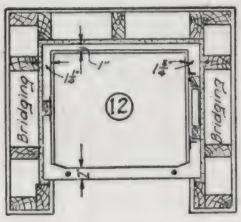
CORNER POST PLAN. OPERATED FROM ONE FRONT



PLAN. CEILED WELL

Where well is sheathed inside with boards the guide runs are fastened direct to this sheathing with wood screws.

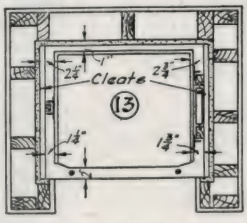
Clear inside dimensions of well are 3" larger than outside dimensions of car.



PLAN. PLASTERED WELL

Where well is plastered inside, the vertical studs are almost never located exactly where required for the guide runs; therefore it is advisable to have horizontal bridging or cats in both sides of the enclosure 30" on centers, to which guide runs are secured by long screws passing through lath and plaster

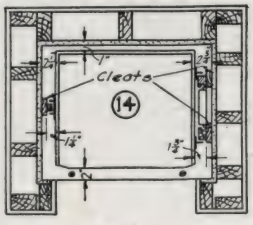
Clear inside dimensions of shaft are 3" larger than outside dimensions of the car



PLAN. PLASTERED WELL

Where horizontal bridging as shown on plan No. 12 has not been provided it is necessary to put horizontal cleats on the face of the plaster 30" on centers to which guide runs are fastened by means of wood screws

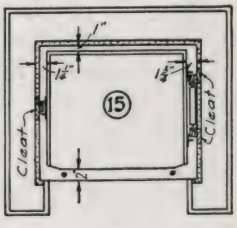
Allowing for 1" cleats on each side, the outside width of car will be 5" less than net inside width of the well 3" being allowed for the guide runs, counterweight, clearance etc



PLAN. PLASTERED WELL

Horizontal cleats as shown in plan No. 13 are frequently objectionable because they make little shelves on which dust collects This objection is overcome where it is possible to secure vertical cleating back of the guide runs as shown in plan No. 14.

Allowing for 1" cleats on each side, the outside width of car will be 5" less than net inside width of well: 3" being taken for the guide runs, weights, clearance etc



PLAN. FIRE PROOF WELL

In fire proof wells cleating may be put in horizontally as shown in plan No 13 or vertically as shown in plan No. 14. The latter is preferable where the construction permits the firm fastening of the vertical cleating.

Where cleating is put in before well is plastered inside, the plaster may be brought flush with face of cleating as shown in plan No. 15 above.

The above show various Single Face Dumb Waiter enclosures, having all door openings in front. The car in a single face well is three inches less in depth than the depth of the well from the front to the rear. In Double Face wells, construction and arrangement are the same except that an extra inch is required between the fronts for the second hand rope. In Double Face wells therefore the car is four inches less in depth than the net inside measurement of the well from front to front

Copyright 1916 by Sedgwick Machine Works

DUMBWAITER SERVICE SHEET

Continued on next page

Invalid Elevators (Fig. E)

The "Sedgwick" automatic brake hand power invalid elevator (Fig. E) is a practical outfit for the purpose intended.

The essential features of such an outfit are ease of operation, absolute safety, and simplicity of design, so that no interruption of service need be anticipated. These essentials are embodied in the Sedgwick outfits.

While the weakness which prevents the invalid climbing stairs would probably make it inadvisable for him to operate the elevator himself, the amount of power required is so small that even a child can safely operate the elevator either up or down with full load.

Complete outfits include machine, car 6 ft. 3 in. high in clear, guide runs, ropes and cables for total height over all of 20 ft. or less, and counterweight, f. o. b. Poughkeepsie, N. Y. For extra height, see table below.

Special booklet on application.

"SEDGWICK" INVALID ELEVATORS, FIG. E

Size of car, ft.	Size of well		Price of outfit	Add for extra height per ft.	Shipping weight lbs.
	Width, ft. in.	Depth, ft. in.			
3 x 3	3 4½	3 3	$600.00	$2.00	950
3½ x 3½	3 11½	3 9	700.00	2.50	1,200
4 x 4	4 6	4 3	800.00	3.00	1,300
4½ x 4½	5 0	4 9	900.00	3.50	1,700
5 x 5	5 6	5 4	1000.00	4.00	1,800
6 x 6	6 8	6 4	1200.00	5.00	2,000

FIG. E. "SEDGWICK" AUTOMATIC BRAKE HAND POWER INVALID ELEVATOR

Sidewalk Elevators (Fig. O)

Many improvements make the "Sedgwick" the simplest, strongest, safest, most durable, most easily operated sidewalk elevator that an architect can specify.

It is designed for heavy duty and stands up under the work.

Blue prints and full directions for erecting with each outfit.

"SEDGWICK" SIDEWALK ELEVATOR, FIG. O

Capacity, lbs.	Size of platform, ft.	Price	Add for extra height per ft.
500	3 x 3	$200.00	$5.00
1,000	3½ x 3½	250.00	6.00
1,500	4 x 4	300.00	7.00
2,000	5 x 5	350.00	7.50
2,500	5 x 5	400.00	8.00

Prices cover outfits complete f.o.b. Poughkeepsie, N. Y., for a total height of 10 ft. Extra for additional height as per table above.

Prices on heavier outfits on application.

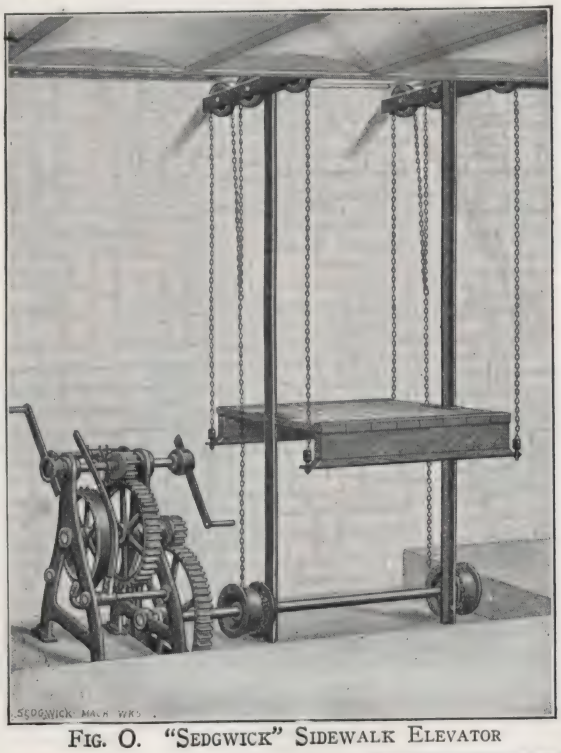


FIG. O. "SEDGWICK" SIDEWALK ELEVATOR

Continued on next page

Carriage and Automobile Elevators (Fig. C)

"Sedgwick" quality is here represented in high grade equipment for stables, garages, livery stables, etc.

These elevators are simple, easy running, safe, and substantially built.

They can be furnished in any size and capacity.

Complete outfits include overhead gearing, platform, adjustable counterweight, guide runs for platform and weight, ropes and cables for total height over all of 20 ft., f. o. b. Poughkeepsie, N. Y.

"SEDGWICK" AUTOMOBILE ELEVATORS, FIG. C

Capacity, lbs.	Platform, ft.	Shipping weight, lbs.	Complete outfit	Add for extra height per ft.
1,500	7½ x 12	2,000	$ 550.00	$3.50
2,000	7½ x 14	2,400	650.00	4.00
2,500	8 x 15	2,800	750.00	4.50
3,000	8 x 16	3,200	850.00	5.00
4,000	8 x 16	4,200	900.00	6.00
5,000	8 x 16	5,200	1000.00	7.00
6,000	8 x 16	6,200	1100.00	8.00

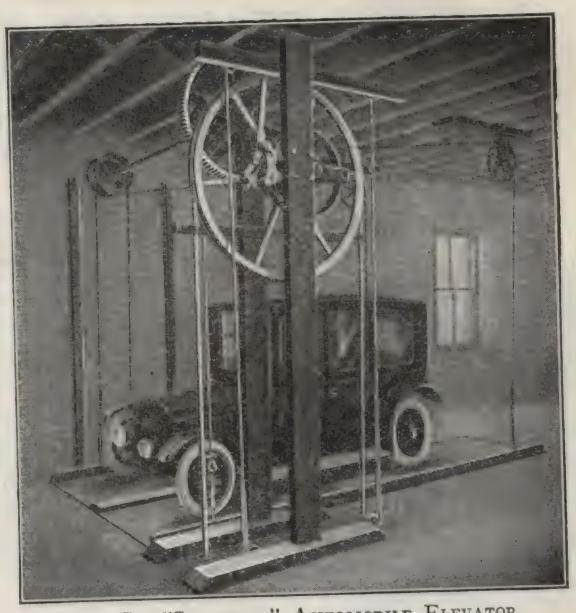


FIG. C. "SEDGWICK" AUTOMOBILE ELEVATOR

Freight Elevators (Fig. D)

These equipments are built in the most substantial manner, designed for severe service and easy operation. In smaller sizes they are used in private homes as trunk lifts.

The larger sizes find application in factories, shops, stores, warehouses, schools and industrial buildings for all purposes.

They have steel antifriction roller bearings and rigidly braced iron frames, resulting in correct alignment and easy running. They are fitted with the improved "Sedgwick" self-locking indestructible band brake.

We recommend double cables independently attached to car and counterweight.

Complete outfits include overhead gearing, platform, adjustable counterweight, guide runs for platform and weight, ropes and cables for total height over all of 20 ft., f. o. b. Poughkeepsie, N. Y.

"SEDGWICK" IMPROVED HAND POWER FREIGHT ELEVATORS, FIG. D

Capacity, lbs.	Size of car, in.	Space required		Complete outfit	Add for extra height, per ft.	Shipping weight, lbs.
		Width, in.	Depth, in.			
500	36 x 36	40½	40	$225.00	$1.75	800
750	42 x 42	47¼	46	300.00	2.00	1,200
1,000	48 x 48	53¼	52	315.00	2.25	1,300
1,200	54 x 54	59¼	58	400.00	2.50	1,600
1,500	60 x 60	65¾	64	450.00	2.75	1,900
2,000	72 x 72	79⅛	76	520.00	3.00	2,400
2,500	72 x 72	79⅛	76	580.00	3.50	2,700

Price on outfits of greater size or capacity quoted on request.

Blue prints and full directions for erecting sent with each outfit.

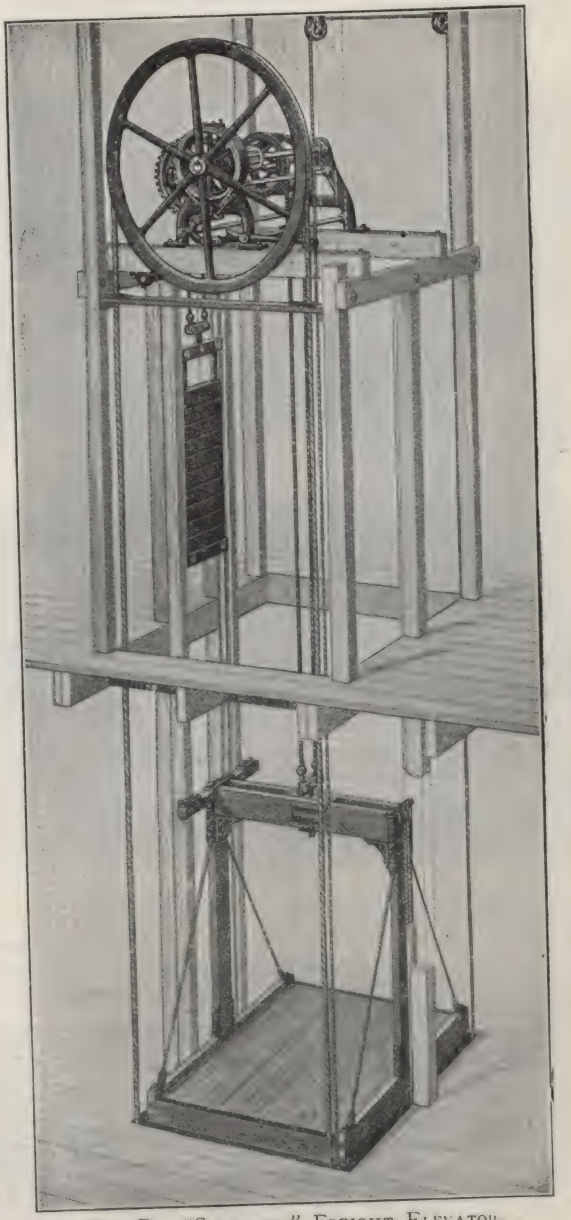


FIG. D. "SEDGWICK" FREIGHT ELEVATOR

ESTABLISHED 1909

STANDARD CARRIER COMPANY

Manufacturers of Electric Dumbwaiters

ESTIMATING DEPARTMENT
112 East 41st Street
NEW YORK, N. Y.

FACTORY
PLANTSVILLE, CONN.

BRANCH OFFICES
BOSTON LOS ANGELES PITTSBURGH

Products

ELECTRIC DUMBWAITERS.

For Pneumatic Tube and Carrier Systems, see pages 2002-2003.

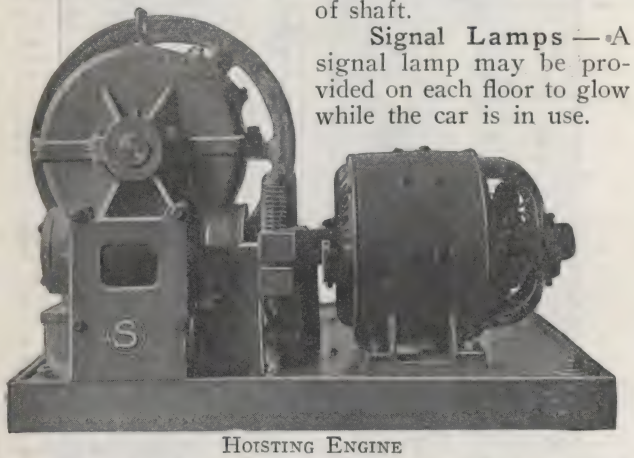
Electric Dumbwaiters

Electric dumbwaiters built and installed by the STANDARD CARRIER COMPANY include car, hoisting engine, cables, guides and all operating equipment such as push buttons, buzzers, signal lamps, mechanical locks, safety switches, etc., but do not include the hoisting engine foundation or supports, shaft enclosure, door, trim and finish.

Car—Built of wood or steel, of any desired dimensions, with or without recessed lamp in side or top, hinged shelves, locked compartments and sliding curtain gate. Cars can be supplied for use in shafts with door openings on one, two or three sides.

Hoisting Engine—Electrically operated, either alternating or direct current. Built for hoisting loads of from 25 to 500 lbs. at speeds of from 65 to 500 ft. per minute (see table below). All hoisting engines operating cars faster than 150 ft. per minute are equipped with slow down devices for bringing car to a gradual stop. Hoisting engine may be located at top of shaft, on any floor alongside of shaft, or alongside lower end of shaft.

Signal Lamps—A signal lamp may be provided on each floor to glow while the car is in use.



HOISTING ENGINE

Buzzers—A buzzer may be provided on each floor to announce arrival of the car.

Mechanical Locks and Safety Switches—Furnished for all doors. They prevent operation of car when door is open, or opening of door except when car is at door.

Timing Device—If desired, a timing device may be installed which prevents "stealing" of car from a floor before the elapse of a predetermined amount of time. Patents are pending on this device.

Operation of Standard Electric Dumbwaiters

Dumbwaiters may be operated directly from each floor, or from a central station.

Full Automatic Direct Control—Car is operated directly from each floor, a complete set of push buttons being provided at each floor, so that car may be sent from any floor to any other floor.

A variation of this system is to have one push button on each floor for calling the car, and a complete set of push buttons on the car for dispatching to any floor.

Complete Central Station Control—A complete set of signal buttons is provided on each floor. Pushing a signal button rings a buzzer and operates an annunciator in the central station. Operator then dispatches car to floor indicated.

Semiautomatic with Central Station—A signal button is provided on each floor and a complete set of push buttons is provided on car. When signal button is pushed, central station operator dispatches car to floor indicated. Car is then sent directly from this floor to any other floor by pushing button on car.

Installation

Standard electric dumbwaiters are usually installed by the STANDARD CARRIER COMPANY. However, if desired, blue prints and full directions for installing will be furnished with each outfit, so that dumbwaiter may be installed by local labor.

Service

The engineering department will be pleased to give advice as to the proper size and operating speed of dumbwaiters for meeting any conditions or requirements. This service is rendered without charge or obligation.

Specifications

Specify as follows:

Dumbwaiter shall be of the electrically operated type manufactured and installed by the STANDARD CARRIER COMPANY, 112 East 41st Street, New York, N. Y.

The car is to travel .... ft. per minute and carry a maximum load of .... lbs. exclusive of car.

Each floor shall be provided with a signal lamp to glow while the car is in use, and a buzzer to announce arrival of car. Mechanical locks and safety switches to be furnished for all doors.

Dimensions of car and location of doors in shaft shall be as shown on drawings. Hoisting engine shall be located where shown on drawing.

Guides to be of steel supported from the building structure at each floor, with intermediate supports not more than 8 ft. apart.

Dumbwaiters shall be arranged for operation by full automatic direct control (or complete central station control or semiautomatic control with central station).

ELECTRIC DUMBWAITERS—LOADS IN POUNDS AND SPEEDS IN FEET PER MINUTE

Machine No.	A		B		C		D		E		F		G	
	Lbs.	at f. p. m.	Lbs.	at f. p. m.	Lbs.	at f. p. m.	Lbs.	at f. p. m.	Lbs.	at f. p. m.	Lbs.	at f. p. m.	Lbs.	at f. p. m.
5	200	65	150	85	125	100	100	125	75	165	50	250	25	500
7	250	75	200	95	150	125	125	150	100	190	75	250	50	375
10	300	85	250	100	200	125	150	170	125	200	100	250	75	330
15	500	75	400	95	300	125	250	150	200	190	150	250	100	375
20	500	100	400	125	300	165	250	200	200	250	150	330		
30	500	150	400	190	300	250	250	300	200	370				
40	500	200	400	250	300	330	250	375						
50	500	250	400	350										

GIFFORD-WOOD CO.

Manufacturers of Elevating and Conveying Machinery

SALES OFFICES
NEW YORK, N. Y., 50 Church Street
BUFFALO, N. Y., Electric Building

MAIN OFFICE AND WORKS
HUDSON, N. Y.

SALES OFFICES AND STOCKROOMS
CHICAGO, ILL., 565 W. Washington Street
BOSTON, MASS., 24 Milk Street

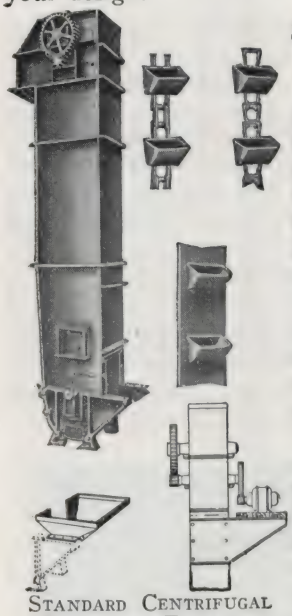
Products

ELEVATING and CONVEYING EQUIPMENT for all lines of industry: Elevators and Conveyors for handling crates, boxes, packages, bags, cans, ashes, coal, sand, gravel, ice, salt, etc.; Power Plant Coal and Ash Handling Equipment; Coal Pockets (wood, concrete, steel; rectangular and silo); Screens; Hoppers; Locomotive Coaling Stations; Pivoted Bucket Carriers; Wagon Loaders; Portable Belt Conveyors; Car Unloaders; Friction Clutches; Hoists; etc.

BUILT STRONGER LASTS LONGER

Service

Architects and engineers are extended close co-operation through the services of our long-experienced engineering staff. Our engineers will be glad to discuss any problems which you may meet in the application of elevating and conveying machinery to structures under your design.



STANDARD CENTRIFUGAL DISCHARGE ELEVATOR

Standard Centrifugal Discharge Elevator

Standardized centrifugal discharge bucket elevators for handling crushed coal, ice, salt, slate, stone, anthracite screenings, ashes, or any granular material such as sand or gravel, less than 3 in. in size. Built in capacities from 500 to 1000 cu. ft. per hour and driven direct by motor or by belt from line shaft. Quick delivery from stock; shipped disassembled with markings and instructions for easy assembly. Quotations on receipt of data as to exact nature of material to be handled, height of lift, and available power. Experience and close observation show unusually low installation and operating costs.

Power Plant Equipment for Coal and Ash Handling

We design and manufacture coal and ash handling equipment for all kinds of power plants. Complete engineering service in determining the most suitable and efficient system for a particular plant is gladly furnished to engineers and architects.

POWER PLANT EQUIPMENT FOR COAL AND ASH HANDLING

Warehouse and Factory Equipment

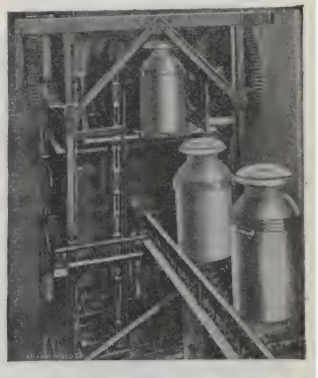
The illustrations herewith merely serve to indicate the wide variety of Gifford-Wood equipment available for elevating and conveying boxes, cases, packages, bags, cans, etc., in factories, warehouses, and similar places.

Recommendations and complete data can be furnished only after a thorough knowledge of conditions and requirements has been obtained. Preliminary data gladly sent on request.

HOLD BAR CONVEYOR HANDLING BOXES

INCLINED CONVEYOR HANDLING CASED BOTTLED GOODS

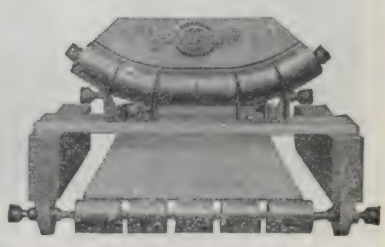
ELEVATOR FOR HANDLING BARRELS



ENDLESS CHAIN ELEVATOR FOR HANDLING MILK CANS

Belt Conveyors

This type of belt conveyor is particularly suited to long hauls of loose materials in large quantities. We design, manufacture, and install complete belt conveyor equipment.



BELT CONVEYOR

THE HASLETT SPIRAL CHUTE CO.

FACTORY AND ENGINEERING DEPARTMENT
520-522 North 61st Street
PHILADELPHIA, PA.

SAN FRANCISCO OFFICE, 228 Pine Street
NEW YORK OFFICE, 110 West 34th Street
BALTIMORE OFFICE, 523 Calvert Building
CLEVELAND OFFICE, 1311 Citizens Building

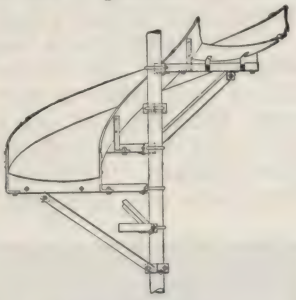
Products

SPIRAL CHUTES; GRAVITY ROLLER CONVEYORS; VERTICAL LIFTS; POWER DRIVEN CONVEYORS; PAPER and RUBBISH CHUTES; SANITARY ALUMINUM CHUTES for SOILED LINEN.

Also manufacturers of Barrel Hoists and Fire Doors.

Spiral Chutes

The Haslett spiral chute has a patented concave bottom, which causes a counterbalance between gravity, centrifugal force and friction. It offers the only solution of speed control of packages on gravity slides. This type of chute is the best made for miscellaneous freight on account of uniformity of speed, and is the kind always supplied for warehousemen and jobbers.



STANDARD CONSTRUCTION HASLETT SPIRAL CHUTE

STANDARD SIZES OF HASLETT PATENT CONCAVE CHUTES AND MAXIMUM SIZES OF PACKAGES HANDLED

Diameter	Trough width	Packages		
		Length	Width	Weight
3 ft.	12 in.	15 in.	9 in.	40 lbs.
4 ft.	19 in.	22 in.	14 in.	75 lbs.
6 ft.	24 in.	30 in.	18 in.	200 lbs.
*7 ft.	30 in.	36 in.	23 in.	350 lbs.
†9 ft.	36 in.	48 in.	28 in.	490 lbs.
9 ft. 10 in.	42 in.	52 in.	32 in.	600 lbs.
12 ft.	48 in.	60 in.	36 in.	1000 lbs.
15 ft.	60 in.	72 in.	46 in.	1400 lbs.

*Generally supplied to grocery jobbers.
†Generally supplied to hardware jobbers.
Special strength chutes can be built for especially heavy work in all sizes.

This company also builds flat bed chutes, both enclosed and open, for department store, mail order and light factory work.

SIZES OF STANDARD FLAT BED CHUTES

Diameter	Trough width	Pipe column	Diameter	Trough width	Pipe column
3 ft. 4⅝ in.	12 in.	4 in. internal	6 ft. 6¾ in.	36 in.	6 in. internal
5 ft. 6¾ in.	30 in.	6 in. internal	7 ft. 8¾ in.	42 in.	8 in. internal

Gravity Roller Conveyors

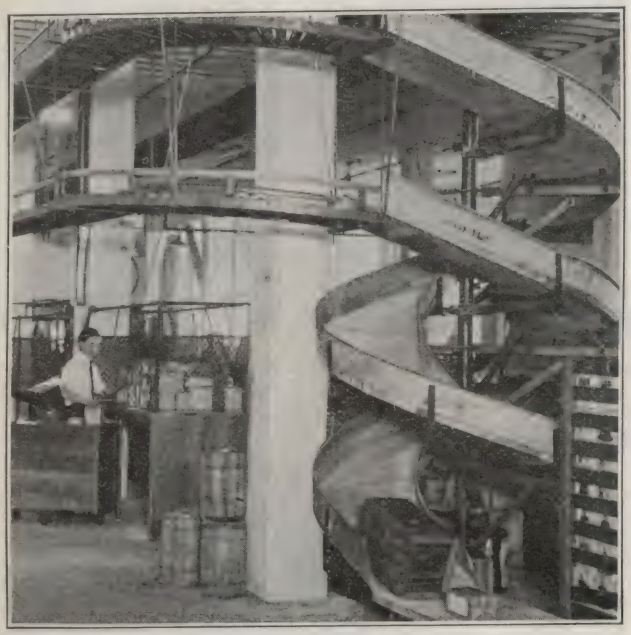
Haslett ball bearing roller conveyor has shafts running entirely through and carried in patented shaft holders, so that they do not protrude through the side rails. It is light, strong, clean and neat. Made for various purposes, in four sizes, of steel tubing rollers: $\frac{13}{16}$ in., 1½ in., 2¼ in. and 3 in.; also with maple rollers.

Vertical Lifts

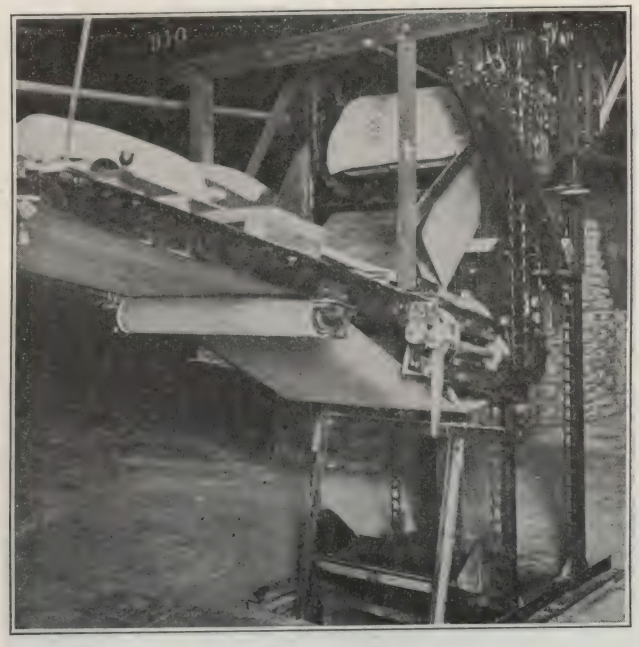
THE HASLETT SPIRAL CHUTE CO. have several standard designs of vertical lifts suitable for heavy warehouse work, jobbing house requirements, factory service, department store work, and for handling trays of dishes between basement and upper restaurant floors. These are made to operate both up and down, and from one or both sides. Special vertical conveyors are also designed for any requirements for which standard machines are not suited.

Power Driven Conveyors

For mail order houses, department stores, factories, etc. A specialty is made of devising and laying out complete systems, including belt and chain conveyors, inclined elevators, etc., with noiseless transmission.



DOUBLE CHUTE RECEIVING FROM SUPER-IMPOSED DOUBLE RUN OF GRAVITY ROLLER CONVEYOR IN LARGE PATENT MEDICINE FACTORY



WAREHOUSE VERTICAL LIFT DELIVERING SACKS OF FLOUR TO LONG BELT CONVEYOR

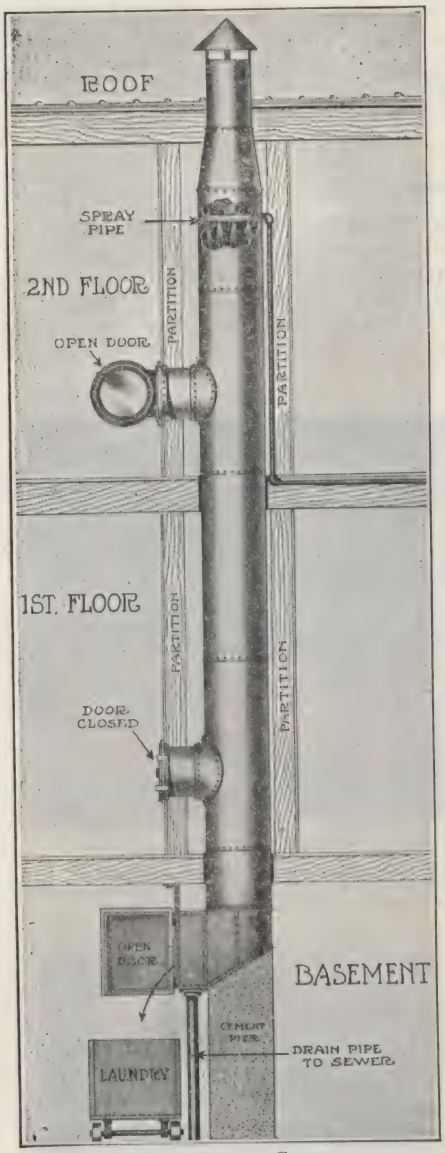
Continued on next page

Soiled Linen Chutes

Chutes for delivering soiled linen from upper floors of hospitals, hotels, institutions and apartment houses are made of sheet aluminum $\frac{1}{16}$ in. thick with laps downward on inside. Rivet holes are countersunk and aluminum rivets driven flush on inside.

A cast aluminum throat is furnished for intake at each floor and is extended through partition wall with sheet aluminum pipe to door jamb casting outside of wall. Door consists of a cast aluminum ring, set with wire glass center, closing against a rubber gasket. The hinge is a heavy pin through strong lugs cast as part of door jamb and door casting and door is forced tight against gasket by a refrigerator door clamp. This is of brass, nickleplated. The door ring is buffed and polished, making a very handsome appearance.

A spray ring is installed near the top, with connections for supply pipe and at bottom a drain pipe leads out for sewer connection.



Soiled Linen Chute

At the bottom, very rigid construction, heavily reinforced, gives ample strength for deflection of bags of laundry by a slanting bottom to a side discharge.

We can provide structural steel legs for support of bottom, or chute can rest on a concrete pier. An angle iron ring is provided for each floor so that chute can be supported and braced.

If desired, an outlet can be furnished through roof with ventilator cap, although it is best to make the portion above flushing pipe of galvanized steel.

This sanitary method or handling soiled linen in institutions and hotels has become recognized as an essential feature in properly protecting patients, guests and especially employes.

The use of aluminum allows of cleansing with the flow from the spray pipe or with disinfectants applied with a long handled brush inserted at intake openings. Aluminum does not rust.

Engineering Co-operation—We invite correspondence with architects and engineers and are glad to furnish complete drawings showing floor openings, framing, supports, etc.

Paper and Rubbish Chutes

These are installed in mail order houses, department stores, factories, hotels and in any building where sweepings from upper floors are sent down to basement for disposal, or waste paper is to be baled or destroyed.

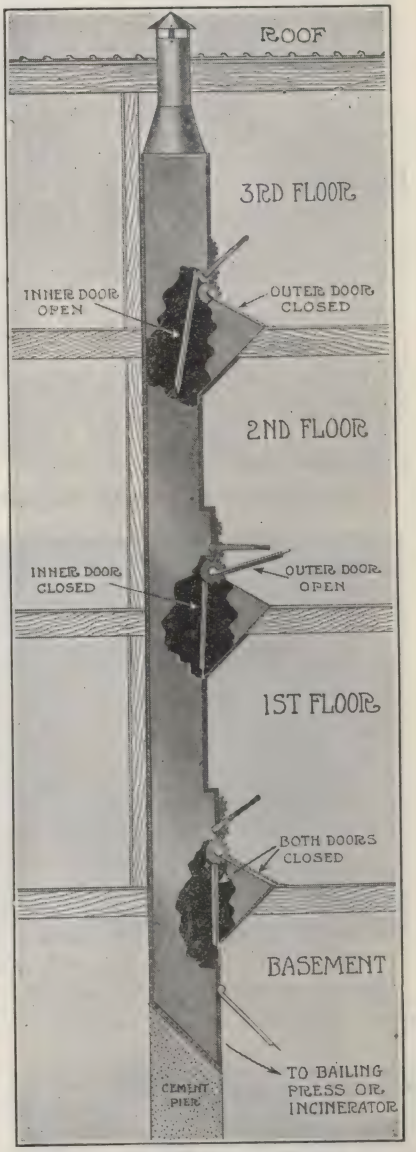
Bottom discharge can be made on floor or to incinerator or baling press.

Bottom is made slanting and heavily reinforced, but owing to the shock of falling pieces of wood or other heavy waste material it is best to have bottom rest on a concrete pier, with grout poured in to fill the crack full so as to form an absolutely solid surface to take the blows. A heavy hinged bottom door is provided.

Chute is rectangular and usually made of No. 16 gauge black steel. Angle iron brackets provide support at each floor and if desired an outlet can extend through roof and a ventilator can be provided at top.

Our double interlocking intake doors (patent applied for) provide positive check against back draught while refuse is being put in chute, and are proof against the tendency to tie fire doors open. They can be opened only by operating lever, and only one door can be opened at a time. It is impossible to open either door by pulling or pushing on door and partial opening of both doors at same time is impossible.

The operating lever controls both doors by a series of interrupted gears — a very simple and positive arrangement.



Paper and Rubbish Chute

These doors make a vestibule of hopper type so that outer door may be opened while rubbish is swept in. Dirt slides down until it rests against inner door. Lever then closes outer door and further stroke of same lever opens inner door allowing sweepings to fall into main chute.

Gears are protected with a sheet steel gear cover.

Service—We employ experienced engineers to advise on layouts in factories, warehouses and distributing plants. Some of the best known architects and engineers in the country avail themselves of this service.

THE LAMSON COMPANY

Builders of Pneumatic, Electrical and Conveyor Apparatus

100 Boylston Street
BOSTON, MASS.

WORKS:
LOWELL, MASS.
TORONTO, CANADA

BRANCH OFFICES

NEW YORK, N. Y., 9-11 East 37th Street
PHILADELPHIA, PA., 210 North Broad Street
PITTSBURGH, PA., 319 Third Avenue
BALTIMORE, MD., Equitable Building
CHICAGO, ILL., 6 North Michigan Avenue
DETROIT, MICH., 525 Woodward Avenue
MINNEAPOLIS, MINN., 320 Tribune Annex
CINCINNATI, OHIO, 119 East 5th Street
INDIANAPOLIS, IND., Washington and Illinois Streets
CLEVELAND, OHIO, 2063 East 4th Street
SAN FRANCISCO, CAL., 617 Mission Street
ST. LOUIS, MO., 709 Pine Street
ROCHESTER, N. Y., 194 East Main Street
ATLANTA, GA., Moore Building
SEATTLE, WASH., 215 Stewart Street
DENVER, COLO., 1622 Arapahoe Street
OMAHA, NEBR., 418 McCague Building
LOS ANGELES, CAL., 221 San Fernando Building
TORONTO, ONT., 136 Simcoe Street
DALLAS, TEX., 905½ Elm Street
VANCOUVER, B. C., W. L. Brown, 104 Empire Building

Products

Conveyors; Chutes; Pneumatic Tubes.

Also manufacturers of Selective Pick-up and Sweep-off Carriers; Automatic Tray Conveyors; Gravity Roller Conveyors; Light Hand Power Elevators and Lifts for carrying papers and materials in industrial plants; Wire Line Cash and Parcel Carriers, Sheet Writers' and Drivers' Bins for carrying cash, sales slips and parcels.

Scope of Use

Used in stores, offices, factories, mercantile plants, libraries, banks, hotels, post offices, etc., for carrying money, papers and materials between departments or buildings.

Co-operative Service

Architects, engineers and contractors are invited to avail themselves of Lamson experience and service.

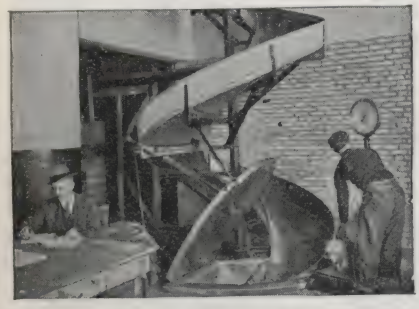
Specialists employed by this company are constantly solving complicated conveying and carrying problems. Full information covering any problem to which Lamson conveyors may be adapted will be gladly furnished.

Lamson Belt Conveyor

Part of complete belt conveyor system for handling merchandise in the wholesale drug warehouse of Lehn & Fink, New York, N. Y. Conveyors simplify and speed up the work of classifying, sorting, and shipping

Lamson Power and Gravity Conveyor

Combination power and gravity conveyor system for loading and unloading freight cars in the Crown, Cork & Seal Co., Baltimore, Md. Lamson heavy duty power conveyor systems carry all kinds of barrels, bags, crates, etc.



Lamson Spiral Gravity Conveyor

This spiral chute is a class of vertical conveyor extensively used in warehouses and industrial plants. Deflectors enable goods to be delivered to any desired floor

Lamson Inclined Power Conveyor

Inclined power conveyor raises boxes of empty bobbins between floors. The gravity spiral in background returns boxes of full bobbins furnishing a continuous operating system between floors

Lamson Pneumatic Tubes

Factory department station of pneumatic tube system for carrying orders, messages, etc. Lamson pneumatic tubes are used for ultra-quick carrying of all papers in practically every industry

LOWERATOR COMPANY, INC.

Manufacturers of Special Conveying Machinery

Lowerator Building, York and Pearl Streets
BROOKLYN, N. Y.

Products

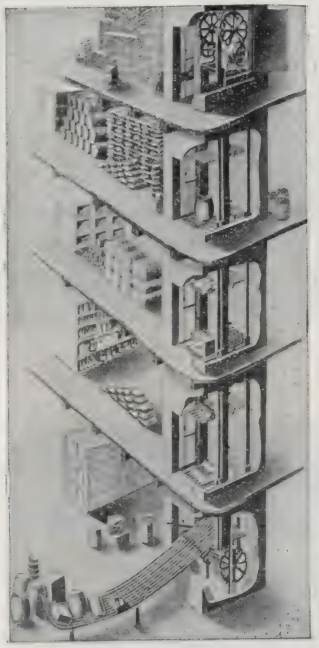
THE LOWERATOR; VERTICAL TRAY ELEVATOR.

Also manufacturers of Basement and Inter-floor Slides; Ice Lowerator; Newspaper Roll Lowerator and Lifts; Automobile Tire Elevating and Lowering Equipment; special designs for Conveying Machines.

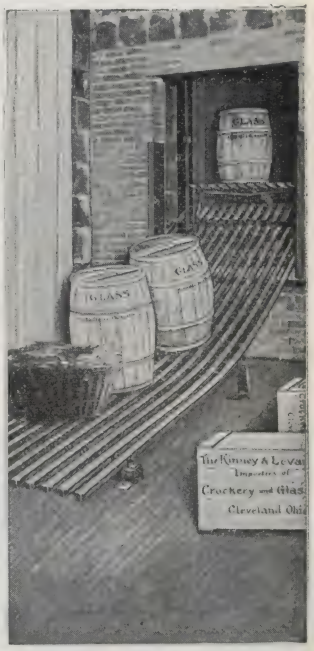
The Lowerator

A patented machine for lowering, by gravity, barrels, boxes, crates, bundles, bales, tote-boxes, etc. Moves goods from any upper to any lower floor without expense for power, operator, or up-keep. Occupies very small space and handles an enormous tonnage per hour. Consists of a series of trays attached to endless steel cables running over sheave wheels.

Used by wholesale houses, warehouses and factories.



STANDARD LOWERATOR



DOES NOT BREAK MERCHANDISE

Vertical Tray Elevator

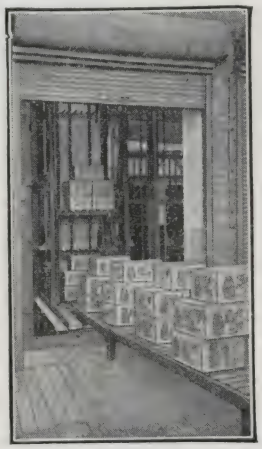
A machine similar in general design to the Lowerator, with the addition of motor and driving mechanism for carrying goods from any lower to any upper floor. Can also be used for down-going merchandise. Push button control at each floor. No operator required. Very desirable where quantity production or movement is required.

Special data on request on other types of machines.

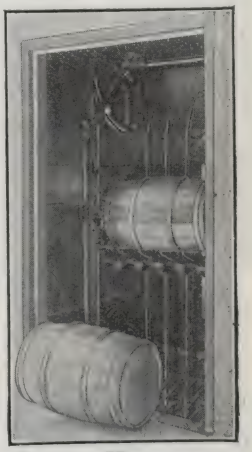
Firms that have used our machines for years report practically no expense for up-keep and no breakage.

List of users in your locality sent on request.

In asking for estimate give distance from floor to floor, and general description of goods to be handled.



CARRYING GLASS JARS TO AN UPPER FLOOR



BARRELS HANDLED ON BILGE OR ON END

DETAILS OF STANDARD LOWERATORS

Machine No.	AA		A		B		C		D	
	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide
Size of shaft required if enclosed, in	84	76	76	60	60	50	54	44	38	30
Size of shaft required if not enclosed, in	84	76	76	54	60	44	54	34	38	26
Size of cars, in	36	48	28	36	24	28	20	24	14	16
Maximum size of package carried, in	42	52	32	38	28	30	24	26	16	18
Cars delivered per minute	4 to 6		6 to 8		6 to 10		8 to 12		10 to 12	
Carrying capacity per car, lbs	800		500		400		200		50	
Carrying capacity of machine, lbs	4,000		3,000		2,000		1,500		600	
Distance between cars, ft	6 to 8		6 to 8		6 to 7		5 to 6		4 to 5	
Speed per minute, ft	60 to 80		60 to 80		60 to 80		60 to 100		60 to 100	
Length of discharge chute, ft	16		16		14		12		10	

DETAILS OF VERTICAL TRAY ELEVATORS FOR UP-GOING MERCHANDISE

Machine No.	18		24		30		35		40		48		54		61	
	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide	Deep	Wide
Size of car, in	10	30	14	36	22	42	24	48	24	54	30	62	30	71	36	71
Maximum size of package carried, in	12	24	16	30	24	36	26	42	30	48	32	56	38	65	48	65
Size of shaft, in	44	61	54	67	68	73	76	80	84	82	99	94	120	128	134	128
Carrying capacity per car, lbs	50		100		200		250		500		1000		1500		1500	
Carrying capacity of machine, lbs	600		1000		1500		2000		3000		4000		5000		6000	
Speed per minute, ft	50 to 60		50 to 60		40 to 60		40 to 60		40 to 50		40 to 50		30 to 40		30 to 40	
Cars delivered per minute	10 to 12		10 to 12		8 to 10		8 to 10		6 to 8		4 to 6		2 to 4		2 to 4	

Width can be reduced or increased to meet special conditions.

SAMUEL OLSON & CO.

Conveying and Elevating Machinery

2418-2426 Bloomingdale Avenue

CHICAGO, ILL.

NEW YORK OFFICE, Fifth Avenue Building

Products

CONVEYING and ELEVATING MACHINERY for handling materials of every description:

Coal and Ash Handling Elevators and Conveyors, Subveyors, Dish Handling Machinery, Packing House Conveyors, Ice Handling Machinery, Spiral Chutes, Spiral Fire Escapes, Gravity and Belt Conveyors, Store and Office Service Conveyors, Automatic and Pivoted Tray Elevators, Steel and Wood Apron Conveyors.

Power Transmission Machinery, Flour Blenders and Patented Automatic Proofers for Bakeries.

HYDROX CO. (CHICAGO, ILL.) INSTALLATION

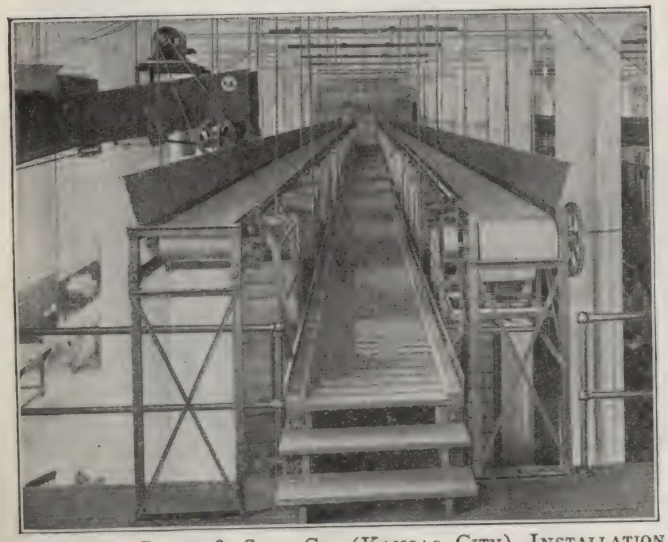
The apron conveyor illustrated is but one of seven conveyor units installed in this plant

WASHBURN-CROSBY CO. INSTALLATION

This system loads cars at the rate of seventeen hundred 196-lb. sacks per hour

AMERICAN CAN CO. (MAYWOOD, ILL.) INSTALLATION

Complete conveying system for handling packing boxes and packed boxes



NATIONAL CLOAK & SUIT CO. (KANSAS CITY) INSTALLATION

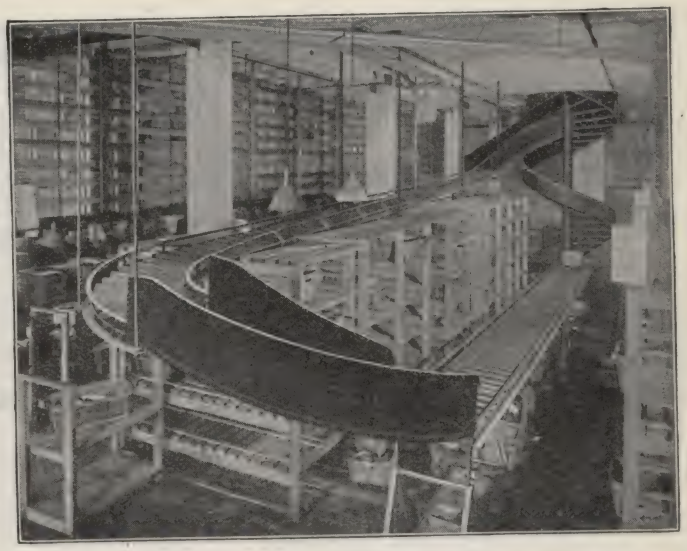
SAMUEL OLSEN & CO. completely equipped this plant with an elaborate conveying and elevating system

Olson Machinery Is Correctly Designed

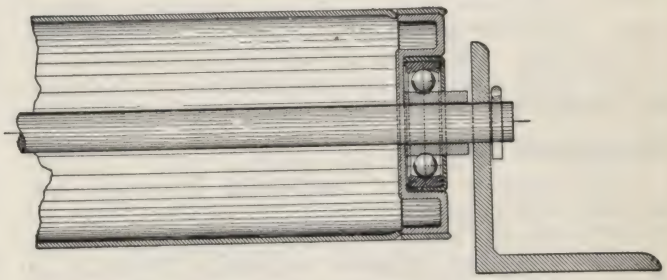
SAMUEL OLSON & CO. make a specialty of designing, manufacturing and completely installing conveying and elevating systems for individual requirements. A conveying system to be efficient must be designed to conform with requirements. This necessitates a thorough analysis of the handling problem. This service is embodied in all equipment manufactured by this company.

Continued on next page

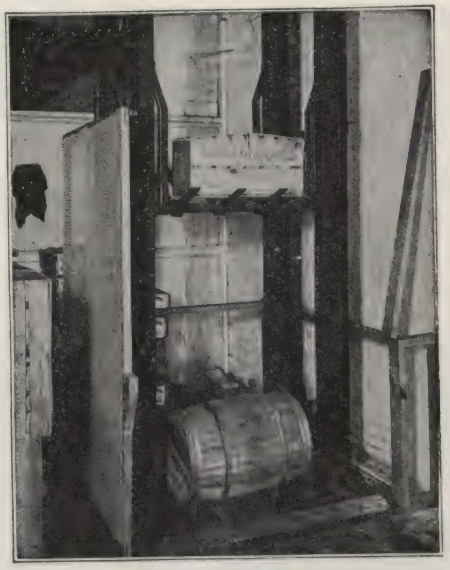
PATENTED AUTOMATIC ELEVATOR
The dominating feature of this elevator is that it is possible to unload on the elevating side



GRAVITY CONVEYOR SYSTEM
Part of a conveying system installed in one of the largest wholesale drug houses



SECTION OF OLSON GRAVITY CONVEYOR ROLLER
Note ball bearing is a separate unit inserted in steel housing. Easily removed. Ball bearing has ground tempered steel race and bushing



PIVOTED TRAY ELEVATOR
The logical equipment where exceptionally heavy or bulky merchandise is to be elevated

SPIRAL CHUTE
A complete line of spiral chutes is manufactured

Co-operative Service

Architects should use the vast experience of SAMUEL OLSON & Co. in the solving of intricate handling problems. The engineering department is ever ready to place at the architect's service experts in this line.

Previous to making final decision as to any type of conveying machinery, consult this company. Recommendations particularly adapted for exact conditions will be supplied.

ESTABLISHED 1909

STANDARD CARRIER COMPANY

ESTIMATING DEPARTMENT
112 East 41st Street
NEW YORK, N. Y.

FACTORY
PLANTSVILLE, CONN.

BRANCH OFFICES
BOSTON LOS ANGELES PITTSBURGH

Products

High grade CONVEYING SYSTEMS which include: Pneumatic Dispatch Tube Systems, Belt Operated Cash Desks, Belt Conveyors, Wire Line Cash and Package Carriers, Cable Carriers, Selective Delivery Tray Conveyors, Sweep-off and Pick-up Carriers, Hand Power and Push Button Light Lifts.

For Electric Dumbwaiters, see page 1994.

Uses

Standard carrier systems are extensively used in offices, stores, factories, banks, libraries, post offices, etc., for the conveyance of papers, money and merchandise between floors, departments and buildings.

Design

All our systems have been designed and developed under the personal supervision of carrier men of many years' experience in manufacturing and installing carrier systems. The result is the best possible system; easy to install and maintain, and economical in both cost and operation.

Co-operative Service

The services of the engineering department are available to architects and engineers without charge or obligation of any kind.

For estimating purposes, we need a floor plan or diagram, locating the points to be served, story elevations, voltage, etc., available for power and the maximum size and number of papers or materials to be conveyed in one container.

Guarantee

Every endeavor has been made to fully meet the most exacting conditions to which any and all parts of the Standard systems are subjected; and they are backed by liberal guarantees, made by a responsible and financially strong company.

Types

We manufacture every known type of carrier system suitable for mechanical messenger work within and between buildings. This enables us to select the type best suited to the customer's requirements.

Belt Operated Cash Desk

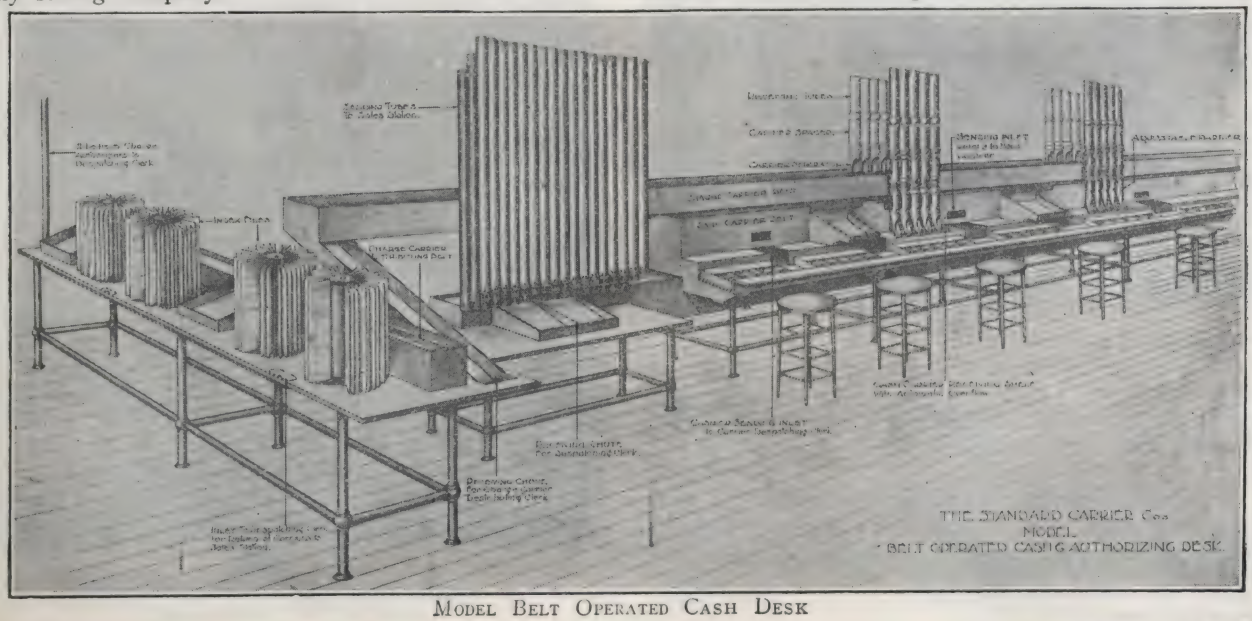
Belt operated cash desks are designed for use in connection with any type of pneumatic tube carrier systems in stores doing both, or either, a charge and cash business. By means of this desk, charge and cash carriers coming from the sales stations are automatically and rapidly distributed to the credit office and cashiers respectively. Provision is made for sending special transactions to the head cashier for reference. From the cashiers' and credit offices the carriers are sent to the dispatching clerk who returns them to their respective sales stations.

This desk is flexible—few or many cashiers can operate at one time. Cashiers are automatically supplied with carriers to their capacity. They can not become overloaded, the surplus carriers, during rush hours, being carried on to the reserve receiving chutes where they are taken care of by additional cashiers. Cash service is speeded up and customers are promptly served. Cash and charge control are centralized.

Pneumatic Tube Carrier Systems

Standard pneumatic tube carrier systems are designed for the rapid transmission, in cylindrical carriers, of money, messages or papers between different points in buildings or between buildings. Made in various sizes and types as follows:

Double Tube Vacuum Circuit—Requires a double tube from central station to each substation. An exhauster creates a partial vacuum in a drum at central station. The transit tube is connected to this drum. Suction thus created in transit tubes is sufficient to transmit carriers. Air pressure used varies from ¾ to



MODEL BELT OPERATED CASH DESK

Continued on next page

1½ lbs. below atmospheric, depending on service requirements. This type permits the simultaneous despatch of carriers from both ends of the line.

Vacuum Pressure Air Circuit—Both inlet (suction) and discharge (pressure) sides of a blower are connected to the transit tubes. Air pressure is used to send carriers from central station to substation, and suction draws carriers from substation. A separate tube is required for sending carriers to each substation, but one return tube serves several stations. Carriers may be despatched from substations at will, and can be arranged either for despatch from central station through only one tube at a time in each group, or to permit despatch of carriers without restriction. The first method is less expensive and is suitable for small stores; the other is suitable for all but the largest department stores. May be operated by a 1-lb. blower.

Combination Vacuum Circuit—Similar to double tube vacuum circuit except that two or more substations may be connected on one circuit. A separate sending tube from the station is required for each substation, and a common return tube serves several stations. Carriers may be despatched simultaneously from all substations but can be despatched from central station to only one station in the circuit at a time. Operates best with but two substations. Suitable where intermediate substation is located close to central station.

Single Tube Pressure System—Has only one transit tube through which carriers may be despatched in either direction. Air under a pressure of about 30 to 40 lbs. is piped to all pneumatic tube terminals in the system. Doors at ends of tube are normally open. Closing door after carrier is placed in tube automatically turns on air, which flows through a pressure reducing valve and blows carrier through tube. A timing device opens door and shuts off air when carrier leaves tube.

Particularly suitable for long lines and in buildings where compressed air is required for other purposes.

Direct Pressure System—Similar to single tube pressure system except that air is supplied by a continuously running low pressure blower and no reducing valves are used. Suitable for small installations.

Foot Power Pneumatic Tubes—Consists of a single tube with cabinet containing foot operated bellows at each station. Air flow is established by bellows. Suitable for use between points not over 150 ft. apart.

Sizes of Tubes and Carriers—Accompanying table shows sizes in which Standard pneumatic tube systems are made, with corresponding size of carrier.

PNEUMATIC TUBE CARRIERS

Tube size, in.	Inside carrier diameter, in.	Maximum inside carrier length, in.
1¾ round	⅞	5
2¼ round	1⅝	10
3 round	1⅞	12
4 round	2⅞	14
5 round	3⅞	15
3 x 6 oval	1¾ x 4¾	12
4 x 7 oval	2¾ x 5¾	14

Varying lengths of carriers can be used in the same system. Bends must be provided to fit the longest carrier used.

Wire Line Carriers

A two-wire system for transmitting cash, messages or packages. Operates over a wire track by means of a pull at each end. Made to meet the most exacting conditions.

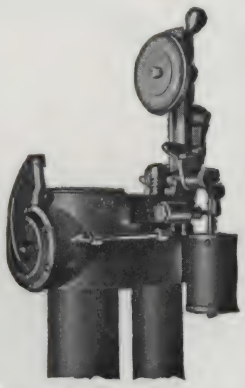
Office Lifts

For carrying papers and small parcels between floors of buildings. Made in single or double car types. Cars or baskets furnished in any desired size.

References

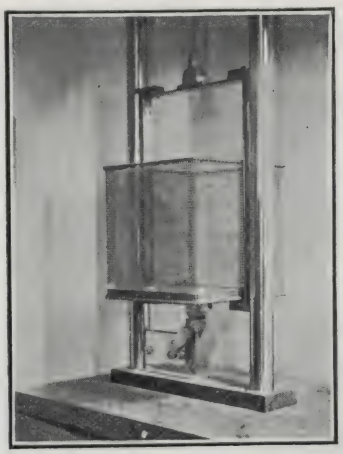
We refer to any user or purchaser of our carrier equipment, among them the following:

Abell, Smalley & Myers, Equipment Specialists, New York, N. Y.
Ambassador Hotel, New York, N. Y.
Benjamin W. Morris, Architect, New York, N. Y.
Buckeye Steel Castings Co., Columbus, Ohio
Cambria Steel Co., Johnstown, Pa.
Charles E. Knox Associates, Engineers, New York, N. Y.
Cunard Steamship Co., New York, N. Y.
Darling & Pearson, Architects, Toronto, Ont.
D. Everett Waid, Architect, New York, N. Y.
Dickson-Ives Co., Orlando, Fla.
Dominion Bank, Toronto, Ont.
Equitable Trust Co., 45th Street, New York, N. Y.
Federal Reserve Bank, Cleveland, Ohio
Geo. A. Fuller Co., Builders, New York, N. Y.
Geo. B. Post & Sons, Architects, New York, N. Y.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Kaufmann Department Stores, Inc., Pittsburgh, Pa.
Marc Eidlitz & Son, Builders, New York, N. Y.
Metropolitan Life Insurance Co., New York, N. Y.
Packard Motor Car Co., Chicago, Ill.
Phoenix Mutual Life Insurance Co., Hartford, Conn.
Providence Biltmore Hotel, Providence, R. I.
R. H. Macy & Co., New York, N. Y.
Ritz-Carlton Hotel, Atlantic City, N. J.
Robert D. Kohn, Architect, New York, N. Y.
Rochester Trust & Safe Deposit Co., Rochester, N. Y.
Sun Life Assurance Co., Montreal, Que.
Thompson-Starrett Co., Builders, New York, N. Y.
Travelers Insurance Co., New York, N. Y.



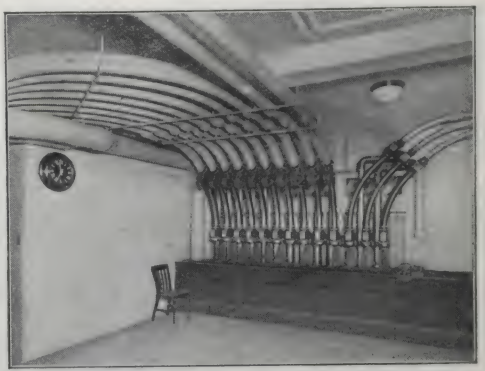
SINGLE TUBE PRESSURE TERMINAL

For high or low pressures, long or short lines



OFFICE LIFTS

Single car or double car with polished brass guides supported either from the floor or a desk top. Basket sizes to suit



PNEUMATIC TUBE CENTRAL STATION (OVAL TUBES)

Carriers in which papers, parts, etc., are dispatched are equipped with addressing dials to indicate the destination of the contents. The central station attendant notes the address and dispatches the carrier through the proper tube

STANDARD CONVEYOR COMPANY

Pneumatic Tube Systems, Conveyors

NORTH ST. PAUL, MINN.

BRANCH OFFICES

CHICAGO, ILL., 549 West Washington Street
MILWAUKEE, WIS., 606 Security Building
NEW YORK, N. Y., 227 Fulton Street
BOSTON, MASS., 113 State Street
CLEVELAND, OHIO, 225 Electric Building

Products

CONVEYING SYSTEMS: Power, Gravity and Pneumatic for Merchandise, Cash, Orders and Messages, for all industries.

PNEUMATIC TUBE SYSTEMS.

CONVEYORS: Gravity Roller Conveyors, Spiral Chutes, Power Automatic Elevators, Belt Conveyors, Chain Slat Conveyors.

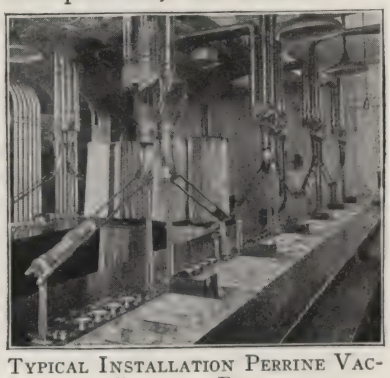
Also Portable Conveyors, Spiral Fire Escapes, Wire Line Cash Carriers, Cash and Message Lifts.

Pneumatic Tube Systems

The addition to the STANDARD CONVEYOR COMPANY'S line of labor saving indoor transportation systems, of the well established line of pneumatic tubes and silent messenger equipment formerly manufactured by the Perrine Store Service Co., Minneapolis, puts *Standard Service* in a distinctive class.

Every labor-time-saving conveyor or mechanical device required for the rapid indoor transportation of merchandise, written orders, cash or messages, is included in *Standard Service*.

Types—*Vacuum*—Independent, twin tube line for each substation. Operated by low pressure, positive exhauster or centrifugal exhauster.

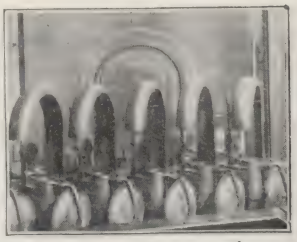


TYPICAL INSTALLATION PERRINE VACUUM PRESSURE PNEUMATIC TUBE SYSTEM

Vacuum Pressure—Vacuum incoming lines serving 3 to 6 substations each. Pressure outgoing line to each substation. Operated either by 1 or 2 low pressure, positive blowers or centrifugal compressors.

Automatic Pressure—Single tube for service in both directions between various stations. Equipped at each end with terminal, which automatically maintains air flow only while carrier is in transit. Operated on a 1-lb. air pressure from special blower unit or by air reduced from high pressure air service.

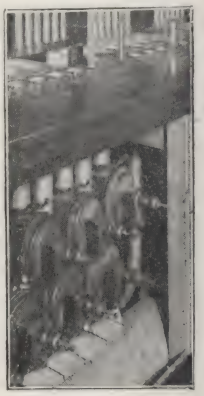
Foot Power—Single tube for service in both directions between stations, with foot power operated compressor at each end. For light service and distances not exceeding 200 ft.



TERMINALS PERRINE AUTOMATIC PRESSURE PNEUMATIC TUBE SYSTEM

Sizes of Tubes—2¼-, 3- and 4-in. outside diameter tubing, and 3x6-in. and 4x7-in. oval tubing; except foot power, which is 2¼- and 3-in. outside diameter tubing only.

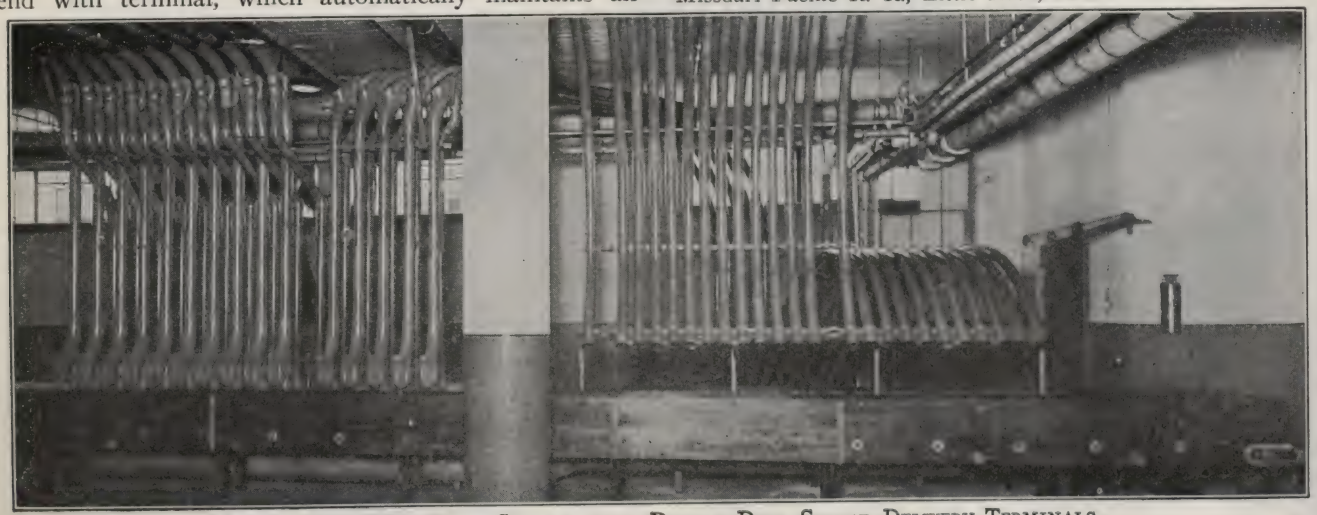
Power Saving Devices—For automatically cutting off air flow through the tubes when the carriers are not in transit. For both vacuum and pressure systems. They are extremely simple in construction, most effective and efficient in operation; require the minimum of attention.



PERRINE POWER SAVING DEVICES

Installations—A few of many installations of Perrine Tube Systems are as follows:

Armour & Co., South St. Paul, Minn.
Swift & Co., South St. Paul, Minn.
Swift & Co., Chicago, Ill.
Swift & Co., Los Angeles, Cal.
Morris & Co., Chicago, Ill.
Drake Hotel, Chicago, Ill.
Hotel Cleveland, Cleveland, Ohio
Washburn-Crosby Co., Minneapolis, Minn.
Powers Mercantile Co., Minneapolis, Minn.
E. E. Atkinson & Co., Minneapolis, Minn.
Minneapolis Journal, Minneapolis, Minn.
Minneapolis Daily News, Minneapolis, Minn.
The Golden Rule, St. Paul, Minn.
Schuneman & Evans, St. Paul, Minn.
Montgomery Ward & Co., St. Paul, Minn.
Missouri Pacific R. R., Little Rock, Ark.



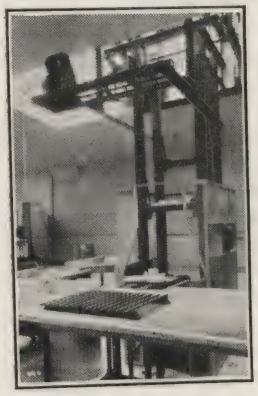
4-INCH PNEUMATIC TUBE SYSTEM WITH DOUBLE DOOR SILENT DELIVERY TERMINALS
Central Station, Montgomery Ward & Co., St. Paul, Minn.

Continued on next page

STANDARD INCLINED ELEVATOR FOR BOXED AND CASED GOODS

Indoor Conveying Systems

Utility—Standard indoor transportation systems offer a practical and economical solution of almost any handling problem. They are built on the unit plan and therefore are remarkably flexible in application.



DISH TRAY ELEVATOR

Standard conveying equipment is used extensively in the following industries: Bottling plants, creameries, canneries, packing houses, flour mills, bakeries, boot and shoe factories, automobile and machinery manufacturing and assembling plants, foundries, textile mills, paper and pulp mills, newspaper offices and publishing houses, warehouses, wholesale grocery, drug and hardware concerns, department stores, mail order houses—in fact, almost every line of industry is served by these versatile conveyors.

Gravity Roller Conveyors—Stationary or portable gravity roller conveyors are built in standard 10-ft. sections, and in special lengths when required.

The rollers are of steel tubing, maple or cast iron, and operate on substantial yet sensitive stud-type ball bearings. The bearing stud is of the very best cold rolled shafting, around which the steel balls revolve in a ball race of case hardened steel.

Spiral Chutes—The wings of a Standard spiral chute are pressed to shape and are joined by downward bent flanges, leaving a runway free of bolts or projections of any kind. The pitch of the chute is accurately determined to give proper speed to the load. Unit construction, automatic fire doors, and intermediate diverters are outstanding features.

Slat Conveyors—Standard slat conveyors are designed to fit the requirements of each installation. The steel or hard maple slats of the moving platform are attached to roller type steel chain of size and weight suitable to the purpose of the construction.

Elevators—The straight lift elevator is continuous in operation, is automatically loaded and discharged, and has a detector device insuring safe unloading.

The inclined elevator automatically receives, elevates and discharges boxed and cased goods from and to connecting lines of gravity conveyor.

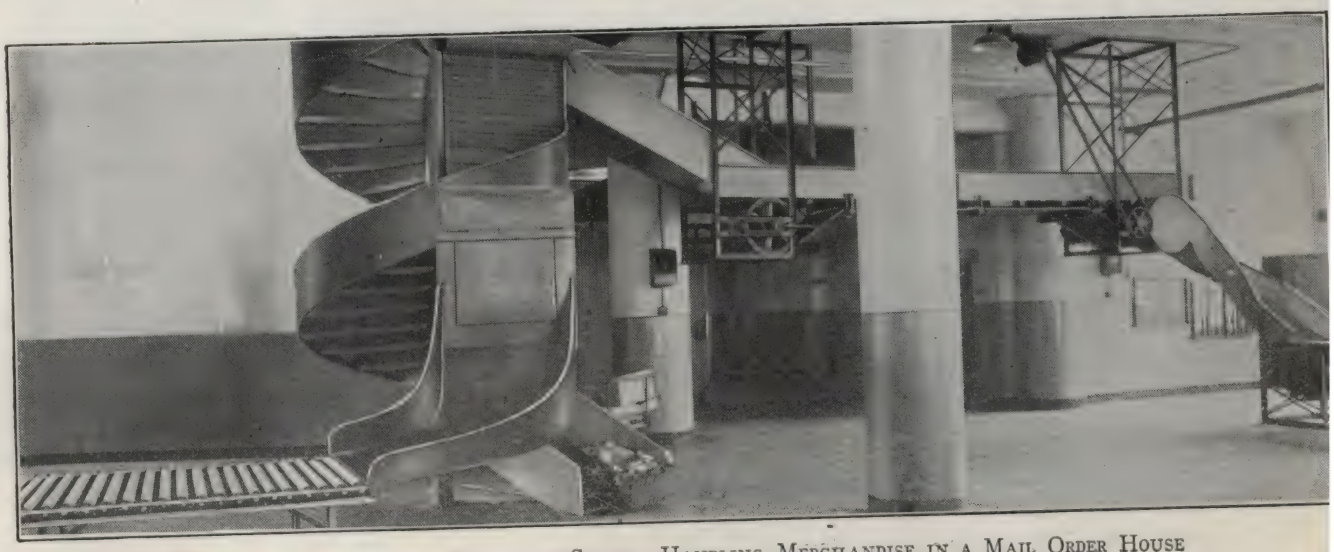
Belt Conveyors—The belt conveyor is constructed to eliminate all drag and reduce friction to a minimum.

Service

The company's engineers will examine your handling problem and assist in planning a practical, efficient conveying system.

This service incurs no obligation.

STANDARD BELT CONVEYOR CARRYING LAP CRADLES IN TEXTILE MILL



STANDARD COMBINATION CONVEYING SYSTEM HANDLING MERCHANDISE IN A MAIL ORDER HOUSE

ATLAS DEVICES CO., INC.

Pneumatic Tube Systems and Devices

TELEPHONE
STERLING 4687, 5432

270 Wyckoff Street
BROOKLYN, N. Y.

Products

PNEUMATIC TUBE SYSTEMS: Complete installations, alterations and supplies of all kinds.

POWER CONTROLS for application to any existing pneumatic tube system.

ATLAS DEVICES CO INC
TRADE-MARK

Pneumatic Tube Systems

This company has specialized in the installation of vacuum tube systems for department stores, industrial plants, banks and hotels. The illustration below, (taken in a New York store) shows the most modern type of tube center for retail stores.

Note that all incoming carriers are delivered by chutes at the receiving station to one operator, who sorts and sends them through short *tubes* to their destination —cashiers, charge authorizers, head cashier, etc. After proper handling at these desks, each carrier is dropped into a convenient tube, sent to the dispatching station and there returned to the outlying sales station. In this installation both receiving and dispatching are done by the same operator, without moving her seat. On larger systems more operators can be added when required. Note particularly the convenient arrangement of tubes at the dispatching station. On large systems, as many as 150 lines can be reached by *one* operator without moving her seat.

This tube room re-arrangement, while eliminating moving belts and troublesome mechanical separators for carriers, has secured the following results as compared with the original system:

50% reduction in floor space.
50% reduction in tube room personnel.
Immeasurably improved service.

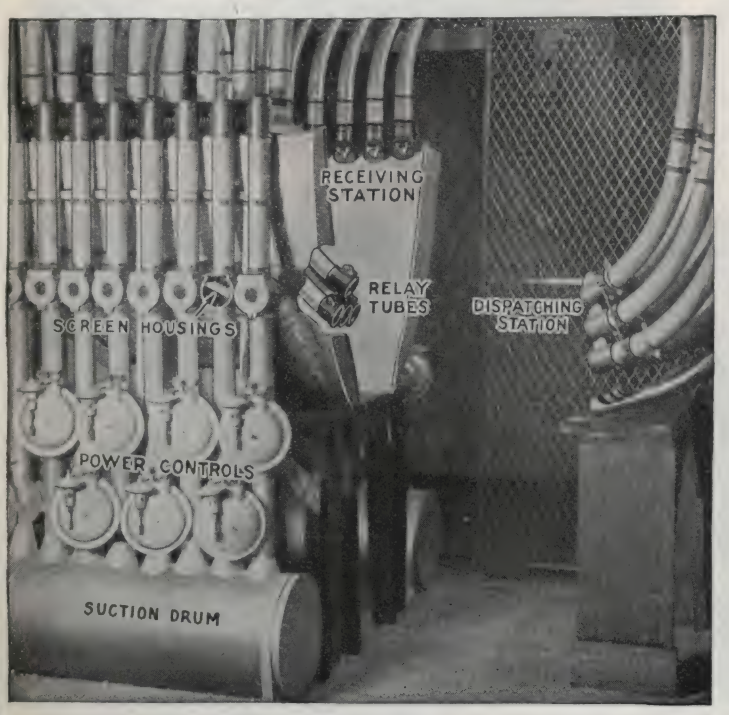
Atlas Self-regulating Power Control for Pneumatic Tubes

This is the most important development in the pneumatic tube art in recent years. It is *self-regulating,* and does away entirely with timing elements, electrical contacts, and doors over bell-mouth sends. The mere insertion or discharge of the carrier itself opens or closes this control. This device not only shuts off the power immediately upon delivery of the carrier, but it *actually regulates at all times* the *flow of air* in the line, and consequently *carrier speed.*

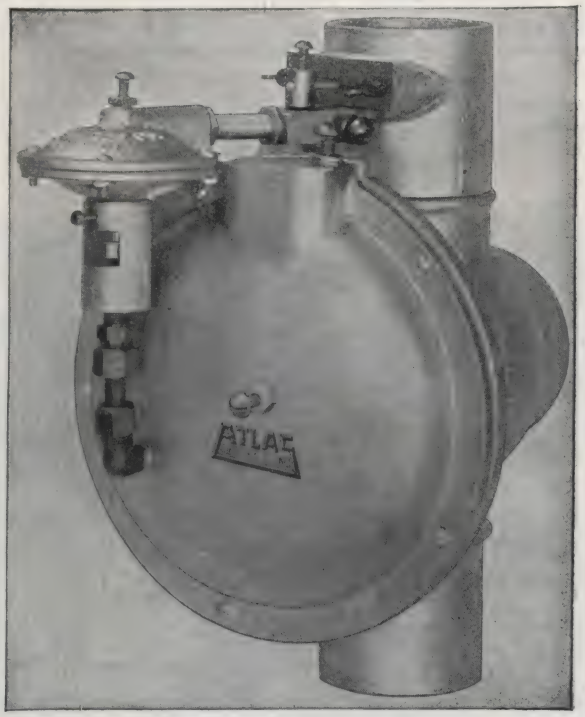
Atlas power controls offer all of the advantages of an "open" system, yet the saving in power is enormous. By actual meter readings in the largest stores and banks in the country, the saving by the use of Atlas controls has ranged from 25% to 75% of power used by other systems or types of control. There are well-known installations in many parts of the country.

Secure an Atlas Proposal

When laying out any pneumatic tube work, secure an Atlas proposal, to be sure of the most efficient equipment, occupying the smallest possible floor space.



ATLAS TUBE CENTER FOR RETAIL STORES



SELF-REGULATING POWER CONTROL

ESTABLISHED 1866

GILLIS & GEOGHEGAN

Manufacturers of Telescopic Hoists

TELEPHONE
SPRING 7801

542 West Broadway
NEW YORK, N. Y.

LIST OF AGENCIES IN THE UNITED STATES

ALBANY, N. Y., ALBANY BUILDERS SUPPLY CO., N. Y. C. Avenue and Manning Boulevard
ATLANTA, GA., H. R. HUFFMAN, Healey Building
BALTIMORE, MD., EASTERN SALES CO., 15 East Fayette Street
BILLINGS, MONT., FRANK RICHARDSON, Electrical Building
BIRMINGHAM, ALA., JOHN D. TURNER CO., Jefferson Bank Building
BOSTON, MASS., see New Haven, Conn.
BUFFALO, N. Y., JONES IRON WORKS, 312 Terrace Street
CHARLOTTE, N. C., M. C. THOMPSON CO., 108 Latta Arcade
CHICAGO, ILL., KAUFMAN & BRODT, 455 Peoples Gas Building
CINCINNATI, OHIO, A. W. FRANK, 209 Gerke Building
CLEVELAND, OHIO, R. L. QUEISSER CO., Schofield Building
COLUMBUS, OHIO, R. L. WATSON CO., 51 Columbia Building
DALLAS, TEX., R. J. DE WESS CO., 605 Slaughter Building
DENVER, COLO., HOWARD H. FIELDING, 815 Boston Building
DES MOINES, IOWA, PRESTON DANIELS, Hubbell Building
DETROIT, MICH., KENNEDY & DAWSON, 816 Penobscot Building
EL PASO, TEX., NEFF STILES CO.
HUNTINGTON, W. VA., J. J. WEILER, Robson-Pritchard Building
INDIANAPOLIS, IND., GEORGE MORING, 1130 Hume Mansur Building
KANSAS CITY, MO., R. O. SMITH, 214 Massachusetts Building
KNOXVILLE, TENN., C. M. ALLEN CO., 407 Bank & Trust Building
LOUISVILLE, KY., R. B. TYLER CO., INC., 114 South 4th Street
MEMPHIS, TENN., AKERS & CO., INC., 225 Madison Avenue
MILWAUKEE, WIS., PHILLIP GROSS HARDWARE CO., 218 Third Street
MINNEAPOLIS, MINN., MORGAN-GERRISH CO., 501 South 6th Street
NASHVILLE, TENN., E. T. KIRKPATRICK & CO., 67 Arcade Building
NEW HAVEN, CONN., WARNER-MILLER CO., Railroad Avenue and St. John Street (for New England States)
NEW ORLEANS, LA., J. T. MANN & CO., 308 Tchoupitoulas Street
OMAHA, NEBR., F. H. TURNEY & CO., 707 South 27th Street
PHILADELPHIA, PA., W. G. CULBERT, 1503 Sansom Street
PITTSBURGH, PA., JAMES R. PITCAIRN, 413 Fourth Avenue
RICHMOND, VA., J. S. ARCHER, 22 North 9th Street; also at NORFOLK and ROANOKE, VA.
ROCHESTER, N. Y., BUILDING SPECIALTIES CO., 61 Mill Street
SALT LAKE CITY, UTAH, M. E. MIHILLS & CO., 924 Kearns Building
SEATTLE, WASH., S. W. R. DALLY, 332 Pioneer Building
ST. LOUIS, MO., REINFORCED CONCRETE CO., 1532 Arcade Building
SYRACUSE, N. Y., H. L. WATERMAN, INC., 904 Canal Street
TOLEDO, OHIO, see Detroit, Mich.
UTICA, N. Y., AMERICAN HARD WALL PLASTER CO.

Products

Equipment for handling ashes, rubbish and other materials between floors, consisting of several models of HOISTS and other articles as follows:

MODEL E HOIST operated by Electric Motor, with Automatic Stop and Gravity Lowering Device.

MODEL D OVERHEAD CRANE HOIST, with Electric Motor in cellar.

MODEL C HOIST, with Electric Motor in cellar.

MODEL B OVERHEAD CRANE HAND POWER HOIST, with Automatic Gear Shifting Brake Device and Silencer.

The G&G ELECTRIC Telescopic Hoist With Automatic Stop and Gravity Lowering Device

The G&G Telescopic Hoist with Automatic Gear Shifting Brake Device and Silencer

TRADE-MARKS

MODEL A HAND POWER HOIST, with Automatic Gear Shifting Brake Device and Silencer.

G&G Flush Watertight Sidewalk Doors (checkered steel or vault light).

G&G Automatic Sidewalk Door Opening and Closing Device.

G&G Spring Guard Gates.

G&G Swing Bail Ash Cans.

G&G Operator's Ladder.

G&G Electric Warning Bell.

G&G Ash Can Truck.

Note

It is recommended that *complete* G&G equipment

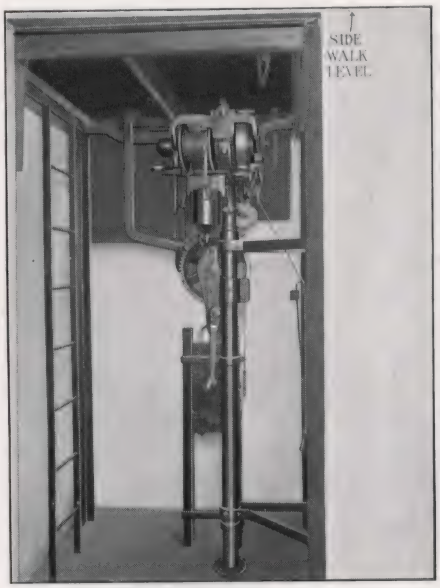


FIG. 1. MODEL E HOIST (ELECTRIC) WHEN NOT IN USE

Hoist telescopes, and no part shows above street level. Sidewalk doors close down flush with pavement, and lock automatically

FIG. 2. MODEL E HOIST (ELECTRIC) IN OPERATION

Hoisting head revolves on ball bearings to deposit can on sidewalk without lifting. Can pushes gate open and gate springs shut after can has cleared it

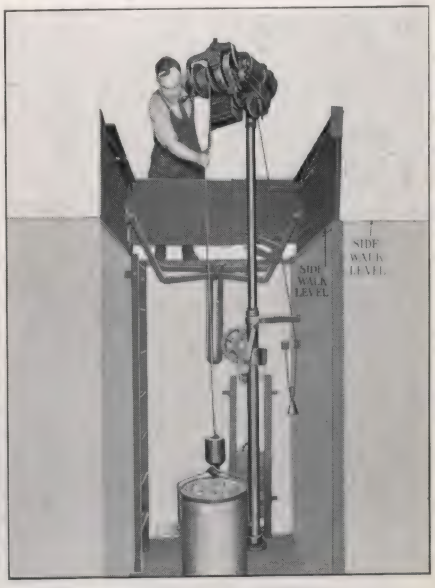


FIG. 3. MODEL E HOIST (ELECTRIC) OPERATED BY ONE MAN

After placing swing bail cans in area, operator ascends ladder and completes removal from grade. One man unaided, can hook and raise electrically filled cans without leaving sidewalk

Continued on next page

be installed as a unit, but if desired, any part or parts thereof can be furnished separately.

Where the sidewalk opening is so located that the building wall does not afford protection when doors are opened, an additional set of spring guard gates can be installed to completely safeguard hoistway (Fig. 5).

Uses

G&G telescopic hoists with complete equipment are designed for lifting and lowering loads up to 500 lbs. in industrial plants, and for ash removal in office buildings, schools, factories, etc. G&G hoist equipment complies with all municipal ordinances. Can be operated in the coldest weather, as no parts are susceptible to freezing.

Model E Telescopic Hoist with Electric Motor

The G&G Model E telescopic hoist with complete equipment affords a simple, safe and economical method for hoisting and lowering between cellar and sidewalk or between floors, such loads as ashes, rubbish, bags, bales, barrels, coal, garbage, ice, auto tires, etc. Fig. 1 shows hoist equipment as installed for ash removal. When not in use no part of hoist shows above sidewalk. A few turns of telescoping handle raises hoisting head to proper position over hoistway (Fig. 2). Operator then ascends to sidewalk level by the iron ladder, and proceeds to raise the cans. Hoisting head revolves on ball bearings, depositing can, without lifting, on sidewalk. Cans are lowered very rapidly by gravity, thus saving electric current. Electric control lever has three positions, and automatically returns to "neutral" when pressure is released. At one extreme, load is raised by electric power; at the other extreme, load is lowered by gravity; and in center position, load is brought to an instant stop.

Advantages—One man, unaided, can operate hoist (Fig. 8). Hoist raises 500-lb. load at a speed of 60 ft. per minute. The hoist equipment is compact and very easy to erect. We furnish all necessary clamps and bolts, and blue print showing, in detail, how to erect.

The sidewalk doors and gates make open hoistway absolutely safe for operator and pedestrian.

Construction—The strongest and most durable materials are used. Hoisting head is steel cast. Steel cable is non-rotating. All gears are machine cut. Every hoist is subjected to thorough working test before shipment. All hoists are given factory coat of paint before shipment.

Motor—Hoist has a 1½ h.p. A.C. or D.C. totally enclosed motor with brake, automatic upper limit, and single speed controller. Current is only consumed when hoisting. The apparatus is dustproof and moistureproof, lubrication being effected throughout by means of grease forced through compression cups.

Factor of Safety—No part has a factor of safety of less than 8, based on the ultimate strength of the materials when the maximum load of 500 lbs. is raised.

Prices—Governed by distance of lift and type of current available and can therefore only be furnished on specific request. See page 2009 for prices on sidewalk doors.

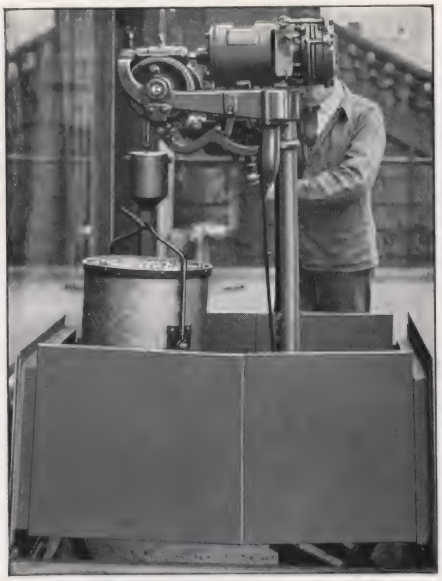


Fig. 5. Model E Hoist with Complete Equipment as Installed at Jay Thorpe Building, 57th Street Near Fifth Avenue, New York

Buchman & Kahn, Architects

Note the double set of spring guard gates to meet a special condition when the sidewalk doors open toward the building and the curb

How to Specify—See page 2014.

Size of Area—We strongly recommend that area be made 4x4 ft. in size for all models. This gives the operator room enough to do his work. If necessary, a smaller or larger area may be provided, but it is not as practical.

G&G Automatic Sidewalk Door Opening and Closing Device with Spring Guard Gate

This device is illustrated in connection with Model E hoist, but may also be used in connection with Models A, B, C and D. Device operates automatically when telescoping handle of hoist is revolved. Sidewalk doors open and close as hoisting head is raised or lowered. A counterweight is provided so that telescoping handle works smoothly and easily. A weatherproof warning bell is provided to operate while doors are opening and closing.

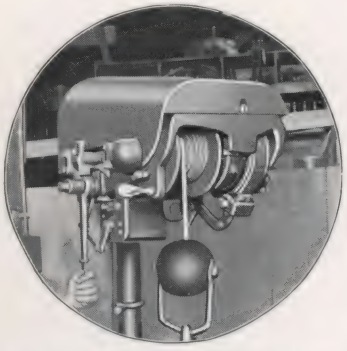


Fig. 4. Model E Hoisting Head

Control level in neutral position and brakes set. Backward movement of lever starts motor and raises load. Forward movement lowers load by gravity. When hand is removed from lever, it automatically comes to neutral position and sets brakes

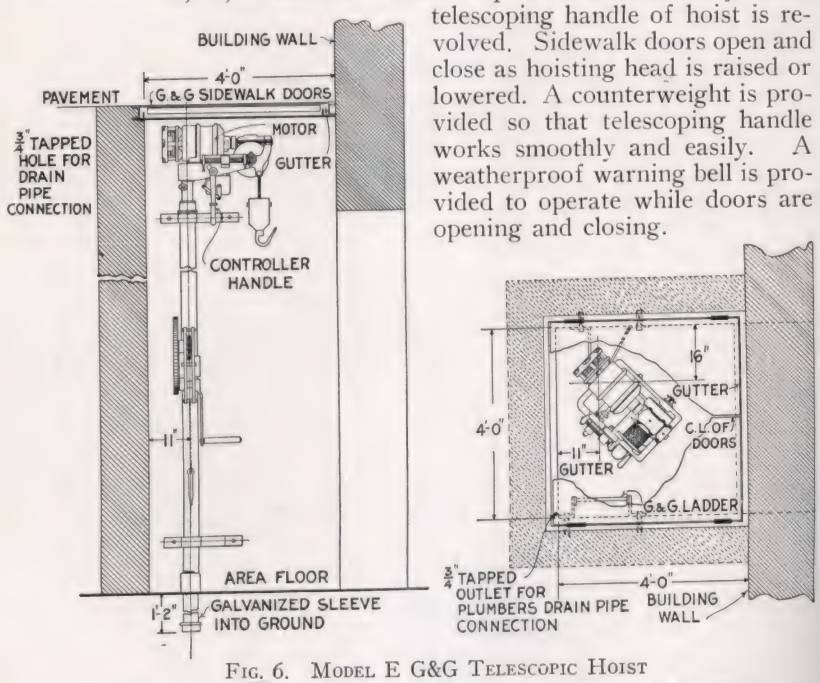


Fig. 6. Model E G&G Telescopic Hoist

Elevation and plan in standard 4x4-ft. area (large enough for all models). Scale, ¼ in. = 1 ft. Copy this on your tracing.

Continued on next page

An important feature is the *self-locking doors, whether open or closed.*

The spring guard gate automatically closes up the opening, at the sidewalk level, between the wide opened sidewalk doors.

The gate *can not be swung inward; swings outward only,* to permit passage of ash can, thus protecting pedestrians and the operator.

G&G swing bail cans are necessary if hoist is to be operated by one man.

Steel sidewalk doors, entire surface checkered or with vault lights, close flush with surface of sidewalk. Equipped with flush bronze hinges, and wrought steel frame with extra deep gutter.

Automatic door opening and closing device and sidewalk doors, with automatic spring guard gates, shipped with hoist to any part of the world. Blue print is furnished, showing how to erect. We subject each hoist, door opening and closing device with spring guard gate, and sidewalk doors to a thorough working test before shipment. For this reason, and also because it makes for ease of installation at the building, *this company prefers to furnish its own sidewalk doors with each hoist and opening and closing device.*

Prices—Furnished on request, and are based on distance between area floor and sidewalk of not exceeding 15 ft., and standard 4x4 ft. sidewalk opening. When distance is greater, or opening is not standard, this should be stated when requesting prices.

Model D Overhead Crane Hoist with Electric Motor in Cellar (Two-man Model)

G&G telescopic overhead crane hoist, Model D, with complete equipment, operates electrically (Fig. 7), and is for use in large buildings where the grade level approach permits wagons to drive up alongside of the hoistway leading to cellar or boiler room. When not in use, no part of hoist shows above sidewalk.

Raises maximum load of 300 lbs. at an actual speed of 60 ft. per minute. The can illustrated in Fig. 7 weighs about 175 lbs. when filled with ashes. This model can also be constructed for maximum working capacity of 500 lbs.

Motor—Hoist has a 1½ h.p. series wound for direct current, squirrel cage for alternating current, totally enclosed motor with magnetic service brake, mechanical load brake, automatic upper and lower carbon point limits, and single speed controller giving one hoisting and one lowering speed. Cable is non-rotating. The apparatus is dustproof and moistureproof, lubrication being effected throughout by means of grease forced through compression cups.

Hoist is so arranged that the operator may raise ash can from cellar into position 6 or 7 ft. above grade, and empty can directly into wagon or truck without rehandling at grade level. Because of

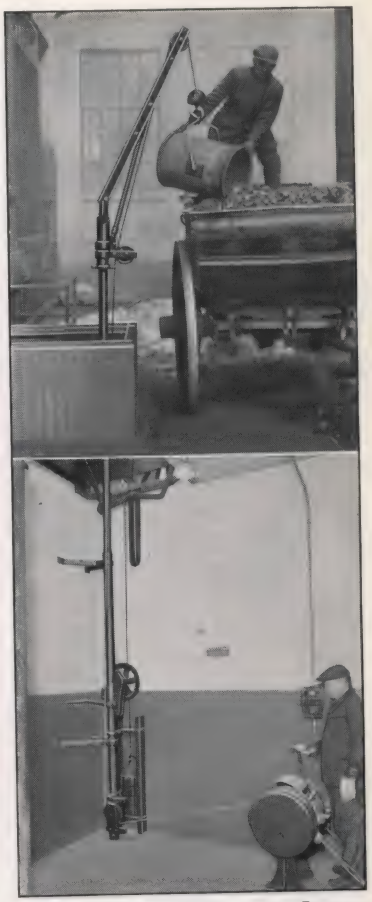
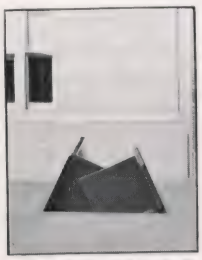


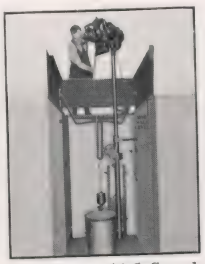
FIG. 7. MODEL D HOIST IN OPERATION, MERGENTHALER LINOTYPE CO., BROOKLYN, N. Y.
FOUGNER ENGINEERING CO., Engineers
When can is being raised, automatic upper limit shuts off power. Overhead crane revolves on ball bearings to swing can over wagon

View with Watertight Doors Closed; Doors and Hinges Flush with Sidewalk



As Hoisting Head Is Raised, Sidewalk Doors Automatically Open; Alarm Bell Rings

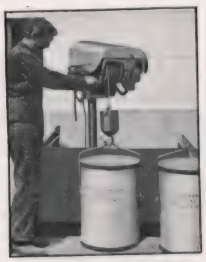
Hooking a G&G Standard Hoisting Can with Swing Bail After Operator Ascends Ladder



Hooking a G&G Standard Hoisting Can with Swing Bail

Raising Filled Can Without Leaving Sidewalk

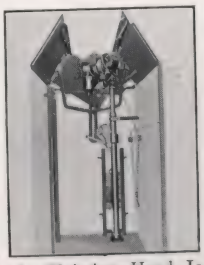
Swinging Hoisting Head to Deposit Can on Sidewalk. Can Pushes Gate Open



Two Filled Cans Raised Without Leaving Sidewalk

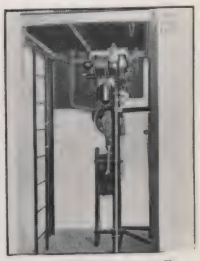
Can Deposited on Sidewalk Without Lifting. Gate Automatically Closes

Lowering Empty Cans by Gravity



As Hoisting Head Is Lowered, Doors Automatically Close; Bell Rings

Sidewalk Doors Closed and Automatically Locked



Hoist in Area, Compact, Out of the Way

FIG. 8. OPERATING MODEL E (ELECTRIC) G&G TELESCOPIC HOIST IN CONNECTION WITH G&G AUTOMATIC SIDEWALK DOOR OPENING AND CLOSING DEVICE WITH SPRING GUARD GATE AT 145 WEST 55TH STREET, NEW YORK
FRED T. LEY & CO., Architects and Contractors
Note that one man, unaided, performs entire operation. Watertight sidewalk doors are self-locking, whether open or closed

Continued on next page

the great saving in time and labor effected by the overhead crane model, architects should plan, if possible, for opening in sidewalk to be near curb or driveway, so as to permit the use of this type of hoist. (See also Model B.)

Ash Cans—G&G standard 17x24-in. hoisting cans with swing bail are specially recommended for use with Model D hoist.

Prices—Governed by distance of lift and type of current available, and can therefore be furnished only on specific request. See page 2009, prices on sidewalk doors.

How to Specify—See page 2014.

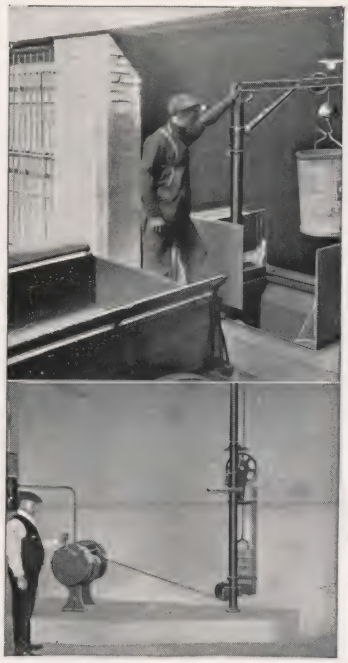


Fig. 10. Model C Hoist in Operation, 53rd Street Freight Station, Illinois Central R. R. Chicago, Ill.

Cans deposited on sidewalk by swinging hoisting head, after automatic upper limit shuts off power

Model C Hoist with Electric Motor in Cellar (Two-man Model)

G&G telescopic hoist Model C with complete equipment operates electrically (Fig. 10), and is used in large buildings where a considerable number of cans or other loads must be handled daily. Raises Maximum load of 500 lbs. to grade level at an actual speed of 60 ft. per min.

Motor—Identical with motor described for Model D hoist.

Prices—Are governed by distance of lift and type of current available, and can therefore be furnished only on specific request. See page 2009, prices on sidewalk doors.

How to Specify—Same as for Model D, omitting words "overhead crane" (page 2014) and stating Model C.

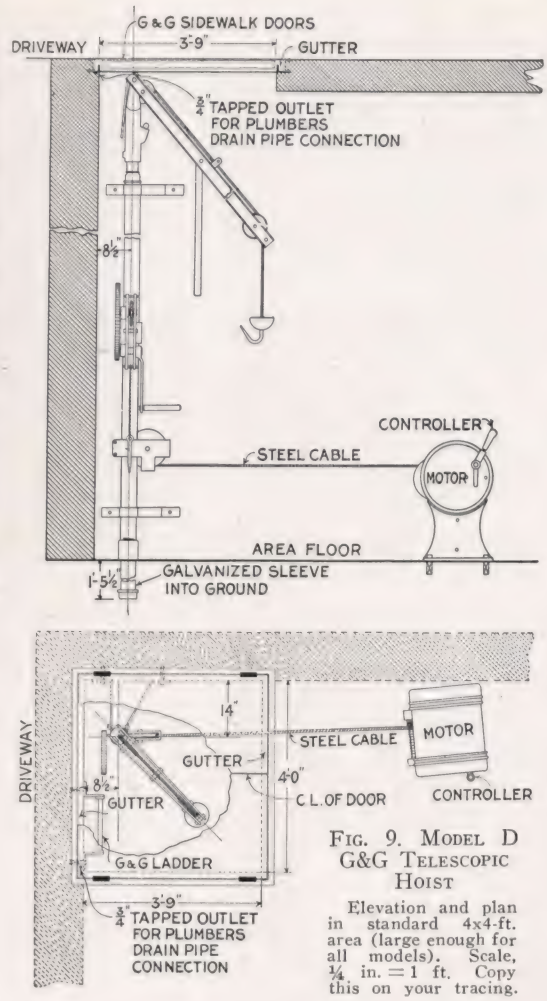


Fig. 9. Model D G&G Telescopic Hoist

Elevation and plan in standard 4x4-ft. area (large enough for all models). Scale, ¼ in. = 1 ft. Copy this on your tracing.

Extra Heavy Flush Watertight Sidewalk Door

Our standard sidewalk door is designed to sustain a live load of 300 lbs. per sq. ft. If there is any danger of the ash wagon or heavily-loaded motor trucks running over the door, we recommend that the architect specify our extra heavy flush watertight sidewalk door. This door is designed to be installed in driveway or alley.

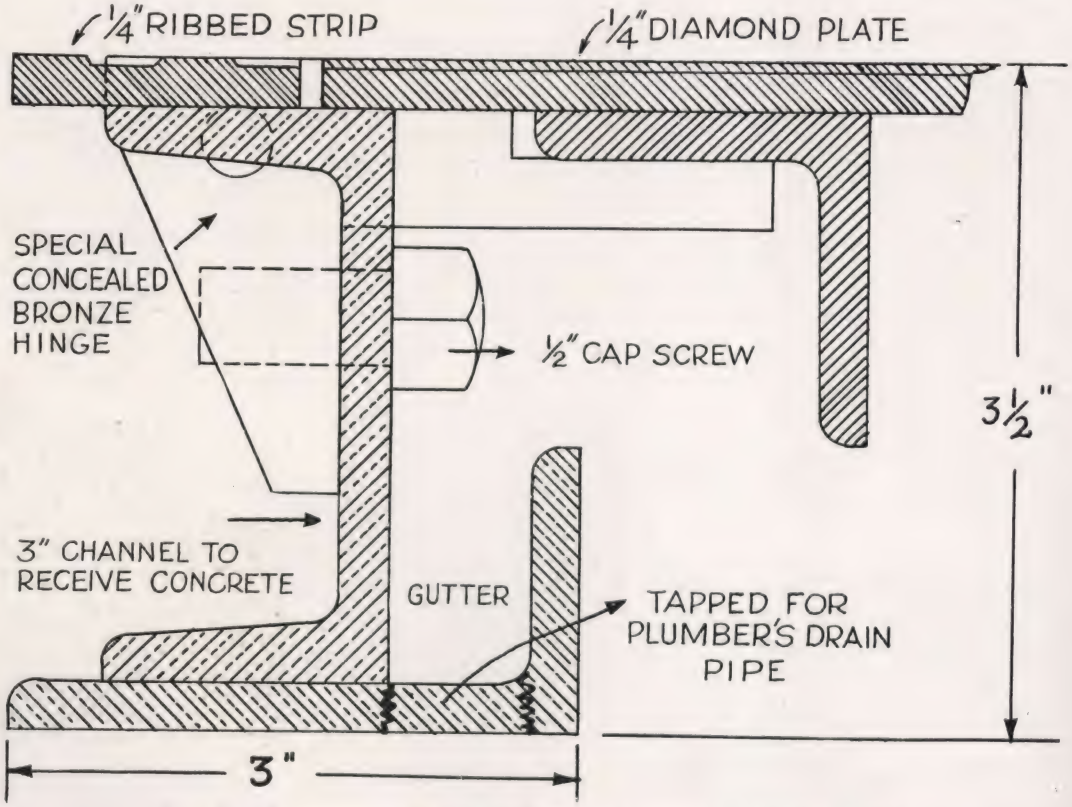


Fig. 11. Construction of G&G Flush Watertight Sidewalk Door

Note the special concealed bronze hinges which can be removed without concrete work. Specifications page 2014.

Continued on next page

Tests That Prove Operating Economy of G&G Electric Hoists

In order to substantiate claims that G&G electric hoists use only a negligible amount of current in their operation, a number of tests have been made for GILLIS & GEOGHEGAN by engineers of the Sprague Electric Works. The results of these tests show conclusively that in every instance the G&G electric hoist consumes so little current that it offers the most economical means available for removing ashes electrically.

FIG. 12. MODEL E ELECTRIC (SPUR DRIVE) HOIST IN OPERATION, HOTEL GRAND, NEW YORK CITY

Hoisting head revolves on ball bearings so can may be swung around to proper position to deposit on sidewalk

At the Mergenthaler Linotype Company, Brooklyn, N. Y., where a Model D hoist is installed, a total of 26 cans were raised, filled and lowered empty for 1c current consumption. Distance from grade to boiler room is 12 ft.; average raising time between cellar and top of wagon was 14.6 seconds, and average lowering time 13.8 seconds. Seventy-eight cans were raised and lowered in 1 k.w.h. Current costs this operator $ .03 per k.w.h.

At the Hotel Grand, New York City, where a Model E (spur drive) hoist is installed, a total of 21 cans were raised, filled and lowered empty for 1c current consumption. Distance from grade to boiler room is 21 ft. 10 in.; average raising time was 11.38 seconds and average lowering time 17.75 seconds. 108 cans were raised and lowered in 1 k.w.h. Current costs this operator $ .05 per k.w.h. This is the same hoist that, after being in use for three years, raised 3,500 cans of ashes in one continuous operation, the accumulation after a heavy snow storm, without the slightest mechanical failure.

At the Hotel Navarre, New York City, where a Model E (spur drive) hoist is installed, a total of 45 cans were raised, filled and lowered empty for 1c current consumption. Distance from grade to boiler room is 9 ft.; average raising time was 6.6 seconds, and average lowering time 6.9 seconds. 227 cans were raised and lowered in 1 k.w.h. Current costs this operator $ .05 per k.w.h.

At the main Brooklyn, N. Y., building of the New York Telephone Company, where a Model E (worm drive) hoist is installed, a total of 85 cans were raised, filled and lowered empty for 1c current consumption. Distance from grade to boiler room is 16 ft. 8 in.; the average raising time was 12.33 seconds, and average lowering time was at the rate of about 200 ft. a minute by gravity. 296 cans were raised and lowered in 1 k.w.h. The Bell Telephone System operates many G&G hoists in its buildings throughout the country.

The variation in consumption costs is due to difference in distance of lift, difference in the cost of current, and the benefit of gravity lowering device on the worm drive, Model E. Complete figures and details of any or all the above and other tests will be gladly furnished on request.

Model B Manually Operated Overhead Crane Hoist

Illustration (Fig. 13) shows how this hoist is arranged so that operator, standing at grade level, may raise ash can from cellar to position 6 or 7 ft. above grade, and empty can directly into wagon or truck, without rehandling at grade level. Because of the great saving in time and labor effected by the overhead crane model, architects should plan, if possible, for opening in sidewalk to be near curb or driveway so as to permit the use of this type of hoist. See also Model D, page 2009.

Advantages—Hoist is equipped with automatic gear shifting brake device and silencer (Fig. 13), and is so designed that it is practicable for one man to perform entire operation when complete equipment, including G&G swing bail cans, is used.

Raises maximum load of 300 lbs. at speed of 30 ft. per minute. This model can also be constructed for maximum working capacity of 500 lbs.

Factor of Safety—No part has a factor of safety of less than 8, based on ultimate strength of material when maximum load is raised.

Ash Cans—G&G standard 17x24-in. hoisting cans with swing bail are especially recommended for use with Model B hoist. No other cans will work as well.

Prices—Governed by distance of lift, and can therefore be furnished only on specific request. See page 2009, prices on sidewalk doors, etc.

How to Specify—See page 2014.

FIG. 13. MODEL B HOIST IN OPERATION, PHOENIX INSURANCE CO. BUILDING, HARTFORD, CONN.

B. W. MORRIS, Architect

Hoisting head revolves on ball bearings and swing bail can is emptied into wagon without rehandling at grade level

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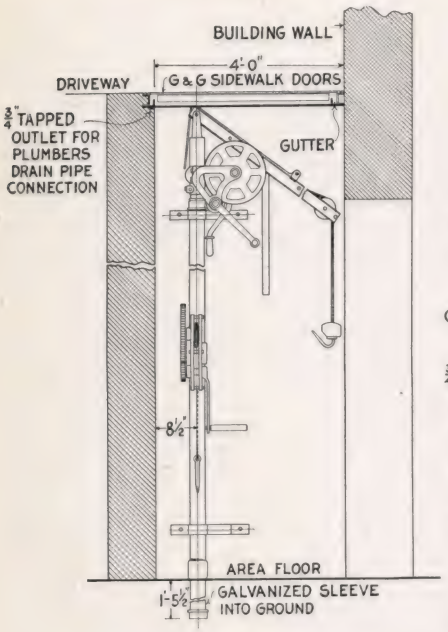


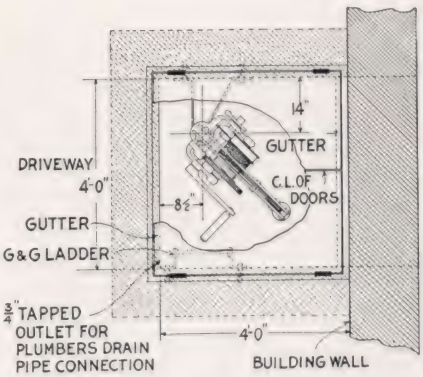


FIG. 14. MODEL B G&G TELESCOPIC HOIST

Elevation and plan in standard 4x4-ft. area (large enough for all models). Scale, ¼-in. = 1 ft. Copy this on your tracing.

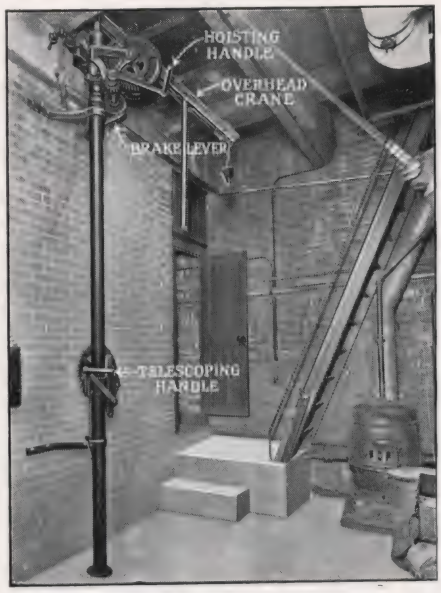


FIG. 15 MODEL B HOIST

When not in use hoist telescopes and no part shows above grade level. Sidewalk doors closed down flush with pavement and locked

Model A Manual Hoist (One-man Model)

G&G telescopic hoist Model A with complete equipment is installed in buildings where it is desired to use hand power for raising and lowering loads, and where sidewalk opening is so situated that trucks can not drive alongside.

Advantages — One man, unaided, can operate hoist (Fig. 17), and loads up to 500 lbs. are easily raised at a speed of 30 ft. per minute.

A pressure of only 7 lbs. for each 100 lbs. of load is required on hoisting handle to raise filled cans. Hoist is equipped with automatic gear shifting brake device. For lowering a powerful band brake is provided. Hoisting handle does not revolve when load is lowered. The patented "Silencer" makes hoist extremely quiet in operation.

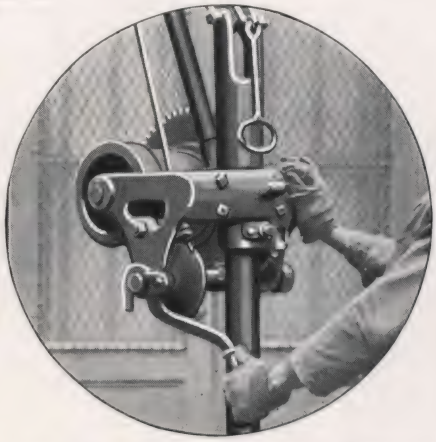


FIG. 16. AUTOMATIC GEAR SHIFTING BRAKE DEVICE IN OPERATION, MODEL B HOIST

A single movement of the brake lever automatically shifts gears and applies brake so that load is lowered by gravity. Hoisting handle does not revolve. Applies to both Model A and Model B

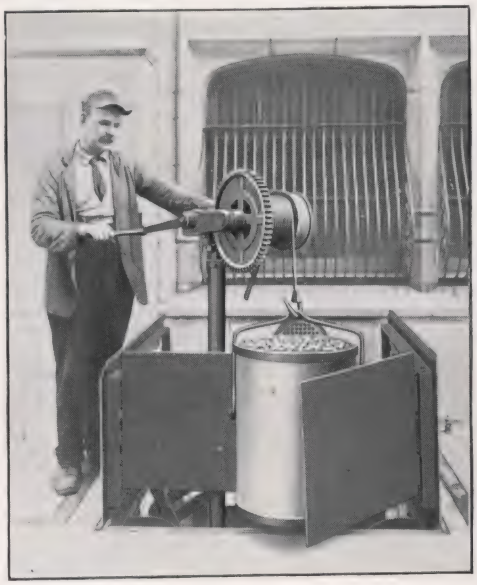


FIG. 17. MODEL A HOIST IN OPERATION, CHURCH OF THE BLESSED SACRAMENT, NEW YORK

GUSTAVE E. STEINBACH, Architect

Hoisting head revolves on ball bearings to deposit can on sidewalk without lifting. Can pushes gate open and gate springs shut after can has cleared it

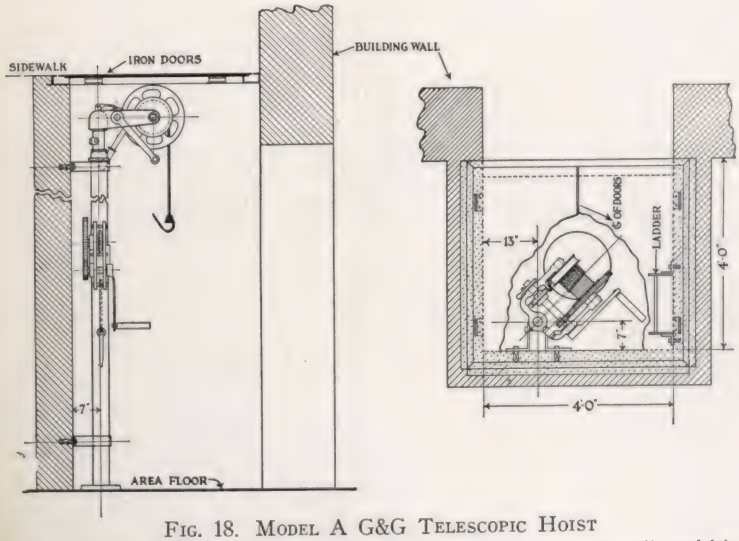


FIG. 18. MODEL A G&G TELESCOPIC HOIST

Elevation and plan in standard 4x4-ft. area (large enough for all models). Scale, ¼ in. = 1 ft. Copy this on your tracing.

Prices—Governed by distance of lift, and can therefore be furnished only on specific request. See page 2009, prices on sidewalk doors.

How to Specify—See page 2014.

Continued on next page

FIG. 19. SPECIAL MODEL B NON-TELESCOPIC HOIST AS INSTALLED FOR J. V. BENDUS CO., BROOKLYN, N. Y.

Loads are raised and lowered between grade level or wagon top and upper floor of building

Industrial Plants Need This Hoist

There are hundreds of situations in industrial circles where the installation of G&G hoists will reduce the number of men employed in raising and lowering loads, and in saving days of labor in the aggregate, by speeding up the handling of materials by direct motion transfer.

The G&G hoist is especially valuable in the quick and economical raising and lowering of ashes, bags, bales, barrels, baskets, boxes, cans, carboys, ice, parts of finished and unfinished machinery, rubbish, tires, trays, and other loads within its scope.

In fact, the range of usefulness of a G&G hoist in industrial plants is almost unlimited. There is a definite need for a G&G hoist wherever *quick, safe, dependable* and *economical* raising and lowering of lighter loads is necessary or desirable; and, therefore, it may be said that a *G&G hoist is needed in every modern industrial plant.*

The Packard Motor Car Co. installed two G&G hoists in the latter part of 1918 for use in connection with their core ovens. Since that time two additional hoists have been ordered—*without* solicitation.

The J. V. Bendus Co., manufacturers of waterproof cloth, use a special Model B, manually operated, G&G hoist at their Brooklyn, N. Y., plant to raise and lower rolls of cloth and other loads between second floor and trucks on grade level.

The Kelly-Springfield Tire Co. uses a G&G hoist for the direct transfer of tires to and from their New York City storage. The Norwalk Tire & Rubber Co. uses a G&G hoist for transferring pans of rubber between floors.

FIG. 20. MODEL B NON-TELESCOPIC HOIST AS INSTALLED FOR RICHES-PIVER CO., LYONS FARMS, N. J.

Loads are raised and lowered between shipping platform and upper floor of building

G&G hoists are daily proving their efficiency at manufacturing plants and service stations of the Willys-Overland Co., Ford Motor Co., Fisher Body Co., Cadillac Motor Co. and other automotive companies.

The Riches-Piver Co., manufacturing chemists, use a G&G hoist at their Lyons Farms, N. J., plant for raising and lowering barrels, carboys, etc.

S. Kann's Sons, one of Washington City's leading department stores, use a G&G hoist for the quick and quiet removal of ashes and rubbish and raising and lowering light loads.

Scores of railroads—including the Chicago, Milwaukee & St. Paul; Pennsylvania Lines (East and West); Canadian Pacific; Union Pacific; Rock Island Lines; Southern Railway; New York Central Lines; Central R. R. of New Jersey; Chicago & Northwestern; Chicago, Burlington & Quincy; Alabama Great Southern; Canadian Northern; Illinois Central and many others — are saving money and time in their lowering and lifting jobs at many types of buildings through the use of G&G hoists.

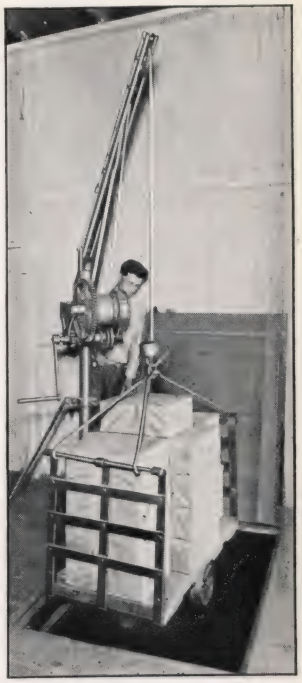


FIG. 21. MODEL B NON-TELESCOPIC HOIST AS INSTALLED FOR GREAT WESTERN PAPER BOX CO., ST. LOUIS, MO.

Hand trucks and barrels are raised and lowered between floors quickly and safely

G&G hoists can be easily installed in old or new buildings on any floor or in boiler room where there is an opening *preferably* 4 ft. square. However, the size of the opening can vary according to conditions and materials handled.

In all cases it is advisable to consult us in regard to present or proposed openings, also with reference to blocks, slings, grapples, chains and other conveying attachments.

We maintain a corps of engineers experienced in all phases of operating conditions of G&G hoists, conveying attachments and allied devices.

Our men are always willing to co-operate with our friends to the end that the proper model of hoist be installed to meet individual conditions.

It is possible that in your plant there is a lowering or lifting problem and an expense incidental thereto that we can reduce. Please tell us:

(1) For what purpose you would like to use a G&G hoist.
(2) Maximum weight of load.
(3) Distance of lift.
(4) Number of lifts daily.
(5) To be installed inside or outside of building.
(6) Submit a sketch of the conditions.

FIG. 22. MODEL A NON-TELESCOPIC HOIST AS INSTALLED FOR PACKARD MOTOR CAR CO., DETROIT, MICH.

H. M. LANE CO., Engineers

First two hoists proved so satisfactory that two more were installed, making four in this plant

Continued on next page

G&G Improved Hoisting Cans

These ash cans are manufactured in GILLIS & GEOGHEGAN'S factory, especially for use with their hoists; are constructed throughout of No. 16 gage galvanized iron, reinforced at top and bottom with ¼ by 1¼-in. steel bands. The thickness and weight of the No. 16 gage iron (very much heavier than the material ordinarily used in making ash cans) makes for great strength and durability.

This company recommends the use of the G&G standard 17 by 24-in. hoisting can *with swing bail* in all cases with Model B hoist and Model D hoist, also with Model A hoist, in buildings where *only one man* is employed to remove ashes. The swing bail can is "balanced"; that is, the can may be easily emptied and will not spill the ashes when being raised. The swing bail is so arranged that it will not drag on the floor when can is being handled in the cellar, and will "stay put" when raised above can.

The side handle can shown in Fig. 24 is built for gruelling service. Like the swing bail can it will withstand rough treatment and outlast several ordinary ash-cans.

Prices—Furnished on request.

FIG. 24. SIDE HANDLE HOISTING CAN

FIG. 23. G&G HOISTING CAN WITH SWING BAIL
Patented March 13, 1917

Patents Issued

UNITED STATES	DOMINION OF CANADA
April 30, 1912	April 19, 1912
May 19, 1914	May 14, 1912
June 23, 1914	December 9, 1913
June 30, 1914 Reissued Ocober 19, 1915	April 7, 1914 Reissued November 14, 1916
August 17, 1915	April 27, 1915
December 7, 1915	June 22, 1915
December 7, 1915	August 3, 1915
February 1, 1916	May 9, 1916
March 7, 1916	July 25, 1916
March 28, 1916	September 5, 1916
March 13, 1917	October 10, 1916
October 8, 1918	November 21, 1916
March 9, 1920	June 1, 1920
March 9, 1920	August 31, 1920

Also patenter in foreign countries.

Samples

Demonstrations can be seen at the Architects Samples Corporation, 101 Park Avenue, New York, N. Y., and at the Building Material Exhibit, Chicago, Ill.

A 4x4 ft. area is the standard and most economical size for all models. See ¼-in. scale drawings on preceding pages.

How to Specify Complete G&G Telescopic Hoist Equipment

Note:—For data on how to specify this equipment without using manufacturer's name, see G&G Catalogue, October, 1921 edition, filed under A.I.A Standard Class No. 35 n8, or Hoist, G&G Telescopic.

Model E Electric Hoist—

(1) Furnish and install where indicated on plans and in accordance with the manufacturer's drawings and instructions, one "G&G" Telescopic Hoist (with electric motor) Model E with Automatic Stop and Gravity Lowering Device.

(2) Include the following "G&G" equipment with the hoist, and set the same in the proper manner, all as shown on the manufacturer's drawings:

Flush watertight sidewalk doors [checkered steel type] [vault light type] with condensation gutter tapped for plumber's ¾-in. drain pipe connection.

Automatic sidewalk door opening and closing device.

Automatic safety spring guard gates.

Electric warning gong.

12 standard 17x24-in. galvanized swing bail ash cans.

Rubber-tired ash can truck.

Heavy iron ladder.

(3) Leave the hoist completely and thoroughly installed, to the satisfaction of the architect.

(4) Above equipment to receive factory coat of paint before shipment and finishing coat of paint after erection.

(5) The necessary wiring and cut-out switch between the switchboard and service lugs on the motor are to be furnished and installed by the electrical contractor at the building.

(6) Before above apparatus is manufactured, this contractor is to submit to the architect for his approval, details and specifications of above equipment together with manufacturer's guarantee for 1 year against defective materials and workmanship.

Model D Electric Hoist—

(1) Furnish and install where indicated on plans and in accordance with the manufacturer's drawings and instructions, one "G&G" Telescopic Overhead Crane Hoist Model D with electric motor.

(2) Include the following "G&G" equipment with the hoist, and set the same in the proper manner, all as shown on the manufacturer's drawings:

Flush watertight sidewalk doors [checkered steel type] [vault light type] with condensation gutter tapped for plumber's ¾-in. drain pipe connection.

Automatic sidewalk door opening and closing device.

Automatic safety spring guard gates.

Electric warning gong.

12 standard 17x24-in. galvanized swing bail ash cans.

Rubber-tired ash can truck.

Heavy iron ladder.

(3) Leave the hoist completely and thoroughly installed, to the satisfaction of the architect.

(4) Above equipment to receive factory coat of paint before shipment and finishing coat of paint after erection.

(5) The necessary wiring and cut-out switch between the switchboard and service lugs on the motor

Continued on next page

are to be furnished and installed by the electrical contractor at the building.

(6) Before above apparatus is manufactured, this contractor is to submit to the architect for his approval, details and specifications of above equipment together with manufacturer's guarantee for one year against defective materials and workmanship.

Model B Hand Power Hoist—

(1) Furnish and install where indicated on plans and in accordance with the manufacturer's drawings and instructions, one "G&G" Telescopic Overhead Crane Hoist Model B with Automatic Gear Shifting Brake Device and Silencer.

(2) Include the following "G&G" equipment with the hoist, and set the same in the proper manner, all as shown on the manufacturer's drawings:

Flush watertight sidewalk doors [checkered steel type] [vault light type] with condensation gutter tapped for plumber's ¾-in. drain pipe connection.

Automatic sidewalk door opening and closing device.

Automatic safety spring guard gates.

Electric warning gong.

12 standard 17x24-in. galvanized swing bail ash cans.

Rubber-tired ash can truck.

Heavy iron ladder.

(3) Leave the hoist completely and thoroughly installed, to the satisfaction of the architect.

(4) Above equipment to receive factory coat of paint before shipment and finishing coat of paint after erection.

(5) Before above apparatus is manufactured, the contractor is to submit to the architect for his approval, details and specifications of above equipment together with manufacturer's guarantee for one year against defective materials and workmanship.

Model A Hand Power Hoist—

(1) Furnish and install where indicated on plans and in accordance with the manufacturer's drawings and instructions, one "G&G" Telescopic Hoist Model A with Automatic Gear Shifting Brake Device and Silencer.

(2) Include the following "G&G" equipment with the hoist, and set the same in the proper manner, all as shown on the manufacturer's drawings:

Flush watertight sidewalk doors [checkered steel type] [vault light type] with condensation gutter tapped for plumber's ¾-in. drain pipe connection.

Automatic sidewalk door opening and closing device.

Automatic safety spring guard gates.

Electric warning gong.

12 standard 17x24-in. galvanized swing bail ash cans.

Rubber-tired ash can truck.

Heavy iron ladder.

(3) Leave the hoist completely and thoroughly installed, to the satisfaction of the architect.

(4) Above equipment to receive factory coat of paint before shipment and finishing coat of paint after erection.

(5) Before above apparatus is manufactured, the contractor is to submit to the architect for his approval, details and specifications of above equipment together with manufacturer's guarantee for one year against defective materials and workmanship.

References

The following architects have repeatedly specified the G&G telescopic hoist:

Lewis F. Pilcher	Boston, Mass.
P. Thornton Marye	Baltimore, Md.
Wyatt & Nolting	Atlanta, Ga.
Densmore & Le Clear	Albany, N. Y.
Cram & Ferguson	Boston, Mass.
Thomas M. James	Boston, Mass.
Monks & Johnston	Boston, Mass.
F. H. Berlenbach	Brooklyn, N. Y.
C. S. Frost (Chicago & North Western Ry.)	Chicago, Ill.
C. W. & G. L. Rapp	Chicago, Ill.
Leon E. Stanhope	Chicago, Ill.
Holabird & Roche	Chicago, Ill.
Perkins, Fellows & Hamilton	Chicago, Ill.
Shattuck & Hussey	Chicago, Ill.
Weary & Alford	Chicago, Ill.
W. E. McCornack	Cleveland, Ohio
Hubbell & Benes	Cleveland, Ohio
Frank L. Packard	Columbus, Ohio
Richards, McCarty & Bulford	Columbus, Ohio
William Gordon	Des Moines, Iowa
C. Howard Crane	Detroit, Mich.
Albert Kahn & Ernest Wilby	Detroit, Mich.
Malcolmson & Higginbotham	Detroit, Mich.
Halstead & Sullivan	Duluth, Minn.
C. Howard Lloyd	Harrisburg, Pa.
Sanguinet & Staats	Houston, Tex.
W. E. Hulse & Co.	Hutchinson, Kans.
D. A. Bohlen & Son	Indianapolis, Ind.
Elmer E. Dunlap	Indianapolis, Ind.
John T. Rowland, Jr.	Jersey City, N. J.
J. H. Felt & Co.	Kansas City, Mo.
Joseph & Joseph	Louisville, Ky.
Reimer & Herlin	Marshalltown, Iowa
Van Ryn & De Gelleke	Milwaukee, Wis.
R. V. L. Haxby	Minneapolis, Minn.
Brown & Van Beren	New Haven, Conn.
Donn Barber	New York, N. Y.
Cross & Cross	New York, N. Y.
Carrere & Hastings	New York, N. Y.
Delano & Aldrich	New York, N. Y.
Cass Gilbert	New York, N. Y.
C. P. H. Gilbert	New York, N. Y.
Bertram G. Goodhue, Jr.	New York, N. Y.
Hunt & Hunt	New York, N. Y.
Louis E. Jallade	New York, N. Y.
Thomas W. Lamb	New York, N. Y.
McKim, Mead & White	New York, N. Y.
McKenzie, Voorhees & Gmelin	New York, N. Y.
Peabody, Wilson & Brown	New York, N. Y.
Charles A. Platt	New York, N. Y.
Starrett & Van Vleck	New York, N. Y.
C. B. J. Snyder	New York, N. Y.
Trowbridge & Livingston	New York, N. Y.
Warren & Wetmore	New York, N. Y.
John & Allan MacDonald	Omaha, Nebr.
Hewitt & Emerson	Peoria, Ill.
Clyde S. Adams	Philadelphia, Pa.
Ballinger & Perot	Philadelphia, Pa.
Paul A. Davis, 3rd	Philadelphia, Pa.
Horace Trumbauer	Philadelphia, Pa.
Rutan & Russell	Pittsburgh, Pa.
Claude Bradgden	Rochester, N. Y.
Wm. B. Ittner	St. Louis, Mo.
Preston Bradshaw	St. Louis, Mo.
C. H. Johnston	St. Paul, Minn.
Edgar Blair	Seattle, Wash.
Edward M. Gee	Toledo, Ohio
Mills, Rhines, Bellman & Nordhoff	Toledo, Ohio
Milburn, Heister & Co.	Washington, D. C.
James A. Wetmore	Washington, D. C.

OTHER REFERENCES

United States Government
Ford Motor Co.
Pennsylvania Railroad
United Cigar Stores Co. of America
American Telephone & Telegraph Co.
Willys-Overland Co.
Kelly-Springfield Tire Co. of New York
Packard Motor Car Company of Detroit, Mich.
Norwalk Rubber Co., Norwalk, Conn.

See also page 2011.

GREEN ENGINEERING COMPANY

Stokers, Ash Conveyors and Hoppers

EAST CHICAGO, IND.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

Manufacturers of NATURAL DRAFT CHAIN GRATE STOKERS, FORCED DRAFT CHAIN GRATE STOKERS, STEAM JET ASH CONVEYOR SYSTEMS, CAST IRON HOPPERS.

Also Sealflex Ignition Arches, Green Pressure Waterbacks, Green Fuel Retarders and Sidewall Tubes.

Green Natural Draft Chain Grate Stokers

Designed to burn all free burning bituminous coals and lignites. They are the nearest approach to completely automatic firing. The operating principle is responsible for this.

Green chain grate stokers feed the fuel automatically; burn fuel thoroughly without forming clinker;

GREEN NATURAL DRAFT CHAIN GRATE STOKER

discharge ash automatically and continuously; automatically clean the air spaces of the grate surface and require but a fraction of a per cent of steam produced for operating the larger stoker. They give absolute smokelessness and require least attendant labor.

Green Forced Draft Chain Grate Stokers

Designed to burn all free burning bituminous coals, lignites and coke braize. They have the added advantage of forced draft for high ratings and continuous overloads. Like the natural draft stoker they are completely automatic in all their functions.

GREEN FORCED DRAFT CHAIN GRATE STOKER

They are exceptionally low in maintenance due to three sides of the fuel bed being surrounded by water cooled members. Special rear end construction insures low ash pit losses regardless of rating. Accessibility for inspection is a feature of their construction. Green forced draft chain grate stokers operate on either natural or forced draft.

Green Steam Jet Ash Conveyor Systems

These systems eliminate ash rehandling—the ash is hoed into the intake and the work is done. The "remote control" applies the electrically operated valve to the system and saves half the steam consumed on the ordinary steam jet system. Steam runs only when ash is actually falling into the intake. Green signal nozzles are the best insurance against use of excess steam due

GREEN STEAM JET ASH CONVEYOR SYSTEM

to worn nozzles. Specially designed elbows and hard iron pipe insure lowest maintenance. Green steam jet ash conveyors are adaptable to practically any boiler room layout.

Green Cast Iron Hoppers

Designed to reduce rehandling charges on storage and transfer of ash, etc. They are of square construction to save space. Cast iron is used to resist abrasion

GREEN CAST IRON HOPPER

and corrosion. The supporting structure is of structural steel to insure safety and strength. They are of standard design, easily erected with unskilled labor. They are adapted to any standard filling method and have easily controlled discharge.

Service

Green engineers have twenty-five years' experience in boiler room problems. Their installations are saving money in hundreds of plants. Let Green engineers assist you in laying out and designing the boiler room. There is no obligation involved for this service.

BRUNSWICK-KROESCHELL COMPANY

Manufacturers of Boilers

MAIN OFFICE AND WORKS
440-472 West Erie Street
CHICAGO, ILL.

Products and Services

KROESCHELL WATER TUBE BOILERS.

KROESCHELL FIRE and WATER TUBE BOILERS.

KROESCHELL BROS. COMPANY is prepared to build and install COMPLETE BOILER PLANTS, with all required PIPING and ACCESSORIES, ready for steam to be turned on.

Also manufacturers of Return Tubular, Firebox and Hot Water Boilers.

For Refrigerating Systems see page 1792.

Water Tube Boiler

The Kroeschell water tube boiler is designed to secure simplicity and durability of construction, together with absolute safety and the highest attainable efficiency. For steaming capacity, economy, ease of cleaning and repairing, it is pre-eminent among water tube boilers today.

The boiler consists of one or more steam and water drums, to which are securely riveted a front and rear header or water leg. Tubes are expanded into these headers in straight horizontal and staggered vertical rows, inclined 1 in. to 1 ft. The tubes are expanded into flat plates, subjecting metal between them to much less strain than where tube holes are punched or drilled into a cylindrical shell. All tube holes are drilled from solid plate.

Feed water is introduced through top of shell into a submerged sheet steel mud drum, where its temperature is raised practically to that of rest of water in boiler, precipitating most of the impurities, which are blown out through a blow-off valve in the rear head, provided for the purpose. The internal mud drum also prevents feed water from coming in contact with hot plates, with consequent contraction and leakage at the seams.

Natural speed of circulation is automatically maintained throughout. Each boiler is tested hydrostatically to a pressure one and one-half times working pressure. In accordance with recommendations of the A.S.M.E. rating is based on 10 sq. ft. of heating surface per horsepower and gives a large overload capacity.

Materials—All plate material is open hearth firebox steel, 55,000 to 65,000 lbs. tensile strength. Tubes, unless otherwise specified, are mild steel, lap-welded. Staybolts are of cold drawn, seamless steel tubing 1.66 in. in diameter, with ¾-in. hole. Rivets are of soft mild steel. Key handhole caps are used as standard equipment making steamtight joints without the use of gaskets, crabs or bolts.

Sizes—Sizes up to 750 h.p. capacity.

Fire and Water Tube Boiler

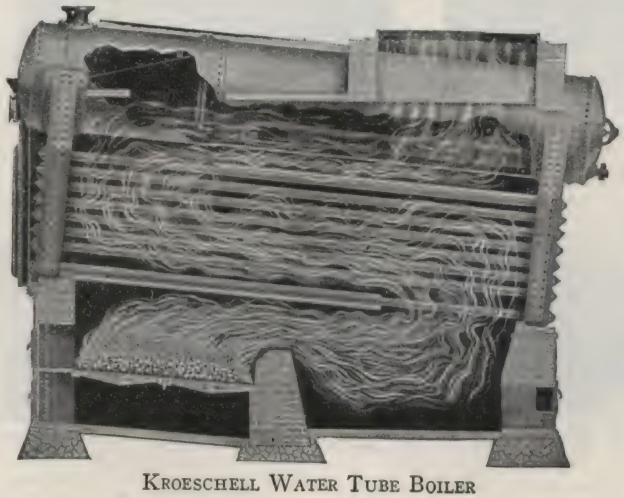
Combining the large storage capacity of the horizontal return tubular boiler with the thorough circulation and rapid steaming properties of the water tube boiler, the Kroeschell fire and water tube boiler is particularly adapted for greatly fluctuating loads and heavy overloads for long periods. No bent or curved tubes used in any part. Easily cleaned throughout.

Shell is placed in second flame pass, away from impinging heat of the fire, so there can be no cracked or bagged plates. The shell, as well as fire tubes within, being heated, leakage at tube ends due to unequal expansion and contraction is absolutely avoided. Construction causes tubes to remain full of water at all times.

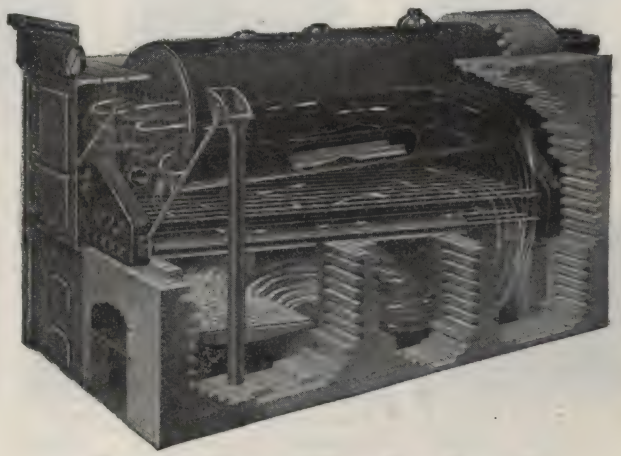
Steam and water from the water tubes enter the shell horizontally and steam is therefore liberated uniformly over a large surface of water. Hence there can be no geyser action and the steam is always dry, even when the boiler is working under heavy overload.

Kroeschell method of baffling gives a three-pass fire travel, longer than that of any other boiler, insuring maximum absorption of heat. Complete combustion and smokeless operation are assured. Bad water can not cause corrosion or excessive scaling and very few shutdowns for cleaning are necessary.

Sizes—Sizes up to 350 h.p. capacity.



KROESCHELL WATER TUBE BOILER



KROESCHELL FIRE AND WATER TUBE BOILER

THE TITUSVILLE IRON WORKS COMPANY

Boilers, Tanks and Steel Plate Work

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CLEVELAND, OHIO, Hippodrome Building

Products

FIRETUBE STEEL BOILERS for Power and Heating.
TUBELESS STEEL WATER HEATERS.

Also manufacturers of Steel Plate Work, including Tanks, Smokestacks, etc.; Boiler Fronts and Castings, Grates, etc.

Facilities

Our shop is one of the largest and best equipped boiler manufacturing plants in the country. It is provided with the latest improved machinery, including hydraulic and pneumatic riveting machines, also best hydraulic flanging equipment. Electric overhead cranes insure careful and rapid handling of material.

A large stock of plates and tubes is carried and shipment can be made with reasonable promptness.

A.S.M.E. Code

Our boilers are made in strict accordance with the latest boiler code of the American Society of Mechanical Engineers, or can be made to conform to local requirements.

Inspection and Test

All boilers are thoroughly inspected during their entire construction by a representative of the Hartford Steam Boiler Inspection and Insurance Company, who is in continual attendance at our works. Boilers are tested to required hydrostatic pressure, made absolutely tight and stamped "ASME." All workmanship and material are guaranteed first class in every respect. The insurance company's test certificate is furnished free of charge if desired.

Working Pressures

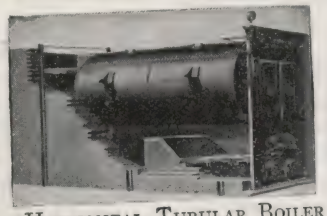
All boilers when used for high pressure or power service are made for 100 to 150 lbs. working pressure, A.S.M.E. Code, and are tested with hydrostatic pressure 50% in excess of the working pressure.

Standard heating boilers are made for 15 lbs. working pressure A.S.M.E. Code and tested to 60 lbs. hydrostatic pressure.

Steam Radiation Ratings

Firebox heating boilers are all rated very conservatively. Boilers up to about 4000 sq. ft. capacity are rated 10 sq. ft. of radiation per sq. ft. of fire surface and larger boilers 11 to 1. Horizontal tubular heating boilers are all rated 10 to 1.

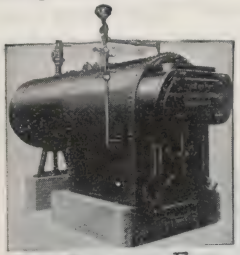
In determining the size of a boiler, take the actual amount of cast iron radiation or equivalent, plus the piping, and add about 5% to 10% and select a boiler with the next highest rating.



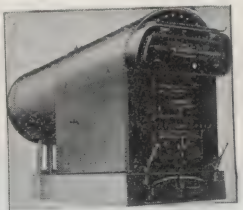
HORIZONTAL TUBULAR BOILER FOR POWER AND HEATING
See tables Nos. 1 and 2

Equipment

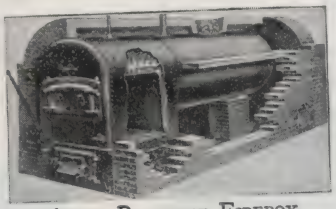
All our boilers are provided with complete castings as illustrated below. Stationary grates are standard equipment on all horizontal tubular boilers. Shaking grates are standard with all firebox boilers. Special grates can be furnished on all types when desired.



TICO PORTABLE FIREBOX HEATING BOILER
See table No. 3



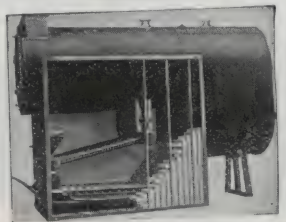
TICO SMOKELESS PORTABLE FIREBOX HEATING BOILER
See table No. 4



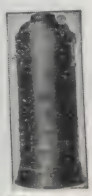
ACME BRICKSET FIREBOX HEATING BOILER
See table No. 5

ACME BRICKSET SMOKELESS FIREBOX HEATING BOILER

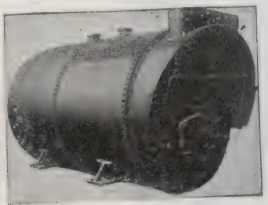
PERFECTION RETURN TUBULAR PORTABLE BOILER
See table No. 6



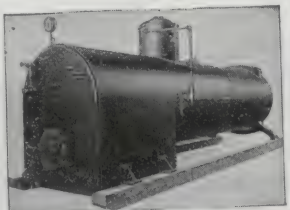
PERFECTION SMOKELESS RETURN TUBULAR PORTABLE BOILER



VERTICAL BOILER
See table No. 7



SCOTCH BOILER



LOCOMOTIVE BOILER

TUBELESS WATER HEATER
See table No. 8

Continued on next page

TABLE NO. 1. SPECIFICATIONS FOR TITUSVILLE "A. S. M. E." HORIZONTAL TUBULAR POWER BOILERS
Working pressures, 100 to 150 lbs. Form 2500

Boiler No.	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519
Horsepower at 10 sq. ft.	34	40	48	50	59	60	69	73	78	83	100	112	125	150	165	180	200	225	250
Diameter...in.	42	44	44	48	48	54	54	60	60	60	66	66	72	72	72	78	78	84	84
Length of shell...ft.	10	10	12	12	14	14	16	14	15	16	16	18	16	18	20	18	20	18	20
Heating surface...sq. ft.	338	398	476	504	592	603	687	727	777	828	1000	1121	1263	1419	1575	1751	1942	2117	2353
Area of grates...sq. ft.	12.25	12.83	14.6	16	18	20.25	22.5	22.5	25	27.5	30.25	33	33	36	39	39	42.25	42	45.5
Tubes { Number	38	46	46	48	48	36	36	44	44	44	54	54	70	70	70	88	88	108	108
Tubes { Size...in.	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Diameter of stack...in.	20	22	22	24	24	26	26	28	28	28	30	30	34	34	34	40	40	44	44

TABLE NO. 2. SPECIFICATIONS FOR TITUSVILLE "A. S. M. E." HORIZONTAL TUBULAR HEATING BOILERS
Working pressure, 15 lbs. Form 2600

Boiler No.	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623
Horsepower at 10 sq. ft.	26	31	34	40	52	61	69	66	76	82	87	83	96	103	110	123	122	129	145	156	176	209	232
Capacity radiation...sq. ft.	2500	3000	3300	4000	5000	6000	7000	6500	7600	8000	8700	8200	9600	10000	11000	12000	12000	13000	14500	15000	17000	21000	23000
Heating surface...sq. ft.	258	309	338	405	523	608	693	656	762	815	868	827	961	1028	1095	1229	1215	1294	1452	1560	1755	2090	2319
Area of grates...sq. ft.	10½	12	12¼	14	16	18	20	20¼	20¼	22½	22½	22½	25	25	27½	30	27½	30¼	33	33	36	39	42¼
Diameter...in.	36	36	42	42	48	48	48	54	54	54	54	60	60	60	60	60	66	66	66	72	72	78	78
Length shell...ft	10	12	10	12	12	14	16	12	14	15	16	12	14	15	16	18	15	16	18	16	18	18	20
Number 3-in. tubes	28	28	38	38	50	50	50	64	64	64	64	82	82	82	82	82	98	98	98	120	120	144	144
Diameter of stack required...in	18	18	20	20	24	24	24	26	26	26	26	28	28	28	28	28	30	30	30	34	34	38	38

TABLE NO. 3. SPECIFICATIONS FOR TICO "A. S. M. E." PORTABLE FIREBOX HEATING BOILERS
Working pressure, 15 lbs. Form 2700

Boiler No.	T20	T22	T25	T31	T34	T38	T41	T46	T51	T55	T65	T72	T80	T81	T86	T90	T97	T98	T105	T113	T125	T135	T150	T161	T186	T220	T250
Capacity radiation...sq. ft.	2000	2200	2500	3100	3400	3800	4600	5100	5600	6100	7200	8000	9000	8800	9600	10000	10800	10800	11600	12500	14000	15000	16500	18000	21000	25000	28000
Heating surface...sq. ft.	202	222	250	311	341	379	415	464	509	555	654	721	812	800	865	902	973	975	1052	1149	1249	1345	1492	1610	1862	2194	2504
Grate area...sq. ft.	6.7	7.9	9.2	9.5	11	12.5	12.8	14.6	16.3	18.7	20.7	20.7	22.7	23.3	25.5	25.5	27.7	28.3	30.8	30.8	31.1	33.9	36.7	37	40	43.3	45.5
Diameter of shell...in.	36	36	36	42	42	42	48	48	48	54	54	54	54	60	60	60	60	66	66	66	72	72	72	78	78	84	84
Length of shell...ft. and in.	8–10	9–10	10–10	9–10	10–10	11–10	10–0	11–0	12–0	11–0	12–6	13–6	15–0	13–2	14–2	14–8	15–8	13–8	14–8	15–8	14–8	15–8	17–2	15–10	17–10	18–0	20–0
Height of water line...in.	61	61	61	64	64	64	72	72	72	77	77	77	77	81	81	81	81	85	85	85	88	88	88	100	100	104	104
Diam. of breeching required...in.	14	14	14	18	18	18	20	20	20	20	22	22	22	26	26	26	26	30	30	30	30	30	30	36	36	36	36

TABLE NO. 4. SPECIFICATIONS FOR TICO "A. S. M. E." SMOKELESS PORTABLE FIREBOX HEATING BOILERS
Working pressure, 15 lbs. Form 2800

Boiler No.	TS7	TS8	TS9	TS10	TS11	TS12	TS13	TS14	TS15	TS16	TS17	TS18	TS19	TS20	TS21	TS22	TS23	TS24
Capacity direct radiation...sq. ft.	3000	3500	4000	4500	5000	5500	6000	7000	8000	9000	10000	12000	14000	16000	18000	20000	26000	28000
Heating surface...sq. ft.	307	360	400	466	517	568	630	697	780	863	920	1050	1274	1373	1582	1694	2093	2284
Grate area A.S.M.E. rating...sq. ft.	11.25	13.1	15	17.5	19.6	21.8	22.5	25	28.1	30.9	31.25	34.4	37.8	41.25	45	45	48.8	52.8
Diameter of shell...in.	42	42	42	48	48	48	54	54	60	60	66	66	72	72	78	78	84	84
Length of shell...ft. and in.	9–8	11–1	12–1	11–0	12–0	13–0	12–0	13–0	13–2	14–2	13–2	14–8	15–2	16–2	15–10	16–10	17–6	18–6
Height of water line...ft. and in.	6–2	6–2	6–2	6–10	6–10	6–10	7–1	7–1	7–10	7–10	8–3	8–3	8–8	8–8	9–5	9–5	10–4	10–4
Diam. of breeching required...in	18	18	18	20	20	20	22	22	26	26	30	30	30	30	36	36	36	36

TABLE NO. 5. SPECIFICATIONS FOR TITUSVILLE "A. S. M. E." ACME BRICKSET FIREBOX BOILERS FOR HEATING
Working pressure, 15 lbs. Form 2800

Boiler No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Capacity, steam...sq. ft.	900	1050	1200	1400	1700	2000	2200	2600	3000	3500	4000	4500	5500	6500	7500	8700	10000	11000	12000	14000
Capacity, water...sq. ft.	1500	1700	2000	2300	2800	3300	3600	4300	5000	5800	6600	7400	9100	10700	12400	14400	16500	18200	19800	23100
Diameter of shell...in.	30	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	72	72
Length of shell...ft.	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Diameter of breeching required...in	16	16	16	18	18	18	20	20	20	22	22	22	24	24	30	30	34	34	40	40
Length of brickwork over all ft. and in	8–7	9–7	10–7	9–7	11–1	12–7	10–7	12–1	13–7	12–7	14–1	15–7	16–1	18–7	18–1	20–7	18–7	20–7	18–7	20–7
Width of brickwork over all ft. and in	5–8	5–8	5–8	6–2	6–2	6–2	6–8	6–8	6–8	7–2	7–2	7–2	7–8	7–8	8–2	8–2	8–8	8–8	9–2	9–2
Height of brickwork over all ft. and in	6	6	6	6–11	6–11	6–11	7–3	7–3	7–3	7–11	7–11	7–11	8–8	8–8	9–1	9–1	9–11	9–11	10–9	10–9
Height of water line...in.	51	51	51	56	56	56	61	61	61	65	65	65	66	66	72	72	78	78	84	84

TABLE NO. 6. SPECIFICATIONS FOR PERFECTION "A. S. M. E." RETURN TUBULAR PORTABLE BOILERS
Working pressures, 15 to 150 lbs. Form 2400 For power and heating

Boiler No.	P-25	P-30	P-35	P-40	P-50	P-60	P-70	P-80	P-90	P-100	P-125	P-150	P-175	P-200
Horsepower at 10 sq. ft.	25	30	35	40	50	60	70	80	90	100	125	150	175	200
Capacity direct radiation...sq. ft	2600	3100	3700	4200	5600	7000	8000	9000	10000	12000	14000	17000	20000	24000
Heating surface...sq. ft	258	308	364	418	503	616	716	814	900	1031	1256	1535	1750	2017
Area of grates...sq ft	10½	10½	14	14	16	20	22½	22½	25	27½	30	35¾	38½	39
Diameter of shell...in.	36	36	42	42	48	48	54	54	60	60	60	66	66	72
Length over all...in.	132	147	144	156	142	160	155	167	168	183	207	210	228	228
Width casing...in.	60	60	66	66	72	72	79	79	85	85	85	91	91	97
Diameter of stack required...in	20	20	24	24	28	28	32	32	34	34	34	38	38	42

TABLE NO. 7. SPECIFICATIONS FOR TITUSVILLE "A. S. M. E." VERTICAL BOILERS WITH FULL LENGTH TUBES
Working pressure, 100 lbs. Form 3000

Boiler No.	V4	V5	V6	V8	V10	V12	V15	V18	V20	V25	V30	V35	V40	V45	V50	V60	V70	V80	V90	V100	V125
Horse power	4	5	6	8	10	12	15	18	20	25	30	35	40	45	50	60	70	80	90	100	125
Diameter...in.	24	24	24	30	30	36	36	36	42	42	42	48	48	48	54	54	60	60	66	66	66
Height of shell...ft.	4	5	6	5	6	7	6½	7	8	7¼	8¼	9¼	8½	9	10	9	10	10	11	10½	12
Height over all...in	67	79	91	82	94	106	103	109	121	115	127	139	132	138	150	142	154	157	169	166	184

*TABLE NO. 8. TITUSVILLE TUBELESS WATER HEATERS
Steel plate construction, 150 lbs. pressure

No.	5	10	15	20
Capacity...gals per hour, 50° raise	500	1000	1500	2000
Diameter shell...in	30	36	42	48
Height shell...in	78	78	78	78
Diameter jacket...in	38	44	50	56
Height over all...in	90	90	90	90
Diameter grate and firebox...in	25	31	37	43

No.	5	10	15	20
Grate area...sq ft.	3 5	4 9	7 0	10
Thickness shell...in.	¼	¼	5/16	5/16
Thickness firebox...in.	3/8	3/8	7/16	7/16
Diameter smoke outlet...in.	12	12	12	14
Asbestos covering required...sq. ft.	70	85	100	115
Shipping weight...lbs.	2200	2750	3700	4300

*Standard equipment includes stationary grates. Shaking grates can be furnished at additional cost.
For further information on any of the above boilers or heaters, send for our complete new Catalogue No. 81.

CRANE CO.

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Also manufacturers of Cast Iron, Malleable Iron, Brass and Steel Screwed and Flanged Pipe Fittings; Railing Fittings; Pipe Hangers; Steam Specialties and complete Piping Equipment.

Government Pattern Heavy Radiator Valves

Heavier than standard pattern and especially adapted for large buildings, and where a heavier type valve is necessary. Made in rough body, plated all over, finished all over, and finished and plated all over.

No. 67G. GOVERNMENT PATTERN HEAVY RADIATOR VALVE

Wood wheel, with union

No. 220. STANDARD SELF-ADJUSTED PACKED STEAM OR VACUUM SYSTEM RADIATOR VALVE

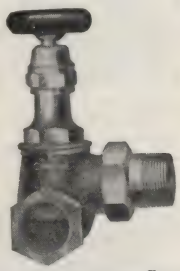
Jenkins disk; rising stem; Crane patent stop and disk spring. Rough body plated all over

Sizes, ½, ¾, 1, 1¼, 1½ and 2 in.

No. 147G. LEFT-HAND GOVERNMENT PATTERN HEAVY CORNER RADIATOR VALVE

Jenkins standard disk. Wood wheel. Made right- and left-hand

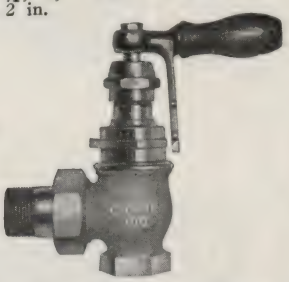
Sizes, ½, ¾, 1, 1¼, 1½ and 2 in.



No. 222. CRANE STANDARD SELF-ADJUSTED PACKED STEAM OR VACUUM SYSTEM RADIATOR CORNER VALVE

Jenkins disk; rising stem; Crane patent stop and disk spring. Right- or left-hand with union. Rough body plated all over

Sizes, ½, ¾, 1, 1¼, 1½ and 2 in.



No. 231. MODULATING BRASS RADIATOR VALVE

Self-adjusting packed stuffing box. Controls steam flow to each radiator of a heating plant. Amount of steam passing through valve depends on area of opening. Seat of valve is not exposed to action of steam; is self-cleaning, insuring complete shut-off and longer life

Sizes, ¾, 1 and 1¼ in.

Identification Marks

The name **CRANE** is the adopted marking which distinguishes nearly all goods made by this company. Exceptions are as follows:

Brass goods, such as steam, gas and water clocks, are marked **CC** Standard lines of malleable and cast iron screwed fittings and forged steel screwed fittings are marked **C** Cast steel valves and cast steel flanged fittings are marked CRANE STEEL 卐 Cast steel screwed fittings are marked with **CRANE** or **C** on one side and 卐 on the other. Forged steel valves have **CRANE** on the center piece and **C** on the body.

Drainage Fittings

These fittings are made with a shoulder, and are same size inside diameter as wrought pipe. The pipe screws in up to the shoulder, making a continuous passage, leaving no pockets for solid matter to lodge in, thus preventing the choking of pipe. They are heavy and strong enough safely to withstand strain of settling.

These fittings also are recommended for vacuum systems and should be galvanized.

Unions and Union Fittings

RAILROAD UNION

This line is unusually complete and selections can be readily made for any requirement. The "brass to iron" seat unions and fittings are positively leakproof and can be taken apart easily. They have been examined and tested by the Underwriters' Laboratories, Inc., and listed by the Consulting Engineers of the National Board of Fire Underwriters.

Standard Crane Valves

Valves are well proportioned, of good weight and sufficiently strong to stand more than their designated steam working pressures. They are thoroughly tested under steam pressures before leaving the factory.

The construction of Crane standard valves is such that they may be packed when open without steam escaping.

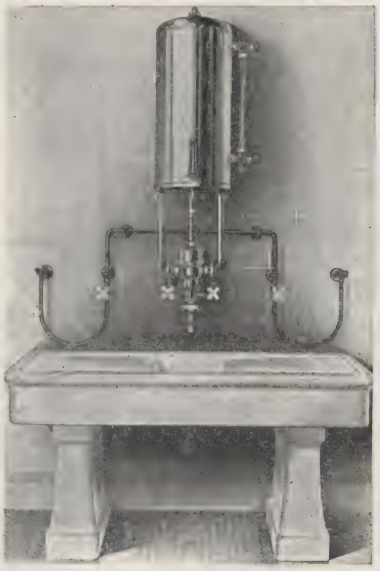
No. 12. BRASS GLOBE VALVE

No. 440. STANDARD BRASS GATE VALVE

Continued on next page

Porcelain Baby Bath

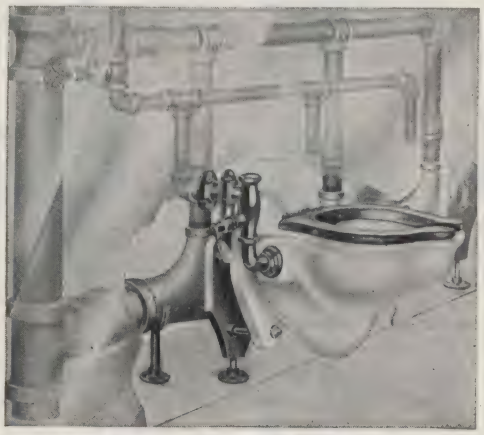
For hospital maternity wards. The supply to the tank is carried through a thermostatic valve which automatically will maintain any predetermined temperature. Water is fed to the sprays by gravity, thus preventing a high pressure.



PORCELAIN BABY BATH FOR HOSPITAL MATERNITY WARDS

"Expedio" Wall Closet

"Expedio" heavy vitroware wall closet with Crane "Hulbert" fittings and "air controlled" valve will accommodate as many as 12 closets in a single battery, or 24 in a double battery *without the horizontal waste line going below the floor.*



"EXPEDIO" WALL CLOSET WITH CRANE "HULBERT" FITTINGS AND "AIR CONTROLLED" VALVE

Fitted with ebony finish Whale-bonite Serpentine seat, with concealed reinforcement and hinge. All exposed metal parts are polished and nickel-plated. Recommended especially for buildings of fireproof construction.

"Corsyn" All-white Noiseless Closet Combination

Combination siphon jet closet with vitroware low tank.

No metal parts exposed.

Fitted with white Sanitoure finish seat and lid. Floor flange with bolts with china caps.

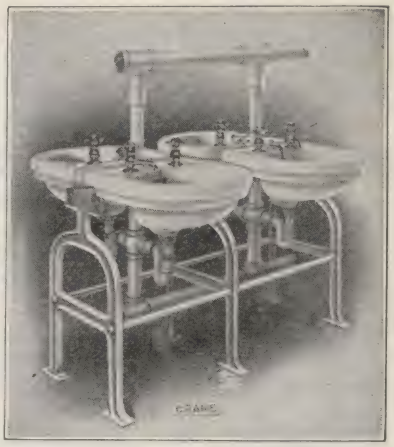
"CORSYN" ALL-WHITE NOISELESS CLOSET COMBINATION

Its *quiet* action makes it a popular closet for the home.

Crane Industrial Plumbing Fixtures

The Crane line of plumbing goods includes the most modern and efficient fixtures for factory sanitation, and are installed in many of the largest industrial plants.

Send for industrial plumbing circulars.



TYPICAL CRANE INDUSTRIAL PLUMBING INSTALLATION

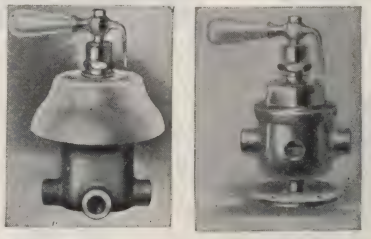
Crane Drinking Fountain

The Crane line of drinking fountains includes many designs for various uses.

"CRETA" VITROWARE DRINKING FOUNTAIN WITH INTEGRAL ANGLE SUPPLY NOZZLE

Crane Quick Opening Shower Mixing Valves

These valves are a combination of two compression valves in a single body, with plungers arranged to deliver either cold, mixed, or hot water, according to the position of the handle. All parts of these valves are extra heavy; made with removable seats and self-adjusting stuffing box.



CRANE QUICK OPENING SHOWER MIXING VALVES

"Nova" Vitroware Lavatory

Made of snow white vitreous china, with integral overflow and splash lip. The combination fitting delivers tempered water to the bowl through a single spout.

This lavatory is especially suitable for the home, club and high class hotel.

"NOVA" VITROWARE LAVATORY WITH INTEGRAL SPOUT

Crane Plumbing Catalogue

For complete line of Crane plumbing fixtures refer to General Crane Plumbing Catalogue "C."

Most of the Crane sales offices contain exhibit rooms, to which the public is cordially invited, where Crane products may be seen in actual operation.

JENKINS BROS.

Manufacturers of Valves

PRINCIPAL STORES AND OFFICES

80 White Street
NEW YORK, N. Y.

524 Atlantic Avenue
BOSTON, MASS.

133 North 7th Street
PHILADELPHIA, PA.

646 Washington Boulevard
CHICAGO, ILL.

FACTORIES IN ELIZABETH, N. J. and BRIDGEPORT, CONN.

JENKINS BROS., LIMITED
CANADIAN WORKS AND HEAD OFFICE: MONTREAL, QUE., 103 St. Remi Street
LONDON OFFICE: 6 Great Queen Street, Kingsway, W. C. 2

Products

JENKINS GLOBE, ANGLE, CROSS, CHECK, HOSE, BLOW-OFF, SAFETY and GATE VALVES.

RADIATOR SUPPLY VALVES.

AUTOMATIC RADIATOR AIR VALVES.

Also, Back Pressure or Exhaust Valves; Rapid Action Valves; Marine Valves; Steam Traps; Gage Cocks.

Mechanical Rubber Goods: Jenkins '96 and Jenarco Sheet Packing, Gaskets, etc. Compressed Asbestos Jointing.

REG. U.S. PAT. OFF. TRADE JENKINS MARK Jenkins Bros

Brass and Iron Body Valves, Standard Pattern

Jenkins valves, standard pattern, all have the feature of renewable disc and disc-holder as shown in the sectional cut of Fig. 106. The renewable disc, first introduced by JENKINS BROS. many years ago, assures absolute tightness. The flexibility of the Jenkins disc secures perfect seat contact and is a most important improvement in valve construction. For steam use, the discs are made of hard composition, which becomes pliable under the action of steam; for water, gas and air service, somewhat softer compounds are furnished.

If grit or scale lodges on the seat it does not seriously injure the valve body, but it becomes embedded in the composition disc, thus saving the valve seat. Discs worn out in service can be replaced easily and quickly at very little expense. A new disc makes practically a new valve. All other parts are standardized and perfectly interchangeable. The valves seldom wear out completely.

FIG. 114
Hose Angle Valve

FIG. 106
Globe Valve

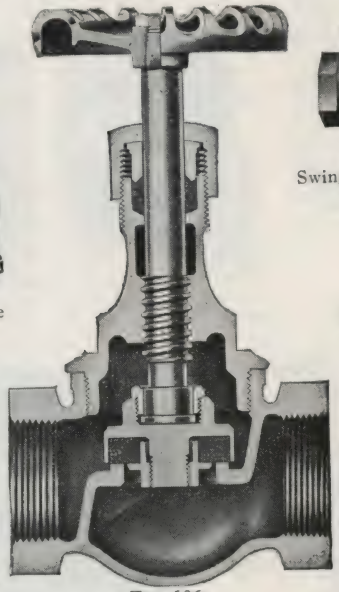


FIG. 106
Sectional View

FIG. 352
Swing Check Valve

FIG. 108
Angle Valve

BRASS VALVES, STANDARD PATTERN

Radiator Valves

Jenkins globe and angle radiator valves are of the same pattern and construction as the standard pattern valves, previously described. These are carefully made of a superior grade of metal, and are unusually heavy and durable. Finished valves take a rich bronze color when polished, making them particularly desirable for the finer grades of work.

Regularly furnished with black hardwood wheels; or, if desired, with brass, wire or iron wheels. Lock shield valves, to be operated with key (as Figs. 170 and 171), designed to circumvent annoyance of tampering, can be supplied in all the different patterns. Corner valves are made in two patterns—regular and offset. Offset globe and corner valves (Figs. 173A and 180) have the inlet at the lowest point, to avoid trapping of water and hammering on first admission of steam.

FIG. 166
W. W. Angle, Screwed

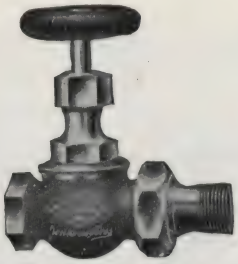


FIG. 167
W. W. Globe, with Union

FIG. 168
W. W. Angle, with Union

RADIATOR VALVES

FIG. 310
Brass Wheel Globe

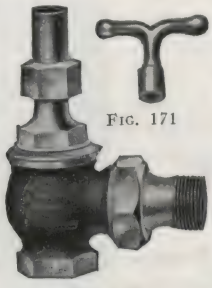


FIG. 171

FIG. 170
Lock Shield Angle

FIG. 173A
Offset Globe

RADIATOR VALVES

For hot water heating, valves may be had, without extra charge, with a small hole drilled through diaphragm to permit slight circulation of water through radiator. When specified for hot water heating systems *using forced circulation,* valves are specially fitted for the service.

Continued on next page

Regular styles of finish follow:

Rough body, finished trimmings, No. 1 screwed, No. 6 with union
Finished and polished all over, No. 2 screwed, No. 7 with union
Rough body, nickelplated trimmings, No. 3 screwed, No. 8 with union
Rough body, nickelplated all over, No. 4 screwed, No. 9 with union
Finished and nickelplated all over, No. 5 screwed, No. 10 with union

Jenkins improved automatic air valves (Figs. 190 to 193) are used to automatically remove air from radiators and heating coils. All finished and nickelplated.

Regular sizes, ⅛ and ¼ in.; also, ⅜-in. size for long runs or large stacks, and the Jenkins Diamond traps, sizes ½ and ¾ in.

Fig. 190 Fig. 191 Fig. 193

Improved Automatic Air Valves

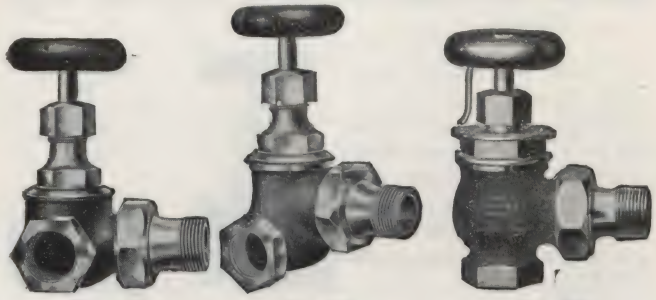


Fig. 176 Regular Corner — Fig. 180 Offset Corner — Fig. 300 Fractional

Radiator Valves

Recent developments in the manufacture of valves for steam heating apparatus have enabled us to perfect a line of devices suitable for all classes of steam circulation in connection with atmospheric, vacuum return line and vapor systems. This includes differential and automatic impulse check valves, also the Jenkins fractional radiator valves (as Fig. 300). The fractional valve has dial indicator, and opens wide in five-sixths of a turn. The opening is correctly graduated and partial heating of the radiator is easily controlled.

Extra Heavy Valves

Jenkins extra heavy valves are a distinct line, especially designed for use under high pressure and severe conditions. These are of representative Jenkins Bros. quality. They are carefully designed, well proportioned and handsomely finished.

The brass globe, angle, cross, check and Y valves are made either screwed or flanged. They are guaranteed for working steam pressures up to 300 lbs., or hydraulic and air pressures up to 800 lbs.

Iron body valves are made in globe, angle, cross, check, automatic equalizing stop and check, and Y patterns, either screwed or flanged. The larger sizes can be supplied with by-passes cast integral with the body.

The bodies, yokes and disc holders are made of high grade cast iron; the spindles, renewable seat rings and discs, of durable steam metal composition. Flanges have raised faces inside of bolt holes; and are made in accordance with the new American Extra Heavy Standard, unless otherwise specified. Before leaving the factory they are carefully tested under 800 lbs. hydraulic pressure, and guaranteed for working steam pressures up to 250 lbs.

Jenkins automatic equalizing stop and check valves are especially adapted to prevent boiler room accidents and to equalize the pressure between the different boilers in a battery. This type is made in extra heavy globe or angle patterns, with iron or cast steel bodies.

Gate Valves

Jenkins gate valves are made in brass or iron body in three patterns: standard, for 125 lbs. working steam pressure or 175 lbs. water; medium, for 175 lbs. steam or 250 lbs. water; extra heavy for 250 lbs. steam or 400 water.

They are of the solid wedge, double face type. One of the important features of these valves is the improved globe shaped body. This new design is used because it secures the greatest possible strength, good proportion, and neat appearance.

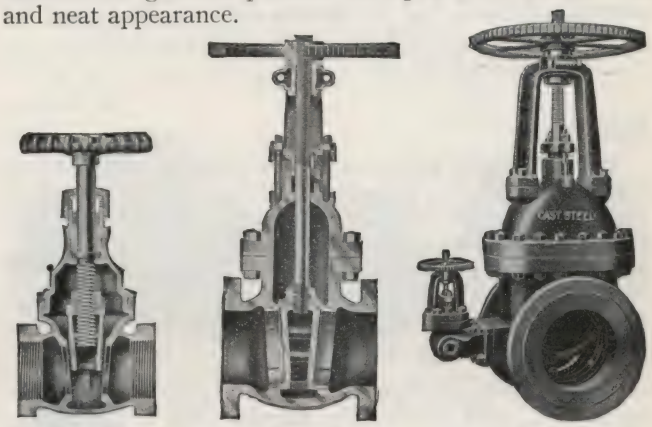


Fig. 270 Brass Gate, with Inside Screw — Fig. 245 Extra Heavy Iron Body Gate, with Outside Screw and Yoke — Fig. 389 Cast Steel Gate, Outside Screw and Yoke, with By-pass

Gate Valves

They are made with inside screw, stationary spindle; or, with outside screw and yoke, traveling spindle.

Cast Steel Valves

Jenkins cast steel valves are made in globe, angle, gate, check, and automatic equalizing stop and check patterns. They are well adapted to the severe conditions incident to high pressure superheated steam service.

The valves are suitable for working steam pressures up to 350 lbs., and 360° superheat, making a total temperature of 800° Fahr.

Quality and Guarantee

Each Jenkins valve is made for the maximum service, not merely for the average. Behind the name and Diamond trade-mark on all *genuine* Jenkins valves stands the famous guarantee which has been adequately maintained for a period of over 57 years.

"If you will put a *genuine* Jenkins valve on the worst place you can find, where you can not keep other valves tight, and if it is not perfectly tight, or does not hold steam, acids, water or other fluids longer than any other valve, you may return it and your money will be refunded."

Specification

"All valves shall be genuine Jenkins bearing the name 'Jenkins' within a diamond mark." For convenience, and to avoid possible mistakes, it is suggested that figure numbers also be specified.

Catalogue

A catalogue of all the Jenkins valves, giving sizes, styles and list prices, mailed on request.

THE KENNEDY VALVE MFG. CO.

General Offices and Works
ELMIRA, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 95 John Street—Telephone, Beekman 1430
BOSTON, MASS., 47 India Street
SAN FRANCISCO, CAL., 23-25 Minna Street
CHICAGO, ILL., 228 North Jefferson Street

AGENCIES

SALT LAKE CITY, UTAH
SEATTLE, WASH.
EL PASO, TEX.

Products

VALVES, for power, heating, fire protection, water supply, plumbing, etc., in Bronze and Iron Body, and in Gate, Globe, Angle, Check and Radiator types.

FIRE HYDRANTS.

Guarantee

All Kennedy products are thoroughly tested before leaving the works. Should any defects develop in their proper use in the service for which they are manufactured and sold, such products will be replaced.

Standard Bronze Gate Valves—Solid Wedge Gate Valves

Solid wedge discs are used in sizes up to 3 in., and double disc parallel seats 3½ in. and larger. Stem is stationary.

Sizes ¼ to 3 in. are for working pressures up to 150-lb. water, or 125-lb. steam; 3½ in. to 6 in. for working pressures up to 125-lb. water, or 100-lb. steam, and made with bolted bonnet. With or without gland in stuffing box.

FIG. 27
STANDARD BRONZE GATE VALVE SCREWED

STANDARD BRONZE GATE VALVES (SCREWED), FIG. 27

Size, in.	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
End to end, in.	2	2	2	2¼	2¾	3⅛	3⅛	3⅝	4⅜	4 11/16	5¾	6
Center to top of wheel, in.	3⅜	3 9/16	3 15/16	4⅝	5 5/16	5 11/16	6⅜	7 1/16	9	10 9/16	11½	13

STANDARD BRONZE GATE VALVES (FLANGED)

Size, in.	2	2½	3	3½	4	5	6
Face to face, flanged in.	4¾	5½	6	6½	7	8	9
Diameter flanges in.	6	7	7½	8½	9	10	11

Medium and Extra Heavy Bronze Gate Valves

Made with iron wheel, solid wedge disc and stationary stem. Gland followers in stuffing box.

Fig. 37, for 250-lb. water, or 200-lb. steam.

Fig. 40, for working pressures up to 300-lb. water, or up to 250-lb. steam.

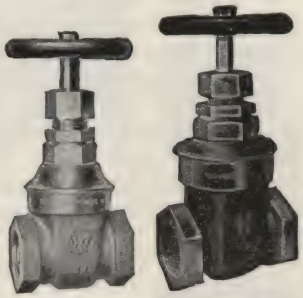


FIG. 37 FIG. 40
MEDIUM AND EXTRA HEAVY BRONZE GATE VALVES

MEDIUM BRONZE GATE VALVES, FIG. 37

Size, in.	½	¾	1	1¼	1½	2	2½	3
End to end, in.	2 5/16	2½	2 15/16	3¼	3 7/16	4	4 5/8	5 13/16
Center to top of wheel, in.	4 11/16	5¼	5¾	6⅝	7⅝	8½	10⅜	12½

EXTRA HEAVY BRONZE SCREWED GATE VALVES, FIG. 40

Size, in.	⅜	½	¾	1	1¼	1½	2	2½	3
End to end, in.		2⅝	3⅛	3½	3⅞	4⅜	5⅝	6⅛	6¾
Center of opening to top of stem, in.	?	5	6	7	7⅞	8¾	10½	12⅜	14

Standard and Regrinding Bronze Globe and Angle Valves

The regrinding feature permits seats to be renewed without disturbing pipe lines. Made with non-heating wheel and extra strong body reinforcement. Sizes ½ to 2 in. for maximum pressure of 125-lb. steam, or 150-lb. water. Also in sizes ⅛ to 2 in. for 200-lb. steam, or 225-lb. water.

FIG. 150
STANDARD BRONZE GLOBE VALVE

FIG. 134
REGRINDING BRONZE GLOBE VALVE

Kennedy Renewable Disc, Heavy Bronze Globe Valves

Iron wheel. For working pressures up to 175-lb. water, or 150-lb. steam. Made in globe (Fig. 91) and angle (Fig. 92) types. Specify if to be used for cold water, air or other services requiring special soft discs.

Sizes, ¼, ⅜, ½, ¾, 1, 1½, 2, 2½ and 3 in.

FIG. 91
RENEWABLE DISC BRONZE GLOBE VALVE

Kennedy Renewable Disc, Heavy Bronze Radiator Valves

Wood wheel. For working pressures up to 175-lb. water, or 150-lb. steam, with gland in stuffing box. Made in right-hand and left-hand corner types, also with male unions.

Sizes, ½, ¾, 1, 1¼, 1½ and 2 in.

Iron Body Gate Valves

These are bronze mounted, or all-iron with steel stems and are equipped with double discs.

Stems on inside screw valves are of manganese bronze of at least 50,000-lb. tensile strength. On outside rising stem and yoke valves they are of steel, unless otherwise specified.

FIG. 95
BRONZE RADIATOR VALVE

Continued on next page

FIG. 57. Screwed

FIG. 58. Flanged

FIG. 59. Bell End

STANDARD IRON BODY, BRONZE MOUNTED GATE VALVES

With double discs, parallel seats, inside stationary stem of bronze of 50,000-lb. tensile strength

WORKING PRESSURES IN POUNDS PER SQUARE INCH, FOR STANDARD IRON BODY, BRONZE MOUNTED GATE VALVES

Sizes	Figs. 57 and 58		Fig. 59
	Water	Steam	Water
8 in. and smaller	150	125	125
9, 10 and 12 in.	125	100	125
14 in. and larger	100	...	100
Ribbed, 14 in. and larger	150	...	150

Sizes, in.: 1½, 2, 2½, 3, 3½, 4, 4½, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24 (geared), 30, 36, (42 and 48 with by-pass).

Underwriters' Type Iron Body, Bronze Mounted Gate Valves

Double discs with parallel seats. Outside rising stem and yoke. This form of stem makes a positive indicator as to whether valve is partly or wholly open or closed.

Sizes 8 in. and smaller for working pressures up to 150-lb. water, or 125-lb. steam. Sizes 9 in. and larger for working pressures up to 125-lb. water, or 100-lb. steam.

Sizes, 2½, 3, 3½, 4, 5, 6, 7, 8, 10, 12 and 14 in.

FIG. 68. UNDERWRITERS' TYPE IRON BODY, BRONZE MOUNTED GATE VALVE

Medium and Heavy Iron Body, Bronze Mounted Gate Valves

With double discs and taper seats. Heavier than standard valves and designed for higher pressures, being suitable for working steam pressures up to 175-lb. for medium patterns, and 250-lb. for heavy pattern. Stems of all sizes of Figs. 74 and 76, and 5 in. and smaller of Figs. 75 and 77 made of bronze of at least 50,000-lb. tensile strength; and of steel, 6 in. and larger of Figs. 75 and 77, although they can be furnished of bronze at a reasonable extra price.

Attention is called to the self-packing feature, both in the inside screw and outside screw and yoke styles.

Sizes, 2½, 3, 3½, 4, 4½, 5, 6, 7, 8, 10 and 12 in.

FIG. 76. Heavy, Stationary Stem

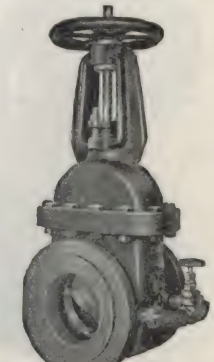


FIG. 75. Medium, Outside Rising Stem and Yoke

FLANGED IRON BODY, BRONZE MOUNTED GATE VALVES

Kennedy Heavy Iron Body, Bronze Mounted Renewable Disc Globe and Angle Valves

For working pressures up to 150-lb. water, or 125-lb. steam. Made in globe and angle types.

Sizes, 2, 2½, 3, 3½, 4, 4½, 5, 6, 7, 8 and 10 in. Screwed and flanged.

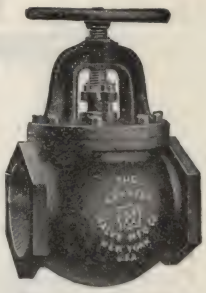


FIG. 100. KENNEDY HEAVY IRON BODY BRONZE MOUNTED RENEWABLE DISC GLOBE VALVE

Swing Check Valves

Fig. 103, a heavy bronze valve for 125-lb. steam or 150-lb. water pressure. Sizes, screwed ends: ⅜, ½, ¾, 1, 1¼, 1½, 2, 2½ and 3 in.; flanged and bell ends: 2½ to 12 in.

Figs. 105 and 106, iron body bronze mounted valves for 100-lb. steam, or 150-lb. water pressure. Sizes 2½, 3, 3½, 4, 4½, 5, 6, 7, 8, 10 and 12 in.

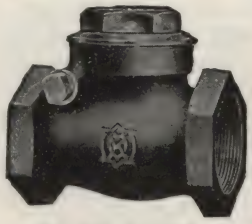


FIG. 103. Screwed BRONZE SWING CHECK VALVE

FIG. 105. Screwed

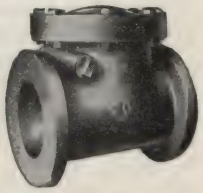


FIG. 106. Flanged IRON BODY, BRONZE MOUNTED SWING CHECK VALVES

Pennie Back Water Valve

A perfect seal against back water, gas and vermin. Its balanced disc offers no resistance to outflow of sewage. Absolutely positive in operation in any position. Will stand smoke and other tests in every case and fit either standard or extra heavy soil pipe. Disc, seats, axle pivots, screws, cover bolts and nuts are made of non-corrosive brass. Used by street railways and gas companies to keep manholes dry.

Sizes, 2, 3, 4, 5, 6, 8, 10 and 12 in.

PENNIE BACK WATER VALVE

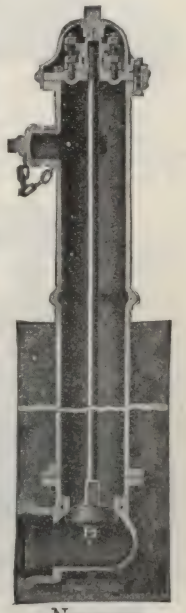
Kennedy Newtype Fire Hydrants

These hydrants are of the compression type.

They are constructed so that, in closing, the inlet valve operates in the same direction as the pressure from the main, and thus, when closed, this pressure aids the action of the stem in keeping the valve tight. In case of accident of any kind to the upper part of hydrant, such as breakage of standpipe by collision of passing vehicles, etc., resulting in the relaxing of the tension of the stem on the valve, the pressure from the main will retain the valve in its closed position, thus preventing inconvenience or damage from loss of water, flooded streets or cellars, etc. No special mechanism is required to accomplish this, as in the case of some other types.

FIRE HYDRANTS

Size of hydrant, in.	4	5	6
Diameter inlet valve, in.	4¼	5¼	6¼
Diameter, standpipe, in.	6	7	8¼
Ground line to center of nozzle (a), in.	17	18	18
Center of nozzle to top of hydrant (b), in.	12½	13¾	15
Ground line to top of hydrant (c), in.	29½	31¾	33



NEWTYPE COMPRESSION FIRE HYDRANT

WALWORTH MANUFACTURING COMPANY

Valves, Fittings and Tools for Steam, Water, Oil, Gas and Air

BOSTON, MASS.

For Branches, see page 572

Products

VALVES: Standard Brass Globe Valves, screwed and flanged; Kewanee Regrinding Globe Valves, screwed and flanged; Iron Body Outside Screw and Yoke Gate Valves for 175 lbs. and 250 lbs. steam pressure; Iron Body Extra Heavy Flanged Swing Check Valves; Standard Brass Gate Valves, screwed; Standard Hose Gate Valves; Standard Iron Body Inside Screw Gate Valves with wedge gate non-rising stem; Iron Body Inside Screw Gate Valves with double disc rising stem; WALMANCO FLANGES; STEEL HEADERS with Welded Nozzles; WALWORTH PIPE BENDS.

We also manufacture a complete line of Cast Iron, Malleable, and Brass Fittings; Pipe Brackets; Hangers; Walmanco Joints; Brass, Iron and Steel Expansion Joints; Floor Stands; Cast Iron Headers; Grease and Oil Cups; Radiators, Radiator Valves, Water Gauges. Brass and Iron Safety Valves; Kewanee Unions; Brass and Wrought Nipples; Walworth Spring Plug Cocks; Genuine Walworth Stillson Wrench, Walco Hex Wrench, Walworth Parmelee Wrench, Walworth Reversible Boston Wrench; Well Points; Renewable Disc Valves, Underwriters' Indicator Valves; Brass and Iron Steam Cocks, Brass Service Cocks, Stop and Waste Cocks; Walworth Pipe Vise; Klingfast Pipe Vise; Pipe Taps and Reamers, Pipe Dies, Pipe Railings; Circulating Boiler Fittings; Cast Iron Flanged Pipe.

Power Piping Equipment, for saturated and superheated steam, water, oil and gas.

Fig. A3041
Screwed

Fig. A3051
Flanged

STANDARD BRASS GLOBE VALVES

For 125 lbs. steam working pressure, screwed or flanged ends. May be repacked while under pressure if valve is wide open. Also furnished in angle and cross patterns. Sizes, ⅛ to 3 in.

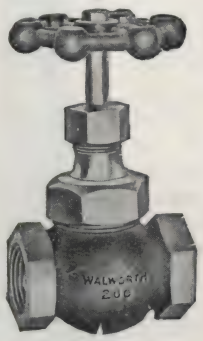


Fig. A3251
Screwed

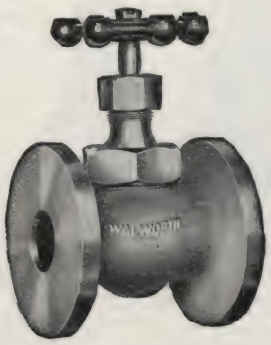


Fig. A3261
Flanged

KEWANEE REGRINDING BRASS GLOBE VALVES

For 200 lbs. steam pressure. Our Kewanee grinding valve can be reground without disconnecting it. All parts are made interchangeable. Sizes, ¼ to 3 in. screwed; 1 to 3 in. flanged

For Steel Flag Poles and Automobile Washers, see pages 572-573.

Valves

Our valves are made from new patterns covering the most approved design and of materials always suitable for the particular requirements specified.

Fig. A3682

IRON BODY EXTRA HEAVY FLANGED SWING CHECK VALVE

For 250 lbs. steam pressure, brass mounted. Sizes, 2 to 10 in. screwed; 2 to 12 in. flanged. Also furnished in cast steel for 350 lbs. steam pressure

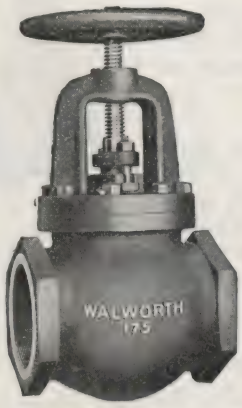


Fig. A3621

Fig. A3631

IRON BODY GLOBE VALVES

With outside screw and yoke for 175 lbs. steam pressure. Globe and angle patterns. Sizes, 2 to 8 in. screwed; 2 to 12 in. flanged. May be packed while under pressure

Fig. A3651

Fig. A3661

IRON BODY EXTRA HEAVY GLOBE VALVES

With outside screw and yoke for 250 lbs. steam pressure. Sizes, 2 to 8 in. screwed; 2 to 12 in. flanged. May be repacked while under pressure

Continued on next page

FIG. A2451 WALCO GATE VALVE

For 100 lbs. steam pressure. Non-rising stem, wedge gate with gland. Sizes, ½ to 2 in.; screwed ends

FIG. A2471 FEDERAL GATE VALVE

For 125 lbs. steam pressure. Non-rising stem, wedge gate with gland. Sizes ⅜ to 3 in. screwed; ½ to 3 in. flanged

FIG. A2461 KAY GATE VALVE

For 125 lbs. steam pressure. Rising stem, double disc, parallel seats. Sizes, ¼ to 3 in. screwed; 1 to 3 in. flanged

FIG. A2941 CAST STEEL GATE VALVE

For 250 lbs. steam pressure; 500 lbs. cold water pressure. Bronze trimmings. Sizes 2½ to 12 in., flanged ends

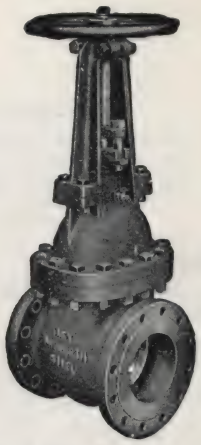


FIG. A2981 CAST STEEL GATE VALVE

For 350 lbs. steam pressure. Total temperature, 800°. Sizes, 2 to 24 in., flanged ends.

Also furnished with by-pass; sizes, 6 to 24 in.

FIG. A2481 KEBO GATE VALVE

For 200 lbs. steam pressure. Tested to 800 lbs. hydraulic pressure. Total temperature, 500°. Non-rising stem, wedge gate with gland. Sizes, ½ to 3 in., screwed; 1 to 3 in. flanged

FIG. 2511 "WALWORTH" GATE VALVE

For 300 lbs. steam pressure. Tested to 800 lbs. hydraulic pressure. Total temperature, 700°. Non-rising stem, wedge gate with gland. Sizes, ½ to 3 in. screwed; 1 to 3 in. flanged

FIG. A2533 FEDERAL HOSE GATE VALVE

For 125 lbs. steam pressure. With or without cap and chain. Iron or brass wheel. Sizes, 1 to 2½ in.

FIG. A2621 SCREWED GATE VALVE

Wedge Gate

For 125 lbs. steam pressure. Sizes, 2 to 6 in. screwed; 2 to 24 in. flanged

FIG. A2622 FLANGED GATE VALVE

Wedge Gate

For 175 lbs., 2 to 10 in. screwed; 2 to 12 in. flanged. For 250 lbs., 2 to 10 in. screwed; 2 to 12 in. flanged. May be repacked while under pressure

FIG. A2661 SCREWED GATE VALVE

Double Disc

For 125 lbs. steam pressure. Sizes, 2 to 6 in. screwed; 2 to 6 in. flanged.

Also furnished with rising stem, and outside screw and yoke. Sizes, 2 to 6 in. screwed and flanged. May be repacked while under pressure

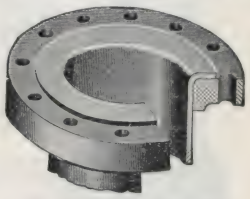
Power Plant Piping

We furnish complete piping equipment for power plants of every description for the highest pressures and superheats. Our exceptional facilities and extensive experience enables us to produce the best in power piping.

Submit power piping problems to our engineers for a satisfactory solution.

Walmanco Pipe Flanges

The first flanges of this type on the market. They have had many years of service under the most severe conditions. Their chief advantages are: pipe is not weakened by threading; gasket bears on face of lap to prevent leaks; flange swivels on pipe, has maximum strength and is not subject to torsional strains in attaching.



WALMANCO FLANGE

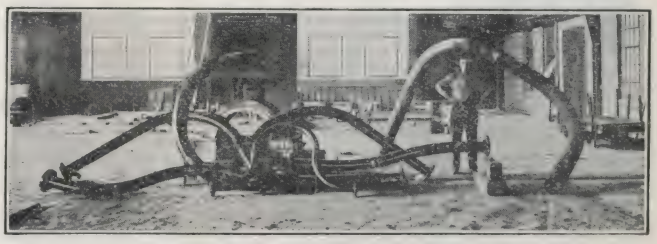
Wrought Steel Headers with Welded-in Nozzles and Cast Steel Headers

For modern requirements of high pressures and temperatures. Steel headers are particularly useful where strength and lightness are desired. Made up with Walmanco flanges.

STEEL HEADER WITH WELDED-IN NOZZLES AND WALMANCO FLANGES

Pipe Bends

Bends of all shapes, radii and sizes in steel and wrought iron, made with standard and extra heavy fittings for all purposes. Table of standard bends sent on request.



ONE ORDER OF WOOLWORTH PIPE BENDS

READING STEEL CASTING CO., INC.

PRATT AND CADY DIVISION

Manufacturers of Valves and Cocks

BRIDGEPORT, CONN.

BRANCHES

BOSTON, MASS., 35 Hartford Street
CHICAGO, ILL., 208 So. La Salle Street
NEW YORK, N. Y., 259 Canal Street
PITTSBURGH, PA., Third Avenue and Ross Street
PHILADELPHIA, PA., 529 Arch Street
SAN FRANCISCO, CAL., 198 Second Street
ST. PAUL, MINN., 727 Pillsbury Avenue
HOUSTON, TEX., 3017 Brazos Street
CLEVELAND, OHIO, 1597 St. Claire Avenue
DETROIT, MICH., 252 W. Jefferson Avenue

Products

BRONZE and IRON VALVES and COCKS for all services.

Bronze Globe and Angle Valves

Renewable Disc Type—Made in sizes ⅛ to 3 in., inclusive, in two weights, suitable for 150 and 250 lbs. steam pressure. Both weights are made with screwed hubs and the 150-lb. line is also made with a union bonnet. The 150-lb. lines have the well-known P&C renewable asbestos disc; the 250-lb. line has a renewable solid bronze disc and renewable seat ring.

BRONZE GLOBE VALVE

Regrinding Type—Made in sizes ⅛ to 3 in., inclusive, in three weights, suitable for 200, 250, and 300 lbs. steam pressure. These valves are of the regrinding type and carry certain special features which make them particularly suitable for severe service. The 300-lb. line can be equipped with renewable seat rings when so ordered.

Iron Body Globe and Angle Valves

Made in two styles, one with renewable asbestos disc for 150 lbs. steam; and the other with 45° seat, in two weights, 150 and 250 lbs. steam pressure.

IRON BODY GLOBE VALVE, FLANGED TYPE

The renewable asbestos disc type is made in sizes 2 to 14 in., inclusive.

The 45° seat valves are made in sizes 2 to 10 in., inclusive.

These valves are all built with renewable seat rings, can be packed under pressure and all parts renewed without taking the valve from the pipe line.

Bronze Gate Valves

Made in all sizes and in five weights, suitable for 125, 150, 175, and 250 lbs. steam pressure, and 800 lbs. water pressure. The 150,- 250- and 800-lb. lines have renewable seat rings which can be changed without removing the valve from the line.

IRON BODY GATE VALVE, FLANGED TYPE

All P&C gate valves are equipped with double faced bronze wedges which permit the pressure to be applied on either side and are reversible.

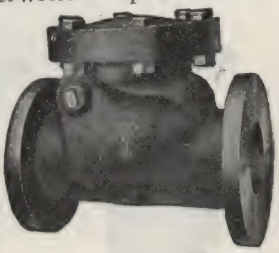
Iron Body Gate Valves

Made in sizes 2 to 16 in., inclusive, for 150 and 200 lbs. steam pressure, and sizes 2 to 24 in., inclusive, for 125 and 250 lbs. steam pressure. The 125-lb. line will be furnished built to underwriter specifications if desired. All the valves are bronze trimmed and have bronze faced solid wedges except the 125-lb. valves which can be furnished with a new design of adjustable wedges, so made as to have the advantages, but not the disadvantages, usual to a split wedge. These valves are made in the inside screw, outside screw and yoke, and quick opening type; and with screwed, flanged, or bell ends.

Swing Check Valves

Solid bronze swing check valves made in sizes ⅛ to 3 in., inclusive, for all pressures and purposes.

Iron body swing check valves made in sizes 2 to 24 in., inclusive, for 150 lbs. water. Sizes, 3 to 12 in., inclusive, conform to Fire Underwriters' specifications. We also make a line suitable for 300 lbs. water in sizes 2 to 12 in., inclusive. Working parts for any of our check valves can be renewed or the disc reground without removing the valve from the line. The only tools necessary for regrinding are a wrench and brace and bit. Made in screwed, flanged or bell ends.



SWING CHECK VALVE, FLANGED TYPE

Iron Body Water Gate Valves

Sizes, 3 to 36 in. for 125 to 150 lbs. water; 14 to 36 in. for 75 to 100 lbs. water, and 10 to 24 in. for 35 to 75 lbs. water working pressures. We also make high pressure hydraulic valves for 800 to 1500 lbs. working pressure in sizes 1½ to 12 in., with port diameter full size or same as double extra strong pipe. Valves are bronze trimmed. In opening, one turn of the spindle releases the wedge in the gate, allowing the valve to open freely without friction. Furnished with inside screw or outside screw and yoke. The 800-lb. line can be furnished either with solid wedge or double disc parallel seat.

WATER GATE VALVE, HUB END TYPE

Asbestos Packed Cocks

Solid bronze cocks in sizes ¼ to 4 in., inclusive, for 150 and 250 lbs. steam pressures.

Iron cocks in sizes ¼ to 4 in., inclusive, for 100 to 125, 150 to 200, and 250 lbs. steam pressures. Also made in sizes up to 10 in. for the various pressures with worm gear operating attachment.

The dovetailed "U" shaped grooves in the body are packed with prepared asbestos and afterwards subjected to a special vulcanizing process. An asbestos ring is used on the shoulder of the plug for top packing. The plug is carefully finished and barffed to make it rustproof. It has no metallic bearing, coming in contact only with the asbestos which compensates for the differential expansion of the plug and body.

These cocks give excellent results as boiler blow-off valves and other severe services where other types of valves fail.

ASBESTOS PACKED COCK WITH WORM AND GEAR ATTACHMENT

THE DAYTON PUMP & MANUFACTURING CO.

Oil Storage Systems

DAYTON, OHIO

Products

SELF-MEASURING GASOLINE PUMPS.

OIL STORAGE SYSTEMS.

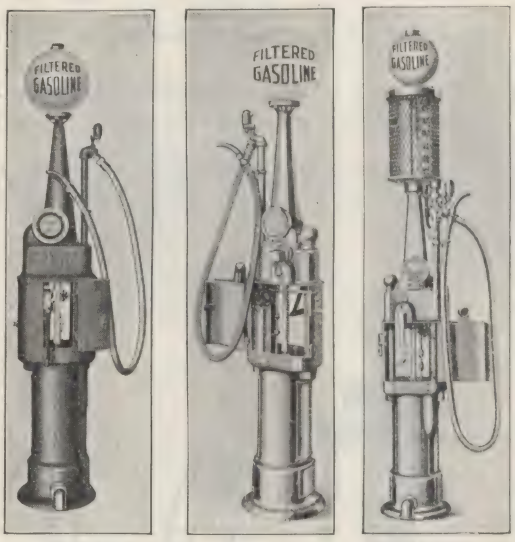
For Water Supply Systems, see pages 1462-1463.

TRADE-MARK

Rapidayton Gasoline Measuring Pumps

We manufacture gasoline measuring pumps for both outdoor and indoor use and for every filling requirement. A few of our leaders are shown in Fig. 1. They are universally known as "The Speed Pumps" and meet every requirement of impressive appearance, speed and ease of operation.

Various models are made to accurately measure and filter quantities from gallons to pints. Equipped with graduated set back discharge registers and continuous registering meters. Furnished with or without lighting attachments. Standard finish is red enamel.



No. 50 No. 25 No. 25-V

FIG. 1. A FEW OF THE MANY MODELS OF RAPIDAYTON GASOLINE MEASURING PUMPS

These pumps discharge 5 gals. in 15 crank turns or 20 gals. per minute. Nos. 50 and 25 are Underwriters' labeled

Rapidayton Underground Steel Storage Tanks

Oxy-acetylene welded throughout and carefully tested. Absolutely tight. Approved and labeled by Underwriters' Laboratories, Inc.

Furnished either black or galvanized.

RAPIDAYTON UNDERGROUND STEEL STORAGE TANKS

Bbls.	Capacity, gals	Diameter, in	Length, in.	Weight No. 16 gage	No 14 gage	No. 12 gage	No. 7 gage	¼ in
1	64	26	30	70	85	.....	.....	.....
2	122	30	42	105	165	.....	.....	.....
3	190	38	42	135	180	.....	.....	.....
4	220	38	48	.....	185	270	.....	.....
5	280	38	60	.....	240	315	520	710
7	405	38	84	.....	295	410	750	860
10	550	38	114	.....	360	495	830	*1075
15	800	48	108	.....	.....	620	1050	1450
20	1060	48	132	.....	.....	775	1280	1800
30	1500	58	150	.....	.....	.....	1950	.....
40	2000	58	180	.....	.....	.....	2265	.....

*Regularly supplied in ¼-in. thickness, size 42x92 in. For list of tank fittings, see Fig. 2.

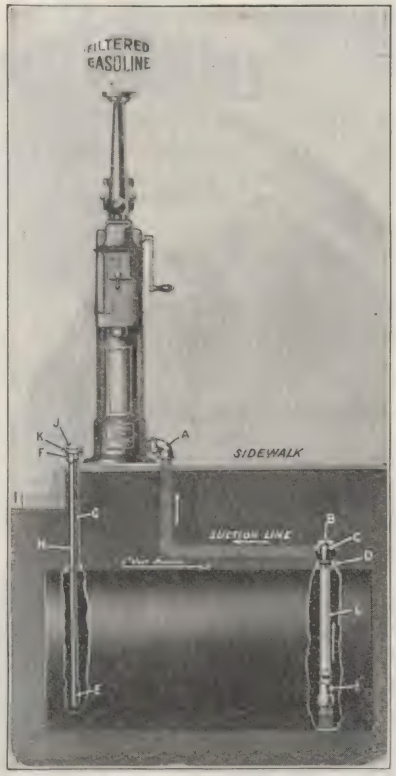


FIG. 2. COMPLETE RAPIDAYTON GASOLINE STORAGE SYSTEM WITH VENTED FILL CAP§

Consists of pump, tank and tank fittings. Tank fittings furnished with a complete Rapidayton system are:

A—Union ell furnished with pump
B—Male and female union
C—Street ell
D—Double tapped bushing
E—Fill tube strainer
F—Vented fill pipe head
G—Removable fill tube
H—Fill pipe
I—Brass double foot valve
J—Padlock
K—Fill pipe cap
L—Suction pipe inside of tank (suction pipe outside of tank not furnished)
Graduated measuring stick of hard maple

§When necessary to install a separate vent pipe, we will furnish the Rapidayton vent protector

Rapidayton Oil Storage Outfits

We manufacture numerous models of stationary and portable pumps and outfits for efficiently and economically handling all kinds of oil.

Rapidayton outfits are designed to save time, eliminate losses due to leakage, careless handling, absorption, evaporation or other causes.

Tanks are of steel, oxy-acetylene welded.

Pumps accurately measure gallons, half-gallons, quarts, pints and half-pints at a stroke.

Equipped with graduated set back discharge registers and continuous registering meters.

Standard finish is olive green enamel.

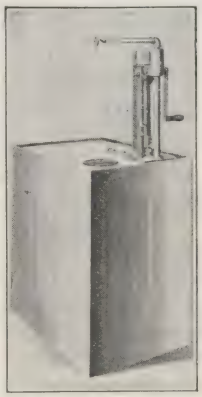


FIG. 3. NO. 44 RAPIDAYTON OIL PUMP AND TANK

FIG. 4. NO. 29 RAPIDAYTON OIL PUMP

FIG. 5. NO. 75 RAPIDAYTON PAINT OIL OUTFIT

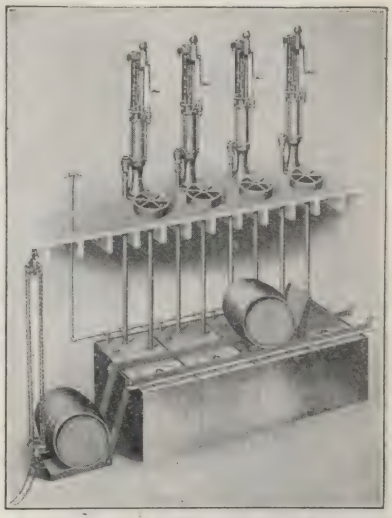


FIG. 6. NO. 74 RAPIDAYTON BATTERY BASEMENT LUBRICATING AND PAINT OIL OUTFIT

S. F. BOWSER & COMPANY, INC.

Pumps, Tanks and Oil Storage Systems

FORT WAYNE, IND.

S. F. BOWSER COMPANY, LTD., TORONTO, ONT.
S. F. BOWSER & COMPANY OF TEXAS, DALLAS, TEX.

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PORTLAND, ORE., 719-720 Corbett Building
KANSAS CITY, MO., 107 Railway Exchange Building
BUFFALO, N. Y., 305 Ellicott Square Building
COLUMBUS, OHIO, 128 E. Gay Street
OKLAHOMA CITY, OKLA., 412 North Broadway
BOSTON, MASS., 913-914 Colonial Building
WASHINGTON, D. C., 207 Evans Building

Products and Services

BOWSER ESTABLISHED 1885 TRADE-MARK

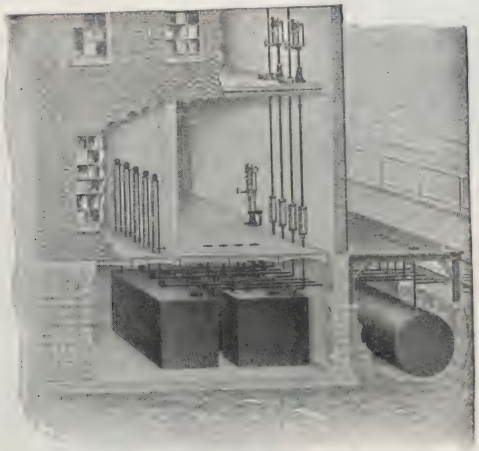
COMPLETE SYSTEMS for the STORAGE and CONTROL of OILS and GASOLINE; HAND and POWER DRIVEN PUMPS; OIL and GASOLINE STORAGE TANKS; DRY CLEANERS' NAPHTHA STORAGE and DISTRIBUTING SYSTEMS.

Also manufacturers of Oil Filtering and Circulating Systems; Cutting Oil Systems.

Expert Engineering Service furnished to all users of oils. Complete Oil Storage Systems designed and manufactured to meet all requirements wherever oils are handled—wholesale, retail or in the manufacture of any product.

Oil and Gasoline Storage and Distributing Systems

Adapted for storing, distributing, measuring and recording all kinds of oils, under varying conditions. Pumps can be placed at any convenient point. The tanks placed on workroom floor, in basement, pit, segregated oil house or underground, as may be required.



GASOLINE AND OIL STORAGE AND DISTRIBUTING SYSTEM SHOWING BASEMENT AND UNDERGROUND TANK

Curb Gasoline and Oil Pumps

Especially designed for stores, public and commercial garages and service stations, for the storing and handling of gasoline, kerosene and lubricating oils.

Pumps of from 1-gal to 5-gal. capacity at a stroke, measure intermediate quantities down to 1 qt.

Furnished with electric lighting arrangement, filter, hose and nozzle, discharge register, meter and other accessories as required.

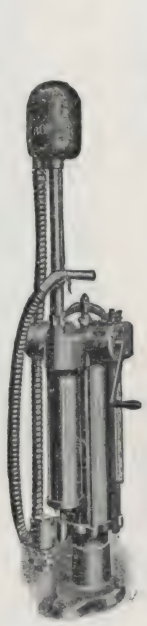


FIG. 101 5-GAL. GASOLINE PUMP FOR INSIDE BUILDING OR OUTSIDE WHERE PROTECTED FROM WEATHER

FIG. 99 5-GAL. GASOLINE PUMP FOR OUTSIDE USE, EITHER HAND OR AIR POWER OPERATED

FIG. 56 LUBE-STER, FOR LUBRICATING OIL SERVICE, 1 PT. AT A STROKE, FOOT POWER OPERATED

FIG. 241 1-GAL. GASOLINE PUMP FOR OUTSIDE INSTALLATION

Indoor Gasoline and Oil Systems

Especially designed for stores, garages, factories, mines, mills, powerhouses, oil houses, etc., for storing

Continued on next page

and measuring gasoline and oils in accurate quantities for use or sale.

Pumps measure on a complete stroke, 5 gals., 1 gal., or ½ gal., intermediate quantities down to 1 pt.

All tanks for storage of volatiles are buried underground. Equipment examined, approved, and labeled by Board of Underwriters.

Pumps equipped with discharge register, meter, filter, hose, hose drainer, portable nozzle and other accessories as required.

Portable Outfits for Gasoline and Lubricating Oil

For indoor or outdoor use; can be moved wherever needed; furnished with accessories.

Pumps from 1-qt. to 1-gal. capacity at a stroke, measure intermediate quantities.

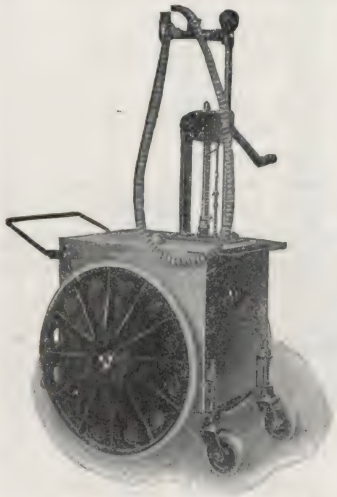


Fig. 121. Portable Gasoline Outfit

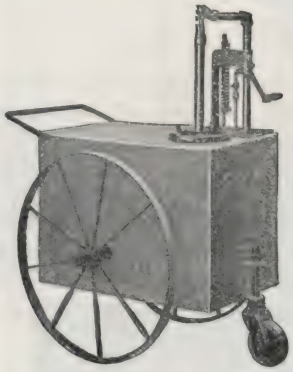


Fig. 154. Portable Lubricating Oil Outfit

Indoor Stationary Equipment for Paint, Lubricating and other Oils

Equipment furnished with pumps on tanks or with tanks in basement, pumps to be on first floor or upper floors, as desired.

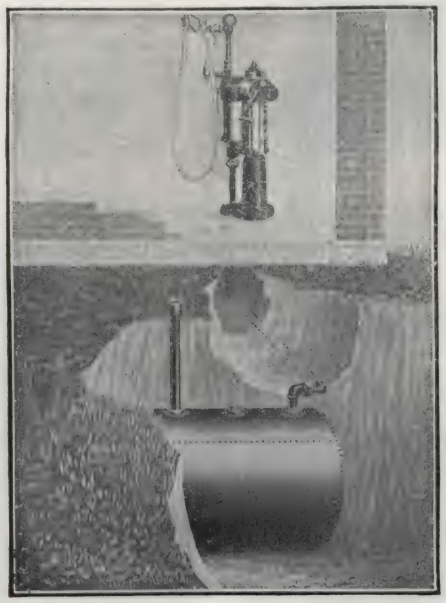


Fig. 103. Indoor Gasoline Pump, Showing Method of Connecting Underground Tank

Power Pumps

Plunger or rotary type for operation by belt or direct motor connection; varying styles and capacities to meet existing conditions and requirements.

Used wherever a power pump is an advantage over a hand operated pump.

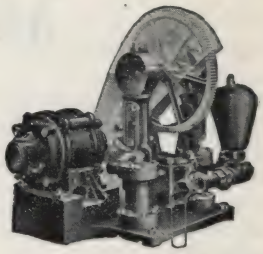


Fig. 706. Power Pump for Direct Motor Drive

Dry Cleaners' Naphtha Storage Equipment

"Standard" or "Premier" styles. Tanks installed underground, as many as necessary, of any desired capacity; cone bottom for settling naphtha. Pumps discharge naptha as desired to washers, still, washer to washer, back to tanks, etc.

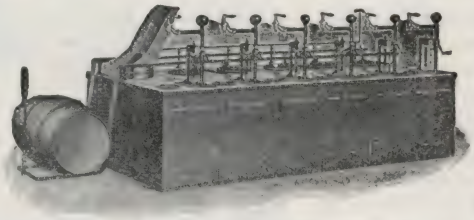


Fig. 109. First Floor Battery Unit for Paint and Other Oils

Tanks

For storage of volatiles, tanks are designed to be placed underground. Tanks for non-volatiles may be placed underground or inside building. For inside installation they are made rectangular and may be placed in battery formation, requiring minimum amount of floor space. All tanks riveted and soldered metal to metal, thoroughly painted, tested and inspected before shipment.

Furnished in varying capacities from 1 bbl. up.

Bulletins

Bulletins illustrating and describing in detail the construction and operation of equipment will be furnished on request.

Fig. 115. Cellar Storage Unit for Paint and Other Oils

Fig. 41. 1-Gal. Pump for Gasoline and Oils

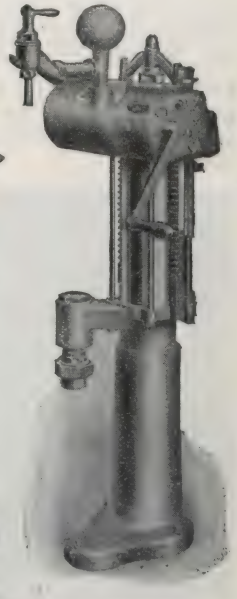


Fig. 106. 1-Gal. Pump for Oils

ART METAL CONSTRUCTION COMPANY

Steel and Bronze Interior Equipment

GENERAL OFFICES AND FACTORIES

JAMESTOWN, N. Y.

BRANCH OFFICES

ALBANY, N. Y., 90 State Street
BALTIMORE, MD., 120 West Fayette Street
BIRMINGHAM, ALA., 1020 Jefferson County Bank Building
BOSTON 9, MASS., 69 Federal Street
BUFFALO, N. Y., 11 South Division Street
CHICAGO, ILL., 434 Wabash Avenue
CINCINNATI, OHIO, 2003 Union Central Life Building
CLEVELAND, OHIO, 901-902 National City Bank Building
DALLAS, TEX., 1309 Kirby Building
DETROIT, MICH., 216 McKerchey Building
HARTFORD, CONN., 222 Pearl Street
INDIANAPOLIS, IND., 1012 Merchants Bank Building
KANSAS CITY, MO., 102 Scarritt Building
LONDON, E. C. 1, ENGLAND, 58 Holborn Viaduct
MINNEAPOLIS, MINN., 627 Plymouth Building
NEW YORK, N. Y., 369 Broadway
PITTSBURGH, PA., 315 Oliver Building
PORTLAND, MAINE, 19 Temple Street
SALT LAKE CITY, UTAH, 602 Deseret Bank Building
SEATTLE, WASH., 207 Central Building
WASHINGTON, D. C., 336 Southern Building

Products

Originators and world's largest makers of complete EQUIPMENT in STEEL and BRONZE for Banks, Libraries, Public Buildings, Commercial and Insurance Offices designed from architects' details and specifications:

Bank Fixtures and Furniture, Cages, Counter Screens, Desks, Doors, Filing Cabinets and Devices, Bookstacks, Library Fixtures, Grilles, Omnibuses, Partitions, Light Weight Safes, Screens, Shelving, Stairways, Tables, Trim, Vault Fittings, etc.

For Hollow Metal Doors see pages 668-669.

TRADE-MARK

Material, Workmanship and Finish

Art Metal steel equipment is made from plates of fine, open hearth steel, cold rolled, annealed, pickled and patent leveled. These plates are made especially for this class of work, and are smoooth, without scale and free from buckle.

The construction involves a scientific manipulation by improved machinery, the most finished handwork, and a careful assembling by skilled workmen through methods and processes that have been perfected and refined during 34 years of making this equipment. Mouldings and grilles of bronze are made from heavy extra-quality material.

All work is finished at the factory, applied by craftsmen, many of whom have spent a lifetime at the work. Depending on the product and finish, the parts are rubbed, sanded, imperfections puttied, and the final coat applied by the brush. The graining is nature idealized, and surpasses in beauty, woods of the finest selection. Every Art Metal product is finished before being fitted up, so that all surfaces are filled, thus preventing any oxidation. Hardware and trim of solid brass or bronze are suitably electroplated and lacquered.

Bank Interiors in Steel, Bronze and Marble

The engineering service of the ART METAL CONSTRUCTION COMPANY is not just to sell so much equipment, but to study the individual needs of banks and recommend methods of handling the work efficiently and economically. Working with the architect, this company furnishes complete interior equipment for any building, from the working drawing to satisfactory installation.

This organization is expert in assisting architects in laying out and handling routine work and in the technical details of producing economical and satisfactory equipment that has no equal.

INTERIOR STEUBENVILLE BANK & TRUST CO., STEUBENVILLE, OHIO

GENERAL LOBBY VIEW—CHECK DESK—QUACHITA NATIONAL BANK, MONROE, LA.

PUBLIC SPACE, FIRST-SECOND NATIONAL BANK, AKRON, OHIO

Continued on next page

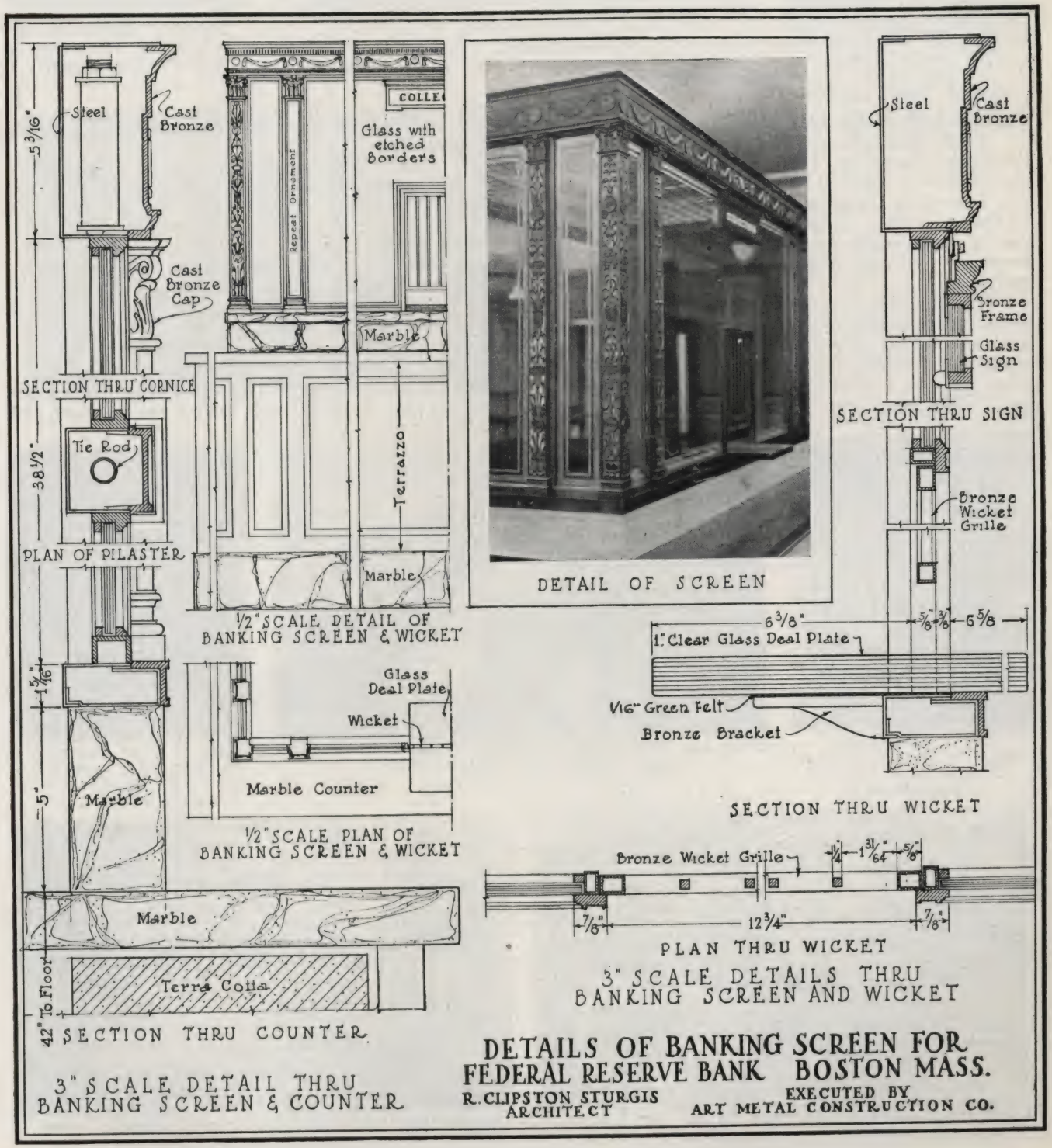
Art Metal Counter Screens and Fixtures

Art Metal counter screens are composite fixtures built with metal or marble front, harmonizing in material and finish with the general architectural scheme. The screen is either wrought or ornamental cast bronze. The backs of screens are usually of steel, having moldings and finish suited to the metal partitions and fixtures in the rear working space.

The metal desks in rear of counter have steel tops, covered with battleship linoleum and bound in bronze on exposed edges. Specially built or stock filing devices, of which the Art Metal line is the most extensive manufactured, may be placed under the desks or the space left open for vault trucks or omnibuses used in the cage during working hours and wheeled into the vault at night. The cage interiors on the next page illustrate examples of both types.

Art Metal ready-built steel equipment includes every item used in bank, office or public building, from desk tray and waste basket to officers' desks and fire resisting record safes. In filing devices, all forms and sizes to take every standard size record in use is manufactured and carried in stock.

Any requirement in desks, vault trucks, steel safes and filing devices which can not be filled from stock can be met in our facilities for built-to-order work.



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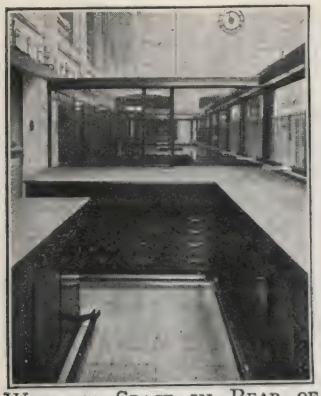
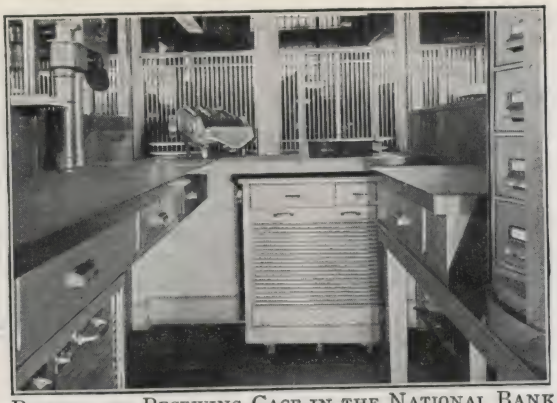


Working Space in Rear of Counter in the Art Metal Equipped Merchants National Bank, New Bedford, Mass.
Alden & Parker, Architects



Paying and Receiving Cage in the National Bank of Commerce, Seattle, Wash.
Beezor Brothers, Architects
Note special coin and currency omnibus under main counter

Art Metal Bronze Check Desks in the National Bank of Commerce, Fort Worth, Tex.

Cages, Check Desks and Vault Grilles

Three types of cage construction are illustrated in the lower illustrations on this page: steel and mesh, glass and mesh, and full height mesh.

A striking example of Art Metal bronze work is shown on the check desks illustrated above, just one of innumerable beautiful designs in check desks executed by this company in steel, bronze and marble.

The safe deposit grilles are representative of Art Metal craftsmanship in this class of work. The bronze work is noted for its perfection of design and beauty of finish, this company having specialized in this kind of work for over a third of a century. We maintain our own engineering and designing department, pattern shop, foundry, bronze finishing, polishing and plating departments.

The work includes counter screens in bronze and marble, bronze check desks, bronze entrance doors, bronze grilles, gates, railings, interior doors, etc.

Bronze Work

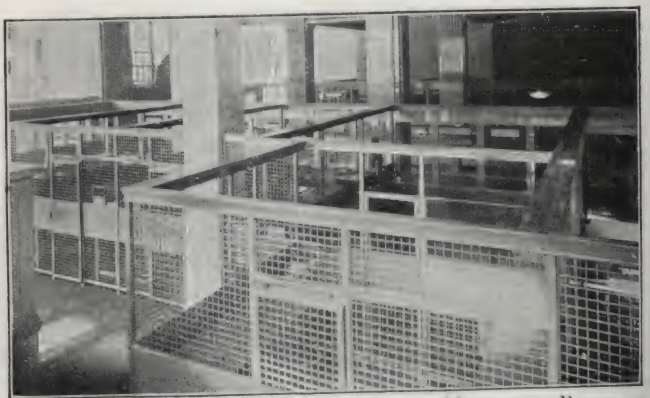
From architect's designs, a plaster model is made and submitted for approval before producing the work. Only skilled craftsmen are employed and every step from modeling to final polishing and hand chasing is carefully supervised. This company works only genuine bronze, insuring artistic embellishment, sharpness of detail, durability and mellow color that age imparts to bronze alone. Sketches are furnished for bronze work, which will include the necessary details.

Bronze Safe Deposit Grille in First Trust and Savings Bank, Cleveland, Ohio

Steel and Mesh Cages in the Art Metal Equipped First National Bank, Kalamazoo, Mich.
Weary & Alford, Architects

Grille of Cast Bronze and Polished Steel in the National Bank of Commerce, Fort Worth, Tex.

Cages in the Deseret National Bank, Salt Lake City, Utah, Showing Glass and Steel Mesh Construction
Cannon & Fetzer, Architects



Looking Down on the Cages in the National Bank of Commerce, Seattle, Wash.

Continued on next page

Library Equipment

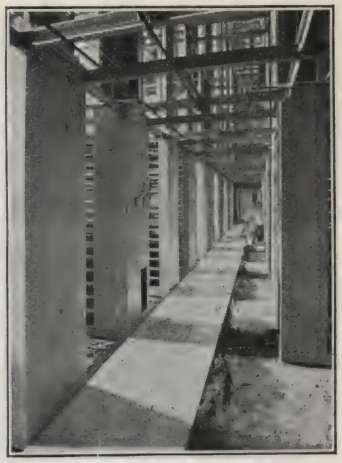
The interior equipment and fixtures are made chiefly of fine steel plate built either in plain design or with rich ornamental bronze embellishments. The finish of the steel work is a durable baked-on enamel in any plain color or grain of wood that may be desired. The standard Art Metal olive F finish is often desirable.

Bookstacks are a leading feature of the line and are produced in a number of forms, each to suit the particular requirements of the case. Stacks are adaptable to a wide variety of arrangements to care for volumes of any size, shape and binding in minimum space. They are flexible in construction and permit of re-arrangement to provide for growth of the library.

Each particular case presents its own individual problem and the services of the library planning department of the Art Metal Construction Company are at the disposal of architects in the solution of library problems on hand.

View of the Art Metal Bookstacks, Railings and Stairways in the Connecticut State Law Library
Donn Barber, Architect

The company solicits an opportunity to present plans and estimates for any library work desired. All work is done in its own plants in Jamestown under the supervision of its library engineers.



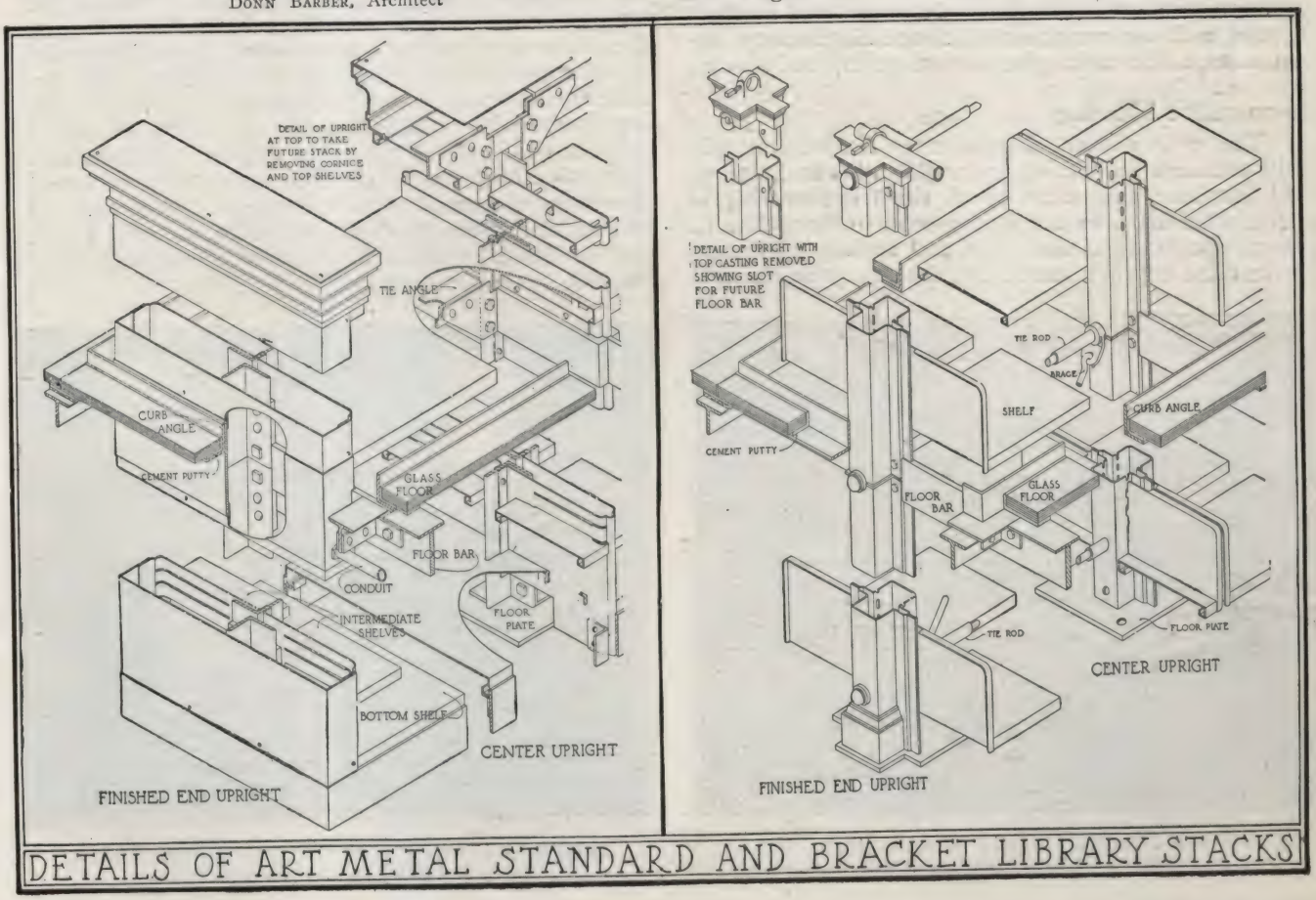
All Steel Work, Bookstacks, etc. for the Seven-story Detroit Public Library was Built and Installed by the Art Metal Construction Company
Cass Gilbert, Architect

Steel Equipment for Public Buildings

Starting with the empty building, this company will design, build and install the complete interior equipment for public buildings of any size. Since its initial order in 1888 for the Courthouse at Dallas, Tex., Art Metal has been recognized as the standard for such equipment and today it will be found in hundreds of public buildings in all parts of the country. A few installations, in addition to those in the government offices at Washington, are:

Municipal Building, New York, N. Y.
City Hall, Philadelphia, Pa.
Cuyahoga County Courthouse, Cleveland, Ohio
County Building and City Hall, Chicago, Ill.
Jackson County Courthouse, Kansas City, Mo.
Hamilton County Courthouse, Cincinnati, Ohio
Also many State capitols

The engineering department of this company is ready to assist at any time in the preparation of plans and designs for such interior equipment.



DETAILS OF ART METAL STANDARD AND BRACKET LIBRARY STACKS

WATSON MANUFACTURING COMPANY

Manufacturers of Metal Furniture in Steel and Bronze

EXECUTIVE OFFICES AND FACTORY

JAMESTOWN, N. Y.

Products

STEEL and BRONZE EQUIPMENT for banks, libraries, public buildings, insurance and commercial offices, including: Counters, Counter Screens, Cages, Desks, Doors, Filing Cabinets, Grilles, Omnibuses, Partitions, Shelving, Tables, Light Weight Safes, Vault Equipment, etc., from our own standard designs, also designed from architects' details and specifications.

For Insect Screens, see pages 1150-1169.

TRADE-MARK

Experience

Our many years of practical manufacturing experience, a business and manufacturing organization of selected, competent and trained men, a sincere desire to satisfy customers, careful adherence to details and specifications, constant study and improvement, and the use of the most modern design and manufacturing processes have not only established an enviable reputation for the best in quality and service, but have won the interest, friendship and confidence of our customers.

Manufacturing Facilities

Our central location in the city of Jamestown (where steel furniture originated and has been largely developed) with shipping facilities over the Erie, New York Central and Pennsylvania lines, access to experienced workmen, a fully and conveniently equipped manufacturing plant in which our product is completely fabricated and finished, together with our competent Sales and Engineering Departments, enable us to give unusual quality and service.

Co-operative Planning

The very efficient Engineering Department will assist architects without charge or obligation in designing steel furniture equipment, at all times endeavoring to maintain the character and requirements of the architect's general specifications and plans and embodying therein all the most improved materials, designs, processes and efficient devices best suited for each particular customer's needs.

Engineering

The Engineering and Sales Departments, through years of experience derived from having satisfactorily met the demands of unusual as well as ordinary conditions and the satisfactory completion of many installations and by constantly keeping pace with improved materials and methods of construction, are competent to give valuable suggestion and advice as to the best methods of meeting any and all conditions. On request, we will make preliminary studies and recommendations to meet varying conditions.

Estimates

On request, and without obligation, we will submit quotations, accompanied by submission drawings if necessary, on architects' plans and specifications, for work completely erected in the building and ready for use.

Preparatory Work

After preliminary studies and recommendations have been made, the general plan and details of the work decided on, quotations made, submission drawings approved, and we are awarded the order, we then prepare complete factory details which are submitted for approval before fabrication is begun. These details show all construction, detailed measurements, assembling units, the character of hardware, the finish and all other details necessary for a complete understanding, all of which is prepared with careful consideration of the architect's requirements and details and original specifications. Fabrication of the work is not begun until all necessary corrections are made and the drawings approved. No subsequent changes are made in the thickness of the steel, or other details of material, construction, or finish, without consent and approval.

INTERIOR BOULEVARD BRIDGE BANK, CHICAGO, ILL.
GRAHAM, ANDERSON, PROBST & WHITE, Architects, Chicago, Ill.

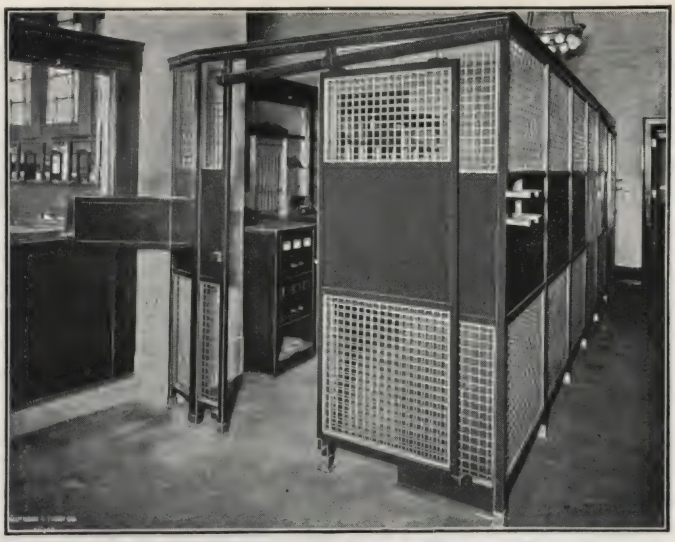
INTERIOR WINTERS NATIONAL BANK, DAYTON, OHIO
JAMES C. FOSTER, Architect, Dayton, Ohio

Continued on next page

Fabrication

After complete details have been approved, the work is taken in charge by our *production department* and sent to the various departments of the factory. Beginning with the *shears* where the material is cut, it is followed by the *press* and *bending* operations preparatory to the preliminary assembling of parts which is done in the *plate* and *sheet departments* by skilled workmen employing the latest processes of electric spot welding and acetylene gas-welding (practically no screws or rivets being employed in construction), and where all joints, bars, angles, etc., are ground smooth. Such fabricated parts are then sent to the finishing department where all oil and dirt is carefully removed and all parts thoroughly cleaned by careful washing with benzine. This is followed by a heavy coat of mineral filler (usually applied by dipping to insure all surfaces in and out being thoroughly covered), baked hard in highly heated ovens. This dip (priming) is thoroughly rubbed down to a smooth and even surface after which it is finished in the color and character of finish required by the application of additional coats of the best enamel applied in the best manner by hand or spray, and again baked. Finally it is rubbed to an even mat or egg-shell surface. All graining is handwork by experienced workmen and made in imitation of choice woods and finishes.

After finishing, the work goes to the *general assembling department* where all fabricated parts are properly fastened together, all ends, cornices, etc., attached, and all locks, hardware, drawers, devices, etc., properly fitted and the work generally made first class and in proper working condition. Then if the work is too large for convenient shipment, it is carefully marked and taken apart and is then sent to the *shipping department* where all work is properly covered and protected by paper and packing materials and carefully and substantially crated and boxed.



Interior Noel State Bank, Chicago, Ill.
Weary & Alford, Architects

Inspection

Throughout all the progress of the work and in all departments, a system of inspecting the work as it enters and leaves each department, together with final inspection, prevents errors and insures work being properly constructed, finished and shipped.

Material

All material used is the best of its specific kind, best adapted to the special constructions for which it is employed. All sheet steel which is exposed (and elsewhere if necessary) is of the best mild steel, pickled (to remove scale), double annealed (to soften and prevent cracks in bending), cold rolled (to smooth the surface), patent leveled (to remove all internal strain and buckling), metallic furniture stock. All shapes are hot or cold rolled, formed or drawn of mild steel. U. S. standard gauges used.

All paints and varnishes are carefully selected and particularly well adapted for the character of the work and the methods of finishing.

All hardware such as pulls, label holders, locks, escutcheons, door trim, etc., are solid cast or wrought bronze or brass.

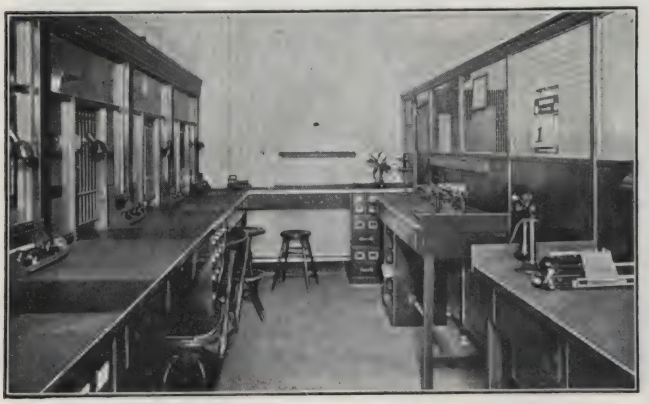
All linoleum and other parts in general are carefully selected for quality and adaptability.

References

We have executed contracts for many if not all of the best architects and bank engineers and number our satisfied customers by thousands. We refer to any user of our product and on request will gladly furnish names of architects and customers as well as list of bank, courthouse, library, hospital and miscellaneous installations.

Co-operative Service

Architects, designers and users of steel office furniture can never know the full measure of satisfaction and assistance that our competent organization can render until by inquiry they give us an opportunity to demonstrate competency. Claims of great merit are easily made but the proof of merit lies in the doing and in the satisfactory execution of contracts. We therefore solicit inquiry and investigation.



Interior Noel State Bank, Chicago, Ill.
Weary & Alford, Architects, Chicago, Ill.

FOUNDED 1876

LIBRARY BUREAU

Manufacturing Distributers of Library, Bank and Office Equipment in Steel and Wood

EXECUTIVE OFFICES
CAMBRIDGE, MASS.

FACTORIES
CAMBRIDGE, MASS. ILION, N. Y. CHICAGO, ILL. NEW YORK, N. Y. LONDON, ENG.

SALES OFFICES
BOSTON, MASS. NEW YORK, N. Y. CHICAGO, ILL. PHILADELPHIA, PA.

Offices in Fifty-one Leading Cities in the United States, Great Britain and France

Products

LIBRARY, BANK and OFFICE EQUIPMENT, which includes the following:

Bookstacks (steel).
Newspaper and Folio Shelving.
Storage Shelving in steel—unit type.
Book Shelving in wood—unit type.
Vault Shelving and Fittings in steel.
Museum Cases of bronze and plate glass.
Card and Filing Cabinets in wood and steel.
Filing Systems and Cabinets.
Book Trucks.
Card Record Trucks of wood and steel.
Card Record Desks of wood and steel.
School Library and Administration Equipment.

Facilities

The LIBRARY BUREAU steel factory is completely equipped for the manufacture of library bookstack, bronze and plate glass museum cases, unit steel shelving, steel filing cabinets, and bank and office filing equipment.

The wood working factories are completely equipped for the manufacture of card and filing cabinets, and technical library furniture.

Catalogues, describing library bookstacks in detail, will be mailed on request.

Steel Bookstacks for Libraries

Standards—The following standards give general information in planning stack room installations. As individual conditions, however, must to a certain degree govern such arrangements, specific information will in most cases be necessary. This organization is pleased to consult with architects and librarians and offers the services of an experienced representative. This service will be rendered without charge or obligation.

Single story standard bracket stack is made 7 ft. 6 in. high; multistory stack 7 ft. 6 in. from floor to floor. The floor framing is made of steel angles with either ¾-in. translucent sand-blasted glass or 1¼-in. marble. Double faced ranges with 8-in. shelves are 17 in. face to face; wall ranges with 8-in. shelves are 10¼ in. from front of shelf to wall. The standard length for shelves is 3 ft. on centers. The standard shelf depths are approximately 8, 10, and 12 in.; the 8-in. depth being regularly furnished as standard.

The width of the main and range aisles of a stack room are controlled somewhat by conditions at the building. For open stack rooms, the ranges are ordinarily set 4 ft. 6 in. apart on centers giving a range aisle of approximately 3 ft. Range aisles may be as narrow as 2 ft. 6 in.; but this is not advisable where the stack room is in general use. Main aisles should be 3 ft. 6 in. wide if possible, and not less than 3 ft.

SPECIALLY DESIGNED DELIVERY DESK AND CARD CATALOGUE CASES, ELIZABETH PUBLIC LIBRARY, ELIZABETH, N. J.

LIBRARY BUREAU MULTISTORY STANDARD BRACKET STACK, STACK ROOM, TRENTON PUBLIC LIBRARY, TRENTON, N. J.

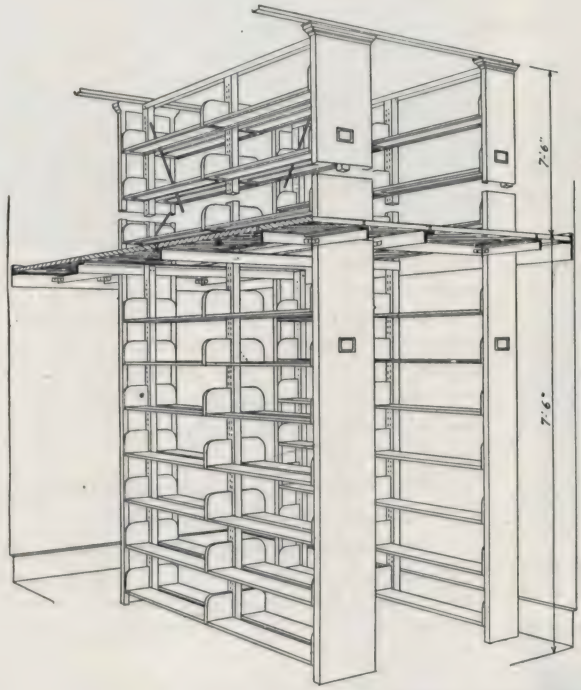
Continued on next page

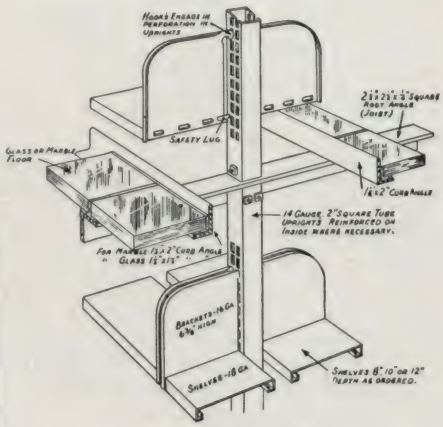
Shelf Capacity—In figuring the amount of shelving required to accommodate a certain number of volumes, the following schedule will be of assistance:

	Volumes per shelf foot	Volumes per 3-ft. double faced section
Fiction	9	378
General literature	8	336
Reference books	7	294
Law books	5	210

Co-operative Service

LIBRARY BUREAU offers to all architects its service, based on over 45 years' experience in furnishing equipment for banks, insurance companies, public service buildings and commercial houses. Special representatives will co-operate in planning the interior equipment for such buildings.





Fragment Sketch Showing Floor Construction

Two or More Levels.
Double and Wall.
Plate Steel Brackets.
Wide Ends.
Stack Floors-Steel & Glass or Marble.

LIBRARY BUREAU STEEL BOOKSTACK No. 17

Planning and Equipping the Library in School Buildings

LIBRARY BUREAU, from its experience of many years in planning libraries and co-operating with the pioneers in school work, has published a book, "School Libraries," containing information of value to all architects who are planning school buildings. This book contains floor plans showing model school library rooms, and gives many suggestions and standards with illustrations of technical equipment.

Catalogues, Booklets and Prints

Steel Bookstack
Library Supplies
Library Furniture
Card and Filing Cabinets in Wood
Card and Filing Cabinets in Steel
Unit Wood Book Shelving
Unit Steel Storage Shelving
Charging Desks
Unit Book Cases
School Libraries
Museum Cases

Any of the above sent on request.

TECHNICAL LIBRARY EQUIPMENT, SCHENLEY HIGH SCHOOL, PITTSBURGH, PA.

LIBRARY BUREAU STANDARD BRONZE FRAME MUSEUM CASES, WALL TYPE, METROPOLITAN MUSEUM OF ART, NEW YORK, N. Y.

FOUNDED IN 1849

SNEAD & CO.

Manufacturers of Metal Bookstacks for Libraries

MAIN OFFICE AND WORKS

TELEPHONE
BERGEN 1185, 1186

94 Pine Street

JERSEY CITY, N. J.

CABLE ADDRESS
"SNEAD, JERSEY CITY"

BRANCH OFFICE, 250 Richmond West, TORONTO, CANADA

Products

Sole makers of the SNEAD STANDARD BOOKSTACK, GREEN-SNEAD BOOKSTACK, SNEAD NEWSPAPER STACK, BRACKET BOOKSTACKS, and METAL SHELVING for Libraries.

Facilities

SNEAD & Co. is the pioneer manufacturer of library bookstacks. Experienced stack designers are at the service of architects planning stack installations. A 271-page catalogue of bookstack and library construction giving many plans and illustrations of libraries sent on request; technical information also furnished free.

Description of Snead Standard Bookstack

The Snead standard stack is installed throughout the Library of Congress at Washington and the New York Public Library. The simple construction fits it for use not only in large but also in smaller libraries with but a single or a few stack tiers (stories), and for offices and private libraries requiring only plain wall shelving. The interchangeability of parts and adaptable construction allow the stack, in case of remodeling, to be reset and extended both horizontally and vertically. Stack consists of solid or openwork cast iron and steel uprights extending full width of ranges, and spaced shelf length apart by fixed shelves at top and bottom. The adjustable shelves are preferably of the special open bar construction, light, strong, resilient, and with dust collecting surfaces reduced to a minimum. Uprights are each the height of one tier, and may be bolted one above the other to obtain a stack of any number of stories.

SNEAD STANDARD BOOK STACK

16-in. double faced range with removable cornice. Designed to receive future second tier. Similar single faced wall ranges of any size required also supplied

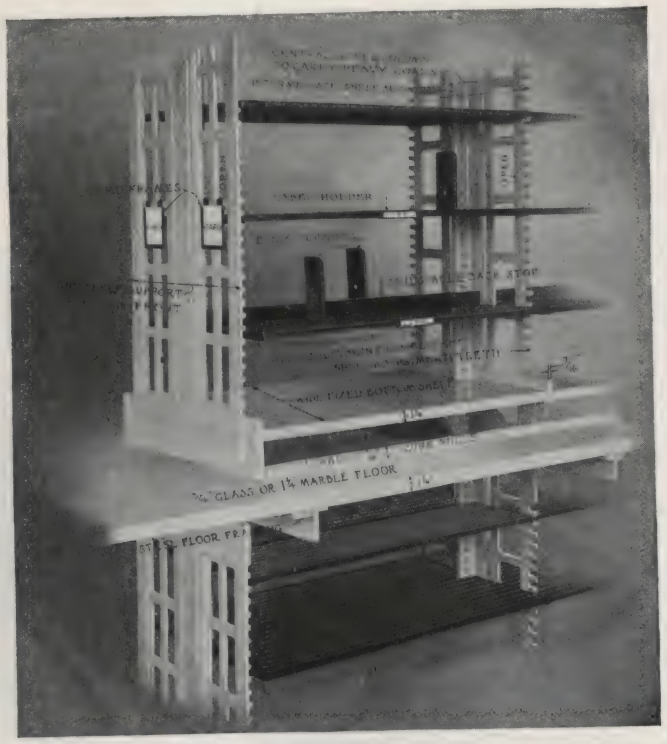
The uprights occupy no available book room, and have no space wasting, dirt and rust collecting hollow members. Deck floors or galleries between tiers give direct access to all shelves. The distance between the main floors of the building should be an even multiple of the stack tier height (preferably 7 ft. or 7 ft. 6 in.), so as to line up the main building floors with stack deck floors. The deck floor construction is carried by the uprights and firmly anchored to the walls of the stack room. Floors of rooms above (without concentrated loads) are economically carried on stack construction. Cover plates at top protect books from dust and injury, and cornice gives a neat finish.

Openwork construction of uprights and shelves, and slits in the deck floors, allow stack to be heated and ventilated as one room.

The system can be adapted to meet any requirement of architecturally planned design.

Adjustable shelves are completely finished at shop with baked rubber japan. Fixed metal parts are preferably finished after erection with air drying enamel; baked enamel is unsuitable, as it can not be renewed in place.

Maximum distribution of light is obtained by using openwork construction where possible and finishing fixed parts in white.



PERSPECTIVE DETAIL OF SNEAD STANDARD STACK, WITH WIDE FIXED BOTTOM SHELVES AND PROTECTED DECK SLIT

Continued on next page

SNEAD STANDARD STACK, NEW YORK PUBLIC LIBRARY, PATENTS ROOM
CARRÈRE & HASTINGS, Architects

Price of Stacks

Cost of stacks depends largely upon arrangement and quantity. Specifications, drawings and estimates furnished free on request. Bookstacks are built on contract. Normally, four or five months should be allowed for the completion of a stack of about 100,000 volumes' capacity.

BOOK CAPACITIES

Average per lineal foot of shelf

U. S. Patent Specifications	2 volumes
Law, public documents, bound periodicals	6 volumes
Medicine and science	7 volumes
Reference and general literature	8 volumes
Economics and fiction	9 volumes
Circulating books	9 to 10 volumes

STANDARD STACK DIMENSIONS

Special sizes built to order if quantity warrants

Shelf widths—For books, 8, 9, 10 and 12 in.; newspapers, 18 and 22 in.
Shelf lengths—3 ft. usual—varied to suit conditions
Tier heights—7 ft. and 7 ft. 6 in.
Aisle widths—Main, 2 ft. 6 in. to 5 ft.; minor, about 28 in. minimum; 30 to 36 in. average.

STANDARD STACK WEIGHTS

Uprights and shelves	7 to 10 lbs. per cu. ft. of range
Books	20 to 25 lbs. per cu. ft. of range
Deck framing	5 lbs. per sq. ft.
Deck flooring, ¾-in. glass	10 lbs. per sq. ft.
Deck flooring, 1¼-in. marble	18 lbs. per sq. ft.

SNEAD STANDARD STACK, WIDENER MEMORIAL LIBRARY, HARVARD UNIVERSITY
HORACE TRUMBAUER, Architect

Metal Shelving

Our products cover shelving for special library requirements and conditions, and for all purposes where fireproof storage convenience and durability are essential.

SNEAD STEEL TREASURE ROOM CASES, WIDENER MEMORIAL LIBRARY, HARVARD UNIVERSITY
HORACE TRUMBAUER, Architect

Typical Bookstack Installations

BUILDING	ARCHITECT
Library of Congress	E. P. Casey, B. R. Green, Eng.
New York Public Library	Carrère & Hastings
Widener Memorial Library	Horace Trumbauer
Williams College Library	Cram & Ferguson
Notre Dame University	Edward L. Tilton
Wisconsin State Capitol	George B. Post & Sons
Arkansas State Capitol	Cass Gilbert
Ohio State University Library	Allen & Collens
Brookline Public Library	R. Clipston Sturgis
Phila. College of Physicians	Cope & Stewardson
University of Chicago Library	Shepley, Rutan & Coolidge
Wilmington Institute Free Library	Tilton & Githens
Michigan University Library	Albert Kahn
New Hampshire Hist. Society	Guy Lowell
Boston Athenæum	Bigelow & Wadsworth
Johns Hopkins Univ. Library	Parker, Thomas & Rice
Am. Museum, Natural History	Trowbridge & Livingston
Sage Foundation Building	Grosvenor Atterbury
St. Paul Public Library	Electus D. Litchfield
San Francisco Public Library	Geo. W. Kelham
Sacramento Public Library	Loring P. Rixford
Montreal Public Library	Eugene Payette
Mass. Institute of Technology	William Wells Bosworth
Maryland Hist. Society	Wyatt & Nolting
Hill Memorial Library	Electus D. Litchfield
Vermont State Library	Densmore & Le Clear
Ontario Legislative Library	Geo. W. Gouinlock
British Columbia Prov. Library	F. M. Rattenbury
Columbia University Library	McKim, Mead & White
Delaware State Capitol	Edward L. Tilton
Indiana State Normal School	J. F. Alexander & Sons
Iowa State Teacher's College	Proudfoot, Bird and Rawson
Library of Hawaii	Henry D. Whitfield
Manchester, N. H. Public Library	Edward L. Tilton
Toronto Public Reference Library	Wickson & Gregg, and A. H. Chapman
University of North Carolina	Frank P. Milburn & Co.
Manitoba Parliament Library	Frank W. Simon
Bangor Public Library	Peabody & Stearns
Multnomah County Public Library	Doyle, Patterson, and Beach
American Geographical Society	Charles P. Huntington
University of Pennsylvania	Furness & Evans

FEDERAL STEEL FIXTURE COMPANY

611 Wrigley Building

CHICAGO, ILL.

TELEPHONE
CENTRAL 1574

DETROIT OFFICE, 913 Dime Bank Building

NEW YORK OFFICE, 706 Park Row Building

Products

FEDERAL STEEL LOCKERS, STEEL SHELVING and RACKS.

Also manufacturers of Bench Legs, Blue Print Cabinets, Boxes, Bins, Filing Cabinets, Metal Furniture, Hospital Equipment.

Federal Unit Steel Lockers

Simple in design, with all parts thoroughly standardized, interchangeable and uniform. The welded angle steel frame and special overlap door absolutely guaranteed against door trouble. The Federal locker has fewer parts, erects more easily and is clean cut, handsome and strong.

Section of Door and Locker Frame

Specifications—*Doors*—Full pickled, cold rolled furniture steel, No. 16 U. S. gauge (.0625 in. thick) if 15 in. wide by 72 in. high or larger; smaller sizes No. 18 U. S. gauge (.05 in. thick). Doors shall have reinforcing panels of hard steel angle bars (¾x¾x$\frac{3}{32}$ in.) riveted or welded to reverse side. Doors shall overlap locker frame and allow ½-in. clearance between door panel and locker frame to prevent binding.

Frames—Front frames shall be of hard angle steel (1x1x⅛ in.) assembled by oxy-acetylene weld. They shall be unit in principle to give absolute squareness and rigidity and allow for rearrangement of lockers.

Body—Locker body shall be pickled and cold rolled steel No. 22 U. S. gauge (.0312 in. thick). Single row lockers shall have angle steel framed backs (¾x¾x$\frac{3}{32}$ in.) for each second unit. All parts shall be properly flanged or braced to give uniform strength.

Key Lock

Time Lock

Adjustable Leg

Regular Door Handle

Side Hook

Ceiling Hook

Handle with Padlock Loop

Coat Rod Hook

Back Hook

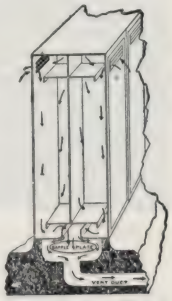
PARTS OF FEDERAL UNIT STEEL LOCKERS

Tops—Tops shall be inserted below top cross angles at front and back and shall overlap adjoining top 1 in. Slant tops shall have 6-in. pitch with ¼-in. eave at front.

Bottoms—Bottoms shall be flush and supported by 1x1x⅛-in. angle reinforcement.

Shelves—Shelves shall be 9 in. below top. They shall be flanged on all sides with double ½-in. smooth edged flange at front.

Hinges—Hinges shall be 2½-in. fixed pin heavy steel butts with concealed flanges. 72-in. doors shall have 3 hinges; smaller doors 2 hinges.



SECTION OF FEDERAL VENTILATED LOCKERS

Hooks—Hooks shall have sherardized, rustless finish. Locker backs shall have 2-prong hook for coat and hat. Sizes 15 in. or less shall have a single prong hook attached with 2 bolts. Larger sizes shall have special 2-prong hooks with ⅜-in. steel rod for coat hanger or 60-in. or 72-in. sizes. A 2-prong ceiling hook shall be supplied if coat rod is omitted.

PLAN OF CEMENT BASE FOR VENTILATED LOCKERS

Legs—All front legs shall be malleable and have a simple screw adjustment (to allow for any unevenness in floor). Legs shall be spaced 3 lockers apart for convenience in cleaning.

Ventilation—Doors shall have embossed, hooded or louver ventilators. They shall be 7 in. long and 1 in. apart on centers with ¼-in. opening at lower edge. There shall be nine embossings near top and also near bottom.

Numbers—Lockers shall be numbered with black figures ¾-in. high sunk in polished brass plates near top of door.

Finish—Two-coat olive green or pigment black enamel baked at a temperature of 300° Fahr.

Standard Sizes—Any combination of dimensions as listed:

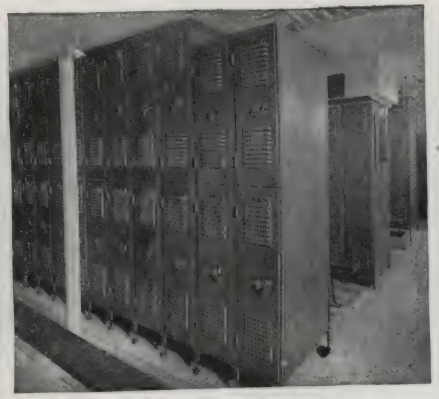
12 in. wide, 12 in. deep, 36 in. high, on 6-in. legs
15 in. wide, 15 in. deep, 42 in. high, on 6-in. legs
18 in. wide, 18 in. deep, 48 in. high, on 6-in. legs
60 in. high, on 6-in. legs
72 in. high, on 6-in. legs

Note: 36-in. and 42-in. sizes made 2 lockers high.

SINGLE TIER LOCKER

FEDERAL LOCKERS, SINGLE TIER WITH SLANT TOPS

DOUBLE TIER LOCKER



FEDERAL LOCKERS, DOUBLE TIER WITH SINGLE AND DOUBLE TIER IN BACKGROUND

FEDERAL EXPANDED METAL LOCKERS

Continued on next page

Engineering Service—We are pioneers in the locker business and first introduced and perfected the (one-piece) welded steel locker frame, the Suffragette locker; the Self Service and Kansas City System lockers, etc. Our engineering service will gladly co-operate to determine your particular locker requirements.

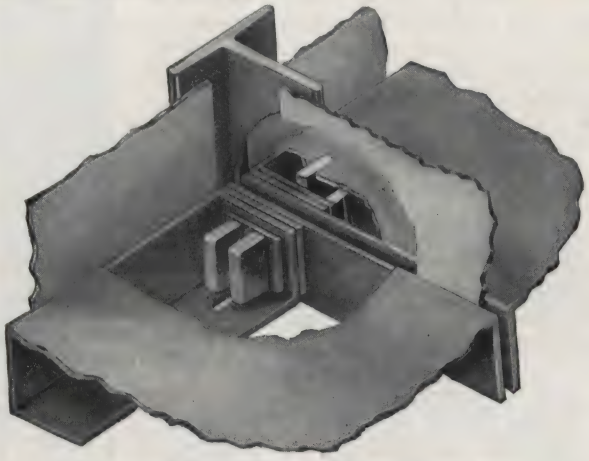
Federal Steel Shelving and Racks

Simple in design, with all parts thoroughly standardized, interchangeable and uniform. The patented shelf formation and patented shelf adjustment give 32% more load capacity, and make adjustment actually possible, practical and probable.

Standardization—We use but one type of construction. From the open rack (tee verticals and shelves) to the entire equipment—including closed sides, backs, bin fronts, shelf dividers, box dividers, and stops, doors either hinged or sliding, ledge panels, ledge shelves, etc.—there is not a single item of parts that must be substituted or discarded.

Adjustability, Time and Labor Saving—The shelf attaches with a hammer blow and is released for readjustment in a similar way.

This very simplicity economizes time, by enabling the storekeeper to provide shelf spaces of convenient size—near, handy and get-at-able.



PHANTOM VIEW FEDERAL STEEL SHELVING
Rear vertical intersection, showing how shelf flanges are formed and interlocked

FEDERAL STEEL SHELVING, MEZZANINE FLOOR AND STAIRWAY
DIAMOND CHAIN AND MFG. CO., INDIANAPOLIS, IND.

Special Service—The Engineering Department is ready at all times to co-operate in designing and planning equipment to carry loads and economically handle and store the parts.

Specifications—*General*—All parts shall be uniform and interchangeable. Each part shall adjust independently. The steel shall be a special rerolled stock which shall be stretched into shape so that all surfaces shall be flat, smooth and square. There shall be no raw cutting edges. Double row sections shall be such that they may be separated and used in single row arrangement.

Uprights—The vertical load shall be carried by 1½x1½x⅛-in. hard steel T-bars, which shall provide for 3-in. [optional 1½-in.] vertical shelf adjustment (closed uprights shall include No. 20 U. S. gauge [.0375 in. thick] cold rolled sheet steel).

Shelves—Shelves shall be of No. 18 U. S. gauge (.05 in. thick) cold rolled flat steel properly reinforced to support 150 lbs. per sq. ft. of shelf [optional—specify maximum safe load required].

All shelf flanges shall be 1 in. deep with 1-in. return at front and rear. Flanges shall be full section, continuous and locked together under compression with the vertical T-bars. To prevent tearing or shearing, square washers ⅞x⅞ in. thick shall reinforce the shelf flange corners.

Backs—Closed backs shall be of No. 20 U. S. gauge (.0375 in. thick) cold rolled steel and shall attach so that they may be added or removed without moving rack sections.

Double row shelving shall have full length backs.

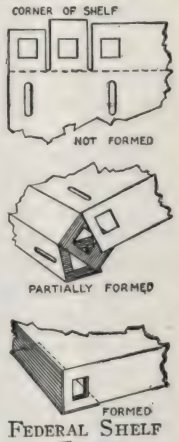
Bin Fronts—Bin fronts shall be of No. 18 U. S. gauge (.05 in. thick) cold rolled steel. They shall overlap and engage the shelf or the bin front immediately below.

Shelf Dividers—The shelf or compartment dividers shall be of No. 20 U. S. gauge (.0375 in. thick) cold rolled steel. They shall have ¼-in. vertical beads and shall attach through the shelf with no raw flanges exposed.

Ledge Shelves—Ledge shelves and ledge uprights shall be of same materials as main sections. They shall attach with a close, smooth fit to front of main equipment.

Label Holders—Label holders shall be of No. 24 U. S. gauge (.025 in. thick) steel. They shall be ⅞ in. high [optional 1⅞ in.], and shall extend entire length of shelf opening.

Doors—All doors, whether hinged or sliding, shall be of No. 18 U. S. gauge (.05 in. thick) cold rolled, flat steel. They shall overlap and be so constructed that they can not bind.



FEDERAL SHELF CORNER PATENTED

STANDARD SIZES FEDERAL SHELVING PARTS
DIMENSIONS IN INCHES

PART NO. 1. UPRIGHT PARTITIONS
Heights. 48–54–60–66–72–78–84–90–96–102–108–114–120–126–132–144–156–168
Depths. . 9–12–15–18–24–30–36

PART NO. 11. SKELETON UPRIGHTS
Same as Upright Partitions

PART NO. 2. SHELVES
Widths. . 18–24–30–36–42–48
Depths. . 9–12–15–18–24–30–36

PART NO. 3. BACKS
Heights. Same as Upright Partitions
Widths. . 18–24–30–36–42–48

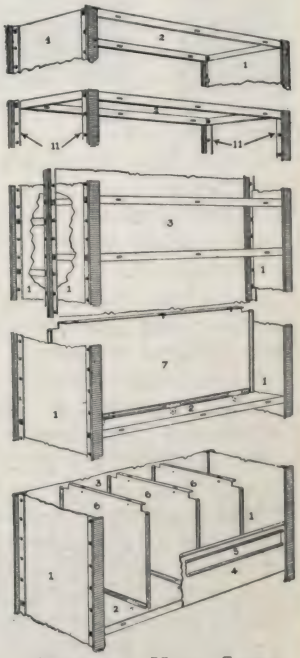
PART NO. 4. BIN FRONTS
Heights. 2–3–4–5–6–8
Widths. . 18–24–30–36–42–48

PART NO. 5. LABEL HOLDERS
Heights. ⅞–1⅞
Widths. . 18–24–30–36–42–48

PART NO. 6. SHELF DIVIDERS, CROSSWISE
Heights. 6–9–12–15–18–21–24
Depths. . 9–12–15–18–24–30–36

PART NO. 7. SHELF DIVIDERS, LENGTHWISE
Heights. 5–8–11–14–17–20–23
Widths. . 18–24–30–36–42–48

PART NO. 8. LEDGE SHELVES
Widths. . 18–24–30–36–42–48
Depths. . 12–15–18–24



SECTIONAL VIEW SHELF FLANGES, FEDERAL STEEL SHELVING

THE BERGER MANUFACTURING CO.

Manufacturers of Berloy Steel Lockers

CANTON, OHIO

For Branch Offices, see page 1036

Product

BERLOY STEEL LOCKERS.

Also Office Furniture, Bins and Shelving.

For Metal Building Materials, see pages 256-257; for Metal Ceilings, see page 1036.

BERLOY
TRADE-MARK

Berloy Steel Lockers

Attractiveness and strength make them ideal for schools, public buildings, gymnasiums, manufactories, etc. They are sanitary, fire resisting, proof against rodents and pilferers, and require small floor space.

Backs, sides, tops, bottoms and shelves, No. 22 gauge U. S. standard. Doors, No. 16 gauge U. S. standard.

Construction—All parts are formed in a manner which gives the highest degree of strength and rigidity.

The doors are solid plates of steel $\frac{1}{16}$ in. thick, flanged at all edges and welded at all corners. All doors wider than 15 in. are reinforced.

For ventilation, extra large hooded slots or louvers are embossed in the field of the doors, allowing abundant air circulation while giving full protection to contents of lockers. Any type of perforated door can be supplied.

Doors of double tier lockers are hung on two fast pin wrought steel concealed hinges. Doors of single tier lockers are hung on three of these hinges.

All parts of these lockers being formed and punched in standard dies, all corresponding parts are interchangeable.

All bolts with heads exposed on the outside surface have slotless oval heads.

The unit principle of Berloy construction, which is followed throughout, gives great flexibility of arrangement. Small groups may be joined together in one long group, or a long group may be divided into as many small groups as may be desired. Single face lockers may be arranged back to back, or back to back lockers may be arranged in single face groups. All can be done without cutting or altering a single piece.

STEEL LOCKERS
(A) Type SS
Single tier, standard louver door with Yale lock
(B) Type PD
Double tier, perforated metal door with padlock
(C) Type FD
Double tier, full louver door with combination lock

Standard Finish—Best quality olive green enamel, baked-on.

Equipment—All single tier lockers are equipped with 3-point locking device, hat shelf, etched brass number plate, and three 2-prong rustproof coat hooks. Equipment of double tier lockers is the same, except that no hat shelf is furnished and a 2-point locking device is used.

Standard lockers are furnished with 6-in. sanitary legs adjustable to uneven floors. Furnished with sloping tops, if desired, at a slight advance in price.

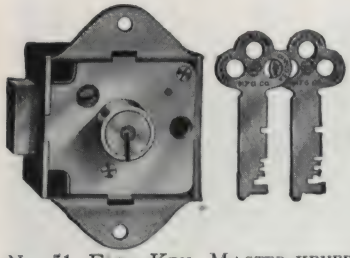
Standard 3-point Locking Device—Securely fastens door at center and near top and bottom by movement of the operating cam at center. The movement of this cam can be controlled by any one of the 3 locks shown or by a padlock if desired.

Erection—Construction has been simplified as much as possible, so that erection cost has been reduced to the lowest practicable point.

SOME STANDARD SIZES, STEEL LOCKERS

Single Tier			Double Tier		
Width, in.	Depth, in.	Height, in.	Width, in.	Depth, in.	Height, in.
12	12	60 or 72	12	12	36 or 42
12	15	60 or 72	12	15	36 or 42
12	18	60 or 72	12	18	36 or 42
15	15	60 or 72	15	15	36 or 42
15	18	60 or 72	15	18	36 or 42
18	15	60 or 72	18	18	36 or 42
18	18	60 or 72			
18	24	72			

3-POINT LOCKING DEVICE



No. 51. FLAT KEY, MASTER-KEYED
Two nickel-plated keys with each lock. Unlimited key changes

No. 56. PADLOCK
Attachment with keyless combination padlock

A Few Installations

Procter & Gamble Co., Cincinnati Ohio; Armour & Co., Chicago, Ill.; Quaker Oats Co., Akron, Ohio; Chicago & Western Indiana R. R., Chicago, Ill.; Boston High Schools, Boston, Mass.; Security Coal Mines, Duquoin, Ill.; University of Minnesota, Minneapolis, Minn.; University of Cincinnati, Cincinnati, Ohio; Y. M. C. A. Building, Minneapolis, Minn; Omaha Country Club, Omaha, Nebr.

THE HART & HUTCHINSON COMPANY

Steel Lockers

NEW BRITAIN, CONN.

BRANCH OFFICES

BOSTON, MASS., 654 Oliver Building
CHICAGO, ILL., 73 East Lake Street
NEW YORK, N. Y., 9 East 40th Street
PHILADELPHIA, PA., Real Estate Trust Building

Products

STEEL LOCKERS; STEEL SHELVING.
Also Steel "Storall" Cabinets.
For Steel Partitions for toilets, dressing rooms and showers, see page 1566.

Standard Lockers

Metal—All sheet metal used is best grade cold rolled U. S. standard gage, free from scale and buckle. Partitions (intermediate sides and ends), tops, shelves and bottoms, No. 21 gage. Backs, No. 20 gage. Door frames and doors, No. 14 gage.

Door Frames and Backs—Made from one sheet each, flanged 1-in. on both edges, formed at bottom to provide 6-in. legs.

Sides—Securely bolted to door frame and back.

Top Member—Projects over and locks on to front frame, giving a finish. Flat top is standard.

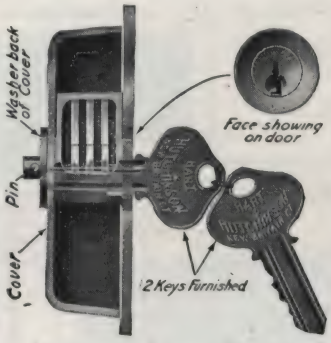
Bottoms—Formed without ledges so they can be brushed out easily.

Locking Device—Operated by rustproof T-handle, engages door frame at 3 points. So arranged that manipulation of latch is impossible when thrown.

Doors—Type "B-C," 6-louvered openings top and bottom; one piece with steel channel reinforcing; hung to door frame with three 2-in. fast pin butts.

Type "A-C," same as "B-C," except panels are perforated with ⅝-in. square holes on 1-in. centers.

Unlocked Position Locked Position
BACK OF DOOR SHOWING LOCK COVER



½ SIZE OF LOCKS, SHOWING DETAILS

SIZES AND SHIPPING WEIGHTS STANDARD LOCKERS

Single Tier				Double Tier			
Dimensions, in. W D H	Wt., lbs.	Dimensions, in. W D H	Wt., lbs.	Dimensions, in. W D H	Wt., lbs.	Dimensions, in. W D H	Wt., lbs.
12x12x60	65	12x12x72	75	12x12x36	35	12x12x48	50
12x15x60	70	12x15x72	80	12x15x36	40	12x15x48	55
12x18x60	75	12x18x72	85	15x12x36	45	15x12x48	60
15x12x60	70	15x12x72	85	15x15x36	50	15x15x48	65
15x15x60	75	15x15x72	90	15x18x36	55	15x18x48	70
15x18x60	80	15x18x72	95				
18x15x60	80	18x15x72	95	12x12x42	40	In double tier style each compartment constitutes a locker.	
18x18x60	85	18x18x72	100	12x15x42	45		
18x24x60	95	18x24x72	115	15x12x42	50		
24x18x60	100	24x18x72	125	15x15x42	55		
24x24x60	110	24x24x72	135	15x18x42	60		

Tabulated sizes are carried in stock for prompt shipment.

Equipment—All standard lockers have a solid brass, pin tumbler, paracentric master-keyed lock, with 2 keys to each lock; 5000 changes.

Each locker has suitable number of 2-prong rustproof hooks of ramshorn design, a towel or coat hanger rod and a solid brass number plate with ½-in. numerals etched in black.

Single tier lockers have hat shelf 3 in. below top with rounded front edge.

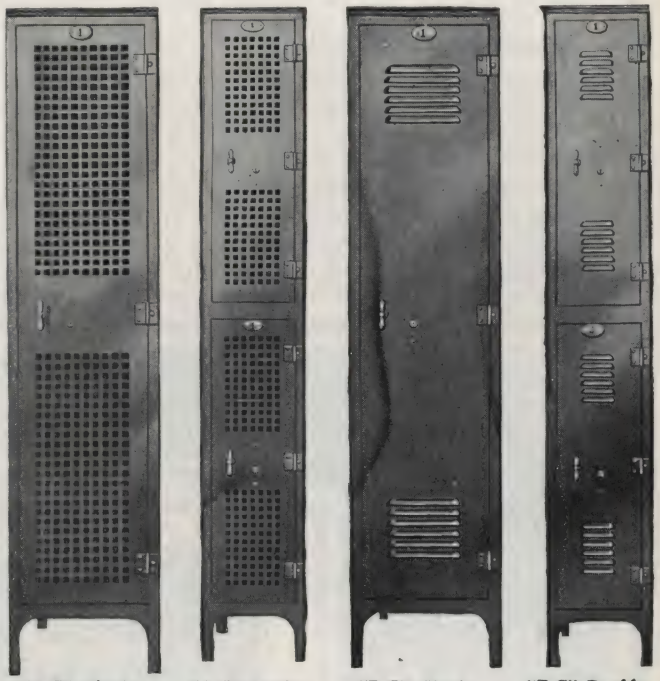
No shelf in double tier.

Optional Equipment—21° angle sloping tops. Combination and keyless locks or padlock attachment.

Extra shelves for storage.

Finish—Standard olive green or black. Special finishes are produced to suit requirements.

Shipped—Knocked down flat, with assembling instructions, or shipped erected and crated, or erected in place by an efficient corps of trained mechanics.



"A-C" Single Tier | "A-C" Double Tier | "B-C" Single Tier | "B-C" Double Tier

REPRESENTATIVE UNITS, "H & H" STEEL LOCKERS
Furnished in sections of any number of units.

Standard Universal Unit Shelving

A standard unit type of steel shelving built on the "mill construction" principle. Substantial channel uprights are bolted together by rods incased in pipe separators and on these rest channel cross supports (or girders) that carry the loads imposed on the shelves. The load is not carried by the shelf but by the structural members under it.

Each section is a separate unit with ends and back; and dividers, bin fronts, card holders, etc., are furnished to suit the desired conditions.

Made in heavy and light weight.

Dimensions—Shelves are 24 in. wide x 12 in. deep; 27 x 15 in., 30 x 18 in., 33 x 21 in., 36 x 24 in.

Uprights are from 60 to 120 in. in length. Vertical adjustment on 3-in. centers.

THE E. F. HAUSERMAN COMPANY

Hauserman-System Steel Shelving

1729 East 22nd Street

CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 41 East 42nd Street — DETROIT, MICH., — PITTSBURGH, PA., Oliver Building

Products

HAUSERMAN-SYSTEM SHELVING (Unitbilt Steel Construction).

Designers, manufacturers and erectors of complete Shelving Installations.

For Hauserman-System Skylights, see pages 968-969; for Hauserman-System Industrial Partitions, see pages 1104-1105; for Hauserman-System Toilet Partitions, see pages 1558-1559.

Service

The Hauserman-System comprises a complete understanding of storage problems, including the design and installation of shelving to meet specific conditions.

Hauserman-System Shelving

Hauserman-System shelving consists of standardized adjustable steel uprights, shelves, backs, dividers and supplementary parts, securely bolted together to give maximum strength and flexibility.

Description—Uprights are built in two parts, including a tee upright with a heavy formed head to withstand shocks and a long stem for ease in making connections, and a flanged upright which connects the tee uprights. Shelves are of sheet steel, with double folded flanges rigidly connected to the uprights. Dividers of sheet steel, with double thickness or beaded edges.

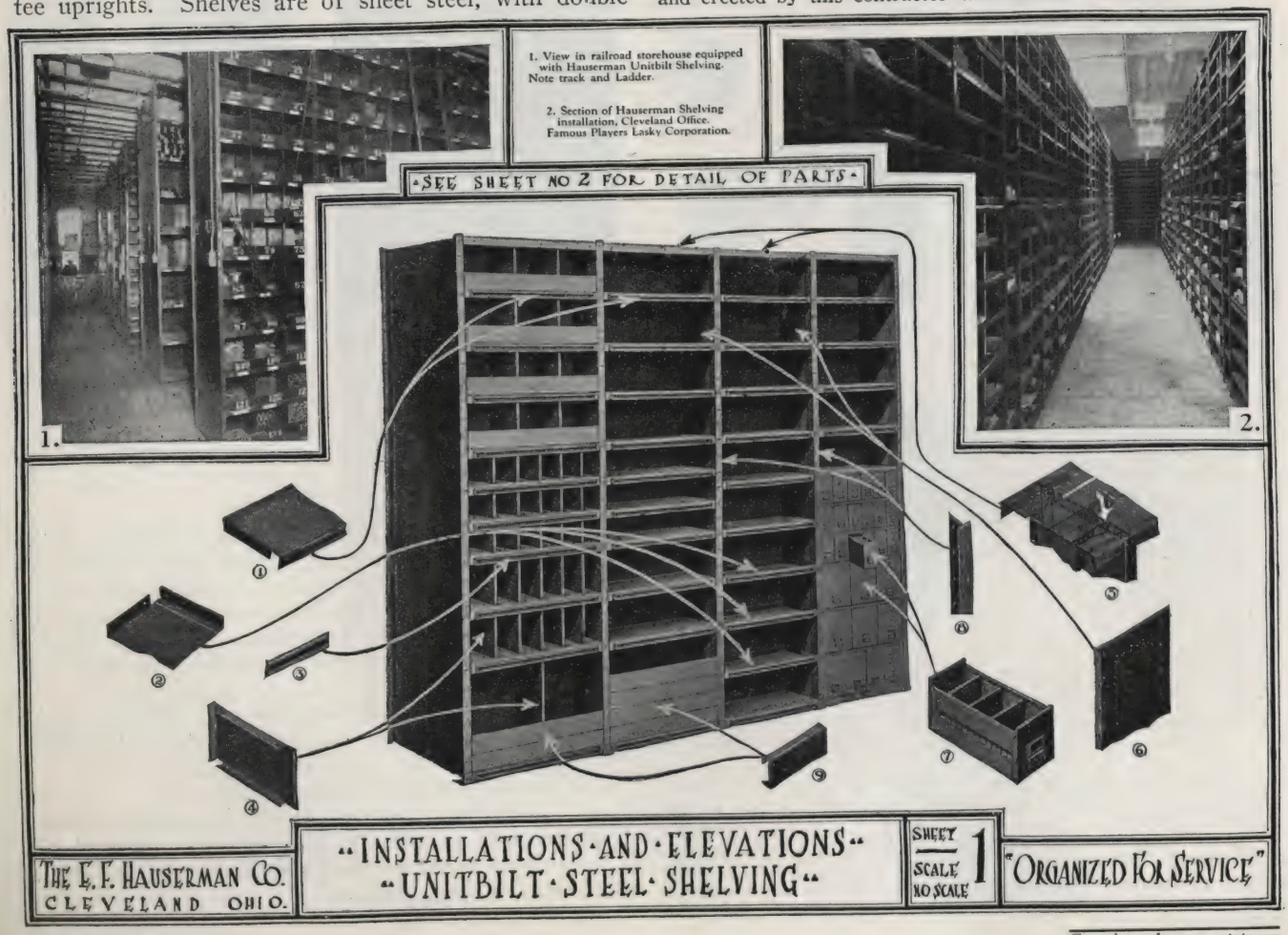
Assembly—Each shelf is joined to tee uprights at the corners with two bolts, making an 8-bolt tie. Intermediate uprights and backs, bolted to the tee uprights, make a rigid unit strong enough to carry by actual test a load of 11 tons for each two uprights. *The use of bolts is the one method of making positive and permanent connection permitting reassembly.*

Hauserman-System shelving is built with 3-in. adjustments vertically and horizontally to meet changing storage conditions. An inverted shelf serves as a shallow bin and 3-in. bin fronts in multiples form deeper bins. Doors with lock or handle can enclose any desired compartment. Boxes furnished with slots in sides to permit any arrangement of dividers on 1-in. adjustments are used as drawers, complete with drawer pull and label holder. Special tool cabinets, milling cutter holders, shop desks, etc., can also be supplied.

Specifications

All shelving indicated in drawings shall be Hauserman-System Shelving as manufactured by the E. F. HAUSERMAN COMPANY, Cleveland, Ohio. They shall have uprights, backs, dividers, bin fronts, label holders, etc., complete.

All work to be finished in baked-on olive green enamel and erected by this contractor with skilled workmen.



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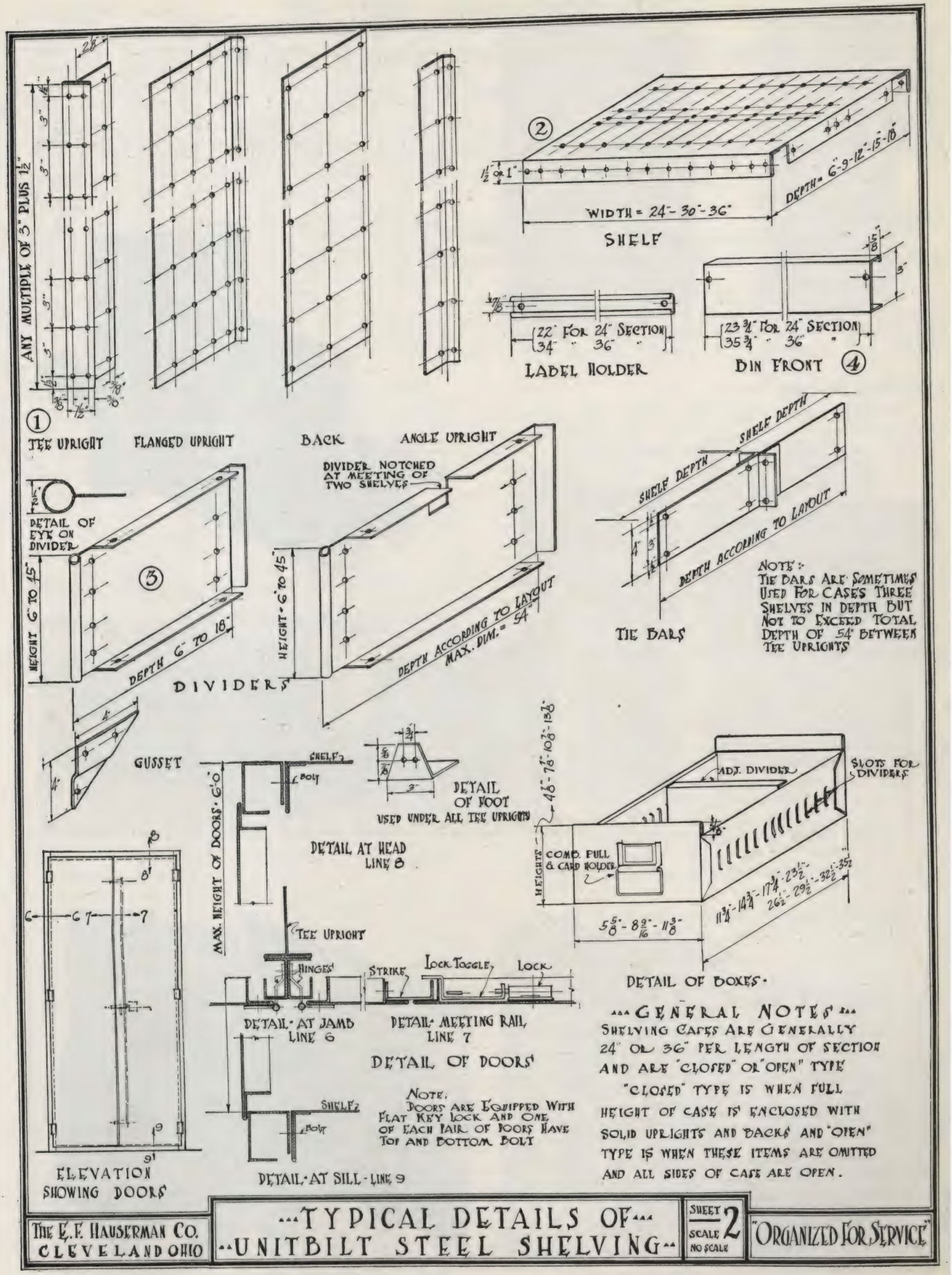

ANY MULTIPLE OF 3" PLUS 1½"
TEE UPRIGHT
FLANGED UPRIGHT
BACK
ANGLE UPRIGHT
WIDTH = 24" - 30" - 36"
DEPTH = 6" - 9" - 12" - 15" - 18"
SHELF
22" FOR 24" SECTION
34" " 36" "
LABEL HOLDER
23¾" FOR 24" SECTION
35¾" " 36" "
BIN FRONT
DETAIL OF EYE ON DIVIDER
HEIGHT 6" TO 45"
DEPTH 6" TO 18"
DIVIDERS
DIVIDER NOTCHED AT MEETING OF TWO SHELVES
HEIGHT - 6" TO 45"
DEPTH ACCORDING TO LAYOUT
MAX. DIM. = 54"
SHELF DEPTH
DEPTH ACCORDING TO LAYOUT
TIE BARS
NOTE:
TIE BARS ARE SOMETIMES USED FOR CASES THREE SHELVES IN DEPTH BUT NOT TO EXCEED TOTAL DEPTH OF 54" BETWEEN TEE UPRIGHTS
GUSSET
SHELF
L BOLT
DETAIL AT HEAD LINE 8
DETAIL OF FOOT
USED UNDER ALL TEE UPRIGHTS
MAX. HEIGHT OF DOORS - 6'-0"
TEE UPRIGHT
HINGES
STRIKE
LOCK TOGGLE
LOCK
DETAIL AT JAMB LINE 6
DETAIL MEETING RAIL LINE 7
DETAIL OF DOORS
SHELF
BOLT
DETAIL AT SILL - LINE 9
ELEVATION SHOWING DOORS
48" - 78" - 108" - 138"
ADJ. DIVIDER
SLOTS FOR DIVIDERS
COMB. PULL & CARD HOLDER
HEIGHT
5⅝" - 8 9/16" - 11⅜"
11¾" - 14¾" - 17¾" - 23½" - 26½" - 29½" - 32½" - 35½"
DETAIL OF BOXES
GENERAL NOTES
SHELVING CASES ARE GENERALLY 24" OR 36" PER LENGTH OF SECTION AND ARE "CLOSED" OR "OPEN" TYPE
"CLOSED" TYPE IS WHEN FULL HEIGHT OF CASE IS ENCLOSED WITH SOLID UPRIGHTS AND BACKS AND "OPEN" TYPE IS WHEN THESE ITEMS ARE OMITTED AND ALL SIDES OF CASE ARE OPEN.
THE E.F. HAUSERMAN CO.
CLEVELAND OHIO
TYPICAL DETAILS OF
UNITBILT STEEL SHELVING
SHEET 2
SCALE NO SCALE
"ORGANIZED FOR SERVICE"

LYON METALLIC MFG. CO.

Manufacturers of Steel Shelving and Steel Lockers

AURORA, ILL.

CHICAGO, ILL., 230 E. Ohio Street
DETROIT, MICH., 1812 Penobscot Building
ROCHESTER, N. Y., 61 South Avenue
BOSTON, MASS., 161 Devonshire Street
CLEVELAND, OHIO, 325 Engineer Building
PITTSBURGH, PA., 629 Oliver Building
PHILADELPHIA, PA., 519 Bulletin Building
LOS ANGELES, CAL., 711-712 Central Building
NEW YORK, N. Y., 342 Madison Avenue

Products

LYON STEEL PRODUCTS
TRADE-MARK

LYON STEEL SHELVING and STORAGE RACKS; STEEL LOCKERS; CABINETS and general Storage Equipment.

Also manufacturers of Blue Print Cabinets, Steel Boxes, Tool Boxes and Bench Drawers, Steel Benches and Tables, Steel Factory Desks, Steel Enclosure Panels.

Lyon Steel Shelving

Standard—An exceptionally rigid type of steel shelving adapted for heavy loads and hard usage. Widely used by the largest industrial plants.

Uprights are made from No. 20 U.S.S. gauge patent leveled steel with heavy rolled face strips of No. 12 gauge material. Shelves are No. 16 gauge steel and supported by tubular rods with shouldered screw ends, making a continuous tube rod the length of the rack. Backs, dividers, boxes, doors and a wide variety of special shelves, inserts and other parts are available for special uses. Standard sizes of important parts are given below for a wide range of special parts are carried in stock for immediate shipment. A special bulletin covering this product is available on request.

Commercial—Adapted for use where an economical fireproof type of shelving is required for medium or light loads. In general use by the largest mercantile establishments. Changes in arrangement and position of shelves are easily made and the complete shelving can be erected by unskilled labor, a screwdriver being the only tool used. Uprights are No. 22 U.S.S. gauge patent leveled steel with rolled "Tee" face strips, shelves are No. 18 gauge. Sizes of parts are as given below and a large stock is carried. Bulletin on request.

Sizes of Standard Parts of Standard and Commercial Shelving—All sizes in inches.

UPRIGHT PARTITIONS
Heights..48—54—60—66—72—78—84—90—96—102—108—114—120—126—132—144—156—168—180—192—216—240
Depths...12—15—18—24—30—36—42—48

SKELETON UPRIGHTS
Same as Upright Partitions

SHELVES
Widths...18—24—30—36—42—48
Depths...12—15—18—24—30—36—42—48

BACKS
Heights..Same as Upright Partitions
Widths...18—24—30—36—42—48

CROSSWISE DIVIDERS
Heights..5—8—11—14—17—20—23
Depths...12—15—18—24—30—36—42—48

LENGTHWISE DIVIDERS
Heights . .5—8—11—14—17—20—23
Widths . .18—24—30—36—42—48

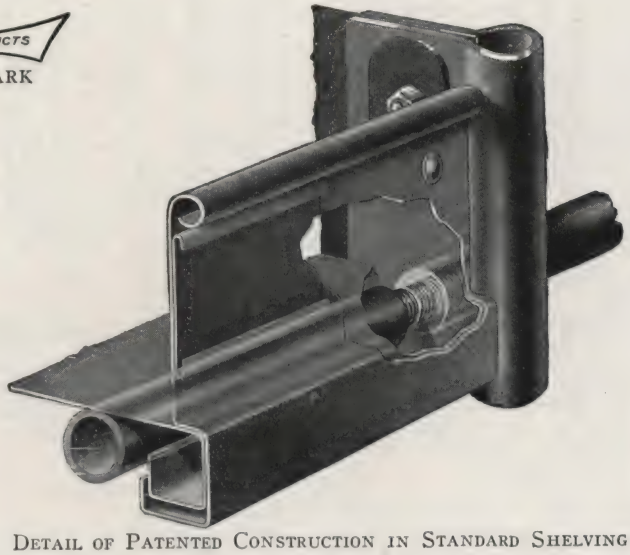
BIN FRONTS
Heights . .2—3—4—5—6—8
Widths . .18—24—30—36—42—48

HALF SHELVES
Widths . .18—24—30—36—42—48
Depths . .12—15—18—24

DIVIDING BACKS
Heights . .48—54—60—66—72—78—84—90—96—102—108—114—120
Widths . .18—24—30—36—42—48

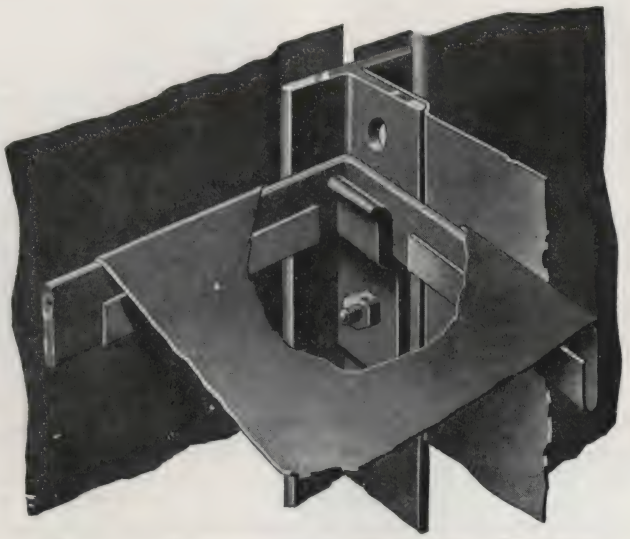
LABEL HOLDERS
Heights .⅞—2
Widths . .18—24—30—36—42—48

Co-operative Service—The District Offices of this company are thoroughly equipped to advise and co-operate with architects and engineers in the layout and design of equipment for economical and efficient operation. Many of the largest industrial and mercantile corporations regularly call on us for this service which entails no obligation.



DETAIL OF PATENTED CONSTRUCTION IN STANDARD SHELVING

INSTALLATION VIEW—GOVERNMENT BUILDING



DETAIL OF CONSTRUCTION IN COMMERCIAL SHELVING

Continued on next page

Lyon Steel Lockers

Lyon steel lockers are built in a wide range of sizes and designs to meet every requirement of the industrial, commercial and institutional fields. Large manufacturing facilities and a well organized erection department insure the prompt and satisfactory handling of installations of any size.

Specifications and Equipment—Doors made from No. 20 U.S.S. gauge furniture steel with double integral channel reinforcement, louver or round hole ventilation. Door frame of hard steel angles with full welded corners; front legs are extension of same frame.

Locking device actuated by straight pull handle, of heavy octagonal design; flat key lock or padlock attachment. Full loop hinges; locking device engages opposite each hinge.

Backs and sides of Nos. 24 U.S.S. gauge. Lockers assembled with "binder head" bolts not removable from outside of locker. All legs provided with adjustable foot plates.

Finish is highest quality baked enamel.

Equipment: double prong coat hooks all lockers; two single prong coat hooks in 12-in. lockers; three in larger sizes.

Numbering: etched aluminum number plates with black enamel figures.

Standard Sizes—All dimensions in inches.

Sizes of lockers			Height over all		Sizes of lockers			Height over all	
Width	Depth	Height inside	With standard 4½ in. legs	Without legs	Width	Depth	Height inside	With standard 4½ in. legs	Without legs
12	12	36 D.T.	78	73½	18	12	36 D.T.	78	73½
	15	42 D.T.	90	85½		15	42 D.T.	90	85½
	18	60 S.T.	66	61½		18	60 S.T.	66	61½
	A	72 S.T.	78	73½		24 (B)	72 S.T.	78	73½
15	12	36 D.T.	78	73½	24	18	60 S.T.	66	61½
	15	42 D.T.	90	85½		24	72 S.T.	78	73½
	18	60 S.T.	66	61½					
	A	72 S.T.	78	73½					

D.T.—double tier. S.T.—single tier. Lockers with sloping tops are 6 in. higher over all in rear than dimensions given above.

Note: "A"—12- and 15-in. wide lockers are not made in 24-in. depth.

Note: "B"—18-in. wide double tier lockers are not made in 24-in. depth.

Stock Sizes—For immediate shipment: Flat top, single or double row; flat key locks or padlock attachment; standard 4½-in. legs; standard louver perforations, finished in olive green.

12x12x36 D.T.
12x15x42 D.T.
12x12x60 S.T.
12x15x60 S.T.
12x12x72 S.T.
12x15x72 S.T.
15x15x72 S.T.
15x18x72 S.T. (A)
18x18x72 S.T. (A)

(A) In single row only

Sectionizing—Lockers assembled in sections as desired, single row or back to back. In laying out sections allow ¾ in. over nominal length for bolt heads, etc.

Compartment Lockers—Adapted for use when the effects of women employees must be provided for. Large door controlled from inside of any small compartment. Carried in stock equipped with combination or flat key locks, finished in olive green. Locker is 20 in. deep x 36 in. wide x 78 in. high. Six small compartments 15 in. wide x 20 in. deep, 12 in. high; one 21 in. wide x 20 in. deep x 12 in. high; large compartment 21 in. wide x 20 in. deep x 60 in. high.

Lyon Cabinets

"60" Cabinet—A substantial cabinet especially adapted for the safe storage of stationery or other articles or as an office clothing locker. 37½ in. wide x 17 in. deep x 78 in. high. Carried in stock equipped with flat key lock, five shelves or one shelf and coat rod, finished in olive green.

"30 Line" Cabinet—A strongly constructed and finely finished cabinet equipped with bronze handle and bar tumbler lock, finished in olive green, ivory gray, oak or mahogany, and equipped with shelves, hangers, etc., for a variety of purposes. 36 in. wide x 18 in. deep x 75 in. high. Carried in stock. Bulletin on request.

Lyon Single Tier Locker

Lyon Double Tier Locker

Lyon "38" Cabinet

Lyon Compartment Locker

Lyon "60" Cabinet

Lyon "36" Cabinet

DAVID LUPTON'S SONS CO.

Manufacturers of Steel Shelving, Racks and Bins

Allegheny Avenue and Tulip Street
PHILADELPHIA, PA.

For list of Sales Offices, see page 834

Products

STEEL SHELVING, BINS and RACKS.

Also Bench Legs and Drawers, Tool Stands and Cabinets.

For Steel Casements, see pages 815-817.

For Steel Sash and Sash Operating Devices, see pages 834-843.

For Steel Partitions, see page 1107.

General Advantages of Steel Shelving

Despite the fact that the initial cost of steel shelving is usually somewhat greater than that of wood shelving, it is much more economical in the end, except for purely temporary installations.

Advantages of steel shelving are as follows:

(1) Has 10% to 30% greater useful storage space. (2) Much longer life, especially under rough usage. (3) Acts as a fire retarder. (4) Does not splinter. (5) Can be taken down and re-erected without injury. (6) Can be adjusted for changes of material on shelves. (7) Encourages orderly habits and neatness of employees.

Lupton Bolted Steel Shelving presents the most effective combination of the advantages outlined above. Its parts are few in number; the reinforcements are incorporated permanently into the structures of the shelves and uprights; it can be erected by unskilled labor, using ordinary supervision and the instruction sheet furnished by us; the design is such as to give unusual strength and rigidity with moderate weight of metal, owing to the scientific distribution of metal at points of maximum stress. In tests, units of Lupton Bolted Steel Shelving have been loaded far beyond their rating without injury.

Lupton Bolted Steel Shelving

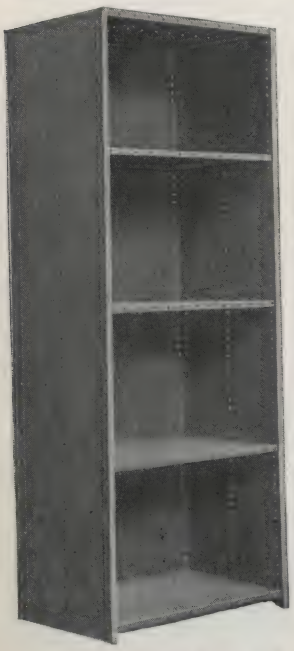
Open or Rack Type—The construction of this type is illustrated below. It can be furnished with detachable sides and back for converting it to the closed type. Side sheets are attached directly by bolts to the T-bar uprights, and the back sheets are attached by angle clips, using the holes already punched in the uprights. Racks of angle bars can also be furnished instead of sheet steel shelves.

Shipped completely knocked down and is assembled entirely by bolts.

Closed or Bin Type—In this type, the sides and back form the uprights. The front edges of the sides are formed permanently around flat reinforcing bars of higher carbon steel than could be used in metal to be worked cold. The effect is practically a T-bar construction with strength to support the shelves and resist shocks. The back edges of the sides are flanged and bolted to the back. Shipped completely knocked down and is assembled by bolts.

Attachments for Lupton Bolted Steel Shelving

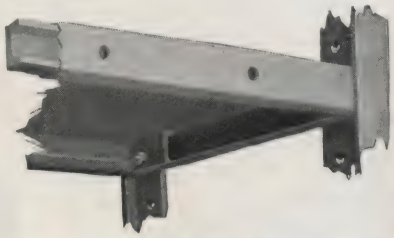
Lupton Bolted Steel Shelving can be modified by means of attachments in order to adapt it to a great variety of uses. The original installation can be suited exactly to the materials to be stored, and a change in these materials involves only minor changes in attachments. Both shelving and attachments are designed so that the latter may be added or removed with minimum effort and by using the minimum number of parts. Besides the removable sides and backs for the rack type of shelving, the attachments include doors, bin fronts, bin dividers, label holders and counter extensions.



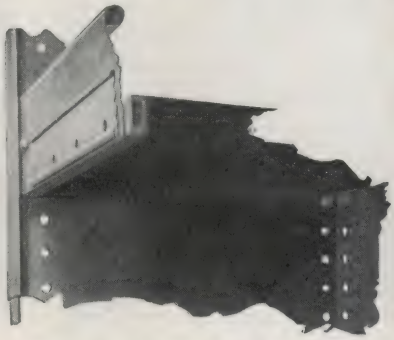
With Removable Sides and Back Attached

Without Sides and Back

LUPTON OPEN OR RACK TYPE BOLTED STEEL SHELVING



DETAIL OF OPEN OR RACK TYPE SHELVING



DETAIL OF CLOSED OR BIN TYPE SHELVING

LUPTON CLOSED OR BIN TYPE SHELVING

MANUFACTURING EQUIPMENT & ENGINEERING CO.

Steel Lockers, Cabinets and Shelving

HOME OFFICE AND SHOWROOMS

BOSTON, MASS.

NEW YORK OFFICE, Grand Central Terminal

FACTORY AND MAIL ADDRESS: FRAMINGHAM, MASS.

Products

STEEL LOCKERS and CABINETS.
STEEL SHELVING, RACKS and BINS.

Also Steel Stools, Chairs, Tables, Work Benches, Bench Legs and Drawers. Steel Boxes.

METAL MEECO PRODUCTS
TRADE-MARK

For Metal Toilet Enclosures, see page 1567; for Sanitary Washbowls, see page 1628; for Sanitary Drinking Fountains and Water Coolers, see page 1621.

Steel Lockers

Standard lockers of unusual strength and stability built in a variety of types and sizes to meet all general requirements. Special lockers built to customer's specifications.

Made of best cold rolled steel; gauges to suit requirements.

Doors provided with either louvered, expanded metal or perforated ventilation.

Flat key or pin tumbler lock, master-keyed, furnished.

We will assemble and erect, or will ship lockers knocked down for erection by purchaser.

Some common standard sizes are:

SINGLE TIER, IN.	DOUBLE TIER, IN.
12x12x60	12x12x36
12x15x72	12x12x42
15x15x72	12x15x36
15x18x72	12x15x42
18x18x72	15x15x42

When making inquiries, please state: (1) Size; (2) height; (3) number required; (4) exact arrangement in batteries; (5) color; (6) whether wanted erected by us or shipped knocked down to be erected by purchaser.

Type F Type K

SINGLE TIER STEEL LOCKERS WITH LOUVERED VENTILATION

Also furnished with doors of expanded metal

Steel Storage Cabinets

Many standard types and sizes carried in stock for all storage purposes.

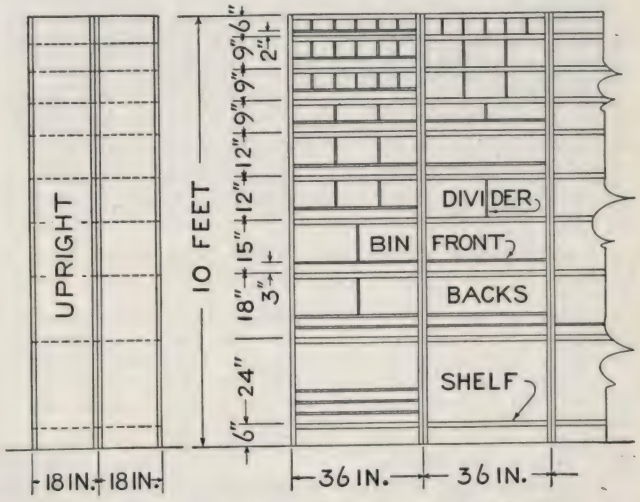
Special cabinets built to specifications.

FIG. 211. SAFETY CABINET

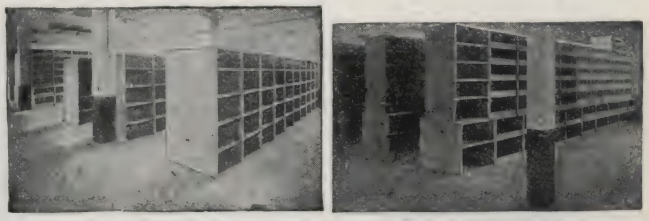
Steel Shelving, Racks and Bins

Either standard or special construction for any requirement.

When making inquiries, please give the following information: (1) space to be occupied; (2) kind of articles to be stored; (3) weight to be carried per shelf foot; (4) whether to be used from one or both sides; (5) a rough sketch showing special arrangement required.



DETAILS OF UNIT RACKS AND SHELVES



TYPICAL INSTALLATION OF STEEL SHELVING

A Few Users of Our Steel Equipment

American Sugar Refinery Co.
Amoskeag Mfg. Co.
Automobile Club of America
Boston & Maine R. R.
Boston University
Brookline High School
Carnegie Steel Co.
Colt's Patent Firearms Mfg. Co.
Fore River Shipbuilding Co.
Hood Rubber Co.
Mergenthaler Linotype Co.
New London Shipbuilding Co.
Pratt & Whitney Co.
Riker-Hegeman Co.
St. Elizabeth's Hospital
Standard Oil Co.
Tedesco Country Club
United Shoe Machinery Co.
United States Government
United Verde Copper Co.
Watertown Arsenal
Yale & Towne Mfg. Co.

ESTABLISHED 1873

FRED MEDART MFG. CO.

Manufacturers of Steel Lockers, Steel Shelving, Gymnasium Apparatus and Playground Apparatus

ST. LOUIS, MO.

SALES OFFICES

NEW YORK, N. Y., 52 Vanderbilt Avenue

CHICAGO, ILL., 326 West Madison Street

Products

STEEL LOCKERS; GYMNASIUM APPARATUS.

Also Playground Apparatus, Steel Shelving, Racks and Bins.

Medart Steel Lockers

Standard Sizes—Locker dimensions have been standardized to include about 12 sizes, the most popular of which are:

SINGLE TIER	DOUBLE TIER
12x12x36 in.	12x12x60 in.
12x15x36 in.	12x15x60 in.
12x12x42 in.	12x18x60 in.
12x15x42 in.	12x15x72 in.
	12x18x72 in.
	15x15x72 in.

Double tier lockers are half length and single tier lockers are full length. "Double tier locker" usually means one compartment.

Types—Lockers are furnished in two types: (1) "Back to back" type in which one back serves two lockers, as shown by the illustration below; (2) "wall" type in which the locker stands with back to the wall or is recessed so that the doors are flush with the wall face.

Specifications—*Metal*—Door frames made of No. 16 U. S. gauge, pickled, re-rolled and patent leveled sheet steel. Balance of locker No. 24 gauge.

Doors, Locking Device and Ventilation—Doors are flanged and paneled, with provision for any of six locking systems and are either louvered or perforated to provide ample ventilation.

Legs and Base—Lockers ordinarily built with 7-in. legs. Can be furnished without legs or with extra 4-in. cabinet base at additional charge.

Finish—Standard finishes are French gray, olive green or black enamel.

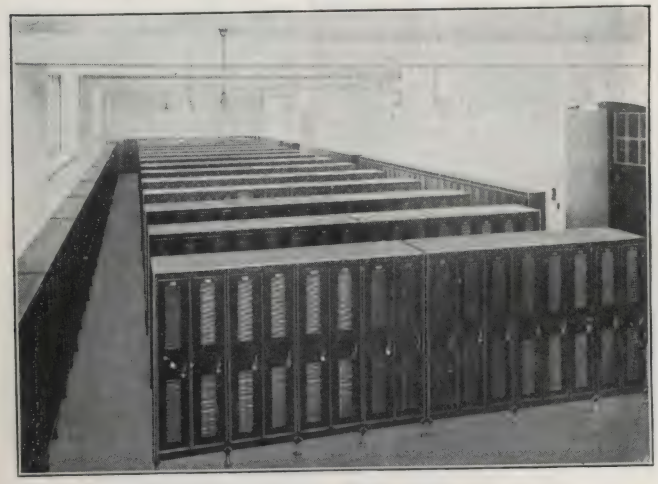
Equipment—Lockers 12 and 15 in. deep have 3 double pronged coat hooks. Lockers more than 15 in. deep have 5 coat hooks. All coat hooks zinc plated. Single tier lockers are provided with hat shelf. All lockers equipped with brass number plates. Handles made of non-rusting aluminum alloy. All bolts and nuts electro-galvanized. Key or combination locks can be furnished.

Planning Locker Installations—Certain conditions often arise which make it desirable to lay out special plans and in such cases the assistance of the Medart Engineering Department will usually be found very helpful. Medart Engineering Service is maintained for the benefit of architects and engineers.

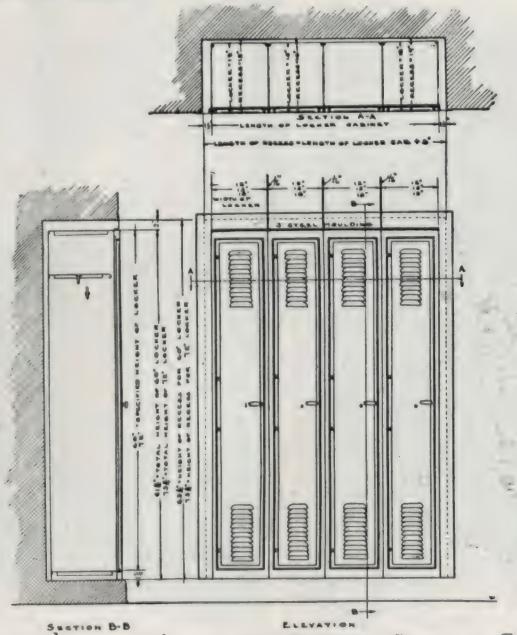
SINGLE TIER, WALL TYPE LOCKERS

Recessed Lockers—In planning the installation of recessed lockers special precautions must be followed with reference to top, bottom and side clearances—otherwise there is a possibility of allowances not being sufficient to permit proper installation. The elevation shown on this page, in combination with the horizontal and vertical cross sections, will furnish the information generally required for this class of installation.

Catalogue—All architects and designing engineers should have a copy of Medart Catalogue "A-7". It is filled with interesting information on Medart steel lockers and locker installation. Mailed on request to any one interested.



BOY'S LOCKER ROOM, CENTRAL HIGH SCHOOL, WASHINGTON, D. C.



TYPICAL CABINET OF SINGLE TIER LOCKERS, SHOWING CLEARANCES AT TOP, BOTTOM AND SIDES

Continued on next page

Medart Gymnasium Plan Service

The Medart Gymnasium Plan Service is maintained specially for architects and engineers. It is not a commercial service but is freely extended to anyone who requires it. In some cases, architects and engineers wish information on only specified subjects, while in others we are called on to furnish complete specifications and plans.

Planning a Gymnasium—To further extend the value of this service, we have collected and published all the important features of Gymnasium design under the heading "Planning A Gymnasium," and included it in our Catalogue L. "Planning A Gymnasium" includes such important suggestions as these:

Co-ordination of Various Departments—The gymnasium, locker room, baths and swimming pool.

Location of Department of Physical Training—A consideration based on health conservation from every angle.

Size and Height of Gymnasium—Considers the general requirements which affect the size, location of running tracks, general dimensional requirements, etc.

Provision for Attachment of Suspended Apparatus—Roof trusses, ceiling fixtures for box trusses, reinforced concrete construction, etc.

Spectators' Galleries—

Auxiliary Gymnasium—Points out the advantages of an auxiliary gymnasium, general practices, location, etc.

Storage Room—A discussion of the space usually provided for storing gymnasium apparatus when it is desired to clear the gymnasium floor.

Lighting, Heating and Ventilation—The various phases on these important subjects are considered from all vital angles. The distribution of light, placing of radiators and ventilator openings, ventilating fans and similar items are discussed in detail.

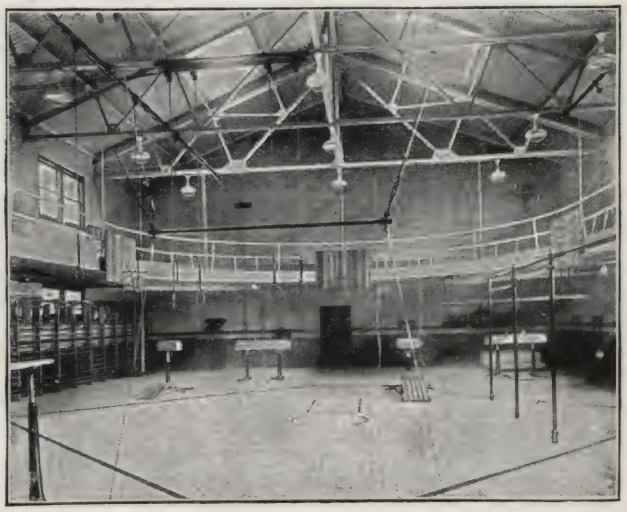
Inside Finish—A discussion of the various wall and floor finishes commonly used.

Running Tracks—Various features of design and construction are outlined, such as planning curvature, banking, etc.

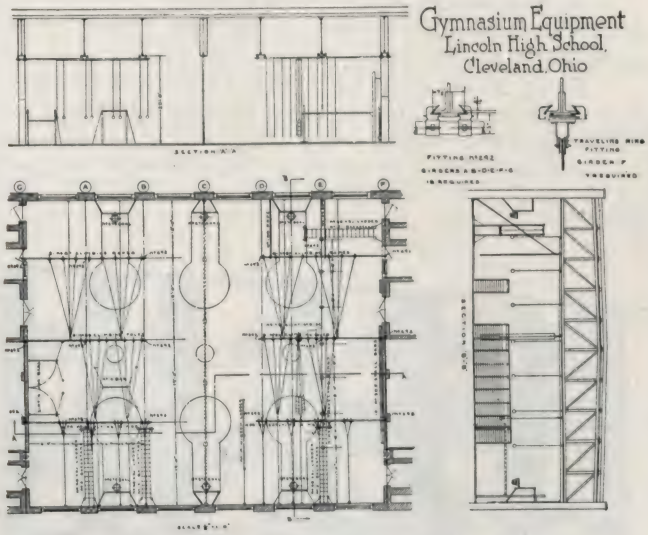
Other Subjects—Aside from the partial outline given above, "Planning A Gymnasium" treats with equal detail every possible phase of gymnasium planning—the various types of apparatus, whether floor, suspended or wall type, nets, mats, special exercise rooms, bathing department, swimming pools, locker rooms, massage rooms, etc.

The Medart Gymnasium Planning Service and the collected data "Planning A Gymnasium" are the result of 49 years of concentrated experience in building gymnasium apparatus and planning adequate gymnasium installations.

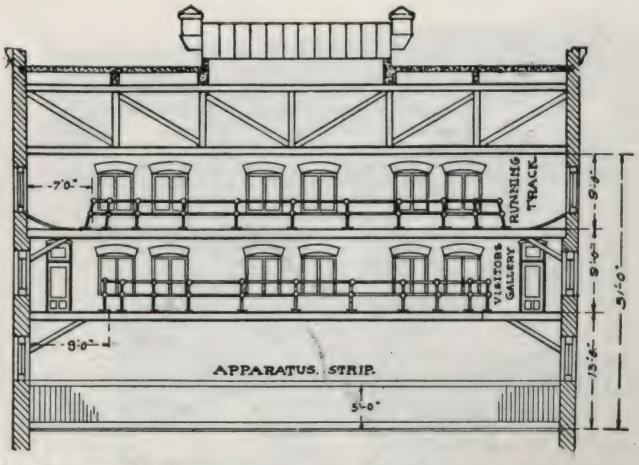
Write for "Planning A Gymnasium" and Catalogue "L" if interested in gymnasium planning. They will be of wonderful assistance to you.



TYPICAL GYMNASIUM INTERIOR, SHOWING APPARATUS SUSPENDED FROM ROOF TRUSSES
From "Planning a Gymnasium"



PLAN OF APPARATUS LAYOUT FOR GYMNASIUM
One of the many layouts shown in the book "Planning a Gymnasium"



CROSS SECTION THROUGH Y. M. C. A. GYMNASIUM 60x100 FT., WITH VISITORS' GALLERY AND RUNNING TRACK ABOVE
For similar details, see the book "Planning a Gymnasium"

YAWMAN AND ERBE MFG. CO.

Manufacturers of Sectional Steel Shelving

MAIN FACTORIES AND EXECUTIVE OFFICES

ROCHESTER, N. Y.

BRANCH OFFICES

BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CLEVELAND, OHIO
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WASHINGTON, D. C.
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DES MOINES, IOWA
MADISON, WIS.
SYRACUSE, N. Y.

Agents and Dealers in All Principal Cities

Products

"Y and E" "Five S" Sectional Steel Shelving.

Also manufacturers of Filing Devices.

For "Y and E" Dry Insulated Safes, Underwriters' Class "B" Label, see page 863.

"Y and E" TRADE-MARK

"Y and E" "Five S" Sectional Adjustable Steel Shelving System

This shelving system consists of standardized steel units which are adjustable and easily assembled by bolting together. Although all the parts are standard they permit great flexibility in assembling for various services. Any "Y and E" sectional filing cabinet for stock records, etc., and box drawer filing sections, may be stacked in this shelving.

All the individual parts of the "Y and E" "Five S" shelving are priced separately and may be ordered as required.

Standard Section

A complete section of shelving requires only 2 uprights and either a back plate for closed back shelving or back braces in the open back type besides the shelving. The shelves form the top and bottom. All parts are assembled to form a strong rigid stack by bolting together.

Sizes

Both the open and closed back types are made in 2 standard widths known as half sections and full sections and 3 standard heights. For sizes and details, see detail drawing on the following page.

Construction

Material and Finish—All material is high grade furniture steel finished by a special process and given a dip coat of an olive green special enamel baked on.

Uprights—Made of No. 18 gauge steel with front and back edges beaded for extra strength and finish. They have 2 vertical rows of adjustment holes equally spaced on 1-in. centers. Uprights are reversible for use on either end on center of stacks.

Shelves—Made of No. 20 gauge steel reinforced at the edges to hold heavy weights. The ends are flanged down and punched with 2 oblong holes for bolting to the uprights. Also made for receiving vertical division and are especially reinforced and provided with holes 1 in. apart for adjustment of divisions. Also made with rollers when required.

Vertical Division—Are made to 4, 6, 8, 10 and 18 in. standard heights and secured in place by use of pins top and bottom which fit into the holes in the shelves.

Closed Backs—Made in one sheet of steel and are held in place by shelves to the back flanges of the uprights from the inside, making the stack rigid.

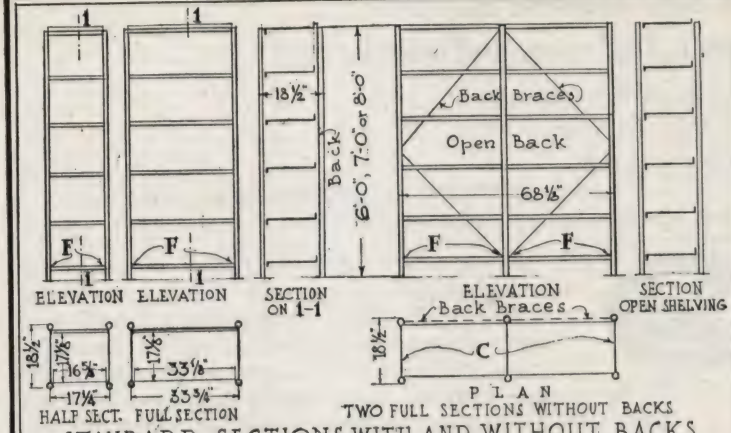
Open Backs with Back Braces—When no backs are to be used, back braces made of round steel bars and turnbuckles are used as sway braces and make the stack rigid. One brace is required on the section at each end of the stack. For more than 5 sections, an extra brace is provided at center.

Closed Type Shelving
Note the filing sections for stock systems. These are optional

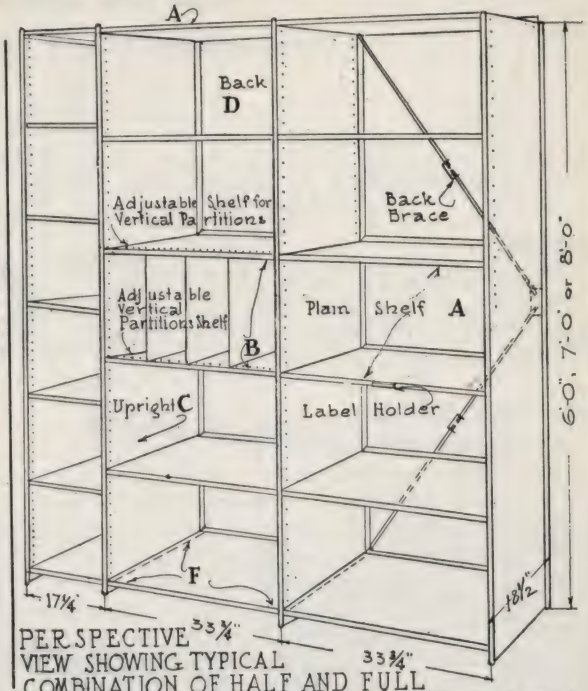
Open Type Shelving
For offices, retail stores, manufacturing plants, stockrooms, etc.

"Y and E" Closed and Open Type "Five S" Sectional Steel Shelving

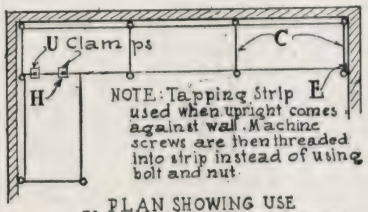
Continued on next page



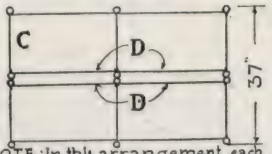
STANDARD SECTIONS WITH AND WITHOUT BACKS



PERSPECTIVE VIEW SHOWING TYPICAL COMBINATION OF HALF AND FULL SECTIONS AND VERTICAL PARTITIONS

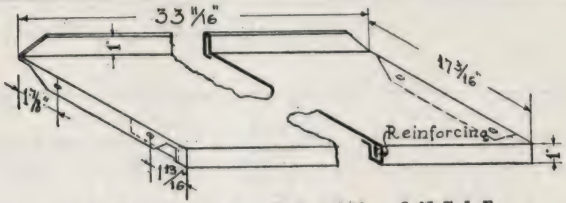


PLAN SHOWING USE OF U CLAMP & TAPPING STRIP

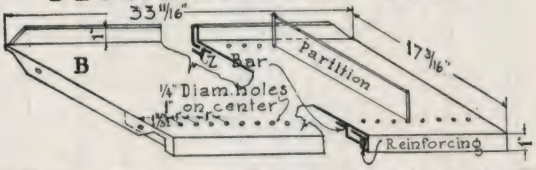


PLAN SHOWING SECTIONS PLACED BACK TO BACK

VARIOUS ARRANGEMENTS OF SHELVES

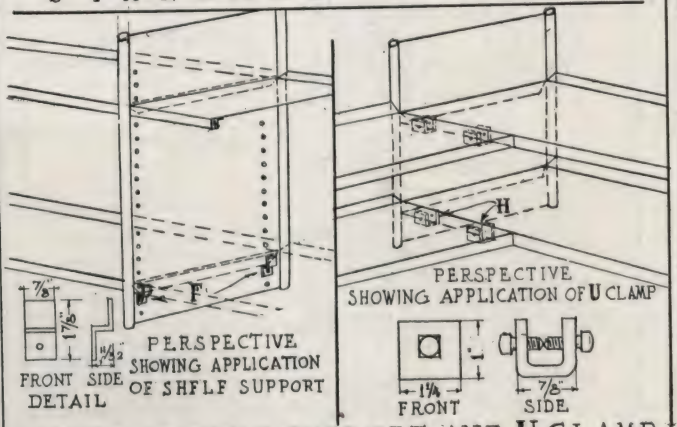


DETAIL OF PLAIN SHELF

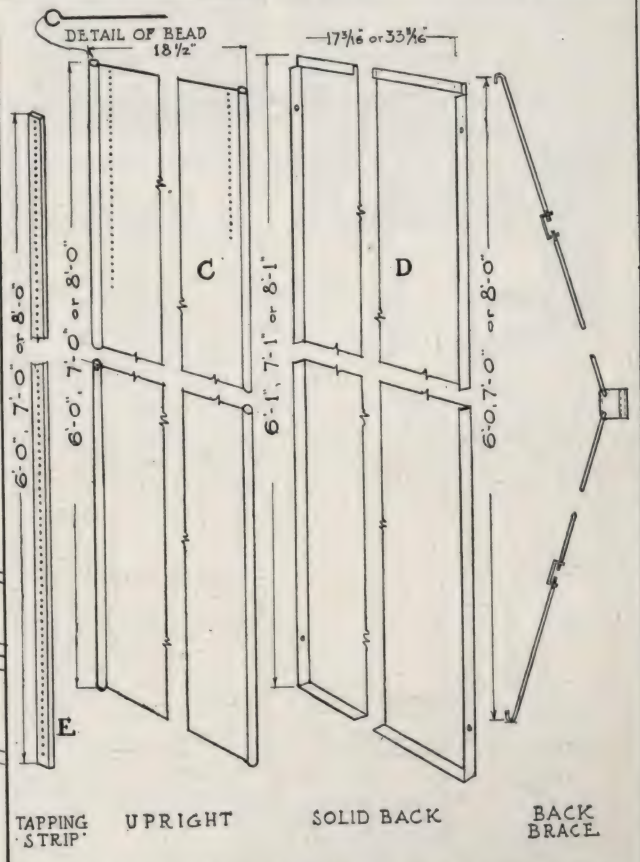


DETAIL OF SHELF WITH Z BARS FOR VERT. PARTITIONS

STANDARD SHELVES



DETAILS OF SHELF SUPPORT AND U CLAMP



DETAILS OF UPRIGHT SOLID BACK TAPPING STRIP AND BACK BRACE

DRAWN BY SWEET'S CATALOGUE SERVICE INC.	YAWMAN AND ERBE FIVE S SECTIONAL STEEL SHELVING	NOT DRAWN TO SCALE. DATE AUG. 22	DRWG. 1

PENN METAL COMPANY

Manufacturers of Steel Shelving and Lockers

65 Franklin Street
BOSTON, MASS.

SALES OFFICES

PHILADELPHIA, PA., 25th and Wharton Streets — PORTLAND, ME., 95 Exchange Street
EXPORT OFFICE, Corner of First and Washington Streets, JERSEY CITY, N. J.

Products

PENCO STEEL SHELVING and LOCKERS.

For Metal Lath and Lathing Accessories, see page 265; for Fire Resistive Doors, Shutters, Partitions, and Windows, see page 709.

anything Penco 1869 in sheet metal
TRADE-MARK

Penco Steel Shelving

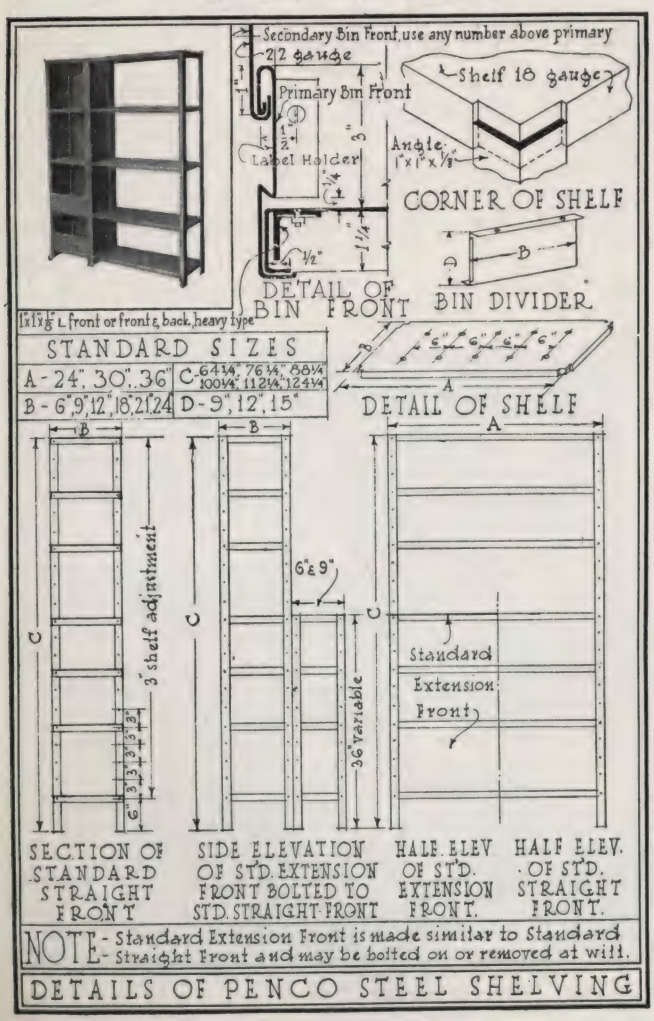
Penco steel shelving is simple and rigid in construction with parts interchangeable. Made in two standard types: straight front and extension front. Angle uprights are hot rolled with true and sharp edges. Shelves are stamped in one piece, with special solid corners and fit against angle uprights, adding greatly to strength. Shelves have 3-in. vertical adjustment; bin dividers, 6-in. horizontal adjustment. Each unit may be set up complete and then joined in battery, and just as quickly detached. Shipped knocked down. Finished in olive green enamel or galvanized.

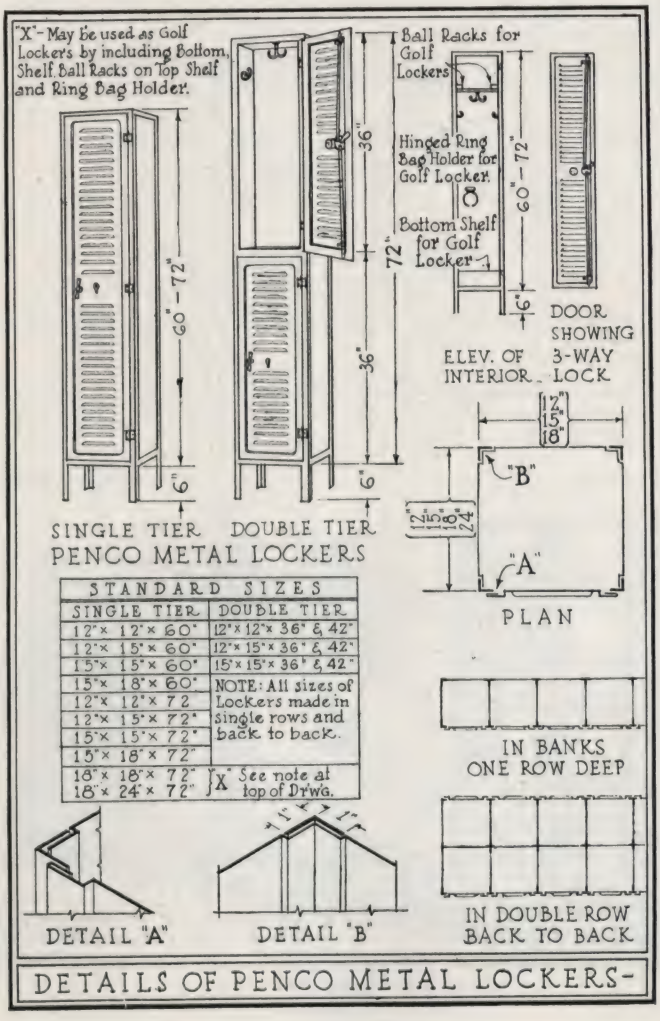
Penco Steel Lockers

Made in single and double tier (half height) and in double row (back to back). Front sections are welded in one piece. Back sections are similarly made, two angle uprights and back wall being spot-welded together. Punched for quick bolting. Ends and backs are reinforced by offsetting vertical edges, No. 24 gauge on all except 18x72 and 24x72 in., which are No. 22 gauge. Tops, bottom and shelves are No. 22 gauge up to 15x18 in. and No. 20 gauge above that.

Doors, No. 18 gauge metal sunk paneled and reinforced on all edges with full height ventilating louvers. Tee handle and cylinder lock, master-keyed if desired. Top shelf and wall hooks furnished in full length lockers; wall hooks only in double tier (half height) lockers. Finished in dark olive baked-on enamel. Shipped knocked down or set up.

Golf locker sizes are 15x18, 18x18 and 18x24 in. Equipped with No. 20 gauge bottom shelf, also ball racks on the top shelf and hinged ring bag holders.





JOHN THOMAS BATTS, INC.

Garment Hangers, Wardrobe and Closet Fixtures

GRAND RAPIDS, MICH.

Products

GARMENT EXTENSION CARRIERS; WISHBONE GARMENT HANGERS; WISHBONE WALL BRACKET SETS; STATIONARY CLOSET RODS.

Service

For twenty years Batts wardrobe fixtures and garment hangers have helped to meet the ever growing demand for modern appointments and conveniences throughout the home. They are designed for use wherever clothes are to be hung—homes, clubs, hotels, apartments, dormitories.

Value

Wardrobe fixtures of this sort offer a neat and orderly arrangement for the care of any and all types of clothing. They keep clothes hanging free from wrinkles, accessible without a moment's delay, always looking their best and ready to wear.

Extension Carriers

Where new homes are planned with new design built-in wardrobes for extension carrier installation, considerable valuable floor space can be saved. More than twice as many garments may be hung in half the space taken up by the old style closet. Extension carriers may likewise be employed to very good advantage in old style closets.

Other Fixtures

Where the use of extension carriers is not practical for certain reasons, Batts improved Stationary Closet Rods and Wishbone Wall Bracket Sets offer a practical solution of the garment hanging problem.

Wishbone Hangers

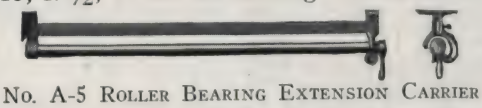
No. 1923
WISHBONE HANGER

Wishbone human shaped garment hangers are *par excellence* the best hangers on the market. They are made of hard maple, carefully finished as follows: (1) Natural wood, wax finish; (2) high grade enamel finish, and color to match decorative scheme.

Four styles, five sizes, for men, women, and children.

No. A-5 Roller Bearing Extension Carrier

Bright nickel finish, made in following stock lengths: 12, 14, 15, 17½, 19 and 22 in. long over all when closed.

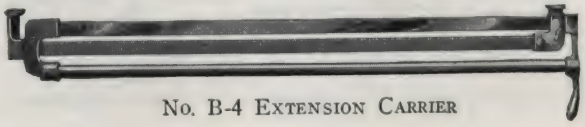


No. A-5 ROLLER BEARING EXTENSION CARRIER

Due to the construction of the front suspension casting on this type of carrier, coat hangers used with it must be fitted with special hooks. Therefore these carriers are sold complete with hangers only.

No. B-4 Roller Bearing Extension Carrier

Designed especially for use in deep wardrobes and closets; strong and durable. Bright nickel finish, made in following stock lengths: 24, 28, 30, 36 and 42 in. over all when closed.

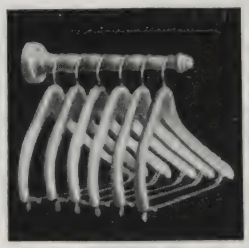


No. B-4 EXTENSION CARRIER

No. 12 Stationary Closet Rod

For use in large, old style closets. Consists of 1¼-in. hard maple dowel, any length up to 72 in., and 2 or more suspension brackets. May be hung beneath shelf or between two walls of closet. Finish, natural wax or enamel.

No. 12 STATIONARY CLOSET ROD



WALL BRACKET SET

Wishbone Wall Bracket Set

For use in large, old style closets and very shallow closets. Consists of 10-in. wall bracket, 3 bright nickel screws, and 6 Wishbone suit hangers. Finish, natural wax or enamel, any color.

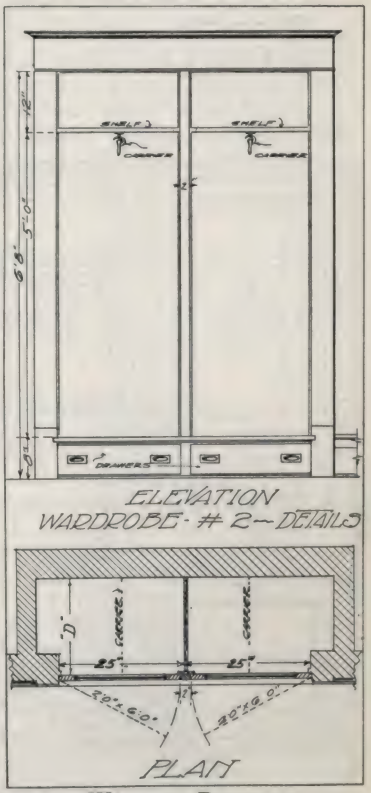
Wardrobe Details

The accompanying elevation and plan show a double wardrobe built in flush with wall. Width of doors may vary from 20 to 36 in.; dimension "D" (inside depth and width of shelf) should be 1 in. greater than length of carrier specified.

Prices and Discounts

Prices, discounts and other information in booklet form gladly submitted on request.

WARDROBE EQUIPPED



WARDROBE DETAILS

KNAPE & VOGT MFG. CO.

Modern Clothes Closet Fixtures

GRAND RAPIDS, MICH.

Product

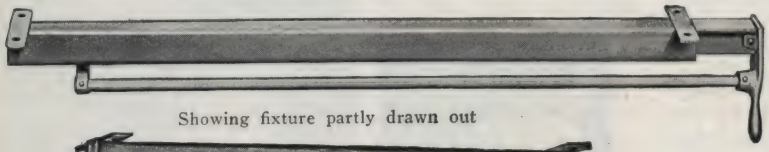
KNAPE & VOGT CLOTHES CLOSET FIXTURES, known under their respective names of "Columbia," "Twentieth Century," "Economy" and other standardized lines.

Knape & Vogt Clothes Closet Fixtures

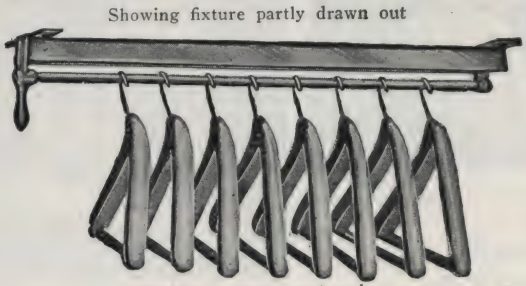
Carriers—Telescoping traveling full nickeled steel slides; run smoothly and noiselessly, without friction, on heavy roller bearings. Can be pulled out and pushed back with the touch of a finger.

Hangers—Shaped in close imitation of the natural curve of the human shoulders, which keeps clothes in shape. Smoothly made of selected wood. Strong and last a lifetime.

Advantages—Knape & Vogt Clothes Closet Fixtures materially save closet space, yet provide for the better storage of as many garments as could be put in large closets where most of the space is wasted.



Showing fixture partly drawn out



Showing hangers on carrier

KNAPE & VOGT CLOTHES CLOSET FIXTURES

Because the fixtures slide in and out, it is possible to pull a whole wardrobe out in the light and air of the room, and selection is thus greatly facilitated.

Styles suitable for any installation, whether in private residences, clubs, schools, lodges, factory lockers—all cloakrooms—and in store showcases. Made in sizes to suit any depth of space, with long or short handles, depending on the height from floor installed. Can be installed in old closets as quickly as in new ones. Many builders specify and erect closets of small dimensions particularly for the installation of Knape & Vogt Clothes Closet Fixtures, giving as great or more clothes capacity than is otherwise possible.

Styles, Sizes and Quotations—Fixtures are manufactured in many styles and sizes and are carried in stock in multiples of 2 in. from 12 to 60 in. in length. Special lengths made to order. Send specifications and let us quote prices.

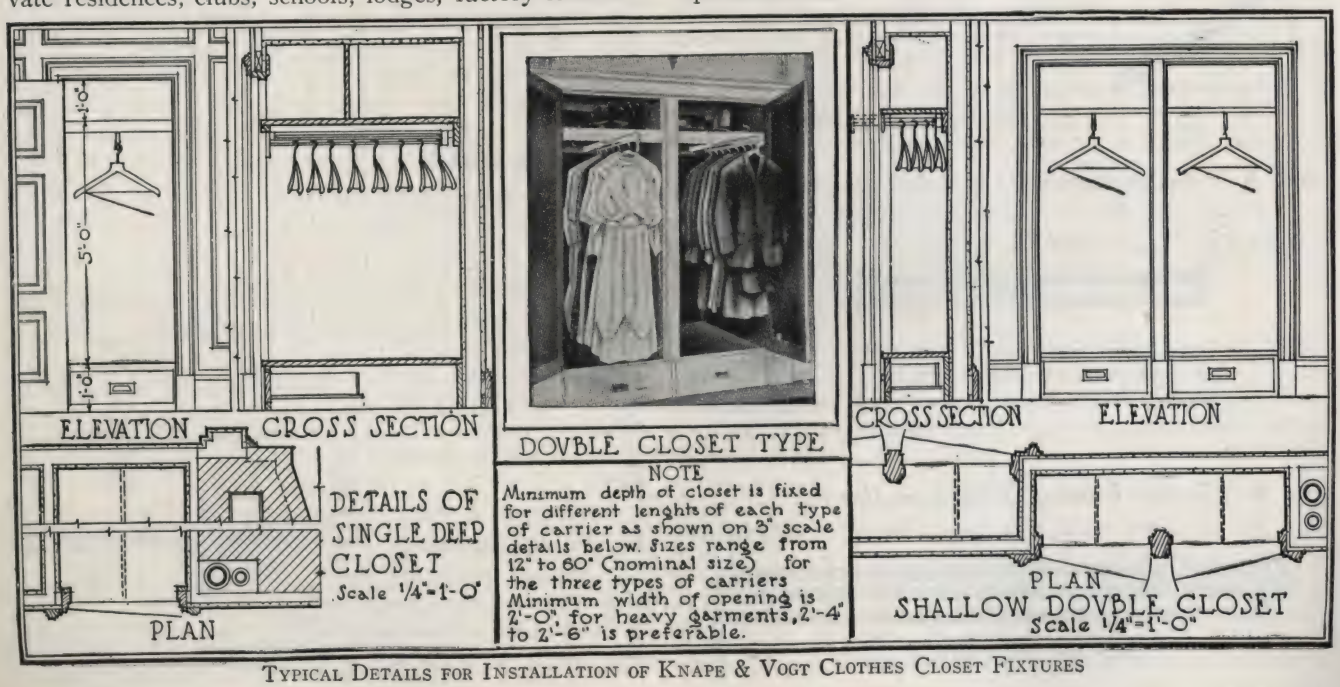
Reference and Cooperation

Knape & Vogt Clothes Closet Fixtures are nationally popular. They have been installed in many leading hotels, clubs, lodges and countless homes where practical and improved equipment at a small expenditure is regarded as a real economy.

We will be glad to furnish further details and cooperate fully with architects and builders. Write to us direct. Address of branch offices in principal cities given on request.

The Modern Way

For several years we have enjoyed the active cooperation of architects and builders throughout the country who, recognizing the advantages of our Clothes Closet Fixtures in economy of closet space and better accommodations and care of wearing apparel, have specified closets for the installation of such fixtures. The present time, when so many new buildings are being erected, seems *most* appropriate for the suggestion by architects and builders of closets of a style and size to include installation of Knape & Vogt Clothes Closet Fixtures. We know thousands who have thanked their architects and builders for this feature of their building specifications.



TYPICAL DETAILS FOR INSTALLATION OF KNAPE & VOGT CLOTHES CLOSET FIXTURES

LAWSON MFG. COMPANY

Manufacturers of Garment Fixtures

TELEPHONE
SUPERIOR 6589

228-230 West Superior Street
CHICAGO, ILL.

Products

RITE-WAY GARMENT FIXTURES.
For Lawson Spring Hinges, see pages 1284-1285.

Rite-Way Garment Fixtures

The Rite-Way garment fixture is an ideal device for the purpose of accommodating clothes hangers on the underside of a shelf. Made in lengths to suit any depth of closet and any size of wardrobe.

Where there is no shelf and the closet ceiling is too high, it can be attached to a board fastened between the rear wall of the closet and the inside of the door frame. Fixtures are made in various lengths to suit any depth of closet and any size of wardrobe; suitable for stores, hotels, apartment houses, residences, bungalows, dormitories, clubs, etc.

It is constructed with a sliding rod so as to allow all clothes hangers to be simply drawn forward, permitting the removal or rehanging of garments in open space outside of the closet.

Rite-Way fixtures are made of nickeled steel, and the channels which carry the slide are equipped with fiber rollers, making it noiseless and easy to operate.

Screws furnished with each fixture.

Advantages of Rite-Way Garment Fixtures

Permit proper hanging of garments and keep them in good condition.

A touch allows clothes to be drawn out of closet into open space when selecting or rehanging garments.

Will not get out of order, will last a lifetime and will support an enormous weight.

Installed by simply attaching with 4 screws.

Operate quickly, easily and quietly.

Provide double the room for clothes in half the space required by ordinary closets.

When selecting a garment, it is unnecessary to remove an armful, as the Rite-Way fixture affords a convenient arrangement and individuality to hangings. This is in striking contrast to the old-fashioned method of attaching hooks along the walls or under shelves, resulting in a compact arrangement and crowding of clothes, increasing the possibility of tearing or mussing them.

Hanging clothes on Rite-Way garment fixtures is the best method of keeping them in good condition.

TYPICAL RITE-WAY GARMENT FIXTURE INSTALLATION

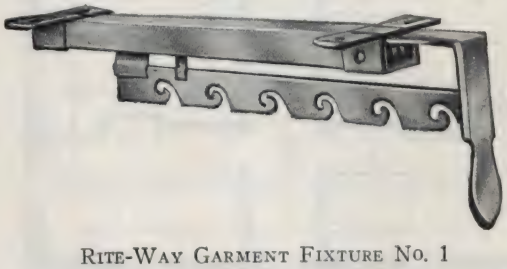
Types of Rite-Way Garment Fixtures

No. 1 Fixture—Made so as to accommodate clothes hangers at a uniform spacing of 2 in., so that any garment can be removed without disturbing the rest. This is made possible by the uniformly spaced notches on the lower sliding bar of the fixture.

No. 2 Fixture—Same as No. 1 except that the uniform spacing feature is lacking and it will thus accommodate clothes hangers limited in number only by the length of the fixture.

Where Obtained

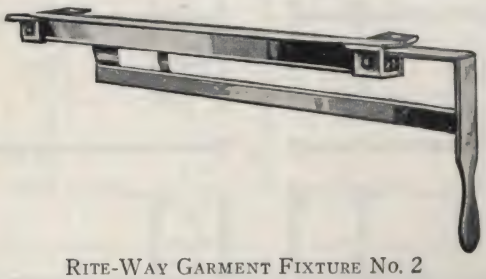
Rite-Way garment fixtures can be purchased from local hardware dealers.



RITE-WAY GARMENT FIXTURE No. 1

Made of nickeled steel. Channel which carries slide is equipped with fiber rollers that make it noiseless and easy to operate. Furnished with screws

Length closed, in.	12	14	16	20	24	28	32	36
Number of hangers	6	7	8	10	12	14	16	18
List price, each	$1.50	1.60	1.70	2.50	4.00	5.00	6.00	7.00



RITE-WAY GARMENT FIXTURE No. 2

Same as No. 1 except lower bar on which clothes hangers are placed. More hangers can be used but garments can not be kept at a positive spacing as afforded by the No. 1 fixture

Length closed, in.	12	14	16
List price, each	$1.30	1.40	1.50

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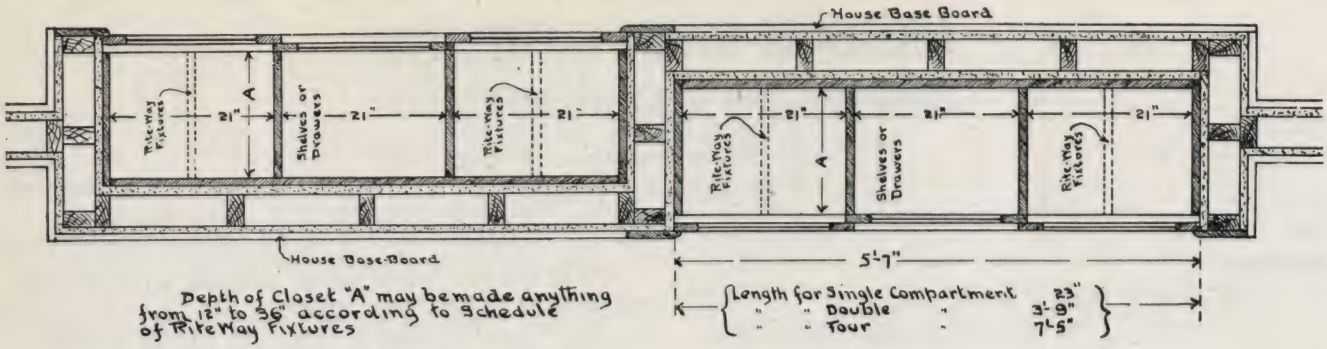


PLAN SHOWING CLOSET ARRANGEMENT FOR TWO ADJOINING BEDROOMS

With closets built for 16-in. fixtures, the projection of the closets into the room is only 9½ in.

How Rite-Way Garment Fixtures Saved $168.00 on a Bungalow

Instead of the old-fashioned deep closets, dark and inaccessible, the plans were changed to the modern space-saving arrangement made possible by the use of the Rite-Way garment fixtures. This did not mean any reduction in the capacity of the closets, as the Rite-Way closet holds more garments than the old-fashioned kind; it resulted in the space originally allowed for the closets in this plan being cut in half. With no change whatever in the size of the room, the length of the house was reduced 6 ft.

The following figures give an estimate of the saving in labor and material:

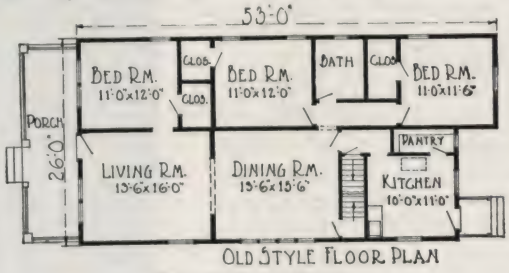
Excavation, 14 yds. at 60c	$ 8.40
Foundation wall, 60 cu. ft. at 65c	39.00
Concrete floor, 60 sq. ft. at 18c	10.80
LUMBER	
12 lineal ft. 2x8 wall plates; 36 lineal ft. 2x4 plates; four 2x10-12 floor joists; four 2x6-12 ceiling joists; ten 2x4-8 rafters—270 ft. at $35.00	$ 9.45
90-ft. roof boards; 80-ft. subfloor; 140 ft. box sheathing, totaling 310 ft. at $34.00	10.23
150-ft. siding at $65.00	9.75
90-ft. finished floor at $90.00	8.10
20 yds. lath and plaster at 85c	17.00
1 square of roofing	9.50
Cornice, lumber, trim, moulding, etc. (estimated)	8.00
Carpenter labor (estimated)	38.00
Total	$168.23

When it is considered that this saving is on a small bungalow, it can be readily seen that on a large apartment or hotel it will be multiplied many times.

Typical Floor Plans

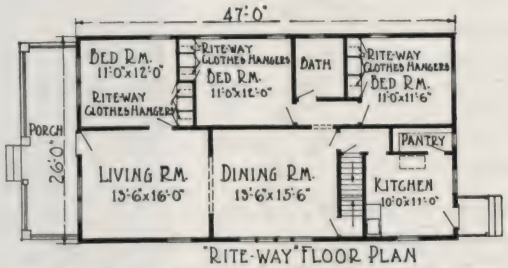
Following are a few floor plans showing the advantages of adopting the new Rite-Way garment fixture method of saving building space and reducing building cost.

Where a saving in first cost is not so important the actual size of the living rooms can be increased by planning closet space for Rite-Way garment fixtures.



OLD STYLE FLOOR PLAN

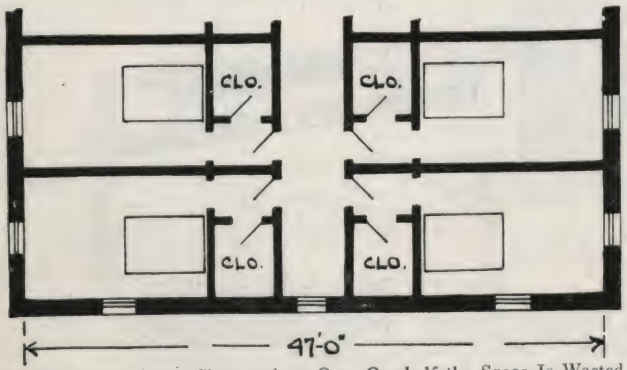
With Ordinary Closets



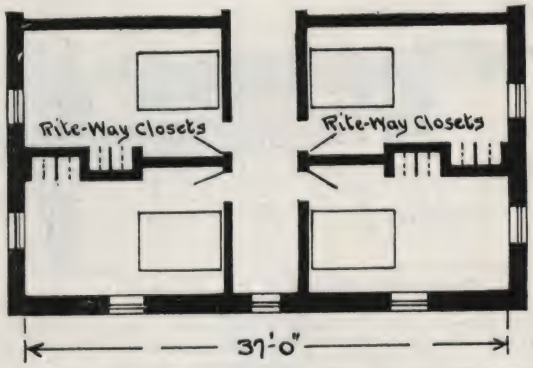
"RITE-WAY" FLOOR PLAN

With Closets Planned for Rite-Way Garment Fixtures. Length of House Reduced by 6 ft.

FLOOR PLANS OF BUNGALOW ON WHICH $168.00 WAS SAVED



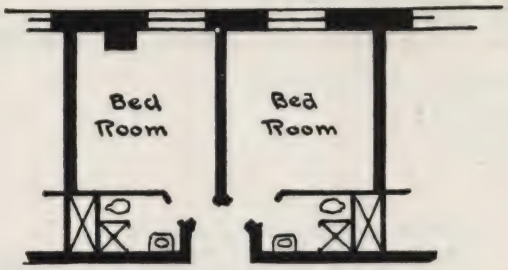
With Ordinary Large Closets where Over One-half the Space Is Wasted



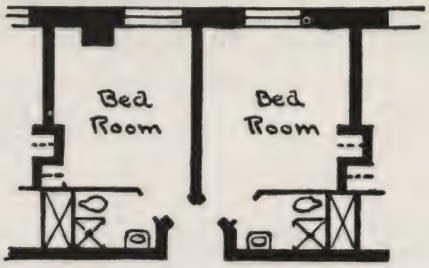
With Closets Planned for Rite-Way Garment Fixtures. Besides adding to the convenience of the arrangement, 10 ft. is cut from width of building

TYPICAL DORMITORY AND CLUB FLOOR PLANS

Continued on next page

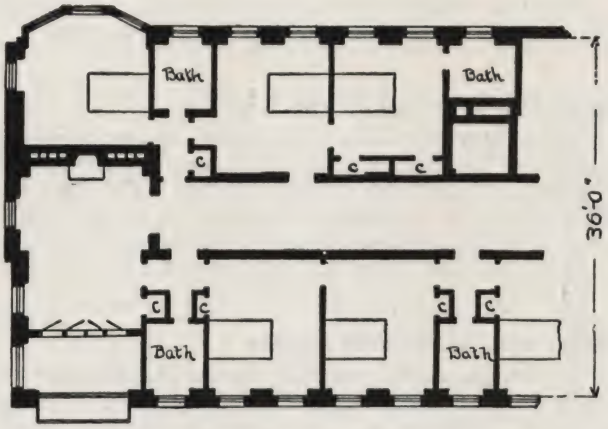


With Interior Bathrooms and no Closets

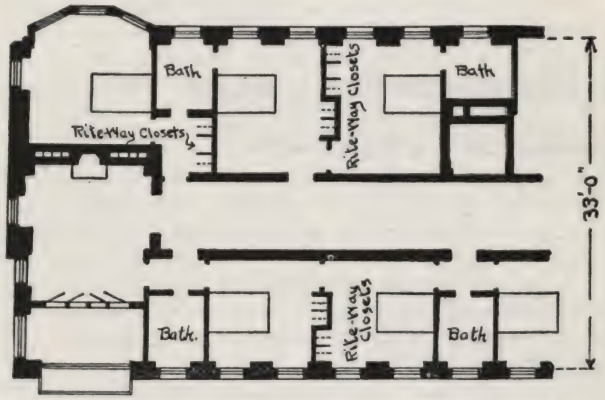


Same Unit with Closets Adapted for Rite-Way Garment Fixtures. The space taken from each room is negligible and closet space provided is ample

TYPICAL FLOOR PLAN OF COMMERCIAL HOTEL UNITS

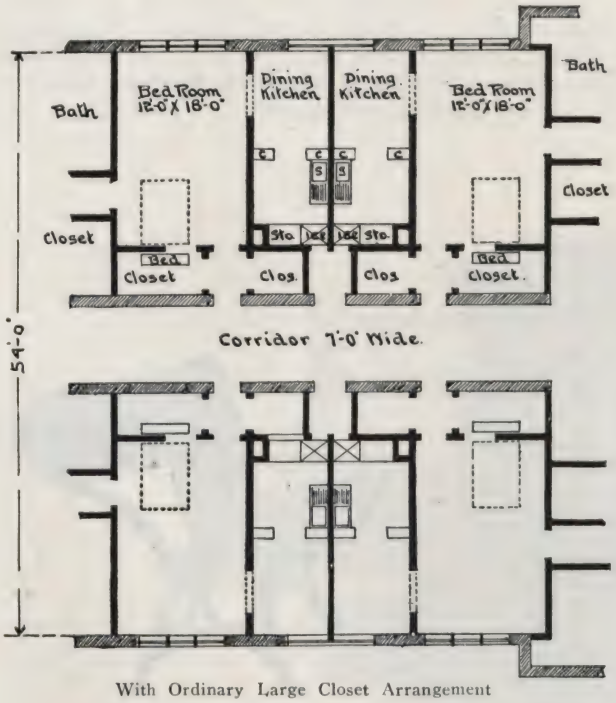


Apartments with Ordinary Closet Arrangement

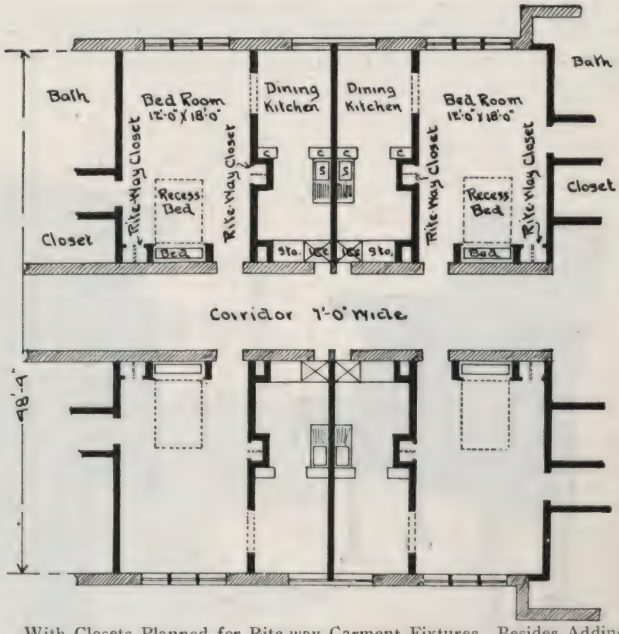


Apartments with Wardrobe Closets Planned for Rite-way Garment Fixtures 3 ft. saved in width of building

TYPICAL FLOORS OF FAMILY HOTEL



With Ordinary Large Closet Arrangement



With Closets Planned for Rite-way Garment Fixtures. Besides Adding to the Convenience of the Closet Arrangement, 6 ft. Is Cut from Width of Building

TYPICAL APARTMENT HOUSE FLOOR PLANS

The possibilities of saving space and thereby reducing cost of construction through the use of closets suitable for Rite-Way garment fixtures are almost limitless. As an example, in a large apartment house 175 ft. long, 7 stories and basement (typical apartment unit plans shown above), the width was reduced 5 ft. 8 in. without changing the size of the rooms, thereby effecting a saving of 79,000 cu. ft.

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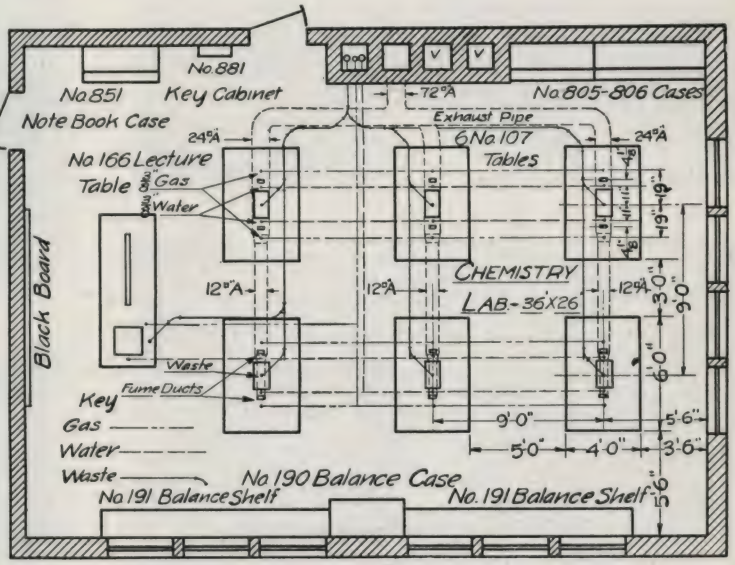
Floor plans, or in some cases dimensioned pencil sketches, are sufficient data to enable us to make our recommendations and submit accurate estimates and plans showing complete cost of installing equipment best adapted to the situation.



CHEMISTRY ROOM EQUIPMENT

Layout for 24 students with location of drain, water, gas, and exhaust fume ducts

FOUR-PUPIL CHEMISTRY TABLE WITH FUME HOOD

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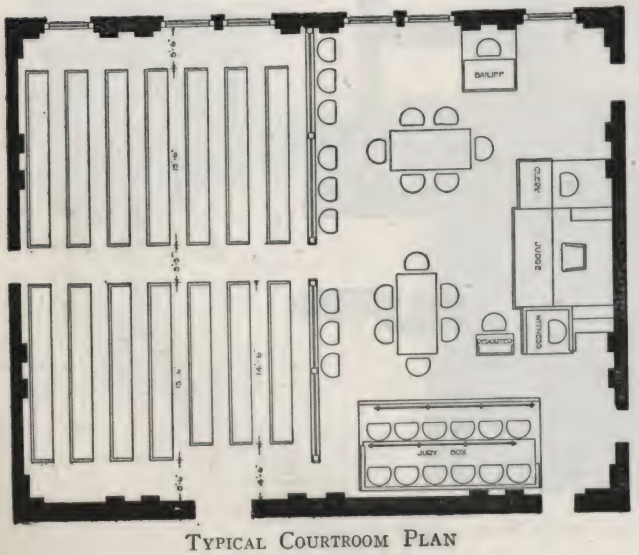
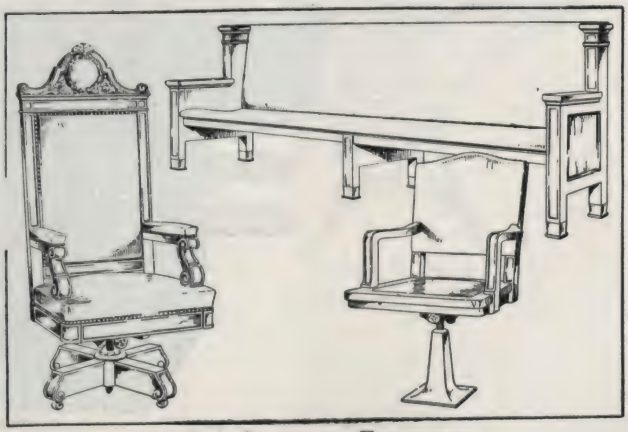


TYPICAL COURTROOM PLAN



TYPICAL COURTROOM FURNITURE

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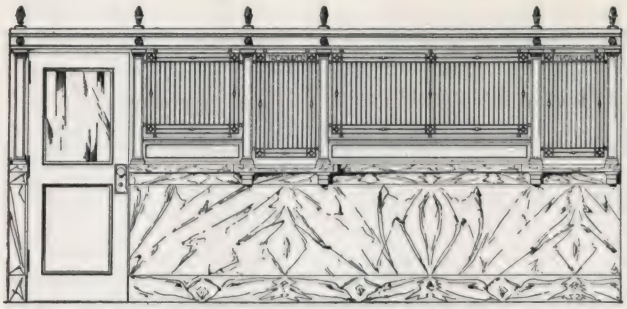
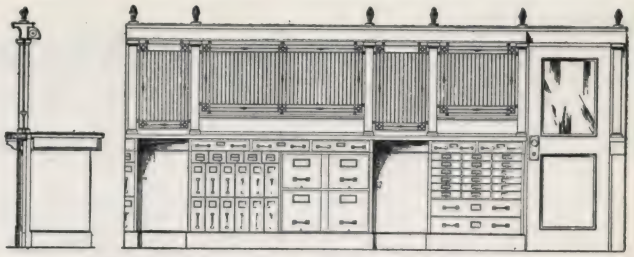


FRONT OF TYPICAL COUNTER OF MARBLE, BRONZE AND WOOD



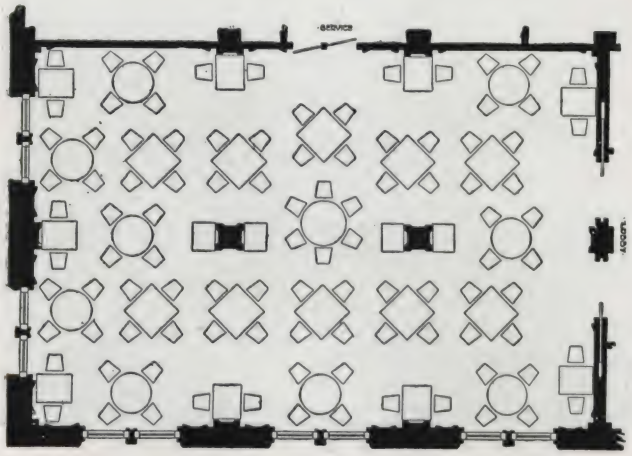
REAR OF COUNTER—WOOD OR STEEL TOP WITH STEEL DEVICES

VIEW OF HALF OF CLUB LOUNGE, NEWARK ATHLETIC CLUB, NEWARK, N. J.

STORE INTERIOR, ALMER COE & CO., OPTICIANS, CHICAGO, ILL.

LOBBY OF MUEHLEBACH HOTEL, KANSAS CITY, MO.
HOLABIRD & ROCHE, Architects

GOVERNOR'S RECEPTION ROOM, STATE CAPITOL, SALT LAKE CITY, UTAH
RICHARD KLETTING, Architect



TYPICAL RESTAURANT PLAN

TYPICAL HOTEL AND CLUB FURNITURE

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This firm's vast experience, covering a long period of years and a wide variety of buildings, amply attests to its ability to handle thoroughly and competently any type of project.

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Contracts accepted for work in any part of the United States.

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MAIN DINING ROOM, AMBASSADOR HOTEL, NEW YORK, N. Y.
WARREN & WETMORE, Architects

WORLD THEATER INTERIOR, OMAHA, NEB.

Continued on next page

References

The following is a partial list of buildings in which the painting or decorating has been done by this company:

Ivanhoe Masonic Temple, Kansas City, Mo.
Ambassador Hotel, Atlantic City, N. J.
Ritz-Carlton Hotel, Atlantic City, N. J.
Manhattan Building, New York, N. Y.
Yale Quadrangle, New Haven, Conn.
Commodore Hotel, New York, N. Y.
Pennsylvania Hotel, New York, N. Y.
Castanea Paper Co., Lock Haven, Pa.
United Fruit Co., New Orleans, La.
John D. Rockefeller Residence, New York, N. Y.
Monongahela Bank Building, Morgantown, W. Va.
Straus Bank, New York, N. Y.
Arlington Hotel, Hot Springs, Ark.
Eastman Hotel, Hot Springs, Ark.
Plaza Hotel Addition, New York, N. Y.
Army & Navy Office Building, Washington, D. C.
G. J. Tire & Rubber Co., Indianapolis, Ind.
Shubert's Great Northern Theater, Chicago, Ill.
Thos. Cusack Company Offices, Chicago, Ill.
Seminary Buildings, St. Mary of the Woods, Area, Ill.
Genesee County Bank, Flint, Mich.
Wade Park Manor Hotel, Cleveland, Ohio
Gordon Square Arcade Building, Cleveland, Ohio
Bulkley Building, Cleveland, Ohio
National City Bank, Cleveland, Ohio.
Penn-Alto Hotel, Altoona, Pa.
Robert E. Lee Hotel, Winston-Salem, N. C.
Edward Ballard Residence, French Lick Springs, Ind.
E. E. Tolman Residence, Lake Forest, Ill.
Edward N. Hurley Residence, Wheaton, Ill.
Western Electric Plant, Chicago, Ill.
Detroit News Building, Detroit, Mich.
Newcomb-Endicott Co., Detroit, Mich.
National Biscuit Co., Detroit, Mich.
Chevrolet Motor Co., Flint, Mich.
Riverside Country Club, Lansing, Mich.
Roosevelt Theater, Chicago, Ill.
Hanna Building, Cleveland, Ohio
General Motors Co., Detroit, Mich.
Armour & Co., 57 Buildings, St. Paul, Minn.
General Electric Co., Fort Wayne, Ind.
Rialto Theater, Louisville, Ky.
Carnegie Houses, Indianola, Pa.
Monteleone Hotel, New Orleans, La.
Patten Hotel, Chattanooga, Tenn.
Commercial National Bank, Independence, Kans.
House of Representatives and Senate Chamber, Springfield, Ill
Westchester-Biltmore Country Club, Rye, N. Y.

HARKNESS TOWER, YALE QUADRANGLE, NEW HAVEN, CONN.

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BLOOMFIELD, N. J.

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Products

FAB-RIK-O-NA WOVEN WALL COVERINGS as follows:

FINISHED COVERINGS, including Dyed Tapestry Burlaps, Pearl Ko-Na, Indikloth and Fab-Rik-O-Na Interwovens.

UNFINISHED COVERINGS (on which Paint or Calcimine is to be applied), including Lining Ko-Na (Muslin), Oil Ko-Na (Muslin), Fab-Rik-O-Na Muslin, Prepared Sheeting, Ko-Na Canvas, Prepared Canvas, Shel Ko-Na Burlap, Lining Burlap, Filled Burlap, Prepared Burlap, and Painted Burlap.

KLING-KO-NA, an Undercoating for Paint Work on Plaster; a Size for Hanging Wall Coverings.

Fab-Rik-O-Na Quality

The large range of colors and materials in the Fab-Rik-O-Na line offer many opportunities to the decorator for the execution of pleasing and individual work. A wall covering is available for every artistic or utilitarian need. The color reproductions on the pages following illustrate some of these materials.

Fab-Rik-O-Na woven wall coverings are the standard of quality, fabric, color and workmanship. The trade-mark of H. B. WIGGIN'S SONS CO. is stamped on the back of all 36-in. widths.

These Fab-Rik-O-Na materials perform a double service; they beautify the wall with their texture, pattern and coloring; and they also reinforce it. Their permanence in color insures lasting service.

Fab-Rik-O-Na Finished Wall Coverings (Fast to Sunlight)

Fab-Rik-O-Na Interwovens — Preeminently a quality product, combining the essentials of beauty and durability to an exceptional degree. Made of a canvas material with a characteristic horizontal weave, well filled, evenly colored, thoroughly shrunk and prepared for pasting to the wall. This material may be successfully hung without showing joints. Furnished in a variety of fast-to-light colors and pleasing brocade designs, providing an unusual opportunity for the distinctive decoration of living rooms, dining rooms, halls, sun rooms. bedrooms, etc., where delicate effects are desired. Comes in rolls 30 in. wide.

Pearl Ko-Na—A material of heavy texture in delicate pastel shades that will remain unchanged in color and finish for years. It has a peculiar brilliancy of surface, and is admirably suited for libraries, halls, reception rooms, living rooms and for hotel work where heavier effects are desired than are obtained with the Interwovens. Furnished in a variety of pleasing colors and in brocade designs. Supplied in rolls 36 in. wide.

Indikloth—A new Fab-Rik-O-Na woven wall covering. Cotton and jute are interwoven to produce a most pleasing and decorative covering. This is finished by a process similar to Pearl Ko-Na. The texture is finer, the character of the weave is more decidedly horizontal, the finish is lustrous and permanent. It has not been possible to prepare illustrations of this material in time for this publication. Comes in 50-yd. rolls 36 in. wide. Samples on request.

Dyed Tapestry Burlap—Even in weave and color, fast to light, and easy to hang. It is universally conceded to be the highest grade wall burlap on the market. It is manufactured in 24 pleasing colors, and comes in rolls 36 in. wide. This material is unsurpassed as a background for pictures and furniture. Fab-Rik-O-Na Dyed Tapestry Burlap will retain its decorative value for many years, offering a resistance to the deteriorating influences of sunlight and everyday use not to be found outside the Fab-Rik-O-Na line. It makes a wall covering of rare merit.

Fab-Rik-O-Na Unfinished Wall Coverings (to Be Painted or Calcimined)

The following products are manufactured ready for hanging in the same manner as wall paper. They are fully prepared for the final application of paint or calcimine.

Covering capacities of paint set forth below are approximate, being based on results obtained with a well-known brand of ready mixed flat paint.

These goods, from light muslin to heavy burlap, are furnished in widths from 36 to 99 in.

Prepared Canvas—Universally acknowledged as the best decorator's canvas. Made of heavy cotton cloth, for lining walls and ceiling where the best material procurable is desired. Gives the maximum protection to the walls. The surface is of extra fine finish for taking paint. Comes in 50-yd. rolls 36 in. wide.

One gallon of paint will cover 390 sq. ft. of Prepared Canvas.

Ko-Na Canvas—A high grade canvas for fine work on plaster walls. Lighter in weight than Prepared Canvas. Has a smooth and highly finished surface. Comes in 50-yd. rolls 36 in. wide.

One gallon of paint will cover 420 sq. ft. of Ko-Na Canvas.

Fab-Rik-O-Na Muslin—A medium weight material easily hung. It does not form wrinkles or blisters, and seams do not shrink open or filling break out. Gives increased strength and protection to the wall. It has a bold texture effect. High in quality, but low in price. Comes in 50-yd. rolls, 36 in. wide.

One gallon of paint will cover 325 sq. ft. of Fab-Rik-O-Na Muslin.

Fab-Rik-O-Na Prepared Sheeting—Similar to Fab-Rik-O-Na Muslin. For use on ceilings and side walls. Especially designed for covering large surfaces and leaving but few seams. The average ceiling requires but two strips, leaving only one seam. Rolls of 30 running yds. are 82 and 99 in. wide.

One gallon of paint will cover 425 sq. ft. of Fab-Rik-O-Na Prepared Sheeting.

Lining Ko-Na Muslin—An inexpensive, lightweight lining muslin, well sized and filled. To be used only on plastered walls in good condition. Comes in 50-yd. rolls 36 in. wide.

Continued on next page

804 Sandalwood Brown

808 Moss Green

No. 800. Interwoven Used in a Living Room

836 Old Ivory

805 Light Yellow

802 Sand

801 Corn Yellow

833 Chinese Blue

838 Devonshire Green

806 Ivory

831 Deep Yellow

803 Powder Blue

839 Jade Green

Fab-Rik-O-Na Interwovens

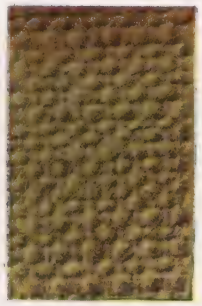
Continued on next page

No. 2 Filled Burlap | Ko-Na Canvas | Prepared Sheeting | Prepared Canvas | Painted Burlap

FAB-RIK-O-NA PRODUCTS REQUIRING PAINTING

430 Bronze Green

AN INSTALLATION OF PEARL KO-NA NO. 424



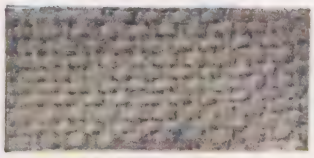
425 Straw

171 Henna Red

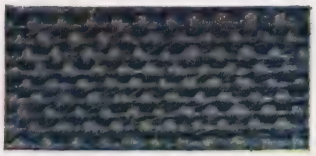
429 Blue

105 Tan

425 Straw



426 Pewter Gray



122 Old Blue

DYED TAPESTRY BURLAP AND PEARL KO-NA

Nos. 105 to 171, Dyed Tapestry Burlap; Nos. 425 to 430, Pearl Ko-Na

165

168

152

128

127

FAB-RIK-O-NA DYED TAPESTRY BURLAP

Continued on next page

One gallon of paint will cover 450 sq. ft. of Lining Ko-Na Muslin.

Oil Ko-Na Muslin—Same as Lining Ko-Na, with the addition of an oil primed face. Comes in 50-yd. rolls 36 in. wide.

One gallon of paint will cover 700 sq. ft. of Oil Ko-Na Muslin.

Shel Ko-Na Burlap—A high grade material with a sized face. For use on plaster walls for painting, staining or calcimining where an unfilled fabric surface is desired. Rolls, 36, 54 and 72 in. wide.

One gallon of paint will cover 240 sq. ft. of Shel Ko-Na Burlap.

Painted Burlap—Has a filled face covered with a priming coat of paint. The ideal protection for walls subject to excessive wear and abuse, such as schools, hotels and public buildings. It gives maximum protection to the walls. Rolls, 36, 54 and 72 in. wide.

One gallon of paint will cover 480 sq. ft. of Painted Burlap.

Prepared Burlap—A smoother face finish than Painted Burlap. Adapted for ceilings, bathrooms or other places where a high grade painted or enameled finish is desired. Strengthens weak walls, and is a protection from cracking or injury. Rolls, 36, 54 and 72 in. wide.

One gallon of paint will cover 360 sq. ft. of Prepared Burlap.

Lining Burlap—An inexpensive prepared burlap, filled on both sides. Similar to Prepared Burlap, but not so highly finished. Comes in 50-yd. rolls, 36 in. wide.

One gallon of paint will cover 280 sq. ft. of Lining Burlap.

No. 2 Filled Burlap—An inexpensive material similar to Lining Burlap, but it is filled on one side only, the other side being sized. For painting and calcimining. Comes in 50-yd. rolls, 36 in. wide.

One gallon of paint will cover 120 sq. ft. of No. 2 Filled Burlap.

Advantages of Using Fab-Rik-O-Na Woven Wall Coverings

Finished Colored Materials—(1) Colors are fast to the sunlight. (2) Rich decorative effect of texture. (3) Wall protected from cracking and injury. (4) Goods adhere firmly to wall without shrinking at the joints. (5) Goods are easily hung in the same manner as wall paper.

Material for Painting After Hanging—(1) A surface of uniform suction is produced, saving paint and labor—a surface that does not show where holes and cracks in plaster have been repaired. (2) Wall is protected from injury by peeling off or cracking of paint and is not easily defaced. (3) Additional decorative effect of texture is secured. (4) These materials are easily hung, adhere firmly, and do not shrink open at joints. (5) They cover easily with paint, do not show laps, and dry out uniformly.

Specifications

Preparation of Walls for Hanging Fab-Rik-O-Na Woven Wall Coverings—*New Walls*—Size with glue or Kling Ko-Na; wash any hot spots containing strong alkali with vinegar, and size again. Allow to dry thoroughly.

Old Walls—Wash off any old wall paper or calcimine; cut out and fill all cracks and holes as when preparing for papering. Size wall as described under New Walls. If ceiling varnish, shellac or paint be on the wall and holds firmly, size with Kling Ko-Na. If walls are greasy or painted with wax paint, this surface must be removed; if ceiling varnish encountered is flaky or does not hold firmly to the wall, it must be scraped off entirely before sizing.

Soft or Sand-finished Walls—Give these walls 1 or 2 coats of heavy Kling Ko-Na; when dry, glue size may be applied to give proper slip for easy hanging.

Hanging Fab-Rik-O-Na Woven Wall Coverings—After wall has been prepared as described above and thoroughly dry, hang wall coverings in the same manner as wall paper, butting the joints; trim all goods, even those which are trimmed in manufacture; use heavy homemade flour paste. In hanging unpatterned colored materials, use the strips in the same order as they are cut from the roll, reversing alternate strips, to bring same edge on both sides of joint, thus avoiding shaded seams. To insure tight joints, brush a strip of paste on the wall where butts are to be made.

Hanging Lining Ko-Na and Oil Ko-Na—These should be trimmed dry, and hung by pasting the wall and not the goods.

Hanging Prepared Sheeting—Paste Ceiling or wall, roll the dry goods on the pasted wall, lap joint about 1 in., run a sharp knife through the lap, remove the trimming, repaste the upper edge and press to a butt joint.

Suggested Color Schemes for Fab-Rik-O-Na Coverings

(1) No. 430 Bronze Green Pearl Ko-Na on walls, gray woodwork, light gray ceiling, and a dark green rug.

(2) No. 836 Old Ivory Fab-Rik-O-Na Interwoven on walls, walnut woodwork, cream ceiling, and an Oriental rug.

(3) No. 804 Sandalwood Brown Fab-Rik-O-Na Interwoven on walls, Jacobean oak woodwork, buff ceiling, and a figured rug in blue, tan and red.

(4) No. 806 Ivory Fab-Rik-O-Na Interwoven on walls, ivory woodwork, light ivory ceiling, with blue and rose hangings, and a blue rug.

(5) No. 839 Jade Green Fab-Rik-O-Na Interwoven on walls, deep ivory woodwork, ivory ceiling in tone with woodwork, and a sand color rug.

(6) No. 803 Powder Blue Fab-Rik-O-Na Interwoven on walls, cream woodwork, light cream ceiling, and a Chinese rug in blue and old rose.

(7) No. 802 Sand Fab-Rik-O-Na Interwoven on walls, with No. 425 below wainscot, walnut woodwork, light sand ceiling, with a blue or Oriental rug.

(8) No. 833 Chinese Blue Fab-Rik-O-Na Interwoven on walls, ivory woodwork, light ivory ceiling, and a Chinese blue and yellow rug.

(9) No. 831 Deep Yellow Fab-Rik-O-Na Interwoven on walls, deep ivory or mahogany woodwork, cream ceiling, a tan rug, and blue hangings.

(10) No. 426 Pewter Gray Pearl Ko-Na on walls, gray woodwork, light gray ceiling, and a green and rose rug.

Kling Ko-Na, a Paste Filler for Walls and Woodwork

A white powder which, upon mixing with boiling water, becomes a paste filler to be used in preparing walls and raw woodwork for papering, calcimining, painting or enameling.

Kling-Ko-Na is used on hard-finish and sand-finish plaster, on wall boards, stucco, concrete and brick; over dyed burlap or raw woodwork before painting. It forms a cementlike coating, covering stains and drying with a surface slightly rough, which may be sandpapered to a glass-smooth finish with surprising ease for enamel work. It may also be stippled where a stippled finish painting job is required. In this case it is not necessary to stipple the paint coats applied over the Kling Ko-Na. It does not form a dangerous film, but fills the pores of the surface to which it is applied. It will not run, fuse, craze, blister or peel off.

In these days of high labor cost and high prices for materials, Kling Ko-Na offers a solution to the question of cutting the cost of a job, while improving its quality.

Samples and Prices

Samples, prices and further information will be freely furnished on request.

CALIFORNIA WALL-BED CO.

Manufacturers of Disappearing Beds

FACTORY
165 13th STREET
OAKLAND, CAL.

MAIN OFFICE AND SHOWROOM
714 Market Street
SAN FRANCISCO, CAL.

REPRESENTATIVES

CHICAGO, ILL., Mandel Brothers
SEATTLE, WASH., D. E. Fryer & Co.
LOS ANGELES, CAL., Barker Brothers
PORTLAND, ORE., D. E. Fryer & Co.
STOCKTON, CAL., C. E. Pike

Other Dealers being established; write the Main office for addresses.

Product

"California" Disappearing Wall-beds.

"California" Disappearing Wall-beds

Design—"California" wall-beds are designed and built to look like ordinary beds and are a credit to the finest surroundings. They fully meet the desires of the architect for artistic concealment and the housewife who wants a bed which when ready for use will match in beauty and finish her finest furnishings. These beds are unexcelled in comfort and mechanical excellence.

There are no unsightly attachments to doors—the bed stands out in room like any other piece of furniture. "California" beds are perfectly balanced—a child can raise or lower them.

Construction—Beds are ruggedly built throughout. Head and foot frames are of 2-in. tubing with electrically welded fillers. Casting on which bed pivots is very heavy. Frame connections are of malleable steel. Foot frame is securely locked to the bed with steel bolts.

All beds have a four-coat finish, baked in the ovens twice.

Uses—"California" wall-beds save space and practically add another room wherever used. They are extensively used in apartments, residences, hotels, dormitories, fraternal homes, boarding schools, summer cottages, etc.

Special Features

Underslung Pivot Connection—This method of connecting the bed to the head frame casting permits of using a wide mattress without fear of tearing or damaging it. There is nothing to catch or tear bed clothing.

No. 1. "California" Wall-Bed
Head and foot frames of square tubing

Locking Bolts—Two steel bolts lock the frame to the bed proper, giving it the strength and appearance of a stationary bed. These bolts are hand fitted and do not rattle or squeak.

Mattress Strap—All "California" beds are furnished with a strap for holding mattress in place. The bed covering is tucked around mattress and, in connection with the folding foot frame, holds all bedding securely in place.

Ease of Installation—Beds are made so that any man can install them. It is only necessary to attach the head frame and head frame casting to the wall or pivoted door by means of screws.

Types and Sizes

"California" wall-beds are made in 8 types, and each type is made in two sizes, regular and twin bed. Regular sizes require a 5-ft. wide door or opening and twin bed sizes a 50-in. wide door or opening.

No. 1—For use with a center pivoted door. Requires a closet depth of not less than 31 in. Bed is attached to pivoted door which can be made so that when closed it has the appearance of a pair of French doors. A half turn brings bed into room and closes opening. A partial turn of door gives access to closet which can then be used as a dressing room.

No. 2—Same bed as No. 1, but for use with door with offset pivots. By offsetting pivots 8 in. a closet with depth of but 22 in. may be used. When bed is swung into room there is an opening 16 in. wide to closet.

No. 3—Same bed as No. 1 and No. 2, but to be installed in a recess, being fastened to the wall instead of to the door. Requires a recess depth of 16 in. in the clear.

No. 4—Same as No. 3 without head frame. In a recess installation the head frame is for appearances only and can be dispensed with, the head frame casting being attached to the floor.

No. 5—Same as No. 1 without vertical fillers in head and foot frames, and lower in cost.

No. 6—Same as No. 5, but for door with offset pivots.

No. 7—Same as No. 5 but for installation in a recess.

No. 8—Same as No. 7 without head frame. Can be installed in a recess or directly against the wall, in which case drapes are used to cover bed when not in use.

Special beds can be furnished in various designs and in various wood finishes and enamels.

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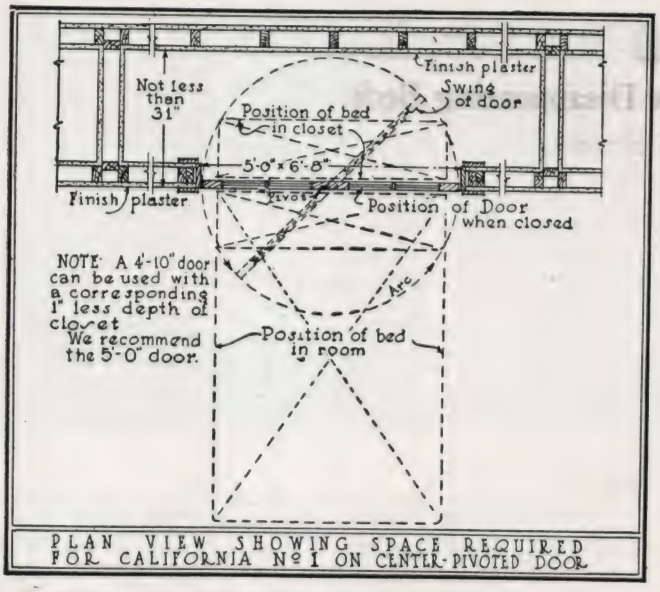
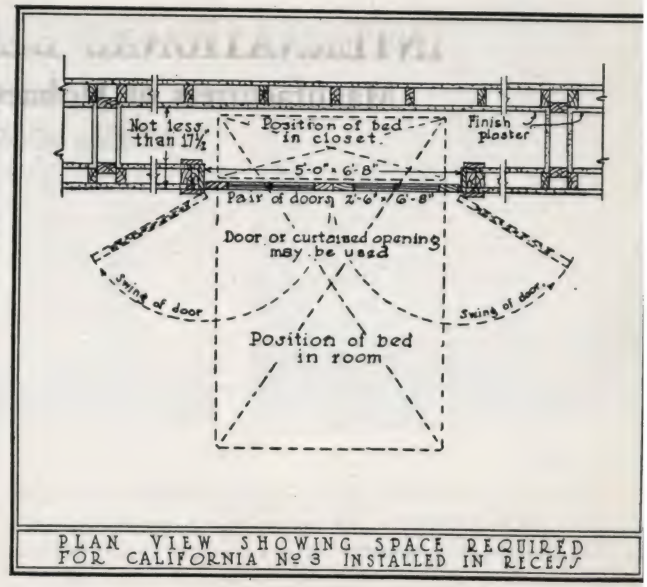


PLAN VIEW SHOWING SPACE REQUIRED FOR CALIFORNIA Nº 1 ON CENTER-PIVOTED DOOR



PLAN VIEW SHOWING SPACE REQUIRED FOR CALIFORNIA Nº 3 INSTALLED IN RECESS

Closet Door Closed, Giving Appearance of French Doors

Door Partially Opened Giving Access to Closet

Ready to Be Lowered

Ready for the Night

"California" No. 1 on Center Pivoted Door

INTERNATIONAL BED CORPORATION

Manufacturers of Holmes Disappearing Beds

30 East 42nd Street
NEW YORK, N. Y.

FACTORIES: Chicago, Ill., Los Angeles, Cal.

BRANCH OFFICES
CHICAGO, ILL. NEW YORK CITY, N. Y. LOS ANGELES, CAL.

Products

HOLMES SPACE SAVING BEDS (patented): In-a-Closet, In-a-Door, Twin Door, Center Pivot, Off-center Pivot, Wall, Couch and Recess.

Experience

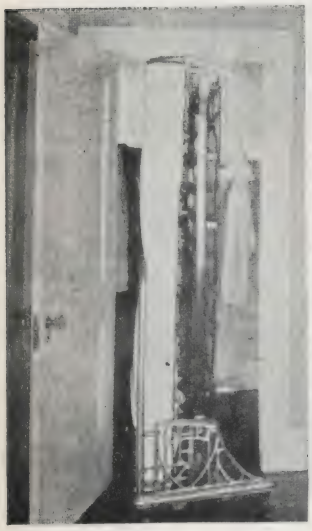
Fifteen years as exclusive manufacturers in the space saving bed business, manufacturing our own product and distributing Holmes beds throughout the world.

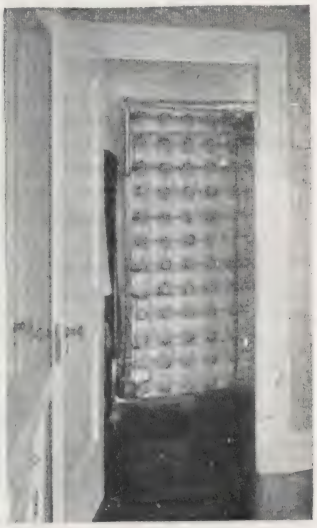
Holmes Beds

All Holmes beds are equipped with open coil box springs or upholstered box springs, which assure complete comfort and durability. Estimates furnished on built-in beds to fit any opening. Our catalogue will be of great value in economical arrangement of your plans.

Service

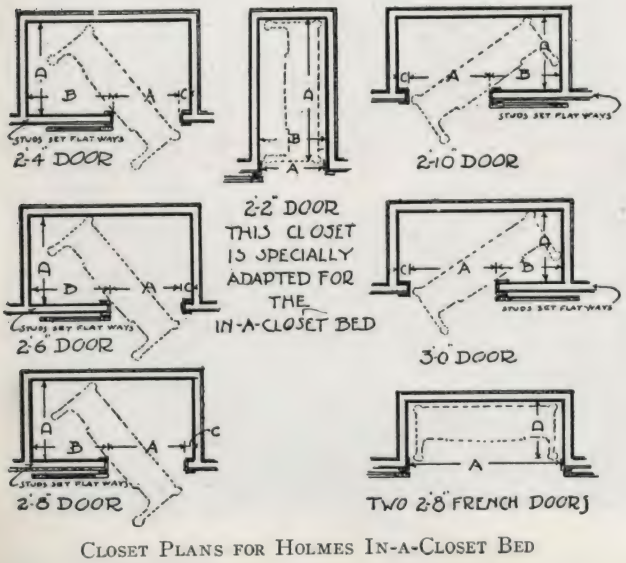
Our Service Department will co-operate with all architects, contractors and builders, in the arrangement of the floor plans where maximum economy and minimum space and expenses are to be considered. This service is free.





THREE VIEWS OF HOLMES IN-A-CLOSET BED

Rolls straight in or pivots through a narrow door into a shallow closet. Does not obstruct the entrance to closet. Attractive in design. Extremely comfortable and sanitary. Stock size doors are used. Doors always closed



CLOSET PLANS FOR HOLMES IN-A-CLOSET BED

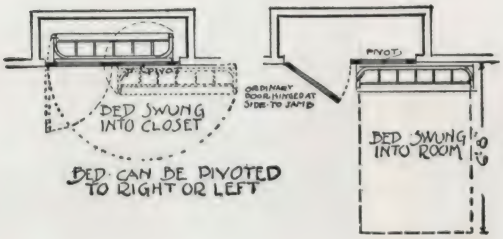
DIMENSIONS IN-A-CLOSET BED

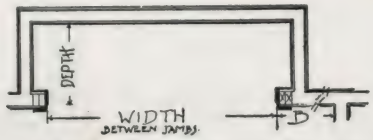
A—Door	B	C	D
FULL SIZE BED			
2′ 2″ x 6′ 8″	2′ 4″	....	5′ 0″
2′ 4″ x 6′ 8″	2′ 11″	5″	3′ 2″
2′ 6″ x 6′ 8″	2′ 9″	5″	2′ 11″
2′ 8″ x 6′ 8″	2′ 7″	5″	2′ 10″
2′ 10″ x 6′ 8″	2′ 5″	5″	2′ 8″
3′ 0″ x 6′ 8″	2′ 3″	5″	2′ 6″
2-2′8″ x 6′ 8″	....	....	2′ 0″
INTERMEDIATE			
2′ 2″ x 6′ 8″	2′ 4″	....	4′ 6″
2′ 4″ x 6′ 8″	2′ 6″	5″	2′ 11″
2′ 6″ x 6′ 8″	2′ 4″	5″	2′ 9″
2′ 8″ x 6′ 8″	2′ 2″	5″	2′ 7″
2′ 10″ x 6′ 8″	2′ 0″	5″	2′ 6″
3′ 0″ x 6′ 8″	1′ 10″	5″	2′ 5″
2-2′ 5″ x 6′ 8″	....	....	2′ 0″
SINGLE			
2′ 2″ x 6′ 8″	2′ 4″	....	4′ 0″
2′ 4″ x 6′ 8″	2′ 1″	5″	2′ 8″
2′ 6″ x 6′ 8″	1′ 11″	5″	2′ 6″
2′ 8″ x 6′ 8″	1′ 9″	5″	2′ 4″
2′ 10″ x 6′ 8″	1′ 7″	5″	2′ 3″
3′ 0″ x 6′ 8″	1′ 5″	5″	2′ 3″
2-2′ 2″ x 6′ 8	....	....	2′ 0″

Continued on next page

THREE VIEWS OF HOLMES IN-A-DOOR BED

Bed is securely fastened to pivoted bar. Entire weight of bed and door rests directly on the floor. No strain on door or jamb. No sagging or warping of door. Hinged door can remain open or closed. A pair of 2 ft. 8-in. x 6 ft. 8-in. doors required





SCHEDULE FOR IN-A-DOOR BED

Style	Width	Height	Depth	"B"
Full size	5′ 6″	6′ 8½″	2′ 2″	2′ 2″
Intermediate	5′ 0″	6′ 8½″	2′ 1″	2′ 0″
Single	4′ 4″	6′ 8½″	2′ 0″	1′ 10″

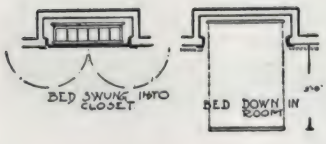
PLAN FOR IN-A-DOOR BED

Recess Bed Concealed Behind French Doors

Doors Open. Bed Ready to Lower.
Note substantial open coil springs

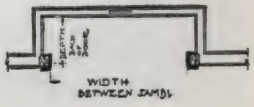
Bed Down, Ready for Comfortable Night's Rest.
Easily operated

THREE VIEWS OF HOLMES RECESS BED



SCHEDULE FOR RECESS BED

Style	Width	Height	Depth
Full Size Bed	4′6″	6′8½″	1′6″
Intermediate	4′0″	6′8½″	1′6″
Single	3′6″	6′8½″	1′6″



PLAN FOR RECESS BED

INTERNATIONAL BED CORPORATION

Manufacturers of Holmes Disappearing Beds

30 East 42nd Street
NEW YORK, N. Y.

FACTORIES: Chicago, Ill., Los Angeles, Cal.

BRANCH OFFICES
CHICAGO, ILL. NEW YORK CITY, N. Y. LOS ANGELES, CAL.

Products

HOLMES SPACE SAVING BEDS (patented): In-a-Closet, In-a-Door, Twin Door, Center Pivot, Off-center Pivot, Wall, Couch and Recess.

Experience

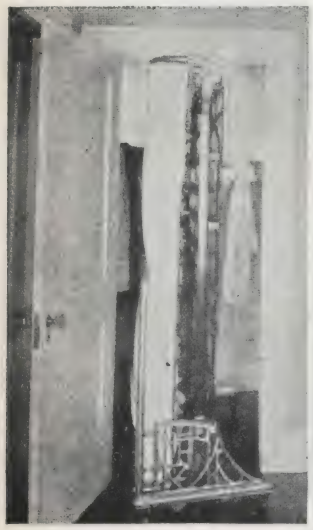
Fifteen years as exclusive manufacturers in the space saving bed business, manufacturing our own product and distributing Holmes beds throughout the world.

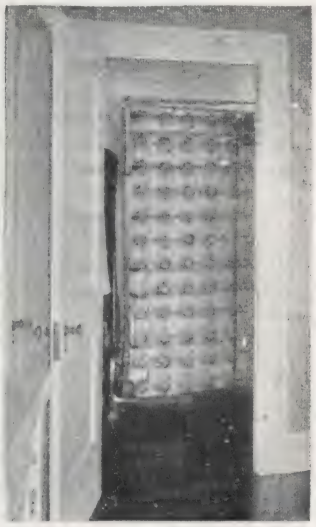
Holmes Beds

All Holmes beds are equipped with open coil box springs or upholstered box springs, which assure complete comfort and durability. Estimates furnished on built-in beds to fit any opening. Our catalogue will be of great value in economical arrangement of your plans.

Service

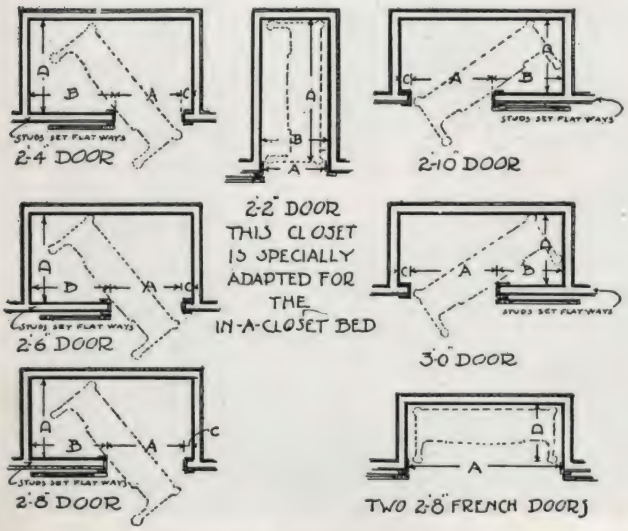
Our Service Department will co-operate with all architects, contractors and builders, in the arrangement of the floor plans where maximum economy and minimum space and expenses are to be considered. This service is free.





THREE VIEWS OF HOLMES IN-A-CLOSET BED

Rolls straight in or pivots through a narrow door into a shallow closet. Does not obstruct the entrance to closet. Attractive in design. Extremely comfortable and sanitary. Stock size doors are used. Doors always closed



CLOSET PLANS FOR HOLMES IN-A-CLOSET BED

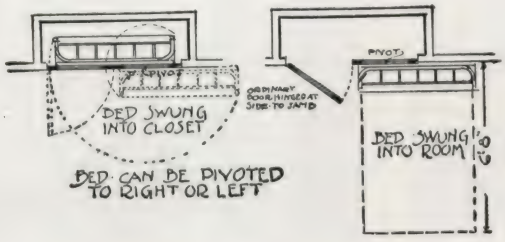
DIMENSIONS IN-A-CLOSET BED

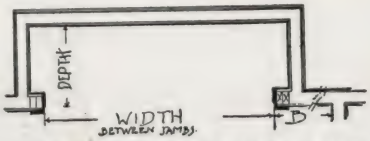
A—Door	B	C	D
FULL SIZE BED			
2′ 2″ x 6′ 8″	2′ 4″	....	5′ 0″
2′ 4″ x 6′ 8″	2′ 11″	5″	3′ 2″
2′ 6″ x 6′ 8″	2′ 9″	5″	2′ 11″
2′ 8″ x 6′ 8″	2′ 7″	5″	2′ 10″
2′ 10″ x 6′ 8″	2′ 5″	5″	2′ 8″
3′ 0″ x 6′ 8″	2′ 3″	5″	2′ 6″
2-2′8″ x 6′ 8″	....	....	2′ 0″
INTERMEDIATE			
2′ 2″ x 6′ 8″	2′ 4″	....	4′ 6″
2′ 4″ x 6′ 8″	2′ 6″	5″	2′ 11″
2′ 6″ x 6′ 8″	2′ 4″	5″	2′ 9″
2′ 8″ x 6′ 8″	2′ 2″	5″	2′ 7″
2′ 10″ x 6′ 8″	2′ 0″	5″	2′ 6″
3′ 0″ x 6′ 8″	1′ 10″	5″	2′ 5″
2-2′ 5″ x 6′ 8″	....	....	2′ 0″
SINGLE			
2′ 2″ x 6′ 8″	2′ 4″	....	4′ 0″
2′ 4″ x 6′ 8″	2′ 1″	5″	2′ 8″
2′ 6″ x 6′ 8″	1′ 11″	5″	2′ 6″
2′ 8″ x 6′ 8″	1′ 9″	5″	2′ 4″
2′ 10″ x 6′ 8″	1′ 7″	5″	2′ 3″
3′ 0″ x 6′ 8″	1′ 5″	5″	2′ 3″
2-2′ 2″ x 6′ 8	....	....	2′ 0″

Continued on next page

THREE VIEWS OF HOLMES IN-A-DOOR BED

Bed is securely fastened to pivoted bar. Entire weight of bed and door rests directly on the floor. No strain on door or jamb. No sagging or warping of door. Hinged door can remain open or closed. A pair of 2 ft. 8-in. x 6 ft. 8-in. doors required





SCHEDULE FOR IN-A-DOOR BED

Style	Width	Height	Depth	"B"
Full size	5′ 6″	6′ 8½″	2′ 2″	2′ 2″
Intermediate	5′ 0″	6′ 8½″	2′ 1″	2′ 0″
Single	4′ 4″	6′ 8½″	2′ 0″	1′ 10″

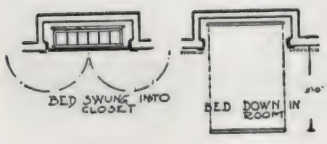
PLAN FOR IN-A-DOOR BED

Recess Bed Concealed Behind French Doors

Doors Open. Bed Ready to Lower.
Note substantial open coil springs

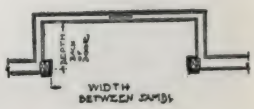
Bed Down, Ready for Comfortable Night's Res
Easily operated

THREE VIEWS OF HOLMES RECESS BED



SCHEDULE FOR RECESS BED

Style	Width	Height	Depth
Full Size Bed	4′6″	6′8½″	1′6″
Intermediate	4′0″	6′8½″	1′6″
Single	3′6″	6′8½″	1′6″



PLAN FOR RECESS BED

MARSHALL & STEARNS COMPANY

Manufacturers of Wall Beds

1152 Phelan Building
SAN FRANCISCO, CAL.

58 East Washington Street
CHICAGO, ILL.

LICENSEES

MICHIGAN, Geo. E. Sherman, 70 Washington Boulevard, Detroit, Mich.
OHIO, Burr-Avey Co., Leader-News Building, Cleveland, Ohio
MISSOURI, Stix-Baer & Fuller, St. Louis, Mo.
NEW ENGLAND, H. E. Holbrook Co., Massachusetts Trust Building, Boston, Mass.
OREGON, Cress & Co., 96-98 Front Street, Portland, Ore.
WASHINGTON, Portal Wall Bed Co., 200 Commercial Building, Seattle, Wash.
SOUTH CALIFORNIA and ARIZONA, Theodore Wold, 608 Metropolitan Building, Los Angeles, Cal.
UTAH and SOUTH IDAHO, Hawley-Richardson-Williams Co., Dooly Building, Salt Lake City, Utah

Products

Oscillating Portal Wall Beds.

Recess Wall Beds.

Also Pivot Wall Beds (Center and Off-center); Twin Wall Beds.

Oscillating Portal Wall Bed

Portal wall beds are *bedrooms that vanish by day.* They increase the hours that expensive floor space can be utilized and eliminate building bedrooms that are used only a few hours a day. Rooms that are equipped with portal wall beds can be used both day and night. During the day there is no suggestion of a bed as it is concealed by attractive doors. At night when the door is turned, it becomes a bedroom, and a full size comfortable bed invites repose.

Portal Wall Bed in Living Room Concealed by Attractive French Doors

Turning the Door Brings the Bed Into the Room
Width of Passageway is 3 ft.

Eighteen years' experience in manufacturing wall beds has resulted in a bed that combines beauty of appearance, exceptional comfort, durability and mechanical simplicity. Portal wall beds operate on the oscillating principle with two eccentric arms which allow a full size double bed, with bedding, to be revolved and concealed in a closet depth of only 22 in. Opening the door automatically revolves the bed into the room, and when lowered is ready for use. Easily raised or lowered, being perfectly balanced by tension springs that are adjusted to the weight of the bedding.

Lowering the bed swings the *one-piece* foot rail from *under* the bed into a vertical position and a friction lock holds it securely in place. The head and foot rails are the only parts of the bed that fold. When the bed is raised to a verticle position, the head piece folds, forming a receptacle for the pillows; mattress and bedding are held in place by pressure retaining fingers. The weight of the door and bed is carried on a pivot floor plate which is adjustable; this enables the bed to be easily raised or lowered in case of shrinkage of floor joists or extra thickness of carpets.

The head and foot pieces are made of round steel

Living Room Is Now a Bedroom with a Full Size Comfortable Bed

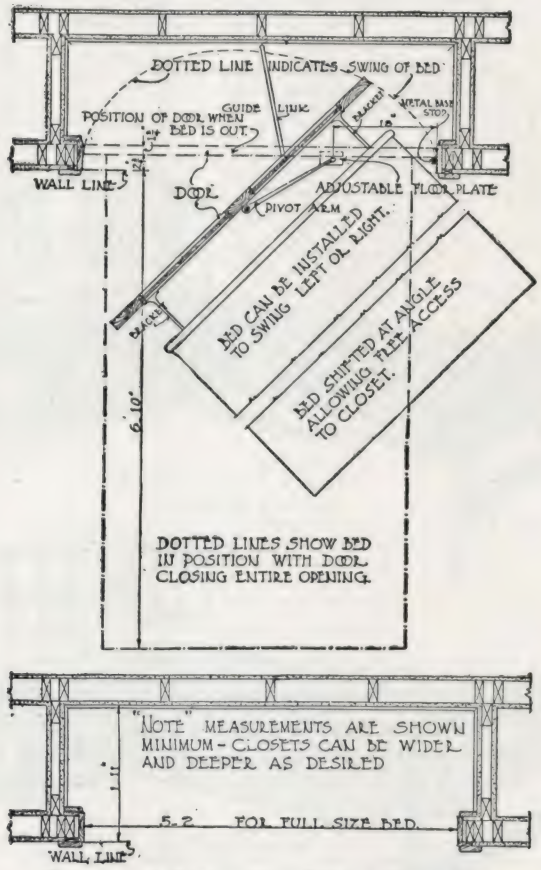
Oscillating Portal Wall Bed Turned at an Angle to Permit Access to Closet

Continued on next page

tubing electrically welded; also made with square tubing in any desired finish. The frame is steel, joined at the corners by pressed steel risers and so securely held that it is practically one piece when fabricated. Made with fabric springs that are guaranteed not to sag; also with full coil springs, slat fabric springs, or box mattress. The brackets with which the bed is screwed to the door are also made of pressed steel—an exclusive feature not found in any other wall bed.

This all-steel construction gives the bed maximum strength, eliminates breakage and insures long life of service. They are manufactured in full size double bed, narrow double bed, and twin beds.

Note: Should any deviation be made from the following detailed drawing and specifications, written permission must be obtained, otherwise we will not be responsible for changes and expense necessary to install our beds.



DETAILS OF OSCILLATING PORTAL WALL BED

Specifications—*Opening*—Opening for beds, jambs and casings around same to be put in by contractor. Use jambs not less than 4 in. in width. Head casings inside of closet to be plain square casings. *Openings must be plumb and true and perfectly square.*

For wide bed the width between finished jambs must be 5 ft. 2 in. For narrow bed the width between finished jambs must be 4 ft. 10 in.

For single bed the width between finished jambs must be 4 ft.

The height of finished head jamb must be 7 ft. ½ in. or 6 ft. 10½ in., or 6 ft. 8½ in.

Closet Door—If furniture is used on front of bed, closet door should be provided. When furniture is not used, closet door may be omitted.

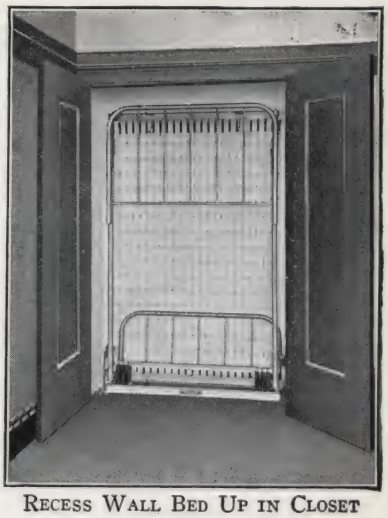
Depth of Closet—The depth of the closet must be 22 in. measuring from the back of the front casing. The bed requires 22 in. but the closet may be as much deeper as desired.

Depth of Closet for Furniture—22-in. closet is required for 1 ft. 1 in. x 4 ft. furniture; 24-in. closet is required for 1 ft. 4 in. x 4 ft. furniture.

Be sure and get our O. K. on width and depth of furniture detail.

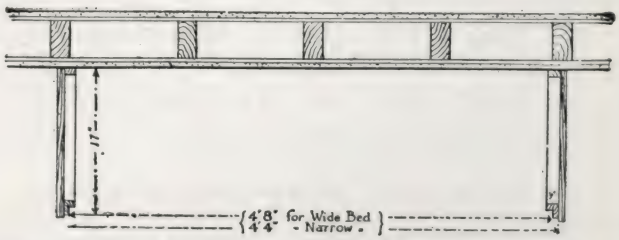
Recess Wall Bed

The construction of the recess wall bed and the materials used are the same as the Portal wall bed. Instead of being attached to an oscillating door the bed is mounted on malleable brackets and placed in a recess 17 in. deep. The brackets are screwed to the floor and the bed is not attached to the wall in any way. During the day the bed is concealed in the recess, up and out of the way. Opening the doors and lowering the bed converts the room into a bedroom at night. When down the bed rests evenly and rigidly on the floor.



RECESS WALL BED UP IN CLOSET

RECESS WALL BED DOWN IN ROOM



DETAIL SHOWING MINIMUM DEPTH AND WIDTH REQUIRED FOR RECESS WALL BEDS
The wide bed is recommended

Specifications—For wide bed the width between finished jambs must be 4 ft. 8 in.

For narrow bed the width between finished jambs must be 4 ft. 4 in.

For single bed the width between finished jambs must be 3 ft. 6 in.

The height of finished head jamb must be 6 ft. 8½ in. or more.

The depth of recess must be not less than 17 in.

Should any deviation be made from the above detailed drawings and specifications, written permission must be obtained, otherwise we will not be responsible for changes and expenses necessary to install our beds.

Note: We do not furnish doors for openings in which the bed is to be installed, nor do we furnish any labor or hardware necessary to hang same.

MURPHY DOOR BED CO.

OFFICES AND DISPLAY ROOMS THROUGHOUT UNITED STATES AND CANADA

NEW YORK, N. Y., Murphy Door Bed Co., 469 Fifth Avenue
Telephone, Murray Hill 2823
For Pennsylvania, West Virginia, Virginia, District of Columbia, Maryland, Delaware, New Jersey, New York and the six New England States.

CHICAGO, ILL., Murphy Door Bed Co. of Chicago, entire 4th floor, Majestic Building, 22 West Monroe Street
For Illinois, Indiana, Ohio, Wisconsin, Minnesota, Iowa, Nebraska, North Dakota, South Dakota

DETROIT, MICH., Murphy Wall Bed Co. of Detroit, Kresge Building
For Michigan

ATLANTA, GA., Murphy Door Bed Co. of Atlanta, 204 Peach Tree Arcade Building
For Georgia, Florida, North and South Carolina

NASHVILLE, TENN., Murphy Door Bed Co. of Alabama and Tennessee, 306 North Third Avenue

DENVER, COLO., Colorado Builders Supply Co., 1435 Blake Street
For Colorado

ST. LOUIS, MO., Murphy Door Bed Co. of St. Louis, 401 Chemical Building
For Missouri, Kentucky, Mississippi, Arkansas, Kansas, Oklahoma, Texas and Louisiana

OGDEN, UTAH, Ogden Furniture & Carpet Co.
For Utah and Idaho

LOS ANGELES, CAL., Southern California Hardwood & Mfg. Co.
For Southern California

SACRAMENTO, CAL., John Breuner Co.
For Sacramento and San Joaquin Counties

SAN FRANCISCO, CAL., Marshall & Stearns Co., Phelan Building
For San Francisco and adjoining Counties

SEATTLE, WASH., Murphy Door Bed Co., Hoge Annex Building
For Oregon, Washington, Montana, Wyoming and Utah

Product

Murphy In-A-Dor Beds.

Description

The Murphy-In-A-Dor Bed is an all-metal bed that can be swung into a closet through a standard door opening and concealed by a standard sized door.

Important Facts to Consider

(1) Perfect concealment behind ordinary stock size doors.

(2) Standard sizes; stock sizes mattresses. Inside measurements—6 ft. 4 in. length; width: 4 ft. 6 in., 4 ft., 3 ft. 6 in., 3 ft.

(3) Made of best materials. All working parts are of high test malleable iron.

(4) Easily operated—a child can handle it. Controlled by multiple tension springs, no weights. Adjustable to weight of bedding at all times.

(5) Sanitary. All parts exposed. Bottom always accessible.

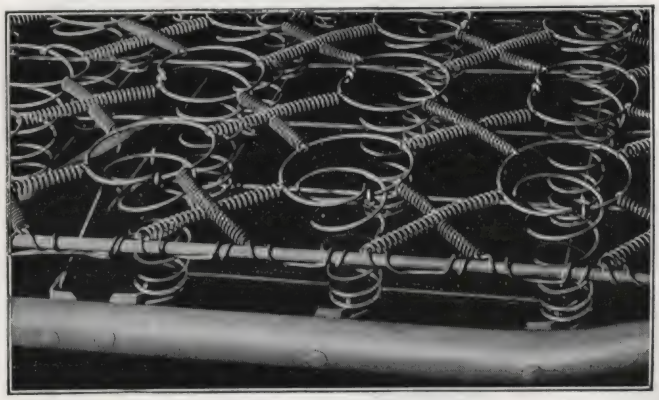
(6) Settling of building or shrinking of doors does not affect its perfect operation.

(7) Equipped with ribbon fabric (standard equipment), soft top coil or box springs.

(8) Easy to install; no special construction required for installation.

Ribbon Fabric Spring
Standard Equipment

Box Spring



Section Soft Top Coil Spring

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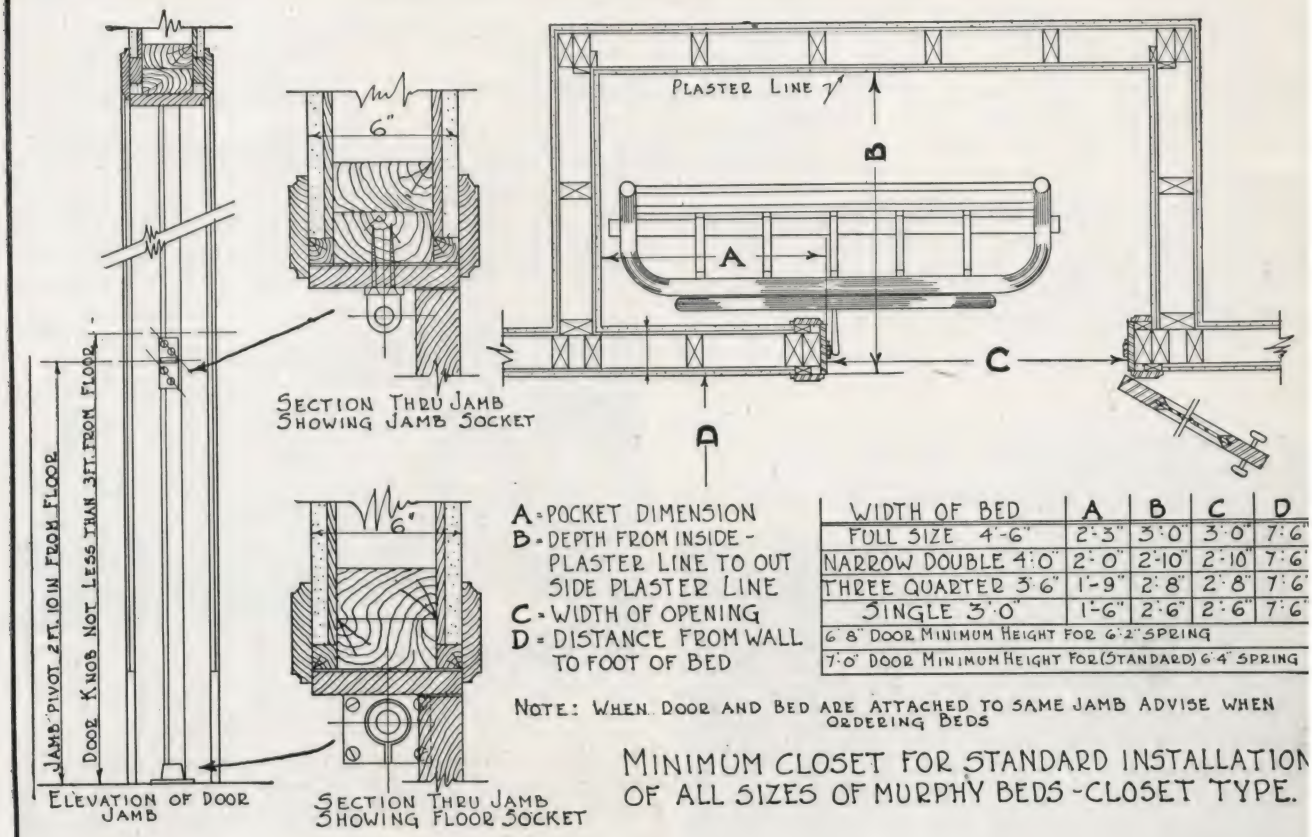
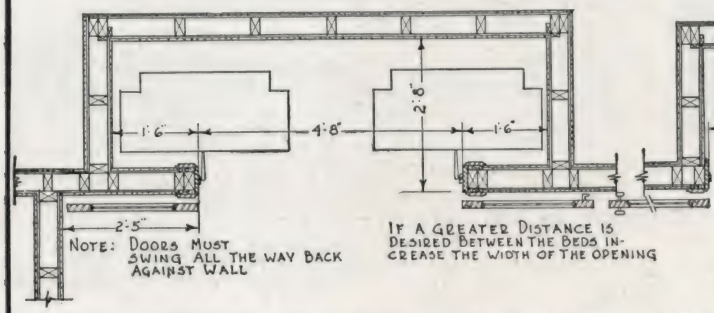


A = POCKET DIMENSION
B = DEPTH FROM INSIDE - PLASTER LINE TO OUT SIDE PLASTER LINE
C = WIDTH OF OPENING
D = DISTANCE FROM WALL TO FOOT OF BED

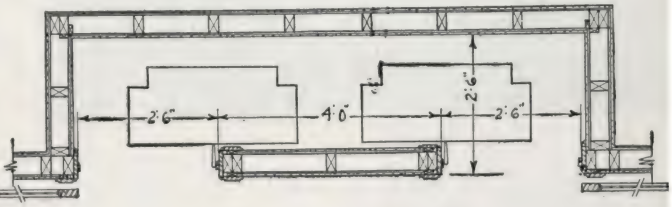
WIDTH OF BED	A	B	C	D
FULL SIZE 4'-6"	2'-3"	3'-0"	3'-0"	7'-6"
NARROW DOUBLE 4'-0"	2'-0"	2'-10"	2'-10"	7'-6"
THREE QUARTER 3'-6"	1'-9"	2'-8"	2'-8"	7'-6"
SINGLE 3'-0"	1'-6"	2'-6"	2'-6"	7'-6"
6'-8" DOOR MINIMUM HEIGHT FOR 6'-2" SPRING				
7'-0" DOOR MINIMUM HEIGHT FOR (STANDARD) 6'-4" SPRING				

NOTE: WHEN DOOR AND BED ARE ATTACHED TO SAME JAMB ADVISE WHEN ORDERING BEDS

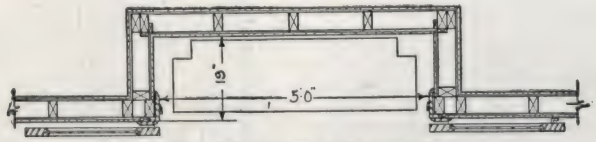
MINIMUM CLOSET FOR STANDARD INSTALLATION OF ALL SIZES OF MURPHY BEDS - CLOSET TYPE.



DETAIL SHOWING "DOUBLE DOOR, TWIN BED" INSTALLATION



DETAIL SHOWING "SINGLE DOOR, TWIN BED" INSTALLATION



NOTE: FOR 4'-0" - 3'-6" AND 3'-0" WIDTH BEDS ALL DIMENSIONS ARE THE SAME EXCEPT WIDTH OF DOOR OPENING, WHICH IN EACH CASE IS 6" WIDER THAN THE BED

MINIMUM RECESS FOR STANDARD INSTALLATION OF 4'-6" WIDTH MURPHY BED - RECESS TYPE

DETAILS SHOWING INSTALLATION AND SPACE REQUIREMENTS FOR THE MURPHY IN-A-DOR BED

ALBERT PICK & COMPANY

"White" Door Beds and Space-saving Devices

208-224 West Randolph Street
CHICAGO, ILL.

Products

"WHITE" DOOR BEDS, KITCHEN CABINETS, CHINA CABINETS, DRESSING CABINETS, DRESSING TABLES, IRONING BOARDS and other Space-saving Devices.

For Equipment, Furnishings and Supplies for Publice Service, see pages 2088-2091.

Uses

"White" door beds and space-saving fixtures are ideal for use in apartment buildings, apartment hotels, hotels, clubs, Y. M. C. A.'s, Y. W. C. A.'s, dormitories, private homes, bungalows, hospitals and steamships.

THE "WHITE" DOOR BED

A perfect bed, mechanically adjusted to smaller space. Spring balances at base hold bed in any position and afford easy operation in raising and lowering bed. Fewest working parts; nothing to get out of order

Co-operation

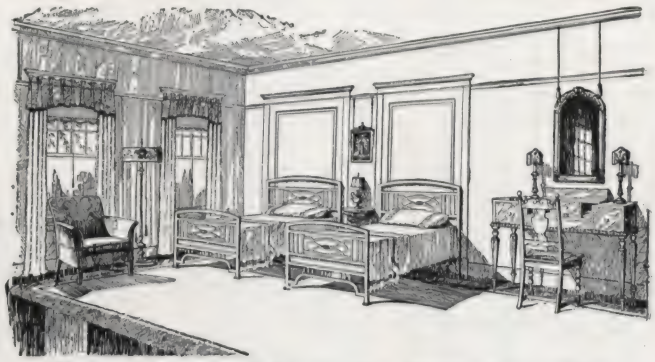
The Architectural Department of ALBERT PICK & COMPANY will co-operate to the fullest extent with architects, and will assist in securing the greatest possible capacity of a given space, with every assurance of comfort and economy. Floor plans of any particular project will be submitted promptly, without obligation. Estimates and specifications for installing "White" door beds and space-saving devices will be provided.

Description of "White" Door Bed

In every respect a *real bed,* mechanically adjusted to smaller space. In comfort, appearance and durability it is equalled only by the finer type of stationary beds. This door bed has made possible the use of disappearing beds in apartment hotels, hotels, homes, school dormitories, etc., where formerly they were not considered practical or sufficiently high grade.

In appearance, the "White" door bed is a regulation bed, coming in standard sizes, with regulation height head and foot ends. Constructed of square steel tubing for lightness and durability; finished in American walnut, mahogany or any enamel color.

The simplicity of "White" door beds is readily noted. No complicated mechanism, no springs to catch dust or vermin, no unnecessary attachments. "White" beds are built with fewer parts than has ever been possible before. They are raised or lowered easily with a single motion—no pulling of legs or headboard, which operate automatically. One effortless motion places the bed in position for use, another raises it out of the way, a third revolves it out of sight.



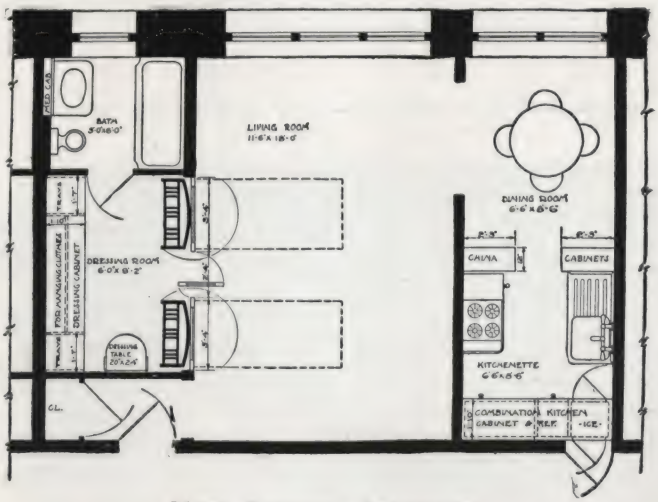
TYPICAL APARTMENT MADE MORE COMFORTABLE WITH "WHITE" DOOR BEDS

Exclusive Advantages of "White" Door Beds

The only space-saving beds that can be equipped with box springs. This is an exclusive feature that emphasizes the distinction between "White" beds and the ordinary folding or disappearing bed.

Bed revolves on 3 ft. 4-in. door and when down in room the opening is completely closed, preventing drafts and completely concealing the clothes closet. Doors operate on easily moving center pivots.

Access may be had to closet or dressing room without disturbing bed, whether folded up or down in room.



MODEL TWO-ROOM APARTMENT

All the efficiency and comfort of four rooms. Equipped with "White" Door Beds and Space-saving devices in an ideal arrangement for Apartments and Apartment Hotels

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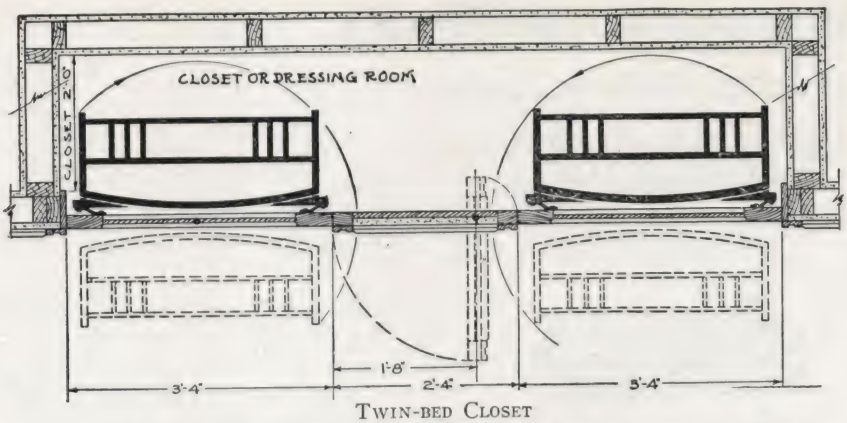
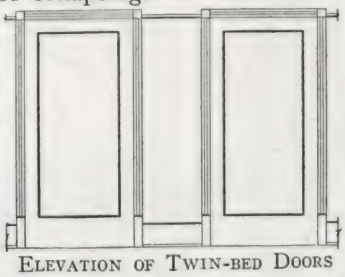


TWIN-BED CLOSET
Details and dimensions. Panel between bed doors gives access to closet at all times

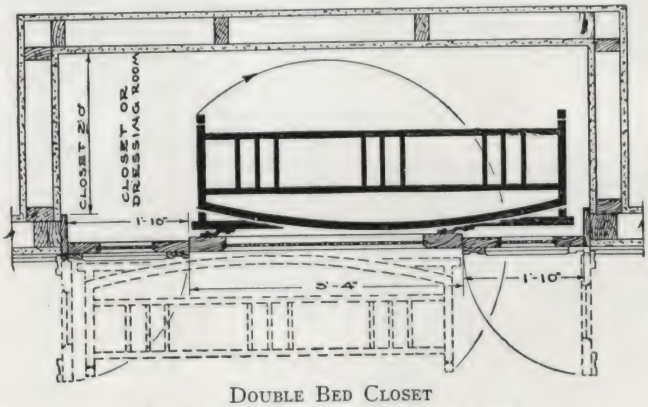
Legs of bed lock automatically when bed is lowered, eliminating all possibility of collapsing.

Beds are instantly interchangeable. Either a full size or a twin-bed may be used on a 3 ft. 4 in. door, without mechanical adjustment or the use of hammer or screwdriver.

"White" beds require less room space when used, as well as less closet space.

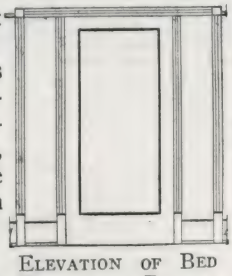


ELEVATION OF TWIN-BED DOORS



DOUBLE BED CLOSET
Panels at each side give entrance to closet

The panel arrangement lends itself readily to attractive decorative features. Panels may be finished like the walls of the room, or may be of wood similar to the door, or of leaded glass, in French window motif.



ELEVATION OF BED DOOR WITH PANELS AT SIDES

Convolute Spring Balance in "White" Door Beds

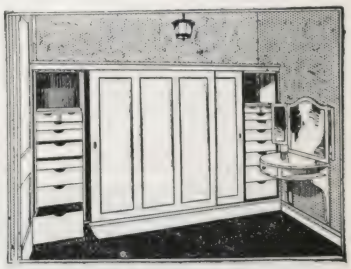
An entirely new principle in disappearing bed construction has been applied in "White" door beds. Powerful convolute balances are used which will balance any weight ranging from 24 to 200 lbs. This means that the changing of bedding has no effect on the balances and does not compel readjustment, as is the case with all other types of beds. Balances operate *parallel* with the door, relieving door strain, and thus can not warp the door. Balances afford easy operation without fear of falling, and hold bed at any angle desired. The life of the balance is practically everlasting.

Space-saving Devices

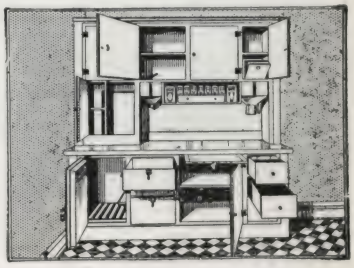
Devices which reduce the amount of space necessary for maximum comfort have been perfected by ALBERT PICK & COMPANY.

"White" Dressing Cabinet—Consisting of 2 hat compartments, 2 tray sections of 9 trays each, and a large section for the hanging of clothes. Builds into a space 9 ft. long, cabinet with 1 chest of trays, 7 ft. long, and may be set up by any carpenter.

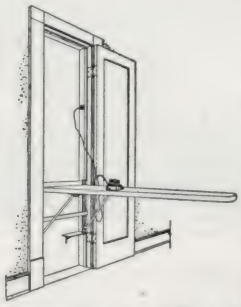
"White" Kitchen Cabinet—Combines refrigerator, work table and pantry. Has receiving door for delivery of packages from outside; refrigerator, also iced from outside, with drawers for food; sugar bin; flour bin and sifter; metal bread box; dough and bread boards; coffee, tea and spice jars; and storage spaces for packages, groceries, pots and utensils, and vegetables and fruit. Comes in three sections, ready to be installed by any carpenter. Builds into space varying from 6 ft. 6 in. to 7 ft. 6 in., as desired.



"WHITE" DRESSING CABINET



"WHITE" KITCHEN CABINET



"WHITE" IRONING BOARD

"White" Ironing Board—Folds into built-in cabinet. Particularly convenient in apartment hotels, apartments, and bungalows.

"White" China Cabinets—Popularly used in apartments and apartment hotels, for china, glass, silver and linens. Size 2 ft. 3 in. wide, 4 ft. 6 in. high and 12 in. deep.

"White" Dressing Table—A unique, space-saving table attached to the wall, with two wing mirrors. Size 20x24 in.

"White" Medicine Cabinet—Builds into wall. Fitted with mirror and glass shelves.

Literature

A special portfolio containing complete data, details and photographs of the "White" Door Bed and Space-Saving Fixtures has been prepared. It includes specifications and representative floor plans of many types of installations. A request for Book BG130 will bring it promptly.

THE AEROSHADE COMPANY

Ventilating Window Shades

2292 Oakland Avenue
WAUKESHA, WIS.

Product

AEROLUX VENTILATING SHADES for factories, offices and public buildings.

AEROLUX VENTILATING REG. U.S. PAT. OFF. WINDOW SHADES
TRADE-MARK

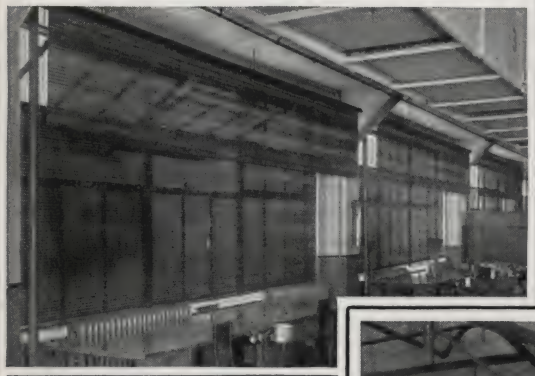
Construction and Operation

The fabric is composed of tough, heat-resisting basswood splints which are woven together with a hard twist seine twine as illustrated at the right. Splints are weather-proof stained with stains made from creosote base. All cords match the splints in color.

AEROLUX FABRIC (REDUCED)

Applicable to All Types of Sash

Each shade, together with its adjusting fixtures, is fastened to a mounting strip at the factory so that the hanging of the shade consists of merely fastening this mounting strip to its supports. In the case of counter-balanced or counter-weighted sash this strip is fastened to the window casing or walls. When used in connection with the pivoted ventilator sash, proper brackets are furnished to suspend the shade away from the window.



DUPLEX TYPE

SINGLE TYPE WITH TOP DROP

SINGLE TYPE WITH REGULAR HANGINGS

The shades are adjusted by means of cords and special stop pulleys—no spring rollers used.

Sizes

Made in all widths up to 20 ft. and in any desired length, thus covering with a single shade practically any factory window.

Three Types of Shades

(1) Single Type with Regular Hangings—Equipped to hang at the top and roll up from the bottom. When used with pivoted ventilator sash this type must hang far enough away from window to clear open ventilators.

(2) Single Type with Top Drop—Drop from the top and roll up from the bottom. When not in use may be rolled entirely to the top. Especially adapted to wide rooms—protect workers close to windows against sun's heat and glare yet allow light over the top for workers farther back in the room.

(3) Duplex Type—Upper section clears ventilator. Lower section hangs back in opening or flush with walls. A type to use where ventilators extend inside wall line and where shades must occupy a minimum of room space.

Advantages of Aerolux Ventilating Shades

Exclude the sun's direct rays, diminish glass intensified heat, yet allow a good diffused working light.

Permit ventilation and a free circulation of air *through the shades* (not at sides only) when sash or ventilators are open. Do not exclude the outside air as other types of shades do.

Rugged construction assures many years of hard industrial usage without expensive upkeep and replacements.

Can be used both winter and summer and since they are used inside are not subject to destructive effects of wind and weather.

Are equipped with simple, easily operated fixtures which are durable, positive in action and foolproof.

Estimates and Further Details

Gladly sent. When inquiring, please give us full specifications of sash and wall openings.

ATHEY COMPANY

Perennial Window Shades

6035-6045 West 65th Street
CHICAGO, ILL.

NEW YORK BRANCH
17 West 45th Street

BRANCHES AND AGENCIES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA
See Classified Telephone Directories

Product

The ATHEY PERENNIAL SHADE for schools, hospitals, office buildings, banks, hotels, shop windows, factories, residences, etc.

For Weather Strips, see page 1176.

Athey
TRADE-MARK

Distinctive Features and Advantages

The Athey Perennial shade is gravity-operated without spring roller, pawl or notch. It is adjustable from either top or bottom giving absolute light control. The brass guide wires prevent the blowing of the shade when windows are open for ventilation, a feature of special importance on casement, counterbalanced or other windows of unusual design. The standard material is translucent. It eliminates all glare while permitting the entrance of a soft diffused working light preventing eye strain. Awnings are usually unnecessary when this shade is used.

Construction

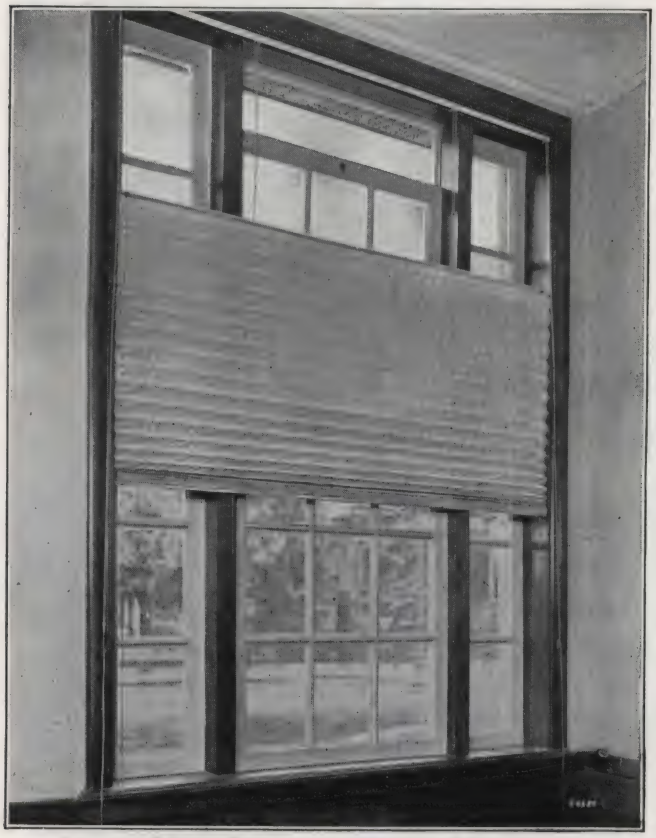
The cloth of which the shade is regularly made is a herringbone weave coutil, thoroughly shrunken to prevent binding on guide wires and also protecting against damage by rain if a window is left open and is well calendered, the surface being smooth and dust resisting. The 1⅝-in. accordion plaits are stitched on each side so that the shape is held and the shade always folds evenly. The cord case at head, in which are the full length brass rollers, is of No. 16 gauge steel, rustproofed and very rigid. The shade can be made any width up to 16 ft. and of any height.

Operation

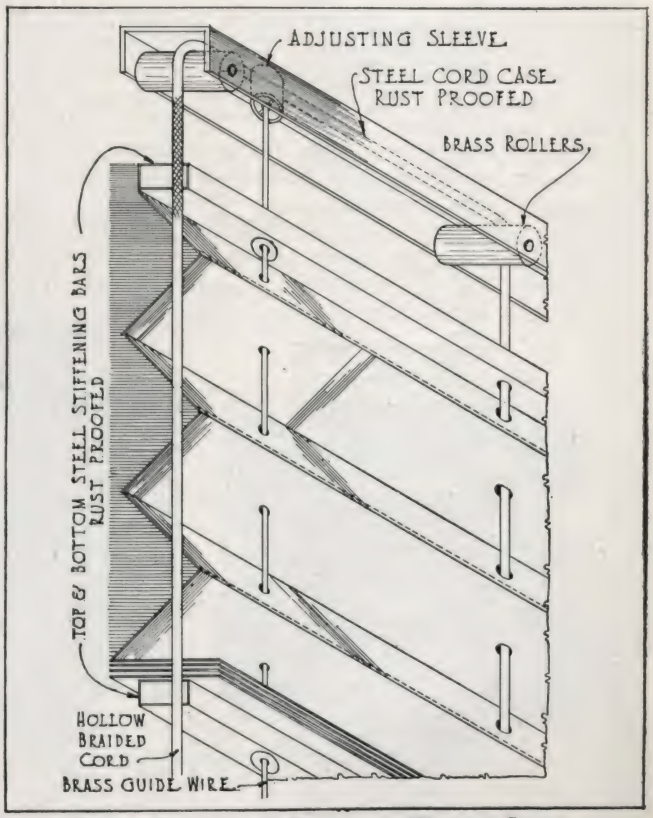
Up from the bottom or down from the top controlled by hollow braided cords, the cord at right side controlling the bottom of the shade while the left cord controls the top. Its simplicity of construction and its ease of operation make it the most durable shade on the market, and many users testify to its being *the cheapest shade that can be bought* when length of service is considered.

Specification

All windows not specifically excepted shall be equipped with cloth gravity operated shades, adjustable from both top and bottom, as manufactured by the ATHEY COMPANY, 6035 West 65th Street, Chicago, Ill. Shades less than 24 in. wide shall have one hollow braided operating cord each for top and bottom of shade; shades 24 to 80 in. wide shall have two operating cords each at top and bottom and shades of greater width, additional cords so spaced that there shall never be over 30 in. between cords, or cords and guide wires. Single cord shades shall have four rollers in each case, while every additional cord will add two rollers.



ATHEY PERENNIAL WINDOW SHADE



DETAIL DRAWING OF PERENNIAL WINDOW SHADE

ESTABLISHED 1857

W. W. KIMBALL CO.

Pipe Organ Builders

Kimball Hall, Jackson Boulevard & Wabash Avenue

CHICAGO, ILL.

TELEPHONE
HARRISON 4014

FACTORY: W. 26th Street and California Boulevard, CHICAGO, ILL.

PRINCIPAL TECHNICAL REPRESENTATIVES

NEW YORK, N. Y., W. B. MILNER, 507 Fifth Avenue (For Eastern territory)
DALLAS, TEX., C. E. SYLVESTER, 500 N. Peak Avenue
SPOKANE, WASH., H. M. HANSEN, 809 W. Fourth Street
OAKLAND, CAL., G. J. BOHEN, 1445 Oak Street
LOS ANGELES, CAL., S. W. WILLIAMS, Van Nuys
SEATTLE, WASH., A. D. LONGMORE, 1421 Third Avenue

Products

PIPE ORGANS for churches, lodges, schools, residences, including Solo Player, or roll operated organs, with music rolls for same; ORCHESTRAL ORGANS for motion picture, vaudeville and other theatres; UNIT ORCHESTRAS.

Also Grand and Upright Pianos, including the Player Piano, both Grand and Upright, in its most modern form of reproducing; also the Kimball Phonograph in variety of models.

Information—Types of Organs and Data

Space Requirements—Kimball organs are built to order, therefore adaptable to all conditions, and architects are assured full co-operation in planning chambers, openings, etc. Dimensions of parts, weights and other technical data given cheerfully by mail, telephone or personal call. Smallest space in which practicable to install a serviceable pipe organ is 6 ft. 1 in. x 12 ft. x 10 ft. high, assuming a chamber is provided.

Unit Orchestras—Unit orchestras and many orchestral theatre organs are provided with the musical percussion instruments, such as harp, marimba, glockenspiel, orchestra bells, xylophone and chimes, and the legitimate orchestra drums and traps.

Residence Organs—Residence organs with the Kimball solo player are played in the usual way, and by music rolls which give solo and accompaniment throughout the compass of manuals and pedals, with or without automatic control of instrumentation and expression by the rolls, at will of performer. These organs are placed successfully in practically any relation to the music rooms, the Kimball electrical control allowing music desk to be at any distance.

Tone Production—All scales determined, all pipes made and voiced, after every condition of acoustics, installation and use is understood. Only ideally correct materials used and the highest skilled labor employed in making Kimball pipes, which are voiced by artists.

Action—In the Kimball action, modern electrical development and adaptation have reached their highest stage, insuring instantaneous response and repetition. High resistance magnets with low current consumption; no sparking at contacts, which are of silver on both sides of circuits; permanent regulation; correct wind pressures and distribution contribute to perfect action, musical tone and prompt speech.

Consoles—Three principal types are available, all with the modern stop keys, inclined manuals, concave and radiating pedals, and adjustable combinations moving the registers.

List of Installations—Forwarded upon request, facilitating investigation by locality, denomination or other classification of existing Kimball organs. Many of the finest churches, public auditoriums, schools, temples, lodges, hotels, theaters, and private residences in this country have Kimball organs.

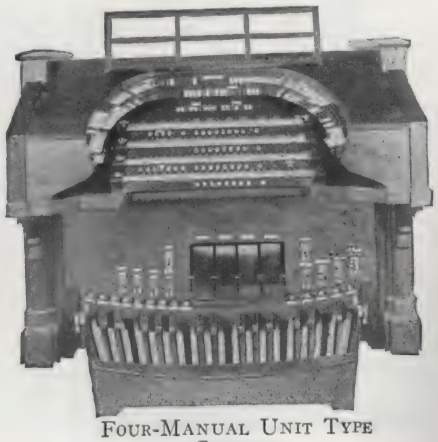
Prices—Church, lodge or school organs range from $3500 upward. Theater organs, from $5250 upward. Unit Orchestras, from $12,500 upward. Residence organs, $7500 upward; with Kimball solo player, operated manually and by solo music rolls, $10,000 upward.

Specifications—To facilitate correspondence, architects should state requirements and possibilities clearly, sending as nearly as possible:

(1) Sketch or blue print showing size, shape and other particulars of auditorium and organ chamber, and distance apart if more than 1 chamber.
(2) Size and location of tone openings into auditorium.
(3) Character and materials of interior of building.
(4) Position of console (key desk) and distance from organ.
(5) Are swell boxes to be provided by organ builder or will organ be installed in chambers provided by purchaser?
(6) Is organ builder to provide cabinet work case or decorated pipe front, or both? (The majority of modern installations are in chambers and screened by grilles installed by the building contractor.)
(7) Give dimensions of blower room, location and distance from organ.
(8) Give electric current available for power, stating: if direct current, voltage; if alternating current, voltage, cycles and phase.
(9) State proposed completion date.
(10) Indicate proposed use of organ, as: in a church, to accompany choir and congregation only, or also for concert purposes; in a theater, for independent use only, or habitually with orchestra.
(11) State approximate amount of money available for organ purchase.

TWO-MANUAL ROLL TOP TYPE CONSOLE

THREE-MANUAL OPEN TYPE SOLO PLAYER CONSOLE



FOUR-MANUAL UNIT TYPE CONSOLE

THE JOHN VAN RANGE COMPANY

Equipment for the Preparation and Serving of Food

CINCINNATI, OHIO

BRANCH OFFICES

CHICAGO, ILL. DETROIT, MICH. OMAHA, NEBR. CLEVELAND, OHIO

Products and Service

EQUIPMENT for the PREPARATION and SERVING of FOOD, planned, manufactured and installed for hotels, restaurants, cafeterias, factories, industrial corporations, clubs, institutions and hospitals.

CAFETERIA SPECIALISTS.

General Scope of the John Van Range Company's Equipment

Aluminum Cooking Ware
Bakers' Machinery
Bread Slicers
Bread and Biscuit Pans
Brushes
Cast Iron Cooking Ware
Chinaware, "Shenango"
China, "Hall's" (fireproof)
Coffee Urns
Cutlery
Dining Room Chairs
Dining Room Tables
Dish Trucks
Electric Chocolate Warmers
Electric Ranges
Electric Toasters
Electric Window Grills
Gas Ranges
Gas Bake Ovens
Glassware
Pyrex Glass Cooking Ware
Refrigerators
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Steam Tables
Trays
Vegetable Peelers
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Van assists architects in planning every detail of installations for kitchen and serving rooms.

Van's engineers are men of much experience, and they personally supervise the planning and installation of all equipment. They are on the job continually and attend to every detail. The finished installation is turned over to the customer in perfect working order.

Van furnishes cooking and serving equipment installations complete and ready for instant use. Write for Catalogue A-S.

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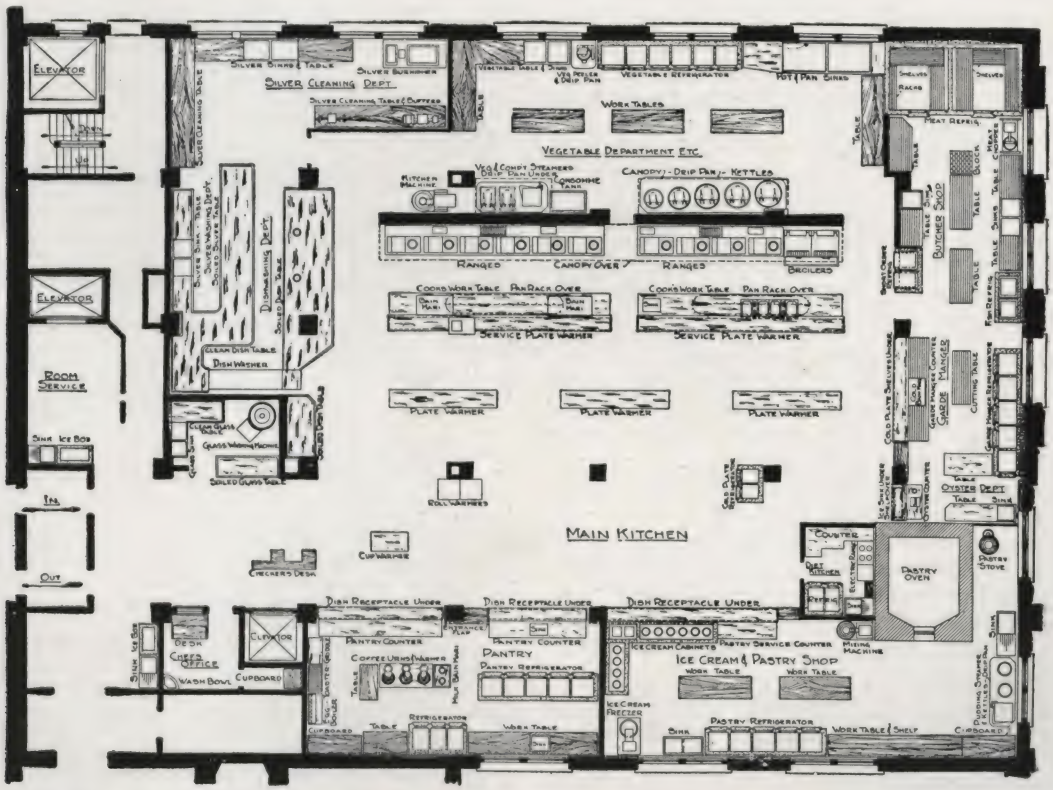

FLOOR PLAN OF KITCHENS IN THE GREENBRIER HOTEL AT WHITE SULPHUR SPRINGS, WEST VA., MADE BY THE JOHN VAN RANGE CO.

BRAMHALL, DEANE COMPANY

Kitchen and Cafeteria Equipment

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Products

KITCHEN EQUIPMENT for hotels, restaurants, clubs, hospitals, institutions and private homes.

Also manufacturers of Cooking Utensils, Cafeteria Counters, Serving Fixtures, Labor Saving Devices, and Sterilizing Apparatus.

Service to the Architect and Owner

Kitchen efficiency engineering is recognized today as a necessity. Not only must equipment meet the most exacting requirements but it is essential that the architect and owner be advised as to space requirements and arrangement of fixtures to assure the best results in economy of operation and service.

We will confer with architects and owners and submit drawings showing, in addition to equipment, each connection requirement for use of the engineers. But as this service is offered without charge, we reserve the privilege to decide whether or not we can serve the architect and owners to our mutual advantage.

Specifications—Specifications are submitted to accompany drawings, describing fixtures in detail.

Estimates—Estimates prepared to cover specifications. If equipment has already been planned and specification written we will submit an estimate.

General

Complete equipment for preparing and serving food, in any quantity and to meet every requirement; sterilizers for use in hospitals and laboratories.

In specifying BRAMHALL, DEANE COMPANY equipment the architect is assured that the size, type and arrangement of the fixtures will be first approved by our Engineering Department and the apparatus built by a factory that has specialized in these lines for more than sixty years. We are selling agents for every labor saving device of proved merit that may be used in connection with our products.

Quality

For more than sixty years we have maintained a standard of construction—quality has never been sacrificed for price. BRAMHALL, DEANE COMPANY equipment is the best in design, quality and weight of material that can be built.

French Ranges and Equipment for Homes

We manufacture a line of French ranges of suitable size for all types of residences from the most palatial to the most humble. Built to give years of daily service and embodying every modern improvement, our ranges are designed to meet all conditions and may be equipped to burn any fuel or combination of fuels.

A few ranges suitable for family use are shown opposite. For the architect's convenience we submit a schedule of the important dimensions. However, we prefer to confer with the architect before, rather than after, ranges are specified, to insure the proper conditions for their installation.

Features—Ranges may be equipped with automatic ash dump and hopper to deposit ashes direct from ash pit into chute to cellar. Direct flue connection can be made or smoke pipe furnished as preferred and conditions permit. A fireproof hearth and back wall is necessary.

An important feature of Deane French ranges, burning coal or wood, is the waterback for heating a hot water boiler; made in several sizes and to heat a boiler up to 100-gal. capacity.

No. 160-S Double Oven French Range—Contains two ovens and one fire. Ovens may be used separately or at one time. Firebox may be equipped to burn coal or wood.

No. 209-S Combination Coal and Gas Range—Coal end contains one oven heated by fire and may be equipped to burn coal or wood. Gas section, containing one oven, top cooking surface and broiler, may be used independently of adjoining section.

No. 140-S Combination Coal and Electric Range—Coal end contains one oven heated by fire and may be equipped to burn coal or wood. Electric section, containing one oven, top cooking discs, and broiler may be used independently of adjoining section.

Range Equipment—*Warming Shelves*—A feature of all Deane French ranges; may be had with or without doors as preferred.

Hoods—To meet every requirement and with side panels extending down to and including range, if desired. Hoods as illustrated usually built 12 in. longer than range to permit of a 6-in. overhang at each end and of sufficient depth to extend 12 to 15 in. beyond front; height of hood should be 2 to 2½ ft.

Kitchen Equipment

Kitchen Tables—We can supply cooks' tables, with or without utensil racks. Also pastry and general kitchen tables of superior design and construction.

Plate Warmers—We manufacture plate and service warmers to order and designed to meet space requirements. These may be heated by electricity or gas.

Catalogues

We will be pleased to forward catalogues and for convenience have grouped our products and issue a separate catalogue of each group. When requesting catalogue please indicate the catalogues desired.

Catalogue 24A. French Ranges, Broilers, Hoods, Cooks' Tables, Work Tables, Utensil Racks, Warmers, Sinks, Ovens, Toasters.

Catalogue 26A. Urns, Cup Warmers, Toasters, Griddles, Steam Tables, Plate Warmers.

Catalogue 29A. A complete line of Cooking Utensils in Copper, Tin, Tinned Steel and Aluminum.

Catalogue 30A. Galley Equipment for Ships.

Catalogue 31A. "The Heart of the Home," a special booklet illustrating and describing some of our recent installations of ranges, broilers, hoods, tables, utensil racks and warmers in large private residences.

Catalogue 32A. Labor Saving Kitchen Devices, including dishwashing machines, vegetable parers, meat and vegetable cutters, meat and bread slicers, dough mixers, troughs and cutters, ice cream freezers, ice crushers, mixing machines, coffee mills, egg boilers, Tahara silver burnishers, silver polishers, bread racks and proofing closets.

Catalogue 33A. Steam Jacket Kettles (Cast Iron, Copper and Aluminum), Vegetable Steamers and Boilers, Steam Roasters.

Catalogue 34A. French Ranges, Combination Gas and Coal Ranges, Broilers, Hoods (for Residences).

Catalogue 35A. "The Sterilizer Blue Book" illustrates and describes the "Deane" line of sterilizers, which embody every improvement and many patented features. There is a "Deane" sterilizer for every use. This catalogue also shows steam tables and warmers for diet kitchen use, bedside service wagons, and blanket warmers.

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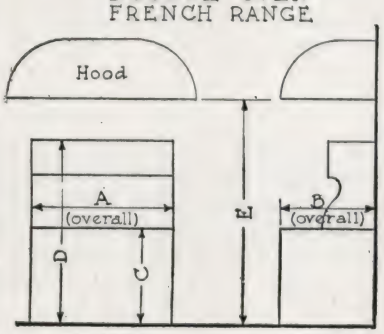
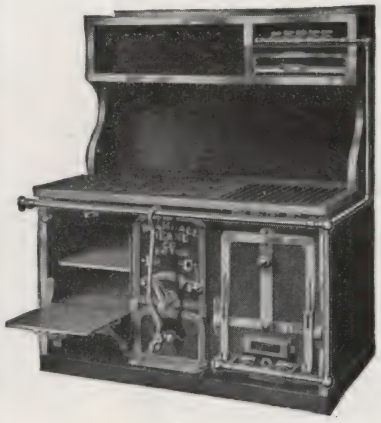
DEANE'S NO. 160-S
DOUBLE OVEN
FRENCH RANGE



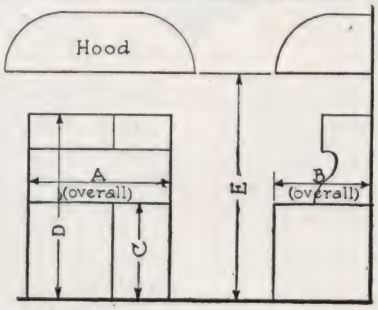
FRONT ELEVATION SIDE ELEVATION

No.	A	B	C	D	E	Ovens
1602	4'-0"	2'-5"	2'-7"	5'-0"	6'-2"	12⅛"X18"X14"
1603	4'-6"	2'-9"	2'-7"	5'-0"	6'-2"	14½"X24"X14"
1604	5'-0"	2'-9"	2'-7"	5'-0"	6'-2"	18"X24"X14"
1605	5'-6"	3'-3"	2'-7"	5'-0"	6'-2"	22½"X28"X14"

NUMBER 160-S SERIES



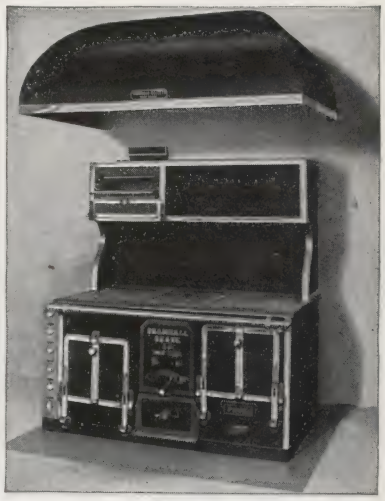
DEANE'S NO. 209-S
COMBINATION
COAL AND GAS RANGE



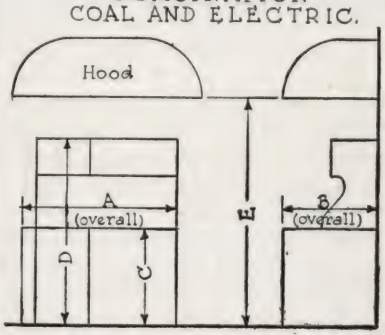
FRONT ELEVATION SIDE ELEVATION

No.	A	B	C	D	E	Ovens
2092	4'-10"	2'-9"	2'-7"	5'-0"	6'-2"	16"X24"X14"
2093	5'-5"	2'-9"	2'-7"	5'-0"	6'-2"	18"X24"X14"

NUMBER 209-S SERIES



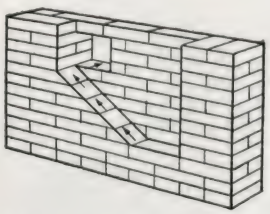
DEANE'S NO. 140-S.
COMBINATION
COAL AND ELECTRIC.



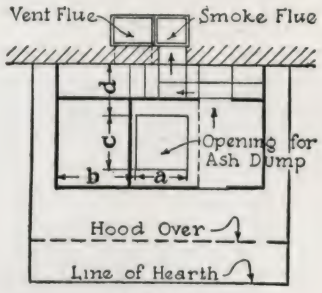
FRONT ELEVATION SIDE ELEVATION

No.	A	B	C	D	E	Ovens
1402	5'-2"	2'-9"	2'-7"	5'-0"	6'-2"	14"X23"X14"
1403	5'-8"	2'-9"	2'-7"	5'-0"	6'-2"	18"X23"X14"

NUMBER 140-S SERIES

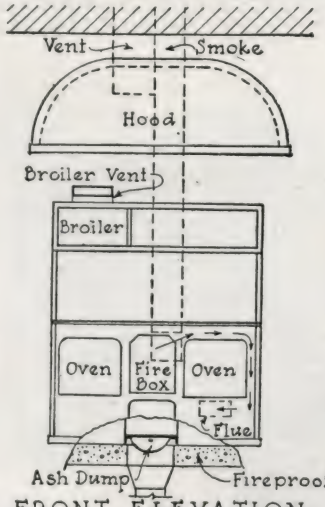


PERSPECTIVE VIEW OF BRICK WORK AND SMOKE FLUE AT BACK OF COAL SECTION

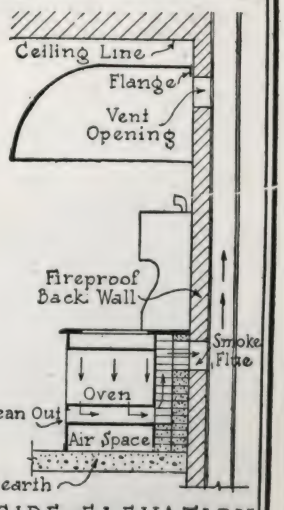


PLAN

NOTE – Dimensions "a", "b", "c", & "d" will be given for any particular range required.



FRONT ELEVATION



SIDE ELEVATION

METHOD OF INSTALLING FRENCH RANGES

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	INSTALLATION DATA FOR BRAMHALL, DEANE FRENCH RANGES	SCALE ¼IN EQUALS 1 FT. DATE AUG 21 DRWG 1

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Equipment, Furnishings and Supplies for Public Service

208-224 West Randolph Street

CHICAGO, ILL.

FACTORY AND WAREHOUSE: 1200 West 35th Street, CHICAGO, ILL.
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The equipment, furnishings and supplies provided by ALBERT PICK & COMPANY are manufactured expressly for rigorous *public* service and the architect, in specifying them, will find them gratifyingly different from ordinary grades.

Complete equipping and furnishing are specialized services of ALBERT PICK & COMPANY.

For Door Beds and Space-saving Devices, see pages 2080-2081.

TRADE-MARK

Facilities

This company is the largest Public Service Equipment House in the world. It offers the greatest scope of services, as well as the greatest resources in merchandise of this kind anywhere to be found. *Everything* required is provided quickly and at a saving.

Technical Consulting Service

Architects and engineers are invited to make use of the extensive advisory service maintained in this organization. Suggestions, data and actual plans based on years of experience in the field will be furnished promptly on request. A department of specialists will assist without charge in the preparation of plans for any type of installation, advising regarding cost, economy of installation, new mechanical devices, approved arrangement, etc.

General Information

The salient details of public service installations have been noted here in brief tabloid form. They are necessarily of general application, of chief value to the architect wishing preliminary information. Supplementary information is readily available and a comprehensive service is offered which architects are requested to employ freely. Whatever the problem, it can be solved with helpful co-operation.

Hotel Kitchens

In the arrangement of hotel kitchens space requirements must be proportioned to the class and amount of restaurant service desired. It is always safe to err on the side of too much space; for the average kitchen is terribly crowded and efficient service is thus rendered impossible.

Taking a 500-room hotel as example, the average dining room space, including lunchroom or cafeteria, should be around 10,000 sq. ft., allowing a total seating

REPRESENTATIVE COMPLETE INSTALLATIONS BY ALBERT PICK & COMPANY

Upper left, Somerset Apartment Hotel, Chicago; upper right, Chicago Beach Hotel, Chicago; lower left, Jackson Park Hospital, Chicago; lower right, Northern Hotel and Elks' Club, Chippewa Falls, Wis.

Continued on next page

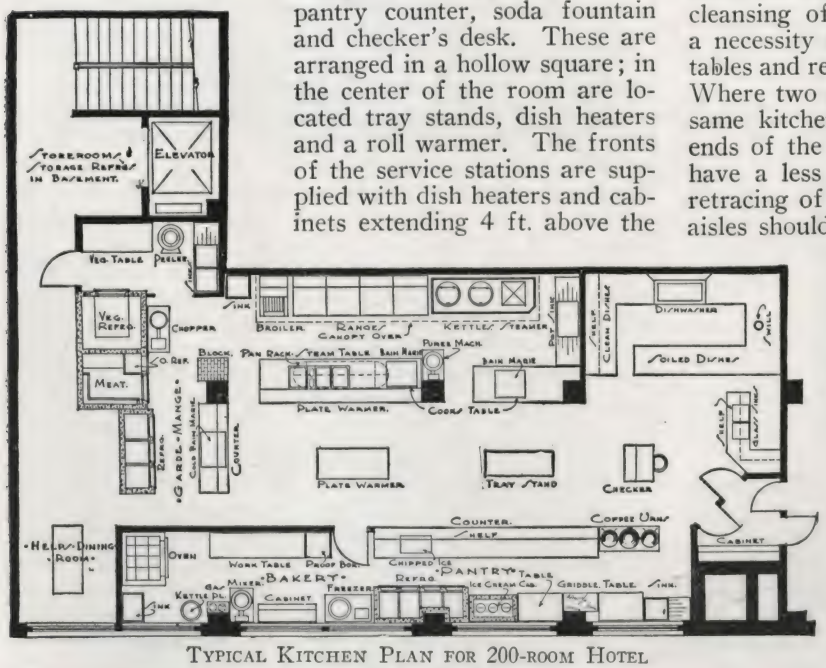
capacity exclusive of banquet rooms of 750 to 800 people. An efficient kitchen will require space, including storeroom, bake shop and dish pantry, equal to the combined dining room space, or a total of 40 sq. ft. per hotel room for the two. Large variations naturally occur according to the size of the city in which the hotel is located and according to the desire of the proprietor to feature either his rooms or his café service. Instances can be found where the combined dining room and kitchen equal 75 sq. ft. per hotel room instead of 40 sq. ft., and on the other hand some smaller hotels give as little as 15 sq. ft. per room when the dining room is desired only as a convenience to guests and considered a necessity in order to keep the rooms filled. Entrance of supplies needs first and most careful consideration. Elevators and broad stairways should lead directly to storeroom entrance and main storage refrigerator. Main storage refrigerator should be a 4-compartment box of not less than 400 sq. ft. of floor space for a 500-room house. From this point the equipment should be so arranged as to avoid all unnecessary retracing of steps until it ultimately is delivered to the patron.

Having determined location of supply entrance, the next consideration is given to the entrance to kitchen from main dining room. This should, if possible, be centrally located for both rooms. If the kitchen is on a different floor from the main dining room, space must be taken for a service pantry where short orders, entrees, pastry and coffee are served. This service pantry requires a cook's table and steam table with dish heater, range, broilers, short order box, pastry counter, urns, and checkers' stands arranged in the above order with right-hand entrance and exit doors, also a broad stairway with division rail leading to main kitchen.

Wherever possible, kitchen and main dining room should be on same floor, right-hand service should be sought if in any way a possibility. Entrance to kitchen should be protected by a vestibule so that doors do not open directly into dining room. Ideal arrangement is a nearly square kitchen with the service stations to the front and corresponding preparation rooms back of them.

The most convenient order of equipment is as follows:

Steam table, short order table, oyster bar, garde manger counter, pastry counter, pantry counter, soda fountain and checker's desk. These are arranged in a hollow square; in the center of the room are located tray stands, dish heaters and a roll warmer. The fronts of the service stations are supplied with dish heaters and cabinets extending 4 ft. above the floor with the tops forming a serving shelf. Back of each of these stations is the preparation room for that part of the food, as follows:



TYPICAL KITCHEN PLAN FOR 200-ROOM HOTEL
Efficiently arranged kitchen designed by ALBERT PICK & COMPANY

The ranges are lined up back of the steam table and cook's table. Racks over the cook's table carry the pans. The ranges in turn have a vegetable and soup preparation room back of them separated by a 6-in. tile partition 6 ft. 6 in. high. Here are the peelers, vegetable steamers and stock kettles and here also is located the pot washing department.

VIEW OF SHERIDAN PLAZA HOTEL KITCHEN
Showing the splendid equipment used throughout

The short order station in addition to having an open top range has two broilers and a short order box. Back of the oyster bar is the shell fish ice box and in it space for trays of opened oysters and clams.

The garde manger counter is backed up by the butcher shop where meat choppers, blocks, meat grinders, cutting tables and slicers facilitate the work. This department should be located convenient to the storeroom in order to expedite the handling of fresh meat and poultry. The pastry pantry and soda counter should be backed up by the bake shop and ice cream preparation rooms. In this section are the fixtures for making toast, waffles and cakes; also a multiple egg timer and spacious service boxes to carry material for all salads.

Each of the departments must be supplied with sinks for washing its own pans and utensils and also for cleansing of raw materials. Work table space is also a necessity and it is safe to state that too many sinks, tables and refrigerators are never supplied in any kitchen. Where two dining rooms are directly supplied from the same kitchen, the doors should be located at opposite ends of the room. Since one of the dining rooms will have a less convenient service and more crossing and retracing of steps than the other, correspondingly wider aisles should be left in the center of the room.

In nearly every modern hotel it has been found advantageous to have all dishes washed in one place with conveyors to bring the dishes from the various serving pantries and return them. Conveyor dishwashing machines are most practical for this type of dish pantry. Metal boxes are used on the conveyor for the transporting of dishes. When conveyors are not used, separate centrally located dish pantries must be provided. Adjacent to the dish pantry is the silver room supplied with lock cabinets, sinks and a silver cleansing machine of suitable size to take care of all hollow-ware.

Efficient kitchens can be produced only with efficient equipment. This must

Continued on next page

be adequate, modern, and above all, durable. Many a carefully planned kitchen has been ruined by improper equipment. The great number of ALBERT PICK & COMPANY kitchens operating today in every size and type of institution is proof that ALBERT PICK & COMPANY equipment sets a new standard of excellence for efficiency, economy and durability. Architects, in specifying ALBERT PICK & COMPANY equipment, are assured for themselves and their clients of securing the equipment that best meets their requirements, with every certainty of long and continuous service.

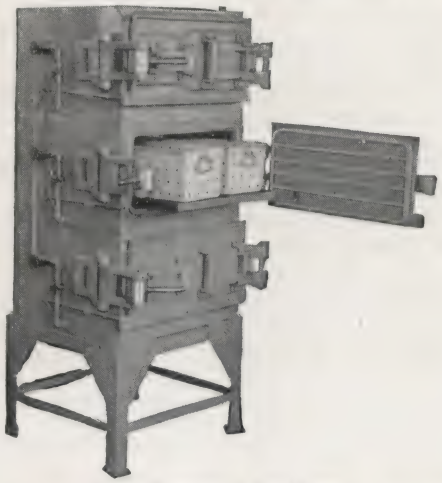
Commercial Cafeterias

In order to make the cafeteria produce the greatest profit, the seating capacity must be proportioned to the counter capacity and the counter length should be sufficient to give the maximum capacity per hour and build up the highest check average. The maximum capacity for a 40-ft. counter is about 400 people per hour and for an 80-ft. counter about 600 per hour. A counter more than 80 ft. in length has been found not to serve more people or build up a higher check than a counter of this length. Between the lengths of 40 and 80 ft. the number of people served is practically proportionate to the length of the counter.

Cafeteria counters exclusive of tray rail should be 36-in. high and 30-in. wide. In addition to the 30-in. width a 6-in. carving board should be built back of the steam table and a tray slide extending approximately 10 in. in front of the counter should be built along the entire front. Minimum aisle space of 42 in. should be provided back of the counter, between it and the kitchen wall, and 54 in. in front. At least two serving slides should be provided in the kitchen wall between it and the counter and these should be located respectively back of the pastry and salad sections. The kitchen side of the wall should be furnished with ample table, refrigerator and sink space for the cutting and preparing of all salads, pastries, fresh fruits, etc. An aisle space of 54 in. in front of the counter is necessary in order to make it possible for persons who do not desire to patronize one section of the counter to pass by those waiting to be served.

BANK OF "PIX" GAS RANGES

The most profitable arrangement of an 80-ft. counter is as follows: tray, silver and napkin stand, 6 ft.; bread, 6 ft.; salad and cold meats, 16 ft. (with a 12-ft. salad pan included); steam table, 20 ft.; milk and ice cream cabinet, 8 ft.; hot and cold drink serving space, 4 ft.; aisle, 2 ft.; urn stand, 2 ft., set at right angle to counter. Salad section and pastry section have 16 ft. of double elevated shelving and the steam table has a counter protector in front of it. Display shelves should be 18 in. wide with the top shelf 20 in. above the counter. Counter protector should be 8 in. high and 8 in. wide. The reason for placing the salads and cold meats ahead of the steam table is that in this manner two busy places are created during the rush period, and by leaving aisle space sufficiently wide in front of counter for people to pass one another more people can be served in the same time. Besides, it encourages the sale of salads and cold meats by bringing them first to the eye of the customer. It has not been found to be a profitable adventure to add soda fountains, oyster bars and other short order arrangements to a cafeteria counter. Anything that delays a continuous movement forward should be avoided as far as possible. These, however, can be added outside the direct line of service.



"PIX PERFECT" STEAMER
A new invention from the laboratories of ALBERT PICK & COMPANY. Automatic, safe, sanitary and marvelously efficient.

In order to have the maximum efficiency, the seating capacity should be proportionate to the counter capacity. If 600 people are served in an hour, at least one-third of that number of seats should be offered in any one time as it has been found that the time people actually remain seated in a cafeteria dining room is approximately twenty minutes. In order to offer vacant seats for couples and parties, there should be at least twenty per cent more seats than are required. In other words, a counter 80 ft. long with a capacity of 600 people per hour, requires a dining room seating capacity of 240 to 250 people, allowing 12½ sq. ft. per chair, which gives an easy uncrowded dining room with plenty of aisle space for the customers coming to and going from the counter; and allowing 1000 sq. ft. for the counter and its necessary aisle space, a total of about 4000 sq. ft. exclusive of the kitchen is necessary.

Where possible, a large portion of the kitchen space should be in a basement located directly under the dining room. This affords ideal conditions for ample storeroom space, dishwashing pantries, cleaning and preparation of vegetables, locker and washrooms for employees and various other requirements of the restaurant. It also makes it possible to use a conveyor system for removing the soiled dishes to the dishwashing pantry and returning the clean ones back of the counter. If such a condition is not possible and separate kitchen and dish pantry have to be furnished on the same floor as the dining room, a minimum of 2000 sq. ft. for each complete service counter as above illustrated is necessary.

This description of the cafeteria does not mean that smaller rooms do not pay, but where it is possible from the size of the city or the location of the room to fill a

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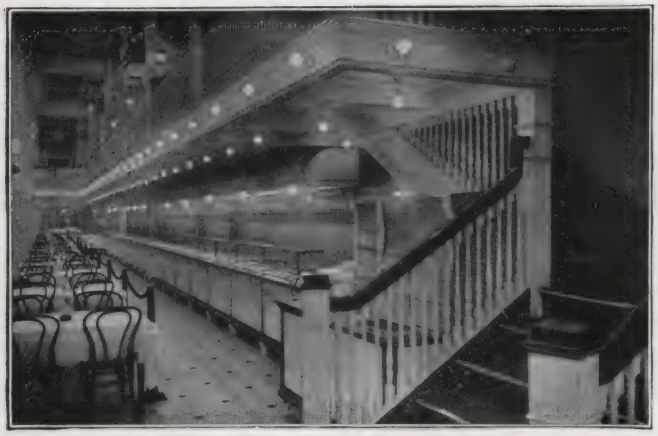
large dining room, the actual overhead is little more than it is on one with one-half the capacity. This description is intended to illustrate a balanced proposition as nearly as possible.



EATON CAFETERIA, CHICAGO, ILL.
Equipped complete by ALBERT PICK & COMPANY

School Cafeterias

Very definite principles of school cafeteria design have been worked out by ALBERT PICK & COMPANY's technical experts in connection with school architects. The requirements for individual schools, however, are so varied that architects are invited to bring their problems to these experts for suggestions and co-operation.

A booklet on school cafeterias will be sent if desired. Simply ask for Book BG93.

CAFETERIA, INDEPENDENT SCHOOL DISTRICT, DAVENPORT, IOWA
Completely equipped by ALBERT PICK & COMPANY

Hospitals and Institutions

Hospital kitchens vary from other types in that their function is to prepare food in quantities for serving with the elimination of service pantries and garde manger counters from the kitchen proper. The problem here is to prepare food for both the sick and the well. For every patient there is one or more attendants and this entire staff must be served, generally on the cafeteria plan in a room which is located adjacent to the main kitchen. The kitchen also prepares the staple articles of food for the patients. Space requirements for this service will average about the same as for a hotel, or a minimum of 20 sq. ft. per hospital room, including store room, bake shop, dish pantry and main preparation kitchen. The main preparation department consists of large storage refrigerators, butcher shop, vegetable preparation room, steamers, bake shop and batteries of ranges with soup kettles and steamers. From the main kitchen the food is transported to each floor and to each ward by a system of dumbwaiters and small elevators supplied with hospital trucks. These hospital trucks are arranged to carry a uniformly shaped and sized utensil with cover marked distinctly with tag or number for the ward from which it comes and to which it is to be returned.

Each ward is provided with a diet kitchen. These diet kitchens should be approximately 14x20 ft. and contain a white porcelain sink, a small refrigerator, household range, a diet steam table with hot plate and dish warmer, in addition to a dish cupboard, work table and kitchen cabinet. Each nurse prepares the diet for her patients in these separate diet kitchens from the staple food brought up from the main kitchen in the conveyors or carriers and the cook and herself prepare delicacies, toast and eggs in this room.

The dishes are returned to a dishwashing pantry in the kitchen which is provided with a large sterilizing dishwasher and also a system of steam sterilizers for contagious diseases. The sterilized dishes are returned via conveyors or trucks to each diet kitchen.

Where the hospital occupies a series of buildings generally one central preparation room is selected, which is connected by tunnels with a large diet kitchen in each building and the small diet kitchens are supplied from this distributing point in order to lessen the amount of travel.

Literature

Publications of special interest to the architect have been prepared and will be sent promptly. They include:

BG 91—Hotel, Apartment Hotel, Club, Hospital and Institution Installations, picturing complete equipments.
BG 92—Restaurant, Cafeteria and Lunch Room Equipment.
BG 90—Kitchen Equipment.
BG 93—School Cafeterias.
BG 61—Industrial Cafeterias, Clubs and Housing Projects.
BG 130—Door Beds.
BG 25—General Catalog of Furnishings, Equipment and Supplies.
BG 41—Soda Fountains, Equipment and Supplies.
BG 66—Billiard and Bowling Equipment and Supplies.

References

The following are among the many prominent customers of ALBERT PICK & COMPANY:

Chicago Beach Hotel, Chicago, Ill., (equipped complete)
Wade Park Manor, Cleveland, Ohio, (equipped complete)
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Hotel Bethlehem, Bethlehem, Pa., (equipped complete)
Hotel George Washington, Washington, Pa., (equipped complete)
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Oak Park Arms, Oak Park, Ill., (equipped complete)
Hotel Fort Des Moines, Des Moines, Iowa, (equipped complete)
Drake Hotel, Chicago, Ill.
Shaw Technical High School, East Cleveland, Ohio
Erie Public Schools, Erie, Pa.
McKinley High School, Canton, Ohio
Kansas City Club, Kansas City, Mo.
United Cafeterias, New York, N. Y.
Kieckhefer Recreation Parlor, Chicago, Ill., (finest Billiard parlor in the Middle West)
Lawndale Recreation Co., Chicago, Ill., (34 Bowling Alleys)

THE CENTURY MACHINE COMPANY

Kitchen and Bake Shop Equipment

CINCINNATI, OHIO

Products

KITCHEN MACHINES and BAKE SHOP EQUIPMENT, including Four-speed Mixers; Dough Mixers; Flour Blending, Sifting and Handling Devices; Flour Hoppers; Tempering Tanks; Loaf Moulders; Cookie Cutting Machines.

HIGH GRADE ONLY Century BAKERY MACHINERY

TRADE-MARK

Service Department

We have a service department which will be pleased to help design and lay out bake-shops, or plan them for installation in buildings already erected, furnish information as to size of machine desired, etc.

Century Quality

All Century machines are strong, simple and efficient, and are most practical.

Only the highest type of construction and workmanship is employed. Phosphor bronze bearings are used throughout the machines, perfect gears cut in our own shop assure quiet operation, making the machines particularly suited for public institution and hotel work.

Giant Four-speed Mixer and Kitchen Machine

Giant kitchen machines are in universal use for mixing bread and cake doughs, beating up batters, whipping cream, eggs, etc., straining soup, making purées, crushing fruits, mashing potatoes, and will take care of from ½ pt. of egg white to 120 lbs. of bread dough.

They operate at 4 speeds. These are controlled by a single lever, and changes are effected without stopping the motor, passing through intermediate speeds, or disengaging gears. Owing to this latter feature, no gear has ever been stripped on a Giant. The fourth speed is about 35% higher than the high speed on other mixers and is invaluable for fast and thorough whipping.

In Giant machines, the raising and lowering of the bowls to remove them or change beaters is eliminated. This does away with unnecessary and back-breaking work and danger of denting bowls or breaking beaters by bringing them too closely together. On the Giant, the bowls swing out to right or left to remove them; the beaters are factory adjusted, self-locking, and can be removed or put on instantly.

The Giant machines are built in 2 sizes, suitable for any purpose. The smaller is equipped with 16- and 36-qt. bowls, wire whip and aluminum beater for each size bowl and a dough hook for the 36-qt. bowl. The larger machine has 36- and 80-qt. bowls and beaters similar to the 16- to 36-qt. machines.

Other attachments which can be furnished at purchaser's option are soup bowls, colanders and strainers; meat, coffee and spice grinders; vegetable slicers; peanut butter and almond paste attachments; bread crumbers; cheese graters; grind stones; auxiliary pulley, etc.

The fleld of use for Giants is unlimited; new uses suggest themselves to users daily.

Installing Giants means furnishing clients strong, simple machines perfect in workmanship, economical in price and operation, and long in life.

Century "All-steel" Flour Outfit

The Century "All-steel" flour outfit insures light, fluffy, pure clean flour right into the mixer, increasing water absorption and giving a greater yield per barrel of flour. It is built to fit any dough mixer. Requires only 30 in. between top of mixer and the ceiling, and can be operated from an extension pulley on a dough mixer, from a line shaft overhead, or an individual motor. Its steel construction makes it sanitary and it will not warp out of shape, leak, or harbor dirt and vermin.

The storage bin may be filled at any convenient time, so that the flour is always ready for immediate use. By pulling a lever, the flour is conveyed from storage bin into elevator and then through spiral, self-cleaning sifter, either into the dough mixer or the scale hopper, as desired. The spiral sifter cleans flour thoroughly, all foreign matter passing into a removable tailings box.

Century Dough Mixer

Every running part of the Century dough mixer is completely housed in by an absolutely rigid frame. Bearings are phosphor bronze. Control lever, conveniently placed, makes starting and stopping easy, without shock or jar. Packing box keeps water and sponge in, and oil and dirt out. An extension pulley enables motor to be used to run other machines. The mixing arm is a special design, practically self-cleaning, and develops all the gluten in a flour quickly and provides a dry white dough in the least time. Spiral gears make machine noiseless. Clutch works perfectly and is guaranteed. Cover, of the "canopy top" type, can be opened from front or back.

Century dough mixers are made in 1-, 1½-, 2-, 3- and 4-bbl. sizes. The 3- and 4-bbl. machines are driven with double gears.

Century Bake Shop Unit

Century equipment may be set up in combination such as dough mixer, flour sifter and cake mixer, the dough mixer motor driving any of the 3 machines.

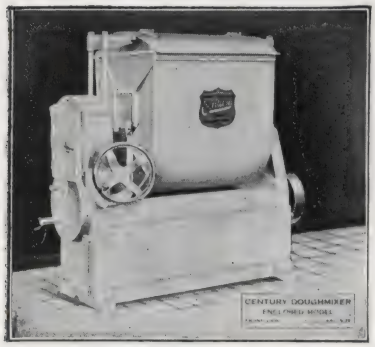
Flour hoppers with dial or automatic scales and water tempering tanks can also be added as shown on adjoining page, where over-all and unit dimensions are also given.

Continued on next page

Century Loaf Moulder

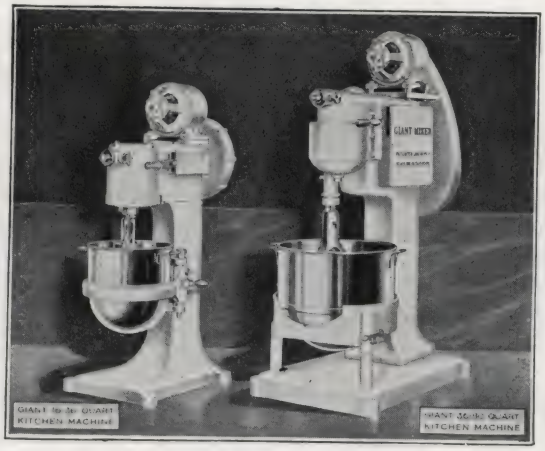
The Century loaf moulder will make more and better bread and at less cost than it can be made by hand. Its capacity is 3,600 loaves an hour. With the extension, loaves up to 16 in. long may be moulded. Every loaf will be perfect. Eliminates flour waste and labor troubles and assures uniform product at all times.

The Century loaf moulder moulds loaves as fast as the dough can be scaled into hopper. No experienced help necessary. Saving of flour dust alone amounts to 4 or 5 additional loaves, or a saving of about 50 cents on every barrel of flour used. A batch is finished so quickly that the first loaves do not "overproof" before the last are ready for oven.



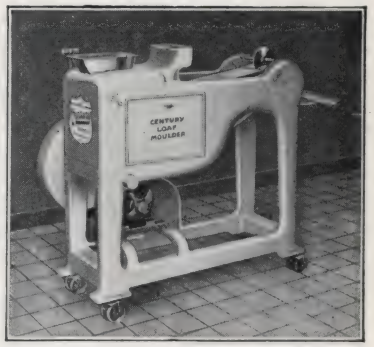
Century Dough Mixer

Floor space for 1-, 1½- and 2-bbl. capacity, 29x67 in.; 3- and 4-bbl. capacity, 35x83 in.



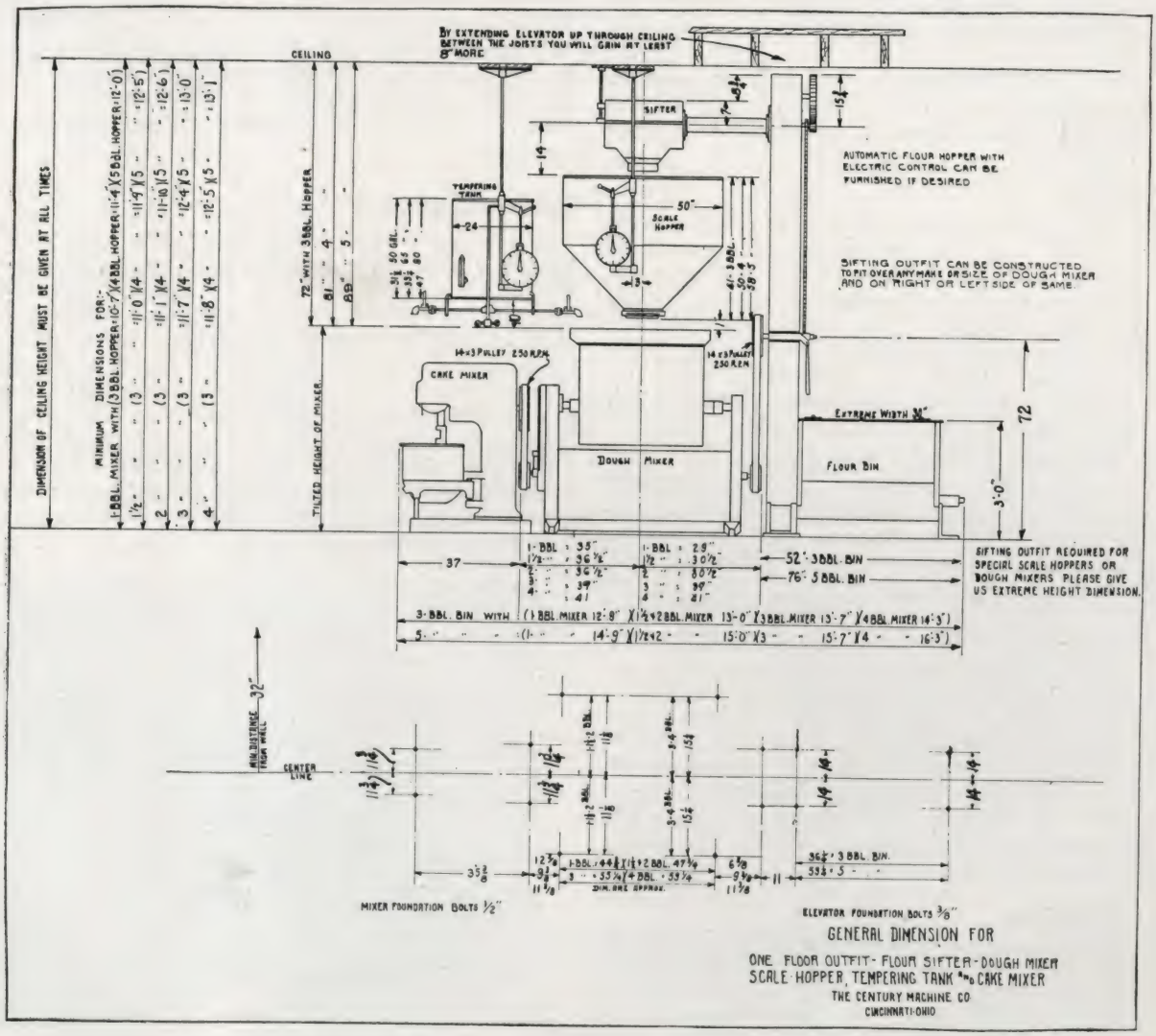
Giant Four-speed Mixers

16/36-Qt. Machine, Floor Space 22x30 in.; Weight 800 lb.
36/80-Qt. Machine, Floor Space 24x43 in.; Weight 1100 lb.



Century Moulder

Capacity, 3600 loaves per hour. Floor space, 24x65 in.; with extension for 16-in. loaves, 29x98 in.



Century Combination Bake Shop Outfit with Scale Hopper and Tank

Automatic weighing outfit with electric control can be furnished if desired

READ MACHINERY COMPANY

Manufacturers of Bakery Machinery

YORK, PA.

SALES AGENCIES

NEW YORK, N. Y. CHICAGO, ILL. SAN FRANCISCO, CAL. BOSTON, MASS.
PHILADELPHIA, PA. ST. LOUIS. MO. MINNEAPOLIS, MINN.
LONDON, ENG. PARIS, FRANCE HAVANA, CUBA

TRADE-MARK

Products

COMPLETE EQUIPMENT for the BAKERY: 3-Speed Mixers, Reversible Double-Arm Dough Mixers, Automatic Sifting and Flour Handling Outfits, Automatic Proofers. Bakery Equipment and Mixing Machines for hotels, hospitals, restaurants and institutions.

Service Department

A wide experience of many years gives to this company a fund of information that is invaluable to the architect. This service is offered to all architects and they are asked to use it freely and at all times. This company has been co-operating with architects for many years and its equipment has been specified for America's leading bakeries, hotels, hospitals, restaurants and institutions.

Layouts and data sheets supplied on request. General catalogues, photographs, standard specifications and preliminary drawings are part of the service offered by this company.

Specifications

For Bakery—In hotels of 500 to 1000 rooms, hospitals of 500 rooms and upwards, restaurants of 1000 meals or more daily, institutions of 500 residents and upwards—install the Read Standard Automatic Outfit comprising 1-bbl. Dough Mixer, two 2-bbl. Variable Feed Bins, Elevator and Conveyor, Cone Sifter, 2-bbl. Automatic Hopper and 35-gal. Automatic Tank.

In hotels of 1000 to 2500 rooms, install 2-bbl. Dough Mixer with specifications as above.

For Kitchen and Pastry Department—In hotels of 250 rooms, hospitals of 150 to 500 beds, restaurants of 100 to 250 meals daily, institutions of 100 to 250 residents—install 1 Kitchen Machine (3-Speed Mixer).

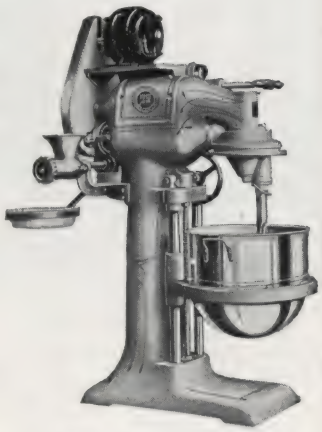
In hotels of 500 rooms, hospitals of 500 to 750 beds, restaurants of 250 to 500 meals daily, institutions of 250 to 500 residents—install in kitchen department, 2 Read 3-Speed Kitchen Machines; in pastry department install 1 Read 3-Speed Cake Machine.

In hotels of 1000 rooms, hospitals of 1000 beds, restaurants of 1000 to 1500 meals daily, institutions of 750 to 1000 residents—install in kitchen department, 3 Read 3-Speed Kitchen Machines; in pastry department install 2 Read 3-Speed Cake Machines.

In hotels of 1500 to 2500 rooms—install in kitchen department, 4 Read 3-Speed Kitchen Machines; in pastry department, 2 Read 3-Speed Cake Machines.

Kitchen Equipment

To obtain a uniform and low-cost production, it is necessary to install in the kitchen a Read 3-Speed Mixer because of its all around usefulness and practical application to many kitchen and bakery duties. It is used for mixing bread and roll doughs, cake batches, pastry, mashing potatoes, crushing fruit and vegetables, sieving soups and purees, whipping cream; mixing mayonnaise and many other mixing, beating whipping and creaming duties. The auxiliary drive on this mixer operates a coffee mill, meat grinder, vegetable slicer and other attachments.

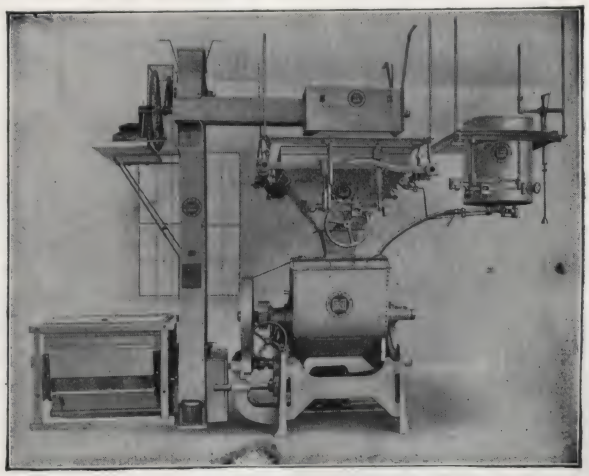


READ 3-SPEED MIXER
Patented

The new "Mixonette" is the latest member of the Read family of mixers and is especially designed for smaller quantity production.

Bakery Equipment

The larger hotels and institutions can profitably operate a bakery outfit. They are always assured clean, wholesome, fresh bread at a low cost. Each outfit is specially constructed for the particular installation and is automatically operated throughout, being controlled by a push button. The flour is blended, sifted and weighed, the water is measured and tempered. Doughs are rapidly and thoroughly mixed in the reversible double-arm dough mixer. Read Automatic Bakery Outfits are now in active service in many of America's leading hotels, hospitals, institutions and in hundreds of bakeries. Standard layout sheets are supplied, showing weights and dimensions for this equipment.



READ AUTOMATIC BAKERY OUTFIT

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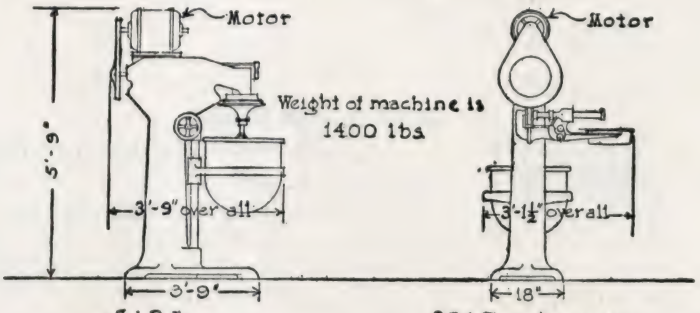
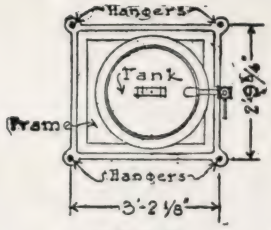


SIDE

REAR, showing auxiliary drive for kitchen purposes.

Note This machine may be placed where most convenient

3-SPEED TYPE "D" CAKE MACHINE.

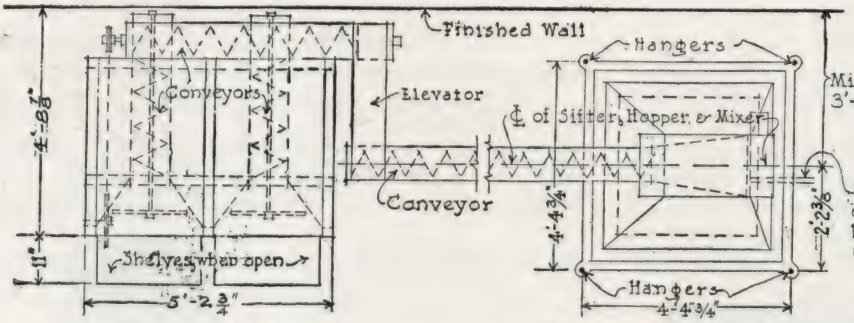


PLAN

DRAWINGS OF AUTOMATIC MEASURING & TEMPERING TANK.

NOTE: This Tank complete can be placed wherever most convenient, with a hose, or a pipe connection, to the Mixer.

The two ends of hose or pipe are shown in elevation, below.

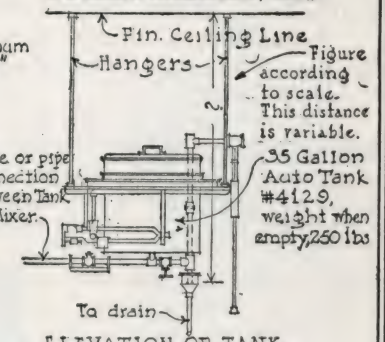


FEED BINS

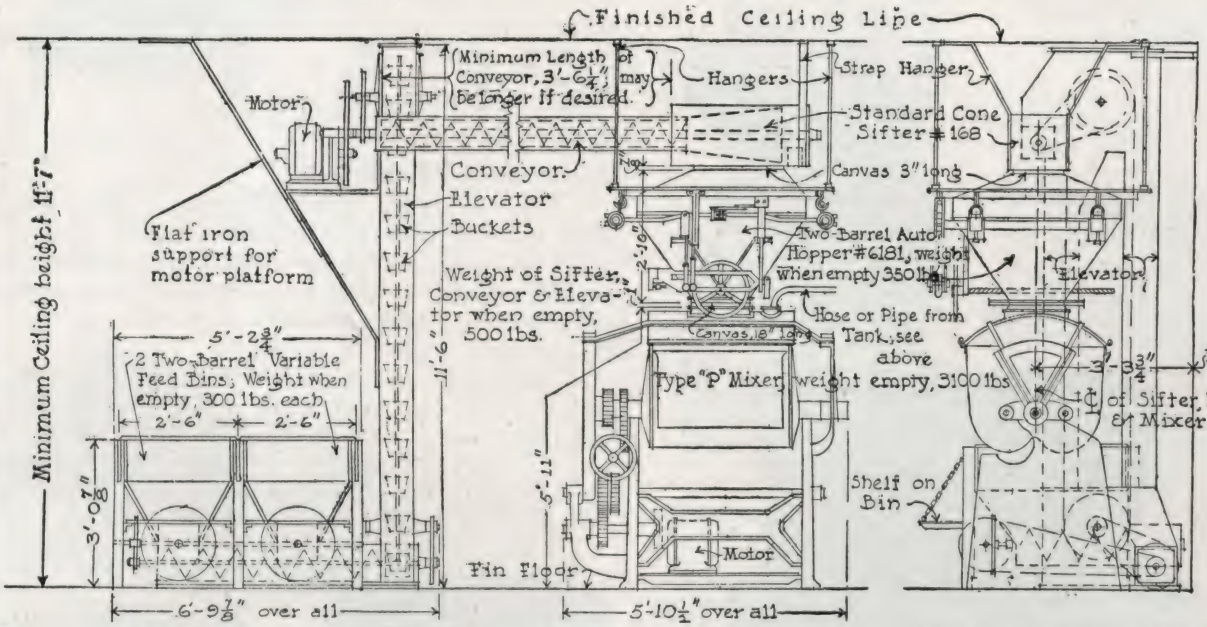
SIFTER & HOPPER

PLAN OF COMBINATION OUTFIT.

Note: Variable Feed Bins are built in units of two or more.



ELEVATION OF TANK, SEE PLAN ABOVE



COMBINATION OUTFIT FOR ONE FLOOR

SIDE ELEVATION

Note 3'd. Elevator, 5'd Cone Sifter, & Variable Feed Bins can be placed on either side of Mixer.

DRAWN BY SWEET'S CATALOGUE SERVICE, INC.	STANDARD LAYOUT FOR AUTOMATIC BAKERY OUTFIT READ MACHINERY CO., YORK, PA.	SCALE ¼" EQUALS 1'-0" DATE JUNE 20	DRWG. 1

FULLER & WARREN COMPANY

Manufacturers of Ranges

TROY, N. Y.

Products

STEWART RANGES.

For Stewart Warm Air Furnaces see page 1655.

Stewart Ranges

Ninety years ago FULLER & WARREN COMPANY built their first stove and since then, year after year, they have continued to improve the design and construction of their stoves and ranges. Stewart ranges assure absolute satisfaction. They embody the latest improvements and are built by highly skilled mechanics.

No. 3F8-18 Service Stewart Range

A combination coal and gas range with separate coal and gas ovens. Very compact, well proportioned and finely finished.

Has elevated gas oven and broiler, provided with ample vents for carrying off all cooking fumes. Cooking top of range has 4 coal holes and 4 large gas burners and a simmering burner. Gas burners are provided with an automatic lighter and white enameled drip pan. Furnished with cabinet or leg base. Oven doors are provided with thermometers.

Range is made with plain, smooth castings, removable nickel trimmings and white enamel splasher back.

Also made in gray or blue enamel.

Also made with combination gas-coal water heater.

Dimensions	
Width over all, in.	41
Depth over all, in.	28¼
Height to cooking top, in.	32
Coal oven, in.	18x18x10 high
Gas oven, in.	18x15x10½ high
Gas broiler, in.	16x15x10½ high

3F8-18 SERVICE STEWART RANGE

IDEAL STEWART RANGE

Ideal Stewart Range

A combination coal and gas range with separate coal and gas ovens. Very compact, convenient and of large capacity.

Furnished only with left-hand fire coal oven. Has double, high warming closet, glass oven doors and thermometers. Solid oven doors, if desired. Gas oven can be used for baking or broiling. Cooking top has 6 coal holes and 4 large gas burners and a simmering burner.

Made with smooth, carefully finished castings and removable nickel trimmings.

SIZES AND DIMENSIONS—IDEAL STEWART RANGES

No.	Cooking holes, coal range, in.	Coal oven, in.	Gas oven, in.	Width over all, in.	Depth over all, in.
I-818	8	18x18x12	16x18x10½	60¾	27½
I-820	8	20x20x13	16x18x10½	63	29½
I-920	9	20x20x13	16x18x10½	63	29½

2S Stewart Range

A coal range with square top and type "M" mantel. Has 6 coal holes. Oven door is equipped with thermometer. Range is made with plain, smooth castings and removable nickel trimmings. Size of oven, 20x20x12 in.

2S STEWART RANGE

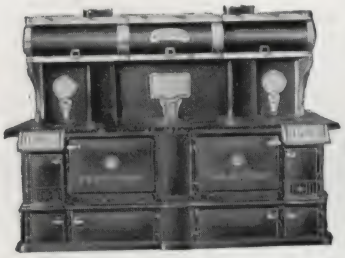
Stewart Hotel Ranges

Made in several types and sizes for hotels, restaurants, boarding houses, clubs, large residences, etc.

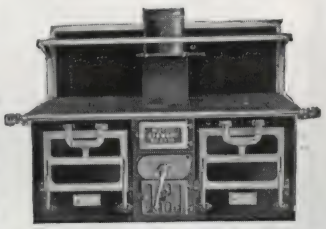
The Twin Hotel range is made with 2 ovens, each having a firebox. Each oven and firebox is operated independently. Has high and low warming closets and 12 coal holes.

The double oven range has 1 firebox and 2 ovens, each controlled independently. Made with elevated warming closet or high shelf. Has 8 coal holes.

The hotel steel ranges are made of steel throughout, trimmed with nickel. Made with single oven, and with 2 ovens and 1 firebox. May be joined in series.



STEWART TWIN HOTEL RANGE



STEWART STEEL HOTEL RANGE

PHILLIPS & CLARK STOVE CO., INC.

Manufacturers of Ranges

MAIN OFFICE AND PLANT

GENEVA, N. Y.

Product

ANDES RANGES.

For Andes Warm Air Furnaces see pages 1660-1661.

ANDES RANGES
TRADE-MARK

Andes Ranges

The Andes ranges of today are the result of 50 years of successful experience in the building of ranges. Improvements have been added from year to year, and the present models combine good appearance with strength, economy, efficiency and long life.

Andes ranges built 45 years ago are still in service. The newer models are just as durable.

They bake and cook with a minimum amount of fuel. In a test of a stock model of one of the newer ranges, 12 loaves of bread (18 lbs.) were baked using 6 lbs. of newspapers as fuel.

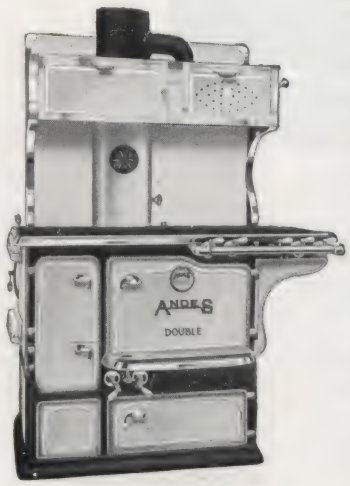
The ovens are quickly heated to baking temperature, thus saving considerable time.

Andes Double

The Andes Double range is built for burning both or either gas or coal, coke or wood.

Finished in white porcelain enamel which is guaranteed not to craze or stain. The enamel can be washed as easily as a china dish. The top has a rust resisting gunmetal finish. Jambs are enameled black, set off by nickel trimmings. This range looks and stays clean, and requires no polishing with stove blacking.

Furnished with high closet, with or without gas broiler top, and with leg base or low closet base. Has a special lift-up top, handy for broiling, toasting and putting on coal. The extra large firebox uses fuel economically.



ANDES DOUBLE RANGE

The Andes Double has 4 cooking holes for coal and 4 gas burners with a simmering burner. The gas burners are equipped with Rutz automatic lighters.

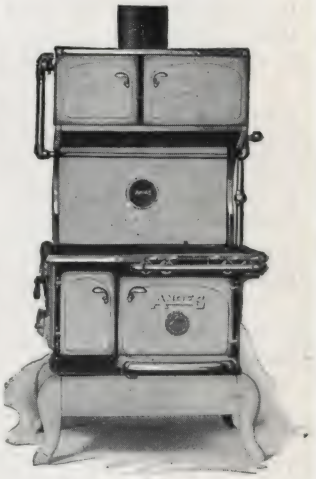
DIMENSIONS AND WEIGHT
Length of cooking top, 44 in.
Depth of cooking top, 29 in.
Oven, 20x18½ in.
Broiler, 14x11½ in.
Height of cooking top from floor, 32 in.
Height of high closet and gas broiler from floor, 49½ in.
Approximate shipping weight, 700 lbs.

Andes 25

The Andes 25 is a combination gas and coal range for homes where kitchen space is restricted. Requires very small space, yet gives ample cooking facilities for a medium sized family.

Regularly furnished with a straight coal oven, straight elevated gas oven, elevated gas broiler, 2 cooking holes for coal and 4 gasburners with a simmering burner. Gas burners are equipped with Rutz automatic lighters.

Can be furnished either blacked, or enameled white or a soft gray with black enamel jambs and nickel trim.

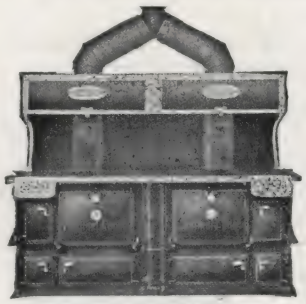


ANDES 25 RANGE

DIMENSIONS AND WEIGHT
Length of cooking top, 36 in.
Depth of cooking top, 28 in.
Coal oven, 20x17½x10 in. high.
Gas Oven, 16½x15x10 in. high.
Gas broiler, 12½x15x10 in. high.
Height of cooking top from floor, 32 in.
Height of gas oven and broiler from floor, 52½ in.
Approximate shipping weight, 600 lbs.

Sentinal Andes

A double oven, double fire box range of unusually large cooking capacity. Each oven and firebox is arranged as a separate unit for economy. Each unit is equipped with patented lift-up broiler top, pouch feed, drop oven door and warming closet.

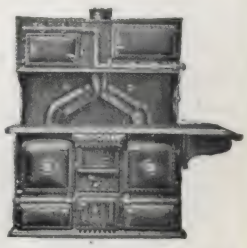


SENTINAL ANDES RANGE

Length over all, 81 in.
Ovens, each, 20x20x13 in.
Approximate weight, 1200 lbs.

Imperial Andes

A double oven, single firebox range of large capacity and compact design. Both ovens may be operated simultaneously. Furnished with a high warming closet or elevated gas attachment. Gas plate may be supplied at either or both ends.



IMPERIAL ANDES RANGE

Length over all, 52 in.
Ovens, each, 13½x20x14¼ in.
Approximate weight, 960 lbs.

RICHARDSON & BOYNTON CO.

SINCE 1837

Manufacturers of Coal and Gas Cooking Ranges

260 Fifth Avenue
NEW YORK, N. Y.

FACTORY
DOVER, N. J.

BOSTON, MASS., 60 High Street
ROCHESTER, N. Y., Rockwood Street
PHILADELPHIA, PA., 1332 Arch Street
PROVIDENCE, R. I., 429 Industrial Trust Building
CHICAGO, ILL., 171-173 West Lake Street

Products

RICHARDSON "PERFECT" COAL and GAS COOKING RANGES.

For Richardson Warm Air Furnaces, see pages 1662-1665; for Low Pressure Boilers for Steam, Vapor and Hot Water, also Domestic Hot Water Supply, Tank and Laundry Heaters, see pages 1675-1679; for Richardson Vapor-Vacuum-Pressure System of Heating, and Automatic Heating System for garages, see pages 1708-1711.

Richardson "Perfect" Cooking Ranges

The Richardson "Perfect" ranges have attained their reputation through their high standard of quality and efficiency, the result of careful study of conditions and many years of experience in the manufacture of cooking apparatus.

"Perfect" ranges are constructed with a large flue which distributes the heat effectively around the oven making possible successful results in baking and cooking. The "Perfect" triangular revolving grate described below can be removed without disturbing the brick, grate rest or waterback. The waterbacks are large and of heavy construction assuring an abundance of hot water.

Finish—All the coal and combination coal and gas ranges illustrated can be obtained in the standard black finish or in a full enamel finish. See illustrations and description of enameled ranges on a following page.

Although both the standard black finish and the enameled finish are illustrated it is recommended that the enameled ranges be used. Although they cost slightly more than the standard range, the difference in price is soon made up in the saving of labor and general appearance.

The gas ranges illustrated are made in the full enamel finish and as noted in the description of each range.

Richardson "Perfect" Grates and Ash Chute

All "Perfect" ranges are fitted with "Perfect" triangular revolving ventilating grate bars (see illustration) for burning coal or wood. They insure a clean fresh fire.

The ash chute can be supplied as illustrated, for all "Perfect" ranges except leg base ranges. The ashes are dropped directly into an ash can or ash pit in the cellar. This does away with the dust and annoyance of ashes in the kitchen.

The attachment consists of ash chute, one damper and two lengths of galvanized pipe. No ash cans supplied. A close fitting top for the can and telescopic section of pipe should be specified to be supplied by sheet metal contractor.

ASH CHUTE

Can be furnished with the "Perfect" ranges. Ashes dropped directly into receptacle in cellar, avoiding dirt and dust

Richardson "Perfect" Grand and "Perfect" Royal Single Oven Ranges

"Perfect" ranges have every modern improvement that up-to-date designing ability can suggest; they are perfect in construction and operation. Their plain design and smooth finish are generally appreciated, making them as easy to keep clean as they are attractive in appearance. The nickel work is detached without removing any nuts or bolts.

All "Perfect" ranges have the same grade of materials and the same careful workmanship: different names denote merely different sizes.

RICHARDSON "PERFECT" GRAND RANGE

RICHARDSON "PERFECT" ROYAL RANGE

RICHARDSON "PERFECT" GRAND AND "PERFECT" ROYAL RANGES

	Grand	Royal
Depth of top, in.	29	28¼
Width of top less end shelf, in.	37½	34¾
Width of top with end shelf, in.	45	42¼
Width of top with reservoir, in.	52¾	50
Height of top from floor, in.	32¾	32
Oven: width, depth, height, in.	20 x 20 x 11¼	18 x 18 x 11¼
Total height, including single mantel, in.	54	53¼
Total height, including dble. mantel, in.	54¾	54
Smoke pipe, diam., in.	6	6
Water front capacity, gals.	40	40

Continued on next page

Richardson "Perfect" Single Oven Coal Range

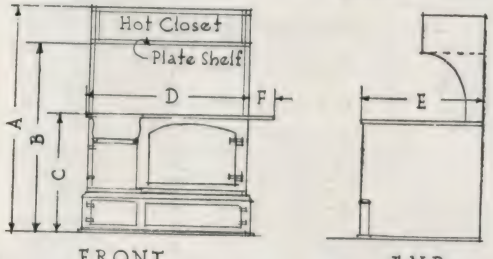
This range is made in four sizes as listed below. It is the highest grade single oven coal range made by this company. As illustrated it has an upper hot closet besides the large oven. The cooking top is large and has 6 covers.

This range can also be obtained with nickel-plated plate shelf and back instead of the upper hot closet if so ordered.

It is supplied with the "Perfect" triangular revolving ventilating grate bar and can be furnished with ash chute and oven thermometer when so ordered: Made with either right- or left-handed fire chamber.

RICHARDSON "PERFECT" SINGLE OVEN COAL RANGE NO. 278, NO. 658E AND 448E

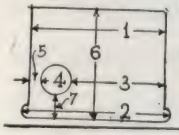
Range No.	278	279	658E	448E
Size of oven, in.	20x20	20x20	18x18	16½x17
Number of boiler holes	6-8 in.	6-9 in.	6-8 in.	6-8 in.
Diam. smoke flue, in.	6	6	6	6



DIMENSION DIAGRAM OF NO. 278, NO. 658E AND NO. 448E

Range No.	A, in.	B, in.	C, in.	D, in.	E, in.	F, in.
278	57	47	30	39½	30	7
279	57	47	30	39½	30	7
658E	57	47	30	39	27	7
448E	57	47	28½	36	25	7

LOCATION OF ASH CHUTE FOR RICHARDSON "PERFECT" SINGLE OVEN COAL RANGE

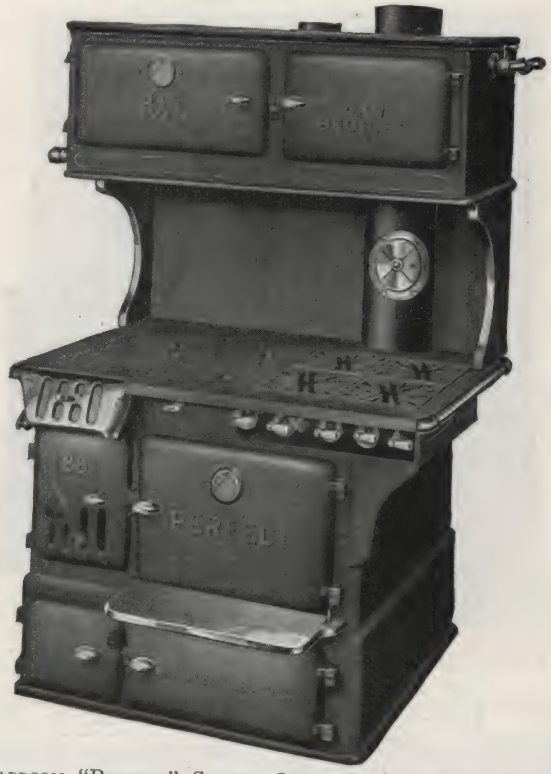


Range No.	1, in.	2, in.	3, in.	4, in.	5, in.	6, in.	7, in.
278	34½	37	24⅝	7¼	2⅝	28	6
279	34½	37	24⅝	7¼	2⅝	28	6
658E	33¼	36½	23½	7¼	2½	25¾	6½
448E	30	33¾	20¾	7¼	2	23½	6¼

Richardson "Perfect" Single Oven Combination Coal and Gas Range No. 88

Furnished as illustrated and has all the advantages of a coal and gas range combined. Has a large single oven heated by coal and a large high oven heated by gas. A large gas broiler is on the same level as the gas oven. The coal range has the same grates, etc., as the regular range. Also has hot closet below coal oven.

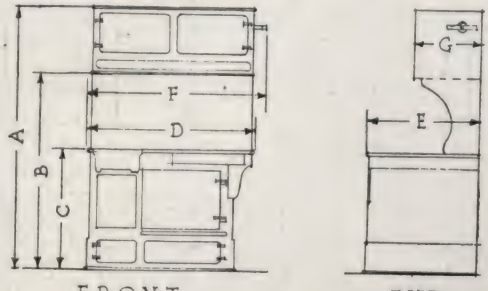
Gas and coal can be used separately or together as desired. Gas hot water heater suitable for 50-gal. boiler can be furnished at slight extra cost.



RICHARDSON "PERFECT" SINGLE OVEN COMBINATION COAL AND GAS RANGE NO. 88

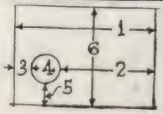
Size of oven, in.		Gas broiler, in.	Coal boiler holes	Gas burners	Smoke pipe, in.	Gas connection, in.
Coal	Gas					
18x18x12	20x16½x12	15½x13x10	4-8 in.	4	6	1

1 Simmering burner. 1 Giant burner. 3 Full size burners.
L-waterback for 50-gal. boiler, heated by coal fire only.
Gas oven is supplied with thermometer.
Enameled drip pan, broiler pan and splash back.
Ash chute supplied when ordered.



DIMENSION DIAGRAM OF NO. 88

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.
66½	46	30	40½	26	47	19



LOCATION OF ASH CHUTE FOR NO. 88

1, in.	2, in.	3, in.	4, in.	5, in.	6, in.
35½	24½	4	7¼	5¾	25

Continued on next page

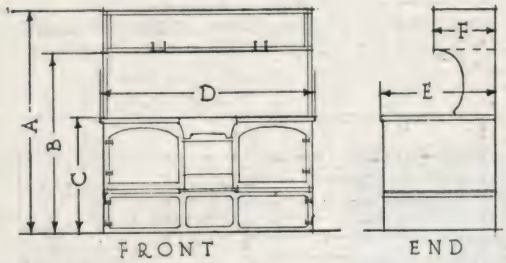
Richardson "Perfect" Double Oven Coal Range

This type of range is the highest quality cast iron double oven range. It is made in three sizes and is fitted with large wrought iron ventilated removable ovens which insure the finest results for roasting or baking. The firebox is of ample size to insure a lasting and economical fire and heat the large waterback. The cooking top has 8 boiler holes —4 over the fire and 2 over each oven. This range can also be supplied with plate shelf and back instead of upper warming closet when so ordered.

RICHARDSON "PERFECT" DOUBLE OVEN COAL RANGE NO. 111E, NO. 112E AND NO. 114E

Range No.	111E	112E	114E
Size of oven, in	20x12x14	20x13x14	20x16x14
Boiler holes	8-8 in.	8-8 in.	8-9 in.
Smoke flue, diam., in.	7	7	8

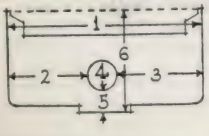
Can be supplied with shelf instead of upper hot closet.
Box waterback will heat 50 to 60 gals.
¾ waterback will heat 60 to 80 gals.
Ash chute supplied when ordered.



DIMENSION DIAGRAM OF NO. 111E, NO. 112E AND NO. 114E

Range No.	A, in.	B, in.	C, in.	D, in.	E, in.	F, in.
111E	55½	45½	28½	49½	28	15½
112E	55½	45½	28½	53	30	15½
114E	55½	45½	28½	60	30	15½

LOCATION OF ASH CHUTE FOR RICHARDSON "PERFECT" DOUBLE OVEN COAL RANGE



Range No.	111E	112E	114E
1, in.	49½	54½	62½
2, in.	21¼	23¾	27¾
3, in.	21¼	23¾	27¾
4, in.	7	7	7
5, in.	9	9	9¼
6, in.	29	31	31

Richardson "Perfect" Double Oven Combination Coal and Gas Range

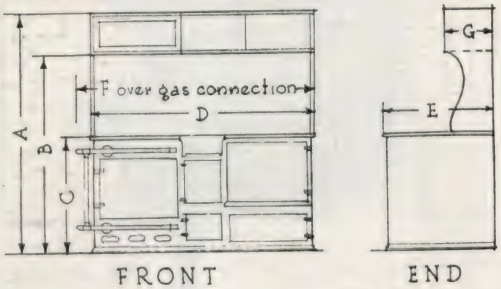
This type of range, as illustrated, combines two ranges in one unit as a double oven type. The feature of this range is that the gas section is as large and will do as much work as the coal section. They may be used separately or together as desired. It can also be supplied without the upper gas broiler if required; having the hot closet only.

Waterbacks for 50-gal. capacity on a straight system can be furnished and broiler may be placed at either side of the range.

RICHARDSON "PERFECT" DOUBLE OVEN COMBINATION COAL AND GAS RANGE NO. 428

Range No.	Sizes of ovens, in.		Boiler holes	Gas burners
	Coal	Gas		
428	18 x 16 x 12	18 x 14 x 12	3-7 in., 3-8 in.	4 full size

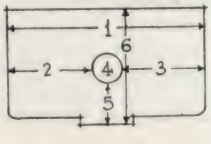
Ash chute supplied when ordered.
Can be supplied with L-waterback for 50-gal. boiler heated by coal fire only.
Gas oven is supplied with thermometer.
Smoke pipe not less than 6-in. diameter.
Gas pipe connections should be 1-in. diameter.



DIMENSION DIAGRAM OF NO. 428

Range No.	A	B	C	D	E	F	G
428	60″	46″	30″	46″	28″	49½″	15¼″

LOCATION OF ASH CHUTE FOR RICHARDSON "PERFECT" DOUBLE OVEN COMBINATION COAL AND GAS RANGE No. 428



1, in.	2, in.	3, in.	4, in.	5, in.	6, in.
49½	20¼	22	7¼	5½	25¾

Continued on next page

Richardson "Perfect" Ranges with Enamel Finish

One of the greatest advances made in the improvement of cooking ranges has been the development of a satisfactory and practical enamel which will withstand heat and will not craze or chip off.

Probably nothing has added to the comfort and ease of cooking as the clean, bright finish on the enameled range. It does away with the necessity of blacking the range. It is cleaner and insures an absolute saving of labor besides adding to the attractive appearance of the kitchen.

The polished cooking top and the enameled finish may be cleaned easily with a damp cloth. This eliminates all the unpleasant features of blackening ranges.

The enameling on Richardson ranges is a porcelain finish, fused on the iron at a high temperature and as it enters the pores of the iron it becomes a part of the casting itself and will not chip or break under usage

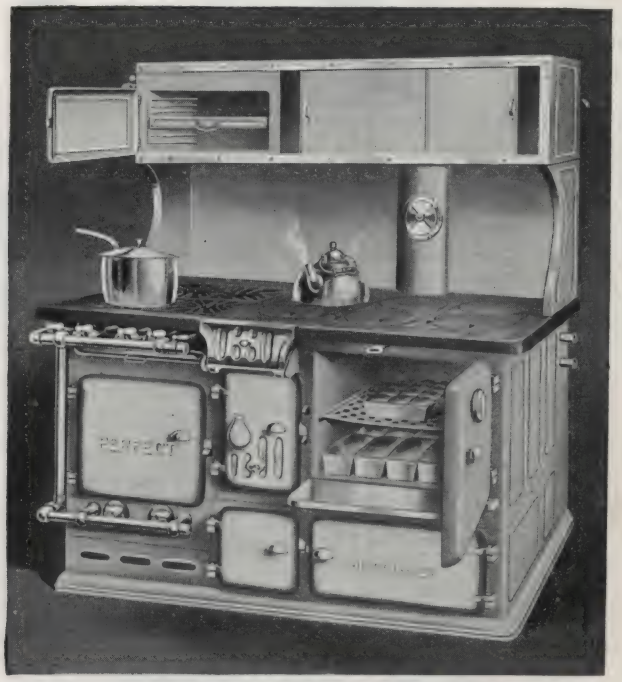
Colors of Enamel—This finish can be obtained in three different colors: Gray, blue and black. A color can thus be selected which will harmonize with any color scheme selected for the kitchen.

Types and Sizes—The illustrations below show four types of the ranges and how they are finished. These ranges are exactly the same as the ones illustrated on the previous pages, except for the enamel finish. In specifying, use the number of the regular range and add that it is to be in full enamel finish. All the ranges previously illustrated can be obtained in the enameled finish.

RICHARDSON "PERFECT" GRAND RANGE
Full enamel finish

RICHARDSON "PERFECT" SINGLE OVEN COAL RANGE
No. 448E and No. 658F. Full enamel finish

RICHARDSON "PERFECT" SINGLE OVEN COMBINATION COAL AND GAS RANGE
No. 88. Full enamel finish



RICHARDSON "PERFECT" DOUBLE OVEN COMBINATION COAL AND GAS RANGE
No. 428. Full enamel finish

Continued on next page

Richardson "Perfect" Gas Ranges

These ranges have been constructed with the idea of safety, durability and convenience. The construction provides the greatest amount of cooking surface with economy of space in the kitchen besides providing for all kinds of cooking.

The design is plain and easily kept clean. All the various parts are easily accessible; the corners are rounded and all surfaces smooth. The ovens and top cooking surface are at convenient heights.

The special oven burner lighter prevents explosions and renders the range absolutely safe.

The ranges are guaranteed to give satisfaction and that the full benefit of the gas is wholly utilized.

Every modern convenience for cooking with gas fuel is embodied in these up-to-date ranges and all have been indorsed by gas companies and institutes.

The 15-in., No. 152X, and the 18-in. ranges are not as expensive as No. 182X, and are illustrated in the order of their cost, the 15-in. being the cheapest range. No. 183E is considerably cheaper than No. 183X.

The 15-in. "Perfect" Single Oven Gas Range

This range may be supplied with three different finishes, as preferred: The full enamel No. 252, the semienamel No. 1152, and the standard finish No. 152E.

This range has a low baking and broiling oven and is without hood. It has a shelf top and space below the burners for extra dishes. It can be equipped with enameled oven doors, splash back, burner pan and broiler pan. It can also be equipped with glass oven door and thermometer.

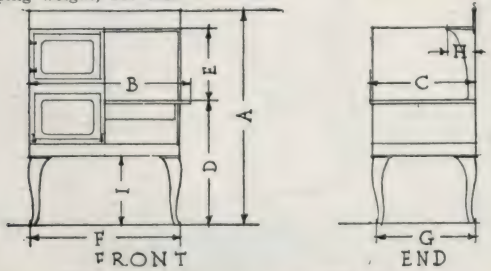
The 15-in. "Perfect" Single Oven Gas Range

The regular equipment includes 4 top burners, 3 full size burners and 1 giant burner.

It can be fitted for burning natural gas when ordered. Self-lighter can also be furnished.

Oven, in.	Broiler, in.	Cooking top, in.	Flue collar, in.	Gas connection, in.	No. of burners
15x18x13	15x18x13	23x22½	2¼x5	1	4

State whether right-hand or left-hand oven is required.
Simmering burner supplied when ordered.
Shipping weight, 215 lbs.



Dimension Diagram of the 15-in.

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.	H, in.	I, in.
54	40½	26	31	18	29½	23¼	7½	17

No. 152X "Perfect" Single Oven Gas Range

This range has semienamel finish and is sold complete, as illustrated. The range has baking and broiling oven, enameled broiler pan and lower tray. The broiling oven is on the level of the cooking top.

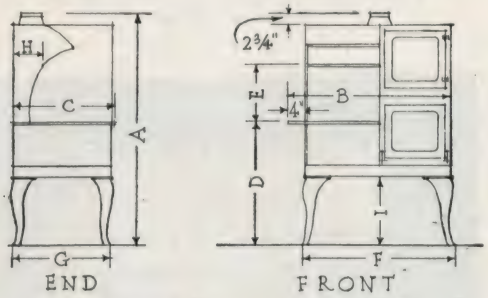
It has 4 top burners: 3 full size and 1 giant, and a simmering burner can be supplied if ordered. Self-lighter can be furnished at slight cost. The range can be furnished fitted for natural gas if ordered.

The end shelf is shipped with range unless otherwise specified.

No. 152X "Perfect" Single Oven Gas Range

Oven, in.	Broiler, in.	Cooking top, in.	Flue collar, in.	Gas connection, in.	No. of burners
15x18x12	15x18x10	23x22½	6	1	4

State whether right-hand or left-hand oven is required.
Simmering burner supplied when ordered.
Shipping weight, 225 lbs.



Dimension Diagram of No. 152X

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.	H, in.	I, in.
58¼	40½	25¾	31	14½	38	21	6½	13

The 18-in. "Perfect" Single Oven Gas Range

This range may be supplied with three different finishes, as preferred: The full enamel No. 282, the semienamel No. 1182, and the standard finish No. 182E.

This is the same type of range as the 15-in. except that the ovens, etc., are larger. It has the low upper oven and the broiler is below the level of the cooking top. It also has a shelf top. It is regularly equipped with enamel oven panels, splash back and side, burner pan and broiler pan. The enameled oven door can be equipped with thermometer or with glass door if desired.

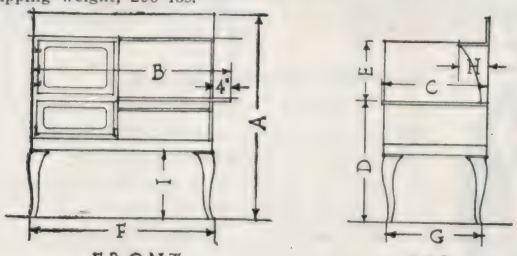
Range can be fitted for burning natural gas when ordered. Self-lighter is also provided.

Continued on next page

THE 18-IN. "PERFECT" SINGLE OVEN GAS RANGE

Oven, in.	Broiler, in.	Cooking top, in.	Flue collar, in.	Gas connection in.	No. of burners
18 x 18 x 13	18 x 18 x 9	29 x 33½	2¼ x 5	1	4

State whether right-hand or left-hand oven is required.
Shipping weight, 250 lbs.

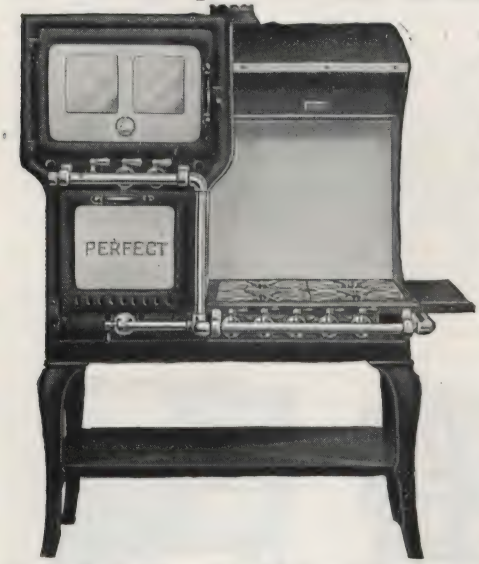


DIMENSION DIAGRAM OF THE 18-IN.

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.	H, in.	I, in.
51½	50	26¼	31	15	47½	25	7½	17½

No. 182X "Perfect" Single Oven Gas Range

This range takes up less floor space than the 18-in. and has the high baking and broiling ovens with the broiler on the level with the cooking top. The oven has glass door and thermometer. It also has canopy with shelf under it and an extra shelf under the range. Enameled splash back and side enameled burner pan and broiler pan.

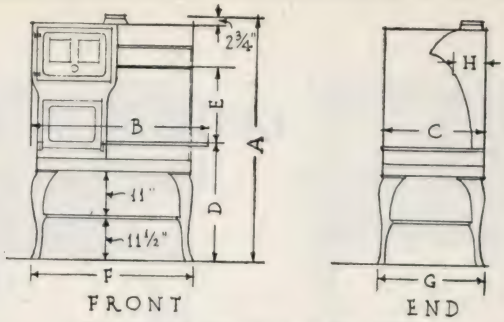


No. 182X "PERFECT" SINGLE OVEN GAS RANGE

The cooking top has 3 full size burners, and 1 giant burner. Range can be equipped for burning natural gas when ordered. Self-lighter can also be supplied.

Oven, in.	Broiler, in.	Cooking top, in.	Flue collar in.	Gas connection, in.	No. of burners
18x18x13	13x18x12	26½x22	6	1	4

State whether right-hand or left-hand oven is required.
Shipping weight, 300 lbs.



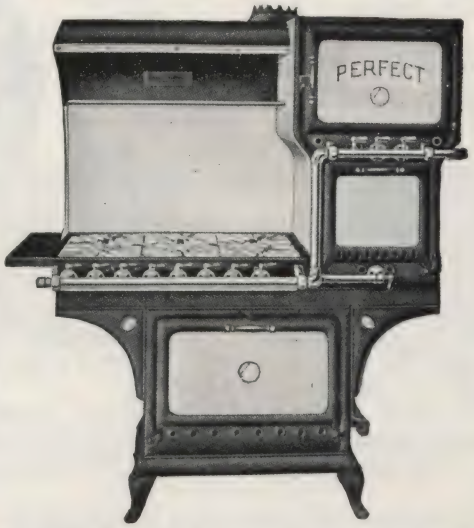
DIMENSION DIAGRAM OF NO. 182X

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.	H, in.	I, in.	J, in.
61⅞	45	25½	30	18½	40½	22½	8	11½	11

No. 183X "Perfect" Double Oven Gas Range

This is the largest range manufactured to occupy the smallest space. It is supplied equipped as illustrated with upper baking and broiling ovens, canopy and lower baking oven. Glass door and thermometer for upper oven and enameled panel door and thermometer are regularly furnished. Enameled splash back and sides, burner pan and broiler pan are furnished.

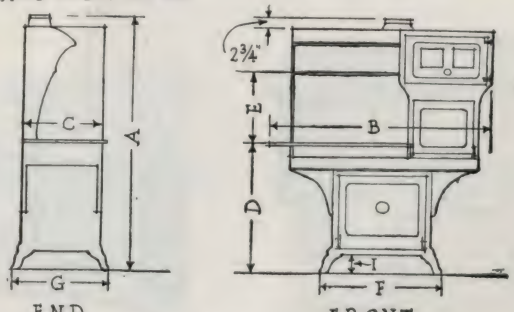
Range has 5 full size top burners, 1 giant burner and 2 simmering burners. Self-lighter can be furnished. Can also be equipped for burning natural gas.



No. 183X "PERFECT" DOUBLE OVEN GAS RANGE

Sizes of ovens. in.		Broiler, in.	Cooking top, in.	Flue collar, in.	Gas connection, in.	No. of burners
Lower	Upper					
22x18x13	18x18x13	13x18x12	35½x22	6	1	6

State whether right-hand or left-hand oven is required.
Shipping weight, 485 lbs.



DIMENSION DIAGRAM OF NO. 183X

A, in.	B, in.	C, in.	D, in.	E, in.	F, in.	G, in.	H, in.	I, in.
64⅜	55¼	25¼	33	18½	30	24	8	5⅜

GEORGE M. CLARK & COMPANY

DIVISION AMERICAN STOVE COMPANY

179 North Michigan Avenue
CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 209 West 43rd Street — SAN FRANCISCO, CAL., 86 Third Street, corner Mission
LOS ANGELES, CAL., Warehouse with BEACON LIGHT COMPANY

Products

GAS RANGES, SPECIAL STOVES for Domestic Science Schools.

Also Restaurant Stoves, Gas Hot Plates, Gas Circulating Water Heaters, Gas Ovens, Gas Appliances; Oil Stoves, Oil Water Heaters.

Clark Jewel Gas Ranges

Equipped with Lorain oven heat regulator they are made in many sizes and styles to meet the most exacting requirements of the modern kitchen where gas is available.

The Lorain oven heat regulator is a simple thermostatic control device that, by means of a temperature wheel, puts some 44 cooking temperatures at your command. As soon as a called-for temperature is reached that temperature is maintained until the wheel is moved. Assured accurate baking in place of guesswork is the result.

Long time, low temperature cooking permits placing a complete meal in the oven and then after cooking three to five hours without attention the meal is ready to serve.

The drudgery of potwatching is eliminated.

Lorain oven canning is so much simpler than the steam boiler and pressure cooking methods, that most of the bother of cold pack canning is eliminated.

The Lorain oven heat regulator cannot be added to a range originally made without it.

While most Clark Jewel ranges are Lorain equipped, we still make some ranges without this attachment.

CLARK JEWEL

LORAIN OVEN HEAT REGULATOR

TRADE-MARKS

Domestic Science Stoves

Domestic science schools are rapidly putting in Lorain equipped ranges to teach time and temperature cooking. We will be glad to have one of our salesmen call to discuss schoolroom layout.

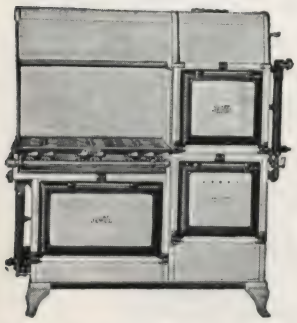
We have a folder showing special stoves for schools.

Details of Construction

The L624, L626, A688 and D234 Clark Jewel gas ranges are full porcelain enameled in white and black.

The A319, A318, A316, A314, A3144 and A3142 are equipped with white porcelain enameled splasher and top lighter. All of these ranges but the A319 also come in semiporcelain finish having white porcelain enameled oven top, high shelf, back roll and white legs, and are numbered A338, A336, A334, A3344 and A3342.

A complete line of white and black enameled ranges in the same sizes as above ranges, with smooth unpanelled door frames white enameled as are legs and body, with black porcelain enameled front, cooking top and side shelf and dark enameled linings. These ranges are numbered A639, A638, A636, A634, A6344 and A6342.



No. L624. Lorain

No. L626. Lorain

No. A688. Lorain

No. A588. Lorain Left Oven

CLARK JEWEL GAS RANGES, LORAIN EQUIPPED

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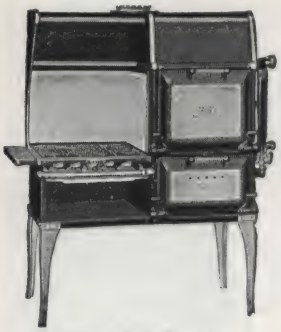


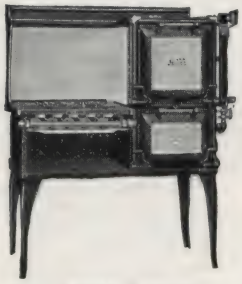
No. A319 Lorain

No. A338 Lorain

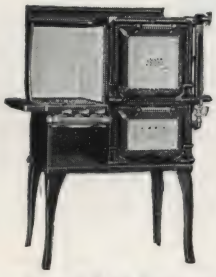
No. A336 Lorain

No. A334 Lorain

No. A318 Lorain



No. A3144 Lorain



No. A3142 Lorain

No. A638 Lorain

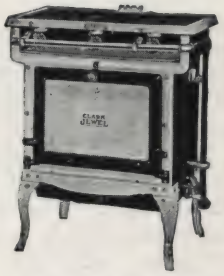
The ovens of all these ranges are 14 in. high and 20-in deep. This gives large capacity, even with the A314 series with ovens 14½ in. wide. All cabinet ranges can be had with oven on right (regular) or left of cooking top.

¾-in. gas supply should be provided for all ranges listed below except Nos. L624 and L626 which should have 1-in. supply.

Catalogue

Catalogues and folders will be sent on request.

No. E230 Duplex Cooker



No. D234 Duplex Cooker

DATA, CLARK JEWEL GAS RANGES

Adaptable for	Stove No.	Size of cooking top, in.			Number of top cooking openings	Oven sizes, in.			Floor space, in.		Height, in.
		Wide	Deep	High		Wide	Deep	High	Wide	Deep	
Large families	L624	31	21½	32½	6	24	Lower oven 19½	14	62½	27	60½
						16	Upper oven 19½	14			
	L626	24	21½	32½	4	20	Lower oven 19½	14	53	27	51
						16	Upper oven 19½	14			
Average family	A688	22¼	21½	32¼	4	18½	20	14	53	27	52
	A588	22¼	21½	32¼	4	18½	20	14	53	27	52
	A319	22½	23	32	4	18½	20	14	53½	27	60
	A318	22½	23	32	4	18½	20	14	53½	27	52
	A336	22½	23	32	4	16½	20	14	51½	27	52
	A338	22½	23	32	4	18½	20	14	53½	27	52
	A638	22½	23	32	4	18½	20	14	53½	27	52
Smaller families and smaller space	A334	22	22½	32	4	14½	20	14	49½	27	52
	A3144	19½	22½	32	4	14½	20	14	43	27	52
	A3142	13	22½	32	2	14½	20	14	40	27	52
Kitchenette	E230	28	13½	32	3	18½	14	13	28½	18½	32¾
	D234	28	13½	32	3	18½	14	13	28½	18½	32¾

WILLIAM M. CRANE COMPANY

Manufacturers of Gas Ranges and Appliances

TELEPHONE
LONGACRE 4220

16-20 West 32nd Street
NEW YORK, N. Y.

CABLE ADDRESS
"VULCAN, NEW YORK"

PACIFIC COAST DISTRIBUTERS: NORTHWEST GAS & ELECTRIC EQUIPMENT CO., PORTLAND, ORE.

BRANCH OFFICES
LOS ANGELES, CAL. SAN FRANCISCO, CAL. SEATTLE, WASH.

VULCAN
TRADE-MARK

Products

VULCAN GAS RANGES.

Also manufacturers of Circulating and Tank Storage Water Heaters, Bakers' Ovens, and Doughnut Stoves, Confectioners' Furnaces, Broilers, Toasters, Griddles, Waffle Irons, and Industrial and Illuminating Burners—for natural and manufactured gas.

Experience and Service

Forty years of experience in the design and manufacture of gas burning appliances have resulted in the Vulcan line, which is standard all over the world. This experience enables the Crane engineers to be of the greatest assistance to architects and builders in their proper selection and installation of gas ranges to meet both cooking requirements and building regulations.

This experience and service is at the disposal of those interested in building.

Vulcan Smoothtop Compact Cabinet Gas Range

These ranges, due to their compact design, occupy about half the floor space required by an ordinary range of equal cooking capacity, thus saving space in kitchens.

Below is shown a comparison of size between a six-burner open top range and the No. 441 Smoothtop (3 burners) which actually has more room for cooking top surface than the larger range. This is typical Smoothtop compactness.

Important Features and Improvements—*(1) Construction*—Smoothtop construction, workmanship and finish are superior throughout. Materials are of highest quality and heavier than ordinarily used in gas ranges.

(2) Closed Top—Makes possible the great cooking utility which is the dominating feature of Smoothtop design. Entire top surface is available for cooking, permitting a great reduction in size of range without sacrificing cooking capacity.

(3) Height of Top—Height of Smoothtop (38 in.) eliminates tiresome backbending. This is an important improvement since 75% of all cooking is done on the top.

(4) Saving of Gas—Heat, supplied by star burners set in front, passes back to the flue, bringing entire top to cooking temperature; this utilizes heat that is ordinarily wasted. When top is thoroughly hot, one or two burners may be shut off; economy in gas naturally results.

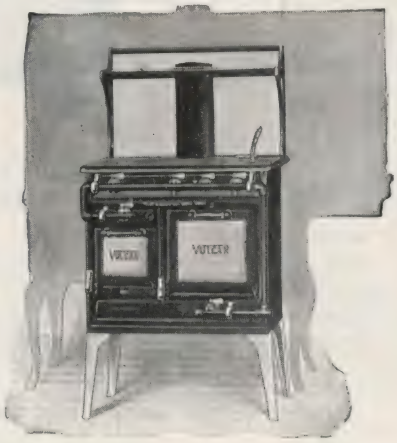
(5) Oven Capacity—The oven of the Smoothtop being very deep, its capacity is equal to that of the open type of range of the same cooking capacity.

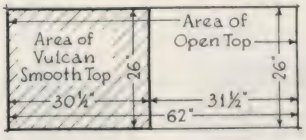
(6) Ease of Cleaning—Any size vessel may be used and shifted at will and the closed top protects the burners from drippings. The smooth sides, absence of projecting parts and corners, and the superior baked japan finish never needing stove polish, makes cleaning as easy as wiping dust from a table.

Sizes—Four sizes, Nos. 444, 440, 441, 442, to fit every kitchen and every kitchen need. Detailed dimensions are given on next page. Write for catalogue showing models with roll top warming closet and canopy hood.

Specifications—Furnish and set complete, with all gas and flue connections (when necessary), Vulcan Smoothtop Gas Ranges as manufactured by the WILLIAM M. CRANE COMPANY, 16-20 West 32nd Street, New York, N. Y., in accordance with the following schedule; (here mention type of range and location).

How Sold—Vulcan Smoothtop cabinet ranges may be ordered through our local agent or dealer. In localities where we have no dealer, arrangements can be made to supply your needs.

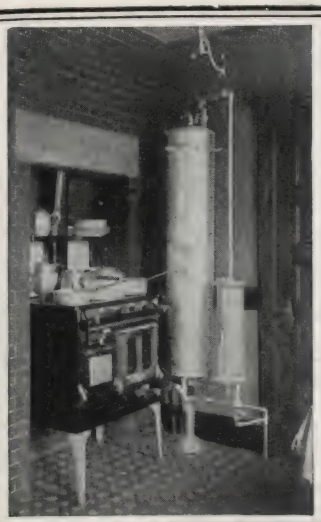




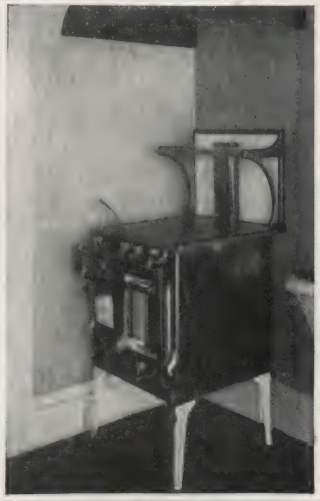
PLAN

NOTE – A saving of 31½" in width is obtained by use of Smooth Top Ranges.
By making provision for these ranges in kitchen layout, considerable space is available for other equipment.
The range may be recessed to advantage effecting even greater saving of space.

COMPARISON OF OPEN TOP AND SMOOTH TOP RANGE OF SAME COOKING CAPACITY



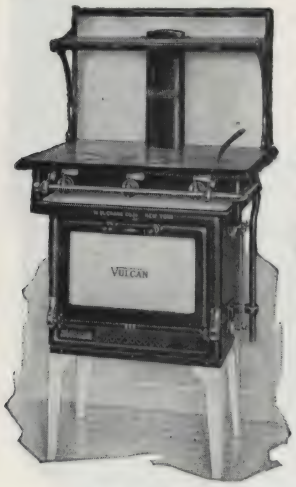
VULCAN SMOOTH TOP RANGE INSTALLED IN KITCHEN OF RESIDENCE



VULCAN SMOOTH TOP RANGE INSTALLED IN KITCHEN OF APARTMENT

Continued on next page

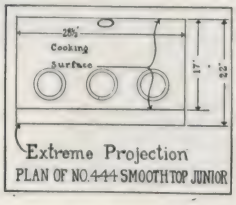
Vulcan Smoothtop Compact Cabinet Gas Ranges



No. 444
(Pat., other Pats. Pend.)

No. 444 Smoothtop Junior—*Description*—For small kitchens, kitchenettes. Equal in every respect to the most expensive cabinet. Closed top heated by 3 burners across front—2 regular burners and simmering burner in center. Oven equipped with both baking and broiling burners.

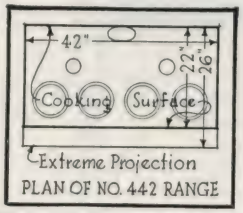
Equipment — White enamel high shelf, door panel, and broiler pan; black japan body finish inside and out; white legs.



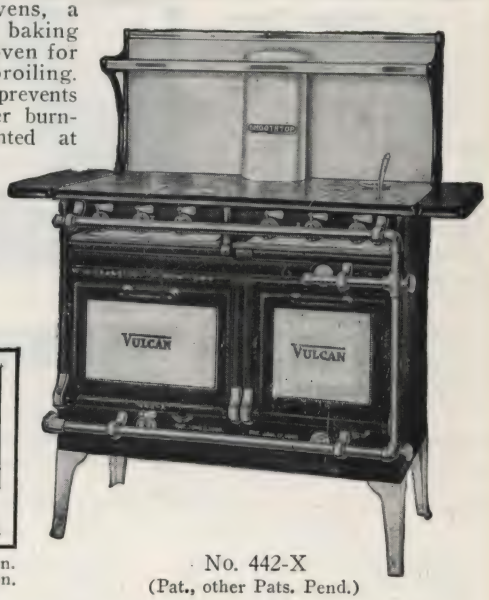
Oven and broiler
18x12½x12 in.

All manufactured gas ranges equipped with automatic lighters. Two ovens, a large one for baking and a duplex oven for baking and broiling. Safety device prevents oven and broiler burners being lighted at same time.

Equipment—White enamel high shelf, burner tray, door panels, broiler pan and flue pipe; black japan body finish inside and out; white legs.



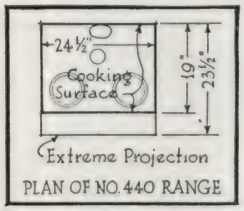
Small oven, 14x18x12½ in.
Large oven, 18x18x12½ in.



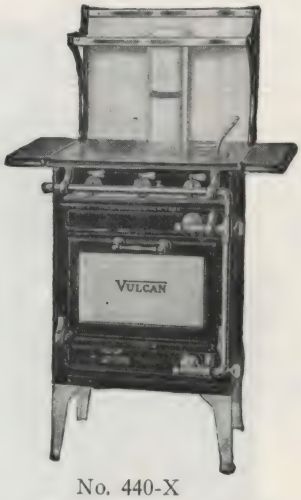
No. 442-X
(Pat., other Pats. Pend.)

No. 440-X—*Description*—A large capacity range for small kitchens. Duplex oven and broiler, safety device prevents oven and broiler being lightened at same time. Closed top heated by 2 regular burners in front, junior burner in back for simmering purposes. Manufactured gas ranges equipped with automatic burner lighter.

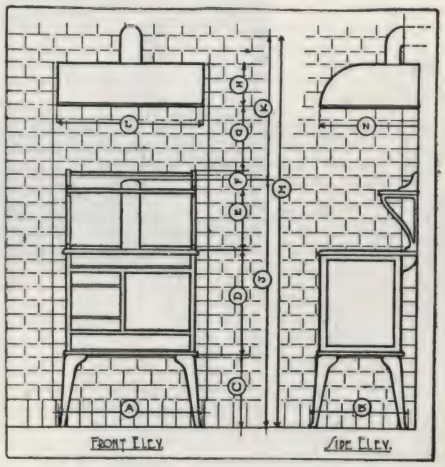
Equipment—White enamel high shelf, burner tray, door panels, broiler pan and flue pipe; black japan body finish inside and out; white legs.



Oven and broiler, 18x14x12½ in.



No. 440-X
(Pat., other Pats. Pend.)



DIMENSION DIAGRAM OF RANGES

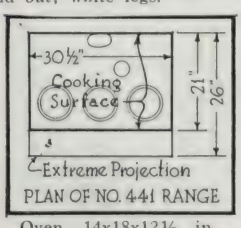
RANGE NUMBERS

Dimensions	444	440X	441X	442X
	in.	in.	in.	in.
A	28½	24½	30½	42
B	21	24	26	26
C	13	10	13	10
D	23	28	25	28
E	13	13	13	13
F	3½	3½	3½	3½
G	16	16	16	16
H	11½	11½	11½	11½
J	50½	52½	52½	52½
K	37½	37½	37½	37½
L	36	28	36	45
M	90	90	90	90
N	27	27	27	27

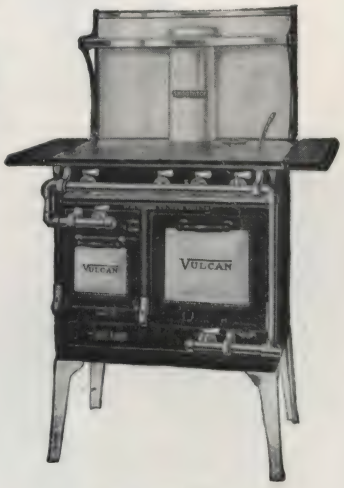
Note: The dimensions of the ranges illustrated on this page, and as listed in the above chart do not include end shelves. When end shelves are supplied, add 10 in. to dimension "A."

No. 441-X—*Description*—Suitable for average size families. Top will hold 6 or more vessels. Closed top heated by 3 star burners in front and 1 junior burner in back. All manufactured gas ranges equipped with automatic lighter.

Equipment — White enamel high shelf, burner tray, door panels, broiler pan and flue pipe; black japan body finish inside and out; white legs.



Oven, 14x18x12½ in.
Broiler, 9x18x8½ in.

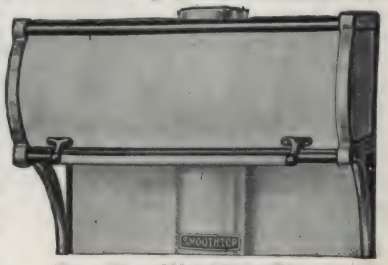


No. 441-X
(Pat., other Pats. Pend.)

No. 442-X—*Description*—Largest of the smoothtop series. Has more actual top cooking capacity than the average 8-burner top range. Closed top heated by 4 star burners in front and 2 junior burners in back for simmering purposes.

Roll Top Warming Closet

A roll top warming closet is a great convenience. It is heated by the waste heat. In it dishes can be warmed and food kept hot while waiting to be served. It is especially useful on the Vulcan Smoothtop compact cabinet gas range. The beautiful white enamel door and sparkling nickel add greatly to the attractiveness of kitchens.

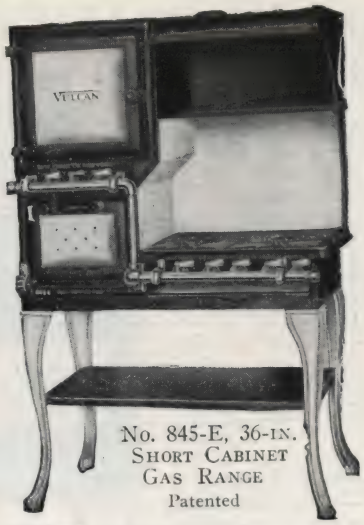


ROLL TOP WARMING CLOSET

Continued on next page

Representative Types of Vulcan Open Top Cabinet Gas Ranges

No. 845-E, 36-in. Short Cabinet Range—36 in. wide. Full size cooking top fitted with 4 burners; 3 regular, 1 giant, and simmering burner; spacious oven and broiler; interiors finished in baked aluminum. Can be supplied with "right oven" if preferred. Height to flue collar, 56½ in.



No. 845-E, 36-IN. SHORT CABINET GAS RANGE
Patented

DIMENSIONS

	Wide	Deep	High
Oven, in.	14	18	14
Broiler, in.	12	18	9
Cooking top, in.	21½	21½	29½
Floor space, in.	36	25	

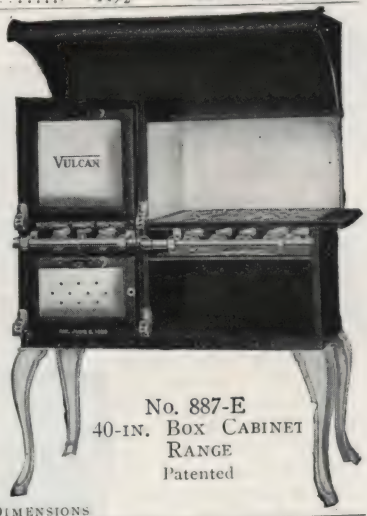
No. 968-SE Box Cabinet Range—Spacious cooking top fitted with 4 top burners: 3 regular, 1 giant, and a simmering burner. Oven is large; broiler large and efficient; interiors finished with baked aluminum. Height to flue collar, 49½ in.

No. 968-SE
BOX CABINET RANGE
Patented

DIMENSIONS

	Wide	Deep	High
Oven, in.	18	18	14
Broiler, in.	18	18	9
Cooking top, in.	22	21	33¾
Floor space with end shelf, in.	47	25	
Floor space without end shelf, in.	44½	25	

Vulcan No. 887-E, 40 in. Box Cabinet Range with Canopy Hood—A canopy hood with flue collar permits flue connection, making this an ideal range for apartment house kitchens; can be set in space 40 in. wide; has large oven and broiler ample in capacity for most roasting and baking requirements; interiors finished in baked aluminum. Full size cooking top fitted with 4 burners: 3 regular, 1 giant, and a simmering burner. Height 59½ in. over all.



No. 887-E
40-IN. BOX CABINET RANGE
Patented

DIMENSIONS

	Wide	Deep	High
Oven, in.	14	18	14
Broiler, in.	14	18	9
Cooking top, in.	22	21	33¾
Floor space with end shelf, in.	42½	25	
Floor space without end shelf, in.	40	25	

Vulcan Heavy Duty Ranges

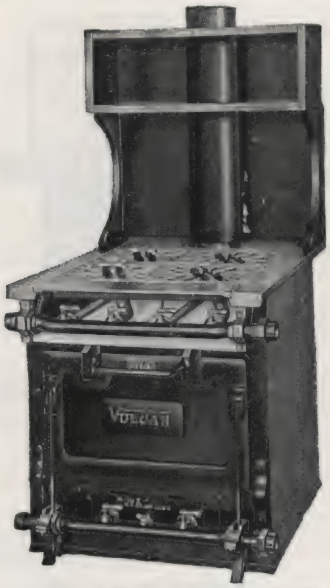
For hotels, hospitals, restaurants, schools, clubs or wherever large quantity cooking is done.

Two types of heavy duty ranges can be supplied. The heavy type for the big hotel, restaurant and hospital and a similar design, smaller in size for small places.

Vulcan ranges of this type can be supplied with closed or open top to meet every cooking need.

Economical Operation—Entirely enclosed top is equipped with removable rings over a powerful 4-ring burner which when lighted rapidly produces a redhot spot.

No. 1751 HOTEL RANGE WITH No. 784 HIGH SHELF



No. M745 HOTEL RANGE WITH No. 784 HIGH SHELF

Special flue construction, together with heavy fire bricks surrounding burner, utilize all the heat and raise the entire top to a cooking temperature.

As each ring has a separate cock a cooking temperature can be maintained with one or more rings shut off.

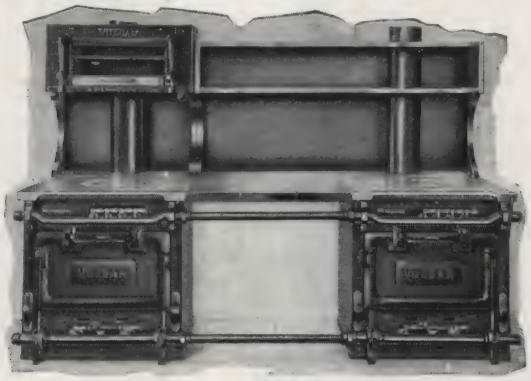
Most operators find they can do much of their work with from 15 to 40 cu. ft. of gas per hour due to great flexibility of control. This, together with the fact that only 96 cu. ft. of gas per hour is consumed by the heavy type with all rings going and 60 to 72 cu. ft. by the smaller type, means great economy in gas.

Attachments—Broilers and high shelves which are interchangeable are furnished as required.

No. M872 RESTAURANT RANGE WITH No. 783 HIGH SHELF

Continued on next page

Below is shown one of the innumerable combinations of Vulcan ranges that can be made to fill every cooking need. Blue prints will be furnished recommending the types and combinations of ranges that will best fill cooking requirements. This service is free.



A Combination of Vulcan Ranges and Spreader Plate

7½ ft. of working surface consisting of two No. 1751 Ranges, one 30½-in. spreader plate, one No. 784 high shelf, and one No. 788 salamander broiler.

This combination gives 7½ ft. of working surface with 2 fires, 2 ovens, salamander broiler and high shelves. It will handle a tremendous amount of work and the spreader plate saves the cost of an additional section.

Vulcan Service

This Company manufactures heavy duty ranges for large installations and maintains a service department, which furnishes architects and builders, free of charge, with advice as to the proper equipment to do the cooking required. This service includes the assistance of the Company's service men and the furnishing of layouts covering the complete kitchen equipment necessary for large installations. Early consultation will enable the architect to get the most value out of this service.

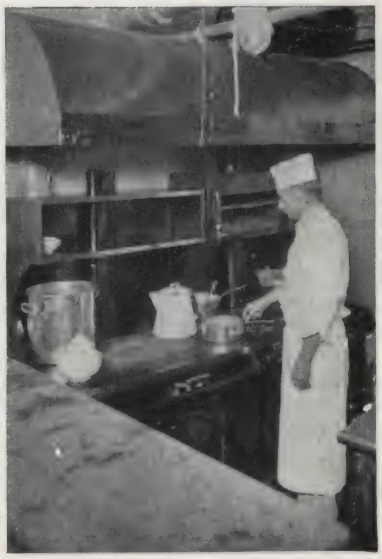
Catalogues

Catalogues covering the complete Vulcan line or any particular Vulcan product will be gladly sent on request.

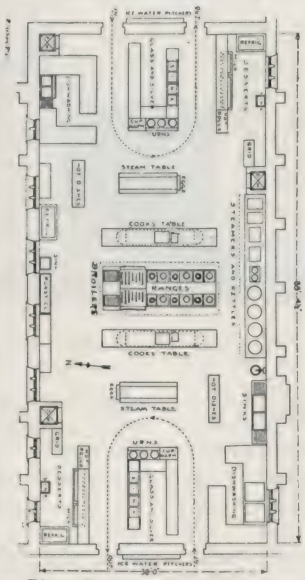
Prominent Installations

Following are a few prominent installations of Vulcan gas appliances:

Hotel McAlpin
Hotel Martinique
Providence-Biltmore Hotel
Westchester-Biltmore Hotel
Hotel Bellevue-Stratford
Princeton University
New York Athletic Club
Union League Club
Fifth Avenue Hospital
Bellevue Hospital
Mt. Sinai Hospital
Overbrook Hospital
Jersey City Hospital
Smith College
Simmons College
General Electric Company
Worthington Pump Works



Ambassador Restaurant, Newark, N. J.



Floor Plan—Princeton University Kitchen Equipped with Vulcan Ranges

Ox-Weld Acetylene Co., Newark, N. J.

City Hospital, Jersey City, N. J.

Robert Treat Hotel, Newark, N. J.

Typical Installations of Vulcan Heavy Duty Gas Ranges

FRANK S. BETZ CO.

All-steel Standard Kitchen Cabinets

HAMMOND, IND.

CONTRACT DEPARTMENT AND SALES ROOMS: CHICAGO, ILL., 30 East Randolph Street—Telephone, Central 6040.
NEW YORK OFFICE: 6-8 West 48th Street—Telephone, Bryant 6142

Product

BETZCO ALL-STEEL STANDARD "KITCHUNITS."

For Medicine Cabinets, see page 1636; for Steel De Luxe Radiator Covers, see page 1731.

Betzco "Kitchunits"

Convenience and cleanliness are two essentials of the modern home kitchen. To these should be added compactness, which, while adding convenience, also adds economy in the building of apartments and bungalows. "Kitchunits" appeal alike to architect, builder, owner and, most important, to the tenant. Built sturdily of heavy gauge furniture steel, finished in durable, washable enamel and correctly designed, "Kitchunits" are economical, not alone in initial cost but through years of exacting service.

Standardized manufacture, in what is probably the largest factory of its kind, enables us to successfully produce these standard kitchen installations at exceptionally reasonable prices and at a maximum speed.

Why "Kitchunits" Should Be Specified

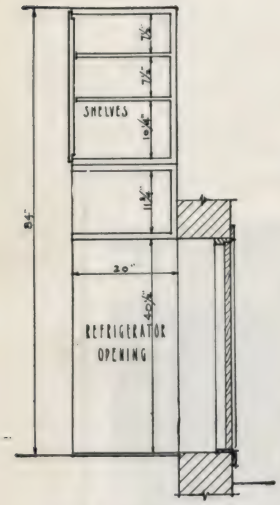
Modern living conditions demand economy and compactness. The natural outcome is the kitchenette apartment or bungalow. From ordinary wood cupboards developed the more efficient and durable steel kitchenettes, which, in turn, were improved and modified until the Betzco "Kitchunits" were designed, representing the final word in modern sanitary kitchenette equipment.

"Kitchunits" are made in definite units, which can be combined in convenient arrangements or installed singly. The unit idea not only adds materially to economy in manufacture, but also greatly simplifies the work of the architect and the cost of installation.

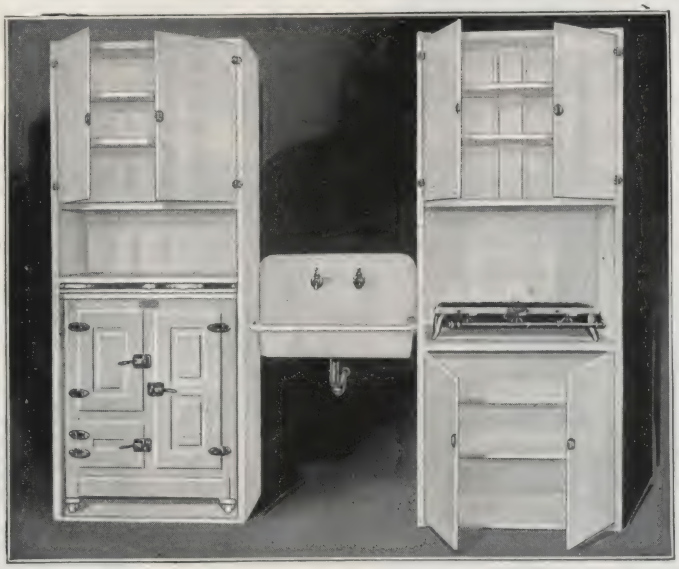
"Kitchunits" are made throughout of heavy gauge furniture steel, welded into a single, solid piece rigid and strong through long years of service and without cracks and crevices for vermin and dirt. The units are finished in washable enamel, oven baked after each coat, giving a durable finish that is easily kept clean and spotless.

The satisfaction of the user is the ultimate test of every device. Thousands of owners have found that "Kitchunits" satisfy and please their tenants and make their apartments easier to lease. Such indorsement combined with the moderate cost and superior construction make "Kitchunits" the logical choice of discriminating architects, builders and owners.

The fact that Betzco "Kitchunits" are made in four different style units, each identical in over-all dimensions, makes them readily interchangeable and per-



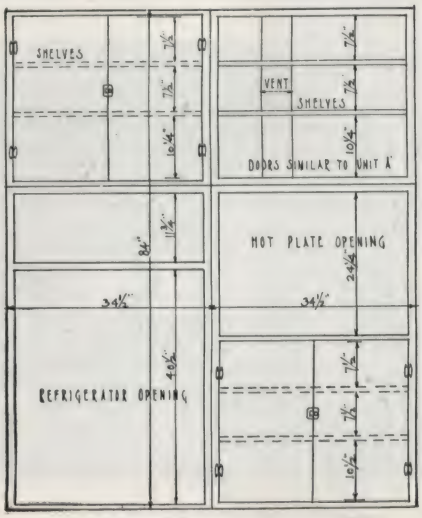
Section of Unit "A"



Unit "A" Unit "B"

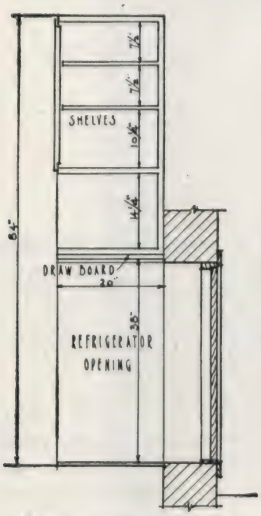
Section of Unit "B"

BETZCO ALL-STEEL STANDARD "KITCHUNITS"

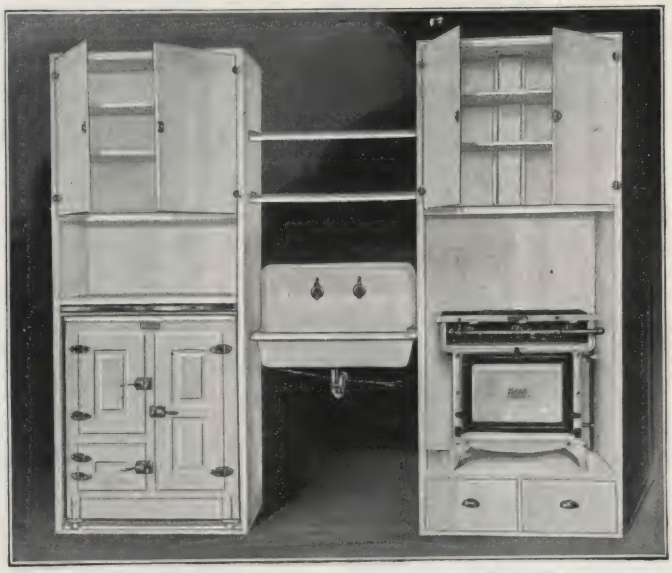


DETAIL OF UNITS "A" AND "B"

Continued on next page



Section of Unit "C"


Unit "C" Unit "D"

Section of Unit "D"

BETZCO ALL-STEEL STANDARD "KITCHUNITS"

mits the combination of any number of units, according to available space and requirements.

Estimates or further details gladly furnished.

General Specifications

Size—Over-all dimensions, 84 in. high, 34½ in. wide, 20 in. deep.

Material—Furniture steel, specially rolled, all joints welded.

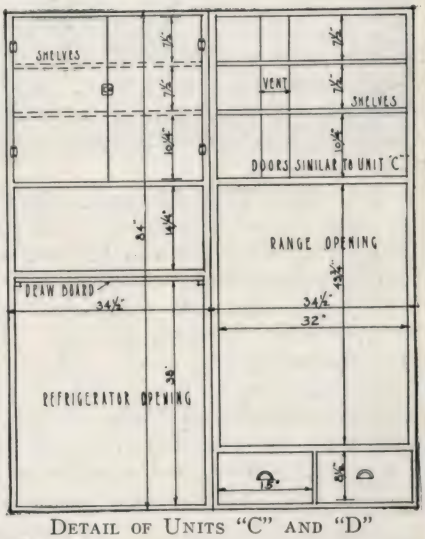
Finish—Washable enamel, pressure coated, oven baked after each coat.

Unit Specifications

Refrigerator Unit "A"—Upper cabinet 29¼ in. high, for groceries—2 shelves; bottom shelf 10½ in. high accommodates milk bottle; other two openings each 7½ in. high. Middle opening 11¾ in. high, for bread, sugar and spice containers. Refrigerator opening 40½ in. high, accommodates refrigerators made by Belding-Hall Co., Belding, Mich., and other manufacturers. Can be made with opening in back for outside icing.

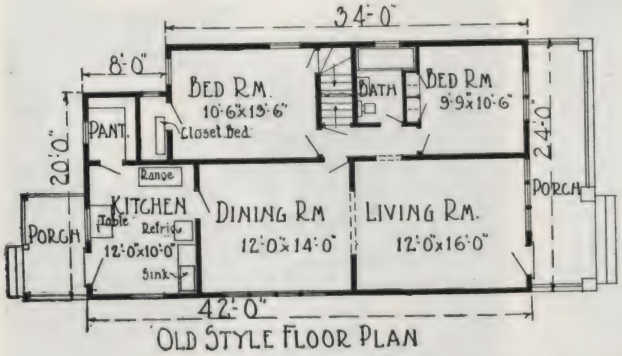
Gas Plate Unit "B"—Upper and lower cabinets have same dimensions as upper cabinet in Unit "A" for dishes, pots and pans. Hot plate opening 24¼ in. high, properly insulated. Flue extending through upper cabinet provides ventilation and carries off smoke and odors.

Refrigerator Unit "C"—Upper cabinet has same dimensions as in unit "A." Middle opening 13½ in. high. Below this is drawboard full width and depth of unit, covered with nickeloid. Refrigerator opening 39 in. high. Can be left open for outside icing.

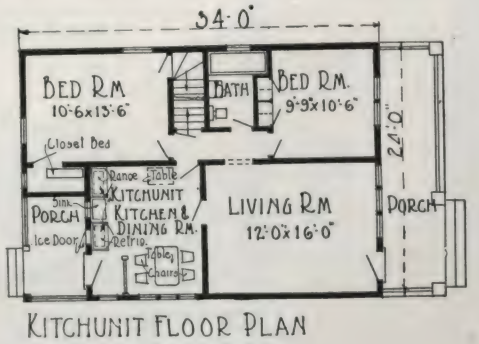


DETAIL OF UNITS "C" AND "D"

Gas Range Unit "D"—Upper cabinet has same dimensions as in unit "C." Middle opening for range 43¾ in. high, 32 in. wide, 19½ in. deep, with insulated walls. Accommodates Geo. M. Clark & Co.'s special range and other marks. Two drawers at bottom 8½ in. high, 15 in. wide, 19 in. deep. Flue extending through upper cabinet provides ventilation and carries off cooking odors. Estimates or further details gladly furnished.



OLD STYLE FLOOR PLAN



KITCHUNIT FLOOR PLAN

SHOWING SAVING IN FLOOR SPACE WITH "KITCHUNIT"

ENAMELED STEEL PRODUCTS CORPORATION

Majestic Built-in Kitchens and Equipment

FACTORY AND GENERAL OFFICE
4223-4231 Belle Plaine Avenue
CHICAGO, ILL.

Products

MAJESTIC STEEL KITCHEN EQUIPMENT comprising: Majestic Built-in Steel Kitchens (patents pending) and Steel Kitchen Cabinets.

TRADE-MARK

Majestic Steel Kitchen Equipment

Majestic equipment lends itself to many useful combinations and arrangements. Made for large, medium, or small capacity kitchens. Side and rear icing and service doors furnished if desired.

All of the Majestic kitchens are made of sheet steel, electrically welded, and finished in either white, ivory or battleship gray enamel, baked on.

The greater convenience and utility, together with the space saving possibilities, are more than enough to pay for the entire equipment. Its sanitary features, abundance of shelf area and exclusive conveniences, together with the durability, appeal to both builders and users.

No. 2325-WR Majestic Steel Kitchen—This type (Fig. 1) is made up of a stove and a refrigerator section, either of which may be purchased separately and installed independently of the other. In the arrangement shown, the sink (furnished by the builder) is placed between the two sections, with the drain and utility shelves directly above. The stove section is 32½ in. wide, 82¾ in. high and 18 in. deep, and is equipped with the Majestic ventilating device which, when connected with the ventilating flue in the building, draws off all cooking odors and superfluous heat.

The stove compartment is insulated by means of double steel walls with dead air space between and in addition a lining of asbestos. The stove, which is of special design manufactured for this company, is equipped with one giant and two single burners on top. The oven is 18½ in. wide, 14 in. deep and 13 in. high.

The refrigerator section is 32½ in. wide, 82¾ in. high and 18 in. deep. This section is equipped with a standard refrigerator having an ice capacity of 60 lbs. The insulation is dead air, obtained by the use of mineral felt, a combination of mineral wool, asbestos and hair felt. The provision chamber is finished in odorless white enamel. Box is equipped with removable drain pipe and air trap, and the hardware throughout is heavy brass, nickelplated.

No. 1325-WR Majestic Steel Kitchen—Consists of a standard stove unit (Fig. 2) exactly the same as furnished with the No. 2325-WR type together with a wall refrigerator, which is attached to the wall above the sink (sink furnished by builder).

Outside dimensions of refrigerator: 26 in. wide, 24 in. high and 13 in. deep. Provision chamber is 12½x19x10 in., finished in odorless white enamel. Ice capacity 30 lbs.

No. 325 Majestic Cabinet—This unit (Fig. 3) has 3 shelves in the top, 32½ in. wide and 18 in. deep; also a large cupboard in the base with two shelves of the same size. Outside dimensions: 32½ in. wide, 18 in. deep, and 82¾ in. high. Where greater cupboard space is desired, one or several units of the No. 325 kitchen cabinet may be installed with a standard full size No. 2325-WR Majestic steel kitchen (Fig. 4).

FIG. 1. No. 2325-WR MAJESTIC STEEL KITCHEN

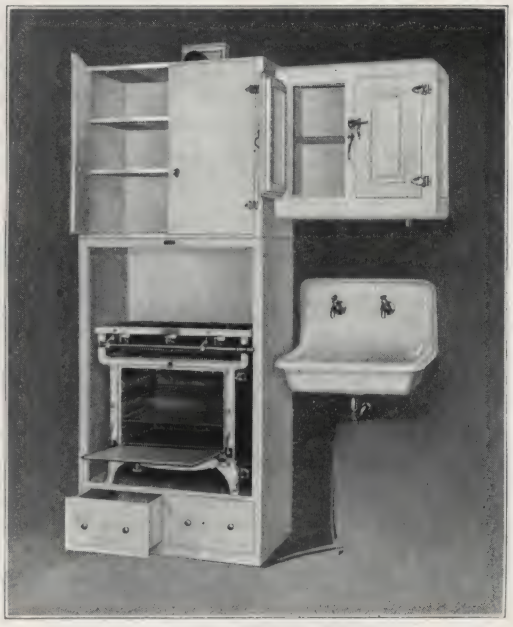


FIG. 2. No. 1325-WR MAJESTIC STEEL KITCHEN

Continued on next page

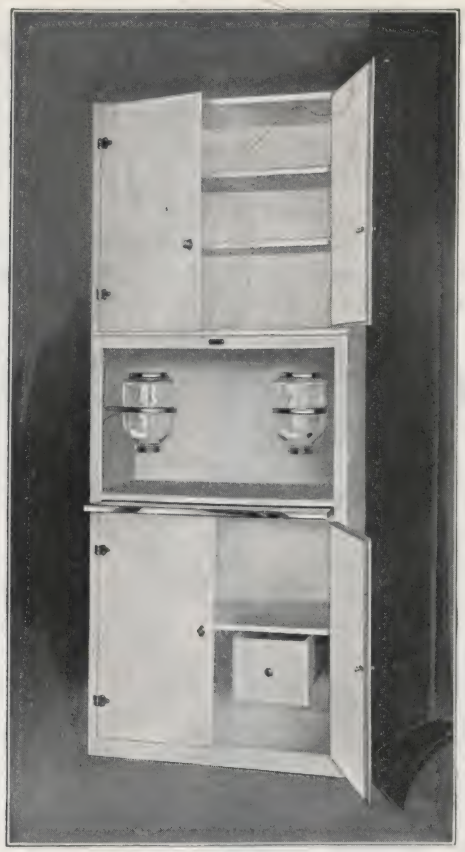


FIG. 3. No. 325 MAJESTIC KITCHEN CABINET

Specification Data

Detailed specifications covering units for right-hand front icing, right-hand and left-hand end icing, right-hand and left-hand rear icing, also data for location of refrigerator drain, gas and ventilator connections, sent on request.

Catalogue

Ask for catalogue of Majestic steel medicine cabinets and steel broom cabinets.

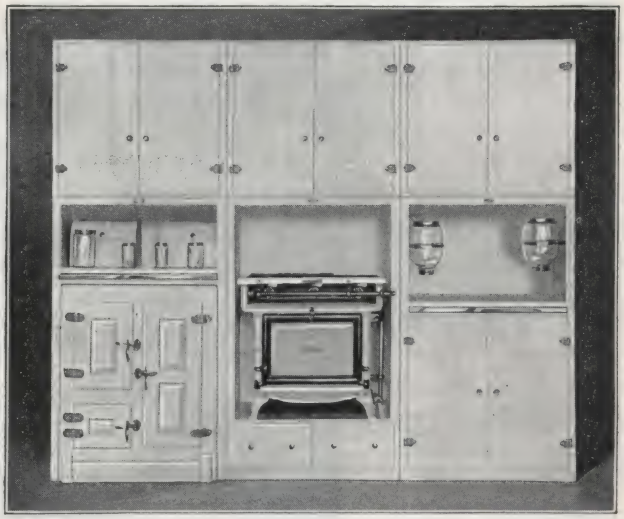
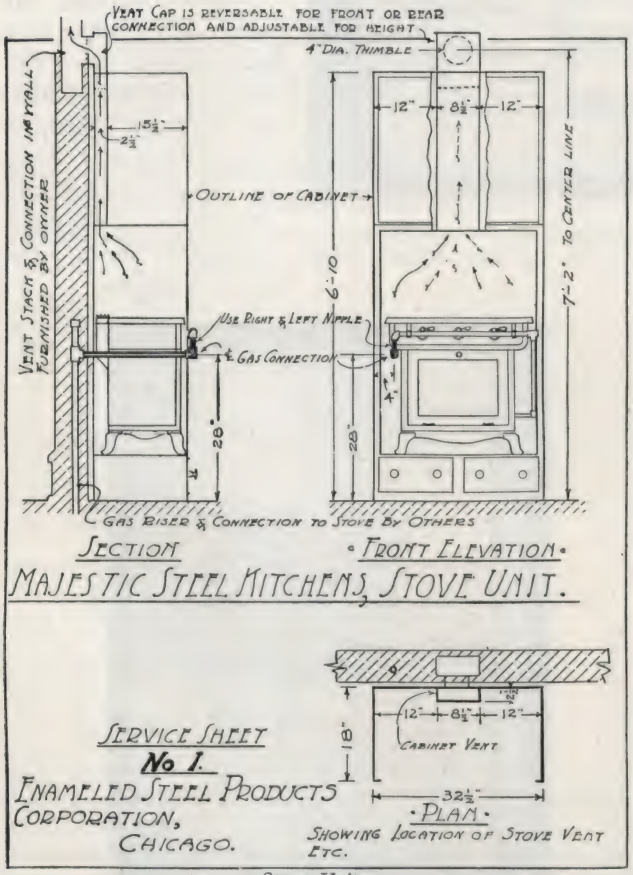
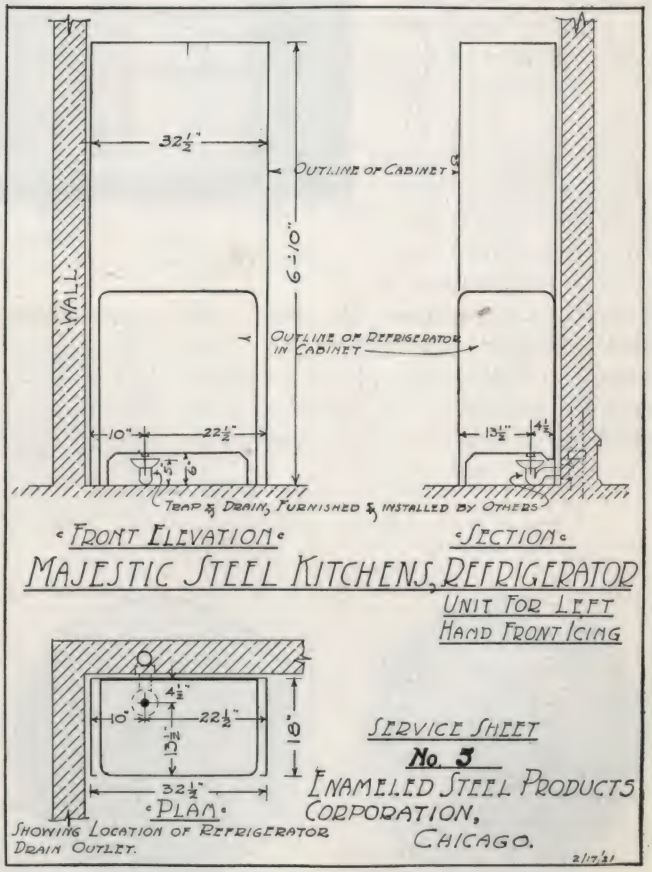


FIG. 4. No. 2325-WR MAJESTIC STEEL KITCHEN WITH No. 325 MAJESTIC KITCHEN CABINET



Stove Unit



Refrigerator Unit for Left-hand Front Icing
(Reverse figures for right-hand front icing)

DETAILS OF MAJESTIC BUILT-IN STEEL KITCHENS

LA GRANGE FIXTURE CORPORATION

Manufacturers of "Kozy-Kitch" Cabinets

LA GRANGE, IND.

SALES AGENCIES IN ALL LARGE CITIES

Product

KITCHENETS for apartment buildings, homes and housing developments.

Description

Refrigerator and three-way service. Made in rights and lefts—either rear or end icing—white enameled inside and out. Made entirely of wood—five-ply laminated stock, and trimmed with handsome heavy nickelplated hardware. More efficiency in 5 ft. of space than any cabinet ever offered to the trade.

A Few Points of Merit

11-piece set crystal glass spice jars. 25-lb. capacity flour bin. Metal receipt holder. Wire cookbook holder. Removable bread or meat board. Large spacious drawers. Linen drawer. Cutlery drawer. Silverware tray. Utility drawer. Bread and cake drawer. Compartment for pans, pots and kettles. Doors—1-piece lap construction. Plenty of storage capacity. Roll curtain which disappears when in use—complete closure. Two 5-in. shelves for extra storage. Garbage, deposited in front, taken out by janitor at rear. Groceries, deposited in rear, taken out by housewife in front. Large swinging glass sugar bin. Porcelain pull out table, 25x40 in., removable to clean. 60 lbs. ice capacity. Refrigerator, iced from front, rear or end. Wire shelves in provision chamber which insures perfect circulation of air. Heavy insulation in all walls of refrigerator. Large size lift door easy access to drain. Refrigerator tray easily cleaned.

MODEL "A" OPEN

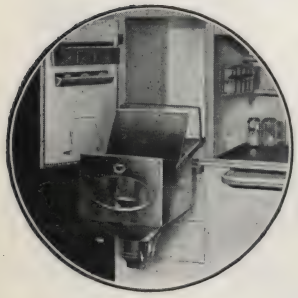
Outside dimensions: 5 ft. long, 20 in. deep, 6 ft. 6 in. high. Shipping weight, 575 lbs.

Economy

A saving in building cost can be made by condensing the kitchen plans.

Sanitation

For reasons of sanitation, efficiency and safety, we claim that no cabinet, no matter of what material, should contain a stove or sink—consequently we show no such arrangement in our plans given herewith.



FLOUR BIN READY TO FILL

42-IN. IRONING BOARD ATTACHED

MODEL "A" CLOSED

Continued on next page

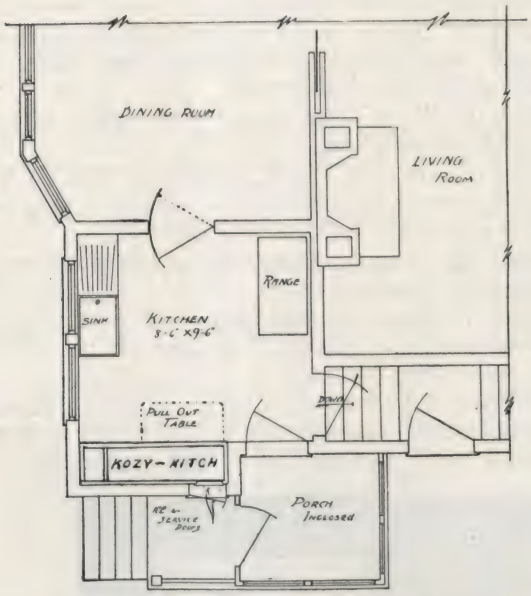
Model "B" Kozy-Kitch

Same style as model "A" with still more efficiency. By adding 1 ft. to either end we give a closet for storage of brooms, vacuum cleaners, mops, table leaves and ironing board. Storage space above suitable for electric toasters, irons, etc. Complete in every detail, no other kitchen equipment needed. A woman's friend; a place for everything and everything in place. Equip the new way.

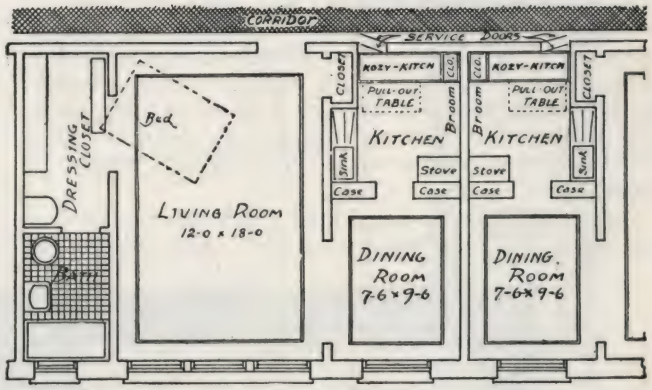
The registered trade-name "Kozy-Kitch" and the line of "Kozy-Kitch" cabinets are fully protected by patents and patents pending.

Write for prices and further information.

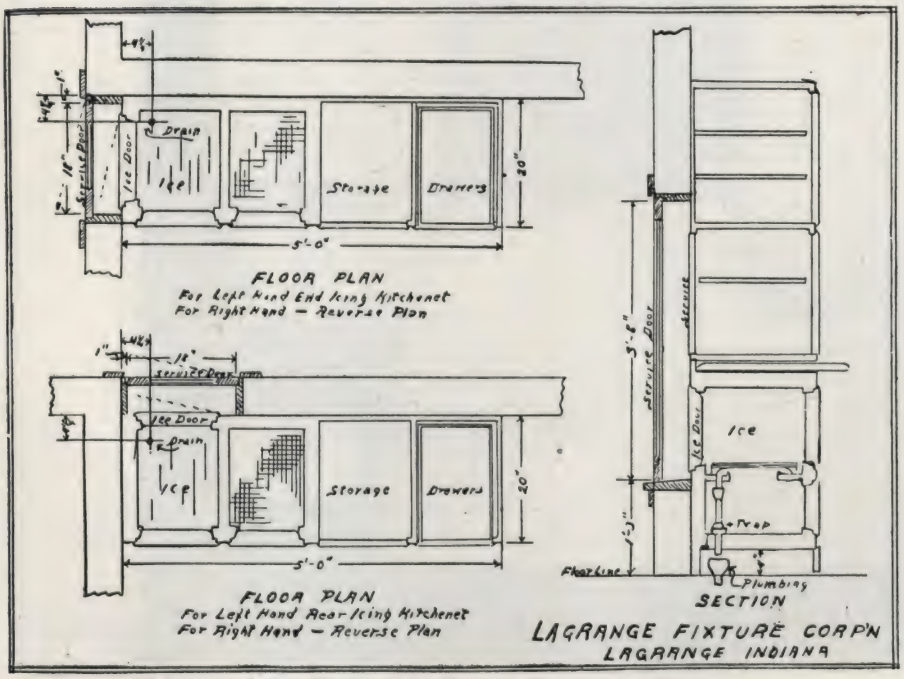
MODEL "B" CLOSED
6 ft. long, 20 in. deep, 6 ft. 6 in. high



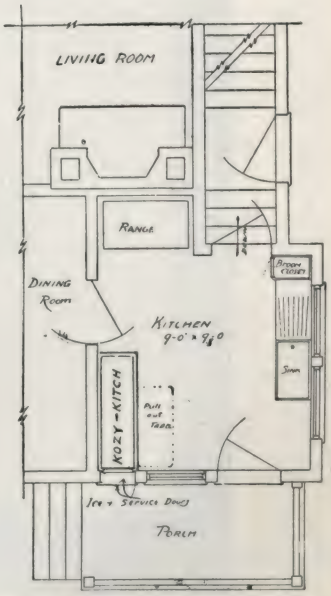
IDEAL KITCHEN—REAR SERVICE



TWO MODEL "B" "KOZY-KITCH" CABINETS IN APARTMENT LAYOUT



ROUGHING IN DETAILS OF SERVICE DOORS AND DRAIN
Either Rear or End—Right or Left



IDEAL KITCHEN—END SERVICE

SHEET STEEL EQUIPMENT COMPANY

DISTRIBUTERS FOR ROCKFORD STEEL EQUIPMENT CO., ROCKFORD, ILL.

Rockford Steel Kitchens

OFFICE AND DISPLAY ROOM

225 East Erie Street

CHICAGO, ILL.

Write for Address of Nearest Representative

Products

ROCKFORD STEEL KITCHENS (Patent Pending).

Also "De Luxe" Steel Medicine Cabinets, Steel Pantries "Built-in-units," Special Steel Equipment Made to Architect's Specifications.

Rockford Steel Kitchen (Patents Pending)

The Rockford steel kitchen is made in standard individual units so that any required layout can be arranged. Units are constructed of No. 20 gauge furniture steel electrically and acetylene-welded. Heavy nickelplated hardware throughout. All drawers mounted on an approved noiseless slide which permits ease of operation and keeps drawers in their proper position at all times. No small breakable parts. Built to stand the abuse of changing tenants.

Unit A—Steel refrigerator thoroughly insulated, no seams to open or warp, lined with non-corrosive sheet metal. Stationary wood work table above refrigerator, handy arrangement of cutlery drawers, tipping flour bin, spice shelf and large storage cupboard, tin lined bread and cake compartment in lower left corner of cupboard.

Unit B—Family size four-burner stove with simmer and lighter, ventilated oven 18 in. wide, 18 in. deep and 14 in. high, finished in baked-on auto black enamel, also furnished with broiler burner and in pearl gray porcelain enamel. Other stove models of various types. Odors from oven and fume hood carried off through flue connection in back of unit. Flue connection has vertical and horizontal adjustment, (patents pending). Ventilated space between fume hood and cupboard.

Unit C—Drain and shelf for small sink layout.

Unit D—Pot and pan storage.

Unit E—Useful space utilized when larger sinks are used. Seal (patent pending) prevents water from flowing under sink drainboard.

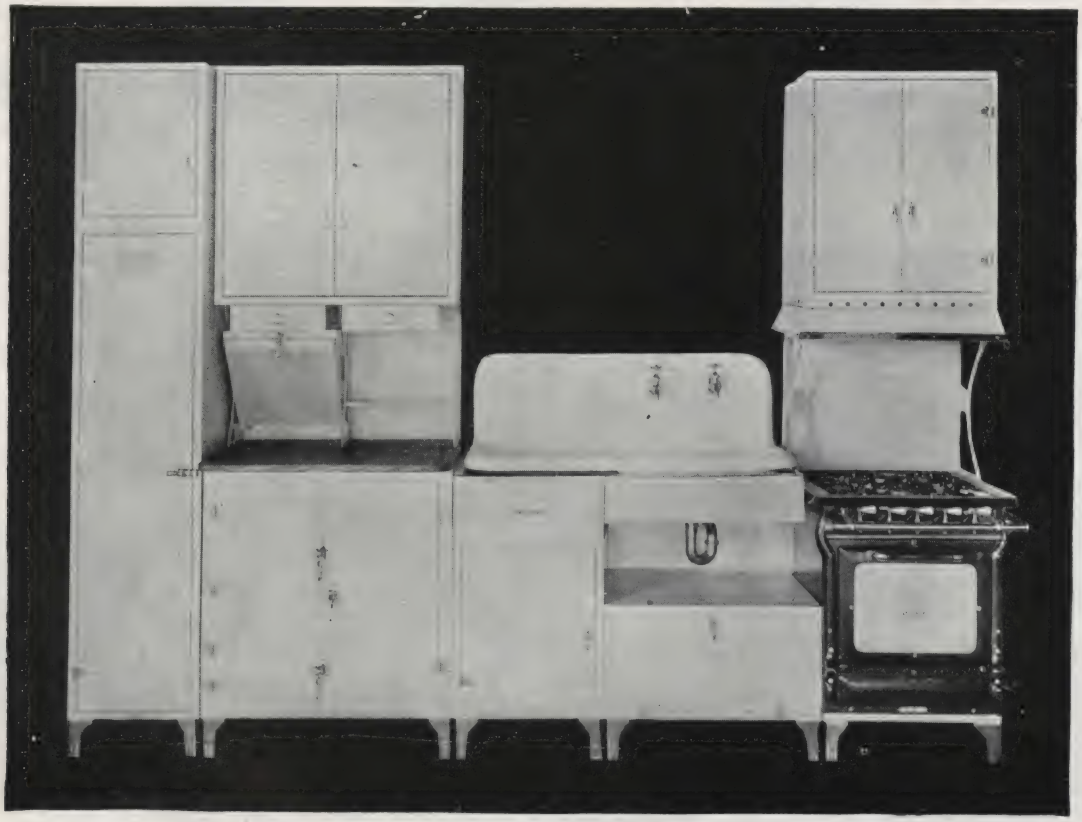
Unit F—Concealing apron, attached to and covers unfinished sink bowl.

Unit G—Broom closet, furnished with or without linen closet above, also with or without ironing board which is attached to and operates from door.

Unit H—Additional storage cabinets of various heights above standard units.

Unit I—Same as unit A except with cupboard and two drawers in place of refrigerator, not indicated on opposite page.

Finish—Standard pearl gray which is the most practical for kitchens, also white. Each coat sprayed on and oven baked separately at a high temperature.



ROCKFORD STEEL KITCHEN—UNITS A, B, D, E, F AND G

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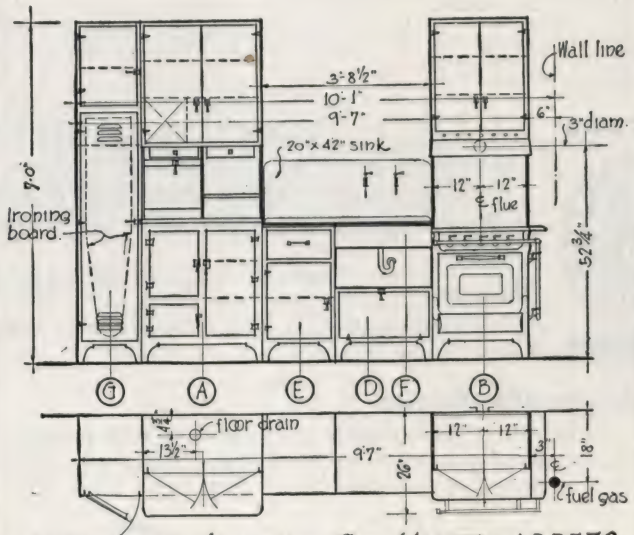
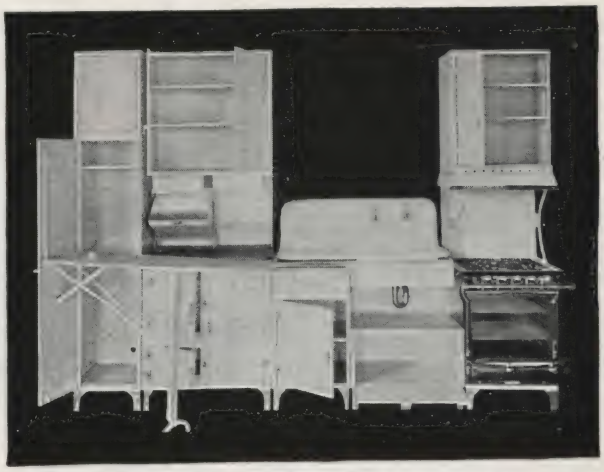
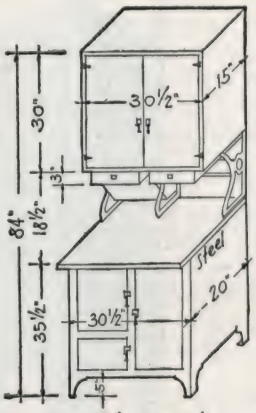


SUGGESTED LAYOUT OF UNITS - ADDEFG

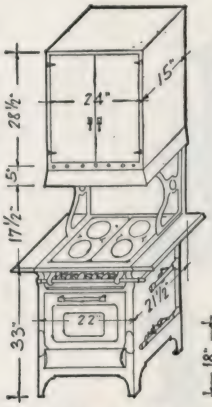


Refrigerator of 60 lbs Capacity made for Front · Rear or for Side Icing; and of steel construction throughout. Ironing board attachment of latest and approved design

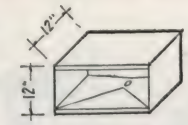
· SUGGESTED LAYOUT OPEN ·



· UNIT A ·

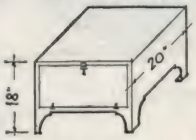


· UNIT B ·



UNIT C

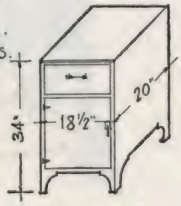
Note: Units "C" and "D" are made in various widths for 20-24 and 30 inch sinks.



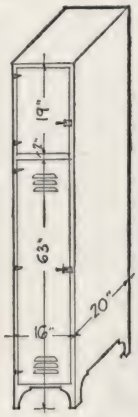
· UNIT D ·

UNIT F.

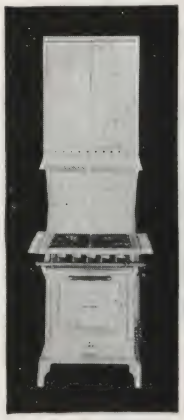
Concealing Apron in various widths



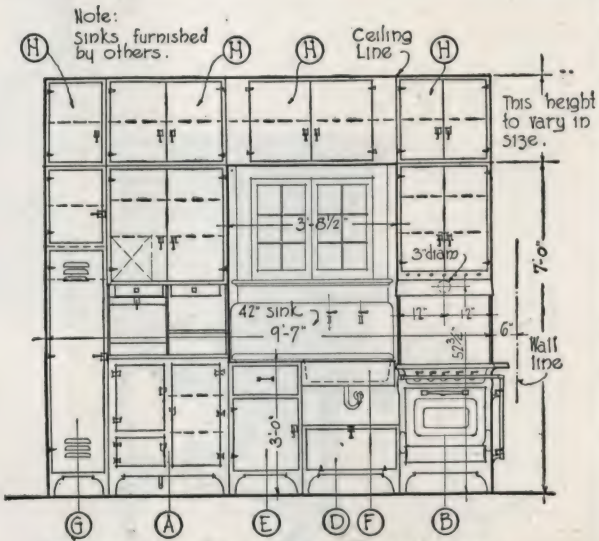
· UNIT E ·



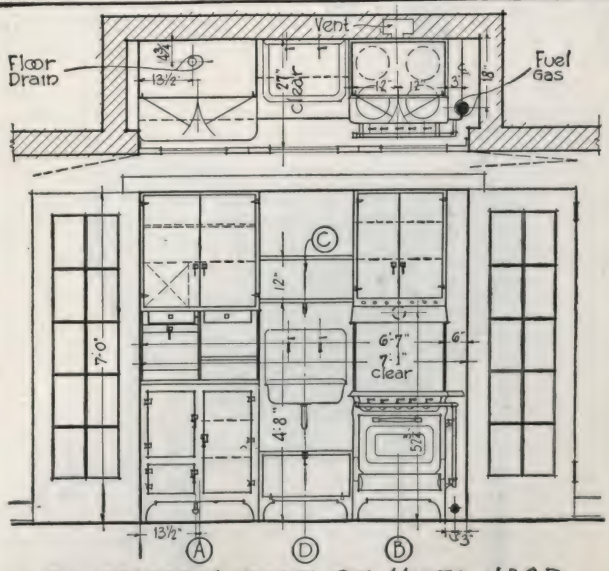
· UNIT G ·



· PORCELAIN STOVE



OVERHEAD STORAGE FEATURED ·



- SUGGESTED LAYOUT OF UNITS - ABCD -

BUILT TO ENDURE

"ROCKFORD STEEL KITCHEN"

SCALE ¼" EQUALS 1'-0"
DATE JULY 18

THE ALUMINUM COOKING UTENSIL CO.

NEW KENSINGTON, PA.

CANADIAN MANUFACTURERS: NORTHERN ALUMINUM CO., LTD., TORONTO, ONT.

Products

"WEAR-EVER" ALUMINUM STEAM JACKETED KETTLES and URNS.

Cleanliness

"Wear-Ever" utensils are made in one piece without joints or seams, and without coating to chip off. Thus "Wear-Ever" utensils assure the utmost cleanliness.

Durability

The metal used in "Wear-Ever" is passed through gigantic rolling mills again and again under tons of pressure. As a result it is not only thick but remarkably dense, non-porous, and durable.

"Wear-Ever" utensils never need tinning —an advantage that saves time, bother and money.

WEAR-EVER TAC ALUMINUM UCO TRADE MARK

Slogan

Replace utensils that wear *out* with utensils that *wear-ever.*

Co-operative Service

This company is glad to co-operate with architects whose plans embrace specification of kitchen equipment.

Address Department 25 for descriptive catalogue.

"WEAR-EVER" LIBERTY URN

"WEAR-EVER" TRUNNION STEAM JACKETED KETTLE

"WEAR-EVER INCASED URN

"WEAR-EVER" TYPE 1 STEAM JACKETED KETTLE

"WEAR-EVER" TYPE 3 STEAM JACKETED KETTLE

CRESCENT WASHING MACHINE COMPANY

Manufacturers of Dishwashing Machinery

CHICAGO OFFICE
136 W. Lake Street

218 Second Avenue
NEW ROCHELLE, N. Y.

Products

CRESCENT ELECTRIC DISH WASHER for washing china, glass and silverware in hotels, restaurants, hospitals, institutions, cafeterias, lunchrooms, clubs, soda fountains, tea rooms, boarding houses, residences.

Crescent Electric Dish Washer

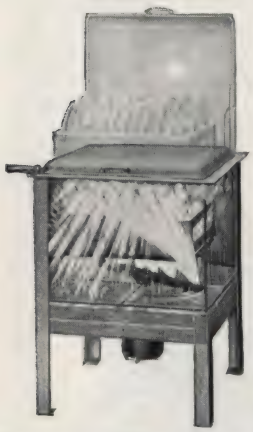
Has the clean, neat appearance of a phonograph cabinet. It is well built, rugged and strong. Made of heavy galvanized iron sheets with galvanized castings and fittings. Finished in attractive grey bronze. It can also be furnished in heavy copper with bronze castings and brass fittings or *Monel metal* with bronze castings and brass fittings.

Operation

How Dishes are Washed—Dishes are washed by the *famous revolving wash,* an exclusive patented feature, acknowledged the most efficient principle of washing dishes. Dishes are held stationary in compartment racks—they cannot move—while whirling torrents of hot soapy water under pressure of electric pump pour over them. No surface or crevice of any dish escapes the cutting, cleansing action of the *famous revolving wash.* The Crescent does not merely wet the dishes, it washes them.

Dishes Can Not Be Broken in the Crescent—Held stationary in compartment racks, dishes are not moved or handled from the time rack is slid into washer until they are dry and ready for use. Marking, chipping, or breaking of finest china is impossible. All dishes are separated and remain immovable while being washed. This insures quick sanitary air drying without use of towels.

Crescent Dish Washers Save Time, Dishes and Labor—The Crescent, with one operator, will do the work of two or three persons. Racks of dishes are slid into the machine which does all the work while operator racks dishes. No time or labor wasted. Its simplicity and ease of operation makes it as easy for a woman to operate as for a man. Makes the laborious task of dishwashing a quick an easy one.



PHANTOM VIEW MODEL "R" CRESCENT DISH WASHER
Showing balanced platform for raising dishes to table level, and revolving wash

Sterilization—By simply moving a lever, dishes are rinsed with clean boiling water direct from boiler. This rinse water, hotter than hands can endure, is used but once. It not only completely sterilizes them, but the instant the rack of dishes is slid out of machine, they dry of their own heat without handling.

Installation Data

The smaller Crescent models require same floor space as the average sink. As soon as power and plumbing connections are made, the Crescent is ready for immediate use. The Crescent is absolutely watertight. No leaking or dripping, eliminates wet, sloppy floors and unhealthy conditions.

MODEL "M" CRESCENT
Has doors on three sides and can be placed in a corner or along the wall

Tables—Tables, for receiving soiled and clean dishes, are made in standard lengths of 40 and 60 in. Tables of special length can be supplied also. The great convenience of having tables at both sides of machine fully justifies their small cost. There is a watertight connection to the machine and the racks of dishes, having same working level, are easily slid from table into dish wash.

Disposal of Grease and Refuse—The grease from the dishes is disposed of automatically. Refuse is caught by removable strainer pans. The soapy water which is used again and again, is cleansed each time a rack of dishes is washed. No water is wasted.

Crescent Household Model

The Crescent electric household model is attractive in design and extremely simple in operation. The same efficient *revolving wash* is used as in the larger models. It thoroughly cleans a machine full of dishes in less than a minute and washes all tableware including glass and silver. One small handle controls its operation. Permanent connections should be made for water, drain and electricity.

Height (cover closed), 33¾ in.; (cover open), 53½ in.; diameter 23 in. Two racks furnished for dishes, cups, glasses and silver.

HOUSEHOLD MODEL CRESCENT

Guarantee

Every Crescent Dish Washer is put through a practical working test before it leaves the factory. It is fully guaranteed against all mechanical defects.

Use

More than 12,000 Crescent Dish Washers are in daily use in leading hotels, restaurants, hospitals and institutions. The Biltmore, Commodore, Waldorf-Astoria Hotels in New York, 191 United States government hospitals, Roosevelt and Mt. Sinai Hospitals of New York, San Francisco General Hospital, Hahnemann Hospital of Philadelphia, Huyler's, Y. M. C. A.'s and Y. W. C. A.'s, 150 Bell Telephone Lunchrooms and Waldorf Lunch System, are but a few of Crescent's satisfied users.

A CRESCENT FOR EVERY SIZE KITCHEN

Model	R	M	AA	EE
Capacity (pieces per hr.)	1200	2000	4000	7000
	Persons accommodated per meal			
Hotel, restaurant or club; 10 dishes per person	120	200	400	700
Cafeteria; 6 dishes per person	200	333	666	1166
Hospital; 7 dishes per person	171	285	571	1000
Racks furnished with machine	3	4	6	10
G. E. motor, h. p.	¼	¼	½	2
DIMENSIONS				
Length, in.	23½	22¾	28	52¼
Width, in.	23½	22¾	24	24
Height (open), in.	57⅝	66¾	69	69
Height (closed), in.	35½	57⅝	59½	59½
Table height, in.	34	34	34	34
Shipping wt., lbs.	350	435	635	1100

Standard heating equipment: gas burner and steam injector. Electric, gasoline or kerosene heaters furnished at slight additional cost.

FEARLESS DISHWASHER CO., INC.

175 Colvin Street
ROCHESTER, N. Y.

Products

DISHWASHERS.

Also manufacturers of Water Coolers; Special Dish, Glass and Pot Sinks.

Fearless Dishwasher

Construction—The construction and operation of the Fearless dishwasher is unusually simple. It is most efficient and economical in saving of time and labor and easy to keep clean. The Fearless has very few parts. Many machine parts mean continual delays and much trouble and expense.

Another feature of the Fearless which should commend itself to every one, is the ease with which it can be kept sanitary. There are no pumps, nozzles or closed passages, but every part is open to the air and sunlight. The whole machine can be washed out in five minutes as easily as a sink.

Principle of Operation—The Fearless dishwasher washes the dishes by submerging them. No type of dishwasher will wash dishes more quickly and efficiently than that which submerges them in strong currents of boiling water, the only right way to properly sterilize. With each complete oscillation of the basket in the wash tank, the dishes receive the force of the water from every angle, so that there is no part of any dish that does not receive the full force of the water thoroughly cleansing it. The complete submersion in the boiling water of the rinse tank, heats them through thoroughly and sterilizes them perfectly.

Power—This dishwasher has the most direct power connection of any dishwasher made. The power is connected direct to the work only, so that the dishes themselves offer the only resistance to the water, eliminating all waste of power. The motor used is ⅛ h. p., slow speed, reduced to machine speed of 32 reciprocations per minute, built in over-sized frame to reduce heating, also of the ventilated, splashproof type. The operating cost is from 1c to 2c per hour, thus washing the greatest amount of dishes for the least cost of any dishwasher made.

Capacities—The Fearless is made in three sizes of two and three tanks each, with the wash tank on the right or left of the operator as required and will wash 2,000 to 10,000 dishes per hour. Necessary power is obtained from an ordinary electric lighting circuit.

Tables—Fearless dishwasher tables are built to suit the particular requirements. They will improve the service, greatly increase the employee's efficiency and working capacity. All we require to supply your needs, is a rough sketch of the space you have for dishwashing equipment and the direction in which the soiled dishes come from the dining room.

Important Users of Fearless Dishwashers—

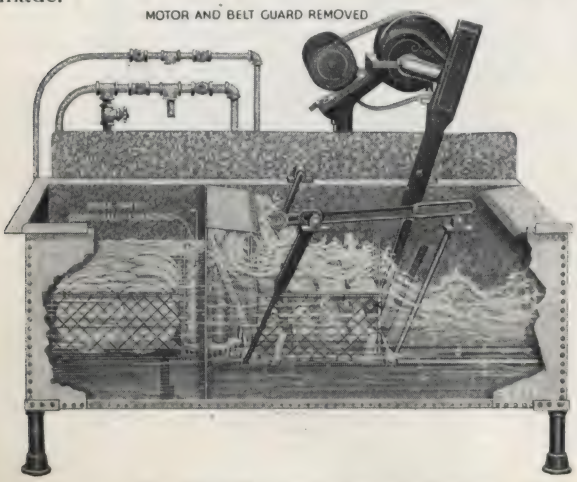
Leighton's, Inc., and White Lunch Co., California
The St. Regis Restaurant Co., New York, N. Y.
Excellent Shops, New York, N. Y.
C. & L. Lunch Co., New York, N. Y.
Allentown State Hospital for the Insane, Allentown, Pa.
The U. S. Vocational Training School, Chick Springs, S. C.
The Waldorf System, Inc., in many states
The Battle Creek Sanitarium, Battle Creek, Mich.
The Bancroft Hotel, Worcester, Mass.
The Hotel Rochester, Rochester, N. Y.
Powers Hotel, Rochester, N. Y.
Indiana University & School of Medicine, Indianapolis, Ind.
Mother Hansen's Kitchen, Dallas, Tex.
Y. M. C. A. Cafeteria, Aurora, Ill.
Carolina Tea Room, Dallas, Tex.
The Dallas News, Dallas, Tex.
El Paso Sanitarium, El Paso, Tex.

Other names furnished upon request.

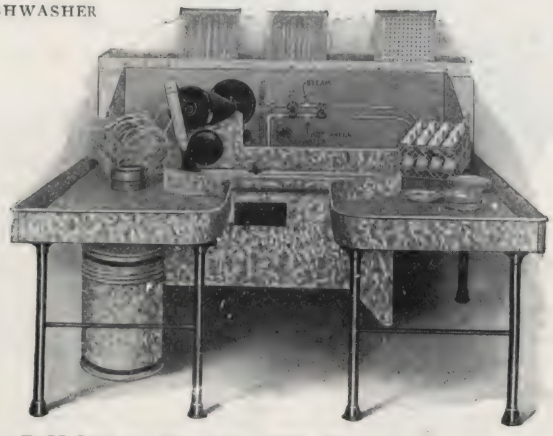
B E FEARLESS DISHWASHER

Fearless Hospital Special

This type of Fearless Dishwasher is especially planned for hospitals and sanitariums where contagious diseases are treated, also for educational institutions where every precaution is taken to keep all disease at a minimum. It has one wash tank, one rinse tank and one sterilizing tank. The sterilizing tank is fitted with a steamtight cover and insures the user of perfectly washed dishes free from bacteria.



FEARLESS DISHWASHER IN ACTION



B V MODEL, PLAN NO. 57S, FEARLESS DISHWASHER

Made in 3 sizes. Floor space 80½x80 in. and 80x90 in. Height of tanks 27½ and 28½ in., total height over the power mechanism 50 in.; height of shelf as shown 23 in.; weight with metal covered tables 800 to 950 lbs.

Tables furnished with or without shelf

Continued on next page

Installation Data on Fearless Dishwashers

The plans illustrated below are all for right-hand machines, where dishes pass from right to left. The corresponding plans for left-hand machines are covered. Whether you use a right- or left-hand machine depends on the direction the dishes come from the dining room and where you wish the clean ones placed. From right to left is the best. The wash tank is on the right in a right-hand machine and on the left in a left-hand machine.

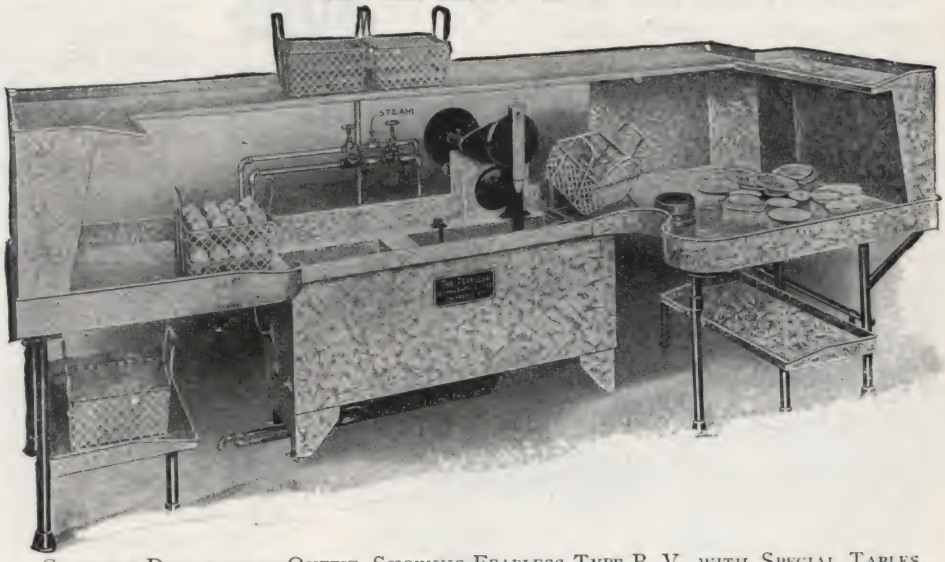
Standard plan tables are shown in connection with type B. V. electric Fearless dishwasher in No. 1 or No. ½ size. When used with hand power machine, figure on machine standing 3 in. from wall instead of 8 in. as indicated. With the No. 0 in either the hand or electric machine, length of tank should be changed to 3 ft. 7 in. instead of 4 ft. 6 in., and the lap at wash end 5 in. in place of 6 in.

B V FEARLESS RAPID DISHWASHER

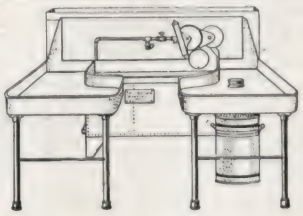
Type	Floor space, in.	Height, in.	Wash tank, in.	Rinse tank, in.	Shipping weight, lbs.
No. 1 B V	62x30	28½	40x18x20*	20x18x20*	500
No. ½ B V	62x28	28½	40x16x20*	20x16x20*	475

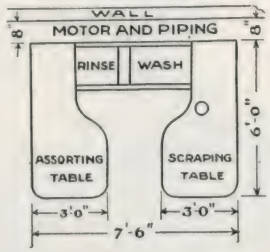
*Deep.

Also made as above with 3 tanks; 2 wash tanks with motor for each and 1 rinse tank, or 1 wash tank with motor and 2 rinse tanks.



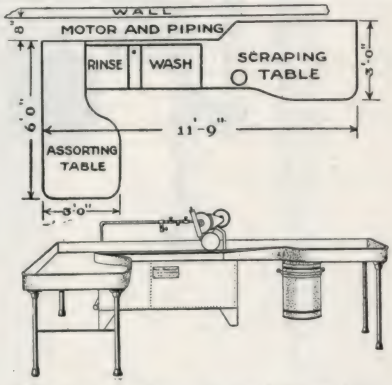
COMPLETE DISHWASHER OUTFIT, SHOWING FEARLESS TYPE B. V. WITH SPECIAL TABLES
Shelf, 23 in. above top of table





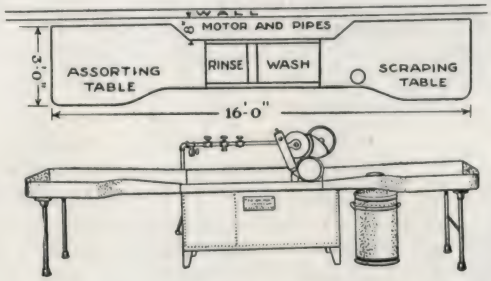
This plan is first choice where space will permit, as it has some advantages over the others. It has room for one or two workers inside the table, and he or they can reach every point with scarcely a step. The waiters, standing on the outside, can also reach every point, and will not interfere with the operators. In order to leave sufficient space between tables for workers to pass in and out, tables of this design made with No. 0 machine are only 30 in. wide instead of 36 in.

RIGHT HAND SQUARE PLAN



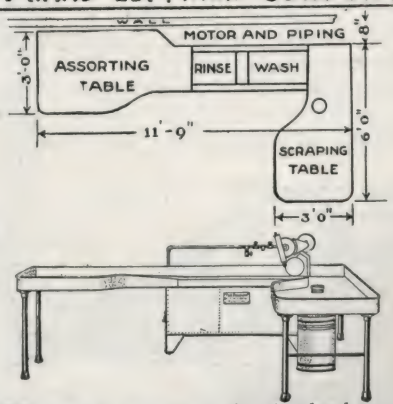
This plan is adapted to the left-hand corner of a kitchen

RIGHT HAND LEFT HAND CORNER PLAN



This plan is adapted to narrow kitchens where the work must be done at one side. The scraping table is so designed that the operator has the work in easy reaching distance in the arc of the circle in the center of which he stands. This plan can stand against the wall, or reverse it, and let the worker stand next to the wall

RIGHT HAND STRAIGHT PLAN



This plan is adapted to the right-hand corner of a kitchen and has some of the advantages of the square plan over the straight

RIGHT HAND CORNER PLAN

VARIOUS ARRANGEMENTS OF "FEARLESS" DISHWASHER & TABLES

SANI SINK DISHWASHER CO.

NORTH CHICAGO, ILL.

BRANCH OFFICES

CHICAGO, ILL., 209 West Randolph Street — NEW YORK, N. Y., 168 Church Street

Products

SANI IN-THE-SINK ELECTRIC DISHWASHER for homes, apartments, and hospitals.

Sani

TRADE-MARK

Sani In-the-Sink Dishwasher

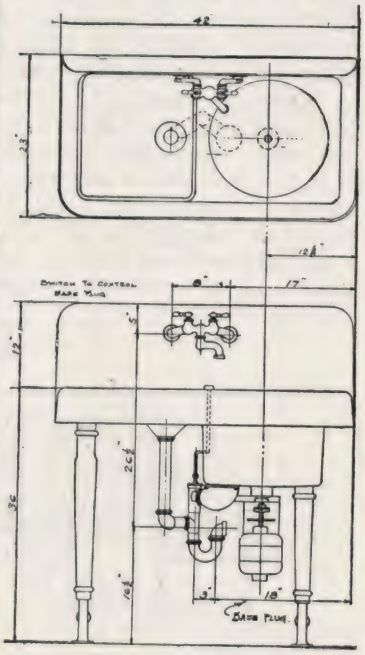
Ideal for Apartments—Architects figuring on new apartment buildings and residences should see this sink dishwasher in operation before specifying any other

SANI IN-THE-SINK ELECTRIC DISHWASHER

sink. Renters are looking for innovations in new buildings. Builders are looking for new labor saving devices which will increase the value of the apartments. No modern apartment building or residence is complete without this wonderful machine.

Operation and Advantages—This perfected dishwasher is the result of 25 years of experimental work. The wonderful Gush-a-tor, which throws 4 gals. of water over and about the dishes, with just the right force, 11 times every minute, is the master achievement. The operation is so simple and efficient that washing dishes for a family of 6 people takes from 4 to 6 minutes. Place all the dishes, as well as silverware and glassware, in wire basket, run in hot water from swinging faucet, add a little washing powder, press the button, and in 4 minutes the dishes are washed absolutely clean. Pull the drain, rinse everything with quick flush of hot water from sprinkler, and let dishes dry in warm air from Gush-a-tor, which starts just by pushing a button.

The dishwasher is in the sink—a part of the sink itself. The basket which holds the dishes may be lifted out easily, leaving a beautiful deep sink. All particles of food are washed into trap at bottom. Sink is kept clean automatically by action of water while dishes are being washed. A special attachment, furnished without extra charge, converts it instantly into a clothes washer. The gentle jets of bubbling, soapy water moved by the Gush-a-tor wash thoroughly all small articles of clothing, as well as dainty linens.



DIMENSION DIAGRAM

Construction Details—Castings made from No. 1 Northern Scotch iron giving strength. These are annealed and sandblasted before being porcelain enameled. Porcelain enameling is dry powder process using highest grade enamel, iron being pre-heated to cherry red heat before enamel is applied, after which enamel is melted on to the iron.

Vertical type footless motor ¼ h.p., 1825 revolutions per minute, totally enclosed and splashproof. Length of shaft 6 in., diameter is ½ in. Packing gland is 3½ in. over all, packing chamber in gland being 1¼ in. in diameter and 1½ in. long.

Water connections consist of mixing faucet, hose and spray independently attached. Sink top, or roll is 36 in. from floor. Outlet delivers waste to 22 in. "roughing-in." Legs of sink are adjustable giving a range of 3 in.

Gush-a-tor, Gush-a-tor cone and wire basket are rustproof. Electrical connection to motor can be made to base plug or any electric light socket. In designing building or residence base plug should be provided below sink.

WELLINGTON COURT APARTMENT BUILDING, CHICAGO

B. LEO STEIF & Co., Architects — Financed by S. W. STRAUSS & Co.
One of many modern apartment buildings under construction that is equipped with Sani In-the-Sink dishwashers. Building contains 66 apartments which will be equipped with No. R-210 Sani In-the-Sink dishwashers 42-in. size

Demonstration and Cooperative Service

Write for literature and arrange to see demonstration of this wonderful machine. Blue prints furnished gratis.

Sales Manager, E. R. THORSON

HEIMBACH INCINERATOR CO.

1611-1615 University Avenue
ST. PAUL, MINN.

DISTRICT REPRESENTATIVES

DETROIT, MICH., J. W. ROLLINSON, 203 Owen Building
COLUMBUS, OHIO, B. M. FREEMAN Co., Gasco Building
INDIANAPOLIS, IND., HARDING & Co., 202 Hume-Mansur Building
DENVER, COLO., F. CORNWALL SMITH, 317 14th Street
DULUTH, MINN., THOMSON-WILLIAMS Co., 206 Manhattan Building
CHICAGO, ILL., C. H. SWANSON, 549 Washington Boulevard
KANSAS CITY, MO., R. L. BROWN, 201 Gloyd Building
DES MOINES, IOWA, TOWER MATERIALS Co., 709 Hubbell Building
HOUSTON, TEX., F. B. WALCOTT, 325 Beatty Building
WINDSOR LOCKS, CONN., J. F. LALLY
AKRON, OHIO, T. P. LALLY, 424 Akron Savings & Loan Building
BALTIMORE, MD., CONSOLIDATED SUPPLY Co., Knickerbocker Building
ALLENTOWN, PA., L. W. LICHTENWALNER, 302 East Hamilton Street
SIOUX CITY, IOWA, HENOCH & BRIDGE, 609 Pearl Street
NEW YORK, N. Y., R. C. TAYLOR Co., 15 East 40th Street
SAN FRANCISCO, CAL., L. T. KELLEY, 77 O'Farrel Street

Products

HEIMBACH TWENTIETH CENTURY INCINERATORS.

Getting Rid of the Garbage Nuisance

The Heimbach 20th Century incinerator has already proved its right to consideration by architects, builders and home owners. The difficulties of proper garbage disposition have for some time occupied the attention of health and sanitary officials. These officers all agree that with proper incinerators installed in residences and in buildings housing more than one family, the troublesome details of properly disposing of garbage, so far as it applies to such buildings, are absolutely eliminated.

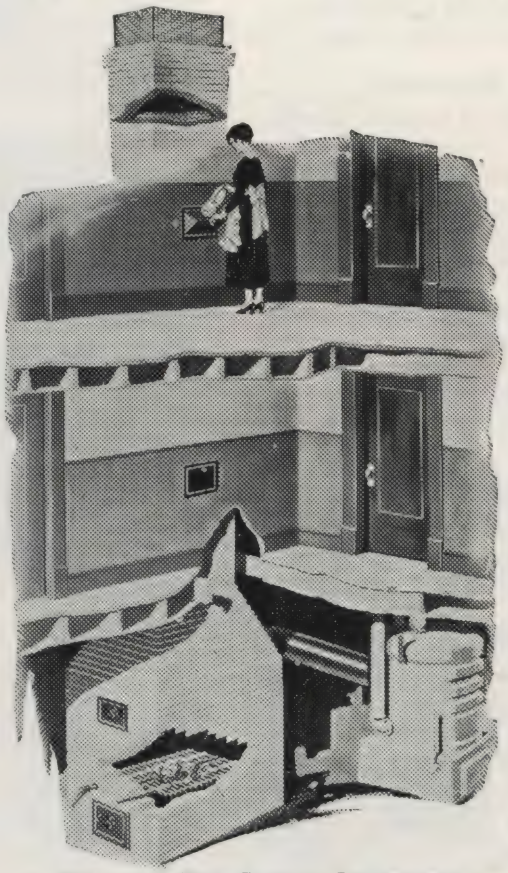
No Fuel Is Required for Destruction of Refuse

There is no fuel required in the maintenance of Heimbach 20th Century incinerator—the garbage itself furnishes that. No expense attaches to the upkeep. Refuse burns up within five to seven minutes after lighting and burns up thoroughly. There is no smouldering, and there is absolutely no odor.

Contruction Eliminates Fire Hazard

The grates in the Heimbach 20th Century incinerator are so arranged as to create a mighty, powerful draft, and yet the construction is such that this draft can not operate in any manner to make a fire hazard. The fireproof construction and operation has been remarked time and time again and complete tests have always proved this incinerator to be really fireproof.

Any vermin or contagious bacilli are killed as soon as the flame strikes them and there is no chance for any to escape the intense heat.



HEIMBACH 20TH CENTURY INCINERATOR

Built to Fit Any Type of Building Construction

You can arrange for the installation of Heimbach 20th Century incinerator in any building, of any construction, of any size, during or after its construction, though it is, naturally, better to arrange for installation at the time of building.

Description of Heimbach 20th Century Incinerator

Heimbach incinerator consists of a series of receiving doors located in a chimney. These doors are placed on every floor and are airtight, and close automatically. Through them the paper wrapped garbage is dropped to the incinerator grates below. In the basement the chimney is enlarged to the size indicated in the accompanying table. Into this chimney enlargement as a chamber special grates are built. Once a week or oftener, the accumulated packages are burned by simply lighting the nearest package to the open door and then closing the door. At regular intervals clean out the ashes underneath.

A Style for Every Type of Building

Heimbach 20th Century incinerators are made in six styles:

No. 1—Design for residences.

No. 2—Design for duplex houses.

No. 2A—Design for four-flat.

No. 3—Design for 6 to 20 apartments.

No. 4—Design for schools, hospitals and apartment buildings up to 80 families.

No. 5—Design for market houses and city garbage and refuse disposal systems.

Blue prints for double flue where city ordinance requires it.

Guarantee

Every Heimbach 20th Century incinerator is sold with an absolute guarantee that if same is installed in accordance with our plans and specifications and is not entirely satisfactory, all payments will be refunded and transportation charges paid both ways when parts are returned to us.

DIMENSIONS OF HEIMBACH INCINERATOR

No.	Type of Building	Size of combustion chamber, in.	Size of flue, in.
1 and 2	Residences, single and duplex	36½ x 50	12 x 12
2A	Four flat unit	54½ x 50	16 x 16
3	6 to 20 apartment unit	55 x 50	18 x 18
4	20 to 80 apartment unit	73 x 50	22 x 22

KERNER INCINERATOR COMPANY

1001 Chestnut Street
MILWAUKEE, WIS.

BRANCH OFFICES AND AGENCIES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DETROIT, MICH.
HUNTINGTON, W. VA.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
MINNEAPOLIS, MINN.
MONTREAL, QUE.
NEW YORK, N. Y.
OMAHA, NEBR.
PHILADELPHIA, PA.
PITTSBURGH, PA.
ROCHESTER, N. Y.
ST. LOUIS, MO.
ST. PAUL, MINN.

KERNERATOR
Built-in-the-Chimney
Reg. U. S. Pat. Off.

Product

The KERNERATOR: a Sanitary Equipment for the destruction, by burning, without cost, of garbage and waste in residences, apartment buildings and hospitals. Patented Aug. 25, 1914 and March 18, 1919.

Description

The Kernerator consists of hopper doors (see illustrations) located in the regular chimney on the different floors, and a brick enlargement of the chimney in the basement into which is built a special arrangement of grates.

The Kernerator combines the three recognized desirable features: first, destroying refuse where it originates; second, destroying by burning; third, burning without cost.

The incinerator is constructed in accordance with detailed working drawings which are furnished with the parts. The drawings are clear and the construction so simple that the mason has no difficulty in building it.

Five Distinctive Features of the Kernerator

First—It is built of brick and not of iron. Hence, there is no replacement of parts.

The grates are of extra heavy construction and do not come into direct contact with the flames.

Second—It does not cost one penny to operate. The waste deposited is the only fuel required.

Experience has demonstrated that the heat from the burning of the dry combustible waste that accumulates in the home is amply sufficient to dry out and eventually consume the garbage.

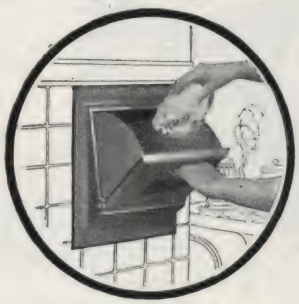
Third—The Kernerator handles all waste—not only garbage, but tin cans, broken crockery, bottles—in fact everything but liquids.

Fourth—It occupies no space in the kitchen.

Although the material is deposited from the kitchen or some point convenient to the kitchen, the incinerator itself is in the basement where space is not so valuable.

Fifth—Practically no odor during burnings.

The by-pass grate is so arranged that the fire is always on top of the material to be burned. As the seat of the fire approaches the garbage, all offensive gases liberated by the heat must pass up through the flames and so be deodorized.



HOPPER DOOR

Built in the Chimney

The same flue that is used for ranges, laundry stoves or house heaters can be used for the incinerator.

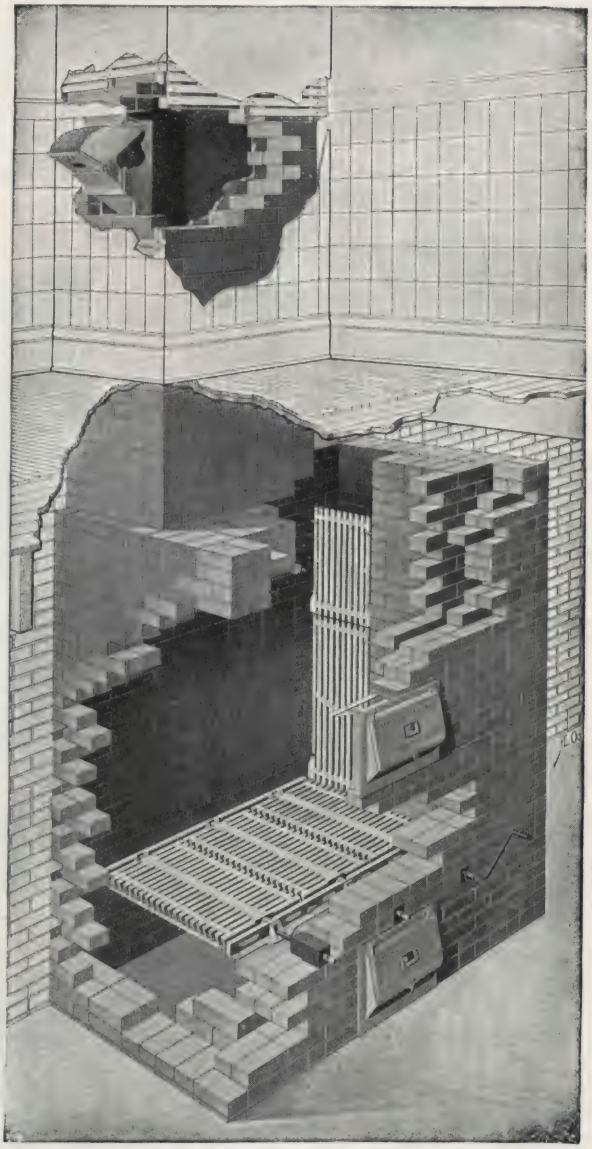
Over 80% of the installations in operation use a flue common to other heating devices in the building.

Guaranty

Every incinerator is sold with a money-back guaranty if the operation is not satisfactory to the purchaser after 6 months' trial. *There has never been an incinerator returned.*

Users

Kernerators have been in successful operation for many years and are in daily use by thousands of families. On application we will refer to users in almost any of the larger cities in the United States.



MODEL OF KERNERATOR FOR LARGE APARTMENT HOUSE
Residence size is very much smaller

OUTSIDE DIMENSIONS, KERNERATOR

	Apartment House Models	Residence Models
Small	5 ft. 4 in. x 4 ft. 3 in.	4 ft. 5 in. x 3 ft. 9 in.
Medium	6 ft. 10 in. x 4 ft. 7 in.	5 ft. 4 in. x 3 ft. 5 in.
Large	9 ft. 1 in. x 5 ft. 8 in.	5 ft. 4 in. x 3 ft. 9 in.

PITTSBURGH INCINERATOR MFG. CO., INC.

229 First Avenue
PITTSBURGH, PA.

Product

"SAN-A-TOR" GARBAGE and RUBBISH INCINERATORS.

Construction of San-a-tor Incinerators

The combustion chamber of San-a-tor is constructed without bolt or screw. Each part interlocks one with the other. The entire parts of the combustion chamber can be removed and replaced through the door opening. This is an economic feature as in years of service should a part wear out it would be only necessary to lift same out and replace the new part which can be ordered by number and sent parcel post direct. There would be no need of employing a mechanic. This one feature alone is of value from an economic standpoint. There would be practically no replacement of parts.

Another prominent feature of San-a-tor is the insulation composed of fire brick walls 2 in. thick which insure many years of service. Directly back of fire walls and between the outside steel jacket is the cooling space which provides air circulation thus reducing exterior heat radiation to a minimum.

The combustion chamber is equipped with a central combustion cone, perforated, to permit the ignition of gases arising from the burning mass thus obviating odors by reason of perfect combustion.

The San-a-tor, finished in black and nickel trimmings, black and heavily nickelplated, and aluminum heavily nickelplated will add beauty to any kitchen.

It is made in portable, wall type, and wall type with automatic ash fall to basement.

It can be operated either with natural or artificial gas. The grates are guaranteed for 5 years. Rubbish and garbage mixed together will reduce gas consumption.

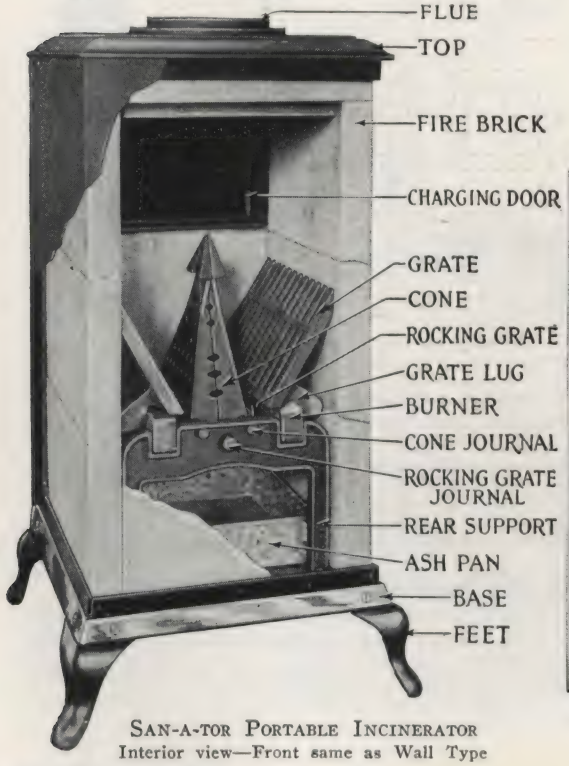
Our *gas fired* incinerator for large apartment houses is not illustrated here but complete blue prints and specifications will be furnished on request.

PITTSBURGH INCINERATORS

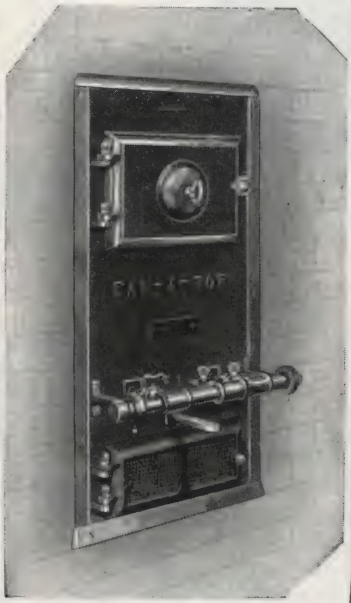
Style	Width, in.	Depth, in.	Height, in.	Gas connection, in.	Flue diam., in.	Net Wt., lbs.	Capacity, bu.	Consump. time, hrs.	Combustion Chamber Width, in.	Combustion Chamber Depth, in.	Combustion Chamber Height, in.	Price
*San-a-tor Portable	21	21	37	½	9	450	1	1	12	12	18	$90.00
†*San-a-tor Wall	18	18	32	½	7	450	1	1	12	12	18	90.00
Junior Portable	17	19	34	½	7	151	½	1	12	12	12	
No. 1 Round Portable	24	36	45	½	7	450	1	1½–2	12	14	14	
No. 2 Round Portable	24	36	62	½	8	600	2	1½–2	15	16	18	
No. 2 Square Portable	33	42	65	½	7	600	2	1½–2	16	16	18	
No. 4 Square Portable	33	42	71	½	8	800	4	2 –3	16½	16½	31	
No. 0 Square Portable	28	54	60	1	10	1600	15		16	50	38	
No. 00 Square Portable	42	75	60	1	17	2700	28		24	60	38	

On Request

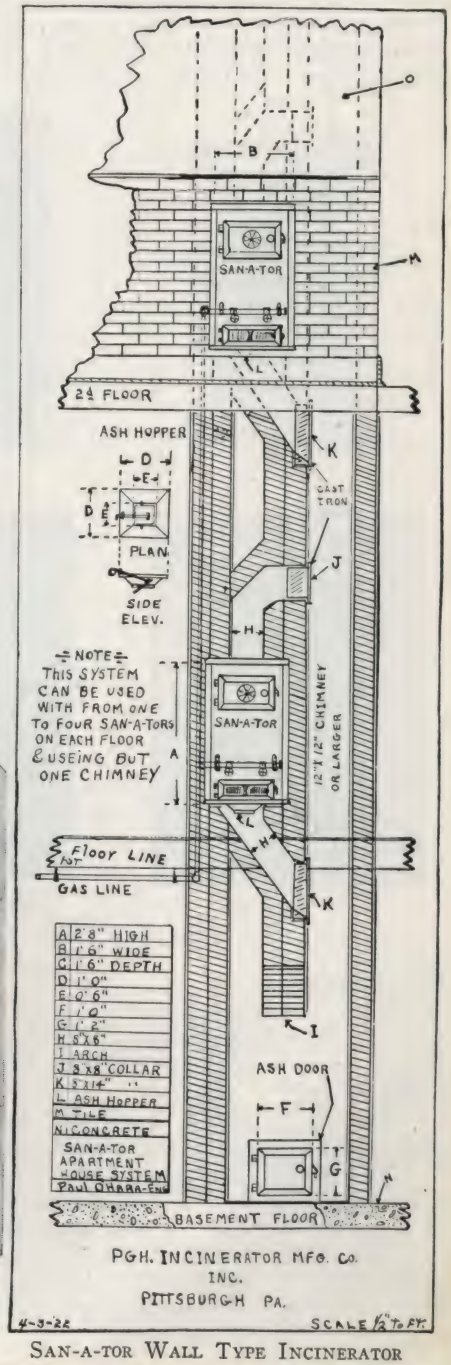
*Finished in dull black and nickel trimmings—nickelplated extra
†Fitted for dumping ashes to basement $10.00 extra



SAN-A-TOR PORTABLE INCINERATOR
Interior view—Front same as Wall Type



SAN-A-TOR WALL TYPE INCINERATOR



SAN-A-TOR WALL TYPE INCINERATOR
Small apartment house and residence installation

J. B. PRESCOTT & SON

Manufacturers of Garbage Incinerators

WEBSTER, MASS.

AGENCIES IN ALL PRINCIPAL CITIES

Product

The PYROFUSE, Sanitary and Original Destroyer of Waste and Garbage at its point of origin.

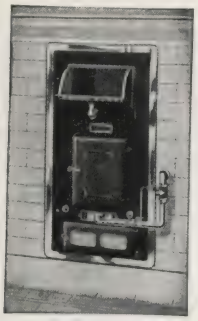
For All-steel Building Specialties, see page 53.

Pyrofuse TRADE MARK

TRADE-MARK (Registered)

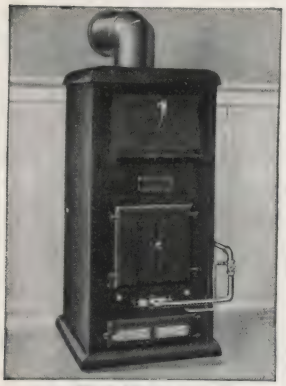
Construction and Operation

The Pyrofuse is constructed of gray iron insulated with asbestos, the outer shell of the back and sides being of sheet steel. Either natural or artificial gas is used for fuel and, by means of a Bunsen burner, an intense heat, ranging from 1800° to 2000° Fahr., is diffused evenly about the burner, always attacking the material from the bottom, thereby precluding the possibility of unburned accumulation.



Wall Types
"C"—"G"—"L"—"X"

Portable Types
"B"—"F"—"K"



Portable Type
"U"

Gasoline Generator Types
"M"—"V"

TYPES OF PYROFUSE

Special Features

The *corner combustion flues*—exclusive features in Pyrofuse design—were developed after extensive experiments as an aid to maintaining perfect combustion.

The *air mixer* is especially designed to secure the proper proportion of air and gas.

The *screen doors* not only act as a dryer and evaporator for the material within the Pyrofuse, but also as a ventilator for the apartment.

The *grate system* of the Pyrofuse is unique and perfect and has proved wonderfully efficient. Each unit is heavily constructed and can be removed and replaced without the use of tools.

The *clean-out door* is large and enables one to approach all interior parts for cleaning and inspection. An ample clean-out door is indispensable in a successful garbage incinerator. Our construction is covered by five United States patents.

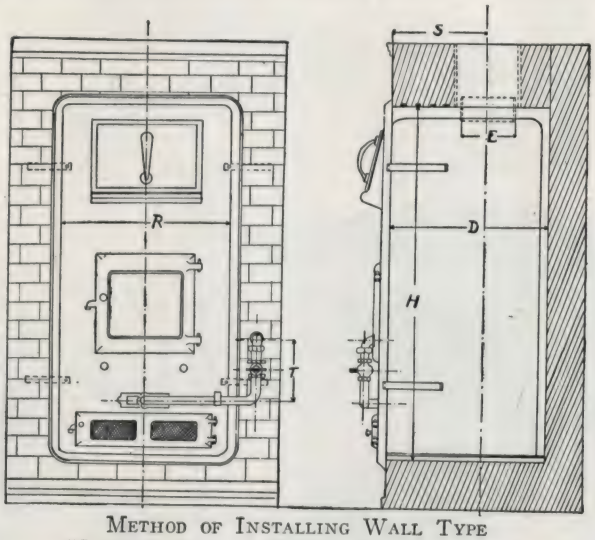
Types and Sizes

Pyrofuse is made in two types, the wall or flush type for new construction, and the portable type for installation. Pyrofuse is made in four sizes, ranging from ⅝- to 4-bushel capacity. This enables Pyrofuse to be used successfully in either the smallest apartment or the largest hospital.

Pyrofuse is also manufactured in a gasoline generator type for use in locations where natural or artificial gas are not available.

SPECIFICATIONS OF PYROFUSE

Type	Style	Outside dimensions, in.			Size flue, in.	Gas used per hour, cu. ft.	Capacity, bushels
		Width	Depth	Height			
B	Portable	15	15	35	6	35	⅝
C	Wall	16	14	35½	6	35	⅝
F	Portable	17	17	37	6	45	1
G	Wall	18	14	36	6	45	1
K	Portable	19	19	41	7	60	2
L	Wall	20	16	41	7	60	2
M	Gasoline	24	34	43	7	.....	2
U	Portable	27	27	56	8	80	4
V	Gasoline	27	38	56	8	.....	4
X	Wall	28	26	54	8	80	4



METHOD OF INSTALLING WALL TYPE
"C," "G," "L," and "X" direct in chimney stack

PYROFUSE DIMENSIONS IN INCHES

Type	R	T	H	D	E	S
C	11½	9	32	11½	6	7½
G	13½	9	33	13½	6	9¾
L	15	9	37	15¼	7	11½
X	26	9	52	22½	8	13¾

Blue Prints and Service

On request we will furnish blue prints of each size and style showing complete dimensions. We will also furnish prints showing the most desirable layouts with necessary directions for multiple installations.

THE PFAUDLER CO.

Glass Lined Steel Laundry Chutes and Glass Lined Steel Containers

ROCHESTER, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., Room 1103, 8 West 40th Street

CHICAGO, ILL., 1442 Conway Building

SAN FRANCISCO, CAL., 206 Sharon Building

FOREIGN AGENCIES

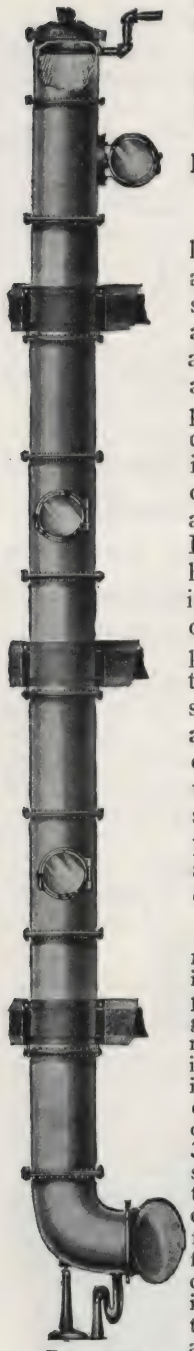
LONDON, W. C. 2, ENGLAND, Enamelled Metal Products Corp., Ltd., 56 Kingsway

SYDNEY, N. S. W., AUSTRALIA, Mauri Bros. & Thomson, 121-123 Castlereagh Street

Products

Glass Lined Steel Laundry Chute for hospitals, hotels, apartment houses, large residences, etc.

Also Glass Lined Steel Containers including Storage Tanks, Mixers, Cooking Kettles, etc.



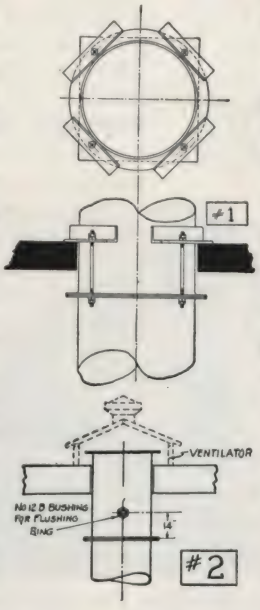
Pfaudler Laundry Chute

Pfaudler Laundry Chute (Glass Lined Steel)

This chute is the conception of a hospital executive and was designed by a hospital architect to provide positive sanitation in disposing of soiled linen and laundry. It has been rapidly adopted by the general hospital field and we offer a pretentious list of hospitals and other institutions using this chute. The initial expense of installing represents the only cost, and because of its construction it will outlast any other chute on the market. The Pfaudler chute is made of heavy open-hearth plate steel, lined with a coating of high-quality glass which is fused directly into the metal at high temperature, making it an integral part thereof. The chute is built in flanged sections which can be bolted together and adapted to a building of any height. Equipped with a flushing system for sterilization, watertight plate glass doors, air vent and sewer connection for drainage.

Specifications for Laundry Chute.—Chute to be installed where shown on plans. To be constructed of glass lined steel of lengths not to exceed 6 ft. (depending on requirements of building) with optional diameter of 24 in. inside and 29 in. outside or 30 in. inside and 35 in. outside (state dimensions from center of chute to face of finished wall, chute being installed just before floors and walls are finished). Glass lining of chute to extend well beyond inner edges of gaskets and to outer edges of door throats and facings. Top section to be provided with a 1½-in. nickel-plated brass pipe flushing ring with standard bushings for connection to water service pipe. Top head to have suitable connections for 3-in. ventilator pipe (see drawing No. 3) or designed for air ventilator (see drawing No. 2).

At a distance of 47 in. above level of each floor will be a german silver door furnished with either plate glass or polished wire glass; door to close watertight against a tubular rubber cushion and secured by german silver clamp of refrigerator type. Throat to which door is attached to be integral with chute proper, 22-in. inside diameter and of length to bring its outer edge flush with face of finished wall (dimensions from center of chute to face of finished wall necessary). Bottom of chute to be an elbow, closed watertight with a steel door, interior surface of which is coated with glass and which is fitted with firmly closing clamp; chute to have 2-in. standard pipe outlet for drain connection. Chute to be supported by one cast iron leg at bottom and by three ⅝-in. tie rods at each floor, connected to angle irons set in steelwork of floor construction. Can be embedded in concrete floor or fastened to ordinary wood (see drawing No. 1).



Details of Pfaudler Laundry Chute

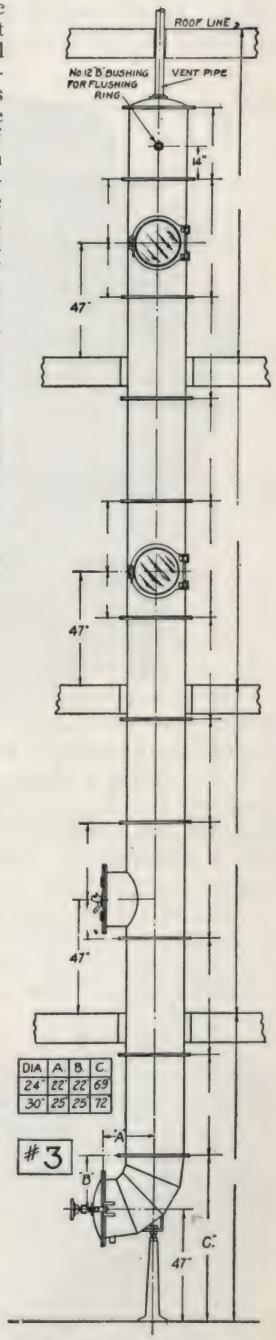
Glass Lined Steel Containers (Storage Tanks, Mixers, Cooking Kettles, etc.)

We can be of material aid to architects in helping them specify necessary equipment in such ways as laying out of dairies and creameries; equipment in sugar and molasses refining and allied fields; water storage tanks for hotels and similar institutions; equipment for the general chemical and allied industries, food and canning industries, beverage industry, etc.

Prices and Literature

Prices furnished on receipt of architect's specifications.

Descriptive literature furnished on request.



Details of Pfaudler Laundry Chute

RAYMOND MANUFACTURING COMPANY

Manufacturers of the Raymond Sterilizer-Washer

SAUGATUCK, CONN.

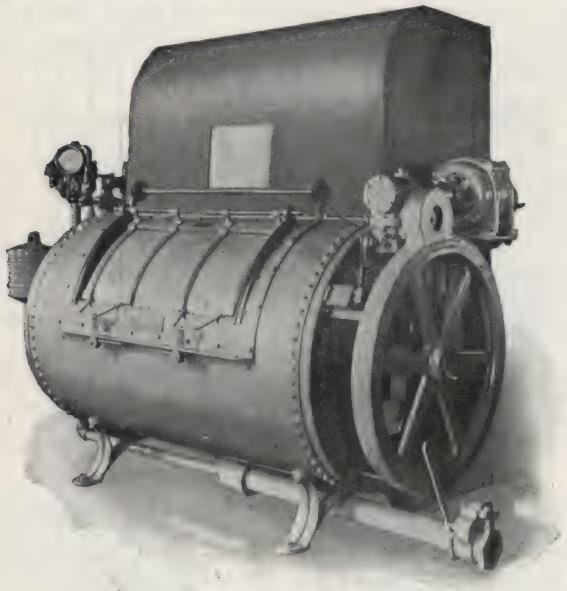
Products

The RAYMOND STERILIZER-WASHER; the RAYMOND HOUSEHOLD WASHING MACHINE.

Also manufacturers of the Raymond Flat Work Ironer.

Raymond Sterilizer-Washer

The Raymond Sterilizer-Washer is a double purpose machine, it both washes and sterilizes. This machine is built of boiler plate, and operates under 15 lbs. of steam pressure. This insures at once rapidity of operation and the perfect sterilization of the goods, as confirmed by government tests, reports of which we will be glad to furnish on request.



RAYMOND STERILIZER-WASHER

It is not intended to wholly supplant the disinfector, but the largest part of the material put through a disinfector can be thoroughly sterilized in The Raymond without the extra expense and second handling involved in the use of the big disinfector. For smaller hospitals it is found unnecessary to install a disinfector. For hospital use, the quiet running of the machine is an important factor.

Blood stained goods put through a disinfector have the stains baked in. By the use of the sterilizer-washer the stains are first washed out, and the goods sterilized all in one machine.

The door of the inner cylinder, when opened, is contained within the outer shell and dispenses with hinges and heavy lifts. The possibility of falling doors is thus removed.

The disinfectant tank is so constructed that liquid or soap can be let into the machine without opening the door or allowing any odor to come into the room.

The vent pipe is carried direct from the machine to the open air outside of the building.

The machine is furnished with disinfectant or soap tank, 4-in. discharge pipe with quick opening gate valve, safety valve, steam gauge, blow-offs and vent pipe, steam, hot and cold water connections.

Two-door Type—This machine is built like the ordinary washer but with two doors, one on either side, so that it may be placed adjacent to the partition separating the receiving or soiled linen room from the laundry proper, be loaded from this sorting room and later unloaded in the laundry proper, thus permitting only sterilized goods to reach the laundry.

When this double door arrangement is desired an opening 7 ft. high by 50 in. wide should be left in the partition, into which the metal hood furnished with this type of machine will fit.

Ample door openings for installation of laundry machinery should be provided.

SIZES OF "RAYMOND" STERILIZER-WASHERS

Size of cylinder, in.	30x40	34x50	34x60
Water Connection, in.	1¼	1½	1½
Steam Connection, in.	1	1	1
Outlet, in.	3	4	4
Diam. of pulleys, in.	15	15	15
R. P. M.	140	140	140
Width of Belts, in.	2 and 2¼	2 and 2¼	2 and 2¼
Line Shaft Pulley Diam., in.	8	8	8
Floor Space, in.	35x65	45x80	45x90
Weight, lbs.	1500	1800	2200
Size of Motor, h.p.	1½	2	3

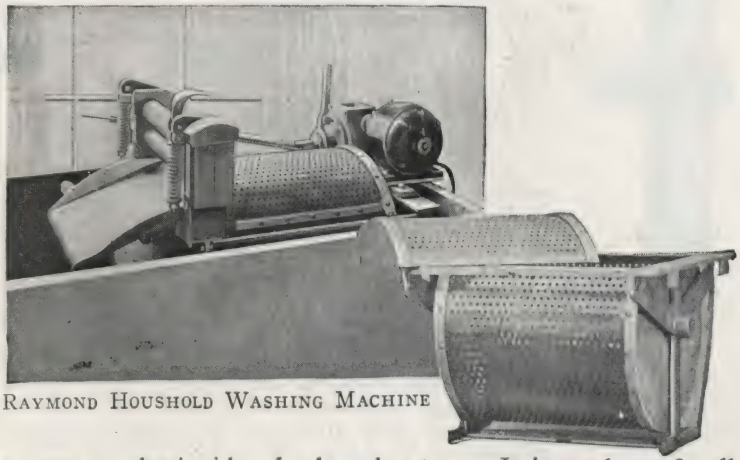
Some of its Users—

Boston, Mass.—Massachusetts General Hospital
Brooklyn, N. Y.—Navy Yard Hospital and Kingston Avenue Hospital
Chicago, Ill.—Municipal Contagious Disease Hospital
Cleveland, Ohio—U. S. Marine Hospital
New York, N. Y.—Riverside Hospital and U. S. Veterans' Hospital (Bronx, N. Y.)
Philadelphia, Pa.—St. Vincent's Hospital, Pennsylvania Hospital and U. S. P. H. S. Hospital
Washington, D. C.—Walter Reed Hospital and U. S. Coast & Geodetic Survey

Co-operation—We are always glad to co-operate, without obligation, with architects in making suggestive layouts for *complete* laundry equipment, if furnished the size of the space available for this purpose. As we specialize on hospitals, and do not seek the commercial trade, we believe we can be of service.

Raymond Household Washing Machine

The RAYMOND MANUFACTURING COMPANY also makes a household washing machine which is placed on the inside of a laundry tray. It is made to fit all standard size trays.



RAYMOND HOUSHOLD WASHING MACHINE

THE AMERICAN LAUNDRY MACHINERY CO.

EASTERN SALES DIVISION
134 West 37th Street
NEW YORK, N. Y.

SOUTHERN SALES DIVISION
Norwood Station
CINCINNATI, OHIO

WESTERN SALES DIVISION
208 West Monroe Street
CHICAGO, ILL.

PACIFIC SALES DIVISION
416 Mission Street
SAN FRANCISCO, CAL.

BOSTON, MASS. PHILADELPHIA, PA. WASHINGTON, D. C. ROCHESTER, N. Y. PITTSBURGH, PA.
ST. LOUIS, MO. KANSAS CITY, MO. LOS ANGELES, CAL. SEATTLE, WASH.

FOREIGN SALES DEPARTMENT, NORWOOD STATION, CINCINNATI, OHIO

CANADIAN FACTORY
THE CANADIAN LAUNDRY MACHINERY CO., LTD., 47-79 Sterling Road, TORONTO, ONT.
BRITISH SALES AGENCY: American Laundry Machinery Co., Ltd.,
36-38 Victoria Street, LONDON S. W.-1, ENGLAND

Products

Laundry Machinery of every description; Tahara Automatic Silver Burnishing Machines for hotels, clubs, restaurants, etc.

Also manufacturers of a Complete Line of Machinery for Cleaners and Dyers; Blue Print Ironers.

TRADE-MARK

Laundry Machinery

This line includes plants for special work such as hospitals, hotels, institutions of all kinds, as well as for private residences and commercial laundries.

Special laundry equipment is furnished for textile mill villages and industrial plants.

Service

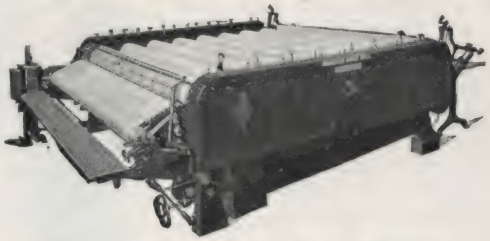
The Engineering Department will furnish, promptly, complete plans, specifications and estimates. Catalogue, or a complete set of specifications covering all "American" laundry machinery, will be sent to any architect on request.

Facilities

The American Laundry Machinery Co.'s experience in manufacturing laundry equipment extends over a period of more than 35 years and it has every facility for turning out high grade work, including the smaller as well as the larger equipment for the modern and efficient laundry.

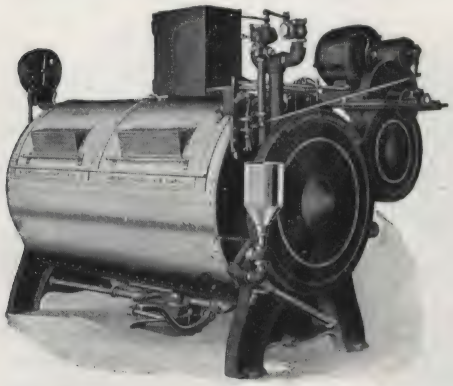
Sterilizing Washer

For hospitals, etc. Destroys all germs, bacilli, etc. Sterilization carried on in connection with regular washing. No extra handling of goods. Cylinder, 36x54 in. or 48x54 in.



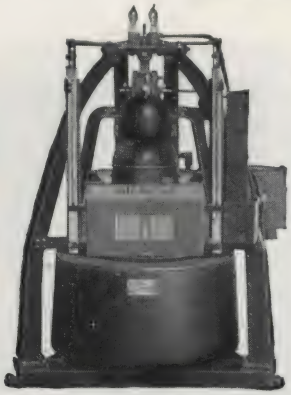
"American" Floating 6-roll Ironer

An ironing machine which will iron flat work and all kinds of wearing apparel so that 85% of it will be ready to wear. By means of very delicately set springs, pressure is applied uniformly. Rolls automatically adjust themselves to the thickness of goods passing through. A complete ironing department in itself.



Cascade Washer

Made with monel cylinder, and monel outer case; cylinder, 36 or 42 in. in diameter, and either 36, 54, 64, 72 or 84 in. in length; has capacity of 4 ordinary washers and particularly adapted for use in hotels, hospitals and institutions



American "Humatic" Extractor with Automatic Safety Cover

Inner basket revolving rapidly removes moisture by centrifugal force. Smooth running. Highly efficient. The almost human machine of the laundry industry. Safety cover. Automatic starting and stopping. Predetermined extracting time. Diameter, 40 and 48 in.

Tahara Automatic Silver Burnishing Machine

A machine for burnishing or polishing silverware without the use of injurious abrasive methods. Keeps the silverware sanitary, in good condition, and does not remove the plating. Made in a number of sizes

THE CANTON CLOTHES DRYER CO.

Manufacturers of Gas and Electric Clothes Dryers

CANTON, OHIO

Products

CLOTHES DRYERS, operated by Gas or Electricity.

TRADE-MARK

Canton Clothes Dryer

Simplicity—The Canton dryer can be set up in any convenient place in the laundry; just connect up the gas or electric current and it is ready for use. No dampers to adjust. No chimney connections required. This is an exclusive Canton feature and eliminates one of the greatest objections incident to using the old style dryer.

Sanitary and Healthful—The clothes are dried—not baked—by our patented system. A continuous circulation of hot air removes the moisture by proper ventilation and thereby bleaches and sterilizes the clothes. The natural result is that they come out sweet, clean, white and pleasing.

Capacity—The washing machine is never large enough to hold the entire washing at one time, and in selecting a clothes dryer, let the drying capacity be the determining factor and not the size of the clothes dryer. The new Canton dryer will dry clothes in approximately the same length of time as that required for washing and running through the wringer, giving dryer a greater capacity than the size of drying cabinet may indicate. Light weight clothes will dry in 30 minutes.

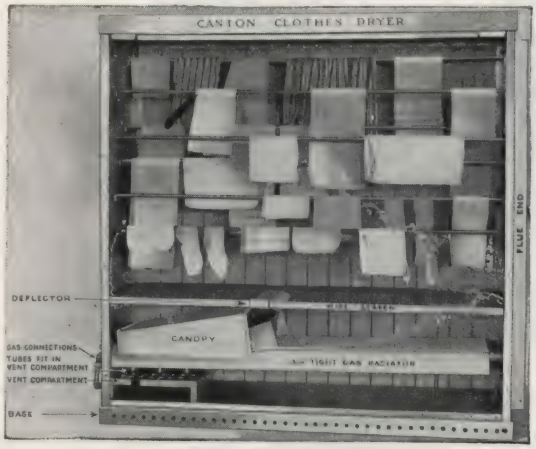
Specification Information—Architects will appreciate our unit system of construction which simplifies the installation of clothes dryers. If the ordinary size domestic washer is used, a single dryer is large enough. For apartment buildings a single dryer is specified for each set of laundry trays. This gives each family using the laundry room at one time the exclusive use of a clothes dryer.

Distinctive Features—The Canton system of heating and ventilating as embodied in both the gas and electric dryer, is the successful culmination of years of investigation and research.

Where the Canton Can Be Used

This dryer is made in one standard size but may be used singly, in any number of units or in batteries as illustrated. Dryer is specially designed for residences, apartment houses, hotels, clubs, hospitals, institutions, restaurants, post offices, fire departments, police stations, armories, mills, factories, foundries, gymnasiums, bath houses, turkish baths, barber shops, in fact any place where positive drying and sterilization of fabrics or clothing is required.

CANTON GAS CLOTHES DRYER



CANTON GAS CLOTHES DRYER
View of dryer with front removed

Sanitary Results

Snow white clothes thoroughly dried can be produced only with perfect heating and ventilation. In the Canton dryer, clothes are dried, bleached and sterilized, as there is a constant change and circulation of heated fresh air in all parts of cabinet during the entire time clothes are being dried.

Canton Electric Dryer

Our invention covers a new principle in heating and ventilating. *Without the use of a fan or mechanical device of any kind,* the Canton system conducts heat in a desired horizontal direction and utilizes electric heat waves or air currents to both heat and ventilate the dryer.

Absolutely safe and dependable. The only clothes dryer with the electric heating element enclosed within a radiator. Water or moisture laden air can not come in contact with the heating element and those using dryer can not come in contact with electric connecting wires. Standard element is for 220 volts, and by order for 110-115 volts. The current may be either alternating current or direct current.

Canton Gas Dryer

This dryer is exactly the same size and construction as the electric, excepting the substitution of gas burner equipment. Any gas dryer may be converted into an electric dryer or vice versa.

No Chimney Connection Necessary

The architect need make no provision for attaching either our gas or electric dryer to a chimney. In the first place it is not necessary with the electric, and in the second place the combustion in our gas dryer is so perfect that it consumes its own gas odors. This is a startling statement but we will guarantee that there will be no gas odors come from our gas dryer. You can write the Peoples Gas Light and Coke Co. of Chicago for confirmation of this statement. If the city ordinance compels a chimney connection, we furnish a special flue attachment.

Reasons Why the Architect Should Specify the Canton

(1) The dryer can be supplied for gas or electricity.

(2) The gas dryer needs no chimney, as the dryer consumes its own fumes (U. S. Patent granted May 3rd, 1921).

Continued on next page

(3) No flues or dampers to contend with.
(4) The floor space occupied is 20x88 in.
(5) It dries light weight clothes in 30 minutes.
(6) The clothes dried therein do not discolor.
(7) It gives your client private drying room.
(8) The clothes are dried by ventilating, not baked as in an oven.
(9) Gas fumes in the new Canton dryer are confined within a radiator and do not come in contact with the clothes—the heat is radiated.
(10) The dryer is standardized and made in one size only.
(11) The dryer is absolutely sanitary and the clothes come out thoroughly dried and sterilized and bleached.
(12) The most inexperienced can handle it.

Why Your Client Will Approve the Choice of the Canton

Your client will approve the choice of the Canton when the following labor saving and desirable economical features are understood.
(1) No lugging of heavy, back-breaking clothes baskets up and down stairs.
(2) No putting up of clothes lines.
(3) No pinning of each garment on the line.
(4) No taking of garments from the line.
(5) No taking down of clothes line.
(6) No extra work occasioned by breaking of clothes lines.
(7) No postponement of washing on account of bad weather.
(8) No rewashing of clothes soiled in drying.
(9) No mending of clothes torn by wind and clothes pins.
(10) Life of clothes is lengthened 50%.
(11) No public exhibition of family wash.

Testimonials

Marshall Field & Company states: "From tests made in our own laboratories, we have found this machine very successful. We know that it is a convenience in any home, especially during uncertain weather. The washing can be done on a certain day in the week irrespective of the atmosphere if one owns a clothes dryer of the Canton type."

The Peoples Gas Light & Coke Company, Chicago, Ill., states: "With reference to the Canton clothes dryer, we have sold this type of dryer the past 2 years and are pleased to inform you of our experience in handling it.

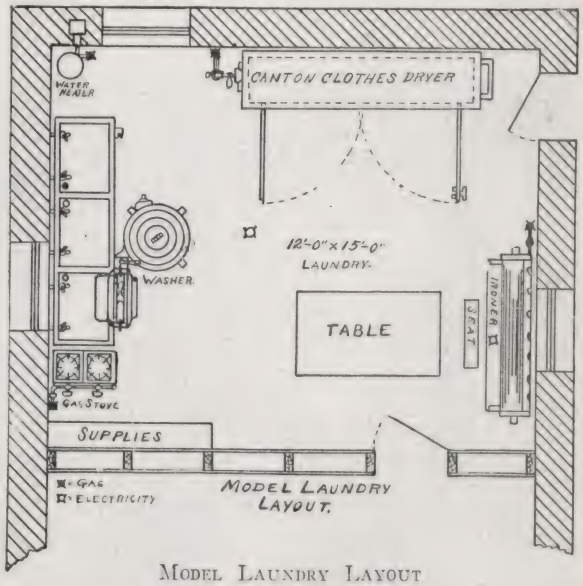
"We have operated the Canton clothes dryer in our windows during this period, demonstrating our modern laundry, washing the same linen from our restaurant every other day, and the writer finds the linen is as white and fresh looking as the day it was bought.

"Wherever we have sold this clothes dryer, it has proved satisfactory.

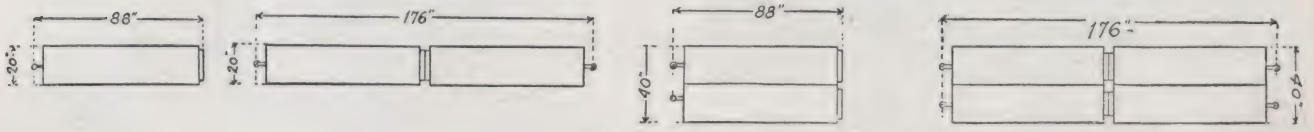
"Our sales on clothes dryers have increased many times since exhibiting this type of clothes dryer. Its simplicity and space required are attractive to our customers."

Good Housekeeping Magazine, in making laboratory tests in the Good Housekeeping Institute, New York City, have verified every claim of Canton superiority. Clothes were washed and dried continuously for months, not only without discoloring, but actually bleached and sterilized. This practical and remarkably successful efficiency test and demonstration should interest every one wanting the best clothes dryer made.

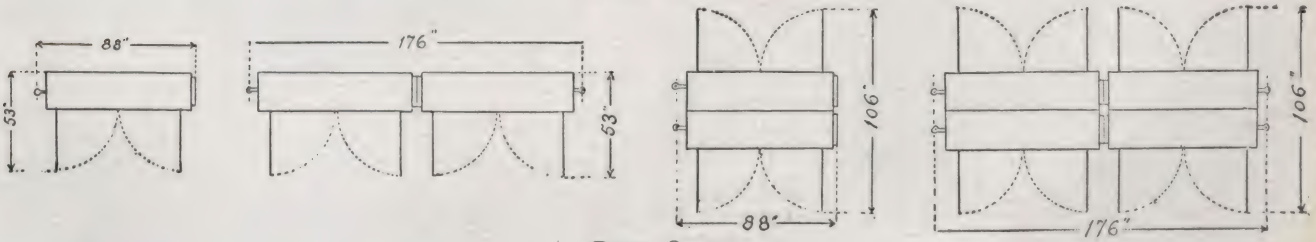
CANTON ELECTRIC CLOTHES DRYER



MODEL LAUNDRY LAYOUT



DOORS CLOSED



DOORS OPEN

One Dryer Unit — Two Dryer Unit, End to End — Two Dryer Unit, Back to Back — Four Dryer Unit, End to End

DIMENSIONS OF CANTON CLOTHES DRYERS

CHICAGO DRYER COMPANY

Laundry Room Equipment

TELEPHONE
BELMONT 0297

2210-2218 North Crawford Avenue
CHICAGO, ILL.

Products

"CHICAGO" CLOTHES DRYERS.
"CHICAGO-FRANCIS" DRYERS.
"CHICAGO" ELECTRIC WASHERS.
"CHICAGO" IRONING MACHINES.
"CHICAGO" IRONING BOARDS.
Also "Chicago" Lawn Dryers.

CHICAGO
TRADE-MARK
(Registered U. S. Pat. Off.)

Scope of Use

Especially adapted for use in residences, apartment buildings, schools, clubs, colleges, gymnasiums, hotels, hospitals, sanitariums and institutions of all kinds.

"Chicago" Dryers Adaptable to any Heating System

These dryers may be heated by means of stove suitable for burning artificial or natural gas, coal or wood; by means of interior gas heating system, steam or electricity.

All our equipments are exclusively high grade, the best that money can buy.

DRYER NO. 5909. "CHICAGO-FRANCIS" INTERIOR GAS HEATED DRYER WITH MODEL 09 GAS HEATING SYSTEM

Contains 5 racks or draws, each 9 in. wide, suitable for artificial or natural gas. No flame exposed. Only pure and clean heat enters drying cabinet.

Built in various sizes ranging from 2 racks or draws, and up. Each rack panel measures 9 in. wide. Adapted for use in residences, apartment buildings and institutions.

Gas burners are placed at base, in an interior heat retaining drum made of heavy galvanized sheet steel, so formed that the heat from the burners is retained therein, thus heating the drying cabinet with minimum gas consumption. Drum is provided with 1, 2 or more small pipe burners, depending on the size of the dryer. Each burner provided with independent shut-off valve, so that heat in the dryer may be regulated to suit conditions.

Base of drying cabinet provided with independent vent ducts, so that all moisture, etc., emanating from clothes while being dried, are carried away by natural air circulation without loss of heat in the drying cabinet. No possibility of accidents or explosions. Efficiency fully 100% to 200% over and above similar machines made by other manufacturers

Measurements and Sizes

All dryers are built to order, and are of metal construction.

Cabinets are generally built 7 ft. high and 7 ft. long, but these measurements can be varied to suit conditions of the room in which the dryer is to be placed.

The rack panels are made in different widths, viz.: 6, 7½, 9, 12 and 18 in. Each rack is equipped with proper number of hanging bars for best service, or as may be specified.

The following table gives the width of dryers containing 2 to 8 racks, inclusive, with rack panels 6, 7½, 9 and 12 in. wide each.

Measurements of larger sizes furnished on request.

No. of racks or draws	Type "W" Racks 6 in. wide each	Type "A" Racks 7½ in. wide each	Type "B" Racks 9 in. wide each	Type "C" Racks 12 in. wide each
2	19 in.	22 in.	25 in.	31 in.
3	25 in.	29½ in.	34 in.	43 in.
4	31 in.	37 in.	43 in.	55 in.
5	37 in.	44½ in.	52 in.	67 in.
6	43 in.	52 in.	61 in.	79 in.
7	49 in.	59½ in.	70 in.	91 in.
8	55 in.	67 in.	79 in.	104½ in.

Above measurements are exclusive of laundry stove. Gas stove as shown in illustration below measures 22 by 22 in. Stove suitable for burning coal or wood occupies space of 27 by 30 in.

Bulletins

For complete information send for the following bulletins, mailed free on request:

Bulletin No. 21—Clothes Dryers.
Bulletin No. 22—Washing Machines.
Bulletin No. 23—Ironing Machines.

DRYER NO. 4906. "CHICAGO-FRANCIS" COMBINED DRYER AND GAS LAUNDRY STOVE

Contains 4 racks, each 9 in. wide, with No. 06 gas stove, adapted for artificial or natural gas, as may be ordered.

Suitable for use in residences, apartment buildings and small institutions. Stove boils clothes, heats flatirons and heats the dryer by waste heat. Cost of operating stove 2c to 3½c per hour, figuring cost of gas at $1.00 per 1000 cu. ft. Will dry dryer full of clothes in 10 to 30 minutes. Built in various sizes ranging from 2 racks or draws, and up. For residences, dryer containing 3, 4 or 5 racks, each 9 in. wide, is recommended. When used in apartment buildings, it is customary to allot dryer containing 2 or 3 racks, each 9 in. wide, with each set of tubs.

Equipped with stove suitable for burning coal or wood, in lieu of gas stove when desired.

Continued on next page

"Chicago" Electric Washer and Safety Wringer, Model "D"

Especially adapted for use in residences and small institutions.

Only machine on the market with wringer equipped with automatic conveyor, for conveying clothes into rolls, and automatic safety stop, which prevents tearing of clothes, and insures absolute protection against possible accidents to operator, when wringing clothes.

Washer tub made of copper with nickeloid plating on inside. Framework is of heavy iron. Provided with water inlet for stationary water and drain connections.

Will wash clothes thoroughly clean and without injury in 10 to 15 mins. The outside of washer tub including framework finished in white enamel.

Made in various sizes, viz:

Number	Capacity	Wringer	Motor
212	9 sheets	12 in.	⅛ h.p.
214	9 sheets	14 in.	⅛ h.p.
314	12 sheets	14 in.	⅛ h.p.
414	15 sheets	14 in.	⅛ h.p.

Tested and approved by the Good Housekeeping Institute, conducted by the "Good Housekeeping Magazine"

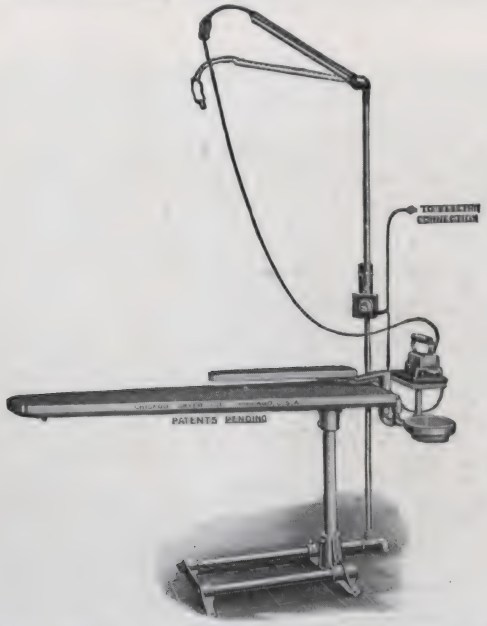
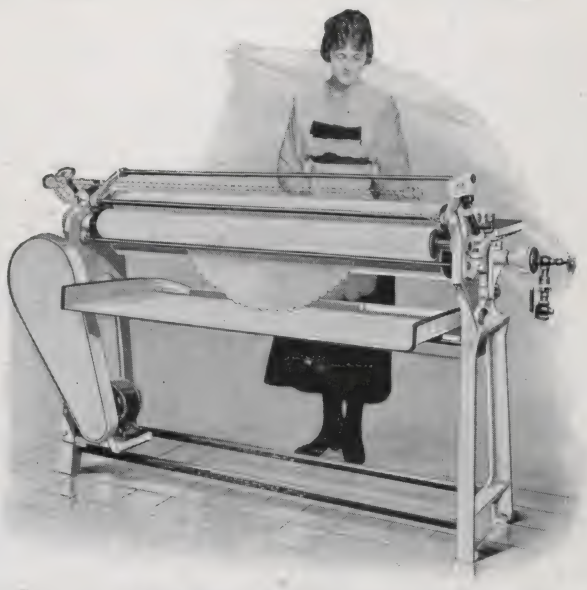


Plate No. 302. "Chicago" Ironing Board With Portable Stand

Equipped with pipe standard, snap switch, pilot light, suspension arm and connector cord. Furnished either with or without electric iron as may be ordered.

Ironing board measures 59 in. long by 1¾ in. thick. Large end measures 18½ in. wide and tapers to 10 in. at small end. Underside of board provided with patented attachment for holding padding. Base and stand finished in white enamel. Can furnish above equipment without electric attachments, in which event it is designated as No. 300 "Chicago" ironing board and stand.

Tested and approved by the Good Housekeeping Institute conducted by the "Good Housekeeping Magazine"



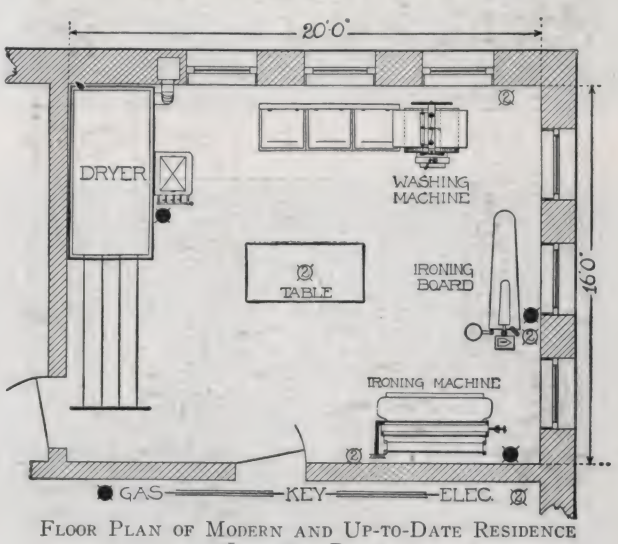
"Chicago" Three-Roll Ironing Machine With Motor Attached

Heated by means of gas, gasoline or electricity. Suitable for ironing all kinds of flat work, such as sheets, pillow cases, napkins, towels, laces, embroideries, etc.

Equipped with 1 heated, and 2 compression rolls. All rolls revolve, which positively eliminates any possible wear on the linens during process of ironing.

Made in various sizes, with rolls 50, 60 and 75 in. long. Equipped with ⅛ h.p. electric motor, which may be connected to any lighting circuit. For residences the 50-in. size is recommended. Each machine is sold under absolute and positive guarantee to accomplish entirely satisfactory work. Framework of ironing machine finished in white enamel.

Tested and approved by the Good Housekeeping Institute conducted by the "Good Housekeeping Magazine"



Floor Plan of Modern and Up-to-Date Residence Laundry Room

Showing installation of "Chicago" laundry appliances

No. 314 Model "D" "Chicago" electric washer and safety wringer.

"Chicago-Francis" combined dryer and laundry stove, containing 4 racks or draws, each 9 in. wide. Dryer may be equipped with stove suitable for coal, wood, artificial or natural gas, as may be specified.

50-in. "Chicago" three-roll ironing machine with motor attached.

No. 302 "Chicago" ironing board complete, including electrically heated flatiron.

Above appliances may be had in smaller or larger sizes, thus enabling us to provide suitable appliances from the smallest to the largest residence. Larger sizes are adapted for small institutions.

Co-operative Service

Individual machines or complete outfits furnished as may be desired. Send a plan of the laundry room, and blue prints will be furnished showing how the various appliances may be installed and the space each device will occupy. All plans and blue prints, including estimate, furnished free without any obligations whatsoever.

DOMESTIC LAUNDRY EQUIPMENT CORPORATION

Chicago Clothes Dryers; American Clothes Dryers

TELEPHONE
CHELSEA 8560

224-232 West 26th Street
NEW YORK, N. Y.

Products

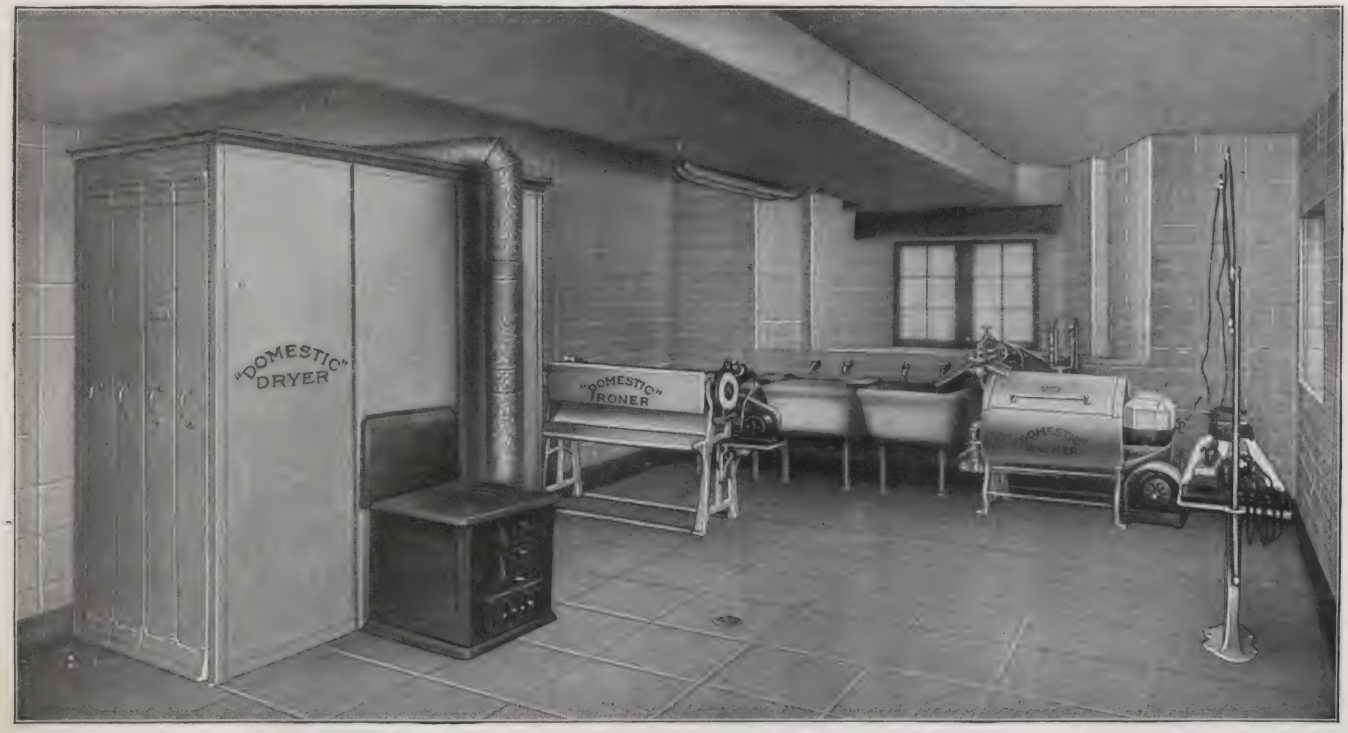
Every Device for the Domestic Laundry in Single Units or Complete Plants. COMPLETE LAUNDRY and "LAUNDRYETTE" EQUIPMENTS for the home, apartments, clubs and small institutions.

Chicago and Domestic Clothes Dryers constructed to fit any requirements; Chicago and Domestic Clothes Washers; Chicago and Domestic Ironing Machines.

Special made Laundry, Skirt and Valeting Tables with Electric or Gas Equipment.

Gas, Steam or Electric Heated Clothes Boilers, Soap Tanks and Starch Cookers.

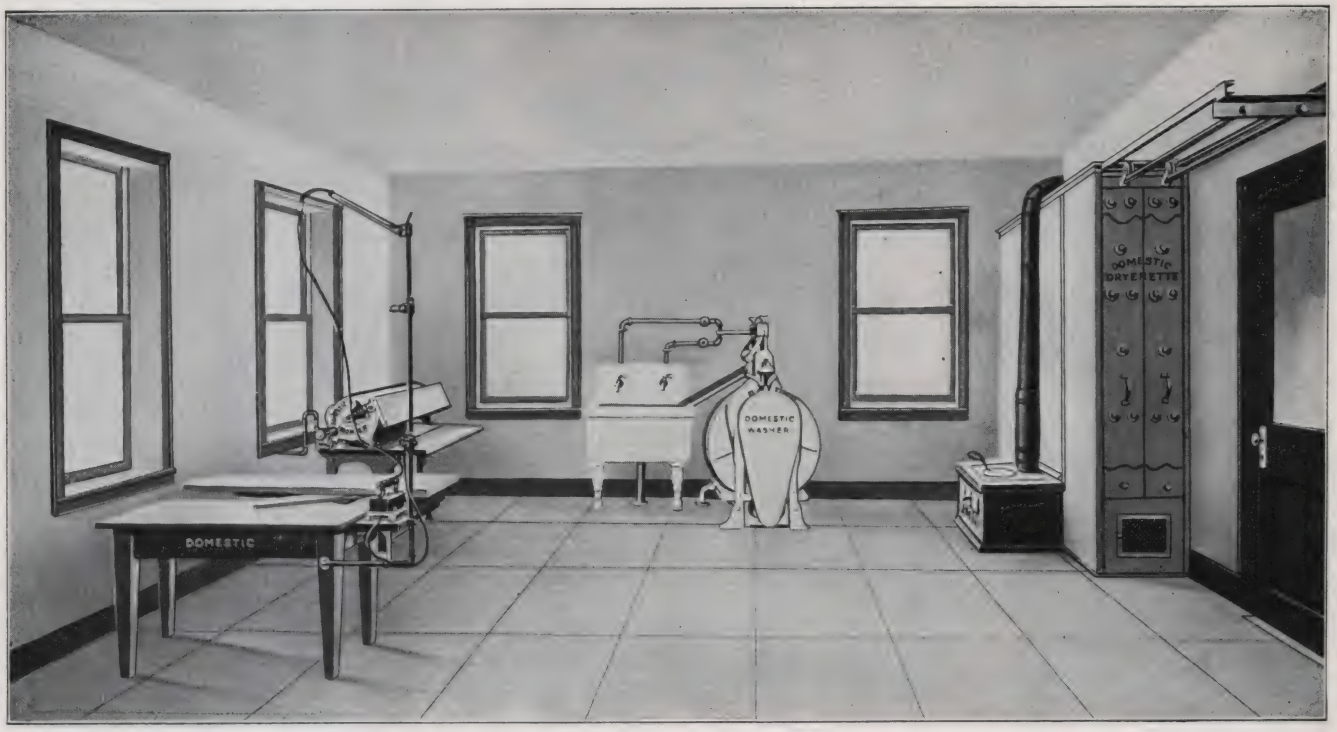
Laundry Supply and Linen Cabinets.



TWO MODERN LAUNDRY ROOMS AND EQUIPMENTS

"Domestic" laundry equipments for residences, built and designed in all sizes to suit individual requirements. If plan of room and number of people to be provided for is received, suggestions and quotations covering appropriate installation will be forwarded

Continued on next page



DOMESTIC "LAUNDRYETTE" EQUIPMENT

Especially designed for the home of not more than 8 rooms, consisting of "Laundryette" washer, "Dryerette" and laundry stove (coal or gas), "Laundryette" ironer and Multiple service "Laundryette" table, shipped f.o.b. factory, complete with full directions for installing. Larger equipments for more extensive homes. Write for prices. Give electric voltage and current, also whether gas is available

Experience

Twenty-five years of actual knowledge of, and experience with, the requirements in this line have caused us to create and develop the most efficient and highest type of laundry devices for the domestic service, and our many complete equipment installations in the finest homes have won for us the distinction of being specialists in this field.

Note to Architects

We solicit the privilege of assisting and co-operating in the planning and proper arrangement of laundry rooms for residences or institutions. Send in blue print or tracing of space to be allotted to the purpose and a general idea of the requirements, and we will return plans, specifications, illustrations and prices.

INSTITUTION OR HOSPITAL LAUNDRY ROOM AND EQUIPMENT

A comprehensive "Domestic" laundry plant, designed for institutions or hospitals where high pressure steam is not available

HILL CLOTHES DRYER COMPANY

58 Central Street
WORCESTER, MASS.

Products

CLOTHES DRYING APPARATUS, Outdoor and Indoor Types; ASH SIFTERS.

Types, Hill Drying Apparatus

Hill sanitary drying cabinets operated by artificial heat for indoor drying and the famous Hill dryers for out-of-door use.

Hill Sanitary Drying Cabinets

Consist of a series of three or more movable clothes racks mounted on overhead carriers and enclosed in a metal cabinet, which is provided with a modern scientific heating and ventilation system.

The racks are arranged so that they can be easily drawn from the cabinet for loading, and inserted for drying purposes.

System—Consists of (a) a heating apparatus and (b) a heating, ventilating and drying cabinet, the lower part of which is divided into two sections by a separating plate.

Fresh air is drawn into the cabinet through a grated opening above the separating plate and heated by contact with radiators. The heated air rises, expands, and forces the steam and moisture to fall and be drawn under the separating plate and removed through a ventilating duct at the bottom of the cabinet.

The chimney draft is utilized to force fresh air into, and withdraw the vitiated air from, the cabinet, and causes a continuous circulation of dry, heated, pure air during the drying process.

Construction of Cabinets—*Casings*—The casing, or body, of heavy galvanized sheet steel, paneled to produce a pleasing appearance and finished with an ornamental metal cornice, is secured to a substantial framework of 3x3x$\frac{3}{16}$-in. and 2x2x⅛-in. rolled steel angles, firmly bolted together and braced.

The casings are ordinarily made of single thickness, but are also made double thickness with an intervening air space, or double with an asbestos core between the plates, when desired.

Racks—Each consists of well constructed, heavy, galvanized sheet steel ends with 1-in. angles on edges (one of which acts as the door to close the cabinet), provided with brass or wrought iron handles for operating and separated by special ventilated hanging bars, correctly spaced and arranged to hold the wash. Each end of each rack is hung to an overhead hanging rod secured to the framework of the cabinet, operating at the top on metal rollers with antifriction ball bearings and at the bottom in, and controlled by, Hill's patent adjustable, ball bearing, guide rollers—an exclusive feature of the Hill dryer, which insures easy, positive and noiseless operation.

Radiators—Are of heavy cast iron, separated from the drying chamber by a screen and supported on substantial standards.

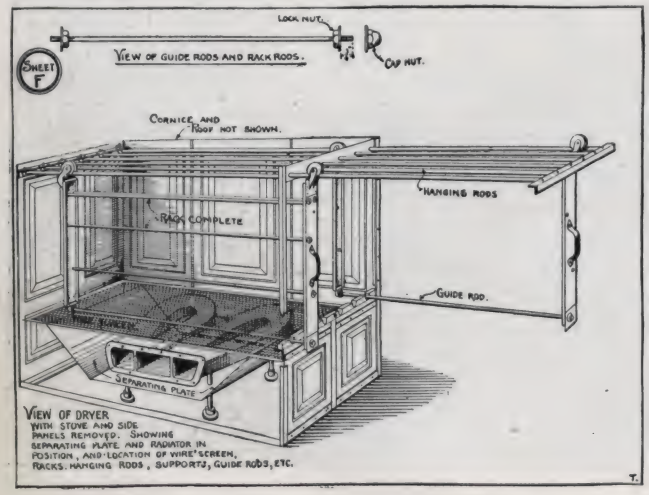
Separator Plate—Is of heavy galvanized sheet steel.

Ventilating Pipes—Are of galvanized iron.

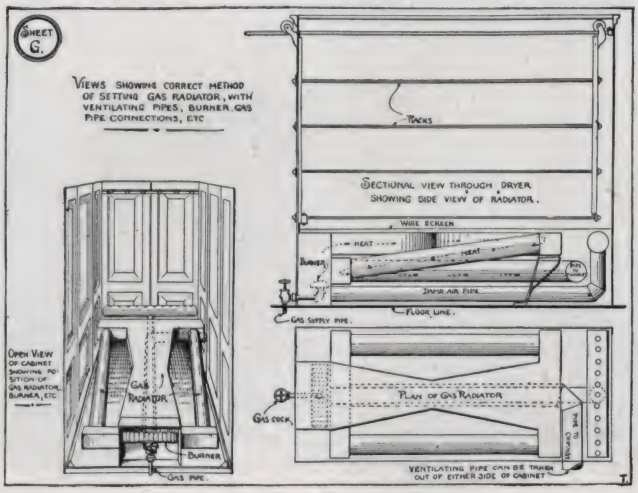
Styles—*Combination Dryer and Laundry Stove*—Stoves are especially constructed to heat and ventilate

COMBINATION CLOTHES DRYER AND LAUNDRY STOVE

GAS HEATED CLOTHES DRYER



DETAILS OF DRYERS FOR LAUNDRY STOVES



DETAILS OF GAS HEATED DRYER

Continued on next page

the cabinet, boil the clothes, heat the irons, etc. The Hill sanitary dryer is the only one equipped with cast iron radiators.

Gas Heated Dryer—In the gas heated cabinet without laundry stove, the gas flame is confined on the inside of the radiators, no open flame burners with deflecting pans being used.

Steam Heated Dryers—Cabinets are also made for drying by the use of steam heated coils.

Sizes—The standard size of the drying cabinet is 7 ft. high and 7 ft. long, exclusive of the space where the racks pull out. This requires a floor space of 14 ft.—allowing the same amount of space in front of dryer as the length or depth of cabinet. Width varies according to the number of racks specified. Racks are 7, 9 and 12 in. wide.

As all dryers are made to order, the height and length can be varied to fit any space.

WIDTH OF DRYERS, NUMBER OF RACKS AND DIMENSIONS

Width of racks, in.	Number of racks or draws							
	3	4	5	6	7	8	9	10
	Total width in inches							
7	27	34	41	48	55	62	69	76
9	33	42	51	60	69	78	87	96
12	42	54	66	78	100	112	124	136

Widths are exclusive of laundry stove, which is 27 in. wide and 30 in. deep. Measurements of wider racks and larger size cabinets will be furnished on request.

Hill Outdoor Dryers

Hill's Champion Lawn Dryer—Consists of a standard (either wood post painted or steel tubing post galvanized, as called for) set in a socket in the ground, and capped with a collapsible and removable reel locked to the post or upright by a patented device, which makes it impossible for the reels to be blown or taken off without first raising the brace head (which unlocks the reel and permits its easy removal).

The standard is also easily removed from the ground socket which is closed by an iron cover. All castings are of best refined malleable iron, galvanized.

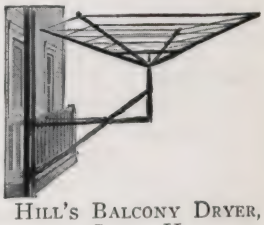
Sizes—No. 1: 4 arms, 6 ft. long equals 100-ft. line. No. 2: 5 arms, 6 ft. long equals 115-ft. line. No. 3: 5 arms, 7 ft. long equals 150-ft. line.

Special sizes are made to order.

Hill's Champion Clothes Dryer for Lawns

Hill's Balcony Dryers—Made in various styles to suit requirements. The swing arm is of 1⅛-in. steel, and when properly put up will support 2000 lbs. Reels are similar to those for lawn dryers, are detachable and collapsible, and have the same locking and unlocking arrangements.

Style H—For hanging to piazza or veranda posts or from sides of buildings, to swing in for easy filling of the rack arms and to swing out clear of veranda, fire escape or window when lines are filled.



Hill's Balcony Dryer, Style H

Style D—To meet the demand for a dryer to swing out over walks and driveways where the underbracket dryer can not be used.

Sizes—Regular Balcony Dryers have 4 arms, 5 ft., 6 in. long and hold 110 ft. of line. Extreme distance of spread for No. 1 is 11 ft., for No. 0 is 10 ft. If space available is less than 10 ft., the dryer can be hooked so as not to swing out at right angles.

Special sizes are made to order.

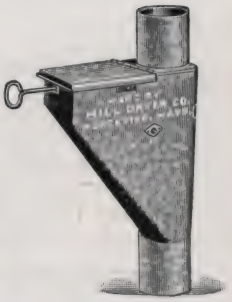
Hill's Roof Clothes Dryers—For flat and apartment houses. Framework is of steel tubing secured to roof by an approved device arranged to fit the slope of any roof. Reels have same collapsible, removable and locking qualities as other dryers.

Hill's Roof Dryers

Hill Shaker Ash Sifter

A chute sifter designed for apartments. Made of heavy galvanized wire and swings on bail, so that no wear comes on the sieve. Can be set in a corner and occupies very small space.

The chute which is furnished for connecting Hill sifters is 8 in. in diameter and is made of galvanized iron and provided with a galvanized iron collar for each floor.



Hill Shaker Ash Sifter

Hill "Hustler" Ash Sifter

A rotary sifter made of galvanized iron with a heavy galvanized wire cylinder sieve. No. 1 holds a hodful of ashes, is designed for stove and small furnace use and fits an 18-in. iron can or flour barrel. No. 2 has twice the capacity of No. 1 and fits a 20-in. iron can or sugar barrel.

Hill "Hustler" Ash Sifter

HILL LAUNDRY EQUIPMENT CO., INC.

70-80 Sixth Street
LONG ISLAND CITY, N. Y.

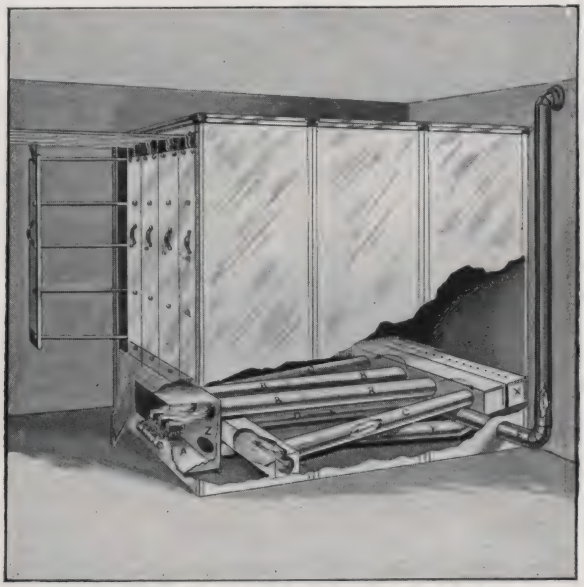
Products

CLOTHES DRYERS heated by gas, coal stove, steam and electricity.

Also manufacturers of General Laundry Equipment for use in private homes, apartment houses, club houses, hotels and institutions.

Hill Clothes Dryers

In the Hill gas heated dryer radiated heat only is used. Gas burners are confined within an airtight radiator making it impossible for odors of combustion and gas fumes to come in contact with the articles being dried.

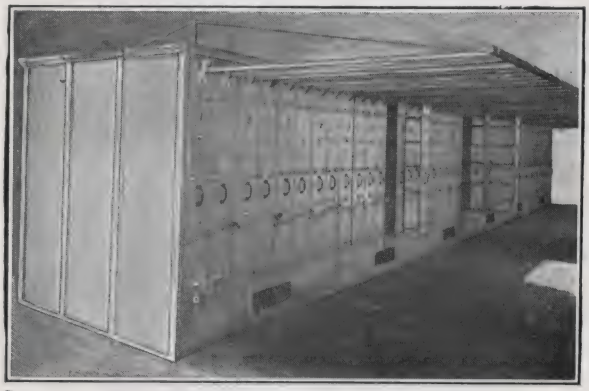


SECTIONAL VIEW OF GAS RADIATOR HEATED CLOTHES DRYER

The coal stove heated dryer which is shown below is for use in places where gas is not available. The stove heating unit being outside, the dryer proper may be used to heat water, boil clothes and heat flat irons in addition to drying the clothes.

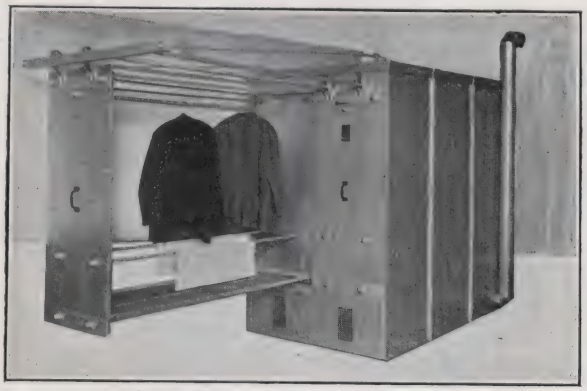
DRYING CABINET AND LAUNDRY STOVE

A steam or gas heated dryer for use in apartment houses is also made. The dryer is divided into compartments by partitions and each compartment is equipped with a locking bar and padlock, and is numbered with a brass figure.



STEAM OR GAS HEATED DRYER FOR APARTMENT HOUSES

Many of our dryers have been installed in country clubs, athletic club houses and in numerous other clubs for the drying of outer garments. The racks are 24 in. wide and are of sufficient width to allow the use of the largest garment hanger. This type of dryer can be heated by gas, steam, coal stove or electricity.



CLUB HOUSE GARMENT DRYER

Sizes

We can furnish *any size* and style dryer possible to manufacture.

Standard dryer is *7 ft. high and 7 ft. deep*, exclusive of space where racks pull out. Requires a floor space of 14 ft., allowing same space in front of dryer as the depth of cabinet. If standard size dryer can not be installed, cabinet can be made to fit any space or laundry room condition. The width depends on the number of racks in cabinet and the width of each rack. Dryers are made with racks 7, 9 and 12 in. wide. Measurements of wider racks and larger size cabinets will be furnished on request.

WIDTH OF DRYERS, NUMBER OF RACKS AND DIMENSIONS

Width of racks, in.	Number of racks or draws							
	3	4	5	6	7	8	9	10
	Total width, in.							
7	27	34	41	48	55	62	69	76
9	33	42	51	60	69	78	87	96
12	42	54	66	78	90	102	114	126

Widths are exclusive of laundry stove, which is 27 in. wide and 30 in. deep. Measurements of wider racks and larger size cabinets will be furnished on request. Dryers made with single walls, and with walls double, and with asbestos filler between walls.

AMERICAN MAILING DEVICE CORPORATION

Manufacturers of Mail Chutes, Parcels Post Chutes and Mail Boxes

GENERAL OFFICES AND FACTORY

TELEPHONE
STUYVESANT 5162, 5163

203 East 12th Street
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Wrigley Building
ST. LOUIS, MO., 16th and O'Fallon Streets
ATLANTA, GA., Candler Building
SAN FRANCISCO, CAL., 523 Market Street
DENVER, COLO., 1534 Blake Street
MINNEAPOLIS, MINN., Metropolitan Bank Building
SEATTLE, WASH., 508 Westlake North
INDIANAPOLIS, IND., 114 East Washington Street
DALLAS, TEX., Slaughter Building
KANSAS CITY, MO., Mutual Building
TACOMA, WASH., 1177 Dock Street
PHILADELPHIA, PA., Franklin Trust Building
SALT LAKE CITY, UTAH, Dooly Building
SPOKANE, WASH., 164 South Madison Street
LOS ANGELES, CAL., 331 East Fourth Street
PORTLAND, ORE., 45 Fourth Street
WASHINGTON, D. C., Woodward Building
BOSTON, MASS., 12 Pearl Street
PITTSBURGH, PA., 413 Fourth Avenue
DETROIT, MICH., Penobscot Building
CLEVELAND, OHIO, Hippodrome Annex
OMAHA, NEBR., Paxton Building
HELENA, MONT., Power Block Annex
NEW ORLEANS, LA., 730 Perdido Street
CINCINNATI, OHIO, 206 West Court Street

Products

TYPE "L," NON-CLOGGING MAIL CHUTES with removable glass panels, and RECEIVING BOXES for United States Free Collection Service for all classes of buildings.

Also U. S. Parcels Post Chutes.

Patents

This company is owner of United States patents for its products.

Authorization

The use of this company's products is authorized by special Act of Congress under the Rules and Regulations of the Post Office Department.

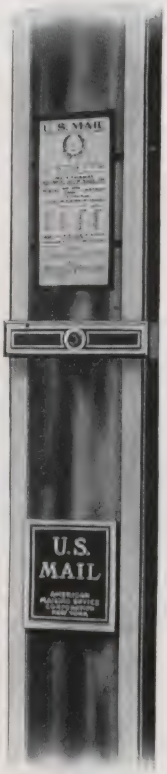
Approvals

United States Post Office Department, Treasury Department, and Building Data League.

Specifications

Where a standard mail chute installation, at a moderate cost, is desired, use the following specifications:

Backing to consist of 2x2x¼-in. steel angles, securely fastened, forming rigid support for the mail chute; to be finished two coats of dead black, or as directed. The necessary adjustable galvanized iron floor sleeves to be furnished and properly attached to this framework.



TYPE "L" MAIL CHUTE

The mail chute to be Type "L," AMERICAN MAILING DEVICE CORPORATION manufacture, with front fittings throughout—including subbase bands, mouldings, mailing pockets, lock bars, neckpieces and ceiling collars—to be bronze, neatly drawn or cast, as the case may be, finished slightly oxidized or "statuary" bronze finish, of color as selected, and lacquered. The mail chute and backing to extend from the top of the receiving box in the first (entrance) story, through all floors, terminating at a point 4 ft. 9 in. above the finished ....(top) story. On all stories above the first (entrance), the mail chute to have a mailing pocket.

The receiving box to be of stock design, No. 1214, AMERICAN MAILING DEVICE CORPORATION manufacture, of solid bronze (or electrobronze plated, except mouldings and castings where the most wear comes, which will be solid bronze). Receiving box to be of ample capacity required to accommodate the mail matter.

The entire work to be executed to the satisfaction of the architects and owners and in strict accordance with the Regulations of the United States Post Office Department.

Installation

Equipment furnished and installed in any part of the world by this company.

Receiving Boxes

Receiving boxes are made from a large stock of standard designs and also from special designs of architects.

1214 STANDARD RECEIVING BOX

Prizes

Gold Medal—Panama-Pacific Exposition, San Francisco, Cal., 1915.

First Prize—Northwest Building Material Exhibit, Minneapolis, Minn.

First Prize—Permanent Building Exhibit, Chicago, Ill.

ESTABLISHED 1883

CUTLER MAIL CHUTE COMPANY

INCORPORATED 1909

GENERAL OFFICES
Cutler Building
ROCHESTER, N. Y.

NEW YORK SERVICE STATION
161 Washington Street

FACTORY
ROCHESTER, N. Y.

(Address all Correspondence to General Offices)

AGENCIES IN PRINCIPAL CITIES

Copyright, 1922, by CUTLER MAIL CHUTE COMPANY

Product and Service

The manufacture and installation of the CUTLER MAIL CHUTE.

Cutler Achievement

The Cutler brothers invented and patented the modern method of mailing letters from the upper stories of buildings in 1883. In 1884 four Cutler Mail Chutes were installed; at the present time there are few important high buildings in the United States which are not equipped with Cutler Mail Chutes. In addition they are in use in many foreign countries, including: Japan, China, India, Transvaal, South Africa, Australia, and Argentina.

Cutler Quality

The name "Cutler" stands for the highest quality of design, workmanship and service.

The design is simple, substantial and elegant, and has a refined architectural and official character which is appreciated and much commended by architects.

The workmanship is the highest class metal work which can be produced. The Cutler factory at Rochester, N. Y., was designed, built and equipped exclusively for the manufacture of the company's *one* product—*The Cutler Mail Chute.*

A complete organization and an experience of 39 years permits the maintenance of the Cutler quality of work and prompt and satisfactory completion of contracts.

United States Post Office Requirements

When installed in connection with the United States Free Collection Service, this work is subject to the Regulations of the Post Office Department. Among the rules most affecting architects are the following:

Mail box must not be placed more than 50 ft. from main entrance of building, except under special conditions. Mail chute must run through a public hall, or premises freely accessible to the public and post office authorities. It must not be run behind a partition or elevator screen.

Cutler Mail Chute (Model F)

The Cutler Mail Chute in its standard form is known as Model F.

Model F is substantial, simple, practicable. Its interior (under government lock) is quickly and easily accessible to authorized persons, as the front is removable in convenient sections.

The fronts are secured at the ends only and are set in, not on, the chute channel, so that the joint is covered, and the panels can not be pried open. The removal and particularly the replacement of the fronts is therefore not complicated; by turning the key in any one of the locks, the two adjoining panels are released and either or both of them can be removed and replaced as desired. This, in a story of ordinary height, permits a person standing on the floor to remove the entire front.

Standard Finish—Consists of steel chute channels (sides and back of chute) in dead black baked enamel; caps, bases, mailing pockets and frames of glass fronts are in bronze, slightly oxidized or statuary bronze color.

Bronze Finish—Model F is also made with all exposed parts in bronze. In this construction the sides of the chute channels are covered with sheet bronze. It is not unusual to use this finish in the first story, combined with the standard finish in the upper stories.

Mail Boxes—The mail box furnished with the standard finish is, for buildings of moderate size, the No. 1165 (see illustration) made of heavy cold rolled steel, duplex electro-bronze plated, with solid bronze mouldings where the most wear comes.

No. 1165 is also furnished in solid bronze.

Stock boxes are recommended where it is necessary to have a low figure. Special and semispecial designs can also be furnished. In the semispecial designs stock models and patterns are used in combination with new details as may be necessary to complete a consistent design.

U. S. MAIL BOX, DESIGN NO. 1165
Furnished with standard equipment

Installation

The CUTLER MAIL CHUTE COMPANY erects its work complete, including steel angle supports, but *not* including openings through floors and the repairing and finishing of plaster and other materials coming in contact with the chute.

MODEL F
Full story

Continued on next page

The Post Office Department requires from us scrupulous observance of its regulations with regard to the installation and use of mail chutes in buildings, and we are under a bond in a large penal sum to secure such observance.

Specifications

Note: Rough openings through floors are not included in the mail chute contract, and are otherwise provided for together with the items of general cutting and patching and repairing of plaster.

When concrete construction is used, openings should be formed by setting centers or curb boxes (6x12 in.) when concrete is poured.

(1) **Mail Chute Equipment**—Mail Chute Equipment where indicated on drawing shall be the Cutler Mail Chute Equipment. To be manufactured and installed complete, including supports, by the CUTLER MAIL CHUTE COMPANY, Rochester, N. Y., as follows:

(2) Supporting frame to be of 2x2x¼ in. steel angles, securely fastened, extending from the floor or top of the mail box in the first (ground) story to a point 4 ft. 8 in. above the finished floor in the .... (top) story, and there finished by neatly mitering and returning the angle across the top. This frame to be plumb and flush in all stories, and sufficiently rigid to form a suitable support for the Mail Chute. Finish to be 2 coats of dead black or color to match elevator screen, as directed.

(3) Furnish and erect on the steel frame described above (one) Cutler Mail Chute, Model F, and (one) (special) U. S. Mail Box. The Mail Box to be located in the first (ground) story, and the Mail Chute, properly connected with and extending from the top of the Mail Box through .... stories and 4 ft. 7 in. into the .... (top) story, with openings for mail in each of these stories.

DETAIL OF MODEL F TYPE
Unlocked, panels released, and lower panel removed

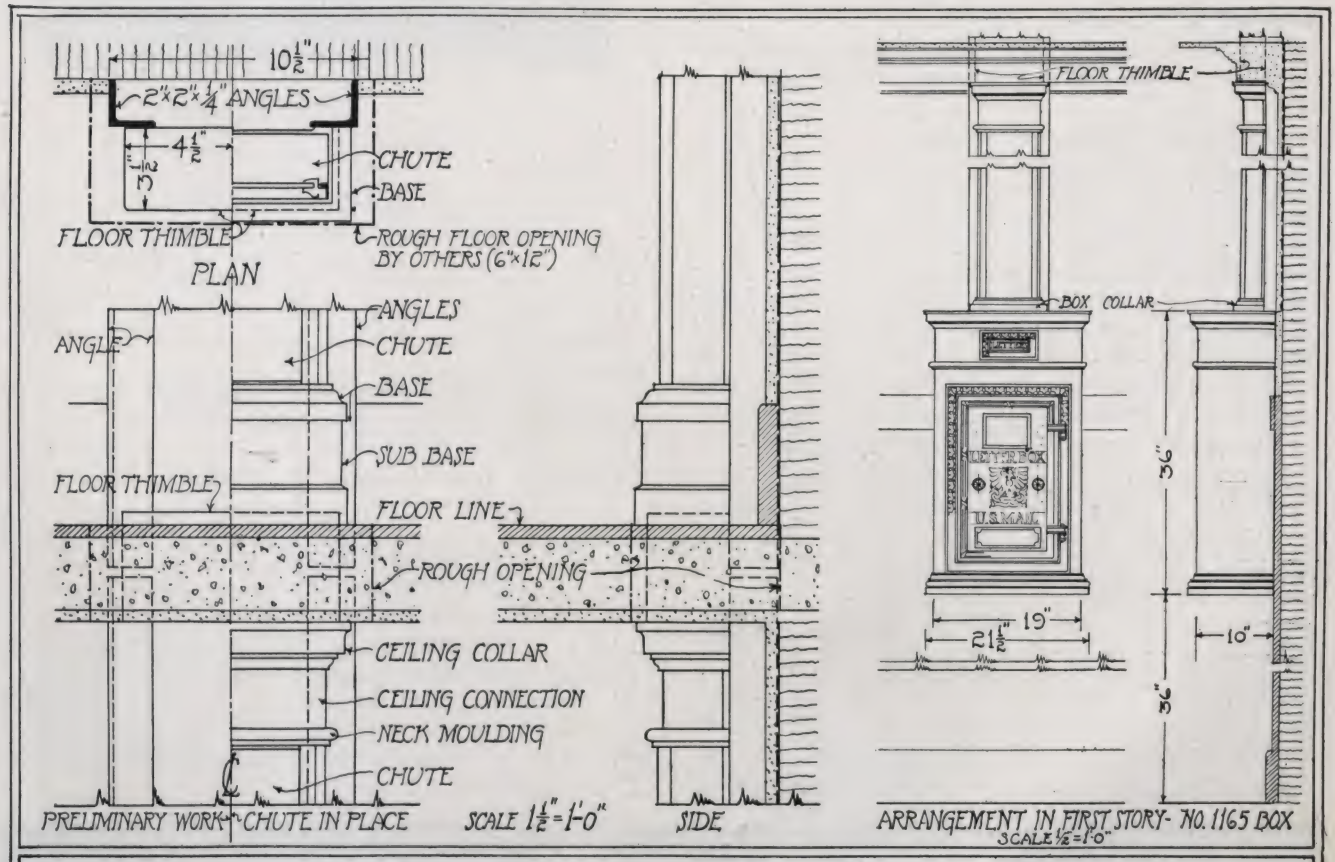
(4) Mail Chute to be constructed of No. 20 U. S. gauge cold rolled steel formed in channels with removable panels of plate glass, set in frames of bronze and secured in place by the standard Cutler U. S. Mail Chute locks with keys in the hands of the Post Office authorities.

(5) Mail Box to be of design No. 1165, 36x21½x11¼ in. over all, electrobronze plated, with mouldings of bronze. Finish of Mail Chute in all stories to be standard, steel chute channels in dead black baked enamel with fittings in bronze. All bronze surfaces to be finished slightly oxidized or statuary bronze color and lacquered.

(6) Work to be done to the satisfaction and acceptance of the architects, ...; in strict accordance with the regulations of the Post Office Department, and installed with the approval of the Postmaster of ..... Any and all defects in workmanship or material developing within 1 year from date of completion, to be made good without charge.

Note: If bronze finish is desired in the first story, substitute the following paragraph for paragraph (5) above:

Mail Box to be of bronze from design No. 1165, ... Exposed parts of Mail Chute and supporting angles in first story to be of bronze, construction and finish of Mail Chute in upper stories to be standard, steel chute channels in dull black enamel with fittings in bronze. All bronze surfaces to be finished slightly oxidized or statuary bronze color and lacquered.



GENERAL INSTALLATION DETAILS CUTLER MAIL CHUTE

B. L. AKINS, INC.

FORMERLY BUILDING DIRECTORIES, BULLETIN & SIGN CO., INC.

Manufacturers of Building Directories and Bulletin Boards

TELEPHONE
BRYANT 2828-2829

118 West 43rd Street
NEW YORK. N. Y.

BRANCH OFFICES IN PRINCIPAL CITIES

Products

BUILDING DIRECTORIES; "MILLER" IN-AND-OUT BOARDS; CORK BULLETIN BOARDS; ANNOUNCEMENT BOARDS.

A Multitude of Uses

Building Directories and Floor Directories—For office buildings, banks, hotels, clubs and fraternal organizations, department stores, hospitals, schools and colleges, business departments, post offices and other public buildings.

Bulletin and Announcement Boards—For railroad and steamship schedules, churches, theater ticket agencies, rosters, menus, programmes.

Statistical Boards—Sales record tabulations, factory production records, hospital and institutional census records, fire department calls, competitive records, stock quotations.

Types of Building Directories

"Akins" Type—With improved changeable name strips—the "scientific" directory board.

"Greeley" Type—With individual, changeable letters—the most flexible, "all purpose" directory system.

"Miller" Type—With changeable printed strips—special for "in-and-out" boards.

Note: All boards sold outright and service maintained or furnished on a rental basis if so desired.

"Akins" Type Building Directories

Consist of removable strips, machine made with white letters on a black background. The letters are automatically spaced, insuring perfect alignment. The process used produces an effect of neatness and "class" impossible with handmade strips. The strips are inserted into a metal back and locked by removable doors of cold rolled steel, fitted with plain or beveled plate glass. In making changes, it is only necessary to remove the doors with a key, leaving all name strips in place, so that operator is always working from the front, making alphabetical mistakes improbable. *This method of making changes is a distinct advance over any other system,* since it permits changes to be made with one operation, allowing the directory board to be in full use while changes are being made.

Additional strips for changes are supplied promptly at a nominal cost.

Standard sizes of doors, 7½ by 26 in. and 7½ by 32 in. Special sizes to meet any requirements.

SIZES AND CAPACITIES OF "AKINS" DIRECTORIES

DOORS 7½ BY 26 INCHES

Number of doors	2	3	4	5	6	7	8
Sight size Height, in.	26	26	26	26	26	26	26
Sight size Width, in.	15	22½	30	37½	45	52½	60
Capacity Style A*	80	140	200	260	320	380	440
Capacity Style B*	50	90	130	170	210	250	290

DOORS 7½ BY 32 INCHES

Number of doors	2	3	4	5	6	7	8
Sight size Height, in.	32	32	32	32	32	32	32
Sight size Width, in.	15	22½	30	37½	45	52½	60
Capacity Style A*	100	170	240	310	380	450	520
Capacity Style B*	75	125	175	225	275	325	375

Style "A" strip is ⅜ in. wide, ¼ in. letters. *Style "B" strip is $\frac{9}{16}$ in. wide, ⅜ in. letters.
Table figures actual name capacity. Alphabet space allowed in addition.

FIG. 1. "AKINS" TYPE DIRECTORY
Stock design No. 256. Bronze frame

"Greeley" Type Building Directories

Offer an individual changeable letter system consisting of a grooved backboard into which individual letters are set and held in place by tongues which slide into the grooves. There are 3 styles: Style No. 1 is a solid, grooved, broadcloth covered board (Fig. 3); Styles Nos. 2 and 3 consist of unit interchangeable grooved strips fitted into the bulletin frame (Fig. 4). The principle of applying letters is the same in all styles. *The letters, having tongues top and bottom, can never be set in any but an upright position and will align perfectly.*

FIG. 2. STRIP FOR "AKINS" DIRECTORY, STYLE A, EXACT SIZE

Continued on next page

Style No. 1 is made of well seasoned kiln dried wood free from knots, and ribbed and reinforced in an improved manner to prevent warping. Especially adapted for directory and announcement boards of all kinds. See Fig. 4 for description of Styles Nos. 2 and 3.

The letters are convex faced and are stamped in one piece (including the tongue grooves) from half-hard brass and covered with a special ivory white enamel. Special colors to order. Sizes, ¼, ½, ¾, 1 and 1½ in. When arranged on a directory or bulletin board, these raised letters stand out with the clearness of an electric sign and present a most pleasing appearance. Samples sent on request.

The broadcloth used on all styles is a fine, durable quality and is supplied in black, blue, green or special colors.

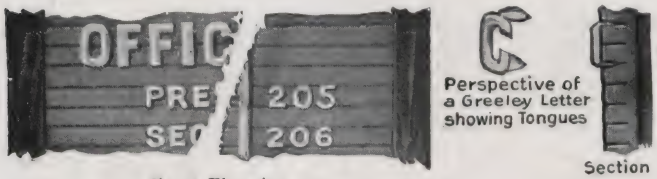


FIG. 3. ELEVATION AND SECTION OF STYLE NO. 1 "GREELEY" DIRECTORY BACKBOARD

FIG. 4. STYLE NO. 3 ILLUSTRATING PRINCIPLES OF STYLES NOS. 2 AND 3 "GREELEY" DIRECTORIES

Unit strips are held in place by spring clips. Style No. 2 differs from Style No. 3 only in the fact that the latter is of a black metal, uncovered (as shown); while the former is of same construction, but covered with broadcloth in any one of several standard or special colors

Sight size, in.	Size of letters, in.	Cap. of names: Style No. 1	Cap. of names: Styles No. 2 and No. 3 in ½" size only, in.	Columns	Sight size, in.	Size of letters, in.	Cap. of names: Style No. 1	Cap. of names: Styles No. 2 and No. 3 in ½" size only, in.	Columns
*10x22	¼	40		1	30x50	¼	300		4
	½	25	11x22	1		½	150	33x44	3
20x30	¼	75		2		¾	75		2
	½	50	22x22	2	40x54	¼	400		5
	¾	25		1		½	250	44x54	4
30x36	¼	200		4		¾	125		3
	½	100	33x30	3	50x62	¼	600		6
	¾	50		2		½	350	55x61	5
						¾	150		3

*No alphabet is allowed for this and smaller sizes.

In the 20x30 size, allowance has been made for title of building in ¾ in. or 1 in. letters. Size 30 in. x 36 in. includes space for title in 1 in. letters and full alphabet up to ¾ in. letters. The larger sizes provide for full alphabet in letters up to 1 in. and title of building in 1½ in. letters. Smaller size directories can be fitted in appropriate size letters, when required.

"Miller" In-and-Out Boards

For clubs and fraternal organizations. Made up of metal strips holding a printed celluloid strip removed by a special tool, showing members "in" or "out," letters, telephone calls, telegrams, etc. Neat and compact. Mechanically perfect, practical and simple in operation. Sold outright, service maintained and involve practically no upkeep cost.

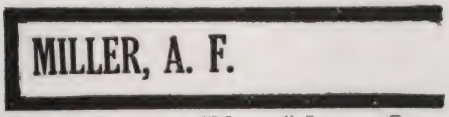


FIG. 5. STRIP FOR "MILLER" IN-AND-OUT BOARDS

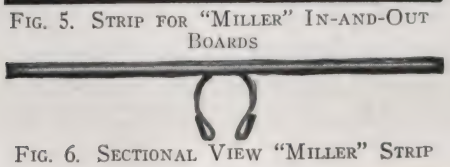


FIG. 6. SECTIONAL VIEW "MILLER" STRIP

FIG. 7. "GREELEY" TYPE DIRECTORY INSTALLED IN MUNICIPAL BUILDING, NEW YORK, N. Y.
Special design cast bronze frame using backboard No. 1

Cork Bulletin Boards

Cork bulletin boards are constructed of a specially resistant cork composition with a special veneered three-ply wood and composition backing. They will not crack, buckle nor warp. Thumb tacks may readily be inserted and hold securely, leaving no marks when removed. The most durable and best cork bulletin boards, with or without frames. Sizes up to 4x14 ft. made in one piece; larger sizes made in sections.

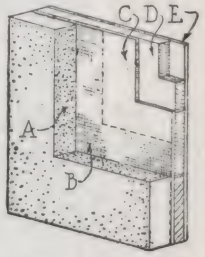


FIG. 8. SECTION THROUGH AKINS MULTI-PLY CORK BULLETIN BOARD
A—Cork composition.
B—Burlap binder.
C and E—Fiber board.
D—Wood core

Frame Designs and Finishes

Frames for the various types of directory and bulletin boards are furnished either in approved stock designs or in accordance with architect's specifications. Special designs are created when desired. They can be had in bronze, wood or iron in any finish required. We supply our systems without frames if so desired.

Consultation

Consult us freely about directory and bulletin board requirements. The service of experts is at your disposal without obligating you in any way.

A Few Recent Installations

International Mercantile Marine Building, New York, N. Y.
Pennsylvania Hotel, New York, N. Y.
Western Electric Co., New York, N. Y.
New York Telephone Co., New York, N. Y.
Lord and Taylor, New York, N. Y.
American Railway Express Co., New York, N. Y.
Pittsburgh Fire Department, Pittsburgh, Pa.

J. A. WEBER, President R. G. MOLITOR, Vice-president O. G. YATES, Secretary-Treasurer

R. W. CLARK MFG. CO.

Manufacturers of Building Directories and Bulletin Boards

TELEPHONE
Ravenswood 4455

1774 Wilson Avenue
CHICAGO, ILL.

ESTABLISHED 1913

Products

Building Directories: Clark Liberty (Changeable Letter) Directories, Clark Changeable Gummed-strip Directories.

Also Rosters, Bulletin and Announcement Boards, Desk Name Plates.

Own Your Directory

TRADE-MARK

Clark Directories

The Clark Liberty Directory—This changeable letter directory gives the owner the following advantages not heretofore offered: little or no up-keep cost; immediate service to tenant—the name can be placed within ten minutes after tenant signs contract; letters and covered strips can be re-used; practically the same wall space is required as for the gummed-strip using the same size letter.

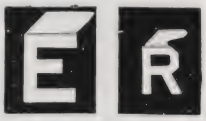
The letters are made of the best white celluloid under the Clark patent. With care they can be re-used many times and will serve for many years.

The Regular Gummed-strip Directory—This directory can also be supplied and a service on strips given. The service costs approximately 15% of the customary rental. We do not rent directories, but save the owner this difference—about 85% of such rental charge.

On the gummed-strip directory the strips fit into a groove and are held in position with a felt covered back, making insertion of new strips a very simple matter.

Styles and Sizes

This company is equipped to furnish directories and boards in all sizes, styles and finishes. Ornamental iron or bronze, and oak or mahogany. Sections are of standard width: for changeable strip (gummed letters) 7½ in.; for the Clark Liberty (changeable letter) directories, 7½ in. when ¼-in. size letters are used and 12 in. with ⅜-in. size letter. Heights of sections or frames can be made any convenient size; those mentioned in tables below are standard.

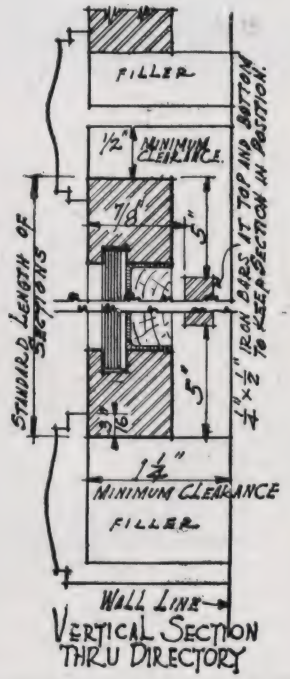


Letter Styles
Pat. Dec. 12, 1916

Estimates

For all ordinary buildings two names to the room will be the approximate capacity of directory required. In the case of special buildings, more or less, according to purpose of the building.

In writing for estimates, state total number of names board must hold; material; style; finish; and, particularly, available wall space.



Clark Office Building Directory and Details of Construction

CLARK LIBERTY (CHANGEABLE LETTER)
Sight opening of frame 30 in.

Number of sections	1	2	3	4	5	6	Double 4
Height of directory, in.	39	39	39	39	39	39	70
Width of directory, in.	15	27	39	51	63	75	51
Strip capacity	50	100	150	200	250	300	400

CLARK GUMMED STRIP
Sight opening of frame 26 in.

Number of sections	2	3	4	5	6	7	8
Height of directory, in.	34	34	34	34	34	34	34
Width of directory, in.	18	25½	33	40½	48	55½	63
Strip capacity	130	195	260	325	390	455	520

Total strip capacity mentioned. Deduct 26 for name capacity where alphabet strips are wanted. Any size can be built. Clark Liberty Directory 7½-in. section—size same as Gummed Strip; capacity per section 50.

HAMILTON & CORD CO.

Builders of Building Directories

EXECUTIVE OFFICES
20 East Jackson Boulevard
CHICAGO, ILL.

FACTORY
MILWAUKEE, WIS.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

SOLID BRONZE DIRECTORIES and NAME PLATES.

Also Memorial Tablets, Announcement Boards and Changeable Desk and Wicket Signs.

System

Consists of 5-ply wood backboard faced with bronze sheet metal, in one panel regardless of size. Bronze vertical retaining strips, ½ in., placed to accommodate standard 4-in., 6½-in. and 8½-in. length name plates. Name plates are installed instantly from the front without necessity of removing or handling any part of the system. Plates of ⅜-in. width, or multiples thereof, can be placed anywhere in any combination and remain in place without use of blank strips. One or two plate glass doors, depending on size, set in 1-in. solid bronze frame and provided with specially constructed pivot hinges and concealed locks.

Cross section showing details of construction of frame to accommodate H & C System is shown in illustration. A—Felt dust pad; B—retaining strip; C—wood backboard faced with bronze sheet metal; D—bronze glass frame; E—plate glass.

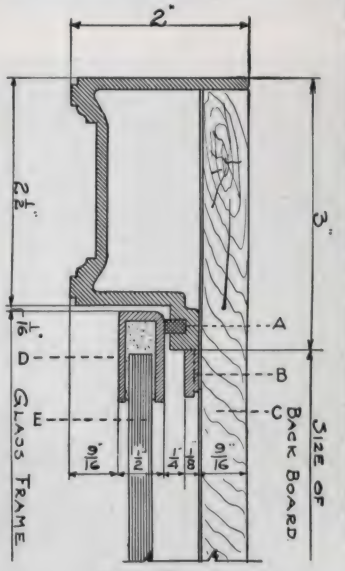
Designs and Finishes

Our catalogue illustrates 6 stock designs in bronze and 2 stock designs in wood. We can furnish any design required in bronze, iron or wood. Standards or easels for floor directories extra.

Finish of bronze directories furnished regularly in choice of natural bronze or statuary with polished high lights. Iron finished regularly in verde antique or dull black. Wood finished regularly in hand rubbed mahogany or bronze. Other finishes extra as required.

Name Plates

These are embossed on bronze metal by machinery, insuring perfect spacing, alignment and durability. Background of plate finished to match bronze metal face of backboard, the face of the raised letters being natural polished bronze. Entire finish made permanent.



CROSS-SECTION

Advantages

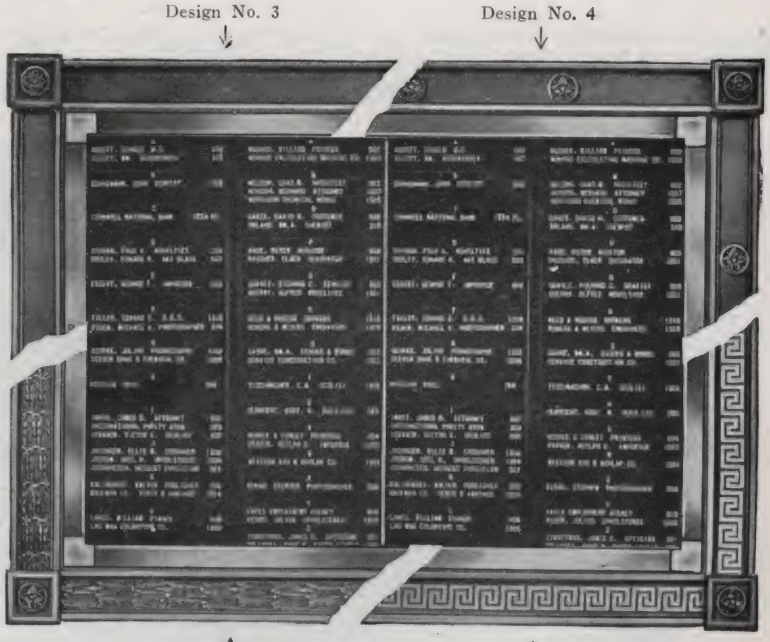
Our system sold outright eliminating yearly rentals. Needs no service or inspection. Name plates instantly installed by any one. Additional name plates at approximately the cost of paper strips, can be forwarded the day order is received.

Provides 25% more capacity in a given area than any other directory made. The use of bronze name plates on a single panel gives the appearance of a solid tablet and in combination with well designed bronze frame, provides a directory simple and practical in construction and operation, and of exceptional beauty and dignity.

The H & C directory is a permanent asset to any building and is so designed as to meet the requirements of modern buildings without necessitating the expense of special designs in bronze frames.

Co-operative Service

Full size detail blue print showing construction of frame to accommodate our system sent to architects and contractors on request. Permanent catalogue in loose leaf form for architects' files sent on request.



FOUR STANDARD BRONZE DESIGNS

HAMILTON & CORD CO. 1407

NAME PLATE ⅜x6½ IN. WITH 34 LETTER CAPACITY

ESTABLISHED 1870

THE TABLET & TICKET CO.

Willson's Office and Loft Building Directories

381-383 Broadway NEW YORK, N. Y.
1015-1021 West Adams Street CHICAGO, ILL.
604 Mission Street SAN FRANCISCO, CAL.

Products

WILLSON'S BUILDING DIRECTORIES, for office and loft buildings, also for floors of large buildings and apartment houses: Club Membership "In" and "Out"; Golf Handicap; Church Pew Directories; Department Directories for banks and institutions; Floor Directories.

TRADE-MARK

finished in bower-barff, verde green, or electro-plated to match the metal work in the building. The sections to hold names are made of steel, bower-barff finished, fitted with beveled plate glass protecting names, and require no door that will be in the way when making changes.

Advantages

Willson's changeable and alphabetical directory is the only directory kept alphabetically correct, alignment accurate, letters uniform and correctly spaced. The simplest, most practical and satisfactory; "each name a unit," can at all times be inserted, removed or changed; placed "right" without special efforts or waste of time. Requires less space than any other directory where space is a factor. Over 4,000 in use.

Inspector calls at building once in every ten or twelve months, and if any repairs are needed, he makes them free of charge—thereby keeping the board in A-1 shape.

Space Required

The space required for the directory should be provided for in the architect's plans, when expensive marble can be saved and frame inserted; or frame can be placed on marble when desired.

Frame

The outside frame is made of ornamental iron;

Special Frames

Of ornamental iron or bronze, designed by the architects and provided for in specifications and on plans, are made by the contractors in accordance with our details, blue print of which will be furnished.

The headings in the special frames are usually made of metal, but can be made same as shown on this page, and fitted with beveled plate glass, or omitted, if desired.

Names

The names are made with white letters on black strips, which can be easily moved up or down, enabling the operator to insert each name in alphabetical order, and also, when removing names, to take out desired strip, move names together, and fill in vacant space left at bottom with blank strips.

The average number required is 2 names for each room, which will permit placing the individual names, as well as the names of firms or corporations, that are necessary on the directory. Figure on 30 names to the vertical foot.

NAME STRIP, ACTUAL SIZE

TYPICAL OFFICE BUILDING DIRECTORY

Continued on next page

Other Sizes of Letters

Many other sizes besides the regular ¼-in. letter used in office buildings can be supplied, and a directory that will answer the requirements of any building will be made by this company.

Sections

Panels or sections are made in the following sizes: 7½x18½ in., 7½x26⅜ in., 7½x32⅞ in., 7½x40⅜ in. To avoid mistakes in these frames exact size of the sight opening of frame is given here.

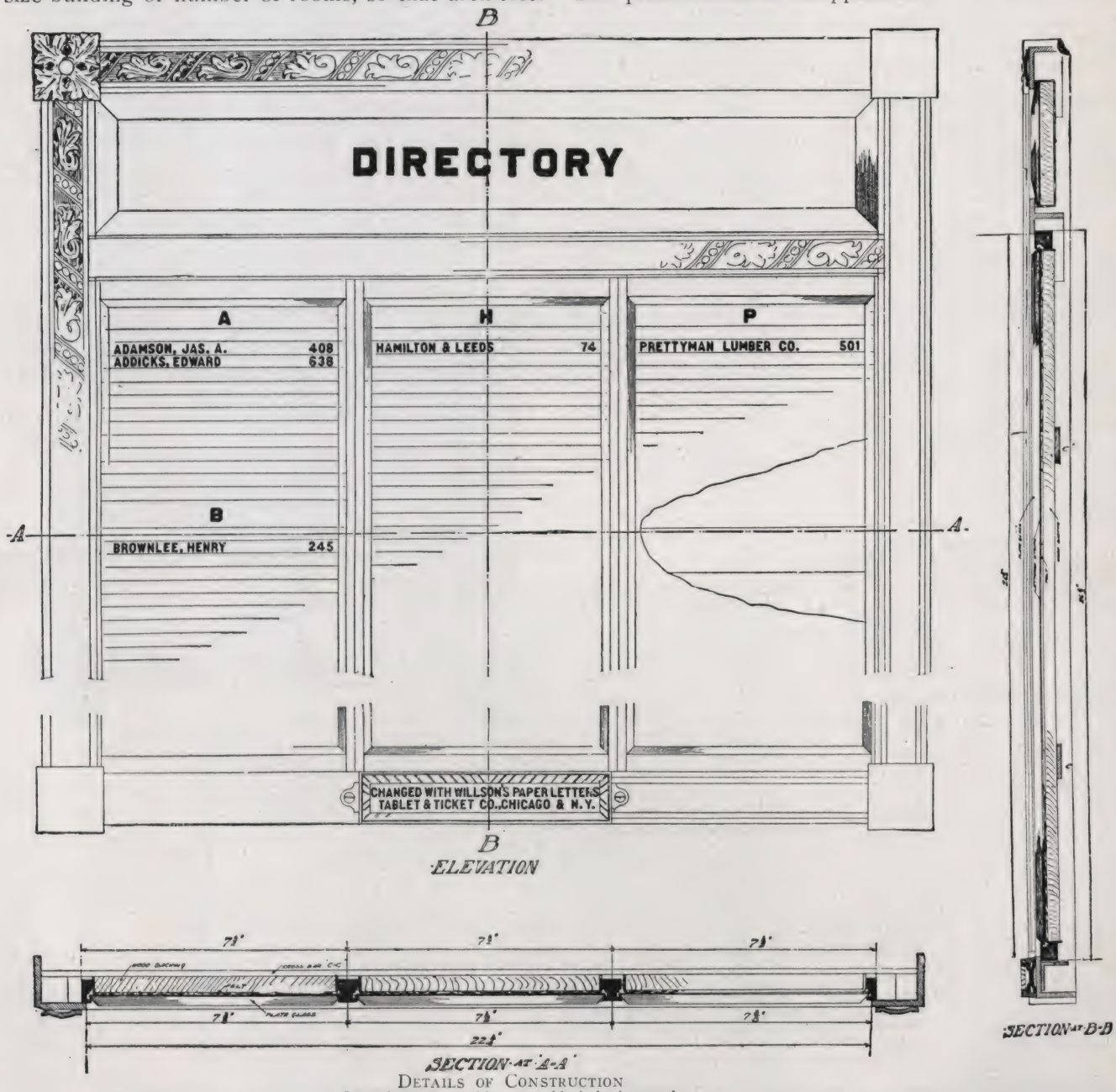
Particulars

On request, drawing or blue prints will be furnished with exact measurements suitable for any size building or number of rooms, so that architects can arrange for space required; or they can send sketch and size of space provided for directory, and full details of directory suitable for space will be forwarded.

Business Directories

This style of board is adapted for loft or mercantile buildings when only a few names are required. Besides putting on the names and room or floor numbers, the business of tenants is included.

Frames are made of wood and finished to match woodwork of building. The name strips measure 1½x14⅛ in., and the letters are ⅜x½ in. in height. Made in sizes for 10 names up to 40, or more. Detail blue print furnished on application.



DETAILS OF CONSTRUCTION

Lettering shows white on a black background

SIZES OF 26⅜-IN. SECTIONS

Frame sections....	3	4	5	6	7	8	9	10
Height, in.....	26	26	26	26	26	26	26	26
Width, in.....	22 5/16	29 13/16	37 5/16	44 13/16	52 3/8	59 7/8	67 3/8	74 13/16
Capacity, names...	100	150	200	250	300	400	450	500

SIZES OF 32⅞-IN. SECTIONS

Frame section ..	3	4	5	6	7	8	9	10
Height, in.....	32½	32½	32½	32½	32½	32½	32½	32½
Width, in.....	22 5/16	29 13/16	37 5/16	44 13/16	52 3/8	59 7/8	67 3/8	74 13/16
Capacity, names.	200	250	300	400	450	500	600	700

Special size sections where actually necessary.

ESTABLISHED 1890 INCORPORATED 1909

U. S. CHANGEABLE SIGN CO.

(C. M. KINNEY CO., SUCCESSOR)

CONTROLLED BY THE AUBURN BUTTON WORKS, INC.

Manufacturers of Building Directories and Bulletin Boards

TELEPHONE
MADISON SQUARE 9962

19-25 East 24th Street
NEW YORK, N. Y.

BRANCH OFFICES
WASHINGTON, D. C. PHILADELPHIA, PA. BOSTON, MASS. ATLANTA, GA. FORT WORTH, TEX. SAN FRANCISCO, CAL.

Products

DIRECTORIES for office buildings, ROSTERS for armories, ANNOUNCEMENT BOARDS for hotels and clubs, TIME TABLES for tourist agencies or railroads, HONOR ROLL BOARDS for clubs, and BULLETINS for every need.

Wide Scope of Adaptability

These directories are particularly suitable for the following uses:

Apartments
Armories and naval vessels (rosters)
Churches and Sunday schools
City halls
Clubs (list of officers and members)
Dry-goods stores (special sales)
Fire department (calls and stations)
Golf clubs (list of officers, members and handicaps)
Hospitals (visiting doctors and house staff)
Hotels and clubs (steamship sailings, theaters and announcements)
Office buildings
Police department bulletins (day's instructions)
Public buildings
Public schools (lecture rooms)
Railroad bulletins (time tables of special trains)
Real estate offices (lists of property for sale or rent)
Salesmen's competitive bulletins
Steamship announcements (tours, sailings)
Steamship bulletins (daily log, concerts, wireless reports)
Theater bulletins
Tourist offices (special railroad and steamship excursions)

Durability

The lasting qualities of our system are evidenced by the fact that boards in use for over 30 years are still giving good service. Boards and letters are guaranteed. In making the changes, the entire outfit is under complete control of the owner; no outside assistance is needed.

Details of Construction

Backboard—Made solid or in interchangeable strips, each strip designed to hold a name or a line of matter, and the whole grooved horizontally and covered with durable cloth.

Letters—Made of ivory white, durable plastic material. Have firmly attached prongs fitting into the grooves of the backboard, and are removable and replaceable with perfect ease. They are made of a solid material and will not crack or chip; therefore their surface will not become defaced. The prongs are so fixed as to assure perfect alignment.

Uniformity of Tint—The letters are manufactured by a process which insures absolute uniformity and permanency of color. The pleasing ivory tint is secured by a proper proportion of pigment throughout the composition, not by merely treating the surface of the letters.

DIRECTORY BOARD, STYLE AA

Heavy high grade drawn bronze with cast ornaments. Peaked top and brackets may be omitted

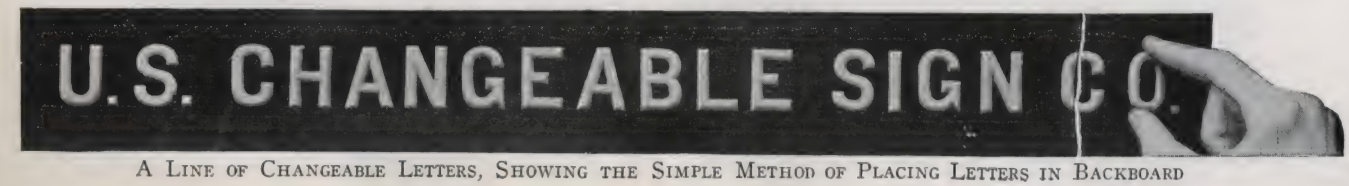
Colors—Square face letters are also carried in colors, red and black. Where the size of the order warrants it, letters may be had in any flat color desired.

Frames—Catalogue designs are made in wood, iron or bronze. These may be modified to harmonize with surroundings, or architects' and special designs can be executed, if desired.

The backboard can be adjusted to frames furnished by other manufacturers.

Only the best of materials and high grade cabinet workmanship are put in these frames and backboards.

With complete equipment there is no further outlay —"First Cost the Only Cost."

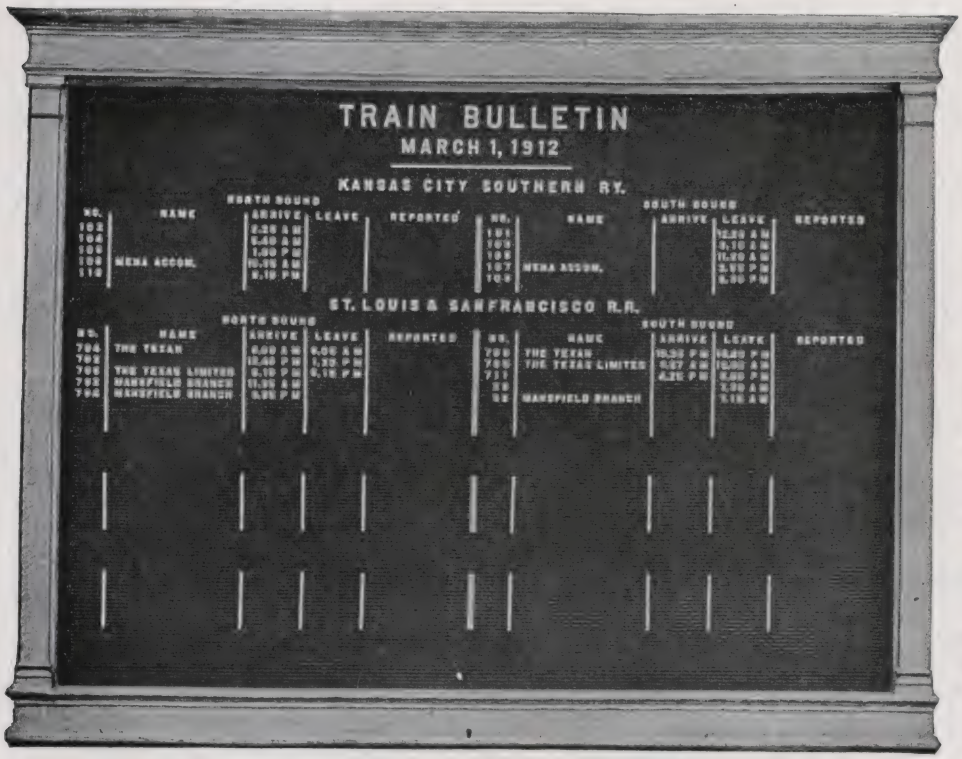


A LINE OF CHANGEABLE LETTERS, SHOWING THE SIMPLE METHOD OF PLACING LETTERS IN BACKBOARD

Continued on next page

Interchangeable Strip Backboard

An improved system of interchangeable units providing for the removal, change and replacement of entire names or lines without rearranging contiguous names.



Bulletin Board, Style Special T. B. No. 1
Protected by two heavy plate glass doors sliding horizontally on pinioned runners, locking at bottom

Information to Architects

Information for calculating space required for backboards of the U. S. Changeable Sign Co., C. M. Kinney Co., Successor:

Patented Solid Backboard—*Thickness*—1½ in. from the inside face of the glass in the door to the back.

Width—Using ½-in. letters for the names and room numbers, 12 in. for each column; using ¼-in. letters, 10 in. for each column.

Height—Using ½-in. letters, ¾ in. for each line or name; using ¼-in. letters, ½ in. for each line or name.

Improved Interchangeable Strip Backboard—*Thickness*—1½ in. from the inside face of the glass in the door to the back.

Width—Using ½-in. letters for the names and room numbers, 12⅜ in. for each column; using ¼-in. letters, 10⅜ in. for each column of names and room numbers.

Height—⅝ in. for each line or name using either ½-in. or ¼-in. letters.

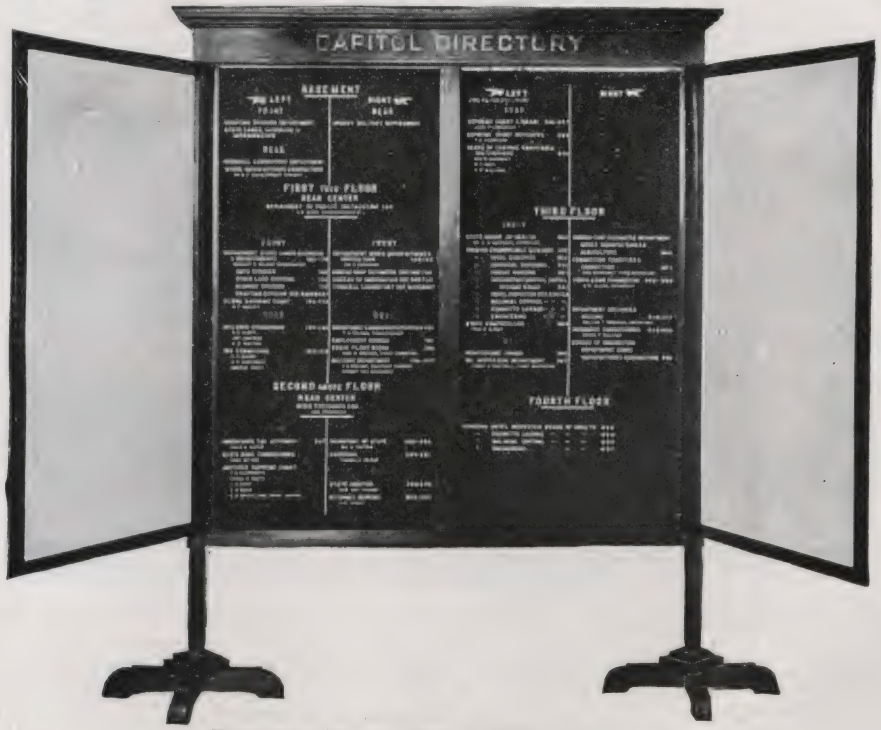
Number of Names—Calculate upon 2 names to each office, in a building containing 200 offices or less; 1½ names to each office in a building containing over 200 offices.

Quantity of Letters Required—Calculate upon 17 letters to each name, including room number.

Space for Title—If title or name of the building is required to be placed at the top of the blackboard, add 3 in. to the height.

Co-operative Service

In specifying the United States Changeable Directory it is advisable that the architect consult the company on essential points, such as space necessary for requisite number of names, etc.



Directory Board, Style Special Standard
Mahogany or oak; plate glass doors, sight size each door, 30x60 in.

ARMSTRONG CORK COMPANY

Manufacturers of Cork Bulletin and Tack Boards

125 Twenty-third Street

PITTSBURGH, PA.

Product

ARMSTRONG'S CORK BULLETIN and TACK BOARDS for schools, colleges, hotels, lodge rooms, offices, factories, etc.

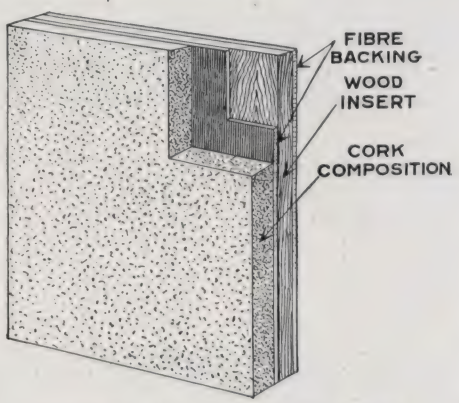
For Linotile and Cork Tile, see pages 456-457; for Cold Storage Insulation and Pipe Coverings, see page 1799.

Description

Armstrong's cork bulletin and tack boards are composed of a layer of cork composition ¼-in. thick, cemented securely to a backing of ¼-in., 3-ply, wood insert compo board. The finished boards will not warp, curl nor buckle, and meet every requirement fully.

Particular Advantages of Armstrong's Cork Bulletin and Tacking Boards

Because of the peculiar texture of the cork composition used in their construction, Armstrong's bulletin and tack boards are far more satisfactory than wooden ones. Thumbtacks can be pushed easily into the cork. They are held securely and can be removed readily without the use of a tack puller or knife, and without damage to the finger nails. Furthermore, due to the resiliency of the cork, the tendency of the tack holes is to close up gradually. Hence, Armstrong's cork bulletin and tack boards are not marred by unsightly splinters and retain a much smoother surface than wooden ones. When soiled, the boards can be easily cleaned with soap and water.



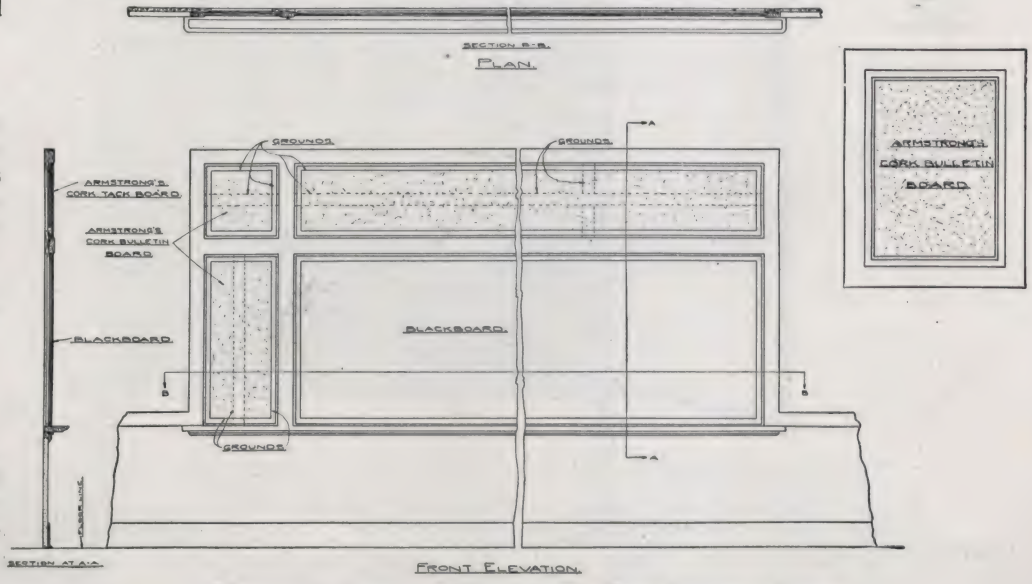
SECTIONAL VIEW, ARMSTRONG'S CORK BULLETIN AND TACK BOARD

Sizes

Standard panels, 4x 6 ft.x½-in. thick. Boards or strips of smaller sizes can be easily sawed on the job from standard panels, or will be supplied by the factory. Larger sizes are furnished in sections.

Installation

Can be easily installed by any carpenter. For directions and proper provisions for installing, see specifications following.



METHOD OF INSTALLING ARMSTRONG'S CORK BULLETIN BOARD

Specifications

The following paragraphs should be included in the carpentry section of the general specification:

Cork Bulletin (Tacking or Exhibition) Boards—Provide and install Armstrong's Cork Bulletin [tacking] [exhibition] Boards where indicated on the drawings or herein specified. (State here where they are required and sizes.)

All tacking spaces of bulletin or tacking boards shall be "Armstrong's" Cork Bulletin Board material or made by the ARMSTRONG CORK COMPANY, Pittsburgh, Pa. (This material to be ½ in. thick consisting of one ¼-in. thick layer or cork composition reinforced with burlap and securely cemented to a 3-ply backing of compo board with wood core.)

All frames to be of same finish and material to match trim and to have loose cover mould as detailed around all cork bulletin boards. All cork bulletin boards to be securely nailed along all edges before placing cover mould in position.

Grounds—(Paragraph to be included under "Grounds" in Carpentry).

Set 2-in.x⅞-in. thick (thickness will depend on adjoining trim, etc.) wood grounds to receive Armstrong's Cork Bulletin Boards and Tack Boards when these are called for on drawings, or specified. All grounds shall be set straight and leveled for all edges and in the middle, running the long way of each bulletin or tack board; also where two sections of the bulletin or tack board may join.

GRAND RAPIDS SHOW CASE COMPANY

Store Equipment

MAIN OFFICE AND FACTORY
100 Coldbrook Street
GRAND RAPIDS, MICH.

BRANCH FACTORY
PORTLAND, ORE.

BRANCH OFFICES

NEW YORK, N. Y., 1465 Broadway, at 42nd Street
CHICAGO, ILL., 215 South Market Street
CLEVELAND, OHIO, 1113-14 Ulmer Building
ST. LOUIS, MO., 410-18 North 18th Street
ATLANTA, GA., 703-4 Candler Building
MINNEAPOLIS, MINN., 242 Plymouth Building
DALLAS, TEX., 401 Insurance Building
KANSAS CITY, MO., 606-8 Ridge Building
DETROIT, MICH., 528 Detroit Savings Bank Building
BOSTON, MASS., 52 Chauncey Street

Products

NEW WAY STORE EQUIPMENT, which includes Showcases, Interchangeable Units, Wardrobes, Millinery Cases, and Miscellaneous Fixtures for department, clothing, drug, jewelry and general stores.

Experience and Facilities

We are the world's largest manufacturers of store equipment. Our position as such has brought us in touch with the fundamental merchandising principles which our store architects and merchandising experts have embodied and standardized in the New Way system.

Manufacturing Methods and Materials Used

Materials and workmanship which enter into the construction of New Way equipment, together with our own special kiln drying and finishing methods, have established a national reputation for a quality product which is always in keeping with the trend of the times and the demands of modern merchandising.

Advantages

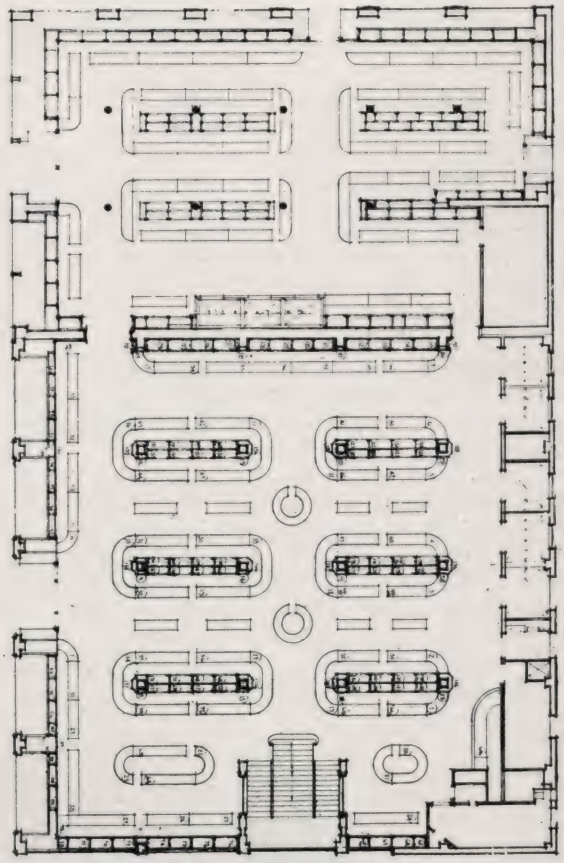
New Way store equipment is built on the interchangeable unit type of construction, which is flexible and permits departmental changes made necessary by store expansion. Being of standardized construction, it can be added to at any time with uniform results in design and finish.

Store Planning Co-operation

The sole business of our special Store Planning Department is to co-operate with the building architects in the matter of arrangement and the various details which enter into the problem of better merchandising according to the New Way principle, which has been accepted as a standard by more than six thousand retailers.

Instance of Store Planning

The accompanying illustration shows the first floor plan of the Ernst Kern Company of Detroit, Mich.



PLAN OF THE MAIN FLOOR OF A LARGE DEPARTMENT STORE, ON WHICH WE CO-OPERATE WITH A LARGE ARCHITECTURAL FIRM

This is but one of the many instances where the special Store Planning Division of the GRAND RAPIDS SHOW CASE COMPANY has co-operated with local building architects, assisting them in the placing of columns, stairways, elevators, entrances, and other details, so as to exactly conform to modern merchandising requirements.

Consult our Store Planning Division when planning retail stores requiring the installation of modern store equipment.

THE SPENCER TURBINE CO.

Manufacturers of Turbine Vacuum Cleaners

HARTFORD, CONN.

Products

SPENCER TURBINE VACUUM CLEANERS.

Also manufacturers of Turbine Compressors and Exhausters, Organ Blowers (Spencer Steel Orgoblo).

The Spencer System of Vacuum Cleaning

The Spencer multistage turbine system has met with the approval of architects and engineers as well as other manufacturers.

The Spencer multistage turbine is a machine of great simplicity and durability. Its one moving part is the welded steel multistage impeller which revolves smoothly and quietly on ball bearings within its casing, with wide clearances on all sides. There are no pistons, valves, water seals, drive chains, belts, cloth bags or wet auxiliary tanks; no close adjustments to be disturbed by dirt. Without the use of complicated and troublesome governing apparatus, the multistage fan inherently maintains a constant vacuum under a varying volume and is so perfectly controlled that the turbine responds to, and co-operates with, every movement of the tool at the cleaning hose.

Simplicity in design and high grade construction insure low maintenance cost. The entire system is designed to produce correct air stream conditions, and to do universal vacuum cleaning with uniform efficiency, speed and thoroughness.

Advantages of the Spencer System

All dirt is sucked out through a tube and no foul exhaust air or any part of the dust is discharged back into the rooms.

There is nothing to handle in the rooms but the hose and cleaning tools, which are so light and easy to use that a maid, or even a child, enjoys using them.

All the machinery is in the basement where it is not moved or handled, and is therefore not skimped in size, weight or efficiency; it hence supplies a strong, even vacuum, so well controlled as to avoid all possibility of injury to rugs or fabric, and removes all dust and grit from cracks or pores of bare floors,

Spencer Turbine Vacuum Cleaners

All Spencer cleaners are of the multistage low velocity turbine type, which adapts itself to the proportions of vacuum and volume required for vacuum cleaning work better than any other type of exhauster,

Turbine Impellers or Fans—Securely fastened to the shaft, making one single moving element which revolves smoothly and quietly within the deflectors,

There is a wide clearance of from ⅛ to ⅜ in. between the stationary and moving elements throughout the entire turbine. The bearings are the highest grade and of liberal capacity.

Separators—Of the centrifugal type, of high efficiency and with dirt receptacles of large size.

On the ½ h.p., ¾ h.p., and 1½ h.p. machines the dirt receptacles are in the base of the machine, while the 3 h.p. and larger equipments have the dirt separators as a separate unit.

Motors—Are of the highest grade and the most approved makes.

Spencer Turbine Equipment—Superiority of cleaning implements and accessories universally acknowledged. Spencer tools are designed with openings in correct proportion to the rest of the system; also with special consideration as to convenience and fitness of the various requirements. Strong in construction, light in weight, and shaped for fast and effective work. Tools are equipped with Spencer patented universal controllable swivel, which enables operator to remove dirt beyond the reach of the rigid tool.

No. 411—¾ H.P. Vertical

5 H.P. Horizontal

TYPES OF SPENCER TURBINES

Continued on next page

All wearing surfaces are renewable. Tools are attached to handle by means of steel locking chuck.

Specifications — While our engineering department prefers to examine each particular job before making definite recommendations regarding layouts or specifications, the following may serve as a general guide when this is not possible:

Piping System—Inasmuch as the hose causes greater vacuum loss than any other part of the system, requires labor in handling, and eventually wears out, while the stationary piping system possesses none of these characteristics, it is obvious that to secure permanent efficiency plenty of piping and short hose runs are the most economical, besides rendering the entire equipment much more rapid, efficient and easily handled by the operator.

A dirt handling pipe system must be of smooth, uniform bore throughout both pipe and fittings. Long turn "drainage" or Durham fittings with horizontally disposed clean-out plugs at the foot of risers have proved satisfactory. Long sweep pipe bends should, however, be used at points where the dirt is required to go from a horizontal pipe up a vertical one.

Spencer Horizontal Turbine

For large installations The Spencer Turbine Co. has developed a line of horizontal direct connected turbine equipments operating at a speed of 1750 r.p.m. as distinguished from the 3500 r.p.m. apparatus which has heretofore characterized all fan and turbine type vacuum cleaners. In addition to this desirable feature, this equipment retains all the superior features which have characterized the earlier Spencer models

Piping should not be so small as to require too high vacuum, high velocity and low density with the accompanying reduction in carrying capacity and increase in "sand blast" wear; nor on the other hand so large as to reduce the velocity sufficiently to permit "dirt settling."

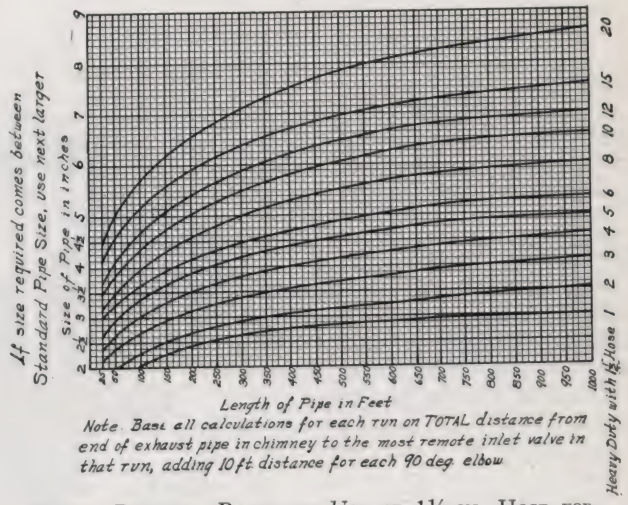
The curves shown on this page give the correct size of piping for any vacuum cleaning system.

Size of Machine to Install—The following rules afford a reasonably accurate and definite method of determining the sweeper capacity of plant required for any given building, if *heavy duty standards* are used, i. e., a minimum vacuum of 2 in. Hg. with ⅞-in. round sharp edged open orifice for bare floor sweeping and 3-in. Hg. with a similar ⅝-in. orifice for carpet cleaning, both at end of 50 ft. of hose with all sweepers working. Use following formula:

The square foot floor or carpet area divided by 7500 times the available hours for each cleaning equals the number of sweepers required.

Capacity Test—For heavy duty work specification should provide that the plant shall maintain a minimum vacuum of at least 2 in. Hg. in back of each of as many ⅞-in. round sharp edged orifices as the system is designed to operate simultaneously, and a vacuum of not less than 3 in. Hg. in back of each of as many ⅝-in. round sharp edged orifices as the system is designed to operate simultaneously. This test to be made at the end of 50 ft. of hose.

Rules for Determining Pipe Sizes—Size of pipe used for any vacuum cleaner installation should be that given at left of diagram, horizontally opposite the intersection of curve for the total number of sweepers to be operated simultaneously with vertical line above the number corresponding to total length of pipe from the end of exhaust pipe to the most remote inlet valve in the building.



Piping Diagram Based on Use of 1½-in. Hose for Each Sweeper

If fewer sweepers are to be operated simultaneously through part of piping system, the size pipe for such part can be reduced to that given in diagram for the number of sweepers that will actually be used simultaneously through that part of piping, based on same total length of pipe from end of exhaust pipe to most remote inlet valve in the building.

Installations

The Spencer system is installed in a very large number of the best buildings of all types throughout the United States and Canada. It is only possible to mention in this space a very few of the representative installations. The name of the architect is given as well as the name and the location of the building.

Massachusetts Institute of Technology, Cambridge, Mass., Wm. Welles Bosworth
Harvard Freshman Dormitories, Cambridge, Mass., Shepley, Rutan & Coolidge
Harry Elkins Widener Memorial Library, Cambridge, Mass., Horace Trumbauer
San Francisco Library, San Francisco, Cal., Geo. W. Kelham
Grover Cleveland High School, St. Louis, Mo., Wm. B. Ittner
East High School, Cincinnati, Ohio, Garber & Woodward
Hotel Pennsylvania, New York, N. Y., McKim, Mead & White
Hotel Commodore, New York, N. Y., Warren & Wetmore
New York Ambassador Hotel, New York, N. Y., Warren & Wetmore
Los Angeles Ambassador Hotel, Los Angeles, Cal., Myron Hunt
Broadmoor Hotel,, Colorado Springs, Colo., Warren & Wetmore
Hotel Cleveland, Cleveland, Ohio, Graham, Burnham & Co.
Hotel Biltmore, New York, N. Y., Warren & Wetmore
New York Municipal Building, New York, N. Y., McKim, Mead & White
City-County Building, Pittsburgh, Pa., E. B. Lee and Palmer, Hornbostel & Jones
Missouri State Capitol, Jefferson City, Mo., Tracy & Swartwout
Washington State Capital Group, Olympia, Wash., Wilder & White
Geo. D. Pratt Residence, Glen Cove, L. I., Trowbridge & Ackerman
John L. Severance Residence, Cleveland, Ohio, Chas. F. Schweinfurth
Arthur Curtiss James Residence, New York, N. Y., Allen & Collens
Bankers Trust Company Building, New York, N. Y., Trowbridge & Livingston
Cincinnati General Hospitals, Cincinnati, Ohio, Samuel Hannaford & Sons
Capitol Theater, New York, N. Y., Thomas W. Lamb

THE UNITED ELECTRIC COMPANY

Tuec Stationary Vacuum Cleaners

CABLE ADDRESS
"TUEC, CANTON"

FACTORIES AND GENERAL OFFICES

CANTON, OHIO TORONTO, ONTARIO

AGENCIES IN ALL PRINCIPAL CITIES

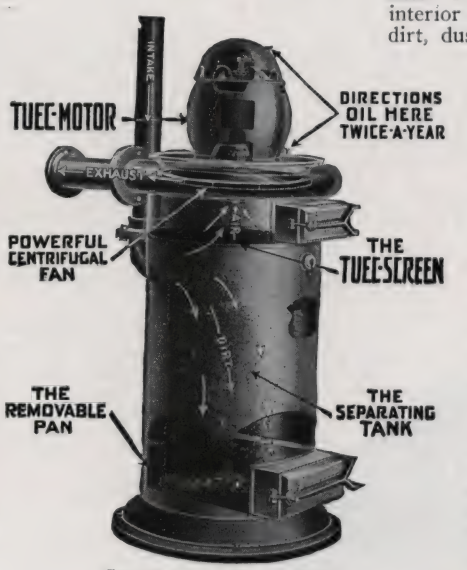
Products

TUEC VACUUM CLEANERS and EQUIPMENT for every type of building, either permanently installed systems or portable trucks; SWIMMING POOL CLEANING TOOLS.

Engineering Service

The attention of architects, interested in any problem relative to stationary cleaning, or the attention of those who may have difficult problems of which they are not quite sure, is called to this company's well organized corps of engineers—men who have thoroughly specialized in matters pertaining to such installations for the past 14 years.

The services of this engineering department are free to all who care to have professional and expert advice on this subject. Experience and knowledge are gladly placed at the service of inquirers. All letters of inquiry receive immediate and careful attention. Consultation involves no obligation.



STATIONARY TYPE TUEC

Tuec Stationary Cleaning System

Tuec Vacuum Cleaners—The outstanding features of the Tuec, which have made it so popular with architects and engineers, are its simplicity of design, low cost of operation and large displacement of air.

The Tuec comprises essentially three parts: an air-tight steel tank; a single stage centrifugal fan housed in a properly shaped casing attached to the top of the tank; a specially designed motor. The tank acts as a separator and receptacle for the dirt and litter. The fan by reason of its design, makes possible the handling of a large volume of air necessary for proper cleaning.

The only moving parts are the motor shaft and the fan directly attached to it. The fan revolves without metallic contact in its snail or housing. The only two wearing surfaces are 2 self-aligning S. K. F. ball bearings, which run in a constant oil bath in dustproof cavities. No cloth bags or baffle plates to interfere with continuous air currents are used. A patented feature makes it impossible to overload the motor, and such devices as automatic relief valves or vacuum breakers are eliminated. The large air displacement permits of the use of liberal sized tools, resulting in fewer strokes and quicker cleaning.

Types and Sizes—The Tuec is manufactured in 7 sizes and any electric motor specifications. Types in electrically driven apparatus in sizes from ¾ h.p. to 10 h.p. with capacities from 1 to 6 sweepers are standard and carried in stock. Independent power machines, to be driven from engines or other powers, are listed in capacities from 1 to 4 sweepers.

Model Specifications for Tuec Stationary Cleaning System

General—The work included in this specification shall be the furnishing and installing, ready for operation, of a complete suction air cleaning system for the removal of dust, dirt and other litter from all exposed surfaces throughout the interior of the building, and for conveying said dirt, dust, etc., to a suitable receptacle located as indicated upon the plans.

The complete system shall include all necessary connections to the piping and wiring (covered by separate specifications), cleaning tools, hose, separator, exhauster, motor and all other appurtenances required to make a complete air cleaning system.

Machine—The vacuum producer, located as indicated on plans, shall be capable of operating simultaneously .... sweepers, and shall operate without overload, under full load conditions.

The machine shall be made of the best material suitable for the purpose, so constructed as to handle the full volume of air required, with the least possible loss.

It shall be of the centrifugal fan type, with impeller fan, directly connected to motor. The construction of fan and casing shall be so proportioned as to allow sufficient clearance in all parts, to prevent clogging and choking from dust or dirt.

Power imput shall be computed upon the basis of 1.9 kw. per sweeper, when operating under full load conditions.

The power, when all inlets of the system are closed, shall not exceed 60% of that of full load.

No auxiliary governing devices of any kind whatsoever will be permitted. The vacuum maintained shall be constant under all conditions.

Motor—To comply with the standard requirements of the American Institute of Electrical Engineers and the National Electrical Code, of such size that when operating under test conditions it will not be under less than three-fourths, nor more than full load conditions, and shall operate continuously without undue heating. The maximum rise in temperature shall not exceed 40° C., above the room temperature under full load conditions. .

Separator—But 1 separator shall be used, which shall be of the dry type; made of steel, rigidly supported and an integral part of the complete machine. A screen, if used, is to be so placed that nothing but the lightest dust may lodge thereon. Gravity to be the only means of separation. No cloth bags or other appliance liable to rupture shall be employed.

Separator to have a clean-out door and handhole to give access to the interior, to allow for the easy removal of the accumulated dirt.

Inlet Valves—The inlet valves of approved design shall be so located, in accordance with the piping layout for the building, that any point may be reached with not more than 50 ft. of hose. Furnish .... concealed inlet valves, ... exposed pipe inlet valves, ... floor valves.

Valve plates to be finished to correspond with hardware of the building.

Piping—All pipe shall be standard black mild steel or wrought iron, without burrs, properly reamed and fully threaded.

All fittings to be preferably "Tuec Special Fittings," or long turn standard vacuum cleaner fittings.

All pipe lines to conform to the piping diagram, as indicated on plans, and shall be installed in a neat, workmanlike manner without staining or tool marks if exposed. When exposed pipes pass through any wall, floor or ceiling, they shall be fitted with escutcheons securely fastened to the pipes of the building.

Continued on next page

All pipes shall be screwed "home" in the fittings, and all joints in pipe lines shall be made by long screws and locknuts or flanged unions, to insure a perfectly smooth and uniform interior surface.

Easily accessible, horizontal, clean-out plugs shall be placed at the bottom of all risers, and at every turn of the piping where possible; so placed that the flow of air is never directly into them.

All pipe lines shall be supported on, or stayed by, iron strap hangers, securely anchored to the building and spaced not over 10 ft. apart.

No pipe shall be less than 2½-in. inside diameter, except for short runs, to single outlet, which may be 2 in. Outlets to be 2 in. (female). Height of outlet, to center not less than 3 in. from finished floor line or at such height as architect may determine; face of outlet to be within ½ to 1½ in. of finished wall or baseboard.

Cleaning Tools—All sweeping tools shall be made of aluminum or bronze.

All handles shall be made of seamless brass or steel tubing, properly finished, not less than 1½ in. in diameter.

Provide the following tools for each sweeper:

One floor handle
One wall handle
*One 15-in. carpet renovator
*One 15-in. bare floor tool
One upholstery cleaner
*One 10-in. wall brush
One 5-in. round duster brush
One 15-in. special bare floor tool with handle and swivel complete
*One carpet brush tool
One library brush
One clothes brush
One radiator cleaner
One tuft cleaner

*Can be furnished with swivel nozzles in aluminum or bronze.

Hose—The hose furnished shall not be less than 1½-in. inside diameter, steel reinforced, fitted with tapered metal terminals (No. 1 grade for medium sized residences, No. 2 for large residences, No. 3 for schools, churches and all public buildings).

All hose shall be the best quality rubber vacuum hose of a grade suitable to the class of work to be performed, reinforced in an approved manner, and sufficiently strong to prevent collapse of the hose under the highest vacuum or collapse or distortion if stepped upon, with couplings of smooth bore of the same inside diameter as the hose.

Test—Contractor will make regular cleaning test, and if desired by architect, orifice test to determine a vacuum of not less than 1-in. behind a ⅞-in. orifice at the end of a 50-ft. length of hose attached to the farthest outlet from the vacuum producer.

Capacity and Limitations of all Machines

For the rapid computation of pipe line losses the following table has been compiled by this company, which will show the maximum capacity of each machine. Anything less in length than that specified will guarantee excellent results. This table applies to both vertical and belt driven types, according to size.

CAPACITIES AND LIMITATIONS OF MACHINES

Machine No.	Capacity	H. p.	Vacuum at machine, in. Hg.	Maximum length of hose, ft.	Maximum length of pipe	Vacuum at operating handle, in. Hg.
260	1-sweeper	¾	2.0	35	100 ft. 2½ in.	.80
300	1-sweeper H.D.	2½	2.2	60	200 ft. 2½ in.	1.00
300	1-sweeper H.D.	2½	2.2	75	200 ft. 3 in. 50 ft. 2½ in.	1.00
400	2-sweeper	3½	2.2	50	Total 200 ft.	1.00
600	3-sweeper	5	2.8	50	Total 350 ft.	1.00 or over
800	4-sweeper	6½	2.8	50	Total 350 ft.	1.00 or over
1200	6-sweeper	10	2.8	50	Total 350 ft.	1.00 or over

Note: Bear in mind that the length of pipe given applies only to the extreme distance from the farthest inlet to the machine and not to the total amount of pipe in the system. 90° elbows are counted in the piping system as the equivalent of 6 ft. of pipe; 45° elbows as 3 ft. of pipe. The company does not advocate using more than 50 ft. of hose in any building unless it is absolutely necessary. It is for such a case that the maximum length for the Tuec 300 size is marked 75 ft. This length can be used on the larger machines, but the piping, in such case, should be less than that specified. The piping on machines of the Tuec 400 size and up should be proportioned according to the table given under pipe sizes. Thus the "total" amount of piping on these machines would be the extreme distance from the farthest inlet to the machine regardless of the size of pipe. When a longer run of piping is found than is covered here, or when a building is already piped with different sizes than specified above, it should be treated as special and referred to the Engineering Department of this company.

CAPACITIES AND LIMITATIONS OF PIPES

Pipe capacity number sweepers	Length of pipe, ft.		Laterals, in.	Risers, in.
	Less than	More than		
1	150	....	2½	2
1	....	150	3	2½
2	100	....	3	*
2	....	100	4	*
3	....	....	4	*
4	100	....	4	*
4	....	100	5	*
5 or 6	....	....	5**	*

* Full capacity risers, next size smaller than corresponding lateral. However, risers are very seldom provided for more than 2-sweeper capacity—a 3-in. pipe as a maximum.

** Diameters of lateral piping are gradually reduced as laterals near inlets and risers farthest from the vacuum producer.

BRIEF SPECIFICATIONS OF STANDARD TUEC CLEANERS

Machine No.	Capacity	Size of motor, h. p.	Speed of motor, r. p. m.	Distance floor to center intake, in.	Distance floor to center exhaust, in.	Over-all dimensions, in.	Size of intake, in.	Size of exhaust, in.	Shipping weight, lbs.
260	1-sweeper	¾	5000	24	30¾	17x46	2½	2½	280
*260	1-sweeper	¾	5000	....	....	†	1¾	2½	350
300	1-sweeper	2½	3500	33¼	47¾	26x72	4	4	950
400	2-sweeper	3½	3500	39¼	53¾	26x76	4	4	1050
600	3-sweeper	5	3500	39¼	54½	30x80	5	5	1250
800	4-sweeper	6½	3500	39¼	54½	30x80	5	5	1250
1200	6-sweeper	10	3500	39¼	54½	30x80	5	5	1250

*Truck. †24¾ x 36 x 51 in.

Record of Tuec Cleaning System

The Tuec has won first place in all open National competitive engineering tests and was awarded the "Grand Prize"—"The Highest Award"—at the Panama-Pacific International Exposition in San Francisco, 1915.

There are more than 10,000 Tuecs now installed in residences, apartments, offices, schools, churches, hotels, theaters, stores, clubs, banks, railway stations and terminals, car barns, stables, dairy barns, garages, flour mills, silk mills, rubber factories, telephone exchanges, laundries, carpet cleaning establishments; for other factory work and many other special uses.

Portable Truck Type Tuec

For existing buildings, where for any reason the building can not be piped, the portable truck type Tuec has been designed. The truck type Tuec offers all of the advantages of the stationary type Tuec, except that it must be moved from floor to floor.

The varied air cleaning which may be accomplished with a Tuec No. 260 truck is identical in scope with the service obtained from the stationary type Tuec, and far superior to the work accomplished by small portable cleaners.

Public buildings, factories, hospitals, schools, office buildings, banks, and other existing structures with elevator service, find the No. 260 truck type Tuec a decided convenience and labor saver.

Tuec Pool Cleaning Tool

This is a special cleaning tool with extension handle, hose and inlet valve, employed to remove precipitates from the bottom of swimming pools, and clean the sides of such pools of accumulated sediment, too fine to be gathered in any other way.

A swimming pool equipped with a refiltering system, or without this service, requires this tool to save the excessive loss of water and heat, where the pools are emptied to scrub down these accumulations.

Before swimming pool specifications are completed write THE UNITED ELECTRIC COMPANY for Bulletin S-5, which contains standard specifications and full details of this important equipment.

THE BRUNSWICK-BALKE-COLLENDER CO.

Manufacturers of Billiard Tables and Bowling Alleys

TELEPHONE
WABASH 7060

623-633 Wabash Avenue
CHICAGO, ILL.

NEW YORK OFFICE, 29-35 West 32nd Street

CINCINNATI OFFICE, Northwest corner 7th and Main Streets

Products

BILLIARD TABLES and BOWLING ALLEYS.

For Whale-Bone-Ite Toilet Seats, see page 1634.

Billiard Tables

This company makes 7 sizes of billiard tables. The space required for each of these tables is given in following table. For dimensions required to use two or more tables of any size or sizes, suggestions will be made and complete information furnished on request.

SIZES OF BILLIARD TABLES AND SPACE REQUIRED

Table	Outside dimensions	Room space required	Length of cue used
2½′ x 5′	2′ 9″ x 4′ 10″	10′ x 12′	42″
3′ x 6′	3′ 4″ x 5′ 11¼″	11′ x 14′	46″
3½′ x 7′	3′ 11″ x 7′ 1″	12′ x 15′	51″
4′ x 8′	4′ 7″ x 8′ 5″	14′ 2″ x 18′	‡57″
4½′ x 9′	4′ 11½″ x 9′ 1½″	14′ 6″ x 18′ 9″	57″
5′ x 10′	5′ 5½″ x 10′ 1½″	†15′ x 20′	57″
*6′ x 12′	6′ 8″ x 12′ 6″	16′ x 22′	57″

*"English table." †Space for regulation table. ‡Standard cue

Bowling Alleys

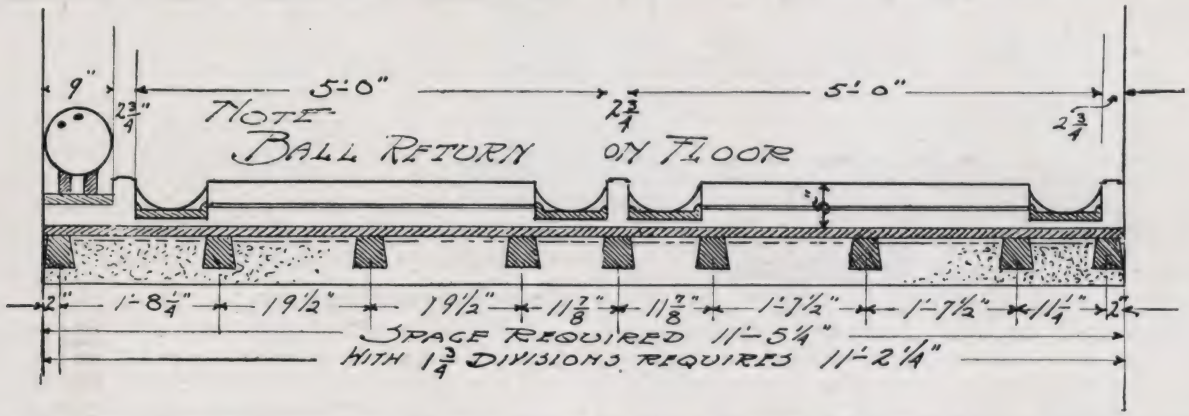
The first two drawings show the maximum and minimum widths required for a single pair of alleys. The length, from back wall to the front of the approach, should never be less than 82 ft. This allows for pit and swinging cushion 4 ft.; for alley (to foul line) 63 ft.; and for approach 15 ft.

Space for players' seats or for spectators should be in addition to the lengths and widths given.

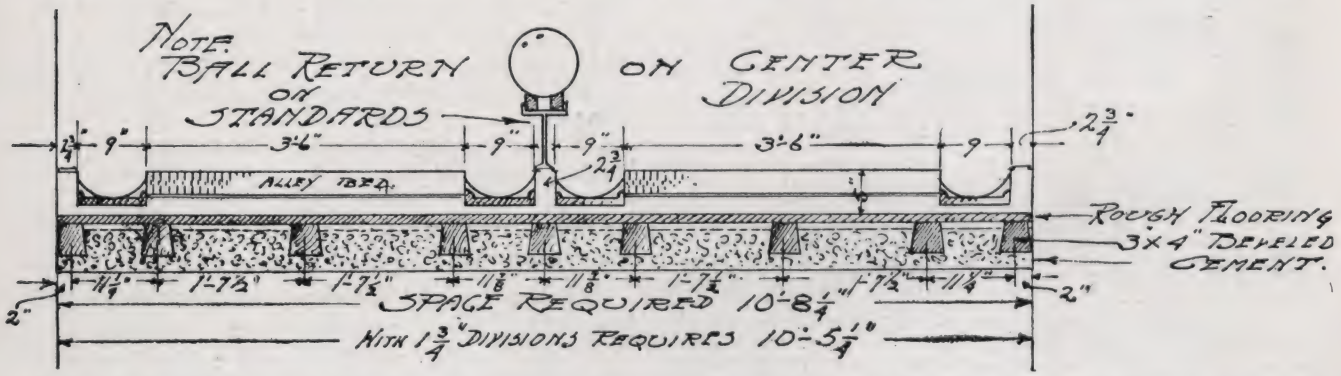
All drawings show concrete foundation construction which is necessary for basement installation and first floors where there is no basement.

Co-operative Service

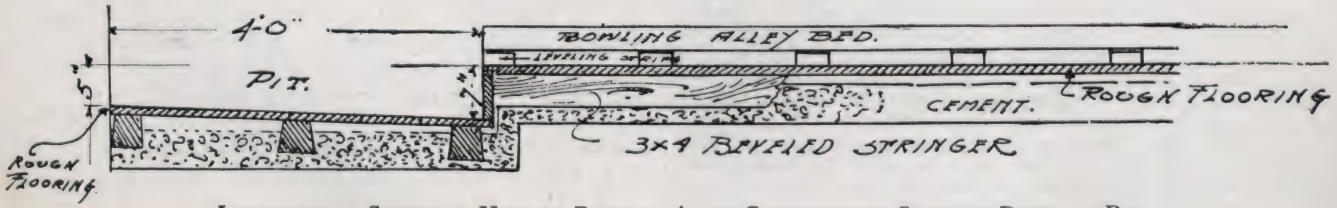
For installations of all kinds, correspondence is invited. We will gladly and without charge make suggestions and furnish complete information to help in the solution of any bowling alley problem.



FRONT SECTIONAL VIEW OF CONSTRUCTION SHOWING MAXIMUM WIDTH REQUIRED FOR SINGLE PAIR OF BOWLING ALLEYS



FRONT SECTIONAL VIEW OF CONSTRUCTION SHOWING MINIMUM WIDTH REQUIRED FOR SINGLE PAIR OF BOWLING ALLEYS



LONGITUDINAL SECTIONAL VIEW OF BOWLING ALLEY CONSTRUCTION SHOWING DEPTH OF PIT

DUDFIELD MANUFACTURING CO.

Manufacturers of Patented Chalk Rails and Metal Blackboard Trim

116 West Kansas Street
LIBERTY, MO.

DISTRIBUTERS ARE BEING ESTABLISHED IN DIFFERENT PARTS OF THE UNITED STATES

Products

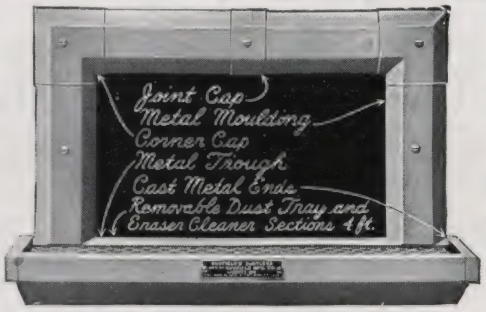
DUSTLESS ALL-METAL CHALK RAILS WITH ERASER CLEANER and METAL BLACKBOARD TRIM.

Dustless All-metal Chalk Rail and Eraser Cleaner

Description—The main trough is made of one piece of No. 24 gauge steel in 10-ft. lengths. Sections are butted together, a concealed cast metal bracket being used at the joints.

Cast metal ends and corners are used, adding to its stability and making installation easy. Removable dust tray and removable wire screens are made of galvanized material in 4-ft. lengths for easy handling in cleaning.

The dust tray and wire screen may be installed in a specially constructed wooden moulding as illustrated, being the same dust tray with ends as in the all-metal product.



NO. 360. METAL BLACKBOARD TRIM WHEN SLATE IS INSTALLED FLUSH WITH PLASTER WALL

Distinctive Features—The following features are embodied in Dudfield's all metal chalk rail and eraser cleaner.

It is sanitary, because chalk dust falls into the removable dust tray, where it remains until cleaned; thus the dust is prevented from permeating the air and settling into the lungs and on the floor or clothing. In general practice, it is cleaned about once each week.

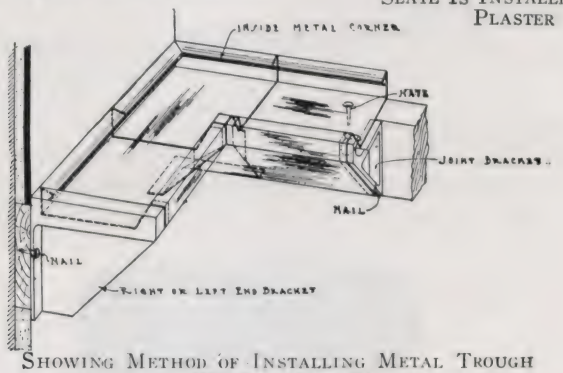
Its all-metal construction adapts it for use in fireproof buildings and prevents defacement by mischievous pupils. It holds firm to the blackboard, and does not warp away as wood often does, is adjustable to all blackboards and is very easily installed. No nails are visible. Eraser cleaner, made of No. 18 gauge, ⅜-in. mesh galvanized wire, holds eraser and crayon out of the chalk dust. Erasers may be cleaned as often as used.

Metal blackboard trim insures the most sanitary equipment.

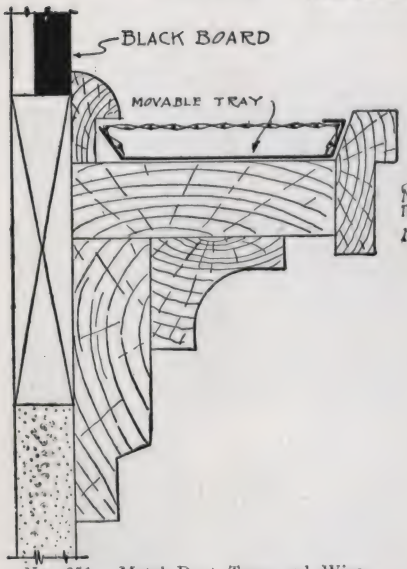
Official Indorsement and Samples

The products of this company have been indorsed by the State Board of Health of Missouri.

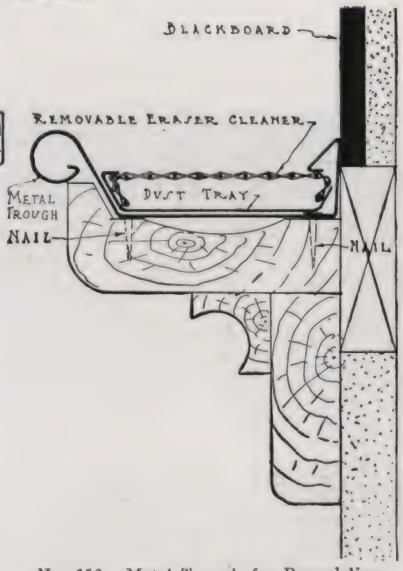
Samples and other information sent on request.



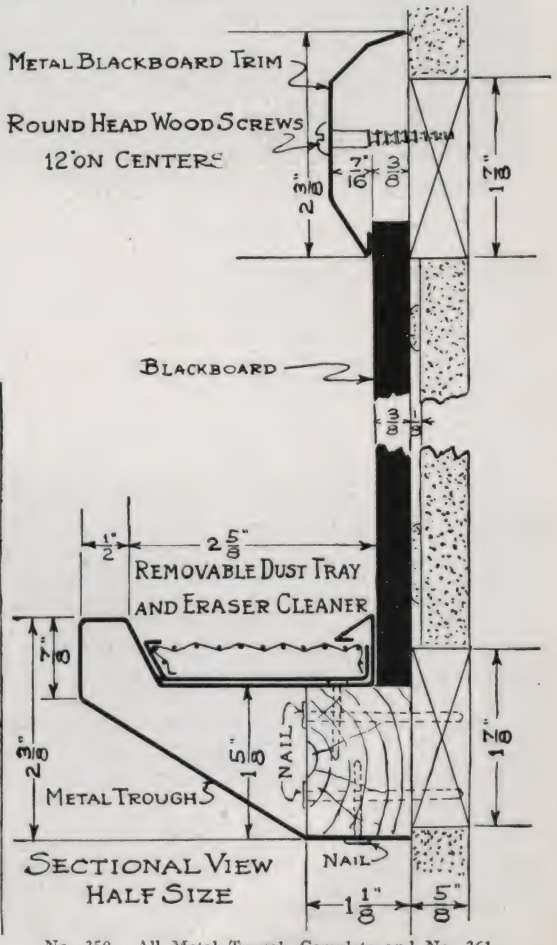
SHOWING METHOD OF INSTALLING METAL TROUGH
(Not drawn to scale)



No. 351. Metal Dust Tray and Wire Screen in 4-in. Sections with Ends



No. 352. Metal Trough for Remodeling Work Complete



No. 350. All Metal Trough Complete and No. 361 Blackboard Trim

SECTIONAL VIEWS OF DUDFIELD'S DUSTLESS CHALK RAILS (ONE-HALF ACTUAL SIZE)

Only metal parts are furnished by manufacturer. Metal trough, metal trays and metal blackboard trim are cut to exact lengths when ordered: give outside measurements over all

FOUNDED 1865

NEW YORK SILICATE BOOK SLATE CO.

TELEPHONE CONNECTION

20-24 Vesey Street
NEW YORK, N. Y.

FACTORY
HOBOKEN, N. J.

Products

SILICATE VENEER PLATE, WALL and REVOLVING BLACKBOARDS; SLATED CLOTH; STONE SLATE BLACKBOARDS; SILICATE LIQUID BLACK DIAMOND SLATING.

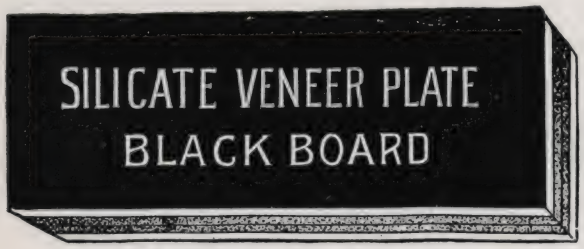
Also manufacturers of Book Slates, Blackboard Cloth and Paper Ivorine Sheets, Black Sheets.

Silicate Veneer Plate Blackboards

These blackboards are composed of the best grades of wood pulp, the four veneers firmly united under great pressure. The marking surface is Silicate Black Diamond Slating. They can be put on any wall.

Blackboards come in sizes 3, 3½ and 4 ft. wide up to 12 ft. long, at 27¢ a sq. ft. for black, and 29¢ for green. Write for discounts.

Specifications—Architects should specify Silicate Veneer Plate Blackboard made by the NEW YORK SILICATE BOOK SLATE CO.



FOUR-PLY SILICATE VENEER PLATE BLACKBOARD

Black Diamond Slating

SIZES, COVERING CAPACITY AND PRICES, BLACK DIAMOND SLATING

Size of can	Covering capacity, one coat	List price
½ pt.	25 sq. ft.	$0.75
1 pt.	50 sq. ft.	1.25
1 qt.	100 sq. ft.	1.75
½ gal.	200 sq. ft.	3.25
1 gal.	400 sq. ft.	6.00

Write for discounts. Prices f.o.b. Hoboken.

Silicate Wall Blackboards

Ready made. Standard sizes from 1½x2 ft. to 4x8 ft., finished both sides.

Frames are of oak, made of the best material, thoroughly seasoned, allowing for shrinkage or swelling. The marking surface is Black Diamond Slating.

DIMENSIONS AND PRICES, WALL BLACKBOARDS

No.	Feet	List price	No.	Feet	List price
0	1½x2	$ 3.25	5	3½x4½	$12.00
½	1⅝x2½	4.00	6	3 x6	14.00
1	2 x3	5.50	7	4 x5	15.50
2	2½x3½	7.00	8	4 x6	17.50
3	3 x4	9.50	9	4 x7	23.00
4	3 x5	11.50	10	4 x8	26.25

Write for discounts. Prices f.o.b. Hoboken.

Stone Slate Blackboards

Made of best quality natural slate, finished on both sides; varnished oak frames. Sizes, 18x24 in. to 4x6 ft.

DIMENSIONS AND PRICES, STONE SLATE BLACKBOARDS

No.	Feet	List price	No.	Feet	List price
0	1½x2	$ 6.00	4	3 x5	$22.50
½	1⅝x2½	7.00	5	3½x4½	24.00
1	2 x3	9.00	6	3 x6	27.00
2	2½x3½	13.50	7	4 x5	30.00
3	3 x4	18.00	8	4 x6	36.00

Write for discounts. Prices f.o.b. Hoboken.

Silicate Revolving Blackboards

Support is made of nicely finished oak, put together with bolts, and stands firmly. Made to fit all sizes of boards in regular stock.

Blackboards are of six-ply silicate, with marking surface of Black Diamond Slating, both sides.

REVOLVING BLACKBOARD

Slated Cloth

A flexible Silicate blackboard for lecturers, teachers, stores, etc.

Marks finely, erases quickly. Rolls tightly, without injury to design or surface.

Fastened with tacks or paste to wall or wood.

No.	Feet	List Price
00½	2 x3	$16.00
0½	2½x3½	18.50
1½	3 x4	21.00
2½	3 x5	23.50
3½	3 x6	26.00
4½	4 x5	27.50
5½	4 x6	30.50

Support $11.50 to $13.00
Write for discounts.
Prices f.o.b. Hoboken.

SLATED CLOTH

DIMENSIONS AND PRICES, SLATED CLOTH
Rolls of 12 Yards

Width, in.	Marking surface	List price, lin. yd.
36	1	$0.80
48	1	.92
36	2	.85
48	2	1.00

Supplied any length desired.
Write for discounts. Prices f.o.b. Hoboken.

References

The Boards of Education of New York and Philadelphia have been supplied with Silicate products for over 40 years, and eighty-three Boards of Education in other cities have also been supplied for various lengths of time.

The United States Government has been supplied for over 30 years.

Many of the schools in Havana, Cuba, and Porto Rico, and Manila in the Philippines have also been supplied.

Goods have been shipped to all parts of the world.

American News Co., 9-15 Park Place, New York, N. Y.

Tower Mfg. & Novelty Co., 326-330 Broadway, New York, N. Y.

Henry Bainbridge & Co., 99-101 William Street, New York, N. Y

E. W. A. ROWLES CO.

Manufacturers of Blackboards, School Furniture and Supplies

2345-2351 South La Salle Street
CHICAGO, ILL.

Products

DUROPLATE BLACKBOARDS.

Also manufacturers of School Furniture and School Supplies.

Duroplate Blackboards

Duroplate blackboard is used successfully by leading educational institutions and is admirably adapted for the varying requirements of a schoolroom blackboard. Each year thousands of square feet are placed in new buildings for permanent use as well as in temporary teaching quarters. It is also used for special framed blackboards in conference rooms, lecture halls, bulletin boards, and has many other uses too numerous to mention.

Foundation or Backing—The backing to which surfacer is applied is made of specially selected, long, wiry wood fibers, combined so as to make a board that will lie flat, give satisfaction, and last indefinitely. Each panel is scientifically kiln cured, waterproofed and surface filled under our own original process. This process gives Duroplate backing a perfect coating surface. No wax or non-drying oils which cause surface to crack, blister, or peel are used. Carpenters prefer to handle Duroplate because it is harder and stiffer and easier to handle and cut.

Surface—No matter how good the surfacer, if the backing to which it is applied is not hard and stiff it is impossible to produce a satisfactory, hard, smooth writing surface. The writing surface of Duroplate is applied by large spring steel trowels over 4 ft. in length, insuring a uniform writing surface. Duroplate surfacer is a thick paste mixture containing selected ground slate, carborundum, colors, flat liquid and other materials. It is mixed by experts and ground together under close supervision. This insures an even, uniform color. Duroplate is therefore restful to the eyes. Ground slate and carborundum produce a surface which is hard and exceedingly tough. It positively will not crack nor peel. It has just enough bite so that chalk marks can be easily and quickly made and instantly and cleanly erased. All crayons can be used with success.

Sizes and Weight—Duroplate is made in widths of 3, 3½ and 4 ft. and in any length up to and including 12 ft. It can be cut to any special size when so ordered, but charge must be made on a basis of even feet. Duroplate is easy to cut and install, therefore we recommend cutting at the building so as to insure perfect fit. Any one who can handle hammer and saw can accomplish a perfect job.

Shipping weight, 1 lb. per sq. ft.

Color—Duroplate is made in two colors, deep blue black resembling natural slate, and dark green. When ordering always specify color wanted. Black will always be shipped unless otherwise specified.

Duroplate is guaranteed for 10 years, but will under ordinary circumstances last much longer.

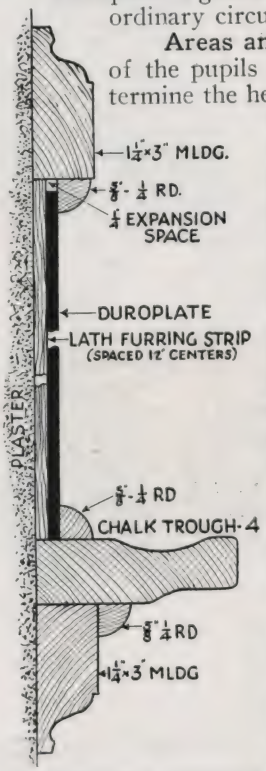


ILLUSTRATION SHOWING DETAILS OF INSTALLATION

Areas and Widths Required—The ages of the pupils in the various rooms should determine the height at which blackboards should be placed from the floor. Many cities have standard specifications governing this. Statistics show that the height at which blackboards should be placed varies from 2 ft. in the kindergarten to 3 ft. in the high school. There is a decided preference for the 4-ft. width, because it is hardly possible to obtain too much blackboard surface on the limited wall space available in most rooms. An average of about 60 lin. ft. is maintained by the leading architects, although some states require at least 80 ft. in each classroom. In lecture rooms all the space possible should be provided with blackboard.

Specifications

The general contractor shall furnish and install (according to manufacturer's instructions), where directed, Duroplate blackboard having a hard troweled surface composed of powdered slate and carborundum. All Duroplate blackboards to be (state height) and fully ¼ in. thick. All wall spaces 12 ft. or less to be provided with one panel and all spaces from 13 to 24 ft. to be provided with two panels of equal length. Where more than one panel of Duroplate is installed, the joint should be covered with ¼x1-in. lattice moulding of same material and finish as woodwork in building.

The carpenter contractor will furnish all grounds, moulding, and chalk troughs, and install them in accordance with details shown in blueprints.

DUROPLATE NONCRACKABLE BLACKBOARD

CORRECT INSTALLATION AND JOINT MOULDING OF DUROPLATE BLACKBOARD

ESTABLISHED 1880

J. C. DEAGAN, INC.

Manufacturers of Tower Chimes

TELEPHONE
LAKE VIEW 4364

MAIN OFFICE AND FACTORY
Deagan Building, 1770 Berteau Avenue
CHICAGO, ILL.

Products

TUBULAR TOWER CHIMES, electrically operated, for churches, public buildings, colleges, cemeteries, mausoleums, country estates, etc.

Also manufacturers of Percussion Musical Instruments for hand playing and organ use; Dinner Chimes; Altar Chimes; Electric Una-Fon, etc.

Deagan Tower Chimes

Deagan tower chimes are much more than mere substitutes for the old-fashioned church bell. The form and method of construction of Deagan chimes make possible extreme accuracy of tuning and even intonation. Deagan chimes, made of an exceptionally fine quality bell metal, are uniform in volume, carrying capacity, and tonal characteristics throughout their entire register. They are noted for their beautiful tone.

Played from Keyboard or Clock

Deagan tower chimes are operated from an electrical keyboard located beside the organ console. Complete musical selections are played on them. The slightest touch of a finger brings forth the full power of the magnificently sweet tones of the chimes. This keyboard may be located at any distance from the chimes. Can be arranged to sound Westminster peals automatically by connecting to clock.

Small Space Required

A complete set of Deagan tower chimes requires comparatively small space, but where sufficient room is not available in the belfry the chime scaffold can be erected on the roof, as Deagan chimes and actions are not affected by the elements.

Equipment Included with Each Set

Standard sets of Deagan tower chimes consist of from 10 to 16 tones. With each set is included, in addition to the chimes, actions and scaffold, an electric keyboard and a motor generator, besides other minor electrical equipment.

Electric Chime Action

The Deagan electric chime action (patented) has been developed to a point of mechanical perfection and compactness truly remarkable. When any key of the keyboard is depressed, the plunger of the corresponding action is propelled forward electrically and delivers a blow against the chime that is far more powerful than is possible by hand. The plunger then automatically returns to its original position. Despite the strength of the blow very little current is used as the action operates almost instantaneously.

Motor Generator

Electrical energy for operating the chime actions is supplied by a motor generator which is manufactured especially for this purpose. The motor is furnished to meet the standard requirements of city current available, as it can be operated from either lighting or power circuit. The generator supplies direct current of the proper voltage for the chime actions. Where city current is not available, heavy duty storage batteries are substituted for the motor generator.

Installation and Guarantee

Deagan tower chimes are installed and connected up by our own erectors, thus insuring perfect results. Chimes and all equipment are guaranteed against any defect in material and workmanship for five years from date of installation. Any part proving defective within that time will be replaced free of charge.

Users of Deagan Tower Chimes

Among those who have installed Deagan Chimes are:

St. Ignatius Church, Chicago, Ill.
Lake Avenue Church, Rochester, N. Y.
Palmer School, Davenport, Iowa
All Souls' Memorial Church, Washington, D. C.
John Wanamaker Mausoleum, Philadelphia, Pa.
Mission Inn, Riverside, Cal.

SINGLE CHIME ACTION

SIXTEEN-TONE SET DEAGAN TOWER CHIMES
Electrically operated. Floor space required 8x8 ft., height 12 ft.

ELECTRIC KEYBOARD

McSHANE BELL FOUNDRY CO.

ESTABLISHED 1856
BY HENRY McSHANE

MAIN OFFICE AND FOUNDRY
Harford Avenue and B. & O. R. R.
BALTIMORE, MD.

INCORPORATED 1904

Products

Founders of CHURCH BELLS, CHIMES, PEAL and CHAPEL BELLS; FIRE ALARM, COURTHOUSE and TOWER CLOCK BELLS; also, WESTMINSTER CLOCK CHIMES, and SCHOOLHOUSE BELLS.

Specialties

This company specializes in the building of musical bells of the highest standard, chimes for churches and tower clocks.

Description and Guarantee

Bells are made exclusively of genuine bell-metal composition, are fully warranted and guaranteed to be satisfactory. Bells are shipped to all parts of the world and more than 40,000 bells have been cast in a half century by the company.

Bells can be installed by any first class carpenter or contractor, full instructions being furnished for the purpose.

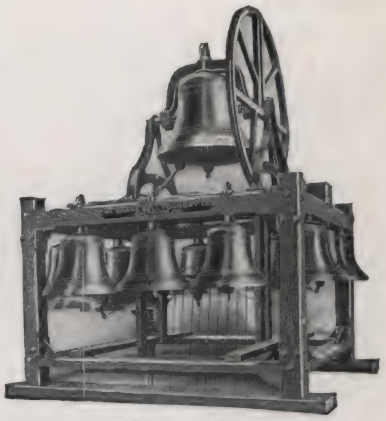
Suggestions for Construction of Belfries

Best results are obtained when floor of bell deck is on a level with comb of roof of the building.

Place windows, which should be 12 to 16 ft. high, on a level with belfry floor and a ceiling just above top of windows. See that windows are as large and open as possible and if louvers are used, see that they be pitched so as not to obstruct entirely the carrying of the tone.

Make provisions for admission of bell.

CHURCH BELL



CHIME BELLS

WESTMINSTER CLOCK CHIMES

FIRE ALARM AND COURTHOUSE BELL

CHAPEL AND SCHOOL BELL

DETAIL SPECIFICATIONS OF BELLS AND MOUNTINGS

Bell			Mountings	
Weight, lbs.	Tone	Diameter, in.	Outside measurements of frame, ft. — in. x ft. — in.	Diameter of wheel, ft. — in.
300	D	25	3 — 4 x 2 — 8	2 — 10
400	C#	27	3 — 4 x 2 — 10	3 — 6
500	C	29	4 — 0 x 2 — 10	4 — 4
600	B	31	4 — 0 x 2 — 10	4 — 4
700	Bb	33	4 — 5 x 3 — 3	4 — 9
800	A	34	4 — 5 x 3 — 3	4 — 9
1000	G#	36	4 — 9 x 3 — 4	5 — 6
1200	G	38	4 — 9 x 3 — 7	5 — 6
1500	F#	41	5 — 0 x 3 — 10	6 — 3
1800	F	44	5 — 4 x 4 — 0	6 — 3
2000	E	46	5 — 8 x 4 — 6	7 — 0
2500	Eb	50	6 — 1 x 4 — 6	7 — 0
3000	D	54	6 — 8 x 5 — 0	7 — 6
3400	C#	55	6 — 8 x 5 — 0	7 — 6
4200	C	59	7 — 0 x 6 — 0	8 — 0
5000	B	62	7 — 6 x 6 — 0	8 — 0
6200	Bb	66	7 — 6 x 6 — 0	8 — 6
7000	A	72	8 — 0 x 7 — 0	8 — 6

References

A few chimes recently installed:

St. Mark's Evangelical Lutheran Church, Van Wert, Ohio
St. Paul's Protestant Episcopal Church, Chattanooga, Tenn.
Church of the Saviour, Philadelphia, Pa.
Taylor Street Presbyterian Church, Fort Worth, Tex.
Westminster Presbyterian Church, Wilmington, Del.
Ohio State University, Columbus, Ohio
St. John's Protestant Episcopal Church, Tallahassee, Fla.
First Methodist Episcopal Church, Fort Dodge, Iowa
John B. Stetson University, De Land, Fla.
Christ Protestant Episcopal Church, Glendale, Ohio
First Baptist Church, Malden, Mass.
First Methodist Episcopal Church, Hastings, Nebr.
Zion Lutheran Church, Niagara Falls, N. Y.
Church of the Good Shepherd, Rosemont, Pa.
St. Giles' Presbyterian Church, Hamilton, Can.
St. Luke's Methodist Episcopal Church, Dubuque, Iowa
First Methodist Episcopal Church, St. Johns, Mich.
St. James' Church, Upper Montclair, N. J.
University of Illinois, Champaign, Ill.

MENEELY BELL CO.

220 Broadway
NEW YORK, N. Y.
TELEPHONE CORTLANDT 1749

22-28 River Street
TROY, N. Y.
TELEPHONE, TROY 525

Products

Manufacturers of BELLS:
Church, Chime, Peal, Angelus, School, Tower Clock, Westminster, Fire Alarm, Fog Signal, Ship, Farm, and other Bells.

Details of Church Bells

WEIGHTS, TONES AND SIZES OF CHURCH BELLS

BELL			MOUNTINGS		
Weight, lbs.	Medium tone	Diameter, in.	Size of frame outside ft. in. ft. in.		Diameter of wheel ft. in.
400	D	27	3	5x3 5	4 4
450	C sharp	28	3	5x3 5	4 4
500	C	29	3	5x3 5	4 4
600	B	31	3	8x3 11	4 9
700	B	33	3	11x4 2	4 9
800	B flat	34	3	11x4 2	5 6
900	A	36	4	2x4 6	5 9
1000	A	37	4	2x4 6	5 9
1200	A flat	39	4	9x4 9	6 3
1500	G	42	4	10x4 10	6 6
1800	F sharp	45	5	5x5 7	7 0
2000	F	46	5	5x5 7	7 0
2500	E	50	5	5x5 9	7 6
3000	E flat	53	6	2x6 6	8 0
3500	D	56	6	2x6 6	8 6
4000	C sharp	58	6	6x6 9	8 6
4500	C	61	6	6x6 9	9 0
5000	C	63	7	0x7 0	9 0
6000	B	67	7	0x7 0	9 6
7000	B flat	69	7	6x8 5	9 6

Illustrations

The accompanying illustrations show a few of the principal bells manufactured by this company.

PEAL BELLS

TOWER CLOCK BELL

CHIME BELLS

CHURCH BELL

SCHOOL BELL

HITCHINGS & CO.

Iron Frame and U-Bar Greenhouses; Glazed Structures of All Kinds

HOME OFFICE AND FACTORY
ELIZABETH, N. J.

NEW YORK OFFICE, 101 Park Avenue
BOSTON OFFICE, 294 Washington Street
PHILADELPHIA OFFICE, 133 South 12th Street

Products and Services

Manufacture, erection and equipment of SECTIONAL IRON FRAME and U-BAR GREENHOUSES.

Also manufacturers of conservatories, sun rooms, glass enclosed swimming pools, etc.

Iron Frame Construction

The foundations are capped with cast iron sills, to which at intervals of 8 ft. 4 in., are bolted flat bar iron rafters, between which are secured angle iron purlins.

The glass is supported by cypress roof bars, spaced about 24 in. apart, secured to each purlin by screws and fastened to the gutter by cast iron clasps.

The curved portion above the gutter is a 30-in. radius and is cut from a solid piece of wood. Hinged underneath the gutter is a high sash opening outward. The gutter has a moulded face on the outside and flat inside.

U-Bar Construction

It differs from the sectional iron frame construction, mainly in the combining of roof bar and rafter in one. This is made possible by enclosing the roof or glazing bar in a galvanized steel U-bar.

The U-bars are made in three sizes to meet roof conditions of varying space widths. The gutter can be combined with the sill capping the masonry wall, or placed at the base of the eave curve as in the sectional iron frame.

All iron and steel portions are galvanized and aluminum coated.

Strength, durability and an airy lightness are its advantages.

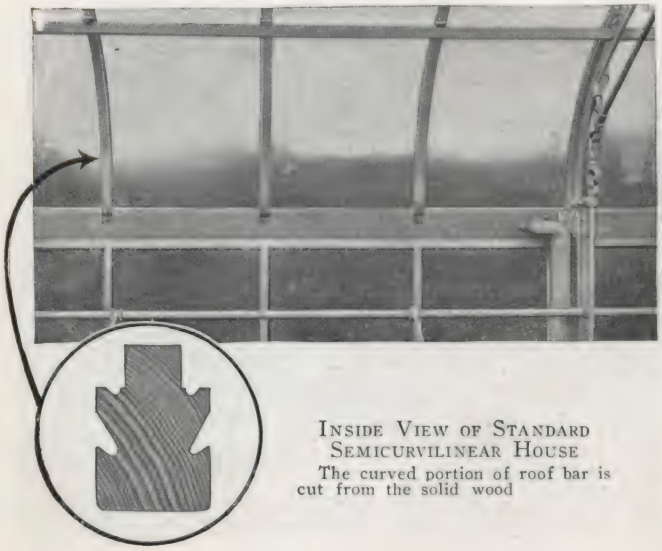
Equipment

Both constructions are furnished complete with ventilating apparatus, plant beds or tables, and heating system.

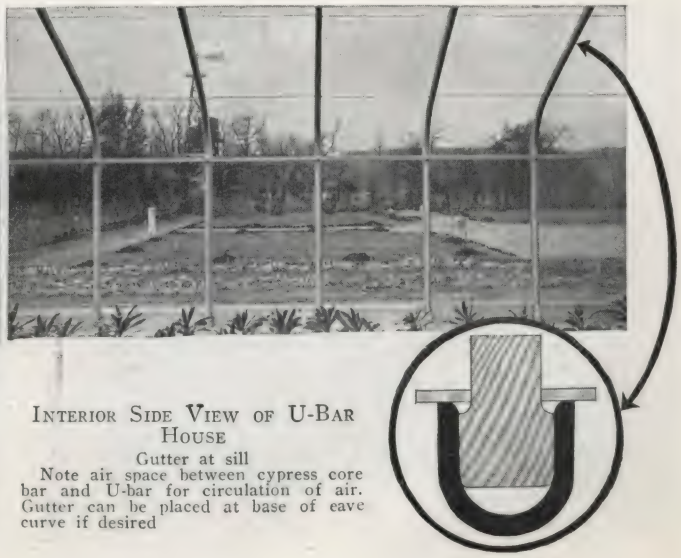
Contracts executed entire, or any part.

Exhibit

We should be pleased to have you look over our exhibit of photographs in the Architects Samples Corporation, 101 Park Avenue, New York, N. Y.



INSIDE VIEW OF STANDARD SEMICURVILINEAR HOUSE
The curved portion of roof bar is cut from the solid wood



INTERIOR SIDE VIEW OF U-BAR HOUSE
Gutter at sill
Note air space between cypress core bar and U-bar for circulation of air. Gutter can be placed at base of eave curve if desired

ESTABLISHED 1902

KING CONSTRUCTION COMPANY

Designers, Manufacturers, and Erectors of Glass Construction of Every Description

GENERAL OFFICES AND FACTORY

NORTH TONAWANDA, N. Y.

SALES OFFICES

NEW YORK, N. Y., 56 West 45th Street
BOSTON, MASS., Board of Trade Building
PHILADELPHIA, PA., 15th and Market Streets
SCRANTON, PA., 307 North Irving Avenue

Products

KING COMMERCIAL AND PRIVATE GREENHOUSES AND CONSERVATORIES.

Also Sun Parlors, Swimming Pool Enclosures and Roofs; Greenhouse Supplies and Accessories, King Sash Operators for greenhouses and factories; Heating Plants and Equipment for greenhouses.

Co-operative Service

The King engineering department is maintained to carry out in detail the architects ideas and to assist with all matters relative to glass construction, greenhouse heating and greenhouse and factory ventilation. Highly illustrated useful bulletins can be procured free from any of the above listed offices by architects requesting them. Sales offices are prepared to furnish suggestions and to co-operate with architects at their request.

Design

Designs have been worked out and tested by a corps of skilled engineers before the design and construction have been submitted to the buying public.

Workmanship

All parts are manufactured by skilled mechanics in a modern daylight factory with modern labor saving machinery. All workmanship is under strict supervision.

General Construction and Materials

King greenhouses are so constructed that they give maximum strength with the minimum of shadow-casting supports. They offer splendid architectural possibilities and possess many exclusive features. Owing to their simplicity and durability of construction they are easily maintained.

Each and every part entering into the manufacture of King products is guaranteed to be made from the best raw materials selected after a long and thorough study of the duties they are to perform.

Materials entering into manufacture are first class iron and steel, malleable and cast iron fittings and double strength "A" quality American window glass. All woodwork is of California clear selected redwood from the heart of the tree. This wood is not affected in any degree by heat, cold or dampness, is practically decay-proof, and can be procured in long lengths eliminating splicings and joints.

Nails, bolts and screws are galvanized. Where parts are galvanized and machined, the machining is done first insuring rustproof work.

Paint is made from our own formula with pure first class ingredients. Three coats are used unless otherwise specified.

Styles of Design

Straight roof with ornamental gutter at eave.
Curved glass eave with gutter at sill or eave.
Curvilinear.
Semicurvilinear.

The curved eave design is generally built with a 16-in. radius at the eave. It can be built with a 24-in. or 30-in. radius at the eave when so specified.

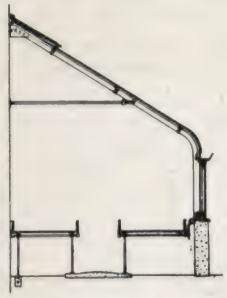
The curvilinear has a full curved roof and long, sweeping graceful lines. This type of house is particularly suited to graperies, orangeries, palm houses and for plants requiring a great amount of height.

The semicurvilinear house has a 3-ft. curve at the eave.

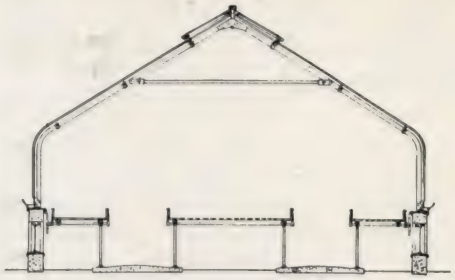
A SMALL LAYOUT CONNECTING PALM HOUSE AND TWO WINGS
It gives an appealing appearance to any estate

INTERIOR OF PALM HOUSE
Tropical growth and warmth even with a blizzard outside. Ground glass is used in the roof making the disfiguring coat of whitewash used in hot weather unnecessary.

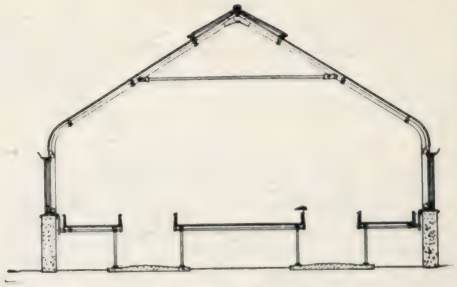
Continued on next page



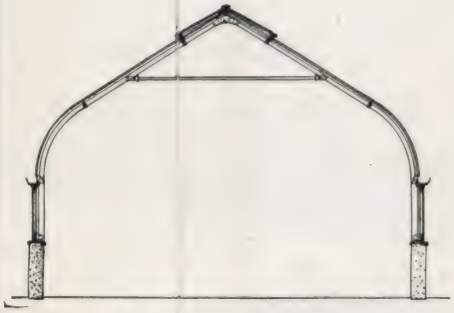
Lean-to House
Adaptable to many widths and bench arrangements



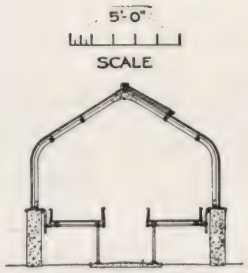
18-ft. Curved Eave House
Combination sill and gutter



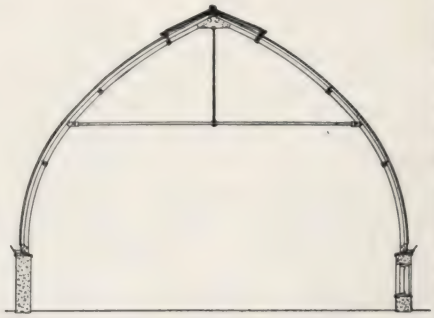
18-ft. Curved Eave House
Gutter at eave



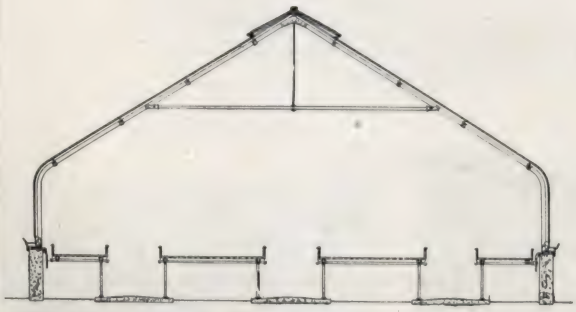
18-ft. Semi-curvilinear House
Combination sill and gutter. Straight roof with large curve at eave. Fine for tall plants



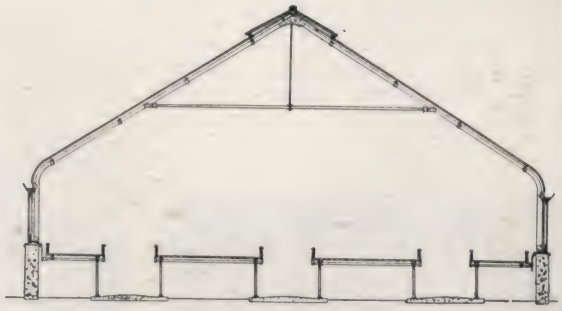
Small House
Used for connecting passages and for propagating



18-ft. Curvilinear House
Both roof and eave curved. For palms, grapes or fruit trees



25-ft. Curved Eave House
Combination sill and gutter



25-ft. Curved Eave House
Gutter at the eave

Note: These sections are shown to illustrate the various types of houses with the typical arrangement of benches and aisles for different width houses, also various gutter and eave arrangements.

TYPICAL SECTIONS OF GREENHOUSES MADE BY KING CONSTRUCTION COMPANY

Standard widths, 11, 18, 21, 25 and 28 ft.
Standard length per section, sectional iron frame house, 8 ft. 5 in.
Standard length per section, channel bar house, 8 ft. 3 in.

Continued on next page

Types of Construction

King sectional iron frame.

King channel bar.

In channel bar construction, the wooden sash bar is incased on three sides with a U-shaped galvanized steel bar (see illustration).

General Data and Dimensions

Dimensions—The length should be in multiples of 8 ft. 5 in. for a standard section of the sectional iron frame house, and 8 ft. 3 in. for a standard section of a channel bar house.

Where plants requiring different temperatures are grown, the houses are divided into compartments. A compartment should not be less than 17 ft. in length. Standard widths are 11, 18, 21, 25 and 28 ft. The most popular widths are 18 and 25 ft. Both work out economically for benches allowing ample space for walks.

Masonry—Greenhouse walls need not be more than 8 in. thick above grade and 12 in. below grade, and need not extend more than 3 ft. below grade. Walls may be made of brick, concrete or hollow tile.

Walks should extend under the sides of the benches and need not be over 4 in. thick. A slight crown causes them to drain quickly. Bricks, set in cement, are not liable to become slippery and get coated with verdigris.

Drainage—The gutters, which may be placed at the eave or sill, are exposed to the heat of the house. The gutters have outlets at the back at suitable intervals to discharge the rain water. Copper leaders (run inside the house to prevent freezing) connect the outlets to the upright opening of the drain at grade line.

Ventilation—Two lines of ventilating sash are placed at the ridge of all houses which are 18 ft. or wider. Side ventilators, when desired, can be placed in side walls between the ornamental gutter at the eave and the sill plate or in the foundation wall. When placed in the foundation wall, the ventilators are cast iron or wood.

Ventilator Operation—All ventilating sash and panels are operated with machines consisting of shafting, arms, levers, hangers, worm and gear. All ventilator operating machines are self-locking, holding the ventilators at any point.

The King patent spring arm allows for any unequal closing of the sash. Any obstruction on the bottom rail or on the header would prevent the sash from closing tight—an icicle, for instance. If the machine was turned down tight the plain arm would pull the screws from the sash or break the glass.

Our patent spring arm takes up by tension on the spring any such inequality. Even when there is no obstruction to the sash closing there is always a tendency to put a strain on the machine, to tighten the sash, and this strain in time pulls or loosens the screws in the sash. The spring arm takes up this strain and keeps the sash tight. These arms have given the best of service.

Benches—Benches are of galvanized steel pipe or angle frames about 30 in. high, and from 2½ to 5 ft. wide to conform to the width of the house. The bottoms are of wood, tile or slate; the sides, wood or slate, approximately 6 in. high. Bench legs should rest on edge of the walk to prevent benches from settling.

Heating—The simplest and most efficient method of heating is by means of hot water running through 2-in. pipe coils. Water holds the heat and maintains a more even temperature in greenhouses than steam. The coils are under the benches, and are connected to the flow and return mains in trenches. At the flow end of each coil a brass gate valve is installed thus enabling the owner to totally or partially shut off any coil when desiring to regulate the temperature of the house. The high points on all coils have King automatic air valve to keep coils from getting air bound and stopping the circulation of the water. The capacity of the boiler should be double the amount of radiation.

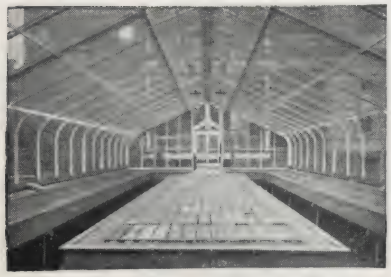
When the boiler is installed in the basement of the adjoining service building the cellar should be at least 8 ft. deep to allow 2 ft. between floor of house and top of the boiler.

Coils are set on cast iron chairs supported on concrete piers.

Watering System—A system of water supply piping, usually of ¾-in. galvanized pipe with brass hose valves at suitable intervals, should be installed for plant watering purposes.

A Few Prominent Installations

Como Park, St. Paul, Minn.
J. L. Luckenbach, New York, N. Y.
Eugene du Pont, Greenville, Del.
Ogden Mills, New York, N. Y.
F. A. Seiberling, Akron, Ohio
United States Military Academy, West Point, N. Y.
T. H. Wickwire, Jr., Buffalo, N. Y.
J. P. Morgan, New York, N. Y.
J. F. Schoellkopf, Lake View, N. Y.
J. B. Stetson Estate, Elkins Park, Pa.
Bronx Park Botanical Gardens, New York, N. Y.
F. H. Shelton, Media, Pa.
Vassar College, Poughkeepsie, N. Y.
Lewis R. Page, Villa Nova, Pa.
Mrs. William Lord Conyngham, Wilkesbarre, Pa.
John Conyngham, Wilkesbarre, Pa.
Walter E. Hunnewell, Wellesley, Mass.
East Technical High School, Cleveland, Ohio
Charles H. Candler, Atlanta, Ga.



INTERIOR VIEW OF CURVED EAVE HOUSE

Benches before being filled. Benches have wood sides, tile bottoms and galvanized steel supporting frames

INTERIOR VIEW OF CURVILINEAR HOUSE

Note the great amount of light and heating coil arrangement

INTERIOR VIEW OF SEMI-CURVILINEAR HOUSE

A fine house for general use as it has plenty of headroom and air space

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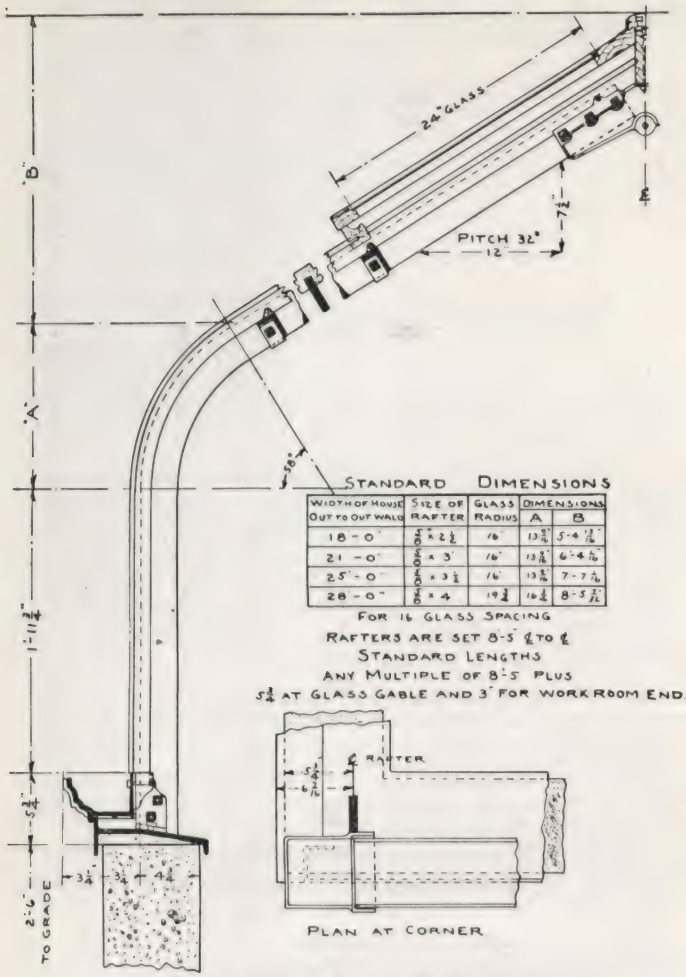


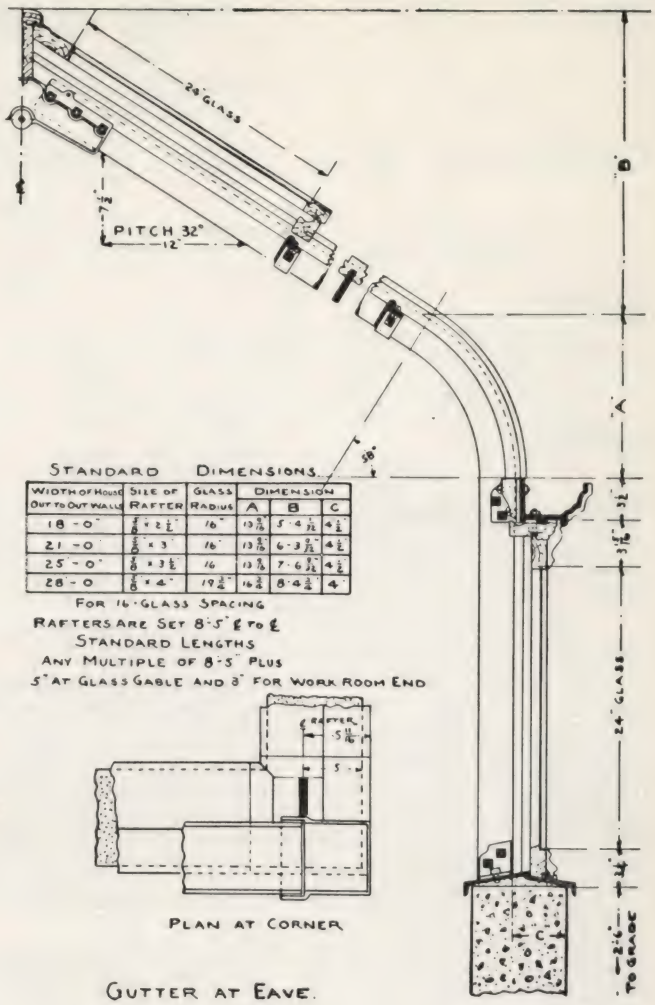
STANDARD DIMENSIONS

WIDTH OF HOUSE OUT TO OUT WALL	SIZE OF RAFTER	GLASS RADIUS	DIMENSIONS A	DIMENSIONS B
18'-0"	2½ × 2½	16"	13⅜	5'-4 1/16
21'-0"	2½ × 3"	16"	13⅜	6'-4 7/16
25'-0"	2½ × 3½	16"	13⅜	7'-7 7/16
28'-0"	2½ × 4"	19¾	16¼	8'-5 7/16

FOR 16 GLASS SPACING
RAFTERS ARE SET 8'-5" ℄ TO ℄
STANDARD LENGTHS
ANY MULTIPLE OF 8'-5" PLUS
5½" AT GLASS GABLE AND 3" FOR WORK ROOM END

PLAN AT CORNER

COMBINATION SILL AND GUTTER



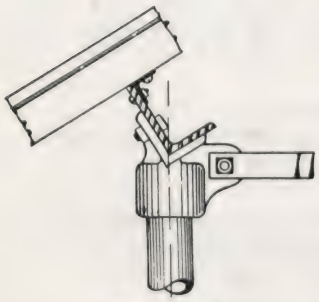
STANDARD DIMENSIONS

WIDTH OF HOUSE OUT TO OUT WALL	SIZE OF RAFTER	GLASS RADIUS	DIMENSION A	DIMENSION B	DIMENSION C
18'-0"	2½ × 2½	16"	13⅜	5'-4 1/16	4½
21'-0"	2½ × 3"	16"	13⅜	6'-3 7/16	4½
25'-0"	2½ × 3½	16"	13⅜	7'-6 7/16	4½
28'-0"	2½ × 4"	19¾	16¼	8'-4 7/16	4

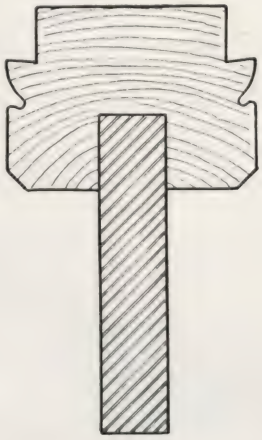
FOR 16 GLASS SPACING
RAFTERS ARE SET 8'-5" ℄ TO ℄
STANDARD LENGTHS
ANY MULTIPLE OF 8'-5" PLUS
5" AT GLASS GABLE AND 8" FOR WORK ROOM END

PLAN AT CORNER

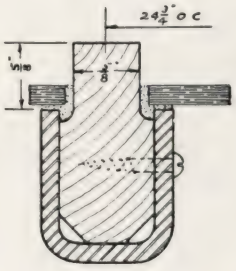
GUTTER AT EAVE.



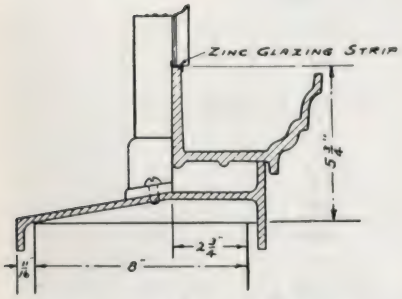
POST TOP
PURLIN & CROSS BRACE
CHANNEL BAR HOUSES



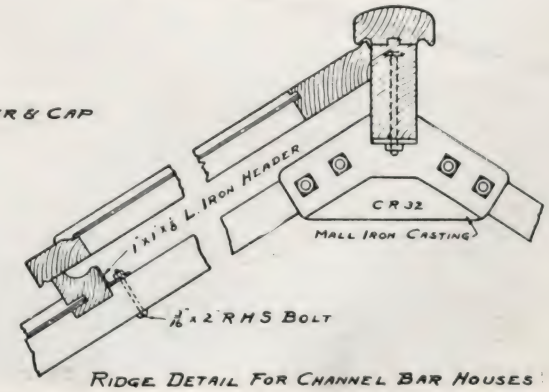
SECTION THRO. STEEL RAFTER & CAP



SECTION THRO CHANNEL BAR



COMBINATION SILL & GUTTER



RIDGE DETAIL FOR CHANNEL BAR HOUSES

TYPICAL DETAILS OF GREENHOUSES MADE BY KING CONSTRUCTION COMPANY

LORD & BURNHAM CO.

Greenhouse Designers and Manufacturers

FACTORIES

IRVINGTON, N. Y. DES PLAINES, ILL. ST. CATHARINES, CANADA

SALES OFFICES

NEW YORK, N. Y. BOSTON, MASS. CHICAGO, ILL. PHILADELPHIA, PA.
CLEVELAND, OHIO ATLANTA, GA. DENVER, COLO. TORONTO, ONT.

Products

Manufacturers of SECTIONAL IRON FRAME GREENHOUSES, and GREENHOUSE EQUIPMENT, including Hot Water and Steam Heating Systems.

Also Conservatories, Sun Parlors, Graperies and Swimming Pools.

For Sash Operating Apparatus, see page 1336.

Quality and Facilities

Back of our greenhouses, as built today, are our over three-score years' experience as specializing greenhouse designers and manufacturers.

We thoroughly understand plant requirements and the best way to construct houses to meet them.

In three extensive factories, located conveniently near the business centers of the United States and Canada, are manufactured everything for the greenhouse except the glass. The fact that all the necessary materials are on hand, ready for immediate working up into houses, eliminates the delays and dissatisfaction that would attend the ordering of iron from one mill, wood from another, and waiting in turn for deliveries.

We will furnish materials and erect, or just furnish materials.

In order to co-operate closely with the architect, eight sales offices have been established, seven in the United States and one in Canada, at any one of which our greenhouse experts can be dealt with direct.

Sectional Iron Frame Greenhouses

General Construction—One section is formed by setting up two spans of rafters, 8 ft. 4 in. apart, at either end of two lengths of cast iron sills. The cross framing between these two spans of rafters consists of the gutters at the eaves and purlins between the eaves and ridge. These latter are placed the right distance apart to carry the roof bars.

Another section may be added by setting up one more span of rafters 8 ft. 4 in. further along, with cross framing, and so on until the required number of sections are had for the length of the house.

Strength and Durability—The strength and durability of this construction is in its steel bar rafters, placed thin edge to the light and framed between the steel angles for purlins; and in the method of securing the rafters to the sills at the joints, where two sections of sills meet, and to the gutters in the same manner, so that the sections of sill and gutter on either side of each span of rafters are united to the rafters, as if they were part of them, making the entire iron frame of rafters, sills, gutters and purlins as one piece.

The combining of iron and wood makes an unusually strong construction. Years of experience have taught us that wooden sash bars are more durable and satisfactory for the purpose than any other material, and prevent glass breakage that is bound to occur from expansion and contraction, if all metal glazing bars are used. If, however, a metal bar is desired, we can use same in place of the wood bar.

Lightness—While attaining durability, the light has been increased many fold, as each framework member is but a fraction of the size of its corresponding member in the wooden house and casts correspondingly less shade. Every unnecessary member is eliminated to admit all possible light.

Attractiveness—Each construction member is prepared with an idea of good proportion, and general shapeliness of contour; the keynote being simplicity of lines.

The rafter caps and pilasters being larger than the glazing bars, each bay of 8 ft. 4 in. is accented, giving an effect of broad spacing throughout the entire roof and sides, not obtainable where the glazing bars are of one size and no rafters are used.

Quick Erection—Our greenhouse construction has been worked out to the end that the labor of erecting be reduced to a minimum. The entire frame is passed through a line of machines in the factory; where it is cut, shaped, punched, fitted and primed, ready for immediate erection.

When the materials are delivered, it is mainly a matter of bolting up the iron parts and fastening the screws.

Styles of Greenhouse Sections

Modified Curved Eave House—The gutter is at the bottom of the curved eave, and the ventilating sash are hinged directly to it. The radius of the eave curve is 2 ft., which increases the height of the curved portion over that of the old style curved eave house, giving greater headroom for the side bench plants. This we consider the most practical house built. (Fig. 1 on following page.)

Curvilinear Roof House—The roof of the curvilinear roof house is curved from the eave line to the ridge. Gutter is at the eave. (Fig. 2 on following page.)

Straight Roof House—Roof is straight from eave to ridge. Gutter is at the eave. (Fig. 3 on following page.)

Heating

Coils of 3½-in. (internal diameter) cast iron pipe, made up with calked joints, are generally located under the benches, where they do not take up any growing space, and are so arranged as to secure a free circulation of air around them. Their surfaces are so distributed as to give the desired temperature with sufficient control in each compartment to produce the best growing conditions.

"Burnham" boilers are used, with ample means for carrying water to the coils.

The system is installed with sufficient grade to insure rapid circulation and even distribution. The coils are equipped with automatic air headers to prevent all air locks.

The cellar should be of a depth that will allow at least 2 ft. above top of boiler. The average cellar depth is 8 ft.

Continued on next page

Beds and Tables

Several kinds of construction are employed in the regular stock beds and tables:

Beds—(1) Galvanized iron frames with cypress bottoms and sides. (2) Galvanized iron frames with tile bottoms and cypress or slate sides.

Tables—(1) Galvanized iron frames with ¾-in. planed slate bottoms. (2) Galvanized iron frames with cypress bottoms.

How to Specify

The following may serve as a suggestive guide in making specifications:

Frame—The greenhouse to be built with a framework consisting of cast iron sills capping the masonry walls, steel rafters and purlins, and non-freezable cast iron gutters. Rafters to be spaced about 8 ft. 4 in. centers. All sills and gutters to be cast in lengths of about 8 ft. 4 in.

Wood Capping—All wood used throughout to be of clear Gulf cypress, neatly milled and free from all defects. The structure to be furnished with the necessary ridge, mouldings, etc. All members to be properly moulded and secured to the steel frame with screws, lugs, etc.

Gables and Partitions—The house to be furnished with ..... glass gables and ..... glass partitions. These to be constructed in a manner similar to the other parts of superstructure.

Ventilation—A run of ventilating sash, constructed of cypress, to be placed on each side of ridge, hinged to same. A line of ventilating sash to be placed on each vertical side hinged to underside of gutter of modified curved eave house (Fig. 1) and in straight eave house (Fig. 3). All to be operated with Lord & Burnham Co.'s special ventilating machinery.

Painting and Glazing—All cast iron and steel work, entering into the superstructure, to receive 1 coat of red lead before shipment. All wood work, 1 coat of pure white lead and linseed oil. After the frame is erected, 1 coat of white paint. After glazing, a finishing coat of white.

Plant Beds—Plant beds, constructed with steel frames, cypress sides and bottoms, to be placed in each compartment, constructed and arranged in manner to best serve the various plants intended to be grown.

Heat—Hot water system. Place a sufficient number of 3½-in. internal diameter cast iron pipes, so as to maintain desired temperature when the thermometer registers zero outside. Connect heating system to a Lord & Burnham Co.'s cast iron boiler having sufficient capacity to maintain the temperatures specified.

Dimensions—House to be .... ft. long by .... ft. wide.

Co-operation

A greenhouse or conservatory, to insure the complete satisfaction of its owner, combines architectural attractiveness with practicability for growing things.

With our architects' service department, our accumulated experience of over half a century, spent in the building of glass enclosed structures, combined with an exact knowledge of the rather inelastic demands of plant life, is placed at the disposal of architects.

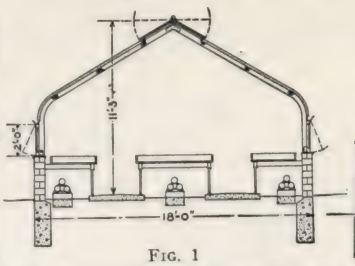


Fig. 1
Modified Curved Eave House

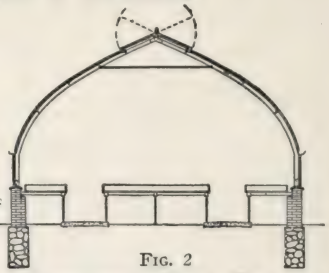
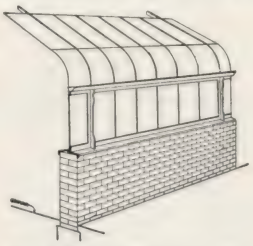


Fig. 2
Curvilinear Roof House



Side Construction of Modified Curved Eave House

Gutter is raised to the eave line. Ventilating sash hinged to gutter, as in straight eave house

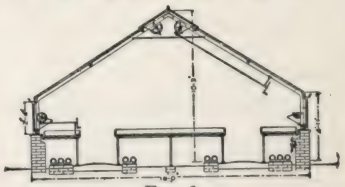
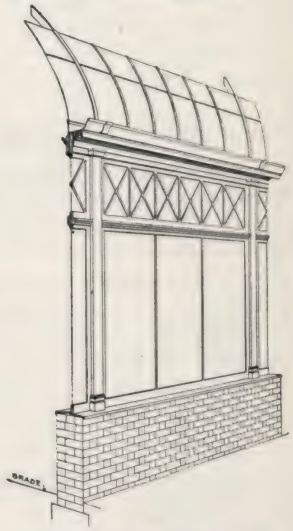


Fig. 3
Straight Roof House

Sectional View of Side of Modified Curved Eave House

By broadening the roof's sweep, height of curved portion above gutter has been increased. Makes possible the growing of taller plants on side benches



Side Construction of Palm House

Cast iron gutter placed at the eave. Masonry walls capped by cast iron sills and the rafter bolted to them

References

Miss Paula Uihlein, Milwaukee, Wis.; George W. Perkins, Riverdale, N. Y., Robert M. Byers, Architect; DeLamar Estate, Glen Cove, N. Y., C. P. H. Gilbert, Architect; Larz Anderson, Brookline, Mass., Fox & Gale, Architects; P. A. B. Widener Estate, Ogontz, Pa., Horace Trumbauer, Architect; Chas. S. Walton, St. Davids, Pa., D. Knickerbacker Boyd, Architect.

One of Our Modified Curved Eave Houses, 25 ft. Wide and 50 ft. Long, Having Bench Space of 850 or More Sq. Ft.

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V-Bar Greenhouse Construction

The Lutton V-Bar greenhouse is the result of over twenty years of careful study and practical experience gained in building greenhouses of all types and sizes for both private and commercial use.

In this type of greenhouse the use of wood is eliminated as far as it is practical to do so, and galvanized steel roof bars, which are smaller in size but much stronger, are used in place of the wood.

This produces a greenhouse that is far more attractive in appearance, more efficient in operation and less expensive to maintain than the standard iron frame type of greenhouse. The V-Bars consist of a galvanized steel "V" bar on edge with a small cypress core to which the glass is secured.

See detail drawings on next page.

Not only are the V-Bars galvanized but the entire iron and steel work (with the exception of the cast iron sills and the wall ventilating panels), thus eliminating unsightly rust streaks so prevalent in ordinary painted steel greenhouse frames.

All iron and steel work is galvanized by the hot process (not electrogalvanized) after being completely fabricated.

Advantages of the V-Bar Construction

(1) The galvanized V-Bar is fitted with a cypress core and the glass rests on a wood and elastic putty bed and does not come in contact with the steel bar as is the case with other steel constructions.

This practically eliminates breakage of glass caused by contraction and expansion of the metal bar and steel frame.

(2) There is a continuous and unobstructed gutter on each side of the V-Bar which takes off the condensation water and drip forming on the underside of the glass adjacent to the bar.

On account of the small area of the V-Bar in comparison with other steel bar constructions, and also on account of the fact that the steel V-Bar does not touch the cold glass but is insulated from the outside temperature by the wood core, practically no condensation forms on the bar itself and there is no drip. Other constructions, without drip gutters, which depend entirely on the theory of capillary attraction to make the condensation water follow the bar down the roof are not reliable, because when the water meets the slightest projection or obstruction, which is invariably the condition and difficult to avoid, it drops off. The V-Bar system is practically the only steel greenhouse construction eliminating drip. In all greenhouses constructed with wood bars the bars are always provided with gutters on each side which demonstrates clearly that gutters are necessary.

(3) The V-Bar construction is architecturally more unique and imposing and lighter in appearance, on account of the shape and size of the steel section, than other steel constructions.

It casts much less shadow (approximately 50% less) on account of its deflecting sides and shallower section.

(4) Should the wood core bar swell or shrink, as might happen under extreme conditions with any metal incased wood bar, the V-Bar core will remain in its proper position for the reason that it is held tightly in place by the wedge-shape metal bar to which it is secured by brass screws, while in other constructions the core bar is only suspended, allowing leeway for movement which is liable to break the glass and misplace the core bar.

In the event a core bar in the V-Bar construction should become broken or damaged from accident, a new core can be easily and cheaply replaced, on account of the natural bed formed by the steel for the wood to rest on so that no adjustment whatever is required, and the amount of wood in the core is comparatively small.

(5) The V-Bar construction does not require columns for supporting the roof (excepting for spans over 30 ft. wide).

Columns in narrow width greenhouses are unsightly and cause shadows, besides occupying space which can be used for plants. The V-Bar construction is held rigid and firm by means of strong light flat steel rafters spaced about 8 ft. 3 in. center to center and spanning the width leaving the center of the greenhouse unobstructed.

Owing to the much greater strength of the steel V-Bar as compared with the ordinary wood bar, the purlins can be spaced further apart thus lightening the appearance of the superstructure.

Service Department

Our Service department will be pleased to co-operate with Architects and Engineers and submit sketches and estimates designed to meet the requirements of any particular case in the most practical and economical manner.

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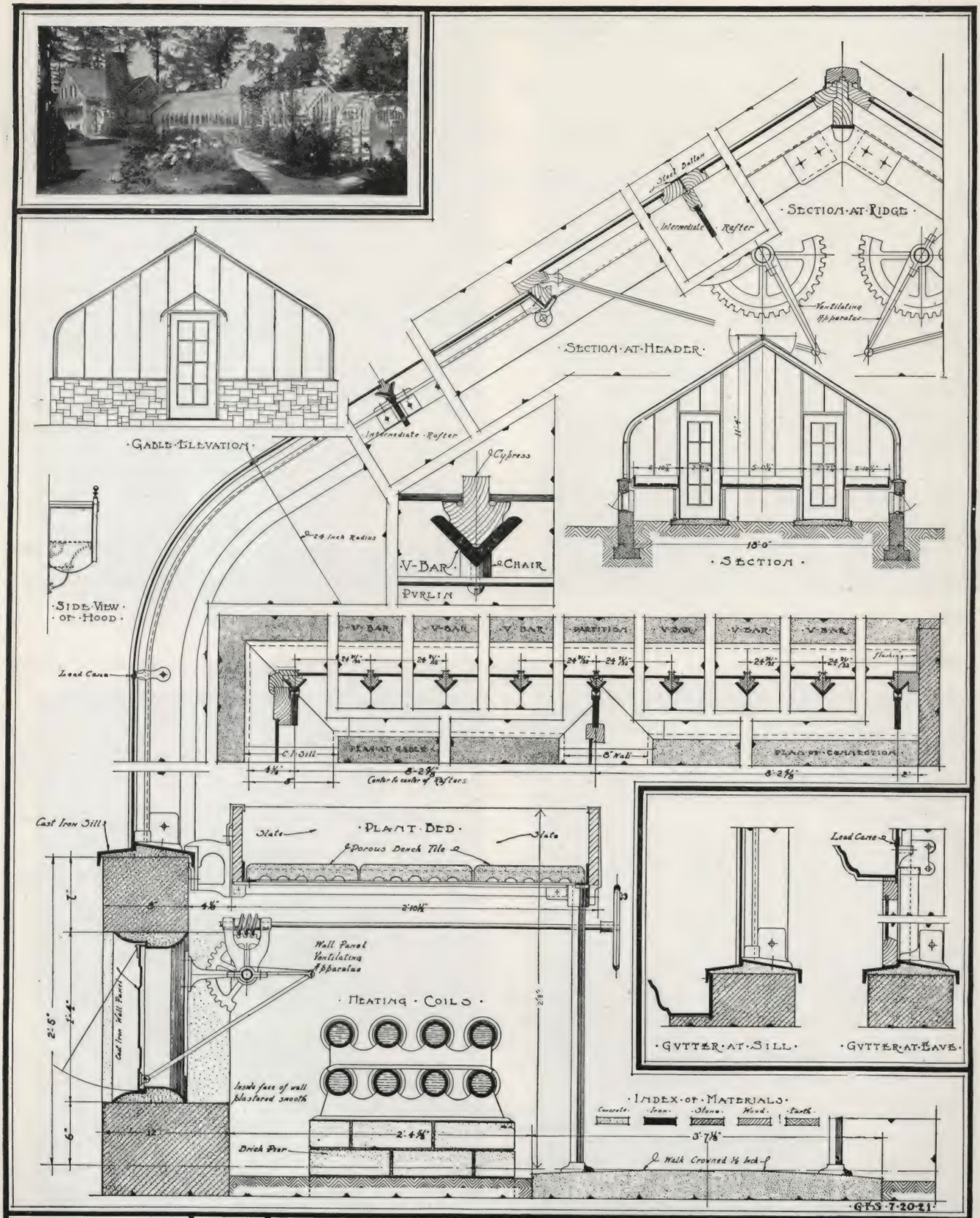
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A complete line of stucco ornaments and details made from exterior and interior composition and weatherproof materials, in all styles and sizes, is carried in stock.

The imitation wood composition is a perfect imitation of the natural wood, showing same grain as in wood, and makes a good substitute for hand carving.

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THE FISCHER & JIROUCH Co. is unrivaled in technical resources for high class decorative work; is equal to any demand, and is prepared to accept and promptly execute orders of any style and size.

The company can meet any competition where quality as well as price is considered.

Garden Furniture

From the modern tendencies in garden building, their enormous expansion in recent years, their relation to architecture, it follows that the essence of garden craft is to give the maximum of pleasure through the medium of beauty.

It is a pleasure to realize—and encouraging to anyone alive to the value of the fine arts and especially the fine art of gardening—that during the last generation, and more noticeably the last decade, there has been a very considerable garden awakening among the American people.

Although the palatial gardens of the Renaissance are too grand in scale for our average scheme, nevertheless they are full of suggestions in the way of vases and furniture and make us again turn to Italy, where we look for inspiration in this, as in other arts.

Ancient Ware

For the *garden, conservatory* or *hall*—archaic, yet new, novel and artistic.

This company's ancient ware is illuminated with burned clay Unitiles, old handmade mosiacs, of which the soft and delicate blending tints produce all the beauty of hoary age. Designed at the tuileries, burned and assembled to their right color and assembled in this studio by skilled artisans of art stone and caen stone cement.

In quaint design and charm they are adaptable to cottage or mansion or wherever an artistic effect is desired.

Garden Gates, Rose Arbors, Pergolas, Trellises and Fences

In conjunction with the ancient ware and art stone, is a line of wood garden furniture, artistic, durable, and comfortable, and built for service.

Sketches will be furnished for special designs of architects or others.

Motors and Pumps

The company can furnish, for fountains, a motor and pump that do away with piping for inlet and outlet, the pump keeping water in circulation at a uniform pressure, and the saving on water bill will pay for pump and motor in the first six months; and, furthermore, fountain can be set anywhere desired, as piping need not be considered.

Co-operative Service

Architects and others will be furnished at any time with estimates or any other information they desire, and to that end correspondence is invited.

Catalogues

Careful study has been taken, and neither expense nor sacrifice has been spared to make attractive catalogues, interesting as well as instructive to architects and others.

A general catalogue is issued on Decorative Ornament; a catalogue on Garden Furniture in Wood and Art Stone; a catalogue on Period Mantels in Wood and Art Stone; and a catalogue on Lighting Fixtures.

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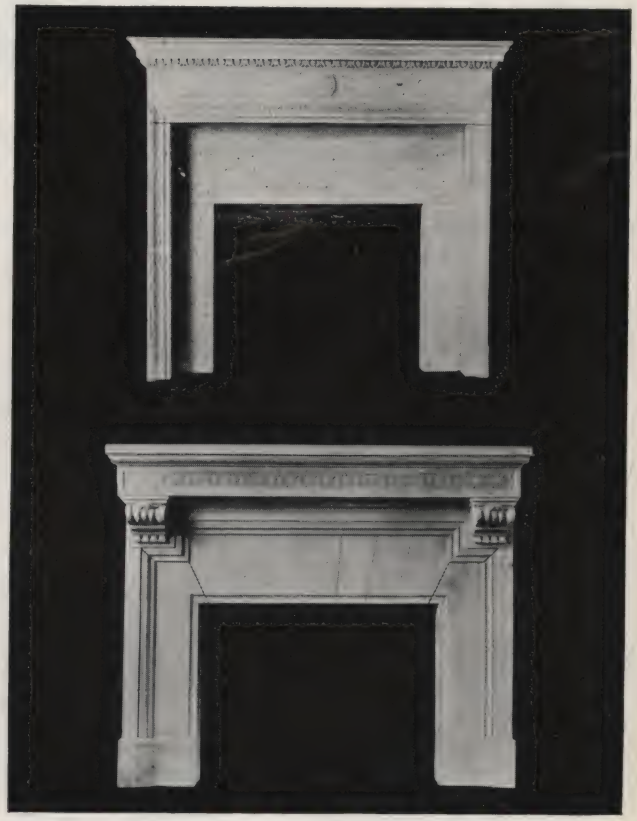

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The Organization

THE F. W. DODGE COMPANY, with its various subsidiary publications, is an organization for information service that operates as a unique co-ordinating factor among the many diverse interests which make up the construction industry.

The activities of this company which are of particular interest to the architectural profession are briefly presented here.

Sweet's Architectural Catalogue

Seventeen years of development in the technique of catalogue production have resulted in a work which needs no introduction to the architectural profession.

These seventeen years have been spent in a constant effort to produce, for the manufacturers whose products are described in the book, a catalogue service of the highest efficiency for architects, specification writers, draughtsmen, and others who select materials, equipment, and accessories entering into building construction.

A little time spent by the users of the book in careful investigation of its contents will be amply repaid in the discovery that the catalogue is much more than a directory of manufacturers' names and products, but is a comprehensive collection of detailed data of the utmost usefulness to the designer and specification writer. The catalogue, properly employed, will demonstrate its usefulness every day in the year.

Architects are urged to write to us their suggestions and criticisms of the book. When a certain manufacturer's presentation of his products seems inadequate, the architect is requested to write to the manufacturer or to us about it. When he desires information about some product not presented in "Sweet's," he is requested to write us in order that we may secure the information for him and possibly secure representation of the product in the next edition of the catalogue.

TRADE-MARK

The Architectural Record

Established in 1891, the sole function of The Architectural Record for thirty-one years has been to supply the architect each month with worth-while information relating to his profession.

Editorially, it concentrates upon a subject of universal interest—the art of design. Articles and illustrations are selected with a view to their news value as exemplifying some advance or development in the art. Recent original studies in plan and design have discussed Workingmen's Homes, Industrial Plants, Churches, Country Houses, War Memorials, and Apartments.

In its advertising section, The Architectural Record furnishes the architect with an immense amount of timely, practical information regarding new and standard materials and equipment.

Manufacturers have come to realize the importance of unifying their messages to architects by presenting a complete and coherent story of their products or services to the profession. Frequently their advertising in The Architectural Record is employed not merely to furnish timely news or to point out the specific advantages of their products, but is so tied up with the more detailed specification data in "Sweet's" as to enable the architect to realize more completely the exact adaptability of the articles described, and thus keep pace with technical progress in the field of construction.

Continued on next page

Dodge Report Service

Dodge Report Service, established 1892, was organized to meet a legitimate demand for news of construction activity.

Contractors, manufacturers of and dealers in construction materials, equipment and supplies, and all others whose business is connected with construction activity, desire information regarding individual projects, and news regarding the progress of those projects. Their information needs are met through Dodge Report Service.

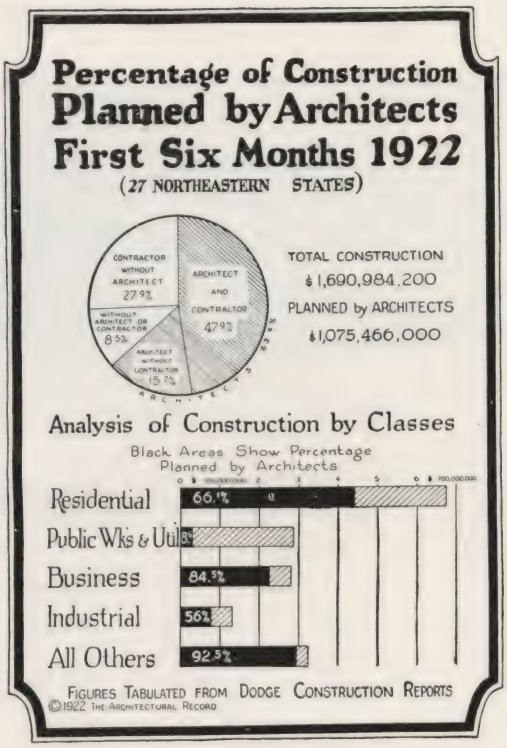
The business world in general desires information regarding the progress of construction activity as a whole, just as it requires definite information regarding other basic industries. This need is met through the compilation, in our Statistical Department, of comprehensive and authoritative detailed statistics concerning building activity in the twenty-seven states now covered by Dodge Report Service. Statistical information thus compiled is furnished to various departments of the United States Government, the Federal Reserve Board and other public bodies, the banks, daily papers, trade papers, and to other firms and individuals who are interested in the statistical record of construction activity.

This information is disseminated principally through the publication of monthly reviews of activity and the distribution of a monthly statistical pamphlet which is sent free on request.

The benefits to the architectural profession of co-operating with this company in giving complete information to the Dodge reporter, although mainly indirect, are real. In the first place, there is the convenience of giving out news to one established, centralized agency instead of to many callers; second, the convenience of notifying manufacturers' representatives and others through this company of the right time to call on the architect; third, the value of the tabulated information which is used to promote the general welfare of the construction industry, in which the architect is one of the important factors.

The chart shown on this page is an illustration of one of the many uses to which this information is put. Based on figures tabulated from many thousands of Dodge Construction Reports, it pictures the importance of the architectural profession as a business factor in the construction field.

This type of information enables us to secure from the manufacturers of all those products that enter into the modern building an ever-increasing measure of co-operation in making Sweet's Architectural Catalogue and The Architectural Record more and more valuable to the profession.



American Contractor

The American Contractor was established more than forty years ago as a paper of information for contractors.

It gives each week a review and analysis of current affairs in building lines throughout the country, with an interpretation of general activities as they affect construction interests, in a digested form not elsewhere obtainable. It also gives weekly tables of material prices, monthly wage scales of building labor, and special articles of high value.

An important feature is the building news section, giving reports on construction projects throughout the country, telling about jobs contemplated, bids wanted, and contracts awarded.

Sweet's Engineering Catalogue of Industrial and Power Plant Materials and Equipment

This catalogue, compiled and distributed according to the same general plan which is followed with Sweet's Architectural Catalogue, describes the products of approximately seven hundred manufacturers of materials, equipment and supplies relating to the practical construction, equipment and maintenance of industrial and power plants.

Our aim in compiling these catalogues has been to make them as comprehensive as possible. They have to a large extent replaced the bulky and disorderly catalogue files of other days. The user of "Sweet's" may now obtain from one volume the specific and comparative information necessary for intelligent purchasing.

The Real Estate Record and Guide

This weekly real estate and building publication for Greater New York, now in its fifty-third year, is the authoritative paper in its field.

Service

The services rendered by the Dodge Organization are substantially described in the above paragraphs. Thirty years of continuous effort have made this company the headquarters for information regarding the construction industry.

Architects and manufacturers are invited to write us for information regarding construction activity, material prices, wage scales in the building trades, materials and manufacturers of materials used in construction. Our best effort will be made to answer such inquiries with such information as will assist in the solution of the problems that continually arise on the business side of the industry.

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